



The Wersi Sound Factory Master Classes

Master Class 8 : December 2013 : The Matrix - Part 3 : Source/Modifier Components - A

The LFO/Matrix screen

The Source/Modifier List for MC8

- Off
- Constant
- Random
- Velocity
- Key
- Pitch
- Mod Wheel
- Aftertouch
- Pitch Bend
- SusPed
- SoftPed
- LFO3

Modifier only
Switch
X-Fade

Classification of the controllers into Physical and Electronic

Here is a reminder of the LFO/Matrix tab.

	Source	Modifier	Modify	Destination	Depth
1	Mod Wheel Std	LFO 1 Std	+100.0 % +100.0 %	Pitch Std	+12.0 % Std
2	LFO 3 Std	Delay Ramp Std	+314 ms +314 ms	Pitch Std	+14.0 % Std
3	Aftertouch Std	LFO 3 Std	-0.0 % -0.0 %	LFO3 Rate Std	+71.0 % Std
4	Off Std	Off Std	-0.0 % -0.0 %	Off Std	-0.0 % Std
5	Off Std	Off Std	-0.0 % -0.0 %	Off Std	-0.0 % Std
6	Off Std	Off Std	-0.0 % -0.0 %	Off Std	-0.0 % Std

Layer LFO3	
Wave	Sine Sine
Phase	0° 0°
Sync	Each Note Each Note
Rate Hz	5.12 Hz 5.12 Hz

The Source, Modifier and Modify columns are the focus for this Master Class

This is the Matrix Table which will form the focus of our attention in these Master Classes.

This table refers to LFO3 which we start to look at in this Class.

By the end of the last Class (Master Class 7) we had covered the list of Destinations available to Sound Factory, except for Mod Env, LFO3 Rate and LFO3 Depth. It's now time to turn our attention to the Source column and also begin to understand the Modifier column.

As we have seen previously, the Source list specifies which controller we wish to use to change the sound. There are many applications however that require us to modify the way in which this controller will operate and this is the function of the controllers in the Modifier list. Most of the controllers can be used in both lists and this gives the system a lot more flexibility as we shall see later on.

In this and the following Master Classes we shall be looking at the Source and Modifier controllers. To understand how they work it's a good idea to classify them into two groups: Physical and Electronic. By classifying them in this way it will help to select the right tool for the job.

These groups can be further divided into smaller sub-groups. It is also important to realise that physical and electronic controllers can be combined and are able to influence each other as well. This leads to multiple possible designs for controlling the various parameters. Because of this, there is normally more than one way to produce the desired effect on a Destination parameter. Some different designs will therefore produce similar results, although the configuration of one design may, in a particular circumstance, have an advantage over another which might in turn appeal more for certain other situations. It's quite usual for computers to offer more than one way of doing the same thing and on different occasions one way may be preferable to another.

To help decide how a controller should be classified, we need a specification. Synthesiser manufacturers would use the following or similar statements to help sort this out.

Physical controllers enable the player to interact with the instrument for them to work. For example, we need to move something like the Modulation Wheel (MW) or activate one of the switches found on the expression pedal to engage the effect. This helps add to the performance which is why this group is also known more recently as 'Performance Controllers'.

Electronic controllers normally require only an initial set up of values from the player. Once those parameter values are set, the result will then become, in a sense, automated and applied to the required Destination automatically.

On a traditional modular synthesiser, those two statements would normally hold true in their application. However, the system we are using is an Organ and not a Synthesiser.

Organs normally require the use of the keyboards and pedalboard to produce any sound. A keyboard/pedalboard therefore is a Physical controller.

**Key down
trigger**

A true synthesiser, however, can produce sound without a keyboard being attached. Because of this fact, a lot of the parameters in an Organ system require the information sent from the initial key down trigger or gate pulse to synchronise with other parts in the system. This is important. In that sense you could say that all control falls into the physical group because none of the parameters can function without a key being played (triggered). If we took that view there would be nothing to sort out: not very helpful.

So, instead, we ignore the fact that everything needs to be triggered or played to hear it and base the results of the two groups on the fact that you can change a value of one or several parameters in real time on the instrument. If a controller falls into this category it is Physical in nature. If a controller is set to be applied automatically and requires only a key down event to start the process, we shall consider it to be Electronic in nature. From this we can begin to sort the available controller choices into useful processes or tools to use.

**The
'Off'
Controller
[Electronic]**

At the top of the list of controllers for the Source and Modifier columns is Off. This is an electronic controller and simply functions as a bypass which disables the patch routing (a row in the Matrix table) when selected in a Destination slot. When placed into the Source or Modifier columns it acts as a form of bypass of that controller and helps with isolating any problems with the Source or Modifier parameters. In technical terms, the Source and Modifier modulate the way the Destination provides the final result. The process of controlling is therefore a modulation and that word will be used from now on to describe what the Source and Modifier do. A simple understanding of the word modulation is change, though those two words are not synonymous.

**The
'Constant'
Controller
[Electronic]**

The second function on the list is Constant. This is an electronic controller. This ensures that a constant modulation of the Destination occurs at its specified Depth value. It is that Depth value which determines the extent of the modulation. You will already have noticed that the Source column has no associated value column. The extent of its modulation is determined by the Destination Depth value. Here's an example using Constant.

Source	Modifier	Modify	Destination	Depth
Constant	Off	0%	Amp	-80%

You will need to have open the Total Preset you are using to try out these Sound Factory designs and to have chosen one of the Selectors to contain a sound you know to have more than one sample layer. Set up the Matrix as above for one of those layers and set any other filled rows with Off in the Destination column.

Playing the keyboard reveals that the sample layer has been turned down in volume but not completely removed from the mix. In this way you can use the Matrix to manipulate the volume of each sample layer individually. You will remember that we do already have a means to change and set the volume of a sample layer from the Sample Page. However, the way the Matrix works is different from the way the calculations are performed to set the volume in dB (Decibels). This gives us the opportunity to make finer adjustments to the

overall mix of each layer being used to form the new edited sound. Negative values in the Depth column will reduce the volume (as above) while positive values will increase the volume (careful!!). You can use this adjustment to complement the original volume setting (if needed) as the divisions found under Sample>Volume are fairly coarse in parts of the range.

**The
'Random'
Controller
[Electronic]**

The next function on the list is Random. This is a random number generator and random numbers can be very useful. With this particular Random controller selected as a modulation it has certain conditions which affect its behaviour.

1. It requires a key down to generate a new number value.
2. It functions only at the initial key down trigger.

If you remember from the key down trigger paragraphs on page 2, we said we would ignore the fact that most of the modulations require a key down trigger to function. Therefore we can consider the Random controller as being Electronic in nature: it automatically performs its task. Let's use Random in an example to demonstrate this.

With a sound set up in a Selector of your Sound Factory Test Total Preset, open up Expert Edit of Sound Factory and select one sample layer, preferably a sample that plays continuously (Strings/Brass or Woodwinds will do) without fading away while holding some key(s) down. Go to the Matrix page and put Off (bypass) into the Destination slot of any row that has a modulation path in order to disable that function. Then add into an empty row the following design:

Source	Modifier	Modify	Destination	Depth
Random	Off	0%	Pan	+100%

When you now play the relevant keyboard, the position of the sample layer will change in the stereo field but only when you select a new key or repeat a key, ie when you've set up a new key down trigger. The sound of that key will remain fixed at that point in the stereo field until the key is released. If you then play another key while holding down the first, that second key will play the new note from a different position in the sound field without moving the sound from the first key still held down. No matter how fast or slow you play, the instrument will move the panning within the stereo sound field only on a key down.

With Amp as the Destination you can use small values of Depth to create a variation in mix volumes between different layers of samples, just as a group of instruments would. Variations of filtering (Cutoff) and panning are also useful, especially with accompaniments.

**The
'Velocity'
Controller
[Physical]**

Continuing down the list of controllers we come to Velocity. Now we have our first true Physical controller. Yes, Velocity does require the use of a keyboard to activate it but we are able to control the range (0-127) by how hard or soft we play the notes. It is therefore physical in nature. Velocity is quite common on most modern instruments and in this system it appears as a direct modulation routing on almost all of the other pages in Sound Factory. So why have it available in the Matrix as well? Once again, by Velocity being present in the Matrix we are able to set up variations that are not possible with the usual Velocity modulation routings found on the other pages.

There is the standard Velocity to Volume function on the Envelope page and the Velocity to Filter function on the Filter-Map page. But interesting velocity options will be found only by using the Matrix page. Here's an example to try. It also uses something called side-chaining as a control which you'll see and hear when you put in the design on page 4.

**Side-chaining
[a Modulator,
the Modifier,
modulates
another
Modulator,
the Source]**

What is side-chaining? In most modular synthesisers, we are able to control a modulator via another modulator. This is called side-chaining or biasing. The choice of modulators can also be either physical or electronic which opens up even more possibilities.

Select a sound as before and make sure that Dynamic for that Selector is set to On. Go into Sound Factory>Expert Edit and select a single sample layer. On the Matrix page, disable any active modulation(s). [\[See the Appendix on page 10 for Ian's way of dealing with this disabling.\]](#) Into a free row put the following design:

Source	Modifier	Modify	Destination	Depth
Velocity	Off	0%	Pitch	+100%

Try this now and you'll find it's very hard to control your instrument's pitch from across the keyboard, but you should hear different variations of pitch by changing how hard you play. We are now going to use a Modifier (remember side-chain or bias) to help understand this. Using the above design, add a Modifier called Switch and its Modify value as +50%, as follows:

Using a Modifier

Source	Modifier	Modify	Destination	Depth
Velocity	Switch	+50%	Pitch	+100%

A Modifier basically allows us to modify the value supplied from the Source. How the Modifier affects the Source will depend on the Source itself and the chosen Modifier as well as the Modify value involved. This leads to complex control of the Destination, especially if we then include compounded and or cascaded modulations into the equation as well; but that's for an advanced user Masterclass!

'Switch' as a Modifier of the Source 'Velocity'

Here we're using Switch as the Modifier. Switch, as you'll find out later, basically takes any input that has a value range, like the MW with a range of 0-127, and converts that value range into just two possible values, On/Off (1/0) or Maximum/Minimum. It is able to do this by comparing the value supplied by the Source with the value we insert into the Modify column. This inserted value is a percentage of the Source value.

If the value received by the Modifier is greater than the value placed in the Modify field (64, in the above example, because the value range from the Source is 0 - 127 with 63/64 being 50% of 0 - 127), the Switch will activate (ie be switched on) and will pass a maximum value (ie 127 in the example) to that particular Destination.

If the Source value is less than the Modify value (63 in the example), the Switch ignores this and in this state the Switch can be considered to be Off, or at its minimum value (0 in the above example), and so the Destination does not respond to the Source. When the Source value does again exceed that Modify value, the Switch switches on and the Destination again responds to the Source value.

Because we can specify the change point from Off to On in the Modify field, it's possible to have one Source, eg the MW, able to supply values in a range between 0 - 127 and thus being able to switch on and off different sample layers. In the case of the MW this switching would depend on the MW position (which determines the Source value). Alternatively we could use multiple Destinations in one sample layer and by using the MW (Source) and Switch (Modifier) combination decide if the sound should play or not and then, if it is playing, what octave that sound should be in. You can keep adding more choices until you run out of available modulation paths in the Matrix (max 6).

In this present case, using Velocity instead of the MW, the only difference as far as Sound Factory is concerned is that the value range is now being supplied by the keyboard Velocity and not the MW value. The value ranges of these two physical control sources is identical (0 - 127), so Switch will treat the incoming values in exactly the same way. Switch will also output exactly the same value when On (ie the maximum of 127). This allows any input value that exceeds the Modify value, even if it is only by 1% of our comparison value, to cause the Switch to activate (switch on) and output its maximum value (127) into the Destination.

Using the values in this example design, by playing softly the values sent from the keyboard will not affect Switch, leaving it in the Off state, because those values will be below the Modify value of +50%. Therefore there will be no modulation of the Pitch Destination, leaving the sound playing at the original pitch selected. Playing harder on the keyboard will activate Switch to an On state, whereby it will then send the maximum value to the Pitch Destination. Because here the Destination is Pitch with a positive Depth value, the sample layer will jump upwards in pitch depending on the value supplied in the Destination

Depth field. In this case, +100% means one octave up. To go one octave down, the Destination Depth value should be changed to -100%.

If 50% as the Modify value doesn't work well for your way of using dynamic velocity when playing, adjust its value to suit. Higher than 50% would require you to play harder to cause the pitch to jump up an octave: lower than 50% would make the whole touch response more sensitive and the pitch would jump up with just a slight increase in hardness of playing.

On the 0 - 127 scale, there are 128 values so between 63 and 64 represents the 50% point. Thus values of 0 - 63 represent Off and values of 64 - 127 represent On. This is how Switch values appear in some Sound Controls parameters. Using the Matrix you can make the switch point happen at any chosen value, expressed as a percentage of the Source value.

Examples of using this Velocity Switch

This design on page 4 is a simple on/off function using Velocity as the Source being modified (side-chained) by using Switch (1/0). This is commonly called a Velocity Switch but in this case we've changed where the information is sent and how it's processed. This can be used in some Brass setups for when you may want the Trumpets to jump up an octave quickly and then return on the next note, while the Trombones remain at their original octave position. This also works with accompaniments. For example, take a String Ensemble sound, apply the above design and assign the saved sound to the lower manual. When you play make sure Dynamic has been activated. Play harder to send notes up an octave; it makes it easier to bring out a counter-melody using one hand! [\[See Jeff Ormerod's example on page 9.\]](#)

The 'Key' Controller [Physical]

Key is the next Source on the list. Just as with Velocity above, Key also requires a key down trigger. Ignore that bit for the moment and just remember that we can change the Key output value by changing where we play on the keyboard. Each key has a Key Number assigned to it and each number is unique to that key only. The numbers normally increase going from left to right. Here's a little experiment to try.

With any sound loaded into Sound Factory, select just one Sample layer to play with. Go to the Matrix page and put Off into any modulation Destination boxes. Then add this design to an empty row:

Source	Modifier	Modify	Destination	Depth
Key	Off	0%	Amp	-100%

Play your keyboard below Middle C and the Sample layer will play as normal. Go above Middle C and the further right/up the keyboard you go the quieter the Sample will become.

In most cases it will vanish at some point in the octave above Middle C. We have created a Scaling function. This is important because all acoustic instruments normally get quieter when they get towards their extreme top ranges. This prevents their becoming too shrill and painful to the listener. If we change the Depth value (-100% at present) to a value around -65% this will allow the Sample to play but at a lower volume output in the top octave of the keyboard range, assuming it can go that high. Adjusting the Depth value to other settings will control the point at which the volume will start to be attenuated or reduced. Positive Depth values increase the volume as you go up the keyboard (careful!!).

The 'Pitch' Controller [Physical]

Continuing down the list of Sources and the next is Pitch. First of all, try not to confuse yourself by assuming that this is the same parameter found in the Destination column; it's not. In this case of using it either as a Source or Modifier or both, it behaves similarly to Key. In other words, it is like another choice of scaling function. If you find that Key isn't quite working as a scaling function, try Pitch as a possible alternative to achieve what you are after. It uses a different note value in the Maths to produce its results.

The
'Mod Wheel'
Controller
[Physical]

Next on the list is our old friend the Modulation Wheel (MW). This is one of the most powerful tools we have at our disposal. It's easy to get at when playing the instrument and, because of its nature, it's flexible and able to produce repeatable results. We've already done some experiments using the MW, but here is one which is full of potential and which also requires the use of side-chaining. We'll set up the MW as a way to bring other instruments into an arrangement without needing to touch any other Selectors or their volume controls in order to become activated. Here's how:

Let's take a hypothetical instrument setup of Flute, Bassoon and Clarinet. We would like these three instruments to be available on just one Selector when being played on the instrument so we can then use the remaining Selectors for different instrument selections giving us more than the usual limit of sounds at any one time from the Upper Manual.

So in Sound Factory that would be one Sample layer for the Flute, a second layer for the Bassoon and a third layer for the Clarinet. But we would like to be able to turn on and off the second and third layers while maintaining the first layer. So we look in the Matrix page for the first layer to check if there are any modulations that require the use of the MW. If there are, change MW to read either Off or Aftertouch (more on this in the next section). This will disable any unwanted modulations coming from any of the original assignments or re-assign them to work via Aftertouch. If there are any other assignments which don't appear to use the MW, leave them alone for now.

In the second layer which has the Bassoon now assigned, once again have a look in the Matrix page for any MW Destinations. Again, if there are, change MW to Off or Aftertouch. Leave the other assignments alone and now add this design into an empty row:

Source	Modifier	Modify	Destination	Depth
MW	X-Fade	+80%	Amp	+100%

In the third layer, the Clarinet, change any existing MW assignments as with layers 1 and 2, then insert the above design into an empty row.

Now play the Upper Manual with the MW in its normal zero position. You should hear just a Flute on its own. Now move the MW towards the middle of its range and you should hear the other two instruments (bassoon and clarinet) fading in together.

'X-Fade' as a
Modifier of
the Mod
Wheel

Things become even more interesting if we assign different values to the Modifier X-Fade parameter for the second and third layers. X-Fade (said as 'CrossFade') is available from the Modifier list only. It's part of a family of Maths functions that are available to us. These functions are for Biasing a control signal or Source input. It is able to change an incoming value by using an Input/Output curve. This is a form of wave-shaping/distortion/warping. When I say distortion, it's not the kind that we normally find in 'Heavy Rock' for example. It's a distortion of how the incoming number values are re-represented when being output by this module. Zero for example would still be zero, but twenty would be output as thirty, fifty could be ninety and so on, producing a biased curve output. Using the example design given above, you can create all sorts of possible mixes and variations by changing the Modify values. You can also add more sample layers and by using different values in the X-Fade Modify value field, mix those in or out as well, to taste. You can use it with any of the available Destinations and in any combination. The three instruments fade in and out as you move the MW rather than just suddenly appear/disappear.

Keep the Bassoon layer at +80% in the Modify column, but change the Clarinet layer to +50%, for example, in the Modify column. Now the Flute will still play as before, regardless of what value the MW is producing. However, each of the other two instruments will be mixed in with it at different MW positions. So at one point on the MW you would hear the Flute as a solo; another point would be a mix of Flute and Clarinet; and another point in the MW range will produce a mixture of all three instruments. With the MW at maximum there will be just a mix of the Flute and Bassoon.

The
'Aftertouch'
Controller
[Physical]

Aftertouch is next on the list. In order to hear this modulating any Destinations, Aftertouch will need to be switched to On in your Total Preset (Selectors>Advanced). Once that is done, we can use it to bring in its most common use: a way of controlling the Depth of an LFO (Low Frequency Oscillator) in order to produce a vibrato. Brass and Woodwind instruments obviously have vibrato and we can use Aftertouch to increase or decrease the effect. We also have some other not so obvious options that it can be used for. One is to control the rate or speed of LFO3. We haven't covered this Destination before because LFO3 is available only by using the Matrix itself. You will find two entries for this LFO3 in the Destination list; Rate and Depth. LFO3 Rate will change the frequency or speed of the selected waveform for the LFO3 to use. LFO3 Depth controls how much of the LFO3 can be applied to the Destination (the more that's supplied the more noticeable the vibrato is).

Let's try a quick experiment to get a feel for how these Destinations work. Load into any Total Preset Jazz Flute 1 * (090-000-018). In the Selectors>Advanced page make sure that both the MW and Aftertouch are activated. Go into Sound Factory>Expert Edit and delete layer two.

Then go into the Filter Map page and change Velocity Switch>High Vel to 127 (otherwise some keys won't sound if you apply too much velocity). In the Matrix page delete all the existing modulations by turning all Sources, Modifiers and Destinations to Off. Then enter the following three designs into the first three rows:

Row No.	Source	Modifier	Modify	Destination	Depth
1	Aftertouch	LFO3	+100%	Pitch	+20%
2	Aftertouch	Off	0%	LFO3 Rate	+100%
3	Mod Wheel	Off	0%	LFO3 Depth	-100%

At the bottom of the Matrix page, change the LFO3>Rate Hz value to 2.97 Hz. Experiment with this value according to your taste in flute vibrato speed.

With the MW at zero, playing the keyboard and using Aftertouch will add the expected vibrato to the Flute, but depending on how much weight is used to push on the keys we can also change the speed or frequency of the vibrato. That's control of the LFO3 Rate. Pushing the MW to its maximum output value and playing the keyboard will gradually remove the vibrato from the sample. This is control of the LFO3 Depth via the MW.

Earlier we referred to being able to use different designs to produce similar results. Try changing LFO3 to either LFO1 or LFO2 in Row 1 above. You will still get the vibrato when adding pressure to the key in question via the Aftertouch, but as far as being able to control the speed or frequency in real time, only LFO3 has this ability via the Matrix. This makes LFO3 more versatile in functionality and therefore is normally a first choice when wanting to add either vibrato or rotor wah or tremolo effects to a sound. Try the above design with a solo Violin or Sax, for example. You'll find they become more alive by your being able to change the speed from this LFO while performing; the instrument becomes more expressive.

Whenever you send the Source Aftertouch to the Destination Pitch, as in Row 1 above, you can bend the tuning of the keys by the amount of pressure applied after the key down: think Guitar note bending without the need to use an Expression Pedal Switch/Piston Switch as a Glide Switch, called Hawaii Effect, or the Pitch Bend Wheel (PB). Here's the design:

Source	Modifier	Modify	Destination	Depth
Aftertouch	Off	0%	Pitch	+100%

Ensure Aftertouch is Active in Selectors, of course, and adjust the value of the Depth parameter to the amount of Pitch Bend that you require.

The
'Pitch Bend'
Controller
[Physical]

Next is Pitch Bend. Originally, on old synthesisers, the Pitch Bend Wheel (PW) was free and not sprung. It's Bi-polar in function, being able to send either positive or negative voltage values into a system, and because it can send these two different signs (positive/negative) it can control different parameters depending on its direction of travel. It's not possible for us to say how the following will work in instruments with a combined MW/PW because we have no access to such instruments.

On the Wersi system, the Pitch Bend Wheel is called Pitch on the instrument panel and Pitch Wheel in Selectors on the screen. For short, it will be referred to as PW in this Master Class. It is still Bi-polar but it returns to zero automatically once the wheel is released. This means that we will need to handle the PW continuously in order to hear any possible contribution to a sound. We don't have to use it for its most common use which is normally bending notes or chords, although it's very effective at this. Sound Factory allows us to use this controller in other ways.

We are going to use the PW partly as it was originally designed, as a pitch controller when pulled downwards. Now because it is Bi-polar, we're going to re-assign its positive values to bring in an effect and not pitch bent when pushed upwards. This enables the chosen sound to be adjusted only when the player wishes to make that adjustment and not all the time.

**Example of
using the
'Pitch Bend'
Controller**

We're going to use the Jazz Flute 1 * (090-000-018) as a starting point for this again, so quickload this sound into your chosen Selector. Make sure that PW is enabled in your TP for this Selector only. Then go into Sound Factory>Expert Edit.

We are presented with two sample layers: Flute Medium; Flute Hard. Delete layer two (Flute Hard) leaving the single sound layer Flute Medium to work on.

The Filter-Map page will once again require the value of 127 placed into the parameter box Velocity Switch>High Vel.

Go to the General page and change only Pitch Bend - Voices>PitchBend Range High to zero. Leave the other PitchBend Range Low as set to 2.

These adjustments ensure that the sample layers making up this sound ignore any positive values from the PW.

Go into the LFO/Matrix page. In the last row of the Matrix for this layer (which should be empty!), place this design:

Source	Modifier	Modify	Destination	Depth
Pitch Bend	Off	0%	Amp	-100%

Once that is done, return to the Sample page and copy this Layer to clipboard and then Paste Behind.

Now go back to layer one and in its last row of the Matrix replace the data with this design:

Source	Modifier	Modify	Destination	Depth
Pitch Bend	X-Fade	+80%	Amp	+100%

For the final step, with layer one still selected, on the Matrix page, touch Set Effect, found in the header bar on the left hand side. From the Effect list that appears, select Delay for now (you can always replace it later with your choice to play with). Then touch Insert Effect Behind (top button of the three buttons on the right) and not from the normal copy/paste buttons found at the bottom of this page. The effect will then be placed in-between the first sample layer and the second sample layer.

The Effect Layer should now be the selected one: if not, select it. Turn up the FeedBack parameter to a higher value, say around 75% which should be enough to hear it once activated. Then name/save the sound and exit Sound Factory.

Quickload your new Sound Factory sound into a Selector. (Once again make sure that the PB check box is active for only this selector in your TP).

This is what should happen:

When you play the keys, you should not be aware of the Delay effect that has been set up in Sound Factory with the PW in its normal resting place. Only when you move the PW forwards should the Delay kick in. When you pull the PW downwards you should still get the downward pitch-shift. You should be able to tailor where the effect should make an appearance by changing the X-Fade Modify value.

The
'Breath Ctl,
Wheel 3 and
Foot Ctl'
Controllers

The next three entries in the list, Breath Ctl (Breath Controller or BC for sort), Wheel 3 (another form of MW) and Foot Ctl (Foot Controller), are all Physical in function but can at this point be accessed only by using an external MIDI keyboard/MIDI controller or a computer with a MIDI interface plus some sort of MIDI based program eg Logic, Cubase or Digital Performer. Don't worry if you do not have any of those. We still have some more options available to us, plus what has been covered already, to use and explore. I don't feel that we are missing out by not being able to use these three controllers on the instrument.

The
'SoftPed and
SusPed'
Controllers
[Physical]

We now come to two related controllers, SusPed and SoftPed. These names, SusPed and SoftPed, refer to how the foot switches on either side of the expression and the foot pistons can also be used to modulate Sound Factory sample layers.

In order to use these options the foot switches and pistons themselves must be set up correctly in a Total Preset. These switches are active (On) only while they have a small amount of pressure applied to them and will return to their Off position once released. We could use this as a way to either turn on or off sample layers quickly without needing to touch the Upper/Lower or Pedal Manual Selectors.

To use this, the first thing to do is to go into Acc>Advanced>Foot Switch Settings and select Piano-Soft for either your left or right foot switch or chosen piston. Then, using the Jazz Flute example again because it's convenient, go into Sound Factory and add this design to an empty row:

Source	Modifier	Modify	Destination	Depth
SoftPed	Off	0%	Amp	-100%

Play the instrument without pushing your chosen foot switch or piston and the Flute will play as before. Now activate your chosen foot switch or piston and this sound will be temporarily muted until that foot switch is released, thus returning the Flute to sounding. Depth values between -99% and -1% progressively raise the volume until at 0% the footswitch has no effect. Values between +1% and +100% progressively make the sound louder (careful!!)

SusPed as a modulator operates the Sustain feature normally found on Pianos and available for the expression pedal foot switches/pistons, so unless you particularly want to engage that modulation as well it can get overpowering. To use it, set up Sustain as the parameter for your chosen footswitch. Depth values between +1% and +100% progressively increase the amount of the sustain effect as well as making the sound slightly louder (careful!!). Values between -1% and -99% progressively reduce the amount of the sustain effect and also reduce the volume of the sound. At -100% there is silence. Piano sounds respond best to this controller.

Jeff's
Brass Octave
Example

Here is an example from Jeff Ormerod that develops Ian's use of the Switch Modifier to implement a full octave shift in pitch when using the instrument's Dynamic function. We shall use the Brass Sforzando sound to create a dual brass section. One half of the section will remain at normal pitch whilst the other half can jump from normal pitch to the octave above when additional force is applied to the keys. Here's how it's done.

- 1) Load the Brass Sforzando * sound (090-000-103) into the Sound Factory and ensure that the Sample Tab page is selected. You will see that there are two samples on the samples list, Brass Section 1 and Brass Section 2. They have identical parameters except for their Panorama and Octave settings. Brass Section 1 is set at the far left of the sound stage at L64 and an Octave setting of -1, whilst Brass Section 2 is set to the far right of the sound stage at R64 and an Octave setting of 0.
- 2) In order to achieve the desired effect it will be necessary to have both samples at the same pitch, and then implement the octave jump on one of them. We shall choose Brass Section 2 for this purpose. Select Brass Section 2 from the samples list on the Sample Tab page and change its Octave parameter from 0 to -1.
- 3) Now we need to implement the octave jump for Brass Section 2 in the Matrix. Select the LFO/Matrix Tab. Firstly, in Row 1 set the Destination to Off as we

don't need the Aftertouch feature with this sample layer. Then, in a spare Row in the Matrix Table, add the following entry.

Source	Modifier	Modify	Destination	Depth
Velocity	Switch	+50%	Pitch	+100%

The +100% value for the Depth parameter allows the pitch to be doubled, whilst the specification of the Velocity controller for the Source parameter links the command to the instrument's Dynamic function. Since this function provides a range of values between 0 and 127, with no Modifier specified the pitch would jump to somewhere within the octave, depending on the amount of force applied to the keys.

Specifying the Switch controller as the Modifier however restricts this jump to either no jump or an octave jump. The value for the Modify parameter is used to set the amount of keyboard force required to activate the jump, and can be adjusted to suit the user's playing style.

- 4) Save the sound as a new Sound Factory sound, and remember to activate the Dynamic function when the sound is played.

There is an audio download of this sound on the Sound Factory page of the WersiClub International website. We use it for a series of brass section fill-ins that occur between the lines of the refrain in the big band number "It's only a Paper Moon". The first time the refrain is heard we apply gentle pressure to the keys such that both halves of the brass section remain at normal pitch. When the refrain is repeated, we apply additional pressure to the last chord of the fill-ins, and to the chords of the end sequence, to trigger the octave jump for the other half of the section and so, to use a technical term, give it some "Umph" !!

We hope you have found this Master Class interesting and that you will join us again for Master Class 9 in February 2014 when we shall continue further down the list of controllers for Source and Modifier.

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Appendix: Ian's way of disabling parts of the Matrix.

Personally, I use 'Off' in a 'Destination' column when checking multiple (compounded) modulations being routed to the same Destination. This helps me to calculate the value amounts to be entered easily.

I'll use 'Off' in a 'Source' when trying to establish if the controller/modulator is actually the correct choice for what I'm after.

I'll use 'Off' in the 'Modifiers' when I want to compare the original controller/modulation against the 'modified' version.

As far as early steps using the 'Matrix' are concerned, I would recommend removing any modulations that are active at this point, so we are able to focus entirely on the results of our initial experiments and check that the design has been correctly entered without getting confused. In other words, clear the board!

Once you have become experienced at using/reading the Matrix and what it is set up to do, then you will recognise the modulations that can be left alone and any that will affect your results.