



Basic MIDI Editing Tutorial

Using Metro 6 and Metro SE

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TECHNOLOGY

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Introduction

This tutorial covers the basics of editing MIDI tracks using the **Graphic Editor Window**.

In order to follow along with the tutorial, you'll need the Metro document entitled "5BarEdit_start." This is the unedited version of a short musical section with two MIDI tracks.

As you work through the tutorial, you'll be making changes to this document by practicing the editing methods in the tutorial. It is a good idea to save the document periodically using a new name, i.e., "5BarEdit_practice" or a similar name.

If you are unsure of whether you have executed the tutorial exercises correctly at any point, you can open and review the included Metro document entitled "5BarEdit_finished," which is the same musical section, but with all of the tutorial exercises correctly applied.

If you are interested in additional technical information on techniques used in this tutorial, they can be found in the Metro online manual.

Getting Ready

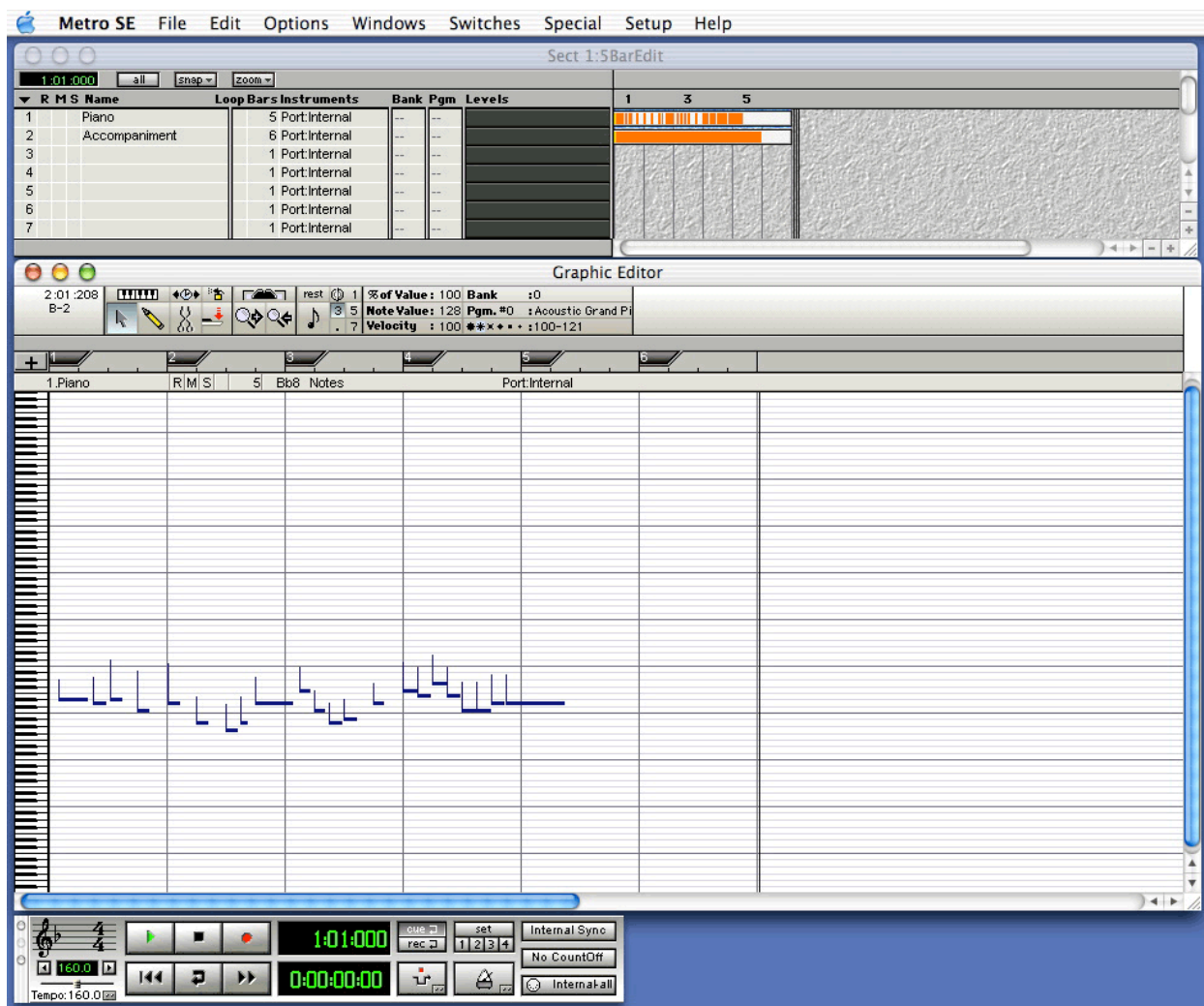
We'll be exploring the basic MIDI editing capabilities using the Metro Graphic Editor window.

First we'll open a practice file to work with:

1. Select *Open* from the Files menu or press **Command-O**.
2. Select the file "5BarEdit_start" from the Tutorial folder. This is a simple Metro document with two tracks: 1) a 5 bar melody on piano and 2) a guitar accompaniment.

Now, let's set up the working space by ensuring that the Tracks, Graphic Editor, and Transport windows are open and arranged as in the illustration below.

1. Press **Command-T** to open the Tracks window.
2. Press **Command-J** to open the Graphic Editor window.
3. Press **Command-B** to open the Transport window.
4. Arrange the three windows as in the illustration below.



Graphic Editor Window Overview

The Graphic Editor window displays graphic representations of audio, video and MIDI data across multiple tracks of the current Section. Metro's Graphic Editor window has the ability to display up to 16 tracks of audio, video, or MIDI data, which can be viewed in various display modes.

Graphic Editor Timeline

The Graphic Editor window displays bars and beats in a horizontal graph just under the toolbar. This area is called the **Timeline**. Data is displayed in either Bar/Beat/Clock time or in SMPTE time, depending on the display you've chosen in the Switches menu.

For the purposes of our exercises in this tutorial, we'll use the Bar view. If this is not the current view, select *Bar Display* from the Switches menu or press **Command-D**.

In our example, select the **Piano** track by clicking on its **Number**, **Name**, or **Bar** field in the Tracks window. This MIDI track will now be displayed in the Graphic Editor window. The default view mode is the Notes view or MIDI Piano Roll.

Note events are displayed as horizontal bars in the "piano roll" area directly below the track's titlebar. Notes can also be displayed using Metro's Velocity Stems feature (**Switches** menu). Let's make sure this feature is turned on by selecting *Velocity Stems* from the Switches menu. You can edit note events using graphical techniques, such as dragging the note to a new start time or pitch, or **Shift**-dragging the note to extend duration, as we'll do later in this tutorial.

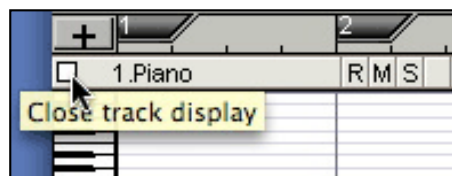
The Track Titlebar

Each track displayed in the Graphic Editor has a corresponding titlebar.



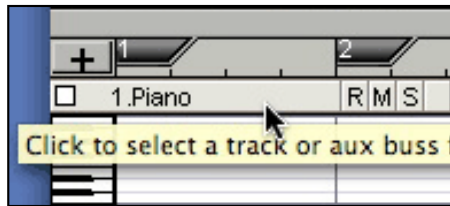
A track's titlebar also displays other relevant controls and menus for that track, including **Record**, **Mute**, **Solo**, and **Loop** buttons, and the **Track Name**, **Data Type** and **Instrument** popup menus. New tracks will default to the name "Untitled". You can name tracks by **Option**-clicking on the Track Name popup menu (within the track's titlebar), or by **Option**-clicking the corresponding track's Name field in the Tracks window.

Let's take a look at each of the elements of the track's titlebar:



Close Track:

Clicking the Close Track Display icon will close the currently selected track.



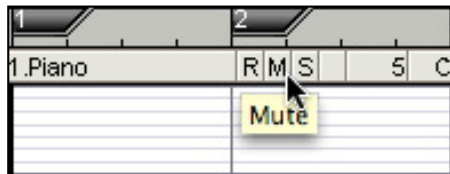
Select Track:

Clicking the name of the currently selected track will allow you to select an alternate track to display.



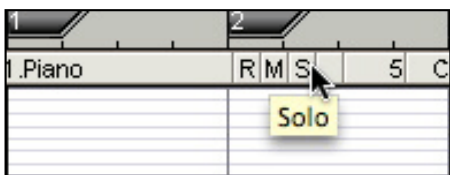
Record Enable:

Clicking the **R** in the titlebar will enable recording on the currently selected track.



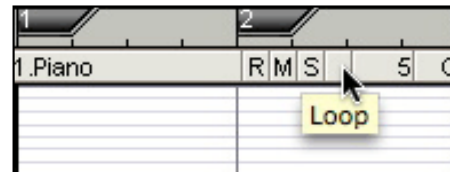
Mute:

Clicking the **M** in the titlebar will mute the currently selected track.



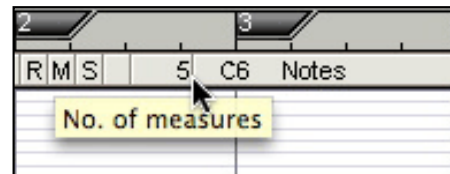
Solo:

Clicking **S** in the titlebar will mute all other tracks except the selected track.



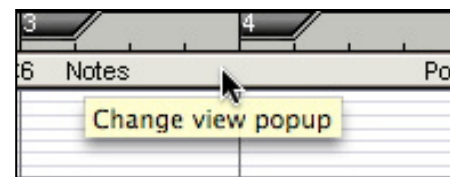
Loop:

Clicking here will turn on or off looping of the current track. The loop icon will display when looping is turned on.



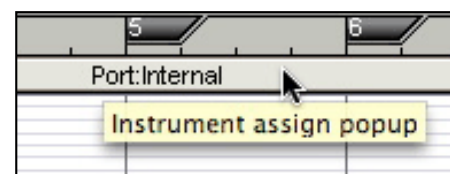
Number of Measures:

Clicking and dragging on the number of measures will increase or decrease the number of measures in the currently selected track.



Data Display:

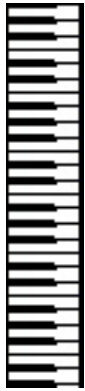
Clicking on the current View mode will allow you to select from a variety of data view options including Notes, Drums, Pitch Bend, Controllers, etc.



Instrument Assign:

Clicking on the Instrument name will allow you to edit or select an alternate port.

The Audible Keyboard



The **Audible Keyboard** is a representation of a standard piano keyboard and is only found within the Notes (MIDI piano roll) display of the Graphic Editor window. When you position the cursor over a key, the note information is displayed, based on the current cursor position, at the top left corner of the Graphic Editor window in the Time and Pitch Display.

2:01:208
B-2

Clicking on a key on the keyboard plays that note on the Instrument currently assigned to that track. If Metro is recording, you can click notes on the keyboard to record them. The **Audible Keyboard** can also be used for Step Time entry.

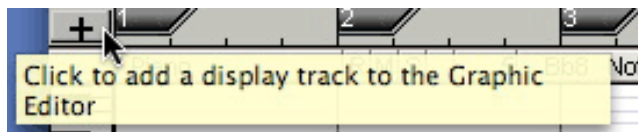
Clicking and holding the mouse while moving up and down across the **Audible Keyboard** continues to play or record these notes. Velocity is controlled by moving the mouse left or right. **Option**-clicking on the keyboard plays notes in the most recently selected scale.

Option-click the Zoom In icon to vertically zoom in on the **Audible Keyboard**. This action also increases the size of note data displayed in the Graphic Editor. **Option**-click the Zoom Out icon to zoom the **Audible Keyboard** back to its default size.


Choosing the Pencil Tool puts you into Metro's Step Record mode. With the **Pencil Tool** selected, clicking on a key enters the note; the current insertion point determines the entered note's start time.

Displaying Multiple Tracks in the Graphic Editor

You can display a single track of data or multiple tracks of data by clicking on the **Add Tracks Icon**.



Let's add a track to view both the **Piano** track and the **Accompaniment** track.

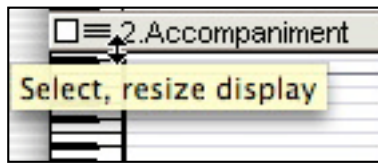
1. Click the **Add Tracks** icon  (to the left of the Timeline) to display more tracks in the Graphic Editor window.

Once you add a new track, you can change it to view data in any variety of graphical displays by clicking the data display popup in the titlebar.

2. Click on the TRACK NAME section of the titlebar for the new track and select **Accompaniment** from the pop-up list.
3. Now you can see both the **Piano** and **Accompaniment** MIDI tracks.

When displaying more than one track at a time, titlebars of any inactive tracks appear differently. You can make a track active by clicking on its titlebar or anywhere within its display area (**Shift**-click to activate multiple tracks at once). To close a track in the Graphic Editor window, click the close box at the left end of the track's titlebar.

To resize a track's display in the Graphic Editor window, click and drag the track's Resize icon up or down to increase or decrease the viewable area of the track.



The Resize Display icon appears in the titlebar between the Close box and the Track Name popup menu when multiple tracks are displayed.

MIDI Track Display Modes

As we mentioned in the overview of the titlebar, the Graphic Editor window can simultaneously display up to 16 tracks, including different tracks or the same tracks in a variety of graphical displays (Notes, Drums, Controllers, After Touch, Pitch Bend, etc.).

In a MIDI track, the following display modes are available:

Notes Display - MIDI Piano Roll

Typing the **n** key, or choosing Notes from the Data Type pop-up menu within the current track's titlebar, changes the desired track to show MIDI note data in the piano roll display. Note events are displayed as horizontal bars in the "piano roll" area directly below the track's titlebar. A new (empty) Metro track will automatically default to the Notes display.

Drums Display

Typing the **d** key, or choosing Drums from the **Data Type** pop-up menu within the current track's titlebar, changes the desired track to show note data in the Drum Grid display. The Drum Grid display shows the Drum Names associated with the current user-definable Drum Sets assigned to a given track. Note events associated with each Drum Name are shown as graphical Drum Strikes; each of the six available Drum Strike icons is displayed according one of the six user-definable velocity ranges.

The Controller Display

Typing the **k** key, or choosing Controller from the Data Type pop-up menu within the current track's titlebar, changes the desired track to show graphical controller data within the Graphic Editor window. Choosing Controller from the Data Type pop-up menu within a track's titlebar adds an additional **Controller Type** pop-up menu item to the current track's titlebar display; use the **Controller Type** pop-up menu for designating which controller name/number is to be displayed. The list of available controllers shown within the **Controller Data Type** pop-up menu is dynamically linked to the Controller Names specified in the Favorite Controllers dialog under the **Setup** menu.

The After Touch Display

Typing the **a** key, or choosing After Touch from the Data Type pop-up menu within the current track's titlebar, changes the current track to show After Touch data.

The Poly After Touch Display

Choosing Poly After Touch from the Data Type pop-up menu within the current track's titlebar changes the current track to show Poly After Touch for a specific note number on that track. Since you are dealing with pitch-specific data, be sure to use the **Pitch** field in the upper portion of the Graphic Editor window to

specify the pitch (note) for which you would like to view or edit the Poly After Touch data.

The Pitch Bend Display

Typing the **p** key, or choosing Pitch Bend from the Data Type pop-up menu within the current track's titlebar, changes the current track to show Pitch Bend. The Pitch Bend range of the window is controlled (in semi-tones) using the **Set Pitch Bend Sensitivity** in the Pitch Bend dialog under the **Options** menu (the **Define Instruments** dialog within the Instruments window also provides Instrument specific Pitch Bend Sensitivity).

The Program Change Display

Typing the **g** key, or choosing Program Change from the Data Type pop-up menu within the current track's titlebar changes the current track to show Program Change messages. Program Change messages are represented by a small circle followed by a horizontal line; the horizontal line will extend until the next Program Change message, or until the end of the piece if no other Program Change events are present.

Average Velocity Display

Typing the **v** key, or choosing Average Velocity from the Data Type pop-up menu within the current track's titlebar, changes the current track to show Note Velocity data. When multiple notes are playing simultaneously within a track, corresponding velocities will be averaged when shown in the Average Velocity display.

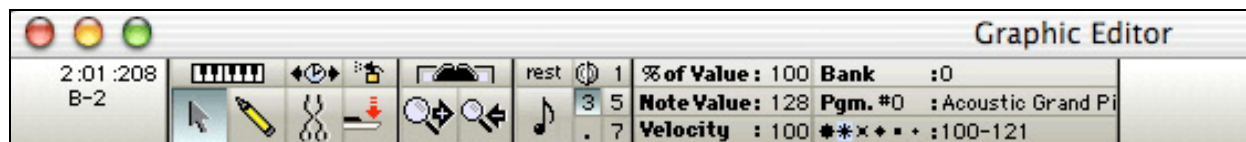
The Tempo Display

Typing the **t** key, or choosing Tempo from the Track Name pop-up menu within the current track's titlebar, changes the current track to show the current Section's tempo data. All displayed tempo data affects the current Section (tempo is not track specific), and tempo events are placed in the Section Event Editor window.

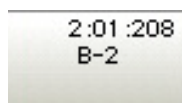
In each of the displays, continuous data can be edited using the **Pencil** and **Curve Tools** to draw in new events or values, and the **Arrow Tool** can be used to select existing elements or events.

MIDI Track Editing Tools Overview

At the top of the Graphic Editor window are a series of selection and editing tools for working with the tracks and track data.



As we explore several of the basic tools, we'll make adjustments to the sample file that you opened at the beginning of this tutorial. *First, let's review each of the tools:*



Time and Pitch Display
Displays the cursor's current.



The Velocity Stem Edit Tool
Used to edit individual note velocities, or scale a selected range of velocities by dragging the Velocity Stem up or down.



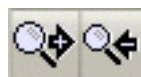
The Arrow Tool
Select all data in a time range by dragging across the area. Command-clicking allows for noncontiguous selections.



Pitch Bend Note View Button
Toggles the Pitch Bend view in the Notes display on and off.



Horizontal Keyboard
Enables your MIDI controller to act as a direct input device.



Zoom In and Out Magnifying Glass
Zooms the Graphic Editor display in or out at 10 different levels.



The Pencil Tool
Turns the cursor into a data entry tool. To erase data, click the data again with the Pencil Tool.



Rest Tool
To enter a rest for as long as the specified **Note Value** and **% of Value** settings.



Forceps Tool
Allows you to use the mouse to select a square marquee area and will select notes and Drum Strikes limited in time and pitch.



Note Tool
Opens a pop-up menu from which you choose duration of Step Entered notes.



The Scale Tool
Allows scaling of note data by dragging around bar lines. The tempos are scaled, and all note data plays back just as it sounded before the Scale Tool was applied.



Note Suidivisions Settings
Click on either the "3", "5", "7", or "Dot" note value buttons in order to make the selected **Note Value** conform to a triplet, quintuplet, septuplet, or dotted note value, respectively.



The Spray Paint Tool
Algorithmic composition tool used to randomly trigger data within a specified area.



Channel
Allows you to set the MIDI channel that will transmit the program (patch) you want to hear or record.

% of Value : 100

Percent of Value Setting

Scales the current **Note Value** setting when manually or Step Entering notes. For example, if the **Note Value** is set to 384 and the **% of Value** is set to 50%, a note with a duration of 192 clocks will be created when using the **Pencil Tool** or Step Entering data.

Note Value: 384

Note Value

Shows how long in clock ticks a step-entered note will last if it is held to its full value. For example, if the **Note Value** is set to 384 and the **% of Value** is set to 50%, a note with a duration of 192 clocks will be created when using the **Pencil Tool** or Step Entering data.

Velocity : 100

Velocity Setting

Determines the velocity value of new notes when using the **Pencil Tool** or Step Entering data.

Bank : 0

Bank

Allows Bank Select messages to be sent to any Metro Instrument. A Bank Select message must first be created for a specific Instrument (via the **Program Names** option under the **Setup** menu) before it can be sent.

Pgm. #0 : Acoustic Grand Pi

Program

Allows you to set the program (patch) that will be sent to the MIDI device selected in the **Channel** setting. Sending a Program Change from this field will physically enter Program Change message at Bar 1, Beat 1, Clock 0 of the active track if no program change exists on that track.

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Drum Strike Icons

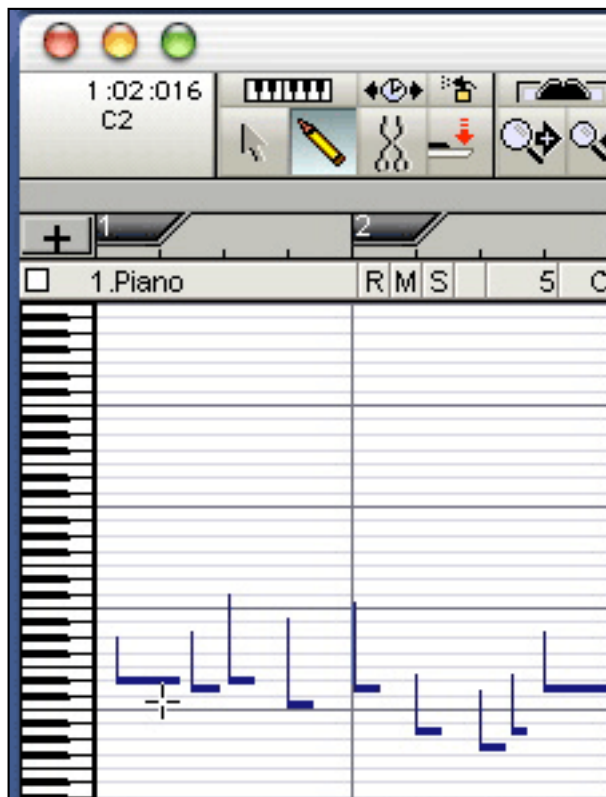
Six graphical Drum Strike icons distinguish between six user-definable ranges of Note On velocities in the Drum Grid display. Use the Drum Strike Velocity Ranges display in the top portion of the Graphic Editor window to view or edit the range of any of the six Drum Strike icons.

Editing MIDI Data in the Graphic Editor Window

You can graphically edit many characteristics of individual notes or groups of notes in the Graphic Editor window by using the selection and edit tools.

Before we begin editing the sample data, let's listen to it by clicking on the PLAY button in the Transport window. As you can hear, there are several problem areas in these few bars that we can easily correct using Metro's Graphic Editor window and tools.

Let's begin with the first bar. As you can hear, the tones are not quite right and the accompaniment begins too early, creating a clash of sounds.



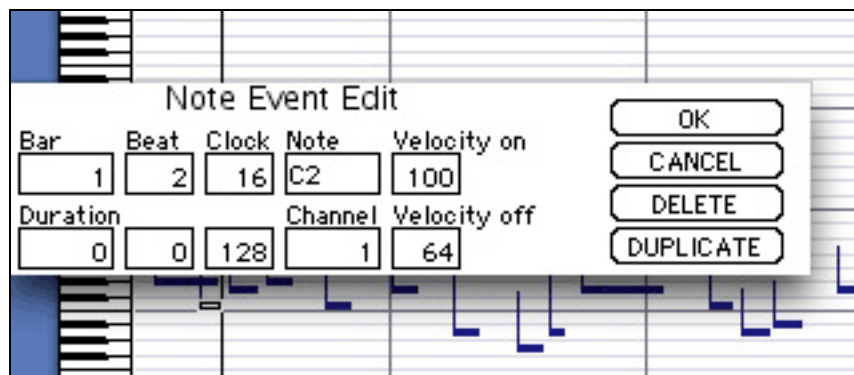
We'll start by adding an additional note between the first and second notes of the first bar:

1. Click on the **Note Tool** and select the eighth note in the pop-up.
2. Then click on **3** in the **Note Subdivisions Settings** to make the note conform to a triplet note value.



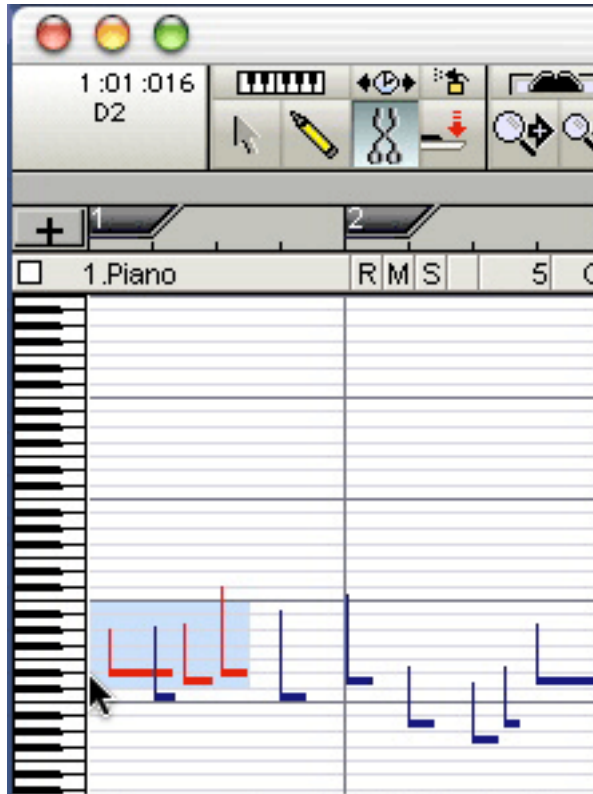
3. Now click on the **Pencil Tool** to activate note entry.
4. Position the cursor just below and to the right of the first note in the bar, so the **Time and Pitch Display** reads 1:02:016, C2.
5. Click the mouse button to enter the note.

To make sure that this note has the attributes that we want, switch to standard selection by clicking the **Arrow Tool**, then double click on the note we just entered.



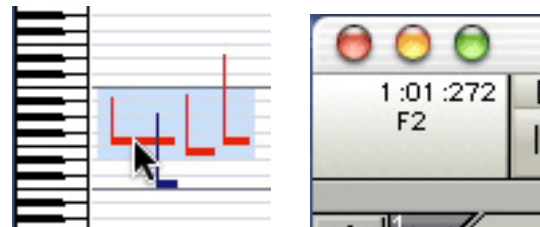
The **Note Event Edit** dialog box appears so that we can view all of the attributes of this note. If any of the attributes of your note are different, just click inside the appropriate entry box and drag up or down to change the value and click on OK to save the changes – Otherwise, just click CANCEL to dismiss the **Note Event Edit** dialog box.

Now we are going to change the pitch of the 1st, 3rd and 4th notes. Because we have just entered a new note between the 1st and 3rd, we need a method to select non-contiguous notes. One option is to **Command-click** each note using the **Arrow Tool**. The second option is to use the **Forceps Tool**, which allows us to select only the pitch data within a rectangular area created by clicking and dragging. Let's try using the **Forceps Tool**.



To select the non-contiguous notes:

1. Click on the **Forceps Tool** to make it the active selection tool.
2. Click and drag a rectangle around the 1st, 3rd and 4th notes, but not including the horizontal bar that represents the 2nd note.
3. Now that all three notes are selected, click on the 1st note and drag up until the F2 is displayed in the **Time and Pitch Display**.

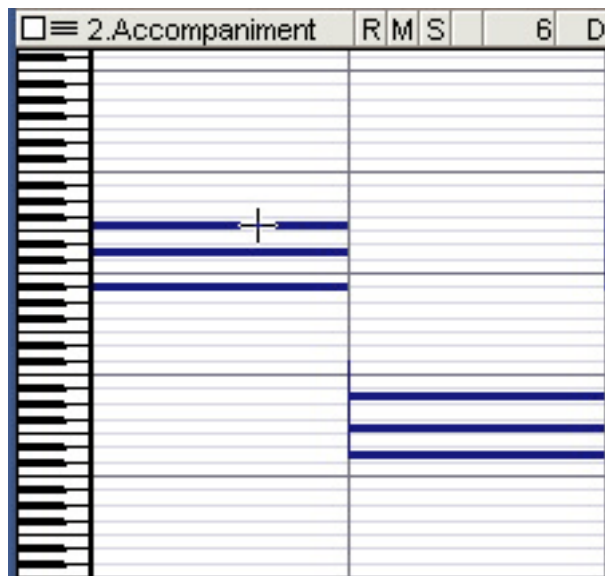


4. We have now raised the pitch of all three notes without affecting the new note that we entered earlier.

Next, we're going to get rid of the clash between our new starting notes and the first chord on the **Accompaniment** track.

You should still have both tracks displayed. If not, click on the **Add Track** icon, then click on the **TRACK NAME** section of the titlebar for the new track and select **Accompaniment**.

Deleting the chord in the first bar and allowing the accompaniment to begin with the second bar of the melody should solve the problem.



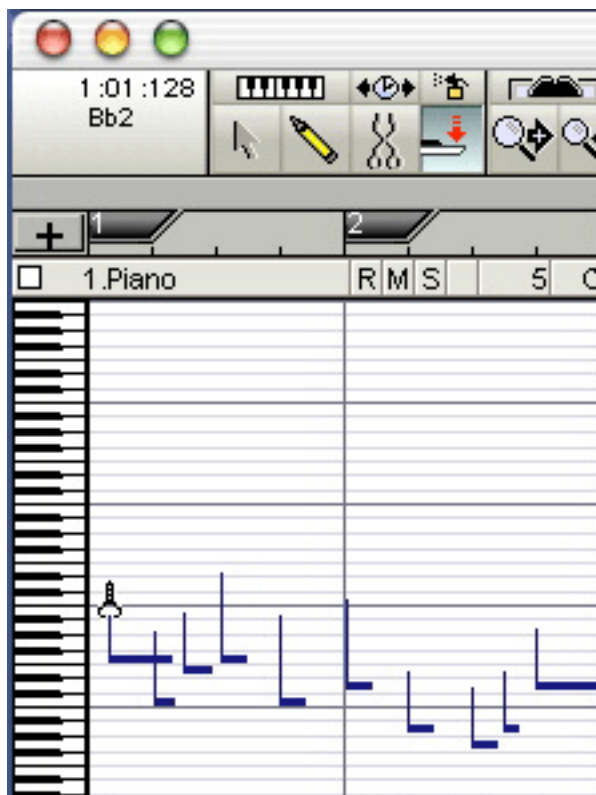
To delete the first chord, you could either select all three notes and press **DELETE** on your keyboard or use the **Pencil Tool**. Let's use the **Pencil Tool** this time:

1. Click on the **Pencil Tool**.
2. Place the cursor over the top note in the chord and click to delete the note.
3. Repeat this procedure for the other two notes in the chord.

Now, click the **PLAY** button on the Transport window to hear how these few simple edits have changed the piece.

Much better! But there are still a few soft notes. We'll use various velocity edit tools to improve our sample by increasing the attack velocity of a few of the notes.

The **Velocity Stem Edit Tool** edits individual note velocity by dragging up or down on the note's velocity stem.

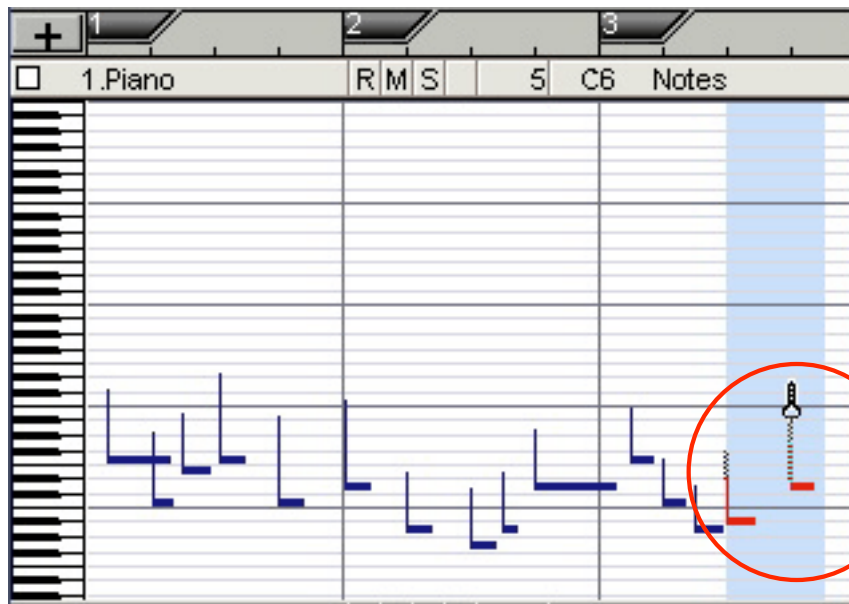


Let's start by increasing the starting velocity of the first note in the first bar:

1. Click the **Velocity Tool** icon (located to the right of the forceps).
2. Position the cursor over the end of the velocity stem.
3. Click and drag up to increase the velocity. As you drag, the **Time and Pitch Display** will reflect the velocity value. Drag the stem until the value reads "100."
4. Release the mouse button to set the value.

You can see that changing the velocity value changes the height of the velocity stem in the display.

Now, we'll do the same for 4th and 5th notes in the third bar, but this time we'll select both notes, then adjust the values at the same time.



Let's try it:

1. Select the **Arrow Tool**.
2. Click and drag over both notes in the fourth bar.
3. Now select the **Velocity Stem Edit Tool**.
4. Position the cursor over one of the stem ends and drag up until the value is "100."
5. Release the mouse.

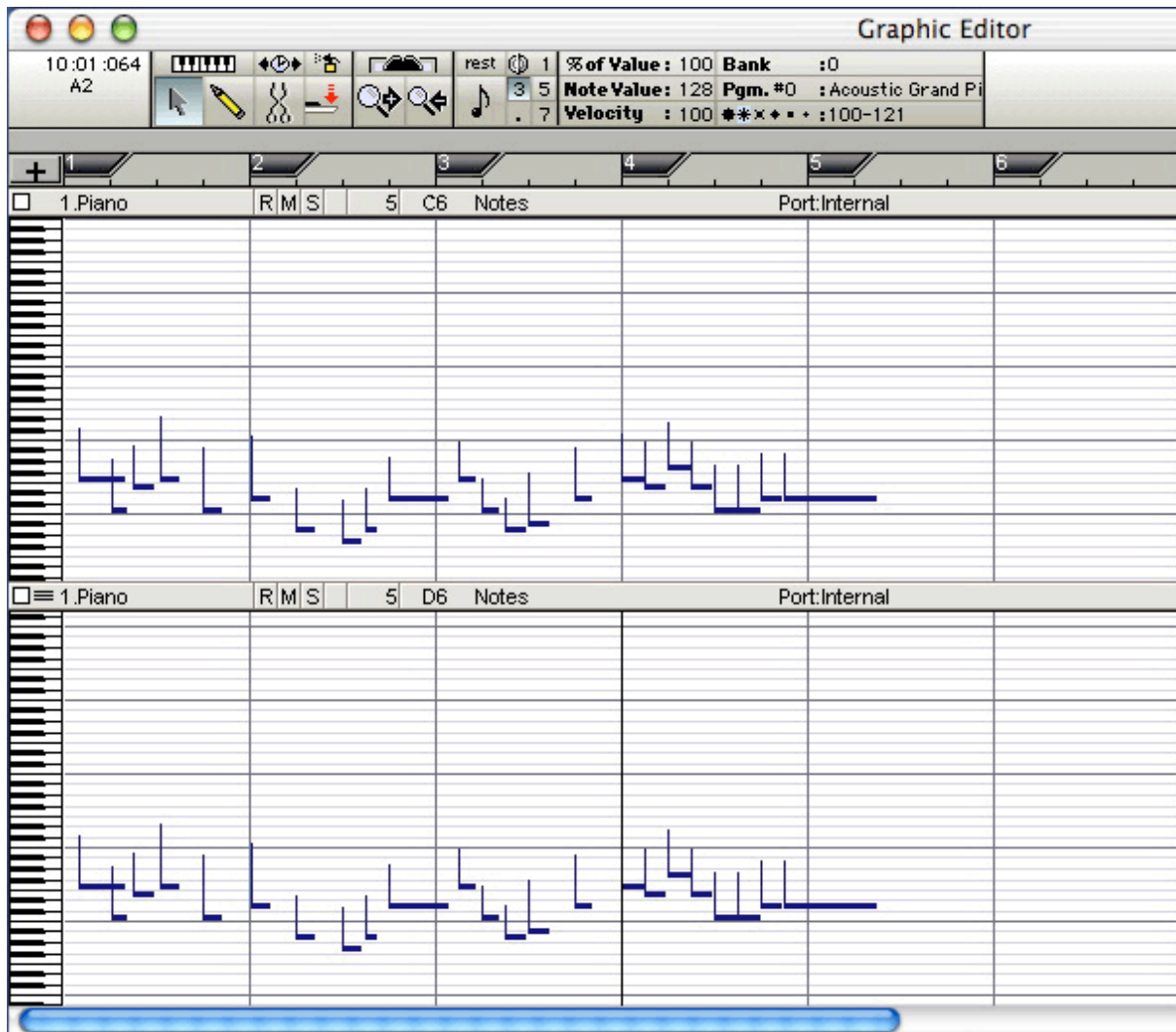
These methods of selection can be done in conjunction with any edit operation. The edit will be executed for each of the selected data elements. If you want to select notes or areas that aren't next to each other in time, **Command**-clicking and **Command**-dragging enable you to do so.

In addition to using the **Arrow Tool** and the **Forceps Tool** to select items, you can also select notes defined by particular criteria (Selection Filter). If the **Selection Filter** is checked in the Switches menu, only the notes within a selection that match certain criteria are affected by edit operations. For example, only notes within a particular velocity or duration range are affected by a Cut operation if defined in the **Selection Filter**. If the **Selection Filter** is Off (not checked), any existing Selection Filter criteria will be ignored and all notes within a selection will be affected by edit operations. To toggle between Selection Filter On and Off settings, press **Command-F**.

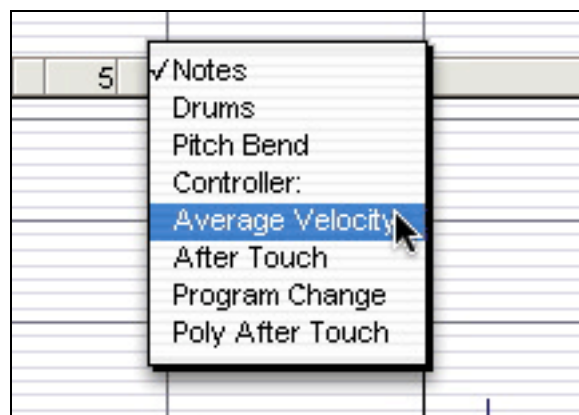
You use the Setup menu's **Selection Filter** submenu command, **Assign to**, to set up criteria for editing.

Now, we'll do one last velocity edit to soften the notes in the last bar on the **Piano** track. This time we'll use one of Metro's Graphic Editor window's view methods to accomplish the edit.

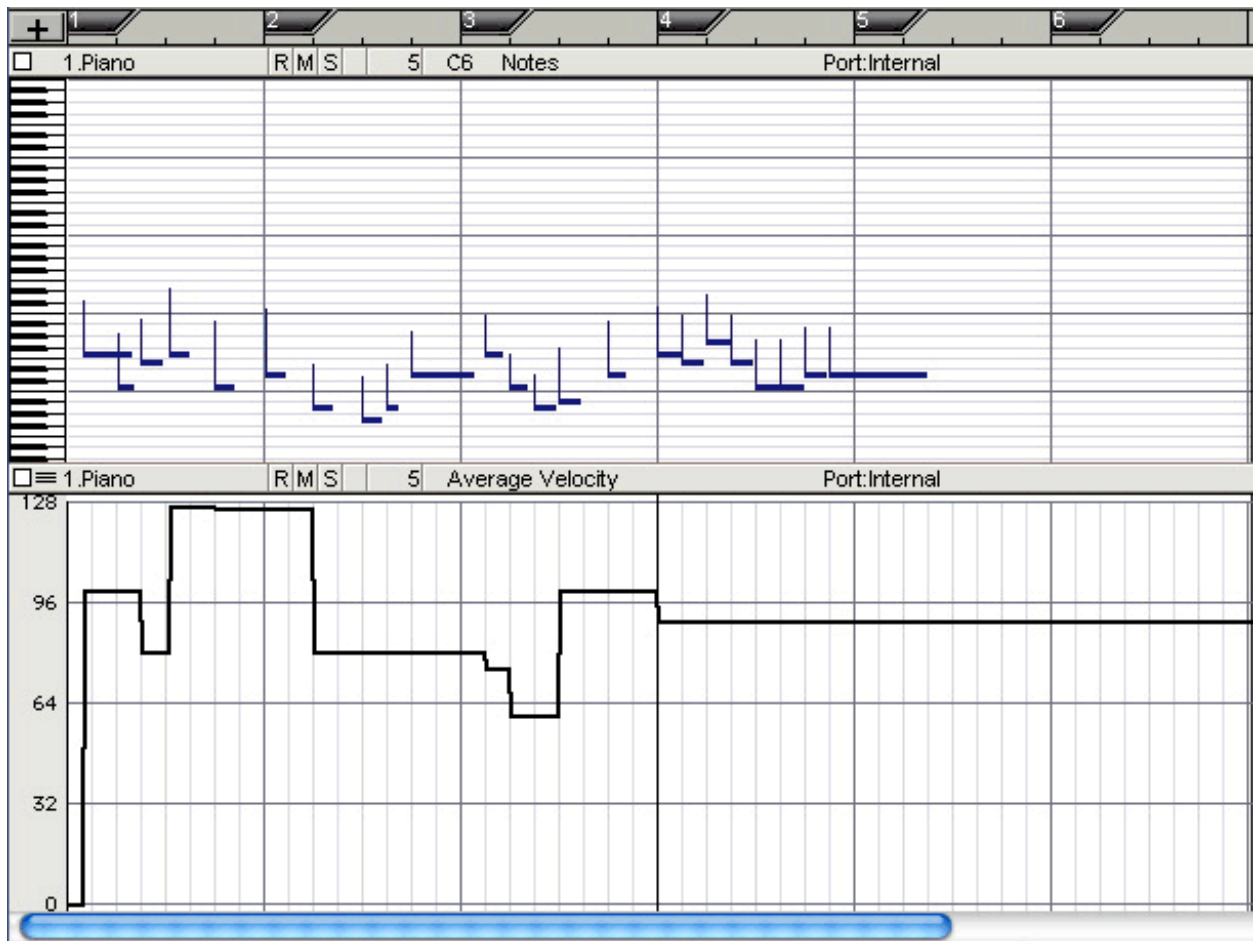
1. To begin, click on the **Accompaniment** track titlebar to make this track the active track. Click on the track name in the titlebar and select **Piano**. Now we have two tracks displayed, both with the identical **Piano** track data displayed in Note view.



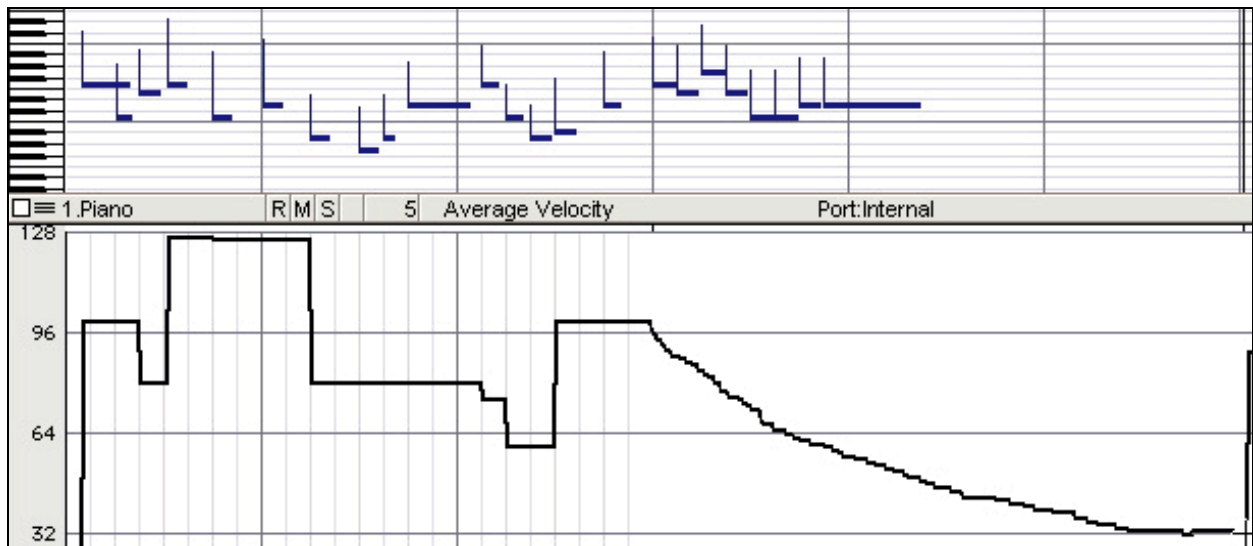
2. Click on the **Data Display** name (Notes) on the titlebar and select *Average Velocity* in the pop-up list.



- Now we have the same track displayed twice, one in Notes view and the other in Velocity view.



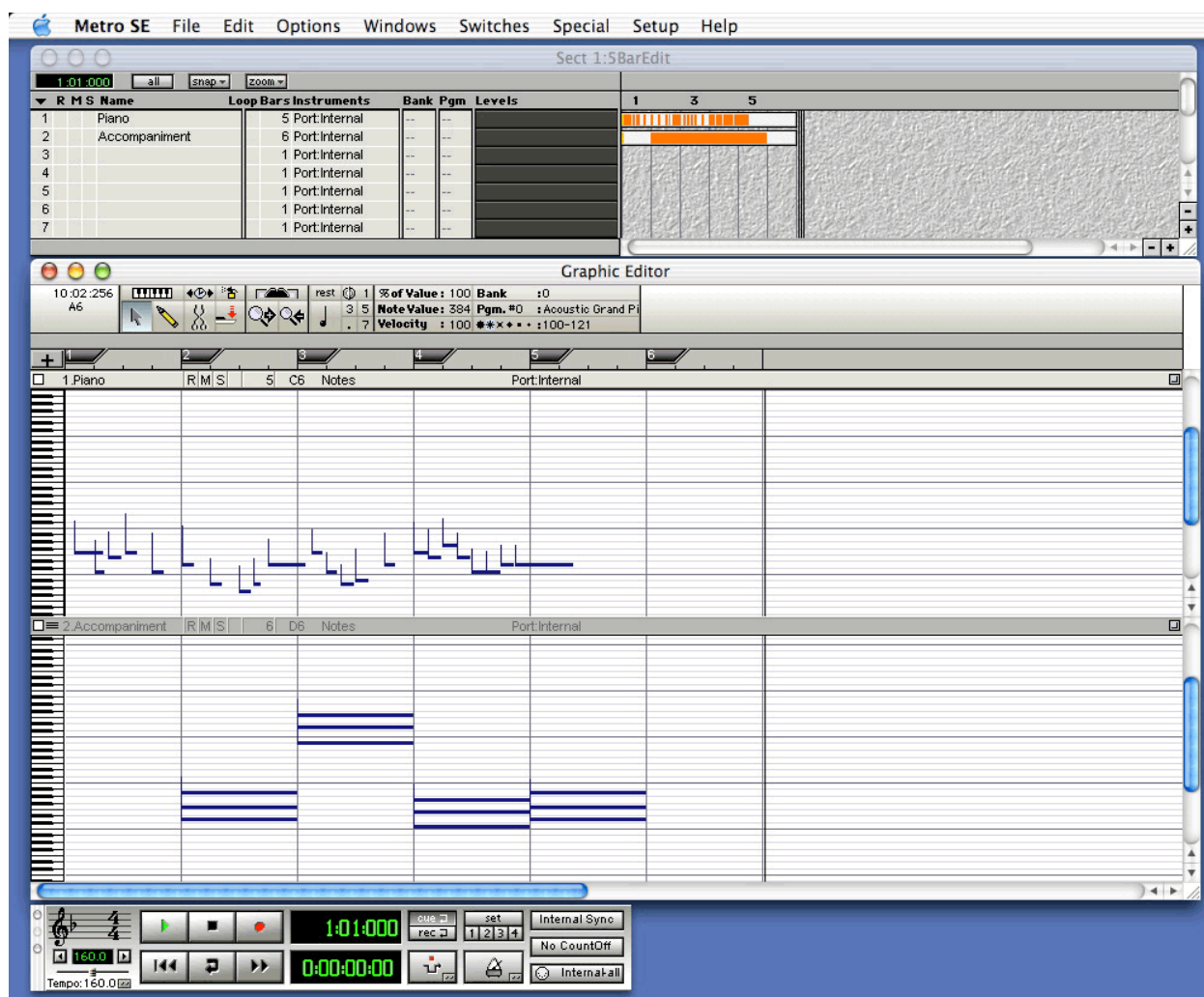
- Click on the **Pencil Tool** to make it the active tool.
- In the velocity view, click and draw a gradual curve down, from the beginning of the fourth bar to the end of the sixth bar.



There, we have now graphically created a gradual decrease in velocity in each of the notes throughout the last two bars.

This method of graphical editing can be accomplished in many of the Graphic Editor window display modes.

We are finished editing, so let's change the Graphic Editor window to display both tracks of the edited piece of music. Your screen should look like the illustration below:



Now let's play the edited sample. Just click the PLAY button on the Transport window.

Now that we're done, if you want to save your edited document, select *Save As* from the File menu, then type the name "5BarEdit_tutorial" in the *Save As* dialog box and save the file in a folder of your choice.

If you want to evaluate your execution of the tutorial editing, the edited Metro file is located in your Tutorial folder as "5BarEdit_finished."

Summary of Note Editing Operations

The following list summarizes the types of note editing operations possible within the Graphic Editor window, in addition to those practiced in this tutorial.

Note Edit	Tool Used	Operation
Change a note's start time	Arrow or Forceps	Drag the note left or right
Change a note's duration	Arrow or Forceps	Shift -drag left to shorten the note; right to lengthen
Change a note's pitch	Arrow or Forceps	Drag the note up or down
Delete a note	Pencil, Arrow, or Forceps	Click with the Pencil Tool; select with Arrow or Forceps and press Delete key
Change a note's velocity	Velocity Stem Edit Tool	Drag velocity stems up or down
Copy a note	Arrow or Forceps	Option -drag the note you want to copy; Arrow Tool can place new note at a different pitch Forceps can't
Enter a note	Pencil Tool	Click the area where you want the note; the duration value comes from the quantize popup (the note icon) in the Graphic Editors toolbar
<p><i>Note:</i> Note or Drum Strikes are constrained by time or pitch when selected. Dragging upwards or downwards will constrain time and dragging to the left or right will constrain pitch. Pressing Shift-Option when selecting will allow you to move the Note or Drum Strike without any constraints.</p>		
<p>You can also use the Command-Left/Right or Command-Up/Down Arrow keys to move a note in any direction.</p>		