Cubase • SE 3

Music Creation And Production System

Mac   PC VERSION

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MIDI devices

Background

The MIDI Device Manager allows you to specify and set up your MIDI devices, making global control and patch selection easy.

MIDI devices – general settings and patch handling

On the following pages, we will describe how to install and set up preset MIDI devices, and how to select patches by name from within Cubase SE. This section also describes how to create a MIDI device from scratch.

About program change and bank select

To instruct a MIDI instrument to select a certain patch (sound), you send a MIDI Program Change message to the instrument. Program Change messages can be recorded or entered in a MIDI part like other events, but you can also enter a value in the Program (prg) field in the Inspector for a MIDI track. This way, you can quickly set each MIDI track to play a different sound.

With Program Change messages, you are able to select between 128 different patches in your MIDI device. However, many MIDI instruments contain a larger number of patch locations. To make these available from within Cubase SE, you need to use Bank Select messages, a system in which the programs in a MIDI instrument are divided into banks, each bank containing 128 programs. If your instruments support MIDI Bank Select, you can use the Bank (bnk) field in the Inspector to select a bank, and then the Program field to select a program in this bank.
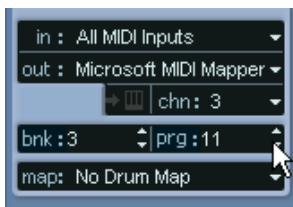
Unfortunately, different instrument manufacturers use different schemes for how Bank Select messages should be constructed, which can lead to some confusion and make it hard to select the correct sound. Also, selecting patches by numbers this way seems unnecessarily cumbersome, when most instruments use names for their patches nowadays.

To help with this, you can use the MIDI Device Manager to specify which MIDI instruments you have connected, by selecting from a vast list of existing devices or by specifying the details yourself. Once you have specified which MIDI devices you're using, you can select to which particular device each MIDI track should be routed. It is then possible to select patches by name in the track list or Inspector.

Opening the MIDI Device Manager

Select MIDI Device Manager from the Devices menu to bring up the following window:

This is the list of MIDI devices you have connected. The first time you open the MIDI Device Manager, this list will be empty.

These buttons let you manage the list of installed devices.

Here you specify to which MIDI output the selected device is connected.

This pop-up menu lets you edit the selected device (provided that "Enable Edit" is ticked).

Here, the patch structure is shown for the device selected above.

This area shows exactly which MIDI messages should be sent out to select the patch highlighted in the list to the left.

When you open the MIDI Device Manager for the first time, it will be empty (because you haven't installed any devices yet). On the following pages we describe how to add a pre-configured MIDI device to the list, how to edit the settings and how to define a device from scratch.

Installing a MIDI device

There is an important difference between installing a preset MIDI device and importing a MIDI device setup:

- The presets available in the Install Device dialog do not include any device mapping of parameters and controls and no graphic panels.
  They are simply patchname scripts. When you install a preset MIDI device it is added to the Installed Devices list.

- A device setup can include device mapping, panels and/or patch information.
  Device setups are also added to the list of installed devices when imported.

To install a preset MIDI device, proceed as follows:

1. Click the Install Device button.
   A dialog appears listing all pre-configured MIDI devices. For now we assume that your MIDI device is included in this list.

2. Locate and select the device in the list and click OK.

- If your MIDI device isn't included in the list but is compatible with the GM (General MIDI) or XG standards, you can select the generic GM or XG Device options at the top of the list.
  When you select one of these options, a name dialog will appear. Enter a name for the instrument and click OK.

Now the device appears in the Installed Devices list to the left.

3. Make sure that the new device is selected in the list and pull down the Output pop-up menu.

4. Select the MIDI output that is connected to the device.

5. Select Patch Banks from the pop-up at the top of the window.

The Patch Banks list in the left half of the window shows the patch structure of the device. This could simply be a list of patches, but it's usually one or several layers of banks or groups containing the patches (much like a folder structure on a hard disk for example).
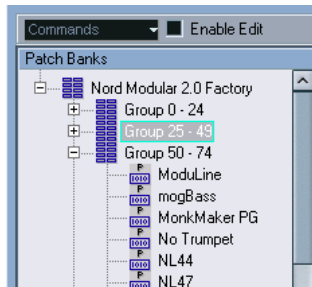
• You can rename a device in the Installed Devices list by double clicking and typing – this is useful if you have several devices of the same model, and want to separate them by name instead of by number.

• To remove a device from the Installed Devices list, select it and click Remove Device.

About Patch Banks

Depending on the selected device, you may find that the Patch Banks list is divided in two or more main banks. Typically, these are called Patches, Performances, Drums etc. The reason for having several patch banks is that different "types" of patches are handled differently in the instruments. For example, while "patches" typically are "regular" programs that you play one at the time, "performances" may be combinations of patches, which could e.g. be split across the keyboard, layered or used for multitimbral playback.

For devices with several banks, you will find an additional item labeled Bank Assignment. Selecting this opens a window in which you can specify for each MIDI channel which bank it should use.

The selection here will affect which bank is displayed when you select programs by name for the device in the track list or Inspector (see below). For example, many instruments use MIDI channel 10 as an exclusive drum channel, in which case you would want to select the "Drums" (or "Rhythm Set", "Percussion", etc.) bank for channel 10 in this list. This would then let you select between different drum kits in the track list or Inspector.

Selecting a patch for an installed device

If you return to the Project window at this point, you will find that the installed device has been added to the MIDI Output menus (in the track list and the Inspector). Now you can select patches by name, in the following way:

1. Pull down the Output menu (in the track list or Inspector) for a track that you want to play the installed device, and select the device.
This directs the track to the MIDI output specified for the device in the MIDI Device Manager. The bank and program fields in the track list and Inspector are replaced by a single Programs field that currently reads "Off".

2. Click the Programs field to display a pop-up menu, hierarchically listing all the patches in the device.
The list is similar to the one displayed in the MIDI Device Manager. You can scroll the list up and down (if required), click the plus/minus signs to show or hide subgroups, etc.
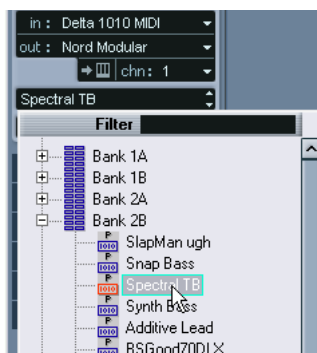
3. Click a patch in the list to select it.
This sends the appropriate MIDI message to the device. You can also scroll the program selection up or down, as with any value.

Renaming patches in a device

The pre-configured devices list is based on the factory-preset patches, i.e. the patches included in the device when you first bought it. If you have replaced some of the factory presets with your own patches, you need to modify the device so that the patch name list matches the actual device:

1. In the MIDI Device Manager, select the device in the Installed Devices list.

2. Activate the Enable Edit checkbox.
When this is turned off (default) you cannot edit the pre-configured devices.

3. Use the Patch Banks display to locate and select the patch you want to rename.
In many instruments, the user-editable patches are located in a separate group or bank.

4. Click on the selected patch in the Patch Banks list to edit its name.

5. Type in the new name and click OK.

6. Rename the desired patches in this way, and finish by deactivating Enable Edit again (to avoid modifying the device by accident).

▪ **It's fully possible to make more radical changes to the patch structure in a device as well (adding or deleting patches, groups or banks).**
For example, this would be useful if you expanded your MIDI device by adding extra storage media such as RAM cards, etc. The available editing functions are described below.

Defining a new MIDI device

This section describes how to define a new MIDI device.

If your MIDI device is not included in the list of pre-configured devices (and is not a "plain" GM or XG device), you need to define it manually to make it possible to select patches by name.

1. In the MIDI Device Manager, click the Install Device button.
The Add MIDI Device dialog appears.

2. Select "Define New…" and click OK.
A dialog appears.

3. Enter the name of the device and the MIDI channels you would like the device to use and click OK.
The device appears in the Installed Devices list.

4. Select the device in the list.
As you can see, it currently contains only an Empty Bank item.

5. Make sure the Enable Edit checkbox is activated.
Now you can use the functions on the Commands pop-up menu to the left to organize the patch structure of the new device.

Patch Structure

A patch structure is made out of the following components:

▪ Banks are the main categories of sounds – typically patches, performances and drums, as described above.
▪ Each bank can contain any number of groups, represented by folders in the list.
▪ The individual patches, performances or drum kits are represented by presets in the list.

The Commands pop-up menu contains the following items:

Create Bank

Creates a new bank at the highest hierarchical level of the Patch Banks list. You can rename this by clicking on it and typing a new name.

New Folder

Creates a new subfolder in the selected bank or folder. This could correspond to a group of patches in the MIDI device, or just be a way for you to categorize sounds, etc. When you select this item, a name dialog will appear, allowing you to name the folder. You can also rename the folder afterwards by clicking it and typing in the list.

New Preset

This adds a new preset in the selected bank or folder.
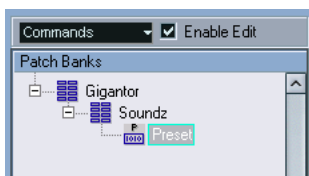
You can rename the preset by clicking it and typing a new name.

When the preset is selected, its corresponding MIDI events (Program Change, Bank Select, etc.) are shown in the event display to the right. The default setting for a new preset is Program Change 0 – to change this, use the following procedures:

For details on which MIDI events are used for selecting patches in the MIDI device, consult its documentation.

▪ To change which Program Change value should be sent out to select the patch, adjust the number in the Value column for the Program Change event.

- To add another MIDI event (e.g. Bank Select) click directly below the last event in the list and select a new event from the pop-up menu that appears.
 After adding a new event, you need to set its value in the Value column, as with Program Change.

- To replace an event, click on it and select another event from the pop-up menu.
  For example, a MIDI device may require that a Bank Select message is sent first, followed by a Program Change message, in which case you would need to replace the default Program Change message with a Bank Select message and add a new Program Change after that.

- To remove an event, select it and press [Delete] or [Backspace].

Different devices use different schemes for Bank Select. When you insert a Bank Select event, you should check the device's documentation to find whether to choose "CC: BankSelect MSB", "Bank Select 14 Bit", "Bank Select 14 Bit MSB-LSB Swapped" or possibly some other option.

Add Multiple Presets

This opens a dialog, allowing you to set up a range of presets to be added in the selected bank or folder.
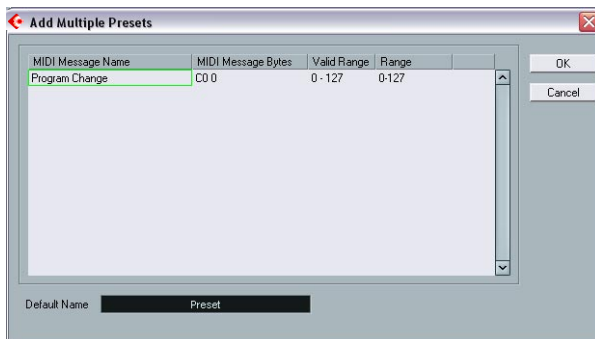
Proceed as follows:

1. Add the event types required for selecting a patch in the MIDI device.
This is done just as when editing the settings for a single event: clicking in the event display brings up a pop-up menu from which you can select an event type.
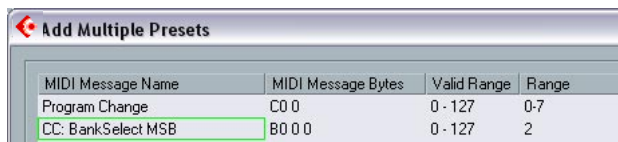
2. Use the Range column to set up either a fixed value or a range of values for each event type in the list.

This requires some explanation:

If you specify a single value in the Range column (e.g. 3, 15 or 127), all added presets will have an event of this type set to the same value.

If you instead specify a value range (a start value and an end value, separated by a dash, e.g. 0-63), the first added preset will have an event set to the start value, the next value will be incrementally raised by one and so on, up to and including the end value.

▪ **The number of added presets depends on the Range setting.**

MIDI Message Name	MIDI Message Bytes	Valid Range	Range
Program Change	C0 0	0 - 127	0-7
CC: BankSelect MSB	B0 0 0	0 - 127	2

This example will generate eight presets, each with a Bank Select event set to 2, but with different Program Change events (ranging from 0 to 7).

3. Specify a Default Name below the event display.

The added events will get this name, followed by a number. You can rename presets manually in the Patch Banks list later.

4. Click OK.

A number of new presets are now added in the selected bank or folder, according to your settings.

Other editing functions

▪ You can move presets between banks and folders by dragging them in the Patch Banks list.

▪ You can remove a bank, folder or preset by selecting it in the Patch Banks list and pressing [Backspace].

▪ If you specify more than one bank, a Bank Assignment item will be added to the pop-up menu at the top of the window. Use this to assign banks to the different MIDI channels (see page 10).

The Create New MIDI Device dialog

When you select "Define New" in the Add MIDI Device window, the Create New MIDI Device dialog opens.

▪ **This is where you can enter a name for the new device and specify which MIDI channels you want the device to use.**

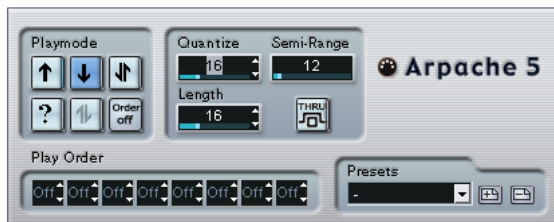# 2

MIDI effects

Introduction

This chapter describes the included MIDI realtime effects and their parameters.

How to apply and handle MIDI effects is described in the chapter "MIDI realtime parameters and effects" in the Operation Manual.

Arpache 5

A typical arpeggiator accepts a chord (a group of MIDI notes) as input, and plays back each note in the chord separately, with the playback order and speed set by the user. The Arpache 5 arpeggiator does just that, and more. Before describing the parameters, let's look at how to create a simple, typical arpeggio:

1. **Select a MIDI track and activate monitoring (or record enable it) so that you can play "thru" the track.**
    Check that the track is properly set up for playback to a suitable MIDI instrument.

2. **Select and activate the arpeggiator.**
    For now, use it as an insert effect for the selected track.

3. **In the arpeggiator panel, use the Quantize setting to set the arpeggio speed.**
    The speed is set as a note value, relative to the project tempo. For example, setting Quantize to "16" means the arpeggio will be a pattern of sixteenth notes.

4. **Use the Length setting to set the length of the arpeggio notes.**
    This allows you to create staccato arpeggios (Length smaller than the Quantize setting) or arpeggio notes that overlap each other (Length greater than Quantize).

5. **Set the Semi-Range parameter to 12.**
    This will make the notes arpeggiate within an octave.

6. **Play a chord on your MIDI instrument.**
    Now, instead of hearing the chord, you will hear the notes of the chord played one by one, in an arpeggio.

7. **Try the different arpeggio modes by clicking the Playmode buttons.**
    The symbols on the buttons indicate the playback order for the notes (up, down, up+down, etc.). The Play Order settings are described below.

Parameters

The Arpache 5 has the following settings:

| Setting	Description
Playmode buttons	Allows you to select the playback order for the arpeggiated notes. The options are down+up, up+down, up, down, random ("?" button) and "Order off", in which case you can set the playback order manually with the Play Order fields below.
Quantize	Determines the speed of the arpeggio, as a note value related to the project tempo. The range is 32T (1/32 note triplets) to 1. (dotted note values).
Length	Sets the length of the arpeggio notes, as a note value related to the project tempo. The range is the same as for the Quantize setting.
Semi-Range	Determines the arpeggiated note range, in semitones counted from the lowest key you play. This works as follows: - Any notes you play that are outside this range will be transposed in octave steps to fit within the range. - If the range is more than one octave, octave-transposed copies of the notes you play will be added to the arpeggio (as many octaves as fit within the range).
Thru	If this is activated, the notes sent to the arpeggiator (i.e. the chord you play) will be passed through the plug-in (sent out together with the arpeggiated notes).
Play Order	If the "Order on" playmode is selected, you can use these "slots" to specify a custom playback order for the arpeggio notes: Each slot corresponds to a position in the arpeggio pattern. For each slot, you specify which note should be played on that position by selecting a number. The numbers correspond to the keys you play, counted from the lowest pressed key. So, if you play the notes C3-E3-G3 (a C major chord), "1" would mean C3, "2" would mean E3, and "3" would mean G3. Note that you can use the same number in several slots, creating arpeggio patterns that are not possible using the standard play modes.

Autopan

This plug-in works a bit like an LFO in a synthesizer, allowing you to send out continuously changing MIDI controller messages. One typical use for this is automatic MIDI panning (hence the name), but you can select any MIDI Continuous Controller event type. The Autopan effect has the following parameters:

Waveform selectors

These determine the shape of the controller curves sent out. The results of most of these waveforms are obvious from looking at the buttons, but a few of them require some extra explanations:

This generates a "random" controller curve.
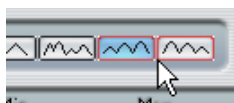
These generate curves with a "periodical envelope". The amplitude will gradually increase or decrease over a time, set with the Period parameter (see below).

Period

This is where you set the speed of the Autopan, or rather the length of a single controller curve cycle. The value can be set in ticks (1/480ths of quarter notes), or as rhythmically exact note values (by clicking the arrow buttons next to the value). The lower the note value, the slower the speed. For example, if you set this to 240 ("8th") the waveform will be repeated every eighth note.

Density

This determines the density of the controller curves sent out. The value can be set in ticks (1/480ths of quarter notes), or as rhythmically exact note values (by clicking the arrow buttons next to the value). The higher the note value, the smoother the controller curve. For example, if you set this to 60 (shown as "32th") a new controller event will be sent out every 60th tick (at every 1/32 note position).

You should probably avoid extremely low Density values, as these will generate a very large number of events (which may cause the MIDI instrument to "choke", delaying notes etc.).

AmpMod

This is only used for the two waveforms with "periodical envelopes" (see above). The period value (set in beats) determines the length of the envelope. In the following figure, Period is set to 4th and the Amp-Mod is 4 beats. This results in a quarter note-based curve in which the top amplitude decreases gradually, repeated each bar:
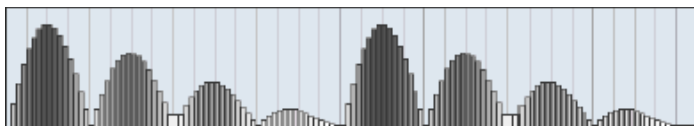
Controller

Determines which Continuous Controller type is sent out. Typical choices would include pan, volume and brightness but your MIDI instrument may have controllers mapped to various settings, allowing you to modulate the synth parameter of your choice – check the MIDI implementation chart for your instrument for details!

Min and Max

These determine the minimum and maximum controller values sent out, i.e. the "bottom" and "top" of the controller curves.

Chorder

The Chorder is a MIDI chord processor, allowing you to assign complete chords to single keys in a multitude of variations. There are three main modes of operation: Normal, Octave and Global. You switch between these modes by clicking the respective button to the left below the keyboard.

Normal mode
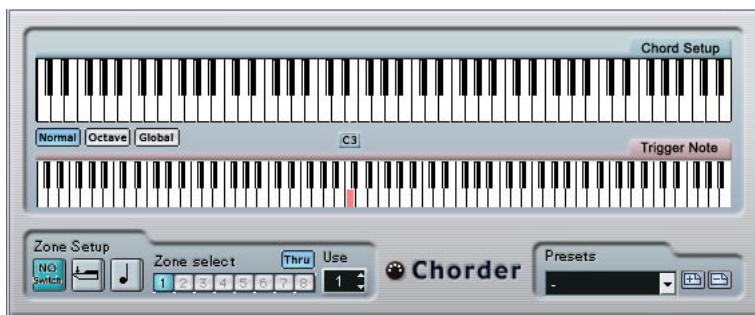
In this mode, you can assign a different chord to each single key on the keyboard. Proceed as follows:

1. Select the key to which you want to assign a chord, by clicking in the lower "Trigger Note" keyboard display.

2. Set up the desired chord for that key by clicking in the upper "Chord Setup" keyboard display.
   Clicking a key adds it to the chord; clicking it again removes it.

3. Repeat the above with any other keys you wish to use.

   If you now play the keys you have set up, you will instead hear the assigned chords.

Octave mode
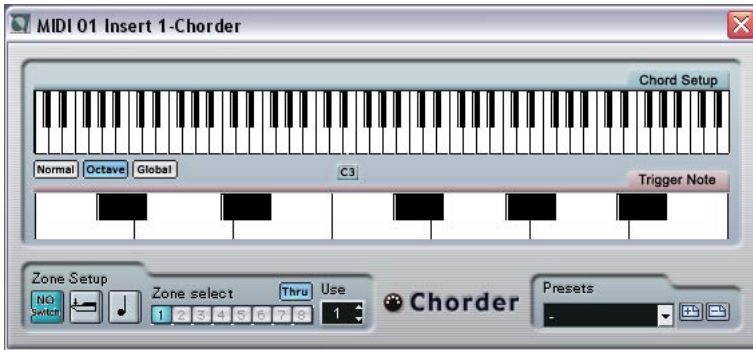
The Octave mode is similar to the Normal mode, but you can only set up one chord for each key in an octave (that is, twelve different chords). When you play a C note (regardless of whether it's a C3, C4 or any other octave) you will hear the chord set up for the C key.

Global mode

In the Global mode, you only set up a single chord, using the Chord Setup keyboard display (the lower keyboard display is hidden). This chord is then played by all keys on the keyboard, but transposed according to the note you play.

Using switches

The Switch Setup section at the bottom of the panel allows you to set up variations to the defined chords. This works with all three modes and provides a total of eight variations for each assignable key (that is, a maximum of 8 different chords in Global mode, 12x8 chords in Octave mode and 128x8 chords in Normal mode).

The variations can be controlled by velocity or note range. Here's how you set it up:

1. Select one of the two switch modes: velocity or note.
How to use these is explained below.

The velocity switch mode selected.

2. Specify how many variations you want to use with the Use value box.

3. Click the first Switch Select button and set up the chord(s) you want for the first variation.

4. Click the next Switch Select button and set up the chord(s) you want for that variation.

5. Repeat this for the number of variations you specified with the Use setting.
Each Switch Select button corresponds to a variation.

6. Now you can play the keyboard and control the variations according to the selected switch modes.
These work as follows:

Switch mode	Description
Velocity	The full velocity range (1-127) is divided into "zones", according to the number of variations you specified. For example, if you're using two variations (Max is set to 2) there will be two velocity "zones": 1-63 and 64-127. Playing a note with velocity at 64 or higher will trigger the second variation, while playing a softer note will trigger the first variation.

Switch mode	Description
Note	In this mode, the chorder will play one chord at a time – you cannot play several different chords simultaneously. When the Note switch mode is selected, you play a key to determine the base note for the chord, then press a higher key to select a variation. The variation number will be the difference between the two keys. To select variation 1, press a key one semitone higher than the base note, for variation 2, press a key two semitones higher, and so on.

▪ To turn the variation switch feature off, select the "No Switch" mode.

Compress

This MIDI compressor is used for evening out or expanding differences in velocity. Though the result is similar to what you get with the Velocity Compression track parameter, the Compress plug-in presents the controls in a manner more like regular audio compressors. The parameters are:

Parameter	Description
Threshold	Only notes with velocities over this value will be affected by the compression/expansion.
Ratio	This determines the rate of compression applied to the velocity values above the threshold level. Ratios greater than 1:1 result in compression (i.e. less difference in velocity) while ratios lower than 1:1 result in expansion (i.e. greater difference in velocity). What actually happens is that the part of the velocity value that is above the threshold value is divided by the ratio value.
Gain	This adds or subtracts a fixed value from the velocities. Since the maximum range for velocity values is 0-127, you may need to use the Gain setting to compensate, keeping the resulting velocities within the range. Typically, you would use negative Gain settings when expanding and positive Gain settings when compressing.

Density
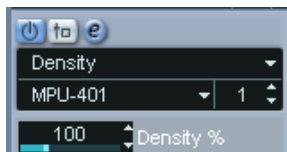
This generic control panel affects the "density" of the notes being played from (or thru) the track. When this is set to 100%, the notes are not affected. Lowering the Density setting below 100% will randomly filter out or "mute" notes. Raising the setting above 100% will instead randomly add new notes.

Micro Tuner

The Micro Tuner lets you set up a different microtuning scheme for the instrument, by detuning each key.

▪ Each Detune field corresponds to a key in an octave (as indicated by the keyboard display). Adjust a Detune field to raise or lower the tuning of that key, in cents (hundreds of a semitone).

▪ Set the Convert setting according to whether the track is routed to a VST instrument or a "real" standard MIDI instrument (capable of receiving microtuning information).

The Micro Tuner comes with a number of presets, including both classical and experimental microtuning scales.

MIDIControl

This generic control panel allows you to select up to eight different MIDI controller types, and use the value fields/sliders to set values for these. A typical use for this would be if you're using a MIDI instrument with parameters that can be controlled by MIDI controller data (e.g. filter cutoff, resonance, levels, etc.). By selecting the correct MIDI controller types, you can use the plug-in as a control panel for adjusting the sound of the instrument from within Cubase SE, at any time.

▪ To select a controller type, use the pop-up menus to the right.
▪ To deactivate a controller slider, set it to "Off" (drag the slider all the way to the left).

MIDIEcho

This is an advanced MIDI Echo, which will generate additional echoing notes based on the MIDI notes it receives. It creates effects similar to a digital delay, but also features MIDI pitch shifting and much more. As always it is important to remember that the effect doesn't "echo" the actual audio, but the MIDI notes which will eventually produce the sound in the synthesizer.

The following parameters are available:

Quantize

The echoed notes will be moved in position to a quantizing grid, as set up with this parameter. You can either use the slider or type to set the value in ticks (1/480 ticks of quarter notes) or click the arrow buttons to step between the "rhythmically exact" values (displayed as note values – see the table below). This makes it easy to find rhythmically relevant quantize values, but still allows experimental settings in between.

An example: setting this to "16th" will force all echo notes to be played on exact 16th note positions, regardless of the timing of the original notes and the Echo-Quant. setting.

▪ **To disable quantizing, set this parameter to its lowest value (1).**

Length

This sets the length of the echoed notes. This can either be the same as their original notes (parameter set to its lowest value, "Source") or the length you specify manually. You can either set the length in ticks or click the arrow buttons to step between the "rhythmically exact" lengths (displayed as note values – see the table below).

▪ **The length can also be affected by the Length Decay parameter.**

Repeat

This is the number of echoes (1 to 12) from each incoming note.

Echo-Quant.

The Echo-Quant. parameter sets the delay time, i.e. the time between a played note and its first echo note. You can either use the slider or type to set the value in ticks (1/480 ticks of quarter notes) or click the arrow buttons to step between the "rhythmically exact" delay times (displayed as note values – see the table below).

For example, setting this to "8th" will cause the echo notes to sound an eighth note after their original notes.

▪ **The echo time can also be affected by the Echo Decay parameter.**

Velocity Decay

This parameter allows you to add or subtract to the velocity values for each repeat so that the echo fades away or increases in volume (provided that the sound you use is velocity sensitive). For no change of velocity, set this to 0 (middle position).

Echo Decay

This parameter lets you adjust how the echo time should be changed with each successive repeat. The value is set as a percentage.

▪ When set to 100% (middle position) the echo time will be the same for all repeats (as set with the Echo-Quant. parameter).
▪ If you raise the value above 100, the echoing notes will play with gradually longer intervals (i.e. the echo will become slower).
▪ If you lower the value below 100, the echoing notes will become gradually faster, like the sound of a bouncing ball.

Pitch Decay

If you set this to a value other than 0, the repeating (echoing) notes will be raised or lowered in pitch, so that each successive note has a higher or lower pitch than the previous. The value is set in semitones.

For example, setting this to -2 will cause the first echo note to have a pitch two semitones lower than the original note, the second echo note two semitones lower than the first echo note, and so on.

Length Decay

This parameter lets you adjust how the length of the echoed notes should change with each successive repeat. The higher the setting (25 – 100), the longer the echoed notes will be compared to their original notes.

About ticks and note values

The timing- and position-related parameters (Echo-Quant., Length and Quantize) can all be set in ticks. There are 480 ticks to each quarter note. While the parameters allow you to step between the rhythmically relevant values (displayed as note values), the following table can also be of help, showing you the most common note values and their corresponding number of ticks:

Note Value	Ticks
1/32 note	60
1/16 note triplet	90
1/16 note	120
1/8 note triplet	160
1/8 note	240
Quarter note triplet	320
Quarter note	480
Half note	960

Note to CC
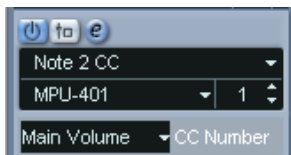
This effect will generate a MIDI continuous controller event for each incoming MIDI note. The value of the controller event corresponds to the note number (pitch) and the single parameter allows you to select which MIDI controller should be sent out (by default controller 7, MIDI volume). The incoming MIDI notes pass through the effect unaffected.

For example, if MIDI volume (controller 7) is selected, notes with low note numbers (pitches) will lower the volume in the MIDI instrument, while higher note numbers will raise the volume. This way you can create "keyboard tracking" of volume or other parameters.

Note that a controller event is sent out each time a new note is played. If high and low notes are played simultaneously, this could lead to somewhat confusing results. Therefore, the Note to CC effect is probably best applied to monophonic tracks (playing one note at a time).

Quantizer
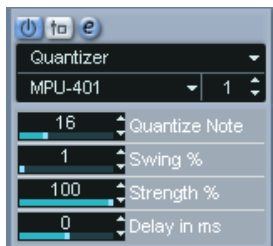
Quantizing is a function that changes the timing of notes by moving them towards a "quantize grid". This grid may consist of e.g. straight sixteenth notes (in which case the notes would all get perfect sixteenth note timing), but could also be more loosely related to straight note value positions (applying a "swing feel" to the timing, etc.).

▪ **The main Quantize function in Cubase SE is described in the Operation manual.**

While the Quantize function on the MIDI menu applies the timing change to the actual notes on a track, the Quantizer effect allows you to apply quantizing "on the fly", changing the timing of the notes in real time. This makes it easier to try out different settings when creating grooves and rhythms. Note however, that the main Quantize function contains settings and features that are not available in the Quantizer.

The Quantizer has the following parameters:

Parameter	Description
Quantize Note	This sets the note value on which the quantize grid is based. Straight notes, triplets and dotted notes are available. For example, "16" means straight sixteenth notes and "8T" means eighth note triplets.
Swing	This allows you to offset every second position in the grid, creating a swing or shuffle feel. The value is a percentage – the higher you set this, the farther to the right every even grid position is moved.
Strength	This determines how close the notes should be moved to the quantize grid. When set to 100%, all notes will be forced to the closest grid position; lowering the setting will gradually loosen the timing.
Delay	This delays (positive values) or advances (negative values) the notes in milliseconds. Unlike the Delay setting in the Track Parameters, this delay can be automated.

Step Designer
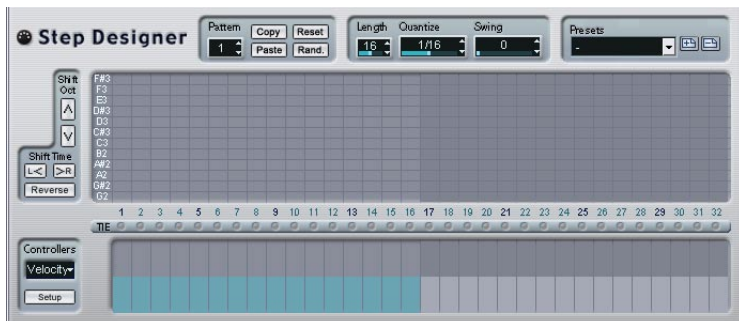
The Step Designer is a MIDI pattern sequencer that sends out MIDI notes and additional controller data according to the pattern you set up. It does not make use of the incoming MIDI, other than automation data (such as recorded pattern changes).

Creating a basic pattern

1. **Use the Pattern selector to choose which pattern to create.**
   Each Step Designer can hold up to 200 different patterns.

2. **Use the Quantize setting to specify the "resolution" of the pattern.**
   In other words, this setting determines how long each step is. For example, if Quantize is set to "16th" each step will be a sixteenth note.

3. **Specify the number of steps in the pattern with the Length setting.**
   As you can see in the note display, the maximum number of steps is 32. For example, setting Quantize to 16 and Length to 32 would create a two bar pattern with sixteenth note steps.

4. **Click in the note display to insert notes.**
   You can insert notes on any of the 32 steps, but the Step Designer will only play back the number of steps set with the Length parameter.

- The display spans one octave (as indicated by the pitch list to the left). You can scroll the displayed octave up or down by clicking in the pitch list and dragging up or down.
This way you can insert notes at any pitch. Note that each step can contain one note only – the Step Designer is monophonic.
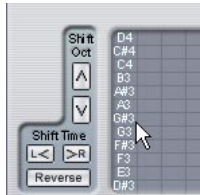
Click and drag to view other octaves.

- To remove a note from the pattern, click on it again.

5. Select "Velocity" on the Controllers pop-up menu.
This pop-up menu determines what is shown in the lower controller display.

6. Adjust the velocity of the notes by dragging the velocity bars in the controller display.
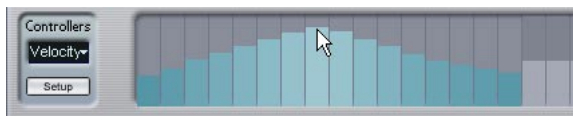
7. To make notes shorter, select "Gate" on the Controllers pop-up menu and lower the bars in the controller display.
When a bar is set to its maximum value (fully up), the corresponding note will be the full length of the step (as set with the Quantize parameter).

8. To make notes longer, you can tie two notes together. This is done by inserting two notes and clicking the Tie button below the second note.
When the Tie button is lit for a note, it won't retrigger – instead the previous note will be lengthened. Also, the tied (second) note will automatically get the same pitch as the first note. You can add more notes and tie them in the same way, creating longer notes.

9. If you now start playback in Cubase SE, the pattern will play as well, sending out MIDI notes on the track's MIDI output and channel (or, if you have activated the Step Designer as a send effect, on the MIDI output and channel selected for the send in the Inspector).

Adding controller curves

The Controllers pop-up menu holds two more items: two controller types.

- You can select which two controller types (filter cutoff, resonance, volume, etc.) should be available on the pop-up menu by clicking the Setup button and selecting controllers from the lists that appears.
This selection is global to all patterns.

- To insert controller information in a pattern, select the desired controller from the pop-up menu and click in the controller display to draw events.
The MIDI controller events will be sent out during playback along with the notes.
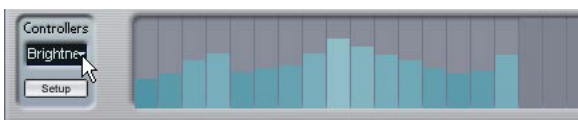
- **If you drag a controller event bar all the way down, no controller value will be sent out on that step.**

Other pattern functions

The following functions make it easier to edit, manipulate and manage patterns:

Function	Description
Shift Oct	These buttons allow you to shift the entire pattern up or down in octave steps.
Shift Time	Moves the pattern one step to the left or right.
Reverse	Reverses the pattern, so that it plays backwards.
Copy/Paste	Allows you to copy the current pattern and paste it in another pattern location (in the same Step Designer or another).
Reset	Clears the pattern, removing all notes and setting controller values to default.
Random	Generates a completely random pattern – useful for experimenting.

| Function	Description
Swing	The Swing parameter allows you to offset every second step, creating a swing or shuffle feel. The value is a percentage – the higher you set this, the farther to the right every even step is moved.
Presets	Handling of Presets is described in the chapter "MIDI realtime settings" in the Operation manual. Note that a stored Preset contains all 200 patterns in the Step Designer.

Automating pattern changes

You can create up to 200 different patterns in each Step Designer – just select a new pattern and add notes and controllers as described above.

Typically, you want the pattern selection to change during the project. You can accomplish this by automating the Pattern selector, either in real time by activating the Write automation and switching patterns during playback or by drawing in the automation subtrack for the Step Designer's MIDI track. Note that you can also press a key on your MIDI keyboard to change patterns. For this, you have to set up the Step Designer as an insert effect for a record enabled MIDI track. Press C1 to select pattern 1, C#1 to select pattern 2, D1 to select pattern 3, D#1 to select pattern 4 and so on. If you want, you can record these pattern changes as note events on a MIDI track. Proceed as follows:

1. Select the desired MIDI track or create a new one and activate the Step Designer as an insert effect.

2. Set up several patterns as described above.

3. Press the Record button and press the desired keys on your keyboard to select the corresponding patterns.
   The pattern changes will be recorded on the MIDI track.

4. Stop recording and play back the MIDI track.
   You will now hear the recorded pattern changes.

▪ **This will only work for the first 92 patterns.**

Track Control
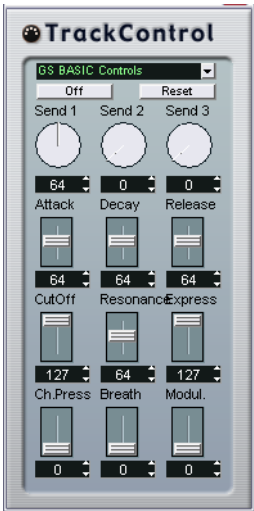
The Track Control effect contains three ready-made control panels for adjusting parameters on a GS or XG compatible MIDI device. The Roland GS and Yamaha XG protocols are extensions of the General MIDI standard, allowing for more sounds and better control of various instrument settings. If your instrument is compatible with GS or XG, the Track Controls effect allows you to adjust sounds and effects in your instrument from within Cubase SE.

Selecting a control panel

At the top of the Track Controls effect window you will find a pop-up menu. This is where you select which of the available control panels to use:

Control panel	Description
GS Basic Controls	Effect sends and various sound control parameters for use with instruments compatible with the Roland GS standard.
XG Effect + Sends	Effect Sends and various sound control parameters for use with instruments compatible with the Yamaha XG standard.
XG Global	Global settings (affecting all channels) for instruments compatible with the Yamaha XG standard.

About the Reset and Off buttons

Regardless of the selected mode, you will find two buttons labelled "Off" and "Reset" at the top of the control panel:

- Clicking the Off button will set all controls to their lowest value, without sending out any MIDI messages.
- Clicking the Reset button will set all parameters to their default values, and send out the corresponding MIDI messages.
  For most parameters, the default values will be zero or "no adjustment", but there are exceptions to this. For example, the default Reverb Send settings are 64.

GS Basic Controls

The following controls are available when the GS Basic Controls mode is selected:

Control	Description
Send 1	Send level for the reverb effect.
Send 2	Send level for the chorus effect.
Send 3	Send level for the "variation" effect.
Attack	Adjusts the attack time of the sound. Lowering the value shortens the attack, while raising it gives a slower attack. Middle position (64) means no adjustment is made.
Decay	Adjusts the decay time of the sound. Lowering the value shortens the decay, while raising it makes the decay longer.
Release	Adjusts the release time of the sound. Lowering the value shortens the release, while raising it makes the release time longer.
Cutoff	Adjusts the filter cutoff frequency.
Resonance	Adjusts the filter resonance.
Express	Allows you to send out expression pedal messages on the track's MIDI channel.
Press.	Allows you to send out aftertouch (channel pressure) messages on the track's MIDI channel. This is useful if your keyboard cannot send aftertouch, but you have sound modules that respond to aftertouch. The default value for this parameter is zero.
Breath	Allows you to send breath control messages on the track's MIDI channel.
Modul.	Allows you to send modulation messages on the track's MIDI channel (just as you normally do with a modulation wheel on a MIDI keyboard).

XG Effects + Sends

The following controls are available when the XG Effects + Sends mode is selected:

Control	Description
Send 1	Send level for the reverb effect.
Send 2	Send level for the chorus effect.
Send 3	Send level for the "variation" effect.
Attack	Adjusts the attack time of the sound. Lowering this value shortens the attack, while raising it gives a slower attack. Middle position means no adjustment is made.
Release	Adjusts the release time of the sound. Lowering this value shortens the release, while raising it makes the release time longer. Middle position means no adjustment is made.
Harm.Cont	Adjusts the harmonic content of the sound.
Bright	Adjusts the brightness of the sound.
CutOff	Adjusts the filter cutoff frequency.
Resonance	Adjusts the filter resonance.

XG Global Settings

In this mode, the parameters affect global settings in the instrument(s). Changing one of these settings for a track will in fact affect all MIDI instruments connected to the same MIDI output, regardless of the MIDI channel setting of the track. Therefore, to avoid confusion it might be a good idea to create an empty track and use this only for these global settings.

The following controls are available:

Control	Description
Eff. 1	This allows you to select which type of reverb effect should be used: No effect (the reverb turned off), Hall 1-2, Room 1-3, Stage 1-2 or Plate.
Eff. 2	This allows you to select which type of chorus effect should be used: No effect (the chorus turned off), Chorus 1-3, Celeste 1-3 or Flanger 1-2.
Eff. 3	This allows you to select one of a large number of "variation" effect types. Selecting "No Effect" is the same as turning off the variation effect.
Reset	Sends an XG reset message.
MastVol	This is used to control the Master Volume of an instrument. Normally you should leave this in its highest position and set the volumes individually for each channel (with the volume faders in the Cubase SE mixer or in the Inspector).

Track FX

This plug-in is essentially a duplicate of the Track Parameter section. This can be useful if you e.g. need extra Random or Range settings, or if you prefer to have your track parameters in a separate window (to get this, [Alt]/[Option]-click the Edit button for the effect).

The Track FX also includes an additional function that isn't available among the track parameters:

Scale Transpose
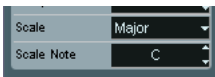
This allows you to transpose each incoming MIDI note, so that it fits within a selected musical scale. The scale is specified by selecting a key (C, C#, D, etc.) and a scale type (major, melodic or harmonic minor, blues, etc.).

• **To turn Scale Transpose off, select "No Scale" from the Scale pop-up menu.**

Transformer
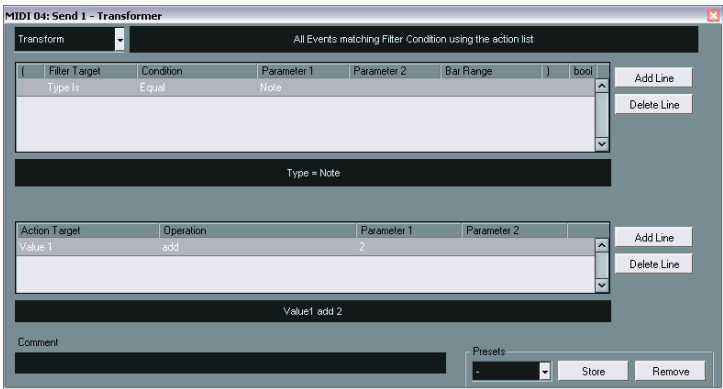
The Transformer allows you to perform very powerful MIDI processing on the fly, without affecting the actual MIDI events on the track. The Transformer is described starting on .

3

Working with System Exclusive messages

Introduction

System Exclusive (SysEx) is a special type of MIDI message used to send things that only make sense to a unit of a certain make and type. Every major MIDI manufacturer has its own SysEx identity code. System Exclusive messages are typically used for transmitting patch data, i.e. the numbers that make up the settings of one or more sounds in a MIDI instrument.

Cubase SE allows you to record and manipulate System Exclusive data in various ways. This chapter points to various features that help you manage and create System Exclusive data.

Bulk dumps

Recording a bulk dump in Cubase SE

In any programmable device, all settings are stored as numbers in computer memory. Change those numbers, and you will change the settings.

Normally, MIDI devices allow you to dump (transmit) all or some settings in the device's memory, in the form of MIDI System Exclusive messages. Return these messages, and you get the settings back. This is (among other things) a way of making backup copies of the settings of any instrument.

If your instrument allows the dumping of a few or all of its settings via MIDI by activating some function on the front panel, this dump will most probably be recordable in Cubase SE.

1. Open the Preferences dialog from the File menu (on the Mac, this is located on the Cubase SE menu) and select the MIDI–MIDI Filter page.
This allows you to govern which MIDI event types should be recorded and/or thru-put.
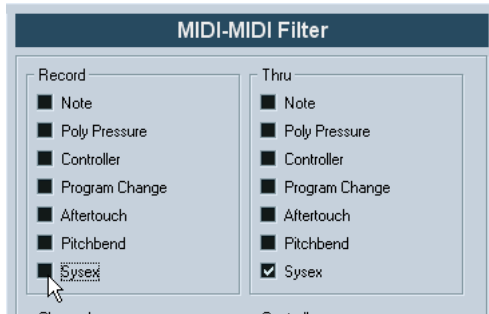
2. Deactivate the Sysex checkbox in the Record section, but make sure the Sysex checkbox in the Thru section is activated.
With this setting (shown in the figure above) SysEx messages will be recorded but not echoed back out to the instrument (which could lead to strange results).

3. Activate recording on a MIDI track and initiate the dump from the front panel of the instrument.

4. When done recording, select the new part and open the List Editor from the MIDI menu.
This allows you to check that the System Exclusive dump was recorded – there should be one or several SysEx events in the part/event list.
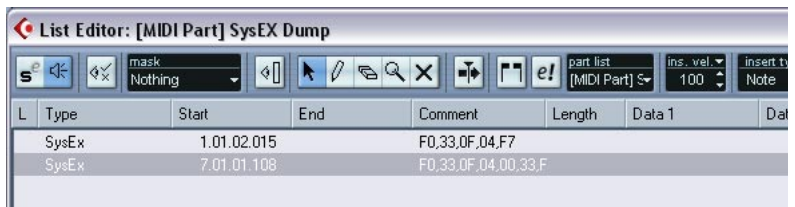
If your MIDI instrument doesn't offer a way to initiate a dump "by itself", you have to send a Dump Request message from Cubase SE to start the dump. You will then have to use the MIDI SysEx Editor (see page 48) to insert the specific Dump Request message (see the instrument's documentation) at the beginning of a MIDI track. When you activate recording, the Dump Request message will be played back (sent to the instrument), the dump will start and be recorded as above.

Transmitting a bulk dump back to a device

1. Make sure the MIDI track with the System Exclusive data is routed to the device.
You may want to check your device's documentation to find details about which MIDI channel should be used, etc.

2. Solo the track.
This might not be necessary, but it is a good safety measure.

3. Make sure the device is set up to receive System Exclusive data (often, the reception of SysEx is turned off by default).

4. If necessary, put the device in "Standby to Receive System Exclusive" mode.

5. Play back the data.

Some advice

▪ Don't transmit more data than you need. If all you want is a single program, don't send them all, it will only make it harder to find the one you want. Usually, you can specify exactly what you want to send.

▪ If you want the sequencer to dump the pertinent sounds to your instrument each time you load a project, put the SysEx data in a silent "count-in" before the project itself starts.

▪ If the dump is very short (for instance, a single sound) you can put it in the middle of the project to re-program a device on the fly. However, you can achieve the same effect by using Program Change. This is definitely preferable, since less MIDI data is sent and recorded. Some devices may be set up to dump the settings for a sound as soon as you select it on the front panel.

- If you create parts with useful "SysEx dumps", you can put these on a special muted track. When you want to use one of them, drag it to an empty unmuted track and play it back from there.
- Do not transmit several SysEx dumps to several instruments at the same time.
- Make a note of the current device ID setting of the instrument. If you change this, the instrument may refuse to load the dump later.

Recording System Exclusive parameter changes

Often you can use System Exclusive to remotely change individual settings in a device, open up a filter, select a waveform, change the decay of the reverb etc. Many devices are also capable of transmitting changes made on the front panel as System Exclusive messages. These can be recorded in Cubase SE, and thus incorporated into a regular MIDI recording.

Here's how it works: let's say you open up a filter while playing some notes. In that case, you will record both the notes and the System Exclusive messages generated by your opening of the filter. When you play it back, the sound changes exactly like it did when you recorded it.

1. Open the Preferences dialog from the File menu (on the Mac, this is located on the Cubase SE menu), select the MIDI–MIDI Filter page and make sure that System Exclusive is recorded.

2. Make sure the instrument is actually set to transmit front panel control movements as System Exclusive data.

3. Record normally.
   When you're done, you can check that the events were recorded properly in the List Editor.

Editing System Exclusive messages

While System Exclusive events are shown in the List Editor, their entire content is not (only the beginning of the message is displayed in the Comment column for the event). Furthermore, you cannot edit the event (other than moving it) as you can with other event types in the List Editor.

Instead, you use the MIDI SysEx Editor for this.

▪ To open the MIDI SysEx Editor for an event, click in the Comments column for the event in the List Editor.
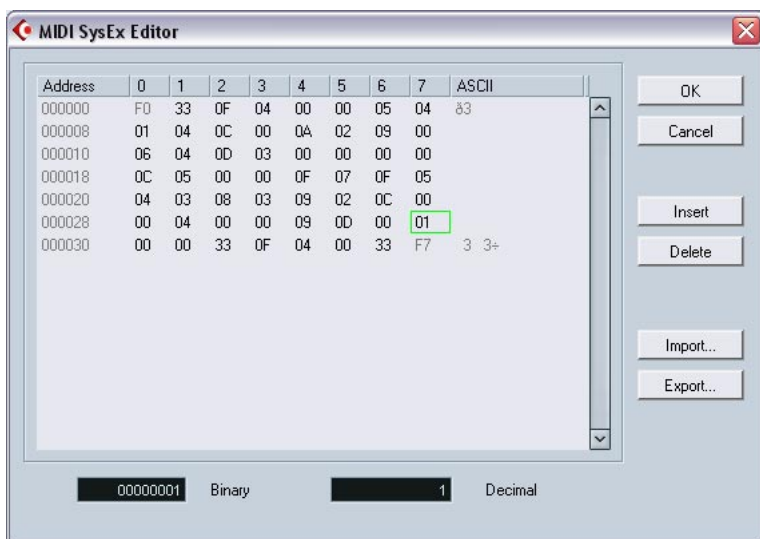
The display shows the entire message on one or several lines. All System Exclusive messages always begin with F0 and end with F7 with a number of arbitrary bytes in between. If the message contains more bytes than fit on one line, it continues on the next. The Address indication to the left helps you find out on which position in the message a certain value resides.

Selecting and viewing values

To select a value, either click on it or use the cursor keys. The selected byte is indicated in various formats:

- In the main display, values are shown in hexadecimal format.
- To the right of this, values are shown in ASCII format.
- At the bottom of the dialog, the selected value is shown in binary and decimal formats.

Editing a value

The selected value can be edited directly in the main display or in the decimal and binary displays. Just click on it and type in the desired value as usual.

Adding and deleting bytes

Using the Insert and Delete buttons, or their corresponding computer keyboard keys, you can add and delete bytes from the message. Inserted data will appear before the selection.

Importing and exporting data

The Import and Export buttons allow you to get SysEx data from disk and to export the edited data to a file. The file format used is called "MIDI SysEx" (.SYX), in which data is saved exactly as is, in a binary file. Only the first dump in a .SYX file will be loaded.

This format should not be confused with MIDI files.

4

Logical Presets, Transformer and Input Transformer

Introduction

About the Logical Presets

Most of the time you will probably perform your MIDI editing graphically, from one of the main graphic editors. But there are times when you want more of a "search and replace" function on MIDI data, and that's where the Logical Presets come in and allow you to perform very powerful processing.

The Logical Presets are found in the MIDI menu.

▪ To apply a preset, select it from the Logical Presets submenu.
This applies the preset to the selected MIDI part directly.

▪ **It is also possible to select and apply Logical Editor presets directly in the List Editor (from the Mask menu).**

About the Transformer MIDI effect

The Transformer effect allows you to apply editing to the events played back from a track "on the fly".

About the Input Transformer

Just like the Transformer effect, the Input Transformer works in real time. However, the Input Transformer filters out and transforms MIDI data as it is recorded. In other words, the settings you make in the Input Transformer will affect the actual MIDI events you record.

Setting up filter conditions

General procedure

Filter Target	Condition	Parameter 1	Parameter 2
Type Is	Equal	Note	
Pitch	Bigger or Equal	F2	

The upper list is where you set up the filter conditions, determining which events to find. The list contains one or several conditions, each on a separate line.

- **If you want to start from scratch (as opposed to basing your settings on an existing preset) you may want to initialize the settings by clicking the Init button.**

- To add a new line (condition) click the Add Line button to the right.
  The new line is added at the bottom of the list. If there are many lines, you may need to use the scrollbar to the right to view them.

- To remove a line, click anywhere on it to select it and click the Delete Line button to the right.

You set up a filter condition line by clicking in the columns and selecting options from the pop-up menus that appear. Here is a brief description of the columns:

Column	Description
Filter Target	Here you select which property to look for when finding events. Your choice here affects the available options in the other columns as well, see below!
Condition	This determines how the Logical Editor should compare the property in the Filter Target column to the values in the Parameter columns (Equal, Unequal, Bigger, etc. – see the separate table below). The available options depend on the Filter Target setting.
Parameter 1	Here you set which value the event properties should be compared to (a numeric value or a choice from a pop-up menu, depending on the Filter Target).

Column	Description
Parameter 2	This column is only used if you have selected one of the "Range" options in the Condition column. Typically, this allows you to find all events with values inside (or outside) the range between Parameter 1 and Parameter 2.
bool	This allows you to insert the boolean operators And/Or, when creating conditions with multiple lines. See page 60.

Conditions

The options in the Condition column have the following meaning (note that the available Condition options depend on the Filter Target setting):

Condition	Events will be found if their Filter Target property…
Equal	…has the exact same value as set up in the Parameter 1 column.
Unequal	…has any value other than the one set up in the Parameter 1 column.
Bigger	…has a value higher than the one set up in the Parameter 1 column.
Bigger or Equal	…has a value that is the same as or higher than the one set up in the Parameter 1 column.
Less	…has a value lower than the one set up in the Parameter 1 column.
Less or Equal	…has a value that is the same as or lower than the one set up in the Parameter 1 column.
Inside Range	…has a value that is between the values set up in the Parameter 1 and Parameter 2 columns. Note that Parameter 1 should be the lower value and Parameter 2 the higher.
Outside Range	…has a value that is not between the values set up in the Parameter 1 and Parameter 2 columns.
Note is equal to	…is the note specified in the Parameter 1 column, regardless of octave (Pitch only). Lets you find e.g. all C notes, in all octaves.

▪ **The Conditions for the "Property" filter target are different, see .**

Below, the different Filter Targets (and their corresponding Condition and Parameter options) are described in more detail.

Searching for notes of certain lengths

Only note events have lengths (actually, a note is made up of separate note-on and note-off events but in Cubase SE it's considered as a single event with a length). Therefore, the "Length" Filter Target is only valid if you're specifically searching for notes – there has to be another condition line with the Filter Target "Type", Condition "Equal" and Parameter 1 set to "Note". See for more about using multiple filter conditions.

Searching for Value 1 or Value 2

A MIDI event is composed of several values. The meanings of value 1 and 2 depend on the type of event:

Event type	Value 1	Value 2
Notes	The Note Number/Pitch.	The velocity of the note.
PolyPressure	The key that was pressed.	The amount of pressure for the key.
Controller	The type of Controller, displayed as a number.	The amount of Control Change.
Program Change	The Program Change number.	Not used.
Aftertouch	The amount of pressure.	Not used.
Pitchbend	The "fine tune" of the bend. Not always used.	The coarse amount of bend.

▪ **System Exclusive events are not included in the table above, since they don't use value 1 and 2.**

Since value 1 and 2 have different meanings for different events, searching for e.g. value 2 = 64 would both find notes with the velocity 64 and controllers with the amount 64, etc. If this is not what you want, you can add an additional filter condition line with the Filter Target "Type", specifying which type of events to find (see below).

This is particularly useful when searching for note pitch or velocity values, as described below.

The general procedures when searching for value 1 or 2 are:

▪ If you select any Condition other than the Range options, you set up a specific value in the Parameter 1 column.

Filter Target	Condition	Parameter 1	Parameter 2	bool
Value 2	Less	80		

Here, the Logical Editor will find all events with a value 2 less than 80.

▪ If you select the Inside or Outside Range option in the Condition column, the range consists of the values between Parameter 1 and Parameter 2.
Note that Parameter 1 should have the lower value.

Searching for note pitch or velocity

If you add another condition line with the Filter Target "Type", Condition "Equal" and Parameter 1 set to "Note", Input Transformer will "know" you are searching for pitch or velocity. This has the following benefits:

▪ The Filter Targets Value 1 and Value 2 will be displayed as "Pitch" and "Velocity" respectively, making it easier to grasp the function of the filter condition.
▪ Pitch values in the Parameter columns will be displayed as note names (C3, D#4, etc.). When entering pitch values you can either type a note name or a MIDI note number (0-127).
▪ When Value 1 (pitch) is selected as Filter Target, an additional option appears in the Condition column: "Note is equal to". When this is selected, you specify a note name in the Parameter 1 column but without any octave number (C, C#, D, D#, etc.). The Input Transformer can then find all notes of a certain key, in all octaves.

See for more info on working with multiple filter condition lines.

Searching for controllers

There is similar extended functionality when searching for controllers: If you've added an additional "Type = Controller" condition line, the Input Transformer will "know" you are searching for controllers. The Parameter 1 column will then show the names of the MIDI controllers (Modulation, Volume, etc.) when Value 1 is selected as Filter Target.

Searching for MIDI channels

Each MIDI event contains a MIDI channel setting (1-16). Normally, these settings are not used, since the MIDI event plays back on the MIDI channel set for its track. However, you can come across MIDI parts with events set to different channels in the following scenarios for example:

▪ If you have recorded MIDI from an instrument sending on several different channels (e.g. a master keyboard with different key zones).
▪ If you have imported a MIDI file of type 0 (with a single track, containing MIDI events with different channel settings).

Searching for MIDI channel values is straightforward; you select a Condition and enter a MIDI channel (1-16) in the Parameter 1 column (and, if you've selected one of the Range Conditions, a higher channel in the Parameter 2 column, creating a value range).

Searching for event types

Selecting Type as the Filter Target allows you to find events of a certain type only.

▪ The Condition column contains only three options: Equal, Unequal and All Types.
▪ Clicking the Parameter 1 column displays a pop-up menu, listing the available event types (Note, PolyPressure, Controller, etc.).

The Input Transformer will find all events matching or not matching the selected type (depending on the Condition).

As mentioned above, selecting Type = Note or Type = Controller adds some additional functionality to the Input Transformer. You should make it a habit to add a Type condition when applicable.

Searching for properties

On the Filter Target pop-up menu you will find an option called Property. This allows you to search for properties that are not part of the MIDI standard but rather event-specific Cubase SE settings.

When the Property option is selected, the Condition column has two options: "Property is set" and "Property is not set". Which property to look for is selected in the Parameter 1 column. The options are "muted" and "selected". Two examples:

Filter Target	Condition	Parameter 1	Parameter 2	bool
Property	Property is set	Event is muted		

Here, the Input Transformer will find all muted events.

Filter Target	Condition	Parameter 1	Parameter 2	bool
Property	Property is set	Event is selected		And
Property	Property is not set	Event is muted		

Here, the Input Transformer will find all events that are selected but not muted.

Searching for event contexts

On the Filter Target pop-up menu you will find an option called "Last Event". This can be used to perform context dependant searches.

"Last Event" indicates the state of an event which has already passed the Input Transformer. The condition has to be combined with Parameter 1 and Parameter 2.

A few examples on how the Last Event filter target can used:

Here, the action will only be performed when sustain pedal is down:

Fiter Target	Condition	Parameter 1	Parameter 2
Last Event	Equal	MIDI Status	176/Controller
Last Event	Equal	Value 1	64
Last Event	Bigger	Value 2	64

In this example, the action will be performed when the note C1 is pressed:

Fiter Target	Condition	Parameter 1	Parameter 2
Type is	Equal	Note	
Last Event	Equal	Note is playing	36/C1

In this example, the action will be performed after playing the C1 note:

Fiter Target	Condition	Parameter 1	Parameter 2
Last Event	Equal	Value 1	36/C1

Combining multiple condition lines

As described above, you can add condition lines by clicking the Add Line button to the right of the list. The result of combining condition lines depends on the boolean And/Or operators.

The bool column

By clicking in the "bool" column to the right in the list, you can select a boolean operator: "And" or "Or". A boolean operator separates two condition lines and determines the result in the following way:

▪ **If two condition lines are separated by a boolean And, both conditions must be fulfilled for an event to be found.**

Filter Target	Condition	Parameter 1	Parameter 2	bool
Type Is	Equal	Note		And
Property	Property is set	Event is muted		

The Input Transformer will only find events that are notes and are muted.

▪ **If two condition lines are separated by a boolean Or, one of the conditions (or both) must be fulfilled for an event to be found.**

Filter Target	Condition	Parameter 1	Parameter 2	bool
Type Is	Equal	Note		Or
Property	Property is set	Event is muted		

The Input Transformer will find all events that are notes (regardless of mute status) and all events that are muted (regardless of their type).

> When you add a new condition line, the boolean setting defaults to And. Therefore, if all you want to do is set up two or more conditions that all must be met for an event to be found, you don't have to think about the boolean column – just add the required lines and make the usual filter settings.

Selecting a function
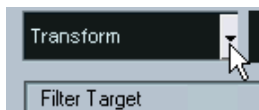
The pop-up menu in the top left corner of the Transformer is where you select the function – the basic type of editing to be performed. When you select an option from the pop-up menu, the field to the right displays a clarifying text, making it easier to see what the function does.

The current settings are automatically applied in real time during playback or live playing.

Below, the available options are listed.

Delete

This function will remove (or "mute") all found events from the "output stream" – the actual events on the track are not affected.

Transform

Changes one or several aspects of the found events. You set up exactly what should be changed in the action list, as described on page 62.

Insert

This will create new events and insert these into output stream. The new events will be based on the events found by the Transformer effect's filter conditions, but with any changes you have set up in the action list applied.

Another way of expressing this is that the Insert function copies the found events, transforms them according to the action list and inserts the transformed copies among the existing events.

Insert Exclusive

This will transform the found events according to the action list. Then, all events that were not found (that didn't meet the filter conditions) are removed from the output stream.

Specifying actions

Action Target	Operation	Parameter 1
Value 1	set to fixed value	F5

The lower list in the Input Transformer window is the action list. This is where you specify any changes that should be made to the found events (relevant for all function types except Delete).

The handling of the action list is similar to the filter condition list, but without the booleans. You simply add lines by clicking the Add Line button to the right, and fill out the columns as required. To remove a superfluous action line, select it and click the Delete Line button.

Action Target

This is where you select the property that should be changed in the events:

Option	Description
Value 1	This adjusts value 1 in the events. As described on page 55, the meaning of value 1 depends on the event type. For notes, value 1 is the pitch.
Value 2	This adjusts value 2 in the events. As described on page 55, the meaning of value 2 depends on the event type. For notes, value 2 is the velocity value.
Channel	Allows you to change the MIDI channel setting. See page 57.
Type	Allows you to change an event from one type to another, e.g. transform aftertouch events to modulation events.
Value 3	This adjusts value 3 in the events, which is used for handling of Noteoff-velocity when searching for properties. See page 58.

Operation

This setting determines what to do with the Action Target. The options on this pop-up menu are different depending on the selected Action Target. Below, all available operations are listed:

Add

Adds the value specified in the Parameter 1 column to the Action Target.

Subtract

Subtracts the value specified in the Parameter 1 column from the Action Target.

Multiply by

Multiplies the Action Target value with the value specified in the Parameter 1 column.

Divide by

Divides the Action Target value by the value specified in the Parameter 1 column.

Round by

This "rounds" the Action Target value using the value specified in the Parameter 1 column. In other words, the Action Target value is changed to the closest value that can be divided by the Parameter 1 value.

Set Random Values between

This will set the Action Target value to a random value within the range specified with Parameter 1 and 2.

Set Relative Random Values between

This will add a random value to the current Action Target value. The added random value will be within the range specified with Parameter 1 and 2. Note that these can be set to negative values.

For example, if you set Parameter 1 to -20 and Parameter 2 to +20, the original Action Target value will get a random variation, never exceeding ±20.

Set to fixed value

This sets the Action Target to the value specified in the Parameter 1 column.

Transpose to Scale

This is only available when Action Target is set to Value 1, and when the filter conditions are specifically set up to find notes (a "Type = Note" filter condition line has been added). When "Transpose to Scale" is selected, you can specify a musical scale using the Parameter 1 and 2 columns. Parameter 1 is the key (C, C#, D, etc.) while Parameter 2 is the type of scale (major, melodic or harmonic minor, etc.).

Each note will be transposed to the closest note in the selected scale.

Use Value 2

This is only available when Action Target is set to Value 1. If this option is selected, the Value 2 setting in each event will be copied to the Value 1 setting.

For example, this would be useful if you are transforming all Modulation controllers to Aftertouch events (since controllers use Value 2 for their amount, while Aftertouch uses Value 1 – see the table on).

Use Value 1

This is only available when Action Target is set to Value 2. If this option is selected, the Value 1 setting in each event will be copied to the Value 2 setting.

Mirror

This is only available when Action Target is set to Value 1 or Value 2. When this option is selected, the values will be "mirrored" or "flipped" around the value set in the Parameter 1 column.

In the case of notes, this will invert the scale, with the key set in the Parameter 1 column as "center point".

Applying the defined actions

- **Again, when using the Transformer MIDI effect the processing is applied to the events played back from the track (or played live "thru" the track) as soon as you set it up.**
  Since no existing events on the track are affected by the Transformer setting, there is no need for undo.

The Input Transformer

This function allows you to selectively filter out and change MIDI data coming to a MIDI track before it is recorded. The Input Transformer contains four independent "modules", for which you can set up different filtering and actions if you like. You can activate any or all of these four modules.

Here are some of the things the Input Transformer allows you to do:

- Set up split keyboard combinations for recording left and right hands separately.
- Turn a controller like a foot pedal into MIDI notes (for playing bass drum the right way).
- Filter out one specific type of MIDI data on one MIDI channel only.
- Turn aftertouch into any controller (and vice versa).
- Invert velocity or pitch.

And again: four of these things can be done at the same time.

Opening the Input Transformer

To open the Input Transformer for a MIDI track, select the track and click the Input Transformer button in the Inspector to open the pop-up menu:
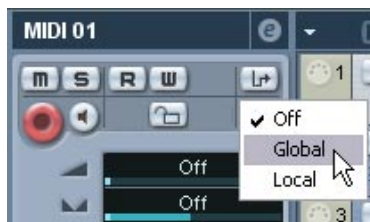
- Select Global to make Input Transformer settings that affect all MIDI inputs (and thereby all MIDI tracks).

- Select Local to make Input Transformer settings for this track only.
  In both cases, the button lights up and the Input Transformer opens.
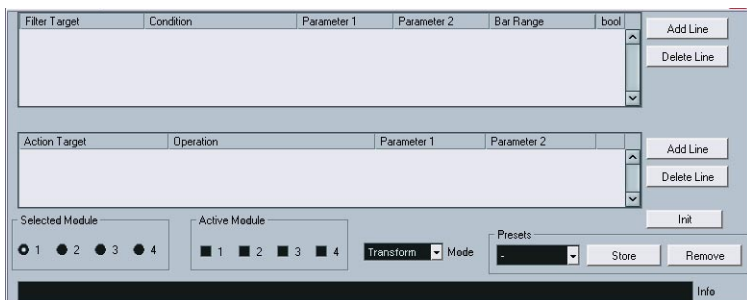
Handling the four modules

The Input Transformer is really four separate transformers, or modules.

- You select which module to view and make settings for by clicking its button in the Selected Module section.
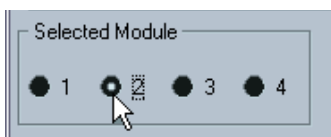
Module 2 selected for viewing and editing.

- The checkboxes in the Active Module section determine which module(s) are active.

Here, modules 1, 2 and 4 are active.

The two modes

The Mode pop-up menu contains two options: Filter and Transform.

- In Filter mode, only the filter conditions (the upper list) are taken into account. All events matching the conditions set up will be filtered out (excluded from the recording).

- In Transform mode, events matching the filter conditions will be transformed according to the settings in the action list (the lower list).

Setting up filtering and actions

- Click the Add Line buttons to add lines to the filter condition list or action list.
  To remove a line, click it to select it and click the Delete Line button to the right.

- Clicking the columns in the filter condition list opens pop-up menus allowing you to specify the conditions to match.

- Clicking the columns in the action list opens pop-up menus allowing you to specify what should be done to the found events (when Transform mode is selected).

  For detailed descriptions of the filter conditions and action columns, see .

- Clicking the Init button will reset the selected module, removing all filter condition and target list lines.

- The settings are active as soon as you activate an Active Module checkbox.
  The settings made in the activated modules will affect all MIDI data you record on the track.

- **Closing the Input Transformer window does *not* turn it off – you need to deactivate all Active Module checkboxes for this!**
  A lit Input Transformer button in the Inspector indicates that one or more modules are active.

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