The included VST Instruments

CUBASE VST

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Introduction

This chapter covers the functions and parameters for the included VST Instruments. The following VST Instruments are included and installed with Cubase VST.

- **JX16 - a software synthesizer.**
  See .

- **CS40 - a software synthesizer.**
  See .

- **LM-7 - a drum machine.**
  See .

- **Neon - a software synthesizer.**
  See .

- **VB-1 – a virtual bass instrument built on realtime physical modelling principles.**
  See .

- **LM-9 - a drum machine.**
  See .

- **Universal Sound Module - a sound module with over 70 MB of sampled waveforms.**
  See .

❐ **The Neon and the LM-9 should be considered as not quite rendered obsolete but at least as being superseded by their newer version equivalents JX16, CS40 and LM-7. The Neon and the LM-9 are however still included with Cubase VST in order to ensure compatibility with songs created using those instruments.**

❐ **For specifics about how to install, set up and activate VST Instruments please refer to the chapter "VST Instruments" in the "Getting into the Details" documentation.**

JX16 Synthesizer

The JX16 is a dual oscillator software synthesizer with the following main features:

- **The JX16 is polyphonic with up to 16 voices.**
  The polyphony setting for each patch is user programmable.

- **Low CPU load and high quality sound (low aliasing distortion).**

- **Multimode Filter.**
  Lowpass, Bandpass and Hipass filter modes are available.

- **Oscillator Lock function enables the creation of pulse and square waveforms with classic PWM (Pulse Width Modulation).**
  See page 9.

- **Built-in stereo chorus effect.**

- **The JX16 receives MIDI in Omni mode (on all MIDI channels).**
  You don't need to select a MIDI channel to direct MIDI to the JX16.

- **The JX16 responds to MIDI Controller messages.**
  These are listed on .

❒ **All parameters can be automated as described in the Getting into the Details chapter "VST Instruments".**

JX16 Parameters

Osc 1+2 Section

This section contains parameters affecting both oscillators.

Parameter	Values	Description
Octave	-2/+2	Tunes the oscillators in octave steps.
Fine Tune	-100/+100 Cent	Tunes the oscillators in cent (100th of a semitone) steps.
Vibrato	0-100	Governs how much the LFO should modulate the pitch of the oscillators (vibrato). The Vibrato parameter is also controllable via MIDI by using the Mod Wheel.
Noise	0-100	This parameter produces white noise mixed with the oscillators. By using the "OSC lock" parameter you can "cancel out" the oscillators and use pure noise as the sound source. This is described on page 9.
OSC lock	0-95/Free	This is described separately on page 9.

The Oscillator 2 Section

This section contains parameters that affect oscillator 2 only.

Parameter	Values	Description
OSC Mix	0-100	Controls the level of oscillator 2. 100 produces equal level to oscillator 1, which has a fixed output level.
Coarse	-24/+24 Semitones	Tuning of Oscillator 2, in semitone steps.
Fine Tune	-50/+50 Cent	Fine tuning of Oscillator 2, in cent (=100th of a semitone) steps.
Vibrato	-100/100	This lets you apply vibrato on the second oscillator only. This can be useful for creating PWM effects - see page 9 for a further description. Both positive and negative values can be set.

The Glide/Chorus Section

This section contains Glide parameters, and also the Polyphony and Chorus parameters.

Parameter	Values	Description
Mode	Off/Held/On	If set to "On", the pitch will glide up or down between notes played. If set to "Held", Glide will only be applied when you press a key while another key is held down.
Rate	0-100	Controls the time it takes for the pitch to glide from one note to the next when using Glide. If Bend (see below) is used, this parameter controls the time it takes for the pitch bend to "land" at the correct pitch.
Bend	-36/+36 Semitones	Applies an initial pitch bend to the notes played. Negative values causes the pitch to slide up to the pitch of the note played, and vice versa.
Polyphony	1 to 16	This sets the polyphony, i.e. the number of voices a patch can use.
Chorus	OFF/I/II/III/IV	This adds a stereo chorus effect. The values set different modulation rates and depths for the effect.

The LFO Section

This section contains the LFO (Low Frequency Oscillator) parameters. LFOs are used to modulate parameters like pitch (vibrato) or the filter cutoff.

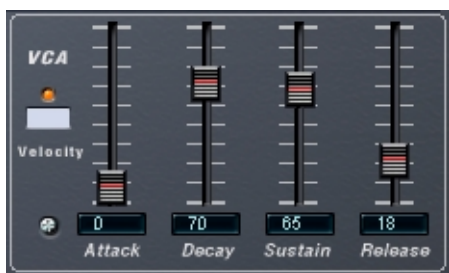| Parameter	Values	Description
LFO Wave	Sine/Square/ Saw+/Saw-/ Random	This sets the LFO waveform for modulating parameters: • Sine waves have a smooth waveform, suitable for normal vibrato. • Square waves produce cycles that abruptly change between two values. • Saw+ produces a ramp up cycle. • Saw- produces a ramp down cycle. • Random produces random stepped modulation.
LFO Sync	On/Off	If this is activated, the LFO rate will be synced to the sequencer tempo in various beat divisions that can be set with the LFO Rate parameter.
LFO Rate	0.018-54.598 Hz	Governs the modulation rate of the LFO.
LFO Rate (tempo sync on)	8 to 1/8 Beats 1 Beat=1/4 note	If the "LFO Sync" parameter is activated, the LFO rate will be synced to the sequencer tempo, according to the different beat divisions that can be specified here.
LFO Velocity	0-100	This allows you to control the LFO Rate parameter with velocity, i.e. by how hard or soft you strike a note on the keyboard. The harder you play the faster the LFO rate.

The VCF Section

This section contains the filter parameters:

Parameter	Values	Description
VCF Mode	LP/HP/BP/ Off	Sets the filter mode to either lowpass (LP), highpass (HP), bandpass (BP) or off. The filter modes are described on page 10.
VCF Freq (Cutoff)	0-100	Controls the filter frequency or "cutoff". If a lowpass filter is used, it could be said to control the opening and closing of the filter, producing the classic "sweeping" synthesizer sound. How this parameter operates is governed by the filter mode (see page 10).
Resonance	0-100	The Resonance control for the filter. Raise this for a more pronounced filter sweep effect. If set to 100, the filter will self-oscillate and produce a pitch. See the "VCF Key" parameter below for a description of how this can be used.
VCF Env	-100/+100	Controls how much the filter cutoff should be affected by the VCF Envelope parameters. Negative values will invert the filter envelope settings.
VCF Vel	-100/+100	Determines how the filter cutoff will be affected by velocity, i.e. how hard or soft you strike a key. Positive values will increase the cutoff frequency the harder you strike a key. Negative values will invert this relationship.
VCF Att/Dec /Sus/Rel	0-100	The Filter Envelope Attack, Decay, Sustain and Release parameters. Use these parameters to determine how the filter cutoff should open and close with time, when a note is played.
VCF LFO	0-100	This controls how much the filter cutoff is modulated by the LFO (low frequency oscillator).
VCF Key	0-100	If this parameter is set to values over 0, the filter cutoff frequency will increase the further up on the keyboard you play. If set to 100, it will track the notes on the keyboard, enabling you to "play" the filter as an extra sound source, as the filter self-oscillates and produces a pitch when the resonance is set to 100.
VCF Touch	-100/+100	This sets the amount the VCF cutoff parameter should be affected by Aftertouch. If positive values are set, the filter cutoff is raised the harder you press. Negative values invert this relationship.
LFO Touch	-100/+100	This sets the amount the VCF LFO parameter should be affected by Aftertouch. If positive values are set, the modulation increases the harder you press. Negative values invert this relationship.

The VCA Section

This section contains the VCA Envelope parameters:

Parameter	Values	Description
VCA Att/Dec/Sus/Rel	0-100	The VCA Attack, Decay, Sustain and Release parameters. Use these parameters to determine how the volume should change with time, when a note is played.
VCA Velocity	On/Off	This determines whether the VCA Envelope should be affected by velocity, i.e. by how hard or soft you strike a note on the keyboard.

About the "Oscillator Lock" parameter

JX16 features two oscillators per voice, with fixed sawtooth waveforms. You can, however, generate square waves and PWM (pulse width modulation) with the JX16, by combining the two oscillators using the "OSC lock" and Oscillator 2 "Vibrato" parameters. The following applies:

- **"OSC lock" allows the phase of Oscillator 2 to be fixed relative to OSC 1, producing pulse waves when Oscillator 2 has the same pitch and level as OSC 1.**

- **If the oscillators are tuned to the same pitch and level, an "OSC lock" setting of 50% produces a square wave with higher and lower settings producing progressively narrower pulse waveforms.**
  With an "OSC lock" setting of 0% the two oscillators cancel out completely, which is useful if you only want to use the noise generator as a sound source.

- **By applying the Oscillator 2 "Vibrato" parameter when OSC lock is set to around 50%, classic PWM is produced.**
  You can also detune Oscillator 2 for even richer modulation effects.

- **In "Free" mode the oscillator phase is allowed to drift, producing a random timbre change.**

By experimenting with these parameters, many different timbres and modulation effects can be produced.

About the Filter Modes

The JX16 features a multimode filter. The various filter modes are selected with the VCF Mode parameter, and are as follows:

- **Lowpass (LP)**
Lowpass filters lets low frequencies pass and cuts out the high frequencies. This is the most commonly used filter type in analog synthesizers.

- **Bandpass (BP)**
A bandpass filter cuts frequencies above and below the cutoff frequency, allowing a specific range of frequencies to pass while attenuating all others.

- **Highpass (HP)**
A highpass filter is the opposite of a lowpass filter, cutting out the lower frequencies and letting the high frequencies pass.

MIDI Controller Messages

The JX16 responds to the following MIDI Controller Messages:

Controller	Parameter/Value
Pitch Bend	+/- 2 Semitones
CC1 (Mod Wheel)	Vibrato
Aftertouch	Can control filter cutoff and filter cutoff modulation (by the VCF LFO).
CC2	Increase filter cutoff
CC3	Decrease filter cutoff
CC7	Volume
CC16	Increase filter resonance
Program Change #	1-64

LM-7

Volume and Tune faders
(for each drum sound).

This sets the global velocity
sensitivity for LM-7.

This adjusts the Pan (the posi-
tion in the stereo image) for
the individual drums. The set-
ting is applied to the currently
selected drum, indicated by a
lit yellow LED over the Pad
button.

Master Volume

Pad (one for each drum sound). Press to audition the
drum sound assigned to the Pad, or to select a sound
for adjusting pan.

The LM-7 is a 24-bit drum machine. It has the following properties:

* **LM-7 is polyphonic with up to 12 voices.**

* **LM-7 receives MIDI in Omni mode (on all MIDI channels).**
  You don't need to select a MIDI channel to direct MIDI to LM-7.

* **LM-7 responds to MIDI Notes with velocity governing volume.**
  Furthermore, all parameters can be automated as described in the Getting into the
  Details chapter "VST Instruments".

LM-7 Parameters:

Parameter	Description
Velocity	This sets the global velocity sensitivity for LM-7. The higher the value, the more sensitive LM-7 will be to incoming velocity data. If set to "1", the sounds will play back with a fixed velocity value.
Volume sliders	The volume sliders are used to adjust the volume for each individual drum sound.
Tune sliders	The tune sliders are used to tune each individual drum sound, up or down 1 octave.
Pad	The Pads are used for two things: To audition the individual drum sounds and to select a sound for adjusting pan.
Panorama	This is used to position an individual sound in the stereo image. The setting applies to the currently selected sound, indicated by a lit yellow LED over the Pad button.

Drum sounds

LM-7 comes with three sets of drum sounds; "Compressor", "909" and "Percussion". Compressor features samples of an acoustic drum kit, 909 features classic analog drum machine sounds and Percussion not surprisingly features various percussion sounds. The table below shows how the drum sounds are assigned to note values on your MIDI keyboard. The mapping is GM compatible:

Drum sound	Note value	Comment
Bd	C1	
Rim	C#1	Compressor only.
Snare	D1	
Clap	D#1	909 only.
Hi-Hat	F#1	
O-Hi-Hat	A#1	
Tom 1	A1	
Tom 2	B2	
Tom 3	D2	
Crash	C#2	
Ride	D#2	Compressor only.
Tambourine	F#2	Percussion only.
Cowbell	G#2	Percussion only.
Hi Bongo	C3	Percussion only.
Lo Bongo	C3#	Percussion only.
Conga Mute	D3	Percussion only.
Conga Open	D#3	Percussion only.
Conga Lo	E3	Percussion only.
Timbale Lo	G3	Percussion only.
Timbale Hi	G#3	Percussion only.
Cabasa	A3	Percussion only.

Switching the sets

Use the Program button to switch between the three supplied drum sets, just like you switch between effect programs.

CS40

The CS40 is a straightforward software synthesizer with the following main features:

- **The CS40 is polyphonic with up to 6 voices.**

- **The CS40 receives MIDI in Omni mode (on all MIDI channels).**
  You don't need to select a MIDI channel to direct MIDI to the CS40.

- **The CS40 responds to the following MIDI messages:**
  MIDI Note On/Off (velocity governs volume).
  Volume.
  Pan.
  Pitch Bend (± 2 semitones).
  Modulation (vibrato).

❐ **All parameters can be automated as described in the Getting into the Details chapter "VST Instruments".**

CS40 Parameters:

Parameter	Description
Oscillator 1 Range	Selects an octave range for oscillator 1; 32, 16, 8 or 4 feet.
Oscillator 1 Waveform	The basic waveform for oscillator 1; Triangle, Sawtooth, Square or Pulse.
Oscillator 1 Tune	Detunes Oscillator 1 ± 7 semitones.
Oscillator 2 Range	Same as Oscillator 1.
Oscillator 2 Waveform	Same as Oscillator 1.
Oscillator 2 Tune	Same as Oscillator 1.
Oscillator Blend	Adjusts the relative volume mix between oscillator 1 and 2.
LFO Speed	Governs the speed of the LFO. If LFO Sync is activated, this parameter sets the LFO speed in various beat increments to the sequencer tempo.
LFO Sync	If activated, the LFO speed will be synced to the set sequencer tempo.
LFO Amount	This governs the amount of LFO modulation applied to the destination parameters.
LFO Destination	This sets the destination parameter(s) for the LFO. Options are as follows: • Off - No modulation • VCF - modulation of the VCF cutoff frequency. • VCA - amplitude modulation (tremolo). • Both - modulation of both the VCF and VCA.
Vibrato Speed	Governs the speed of the Vibrato LFO. The Vibrato amount is controlled by the Mod Wheel.
VCF Cutoff	The Cutoff Frequency for the filter, governing the amount of high frequencies in the sound.
VCF Resonance	The Resonance control for the filter. Raise this for a more hollow, pronounced filter effect.
Filter Mod ADSR	This controls how much the VCF cutoff is affected by the VCF Envelope. Negative values invert the Envelope settings.
VCF Attack, Decay, Sustain, Release	The Filter Envelope. Use these parameters to determine how the filter should open and close with time, when a note is played.
VCA Attack, Decay, Sustain, Release	The Amplitude Envelope. Use these parameters to determine how the amplitude (volume) should change with time, when a note is played.
MonoMode	When activated the CS40 will be monophonic.
Volume	Governs the overall volume.

The Neon

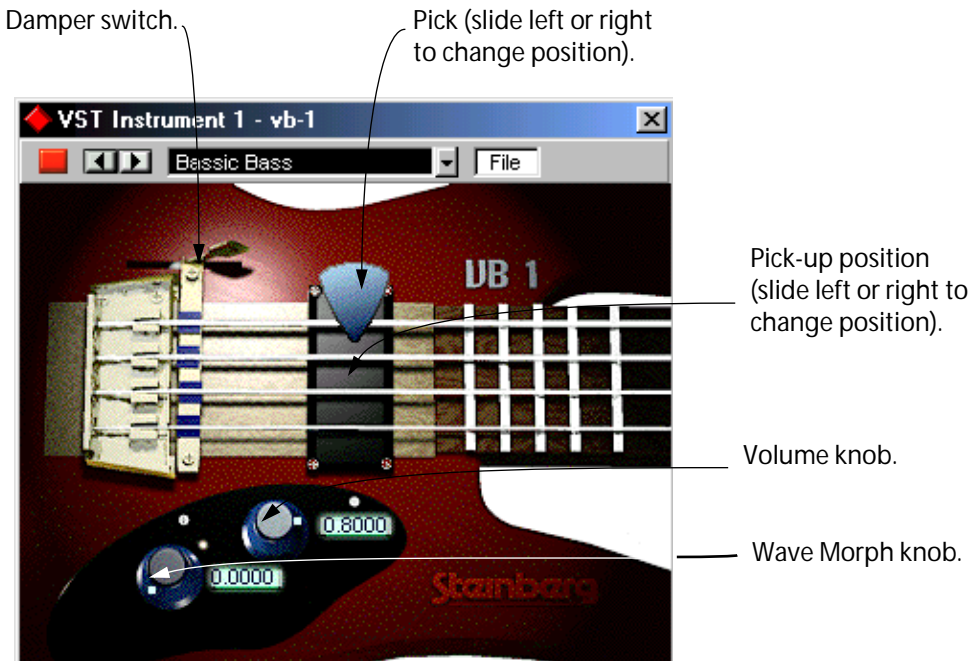The Neon is a simple software synthesizer. It has the following properties:

- **The Neon is polyphonic with up to 16 voices.**
  However, since each added voice consumes CPU power, the maximum polyphony may be limited by the speed of your computer.

- **The Neon receives MIDI in Omni mode (on all MIDI channels).**
  You don't need to select a MIDI channel to direct MIDI to the Neon.

- **The Neon responds to the following MIDI messages:**
  MIDI Note On/Off (velocity governs volume).
  Volume.
  Pan (remember to pan the two Instrument channels hard Left/Right if you want to use MIDI Pan messages).
  Pitch Bend (± 2 semitones).
  Modulation (vibrato).

  Furthermore, all parameters can be automated as described in the Getting into the Details chapter "VST Instruments".

Neon Parameters:

Parameter	Description
Range	Selects an octave range for the oscillators, 16, 8 or 4 feet.
Waveform	The basic waveform for the oscillators, Triangle, Sawtooth or Square.
LFO Speed	Governs the speed of the vibrato. The vibrato depth is controlled via MIDI Modulation messages (for example, using the Mod Wheel on your MIDI controller).
Osc 2 Detune	Allows you to detune the "second oscillator" ± 7 semitones. By setting this to a value close to "twelve o'clock", you will get fine detuning, for a warmer, fatter sound.
VCF Cutoff	The Cutoff Frequency for the filter, governing the amount of high frequencies in the sound. On the Neon, the Cutoff control also serves as a Depth control for the Filter Envelope (VCF Attack, Decay, Sustain, Release), so that the lower the setting of the Cutoff parameter, the more will the filter be affected by the Filter Envelope.
VCF Resonance	The Resonance control for the filter. Raise this for a more hollow, pronounced filter effect.
VCF Attack, Decay, Sustain, Release	The Filter Envelope. Use these parameters to determine how the filter should open and close with time, when a note is played.
VCA Attack, Decay, Sustain, Release	The Amplitude Envelope. Use these parameters to determine how the amplitude (volume) should change with time, when a note is played.

VB-1

Damper switch.

Pick (slide left or right to change position).

Pick-up position (slide left or right to change position).

Volume knob.

Wave Morph knob.

The VB-1 is a virtual bass instrument built on realtime physical modelling principles. This has the following properties:
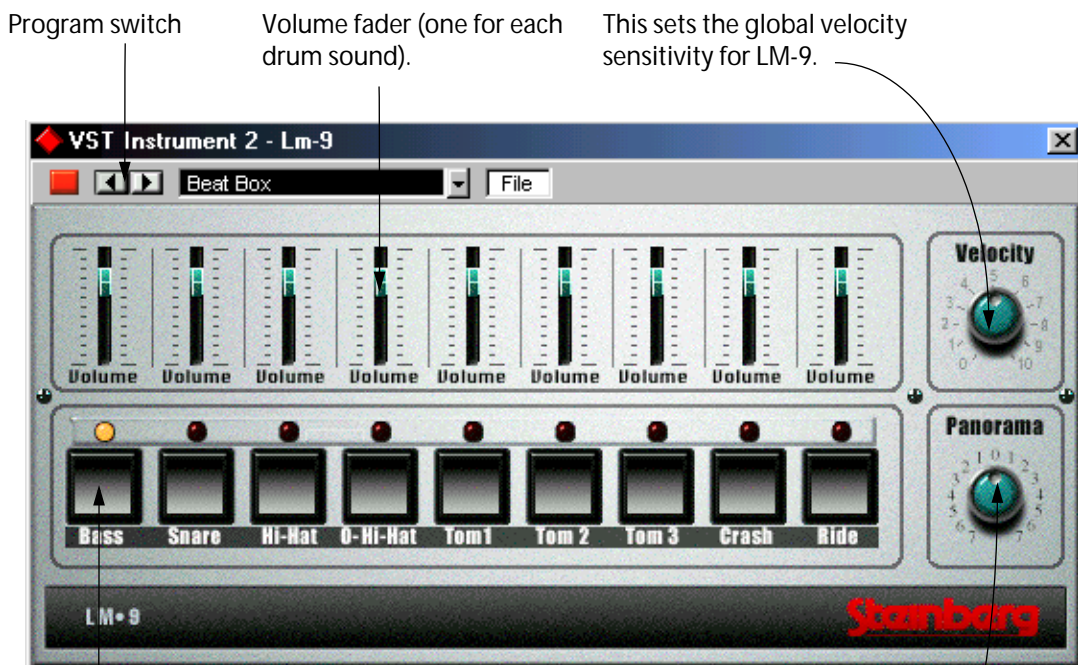
• **VB-1 is polyphonic with up to 4 voices.**

• **VB-1 receives MIDI In Omni mode (on all MIDI channels).**
  You don't need to select a MIDI channel to direct MIDI to the VB-1.

• **VB-1 responds to the following MIDI messages:**
  MIDI Note On/Off (velocity governs volume).
  Volume.
  Pan (remember to pan the two Instrument channels hard Left/Right, if you want to use MIDI Pan messages).

  Furthermore, all parameters can be automated as described in the Getting into the Details chapter "VST Instruments".

VB-1 Parameters:

Parameter	Description
Volume	This regulates the VB-1 volume.
Damper	This switch controls the length of time the string vibrates after being plucked.
Pick-up position	By dragging the "mic" left or right you can change the tone. Positioning it towards the bridge position produces a hollow sound that emphasizes the upper harmonics of the plucked string. When placed towards the neck position, the tone is fuller and warmer.
Pick position	This determines where along the length of the string the initial pluck is made. This controls the "roundness" of the tone, just like on a real guitar.
Wave Morph	This knob selects the basic waveform that is used to drive the plucked string model. This parameter can drastically change the sound character. The control smoothly morphs through the waves. It is possible to create sounds that have no relation to a bass guitar with this control.

LM-9

Program switch   Volume fader (one for each drum sound).   This sets the global velocity sensitivity for LM-9.

Pad (one for each drum sound). Press to audition the drum sound assigned to the Pad, or to select a sound for adjusting pan.

This adjusts the Pan (the position in the stereo image) for the individual drums. The setting is applied to the currently selected drum, indicated by a lit yellow LED over the Pad button.

The LM-9 is a simple drum machine. It has the following properties:

- **LM-9 is polyphonic with up to 9 voices.**

- **LM-9 receives MIDI in Omni mode (on all MIDI channels).**
  You don't need to select a MIDI channel to direct MIDI to LM-9.

- **LM-9 responds to the following MIDI messages:**
  MIDI Note On/Off (velocity governs volume).

  Furthermore, all parameters can be automated as described in the Getting into the Details chapter "VST Instruments".

LM-9 Parameters:

| Parameter	Description
Velocity	This sets the global velocity sensitivity for LM-9. The higher the value, the more sensitive LM-9 will be to incoming velocity data. If set to "0", the sounds will play back with a fixed velocity value.
Volume sliders	The volume sliders are used to adjust the volume for each individual drum sound.
Pad	The Pads are used for two things: To audition the individual drum sounds and to select a sound for adjusting pan.
Panorama	This is used to position an individual sound in the stereo image. The setting applies to the currently selected sound, indicated by a lit yellow LED over the Pad button.

Drum sounds

LM-9 comes with two sets of drum sounds: "Acoustic" and "Beat Box". Acoustic features samples of an acoustic drum kit and Beat Box features classic analog drum machine sounds. The table below shows how the drum sounds are assigned to note values on your MIDI keyboard. The mapping is GM compatible:

Drum sound	Note value
Bass	C1
Snare	D1
Hi-Hat	F#1
O-Hi-Hat	A#1
Tom 1	D2
Tom 2	B1
Tom 3	A1
Crash	C#2
Ride	D#2

Switching the sets

Use the Program button to switch between the two supplied drum sets, just like you switch between effect programs.

Universal Sound Module (USM)
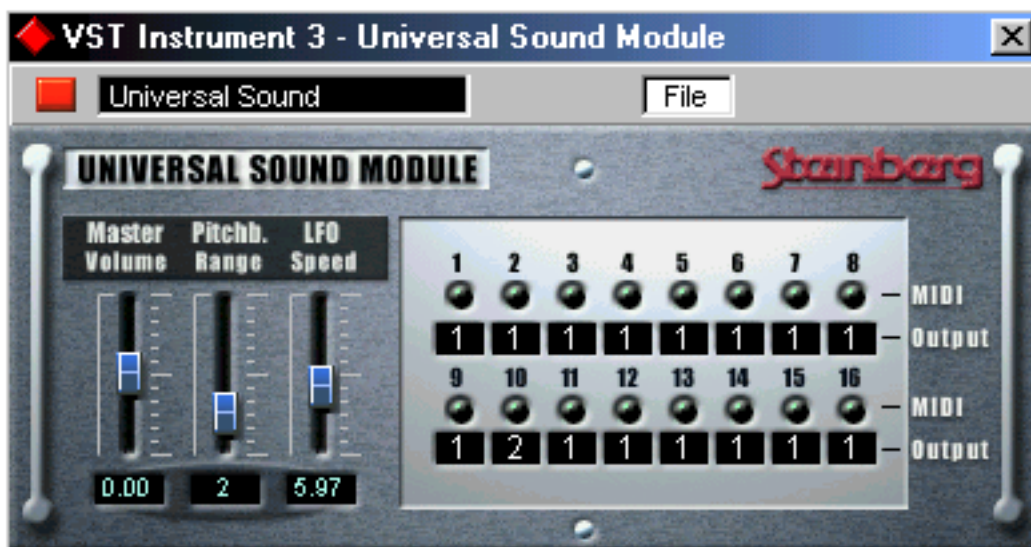
The USM is a General MIDI compatible sound module. General MIDI (GM) is a standard set up by the MIDI Manufacturers Association (MMA) and the Japanese MIDI Standards Committee (JMSC).

It defines a standardized group of sounds and the minimum requirements for General MIDI compatible synthesizers or sound modules, so that a specially prepared sequence or MIDI file that is sent to the instrument via MIDI will play back the correct sound types, regardless of make and model of the instrument.

MIDI identifies sounds by their program change number. Before the General MIDI standard was introduced, the same MIDI program change number often addressed totally different *types* of sound in any two synthesizers or sound modules from different manufacturers, e.g. a flute type sound in one instrument and a piano type sound in the other.

With the introduction of General MIDI standard compatible instruments this changed. These instruments use the same program change numbers for the same *types of instruments.*

So, if the person that prepared a sequence or MIDI file wants the melody to be played by a "piano", he can use a certain program change command embedded into the sequence to automatically select a piano sound in any GM compatible sound module. The GM standard, however, does not specify in great detail how that piano should sound. It is simply assumed that the manufacturer reproduces an acoustic piano within the capabilities of the instrument. A consequence of this was that, depending on the GM module used, a song would sound very different, even though the instrument sounds were mapped correctly.

This problem is solved by the Universal Sound Module! Cubase users can make sure that their music created using the USM will sound *exactly* the same when played back on another computer, because the sound reproduction is no longer hardware based - perfect for Rocket users!

❑ **RocketPower is described in a separate document.**

- **The USM features over 70 MB of sampled waveforms and four stereo outputs.**

- **The USM is polyphonic with up to 96 voices.**

- **The USM receives MIDI in 16 channel Multi mode (simultaneous multi-timbral play-back on 16 MIDI channels).**
  In other words, one USM unit can play up to 16 MIDI Tracks, each with a different sound.

- **The USM responds to the following MIDI messages:**
  MIDI Note On/Off (velocity governs volume).
  Volume.
  Pan.
  Pitch Bend (up to ± 12 semitones).
 Modulation (vibrato).

Selecting Sounds

❑ **According to the General MIDI Standard, MIDI channel 10 is reserved for drums. This can not be changed.**

The USM features 128 different sound patches. Selecting programs is done by sending program change messages, either numerically (using the Prg value field in the Inspector), or by selecting from the Patchfield pop-up menu (see the chapter "VST Instruments" in the "Getting into the Details" document).

Selecting Outputs

The USM features four stereo outputs, allowing for flexible routing of sounds to different effect processors etc. By default, all MIDI channels are routed to USM stereo output "1".

- **To select another output, click the "Output" field below the Channel Activity indicator for the MIDI channel you wish to direct to another output.**
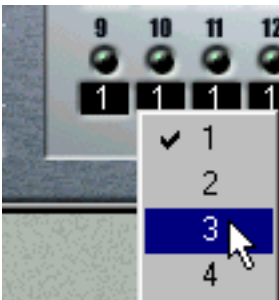
This opens a pop-up allowing you to select one of the four stereo outputs.

USM Parameters:

Parameter	Description
Master Volume	Sets the master output volume for the USM.
Pitchb. Range	Sets the range for incoming Pitchbend messages (selectable between 1 to 12 semitones).
LFO Speed	Governs the speed of the vibrato. The vibrato depth is controlled via MIDI Modulation messages (for example, using the Mod Wheel on your MIDI controller).
MIDI channel activity indicators 1-16.	These light up to indicate activity on the corresponding MIDI channel.
Output 1-16	Clicking in this field opens a pop-up allowing you to direct the corresponding USM MIDI channel to one of the four available stereo outputs.