YAMAHA

MOTIF XS

Power User:
Working with and Understanding Physical Controllers

How to use this document:
This is a tutorial and assumes you are making the button pushes as it advances. By following the example setup, you will gain an insight into how the controllers work and how they can be assigned to your advantage. All possibilities could never be covered in a short guide but this should get you on your way. After going through this article feel free to experiment with other assignments.

Background: (written with version **1.05.6**)
Get your Motif XS DATA LIST booklet and refer to the CONTROL LIST on page 51: "CONTROL SET DESTINATIONS" and "LFO BOX DESTINATIONS". You will also want to refer to the EFFECT PARAMETER LIST (pages 35-42).

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Assigning Controllers in Voice Mode

Within the architecture of each AWM2 (sampled-based) Voice is a set of 6 controller assignment setups, called Control Sets. You can program how the physical controllers will be assigned to affect a specific part of the sound. The assignable physical controllers are:

RB – Ribbon Controller
FC1 – Foot Controller 1 (optional FC7 pedal)
FC2 – Foot Controller 2 (optional FC7 pedal)
FS – Foot Switch (optional FC4/FC5 pedal)
AF1 – Assignable Function button
AF2 – Assignable Function button
MW – Modulation wheel
PB – Pitch bend wheel
AT - Aftertouch
Assign 1 – Knob 7 (Tone 1 row)
Assign 2 – Knob 8 (Tone 1 row)
BC – Breath Controller[1]

What about the Sustain pedal and the new Half-damper and the Damper Resonance functions? These will be the subject of a separate article.

Certain Control Set assignments are *common* to all elements and others can be specific to a particular *element* of the sound. There are 6 Control Sets, each allows the user to pick a physical controller and assign it a parameter destination (Destination = the target parameter you will be changing). It is possible with this system to assign more than one controller to the same destination by using more than one CONTROL SET. And it is also possible to have a single destination under the control of more than one physical controller. The degree or *depth* of the control of each physical controller can be programmed, as well. In fact, the Depth parameter is very important – because without a Depth amount the assignment is meaningless. Think about the Depth setting as controlling *how far* the controller will be moved to get the response you wish. This is your performing gesture and should be set to your taste and style. (It is okay to have an opinion when setting this parameter).

You can view and set the parameters for the Controller Setups in the Motif XS itself or via the "Motif XS Editor" in your computer. To navigate to the Controller Sets in the MOTIF XS from **Voice mode**:
- Press [EDIT]

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[1] Although the XS does not physically accept a BC3, the instrument nevertheless is able to respond to and send this controller number. More on this later in the article...

- Press [COMMON EDIT], if not already selected
- Press [F4] CTRL Set
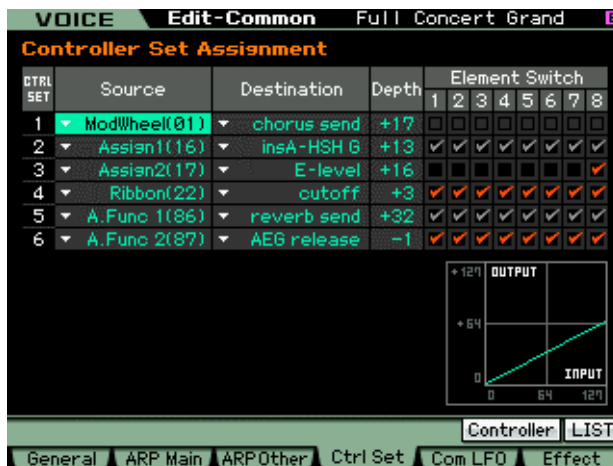
- There are 6 sets

- **Setting the SOURCE/DESTINATION:** select a <u>Source</u> controller and assign a target <u>Destination</u> parameter. You can use [F6] LIST to view the available options.

- **Destination Elements or Common:** The Element Switches activate control for each element. If the destination is 'common' to all elements you will see grey check marks for each individual Element. Grey check marks means you cannot get at it (this is the equivalent of being 'greyed-out'). In this case because all Elements will be treated together. Some typical Common parameter destinations are Volume, Reverb Send or Chorus Send. If the destination can be assigned to a specific Element(s) you will see the destination parameter name such as "**E-level**" = Element level, "**E-pan**", etc. You can select which elements are to respond to this control setting. An Element Switch setting with a red check mark, represents a setting where an element will be affected, and the others are unaffected. (See example assignment above).

- **Real-time Control over Insertion Effects:** Other possible destinations include real-time control over the powerful DUAL INSERTION EFFECTS that can be applied to a VOICE. Refer to the Effect Parameter List (page 35-42) for an idea of potential here. When targeting a control destination if an effect parameter can be real-time controlled you will see an abbreviation of the parameter name appear in the Control Set. If not, the parameter will be designated with a number,

as in "insB-prm10". For example, call up the Organ sound "Or:16+8+5&1/3"; This Voice uses the Rotor Speaker algorithm for INSERTION B. You will find data about this effect on the top right of page 38 of the DATA LIST booklet. Navigate to its Control Set;

- Press [EDIT]
- Press [COMMON EDIT], if necessary
- Press [F4] CTRL SET
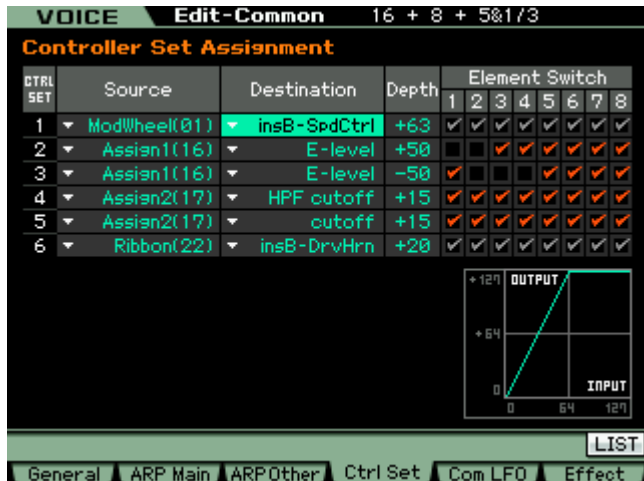
This Voice has the destination set to "insB: SpdCtrl" which translates to "Insertion Effect B: Speed Control". It has two speeds (like a Leslie) Slow and Fast. This Control Set is using the Mod wheel to switch between Slow/Fast speeds. It is a switch – do not mistake this for the transition time (the ramping up or gradual slow down in speed) – that is handled by parameters within the Effect algorithm. The switch selects either SLOW or FAST – how it transitions is extremely programmable within the Effect.

Most of the parameters of the Rotary Speaker algorithm are assignable for real-time control. There are 16 possible parameters in the processor. Speed Control is listed as MIDI Parameter Number 16. MIDI Parameters 10 and 15 are unavailable for real-time control assignment. If you attempt to select them you will see "insB–prm10" and "insB–prm15" instead of a parameter abbreviation – meaning they are unavailable. (MIDI Parameter Number 10: (typically Wet/Dry Balance) is totally unavailable because of phase cancellation possibilities - it is not even listed. After all in a real world situation either your entire signal is going through the speaker or none of it is going through the speaker. It is simply not a parameter that would logically be adjusted in this instance; and Number

15 "Microphone L-R angle" is the angle of the modeled stereo microphone on the Leslie cabinet...simply not a parameter you would move in real-time. Mic angle is a "set and forget" parameter. Parameters that are unavailable typically have no musical or practical use. If you want to see and tweak this effect press [F6]:EFFECT/ [SF3]:INSB

- **DEPTH** The setting here must be set with care and some thought. The range here is –64 ~ 0 ~ +63. How the MOTIF XS responds to a setting will depend on *which parameter* and *which controller* is selected. (See below some example assignments). A Depth setting of 0 defeats all other settings in the Controller Set (and renders them meaningless). In general, the higher the number the more it increases the range of control. Negative value settings reverse the effective *direction* of the controller. You will have to be logical here.

Rotary Speaker study: Since this is a common question – we will digress here and explain a bit more about how the Rotary Speaker control works. Say you have a Voice like the "16 + 8 + 5&1/3" Organ Voice where the Mod Wheel is changing the Speed Control from SLOW to FAST. You may think that all you need to do is to set the DEPTH to a negative number and the MW will now switch the Speed Control from FAST to SLOW. But that is not how it works. How come? Because Wheel down is SLOW, by changing the DEPTH to a negative value you are not changing anything about the speed itself. You must do two things to make it so; set the speed of the Rotary Speaker to FAST, then set the MW Depth to a negative value.

- Press [F6] EFFECT
- Press [SF3] INS B
- Set the SPEED CONTROL = FAST
- Press [F4]
- Set the MW – insB-SpdCtrl = -64

Now when you raise the MW the speed will go from FAST to SLOW.

A close examination of the Rotary Speaker algorithm (shown below) you will see all the parameters that control the speed. You have a setting for Rotor when SLOW is active. You have a separate setting for the Rotor when FAST is active. You have a SLOW-FAST transition Time for the Rotor. You have setting for Horn when SLOW is active. You have a separate setting for the Horn when FAST is active. You have a SLOW-FAST transition Time for the Horn.

The MW is only a switch for SLOW to FAST, the time each component (the Rotor and the Horn) takes to transition is separately programmable.

BIASING a parameter to a CONTROLLER
Example Assignment: In this example we deal with controlling VOLUME via controllers within a MOTIF XS sample-based Voice. This can be tricky, but this example should make clear how it works. This process will allow you to learn about how physical controllers are assigned within a VOICE to various functions – these are in addition to those already assigned via the 8 knobs and 3 rows of functions in the upper left corner of your front panel (the [SELECTED PART CONTROL]. Each Voice when selected will have access to these 24 real time parameters via the dedicated knobs.

--Let's say you want to control the **total** Volume of the Voice with the Modulation Wheel. MIDI control change message #001 is the Modulation Wheel. The modulation wheel can be assigned to control all manner of parameters within a synthesizer, not just vibrato. But for our example let's see what happens when you attempt to assign the MW to control overall volume. For our experiment let's initialize a voice. This way we are not inheriting values from a preprogrammed Controller Set. From **Voice mode**:

Press the following buttons:
• [JOB]
• [F1]:INIT
• [ENTER]
• [INC/YES] to execute.

This will create an INIT VOICE with just a piano wave in it.

• Press [EDIT]

Let's select a synth wave. Navigate to the OSCILLATOR WAVE page:

• Press Track Select button [1] to drop to the Element level of editing. (Notice the Inverse video 'E' in the upper right corner and the 'EL1' on the top line – denoting the Voice has been edited but not yet stored and we are editing Element 1.)
• Press [F1] OSCILLATOR
• Select sample Wave Category: Wv Wave Number: 0934: Padd
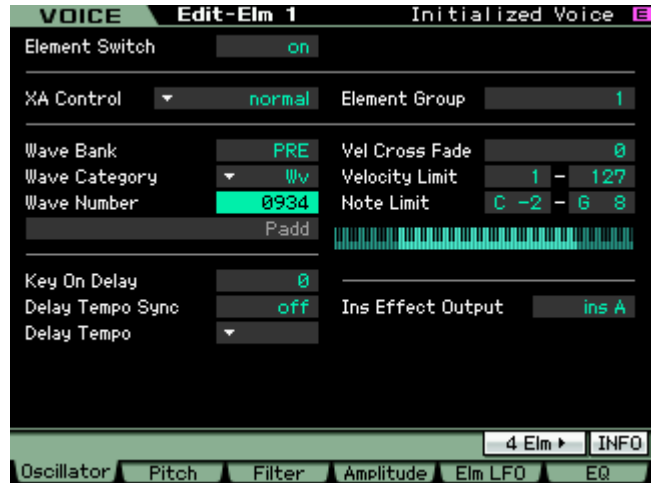
• Now, for fun, let's activate a second Element in this Voice. Press the Track Select [2] button that represents Element 2. You can now turn the Element Switch ON.
• Set Element 2 to waveform #1007 [Wave Category: Wv; UniBass
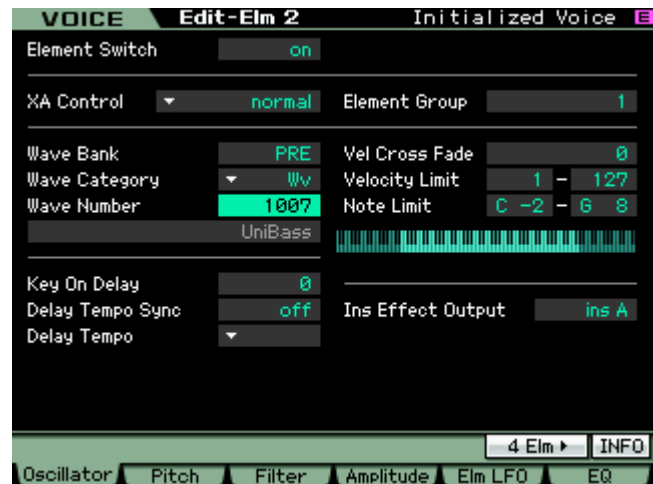
• You can use Track Select buttons [1] - [8] to **select** Elements, Currently we can use [1] and [2] to select and the dedicated [MUTE] button will illuminate an element when it is active. Press [MUTE] all currently active Element (Track Select) buttons will light. This will allow you to isolate each element when

you want to concentrate on just one at a time. Practice this basic skill.

- Navigate to the Control Set page. (Press the [COMMON EDIT] button to return to Common edit. [F4]:CTL SET
- Set the CTL SET 1 as follows:
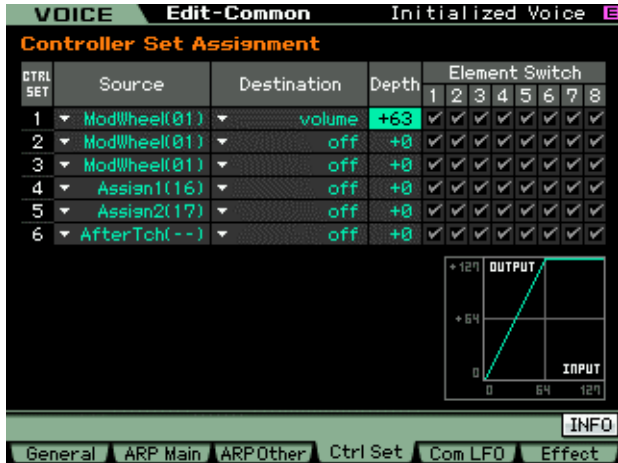
In the above example, the Volume parameter is 'common' to **all Elements.** We know this because the Element Switches are grayed out. If you were to activate additional Elements they would also share the same setting when you select a 'common' destination. The modulation wheel will effect all the Elements. The **+63** Depth setting sets the maximum range of the controller. Try it…move the mod wheel…

Hey! It **doesn't** work. Is the unit broken? Not at all… Here's why it is not working: This is not the place that the overall volume of the sound is set, only where you **assign control to it**. We need to go to the overall Voice volume parameter and reduce it to zero. Here is how to change it.

Navigate to the Common OUTPUT page:
- Press [F1] GENERAL
- Press [SF2] PLAY MODE.

Here you will see a parameter for the total OUTPUT LEVEL of the Voice = 127. Program it to 0. That's right, 0.

Now when you move the modulation wheel you have **total** control over the volume of the Voice. The position of the modulation wheel is now an *absolute* representation of the current common volume, 0-127. We call this process 'biasing' the parameter (in this case, volume) to the controller. In other words, it will now look to this controller (mod wheel) for volume instructions.
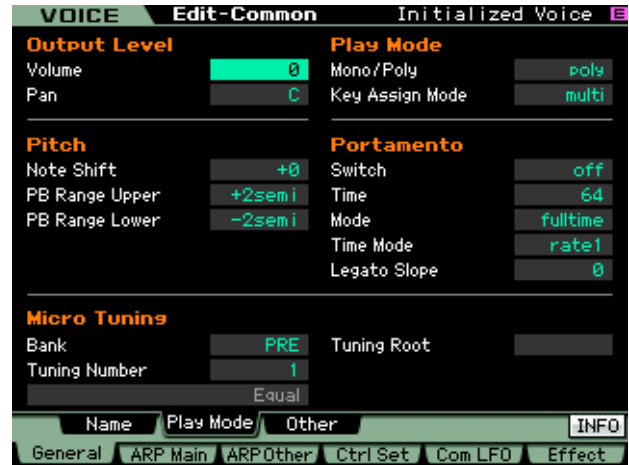

Okay, before continuing: return the Common Voice Volume to 127.

Similarly, a volume assignment can be made on the Element level. This would allow the player/programmer to have control over specific parts of the sound (Elements) within a Voice. In our Control Set instead of making the Destination = Volume (common overall volume) like before, this time assign it to **ELM-Lvl** or Element Level. When ELM-Lvl is selected you can individually assign which elements will respond to this Control Set's Depth setting when the physical controller is moved.

Return to Control Sets:
- Press [EDIT]
- Press [COMMON EDIT], if necessary
- Press [F4]:CTRL SET
- Select 'E-level' as the Destination

Set only Element 2's level to be controlled via the MW (Element Switch). This is accomplished by moving the cursor to the Element Switch line and un-checking all but Element 2.

5
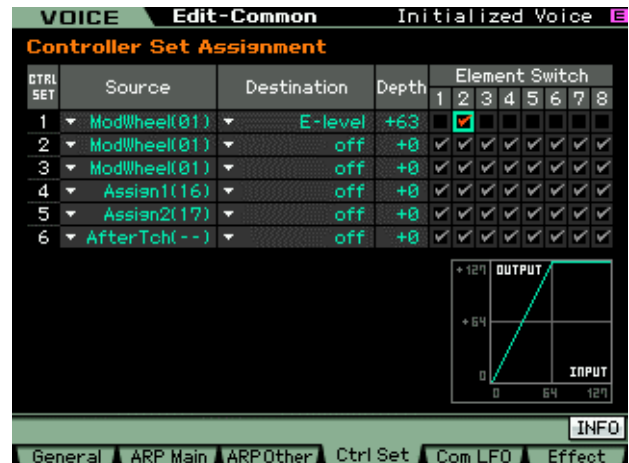
What this accomplishes is that only ELEMENT 2 will respond to the MW position for its Volume, however, in a similar scenario to our previous example, we must set the Volume of Element 2 to zero. Here's how...

• Press Track Select [2] to view Element parameters
• Press [F4]: Amplitude
• Press [SF1]:Level/Pan
• Set EL2 Level to 0

Instead of "Total" Voice volume we are controlling the level of this particular Element. When you set Element 2's Level to 0, it is biased to the MW. This is a very flexible arrangement. You can expand upon it and dream up your own configurations. For example, you could take Control Set 2 and program it to control just Element 1 with the same Mod Wheel but set the E–Level DEPTH to a negative (–64). Now when you move the wheel forward it will fade out one Element and fade in the other. A negative DEPTH setting will reduce the normal Volume setting.

Notice you did not have to set the Element Level for Element 1 to 0. This is because if you did and then applied a minus value to it... this would be illogical...because levels below 0 are still inaudible.

Experiment. Try changing the controller to the RB (Ribbon). The Ribbon defaults to sending Control Change message number 22. This is shown in parenthesis as: Ribbon(22)

Now that you have the Ribbon controller selected you will notice that only one Element is active when the Ribbon is not touched but if you move your finger to the right side of the ribbon only Element 2 is heard. And as you move your finger to the left side of the ribbon only Element 1 is heard. This is because the ribbon, unlike the wheel is a left-center-right controller (more on this later in the article). However, we just want you to observe that now.

One other important new feature is that you can assign how the ribbon behaves on a per VOICE basis. That is whether it remains where you last touched it (hold) or if it reverts back to the first condition (reset).

• Press [COMMON EDIT]
• Press [F1] GENERAL
• Press [SF3] OTHER

Here you can set the RIBBON MODE to "reset" or "hold".

Almost any controller can be used for this purpose – some make more sense than others in certain situations.

FOOT PEDALS
The same scenario holds true for controlling volume with an optional Yamaha FC7 (sweep control pedal) plugged into the **Foot Control** jack (FC2). Foot Control (cc #004) can be assigned to control many different parameters within a synth voice. (Not to be confused with Foot Volume (cc #007) which will <u>always</u> control MIDI Channel Volume). There is always some confusion here because they both use the same FC7 pedal –

however, the function can be quite different. One key difference is that if you use cc007 every thing connected to that MIDI channel will be controlled exactly the same. However, if you use the assignable Foot Control cc004 you can choose the destination parameter for the foot pedal and it will only affect the MOTIF XS and only the Elements of the MOTIF XS sound that you designate.

Foot Control (cc004) can be assigned to control the internal volume of the MOTIF XS in a similar fashion to how we did the MW experiment. Simply follow the same steps we did with the MW, above, to assign the Foot Controller (FC04) to be the Source and set volume as the Destination. When you set the Volume to 0 you will have biased total volume to the Foot Controller.

Note: If the parameter to be controlled is set at any value other than 0, you are, in affect, setting a *minimum value*. In the case of our volume example, this would be the minimum volume when the controller was in the heel down position (or wheel down position). In some instances you may wish to set the minimum to a value other than zero as the stored condition (especially for Live players this is invaluable). The example above is useful in a scenario where you want to control the internal MOTIF XS sound with a separate foot pedal from what is sent via MIDI.

After any and all Voice edit procedures you should STORE and then SAVE data (if it is worthy of keeping). If you started editing a Preset or you started editing an Internal Voice, simply point the Store procedure towards a desirable Internal location. Press [STORE]; Select a location; press [ENTER]; then [YES].

Note: At the end of any editing session you should make a backup copy of all your new Voice edits. Save sounds either to the optional SmartMedia card in ALL or ALL-VOICE files or backup the current set via a MOTIF XS Voice Editor

What other things can be assigned
To answer this question we must recognize that there are answers for internal Voices/Performances and answers for external communication via MIDI Master Keyboard setups. But first, let's gain an understanding of how the controllers work. MIDI provides for standard physical controllers. Some are **fixed** as to what control change message they send, while others are **assignable**. We must consider what these controllers are doing to the internal MOTIF XS sounds and what they are doing out via MIDI. These two things can be quite different, by design.

First, here is how it works with Voices. MOTIF XS Voice banks hold the factory programmer's best

work. These are your fundamental, playable sounds. A Voice can have as many as eight completely independent multi-sampled waveform sets within it – Yamaha calls these components *Elements*. Each Element can be individually controlled by MOTIF XS parameters such as filters, envelopes, LFOs, etc. You can assign the various physical controllers to control specific areas within the sound. The physical controls available are:

> **PB** – Pitch bend wheel
> **MW** – Modulation wheel
> **Assign 1** – Knob 7, Row 1
> **Assign 2** – Knob 8, Row 1
> **AT** – Aftertouch
> **FC1** – Assignable Foot Control (011 Expression)
> **FC2** – Assignable Foot Control (004 Foot Cntrl)
> **FS** – Assignable Foot Switch
> **BC** – Breath Controller*
> **SUS** – Sustain
> **Control Sliders** 1 – 8
> **AF1** – Assignable Function 1
> **AF2** – Assignable Function 2

PB (fixed) – Pitch Bend wheel will always send information that is Pitch Bend data (its own category of MIDI message) both internally and out via MIDI. Exactly how the data is interpreted by the tone generator (receiving device) **is** programmable. For example, it is possible to use the wheel for something other than just pitch bend by programming the sound to have a pitch bend **depth** of 0 and then assigning the PB wheel to a different parameter. Typically, however, on the internal AWM2 sample-based Voices PB range is set to up/down 2 steps (+2 and -2 semi tones equals a whole tone; see below).
Pitch Bend range is a COMMON parameter and can be set per Voice on the [COMMON EDIT]/[F1] General/[SF2] PLAY MODE:

MW (fixed) – Modulation wheel will always send control change message 001 and this data is typically used for vibrato depth both internally and

out via MIDI. Exactly how the data (control change message 001 – written cc001) is interpreted by the tone generator (receiving device) **is** programmable. For example, it is possible to use the modulation wheel for something other than just vibrato depth by programming the sounds PMD (pitch modulation depth to 0) and assigning it another parameter. (PMD is another name for vibrato.) For example, the mod wheel makes a good mix control. You can use it to fade one layer *in* (+ depth/level at 0) while a second layer is programmed to fade *out* (-depth/level at 127). The assignment to vibrato (Pitch Mod) is not automatic. Each Voice that uses the MW as vibrato has it assigned in a Control Set.
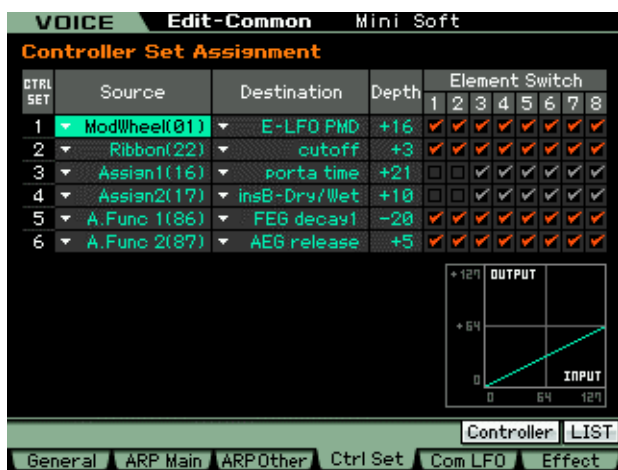
Above you see a typical synth lead Voice PRESET 5:049 D01) "Mini Soft". A two Element Voice that has the Mod wheel as the ELFO-PM depth control – this translates to Element Low Frequency Oscillator- Pitch Modulation Depth control. Depth = +16. As you move the wheel up you will add vibrato (pitch modulation) to the Voice. In some Voices the programmer may have elected to use the C-LFO or Common Low Frequency Oscillator. This is strictly a matter of preference. The C-LFO has different options available via a special 'matrix' called the "BOX". This has to do with targeting specific destinations within a VOICE.

AS 1 – ASSIGN 1 does not have a fixed message. It can be assigned as an internal control device. You can use Assign 1 to change Element level, filter cutoff/resonance, effect send, etc., etc. (see Control Set Destination list). It can **independently** be assigned **any** control change message, (cc1-cc95), for transmitting out via MIDI. The default assignment is cc #016 called: "General Purpose control 1". If you reassign the default control change assignment (global setting found in UTILITY) to cc #002 Breath Control, for

example, you will in effect have a Breath Controller on a knob.

AS 2 – ASSIGN 2 does not have a fixed message. It can be assigned as an internal control device. You can use it to change Element level, filter, effects, etc., etc. (see Control Set Destination list). It can **independently** be assigned any control change message for transmitting out via MIDI. The default assignment is cc #017: "General Purpose control 2". If you reassign the default assignment (global setting found in UTILITY) to cc #002, for example, you will in effect have a breath control on a knob.

AFTERTOUCH (fixed) – will always be sent when extra pressure is applied to the key. How this controller data is interpreted, if at all, **is** a function of the voice parameters in the tone generator/receiving device. Some players use aftertouch to vary PMD (pitch modulation depth), vibrato. Others like it to brighten the sound and assign it to filter cutoff. Try substituting AT for MW in our example Voice.
A word on Aftertouch: The Motif XS sends a kind of Aftertouch called Channel Aftertouch (ChAT). Any key on the keyboard will be able to trigger the message and it will be sent regardless of the ZONE or regardless of any split. The VOICE set to receive AT will respond – even if a key not assigned to its region is triggering the AT. There is a sensor under the keys that detects additional downward pressure on the keys. Aftertouch defaults to be FILTERED from being recorded to the Motif XS sequencer. (This is also the default condition for many of the popular software and hardware sequencers). You must remove the filter or deactivate the filter before attempting to purposefully record Aftertouch. The reason it is so often filtered is it can use up valuable sequencer memory and can cause timing problems even when it is not being used specifically. Those heavy-handed players will fill-up their tracks with superfluous data.

FOOT CONTROL 1 (FC1) – An optional FC7 pedal plugged into the Foot Control 1 jack is available as an assignable controller. You select what it will send from VOICE mode:
• Press [UTILITY]
• Press [F3] VOICE
• Press [SF3] CONTROL

It is assignable on a per PERFORMANCE, per MIXING program. The default is 011 (expression) which is *similar* but not the same as control 007 (Main volume). Many people mistake these two as being the same thing. While they both control 'how loud', they have different functions. For example, in a Song you plan to play a B3 organ

Voice on top of a sequenced rhythm section. You set the mix volume of the organ to a level of 96. (Because 96 is the perfect setting for as "loud" as you will ever need to be compared to the rhythm section). You are setting how loud the organ sound will play on a scale from 0-127 - relative to the other sounds. If your FC1 pedal is set to control 011 (expression) – toe down will never exceed the '96' Main volume setting of the Part. If, on the other hand, you have the FC1 assigned to cc007 (Main volume) the volume will be set by the absolute position of the pedal – toe down will reset the volume to 127 – and you will be too loud. Expression (cc11) is **relative** volume within the maximum set by the individual parts Level. Volume (cc07) is **absolute** volume for the current MIDI channel.

FOOT CONTROL 2 – An optional FC7 pedal plugged into the Foot Control 2 jack is available as an assignable controller. You select what it will send from VOICE mode:
- Press [UTILITY]
- Press [F3] VOICE
- Press [SF3] CONTROL

It is assignable on a per PERFORMANCE, per MIXING program. It defaults to sending control change message 004, but can be reassigned to any control change number 1-95 (global setting found in UTILITY). How this data is interpreted by the tone generator/receiving device **is** programmable. For example, it is possible to use the foot control for filter cutoff (wah-wah) on an internal sound and have an external sound set to interpret cc #004 as something entirely different.

FOOT SWITCH – Use an optional Yamaha FC4 or FC5 (sustain like momentary switch). It can be assigned any cc number between 1-100. It will always send a control change value of 127 when activated; otherwise the value is 0. The nature of the switch makes it ideal for OFF/ON operations. This message can be used to turn something from off to on or vice versa. The default assignment is cc #088 an unassigned number. Assigned to cc #098 or 099 you can advance or move backward through Voices or Performances. You could even use it to start/stop the arpeggiator (cc96*), start/stop the sequencer (97). *The MOTIF XS default for Arp Sw – this can be very useful in PERFORMANCE mode.

Set to cc66 it will become a *sustenuto* pedal. Set to 100 it will reset the OCTAVE transpose.

BREATH CONTROL – Although the Motif XS does not have a Breath Controller jack (nor can it use the optional BC3) it is still capable of sending and receiving this standard MIDI message (cc002). So a Voice can be biased to Breath Control and you can send this message from any assignable controller. How this data is interpreted by the tone generator is programmable. This is accomplished for Voice mode:
- Press [UTILITY]
- Press [F3] VOICE
- Press [SF3] CONTROL

It is assignable on a per PERFORMANCE, per MIXING program.

SUSTAIN (fixed) – will always send a control change message 064. This MIDI control number is HOLD 1. (Other controllers can be assigned to send cc064 sustain but a momentary pedal plugged into the Sustain jack will always send sustain). The Motif XS can use either an FC4/FC5 or and FC3 as the sustain pedal. This must be selected in UTILITY mode:
- Press [UTILITY]
- Press [F1] GENERAL
- Press [SF1] PLAY

The optional FC3 adds additional functionality to the Motif XS (Half-Dampering) covered in a separate POWER USER article.

CONTROL Knobs 1 through 8 – These can be used for a variety of functions as defined by the [SELECTED PART CONTROL] section. Options are as follows – information in parenthesis is sent out via MIDI:

- Cutoff (cc71 also called brightness)
- Resonance (cc74 also called harmonic content)
- Amplitude Envelope Generator (ADSR)
  - Attack (cc73)
  - Decay (cc75)
  - Sustain (not sent)
  - Release (cc72)
- Assign 1 (cc16)
- Assign 2 (cc17)
- Equalizer (not sent)
  - Low Gain
  - Mid Gain, Frequency, Q
  - High Gain
- Pan (cc10)
- System FX Sends
  - Reverb Send (cc91)
  - Chorus Send (cc93)
- Arpeggio Play Effects (not sent)
  - Swing, Quantize value, Quantize Strength, Gate time, Velocity, Octave range, Unit Multiply
- Tempo (tempo change)

Data that is sent out via MIDI can be recorded to either the internal or external sequencer.

When in [MASTER] mode (Master LED illuminated) you select the "ZONE" function for the control knobs as follows:

- Press [EDIT]
- Press [COMMON EDIT]
- Press [F2] OTHER

(shown below)


This allows the Knobs to be programmable per Zone.

CONTROL SLIDERS 1 – 8 These default to controlling levels via Sysex messages in both Voice and Performance modes. They are assignable per zone in an 8-zone Master Keyboard setup to Control Change message. In a Master Keyboard setup they are individually programmable – CS 1 will be for zone 1, CS 2 for zone 2 and so on. But you select the parameter they each control.

When in VOICE Mode, the Sliders will send System Exclusive messages to control the Element levels within the Voice. When in PERFORMANCE mode, the Sliders control Voice levels via System Exclusive. When in SONG or PATTERN mode the CS send cc007 (main channel volume) and control the corresponding PART Volume. When in a MASTER Setup you can select which row of functions is the active function. The CS will then behave either according to the rules of VOICE mode, PERFORMANCE mode or MIXING mode. The rules for the associated MODE will apply. For example, TONE 1, TONE 2, ARP FX, REVERB SEND, CHORUS SEND, PAN, or ZONE can be selected and stored with the MASTER program. If ZONE is selected (and the ZONE SWITCH is set to ON) the Sliders are then individually programmable per Master setup).

ASSIGNABLE FUNCTION 1 and 2 – AF1/AF2 These functions default to cc086 and cc087,

respectively. The [AF1] and [AF2] are switches that can be programmed to be either "momentary" or "latch". This means they can either be used by holding the switch down for a quick change or they can toggle something on or off without having to continue to hold the button. For example, if you want to change quickly from on articulation to another (add a spiccato attack on a few string notes) and return to normal play the 'momentary' setting would be selected. If however, you want to change from one articulation to another you might opt to have the 'latch' function setting.

PRE 4: 002(A02) Violin Solo 2 AF1 – features AF1 switching momentarily to spiccato, while AF2 is set to latch, offering an alternate selection for lower portion of the keyboard (D2 and below).
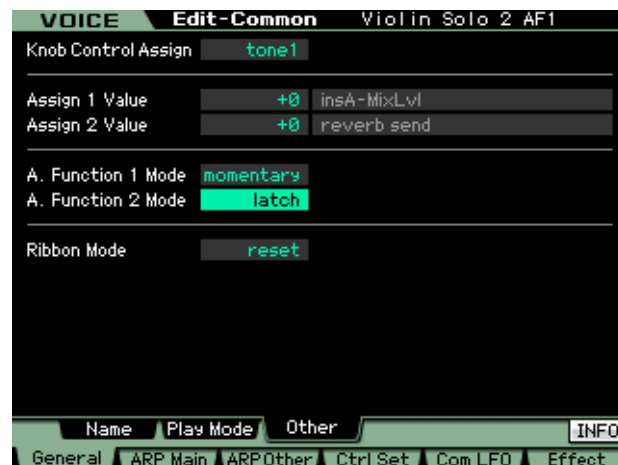
PRE 4:001(A01) Violin Solo 1 – features AF1 latching an ensemble feel, while AF2 is also latching switching to the violin element without vibrato. Together AF1+AF2 you get yet another timbre.

See the "Advanced Application" Power User tutorial for additional Tips and Tricks with the [AF] Assignable Function buttons.

Control Sets Summary: Each MOTIF XS Voice has six Control Setups where a physical controller, called the Source, is assigned a specific controllable parameter, called the Destination and a Depth value that determines how much effect the controller will have. This flexible system will enable the user to tailor the sensitivity of each controller's movement. Sensitivity or Depth refers to how far you move the controller to get a desired result. This is an important setting because you want to be comfortable working the controller while you perform.

The CONTROL SET DESTINATION are listed in detail on page 51 of the Data List booklet that comes with your MOTIF XS. They include Voice volume, reverb send, chorus send, and some 64 Insertion Effect parameters (not all Insertion Effect parameters are real time controllable), 101 locations total. An array of Common and individual Element parameters like filter cutoff, resonance, LFO speed and depth, tuning, key on delay, Pan position, Pitch, Filter and Amplitude envelopes, etc., etc., can be programmed.

Understanding how the Controller and the Parameter ranges work:
Put on your thinking caps…this is tricky. Remember I mentioned *logic* – well here we go. Minimum-to-Maximum controls versus Negative-to-Positive controls: Consider the Mod wheel versus the Pitch Bend wheel as an MOTIF XS physical control device. One has its zero position in the middle, while the other is at zero in the down position. One changes values from minimum towards maximum, the other above and below a 0 center value. These factors must be considered when you make an assignment of a parameter to a physical control. Think about all physical controllers in these two groups:

Minimum to Maximum Controllers
Modulation Wheel
Foot Controllers: FC1/FC2
Breath Controller*
Aftertouch
Foot Switch/Sus *min. **or** max. only
Foot Switch (FC3) minimum through maximum
AF1/AF2: on or off
Control Sliders CS1-CS8

Negative ~ 0 ~ Positive Controllers
Pitch Bend Wheel (self centering)
Knobs (center détente)
Ribbon

Now think about the parameters and the range of possible values. Some parameters go from minimum to maximum (like volume and effect sends: 0-127) while others move above and below a center zero point (pan position: L-C-R), and filter cutoff: -64 closed, 0 normal, +63 open).

This can be an issue if, for example, you assign a **minimum to maximum** parameter, like Common **volume** 0-127, to a **negative to positive** controller like Assign 1.

Here's what happens if you, say, bias the total Volume control to the AS1 Knob:
The center position will be 0 volume, while +63, fully clockwise, will be maximum volume. For all settings below the center position, 0 through –64,

the minimum volume is sent out, 0. The control seemingly only works half the time. You can't hear less than 0.
Conversely, if you assign a parameter that is **negative to positive** to a controller that does not have a center détente (a **minimum to maximum** controller like MW), you may find it difficult to place it back to neutral.

It is **not** an issue when you assign a negative/positive parameter, like pan position, to a negative/positive controller like a MOTIF XS knob. In such a case, negative values pan left, positive values pan right and the center position is center.

Conclusion: Consider the above when selecting a controller for a specific parameter.

The Control Sliders
There are 8 Control Sliders, CS1-CS8. We need to talk about their function in Voice, Performance, Sequencer and Master Keyboard modes.

Why don't the Control Sliders send cc007 in Voice Mode? The sliders send Element Level (via system exclusive messages). In Voices that combine up to eight (sampled) elements you have a slider for each Element. Of course, they **do not** send cc007 (Main Volume) in Voice mode – cc007 is main channel Volume and would control all components together. You would lose individual control. It would set all Elements to the same Volume no matter which slider you moved.

Why don't the Control Sliders send cc007 in Performance Mode? The sliders send Voice Level (again via system exclusive messages – which will affect only the MOTIF XS). In a Performance that has up to 4 Voices each slider controls the volume of one of the Voices. Of course, the sliders **do not** send cc007 in Performance mode - that would be silly. Again you would lose individual control. It would set all Voices to the same Volume no matter which slider you moved.

What do the Control Sliders send when I'm in a SEQUENCER mode (SONG or PATTERN)? They send cc007 which is main (channel) volume. And they will transmit this out on the MIDI channel that the corresponding Track is set to transmit. Because in MIXING mode each PART is on a separate MIDI channel this makes perfect sense. If you place more than one PART on the same MIDI channel all PARTS on that channel will be effected by the slider.

What about the Control Sliders in Master Keyboard Mode? The sliders are assignable to

any control change number from 1-95, when you are setting up an **8-zone** setup. You determine what each slider sends to each corresponding zone. You determine the MIDI channel and destination (internal TG or MIDI or both) for each zone. The default is cc #007 (volume) for each zone and this is sent out via MIDI (if you want). Controllers can be activated or deactivated per Zone. Of course, they **can** send cc007 in Master mode because each Voice can be on a separate MIDI channel!

What happens when I want to control Voices in a Performance, independently?
A Performance is literally, up to 4 Voices addressed together. If you want to control one Voice a certain way and another a different way within the same Performance you may need to program each individually back in Voice mode. That is what you learned about in this article – assignment of controllers in Voice mode. You now can assign parameters in a Voice and when you place that Voice in a Performance all of your controller routings will apply. This can be very interesting because a single assignable knob can be doing different things to different Voices in your Performance. Cool. For example, you want to control a Performance with three sounds: PIANO STRING/PAD. You want to control the string sound independently with a FOOT CONTROL pedal. You could program the individual Voice, however, you do have the option of activating or deactivating a controller for an individual PART within a Performance. You will have to determine if you need to make adjustments to individual Voices or can you simply activate or deactivate certain controllers to accomplish your goal. In a Performance you can see which Controllers are active per Part by pressing: [EDIT]/ Touch program button [1] to select PART edit level/ [F6]: RcvSwitch.

Here you can set each Part as necessary. A 'check' means the Controller is active on this PART.

In general, each Performance is pretty much autonomous when it comes to control assignments. In other words the Ribbon Controller, the Foot Controllers, the Foot Switch, BC, Assign1, Assign2, FC1, and FC2 can be assigned differently per Performance, and per SONG MIXING/PATTERN MIXING program as necessary, whereas in Voice mode the assignment for these was global.

One last tip concerning your controller assignments: There is a default condition for each when a Voice or Performance is recalled. This is affected by the "CONTROLLER RESET" parameter which can be set globally in [UTILITY]/ [F5]:CONTROL/ [SF2]:MIDI. This parameter can be set to either RESET or HOLD. Hold will allow each Voice to inherit the current condition of a controller. How can you use this? For example, if you use a Foot Controller as your master Volume level, setting this to HOLD will mean that the next setup you call up will hold at the current volume of your pedal. This will apply to all physical controllers with the exception of the Ribbon controller which as mentioned, is programmable on a per Voice basis. Cool...enjoy!

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