

## Dynamics, Velocity and Volume.

In the 'real' world of music, whether an instrument is struck, bowed, twanged, picked, plucked, blown into or manipulated in any other way, the resulting loudness or softness is determined by the player. Depending on the instrument involved, in many instances a single note may have variations from very soft to very loud.

**Dynamics.** The loudness or softness of music notated in NoteWorthy Composer is determined by the file creator. Generally speaking, these effects are governed by the use of dynamics, which in NWC follow musical conventions - from ppp (very, very soft) to fff (very, very loud).

**Velocity.** Each note has only one velocity value - the force with which a key on a piano or a percussion instrument is struck - which occurs at the start of the note. It cannot be changed while the note is sounding. The default velocities of dynamics in NWC are: ppp=10, pp=30, p=45, mp=60, mf=75, f=92, ff=108 and fff=127.

**Volume.** Unlike the above, the relative loudness of wind and string instruments is determined by the musician and is variable across individual notes or passages. For these instruments therefore, the use of volume in NWC gives a more realistic sound than velocity on its own. Volume in NWC is set in Staff properties, and the default value=127.

**Dynamic Variations.** Both velocity and volume are affected by *cresc.* (crescendo), *decresc.* (decrescendo), *dim.* (diminuendo) and (in NWC2) by the use of hairpins.

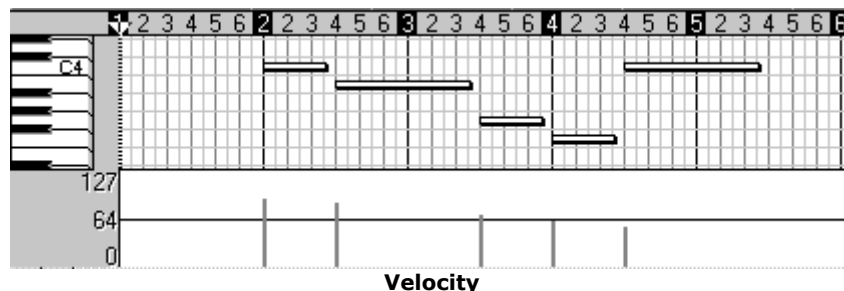
Using the NWC dynamic default values, each dynamic inserted into the score has three properties, defined as name(velocity,volume). Only the name is visible, but in effect these are each defined as; ppp(10,127) pp(30,127) p(45,127) mp(60,127) mf(75,127) f(92,127) ff(108,127) fff(127,127).

To use volume instead of velocity to determine the loudness of the music these values can be reversed via the "Notation Properties" dialogue window to: ppp(127,10) pp(127,30) p(127,45) ..... fff(127,127).

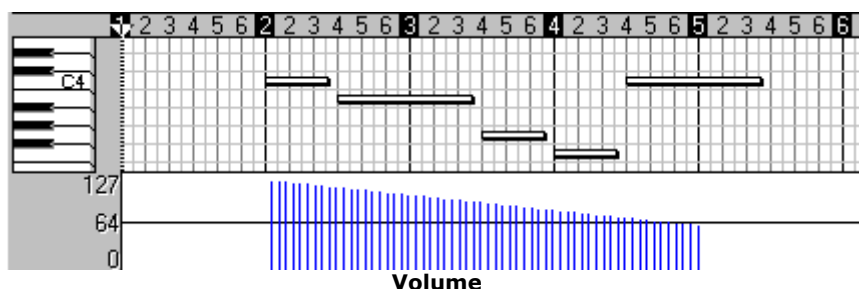
It is my opinion that leaving the default volume at 127 in combination with the higher range of dynamic velocities may cause distortion on some systems. In addition, if the velocity is set at 127 then accented notes will be ineffective. Therefore I shall use 120 instead in the following example.



The second note (B) retains its velocity throughout its duration and the G is considerably quieter, so instead of a smooth transition there is a sudden drop in loudness.

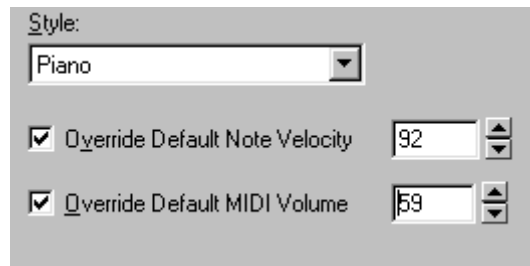


Simply changing the two dynamics to f(120,92) and p(120,45) respectively, we get



## Changing the defaults.

All of the default velocity and volume values can be changed in the "Notation Properties" window - (select a previously inserted dynamic and go to Edit/Properties) thus:



On a large score with a full orchestra 500+ measures long, this can be a time consuming and tedious task, necessary in NWC1.x but with the advent of **NoteWorthy Composer 2**, however, it's as easy as abc.

- a) Personalise your dynamics.
- b) Create an itree file to reflect your chosen dynamic velocities.
- c) Create a user tool to define dynamic volume values.

Do not worry if this appears complicated, the following instructions will take you through each of the stages in detail.

### a) Personalising Dynamics.

You may be quite happy with the default dynamics, in which case skip this section. On the other hand you may feel that ppp at 10 is far too soft and that fff at 127 is far too loud. If you simply change those, however, you will also need to adjust all those in between. First, create a new file in NWC2 with a single staff. Go to Staff properties/ MIDI and adjust the "Part Volume" to 120. Then select the Instrument tab. You will see the (original) default velocities listed. Select either a wind or string instrument from the list and change the velocity values to your own taste. Test by entering some notes and dynamics, changing the values until you are satisfied with the results. Make a note of the values you have chosen.

Let's say, for example, you want ppp to be 20 and fff to be 108. You may finish up with something like; ppp=25 pp=35 p=45 mp=55 mf=68 f=80 ff=92 fff=108. This is only one example of what you may choose but for demonstration purposes these are what I shall use for the moment.

### b) Creating an itree file.

In the NoteWorthy Composer 2 folder is a sub folder named itrees. If you have not already done so, carefully read and inwardly digest the contents of "Sample.nwctree" file. (It is a text file so can be opened with any text editor such as Notepad, Wordpad or your preferred WP). You will notice that the format for dynamic velocities is (ppp,pp,p,mp,mf,f,ff,fff). I shall use this convention for both velocity and volume hereafter. There are many ways in which nwctree files can be personalised, which we will cover later.

Open "General Midi.nwctree"<sup>1</sup> and save it under a different name, keeping the \*.nwctree extension. For ease of reference, let's call it "Dynamic.nwctree". Insert the following line at the beginning of the file:

```
\=Bank(0,0),DynVel(25,35,45,55,68,80,92,108),Trans(0)
```

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<sup>1</sup> You may already have several files for different purposes depending on how familiar you are with the process. If you have previously edited the General Midi file then use a different, unedited file.

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Further changes will be required later, but for now save and close the file. You may find it convenient to place a shortcut to the file on your desktop for easy access.

To test the result, create a new NWC2 file with a single staff. Go to Staff properties/instrument. You will see the (original) default velocities listed. Select "Predefined Instruments" and at the bottom of the resulting window select "Change List". Find Dynamics.nwcitree and select it. Now select an instrument. All the dynamics should now show the values you entered in the itree.

Now reopen the Dynamics.nwcitree file and edit the line previously entered by inserted # at the beginning. NWC ignores such lines. Now add a new line redefining all dynamics to the value of 108. You now have this:

```
#\=Bank(0,0),DynVel(25,35,45,55,68,80,92,108),Trans(0)  
\=Bank(0,0),DynVel(108,108,108,108,108,108,108,108),Trans(0)
```

The reason for marking the line to be ignored rather than deleting it, is that it will be needed for keyboard and percussion instruments.

### c) Creating a User Tool to change Dynamic Volumes.

**Calculating Dynamic Volume.** Thus far only the dynamic velocities have been affected. The next step is to calculate the volume values for each dynamic so that they match the sounds created by using velocities alone, and create a User tool to change them for you.<sup>2</sup>

This is done by applying a straight forward equation to each of the eight dynamics, thus:  $(\text{Velocity} * \text{default volume}) / \text{highest dynamic velocity} = \text{required value}$ . (highest dynamic velocity is that of fff). Still using the example given above and a maximum volume of 120 the correct calculation for ppp is  $(25 * 120) / 108 = 28$  pp:  $(35 * 120) / 108 = 39$ . p:  $(45 * 120) / 108 = 50$  etc. The end result is (28,39,50,61,76,89,102,120).

In NWC2 select Tools/User Tool and select "New". In the "name box" type "Change Dynamics" In the "Command" box type (with spaces instead of line breaks)  
php\php.exe Scripts\adp\_GlobalMod.php Dynamic,Style==ppp Opts.Volume=25  
Dynamic,Style==pp Opts.Volume=35 Dynamic,Style==p Opts.Volume=45  
Dynamic,Style==mp Opts.Volume=55 Dynamic,Style==mf Opts.Volume=68  
Dynamic,Style==f Opts.Volume=80 Dynamic,Style==ff Opts.Volume=92  
Dynamic,Style==fff Opts.Volume=108

To simplify the process, copy the above and paste into Notepad, unchecking "Word wrap" in the edit menu.<sup>3</sup> Then copy and paste it into the 'Command' box.

As you can see, the commands are in pairs, separated by a single space. Each pair of commands are also separated by single spaces, all on one line.

Next, create a new NWC2 file with a single staff. Select a wind instrument from Dynamics.nwcitree (as before). The velocities listed are now all set at 108. Now add a few bars of music, liberally sprinkled with dynamics and hairpins. You may finish up with something like:



When played, the whole piece is one volume with no variations in sound.

To run the User tool you just created, go to Tools / User tool and select Change Dynamics from the list and press <enter>.



Now hear the difference.

\* \* \*

<sup>2</sup> For the general purposes and applications of User tools see the extensive explanations on the NWC Scriptorium - <http://www.vpmag.com/nwc/nwc2scripts.html>

<sup>3</sup> Save the text file so that later you can change the values to match your own requirements.

**More examples.**

The following examples are for mainly for guidance. You may, of course, use one or another, or you may prefer to define your own.

I shall follow the NWC convention of placing 8 values separated by commas inside brackets for both velocity and volume. i.e. (ppp,pp,p,mp,mf,f,ff,fff)

**Example 1**

Velocity (30,38,48,60,73,87,101,116) Maximum volume 120  
Volume (31,39,50,62,76,90,104,120)

**Example 2**

Velocity (40,50,60,70,80,90,100,110) Maximum volume 115  
Volume (42,52,63,73,84,94,105,115)

**Example 3**

Velocity (42,52,63,73,84,94,105,115) Maximum volume 100  
Volume (37,45,55,63,73,82,91,100)

**Example 4**

Velocity (20,32,45,59,73,89,106,124) Maximum volume 110  
Volume (18,28,40,52,65,79,94,110)

**Example 5**

Velocity (30,42,54,67,80,93,106,118) Maximum volume 118  
Volume (30,42,54,67,80,93,106,118)

**Notes on the above.**

Where the maximum volume is higher than the velocity of fff, as in examples 1 & 2, then the volume for each dynamic is higher than it's velocity.

Where the maximum volume is lower than the velocity of fff, as in examples 3 & 4, then the volume for each dynamic is lower than it's velocity.

Where the maximum volume is equal to the velocity of fff, as in example 5, then the velocity and volume of each dynamic is equal.

Remember the equation used to calculate the volumes?

$[(\text{Velocity} * \text{default volume}) / \text{highest dynamic velocity} = \text{required value}]$

Where the default (maximum) volume is the sama as the highest velocity (fff), they cancel each other out and you are left with the number you first thought of. In such cases, it seems far easier to simply swap the velocity and volume values for each dynamic (just as in the NWC default values) rather than have to calculate each one.

**Caution.** It may appear on the surface to be so simple to swap values that you may be tempted to do so regardless. But beware! You will not get what you set out to get in the first place. Suppose you decided the set the velocity of ppp to 25 and the velocity of fff to 108, but you decided on these figures using a channel colume of 120. To swap the values means ppp(25,120) becomes ppp(120,25) and fff(108,120) becomes fff(120,108)

Put to the test:

Recorded and saved as a wave file:



As you can see, simply swapping the velocity / volume values where the velocity of fff is not equal to the required volume does not give the results you expected.