

A Seq24 User Manual

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Contents

1	Introduction	3
1.1	Seq24: What and Why?	4
1.2	Document Structure	4
1.3	Let's Get Started!	5
2	Concepts	5
2.1	Concepts / Terms	6
2.1.1	Concepts / Terms / armed	6
2.1.2	Concepts / Terms / buss (bus)	6
2.1.3	Concepts / Terms / group	6
2.1.4	Concepts / Terms / loop	6
2.1.5	Concepts / Terms / measures ruler	6
2.1.6	Concepts / Terms / MIDI clock	6
2.1.7	Concepts / Terms / pattern	7
2.1.8	Concepts / Terms / performance	7
2.1.9	Concepts / Terms / queue mode	7
2.1.10	Concepts / Terms / screen set	7
2.1.11	Concepts / Terms / sequence	7
2.1.12	Concepts / Terms / snapshot	7
2.1.13	Concepts / Terms / song	7
3	Menu	7
3.1	Menu / File	8
3.2	Menu / File / New	8
3.2.1	Menu / File / Open	8
3.2.2	Menu / File / Save and Save As	9
3.2.3	Menu / File / Import	10
3.2.4	Menu / File / Options	12
3.2.4.1	Menu / File / Options / MIDI Clock	12
3.2.4.2	Menu / File / Options / MIDI Input	14
3.2.4.3	Menu / File / Options / Keyboard	14
3.2.4.4	Menu / File / Options / Mouse	16
3.2.4.5	Menu / File / Options / Jack Sync	17
3.3	Menu / View	18
3.4	Menu / Help About...	18

4 Patterns Panel	19
4.1 Patterns / Top Panel	20
4.2 Patterns / Main Panel	20
4.2.1 Pattern Slot	21
4.2.2 Pattern	21
4.2.3 Pattern Keys and Click	24
4.2.3.1 Pattern Keys	24
4.2.3.2 Pattern Clicks	25
4.3 Patterns / Bottom Panel	25
5 Pattern Editor	26
5.1 Pattern Editor / First Panel	27
5.2 Pattern Editor / Second Panel	27
5.3 Pattern Editor / Piano Roll	32
5.3.1 Pattern Editor / Piano Roll Items	33
5.3.2 Pattern Editor / Event Editing	33
5.3.2.1 Editing Note Events	34
5.3.2.2 Editing Other Events	36
5.4 Pattern Editor / Bottom Panel	36
6 Song Editor	38
6.1 Song Editor / Top Panel	38
6.2 Song Editor / Arrangement Panel	40
6.2.1 Song Editor / Arrangement Panel / Patterns Column	41
6.2.2 Song Editor / Arrangement Panel / Piano Roll	42
6.2.3 Song Editor / Arrangement Panel / Measures Ruler	43
7 Seq24rc Configuration File	43
7.1 Seq24rc / MIDI Control Section	43
7.1.1 Seq24rc / MIDI Control Pattern Group	45
7.1.2 Seq24rc / MIDI Control Mute In Group	46
7.1.3 Seq24rc MIDI Control Automation Group	46
7.2 Seq24rc / Mute-Group Section	47
7.3 Seq24rc / MIDI-Clock Section	47
7.4 Seq24rc / Keyboard Control Section	48
7.5 Seq24rc / Keyboard Group Section	48
7.6 Seq24rc / JACK Transport	50
7.7 Seq24rc / Other Sections	50
8 Seq24usr Configuration File	51
8.1 Seq24usr / MIDI Bus Definitions	52
8.2 Seq24usr / MIDI Instrument Definitions	53
9 Seq24 Man Page	54
10 Summary	56
11 References	56

List of Figures

1	Seq24 Main Screen	5
2	Seq24 File Menu Items	8
3	File Open	9
4	File Save As	10
5	File Import	11
6	Imported MIDI Song	12
7	File / Options / MIDI Clock	13
8	File / Options / MIDI Input (Condensed View)	14
9	File / Options / Keyboard	15
10	File / Options / Mouse (Condensed View)	16
11	File / Options / Jack Sync	17
12	Help About	18
13	Help Credits	19
14	Help Documentation	19
15	Patterns Panel, Top Panel Items	20
16	Patterns Panel, Main Panel Items	21
17	Empty Pattern, Right-Click Menu	21
18	Existing Pattern, Right-Click Menu	22
19	Existing Pattern, Right-Click Menu, Song	23
20	Existing Pattern, Right-Click Menu, MIDI Output Busses	23
21	Existing Pattern, Right-Click Menu, MIDI Bus Ports	24
22	Patterns Panel, Bottom Panel Items	25
23	Pattern Edit Window	26
24	Pattern Editor, First Panel Items	27
25	Pattern Editor, Second Panel Items	28
26	Tools, Context Menu	28
27	Tools, Transpose Selected Values	29
28	Tools, Two "Transpose" Menus	30
29	Tools, Harmonic Transpose Selected Values	30
30	C Major Scale Masking	31
31	Sample Background Sequence Values	31
32	Background Sequence Notes	32
33	Pattern Editor, Piano Roll Items	33
34	Piano Roll, Selected Notes and Events	35
35	Pattern Editor, Bottom Panel Items	36
36	Pattern Editor, Event Button Context Menu	37
37	Pattern Recording Volume Menu	38
38	Song Editor Window	38
39	Song Editor / Top Panel Items	39
40	Song Editor Arrangement Panel, Annotated	41

1 Introduction

This document describes how to use Seq24 [7], through version 0.9.2, dated approximately to 2010.

`Sq24` is a live-looping sequencer with an interface more like a hardware sequencer than the typical software MIDI sequencer. The contents of this document are derived in part from existing documents, such as the `SEQ24` file shipped with the `Sq24` source code, and a printout from a long-lost wiki.

`Sq24` is not a synthesizer. One needs hardware synthesizer, or a software synthesizer such as Timidity [9], FluidSynth [3], ZynAddSubYX [16] and Yoshimi [12] [13], AmSynth [1], Bristol [2], and others (see [4] for a fairly comprehensive list of "Linux" synthesizers).

`Sq24` is meant to work a bit like an Alesis SR16 drum machine, which, for some, is a very intuitive and fast way to do MIDI. If one has worked with trackers like *SoundTracker* and *ShakeTracker*, then "you are a tracker guy and it gonna go fast". With `Sq24`, one creates several patterns, and then combines them.

There are a number of current authors of `Sq24` today, as one can see in figure 13 ("Help Credits") on page 19, and it figure 14 ("Help Documentation") on page 19. The original author is Rob C. Buse; where the word "I" occurs, that is probably him.

Now, unfortunately, `Sq24` is not currently under active development (2010 seems to be the last update). There are a number of half-hearted forks for it on *GitHub*, including some conversions to Java-based and browser-based code. One of the fork consists of some patches for LASH support, which should be incorporated at some point. `Sq24` could use a few more features, such as "infinite patterns" (i.e. tracks), better annunciation of mouse modes, ways to work around the need for two mice, a more up-to-date GUI, a few bug fixes, fix the formating of out rc files, and a way to edit parts of the MIDI file textually.

So, why would we bother with `Sq24`? The next section answers, in pretty much the original author's words.

1.1 Seq24: What and Why?

`Sq24` is a real-time MIDI sequencer. It was created to provide a very simple interface for editing and playing MIDI 'loops'. After searching for a software based sequencer that would provide the functionality needed for a live performance, there was little found in the software realm. I set out to create a very minimal sequencer that excludes the bloated features of the large software sequencers, and includes a small subset of features that I have found usable in performing.

Written by Rob C. Buse. I wrote this program to fill a hole. I figure it would be a waste if I was the only one using it. So, I released it under the GPL.

Taking advantage of Rob's migh morality, we've creating a continuation, minor fork, refactoring, fixing, improvements (we hope) of `Sq24` in a project called "Sequencer24" [8]. It preserves the lean nature of `Sq24`, and might even make it a bit leaner, while adding a few features we've found useful. Stay tuned for a project that documents "Sequencer24" and its new features.

1.2 Document Structure

The structure of this document is based on the user-interface of `Sq24`. The sections are basically provided in the order their contents appear in the user interface of `Sq24`. To help the reader jump around this document, multiple links and references are supplied.

Usage tips for each of the functions provided in `Sq24` are sprinkled throughout this document. Each tip occurs in a section beginning with "Tip:". Each tip is provided with an entry in the Index, under the main topic "tips".

Bug notes for some of the oddities found in *Sq24* are sprinkled throughout this document. Each bug occurs in a sentence beginning with "Bug:". Each bug is provided with an entry in the Index, under the main topic "bugs".

TODO items are also present, in the same vein. This document currently has a lot of them!

1.3 Let's Get Started!

Let us run *Sq24*, but run it without using *JACK*, which complicates the discussion of *Sq24*. The first thing to do is make sure one has no other sound application running (unless one wants to risk blocking *Sq24* or hearing two sounds simultaneously, depending on one's sound card and ALSA setup). Then start *Sq24* so that it uses ALSA for MIDI. Provide a default MIDI file so that all elements of the user interface can come into play. Also use the "&" character so that we get back to the command-line prompt.

```
$ seq24 click_4_4.midi &
```

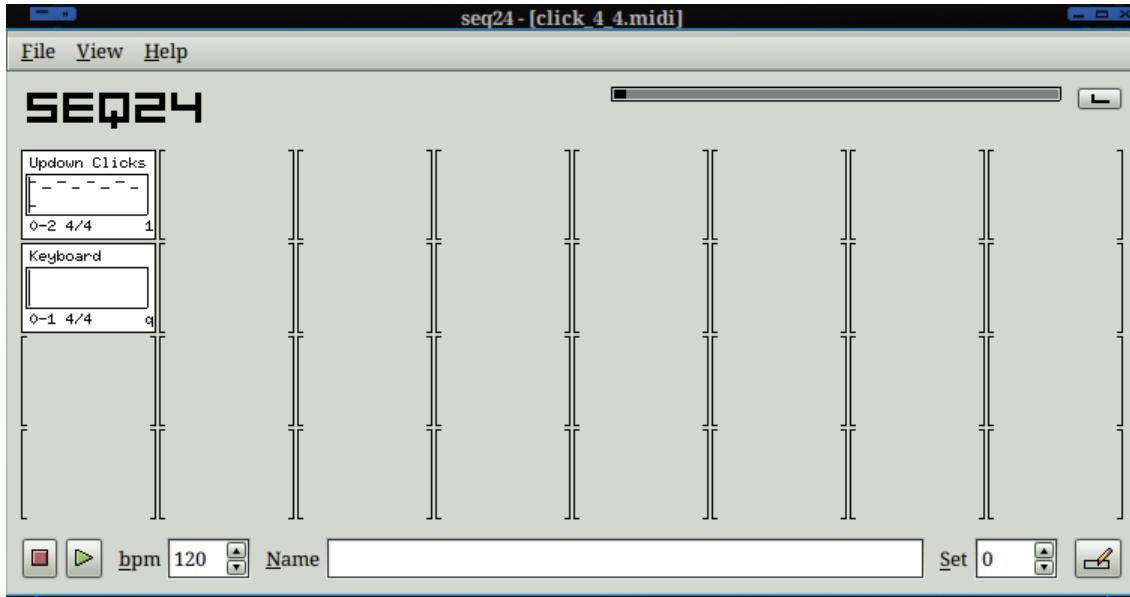


Figure 1: Seq24 Main Screen

Then the *Sq24* main window appears, as shown in figure 1 ("Seq24 Main Screen") on page 5.

As with most user-interfaces, holding the mouse over any button for a short period will let one view a short description (tooltip) of what it does.

The *Sq24* program is basically a loop playing machine with a simple interface. Before we describe this interface, it is useful to present some concepts.

2 Concepts

This section presents some useful concepts and definitions of terms as they are used in *Sq24*.

2.1 Concepts / Terms

This section doesn't provide comprehensive coverage of terms. It covers mainly terms that puzzled the author at first or that are necessary to understand the *Seq24* program.

2.1.1 Concepts / Terms / armed

An armed sequence is a sequence that will be heard. "Armed" is the opposite of "muted". Performing an *arm* operation in *Seq24* means clicking on an "unarmed" sequence in the patterns panel (the main window of *Seq24*). An unarmed sequence will not be heard, and it has a white background. When the sequence is *armed*, it will be heard, and it has a black background.

A sequence can be armed or unarmed in three ways:

- Clicking on the sequence/pattern box.
- Pressing the hot-key for that sequence/pattern box.
- Opening up the Song Editor and starting playback; the sequences arm/unarm depending on the layout of the sequences in the piano roll of the Song Editor.

2.1.2 Concepts / Terms / buss (bus)

A *buss* (also spelled "bus" these days) is an entity onto which MIDI events can be placed, in order to be heard or to affect the playback.

2.1.3 Concepts / Terms / group

A *group* in *Seq24* is one of up to 32 previously-defined mute/unmute patterns in the active screen set. A group is a set of patterns that can toggle their playing state together. Every group contains all 32 sequences in the active screen set. This concept is similar to mute/unmute groups in hardware sequencers.

2.1.4 Concepts / Terms / loop

Loop is a synonym for *pattern* or *sequence*, when used in existing *Seq24* documentation. Each loop is represented by a box in the Patterns window.

2.1.5 Concepts / Terms / measures ruler

The *measures ruler* is the bar at the top of the Song Editor arrangement window that shows the numbering of the measures in the song. Left and right markers can be dropped on this ruler to set durations to be played, looped, expanded, or collapsed.

Note: The original *Seq24* documentation calls this item the *bar indicator*.

2.1.6 Concepts / Terms / MIDI clock

MIDI clock is a MIDI timing reference signal used to synchronize pieces of equipment together. MIDI clock runs at a rate of 24 ppqn (pulses per quarter note). This means that the actual speed of the MIDI clock varies with the tempo of the clock generator (as contrasted with time code, which runs at a constant rate).

2.1.7 Concepts / Terms / pattern

A *Sq24 pattern* (also called a "sequence" or "loop") is a short unit of melody or rhythm in *Sq24*, extending for a small number of measures (in most cases). Each pattern is represented by a box in the Patterns window.

Each pattern is editable on its own. All patterns can be laid out in a particular arrangement to generate a more complex song.

pattern is a synonym for *loop* or *sequence*. It is our preferred term.

2.1.8 Concepts / Terms / performance

In the jargon of *Sq24*, a *performance* is an organized collection of patterns. This collection of patterns is created using the Song Editor.

2.1.9 Concepts / Terms / queue mode

TODO: We need to figure out what "queue" refers to in the documentation, what do the "temporary queue" and "permanent queue" are, and what the "keep queue" functionality is used for.

2.1.10 Concepts / Terms / screen set

The *screen set* is a set of patterns that fit within the 8x4 grid of loops/pattern in the Patterns panel. *Sq24* supports multiple screens sets, and a name can be given to each for clarity.

2.1.11 Concepts / Terms / sequence

Sequence seems to be another synonym for *pattern*, used in some of the *Sq24* documentation. *Loop* is another synonym. Each sequence is represented by a box in the Patterns window.

2.1.12 Concepts / Terms / snapshot

TODO: determine what exactly is a *Sq24 snapshot*.

2.1.13 Concepts / Terms / song

A *song* is a collection of patterns in a specific layout, as assembled via the Song Editor window.

3 Menu

The *Sq24* menu, as seen at the top of figure 1 ("Seq24 Main Screen") on page 5, is fairly simple, but it is important to understand the structure of the menu entries.

3.1 Menu / File

The **File** menu is used to save and load standard MIDI files. It should be able to handle any Format 1 standard files that any other sequencer is capable of exporting.

The *Sq24* menu entry contains the sub-items shown in figure 2 ("Seq24 File Menu Items") on page 8. The next few sub-sections discuss the sub-items in the *File* sub-menu.

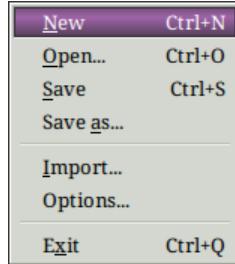


Figure 2: Seq24 File Menu Items

1. **New**
2. **Open...**
3. **Save**
4. **Save As...**
5. **Import...**
6. **Options...**
7. **Exit**

3.2 Menu / File / New

The **New** menu entry clears out any current song and patterns, allowing one to create new ones from scratch. If unsaved changes are pending, the user will be prompted to save the changes.

3.2.1 Menu / File / Open

The **Open** menu entry opens a song that had been saved previously. It opens up a standard GTK+ file dialog.

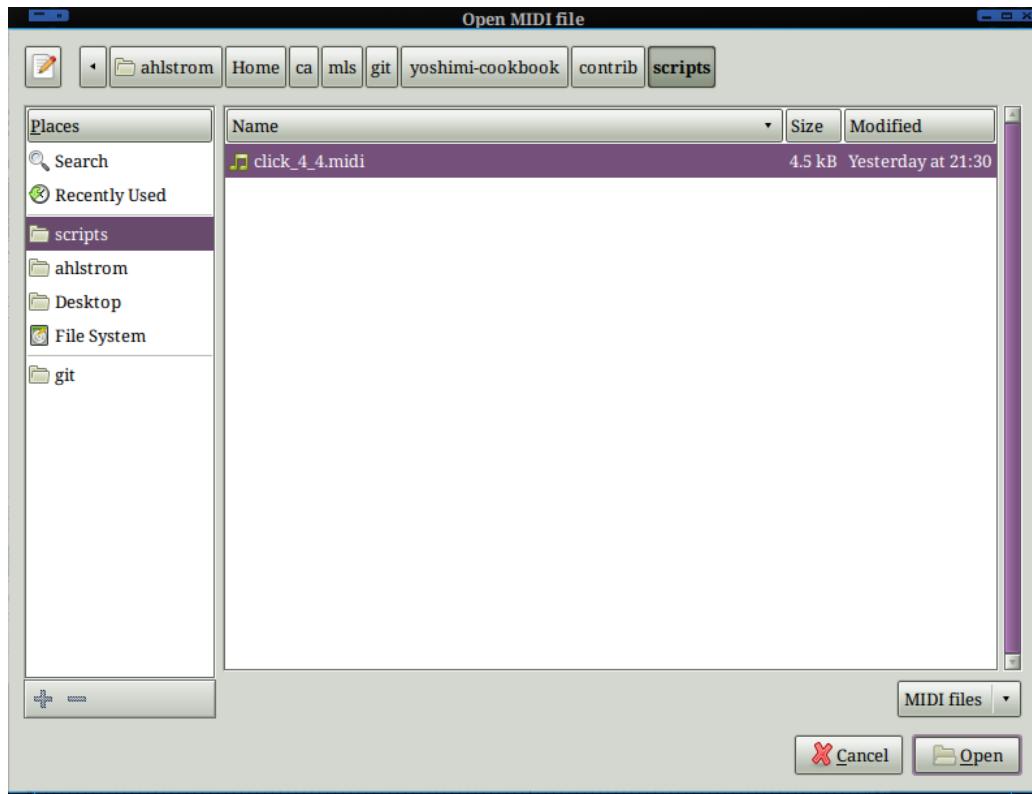


Figure 3: File Open

If unsaved changes are pending, the user will be prompted to save the changes.

3.2.2 Menu / File / Save and Save As

The **Save** menu entry saves the song under its current name. If there is no current name, then it opens up a standard GTK+ file dialog.

The **Save As** menu entry saves a song under a different name. It opens up the following standard GTK+ file dialog.

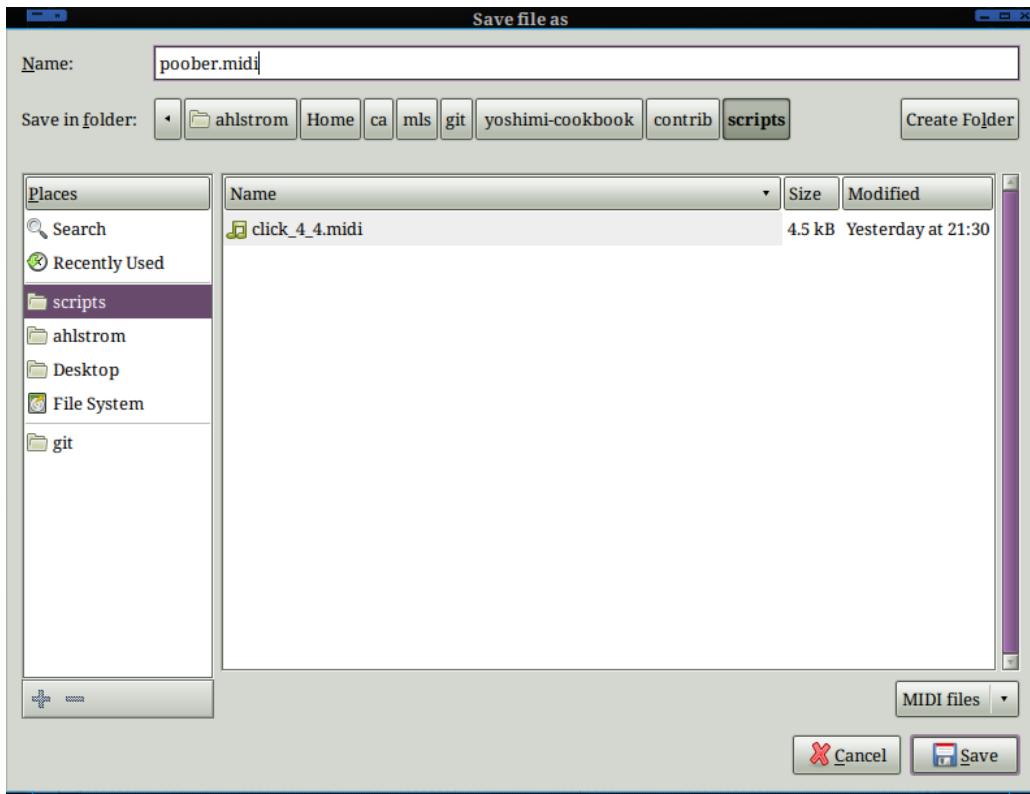


Figure 4: File Save As

To save a new file, or to save the current existing file to a new name, enter the name in the name field, *without an extension*. Seq24 will append a `.midi` extension to the filename.

The file will be saved in a format the Linux `file` command will tag as something like:

```
myfile.midi: Standard MIDI data (format 1) using 16 tracks at 1/192
```

It looks like a simple MIDI file, and yet, if one re-opens it in Seq24, one sees that all of the labelling, pattern information, and song layout has been preserved in this file. Even the pattern subsections, as discussed in section 6.2.2 (“Song Editor / Arrangement Panel / Piano Roll”) on page 42, have been saved. (But the L and R marker positions are not saved.)

Compare the sizes of the original project MIDI file, `contrib/b4uacuse.mid`, and the output MIDI file after Seq24 saved the patterns and the song layout we created, `contrib/b4uacuse-seq24.midi`. The latter is a lot bigger.

3.2.3 Menu / File / Import

The **Import** menu entry allows one to import a MIDI file into a pattern.

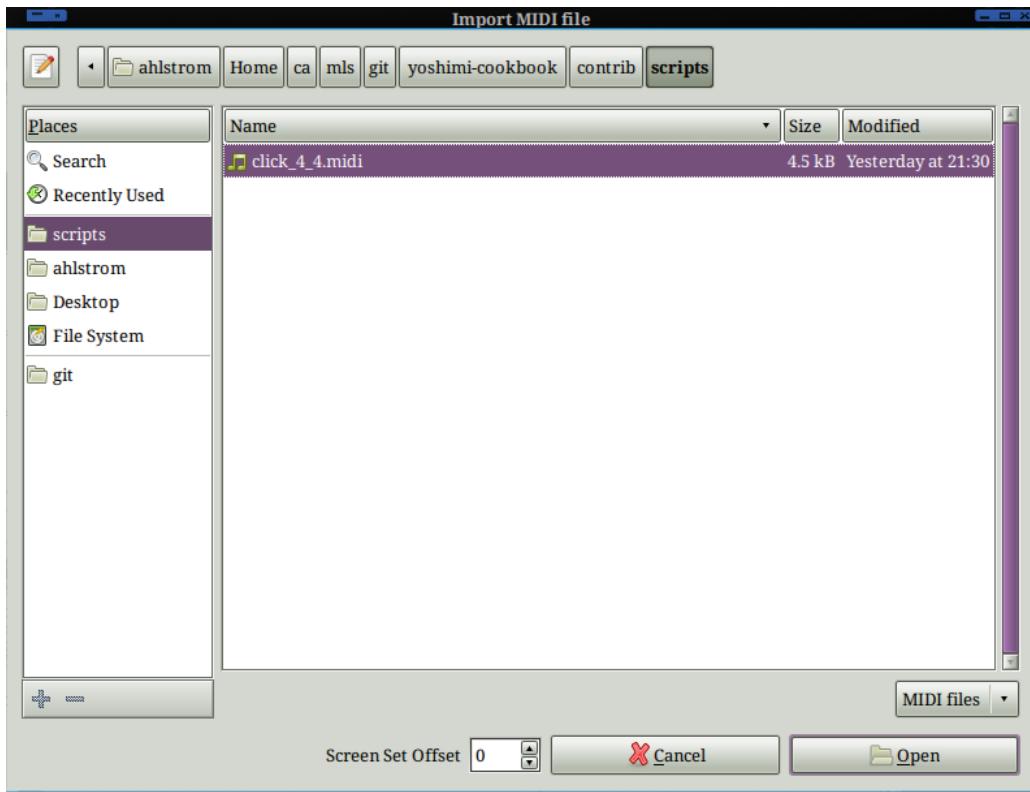


Figure 5: File Import

When imported, each track, whether a music track or an information track, is entered into its own loop/pattern box. The import operation can handle reasonably complex files, as shown in the following diagram, which shows an import of the `contrib/b4uacuse.mid` file, which contains a transcription of an Eric Clapton tune that we'd made over 20 years ago and had uploaded to the *GEnie* network service.

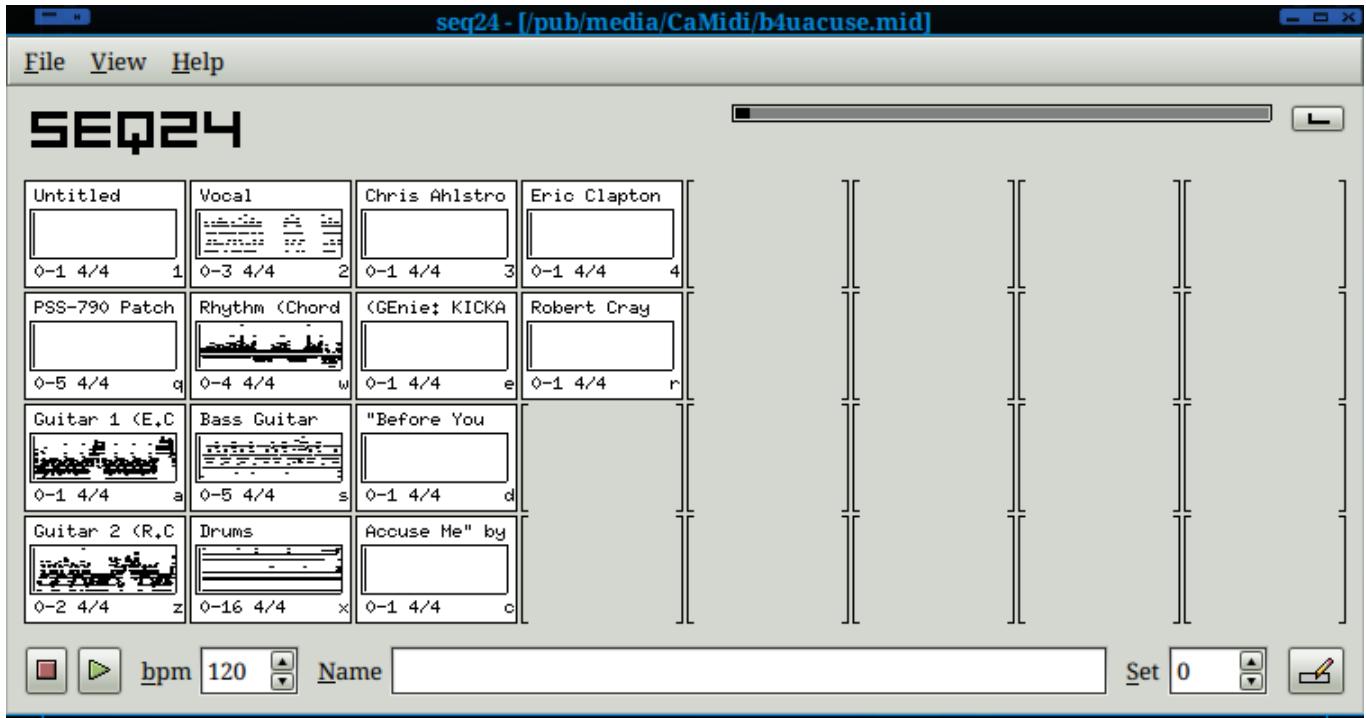


Figure 6: Imported MIDI Song

Unfortunately, this song was created before the days of General MIDI. It is scored for the Yamaha PSS-790 consumer-level synthesizer. One can use our MIDI-conversion project (see reference [6]) to convert it to General MIDI format, including General MIDI drums.

3.2.4 Menu / File / Options

The **Options** menu item provides a number of settings in one tabbed dialog, shown in the figure below. This dialog allows one to select which sequence gets the MIDI clock, which incoming MIDI events control the sequencer, what keys are mapped to functions, how the mouse works, and some JACK parameters.

3.2.4.1 Menu / File / Options / MIDI Clock

The **MIDI Clock** tab provides a way to send the MIDI clock to one or more of the Seq24 output busses. It is used to configure to what busses the MIDI clock gets dumped.

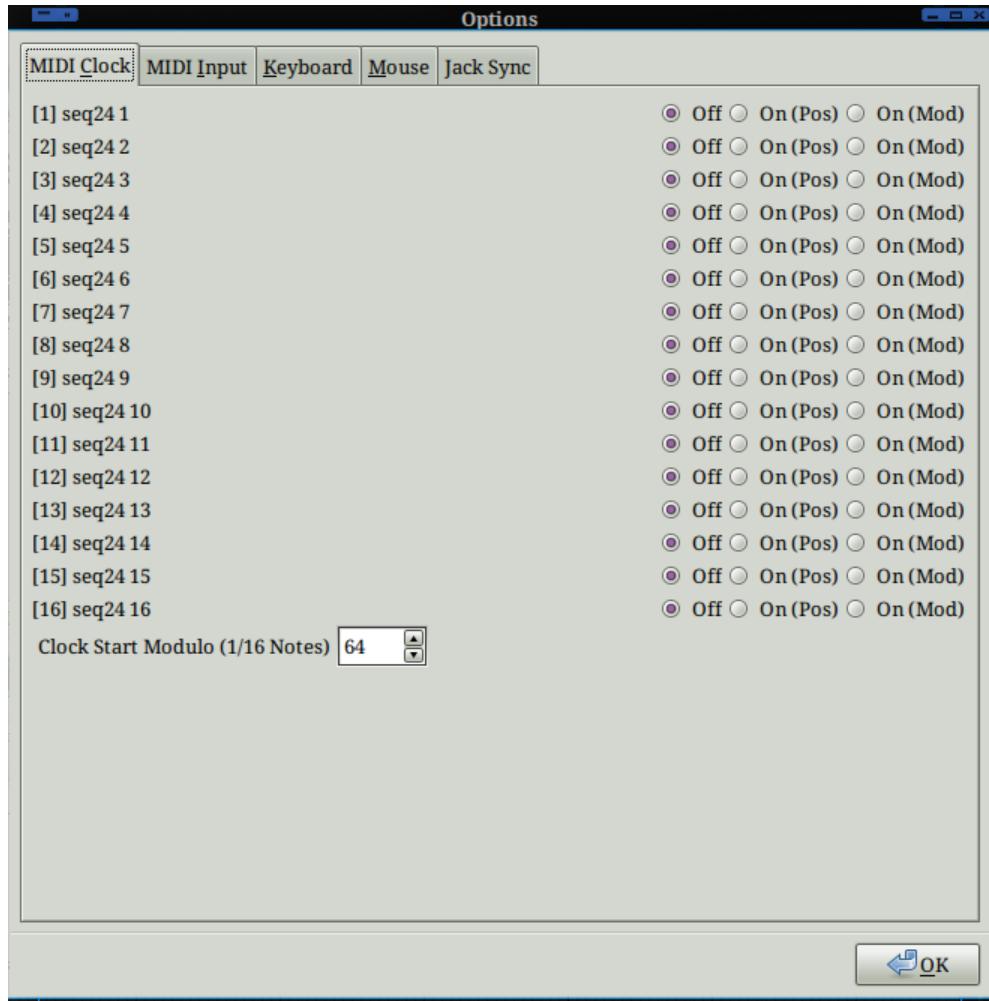


Figure 7: File / Options / MIDI Clock

The following elements are present in this dialog:

1. **Buss Name**
2. **Off**
3. **On (Pos)**
4. **On (Mod)**
5. **Clock Start Modulo**

1. Buss Name. These labels indicate the output busses of Seq24. They range from [1] seq24 1 to [16] seq24 16.

2. Off. This setting disables the MIDI clock for the given output buss.

3. On (Pos). The MIDI clock will be sent to this buss. MIDI Song Position and MIDI Continue will be sent if playback is starting at greater than tick 0 in Song mode. Otherwise, MIDI Start will be sent.

4. On (Mod). The MIDI clock will be sent to this buss. MIDI Start will be sent and clocking will begin once the Song Position has reached the start modulo of the specified size (see the next item's description). This setting is used for gear that does not respond to Song Position.

5. Clock Start Modulo. Clock Start Modulo (1/16 Notes). This value starts at 1 and ranges

on upward to 16384. It defaults to 64. It is used by the **On (Mod)** setting discussed above. It is the `[midi-clock-mod-ticks]` option in the *Seq24* "rc" file as described in section [7.7 \("Seq24rc / Other Sections"\)](#) on page [50](#).

3.2.4.2 Menu / File / Options / MIDI Input

The only item in the **MIDI Input** tab is the single MIDI input buss provided by *Seq24*: [0] **seq24 0**.

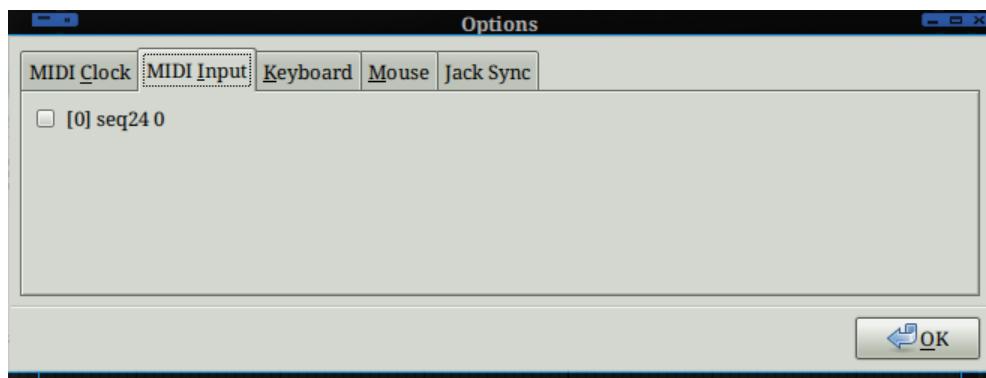


Figure 8: File / Options / MIDI Input (Condensed View)

This item, if checked allows *Seq24* to be used to record MIDI information from another source, or pass it through to the output busses that are configured to allow pass-through (in the Pattern Editor, as discussed in section [5.4 \("Pattern Editor / Bottom Panel"\)](#) on page [36](#).)

3.2.4.3 Menu / File / Options / Keyboard

Seq24, as befits a good application, allows extensive use of keyboard shortcuts to make operations go faster than when using a mouse. The **Keyboard** tab allows for the configuration of these keyboard shortcuts.

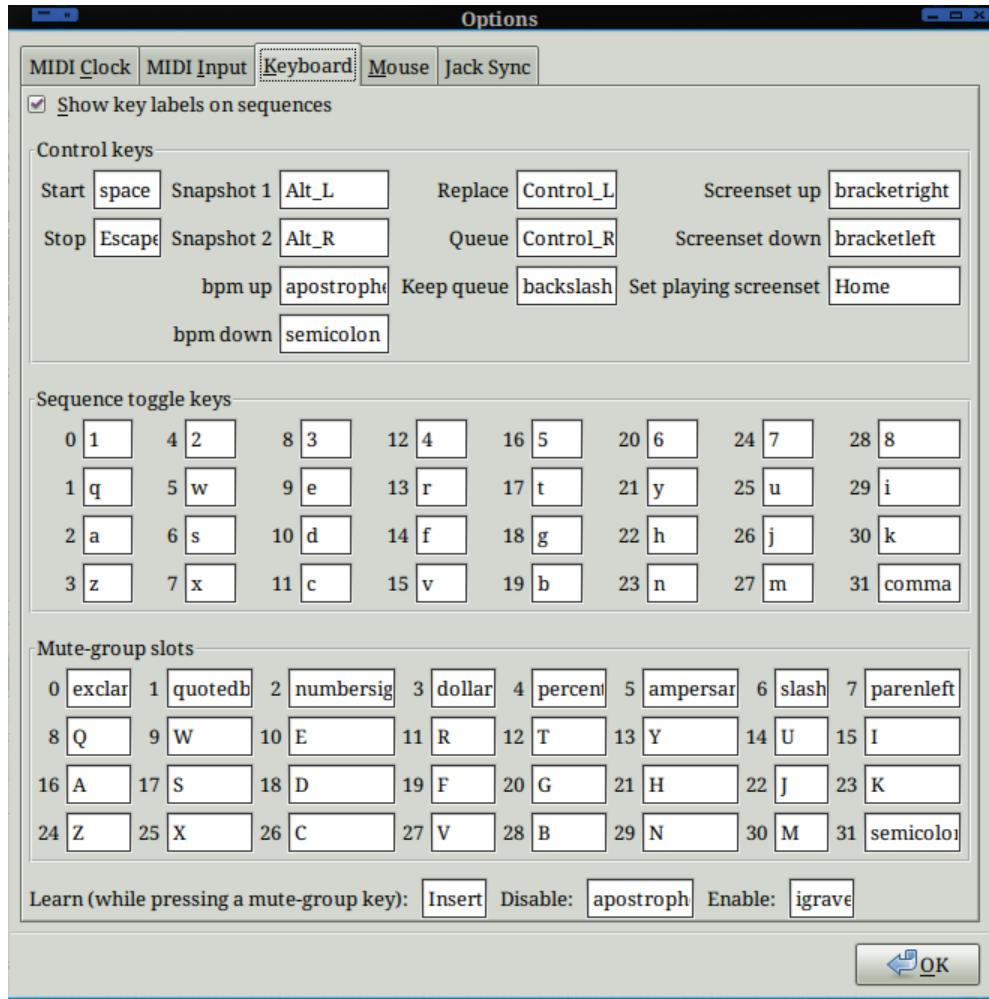


Figure 9: File / Options / Keyboard

We won't attempt to cover every user-interface item in this busy dialog, just the categories.

1. Show key labels on sequences
2. Control keys
3. Sequence toggle keys
4. Mute-group slots
5. Learn
6. Disable
7. Enable

1. Show key labels on sequence. This item, if enabled, shows the key labels in the lower-right corner of each loop/pattern in the Patterns window.

2. Control keys. This block of fields provides shortcut keys for many operations of Seq24.

1. Start. Key: space.
2. Stop. Key: Escape.
3. Snapshot 1. Key: Alt_L.
4. Snapshot 2. Key: Alt_R.
5. bpm up. Key: apostrophe.

6. **bpm down.** Key: **semicolon.**
7. **Replace.** Key: **Control_L.**
8. **Queue.** Key: **Control_R.**
9. **Keep queue.** Key: **backslash.**
10. **Screenset down.** Key: **bracketleft.**
11. **Screenset up.** Key: **bracketright.**
12. **Set playing screenset.** Key: **Home.**

Note that some of the keys have positional mnemonic value. For example, for BPM control, the semicolon is at the left (down), and the apostrophe is at the right (up).

Also note that the keys definable in this tab are only a subset of the various keys that can be used, especially keys used with the **Ctrl** key.

TODO: One thing we need to figure out is just what this "snapshot" feature provides. Another thing is the "queue" and "keep queue" features.

3. Sequence toggle keys. Each of these keys toggles the playing/muting of one of the 32 loop/pattern boxes. These keys are layed out logically on the keyboard, and can also be shown in each loop/pattern box. No need to list them all here!

4. Mute-group slots. Each of these keys operates on the mute-grouping of one of the 32 loop/pattern boxes. These keys are layed out logically on the keyboard, and can also be shown in each loop/pattern box. No need to list them all here!

TODO: One thing we need to discover is just what this mute-grouping means functionally.

5. Learn. Learn (while pressing a mute-group key). This items sets the key used to initiate a learn mode. It is the **Insert** key by default.

6. Disable. TODO: What gets disabled? It is the **apostrophe** key by default.

7. Enable. TODO: What gets enabled? It is the **igrave** (back-tick) key by default.

There is much to learn about this learn/enable/disable triad!

3.2.4.4 Menu / File / Options / Mouse

This item selects the mouse-interaction method.

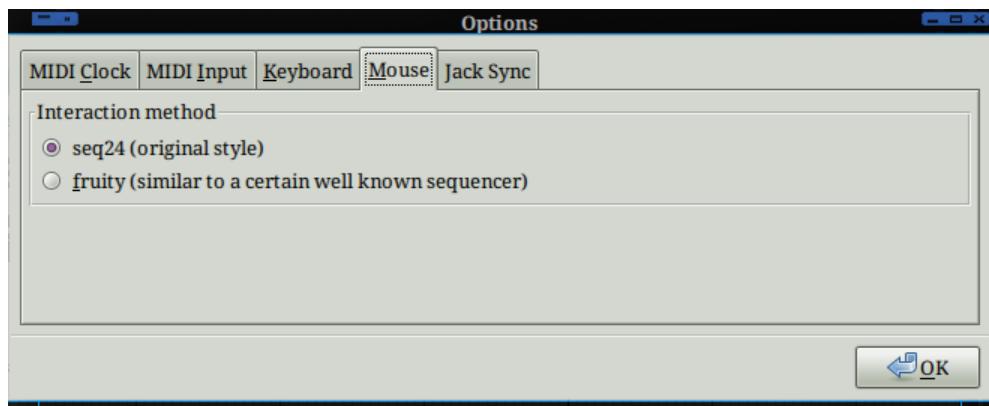


Figure 10: File / Options / Mouse (Condensed View)

The default method is **seq24 (original style)**. The alternate method is **fruity (similar to a certain well known sequencer)**.

The alternate method is presumably that of the *Fruity Loops* (now *FL Studio*) sequencer. The fruity mode seems to involve the following (based on scanning the source code):

- **Left-click left side.** Begin a grow/shrink operation for the left side.
- **Left-click right side.** Begin a grow/shrink operation for the right side.
- **Left-click middle.** Move the object.
- **Left-click.** Add an event if nothing selected.
- **Middle-click.** Split the note?

3.2.4.5 Menu / File / Options / Jack Sync

This tab sets up options for JACK synchronization.



Figure 11: File / Options / Jack Sync

1. **Transport**
2. **Jack start mode**

3. **Connect**
4. **Disconnect**

1. Transport. This items collects the following settings:

- **Jack Transport.** Enables synchronization with JACK Transport.
- **Transport Master.** Seq24 will attempt to serve as the JACK Master.
- **Master Conditional.** Seq24 will fail to serve as the JACK Master if there is already a Master set.

2. Transport. This items collects the following settings:

- **Live Mode.** Playback will be in live mode. Use this option to allow muting and unmuting of patterns.
- **Song Mode.** Playback will use only the Song Editor's data.

3. Connect. Connect to JACK Sync.

4. Disconnect. Disconnect from JACK Sync.

3.3 Menu / View

This menu item has only one entry, **Song Editor**, which is already covered by a button at the bottom of the Patterns window. Selecting this item bring up the Song Editor window. See figure 38 ("Song Editor Window") on page 38

3.4 Menu / Help About...

This menu entry shows the "About" dialog.



Figure 12: Help About

That dialog provides access to the credits for the program, including the authors and the project documentor.

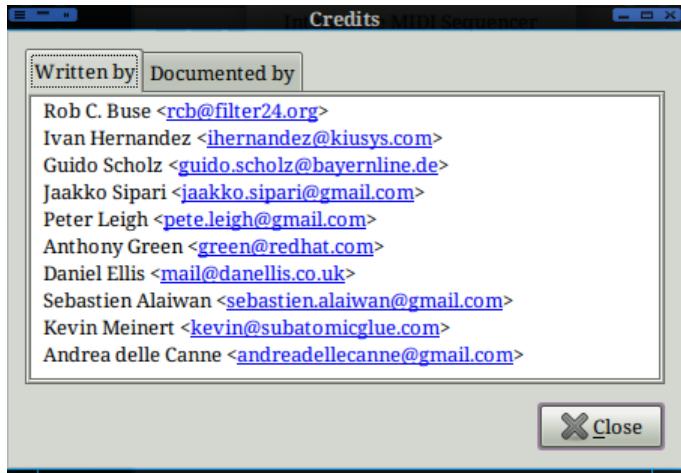


Figure 13: Help Credits

Shows who has worked on the program, with the original author at the top of the list.

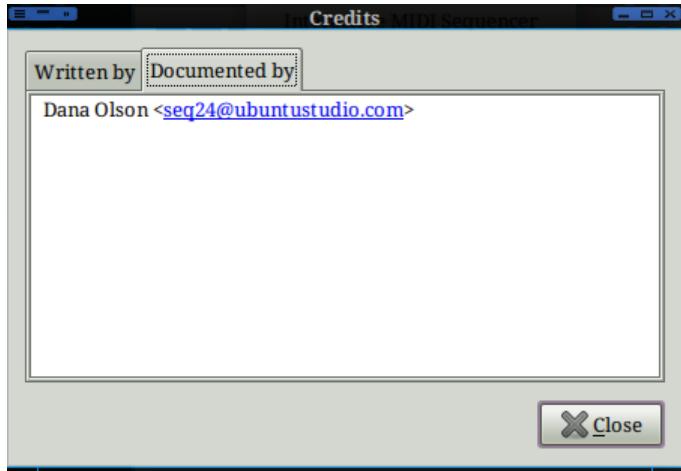


Figure 14: Help Documentation

Shows who has documented this project. Say, maybe "we" can get "our" name there someday! :-)

4 Patterns Panel

Seq24 works with the idea of patterns (loops) that are repeated all along a song. One composes and edits small patterns, and combines them to create a full song. This is a powerful way to work, and makes one productive within an hour.

The *Seq24 Patterns Panel* is the main window of *Seq24*. See figure 1 ("Seq24 Main Screen") on page 5. It is also called the "main window" or the "patterns window". It is here one manages a set of patterns (see section 2.1.10 ("Concepts / Terms / screen set") on page 7), manages the configuration, and opens the pattern or song editors.

For exposition, we break it into a top panel, a pattern panel, and a bottom panel. Note that the *Seq24* main menu is discussed in section 3 ("Menu") on page 7.

4.1 Patterns / Top Panel

The top panel of the Pattern window is simple, consisting of the name of the program and a couple of controls.

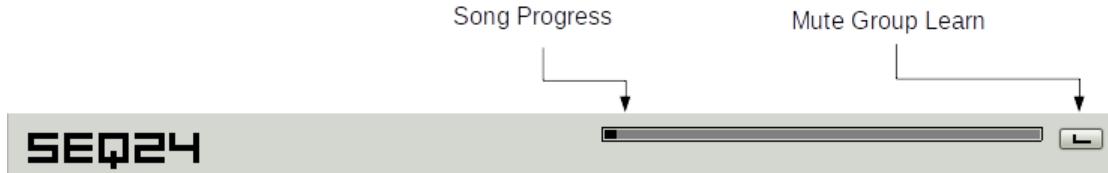


Figure 15: Patterns Panel, Top Panel Items

1. **Song Progress**
2. **Mute Group Learn**

1. Song Progress. The **Song Progress** bar is also known as the "main time" bar. This bar shows a number of small black cursors ("pills") that show the progress of the song through the various patterns. For short patterns, the progress is fast. For patterns that last longer, the progress is slow. This field shows that something is going on. It can also indicate the relative lengths of the various patterns.

Note that the individual pattern boxes in the main panel have their own moving progress cursor, a tall thin line in each box. Unfortunately, this bar moves along even in patterns that have no events, only meta items such as the track name.

2. Mute Group Learn. This button is also known as the "L" button. Click this button, and then press a mute-group key to store the mute-state of the patterns in that key.

See the **File / Options / Keyboard** menu entry to bring up the dialog showing the available mute-group keys and the corresponding hot-key for the "L" button.

One can toggle the playing status of up to 32 previously defined mute/unmute patterns (groups) in the active screen set, similar to hardware sequencers. This toggling is done either by one of the *group toggle* keys or by a MIDI controller, both assigned in the `/.seq24rc` file. A mute/unmute pattern (group) is stored by holding a *group learn* key (**Insert** by default) while pressing the corresponding *group toggle* key. There are also keys assigned to turn on/off the group functionality.

4.2 Patterns / Main Panel

The main panel of the Patterns window provides a grid of empty boxes, each box delimited by brace-like lines at left and right. Each filled box represents a loop or pattern. One sees only 32 loops at a time in the main panel (but more 32 loops can be supported by Seq24. This group of 32 loops is called a "screen set", as discussed in section 2.1.10 ("Concepts / Terms / screen set") on page 7. One can switch between sets by using the [and] keys on the keyboard, or by using the spin-widget-driven, labelled **Set** interface item. There are a total of 32 sets, for a total of 1024 loops/patterns.

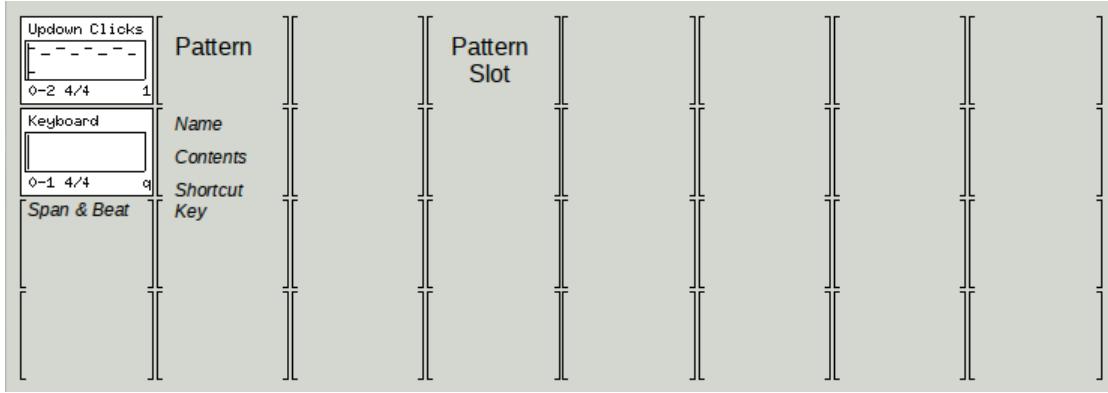


Figure 16: Patterns Panel, Main Panel Items

1. **Pattern Slot**
2. **Pattern**

4.2.1 Pattern Slot

An empty box is a slot for a pattern. By right-clicking on an empty box one brings up a menu to create a new loop, as well as some other operations:



Figure 17: Empty Pattern, Right-Click Menu

1. **New**
2. **Paste**
3. **Song / Mute All Tracks**

1. New. Creates a new loop or pattern. Clicking this menu entry fills in the empty box with an untitled pattern, and brings up the Pattern Editor so that one can fill in the new pattern.

2. Paste. Pastes a loop or pattern that was previously copied.

3. Song / Mute All Tracks. This item is the one item in the **Song** context menu; it mutes all tracks (or loops/patterns). (We are not clear on exactly what it does. There is no change in visible status of any of the patterns in the patterns-panel.)

4.2.2 Pattern

A filled pattern slot is referred to informally as a pattern. A pattern is shown in the Pattern windows as a filled box with the following items of information in it:

- **Name.** This line contains the name or title of the pattern, to help reference it when juggling a number of patterns.

- **Contents.** The contents of the pattern provide a fairly detailed and distinguishable representation of the notes or events in the pattern. Also, when the song is playing, a vertical bar cursor tracks the position of the playback of the pattern or loop; it returns to the beginning of the box every time that pattern starts over again. **Bug:** However, an imported empty pattern will still (needlessly) scroll; perhaps such patterns can be marked as inactive.
- **Bus-Channel.** This pair of numbers shows the the MIDI buss number, a dash, and the MIDI channel number. For example, "0-2" means MIDI buss 0, channel 2.
- **Beat.** This pair of numbers is the standard time-signature of the pattern, such as "4/4" or "3/4". The first number is the beats-per-measure, and the second is the size of the beat, here, a quarter note.
- **Shortcut Key.** If the display of shortcut keys is enabled (see section [3.2.4.3 \("Menu / File / Options / Keyboard"\)](#) on page [14](#)), then the key noted in the lower-right corner of the pattern can be pressed to toggle the mute/unmute status of that pattern. This action is an alternative to left-clicking on the pattern.
- **Progress Cursor.** At the left of each box is a vertical line, waiting for playback to start so that it can move through the pattern, again and again.

Left-clicking on an filled pattern box will toggle the status of the pattern between muted (white background) and unmuted (black background). If the song is playing via the main window, toggling this status makes the pattern stop playing or start playing. Note that the armed status can also be toggled using hot-keys.

Also note that the pattern boxes will toggle between the muted/unmuted states as the music plays, and the pattern is active or inactive at the point of playback, if the Song Editor is the active window and was used to start the playback.

By right-clicking on an already-filled box, one brings up a menu to allow one to edit a existing one, or perform a few other actions specified in the context menu. Here is that menu:

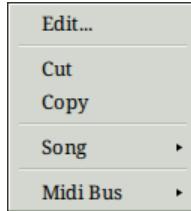


Figure 18: Existing Pattern, Right-Click Menu

Here one can choose to edit the pattern, cut and copy the pattern, set the MIDI bus/channel, and more. One can also clear all performance data for the pattern.

1. **Edit...**
2. **Cut**
3. **Copy**
4. **Song/**
5. **Midi Bus/**

1. Edit. Edits an existing loop or pattern. Clicking this menu entry brings up the Pattern Editor so that one can modify the existing pattern. See [figure 23 \("Pattern Edit Window"\)](#) on page [26](#).

2. Cut. Deletes and copies an existing loop or pattern.

Bug: This operation seems to have no effect. The loop or pattern remains in place.

3. Copy. Copies an existing loop or pattern. The pattern can then be pasted elsewhere in the Patterns panel. See section 4.2.1 (“Pattern Slot”) on page 21.

4. Song. Clicking this menu entry brings up a small popup menu:

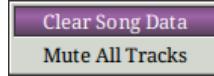


Figure 19: Existing Pattern, Right-Click Menu, Song

1. **Clear Song Data**
2. **Mute All Tracks**

1. Clear Song Data. Selecting this filled-box right-click menu item causes that box’s loop/pattern to be removed from the song. This means that it disappears from the Song Editor window, and so will not be played when the song plays.

2. Mute All Tracks. Selecting this filled-box right-click menu item causes... TODO. Cannot yet see that this does anything, NEEDS EXPERIMENTATION.

3. Midi Bus. Selecting this filled-box right-click menu item brings up a list of the 16 MIDI output busses that Seq24 supports:

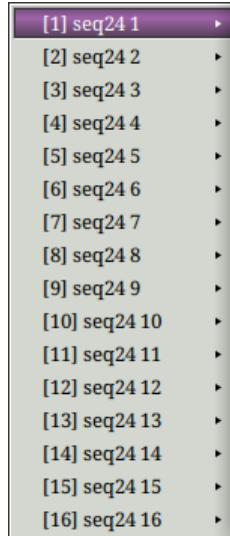


Figure 20: Existing Pattern, Right-Click Menu, MIDI Output Busses

For each of these buss items, another pop-up menu allows one to specify the MIDI output port for that buss:

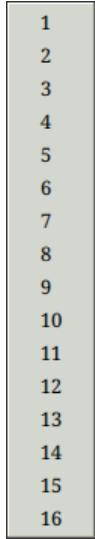


Figure 21: Existing Pattern, Right-Click Menu, MIDI Bus Ports

4.2.3 Pattern Keys and Click

This section recapitulates all the clicks and keys that perform actions in the Pattern windows. Some additional clicks and keys are noted here as well.

4.2.3.1 Pattern Keys

For each pattern, hitting its assigned keyboard key will also toggle its status between muted/unmuted (armed/unarmed). Below is the default grid that is mapped to the loops/patterns on the screen set. This grid can be changed in the Keyboard options tab, and is saved in the *keyboard-control* section of the */.seq24rc* file.

```
[ 1   ][ 2   ][ 3   ][ 4   ][ 5   ][ 6   ][ 7   ][ 8   ]
[ q   ][ w   ][ e   ][ r   ][ t   ][ y   ][ u   ][ i   ]
[ a   ][ s   ][ d   ][ f   ][ g   ][ h   ][ j   ][ k   ]
[ z   ][ x   ][ c   ][ v   ][ b   ][ n   ][ m   ][ ,   ]
```

These characters are shown in the lower right corner of each pattern, as an aid to memory.

The [and] keys on the keyboard switch between sets.

We're not sure about the functionality of the key sequences involving the **Alt** key. The handling of **Alt** is generally taken over by the window manager.

Holding **Alt** will save the state of playing patterns and restore them when **Alt** is lifted. Not yet sure exactly what this means.

Holding **Left Ctrl** and **Alt** at the same time will enable one to flip over to new patterns briefly and then flip right back upon lifting **Alt**. Not yet sure exactly what this means.

Holding **Right Ctrl** will queue a on/off toggle for a sequence when the loop ends. This is the "temporary queue" functionality. Queue also works for mute/unmute patterns (groups); in this case every sequence will toggle its status after its individual loop end.

Pressing the "keep queue" key (by default, the backslash key) assigned in the `/.seq24rc` file activates permanent queue mode until you use the temporary queue function again pressing **Right Ctrl**.

4.2.3.2 Pattern Clicks

Left-clicking on a pattern-filled box will change its state from muted (white background) to playing (black background) when the sequencer is running.

Holding down **Left Ctrl** while selecting a pattern with a left click will mute all other patterns and turn on the selected pattern.

By clicking and holding the left mouse button on a pattern, one can drag it to a new location on the grid. The box will disappear while dragged, and reappear in the new location when dropped. However, note that a pattern cannot be dragged if its Pattern Editor window is open.

Right-clicking a pattern will bring up the appropriate context menus, as discussed earlier, depending on whether the pattern box is empty or filled.

Middle-click does nothing when the mouse rests inside a pattern box.

4.3 Patterns / Bottom Panel

The bottom panel of the Patterns window provides way to control the overall playback of the song.

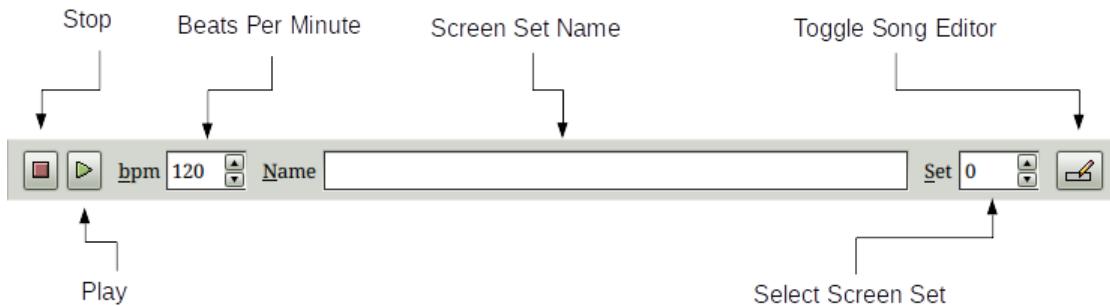


Figure 22: Patterns Panel, Bottom Panel Items

1. Stop
2. Play
3. bpm
4. Name
5. Set
6. Toggle Song Editor

1. Stop. The red squarebutton stops the playback of the song and all its patterns. It is not clear if it also sends MIDI Off messages on all notes. The keystroke for stopping playback is the **Escape** character.

2. Play. The green triangular button starts the playback of the whole song. The keystroke for starting playback is the **Space** character.

3. bpm. The spin widget adjusts the "Beats Per Minute" or BPM value. The range of this field is from 20 bpm to 500 bpm, with a default value of 120 bpm. Although this field looks editable, it is not. Most keystrokes that are entered actually toggle one of the pattern boxes. However, the following

keys can also modify the BPM in small increments: The **semicolon** reduces the BPM; The **apostrophe** increases the BPM.

4. Name. Each of the 32 available screen sets can be given a name by entering it into this field.

Bug: While one is typing in the name of the set in this field, the keystrokes will affect the panel window, causing playback to start and pattern boxes to be toggled!

5. Set. This spin widget selects the current screen set. The values in this field range from 0 to 31, and default to 0. Although this field looks editable, it is not.

Bug: While one is typing in the number of the set in this field, the keystrokes will affect the panel window as well.

6. Toggle Song Editor. Pressing this button toggles the presence on-screen of the Song Editor.

5 Pattern Editor

The Seq24 *Pattern Editor* is used to edit and preview a pattern, as well as to configure its buss and channel settings.

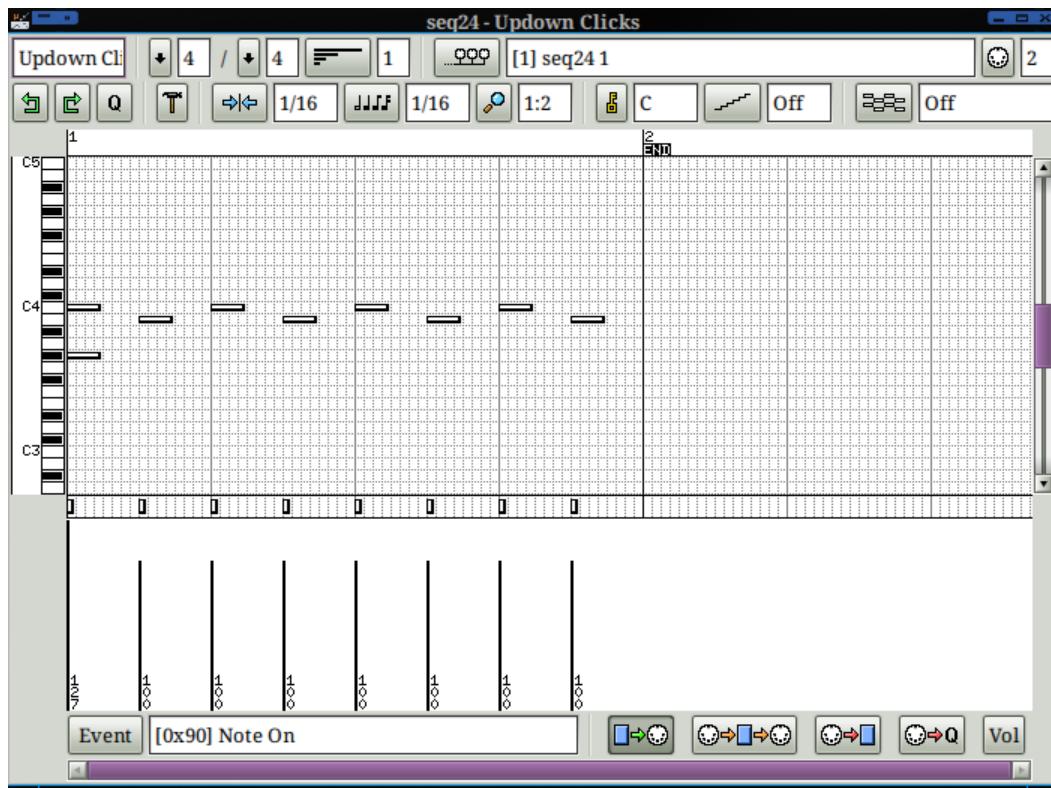


Figure 23: Pattern Edit Window

This dialog is quite complex. For exposition, we break it into a first panel, a second panel, a bottom panel, and a piano-roll/events section.

1. First Panel
2. Second Panel

3. Piano-Roll/Events Panel

4. Bottom Panel

5.1 Pattern Editor / First Panel

The top bar (horizontal panel) of the Pattern (sequence) Editor lets one change the name of the pattern, the time signature of the piece, how long the loop is, and some other configuration items.

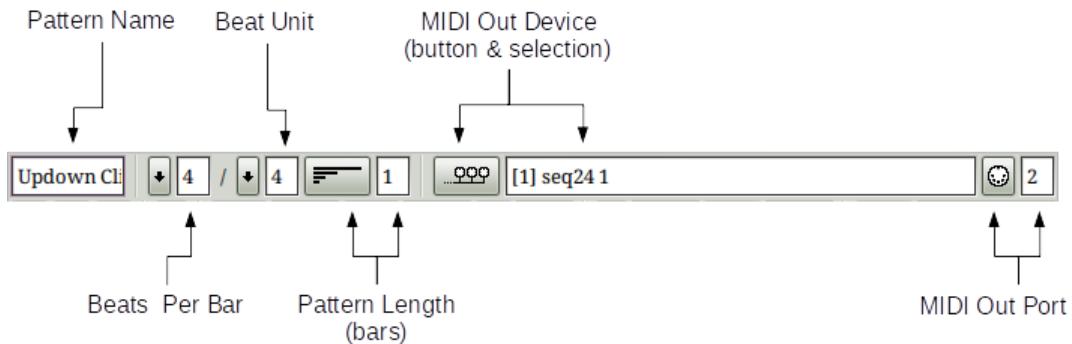


Figure 24: Pattern Editor, First Panel Items

1. Pattern Name

2. Beats Per Bar

3. Beat Unit

4. Pattern Length

5. MIDI Out Device

6. MIDI Out Port

1. Pattern Name. Provides the name of the pattern. This name should be short and memorable. It is displayed in the Patterns window.

2. Beats Per Bar. Part of the time signature, and specifies the number of beat units per bar. The possible values range from 1 to 16.

3. Beat Unit. Part of the time signature, and specifies the size of the beat unit: 1 for whole notes; 2 for half notes; 4 for quarter notes; 8 for eight notes; and 16 for sixteenth notes.

4. Pattern Length. Sets the length of the current pattern, in measures. The possible values range from 1 to 16, then 32, and 64.

(It would sure be nice to have a value that represents "indefinite", so that the loop or pattern would be more like a track, and perhaps not be repeatable.)

5. MIDI Out Device. This setting specifies one of the 16 MIDI output busses provided by Seq24. The settings look a lot like figure 20 ("Existing Pattern, Right-Click Menu, MIDI Output Busses") on page 23.

6. MIDI Out Port. This settings select the MIDI output channel, or port. The possible values range from 1 to 16.

5.2 Pattern Editor / Second Panel

The second horizontal panel of the Pattern Editor provides a number of additional settings.

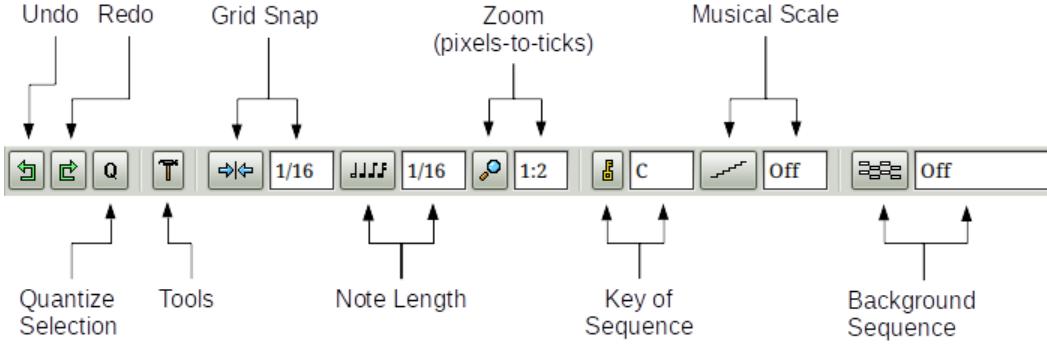


Figure 25: Pattern Editor, Second Panel Items

1. **Undo**
2. **Redo**
3. **Quantize Selection**
4. **Tools**
5. **Grid Snap**
6. **Note Length**
7. **Zoom**
8. **Key of Sequence**
9. **Musical Scale**
10. **Background Sequence**

1. Undo. The Undo button will roll back any changes to the pattern from this session. It will roll back one change each time it is pressed. It is not certain what the undo limit is, however. Pressing **Ctrl-Z** is the same as using the **Undo** button.

2. Redo. The Redo button will restore any undone changes to the pattern from this session. It will restore one change each time it is pressed. It is not certain what the redo limit is, however. There doesn't seem to be a "Redo" key.

3. Quantize Selection. Pressing this button will quantize the selected events, presumably as per the **Grid Snap** setting.

4. Tools. This button brings up a nested menu of tools for modifying selected events and notes.

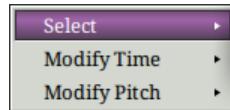


Figure 26: Tools, Context Menu

1. **Select**
 2. **Modify Time**
 3. **Modify Pitch**
- **Select** provides two sets of selections for notes:

- **All Notes**, which selects all notes in the pattern; Note that **Ctrl-A** will also select all of the events in the pattern editor.
- **Inverse Notes**, which inverts the selection of notes.

Other event-selection actions are provided:

- Pressing the left button on a note or a event deselects all other notes or events, and selects the item clicked on.
- Pressing the **Ctrl** key and the left button on a note or a event adds that event to the selection.
- Pressing the left mouse button and dragging also lets one select multiple events and notes.
- Pressing the **Ctrl** while left-click+dragging lets one make additional selections of multiple events and notes.
- **Modify Time** offers two ways to tweak the timing of the selected note: **Quantize Selected Notes**, which quantizes the selected notes, presumably the same way as the **Quantize ("Q")** button; **Tighten Selected Notes**, which presumably is a less strict form of quantization. TODO: Need more information about this.
- **Modify Pitch** has only one entry by default, **Transpose Selected** (not shown). Selecting the **Transpose Selected** entry brings up the following sub-menu:

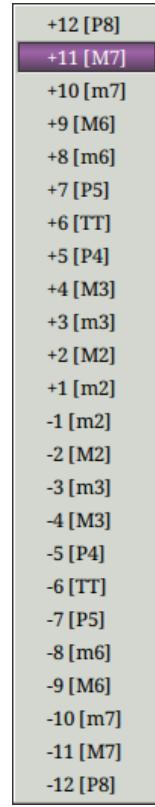


Figure 27: Tools, Transpose Selected Values

- If the user has selected a **Musical Scale** setting other than **Off**, then **Modify Pitch** has two entries: **Transpose Selected**, discussed above, plus another sub-menu, **Harmonic Transpose Selected**, which makes sure that all transpositions stay on the selected scale.

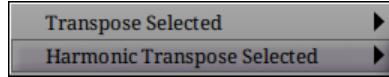


Figure 28: Tools, Two "Transpose" Menus

Remember that only the **Transpose Selected** entry is shown if the **Musical Scale** setting is **Off**.

Selecting the **Harmonic Transpose Selected** entry brings up the following sub-menu:

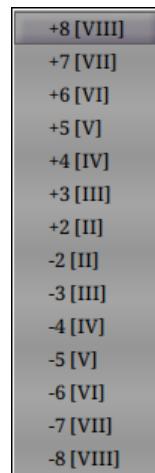


Figure 29: Tools, Harmonic Transpose Selected Values

Again, the harmonic-transpose option will not be available unless a scale has been selected.

5. Grid Snap. Grid snap selects where the notes will be drawn. The following values are supported: 1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, and 1/128. Additional values are also supported: 1/3, 1/6, 1/12/, 1/24, 1/48, 1/96, and 1/192.

6. Note Length. Note Length determines what size they will be. Like the **Grid Snap** values, the following values are supported: 1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, and 1/128. Additional values are also supported: 1/3, 1/6, 1/12/, 1/24, 1/48, 1/96, and 1/192.

7. Zoom. Zoom is the relation between MIDI pixels and ticks, written as "pixels:ticks. For example, 1:4 = 4 ticks per pixel. Supported values are 1:1, 1:2, 1:4, 1:8, 1:16, and 1:32.

8. Key of Sequence. Selects the desired key for the pattern. The following scales are supported: C, C#, D, D#, E, F, F#, G, G#, A, A#, and B.

9. Musical Scale. Selects the desired scale for the pattern. Only the following values are supported: Off, Major, and Minor.

One can select which **Musical Scale** and **Key** the piece is in, and Seq24 will grey out those keys on the piano-roll that are not in the key. This effect is shown for the C Major scale in the following figure:

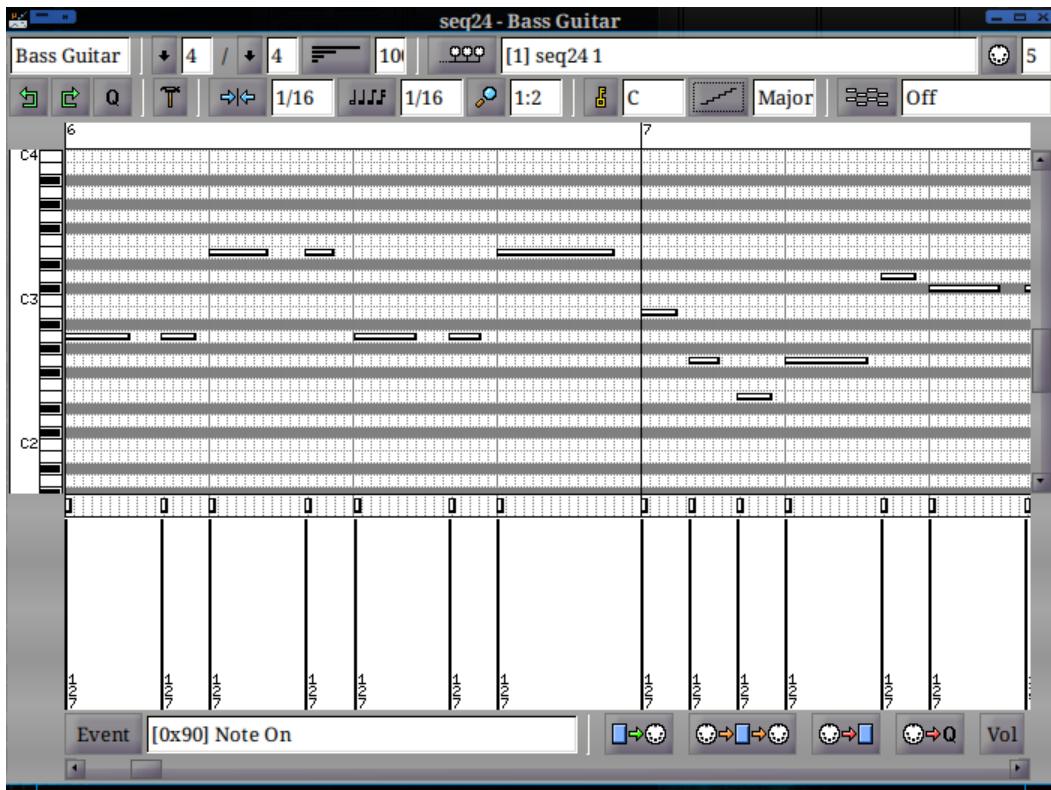


Figure 30: C Major Scale Masking

This feature makes it a bit easier to stay in key while playing and recording.

10. Background Sequence. One can select another pattern to draw on the background to help with writing corresponding parts. The button brings up a small menu with values of **Off** and **[0]**. Presumably, the 0 is a set number. Under that entry, a menu like the following appears.



Figure 31: Sample Background Sequence Values

Once the desired pattern is selected from that list, it appears as gray notes, along with the notes that are part of the pattern. (Also note the orange selected notes and events in the following figure.)

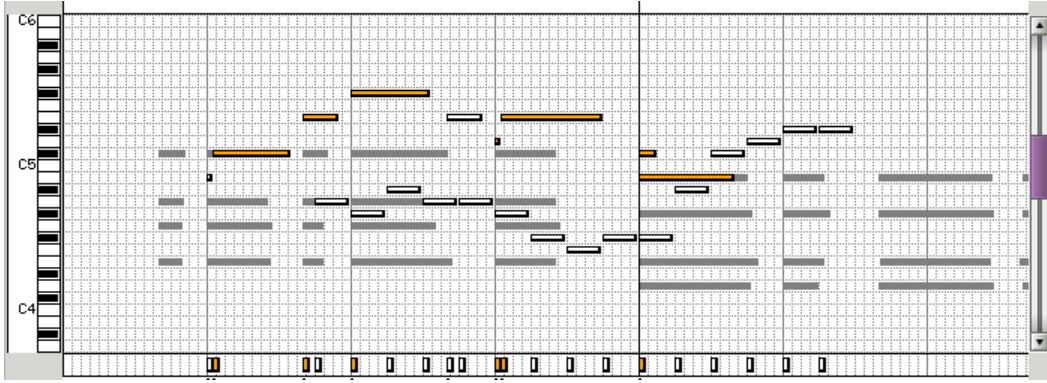


Figure 32: Background Sequence Notes

The gray notes shown represent a rhythm pattern.

5.3 Pattern Editor / Piano Roll

The piano roll is the heart of the pattern (loop, sequence) editor. While it is very similar to note editors in other sequencers, it is a bit different in feel. A good mouse with 3 or more buttons is practically a necessity for editing. We tend to like the Logitech Marble Mouse, an ambidextrous USB trackball. It has four buttons, and we use the `contrib/scripts/marblemouse` script to set up the left small button as a middle button. The script merely makes the following call:

```
xmodmap -e "pointer = 1 8 3 4 9 6 7 2 5 10 11"
```

Editing is much easier after making that setting. (In a future version of *Seq24*, we will add support for some of the crappy trackpads we've encountered on various laptops.)

5.3.1 Pattern Editor / Piano Roll Items

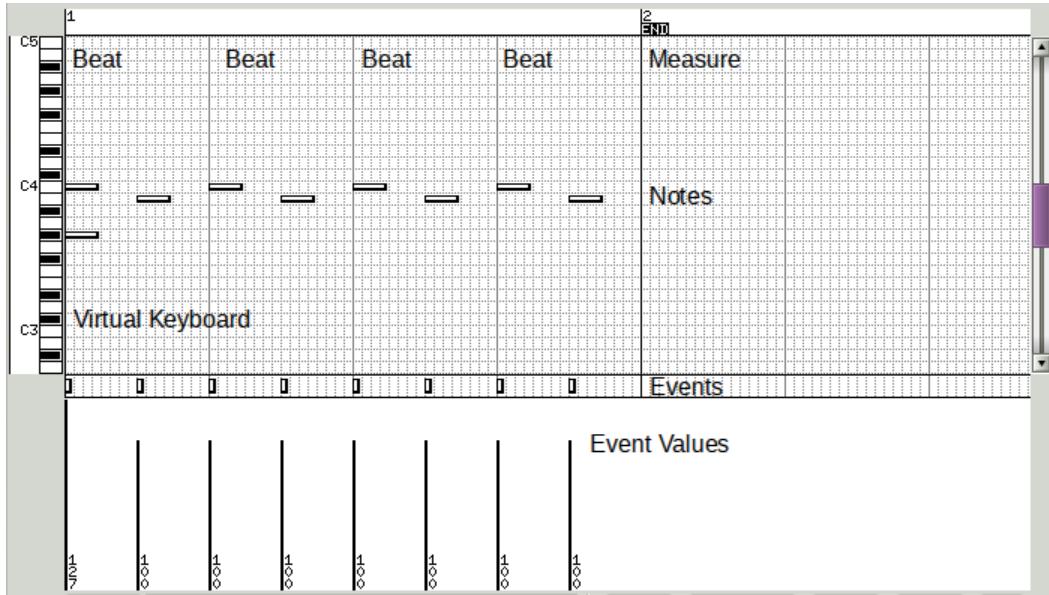


Figure 33: Pattern Editor, Piano Roll Items

1. **Beat**
2. **Measure**
3. **Virtual Keyboard**
4. **Notes**
5. **Events**
6. **Event Values**

1. **Beat.** The light vertical lines represent the beats defined by the configuration for the pattern.
2. **Measure.** The heavy vertical lines represent the measures defined by the configuration for the pattern. Also note that the end of the pattern occurs at a measure, and is marked by a blocky **END** marker.
3. **Virtual Keyboard.** The virtual keyboard is a fairly powerful interface. It shows, by shadowing, which note on the keyboard one will be drawing. It can be played with a mouse, to preview a short motif. It can show marks to indicate off-scale notes, to make them easy to avoid.
4. **Notes.** Musical notes are indicated by short bars. The bars provide a visual representation of the pitch of the note and the length of the notes.
5. **Events.** The small (just a few pixels high) events strip shows discrete events, such as Note On and Note Off and their velocities, or various Controller items and their values. We recommend not trying to edit or select events in that pane, in general, but feel free to try it.
6. **Event Values.** The events values for the currently selected category of events are shown in this window as vertical lines of a height proportional to the value. These values can be easily modified.

5.3.2 Pattern Editor / Event Editing

Note editing is a bit different with *Seq24*, since it requires two mouse buttons in many cases. There are some new laptop touchpads from FocalTech that have only one mouse button, and use positioning to

determine if the click is a left- or right-click. The Linux drivers for this touchpad aren't sophisticated enough (as far as we know) to handle converting a two-fingered press properly. We've found that a good solution is to use a four-button USB trackball configured with an easy middle-button setup. It's easier than a touchpad, anyway. See the comments at the beginning of this section, too.

Note that, if only a middle-button is needed, **ctrl-left-button** will simulate that button.

5.3.2.1 Editing Note Events

The Roll pane provides for a quite sophisticated set of note-editing actions. Please study the following paragraphs carefully, ideally while trying them out in *Seq24*.

In the note (grid/roll) panel, **holding** down the **right** mouse button will change the cursor to a pencil and put the editor into "draw" mode.

Then, while still **holding** the **right** mouse button, click the **left** mouse button to **insert** new notes. Many people find this combination strange at first, but once one gets used to it, it becomes a very fast method of note manipulation.

To increase the duration of the note(s), keep dragging the mouse (with both buttons held) rightward. Note that, if one keeps dragging the mouse past the duration of a beat unit (e.g. a quarter note), then *multiple* notes are drawn, each one being the duration of a beat unit. This *auto-note* facility can be convenient.

However, if one wants a *single long note*, first draw the short note, and then use one of the operations described in the next paragraph to change the length of the note. These operations also caused the note to be selected.

Pressing the **middle** mouse button **or** pressing the **ctrl left** mouse button tandem will let one change the length of the note. If more than one note is selected, then the length of all selected notes is changed.

Warning: If one reduces the length of a note by more than its current length, the note will end up "infinitely" long.

The **left** mouse button lets one select multiple events which can then be clicked and moved, **cut** (**Ctrl-X**), **copy** (**Ctrl-C**), or **pasted** (**Ctrl-V**). When the notes are selected, one can delete them with the **Delete** key.

Pressing the **Ctrl** while left-click+dragging lets one make additional selections of multiple events and notes.

For the appearance of selected events (orange), see [figure 34 \("Piano Roll, Selected Notes and Events"\)](#) on page [35](#).

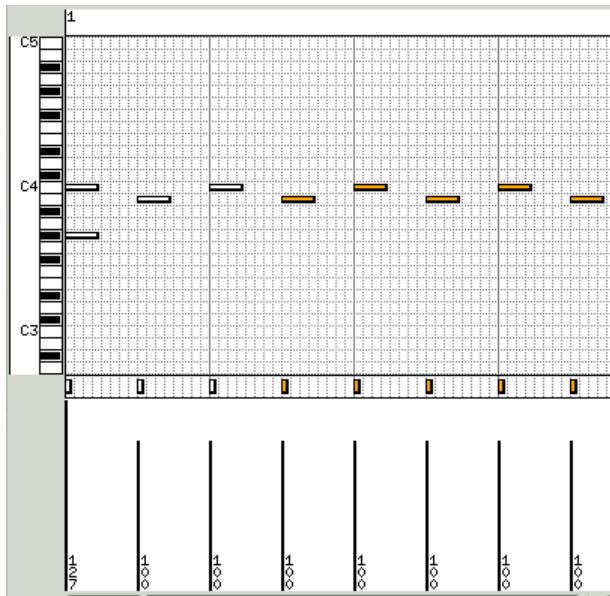


Figure 34: Piano Roll, Selected Notes and Events

Pressing the **left** button on a note or a event deselects all other notes or events, and selects the item clicked on.

Pressing the **Ctrl** key and the **left** button on a note or a event *adds* that event to the selection.

Note that pressing the left mouse button and dragging also lets one select multiple events and notes. Pressing the **Ctrl** while left-click+dragging lets one make additional selections of multiple events and notes.

The **Tools** button described in section 5.2 (“[Pattern Editor / Second Panel](#)”) on page 27 can also be used to modify selections.

Ctrl-A will select all of the events in the pattern editor.

Pressing the **middle** mouse button **or** pressing the **ctrl left** mouse button tandem will let one change the length of the note. If more than one note is selected, then the length of all selected notes is changed.

Once a selection of notes is made, one can use the Shift-middle-click+drag sequence over the selected notes to draw a box beyond the extent of the notes. When the mouse is released, each of the events is moved and lengthened to be proportionally longer to fit exactly within the box one drew. This feature is called *event stretch*.

If the box that was drawn was shorter than the original extent of the notes, then the notes move and shrink proportionally to occupy the smaller box. This feature is called *event compression*.

Warning: If one reduces the length of a note by more than its current length, the note will end up “infinitely” long.

The **left** mouse button lets one select multiple events which can then be clicked and moved, cut (**Ctrl-X**), copy (**Ctrl-C**), or pasted (**Ctrl-V**). When the notes are selected, one can delete them with the **Delete** key.

5.3.2.2 Editing Other Events

Note On and Note Off events appear as small squares in the event strip, along with a black vertical bar with a height proportional to the velocity of the note event, plus a numeric representation of that value. Note events do not need to be inserted in the event strip. (*Note events can be inserted there, but they end up as short events of the lowest possible note, 0 or C1, and they don't have a Note Off event. So don't do that!*)

Other events can be inserted via the event strip. To do that, first select the kind of event to insert using the **Event** button in the bottom panel. Then place the mouse cursor in the event strip. Right-click to make the drawing pencil appear at the exact spot where the event must go. While holding the right button, click the left button. A small square for the event should appear.

Should one want more of the same event, continue to hold both buttons and drag the mouse. One event should appear at each beat position (e.g. at each 16th note position) that is crossed.

To move the event(s) to a different spot, select it or them via the left button. Then drag it or them to where one wants them. *Note: it is currently not possible to move them to positions smaller than the beat size. Is there a way to do it?*

Once the event positions are set, the next step is to modify the data values of the events.

The event value (data) editor (directly under the event strip) is used to change note velocities, channel pressure, control codes, patch select, etc. Just left-click+drag the mouse across the window to draw a line. The values will match that line. middle-click+drag and right-click+drag also draw the value line.

Bug: Sometimes the editing of event values in the event data section will not work. The workaround is to do a **Ctrl-A**, and the click in the roll to deselect the selection; that makes the event value editing work again.

Any events that are selected in the piano roll or event strip can have their values modified with the mouse wheel.

5.4 Pattern Editor / Bottom Panel

The bottom horizontal panel of the Pattern Editor provides for selecting events for viewing and edition, and the MIDI playback, pass-through, and recording options of Seq24.

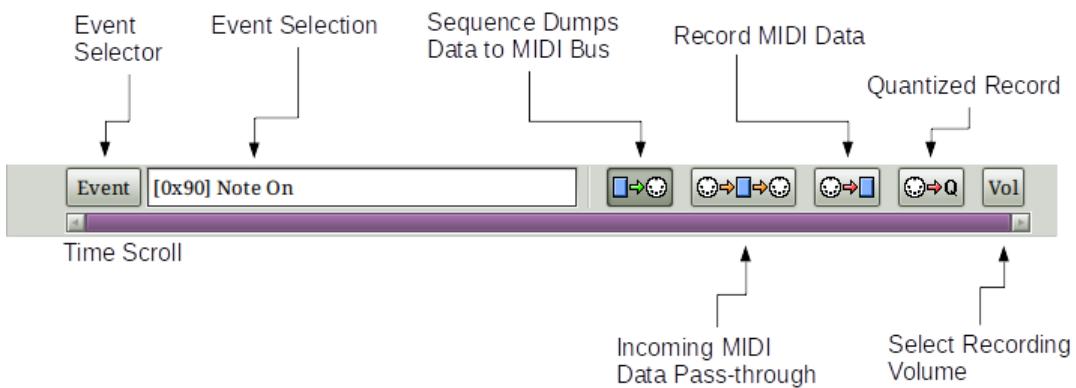


Figure 35: Pattern Editor, Bottom Panel Items

1. Event Selector

2. Event Selection
3. Time Scroll
4. Data To MIDI Buss
5. MIDI Data Pass-Through
6. Record MIDI Data
7. Quantized Record
8. Select Recording Volume

1. Event Selector. This button brings up the following context menu, so that the user can select the category of events to view and edit.

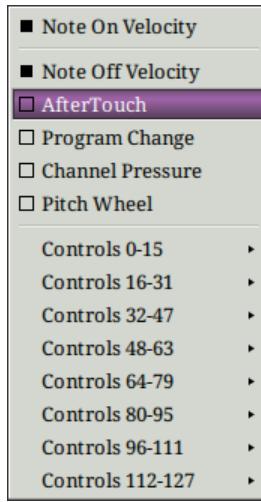


Figure 36: Pattern Editor, Event Button Context Menu

The sub-menus of this context menu show 128 controller messages, so we won't try to show all of them here.

These sub-menus can be modified, as far as we know, by editing the file `$HOME/.seq24usr`, to make it match one's instrument. See section 8 ("Seq24usr Configuration File") on page 51.

2. Event Selection. Shows the selection event, with its number shown in hexadecimal notation, and the name of the event shown.

3. Time Scroll. Allows one to pan through the whole pattern, if it is too long to fit in the window.

4. Data To MIDI Buss. Activating this button will cause the pattern to be output to the MIDI output buss, which will normally be connected to a software or hardware synthesizer, to be heard.

5. MIDI Data Pass-Through. Activating this button will route incoming MIDI data through Seq24, which will then write it to the MIDI output buss.

6. Record MIDI Data. Activating this button will route incoming MIDI data into Seq24, which will then save the data to its buffer, and also display the new information (notes) in the piano roll view.

7. Quantized Record. Activating this button will also cause MIDI data to be recorded, but it will be quantized on the fly before saving it.

8. Vol. This button allows controlling the volume of the recording.

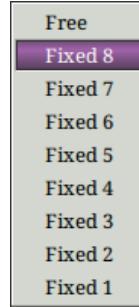


Figure 37: Pattern Recording Volume Menu

The values provided are: Free, Fixed 8, Fixed 7, Fixed 6, Fixed 5, Fixed 4, Fixed 3, Fixed 2, and Fixed 1. TODO: We need to figure what these mean!

6 Song Editor

The *Sq24 Song Editor* is used to combine all of the patterns into a complete tune. It works by showing one row per pattern/loop/sequence in numbered columns, and the placement of each pattern at various musical bars in the song.

In *Sq24* parlance, the Song Editor creates a *performance*.

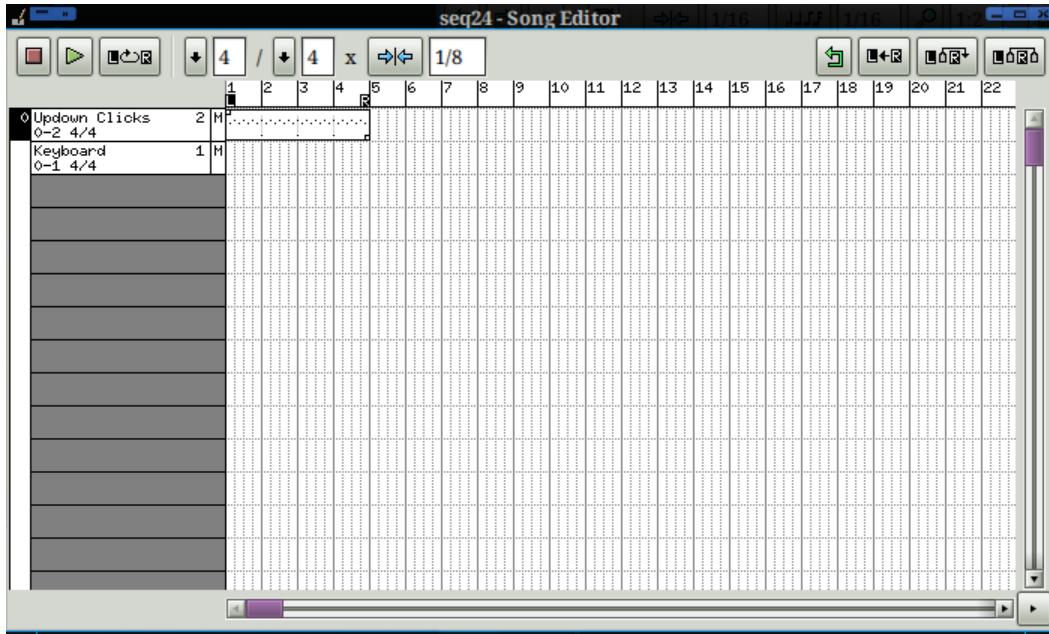


Figure 38: Song Editor Window

This dialog is not too complex, but for exposition, we break it into a top panel and the rest of the window.

6.1 Song Editor / Top Panel

The top panel provides quick access to song-playback actions and configuration.

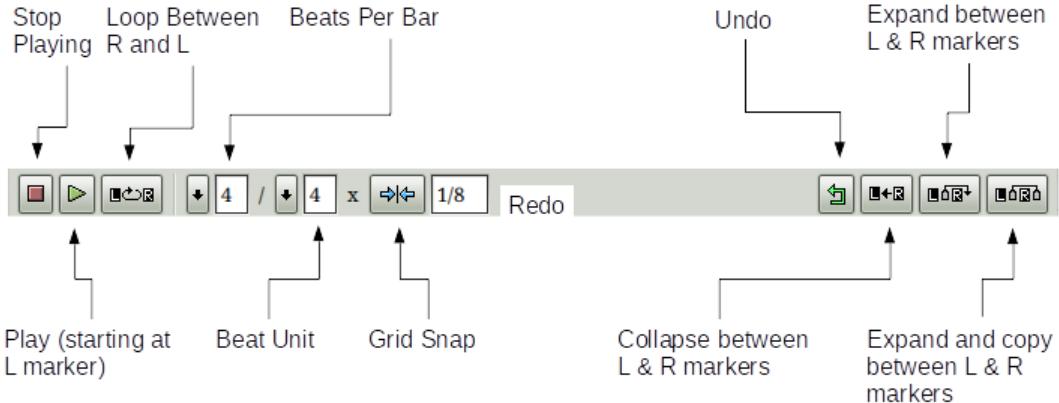


Figure 39: Song Editor / Top Panel Items

1. **Stop**
2. **Play**
3. **Loop**
4. **Beats Per Bar**
5. **Beat Unit**
6. **Grid Snap**
7. **Undo**
8. **Collapse**
9. **Expand**
10. **Expand and copy**

1. Stop. Stops the playback of the song. The keystroke for stopping playback is the 'Escape' character. It can be configured to be another character (such as 'Space', which would make the space-bar toggle the playback status).

2. Play. Starts the playback of the song, starting at the **L marker**. The keystroke for starting playback is the 'Space' character.

3. Loop. Play the song, looped between the **L marker** and the **R marker**. This button is a state button, and its appearance indicates when it is depressed, and thus active. If this button is deactivated during playback, then playback will continue past the **R marker**.

4. Beats Per Bar. Part of the time signature, and specifies the number of beat units per bar. The possible values range from 1 to 16.

5. Beat Unit. Part of the time signature, and specifies the size of the beat unit: 1 for whole notes; 2 for half notes; 4 for quarter notes; 8 for eighth notes; and 16 for sixteenth notes.

6. Grid Snap. Grid snap selects where the patterns will be drawn. Unlike the **Grid Snap** of the Pattern Editor, the units of the Song Editor snap value are in fractions of a measure length. The following values are supported: 1/1, 1/2, 1/4, 1/8, 1/16, and 1/32.

7. Undo. The Undo button will roll back the last change in the layout of a pattern. Each time it is clicked, the most recent change will be undone. It will roll back one change each time it is pressed. It is not certain what the undo limit is, however. There is no Redo button in the Song Editor.

8. Collapse. This button collapses the song between the **L marker** and the **R marker**. What this means is that, if there is song material (patterns) before the **L marker** and after the **R marker**, and

the **Collapse** button is pressed, any song material between the L and R markers is wiped out, and the song material after the **R marker** is moved leftward to the **L marker**.

Collapsing occurs in all tracks present in the Song Editor.

9. Expand. This button expands the song between the **L marker** and the **R marker**. It inserts blank space between these markers, moving the song material that is after the **R marker** to the right by the duration of the blank space.

Expansion occurs in all tracks present in the Song Editor.

10. Expand and copy. This button expands the song between the **L marker** and the **R marker** much like the **Expand** button. However, it also copies the original data that is present after the **R marker**, and pastes it into the newly-available space between the L and R markers.

6.2 Song Editor / Arrangement Panel

The arrangement panel is the middle section shown in figure 38 ("Song Editor Window") on page 38. It is also known as the "piano roll" of the song editor. Here, we zero in on its many features.

The following figure is taken from a conventional MIDI file, imported, with a few long tracks, rather than a large number of smaller patterns. In other words, the patterns used here are very long, and used only once in the song.

We might need to provide an example that shows off Seq24's pattern features better, at some point.

Please note that, if playback is started with the Song Editor as the active window, then the pattern boxes in the patterns panel will show as armed/unarmed (unmuted/muted) depending upon whether or not the pattern is shown as playing (or not) at the current playback position in the Song Editor piano roll.

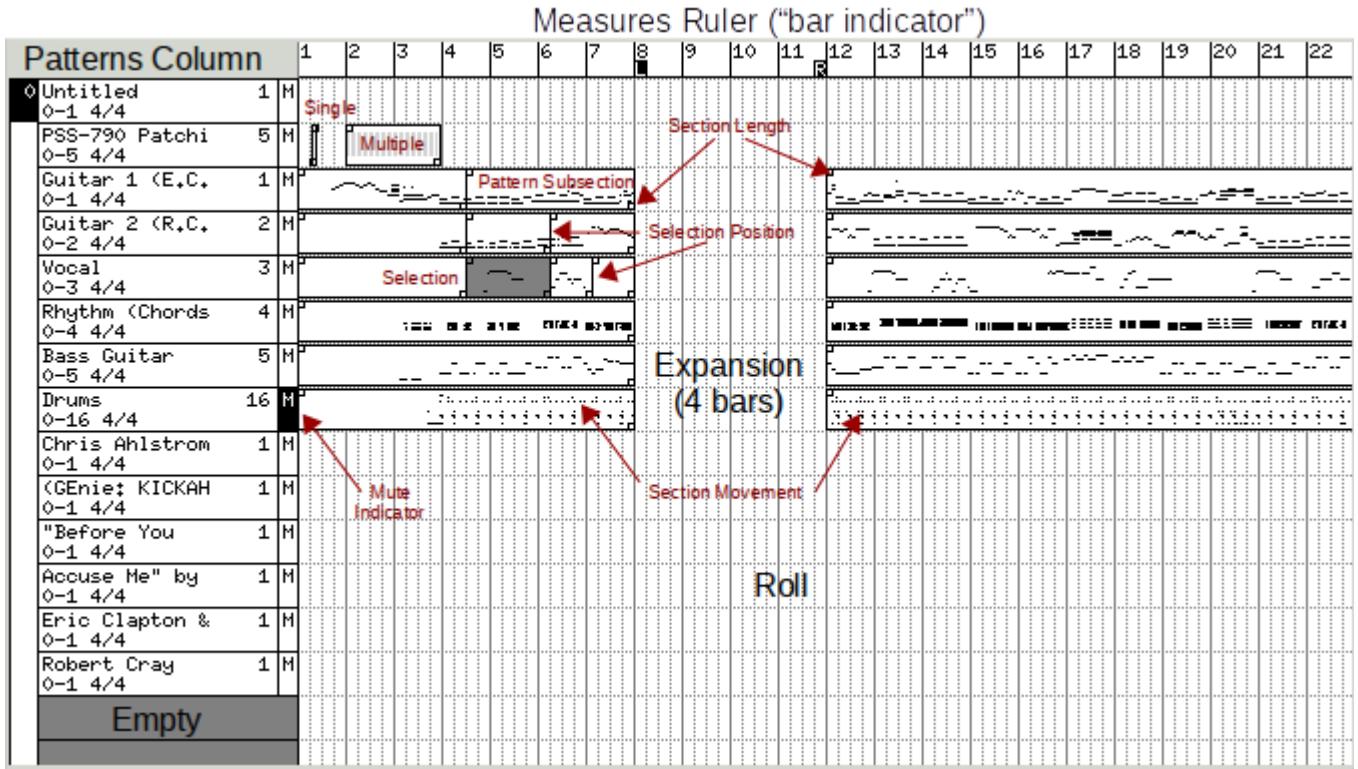


Figure 40: Song Editor Arrangement Panel, Annotated

It consists of a *measures ruler* (bar indicator) at the top, a numbered patterns column at the left with a muting indicator, and the grid or roll section. There are a lot of hidden details in the arrangement panel, as the figure shows. Here are the main sections we will deal with:

1. **Patterns Column**
2. **Piano Roll**
3. **Measures Ruler**

These items are discussed in the following sections.

6.2.1 Song Editor / Arrangement Panel / Patterns Column

Here are the items to note in the patterns column:

1. **Number.** Not yet sure what the number on the left means. The number of the screen set?
2. **Title.** The title is the name of the pattern, for easy reference.
3. **Channel.** The channel number appears at the right of the title.
4. **Span.** This pair of numbers shows the starting measure of the pattern and the measure just after the end of the pattern.
5. **Beat.** This pair of numbers is the standard time-signature of the pattern.
6. **Mute Indicator.** The letter M is in a black box if the track/pattern is muted, and a white box if it is unmuted.
7. **Empty.** Empty tracks are indicated by a dark-gray filling.

The patterns column shows a list of all of the patterns that have been created in the current song. Each pattern in this list has a track of pattern layouts associated with it in the piano roll section.

Left-clicking on the pattern name or the "M" button toggles the muting status of the track.

Right-clicking on the pattern name or the "M" button brings up the same pattern editing menu as discussed in section 4.2.2 ("Pattern") on page 21. Recall that this context menu has the following entries: Edit..., Cut, Copy, Song, and Midi Bus.

6.2.2 Song Editor / Arrangement Panel / Piano Roll

The "Piano Roll" section of the arrangement panel is where patterns or subsections are inserted, deleted, shrunk, lengthened, or moved.

Here are the items to note in the Piano Roll area:

1. **Single.** In the diagram, under the word "Single", is a very small pattern. It is small because it consists only of some MIDI Program Change messages meant to set the programs on a Yamaha PSS-790 keyboard.
2. **Multiple.** This item is the same pattern as in "Single", but dragged out for multiple repetitions, simply to show how even the shortest patterns can be easily replicated.
3. **Pattern Subsection.** Middle-clicking inside a pattern inserts a selection position marker in it, breaking the pattern into two equal pieces. We call each piece a *pattern subsection*. This division can be done over and over. (Note that, in the Song Editor, a middle-click *cannot* be simulated by ctrl-left-click.)
4. **Selection Position.** A selection position is a marker that divides a pattern into two pieces, called *pattern subsections*. This makes it easy to select smaller portions of a pattern for editing or deleting. It is especially useful for making holes in a pattern. There may be other uses of a selection position that we have not yet discovered.
5. **Selection.** By clicking inside a pattern or a pattern subsection, it darkens to denote that it is selected. A pattern subsection can be deleted by the Delete key, copied by the **Ctrl-C** key, and then inserted (one or more times) by the **Ctrl-V** key. When inserted, each insert goes immediately after the current item or the previous insertion. The same can be done for whole patterns.
6. **Section Length.** Looking closely at the diagram where the arrows point, small squares in the corner of the patterns can be seen. By grabbing that square with a left-click, the square can be moved horizontally to either lengthen or shorten the pattern or pattern subsection, if there is room to move in the desired direction. It doesn't matter if the item is selected or not.
7. **Section Movement.** If, instead of grabbing the section length handle, one grabs inside the pattern or pattern subsection, that item can be moved horizontally, as long as there is room. Of course, left-clicking inside the item will also cause it to show as selected.
8. **Expansion.** Originally, all the long patterns of this song were continuous. But, by setting the L and R markers, and using the **Expand** button, we opened up some silent space in the song.

The Seq24 help files refer to work in the Song Editor as the "Performance Edit" or "Performance Mode". Adding a pattern in this window is a bit like adding a note in the Pattern Editor. One clicks, holds, and drags the mouse to insert a copy of the pattern associated with the row in which one is dragging. The longer one drags, the more copies of the pattern that are inserted.

Right-click on the arrangement panel (roll) to enter draw mode, and hold the button.

Then left-click the mouse to insert one copy of the pattern. The inserted pattern will show up as a box with a tiny representation of the notes visible inside. (Some patterns, however, can be less than a measure in length, resulting in a tiny box.)

To keep adding more copies of the pattern, continue to hold both buttons and drag the mouse rightward.

Middle-click on a pattern to drop a new selection position into the pattern, which breaks the pattern into two equal *pattern subsections*. Each middle-click on the pattern adds a new selection position, halving the size of the subsections as more pattern subsections are added.

When a pattern or a pattern subsection is left-clicked, it is marked as dark gray. When a right-left-hold-drag action is done in this gray area, the result is to *delete* that pattern section or subsection. One can also hit the Delete key to *delete* that pattern section or subsection.

6.2.3 Song Editor / Arrangement Panel / Measures Ruler

The *measures ruler* is the ruled and numbered section at the top of the arrangement panel. It provides a place to put the left and right markers. In the Seq24 documentation, it is called the "bar indicator".

Left-click in the measures ruler to drop an **L anchor** on the measures ruler. Right-click in the measures ruler to drop an **R anchor** on the measures ruler.

Once these anchors are in place, then use the *Collapse* and *Expand* buttons to modify the placement of the pattern events.

Note that the **L marker** serves as the start position for playback in the Song Editor. One can change the start position only when the performance is not playing.

7 Seq24rc Configuration File

The Seq24 configuration file is called `.seq24rc`, and it is stored in the user's `$HOME` directory.

After you run Seq24 for the first time, it will generate a `.seq24rc` file in your home directory. It contains the the data for remote MIDI control, keyboard control, and MIDI clock.

Seq24 will overwrite the `.seq24rc` file on quit. One should therefore quit Seq24 before doing modifications to the `.seq24rc` file.

7.1 Seq24rc / MIDI Control Section

For each pattern, we can set up MIDI events to turn a pattern on, off, or to toggle it. This setup is in the MIDI Control section of `.seq24rc`, and begins with an "INI" group marker `[midi-control]`.

THE MIDI Control section is implicitly broken into subsections, though those subsections are marked with comment-lines for better comprehensibility. The subsections of the MIDI Control section are:

1. **pattern group.** Consists of 32 lines, one for each pattern box shown in the Pattern window.
2. **mute in group.** Consists of 32 lines, one for each pattern box shown in the Pattern window.
3. **automation group.** Each item in this group consists of one line.
 1. **bpm up.** Consists of one line.
 2. **bpm down.** Consists of one line.
 3. **screen-set up.** Consists of one line.
 4. **screen-set down.** Consists of one line.
 5. **mod replace.** Consists of one line.
 6. **mod snapshot.** Consists of one line.
 7. **mod queue.** Consists of one line.
 8. **mod gmute.** Consists of one line.

9. **mod glearn**. Consists of one line.

10. **screen-set play**. Consists of one line.

We see the following lines in the MIDI Control section, which is broken into groups or subsections marked by comments:

```
[midi-control]
74

# pattern group
0 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]
1 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]
2 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]
...
31 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# mute in group
32 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]
33 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]
...
63 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# bpm up
64 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# bpm down
65 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# screen set up
66 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# screen set down
67 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# mod replace
68 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# mod snapshot
69 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# mod queue
70 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# mod gmute
71 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]

# mod glearn
72 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]
```

```
# screen set play
73 [0 0 0 0 0 0] [0 0 0 0 0 0] [0 0 0 0 0 0]
```

The number (74) is the number of lines in the MIDI Control section.

The first number is the pattern/sequence number in the main window, which ranges from 0 to 31. Each set of brackets corresponds to a MIDI filter. The MIDI filter in the leftmost brackets is the *toggle* filter. The MIDI filter in the middle brackets is the *on* filter. The MIDI filter in the rightmost brackets is the *off* filter. If the incoming MIDI event matches the filter, it will either [toggle], [on], or [off] the pattern/sequence, respectively.

The layout of each filter inside the bracket is as follows:

[OPR INV STAT D1 D2min D2max]

where

- **OPR** = **on/off**
- **INV** = **inverse**
- **STAT** = **MIDI status byte** (channel ignored)
- **D1** = **data1**
- **D2min** = **data2 min**
- **D2max** = **data2 max**

If **on/off** is set to 1, it will match the incoming MIDI against the **MIDI status byte** pattern and perform the action (on/off/toggle) if the data falls in the range specified. All values are in decimal.

The **inverse** field will make the pattern perform the opposite action (*off* for *on*, *on* for *off*) if the data falls outside the specified range. This is cool because one can map several sequences to a knob or fader.

The last three fields describe the range of data that will match.

7.1.1 Seq24rc / MIDI Control Pattern Group

Complex? Here is an example for the some of the first 32 lines, which comprise the *pattern group*. The following is an example of responding to Note On events for note 0, with any velocity, to turn the pattern on, and Note off events for note 0, and any velocity, to turn the pattern off.

Toggle	On	Off
1 [0 0 0 0 0 0]	[1 0 144 0 0 127]	[1 0 128 0 0 127]

The **toggle** field is off (inactive).

The **on** field is on (active). Inverse is inactive. The **MIDI status byte**, 144, is 0x90 (hex), which is a Note On event on channel 0. However, the channel is ignored. **data1** is 0, and (**data2**) can range from 0 to 127.

The **off** field is on (active). The **MIDI status byte**, 128, is 0x80 (hex), which is a Note Off event on channel 0. Again, the channel is ignored. **data1** is 0, and **data2** can range from 0 to 127.

So, basically, pattern 1 starts when any Note On is received, and it stops when any Note Off is received.

The following example would map a row of sequences to one knob sending out changes for Control Code 1:

Toggle	On	Off
0 [0 0 0 0 0 0]	[1 1 176 1 0 15]	[0 0 0 0 0 0]
1 [0 0 0 0 0 0]	[1 1 176 1 16 31]	[0 0 0 0 0 0]
2 [0 0 0 0 0 0]	[1 1 176 1 32 47]	[0 0 0 0 0 0]
3 [0 0 0 0 0 0]	[1 1 176 1 48 63]	[0 0 0 0 0 0]
4 [0 0 0 0 0 0]	[1 1 176 1 64 79]	[0 0 0 0 0 0]
5 [0 0 0 0 0 0]	[1 1 176 1 80 95]	[0 0 0 0 0 0]
6 [0 0 0 0 0 0]	[1 1 176 1 96 111]	[0 0 0 0 0 0]
7 [0 0 0 0 0 0]	[1 1 176 1 112 127]	[0 0 0 0 0 0]

The **on** field is on (active). Inverse is active. The **MIDI status byte**, 176, is 0xB0 (hex), which is a Control Change event (channel ignored). **data1** is 1, which is the controller number for a Modulation Wheel. The **data2** ranges are set so that, as the controller data increases (as the modulation-wheel knob is turned, so to speak), patterns 0 through 7 come on one at a time until all are running.

7.1.2 Seq24rc / MIDI Control Mute In Group

This section controls 32 groups of mutes in the same way as defined for `[midi-control]`, and is in fact placed in the `[midi-control]` section.

A group is a set of patterns that can toggle their playing state together. Every group contains all 32 sequences in the active screen set (see after).

So, this part of the MIDI Control section is used for muting and unmuting (and toggling) a group of patterns.

7.1.3 Seq24rc MIDI Control Automation Group

1. **bpm up.** Increases the BPM (speed) of the sequencer based on MIDI input.
2. **bpm down.** Decreases the BPM (speed) of the sequencer based on MIDI input.
3. **screen-set up.** Increases the active screen-set of the sequencer based on MIDI input.
4. **screen-set down.** Decreases the active screen-set of the sequencer based on MIDI input.
5. **mod replace.** This item provides a way to automate replacement. TODO. Explain the concept of replacement.
6. **mod snapshot.** This item provides a way to automate snapshots. TODO. Explain the concept of snapshots.
7. **mod queue.** This item provides a way to automate queueing. TODO. Explain the concept of queue.
8. **mod gmute.** This item provides a way to automate group-muting. Explain the concept of snapshots.
9. **mod glearn.** This item provides a way to automate group-learning. TODO. Explain the concept of group-learning.
10. **screen-set play.** This item provides a way to automate screen set play. TODO. Explain the concept of screen set play.

7.2 Seq24rc / Mute-Group Section

This section is delimited by the [mute-group] construct.

```
[mute-group]
1024
0 [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0]
1 [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0]
2 [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0]
...
31 [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0] [0 0 0 0 0 0 0 0]
```

The initial number, 1024 is..... WHAT?

In this group are the definitions of the state of the 32 sequences in the playing screen set when a group is selected. group [state of the first 8 sequences] [second 8] [third 8] [fourth 8]

After the list of sequences and their MIDI events, one can set *Seq24* to handle MIDI events and change some more settings in *.seq24rc*.

7.3 Seq24rc / MIDI-Clock Section

The MIDI Clock fields will contain the clocking state from the last time *Seq24* was run. Turn off the clock with a 0, or on with a 1. This section has 16 entries, one for each MIDI output buss that *Seq24* supports.

This configuration item is the same as the **MIDI Clock** tab described in paragraph [3.2.4.1 \("Menu / File / Options / MIDI Clock"\)](#) on page [12](#)

Here is the format:

```
[midi-clock]
16
0 0 # [1] seq24 1
1 0 # [2] seq24 2
2 0 # [3] seq24 3
3 0 # [4] seq24 4
4 0 # [5] seq24 5
5 0 # [6] seq24 6
6 0 # [7] seq24 7
7 0 # [8] seq24 8
8 0 # [9] seq24 9
9 0 # [10] seq24 10
10 0 # [11] seq24 11
11 0 # [12] seq24 12
12 0 # [13] seq24 13
13 0 # [14] seq24 14
14 0 # [15] seq24 15
15 0 # [16] seq24 16
```

7.4 Seq24rc / Keyboard Control Section

The keyboard control is a dump of the keys that *Seq24* recognises, and each key's corresponding sequence number. Note that the first number corresponds to the number of sequences in the active screen set.

```
[keyboard-control]
32
# Key #, Sequence #
44 31      # comma
49 0       # 1
50 4       # 2
51 8       # 3
52 12      # 4
53 16      # 5
54 20      # 6
55 24      # 7
56 28      # 8
97 2       # a
98 19      # b
99 11      # c
100 10     # d
101 9       # e
102 14     # f
103 18     # g
104 22     # h
105 29     # i
106 26     # j
107 30     # k
109 27     # m
110 23     # n
113 1      # q
114 13     # r
115 6      # s
116 17     # t
117 25     # u
118 15     # v
119 5      # w
120 7      # x
121 21     # y
122 3      # z
```

7.5 Seq24rc / Keyboard Group Section

This section is the same as [keyboard-control], but to control groups. The keyboard group specifies more automation for the application. The first number specifies the Key number, and the second number specifies the Group number.

Additional control:

1. **# bpm up and down.** Keys to control BPM (beats per minute).
2. **# screen set up and down.** Keys for changing the active screenset.
3. **# group functionality on, off, learn.** Note that the group learn key is a modifier key to be held while pressing a group toggle key.
4. **#replace, queue, snapshot_1, snapshot_2, keep queue.** These are the other modifier keys explained in section 3a.

To see the required key codes when pressed, run `seq24` with the `--show_keys`.

Some keys should not be assigned to control sequences in *Seq24* as they are already assigned in the *Seq24* menu (with **Ctrl**).

This configuration item is the same as the **Keyboard** tab described in section 3.2.4.3 ("Menu / File / Options / Keyboard") on page 14.

```
[keyboard-group]
# Key #, group #
32
33 0      # exclam
34 1      # quotedbl
35 2      # numbersign
36 3      # dollar
37 4      # percent
38 5      # ampersand
40 7      # parenleft
47 6      # slash
59 31     # semicolon
65 16     # A
66 28     # B
67 26     # C
68 18     # D
69 10     # E
70 19     # F
71 20     # G
72 21     # H
73 15     # I
74 22     # J
75 23     # K
77 30     # M
78 29     # N
81 8      # Q
82 11     # R
83 17     # S
84 12     # T
85 14     # U
86 27     # V
87 9      # W
88 25     # X
89 13     # Y
90 24     # Z
```

```

39 59      # bpm up, down: apostrophe semicolon
93 91 65360 # screen set up, down, play: bracketright bracketleft Home
236 39 65379 # group on, off, learn: igrave apostrophe Insert
# replace, queue, snapshot_1, snapshot 2, keep queue:
65507 65508 65513 65514 92 # Control_L Control_R Alt_L Alt_R backslash
1          # show_ui_sequence_key (1=true/0=false)
32         # space start sequencer
65307      # Escape stop sequencer

```

7.6 Seq24rc / JACK Transport

The JACK Transport options are also command-line options, as indicated in the comments below.

This configuration item is the same as the **Jack Sync** tab described in section [3.2.4.5 \(“Menu / File / Options / Jack Sync”\)](#) on page [17](#).

```

[jack-transport]

# --jack_transport: Enable sync with JACK Transport.  Seq24 will sync
# to JACK transport if the JACK server is available.
0

# --jack_master: Seq24 will attempt to serve as JACK Master.
0

# --jack_master_cond: Seq24 will fail to be JACK master if there is
# already a JACK master set.
0

# --jack_start_mode n
# 0 = Playback will be in live mode.  Use this value to allow muting
#     and unmuting of loops.
# 1 = Playback will be in performance mode.  Playback will use the song
#     editor's data.  When Seq24 is synced to JACK, the playback command
#     comes from the JACK server.  Seq24 is in performance mode by default.
1

```

7.7 Seq24rc / Other Sections

This configuration item is the same as the **Clock Start Modulo** option described in paragraph [3.2.4.1 \(“Menu / File / Options / MIDI Clock”\)](#) on page [12](#).

```

[midi-clock-mod-ticks]
64

```

This configuration item is the same as the **MIDI Input** tab described in paragraph [3.2.4.2 \(“Menu / File / Options / MIDI Input”\)](#) on page [14](#). The “1” is undoubtedly a record count, and would equal the number of supported input ports. This “rc” entry here has two variables; the first is the record number or port number, and the second number indicates whether it is disabled (0), or enabled (1).

```
[midi-input]
1
0 0          # [0] seq24 0
```

There is no user-interface item for the following value, but it does correspond to the `--manual_alsa_ports` command-line option.

```
# set to 1 if you want seq24 to create its own alsa ports and
# not connect to other clients

[manual-alsa-ports]
1
```

This configuration item is the same as the **Mouse** tab described in paragraph [3.2.4.4 \(“Menu / File / Options / Mouse”\)](#) on page [16](#).

```
# 0 - 'seq24' (original seq24 method)
# 1 - 'fruity' (similar to a certain fruity sequencer we like)

[interaction-method]
0
```

We’re not sure what directory the following item refers to. It is empty in our “rc” file.

```
[last-used-dir]

# Last used directory.
```

8 Seq24usr Configuration File

The *Seq24* configuration file is called `.seq24usr`, and it is stored in the user’s `$HOME` directory. It allows you to give an alias to each MIDI bus, MIDI channel, and MIDI control codes, per channel. The process is to:

1. Define one or more MIDI busses, the name of each, and what instruments are on which channels. Each bus is configured in a section of the form “[**user-midi-bus-X**]”, where “X” ranges from 0 on up.
2. Define all of the instruments and their control-code names if they have them. Each instrument is configured in a section of the form “[**user-instrument-X**]”, where “X” ranges from 0 on up.

8.1 Seq24usr / MIDI Bus Definitions

This section begins with an "INI" group marker [user-midi-bus-definitions]. It defines the number of user busses that will be configured in this file.

```
[user-midi-bus-definitions]
3      # number of user buses
```

This means that the .seq24usr file will have three MIDI buss sections: [user-midi-bus-0], [user-midi-bus-1], and [user-midi-bus-2]. Here's is an annotated example of one such section:

```
[user-midi-bus-0]
2x2 A (SuperNova,Q,TX81Z,DrumStation)      # name of the device
16                                         # number of channels

# NOTE: Channels are 0-15, not 1-16. Instruments set to -1 = GM

0 1                                         # channel and instrument
1 1
2 1
3 1
4 1
5 1
6 1
7 1
8 3
9 3
10 3
11 0
12 0
13 0
14 0
15 2
```

Here's an example of one that needs only one override:

```
[user-midi-bus-2]
PCR-30 (303)
1                                         # number of channels
0 8                                         # channel and instrument
# The rest default to -1 - General MIDI
```

8.2 Seq24usr / MIDI Instrument Definitions

This section begins with an "INI" group marker [user-instrument-definitions]. It defines the number of user instruments that will be configured in this file.

```
[user-instrument-definitions]
9      # number of user instrument
```

So this "rc" file will define 9 instruments. We will provide one section as a sample.

```
[user-instrument-0]
Waldorf Micro Q                      # name of instrument
128                                     # number of MIDI controllers
0                                         # first controller value, unnamed
1 Modulation Wheel
2 Breath Control
3
4 Foot Control
5 Glide Rate
6
7 Channel Volume
8
9
10 Pan
11
12 Arp Range (0-9) (1-10 octaves)
13 Arp Length (0-15) (1-16 steps)
14 Arp Active (0-3) (Off,On,One Shot,Hold)
15 LFO 1 Shape (0-5) (Sine,Tri,Square,Saw,Rand,S&H)
    .
119
120 All Sound Off (0)
121 Reset All Controllers (0)
122 Local Control (0-127) (Off,On)
123 All Notes Off (0)
124
125
126
127
```

We assume that an unnamed control number is an unsupported control number.

Here is an instrument where its synthesis parameters can be controlled:

```
[user-instrument-1]
SuperNova
```

```

128
0 Bank Select MSB
1 Modulation Wheel
2 Breath Controller
3 Arp Pattern Select
4 Ring Modulator 2 * 3 Mix Level
5 Portamento Time
6 Data Entry
7 Part / Program Volume
8 Effects Config Morph Amount
9 Arp Speed (Internal Clock Rate) [*]
10 Pan
11 Osc 1 Fine Tune
12 Osc 3 Fine Tune
13 Osc 1 Soften
14 Osc 2 Soften
15 Osc 3 Soften
16 LFO 1 Speed
17 LFO 1 Delay
    .
119 Delay Mod Wheel Depth
120 All Sound Off
121 Reset Controllers
122 Local Control [*]
123 All Notes Off
124 All Notes Off
125 All Notes Off
126 All Notes Off
127 All Notes Off

```

Here is an instrument that perhaps has no controllers, or maybe is simply not configured yet.

```

[user-instrument-4]
WaveStation
0

```

The sample file `contrib/scripts/dot-seq24usr` contains examples of some other kinds of instruments, such as drum machines.

Sometime we would like to create a section that sets up the *Yoshimi* 1.3.9+ software synthesizer as an instrument.

9 Seq24 Man Page

This section presents the contents of the *Seq24* man page, but not exactly in *man* format. Also, an item or two are shown that somehow didn't make it into the man page, and minor corrections and formatting

tweaks were made.

Seq24 - Real time MIDI sequencer.

Seq24 is a real-time MIDI sequencer. It was created to provide a very simple interface for editing and playing MIDI 'loops'.

seq24 [OPTIONS] [FILENAME]

Seq24 accepts the following options, plus an optional name of a MIDI file.

-h --help

Display a list of all command-line options.

-v --version

Display the program version.

N/A --file [filename]

Load MIDI file on startup. **Bug:** This option does not exist.

-m --manual_alsa_ports

Seq24 won't attach ALSA ports.

-s --showmidi

Dumps incoming MIDI to the screen.

-p --priority

Runs at higher priority with FIFO scheduler.

N/A --pass_sysex

Passes any incoming SYSEX messages to all outputs.

-i --ignore [number]

Ignore ALSA device [number].

-k --show_keys

Prints pressed key value.

-x --interaction_method [number]

Select the mouse interaction method. 0 = seq24 (the default); and 1 = fruity loops method.

-j --jack_transport

Seq24 will sync to JACK transport.

-J --jack_master

Seq24 will try to be JACK master

-C --jack_master_cond

JACK master will fail if there is already a master

-M --jack_start_mode [x]

When **Seq24** is synced to JACK, the following play modes are available: 0 = live mode; and 1 = song mode, the default.

-S --stats

Print statistics on the command-line while running.

-U --jack_session_uuid [uuid]

Set the UUID for the JACK session.

`$HOME/.seq24rc` stores the user settings for Seq24.

The old project homepage is at <http://www.filter24.org/seq24/> the new one is at <https://edge.launchpad.net/seq24/>. It is released under the GNU GPL license.

Seq24 was written by Rob C. Buse <mailto:seq24@filter24.org> and the Seq24 team.

This manual page was written by Dana Olson <mailto:seq24@ubuntustudio.com> with additions from Guido Scholz <mailto:guido.scholz@bayernline.de>.

Version 0.9.2

November 20 2010

Seq24(1)

10 Summary

In summary, we can say that you will find Seq24 intriguing.

There are some topics that this document does not yet treat ...:

Contact: If you have ideas about Seq24 or a bug report, please email us (at <mailto:seq24@filter24.org>). If it's a bug report, please add [BUG] to the Subject.

11 References

The Yoshimi seq24 reference list.

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Index

- file [filename], 55
- help, 55
- ignore [number], 55
- interaction_method [number], 55
- jack_master, 50, 55
- jack_master_cond, 50, 55
- jack_session_uuid [uuid], 55
- jack_start_mode, 50
- jack_start_mode [x], 55
- jack_transport, 50, 55
- manual_alsa_ports, 55
- pass_sysex, 55
- priority, 55
- show_keys, 55
- showmidi, 55
- stats, 55
- version, 55
- C, 55
- J, 55
- M, 55
- S, 55
- U, 55
- h, 55
- i, 55
- j, 55
- k, 55
- m, 55
- p, 55
- s, 55
- v, 55
- x, 55
- .seq24rc, 43
- .seq24usr, 51
- [.seq24rc], 43
- [.seq24usr], 51
- [interaction-method], 51
- [jack-transport], 50
- [keyboard control], 48
- [keyboard-group], 48
- [last-used-dir], 51
- [manual-alsa-ports], 51
- [midi-clock-mod-ticks], 50
- [midi-clock], 47
- [midi-control], 43
- automation group, 46
- bpm down, 46
- bpm up, 46
- mod glearn, 46
- mod gmute, 46
- mod queue, 46
- mod replace, 46
- mod snapshot, 46
- mute-in group, 46
- screen-set down, 46
- screen-set play, 46
- screen-set up, 46
- [midi-input], 51
- [user-instrument-definitions], 53
- [user-midi-bus-definitions], 52
- armed, 6
- auto-notes, 34
- automation group, 46
- Background Sequence, 31
- bar indicator, 6
- Beat, 33
- Beat Unit, 27, 39
- beat unit, 34
- Beats Per Bar, 27, 39
- bpm, 25
- bpm down, 46
- bpm up, 46
- bugs
 - file option doesn't exist, 55
 - empty pattern scrolls, 22
 - event editing can fail, 36
 - in document, 5
 - pattern cut doesn't work, 23
 - set name has side-effect, 26
 - set number has side-effect, 26
- bus, 6
- buss, 6
- Buss Name, 13
- Clear Song Data, 23
- Clock Start Modulo, 13
- Collapse, 39
- Connect, 18
- Control keys, 15
- Copy, 23

ctrl left click, 29, 35
ctrl left click drag, 29, 34, 35
Cut, 22

Data To MIDI Buss, 37
Disable, 16
Disconnect, 18
draw mode, 34

Edit, 22
Enable, 16
event data, 36
event data editor
 draw, 36
 left click, 36
 middle click, 36
 mouse wheel, 36
 right click, 36
Event Selection, 37
Event Selector, 37
event strip, 36
Event Values, 33
Events, 33
events strip, 33
Expand, 40
Expand and copy, 40

Grid Snap, 30, 39
group, 6
 learn, 20
 learning, 46
 muting, 46
 toggle, 20
group learn, 49
group toggle, 49

JACK
 live mode, 18
 master conditional, 18
 song mode, 18
 transport, 18
 transport master, 18

jack sync
 connect, 18
 disconnect, 18
 transport, 18

Key of Sequence, 30
keyboard

control keys, 15
disable, 16
enable, 16
learn, 16
mute-group slots, 16
sequence toggle keys, 16
show labels, 15

keys
 [, 16, 20, 24
], 16, 20, 24
 alt, 24
 alt-l, 15
 alt-r, 15
 apostrophe, 15, 16, 26
 backslash, 16, 24
 ctrl-a, 28, 35
 ctrl-c, 34, 35, 42
 ctrl-l, 16
 ctrl-r, 16
 ctrl-v, 34, 35, 42
 ctrl-x, 34, 35
 ctrl-z, 28
 del, 34, 35
 delete, 42, 43
 esc, 15
 esc (stop), 25, 39
 home, 16
 igrave, 16
 left ctrl, 25
 left ctrl alt, 24
 pattern toggles, 24
 right ctrl, 24
 semicolon, 16, 26
 space, 15
 space (play), 25, 39

L anchor, 43
L button, 20
L marker, 39
Learn, 16
left click, 29, 35
left click drag, 29, 35
Loop, 39
loop, 6

Measure, 33
measures ruler, 6, 41
 left-click, 43

right-click, 43
 Midi Bus, 23
 midi clock, 6
 buss name, 13
 clock start modulo, 13
 off, 13
 on (mod), 13
 on (pos), 13
 MIDI Data Pass-Through, 37
 MIDI Out Device, 27
 MIDI Out Port, 27
 mod glearn, 46
 mod gmute, 46
 mod queue, 46
 mod replace, 46
 mod snapshot, 46
 Musical Scale, 30
 Mute All Tracks, 23
 Mute Group Learn, 20
 Mute-group slots, 16
 mute-in group, 46

 N/A, 55
 Name, 26
 New, 21
 Note Length, 30
 Notes, 33

 Off, 13
 On (Mod), 13
 On (Pos), 13

 Paste, 21
 pattern, 7
 beat, 22, 41
 bpm, 25
 bus-channel, 22
 channel, 41
 clear song data, 23
 contents, 22
 copy, 23
 cut, 22
 edit, 22
 end marker, 33
 left click, 22, 25
 left click-drag, 25
 left ctrl left click, 25
 middle click, 25
 midi bus, 23
 mute, 25
 mute all, 21
 mute all tracks, 23
 mute group learn, 20
 mute toggle, 25
 name, 21, 41
 new, 21
 paste, 21
 Play, 25
 progress, 20
 right click, 21, 22, 25
 set name, 26
 set number, 26
 slot, 21
 song, 23
 span, 41
 stop, 25
 title, 41
 toggle song editor, 26
 unmute, 25
 pattern editor
 background sequence, 31
 beat unit, 27
 beats/bar, 27
 copy, 34, 35
 ctrl left click, 34, 35
 cut, 34, 35
 data to midi buss, 37
 delete, 34, 35
 event compression, 35
 event selection, 37
 event selector, 37
 event stretch, 35
 grid snap, 30
 key, 30
 left click drag, 34, 35
 left click right hold, 34
 middle click, 34, 35
 midi data pass-through, 37
 midi out device, 27
 midi out port, 27
 name, 27
 note length, 30
 paste, 34, 35
 progress, 27
 quantize, 28
 quantized record, 37
 record midi data, 37

redo, 28
right click hold, 34
right left hold drag, 34
scale, 30
shift middle click drag, 35
time scroll, 37
tools, 28
undo, 28
vol, 37
zoom, 30

Pattern Length, 27
Pattern Name, 27
pattern subsection, 42
patterns column
 left click, 41
 right click, 42
performance, 7
piano roll
 beat, 33
 event values, 33
 events, 33
 measure, 33
 notes, 33
 virtual keyboard, 33

Play, 25, 39

Quantize Selection, 28
Quantized Record, 37

queue
 keep queue, 24
 permanent, 24
 temporary, 24

R anchor, 43
R marker, 39
Record MIDI Data, 37
Redo, 28

screen set, 7, 20
screen-set down, 46
screen-set play, 46
screen-set up, 46
sequence, 7
Sequence toggle keys, 16
Set, 26
Show key labels on sequence, 15
snapshot, 7
Song, 23
song, 7

main time—hyperpage, 20
progress, 20
Song / Mute All Tracks, 21
song editor
 beat unit, 39
 beats/bar, 39
 collapse, 39
 expand, 40
 expand and copy, 40
 grid snap, 39
 left click, 43
 left click right hold, 42
 loop, 39
 middle click, 42
 mute indicator, 41
 pattern subsection, 43
 play, 39
 right click hold, 42
 right left hold drag, 42, 43
 stop, 39
 undo, 39

Song Progress, 20
Stop, 25, 39

Time Scroll, 37

tips
 in document, 4

todo
 explain queue, 46
 explain recording volume, 38
 explain replacement, 46
 explain snapshots, 46
 group learning, 46
 high precision events, 36
 how mute all tracks works, 23
 in document, 5
 keep queue, 16
 keyboard disable, 16
 mute-group, 16
 queue definition, 7
 snapshot definition, 7, 16
 solve seq24 format, 10
 what is tighten—hyperpage, 29

Toggle Song Editor, 26
Tools, 28
tooltips, 5
Transport, 18

Undo, 28, 39

Virtual Keyboard, [33](#)

Vol, [37](#)

Zoom, [30](#)