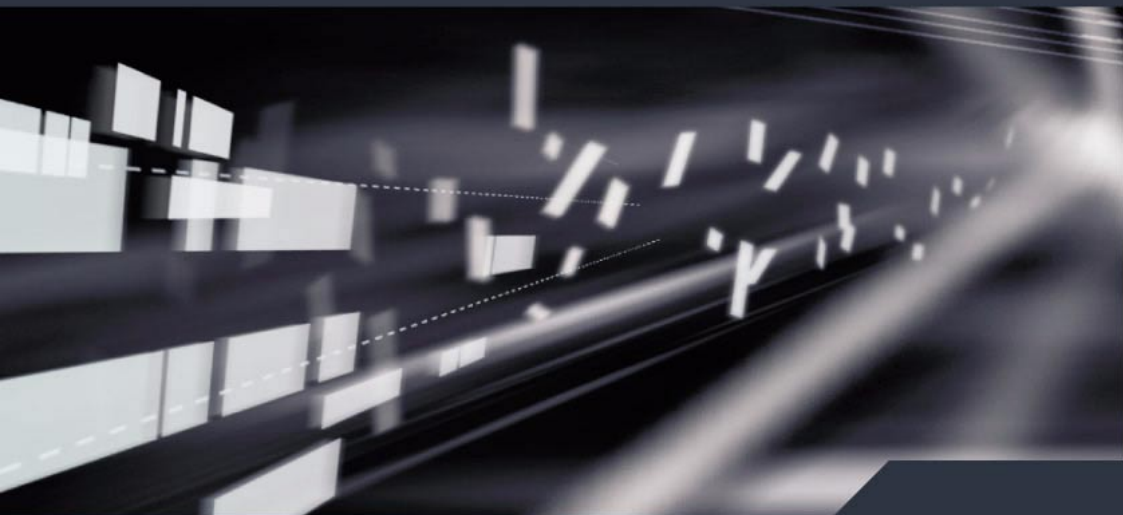


## MIDI Devices and Features

# Cubase • SX/SL 3

MUSIC CREATION AND PRODUCTION SYSTEM



Manual by Anders Nordmark

Quality Control: C. Bachmann, H. Bischoff, S. Pfeifer, C. Schomburg

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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.

But the MIDI Device Manager also features powerful editing functions that can be used to create MIDI device panels (Cubase SX only). MIDI device panels are internal representations of external MIDI hardware, complete with graphics. The MIDI device panel editor provides all the tools you need to create device maps where every parameter of an external device can be controlled and automated from inside Cubase SX.

For descriptions of how to create device maps and the powerful device panel editing features, see [page 20](#).

# 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 SX/SL. 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 SX/SL, 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

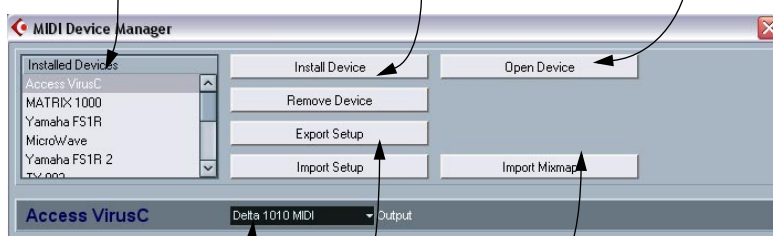
Select MIDI Device Manager from the Devices menu to bring up the following window:

SX:

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.

This button opens a selected device.



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

These buttons are used to import/export XML Device setups.

This button allows you to import Mixmaps.



SL:

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

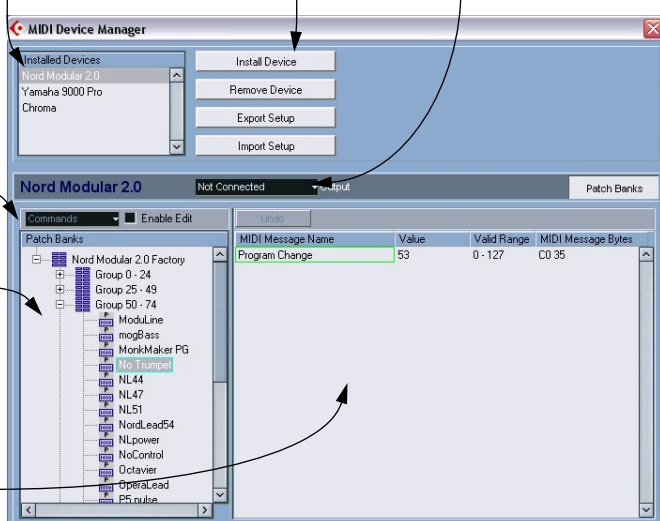
These buttons let you manage the list of installed devices.

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.

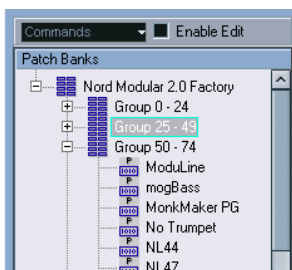
Now the device appears in the Installed Devices list to the left.

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. If you are using Cubase SX, click the Open Device button.

Now a separate window opens for the selected device, showing a node structure in the left half of the window. At the top of this structure is the device itself, and below it the MIDI channels used by the device.

6. 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.

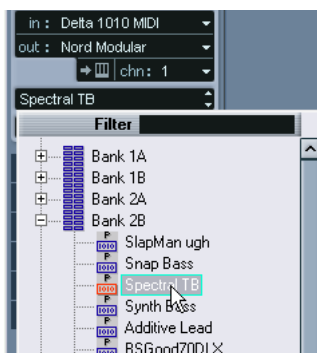
Channel 1	Presets
Channel 2	Presets
Channel 3	Presets
Channel 4	Presets
Channel 5	Presets
Channel 6	Presets
Channel 7	Presets
Channel 8	Presets
Channel 9	Presets
Channel 10	Presets
Channel 11	Presets
Channel 12	Presets
Channel 13	Presets
Channel 14	Presets
Channel 15	Presets
Channel 16	Presets

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. If you are using Cubase SX, click Open Device.  
Make sure that Patch Banks is selected on the pop-up at the top of the window.
  3. Activate the Enable Edit checkbox.  
When this is turned off (default) you cannot edit the pre-configured devices.
  4. 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.
  5. Click on the selected patch in the Patch Banks list to edit its name.
  6. Type in the new name and click OK.
  7. 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. This is handled slightly differently for Cubase SX and Cubase SL:

Cubase SX:

1. In the MIDI Device Manager, click the Install Device button.  
The Add MIDI Device dialog appears.
2. Select “Define New...” and click OK.  
The “Create New MIDI Device” dialog appears. For a description of all the options in this list, see [page 18](#).
3. Activate the MIDI channels you would like the device to use in the “Identical Channels” list.  
This means that the device will receive Program Change over any MIDI channel. Identical and Individual channels are described on [page 18](#).
4. Enter a name of the device at the top of the dialog, click [Enter] and then OK.  
The device appears in the Installed Devices list.
5. Select the device in the list and click on the Open Device button.  
The device node structure for the device is shown.
6. Select Patch Banks from the pop-up at the top of the window.  
As you can see, the list is currently empty.
7. 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.

Cubase SL:

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**

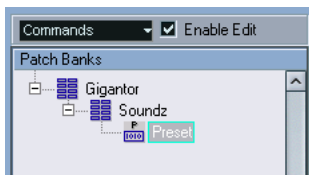
Creates a new bank at the highest hierarchical level of the Patch Banks list. You can rename this by clicking on it and typing a new name.

### **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:

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

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- 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].

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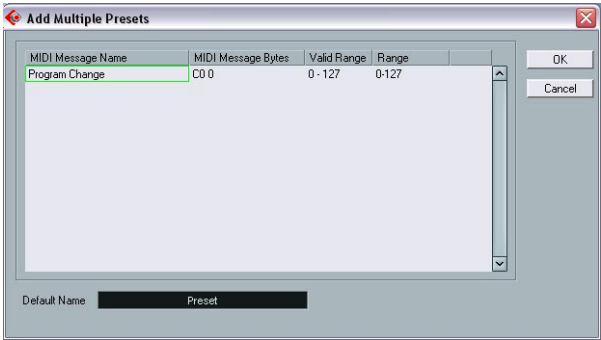
**Different devices use different schemes for Bank Select. When you insert a Bank Select event, you should check the device's documentation to find whether to choose "CC: BankSelect MSB", "Bank Select 14 Bit", "Bank Select 14 Bit MSB-LSB Swapped" or possibly some other option.**

---



## 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.



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**

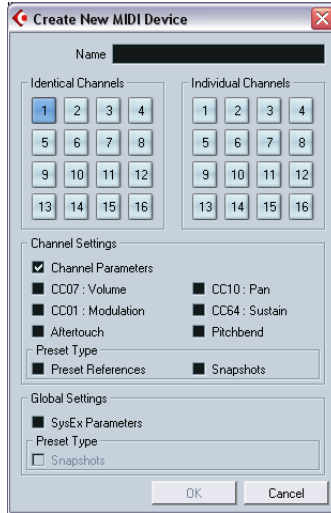
- You can move presets between banks and folders by dragging them in the Patch Banks list.
- You can remove a bank, folder or preset by selecting it in the Patch Banks list and pressing [Backspace].
- If you specify more than one bank, a Bank Assignment item will be added to the pop-up menu at the top of the window. Use this to assign banks to the different MIDI channels (see [page 11](#)).

### **The Create New MIDI Device dialog**

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

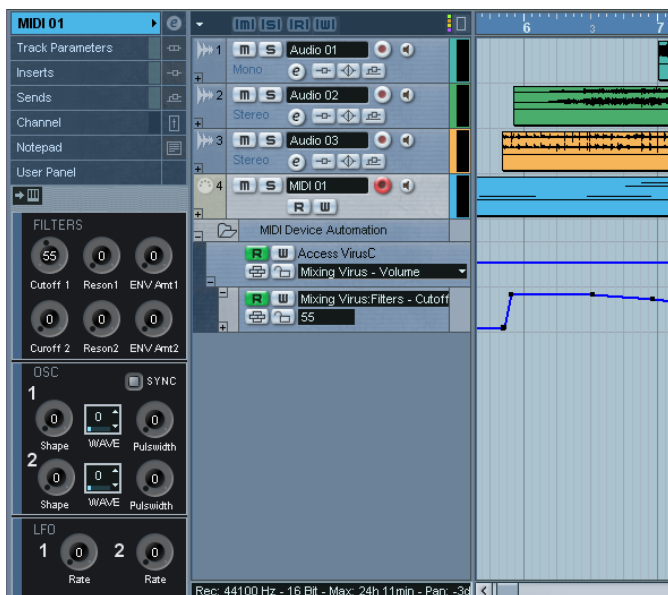
- **If you are using Cubase SL, this is where you can enter a name for the new device and specify which MIDI channels you want the device to use.**

- If you are using Cubase SX, the dialog contains the following settings:



Item	Description
Identical/Individual Channels	Here you can specify which MIDI channels you wish the device to use. Identical channels share channel settings and parameters, whereas Individual channels are "exclusive". An example for this are GM/XG devices – in these devices, the channels are all identical, except channel 10, which is always the drum channel.
Channel Settings	This specifies which MIDI messages should be supported by the MIDI device (for each Identical channel).
Preset Type	Preset References contain the patch name and a corresponding MIDI message (typically Program Change/Bank Select). Snapshots also contain a patch name but in addition complete parameter settings, which are reset when such a preset patch is recalled.
Global Settings SysEx Parameters	Activate this checkbox if you wish the device to use System Exclusive messages.
Global Settings Snapshots	This specifies whether the device supports global snapshots, which memorize all parameters in a device.

# About Device panels (Cubase SX only)



On the following pages we will describe how to use MIDI Device panels and the powerful MIDI device panel editing features of the MIDI Device Manager.

## Basic concept

The panel editing features in the MIDI Device Manager can be seen as a separate application or entity within Cubase SX. It allows you build device maps complete with control panels, with all parameters controllable from within Cubase SX. Building more complex device maps requires that you are familiar with SysEx programming (see [page 53](#)). But you can also create simpler panels by assigning MIDI Control Change messages to control objects, which does not require any programming skills.

Although these powerful editing features are there if you need them, you do not have to use them to use MIDI devices.

Seasoned Cubase users may recall the MIDI Mixer, which allowed you to create similar control setups, called Mixer maps. Third-party developers created Mixer Maps for hundreds of popular devices at that time.

But in Cubase SX the concept has been taken to a higher level, offering a much deeper and more intuitive integration of the control features in the program.

## Overview (Cubase SX only)

### Device panels in the program

In this section we shall take a look at a pre-configured MIDI device panel to illustrate how it can be used in Cubase SX. Several device setups complete with panels are included with the program.

- On the PC, these are located in the “Device Maps” folder inside the application folder.
- On the Mac they can be found in the following location: (Startup Volume)/Library/Application Support/Steinberg/Cubase SX 3/Device Maps.

### Opening a device setup

Proceed as follows to open a MIDI device setup:

1. Open the MIDI Device Manager from the Devices menu.
2. Click the “Import Setup” button.

A file dialog opens, where you can select XML files (the file format used for device setups) for import by navigating to the Device Maps folder (see above).

- When you select a device setup XML file and click Open, the Import MIDI Devices dialog appears where you can select a device for import. A device setup file can contain one or several MIDI devices.



- When you select a device and click OK, the device is added to the list of installed devices in the MIDI Device Manager. Select the correct MIDI output from the Output pop-up menu, select the device in the list and click "Open Device".

The device control panel opens in a separate window. The Edit ("e") button at the top opens the Edit Panel window, the main edit window, see [page 31](#).



A device control panel representing an Access Virus synth.

5. Close the Device panel and return to the Project window.
6. Select the device from the “Out” pop-up menu for a MIDI track.  
Note that for some devices, you may have to set the MIDI channel to “ANY”.  
Now the Device panel can be opened by clicking the Open Device button in the Inspector or in the channel strip for the corresponding track in the Mixer.

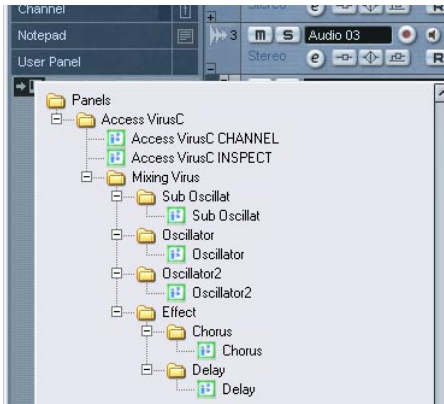


- Note that [Ctrl]/[Command]-clicking the Open Device button allows you to open a subpanel via the panel browser pop-up menu.

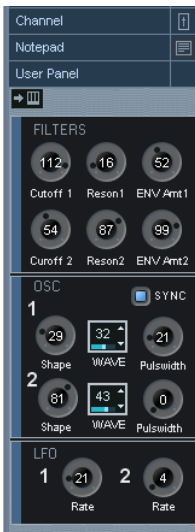
## Showing panels in the Inspector

1. In the Inspector, open the User Panel tab and click on the User Panel icon.

A “Panels” folder is shown with the selected device in a node structure below it. If you open all the folders, you can select any individual panel from the device that “fits” into the User Panel space.



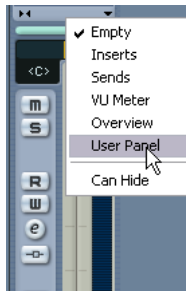
- Select a panel by double-clicking it in the list. The panel opens in the Inspector.





## Showing panels in the Mixer

1. Open the Mixer, and make sure the extended channel view is shown.
2. Open the View options pop-up for the MIDI channel connected to the device and select “User Panel”.



3. Click the icon shown in the extended section of the channel strip.  
The Panels folder is displayed like in the Inspector, but with different available panels. Just like in the Inspector, the panel has to “fit” into the available space to be selectable.
4. Double-click to select a panel.  
The panel is now shown in the extended section of the channel strip.



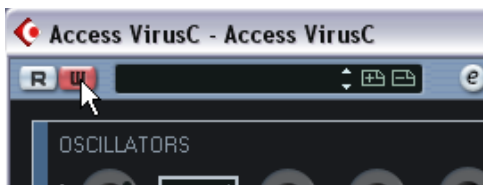
## Automating device parameters

Automation works just like for normal audio and MIDI tracks:

1. Open the device control panel by clicking the “Open Device” button in the Inspector.



2. Activate Write automation on the device panel.



3. If you now go back to the Project window, there will be a MIDI Device Automation track in the Track list.

If you click in the name field, all parameters in the device are shown and can be selected for automation. You can automate the device by either moving knobs and sliders on the control panel itself or by drawing curves on the automation track for a selected parameter.



# The main edit windows (Cubase SX only)

To edit device panels you use two main windows; the Device window and the Edit Panel window. In this section we will describe the main working areas of these edit windows, and what they are used for.

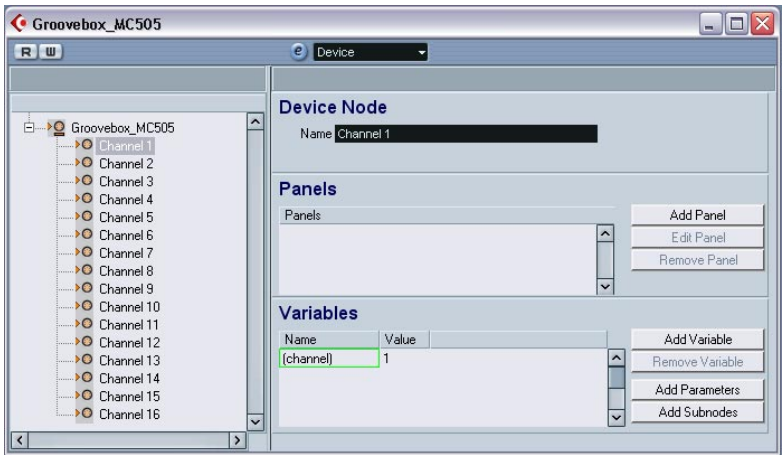
## The Device window

1. Select a device in the Installed Devices list in the MIDI Device Manager dialog and click Open Device.

The Device window opens with a node structure in the left half of the window. In this example, the top node represents the device and the subnodes the MIDI channels used by the device.

2. Click on a node.

Now three areas appear in the main window: Device Node, Panels and Variables.



The Device window.

## Device structure

On the left is a hierarchical view of the device's structure, which can consist of nodes, subnodes and parameters. By default, the structure of a newly created device (or a device with no panels added yet) will either be based on the MIDI channels that have been activated in the Create New Device dialog (see [page 18](#)), or as in this case, one of the preset devices, which all have the same structure (all 16 MIDI channels activated).

## Device node

This shows the name of the selected node. You can rename some or all nodes, for example if the device is a typical GM-compatible synth you may want to rename "Channel 10" to "Drums".

## Panels

In the Panels window area a list of panels assigned to the selected node will be shown (currently no panels are assigned).

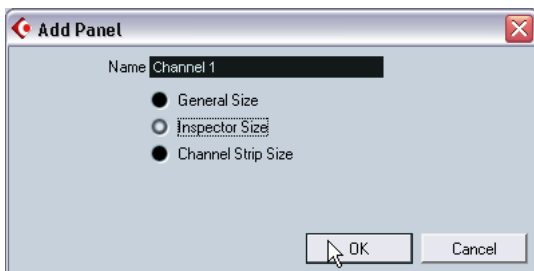
- The "Add Panel" button opens the Add Panel dialog, see [page 30](#).
- When an existing panel is selected in the Panels window area, the "Edit Panel" button will open the panel for editing in the Edit Panel window, see [page 31](#).

## Variables

- The "Add Variables" button lets you define variables. Variables are useful when you're working with multiple instances of the same panel. A typical example is when you have a multi-timbral synthesizer with 16 parts, where each part is identical in terms of features and functions, and all that distinguishes them are the MIDI channel numbers. So you create multiple subnodes where the variable is named "part" and the variable range is 1-16. This way you can repeat the same objects and parameters across all parts.

- The “Add Parameters” button opens the “Add Parameter” dialog where you define the parameters that will be used in the Panel. A parameter defines how the setting of the connected device can be modified, what the valid range is and what the current state of the parameter is. Parameters are assigned to objects (see [page 32](#)), i.e. knobs, faders, switches or data entry fields on a panel.
- The “Add Subnodes” button lets you create subsidiary nodes. This is useful when you wish to create multiple panels for one node. When you build a device panel you may want to break it up in several parts, or “subpanels” – e.g. one for the Envelope section, one for the Filter section and so forth. By creating all panel sections under separate subnodes, you can show the different sections in the Inspector or channel strip. From these subpanels you can later build a large main panel using the subpanels.

## The Add Panel Dialog

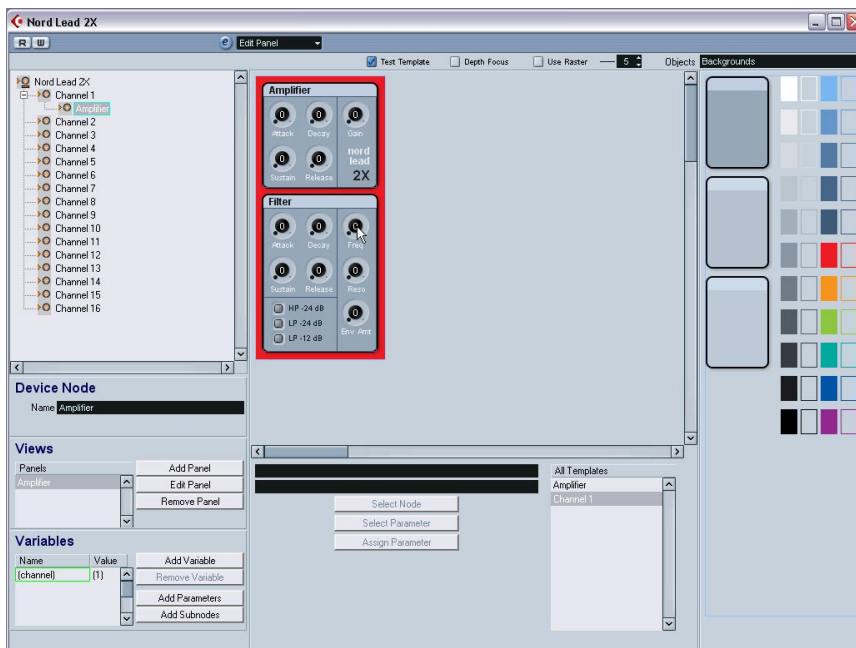


Clicking the “Add Panel” button in the Device window opens a dialog where you select the size and enter a name for the new panel. You have three default sizes to choose from:

- **General Size (352\*352 pixels by default).**  
This is the largest view, which is to be used in a separate Panel window. The size is customizable, as you often need more than 352 by 352 pixels to fit all controls of an entire instrument into one screen.
- **Inspector Size (157\*342 pixels).**  
The standard size for a Panel to be used in the Inspector.
- **Channel Strip Size (84\*322 pixels).**  
The standard size for a panel to be used in a Mixer channel strip.

## The Edit Panel window

After selecting a name and a panel size in the Add Panel dialog, click OK to open the Edit Panel dialog. When a panel has been added you can switch between all edit windows (Device/Edit Panel/Patch Banks) by using the pop-up menu at the top of the window for an open device.



The Edit Panel window contains the following sections:

### Device structure (top left)

This is the device “tree” where you can navigate the device structure and its nodes, subnodes and parameters. This is the same as shown in the Devices window.

### Edit area (top middle)

This is the “stage” where you build the panel from various object components. Above the edit area are the Panel Edit settings which affect the operations you perform in the edit area.

## Objects area (right)

This area contains the predefined objects which can be dragged and dropped into the edit area. At the top of this area there is a pop-up menu where you can select Object categories; backgrounds, faders, knobs, data entry, switches and labels, see [page 33](#).

## Device item properties (bottom left)

This contains all data and options pertaining to the currently selected node, subnode or parameter.

- When a node or subnode is selected in the device structure, you can rename it and add or remove parameters, variables and subnodes.
- When a parameter is selected in the device structure, you can edit its name, value and transmission type (Control Change or SysEx messages).

At the top you can see and edit the node name. In the Views area, you see the list of panels assigned to the current node. Using the buttons to the right of the list, you can add a new (blank) panel to a node, and edit or remove an existing panel. The way to reach a particular panel or subpanel is to select a node in the device structure area, and then select the desired panel in the Views window area. If you click the Edit Panel button, the panel will open in the edit area.

- It is also possible to drag a subnode's panel from the "Views" area into the panel of a parent node.

## Control to parameter assignment (bottom middle)

This is where you couple parameters with controls. Once you have added a control object (knob, data entry, fader or switch), you can either edit its parameter options directly, or – if you have defined parameters already – assign any of those parameters to your new control by first selecting the control, then selecting a Parameter in the Device structure area, then clicking on the Assign Parameter button.

## All Templates list (bottom right)

As panels are created, they are added to the All Templates list.

- You can switch between templates, copy objects that you need, switch back to the Panel you're currently editing and paste the objects into that panel.



## The available objects

On the Objects pop-up in the top right corner you can select between object categories. Faders, knobs, data entry and switches are control objects, i.e. you have to define a parameter assignment to them when inserted into the edit area, whereas labels and backgrounds are only graphic elements. The object categories are as follows:

Object category	Description
Backgrounds	Here you can select various background colors and borders.
Faders	There are four basic horizontal and vertical fader/slider types, each with three options: basic, with title field, and with title field and min-max values.
Knobs	Various types of knobs, with and without title fields and min-max values.
Data entry	Various types of data entry fields for entering values. There are data entry fields for direct entry, and data entry types for using up/down arrows or sliders (or both) to set values.
Switches	Switches can only send two values. There are three basic types of switches: on/off, momentary and one shot. Momentary switches change to the second value as long as the switch is pressed and revert back when released. One shot switches activate a command, e.g. resetting a value to a default value.
Labels	Labels of various sizes and styles.

# Operations in the Edit Panel window (Cubase SX only)

On the following pages, we will describe the basic operations in the Edit Panel window. For a more “hands on” description of how to create panels, see [page 39](#).

## Creating a panel

1. Either create a new MIDI Device (see [page 14](#)), or select a preset device from the Add MIDI Device dialog, see [page 29](#).
2. In the MIDI Device Manager dialog, select the device in the Installed Devices list and click the “Open Device” button.

Now the Devices window opens with the Device structure to the left.

3. Select the node, subnode or parameter you wish to add a panel to.
4. Click the Add Panel button, and select a name and size for the panel, see [page 30](#).

The Edit Panel window opens.

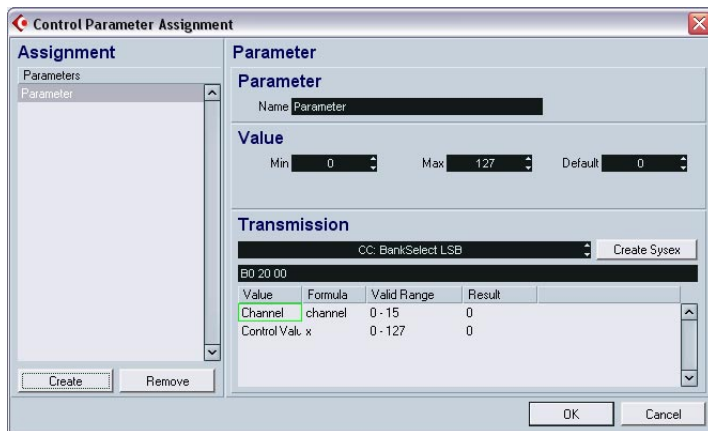
When you have created a new panel you will see a light blue rectangle which defines the size of the Panel. When you click on the rectangle, resize handles will appear. These allow you to customize the Panel size.

- If you are creating a specific Inspector or Channel Strip panel you should not resize the panel.

## Adding objects and assigning parameters

You build a panel by dragging objects from the Objects area on the right hand side of the window into the rectangle in the edit area.

When you add graphic objects (backgrounds and labels) these are simply added to the edit area, but when you add control objects (switches, faders etc.), the Control Parameter Assignment dialog appears:



In this dialog you can create and define a name for the parameter and set the parameter value range and a transmission message (see below). When you have set up the parameters as desired, click OK to close the dialog.

## Parameter value

In the “Min” and “Max” fields you can set the value range for the parameter. The Default value determines what the value will be when you open the device.

## Transmission

Here’s where you set the parameter assignment. Clicking in the value field opens a pop-up menu where you can select either “Channel Messages” i.e. MIDI Control Change messages, or SysEx messages.

If you wish to create custom SysEx messages, click the “Create Sysex” button to open the respective dialog.

For information on SysEx and SysEx editing, see [page 53](#) and the chapter “[Working with System Exclusive messages](#)”.

## Object handling

### Selecting objects

You select an individual object by clicking on it.

- Select multiple objects by pressing [Shift] and clicking on each object in turn.
- You can also click in an empty area and drag a selection rectangle around one or more objects, to select them.

### Moving objects

Simply click-drag an object to a new location and drop it.

- You can also use the arrow keys to move a selected object one pixel horizontally or vertically.
- If you press [Shift] the arrow keys will move the object in steps of 10 pixels.

### Using cut/copy/paste

You can use standard key commands ([Ctrl]/[Command]+[X], [Ctrl]/[Command]+[C], [Ctrl]/[Command]+[V]) or the corresponding Edit menu items to cut, copy and paste selected objects.

### Deleting objects

Select any object(s) and hit [Backspace] or [Delete] or select “Delete” from the context menu.

### Resizing objects

Click on any object to make resize handles appear. Click and move the handles to resize the object.

### Sending objects to front/background

Select an object and right-click/[Ctrl]-click to bring up the context menu.

- Choose “To Front” to make the selected object the topmost one.
- Choose “To Background” to place the object behind all other objects.

## Editing text

Double-click on any text (text object or text label on a control object) and enter the text.

## Aligning objects horizontally/vertically

Select multiple objects, then right-click/[Ctrl]-click to open the context menu.

- For horizontal alignment, your options are Left, Centre and Right.
- For vertical alignment, you can choose Top, Middle and Bottom.

## Spacing objects evenly

Select multiple Objects and open the context menu. Select “Space Evenly Horizontally” or “Space Evenly Vertically” to place the objects in a row or column with identical distances between the objects.

## Making objects the same size

Select multiple Objects and resize one of them. All selected Objects will be resized in accordance with the source Object.

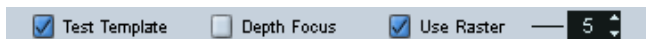
## Import Bitmap

You can use bitmaps (pictures) as backgrounds as well. Open the context menu and select “Import Bitmap...”. You can import custom bitmaps in the following formats: PNG (Portable Network Graphics), PSD (Photoshop) or BMP (Windows bitmap).

## Edit Object Parameter

Double-click on a control object (knob, fader, data entry, switch) to open the Control Parameter Assignment window. In this window you can also assign previously defined parameters to an object by choosing one from the Assignment list, or create new parameters.

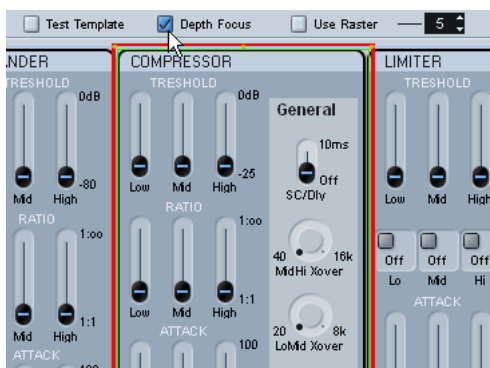
## Panel Edit Settings



### Test Template

Puts the currently edited panel into live test mode. All controls will be fully functional, transmitting MIDI data to the device. Activate this mode when you want to try out the panel to make sure that all parameters are set up correctly. You cannot edit objects while in test mode, so make sure to deactivate Test Template when you're done testing.

### Depth Focus



This is useful when editing very complex panels, or panels featuring nested views (subpanels). By enabling Depth Focus, you get a red rectangle around the area whose level is currently in edit focus. By double-clicking inside a subpanel, the red rectangle will mark the boundaries of the subpanel and you can only edit objects inside the focus area. For each double-click you go down one level. To go up one level, press [Return].

### Use Raster

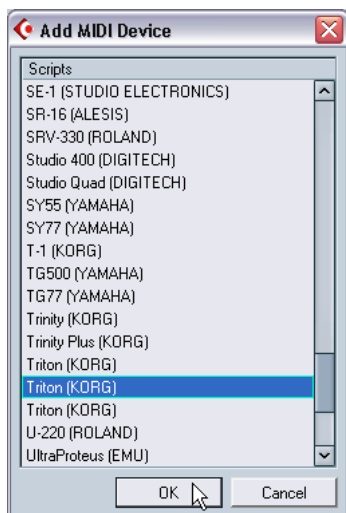
This activates an invisible grid that objects will snap to when moved. The value (5 by default) dictates the resolution of the grid. With a value of 20, the raster will be made up of squares of 20\*20 pixels in size. The raster is anchored in the top left corner of the actual panel (not in the edit area).

# Building a control panel – a tutorial (Cubase SX only)

In this tutorial we will create a simple control panel for a device:

1. Open the MIDI Device Manager window, and click the Install Device button.

Here you can choose from a list of pre-defined devices, or define a custom device. In this example we will use a Korg Triton preset.



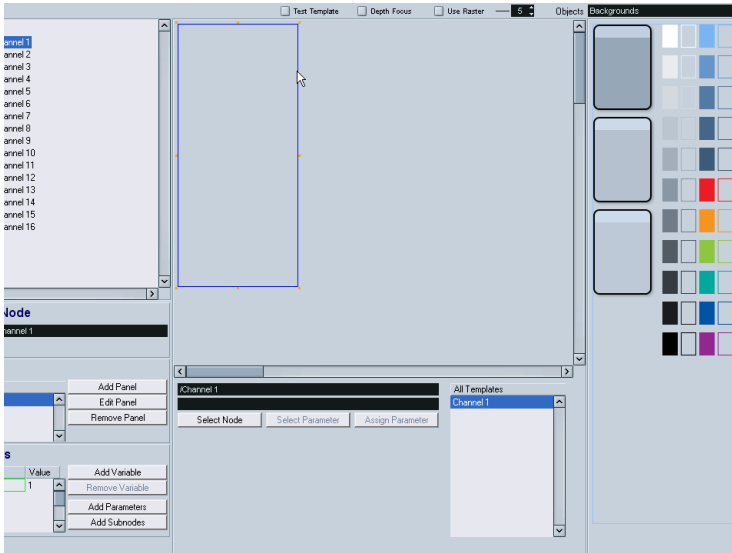
2. Once you have installed the Triton device, select it by clicking on its name in the Installed Devices list and click the “Open Device” button.

Now you will see the Device structure to the left of the window. In this example, we will select Channel 1.

3. Select the Channel 1 node and click the Add Panel button.

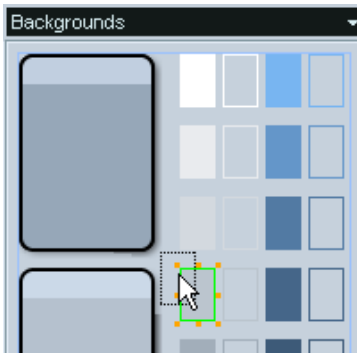
Now you can set a size for the panel - see [page 30](#) for details.

4. For this tutorial, select “Inspector size” and click OK.  
The main Panel Edit window will now open. The blue rectangle is the panel edit area.



Now you can begin adding objects to the Panel. Let's start with a suitable background. Backgrounds are selected from the area to the right of the edit area.

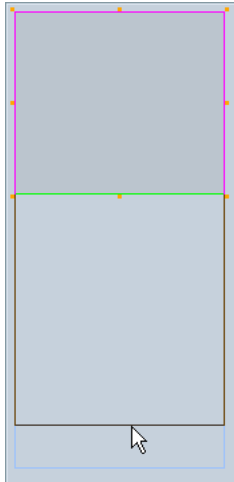
5. Drag a background object into the blue rectangle (in the edit area) and release the mouse button.





Once an object is selected you can adjust its size to your liking using the resize handles.

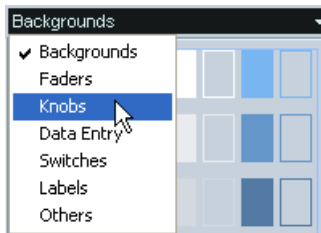
6. Stretch this background so that it covers the entire Panel area.



All objects, both backgrounds and other, can overlap. By right-clicking/ [Ctrl]-clicking the object you can bring up a context menu with the items “To Front” and “To Background”. If you select an object and then select “To Front”, it will become the foremost object (while “To Background” results in the opposite). This is useful when you’re dealing with backgrounds, labels and controls sharing the same panel space.

Now that the panel has a background, we can move on to control objects.

7. Select “Knobs” from the Objects pop-up menu.  
This brings up an assortment of rotary knobs.



8. Select one and drag it into the panel.

Once you have dropped a control into the edit area, the Control Parameter Assignment dialog will open. In this window you can define the parameters and other data pertaining to the control.

9. Click the Create button in the bottom left corner.

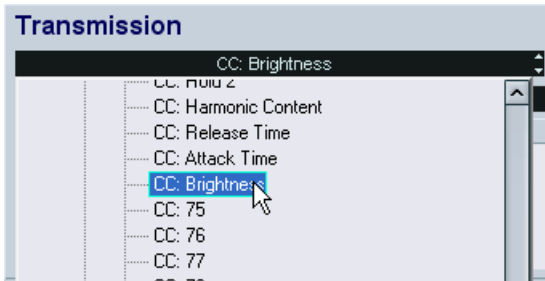
10. Enter a name.

Note that this is not the name of the control object itself, but the name of the actual parameter, an item which exists independently from objects. A logical and intuitive naming convention will help!

Now it's time to select the Control Change number in the Transmission field. At this point it may be required to consult the MIDI Implementation Chart of the device you're creating the panel for.

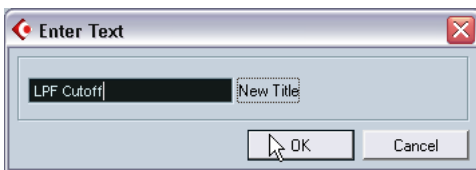
In the case of Korg Triton, we find that LPF Cutoff corresponds to Control Change 74, "Brightness".

11. Select Brightness from the Transmission pop-up menu.



12. At this point we're done with the Parameter window, so just click OK.

13. If the Knob type you have chosen has a text label, you can edit this by double-clicking on the label under the knob. Enter an appropriate Title in the window that appears.



Now the Knob is finished, and we can use it as a starting point for additional Knobs.

**14.**Select the knob and select Copy from the Edit menu.

**15.**Select Paste from the Edit menu to paste in another instance of the knob.

A pasted object will be placed at the same coordinates as the original object. Use the arrow keys or the mouse to move the new knob to an empty space.

Since the new knob needs a different name and a different parameter assigned to it, we need to do some editing:

**16.**Double-click on the copied knob to open the Parameter window.

Here you will notice that the assigned Parameter is LPF Cutoff (the only parameter we've created so far).

**17.**Click the Create button again to define a new Parameter, "Resonance".

**18.**Enter this name in the Parameter name field.

According to the Triton MIDI Implementation Chart, Resonance corresponds to Controller 71 (CC: Harmonic Content).

**19.**Select controller 71 (CC: Harmonic Content) from the Transmission pop-up menu and click OK.

**20.**Double-click on the name Label to edit the label text.

**21.**Enter "Resonance" and click OK.

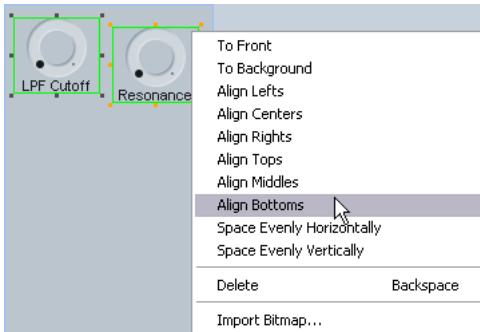
Done! Now you have two knob controls with different parameters assigned to them.

You may find that the Knobs aren't properly aligned, horizontally and/or vertically. The Panel editor can assist you with this.

**22.**Press [Shift] and click on both knobs to select them.

**23.** Right-click/[Ctrl]-click to open the context menu, and you will see a range of alignment and spacing commands.

In this case we're interested in vertical alignment, so we'll choose **Align Bottoms**.



Now the bottom edges of the two Objects are aligned vertically.



We're going to create two more control knobs, but this time we'll define the parameters first. As stated earlier, parameters exist independently from objects and can be created in a separate process, which is useful when you have the MIDI Implementation Chart in front of you anyway.

In the main window of the Editor, below the Device “tree” (known as the Device structure), you'll see an area called Variables. In this area you'll find the Add Parameters button.

**24.** Click this to open the Parameter window and create two new parameters, “EG Intensity” (CC 79) and “EG Release” (CC 72).

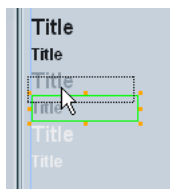
- 25.** When you're done, duplicate the two existing knobs and place the copies in an empty space.

You can select multiple knobs and use the alignment and spacing commands to get all the controls in neat and tidy rows and columns.



These four Knobs are known as “Realtime Controls A” on the Korg Triton. It might be a good idea to add a Title Object to this group, for easy identification.

- 26.** Switch to Labels on the Objects menu, pick a title object and drag it to the edit area.



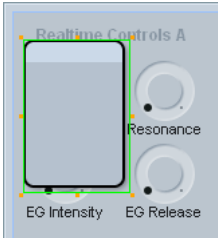
- 27.** Double-click on it, enter “Realtime Controls A” in the text dialog and click OK.



It's starting to look good, but perhaps we should add some kind of frame around this group of controls to distinguish them from others.

- 28.** Go back to Backgrounds on the Objects menu and drag one of the backgrounds to the edit area.

Since the most recently added object automatically ends up on top of all others, we must rearrange the order here.

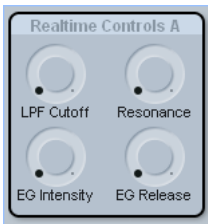


- 29.** Select the object you just added, then right-click/[Ctrl]-click to open the context menu.

- 30.** Choose “To Background” – this will send the object to the back.

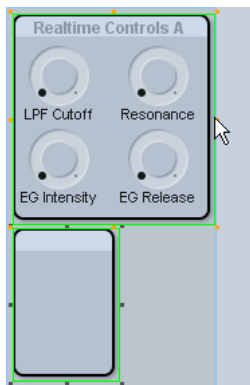
At this point the Object is no longer visible, simply because it ended up behind the large grey Background that we added in the beginning.

- 31.** To solve this problem, click on the grey background to select it, then open the Context menu again and select “To Background” once more. Now the Objects are in the correct order, and you can go on to resize the additional Background so that it encompasses the Title and the knobs.



Now let's create a second group of controls.

- 32.** Drag another Background like the one we just added and drop it in the empty space below the existing group.



- 33.** To make the new background the same size as the first one, press [Shift], select both objects and then use the resize handles of the original object.

The second object will assume the same height and width as the first.



The obvious thing to do now is to make the second group “Realtime Controls B”, but since we’ve gone over rotary knobs already let’s try a few other Korg Triton controls.

The Triton has a slider called “Value” (commonly known as a data entry slider), whose function is doubled by two buttons, increase and decrease. To mimic these controls we need a Fader and a Data Entry object.

- 34.** Switch to Faders on the Objects menu, then drag and drop a vertical fader into the edit area.

The Parameter window appears.

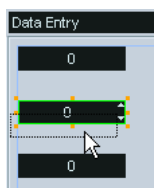
- 35.** Create a new Parameter called “Value” (CC 18, General Purpose 3).

To edit the “min” and “max” labels on the fader, double-click on each label and enter “0” and “127”, respectively.



- 36.** Select Data Entry from the Objects menu.

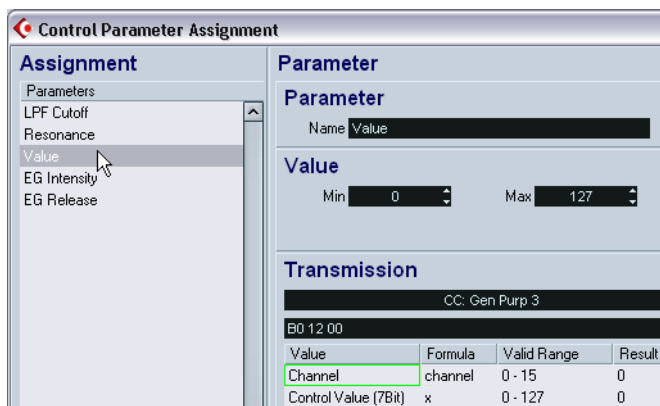
- 37.** Pick one of the objects featuring up/down arrows and drag it to your Panel.



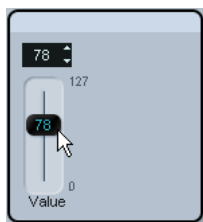
In the Parameter window that pops up, don't create a new parameter.



38. Instead, click on the previously defined Parameter “Value” in the list and then click OK.



When the same Parameter is assigned to two or more controls, the Controls become linked so that when you move one of them, they all follow.



We're almost done. Let's add a couple of switches as well.

39. Select Switches from the Objects Menu and drag a switch from the On/Off subcategory to the edit area.

Unlike faders, knobs and data entry objects, the switches can only send two values. Normally, hardware controls that function like Switches only respond to 0 and 127, or 0 and 64. The Min and Max values in the Parameter window correspond to the two alternate states (on/off) of the switch.

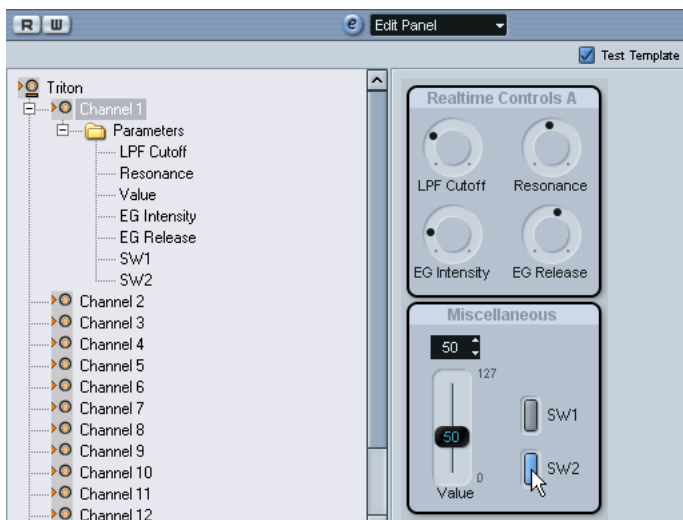
The Korg Triton's realtime controls SW1 and SW2 respond to CC 80 (General Purpose 5) and CC 81 (General Purpose 6), respectively.

- 40.** Define the two Parameters and assign them to the switches, SW1 and SW2.

Now we're nearly there, but before we might want to test it.

- 41.** Activate the test mode by checking the "Test Template" option at the top of the edit area.

This will make the Panel "go live" and transmit MIDI data over the output port when you move the controls.

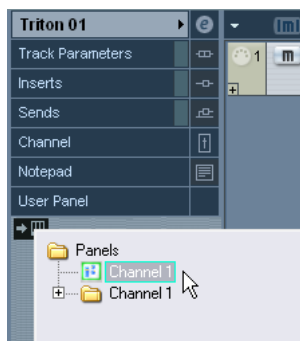


If everything appears to be functioning OK, we can consider the Panel completed, and it's time to start using it!

- 42.** Click the Exit button on the Panel Edit window, and click Save in the dialog that appears.

To use the new panel in the Inspector, go back to the main Project window, create a MIDI track and assign its output to the device the panel was made for, i.e. Triton.

- 43.** Now click the User Panel tab at the bottom of the Inspector.  
Click the button to open the Device structure and choose the appropriate panel.



Done! Now the device panel is displayed in the Inspector and ready for automation recording.



## Exporting and importing device setups (Cubase SX only)

Clicking the Export Setup button allows you to export your complete MIDI device setup as a separate XML file. The file can then be imported using the Import Setup button. This is useful if you move to another studio, install the program on a new computer, etc.

- **When you import a stored setup with the Import Setup function, a dialog will appear, listing all devices included in the stored setup.**  
Select the device(s) you wish to import and click OK.
- **Importing will not overwrite any currently installed devices.**  
If the current list contains a device with the same name as a device to be imported, a number will be added to the name of the imported device.

# Defining a SysEx device – a tutorial (Cubase SX only)

On the following pages, the basic concepts of the MIDI devices are described, so that you will be able to create your own ones later.

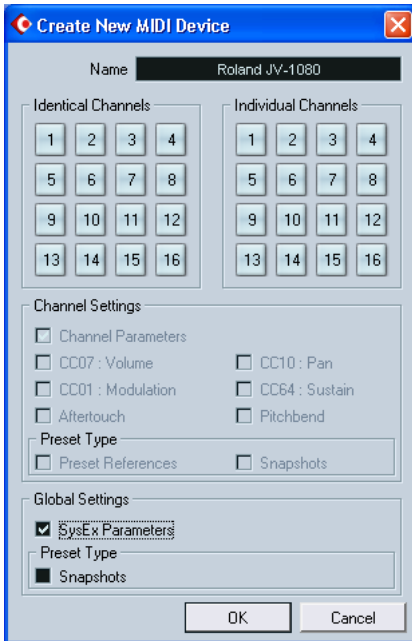
If you want to define a SysEx device, it is absolutely vital that you have the manual for the hardware device, which describes its MIDI definitions. Usually, these settings are described on the last few pages of the manual: watch out for small letters and lots of tables referencing each other. If the MIDI definitions are not provided in the manual for your device, you should search on the manufacturer's website for the necessary documentation.

It is often necessary to convert hexadecimal numbers to decimals and vice versa, so you'd better have a translation-table or a calculator (that is able to make this conversion) ready. Under Windows, you can use the calculator found under Start/Programs/Accessories.

In the following example, we will define a MIDI device that provides access to the parameters of a Roland JV-1080.

1. To create a new MIDI device, pull down the Devices menu, open the MIDI Device Manager and click on "Install Device".
2. In the dialog that appears, select "Define New..." and click OK.

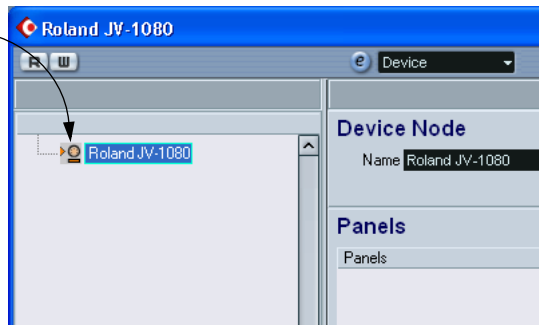
3. The Create New MIDI Device dialog appears. Set it up as shown in the following picture:



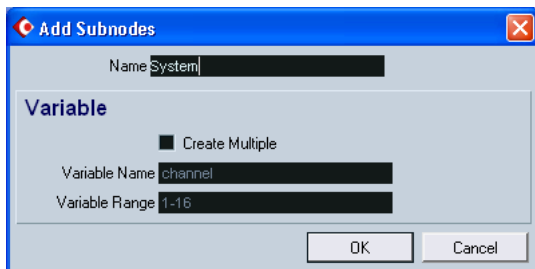
4. Click OK.

Now, the device editor will open with an empty Roland JV-1080 device displayed to the left.

This is the “root” of the device, which stands for the device as a whole.



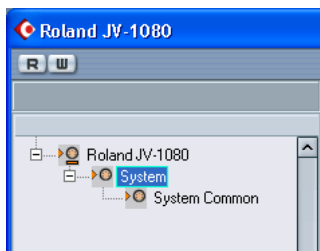
- Now, you need to create subsections (Device Nodes) for the device. Click the “Add Subnodes” button and in the dialog that appears, type in “System” in the Name field.



- “System” can be found as a separate table in the MIDI definition part of the JV-1080 manual. It’s almost always a good idea to create a separate device node for each table in the MIDI definition of a device.
- When you click OK, the new subnode is added in the device editor.



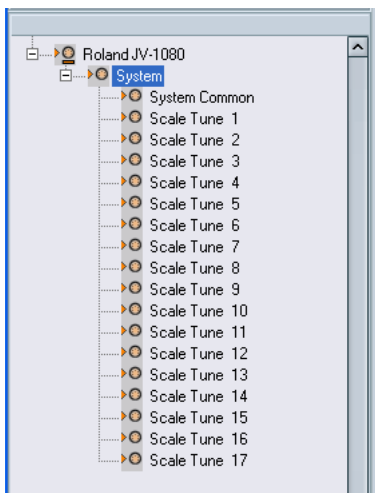
- Repeat the two steps above to create the subnode “System Common”, which is also a separate table in the MIDI Definition section in the JV-1080 manual and is referenced by the “System” table.



The “System” table contains 17 references to another table called “Scale Tune”. So we need to add 17 more subnodes, but this time, we will proceed differently: we’ll create 17 similar subnodes at once.

**8. Click the “Add Subnodes” button again.**

In the dialog that appears, enter Scale Tune as name, check the Create Multiple checkbox, enter “Part” as Variable name and set the Variable range to 1-17. When you click OK, 17 new subnodes are created:



The added subnodes all have a Variable called “Part”, set to different “Values”.

**9. Rename the subnode Scale Tune 17 to “Scale Tune Patch Mode” (according to the System table), by selecting the node and entering the new name in the Name field.**

All of these “Scale Tune” nodes behave like alias copies in many aspects (this is described later).

**10. Now you’ll create parameters for the “Scale Tune” nodes. Click the “Add Parameters” button.**

The “Add Parameters” dialog appears.



11. According to the MIDI definition, the “Scale Tune” table contains 12 parameters. All of them are named “Scale Tune for XX”, where XX stands for the different notes in an octave. The parameter range of these parameters is from 0 to 127 and all are set to the default value 64. Fill in the Name, Min, Max and Default fields accordingly. Next, activate the “Create Multiple” checkbox and set the Variable Range to “0-11”, which is the address range of the 12 parameters.

**Add Parameters**

**Parameter**  
Name: Scale Tune for

**Value**  
Min: 0 Max: 127 Default: 64

**Transmission**  
CC: BankSelect LSB Create Sysex  
B0 20 00

Value	Formula	Valid Range	Result
Channel	channel	0 - 15	error
Control Value	Control Value	0 - 127	0

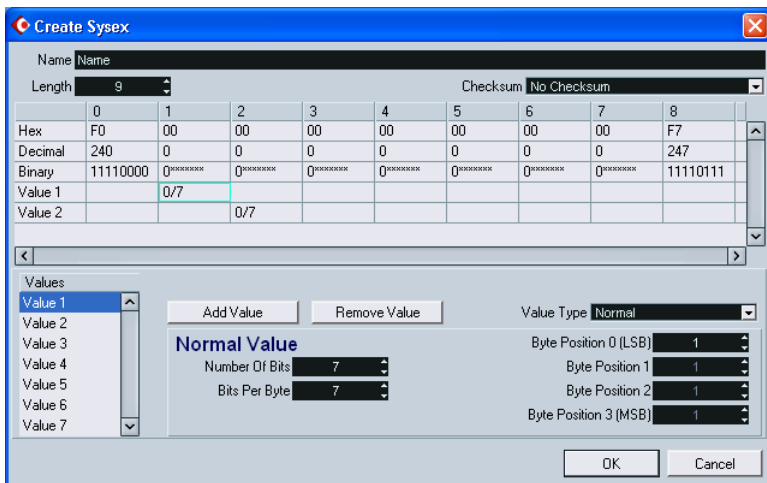
**Variable**  
☒ Create Multiple  
Variable Name: index  
Variable Range: 0-11

OK Cancel

- Some devices can be edited by MIDI channel messages like Control Change, RPNs or NRPNs. In that case you'd only have to select the desired message by clicking in the MIDI message field next to the Create Sysex button and browse for it. But that is not true for the JV-1080. You need to define the MIDI sysex message that allows you to access these parameters, therefore:

## 12. Click the Create Sysex button...

...and be prepared for a dive into the deep waters of ancient MIDI mythology. You'd better take a deep breath before...



...the "Create Sysex" dialog appears.

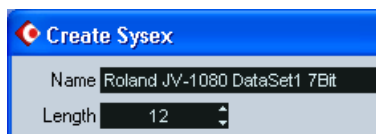
- In the MIDI definition part of the MIDI device's manual, you should be able to find sysex message definitions. Look out for messages that allow you to set individual parameters according to the tables mentioned earlier. In case of the JV-1080, you'll find this definition 1 or 2 pages before the tables. The message is called "Data Set1 (DT1)", which is a message that is used by many, if not all, of Roland's MIDI devices.

The next step is to translate this definition to the Create Sysex dialog.

## 13. Type in "Roland JV-1080 DataSet1 7Bit" in the Name field and select the checksum from the Checksum pop-up menu.

Now the number of bytes necessary for this message have to be evaluated. Looking at the table in the JV-1080 manual, do not be confused by the entry "...". It means that it is possible to transfer more than one MIDI byte (7bit) in the message in one go, by sending multiple data bytes. But right now you don't need this because about 99% of the device's parameters are in the range of up to 128 states, which can be transmitted with one data byte. So if you count the bytes, when using only one data byte you get a count of 12.

14. Enter "12" in the Length value box.



- It is important to set "Length" and "Checksum" at the beginning, otherwise you may need to do the additional steps again.

If you look at the sysex definition table, you'll notice upper and lower case letters in the "Status" column. Upper case letters stand for static hexadecimal numbers (indicated by the "H" suffix). Lower case letters stand for variable numbers that depend on the context. In the "Create Sysex" dialog, "Values" are used for these variable numbers. For the static ones, there is no need for "values", you can simply enter the respective number.

All System exclusive messages always begin with F0H and end with F7H, with an arbitrary number of bytes in between. This cannot be changed.

15. In our example, the first byte after that is "41H", which is static. Therefore, delete "Value 1" by selecting it and clicking on "Remove Value" and click in the position 1 field in the "Hex" row.

16. Enter "41".

You see that the number is automatically converted to decimal and binary format. You can also enter decimal or binary numbers by clicking into the appropriate rows.

	0	1	2	3
Hex	F0	41	00	00
Decimal	240	65	0	0
Binary	11110000	01000001	0xxxxxxx	0xxxxxxx
Value 2			0/7	
Value 3				0/7

17. Next is the "device ID" which is a dynamic value (depending on what is set as the "device ID" in the receiving JV-1080). Double-click on "Value 2" in the Values list and rename it to "DevID".

- 18.Reduce the number of bits to “4” and enter “10” in the Hex row at position 2, because the device ID ranges from 10H to 1FH.

	0	1	2	3	4	5	6
Hex	F0	41	10	00	00	00	00
Decimal	240	65	0	0	0	0	0
Binary	11110000	01000001	0000xxxx	0xxxxxxx	0xxxxxxx	0xxxxxxx	0xxxxxxx
DevID			0/7				
Value 3				0/7			

Values

- DevID
- Value 3
- Value 4
- Value 5
- Value 6
- Value 7
- Value 8

Add Value Remove Value

Normal Value

Number Of Bits 4

Bits Per Byte 7

- 19.Next, remove Value 3 and Value 4 and enter the right Values (6A and 12) in the Hex row.

- 20.Finally, rename Values 5 to 9 according to the Syssex definition table. The dialog should now be set up like this:

Create Sysex

Name Roland JV-1080 DataSet1 7Bit

Length 12 Checksum C5 Roland Checksum

	0	1	2	3	4	5	6	7	8	9	10	11
Hex	F0	41	10	6A	12	00	00	00	00	00	00	F7
Decimal	240	65	16	106	18	0	0	0	0	0	0	247
Binary	11110000	01000001	0001xxxx	01101010	00010010	0xxxxxxx	0xxxxxxx	0xxxxxxx	0xxxxxxx	0xxxxxxx	00000000	111101
Address4LSB										0/7		
Data										0/7		

Values

- DevID
- Address1MSB
- Address2
- Address3
- Address4LSB
- Data

Add Value Remove Value

Normal Value

Number Of Bits 7

Bits Per Byte 7

Value Type Normal

Byte Position 0 (LSB) 9

Byte Position 1 1

Byte Position 2 1

Byte Position 3 (MSB) 1

OK Cancel

- 21.Now, click OK, to return to the world of the living...

- All the values that have been defined now appear in the Add Parameters dialog and can be assigned to a so called “Formula”.
22. Click in the Formula column for the DevID and enter “DevID”, to set this value to a variable called “DevID”.

Value	Formula	Valid Range	Result
DevID	DevID	0 - 15	error
Address1MSB	0	0 - 127	0
Address2	0	0 - 127	0
Address3	0	0 - 127	0
Address4LSB	0	0 - 127	0

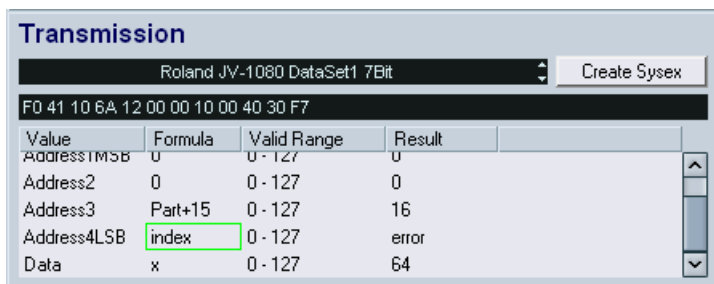
As there is no “DevID” variable defined yet, you get “error” as a result. For now, this can be ignored. We will define the “DevID” variable later.

23. Now you need to set the right address. In the Scale Tune table of the manual, “Address1MSB” and “Address2” are set to 0 for all parameters of the “Scale Tune” nodes. Therefore, leave them as they are: already set to 0.

“Address3” indicates the part which is affected by each Scale Tune and ranges from 10H to 20H. Remember: you created the 17 Scale Tune nodes by using a variable called “Part” which ranged from 1-17, so if you add 15 to this “Part” variable, you get the desired range of 10H-20H, which is 16-32 in decimal. To achieve this, simply type in “Part+15” in the “Formula” column for “Address3”. (You can also use other operations in the “Formula” column: “-” (subtraction), “\*” (multiplication) and “()” (parentheses) for small calculations.)

24. Finally, enter “index” in the Formula column for “Address4LSB” because this variable will be used to create multiple (12) parameters at once, as set in the “Variable” section of the “Add Parameters” dialog. Again, “error” is displayed in the Result field, because there is no such variable defined yet. In fact “index” is no real variable, because it simply will be replaced by each of the values in the defined range after completion of the dialog.

The dialog should now be set up as follows:



As you may have noticed, the variable “x” is automatically assigned to the “Data” value. “x” stands for the value that is represented by this parameter and is always defined individually by each parameter. If you later assign a control like a fader to this parameter, this fader will control and modify “x”. “x” is automatically assigned to the last value of the message, but can be freely assigned to any other value.

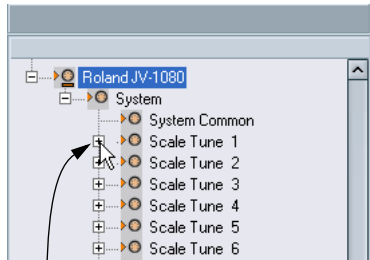
**25.** Click OK to close the dialog.

In the device editor, small plus symbols are now displayed next to the Scale Tune nodes, indicating further content.

Before looking into these nodes, you should add the missing “DevID” variable to the root of the device, because this is a global value that affects the device as a whole.

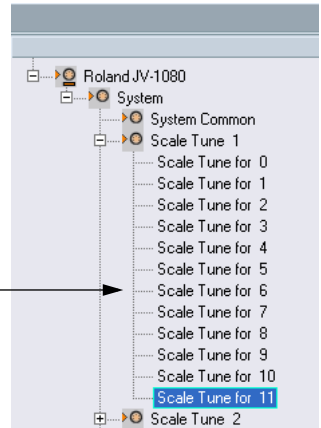
**26.** Select the “Roland JV-1080” node, click the “Add Variable” button and rename it to “DevID”. Normally, you can keep the default value setting of “0”, except if your hardware device is set to another value.

27. Now, let's look into the Scale Tune 1 node by clicking its plus symbol.



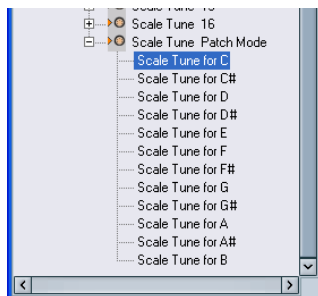
Click here...

...to display the parameters for the node.



You can now browse the parameters, to verify that the correct MIDI messages are transmitted. You can of course also do this for any of the other nodes.

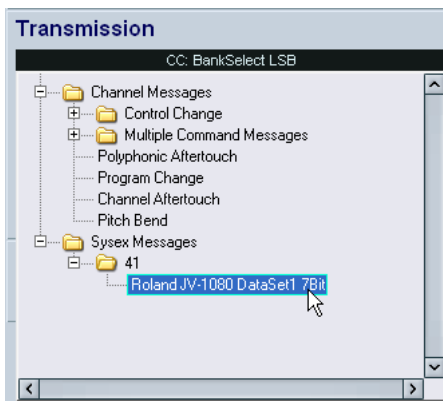
28. The next step is to rename the parameters according to the “Scale Tune” table of the device's manual by selecting each of the 12 parameters and entering their correct name in the “Name” field.  
Now, the parameters should be displayed as follows:



- If you open any of the other Scale Tune nodes now, you'll see that the names of the parameters have also changed. This is what was meant by "alias copies" in the beginning. Furthermore, you will notice that if you add a panel to one of the Scale Tune nodes (see [page 20](#)), it will be added to all of them, which makes it much easier to create panels with repeating sections.

**29.** Now, you need to add parameters to another node, "System Common".  
In the list to the left, select "System Common".

**30.** Click the Add Parameters button and select the Sysex message  
"Roland JV-1080 DataSet1 7 Bit" you created earlier.



**31.** Now set up the DevID as described before.  
See [page 61](#).



32. Activate the Create Multiple checkbox and enter a range of 0-81, because the System Common table in the manual of the JV-1080 contains 82 parameters, starting with an index of "0". Address1MSB, Address2 and Address 3 are all 0 for all System Common parameters, so leave them as they are. Enter "index" in the Formula column for Address4LSB to address each of the 82 parameters separately. The dialog should now look like this:

**Add Parameters**

**Parameter**  
Name: Parameter

**Value**  
Min: 0 Max: 127 Default: 0

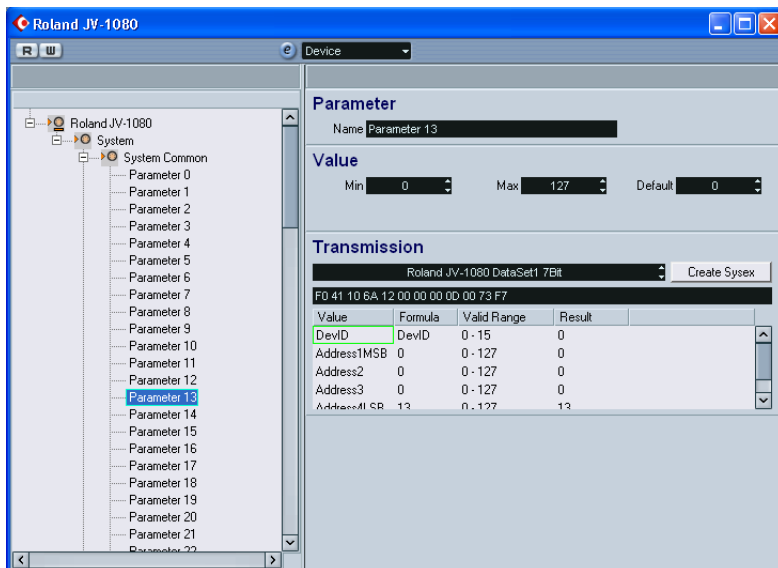
**Transmission**  
Roland JV-1080 DataSet1 7Bit Create Sysex  
F0 41 10 6A 12 00 00 00 00 00 00 F7

Value	Formula	Valid Range	Result
Address1MSB	0	0 - 127	0
Address2	0	0 - 127	0
Address3	0	0 - 127	0
Address4LSB	index	0 - 127	0
Data	x	0 - 127	0

**Variable**  
☒ Create Multiple  
Variable Name: index  
Variable Range: 0-81

OK Cancel

When you click OK, you will notice that 82 new parameters have been added to the System Common node.



You can now set the Names, Min, Max and Default values for each of the parameters according to the specifications in the System Common table, as described earlier.

You should now be familiar enough with the basic procedures to continue with other parameter settings and adjustments and to finally create your own specific devices.

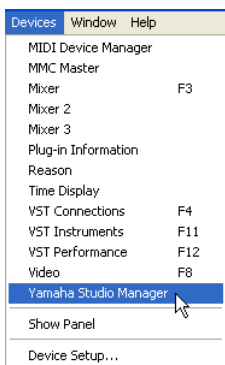
# About Studio Connections (Cubase SX only)



Studio Connections is the name of an initiative led by Steinberg and Yamaha. The initiative intends to create industry standards for totally integrated system environments using software and hardware products.

First implementation stage of the Studio Connections open standard is the integration and support of Yamaha's Studio Manager 2 and Total Recall for compatible hardware devices.

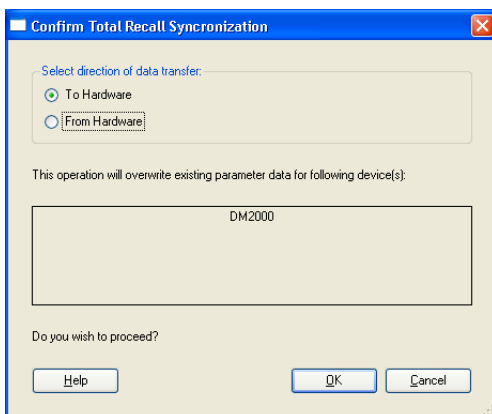
If you have a SM2 component installed, there is an additional menu item in the Devices menu for the Yamaha Studio Manager window.



## Total Recall

Total Recall means that you can save and recall all settings of your hardware and software products by opening one integrated file in a DAW such as Cubase or Nuendo. Also you will have instant and organized access to hardware editors.

When you load a project or switch to another active project that contains SM2 data, the Total Recall Synchronization dialog appears:

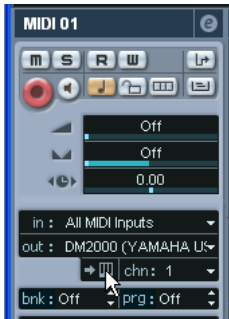


This dialog can also be opened any time from the Studio Manager's Synchronize menu. Click OK for the Dump to start.

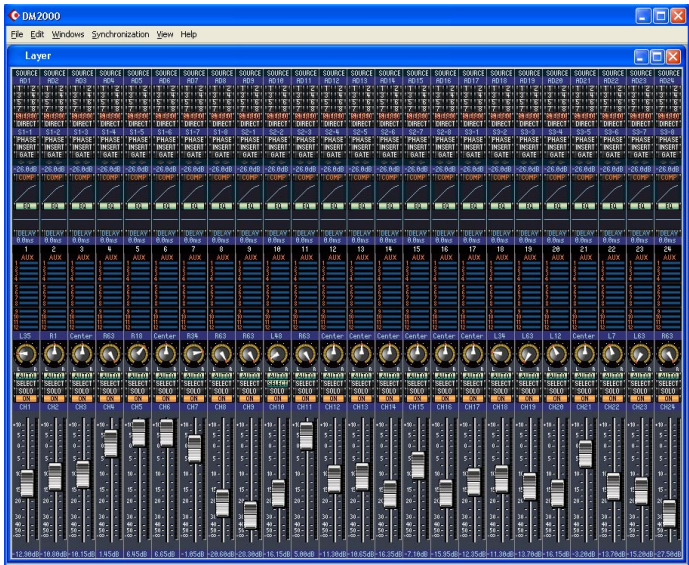
# Virtual MIDI Devices

If you have a new OPT component (e.g. the DM2000) which uses a new special interface, you can access these components as virtual MIDI Devices in the MIDI track's out port selection.

When a MIDI Track is routed to such a device, the “Panel” Button becomes available.



Click the Panel button...



...to open the editor window for the device.

- Please also refer to the separate Yamaha documentation.



**2**

**MIDI effects**

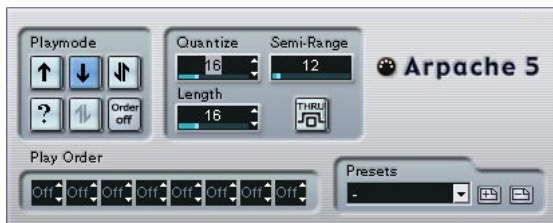
# Introduction

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 play-back 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.

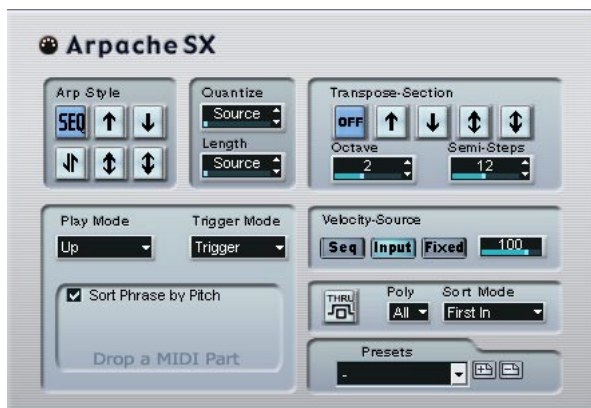
Parameters

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 play-back 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 trans-posed 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 oc-taves 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 to-gether 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 posi-tion 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 ar-peggio patterns that are not possible using the standard play modes.



## Apache SX (Cubase SX only)



This is an even more versatile and advanced arpeggiator, capable of creating anything from traditional arpeggios to complex, sequencer-like patterns. The Apache SX has the following parameters:

Parameter	Description
Arp Style	Determines the basic behaviour of the Apache SX. In the Seq mode, the arpeggiator uses an imported MIDI part as a starting point for the pattern – this is described below. All other modes describe how the notes in the chord you play should be arpeggiated – up, down, up & down, mostly up or mostly down.
Quantize	Determines the resolution of the arpeggio, i.e. its “speed”. The “Source” setting is used in Seq mode, see below.
Length	Determines the length of the arpeggio notes. The “Source” setting is used in Seq mode, see below.
Transpose	When a mode other than “Off” is selected, the arpeggio will be expanded upwards, downwards or both (depending on the mode). This is done by adding transposed repeats of the basic arpeggio pattern. The “Octave” setting sets the number of transposed repeats and the “Semi-Steps” setting determines how much each repeat will be transposed.
Play Mode	See the description of Seq mode below!
Trigger Mode	See the description of Seq mode below!

Parameter	Description
Velocity Source	Determines the velocity of the notes in the arpeggio. The options are Seq (used in Seq mode only), Input (the same as the velocity values of the corresponding notes in the chord you play) or Fixed, in which case all arpeggio notes will get the velocity set in the value field to the right.
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).
Poly	Determines how many notes should be accepted in the input chord. The "All" setting means there are no limitations.
Sort Mode	When you play a chord into the Arpatche SX, the arpeggiator will look at the notes in the chord as sorted in the order specified here. For example, if you play a C-E-G chord, with "Note Lowest" selected, C will be the first note, E will be the second and G the third. This affects the result of the Arp Style setting.

## Seq mode

When Seq mode is selected in the Arp Style section, the Arpatche SX uses an additional MIDI part as a pattern. This pattern then forms the basis for the arpeggio, in conjunction with the MIDI input.

- To import a MIDI part into the Arpatche SX, drag it from the Project window and drop it in the "Drop a MIDI Part" section on the Arpatche SX.

Now, the notes in the dropped MIDI part will be sorted internally, either according to their pitch ("Sort Phrase by Pitch" checkbox activated) or according to their play order in the part. This results in a list of numbers. For example, if the notes in the MIDI part are C E G A E C and they are sorted according to pitch, the list of numbers will read 1 2 3 4 2 1. Here, there are 4 different notes/numbers and 6 trigger positions.

Now the MIDI input (the chord you send into the Arpatche SX) will also generate a list of numbers, with each note in the chord corresponding to a number depending on the Sort Mode setting.

The two lists of numbers will now be matched – the Arpatche SX tries to play back the pattern from the dropped MIDI file but using the notes from the MIDI input (chord). The result depends on the Trigger Mode setting:

Trigger Mode	Description
Trigger	The whole pattern from the dropped MIDI file will be played back, but transposed according to one of the notes in the MIDI input. Which note is used for transposing depends on the Sort Mode setting.
Trigger Cnt.	As above, but even when all keys are released, the phrase continues playing from the last position (where it stopped), when a new key is pressed on the keyboard. This is typically used when playing “live” through the Arpatche SX.
Sort Normal	Matches the notes in the MIDI input to the notes in the dropped MIDI part. If there are fewer notes (numbers) in the MIDI input, some steps in the resulting arpeggio will be empty.
Sort First	As above, but if there are fewer notes in the MIDI input, the missing notes will be replaced by the first note.
Sort Any	As above, but if there are fewer notes in the MIDI input, the missing notes will be replaced by any (random) note.
Arp. Style	As above, but if there are fewer notes in the MIDI input, the missing notes will be replaced by the last valid note in the arpeggio.

Finally, the Play Mode setting affects the resulting arpeggio. Note also that you can choose to keep the original note timing, note length and note velocities from the dropped MIDI part, by selecting “Source” in the Quantize and Length fields, and “Seq” in the Velocity Source section.

# Autopan



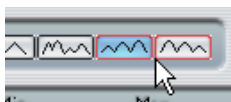
This plug-in works a bit like an LFO in a synthesizer, allowing you to send out continuously changing MIDI controller messages. One typical use for this is automatic MIDI panning (hence the name), but you can select any MIDI Continuous Controller event type. The Autopan effect has the following parameters:

## 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).

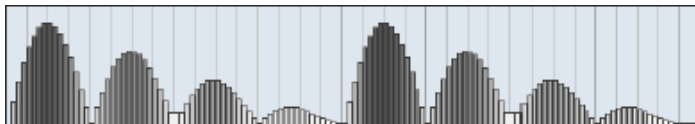
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**You should probably avoid extremely low Density values, as these will generate a very large number of events (which may cause the MIDI instrument to “choke”, delaying notes etc.).**

---

## 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!

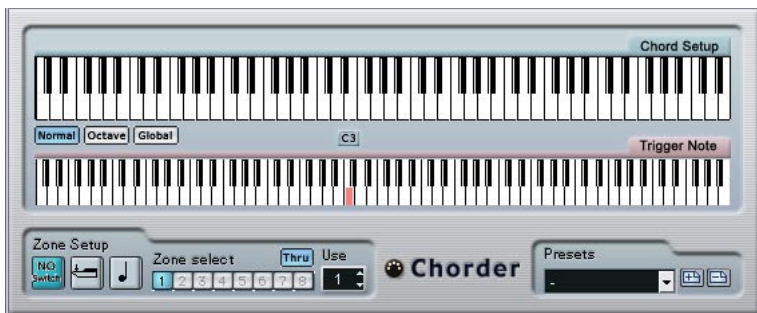
## Min and Max

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



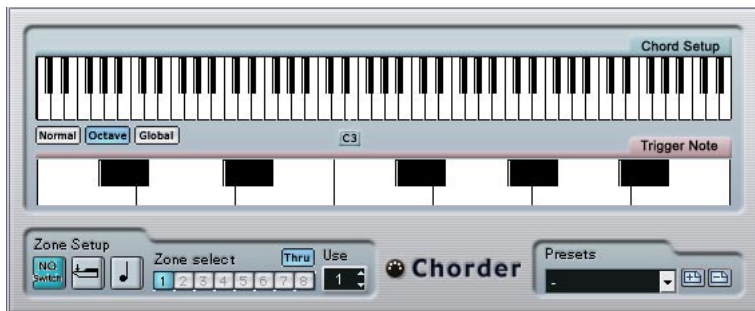
In this mode, you can assign a different chord to each single key on the keyboard. Proceed as follows:

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.

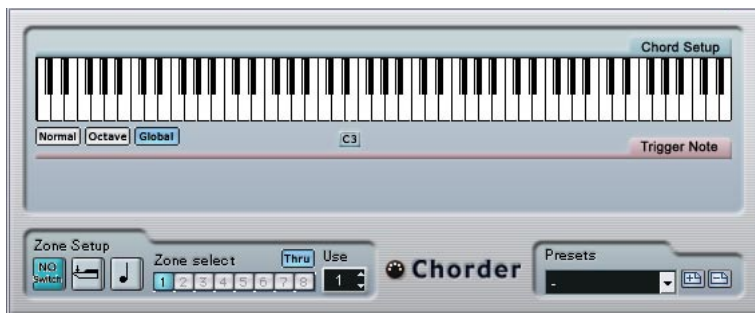


## Octave mode



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.

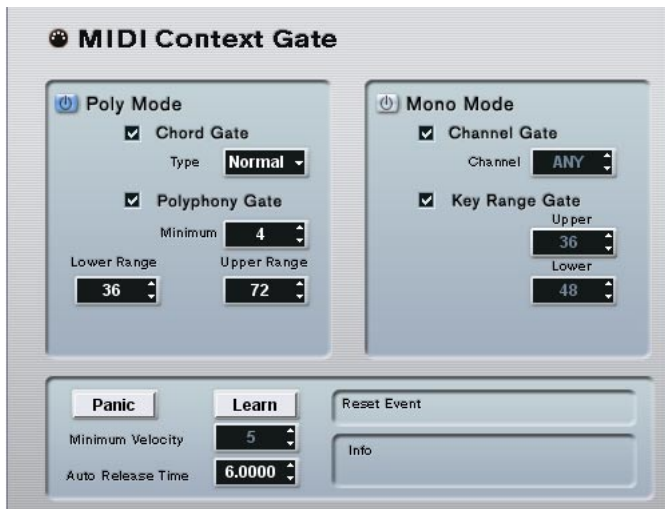
## Compress



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.

## Context Gate (Cubase SX only)



The Context Gate allows for selective triggering/filtering of MIDI data. It can be used for context selective control of MIDI devices. The following parameters are available:

### Poly Mode – Chord Gate

When Chord Gate is activated, only notes in recognized chords are let through. There are two modes of chord recognition available; Simple and Normal. In Simple mode, all standard chords (major/minor/b5/dim/sus/maj7 etc.) are recognized, whereas Normal mode also takes more tensions into account.

### Poly Mode – Polyphony Gate

This allows you to filter MIDI according to the number of pressed keys within a given key range. This can be used independently or in conjunction with the Chord Gate function.

- The Minimum value field allows you to specify the minimum number of notes needed for the notes to be let through.
- The Upper/Lower Range sets the key range. Only notes within this range will be let through.

## **Mono Mode – Channel Gate**

When this is activated, only single note events in a specified MIDI channel are let through, which can be used with MIDI controllers that can send MIDI over several channels simultaneously, for example guitar controllers which send data for each string over a separate channel. You can either set this to a specific channel (1-16), or to “Any”, i.e. no channel gating.

## **Mono Mode – Key Range Gate**

This can be used independently or in conjunction with the Channel Gate function. Played notes will sound (no note off message) until a note is played inside the set Upper and Lower range (and additionally the set Channel Gate channel, if checked).

## **Learn button**

When this is activated, you can specify a Reset trigger event via MIDI. Whenever this specific MIDI event is sent, it triggers an “All Notes Off” message. When you have set the Reset event, the Learn button should be deactivated.

## **Auto Release time**

If there is no input activity, all resounding notes are sent a note off message after the set time, in seconds or milliseconds.

## **Min Velocity**

Notes below a set velocity threshold value will be gated.

## **Panic button**

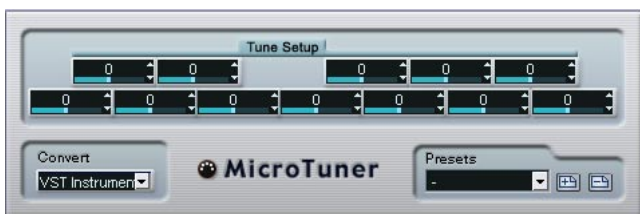
Sends an “All Notes Off” message over all channels, in case of hanging notes.

## 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 SX/SL, 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.

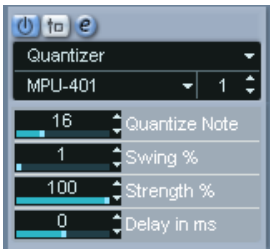
For example, if MIDI volume (controller 7) is selected, notes with low note numbers (pitches) will lower the volume in the MIDI instrument, while higher note numbers will raise the volume. This way you can create “keyboard tracking” of volume or other parameters.

---

**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 SX/SL is described in the Operation manual.**

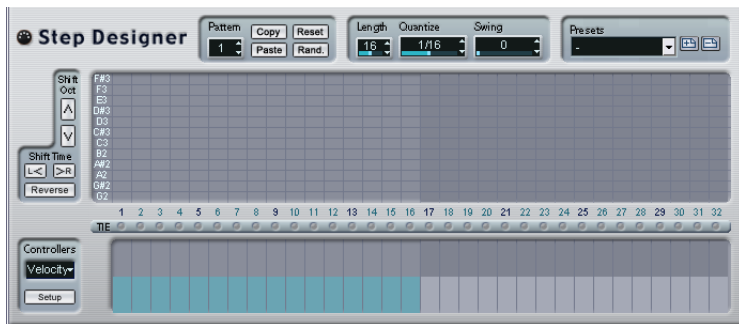
While the Quantize function on the MIDI menu applies the timing change to the actual notes on a track, the Quantizer effect allows you to apply quantizing “on the fly”, changing the timing of the notes in real time. This makes it easier to try out different settings when creating grooves and rhythms. 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.

Parameter	Description
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

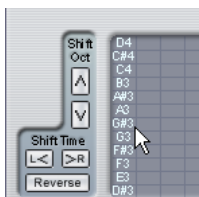


The Step Designer is a MIDI pattern sequencer that sends out MIDI notes and additional controller data according to the pattern you set up. It does not make use of the incoming MIDI, other than automation data (such as recorded pattern changes).

### Creating a basic pattern

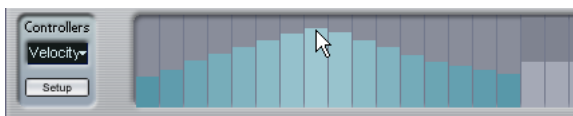
1. Use the Pattern selector to choose which pattern to create.  
Each Step Designer can hold up to 200 different patterns.
2. Use the Quantize setting to specify the “resolution” of the pattern.  
In other words, this setting determines how long each step is. For example, if Quantize is set to “16th” 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.



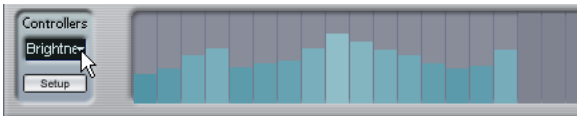
7. To make notes shorter, select “Gate” on the Controllers pop-up menu and lower the bars in the controller display. When a bar is set to its maximum value (fully up), the corresponding note will be the full length of the step (as set with the Quantize parameter).
8. To make notes longer, you can tie 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 SX/SL, 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

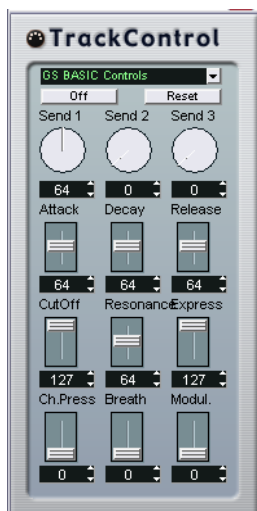
You can create up to 200 different patterns in each Step Designer – just select a new pattern and add notes and controllers as described above.

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 SX/SL.

## 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.

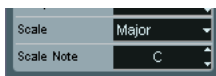
Control	Description
Eff. 3	This allows you to select one of a large number of “variation” effect types. Selecting “No Effect” is the same as turning off the variation effect.
Reset	Sends an XG reset message.
MastVol	This is used to control the Master Volume of an instrument. Normally you should leave this in its highest position and set the volumes individually for each channel (with the volume faders in the Cubase SX/SL 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 is a real-time version of the Logical Editor. With this you can perform very powerful MIDI processing on the fly, without affecting the actual MIDI events on the track.

The Logical Editor is described starting on [page 111](#). As the parameters and functions are almost identical, the descriptions for the Logical Editor also apply to the Transformer. Where there are differences between the two, this is clearly stated.



# **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 SX/SL 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 SX/SL

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

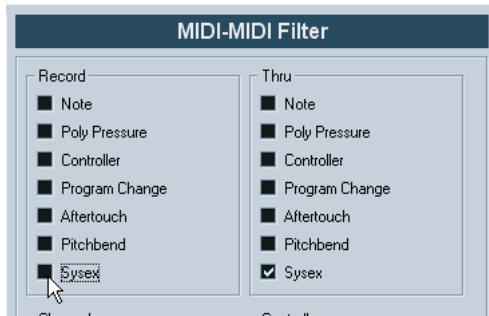
Normally, MIDI devices allow you to dump (transmit) all or some settings in the device's memory, in the form of MIDI System Exclusive messages. Return these messages, and you get the settings back. This is (among other things) a way of making backup copies of the settings of any instrument.

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 SX/SL.



1. Open the Preferences dialog from the File menu (on the Mac, this is located on the Cubase SX/SL menu) and select the MIDI-MIDI Filter page.

This allows you to govern which MIDI event types should be recorded and/or thru-put.

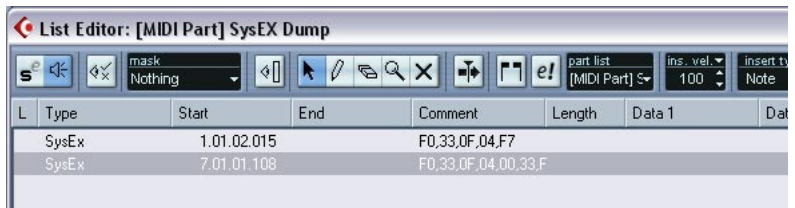


2. Deactivate the Sysex checkbox in the Record section, but make sure the Sysex checkbox in the Thru section is activated.

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 SX/SL to start the dump. You will then have to use the MIDI SysEx Editor (see [page 108](#)) 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 SX/SL, 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.

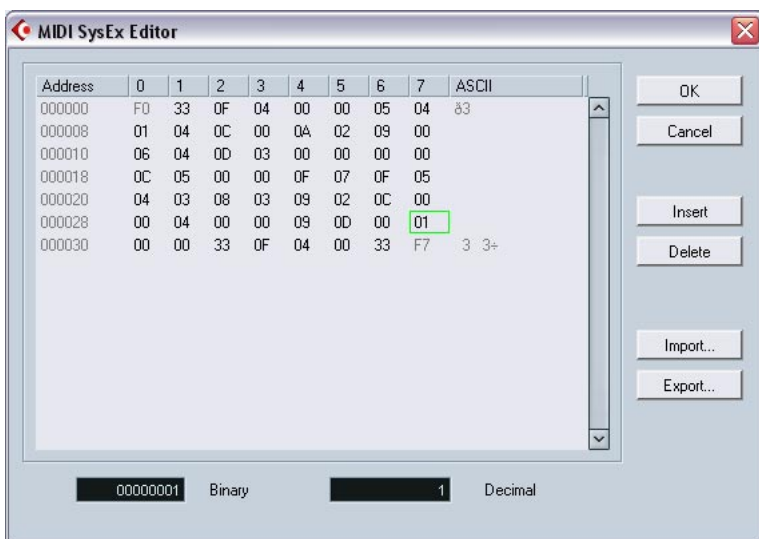
1. Open the Preferences dialog from the File menu (on the Mac, this is located on the Cubase SX/SL menu), select the MIDI-MIDI Filter page and make sure that System Exclusive is recorded.
2. Make sure the instrument is actually set to transmit front panel control movements as System Exclusive data.
3. 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/Project Browser, 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/Project Browser.



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

## **The Logical Editor, Transformer and Input Transformer**

# Introduction

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 Editor comes in.

The principle for the Logical Editor is this:

- **You set up *filter conditions* to find certain events.**  
This could be events of a certain type, with certain attributes or values or on certain positions, in any combination. You can combine any number of filter conditions and make composite conditions using AND/OR operators.
- **You select the basic *function* to be performed.**  
The options include Transform (changing properties of the found events), Delete (removing the events), Insert (adding new events based on the found events' positions) and more.
- **You set up a list of *actions*, which specify exactly what should be done.**  
This is not necessary for all functions. For example, the Delete function does not require any additional action specifications – it simply removes all found events. The Transform function on the other hand requires that you specify which properties should be changed and in which way (transpose notes by a certain amount, adjust velocity values, etc.).

By combining filter conditions, functions and the specific actions, you can perform very powerful processing.

To master the Logical Editor you need some knowledge about how MIDI messages are structured. However, the Logical Editor also comes with a rich selection of presets, allowing you to access its processing powers without delving into its more complicated aspects, see [page 115](#).

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**Studying the included presets is an excellent way to learn the workings of the Logical Editor! Many of them can also be used as starting points when you set up your own editing operations using the Logical Editor.**

---



## About the Transformer MIDI effect

The Transformer effect is a real-time version of the Logical Editor, allowing you to apply editing to the events played back from a track “on the fly”. The Transformer contains virtually the same settings and functions as the Logical Editor – where there are differences between the two, this is clearly stated on the following pages.

## About the Input Transformer

Again, this is very similar to the Logical Editor. 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.

The Input Transformer is described on [page 136](#). However, we recommend that you make yourself familiar with the Logical Editor first, since they share many features and principles.

# Opening the Logical Editor

1. Select the desired parts or events.

What will be affected by the operation depends on the current selection:

- In the Project window, edits using the Logical Editor are applied to all selected parts, affecting all events (of the relevant types) in them.
- In the MIDI editors, edits using the Logical Editor are applied to all selected events. If no events are selected, all events in the edited part(s) will be affected.

You can change the selection while the Logical Editor window is open.

2. Select “Logical Editor...” from the MIDI menu.

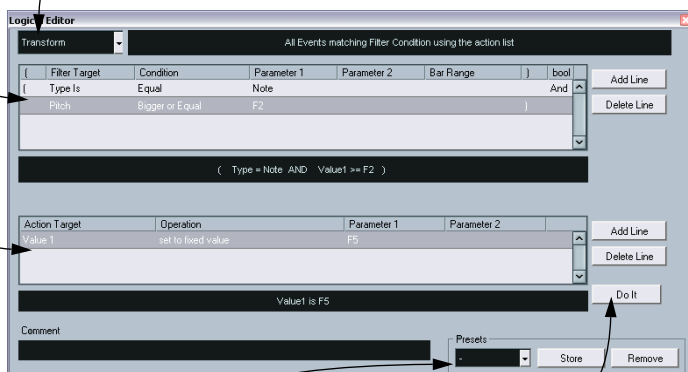
- **For details on how to open the Transformer (and other MIDI effects), see the chapter “MIDI realtime parameters and effects” in the Operation manual.**

## Window overview

This is the filter condition list, specifying which events to look for.

This is the action list, specifying e.g. how to change the found events.

This is where you select a function (Transform, Delete, etc.). The field to the right shows an additional explanation of the selected function.



This is where you load, store and handle presets. See [page 135](#).

The “Do It” button performs the task you have set up (not available in the Transformer).

## Selecting a preset

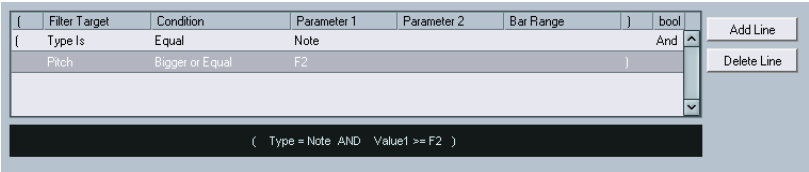
To understand the Logical Editor, it might be a good idea to start with exploring the included presets. These are found on the Presets pop-up menu at the bottom of the window, to the right.

- To load a preset, select it from the Presets pop-up menu.  
The window will show the settings stored in the preset. As the preset is not applied to the MIDI events yet, you can load different presets just to study them without affecting any events. You can also edit the preset before applying it.
- To apply the loaded preset (i.e. to perform the operations defined in the Logical Editor), click Do It.
- **You can also select Logical Editor presets directly from the MIDI menu.**  
This allows you to apply a preset to the selected MIDI part directly, without having to open the Logical Editor.
- **It is also possible to select and apply Logical Editor presets directly in the List Editor (from the Mask menu). You can also open the Logical Editor from the List Editor.**

For information on how to create and handle your own presets, see [page 135](#).

# Setting up filter conditions

## General procedure



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 selecting the Init option from the Presets pop-up menu.
- 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
Left bracket	This is used for “bracketing” several lines together when creating conditions with multiple lines and the boolean operators And/Or. See <a href="#">page 125</a> .
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.

Column	Description
Parameter 1	Here you set which value the event properties should be compared to (a numeric value, a position or a choice from a pop-up menu, depending on the Filter Target). For example, if the Filter Target is "Position" and Condition is "Equal", the Logical Editor will look for all events starting at the position you specify in the Parameter 1 column.
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.
Bar Range	This column is only used if the Filter Target is "Position" and one of the "Bar Range" options is selected in the Condition column. In these cases, you use the Bar Range column to specify "zones" within each bar (allowing you to find e.g. all events on or around the first beat of every bar). See <a href="#">page 119</a> .
Right bracket	This is used for "bracketing" several lines together. See <a href="#">page 125</a> .
bool	This allows you to insert the boolean operators And/Or, when creating conditions with multiple lines. See <a href="#">page 125</a> .

- You can also set up filter conditions by dragging MIDI events directly into the upper list.  
If the list contains no line entries, a MIDI event dragged into this section will form conditions including the state and type of the event. If it contains entries, the dragged event(s) will initialize the matching parameters. E.g. if a length condition is used, the length will be set according to the event length.

## 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.

Condition	Events will be found if their Filter Target property...
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.
Inside Bar Range	...is within the "zone" set up in the Bar Range column (Position only), in each bar within the current selection.
Outside Bar Range	...is outside the "zone" set up in the Bar Range column (Position only), in each bar within the current selection.
Before Cursor	... is before the song cursor position (Position only).
Beyond Cursor	... is after the song cursor position (Position only).
Inside Track Loop	... is inside the set track loop (Position only).
Inside Cycle	...is inside the set cycle (Position only).
Exactly matching Cycle	...exactly matches the set cycle (Position only).
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.

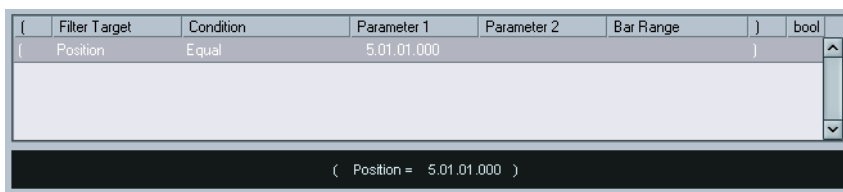
- **The Conditions for the "Property" filter target are different, see [page 123](#).**

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

## Searching for events at certain positions

Selecting Position in the Filter Target column lets you find events starting at certain positions, either relative to the start of the song or within each bar.

- If you select any condition other than the Range or Bar Range options, you set up a specific position (in bars, beats, sixteenth notes and ticks) in the Parameter 1 column.



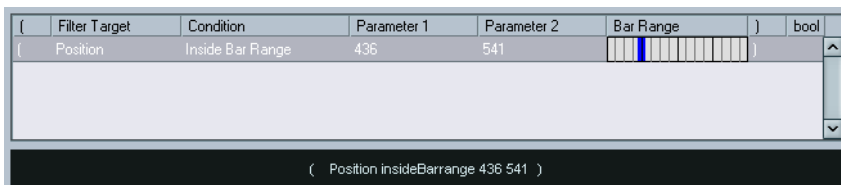
Here, the Logical Editor will find all events at 5.1.1 in the project.

- If you select the Inside or Outside Range option in the Condition column, you set the start position of the range in the Parameter 1 column and the end position in the Parameter 2 column.

The Logical Editor will then find all events inside or outside this position range.

- If you select one of the Bar Range options in the Condition column, the Bar Range column will show a graphic bar display. You specify the range within the bar by clicking and dragging in the bar display (the specified Bar Range is indicated in blue).

The Logical Editor will then find all events starting inside or outside this Bar Range, in all bars (within the current selection).



Here, the Logical Editor will find events starting around the second beat in each bar.

## 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 SX/SL 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 [page 125](#) 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).

---

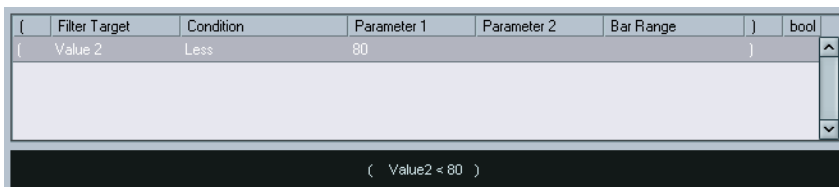
**This is particularly useful when searching for note pitch or velocity values, as described below.**

---



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.



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”, the Logical Editor 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 Logical Editor can then find all notes of a certain key, in all octaves.

See [page 125](#) 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 Logical Editor 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 Logical Editor 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 Logical Editor. 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 SX/SL 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	Bar Range	)	bool
(	Property	Property is set	Event is muted			)	

Here, the Logical Editor will find all muted events.

(	Filter Target	Condition	Parameter 1	Parameter 2	Bar Range	)	bool
(	Property	Property is set	Event is selected			)	And
	Property	Property is not set	Event is muted			)	

Here, the Logical Editor 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 (especially useful in the Input Transformer).

"Last Event" indicates the state of an event which has already passed the Input Transformer/Logical Editor. 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 (the “Note is playing” condition is only available in the Input Transformer and in the Transformer effect):

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 and the brackets.

## 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	Bar Range	)	bool
(	Type Is	Equal	Note			)	And
	Position	Equal	3.01.01.000			)	

( Type = Note AND Position = 3.01.01.000 )

The Logical Editor will only find events that are notes and start at the beginning of the third bar.

- 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	Bar Range	)	bool
(	Type Is	Equal	Note				Or
	Position	Equal	3.01.01.000			)	
( Type = Note OR Position = 3.01.01.000 )							

The Logical Editor will find all events that are notes (regardless of their position) and all events starting at the beginning of the third bar (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.

## Using brackets

The bracket (parenthesis) columns let you enclose two or more condition lines, dividing the conditional expression into smaller units. This is only relevant when you have three or more condition lines and want to use the boolean Or operator. This is how it works:

- **Without brackets, the conditional expressions are evaluated according to their order in the list.**

(	Filter Target	Condition	Parameter 1	Parameter 2	Bar Range	)	bool	
	Type Is	Equal	Note				And	^
	Pitch	Equal	C3				Or	
	Channel	Equal	1					
Type = Note AND Value1 = C3 OR Channel = 1								

In this case we have the expression Type = Note AND Pitch = C3 OR Channel = 1, without brackets. This means that the Logical Editor will find all MIDI notes with the pitch C3, as well as all events (regardless of their type) set to MIDI channel 1.

Maybe you wanted to find all notes that either had the pitch C3 or the MIDI channel 1 (but no non-note events)? Then you need to add some brackets:

(	Filter Target	Condition	Parameter 1	Parameter 2	Bar Range	)	bool	
	Type Is	Equal	Note				And	^
(	Pitch	Equal	C3			)	Or	
	Channel	Equal	1			)		
Type = Note AND ( Value1 = C3 OR Channel = 1 )								

Here the expression is Type = Note AND (pitch = C3 OR Channel = 1), which will find what you want. The rule behind this is:

- **Expressions within brackets are evaluated first.**

If there are several layers of brackets, these are evaluated “from the inside out”, starting with the innermost brackets.

You add brackets by clicking in the bracket columns and selecting an option. Up to triple brackets can be selected.

## Editing filter conditions as text

(	Filter Target	Condition	Parameter 1	Parameter 2	Bar Range	)	bool	
	Type Is	Equal	Note				And	^
(	Pitch	Equal	C3				Or	
	Channel	Equal	1			)		
Type = Note AND ( Value1 = C3 OR Channel = 1 )								

The area directly below the filter condition list shows you the current filter conditions as text. It also allows you to enter and edit the filter conditions in textual form. For tips on the syntax, please study the included presets.

- **There is no additional functionality involved when editing filter conditions as text; it is simply another way to make settings.**  
When you enter something in the text field you will see the corresponding settings appear in the filter condition list (provided that you have used the correct syntax).

# Selecting a function



The pop-up menu in the top left corner of the Logical Editor 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.

---

**In the Logical Editor, processing isn't performed until you click the Do It button. When using the Transformer MIDI effect there is no Do It button – the current settings are automatically applied in real time during play-back or live playing.**

---

Below, the available options are listed. Note that some options are available in the Logical Editor only – not in the Transformer effect.

## Delete

Deletes all events found by the Logical Editor. In the case of the Transformer, 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 130](#).

## Insert

This will create new events and insert these into the part(s) (Logical Editor) or the output stream (Transformer). The new events will be based on the events found by the Logical Editor'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 deleted (Logical Editor) or removed from the output stream (Transformer).

## **Copy (not available in the Transformer)**

This will copy all found events, transform them according to the action list and paste them into a new part on a new MIDI track. The original events are not affected.

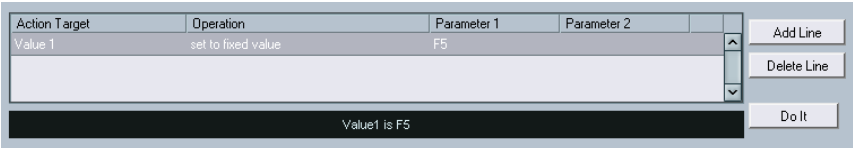
## **Extract (not available in the Transformer)**

This works like Copy, but will cut the found events instead. Or in other words, Extract will transform all found events and move them to a new part on a new MIDI track.

## **Select (not available in the Transformer)**

This will simply select all found events, highlighting them for further work in the regular MIDI editors.

# Specifying actions



The lower list in the Logical Editor 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 and Select).

The handling of the action list is similar to the filter condition list, but without the brackets and 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
Position	Adjusting this value will move the events.
Length	Lets you resize the events (notes only).
Value 1	This adjusts value 1 in the events. As described on <a href="#">page 120</a> , 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 <a href="#">page 120</a> , 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 <a href="#">page 122</a> .
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 Note-off-velocity when searching for properties. See <a href="#">page 123</a> .

## 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.

For example, if the Action Target value is 17 and Parameter 1 is 5, the result of rounding will be 15 (the closest value that can be divided by 5). Another word for this type of operation would be “quantizing”, and it’s actually possible to use it for this, by setting the Action Target to “Position” and specifying a quantize value with Parameter 1 (in ticks, with 480 ticks per quarter note).

### 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  $\pm 20$ .

## Set to fixed value

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

## Add Length

This is only available when Action Target is set to Position. Furthermore, it is only valid if the found events are notes (and thus have a length). When Add Length is selected, the length of each note event will be added to the Position value. This can be used for creating new events (using the Insert function) positioned relative to the end positions of the original notes.

## 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 [page 120](#)).

## **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”.

## **Linear Change in Loop Range**

This will affect events within the loop range (between the left and right locators) only. It will create a linear “ramp” of values (replacing the original values) starting at the value in the Parameter 1 column and ending at the Parameter 2 value.

This can be used for creating linear controller sweeps, velocity ramps, etc.

## **Relative Change in Loop Range**

As with the previous option, this will create a ramp of values, affecting events in the cycle loop range only. However, here the changes are “relative”, meaning that values will be added to the existing values.

In other words, you set up a value ramp starting at Parameter 1 and ending at Parameter 2 (note that the Parameter values can be negative). The resulting value ramp is then added to the existing values for the events within the cycle loop range.

For example, if you apply this to note velocities with Parameter 1 set to 0 and Parameter 2 set to -100, you create a velocity fade-out, keeping the original velocity relations:

(	Filter Target	Condition	Parameter 1	Parameter 2	Bar Range	)	bool
(	Type Is	Equal	Note			)	
( Type = Note )							
Action Target	Operation	Parameter 1	Parameter 2				
Value 2	Relative Change in Loop Range	0	-100				
Value2 relDynamicChange 0 -100							

## Applying the defined actions

Once you have set up filter conditions, selected a function and set the required actions (or loaded a preset), you apply the actions defined with the Logical Editor by clicking the Do It button.

Logical Editor operations can be undone just like any other editing.

- **Again, when using the Transformer MIDI effect there is no Do It button. 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.

## Working with presets

The Presets section in the bottom right section of the window allows you to load, store and manage Logical Editor presets. A preset contains all settings in the window, which means you can simply load a preset and click Do It.

- **To load a preset, select it from the Presets menu.**

### Storing your own settings as a preset

If you have made Logical Editor settings that you want to use again, you can store them as a preset:

1. You can enter some explanatory text in the Comment field.  
An extra description of the preset can be useful, especially if the settings are complex.
  2. Click the Store button in the Presets section.  
A dialog for specifying a name for the new preset is displayed.
  3. Enter a name for the preset and click OK.  
The preset is stored.
- **To remove a preset, load it and click the Remove button.**

### Organizing and sharing presets

The Logical Editor presets are stored as individual files within the Cubase SX/SL program folder, in the presets\Logical Edit subfolder. While these files cannot be edited “manually”, you can reorganize them (e.g. putting them in subfolders) like any files.

This also makes it easy to share presets with other Cubase SX/SL users, by transferring the individual preset files.

- **The list of presets is read each time the Logical Editor is opened.**

# 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 is very similar to the Transformer MIDI effect, but 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

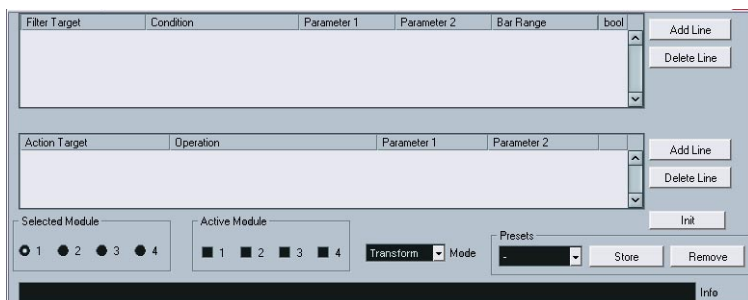
To open the Input Transformer for a MIDI track, select the track and click the Input Transformer button in the Inspector to open the pop-up menu:



- 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.



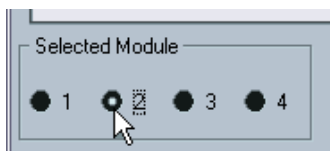
In both cases, the button lights up and the Input Transformer opens.



## Handling the four modules

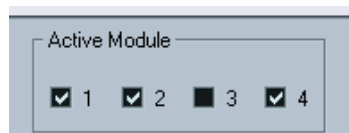
The Input Transformer is really four separate transformers, or modules.

- 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

This is done just like in the Logical Editor. Here is a brief rundown:

- 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 [page 116](#).

- Selecting the Init option from the Presets pop-up menu will reset the selected module, removing all filter condition and target list lines.
- The Input Transformer has no “Do It” button – 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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