

# Amending Midi Files on the Yamaha Clav

Author: Phil Gray

Contact details: see [www.evrblue.com](http://www.evrblue.com)

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## LESSON 1 – CHANGING VOICES

### Some Terminology

A voice is also sometimes called an instrument, patch or a program (it is a bit confusing, but remember that when midi was first developed, it was a very numerical type of thing). I mention that because in pure midi, reference is usually made to a 'Program Change' being the instruction which tells the midi to change the voice program (ie select a particular voice from those which are available). Throughout, I am guilty of using 'voice' and 'instrument' interchangeably, but when I refer to program change I am referring to the data instruction which causes a voice to change.

Balancing refers to the process of altering the volume at which individual voices playback. Often a rock/pop item works better with a loud rhythm section (ie drums and bass), whereas a classical item is going to work better if the melody voice is distinct above all the others (eg 1<sup>st</sup> violin). Often, a midi which you download from the net will have voices for which the volumes have been carelessly set, and adjusting the balance between instruments is a quick and easy way to create a more realistic sound.

Panpot is an abbreviation for pan position which is the position (from 0-127, being left to right) where an instrument is placed in the stereo field. Drums and piano are usually close to the middle of the stereo field (ie around 'centre'). In the case of classical instruments, the position can be set to approximate where they sit relative to the conductor (eg the 1st and 2nd violins are just slightly left of centre), whereas the string bass is to the far right. It is surprising, but placing instruments in different parts of the stereo field makes an enormous difference to the ability of your ears to distinguish each from within the overall mix of the sound.

### EQ

EQ is simply an abbreviation for equalisation. Just as you have a bass-treble adjustment on your radio or hifi system, we apply EQ to instruments individually to achieve more realism in the overall sound quality (eg adding high frequency to a violin will make it brighter). A little brightness will highlight a trumpet melody, but too much will actually make it sound thin and artificial.

### Velocity

I will use a piano analogy to explain this - velocity is the 'quickness' with which a note is played (we are talking here about the quickness of the down action of the key (not its length, such as quaver or crotchet). For most instruments (including string instruments), increased velocity is associated with brightness or plucking. With woodwind, velocity will add breathy air sound. Velocity is often associated also with note volume (ie more velocity *usually* leads to an increase in volume as well).

But pure velocity is not the same as volume - if you record a piano which is played gently, and play the recording back loudly, it does not sound the same as a piano which is simply played more vigorously. Experiment on your clav with different voices, quick down actions will produce a different sound to a slow action, even if you then hold the note down firmly. I think that some of the jazz organ voices respond well to velocity, adding jazzy harmonic percussive sounds over the basic organ. Most midi files downloaded from the 'net have a uniform setting for velocity (eg all notes have v=100) and this can lead to a bland and unrealistic playback.

### Aftertouch

After you press a note on the keyboard, midi records the velocity as we just described, and it also records the aftertouch which is the amount of 'pressure' as you continue to hold the note for its count. If I recall, some of the harmonica voices on the clav will bend if firm aftertouch is applied, but won't bend just as a consequence of high velocity.

Together, the use of velocity and aftertouch are the easiest ways to get some realism when playing your clav.

Addendum: see the footnote on Aftertouch at the end of this document.

### Release

I don't usually bother tweaking this, but just to observe that release is the opposite of velocity, being the speed at which the note is released. The Yamaha clav does not recognise release in its midi implementation.

### Changing Voices

**Note - these displays are from my CVP-309. Hopefully yours are similar, otherwise you will need to check the User Manual for your clav for any minor menu differences.**

If you get lost or make a mistake, don't worry, you can't break anything, just reload the midi file and start again.

Load a simply midi file (ie song file) into your clav.

Now there is a control button called 'Mixing Console', press this repeatedly until you get to a display called ' Song (Ch1-8)'. This shows us some of the settings (ie voice, panpot, volume) for each channel track of the song. The channels correspond to each column of the display.

For this lesson, we are simply going to change the instrument on Channel 1 (eg the piano, or whatever voice is shown for Channel 1)) to something else. Once you know how do that, you can change the other channels just as easily.

Now towards the top right of the display, you will see an option for 'Song Auto Revoice'. Be sure this is set to 'OFF', otherwise the clav is going to automatically reset some of the voices in the

midi file to other voices which it thinks are better whenever you load a midi. We don't want it doing that, we want to pick the voices ourselves. The current voices are depicted by a picture of the instrument.

Use the 'C' button to highlight the instrument row, as we want to amend voice selections.

Press the up/down arrow below the column corresponding to Channel 1, and this will open the voice library and show that oboe is currently selected. To change this (eg to a Pan Flute) select a voice bank (eg flute and woodwind), then navigate and select the Pan Flute.

Exit the voice display, and if necessary press 'Mixing Console' repeatedly till you return to the 'Song (Ch1-8)' display and you will see that the instrument picture has indeed changed to that of a Pan Flute.

Press the 'Song Play' button and you will hear a Pan Flute has replaced the oboe as the melody instrument.

That's it, almost.

You can use this process to play around with changing the voices on the other channels (or simply to inspect what voice is currently being used by the clav). By selecting voices, then using 'Song Play' it is possible to audition a wide range of voices quite quickly.

Whilst in the Mixing Console, observe the volume faders below each voice: you can press the E button to highlight the faders and then use the up-down arrows to adjust the playback volume of the different voices.

### **Next Lesson**

Now unfortunately, it is not quite as simple as one would expect to save our midi file with the amended voices (you can try using the Song/Save function and save as 'Song 2', but the probability is that if you load some other song (eg Song Other), then subsequently load your previously saved 'Song 2' again, you will find that it still has the original voicing rather than the changes you made.

That is because we need to tell the clav what changed parts of a midi file we want it to save.

I will cover that in next lesson.

In the meanwhile, just play around inspecting, auditioning, changing the voices on other channels of your midi file, and adjusting their playback volumes, till you are comfortable with how easy it is.

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## LESSON 2 – SAVING VOICE CHANGES

Now, one would expect that if you have made various changes via the 'Mixing Console', that simply saving the midi would be sufficient to also save the new settings (such as voice, volume, panpot, etc).

But it does not.

The only way to rationalise this is to regard the various changes we made (eg voice) as being simply for our *listening pleasure*, but the underlying midi data has not actually been edited in any way. It is a bit like playing a CD on your hi fi - increasing the treble will certainly change how it sounds, but we haven't altered any of the data on the CD data disc, so next time we play it our hi fi adjustments are forgotten. (Personally, I think Yamaha should assume that if we have gone to the trouble to change the sound of playback, that we would probably like to save the new settings automatically, but it doesn't do that)

So how do we save the changes?

### **Saving the amended midi file**

We do this by using the 'Song Creator' function: to understand this rather roundabout method, consider that we are really creating a new song, with changes to the underlying midi data, rather than just amending what we hear in a single playback session.

#### **Step 1: Load original song**

Import or load the original song and amend the desired playback settings (eg voice, channel volume, panpot, EQ, etc).

#### **Step 2: Go to Song Creator**

Select the 'Digital Recording' button and then select 'Song Creator' because we are now about to create a new midi song.

#### **Step 3: Initialise Song Creator settings**

Use the Tabs, and select 'Channel' and then scroll down and select 'Setup'.

This is where we tell the clav which items (ie data types) we want to include in our new song. Select at least those items you have changed (eg voice, volume, etc) by marking with a Tick. Now you may be unsure at this stage which items should be marked, and which not, so no harm is done by just selecting everything. The midi file may be slightly larger than otherwise, because you would also be storing a whole lot of style and lyric data which are somewhat redundant, but it doesn't really matter. (Because a lot of this 'other' data is Yamaha System Exclusive data, if you play it back on another device, then it will be unrecognised and simply ignored)

#### **Step 4: Create the song**

Now that we have told the clav what data we want included in our new song, we need to actually create the new song. Select 'Execute' to do this. This creates a new song incorporating the changes that were made though the 'Mixer Control'. At this stage, the new song resides in main memory.

**Step 5: Save the new song.**

To do this, press the 'save' button whilst still in the Song Creator display. Use the tabs to navigate to either the User or USB folder and press 'Save' again. The current songname will be displayed, amend that to a new name (eg Song3) and press 'Ok'

**Footnote**

If you have changed instruments to some of the great sounding Yamaha voices (many of which are not GMidi or XG voices eg Mega voices are not GM or XG compatible), when you playback the midi file on another device they will sound different. This is because the other device does not have Yamaha voices built in (although many PC sound cards do have XG). When the other device sees the Program Change instruction designating the voice, if it is unrecognised it will either default to a piano, or will 'guess' (eg possibly a Sweet Violin may be switched to a GMidi violin) and the results may be erratic.

If you import your amended midi to a sequencing or notation program such as Cubase or Finale, the results are almost certainly going to sound a bit strange. Finale, for example, only recognises GMidi voices, whether or not your PC sound card supports XG voices..

**Next Lesson**

You now know how to change voices, and voice volumes.

And you probably know how to amend panpot by just playing around in the Mixing Console display, as this is shown in the same screen display as voices and volume. (NB: to experiment with panpot, reduce the volume on all other voices except that which you are amending and, ideally, use headphones to hear the stereo field more easily)

In the next lesson, we will look at how to amend EQ.

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## LESSON 3 – AMENDING EQ

### Introduction

Adjusting the equalisation (EQ) which applies to individual voices, and also to the overall mix, is one of the easiest ways to improve the overall quality of the sound. Equalisation is really just like the treble/bass controls that you have on your hifi, except that we can apply this to each voice individually (using just EQ HIGH and EQ LOW adjustments).

Also, the clav has the facility to modify the EQ of the whole mix (ie the combined final sound of all the instruments playing together). In this case, there are 5 knobs available, providing greater control of the frequencies ranging from very low to very high.

The way in which a voice responds to EQ depends very much on the voice itself. Thus, applying some more treble (EQ HIGH) to a steel guitar or a flute will make it sound even brighter, especially the high pitch notes. A cello, on the other hand, will only respond modestly to more EQ HIGH as the sound does not really contain a lot of high frequency wave forms, whereas EQ LOW will affect a cello quite a lot because of the lower frequency tones that the cello generates. Applying EQ HIGH to a drum track will usually emphasise the snare and cymbal sounds, whereas EQ LOW highlights the kick drum

Now a word of caution (using the cello as an example): increasing the EQ (in this case EQ LOW) may make the voice also sound louder in the overall mix, but it is not the same as increasing the voice volume. Applying more EQ LOW to a cello makes it sound louder because the lower frequencies have been amplified, but this is relative to any high frequencies (eg overtones) that the voice may have. In fact, too much EQ LOW could make a cello sound muddy because of the loss of the higher overtones which add a certain amount of warmth.

I noted previously that if you record a piano played gently, and then play the recording back very loudly, it does not sound the same as a piano which is simply played loudly in the first place. Similarly, whilst increasing the EQ LOW on a cello will increase its volume in the mix, it will sound deeper and certainly not the same as if you simply increased its overall volume as per Lesson 1.

### To Change EQ

#### **Step 0: Load midi song**

#### **Step 1: Scroll to 'Mixing Console (Ch1-8)'**

This is the same procedure which we used when changing the voice volume.

Tip: Write down which voices are on each channel, as the next display does not display the voice names for you.

Warning: Do not leave a pen on top of the clav console, it can fall through the gap behind the keyboard cover and into the electronics.

Now use the tabs to scroll across the display to EQ. The upper part of the display shows 'Master EQ'; the bottom half of the display shows 'Part EQ', and this is where you can amend the EQ of individual voices. (For now, we are using the lower 'Part EQ' of the display)

**Step 2: Amend EQ for particular voices**

Use the D,E buttons to highlight either the EQ HIGH or the EQ LOW controls, then use the up/down lower buttons to rotate the controls.

Note - Do all this whilst the song is playing in order to audition the changes that you are experimenting with.

**Step 3: (Optional) Apply EQ to overall mix**

**Note** - I don't think that changes to the 'Master EQ' are saved with the midi song, so you would only amend these if you want to improve the sound of a song that you are recording to an audio wave file.

As well as applying EQ to the individual voices, we can amend the relative frequencies within the overall mix. (See top half of the EQ display).

The item list (eg Flat, Home, Orchestra, ...) are preset EQ's which apply to the mix. Scroll through these and you will hear the difference. If you click 'Edit' (eg after selecting the 'Flat' preset, for example), it is then possible to adjust the EQ settings which apply to the overall mix. In this case, there are 5 controls available instead of just EQ HIGH and EQ LOW.

**Step 4: Save the amended midi song**

Use Digital Recording/Song Creator to navigate to 'Execute' and then 'Save' the changes (as described in Lesson 2).

**Next Lesson:** Changing the tempo at a measure

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## LESSON 4 – CHANGING TEMPO AT A MEASURE

This lesson will teach you how to add *ritardo* to a song, but the same principles can be used to modify tempo at any part of a song (NB: whilst it is normal for a tempo change to occur at the beginning of a measure, there is nothing which prevents the change from occurring part way through a bar, or even off the beat).

### **Introduction**

Midi files contain data which specify the tempo for a song. These data are referred to as 'tempo changes' and instruct the keyboard to change the playback speed, and are analogous therefore to a 'program change' which instructs the keyboard to change voicing. But this data is stored on an "any" channel (which means that the instrument can play back the data on any one of channels 1-16) and in that sense is related to the song, whereas a program change relates to a particular instrument on a particular channel.

In the case of Yamaha midi song files, the tempo data is treated as if it is a System Exclusive message, though it is not really SysEx because any midi player will recognise a tempo change (a SysEx message is one which is proprietary, unique to a particular keyboard or manufacturer and will not be recognised by other brands).

Most times, the midi file will contain only one tempo setting, and then the whole of the song plays through at that speed. But occasionally a midi file may contain various tempo changes to add effect by increasing or reducing the tempo at different sections of the song.

Therefore, to add *ritardo*, we need to create or add additional tempo changes into the midi file, and define that data to include details of the new tempo and the measure number at which it is to apply.

**To create a *ritardo*** we need to add quite a few additional tempo changes: when an orchestra moves into *rit*, the tempo does not fall immediately and then remain constant at reduced speed. Rather, the tempo decreases continuously for some time (often over a number of bars) before reaching a slower constant speed. We can achieve that by having numerous tempo changes embedded closely together in the song.

Now the clav does not offer a direct way of adding a tempo change to our midi file. But there are other tricks we can use to add tempo changes and I have identified two alternate methods:

- a) Amend midi file data through the Song Creator menu; or
- b) Record tempo changes by using the 'Record' function and slowing/speeding the song as it plays.

Method (a) appears to be simpler, but there are some situations when you would use method (b).

### **METHOD A - Amend midi data**

Follow these steps:

**Step 1: Pre-plan** and write down on a piece of paper, the measures and revised tempos that you want to append to your song (NB: when the midi file plays in the clav, the measures may be slightly "offset" so you will need to allow for this. 'Offset' means that

Bar 1 of the song (as viewed in manuscript) might not commence till, say, Bar 3 in the clav because of the addition of other Yamaha data at the front of the song.) Or you can play the song in the clav, and 'Pause' at the selected passages so you can note the bar numbers shown in the display.

**Step 2:** Load the song file.

**Step 3:** To inspect the midi data within the song file, select Digital Recording/Song Creator and then tab across to Sys/Ex. The Sys/Ex display shows all the midi data which is not channel specific (and also excludes 'Chord' data which we won't discuss here). Now the file will probably contain heaps of SysEx data, and it may be difficult to actually locate a tempo change.

**Step 4:** To view 'Tempo Change' data only, select 'Filter' and use the data entry wheel to move up/down items and uncheck all items except for 'Tempo Changes' (a faster way is to uncheck 'Tempo Changes' and then 'Invert'). Press 'Exit' to return to the SysEx display and now only tempo data will be displayed. The song will probably only contain one tempo change instruction.

**Step 5:** If necessary, use the A and B buttons to highlight the entry for tempo change (if there is more than one entry, pick any one, it does not matter).

**Step 6:** To create additional entries, press the 'Copy' function in the display, then 'Paste' repeatedly 'n' times, corresponding to the number of additional tempo changes you wish to add. At this stage, all of the new tempo changes will have the same bar number and tempo as that which was copied.

**Step 7:** Use the up/down arrows to highlight entries to amend, then use the D and E buttons to move horizontally to either the bar position or tempo fields. Use the data entry wheel to amend the values.

**Step 8:** If you pasted in more tempo changes than you actually need, they won't do any harm as duplicates, or simply 'Delete' these now.

**Step 9:** When you have completed the amendments, 'Save' the song.

**Step 8:** Reload your new song, and when played, the tempo changes that you made will take effect (and you can see the tempo vary in the main display).

### **METHOD B - Record tempo changes**

In this method, we will record additional tempo changes as the song is played. You might use this method if you are not really sure what you want the new tempo to be, and prefer to experiment whilst listening to the song.

It is unlikely that you will "get it right" using this method, but it will create lots of new tempo change data that can then be amended using Method (A).

**Step 1:** Press 'Record', and this will bring up the 'Channel On/Off' display, showing the record/playback status of channels 1-16. Now, because these are voice channels, we don't actually want to record to any of these channels (because we are recording

SysEx), but unfortunately if we set all channels to 'On', the record button will extinguish. So, leave one channel (which has no instrument data in it, such as Ch16) set to 'Rec' and set all others to 'On' . 'On' means the channel will play, but not record.

**Step 2:** Press 'Play' to start song playback with record.

**Step 3:** When you reach the passages where you want to insert a tempo change, press (or hold) the Tempo +/- buttons to vary the playback speed. These button actions will cause tempo changes to be written to the midi file. (You can press 'Stop' at any time if you don't need to play the song all the way through.)

**Step 4:** Save the song

**Step 5:** Now when you play back the song, it will incorporate the tempo changes you just made. They probably won't be exactly what you want, you can amend them by opening the file using Method (A) and amending the tempo settings as needed.

**Step 6:** Save the song.

**Step 7:** Reload your new song, and when played, the tempo changes that you made will take effect (and you can see the tempo vary in the song display).

#### **What if the midi file does not have any tempo changes at all?**

Rare, but it is possible that a midi file may not contain a tempo change at all (eg if it was produced purely for manuscript purposes, or is a poor quality file and the creator forgot to specify tempo).

In this situation, you can't use Method (A) because the SysEx display is empty and there is nothing to copy-paste.

In that case, you would need to use Method (B) to create some initial tempo change data, and then proceed to amend this using either of the preferred methods.

#### **Ritardo**

To create a smooth rit, you will usually need upto 8 tempo changes per bar, each reducing tempo by only a few beats per minute, until the desired speed has been reached. That is, you may need to add tempo change at 1/2 beat intervals depending on the song.

**Tip:** We often think that a chorus will sound better if played slightly faster than the verses. In fact, reducing the chorus speed slightly (perhaps by just 2-3 beats per minute) will add a touch of the dramatic, especially if the chorus is held in place by a good snare beat.

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## LESSON 5 – EDITING NOTE VELOCITY AND AFTERTOUCH

Firstly, just to revisit the definitions:

**Velocity** is the speed at which the note is depressed and many voices will respond to this, by brightness. Often a string instrument will respond with pronounced bow attack, and brass instruments may sound more raspy. A snare will usually assume more presence with increased velocity. Occasionally, velocity will effect note attack (which is the amount of time between playing the note and hearing the note eg a pipe organ has slow attack because of the amount of time taken for the air to reach the correct pipe and then sound the note).

If you select different voices on your clav, and experiment with slow or fast note actions, you will hear what I mean.

### **Aftertouch**

This is the amount of force or pressure which is applied to the note when it is held in the depressed position. Depending on the voice, there are quite a number of different effects that strong after touch may produce. Eg; harmonica may pitch bend (as in the blues), a guitar may wow or tremolo, and some woodwind may add breath effect. Generally, percussive voices (which, in a sense, also includes piano and plucked strings like a harpsichord) do not respond to aftertouch at all.

Again, select a few voices and press the note firmly whilst holding it down.

### **Note Release**

Note release (sometimes called "note off velocity") corresponds to the speed of release of a note. As this is not supported by the Yamaha clav, I won't spend any more time on that.

### **Amending Velocity and Aftertouch**

Velocity allows an instrument to sound more realistic - a musician does not play every note using exactly the same playing technique. Now if you have identified voices on your clav which respond to velocity, try the following exercise:

- a) Play a simple melody and try to play every note with exactly the same velocity and aftertouch.  
Very boring
- b) Now play the same melody line again, using your playing technique to bring out responsiveness in the instrument.

[If you consult the Data Manual which complements the User Manual for your keyboard, there are tables for mega voices which explain how each of these react to note-on velocity.

### **So, how do we amend velocity/aftertouch in a midi song file?**

Unfortunately, the clav does not make this very easy, and this lesson is going to be short.

Now the preferred method of editing velocity would be to use sequencing software, such as Cubase. This provides a pictorial view of velocity, and it is easy to use a pencil or compass tool to edit individual note velocity or create velocity ramps. (A velocity ramp would be, say, where

the velocity is higher at the beginning of a bar, than it is at then end. Or you might increase velocity on the beat.

A second option, which would work very well if you have the keyboard skills, is to re-record some selected voice channels, and record the notes as you play them live at the keyboard. You might want to do this if (a) the midi file has flat velocity throughout (eg every note at a velocity of, say, 100) or (b) the response of the Yamaha instrument may not sound quite right, as it the Yamaha voice is responding to velocity in a slightly different to the instrument that the person who created the original midi file used.

The third option, is to edit the note data directly - this would be tedious, but it might be an option, for example, if you simply wanted to add more velocity to a snare drum or to tambourine, or other percussive voices.

### **Editing Note Velocity directly**

To inspect the midi data within the song file, select Digital Recording/Song Creator and then tab across to Ch1-16. Select the appropriate channel number for the instrument you wish to edit (be sure that the filter function (described in Lesson 4) is set to display "notes" .

The note display looks something like this (example row):

msr:beat:ppq	Note	Note Value	Vel	Length
021:4:1896	Note	E2	100	4:0000

Thus, this example shows a data entry for the E above middle C which occurs in the song at the 4th beat of bar 21, has a velocity of 100 and a length (ie note value) of 4 beats. (The 1896 is parts per quarter, which is the *fineness* at which the midi file was defined. In this example, units are as fine as 1920 ppq, so the note almost starts at bar 22 since 1896/1920 is almost equal to 1 beat)

You can use the side buttons to tab across the row, and then the data wheel to amend the value (eg increase velocity to 115).

You can see that it would not be very practical to edit note data this way (as every note in the song is a distinct data entry), but it might be an option as I mentioned for some percussion.

### **Conclusion**

If the note velocity in the midi file is flat and sounds boring, my preferred approach would be to export the midi file to a notation program (eg Finale, Sibelius) so I have some manuscript to follow, and then re-record the voice by playing the voice live at the keyboard.

Depending on the song, it may be sufficient to do this for just the melody voice, if this is dynamic, it may well mask the fact that much of the accompaniment voices are flat. Playing live has the advantage that you can record both velocity and aftertouch dynamics simultaneously.

Aftertouch can also be edited through the Song Creator (be sure that the filter has "aftertouch" checked. Most midi files do not include aftertouch data, so the display may be empty, but if you record a live performance, aftertouch will be captured.

## **Footnote**

### **Aftertouch**

Firstly, a correction, I have misled you regarding aftertouch - despite the fact that the Song Creator lets you display and edit aftertouch, none of the Yamaha clav voices seem to respond to it. I have auditioned many voices, and cannot find any that do so. Because my Yamaha synth has aftertouch, and as the Song Creator lets you view/edit aftertouch, I just assumed the clav also responded to aftertouch.

I was wrong.

### **Velocity**

I have auditioned voices and here are some examples of voices which respond to velocity (and most voices also increase note volume in response to velocity):

(Sweet!) Violin	Velocity increases bow bite
Harp	Good example of velocity increasing note volume
Tuba	Velocity increases brass rasp at beginning of the sound

### **Increasing the volume of a particular note**

Depending on the voice, increased velocity will usually also increase note volume (but *may* have other effect also, such as bow bite, depending on the particular voice).

You can also achieve an increase in note volume by inserting a volume change for that voice channel, and then reducing the volume back again immediately after the note is sounded (remember how we balanced the voices? These are actually controller changes (CTRL=7) unique to each channel. Whilst one might normally balance voices and then just have one volume setting per channel throughout the song, you don't have to. I think you will find you can add/amend these controller changes in the Song Creator, exactly like amending velocity or aftertouch levels.