

Editing Sequences II

After completing this lesson, you should be familiar with the following concepts:

- **Region edits** allow you to change the values of notes in a range of measures while **event edits** allow you to change data one note at a time.
- **Sequencers** divide up each beat into many units called ticks. The number of ticks which make up each quarter note is called the **ppq** or parts per quarter.
- The **event edit window** displays MIDI data as individual messages. Each message is shown with the measure, beat, and tick on which it occurred. Note messages are shown with their note, attack and release velocity messages as well as their duration and ending time in beats and ticks.
- The **graphic editing window** gives you a different way to edit MIDI data by displaying each note as a bar whose length can be adjusted, start time can be adjusted, and which can be dragged up or down to create different transpositions.
- The **event list window** is very helpful when you need to change something about just one note in a track, while **region edits** are more useful when you need to edit many notes at once.

Glossary for this Lesson:

Event Edit- A method of editing MIDI data in which MIDI messages (events) are displayed in a list so that you can change individual things about each event.

Event List- A list of MIDI messages shown in the event edit window.

Graphic Editing- A method of editing MIDI data in which MIDI messages are displayed graphically as long, narrow bars. You can then change the length, timing, and transposition of the note by dragging it.

Parts Per Quarter- A measurement of how many ticks a sequencer divides each quarter note into. The higher the number of parts per quarter, the more sensitive the sequencer is to the timing nuances in your playing. Most modern sequencers allow for 480 ticks per quarter note.

PPQ- The abbreviation of parts per quarter.

Region Edit- An edit which changes MIDI data in a range of measures instead of changing one event at a time (event edit).

Tick- The smallest division of a beat a sequencer can sense.

Editing Sequences II

AND NOW THE MAIN EVENT

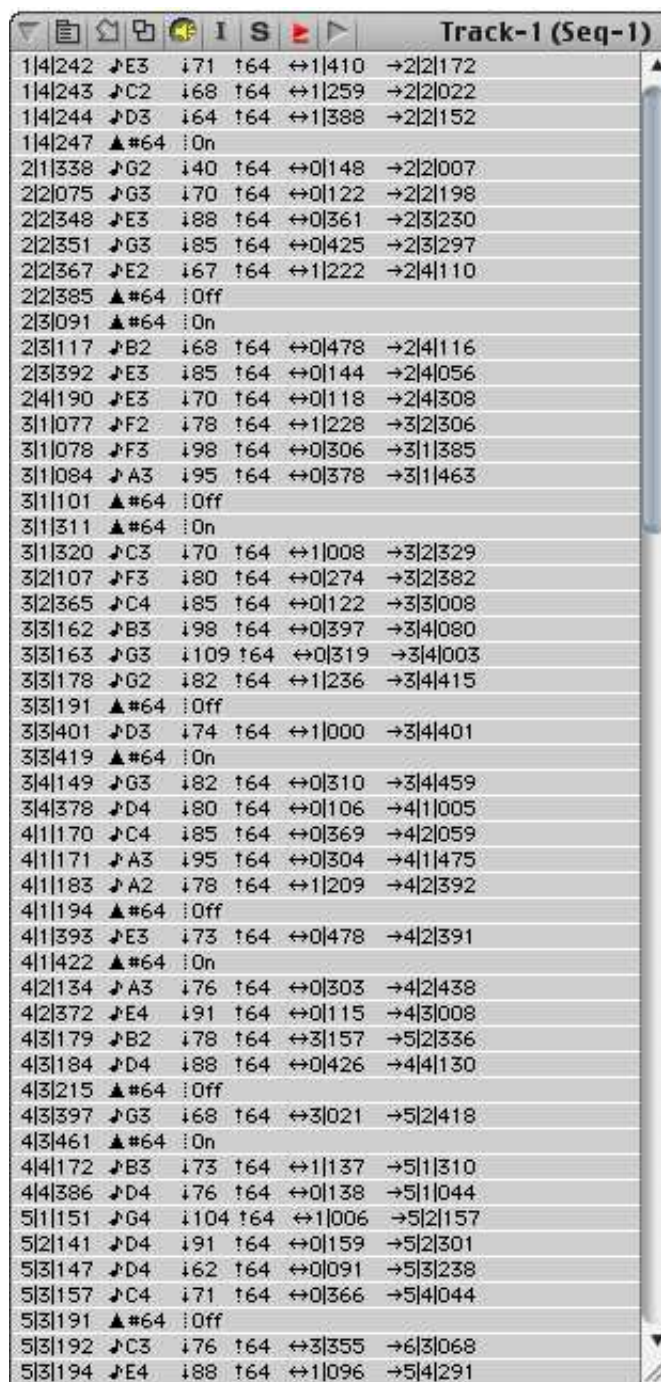
In the last lesson, we learned several different editing techniques which allowed us to edit MIDI data in a certain region of a track. This region was defined by selecting a measure or group of measures. For this reason, we will refer to these editing procedures as **region edits**. Region edits are very useful and essential to make a MIDI track sound its best. However, there are times when we want to edit just one or two notes, and not an entire measure. In times like these, region edits won't usually help very much. We need to use a different kind of editing technique which will allow us to change individual events in a MIDI track. This group of edits is referred to as **event edits**, and we will learn all about them in this lesson.

GETTING ON THE GUEST LIST

Almost every software sequencer on the market is able to display the contents of a MIDI track as a list of data. You can see an example of a list on the right side of this page. This window is called an **event list**. The event list window provides a lot of very useful information. The window displays only one track's data at a time, but you can usually have several of these windows open at once if you wish. Most sequencers allow you to open this window by simply double-clicking on some MIDI data from the main window.

DEER TICKS AND WOOD TICKS

Before we dive into learning about the event list window, it is important to learn a little bit about how sequencers measure time. We already know that sequencers measure time in measures and beats, but what is finer than a beat? A **tick** is one tiny part of a beat. Most sequencers divide up each quarter note into 96 or more parts (ticks). More sophisticated sequencers can divide up each quarter note into as many as 48,000 ticks! It is much more common, however, to use 480 ticks per quarter note as a standard. When a quarter note gets 480 ticks, an eighth note gets 240,



Time	Event	Data 1	Data 2	Data 3	Data 4
1 4 242	♪E3	171	164	↔1 410	→2 2 172
1 4 243	♪C2	168	164	↔1 259	→2 2 022
1 4 244	♪D3	164	164	↔1 388	→2 2 152
1 4 247	▲#64	10n			
2 1 338	♪G2	140	164	↔0 148	→2 2 007
2 2 075	♪G3	170	164	↔0 122	→2 2 198
2 2 348	♪E3	188	164	↔0 361	→2 3 230
2 2 351	♪G3	185	164	↔0 425	→2 3 297
2 2 367	♪E2	167	164	↔1 222	→2 4 110
2 2 385	▲#64	10ff			
2 3 091	▲#64	10n			
2 3 117	♪B2	168	164	↔0 478	→2 4 116
2 3 392	♪E3	185	164	↔0 144	→2 4 056
2 4 190	♪E3	170	164	↔0 118	→2 4 308
3 1 077	♪F2	178	164	↔1 228	→3 2 306
3 1 078	♪F3	198	164	↔0 306	→3 1 385
3 1 084	♪A3	195	164	↔0 378	→3 1 463
3 1 101	▲#64	10ff			
3 1 311	▲#64	10n			
3 1 320	♪C3	170	164	↔1 008	→3 2 329
3 2 107	♪F3	180	164	↔0 274	→3 2 382
3 2 365	♪C4	185	164	↔0 122	→3 3 008
3 3 162	♪B3	198	164	↔0 397	→3 4 080
3 3 163	♪G3	1109	164	↔0 319	→3 4 003
3 3 178	♪G2	182	164	↔1 236	→3 4 415
3 3 191	▲#64	10ff			
3 3 401	♪D3	174	164	↔1 000	→3 4 401
3 3 419	▲#64	10n			
3 4 149	♪G3	182	164	↔0 310	→3 4 459
3 4 378	♪D4	180	164	↔0 106	→4 1 005
4 1 170	♪C4	185	164	↔0 369	→4 2 059
4 1 171	♪A3	195	164	↔0 304	→4 1 475
4 1 183	♪A2	178	164	↔1 209	→4 2 392
4 1 194	▲#64	10ff			
4 1 393	♪E3	173	164	↔0 478	→4 2 391
4 1 422	▲#64	10n			
4 2 134	♪A3	176	164	↔0 303	→4 2 438
4 2 372	♪E4	191	164	↔0 115	→4 3 008
4 3 179	♪B2	178	164	↔3 157	→5 2 336
4 3 184	♪D4	188	164	↔0 426	→4 4 130
4 3 215	▲#64	10ff			
4 3 397	♪G3	168	164	↔3 021	→5 2 418
4 3 461	▲#64	10n			
4 4 172	♪B3	173	164	↔1 137	→5 1 310
4 4 386	♪D4	176	164	↔0 138	→5 1 044
5 1 151	♪G4	1104	164	↔1 006	→5 2 157
5 2 141	♪D4	191	164	↔0 159	→5 2 301
5 3 147	♪D4	162	164	↔0 091	→5 3 238
5 3 157	♪C4	171	164	↔0 366	→5 4 044
5 3 191	▲#64	10ff			
5 3 192	♪C3	176	164	↔3 355	→6 3 068
5 3 194	♪E4	188	164	↔1 096	→5 4 291

a sixteenth note 120 and so on. The advantage of using a number like 480 instead of something even like 500 is that 480 can be divided equally by both 2 (for eighth notes, sixteenth notes and so on), by 3 (for triplets), and by 5 (for quintuplets). It is very

important to be able to figure out what a rhythm would look like when represented in the event list window because this is how you can tell how accurate your playing was.

Each event in the track occurs at a particular time in the sequence, so the start time of each event is shown in the left most column. The start times of the events appear in the following format: Measure# | Beat# | Tick#. The first note shown on page 57 would then start in the first measure one eighth note after the first beat since its start time is listed as 1|4|242. This particular note is 2 ticks late. A note which is this close to being perfectly in time will probably sound like it is perfectly in time to most listeners. Under the system of 480 **ppq** or **parts per quarter** (the measurement of how sensitive a sequencer is to timing) if all of the values in the ticks column were set to zero, then every note would fall exactly on a beat. If notes were on eighth notes, you would see 000 and 240 as values in the ticks column. If you had sixteenth notes, you would see 000, 120, 240, and 360 as possible values.

MESSAGES

As we learned in Lesson Five, there are hundreds of types of MIDI messages. The type of each MIDI message is displayed just to the right of the time column in the event edit window. The two most common messages by far are note and controller messages. Note messages are represented with a small eighth note while controller messages are represented with a triangle. You can see examples of both of these messages on page 56.

WORKING WITH NOTE MESSAGES

Next to each note message symbol is a note name and its octave value. Middle C is C3, while the C one octave higher is C4 and so on. When you click on a note message, That note message will be sent out the MIDI interface and will play a synthesizer so that you can hear the note. By dragging over many different note messages, you can get them all to play. You can change any note by double-clicking on it to select it, and then dragging up or down on the note,

typing in a new note name and number, or by playing the key on the keyboard.

To the right of the note message is a small arrow pointing down followed by a number. This number is the velocity value for the note. After double-clicking this number, you can change values again by dragging up or down, by typing in a value, or by playing the keyboard. The next column to the right (with the arrow pointing upwards) is the release velocity column. Since most keyboards can't create release velocity messages, this number usually shows up as 64. You can change this value here if you wish, however.

To the right of the velocity values are the duration values. The left column shows the duration of the note in beats and ticks while the right column shows the bar, beat, and tick the note ends on. Entering a new value into one changes the other. The reason that sequencers display data both ways is that sometimes we are interested to see how long a note is. Even if the note doesn't start exactly on the beat, we can see if it is exactly as long as we want it to be without much difficulty. There are other times when it is more important to see when a note ends, and we can use the second column for this purpose.

CONTROLLER MESSAGES

Next to the triangle which indicates that a message is a controller message, you can see the controller's number. To the right of the controller's number, you can see its value. Most controller's values range from 0-127, but those which have only two possible values (like the hold pedal) show up as on or off.

WHEN DO WE USE THE LIST WINDOW?

As you can probably guess, the event list window is really helpful in many cases, but there are also times when it is not the best way to accomplish things. The event list window is an excellent way to edit the tiniest details of a particular track. It allows you to make changes note by note and it allows you to put a track under the microscope and see all of the nuances of the track. The strength of the event list

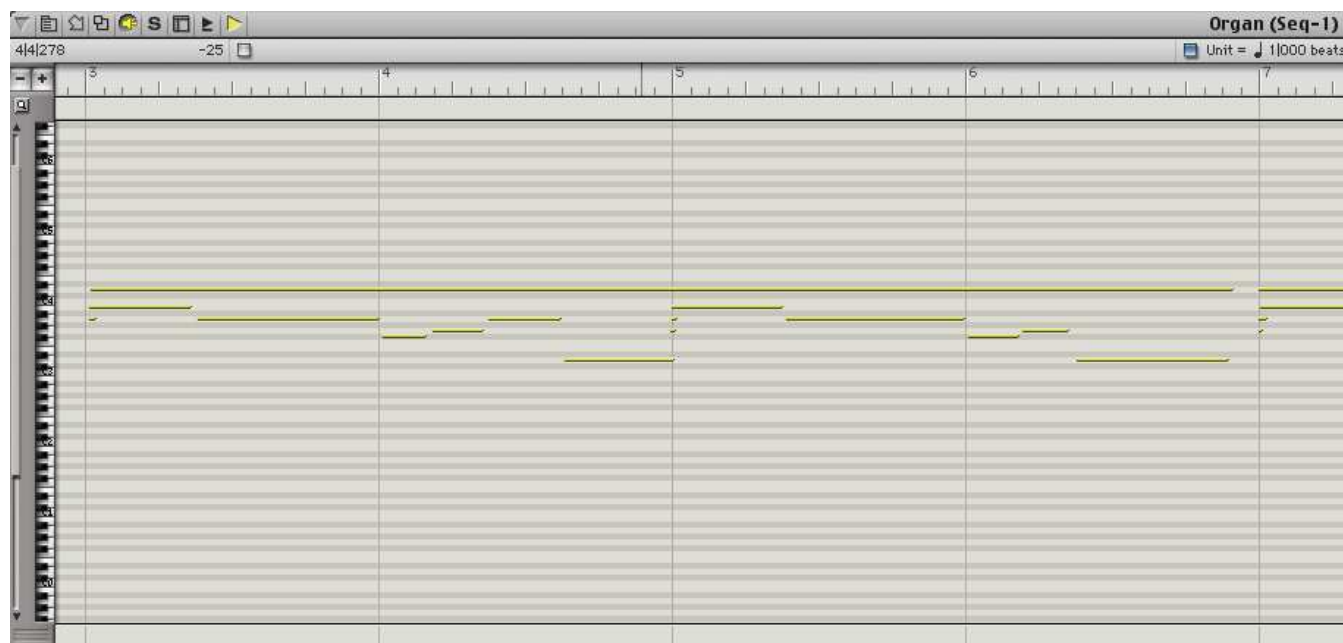
window is that it lets us change a track one event at a time. However, the event list's strength is also its weakness. While there are times we might want to edit one note's velocity, there are also times when we want to edit the velocity data of many different notes. While we could go through the entire track and change them all manually, this could take a lot of time. We would be better off trying to find a region edit that would accomplish the task for us in less time.

The event list is also extremely helpful when we need to remove one small piece of data from the track, such as one note we accidentally played or removing an extra pedal message from the track which is making notes stick. The event edit window also allows us to view data to see if it has been quantized.

As you might guess, you can click on any of the bars and drag them up or down to change the note from one to another. You can also click on the either end of the note to drag it forward or backward, making the note shorter or longer. By drag-enclosing several notes, you can drag them all up or down and transpose a small group of notes this way.

The graphic editing window also allows you to see notes with very short durations easily. It is important to spot these notes, as they are often notes which you accidentally pressed while playing in a part in real time.

The final way in which the graphic editing window is helpful is perfectly lining up audio and MIDI events that might not be on a beat. The graphic editing window can display audio and MIDI tracks side



VIEWER DISCRETION ADVISED

Another method of editing which is very different from the event list is the **graphic editing** window. You can see the graphic editing window above. You can open the graphic editing window from the mini menu in the event list window. The graphic editing window displays notes as long bars. These bars line up with the piano keyboard at the left side of the window so that you can determine what notes you are looking at.

by side. When you can see the exact place where an audio event happens, it is easy to drag the MIDI event to match it.

Although it is not immediately obvious, you can edit velocity messages in the graphic editing window as well. Below the main pane of the graphic editing window is another pane (not shown) with a small x for each note. By dragging these x's higher and lower in the pane, you can change each note's velocity value.

Let's Review

1. What is the event window, and when is it the best choice for editing MIDI data?
2. What kinds of data can be edited in the event edit window? How can you input data? How can you tell when each event occurs by looking at the event list? Why are these numbers displayed two ways? How can you edit this data?
3. How do sequencers divide up beats, and what is this called? Why is it important to understand this and how can you tell what beats you played on by looking at this data?
4. What is the graphic editing window, and when is it a good choice for editing MIDI data? What kinds of edits can you perform in the graphic editing window? What kinds of data are shown?

Words To know:

Event Edit	Parts Per Quarter	Tick
Event List	PPQ	
Graphic Editing	Region Edit	

Experiments:

1. Input some MIDI performance data in real time (be sure to use some controller data) and double click on it. Use the event list window to look at your data. Did you play accurately? What is the smallest rhythmic value you played?
2. Now try changing velocity and duration data. Try entering data by typing, dragging, and using the keyboard. What happens when you change the start time on an event? Is it possible to change notes from one note to another?
3. Can you see some controller data in the event list? How can you tell that these messages are controllers? Can you change events from one controller to another? Is it possible to change the value of the controller and its start time?
4. View your data in the graphic editing window (use the mini menu in the event edit window). Try transposing some notes by dragging them. Next try changing the durations of notes by moving the ends. Also try moving notes forward and backward in time by dragging them. Finally, try editing the velocity of different notes by dragging the x's. Can you see your controller data in this window?