



# USER MANUAL

SOFTWARE VERSION 1.1X





SHOCK DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL. ATTENTION:POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFE. AVIS: POUR EVITER LES RISQUES D'INCIDENTE OU D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE A LA PLUIE OU L'HUMIDITET.



The lightning flash with the arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated voltage within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Le symbole éclair avec le point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la presence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'éléctrocution.

The exclamation mark within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter l'utilisateur de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instructions accompagnant l'appareil.

Instructions pertaining to a risk of fire, electric shock or injury to persons.

## IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

Warning - When using electric products, basic precautions should always be followed, including the following:

**1.** Read all the instructions and observe the graphic symbols above before using the product.

**2.** Do not use this product near water - for example near a bathtub, washbowl, kitchen sink, in a wet basement, near or in a swimming pool, a swamp or the like.

**3.** This product should be used only with a cart or a stand that is recommended by the manufacturer.

**4.** This product, either alone or in combination with an amplifier and headphones or speakers may be perfectly capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.

**5.** The product should be located so that its location or position does not interfere with or obstruct its normal flow of ventilation.

**6.** The product should be located away from heat sources such as radiators, heat registers or other products that produce heat.

**7.** The product should be connected to a power supply only of the type described in these operation instructions or as marked on the product.

**8.** The power supply cord of the product should be unplugged from the outlet when the product is left unused for a long period of time.

**9.** Care should be taken so that objects do not fall, or liquids are not spilled into the enclosure through openings.

10. The product should be serviced by qualified service personnel when:

- A. The power supply cord has been damaged; or
- **B.** Objects have fallen or liquids have been spilled onto the product; or
- C. The product has been exposed to rain; or
- **D.** The product does not appear to operate normally or exhibits a marked change in performance; or
- **E.** The product has been dropped or the enclosure has been damaged.

**11.** Do not attempt to service the product beyond those means described in this operating manual. All other servicing should be referred to qualified service personnel.

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## NOTE!

The 'Operator' and 'DXRouter' modules described on pages 134-135 and 168-169 are not yet implemented in the system. These modules will be included shortly in an upcoming software update which can be downloaded at http://www.clavia.se - free of charge.

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## 1. INTRODUCTION

## WELCOME!

Thank you for choosing the Nord Modular G2! We would like to welcome you to the fascinating world of modular synthesis. Prepare yourself for a journey where your creativity can reach new levels, in a way that has not been conceivable with synthesizers before (except with the previous Nord Modular family). Nord Modular G2 synthesizer is a digital instrument that remains true to the traditional modular synthesis concept and, as you will find out in a few minutes, manages to go where no modular synthesizer has ever gone before.

## ABOUT THE NORD MODULAR G2 SYSTEM

The Nord Modular G2 system consists of two parts: the synthesizer, which will be called *the synth* from now on, and the editor software, which will be called the Editor. Nord Modular G2 comes in two different hardware models, the Nord Modular G2 Key with a three-octave keyboard and the 1U high 19" rack mountable Nord Modular G2 Engine. Even though you have to use the Editor to create Patches, it is possible to load synth with Patches from the Editor, disconnect it from the computer and then use the synth as a stand-alone synthesizer. This solution makes the Nord Modular G2 system extremely flexible and portable.

## ABOUT THIS MANUAL

Every time this manual wants your attention to an object on the synth panel, the name of that object will be printed LIKE THIS, e.g. 'press the STORE button'. The LCD displays on the G2 synth are always referred to as the **DISPLAYS** (MAIN OR ASSIGNABLE) and the computer monitor is always referred to as the 'screen'. Whenever there is a reference to the 'keyboard', that reference will also apply to any incoming MIDI notes to the synth. The parts of the manual that describes operation from the synth **do not** apply to the rack mountable Nord Modular Engine. Since the Nord Modular G2 Engine lacks a user interface, it has to be programmed entirely from the Editor. Therefore, if you have the Nord Modular G2 Engine, please refer to the chapters that describes operation from the Editor.

## READING THE MANUAL IN ADDBE ACROBAT READER

This manual is also available as a PDF file. It can be downloaded, free of charge, from Clavia's web site at http://www.clavia.se. When reading the manual as PDF file, you will need Adobe Acrobat Reader 4.0 or later. This program can be downloaded, free of charge, at http://www.adobe.com.

With Adobe Acrobat Reader it is possible to use special navigation features like hyperlinks. This means that you can click with the mouse on a word or sentence and automatically get to the location indicated by the word/sentence. To better show what words or sentences are hyperlinked in this manual, these words are written in purple color.

## WINDOWS 985E/2000/XP

It is beyond the scope of this manual to explain the functions of these operating systems. In order to run the Editor, you need to be familiar with the basic functions of the computer, like mouse functions, saving and loading files to and from disk drives, moving and closing windows, closing dialog boxes etc. It is also important that the computer has a free USB port and that the Nord Modular G2 USB driver has been properly installed before connecting the Nord Modular G2 synth to the PC.

## **CLAVIA ON THE INTERNET**

If you have access to the Internet, you can check out the Nord Modular G2 section at Clavia's web site. There, you will also find a sound library with Patches for the Nord Modular G2 system. Point your browser to http://www.clavia.se.

## 2. OVERVIEW

## NORD MODULAR G2 FRONT PANEL



## LEFT PANEL SECTION

#### MASTER LEVEL

The MASTER LEVEL knob controls the output level of all four OUT jacks and the HEADPHONES output. The MASTER LEVEL knob does not send or receive any MIDI CC# but is used to control the entire instrument's output level. (For info on how to control the level(s) of the individual sounds and via MIDI, refer to "Patch Level" on page 99).

#### MIC LEVEL

The MIC LEVEL knob controls the XLR mic preamp level. Below the MIC LEVEL knob are three LEDs which show the input level of the microphone connected to the XLR INPUT on the rear panel. If you don't use a mic, the Level LEDs will indicate the input level of the signal routed to the IN 1 input instead.

#### SYSTEM, PATCH AND STORE BUTTONS

Above the MAIN DISPLAY are the SYSTEM and PATCH buttons which can be used to enter all system and Patch related menus. The STORE button is used for storing Patches and Performances.

#### NAVIGATOR BUTTONS, ROTARY DIAL AND MAIN DISPLAY

Below the MASTER LEVEL knob is a set of four buttons, the NAVIGATOR buttons. These are used to navigate in the MAIN DISPLAY and to select different functions. Below the NAVIGATOR buttons is the RO-TARY DIAL. With the ROTARY DIAL you can select Patches and Performances, enter various kind of data etc.

#### PATCH LOAD

Press this button when you want to load a selected Patch or Performance into the focused Slot.

#### SLOT BUTTONS

Below the MAIN DISPLAY are the four SLOT buttons (A, B, C and D). You can load one Patch in each of the Slots at a time.

#### OCTAVE SHIFT BUTTONS

Lets you transpose the keyboard +/-2 octaves for each of the Slots. Press SHIFT+LEFT OCTAVE SHIFT button to enter Global Octave Shift mode. In this mode you can octave shift the keyboard globally for all Slots.

#### KB HOLD

Press the KB HOLD button to make every note or chord you play sustain until you press any new keys.

#### THE FOCUS/COPY/(ASSIGN/PASTE) BUTTON

To the right below the MAIN DISPLAY section you find the FOCUS/COPY button. This button can be used in many situations, for example when you want to copy & paste various things and also when you assign parameters to Parameter Pages. Holding SHIFT+FOCUS/COPY alternates the functionality to Assign/Paste.

#### PERFORMANCE CONTROLS

Below the MAIN DISPLAY section you find the performance controls: the PITCH STICK and MOD WHEEL.

#### DISPLAY MODE

Lets you switch between two different display modes for the AS-SIGNABLE DISPLAYS. By default, the ASSIGNABLE DISPLAYS show module names and parameter names. When you turn an ASSIGN-ABLE KNOB or press an ASSIGNABLE BUTTON, the parameter name is temporarily replaced by the parameter value. In the other display mode, the parameter names and values are constantly displayed. However, the module names are not shown in this mode.

FltNord1-	
Freq	Res

Freq	Res
622.5Hz	1.72

#### KB SPLIT MODE

Lets you split the keyboard and play/control different Slots from different keyboard zones.

#### PERFORMANCE MODE

In Performance mode you can create and store combinations of up to 4 Patches - one in each Slot.

#### THE SHIFT BUTTON

The SHIFT button is used to activate functions printed below some buttons on the front panel.

## **RIGHT PANEL SECTION**

#### ASSIGNABLE KNOBS AND BUTTONS WITH DISPLAYS

Module parameters in a Patch can freely be assigned to any of the 8 ASSIGNABLE KNOBS or BUTTONS below the four ASSIGNABLE DISPLAYS. Around each ASSIGNABLE KNOB you'll also find circular LED graphs which give you instant visual feedback of the coarse value of the assigned parameter. As soon as a module parameter has been assigned to an ASSIGNABLE KNOB or BUTTON, the parameter name and ex-

act value is shown above in the corresponding ASSIGNABLE DISPLAY. You can assign a maximum of 15 Columns (see below), each containing 8 parameters (in total 120 parameters) per Patch.

#### VARIATION/MORPH BUTTONS

There are 8 VARIATION buttons with which you can select up to eight different Patch Variations (complete parameter setups) within each Patch. In 'Morph Mode', these 8 buttons function as Morph group selection buttons. They are used when you want to control several parameters in a Patch from a single control source.

#### PATCH SETTING

This button is used when you want to switch display between the Patch parameters (which are printed above the ASSIGNABLE DISPLAYS) and the Programmable Parameter Pages.

#### PROGRAMMABLE PARAMETER PAGES BUTTONS

To the right are 5 main PARAMETER PAGE buttons in combination with 3 COLUMN buttons for a total of 15 Columns per Patch. Each of these Columns can contain the 8 ASSIGNABLE KNOBS or BUTTONS for a total of 120 assignable parameters per Patch.

## NORD MODULAR G2 REAR PANEL



Connect a control/expression pedal to the CONTROL PEDAL input. Connect a foot switch/sustain pedal to the SUSTAIN PEDAL input. The polarity of the input can be adjusted to suit different types of foot switches.

Connect a free USB port of the computer that runs the Editor software to the USB Port.

Connect any external MIDI equipment to the MIDI IN, MIDI OUT and MIDI THRU ports. This could be a sequencer, a master keyboard or another MIDI device.

The unbalanced, line level (-10 dBV) audio outputs **OUTPUT 1-4** route the audio signals from the four virtual mix buses in Nord Modular G2. Use **OUTPUT 1** if you are going to use Nord Modular G2 with a mono sound system. If only **OUTPUT 1** is connected, it will route the audio from **OUTPUT 2** as well.

By connecting external sound sources to the unbalanced, line level (-10 dBV) inputs INPUT 1-4, you can Patch in audio signals and process in the Nord Modular G2.

The XLR MIC INPUT can be used for dynamic, non-Phantom powered microphones. If you use the MIC INPUT, it will automatically disable the INPUT 1 input. The MIC INPUT has a built-in preamp so you don't have to amplify the signal externally.

The HEADPHONES output routes audio signals which are assigned OUTPUT 1 and 2.

## NORD MODULAR G2 ENGINE FRONT PANEL



#### UPDATE MODE BUTTON

This is an "emergency" button which can be used to manually set the G2 Engine in Update Mode. Normally you don't have to use this button.

#### MIDI LED

Indicates incoming MIDI Note On messages received on the MIDI IN jack.

#### USB LED

Lights steadily when the G2 Engine's USB port is connected to the computer's USB port and the Editor has established contact.

#### POWER ON LED

Lights steadily when the G2 Engine is powered on.

#### ON/OFF BUTTON

Switch on and off the G2 Engine with the ON/OFF button.



## NORD MODULAR G2 ENGINE REAR PANEL

Connect a free USB port of the computer that runs the Editor software to the USB Port.

Connect any external MIDI equipment to the MIDI IN, MIDI OUT and MIDI THRU ports. This could be a sequencer, a master keyboard or another MIDI device.

The unbalanced, line level (-10 dBV) audio outputs OUTPUT 1-4 route the audio signals from the four virtual mix buses in Nord Modular G2 Engine. Use OUTPUT 1 if you are going to use Nord Modular G2 Engine with a mono sound system. If only OUTPUT 1 is connected, it will route the audio from OUT-PUT 2 as well.

By connecting external sound sources to the unbalanced, line level (-10 dBV) inputs INPUT 1-4, you can Patch in audio signals and process in the Nord Modular G2 Engine.

The HEADPHONES output routes audio signals which are assigned OUTPUT 1 and 2. Note! Since the G2 Engine lacks a volume knob, be careful when you use headphones so the volume isn't too loud. Make it a habit of always lowering the Patch Level in the Editor before using headphones with the G2 Engine.

## 3. SYNTH QUICK TOUR

Before we install and start using the Editor software, let's have a look at the Nord Modular G2 synthesizer and check out some internal sounds and basic functions. Turn on the power!

## CHECK OUT SOME PATCHES!

When you have turned on the Nord Modular G2, a Patch is automatically loaded in Slot A and the Patch name is shown in the MAIN DISPLAY. Then, if necessary, press the PARAMETER PAGE A button to the upper right to make the 4 ASSIGNABLE DISPLAYS show some of the assigned Patch parameters. In the 4 ASSIGNABLE DISPLAYS, 8 different Patch parameters are displayed together with their current values. Below the ASSIGNABLE DISPLAYS, the 8 LED GRAPHS around the ASSIGNABLE KNOBS show the parameters' coarse values. Now, if you turn one of the ASSIGNABLE KNOBS, the LED GRAPH will change and the exact value will be shown in the ASSIGNABLE DISPLAY above the knob



## ACCESS MORE ASSIGNED PARAMETERS IN THE PATCH

To the bottom right of the front panel are 5x3 programmable PARAMETER PAGES buttons. The Programmable Parameter Page function is arranged in 5 Pages with 3 Columns each. By using these, you can access a total of 15 Columns of parameters in a Patch. Since each Column can contain 8 separate parameters, this gives you instant access to a total of 120 parameters per Patch. Press the COLUMN 2 button to access Parameter Page A2. Now, 8 new parameters are shown in the ASSIGNABLE DISPLAYS and you can edit them. If you press the COLUMN 3 button, another 8 parameters are displayed. Then, you can continue by pressing the PAGE



B button access and its Columns to check out more assigned parameters.

## VARIATIONS (PATCH PARAMETER VARIATIONS)

Below the 8 ASSIGNABLE KNOBS are 8 Variation buttons. A Nord Modular G2 Variation is a complete setup of parameter values in a Patch. In other words, it's possible to have up to eight different complete parameter "setups" in each Patch. You could compare the Variation function in the Nord Modular G2 with a traditional hard-wired synth where a "variation" would be the same as a "Program", i.e. a setup of the sound parameters in the synth. Press the VARIATION 2 button and you will hear a different sound - but based on the same Patch.



## LOAD A NEW PATCH FROM THE INTERNAL MEMORY

Load the new Patch into the active Slot (Slot A in this example) by first turning the **ROTARY DIAL** to select the Patch. If you like you can also switch between Banks by pressing the UP/DOWN NAVIGATOR button. Then load the selected Patch into the Slot by pressing the PATCH LOAD button. Now, you can try out other Patches of the internal memory, edit parameters and check out different Variations as described above.



## CHECK OUT SOME PERFORMANCES

A Performance is a combination of up to four Patches. Enter Performance mode by pressing the **PERFORM**-ANCE button. Load a Performance into the Slots by first turning the **ROTARY DIAL** to select the Performance and then pressing the **PATCH LOAD** button. As you can see, several **SLOT LEDS** are now lit to indicate that several Patches are used in the Performance. The Performance name is shown in the **MAIN DISPLAY** and the first 8 parameters of the focused Patch are shown in the **ASSIGNABLE DISPLAYS**.



## ACCESS ASSIGNED PERFORMANCE (GLOBAL) PARAMETERS

Each Performance can have a separate set of programmable Parameter Pages, in addition to the Parameter Pages of each Patch in the Performance. Hold down SHIFT and press the PATCH SETTINGS button to access Global Parameter Page A, Column 1. Now, 8 new parameters are shown in the ASSIGNABLE DISPLAYS and you can edit them. If you press the COLUMN 2 button, another 8 Performance parameters are displayed, and so on. If you want to access the Programmable Parameter Pages of each individual Patch, hold down SHIFT and press the PATCH SETTINGS button



again. Now, the first Parameter Page of the Patch in the focused Slot is shown in the ASSIGNABLE DIS-PLAYS.

#### LOAD A NEW PERFORMANCE FROM THE INTERNAL MEMORY

Load the new Performance into the Slots by first turning the ROTARY DIAL to select the Performance. If you like you can also switch between Banks by pressing the UP/DOWN NAVIGATOR button. Then load the selected Performance into the Slots by pressing the PATCH LOAD button. Now, you can try out other Performances of the internal memory and edit parameters as described above. To revert to "Patch mode", press the PERFORMANCE MODE button.



## 4. SOFTWARE INSTALLATION

## EDITOR SYSTEM REQUIREMENTS

The Nord Modular G2 Editor software requires a PC running Windows 98SE/2000/XP (a Pentium II 450 MHz or better with minimum 64 MB RAM is recommended), with a USB (1.1) port, CD ROM drive, keyboard and a mouse. The computer has nothing to do with the actual sound processing in the Nord Modular G2 - it is used only for visual Patching and to send instructions to the Nord Modular G2. The Editor is designed for minimum 1024 x 768 pixels screen area, and minimum 16-bit color (thousands).

## INSTALLATION OF THE USB DRIVER

Before connecting the Nord Modular G2 synthesizer to the PC, you need to install the USB driver. The USB driver makes it possible for the PC to recognize the G2 and for the Editor to communicate with the synth. To install the USB driver, do like this:

- 1. Insert the 'Modular G2 V1.10' CD into the CD-ROM drive.
- 2. Connect the USB cable between the synth and the computer. The 'Found New Hardware' wizard should appear.
- 3. Let the wizard search for the USB driver and install it.

## INSTALLATION OF THE EDITOR

- 1. Insert the 'Modular G2 V1.10' CD into the CD-ROM drive.
- 2. Run SetupModularG2\_V1\_10.exe and follow the instructions in the setup program.
- 3. The Editor software will be installed in a folder named Clavia in the Program Files folder on the hard disk. During the installation you will be able to select an alternative location for the software.
- 4. Confirm every window in the installation procedure by clicking on the Next button. The installation may be aborted by clicking on Cancel.
- 5. When the installation is complete, click the Close button to return to the Windows desktop. There is no need to check in the 'Synth Updater' check box since the synth has the latest OS already installed from factory.

## STARTING UP

Make all the audio connections before turning on any of the devices. The computer that runs the Editor must be connected via a USB port to the Nord Modular G2.

## SOUND SYSTEM

Connect the desired outputs of the Nord Modular G2 to a sound system. We suggest that you start by connecting output 1 to the left channel and output 2 to the right channel of the sound system. Turn on Nord Modular G2 first, followed by the sound system.



Connecting the G2 to the PC



Connecting the G2 to the sound system

## LAUNCHING THE EDITOR

Power on the synth and make sure the USB cable is properly connected between the synth and your computer. From the Start menu in the Windows taskbar, select Programs|Nord Modular G2 V1.10|Modular Editor V1.10. During the start-up procedure, the Editor software will automatically search for and establish contact with the Nord Modular G2 synthesizer. If the connection between the synth and the computer is not working properly, an error message will appear. In that case, check the USB cable, make sure that the USB driver is properly installed and working, and that the synth is turned on. When the Editor has found the synth, the name of the connected synth is shown in the Status line. Any Patch currently loaded in the focused **SLOT** will automatically upload to the Editor and open in the Patch window.

## UPDATING THE OS IN THE SYNTH

Note! If you received a brand new Nord Modular G2 or G2 Engine, the latest operating system is already installed from factory. If so, there is no need to update the synth. If you need to update the OS in the synth, do like this:

- 1. Make sure the USB Driver and Editor are properly installed as described earlier in this chapter.
- 2. Power on the G2 synth and connect the USB cable between the synth and computer.
- 3. Make sure the G2 Editor is not running.
- 4. Open the 'Modular Synth Updater' in the Programs|Nord Modular G2 folder in the Start menu of the computer and click the Update button to complete the OS update. As the update proceeds, the

different stages are shown in plain text in the G2 Main Display. On the G2 Engine, the different LEDs show the status of the update according to the following:



1. Receiving new OS via USB: MIDI LED is blinking slowly. USB LED is flashing



2. Erasing old OS and storing new OS in memory: MIDI LED and USB LED are flashing alternating.



3. Starting new OS and reverting to normal operation: Both LEDs go off and then the USB LED is lit until you quit the Synth Updater program.

5. When the G2 synth has started up with the new OS you can exit the Synth Updater program and start the G2 Editor.

Note! If the Synth Updater program shouldn't recognize the connected G2 synth for some reason, even tough the USB Driver has been properly installed, you may have to enter Update Mode manually in the synth. On the Nord Modular G2, hold the STORE+PERFORMANCE MODE buttons and power on the synth.

On the G2 Engine, press the "hidden" button inside the hole to the right of the G2 logotype and power on the synth. First, the MIDI LED lights up, then the USB LED lights up and finally both LEDs light up. Then, both LEDs go off and the synth goes into "Update Mode" as indicated by the slowly blinking MIDI LED. Now, you can run the Synth Updater program as described above.





Update Mode button

## 5. BASIC FUNCTIONS

## INTRODUCTION TO THE NORD MODULAR G2

A modular synthesizer could be described as a flexible electronics kit. It contains a lot of parts, the modules, which have various functions. You can build your own, customized synthesizer by connecting different modules and functions with Patch cables. A modular synthesizer has the advantage of being a very flexible instrument, leaving you in charge of the routing of the signals and functions in the synth. Nord Modular G2 takes this concept several steps further, being programmable, polyphonic, and multitimbral. Nord Modular G2 also features a very powerful editing system in the supplied Editor software.

## MODULES

A module in Nord Modular G2 can be, for example, an oscillator, an envelope generator, a filter or a step sequencer. There are currently over 150 different types of modules available in Nord Modular G2. You are not limited to use only one module of a specific type in a Patch. Several identical modules can be used together, creating, for example, really fat multi-oscillator Patches.

## CONNECTIONS

Almost every module and nearly every function of a module can be Patched to other modules and functions, using virtual cables. Each module has one or more connectors (except for some modules in the MIDI module group which have no connectors). These connectors come in two different shapes: circular inputs and square outputs, and three different variants: red audio, blue control and yellow logic connectors. Most of the modules share the same basic layout, with the audio input connector(s) to the top right and the audio output connector(s) to the bottom right.

## PARAMETERS

There are usually one or more parameters in each module. A parameter can be a knob, a slider or a button or a set of combined buttons - radio buttons. You change the setting of a parameter either with the mouse in the Editor software or with an ASSIGNABLE KNOB/BUTTON on the synth front panel. A knob parameter in the Editor is "turned" by click-holding it and moving the mouse. Click on the increment and decrement buttons to change the value one step a ta time. You can also use the computer keyboard's up and down arrow keys to increase and decrease the focused parameter value. A button is toggled simply by clicking on it.

#### SCROLL BUTTONS

Some buttons look like regular "single" buttons but have more than two states. These buttons are called scroll buttons since you "scroll" through the different states. The different states are selected by clicking the button repeatedly. An example of a scroll button is the 'Semi/Partial/Frequency/Factor' scroll button on the Oscillator modules. See "Scroll buttons" on page 31.

## DROP-DOWN SELECTORS

Some modules feature so called drop-down selectors. Here you select functions (oscillator waveforms for example) by selecting from a drop-down list. The advantage of using these drop-down selectors in a module is that the module use less Patch Load compared to a module with radio buttons. However, changing

function with these drop-down selectors will force the Sound engine to recalculate and thus cause a brief moment of silence. See "Drop-down selectors" on page 31.

## DISPLAY BOXES AND GRAPHS

Some modules feature one or more display boxes that display alphanumeric and/or graphical information. Some oscillator modules, for example, display the frequency. The read-out of the oscillators is selectable between Hz and semitones, by clicking on the corresponding scroll button. Graphical information in modules can be envelope curves, wave shapes, frequency diagrams etc.

## LEDs

Some modules have LEDs to indicate functions. The rate of an LFO, the opening or closing of an Envelope or the current step position in a sequencer module are some examples of where LEDs are used.

## THE PATCH

When you have connected a couple of modules together, you have created a Patch. A Patch can be saved on the computer and/or stored in the internal memory of the synth. A Patch can produce one particular sound, or several sounds at once, depending on how many sound sources you use in the Patch. A Patch could be anything from a copy of an existing vintage synthesizer, to a completely unique synthesizer configuration of your own design. A Patch can also contain up to 8 different complete parameter setups -Variations (see "Creating Patch parameter Variations" on page 47).

## SLOTS

There are four SLOTS labelled A, B, C and D, on the Nord Modular G2. You can load one Patch at a time to each Slot. A Slot can be considered a temporary RAM memory which can hold a Patch for playing and editing. You activate a SLOT by pressing one of the SLOT buttons on the Nord Modular G2 front panel. The LED above the SLOT button will be lit to indicate that the SLOT is active for playing and the LED below that the PAtch in the Slot is enabled for editing. The MAIN DISPLAY shows the memory location and the name of the Patch as well as Sound Category selected for the Patch.



#### PLAYING MULTITIMBRALLY

The Slots can receive MIDI information on separate MIDI channels, making Nord Modular G2 up to 4 part multitimbral. If you want to use Nord Modular G2 multitimbrally, you first have to load the Patches you want in each SLOT. Hold down SHIFT and press the SLOT buttons you want to include in the multitimbral configuration. Then, simultaneously press the SLOT buttons for the Slots you want to use. You can change the focused Slot by pressing the corresponding SLOT button. To deactivate and reactivate Slots in a multitimbral setup, hold SHIFT and the desired SLOT button(s). The MAIN DISPLAY shows the memory location and the name of the Patch as well as Sound Category for the focused Patch.

#### PERFORMANCES

A multitimbral setup of Patches can also be saved as a Performance. Thanks to the flexible routing possibilities in the Nord Modular G2 system it's possible to route audio and MIDI between Patches in a Performance for really powerful configurations. (See "Performances" on page 54).

## Focus

An often used expression in this manual is "focus". For example, you can put a module parameter, a Slot, a Morph group or a Patch Variation "in focus". This simply means that the focused object is currently selected and enabled for editing.

## SIGNALS IN THE PATCH

## DEFINITIONS

Just as in a traditional analog system, modules and parameters in Nord Modular G2 interact with each other by means of signals being Patched from one place to another. In a typical analog system, these signals are represented by voltage ranging from e.g. -10 to +10 volts. The signal levels in the Nord Modular G2 system are represented by "units". These units have nothing to do with the internal resolution of the Nord Modular G2 system, which is 24-bit, but is used to more easily indicate levels in the system. Nord Modular G2 uses three types of signals in its Patches:

- bipolar audio signals (-64 to +64 units)
- bipolar and unipolar control signals (-64 to +64 units, 0 to +64 units or 0 to -64 units)
- unipolar, high or low, logic control signals (0 or +64 units)

The illustration to the right shows the levels and the polarity of the signals from the keyboard, an LFO, an envelope, an audio signal and a logic signal.

The LFO is an example of a bipolar modulator. Bipolar means that it sends both positive and negative levels (peak to peak –64 to +64 units). The keyboard is another example of a bipolar modulator. The key E4 (MIDI note number 64) represents 0 units in the Nord Modular G2 system.

A normal ADSR envelope generator is an example of a unipolar modulator. It will typically only modulate in one direction, either positive or negative. In the case of Nord Modular G2 ADSR envelopes, they can be either unipolar or bipolar and have a range of 64 units.

The Clock generator is an example of a module which sends logic signals. A logic signal is also a un-



ipolar signal but it has only two possible values, two states: low (0 units) or high (+64 units). The types of output signals of each module in Nord Modular G2 will be described further on in this manual using the definitions: **bipolar**, **unipolar** and **logic**.

#### RESOLUTION AND HEADROOM

The resolution in the Nord Modular G2 system is 24 bits. This ensures a supreme audio quality. The headroom of the audio signals in Nord Modular G2 is -12 dB for every sound source (Oscillator). This

means that if you mix more than 4 sound sources in a voice, at very high or un-attenuated levels, distortion may occur. This is easily dealt with by attenuating the levels of the sound sources.

The mix bus headroom of the output modules is -6 dB per bus.

The amplitude of the audio signals increases for each voice you play. A monophonic Patch with an amplitude that is perfectly within the headroom, might produce distortion in the Output modules if more voices are added and played together.

To determine where any unwanted distortion occurs, first try to lower the Patch Gain level on the top of the Patch window. This action removes any mix bus related distortion. If this does not help, check the input signals to the mixers in the Patch for possible distortion

## AUDIO SIGNALS, RED CONNECTORS

Audio signals are bipolar as described above. The audio signals in Nord Modular G2 are 24-bit at 96 kHz sampling frequency for extremely high quality, and they have highest priority in the Sound engine. Audio connectors are distinguished by the red color. Do not let the description "audio" stop you from experimenting with these signals. They can be used to modulate things too. You can, for example, Patch the red audio output from an oscillator to a blue Pitch input of another oscillator.

#### CONTROL SIGNALS, BLUE CONNECTORS

Control signals are sent from envelope generators, LFOs, the keyboard, sequencers etc. The control signals can be either uni- or bipolar. They are used to control or modulate parameters in a Patch. The control signals are 24-bit at 24 kHz sampling frequency, i.e. a quarter of the audio signal bandwidth. This is because they are often low-frequency signals by nature, and do not require a high bandwidth. The control signal connectors are distinguished by the blue color.

## LOGIC SIGNALS, YELLOW AND ORANGE CONNECTORS

Logic signals are used to clock, trig or gate different functions. They have two possible levels, low (0 units) or high (+64 units). The logic signals can use either 24 kHz or 96 kHz bandwidth depending on application and use 24-bit resolution. Logic signal connectors are distinguished by the yellow color. If 96 kHz bandwidth is used, the connector color changes to orange.

The state when a logic signal switches from 0 units to +64 units, is called the positive edge. When the logic signal change back to 0 units again, is called the negative edge. The logic inputs in the system can react to an incoming signal in four different ways. These are easily recognized by one of three symbols or the absence of a symbol, next to the input.

A logic input that responds to both edges of the logic signal has no symbol next to it. Please note that even though they respond to both edges, the response is not the same for the positive and the negative edge. An example of this is the Gate input on the ADSR envelope generator. This input "starts" the envelope when the positive edge of a logic signal appears and "releases" the envelope when the logic signal switches back to 0 units again.



<mark>⊜</mark> 8Count ●)†Cik

A logic input that reacts only to the positive edge has an arrow, pointing upwards, next to it. This is a typical behaviour of a clock input on a sequencer module or a clock divider. This input is only interested in the positive edges of a logic signal.

There are some logic inputs that will react to the positive edge of a logic signal only if there is a clock signal coming in to the module as well. These inputs have an arrow, pointing upwards towards a horizontal marker, next to them. The Park input on the various sequencer modules is an example of this. These modules will park in sync with the next clock signal (on the Clk input) when they receive a positive edge at the Park input.





The logic Clock input on the Clock divider module is an example of an input that reacts the same way to both of the edges of an incoming logic signal. This input has a double-sided arrow next to it.

The different behaviors of the logic inputs are important to remember. It is possible to Patch other signals than logic ones to the logic inputs. The output of a LFO, for instance, can be a good clock source or could be used to start envelopes. The logic input will not mind having a control or an audio signal connected to it. The logic inputs interpret any signal with a level of 0 units or less as a low signal and any signal with a level greater than 0 units as a high signal.

#### BANDWIDTH CONSIDERATIONS

The two different bandwidths of the signals in Nord Modular G2 are important to keep in mind. You can Patch a red audio output to a blue control input and vice versa but sometimes the results might be surprising. Some of the LFOs are capable of producing audible frequencies. Since the output of an LFO is a control signal, updated at quarter speed of an audio signal, the quality of an LFO generated signal might not be good enough to be used as an audio signal. If high audio quality is important in a Patch, use oscillators as audio signal generators instead. The LFOs can, however, provide excellent signals to be used as a frequency modulators in an FM-type Patch.

#### SELF-OPTIMIZING MODULES

A lot of modules in the Nord Modular G2 system are self-optimizing. This means they automatically adapt their Patch Load according to which connectors are being used and to the bandwidth of the incoming signal(s). All Mixers, for example, default to blue (control signal) inputs and outputs. If you connect only control signals to a Mixer, the inputs and outputs will remain blue and the Mixer will use less Patch Load - enabling for larger Patches or greater polyphony. However, if you connect a red (audio signal) cable to a Mixer input, all inputs and outputs will automatically "update" to audio bandwidth for maximum signal quality. This is indicated on the module by the inputs and/or outputs changing color.

### EXPERIMENT!

You can always try to Patch the three different types of signals to wherever you want. You may run into situations where the result of a connection will not be what you expected, but that is part of the beauty with a modular system like this. A blue control signal output can be very useful modulating on a yellow logic signal input, and an audio signal output can certainly produce interesting results connected to a control signal input. The colors are only there to help you identify the various signal types, not to restrict any experiments.

## GENERAL MODULE PARAMETER TYPES

## BUTTONS

A button can only have two states (on or off). An example of a button is the On/Off button of the Oscillator modules. The 'On' position is indicated by a colored button.

## RADIO BUTTONS

Radio buttons basically are a row of Button selectors. If you click on one of the buttons, the previously active button will automatically be deactivated. An example of radio buttons are the waveform buttons of the OscillatorA module. The selected alternative is indicated by a colored button

## ARROW BUTTONS

By clicking on an arrow button you increment or decrement a parameter value by one step at a time. If you click and hold an arrow button the value is auto incremented/decremented. An example of an arrow button is the Analysis buttons of the Vocoder module.

## KNOBS

A knob is the type of circular knob found on almost every module in the Nord Modular G2 system. For example the Pitch modulation, Semitone and Fine tune knobs of the OscillatorA module. If a knob has a green triangle above it, you can click the triangle to reset the knob to the default 12 o'clock position.

## SLIDERS

A slider basically has the same functionality as a knob - only a different appearance. Sliders can be found on some Sequencer modules, for example.

## DROP-DOWN SELECTORS

Drop-down selectors are distinguished by a vertical rectangular button with a small black triangle on it. When you click and hold this type of selector, a drop-down list with various alternatives is shown. Some drop-down selectors also feature a graph to display the current selection (a waveform, for example) is shown. The advantage of using drop-down selectors compared to radio button selectors in a module is that the module *replaces* the function rather than switches between functions. This makes modules with drop-down selectors of-

ten use less Patch Load than radio button modules. However, when you change these types of drop-down parameters, it will force the Sound engine to recalculate the Patches in all active Slots and thus cause a brief moment of silence. Also, note that drop-down selectors cannot be assigned to a KNOB, Morph group or MIDI Controller. Modules with drop-down selectors can only have one selection for all Variations in a Patch.

## SCROLL BUTTONS

Scroll buttons can have two or more states. When you click on a scroll button you activate the "next function in line". When you click again the following function is activated and so on. An example of a scroll button is the Attack/Decay Shape button of the ADSR Envelope module.



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## MODULATION

The method of controlling one function in a module with another function is called to "modulate". When you play on a keyboard and the oscillator changes its pitch, you are modulating the pitch with the keyboard signal. Another example is an envelope opening up a filter when a key is pressed. Logic signals from the keys tell the envelope to start modulating the cut-off frequency of the filter. Modulation can be positive or negative, e.g. the cut-off frequency of a filter can increase with positive modulation and decrease with negative modulation or vice versa. As you will see, there are some modules in Nord Modular G2 that can change the polarity of a modulator signal. Some modules can be set to send either bipolar or unipolar control signals, like the Constant module or the Control Sequencer module.

## MODULATION INPUTS

A module parameter that can be modulated from an external source has a modulation input, often in combination with modulation amount control. This is called a mod-input. The modulation amount control attenuates the incoming signal. The modinputs can be red, like the Sync, FM and Shape inputs of the OscillatorB module, which means they are capable of handling signals at full audio bandwidth, or they can be blue, like the Vowel modulation input of the Voice Filter module, working at 1/4 audio bandwidth. The modulation inputs can also be self-optimiz-



ing, like the Pitch inputs of the Oscillator B module, meaning that they adapt their bandwidth to the incoming modulation signal bandwidth. This is indicated by the inputs changing color.

## MOD-AMOUNT KNOBS (ATTENUATORS)

There are four different response behaviors of the mod-amount knobs next to the modulation inputs: linear [Type I], exponential/dB [Type II] and amplified linear [Type III]. The different response type(s) will be indicated for each module in the module reference section starting on page 109.

## [TYPE I]

The mod-amount knobs attenuates the incoming signal in a linear fashion. A setting of 100 (maximum) leaves the incoming signal unaffected, a setting of 50 attenuates the incoming signal by a factor 0.5 (leaving half of the level of the incoming signal to modulate). A setting of 0 shuts off the modulation completely. Oscillator pulse width modulation is an example of Type I attenuation. Signal attenuation/ amplification factor



## [TYPE II]

The mod-amount knob attenuates the incoming signal in an exponential fashion. A setting of 100 (maximum) leaves the incoming signal unaffected, a setting of 50 attenuates the incoming signal by a factor
considerably less than 0.5 (leaving less than half of the level of the incoming signal to modulate). A setting of 0 shuts off the modulation completely. The pitch mod-input on the various oscillators and the 'dB' attenuation alternative in the Mixer modules are examples of Type II attenuation.

#### [TYPE III]

The mod-amount knob affects the incoming signal in an attenuated and amplified, linear fashion. A setting of 200% (maximum) amplifies the incoming signal to twice its original level, a setting of 50 leaves the incoming signal unaffected and a setting of 25 attenuates the incoming signal by a factor of 0.5 (leaving half of the level of the incoming signal to modulate). A setting of 0 shuts off the modulation completely. The frequency mod-input on the various filters are the sole examples of Type III attenuation.

### MODULATION EXAMPLES

#### PULSE WIDTH MODULATION

Let us use the pulse width on the OscDual module as an example in two scenarios:



- 1. If you want to modulate the pulse width from the minimum value (1%) to the maximum value (99%) with a positive envelope (that produces a control signal with a peak to peak level swing from 0 units to +64 units), set the initial pulse width (PW) to 50% and the mod-amount to 100.
- 2. If you want to modulate the pulse width from the minimum value (1%) to the maximum value (99%) with an LFO (that produces a bipolar control signal with a peak to peak level swing from -64 units to +64 units), set the initial pulse width (PW) to 75% and the mod-amount to 50.

Increasing the setting of the mod-amount can force the pulse-width beyond the limits (1% - 99%). This will result in the signal being "mirrored".

Note the difference between the total amount of modulation from an envelope (unipolar, 64 units) and from an LFO (bipolar, -64 to + 64 units = 128 units). This explains why the first scenario has the modamount set to 100, and the second scenario set to 50 for maximum modulation.

#### PITCH MODULATION

A signal routed to a Pitch input on a module affects the pitch by modulating it linearly in the note scale (see figure to the right below)

The figure to the right shows an A4 note being pitch modulated by a sym-

metric bipolar signal.





50%

#### FREQUENCY MODULATION (FM)

A signal routed to an FM input on a module affects the pitch by modulating it linearly in the frequency scale (see figure to the right below).

The figure shows an A4 note being pitch modulated by a symmetric bipolar signal. As you can see, FM modulation results in equal pitch shifting, in Herz, on either side of the basic pitch, whereas Pitch shifting results in equal shifting in the note scale.



FM Lin

#### SYNC

A waveform of an oscillator with a Sync input can be synchronized with a signal of another oscillator. The synchronization forces the wave to restart each time the modulating signal raises above 0.



This results in a complex waveform that depends both on its own pitch and on the modulator pitch. When sync is used, the oscillator pitch is locked to the modulator pitch. If you change the modulator pitch, you will affect the overall pitch, and if you change the oscillator pitch, this will create changes in timbre rather than in pitch.

If you let the synchronized oscillator pitch vary continuously, from an LFO or other modulator, you will change the timbre of the wave in a very interesting and characteristic way.



#### MAXIMUM MODULATION

The maximum amount of modulation that a module (with one exception) can accept is +/-64 units from the initial setting of the parameter. The exception to this are the Filter Freq modulation inputs. These mod-inputs can accept +/-128 units of modulation.

The modulation amount is the sum of all modulation appearing at the modulation inputs.

Let us use the OscA module as an example: there are two pitch modulation inputs and the KBT (Key-Board Tracking) function. The total modulation amount of these three inputs can not be greater than +/-64 semitones. If you turn the coarse tuning down to e.g. E0, add a transpose value of +64 with a Con-

stant module to the first pitch-mod input, you will reach a point, when playing on the keyboard, where the pitch of the oscillator will be fixed. Any additional, positive modulation will have no effect, which could lead to interesting effects. For example, an LFO would be able to modulate the pitch of the oscillator downwards, but not upwards.

# VOICES, MONO- AND POLYPHONIC PATCHES

A Patch can be set to a polyphony between 1 (Legato and Mono) and 2-32 voices, as long as there is enough Sound engine power (Patch Load) available. It is not necessary to manually duplicate all the modules and settings for each voice to create a polyphonic Patch, as it would in a traditional modular system. All you have to do is change the requested polyphony in the top of the Patch window in the Editor or in the Patch Settings "menu" in the synthesizer. To be able to make a Patch polyphonic, you have to create the Patch, or the part of the Patch, you want to be polyphonic, in the Voice Area of the Patch window (see "Voice Area and FX Area" below).

The actual polyphony of a Patch is displayed in the Voice Mode display box. The requested number of voices is displayed within parenthesis. Should your request for polyphony exceed the actual capacity of the Sound engine, the system assigns the highest possible amount of voices to the Patch instead.

All Patches must have a requested number of voices assigned to them (minimum 1 voice - Legato or Mono). The dynamic allocation method used by other multitimbral hardware synthesizers is not applicable with Nord Modular G2.

You can easily adjust the polyphony for a Patch in the synth by selecting a SLOT, pressing the PATCH SETTINGS button and turn the KNOB below the Voice Mode DISPLAY. This can be useful if you have a couple of Patches loaded in several SLOTS and wish to quickly redistribute the polyphony among the Patches.



Set the requested number of voices by clicking the arrow buttons. The requested number of voices is shown within parenthesis and the actual number of voices is shown to the left in the display box.



See the actual and requested number of voices allocated to the Patch in the display.

The Nord Modular G2 note recognition system operates according to the "last note" principle. If you run out of polyphony and continue to play notes, the synthesizer will always add the last note played and remove the first note, with one exception: it will try to keep the lowest note sounding.

# 6. PATCHES

# WHAT IS A PATCH?

In the Nord Modular G2 system, a Patch is always the base for a sound (and/or control application). A Patch is a configuration of modules which are connected with virtual cables to generate and/or process sound. A Patch can also be used only to control things, for example other instruments via MIDI. To put it simple: no Patch - no action! A Patch can contain up to eight different Variations. A Variation is a complete setup of Patch parameter settings. Read more about Variations on page 47.

# **CREATING YOUR FIRST PATCH**

When you want to create new Patches in the Nord Modular G2 system you always have to do this in the Editor on the computer. Open the Editor on your computer. In this first example we will create a basic subtractive synthesis Patch. Make sure the Editor has established contact with the synthesizer. If it hasn't, please see "Launching the Editor" on page 24.

- 1. Select File|New.
- 2. An empty Patch window is opened. The Patch window automatically "connects" to the focused Slot in the synth. The Patch window is divided into two sections: the Voice Area, at the top of the Patch window split bar, and the FX Area at the bottom of the Patch window. The difference between these areas will be explained later in this example. We will begin using the upper section, the Voice Area.
- Locate the Module tabs in the upper left part of the Patch window (In/Out, Note, Osc, LFO etc.). Select the In/Out tab. A preview of the module appears when you place the cursor over a module icon.

New	In/Out Note Osc LFO Env Shaper Filter Mix	er Sw
Init 1	KBD OUT2 OUT4 2-IN 4-IN FX IN N-BAR	
Init 2		
Patch	Keyboard Note Sate Vel Kee	•
Name 🗖		- · -
1. 16 1 2.	Keyboard - voice	1

- 4. Click-drag one 'Keyboard' module and one '2-Out' module to the (upper) Voice Area. As you will notice, the modules will self-align when placed near each other. It doesn't matter where in the Voice Area you put your modules, but a good idea is to place them in a "natural" flow so it becomes easier to follow the signal paths visually.
- 5. Click on the Osc tab, and click-drag one 'OscB' module to the Voice Area.
- 6. Click on the Env tab and click-drag one 'EnvADSR' to the Voice Area.

- 7. Click on the Filter tab and click-drag one 'FltNord' to the Voice Area. Now your Patch should look something like this:
- 8. Let's settle with these modules for now and start with the cable connections. First of all, let's connect all audio cables between the modules: Place the cursor over the red square output of the 'OscB1' module. Click, hold and drag the cursor to the blue circular input of the 'EnvADSR1' module. Release the mouse button. Now, a red audio cable appears between the two modules. Also note that the input and output of the 'EnvADSR1' module changes color to red to indicate adaption to audio bandwidth. Repeat the procedure and connect the 'EnvADSR1' output to the 'FltNord1' input and the 'FltNord1' output to the '2-Out1' input L.



If you should accidentally connect wrong, simply double-click-hold on one of the connectors, drag the cable away from the connector, and release the mouse button. The cable disappears.

Finally, check that the Destination button is set to Out 1/2 of the '2-Out1' module to route the audio signal to the physical OUT 1 jack of the synth. Your Patch should now look like this.

9. Even though all audio cables have been properly connected, no sound is heard. You have to make the envelope generator "open up" for the audio signal. This is done by simply playing the synth keyboard. The KBG (Keyboard Gate) button on the 'EnvADSR1' module is on by default which makes it possible to gate the envelope without connecting the Gate input.

If you play on Nord Modular G2 (via the keyboard or MIDI IN), the envelope Gate LED lights up and the Patch will sound.

10. Now, let's add an 'LFOA' module from the LFO tab to the Patch. Connect a cable between the square, blue output of the 'LFOA1' module, to the lowest blue, circular Pitch input of the 'OscB1' module. Play the Nord Modular G2 and turn the Pitch input attenuator knob next to the input of 'OscB1' by click-holding and moving the mouse. This makes 'LFOA1' modulate the pitch of the oscillator, adding vibrato to the Patch. Your Patch should look something like this:

If you like, you can serial connect a new cable from the lowest Pitch input of the 'OscB1' module, to the circular, red Shape modulation input, located to the bottom right in the same module. This will route the LFO to both the Pitch and the Shape modulation inputs. Select the square wave on the oscillator waveform selector and turn up the modulation attenuator knob, next to the Shape modulation input. Also, increase





the cutoff frequency of the 'FltNord1' a bit to make the sound brighter. (One single modulator can

be connected to several different destinations, either by making a "branch connection" from the original output to every input, or by making a serial connection from the first input to the second input, to the third etc.)

11.Now that we are satisfied with the modules and connections, let's make the Patch polyphonic. Since all modules are used in the Voice Area, it is possible to play the Patch polyphonically. No Cat Vice 4 (4) Var. 12

Locate the Voice Mode arrow buttons, to the right of the Var(iations) buttons in the toolbar. Set the requested number of voices by clicking on the upper arrow button. In the Voice Mode display box, the actual number of voices for the Patch is shown and the requested number within parenthesis. In this example, we request 4 voices.

12. In the bottom section of the Patch window, the FX Area, you can place modules that should act equally on all voices in the Patch. Modules used in the FX Area will act on the sum of the signals from the Voice Area. Let's say we want a reverb acting on all voices in our sound, but we don't want the reverb module to be duplicated for each voice like the other modules. First we need to tell the '2-Out1' module in the Voice Area to route the signal to the FX Area instead of the physical **OUT1** of the Nord Modular G2. Do this by clicking the FX destination button on the module. Click on the In/Out tab and click-drag one 'FX In' module and one '2-Out' module to the FX Area. Your Patch will now look like this:



+0 KBT

FM Lin

BR HP 0.50 (

GC

KBT Off

Note 💌 Gate 🗕 🛛 Vel 💌

Rel 🗾

M

Enı

dB/Oct B

л л

M

12 24

Keyboard1

AASR-Env1

🔽 12/24dB f. 1

🛛 20utput1

Pitch Poly

Pad OdB LfoA1

•

AIVIXI

+0

Semi Cent

○ KB 1.3m 2.62s 40.0 1.02s

Out 1/2 3/4 1/2 3/4 1

Rate Lo

5.13Hz (

🗑 OscB1

🌖 † Sync

Pitch

0

Gate

13. Now, connect the red L audio output of the 'FX In1' module to the red circular L and R inputs of the 'Reverb1' module. Then, connect the two outputs of the 'Reverb1' module to the inputs of the '2-Out1' module. As you play, you can see the level meter of the 'FX In1' module display the signal level from the Voice Area. If you need to lower the level on the 'FX In1' module to avoid distortion, click the Pad scroll button and select -6dB.

- 14.Now, we also want to make the 'FltNord' respond to Keyboard Velocity and "open up" with increasing Velocity. Patch a cable from the 'Keyboard1' module's Exp Velocity output to the 'FltNord1' lower Pitch modulation input. Increase the Pitch modulation amount and lower the Freq amount a little. Play the keyboard and notice how the filter "opens up" with increasing Velocity.
- 15. Finally, to make the Patch editable and controllable from the Nord Modular G2 front panel, you can assign any parameter in the Patch to any of the 8 ASSIGNABLE KNOBS. Simply right-click on a module parameter, for example, the Attack knob of the 'EnvADSR1' module, and select which PAGE and KNOB to assign it to.

Let's say you want to assign the 'EnvADSR1' Attack to PAGE 1A, KNOB 1. Now, when turning

KNOB 1 on PAGE 1A on the synthesizer front panel, the attack time will change. Proceed with the knob assigning until you are satisfied. Note that you can also assign KNOBS to button parameters, such as the waveform selectors of 'OscB', the Pad scroll button on 'FX In1' etc. You can deassign any of the KNOBS by right-clicking on the parameter and choosing Assign|Disable from the knob popup.







You can also reassign a parameter to another knob by right-clicking and selecting an unused knob number.

16. To (re)name the Patch, click on the Patch Name display box to the upper left of the toolbar and enter a Patch name. Press Enter on the computer keyboard and the Patch name is changed in the Editor and in the MAIN DISPLAY. Save your Patch on the computer using Save As from the File menu. To save the Patch in the memory of the Nord Modular G2 (and Engine), select Synth|Save In Synth. Select memory location from the list(s) and click Store. Note that the original Patch in the selected memory location (if any) will be overwritten by your new Patch. Make sure you do not overwrite Patches you want to keep! It is a good idea to save a backup of all your Patches on the computer, just in case.

# PATCHES (IN-DEPTH)

When you want to create new Patches in the Nord Modular G2 system you always have to do this in the Editor on the computer. Open the Editor on your computer. Make sure the Editor has established contact with your Nord Modular G2 synthesizer. If it hasn't, please see "Launching the Editor" on page 24.

# EDIT A FACTORY PATCH

If you want to edit a factory Patch from the instrument's internal memory, load the desired factory Patch into a SLOT in Nord Modular G2. A new Patch window will be created in the Editor containing the Patch of the active SLOT. The Patch window gets the same name as the Patch in the uploaded SLOT when saved to disk.

# CREATE A NEW EMPTY PATCH WINDOW

Create a new Patch by selecting File|New. This opens up a new, empty Patch window in the Editor and clears the selected **SLOT** in Nord Modular G2.

# ADD MODULES TO A PATCH

The modules are grouped together in module groups. You access these groups by clicking the tabs in the toolbar located above the Patch window. The various modules in each group are distinguished by icons

Select a group tab, click-hold on a module icon and



drag it to the Patch window. When you place the cursor over any of the module buttons, a preview image of the module appears. Drag the "phantom frame" of the selected module to the Patch window. The other modules will move, if necessary, when you drop a new one. The modules will automatically snap to a grid in the Patch window. If you like you could also double-click a module icon to automatically add it to the Patch window below the currently focused module. The Patch window will expand when needed and scroll-bars will appear at the bottom and to the right if the Patch window becomes larger than the available screen area. As you add modules to the Patch window, the Patch Load indicator(s) on the toolbar will expand, indicating the use of the Sound engines. Maximum Patch Load is 100% per Patch Area. Another way of adding modules to the Patch is by right-clicking on the background of the Patch window and selecting 'Insert'. A popup of the module groups appears. Select desired module by selecting it from the popup. The cursor gets a plus sign next to it. Place the cursor where you want the module to be placed and click to drop the module.

#### RENAME A MODULE

Double-click on the name of the module to rename it. You can also right-click on the gray background of the module and select Rename. Type in the new name and press Enter on the computer keyboard. This is the name which will be shown in an ASSIGN-ABLE DISPLAY if you later assign any of the module's parameters to an ASSIGNABLE KNOB on the synth front panel.



### MOVE A MODULE

You can move the modules in the Patch window by click-holding on its gray "panel" and move the frame that appears. Any connected cables will extend themselves and other modules will move out of the way automatically. You can also move several modules at the same time by placing the cursor on the Patch window background and click-hold and mark the modules you want to move. Another way of selecting several modules is to Shift-click on the desired modules. The names of the selected modules are highlighted to indicate that they have been selected.

#### DELETE A MODULE

To delete a module from a Patch, either click on the module and press Delete on the computer keyboard or select Clear from the Edit menu. Alternatively, right-click on a module's background and select Delete from the popup. Note that all cable connections made to the module will also be deleted or rerouted. You can also delete several modules by selecting them as described in the example above. Then, either press the Delete key, select Clear from the Edit menu or right-click on one of the selected modules and choose Delete from the popup.

#### REPLACE A MODULE

There is an intelligent module replace function in the Editor. To replace a module with another module of the same module group, click the arrow button to the left of the module name. A popup appears with the names of the other modules in the group. Click on one of the modules in the popup. Now, the selected module will replace the current one - with all cable connections preserved (if possible)! This function saves a lot of time if you, for example, need a Mixer with more inputs or an Oscillator or Envelope generator with more/different functions. Note that the "replacement module pop-ups" doesn't always feature exactly the same modules as the module groups in the Toolbar.



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6. Patches: Patches (in-depth)

# COLORING A MODULE

To distinguish a module, or a group of modules, from other modules in a Patch, it's possible to apply a color to the module. Select a color from the Color selector in the Toolbar. Any new

modules you add to the Patch window will now get the selected color. You can also focus any modules in the Patch window by Shift-clicking them and then clicking on the "paint bucket" icon to apply the selected color to the module(s) or select another color from the drop-down palette.

### CONNECTING MODULES

#### INPUTS AND OUTPUTS

There are two types of main connectors on the modules in the Nord Modular G2 Editor: inputs and outputs. The inputs are circular and the outputs are square.

#### CONNECTOR TYPES

There are three different types of connectors that are used for different signals. These connectors are distinguished by different colors:

- audio signal connectors: Red (24 bit and 96 kHz sampling frequency)
- control signal connectors: Blue (24 bit and 24 kHz sampling frequency)
- logic signal connectors. Yellow (24 bit and 24 kHz sampling frequency) or Orange (24 bit and 96 kHz sampling frequency)

#### CONNECTING CABLES IN A PATCH

Place the cursor on a module connector and click-hold. The cursor will change to a plug. Drag the cursor to a suitable connection elsewhere in the Patch. As you drag the cursor away from the source connector, a line will appear between the cursor and the connector. When you reach the destination connector, the cursor will change to a cable with a white dot instead of a plug. As you release the mouse button, a cable will appear between the two connections. The color of the output connection will determine the color of the resulting cable. You can later change the cable color if you like.

It is also possible to connect cables between connectors of different colors, e.g. connect an audio signal output to a control signal input etc. This depends on the actual application. If a connection is not possible to make, this will be shown; the cursor will not change to a cable with a dot as you reach the "illegal" destination connector. It is not possible to damage the system in any way by connecting "wrong" - feel free to experiment!

You can connect one output to several inputs to make a parallel connection.

You can also make a serial connection, from input to input. The result is exactly the same as in a branch connection. If a module within a serial cable chain is removed, the remains of the cable chain will be re-routed.







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It is also possible to make a serial connection between several inputs, without connecting to an output. This won't result in any signal flow, but can be useful if you want to choose an output after having connected all inputs. These "non-functional" input-to-input connections are indicated by white cable color. When you connect such a chain to an output, the cable color will change to the output's color. It is also possible to combine parallel and serial connections in several ways. For example, you could have a serial connection branch off to a parallel connection anywhere in the chain.

#### HIGHLIGHT CABLES AND CABLE CHAINS

To make it easy to follow cable connections and signal paths visually in the Patch, click-holding a connector will highlight any connected cables or cable chains. The highlighted cable(s) turns light blue for as long as you hold the mouse button depressed.

#### DISCONNECT OR RE-ROUTE CABLES IN A PATCH

To remove a cable, right-click on a connection (input or output) and select Disconnect, or double-click-hold or Ctrl-click on a connection (an extra wire appears next to the connector cursor) and "pull out" the connector by dragging the connector symbol away from the input/output and release the mouse button. If you place the "disconnected" plug on another connection instead, the cable will be rerouted.



ਾ⊐⊡ਅ

right-click

OR

Double-click/ Ctrl-click

#### EDIT MODULE PARAMETERS IN A PATCH

#### PUT A MODULE PARAMETER "IN FOCUS"

A parameter can be a knob, slider or a selector switch (button). Put a parameter "in focus" by clicking on it. An increment and decrement button appears below the knob or slider parameter as you move the cursor over it, and the current setting of the parameter displays briefly in a yellow hintbox. When you click on the parameter, the increment/decrement buttons (or button selectors) are highlighted.



To move the focus to another parameter in the module, press the Left/Right arrow buttons on the computer keyboard.

To move the focus to another module in the Patch, press the Shift key on the computer keyboard together with the Up/Down/Left/Right arrow buttons. The modules in a Patch are accessed depending on how they were visually placed in the Patch window.

#### EDITING A MODULE PARAMETER

You can edit the parameters with the mouse. Place the cursor over a knob, click-hold it (put it in focus) and then move the mouse. The knobs have no end stops; you may jump from maximum to minimum by turning past the 6 o'clock position (if Knob control is set to 'Circular' in the Setup|Options dialog box). When a knob is in focus, two small buttons will appear beneath the knob. Clicking on the 'up' button will increase the value one step for each click and clicking the 'down' button will decrease. You can also use the computer keyboard's Up/Down arrow keys to increase and decrease the focused parameter value. Click on a button to select e.g. a waveform button of an oscillator. The selected button will be "depressed".



Editing a knob



Editing a button

# VOICE AREA AND FX AREA

A Nord Modular G2 Patch can consist of two parts: a polyphonic part and a monophonic part. In the Editor, these two parts are represented by two sections of the Patch window, divided by a horizontal split bar. The upper section is called the Voice Area and the lower section the FX

Area. In the Voice Area you place modules that should be duplicated for each voice, e.g. oscillators, envelope generators and filters. In the lower Patch window, the FX Area, you can place modules that should act equally on all voices in the Patch, e.g. different types of FX modules. Modules used in the FX Area will act on the sum of the signals output from the Voice Area, and consequently will not be duplicated for each voice in the Patch. This gives two big advantages:

- A module is able to process whole chords, and not just a single voice, affecting the sound the same way an external audio processor would.
- In most situations you will be able to free up Sound engine power (Patch Load) so you could increase the polyphony of the Patch.

Cables cannot be connected from modules in one Patch Area to modules in the other. However, you can route four separate audio signals from the Voice Area to the FX Area by using the FX In module. The routing is one-way only; from the Voice Area to the FX Area. You can also use the four global audio Bus channels to route audio signals to and from both Patch Areas of all Slots. The global audio Bus routing is "bidirectional".

#### EXAMPLE OF A PATCH THAT USES BOTH THE POLY AND FX AREAS

This example shows a Patch where both the Poly and FX Areas are used:

The '2-Out1' module in the Voice Area is set to route the signal to FX In 1/2, the Left and Right output of the 'FX In1' module in the FX Area. The sum of all voices from the Voice Area is sent to the FX Area to be processed in the 'Reverb1' module and output at OUT1 and OUT2 jack of the synthesizer.

A Patch in the Voice Area set to 'Mono' in the Voice Mode display box would give the same result as having the Patch only in the FX Area instead.



#### DOWNLOAD A PATCH TO THE SYNTHESIZER

If you have opened a couple of Patches in the Editor while the synth wasn't connected and you want to download one of the Patches from the Editor to the synth, do either of the following:

1. Right-click on the Patch window background and select a Slot from the bottom of the popup. This will download your Editor Patch, overwriting the Patch that is currently in the destination Slot.

OR:

2. Select Patch|Download To Slot and select Slot in the dialog box that appears.

#### STORE A PATCH

A Patch can be stored in two different locations: in the internal memory of the synthesizer, and/or on disk on the computer. The examples below describes three different ways of saving/storing a Patch.

- 1. Save a Patch only on the computer by selecting File|Save. File|Save As will let you rename and/or relocate the Patch before saving to disk. File|Save All will save all open Editor Patches to their original locations.
- 2. Store a Patch in one of the Nord Modular G2 internal memory locations by pressing the STORE button on the front panel once. The LED above the STORE button will flash. Select a bank (1-32) with the UP/DOWN NAVIGATOR buttons and a memory location (1-128) with the ROTARY DIAL. Confirm by pressing STORE again. Abort by pressing any other button.
- 3. To store a Patch in Nord Modular G2 internal memory from the Editor, select Synth|Save In Synth. Select a memory location and a bank from the Drop-down lists and click 'Save'. Note that the original Patch in the selected memory location (if any) will be overwritten by your new Patch. Make sure you do not overwrite Patches you want to keep!

There is a memory protect function to minimize the risk of accidentally overwriting Patches. Read more about the internal memory protection in the section "Memory Prot" on page 81.

#### SELECTING SOUND CATEGORY FOR THE PATCH

To make it easier to define different types of sounds in the synth's memory it's possible to specify a Sound Category for each Patch. There are 13+2 different categories to choose be-



tween. Select Category from the drop-down list to the right of the Patch Name display box in the Toolbar:

CATEGORY	DESCRIPTION
Acoustic	Patches with an acoustic character like flutes, violins, guitars, ethnic sounds, bells, mallets etc. Doesn't necessarily have to be emulations of existing instruments
Sequencer	Sounds which use sequencer modules to produce melodic and/or rhythmic lines.
Bass	All sorts of bass sounds

CATEGORY	DESCRIPTION
Classic	Traditional "clean" analog types of polyphonic synth sounds based on the classic waveforms
Drum	Drum and percussion sounds
Fantasy	Melodic effects sounds and textures, often with rhythmic modulations
FX	Atonal effects sounds like water, laser guns, explosions etc. Sometimes with heavy modulations.
Lead	Sounds meant for lead lines. Usually monophonic sounds. Also lead "chord mem- ory" sounds
Organ	Different types of organ sounds
Pad	Melodic polyphonic "chord" sounds with fairy slow attacks like strings, choirs etc.
Piano	Different types of electric and acoustic piano emulations
Synth	All sorts of melodic polyphonic synth sounds
Audio In	All sorts of Patches that make use of the Audio Ins of the synth.
User1	Reserved for your own Sound Category
User2	Reserved for your own Sound Category

#### ABOUT THE NORD MODULAR G2 INTERNAL MEMORY

As mentioned above, the Nord Modular G2 internal memory is divided into 32 banks with 128 memory locations each. However, it's not possible to fit in 4096 (32x128) Patches at the same time in the Nord Modular G2 memory due to the total size of the Patches. Considering that an average Patch uses around 5 kB memory, this means you'll be able to fit in approximately 1200 Patches. If you also have stored Performances, the number of Patches will be less. The reason the G2 has this many Banks and memory locations is that it makes it easier to manage your Patches. For example, you could have all your Patches for a certain song or project in a separate Bank.

The dynamic structure of the internal memory makes it suitable to consider it a storage device similar to a computer hard disk, with banks representing folders and Patches representing files.

When you want to store a Patch in a memory location that doesn't contain any Patch, this is indicated in the MAIN DISPLAY as shown:

If you should run out of internal memory when trying to store a Patch, this will be indicated by the following message in the DIS-PLAY: You will then have to delete one or several Patches to make room for new ones. This can be done using the Tools|File Browser window (see below).

Store	to	2:24
Empty	Pat	cch
Patch	Nar	ne
Memory	r Fi	111

# DELETE A PATCH

To delete a Patch from the internal memory of the synth you have to use the File Browser. Select Tools|File Browser and click the Patch tab to display the Patches of the internal memory of the synth.

Right-click on a Patch icon and select 'Delete'.

# **CREATING PATCH PARAMETER VARIATIONS**

First of all, you need to create or open a Patch to be able to create Patch parameter Variations. Let's use the Patch we created in the 'Getting Started' chapter:

Locate the row of Variation buttons to the right of the Voice Mode arrow buttons at the top of the Patch window. As you can see, the Variation 1 button is already focused. This is because as soon as you create a Patch, you have automatically also created a Variation within that Patch. This Variation contains the parameter data for the Patch. Now, to create more Variations, do like this:

1. Click on the Variation 2 button at the top of the Patch window. The Variation 2 button is focused to indicate it's the currently active Variation in the Patch

On the synth front panel, the VARIATION 2 LED lights up to indicate it's the focused Variation.

2. Change the settings on a couple of parameters in the Patch. Note that modules that have a drop-down selector, for example Oscillator C and LFO B, can only have one waveform for all eight Variations. This is because when changing waveform in these types of modules, the Sound engine has to

recalculate the whole Patch the same way as if you replaced the entire module. If you want to have different Oscillator or LFO waveforms in different Variations, use modules with radio button selectors instead, e.g. Oscillator A and B and LFO A.

3. Click the Variation 1 button to focus Variation 1 again. On the synth front panel, the VARIATION 1 LED lights steadily to indicate it's now in focus. As you can see, the parameters you changed in Variation 2 now get their Variation 1 values again. You have now created two Variations in the Patch.

If you want to have more Variations in your Patch, click another Variation button and change parameter settings. Each Patch contains eight different Variations. When you save your Patch (on your computer or in the synth), all Variations will automatically be saved within the Patch.

# SAVE A VARIATION

All Variations are automatically saved when you save the Patch. You can't save Variations as separate files.

# COPY A VARIATION

To copy the parameter settings in one Variation to another in the Patch, right-click the Variation button and select the destination Variation from the pop-up window.

# VARIATION INIT

The last selection in the Copy pop-up window described above is the 'Var Init'. Here you can paste parameter values of a selected Variation to be used as a "default" parameter setup for your





3 4 5 6 7

Var. 1 2



Patch. This parameter setup can then be recalled for any Variation by pressing the Init button to the right of the Variation buttons.

# MIDI CONTROL OF VARIATIONS

The Variation buttons transmit and respond to MIDI Controller #70.

# KNOBS AND CONTROLLERS

The 8 ASSIGNABLE KNOBS and 8 ASSIGNABLE BUTTONS on the front panel of Nord Modular G2 can be used to tweak parameters in real-time. The ASSIGNABLE KNOBS and BUTTONS and controllers can be assigned to almost any parameter in a Nord Modular G2 Patch. You have direct access to 5 x 3 pages with 8 assignable controllers each for a total of 120 assignable parameters per Patch.

### THE PARAMETER PAGES WINDOW

The Parameter Pages window is the graphical representation in the Editor of the 5 Pages and 3 Columns with ASSIGNABLE KNOBS of the Nord Modular G2 front panel. The Parameter Pages window gives you both visual indication and the possibility to edit the parameters currently assigned to an ASSIGNABLE KNOB/BUTTON. The module name and its current value in the corresponding Parameter Pages display box indicates that the knob/button is assigned to a module parameter.

When you edit a knob in the Parameter Pages window, by click-holding and turning the knob, the corresponding module parameter in the Patch window will be focused and change too. The value of the AS-SIGNABLE KNOB/BUTTON on the Nord Modular G2 front panel will also change. If you turn an assigned ASSIGNABLE KNOB on the front panel, the knob in the Parameter Pages window and the corresponding module parameter will change, also visually.

Bring up the Parameter Pages window by selecting Parameter Pages from the Tools menu. The Parameter Pages window is a floating window, meaning it can be positioned "on top" anywhere in the Patch window.



# ASSIGN A PARAMETER TO A KNOB

A parameter can be either a continuous parameter (knob or slider), or a button, radio buttons or scroll button. There are three ways of assigning a parameter to a to an ASSIGNABLE KNOB, two in the Editor and one in the synth.

ΓŔ dB/Oct

> Knob 1 C3

Knob 2

Knob 3

Knob 4

Knob 5

Knob 6

Knob 7

Knob 8

Page 1A 🕨

Page 1C 🔸

Page 2A 🔸

Page 2B 🕨

Page 2C 🕨

Page 3A

Page 3B .

Page 5A

Page 5B

Page 5C

Disable

Page 1B •

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🕽 квт 🗔

1. Right-click on a parameter in the Editor window, select Assign Page Knob from the popup menu and select one of the Knobs in the menu.

To deassign an ASSIGNABLE KNOB, select Disable at the bottom of the popup menu. You can also re-assign an ASSIGNABLE KNOB by selecting another (unused) knob in the popup menu.

2. The other way of assigning a parameter in the Editor is to use the Parameter Pages window. Click and hold a display box in the Parameter Pages window and then drag the cursor



🗩 Gate 🟹

Pitch

🗩 AM 👬 🗟

🔽 12/24dB f..

3.14kH

Freq

۲

20utput1

Pitch Poly

Pad OdB

LfoA1

Exinput1

Pad -6dB

20utput1

Default value

Morph assign

Global Assign

MIDI Controller

1/2 3/4

Edit name

Assign

Help

Out

Pad 0dB 1/2 3/4 1/2 3/4 1/2 3/4

5.13Hz (

to the module parameter you wish to assign. The arrow gets a + sign next to it as you reach an assignable module parameter. Release the mouse button and the assignment is completed. To deassign, right-click the knob or display box in the Parameter Pages window and select 'Deassign'.

An ASSIGNABLE KNOB will always control the entire range of a parameter. If you need to control only a part of the range, use a Morph group instead. The Morph concept is described in "Morph groups" on page 51.

#### MOVE ASSIGNED PARAMETERS

By click-holding on a display box and then dragging the cursor to another display box and releasing, you can move the assignment to another ASSIGNABLE KNOB/BUTTON. If you want to move a parameter assignment to another Page or Column, right-click the knob or display box and select 'Move To' and select destination. Another way of moving a parameter assignment is to use the Parameter Overview window described on page 93.

#### ASSIGN ALL MODULE PARAMETERS TO A SET OF KNOBS

You can easily assign all module parameters to a set of Knobs. This is very useful when assigning Sequencer module parameters, for example. Rightclick the module background and select Assign|Page X|Multi Column. This will automatically assign all module parameters to as many Page Columns as necessary to fit in all parameters. For modules that contain 8 or less parameters, you can select Page and specific Column from this pop-up menu. Alternatively, you can click-hold a Page or Column button in the Parameter Pages window and drag to a module in the Patch window. Release the mouse button on the module to assign all module parameters.



#### MIDI CONTROLLERS

Almost any parameter in the different modules can be assigned to a MIDI Controller. This is very useful if you want to record parameter adjustments to an external sequencer or if you want to control external MIDI devices from the ASSIGNABLE KNOBS. When a parameter is assigned to a MIDI controller, the parameter will transmit MIDI data when being edited, as well as receive data from external MIDI sources (sequencer, master keyboard, etc.).

Right-click on a module parameter and select MIDI controller|Assign from the parameter popup. Here you can choose either to assign the parameter to any of the listed MIDI Controller numbers.

You are free to assign up more than 100 MIDI Controllers to module parameters. Some "predefined" MIDI Controllers like #1 (Mod Wheel), #0 and #32 (Bank Select) and #64 (Sustain Pedal) cannot be selected from this list. When you edit a parameter that is assigned to a MIDI controller, it will transmit MIDI controller data. It does not matter if you edit



the parameter from the Editor or on the synthesizer with the ROTARY DIAL (not Engine).

You may also assign a parameter to an ASSIGNABLE KNOB as described earlier. In that a case, turning a KNOB will result in editing the parameter, which subsequently generates MIDI controller data. Deassign a parameter from a MIDI controller by highlighting a controller and clicking Remove in the dialog box.

#### AUTO ASSIGN MIDI CONTROL-LERS

It's also possible to automatically assign MIDI controllers to all parameters of selected modules. Select the modules you want to assign MIDI controllers to,

	MIDI Ctrl	Module	Parameter	OK
2	Breath	OscDual1	Coarse	• Consel
3		OscDual1	Fine	
4	Foot ctrl	OscDual1	КВТ	D
8	Balance	OscDual1	Pitch M	Remove
10	Pan	OscDual1	Tune Md	
12		OscDual1	Sqr Lvl	Remove all
13		OscDual1	PW M	
19		OscDual1	Saw Lvl	
20		OscDual1	Saw Ph	
21		OscDual1	Sub Lvl	
22		OscDual1	Mute	
23		OscDual1	Sqr PW	
24		OscDual1	Phase M	
25		OscDual1	SoftSqr	
26				
27				
28				-1

select Tools|Auto Assign MIDI Controllers. Now, all parameters of the selected modules will be automatically assigned to MIDI controller numbers. If you want to deassign MIDI Controllers of specific modules, select the modules and choose Tools|Deassign MIDI Controllers.

#### USING THE ASSIGNABLE KNOBS TO SEND MIDI CONTROLLERS

If you want to use one or several ASSIGNABLE KNOBS to exclusively transmit MIDI controller data to external devices, you will need to take a detour and assign the ASSIGNABLE KNOBS to parameters on modules that are not used (connected) in the Patch. Then, assign the parameters to MIDI controllers. Very useful for this purpose is the MIDI Ctrl send module (see page 195), which does not use any Sound engine resources. You determine which MIDI channel to use directly in this module. Read more about the MIDI modules in "MIDI group" on page 195.

# MORPH GROUPS

The Morph function lets you continuously control defined ranges of several parameters in a Patch, using only a single control source. This lets you produce radical changes in a sound in a very fast and easy way. Nord Modular G2 features eight separate Morph groups per Patch. A parameter can also be assigned to several Morph groups - all Morph groups, actually - and thus be controlled differently from several sources. Also, if you use several Variations in a Patch, the Morph group assignments can be totally different for each Variation.

The Morph groups and their corresponding knobs are located in the Editor toolbar. There are eight Morph groups available in each Patch and you may assign a total of 25 Patch parameters to these Morph groups.



# ASSIGN PARAMETERS TO A MORPH GROUP

- Click on any of the Morph group knobs in the toolbar to select it. The white frame moves to the selected Morph group and the Morph group knob turns red. Then Ctrlclick on the knob, button or slider you wish to assign to the selected Morph group. Alternatively, right-click on the module parameter and select 'Morph assign'. The color of the selected parameter will now change to red to indicate it's been assigned to the selected Morph group.
- 2. Every parameter assigned to a Morph group should also be given a Morph range. Place the cursor on the knob that you assigned to the Morph group. Hold down the Ctrl key and Click-drag the cursor as if you were turning the knob. A red sector will appear, indicating the Morph range. The

range will also appear in a yellow hintbox next to the parameter. The initial Morph value is where the black line is on the knob. Note that if you assign buttons to a Morph group, the Morph range will always be fixed at the maximum range.

- 3. Turning the Morph group knob in the toolbar will now control the morphed parameter within the selected range. Note that the morphed knob(s) in the module(s) won't change visually.
- 4. If you want to assign parameters to another Morph group, click another Morph group knob in the Toolbar and repeat the procedure from step 1. Any parameters assigned to other Morph groups will now turn blue to indicate they are morphed from another source.

You can assign each Morph group knob to any of the predefined controls **MOD WHEEL**, Keyboard Velocity, Keyboard Note Values, Aftertouch, Control Pedal, Foot Switch, **PITCH STICK**, or to **ASSIGNABLE KNOBS** on the

front panel. If you want to assign a Morph group only to an ASSIGNABLE KNOB instead of the predefined control source, simply click the Group button below the Morph group knob in the Toolbar. Then, right-click the Morph group knob and select Assign|Page X|Knob. The Group buttons can also be renamed by right-clicking and selecting 'Edit name'. You can also assign the Morph group knob to a MIDI controller by right-clicking and selecting MIDI Controller|Assign.

#### DEASSIGN PARAMETERS FROM A MORPH GROUP

To deassign a parameter from a Morph group, right-click on the parameter and deselect 'Morph assign' in the popup.

To deassign all assigned parameters from a Morph group, right-click on the Morph group knob in the Toolbar and select 'Clear'.









#### EDIT PARAMETERS IN A MORPH GROUP

The Morph range will always start at the current position of a knob or slider. The relationship between the setting of the parameter and the Morph range will be fixed, even if you move the setting of the parameter after a Morph range has been set.

You can edit the morph range (the size of the sector) by using the mouse in conjunction with the Ctrl key on the computer keyboard. You can also use the computer keyboard Up and Down Arrow keys in conjunction with the Ctrl key to increase and decrease the focused parameter's Morph range.

You can also get a read-out of which Morph group a parameter is assigned to by pressing the F7 function key on the computer keyboard. Pressing the F5 key displays the Morph ranges (start and end values) of the assigned (morphed) parameters.

#### COPY A MORPH GROUP TO ANOTHER SOURCE

Right-click the Morph group knob in the Toolbar you wish to copy. Select Copy To|Group X. You may also want to delete the original Morph group source afterwards by right-clicking the Morph group knob and selecting 'Clear'.

#### MORPH GROUPS IN SEPARATE VARIATIONS

Each Variation in a Patch can have its own unique Morph group assignments.

#### COPY MORPH GROUPS BETWEEN VARIATIONS

Any Morph group assignments are automatically copied when you copy the entire Variation as described in "Copy a Variation" on page 47.

#### A WORD ABOUT KEYBOARD MORPH

Keyboard Morph lets you control the Morphed parameters differently depending on where on the keyboard you play. The minimum source value is the lowest key of the Nord Modular G2 keyboard when no Octave Shift is used, i.e. note C2, and maximum is the highest key, i.e C5. When you transpose the keyboard up or down, the Keyboard Morph range will extend beyond the set Morph limits.

Tip! This function makes it easy to create, for example, "custom made" Filter Keyboard Tracking. Just make sure you deselect the KBT function in the filter module to make this work as intended.

#### MORPHING CLOCK-SYNCHED MODULE PARAMETERS

It's not possible to Morph a clock-synched parameter. You can assign and set a Morph range on a clock-synched parameter, but Morphing it will have no effect.

# 7. PERFORMANCES

# WHAT IS A PERFORMANCE?

A Performance is a complete setup (combination) of up to four Patches - one in each Slot. The Nord Modular G2 has 1024 (8 x 128) memory locations for Performances. A Performance contains information about which Slots should be active, layered and also any Keyboard Split settings and Master Clock settings. A Performance also contains information about a number of other settings. Later in this chapter follows a detailed list of what settings are saved in a Performance.

### SPECIAL FEATURES IN PERFORMANCES

A Performance in the Nord Modular G2 system doesn't necessarily have to be just four layered/split Patches in combination. Thanks to the internal audio Bus functionality in the G2 system, it's possible to have, for example, the audio output signals of three Patches in three Slots routed to a "global" Effects Patch in the fourth Slot.

# UPLOADING A PERFORMANCE TO THE EDITOR

When you upload a Performance from the synth to the Editor, you replace the four Patches currently in the Slots A to D with the Patches in the Performance. You also recall other settings as listed in the table later in this chapter.

- 1. Click the Prf button in the Toolbar.
- 2. Open the File Browser by selecting Tools|File Browser from the menu. The Browser window opens up. Click on the Synth tab to display the Performances of the internal memory in the synth.
- 3. Double-click on a Performance icon in the File Browser to load the Performance in the synth and upload to the Editor. The focused Patch in the Performance is placed on top in the Editor.

# **CREATING A PERFORMANCE IN THE EDITOR**

#### SELECTING PATCHES FOR THE SLOTS

- 1. Select File New Performance
- 2. Select Patches for the Slots by using the File|Open To|Slot X command. Repeat the procedure for the Slots you want to use.
- 3. To activate or exclude a Slot from the Performance, Shift-click on the desired Slot button in the Toolbar. To enable or disable Keyboard Assign (which Slots are going to be controlled from the keyboard), Ctrl-click on the desired Slot button(s). Note that even if you exclude a Slot from the Performance, any Patches in deselected Slots will still be saved with the Performance. If you want to keep the file size of a Performance down, load any deselected Slots with empty Patches (no modules in the Patch window).

#### EDITING

This is done just as in Patch (non-Performance) mode. To activate a Slot for editing, simply click the desired Slot button in the Toolbar. The focused Slot is indicated by a white frame surrounding the Slot button. Note that to be able to play the selected Slot, you also need to activate Keyboard Assign for it. Do this by Ctrl-clicking the selected Slot button (a red horizontal bar appears above the Slot button).

#### KEYBOARD SPLIT (KEYBOARD RANGE)

The Keyboard Split function allows you to define separate keyboard ranges for all Slots in the Performance. It's also possible to have the Slots' keyboard ranges overlapping each other. Activate Keyboard Split as follows:

- 1. Select Performance Performance Settings from the menu.
- 2. Check in the Keyboard Range box. The red LED above the KB SPLIT button on the synth front panel lights up to indicate that the keyboard is enabled for split.

Performance Settings			X
Name RedMonday_DZ	Master Clock Rate (BPM) 150 😴 📀 Stop C Run		
Slots Enable Keyboard IV Slot A IV	Hold	Lower	oard Range Upper 127
I Slot B I I Slot C I I Slot D I I		0	127 127 127

3. Type in the keyboard ranges (MIDI Note ranges) for each of the Slots in the Lower and Upper boxes.

#### COMBINING SPLIT AND LAYER

Layering Slots simply means that you overlap keyboard ranges for the Slots you want to layer.

#### THE GLOBAL PARAMETER PAGES

Each Patch in a Performance can have its own parameter assignments, just like in Patch (non-Performance) mode. In addition to this, a Performance can have a separate setup of 5x3 Programmable Parameter Pages



with up to 8 parameters per page - the Global Parameter Pages. To assign parameters to the Global Parameter Pages, click the Global Pages button in the Tools|Parameter Pages window and assign the parameters as described in "Assign a parameter to a knob" on page 48. When you assign parameters to the Global Parameter Pages each assignment will be displayed with an initial letter indicating from which Slot the module parameter originates from.

# STORING A PERFORMANCE

Note! When the Nord Modular G2 is shipped from factory, Memory Protect is set to 'On'. To be able to store Performances, first disable the Memory Protect function. Select Synth|Synth Settings and uncheck the Memory Protect On box.

#### STORING IN THE SYNTH

Storing a Performance in the synth from the Editor can be done in two ways. Either, select Synth|Save in Synth from the menu. Then, select memory location and click OK, or:

- 1. Select Tools|File Browser to open the Browser window.
- 2. Click on the Perf tab to display the Performances in the internal memory of the synth.
- 3. Right-click on a Bank icon, select 'Save Current Performance to' and select a memory location for your Performance.

#### SAVING ON THE COMPUTER

Select File|Save or Save As... from the menu. If you selected 'Save As...', select a folder and press/click OK.

#### **RENAMING SINGLE PATCHES IN PERFORMANCES**

It's also possible to name each of the Patches in a Performance individually. In Performance Mode, simply click on a Slot to focus the Patch. Enter a new Patch name in the Patch display box. Click on another Slot button to put the next Patch in focus. Enter a new Patch name in the Patch display box. When you're done, store and/or save the Performance as described above.

# EXTRACTING PATCHES FROM A PERFORMANCE

The Patches used in the Slots of a Performance are *not* references to Patches in the Patch memory of the synth, but complete Patches "on their own" in the Performance. You will find several unique Patches in the factory Performances; Patches that you will not find in any of the internal Patch memory locations. You may want to extract such a Patch, to use as a single regular Patch, or to make it part of another Performance.

#### EXTRACT A PATCH AND STORE IT IN THE SYNTH

Click on the Slot button that contains the Patch you want to extract. Click the Prf button in the Toolbar to exit Performance mode. Then, select Synth|Save In Synth. Select Patch memory location and click OK.

#### EXTRACT A PATCH AND SAVE IT ON THE COMPUTER

Select File|Save From|Slot X. Select folder, rename the Patch if you like, and click OK.

#### DELETING PERFORMANCES IN THE SYNTH

Do like this to delete a Performance from the internal memory of the synth:

- 1. Select Tools File Browser to open the File Browser window.
- 2. Click on the Perf tab to display the Performances in the internal memory of the synth.
- 3. If necessary, double-click a Bank icon. then right-click on a Performance icon and select Delete.

# EXITING PERFORMANCE MODE

To exit Performance mode, click the Prf button in the Toolbar. Now you return to the regular Patch mode. Note that the four Slots contain the same Patches they had in Performance mode and also that any Layering and Keyboard Range settings remain unchanged.

# 8. WORKING WITH THE SYNTH

# PANEL CONTROLS



#### LEFT PANEL SECTION

#### MASTER LEVEL

The MASTER LEVEL knob controls the output level of all four OUT jacks and the HEAD-PHONES output. The MASTER LEVEL knob does not send or receive any MIDI CC# but is used to control the entire instrument's output level. To affect the volume of a Patch from MIDI, you have to assign MIDI Controller #7 to any of the Patch Gain knobs in the respective Patch (see more about this on "Patch Level" on page 99).



#### MIDI LED

The **MIDI LED** indicates incoming MIDI Note, Controller and SysEx messages on any MIDI channel. MIDI messages on any of the Slot's MIDI Channels and the Global MIDI Channel are indicated by long LED blinks. Messages on other MIDI Channels are indicated by short LED blinks.

#### MIC LEVEL

The MIC LEVEL knob controls the XLR mic preamp level. Below the MIC LEVEL knob are three LEDS which show the input level of the dynamic microphone connected to the XLR INPUT on the rear panel. If you don't use a mic, the LEVEL LEDS will indicate the input level of the line level signal routed to the IN 1 input instead. Note that the MIC LEVEL knob only affects the XLR INPUT - not the IN 1 input.





# SYSTEM, PATCH AND STORE BUTTONS

Above the MAIN DISPLAY are the SYSTEM (see page 79) and PATCH (see page 62) buttons which can be used to enter all system and Patch related menus. The STORE button (see page 67 and page 77) is used for storing Patches and Performances.

# NAVIGATOR BUTTONS, ROTARY DIAL AND MAIN DISPLAY

Below the MASTER LEVEL knob is a set of four buttons, the NAVIGATOR buttons. These are used to navigate in the MAIN DISPLAY and to select different functions. Below the NAVIGATOR buttons is the RO-TARY DIAL. With the ROTARY DIAL you can select Patches and Performances, enter various kind of System data etc.

# PATCH LOAD

Press this button when you want to load a selected Patch or Performance into the focused Slot/Slots (see page 61 and page 75).

# SLOT BUTTONS

Below the MAIN DISPLAY are the four SLOT buttons (A, B, C and D). You can load one Patch in each of the Slots at a time. See "Load a Patch from memory" on page 61, "Activate several Slots" on page 70 and "Creating a Performance" on page 75 for info on how to use the Slots.

# OCTAVE SHIFT BUTTONS

Lets you transpose the keyboard +/-2 octaves. In default mode, the OCTAVE SHIFT buttons controls each of the Slots separately. In Global Octave Shift mode (SHIFT+left OC-TAVE SHIFT buttons) the octave shift controls all Slots and also affects the output MIDI notes on the MIDI OUT jack of the synth.

# KB HOLD/PANIC

Press the **KB** HOLD button to make every note or chord you play sustain until you press any new keys. The Keyboard Hold function is also very useful together with the Arpeggiator (see "Arpeggiator" on page 63). If notes should hang or the synth should behave strange, press **SHIFT+KB** HOLD to send an internal All Notes Off to the synth.

# THE FOCUS/COPY/(ASSIGN/PASTE) BUTTON

To the right below the MAIN DISPLAY section you find the FOCUS/COPY button. This button can be used in many situations, for example when you want to copy & paste various things and also when you assign parameters to Parameter Pages. Holding SHIFT+FO-CUS/COPY alternates the functionality to Assign/Paste.



O Pa









#### PERFORMANCE CONTROLS

Below the MAIN DISPLAY section you find the performance controls: the PITCH STICK and MOD WHEEL. The PITCH STICK can be used to control pitch bend (see "Bend" on page 64) as well as an entire Morph group. The MOD WHEEL can control Vibrato (see page 63) and also a separate Morph group. See "Morph groups" on page 71 for info on how to use these controls with Morph groups.

#### DISPLAY MODE/BUTTONS

Lets you switch between two different display modes for the AS-SIGNABLE DISPLAYS. By default, the ASSIGNABLE DISPLAYS show module names and parameter names. When you turn an ASSIGN-ABLE KNOB or press an ASSIGNABLE BUTTON, the parameter name is temporarily replaced by the parameter value. In the other display mode, the parameter names and values are constantly displayed. However, the module names are not shown in this mode. Hold SHIFT and press the DISPLAY MODE button to display the names of button parameters instead of knob parameters in the AS-SIGNABLE DISPLAYS. This is useful when you have assigned combined knob+button parameters to the ASSIGNABLE DISPLAYS. Pressing only the DISPLAY MODE button in 'Button' mode will change the parameter display as described above.

#### PERFORMANCE MODE

In Performance mode you can create split/layers configurations of up to 4 Slots. See "Performances" on page 74.

#### KB SPLIT MODE/SET SPLIT POINT

Lets you split the keyboard and play/control different Slots from different keyboard zones. See "Keyboard Split" on page 76.

#### THE SHIFT/CLEAR BUTTON

The SHIFT button is used to activate functions printed below some buttons on the front panel. It's also used for deleting entire Morph groups and for clearing Variations.

#### **RIGHT PANEL SECTION**

#### ASSIGNABLE KNOBS AND BUTTONS WITH DISPLAYS

Module parameters in a Patch can freely be assigned to any of the 8 ASSIGNABLE KNOBS or BUTTONS below the four ASSIGNABLE DISPLAYS. Around each ASSIGNABLE KNOB you'll also find circular LED graphs which give you instant visual feedback of the coarse value of the assigned parameter. As soon as a module parameter has been assigned to an ASSIGNABLE KNOB or BUTTON, the parameter name and exact value (when you turn the KNOB) is shown above in



FICNOLUI-	
Freq	Res

El+Nord1

Freq	Res
622.5Hz	1.72









the corresponding ASSIGNABLE DISPLAY. You can assign a maximum of 15 Columns (see below), each containing up to 8 parameters (120 parameters in total) per Patch.

#### VARIATION/MORPH BUTTONS

There are 8 VARIATION buttons with which you can select up to eight different Patch Variations (complete parameter setups) within each Patch (see "Patch parameter Variations" on page 65). In 'Morph Mode', these 8 buttons function as Morph group selection buttons. They are used when you want to control several parameters in a Patch from a single control source (see "Morph groups" on page 71).

#### PATCH SETTINGS/GLOBAL

This button is used when you want to switch display between the Patch parameters which are printed above the AS-SIGNABLE DISPLAYS (see page 63) and the Programmable Parameter Pages (see page 64). Press SHIFT+PATCH SET-TINGS to enter the Global Parameter Pages (see page 76).

#### PROGRAMMABLE PARAMETER PAGES BUTTONS

To the right are 5 main PARAMETER PAGE buttons in combination with 3 COLUMN buttons for a total of 15 Programmable Parameter Pages per Patch. Each of these pages can contain the 8 ASSIGNABLE KNOBS or BUTTONS mentioned above. See page 64 and page 76 for info on how to use these pages.

#### KEYBOARD SPLIT LEDS

Above the keyboard are four Keyboard Split LEDs which indicate current keyboard split position in Keyboard Split mode (see "Keyboard Split" on page 76).

# LOAD A PATCH FROM MEMORY

Press a SLOT button to select the Slot in which to load the Patch. Load the Patch into the Slot by first selecting Bank (if necessary) with the UP/DOWN NAVIGA-TOR buttons and then turning the ROTARY DIAL to select the Patch. Load the selected Patch into the Slot by pressing the PATCH LOAD button. Note that every time you load a Patch into a Slot, there will be a brief moment of silence when the Sound engine recalculates the Patch data



#### SEARCH FOR AND LOAD A PATCH

By default, when you load a Patch into a Slot, by first selecting Bank with the UP/DOWN NAVIGATOR buttons and then turning the ROTARY DIAL and pressing PATCH LOAD, the Patches are displayed by









memory location number. However, you can change the sort/search mode to either 'Alphanumerical' or by 'Category'.

#### SEARCH FOR A PATCH IN ALPHANUMERICAL ORDER

By pressing the SHIFT + DOWN NAVIGATOR buttons you will be able to load Patches in alphabetical order rather than by memory location number. Select letter by pressing the UP/DOWN NAVIGATOR buttons and select Patch with the ROTARY DIAL.



#### SEARCH FOR A PATCH IN A SPECIFIC CATEGORY

By holding down SHIFT and pressing the DOWN NAV-IGATOR button twice you will be able to load Patches by Category rather than by memory location number. The Patches within a Category will now be displayed in alphanumerical order. Select Category by pressing the UP/DOWN NAVIGATOR buttons and select Patch with the ROTARY DIAL.



# **CREATE A PATCH**

This can only be done in the Editor. Please refer to "Patches (in-depth)" on page 40.

# EDIT A PATCH

Press the PATCH button above the MAIN DISPLAY. Hold down SHIFT and press the DOWN NAVIGATOR button to get to the first module in the Voice Area (VA) of the Patch. The module currently "in focus" in the Patch will appear in the MAIN DISPLAY with its name and visual position in the Editor within brackets [1:1] (first row, first column) The first module's (up to) eight parameters will appear in the ASSIGNABLE DISPLAYS. You can now change the values of the parameters by turning the ASSIGNABLE KNOBS or press-



ing the ASSIGNABLE BUTTONS. Navigate to the next module by pressing the DOWN or RIGHT NAVIGATOR button or turning the ROTARY DIAL. If a module should contain more than eight parameters, the remaining parameters can be found by pressing the COLUMN 2 and COLUMN 3 Parameter Pages buttons. Hold down the SHIFT button and press the UP/DOWN NAVIGATOR button to immediately change Patch Area focus between the Toolbar (Morph groups), Voice Area and the FX Area.

Play on the synth and turn the ASSIGNABLE KNOBS to instantly hear what is happening with the sound. If connected, the Editor will echo any adjustments that you make from the synth front panel. When editing



module parameters it can be useful to switch Display Mode (see page 60) to constantly view the actual values of each parameter in the ASSIGNABLE DISPLAYS. Some modules, like Mixers with Mute buttons, have a combination of button+knob parameters assigned to each individual control. By default, the AS-SIGNABLE DISPLAY shows the knob parameter name. To view the button parameter name instead, hold SHIFT and press the DISPLAY MODE button.

# EDIT PATCH SETTINGS



Press the PATCH SETTINGS button to the top right of the panel to display the "global" Patch Parameters for the Patch. The parameter names are printed on the panel above each ASSIGNABLE DISPLAY and you can edit them by turning the ASSIGNABLE KNOBS and/or the ASSIGNABLE BUTTONS. Revert back to Patch Edit mode by pressing the PATCH button again.

#### MASTER CLOCK

Set the Master Clock Rate with the corresponding Knob. Activate/stop the Master Clock with the corresponding Button below the Knob.

#### Voice Mode

Set requested polyphony with the Knob (2-32 voices). The actual polyphony is displayed together with the requested polyphony within parenthesis. Select Voice Mode (Poly, Mono or Legato) with the Button below the Knob. In Legato mode, the Envelope modules don't retrig when you play in a legato fashion, i.e. when you play a new key before releasing the previous key.

#### ARPEGGIATOR

Select Period (sync division) for the Arpeggiator in relation to the Master Clock rate with the Knob. Activate/stop the Arpeggiator with the Button below the Knob. Note that the Master Clock has to be active for the Arpeggiator to run. Select Direction with the right Knob and Range with the Button below the Knob. If you want the Arpeggiator to continue when you release the keys, use the KB Hold function described on page 59.

The Arpeggiator uses MIDI Song Position Pointer when synched to an external MIDI Clock, which means that if you record an arpeggio in an external sequencer, it will always play back the pattern exactly the same way it was recorded - even if you start the sequencer in the middle of the sequence.

#### VIBRATO

This is a separate vibrato which affects all Oscillator modules in the Patch set to Keyboard Tracking. Set the Vibrato amount, in cents of a semitone, with the Knob and select control source (Aftertouch, Mod

Wheel or Off) with the Button below the Knob. Set the Vibrato rate in the System menu described on page 79.

#### GLIDE

The Glide function is mainly intended for use in mono or legato Voice Mode (see above). The glide characteristics can be described as "constant rate". "Constant rate" means that the greater the "distance" between two subsequent notes, the longer the glide time. Turn the Knob to adjust the glide rate and press the Button to select glide mode. 'Normal' means the glide is always active and 'Auto' that glide is active only when you play legato (you press a new key before you release the previous key). Range: 19 mso (milliseconds per octave) to 6.27 so (seconds per octave).

Note: If you use Glide in polyphonic mode, the glide will be unpredictable and perceived as more or less random. This is because the glide is between voices rather than between keys. The glide will therefore be from the available voices' latest note values to the new notes rather than from the previously pressed keys.

#### BEND

Set the Pitch bend range, in semitones, with the Knob. The pitch bend will affect all Oscillator modules in the Patch set to Keyboard Tracking when you bend the **PITCH STICK**. Switch on/off the pitch bend function with the Button below the Knob.

#### PATCH LEVEL

Set the total output level of the Patch with the Knob. Mute the output from the Patch by pressing the Button below the Knob.

# ASSIGN PARAMETERS TO PANEL CONTROLS

It's possible to assign nearly every module parameter in a Patch to a separate ASSIGNABLE KNOB or AS-SIGNABLE BUTTON on the synth front panel. Do like this:

- 1. Press the PATCH button above the MAIN DISPLAY to enter Patch Edit Mode. Hold down SHIFT and press the DOWN NAVIGATOR button to get to the first module in the Voice Area of the Patch.
- 2. Navigate to the module which contains the parameter you want to assign. The module's name and first parameters are shown in the ASSIGNABLE DIS-PLAYS. (If a module contains more than 8 parameters, you can access the remaining parameters by pressing the COLUMN 2 and COLUMN 3 buttons.)



 When you have found the module and parameter you want to assign to an ASSIGNABLE KNOB or ASSIGNABLE BUTTON, hold down the FOCUS/ ASSIGN button and turn the parameter KNOB (or push the parameter BUTTON if the module parameter is a button). In this example we choose the FltMulti1 Freq parameter. Note! Some modules, like Mixers with On/Off buttons, have a combination of button+knob parameters assigned to each individual control.



If you want to assign these types of "combination parameters" to an ASSIGNABLE KNOB and BUT-TON, you have to copy the *knob* parameter and paste it by turning the ASSIGNABLE KNOB for the parameter combination to be assigned properly.

- 4. Press the PATCH button or a PARAMETER PAGE button to exit Patch Edit Mode and revert to normal "play mode".
- 5. Press the desired Parameter Page buttons (PAGE and COLUMN) to get to the desired destination. You can choose freely where to assign a parameter but it could be convenient to use the Parameter Page groups printed in blue on the front panel. Here, we choose Page D (Filter), Column 1.



6. Hold down the SHIFT and FOCUS/COPY buttons (Paste) and turn the ASSIGNABLE KNOB (or push the ASSIGNABLE BUTTON) you want to assign the module parameter to. We choose to assign the parameter to the first ASSIGNABLE KNOB. The LED GRAPH around the ASSIGNABLE KNOB (or the ASSIGNABLE BUTTON LED) will light up with the pasted module parameter's current value and the parameter name will be shown in the corresponding ASSIGNABLE DIS-PLAY.



7. If you want to assign more module parameters, press the PATCH button and repeat the procedure from step 3 above. If you have assigned several parameters from the same module to adjacent ASSIGNABLE KNOBS/BUTTONS in a Page or Column, the module name will only be shown for the first parameter. Then, there will be dashes in the ASSIGNABLE DISPLAYS to indicate that the following parameters are from the same module.

# PATCH PARAMETER VARIATIONS

# WHAT IS A VARIATION?

A Variation is a complete setup of Patch parameters, i.e. basically all module parameters in a specific Patch. Variations always reside inside every single Patch. A Patch automatically holds eight different Variations. Each of these Variations are simply different parameter settings of one and the same Patch. You could compare a single Nord Modular G2 Patch with a complete hard-wired synthesizer where you have a predefined number of hard-wired "modules". A Variation in a hard-wired synthesizer would then be a

complete setup of parameters - usually called a "Program". A Variation in the Nord Modular G2 is exactly the same but is based on a Patch instead.

#### PARAMETERS THAT CAN'T BE CHANGED BETWEEN VARIATIONS

There are some things in the Patch that can't be changed for different Variations: the number of modules, cable connections and functions in drop-down selectors, such as the waveform selectors of Oscillator C and D, for example. This is because when the above mentioned things are changed, the Sound engine has to recalculate the whole Patch and thus cause a brief moment of silence. Since Variation changes should be "glitch free", these restrictions are necessary. If you want to be able to switch Oscillator waveforms between Variations, use modules with radio buttons instead, Oscillator A, B and ShpA, for example. The same goes for some of the LFO modules.

#### **CREATE (CHANGE) A VARIATION**

- 1. Load a Patch in a Slot. The VARIATION 1 LED lights up.
- Create a new Variation by pressing the VARIATION
  button. The VARIATION 2 LED lights up to indicate it's now the focused Variation.
- 3. Change the settings on a couple of parameters in the Patch either by using the PARAMETER PAGES buttons and turning the ASSIGNABLE KNOBS or by entering Patch Edit mode by pressing the PATCH button and navigating to the parameters. Note that modules that have a drop-down selector, for example Oscillator C and LFO B, can only have a single waveform for all eight Variations as described above.



4. Now, press the VARIATION 1 button again to put Variation 1 in focus. The parameters you changed now revert to their original settings.

If you want to have more Variations in your Patch, simply press another VARIATION button and change parameter settings. Each Patch contains eight different Variations. When you store your Patch, all Variations will automatically be saved together with the Patch.

#### SAVE A VARIATION

All active Variations are automatically saved when you store the Patch (see "Store a Patch" on page 67).

#### COPY A VARIATION

To copy the parameter settings of an existing Variation to another in the Patch, hold down the FOCUS/ COPY button and press the VARIATION button that you want to copy parameters from. Then hold down SHIFT+FOCUS/COPY (Paste) and press the destination VARIATION button to paste all parameter values.

### VARIATION INIT

Here you can have a "default" parameter setup for your Patch. This Init parameter setup can be recalled in any Variation by pressing the VAR INIT button (SHIFT+MORPH) to the right of the Variation buttons. When you do this, the Var Init parameter settings will be copied to the currently focused Variation.

#### SAVE A VARIATION INIT

This has to be done in the Editor. Refer to "Variation Init" on page 47.

### **CLEAR A VARIATION**

You clear a Variation and reset all module parameters in the Patch to their default settings by pressing SHIFT and desired VARIATION button.

# STORE A PATCH

Storing a Patch will permanently overwrite an existing Patch. Be careful so that you don't accidentally erase Patches you want to keep! Note! When the Nord Modular G2 is shipped from factory, Memory Protect is set to 'On'. To be able to store Patches, first disable the Memory Protect function. See "Memory Prot" on page 81.

Storing a Patch on the Nord Modular G2 can be done in two ways:

#### STORING WITHOUT CHANGING THE PATCH NAME

- 1. Press the STORE button once. The LED above it starts flashing.
- Select memory location by turning the ROTARY DIAL. Switch between Banks by pressing the UP/ DOWN NAVIGATOR buttons. As you scroll through the memory locations, you can see the Patch names in the DISPLAY. This prevents you from overwriting a Patch that you want to keep.



3. Press STORE again to store your Patch. (To cancel the operation, press the FOCUS/COPY button.)

#### STORING WITH NEW CATEGORY AND/OR NEW PATCH NAME

To make it easier to find different types of sounds in the synth's memory it's possible to define a category for each Patch. When you're looking for a specific type of sound you can then search by Category, instead of Alphabetically or Numerically. There are 13+2 different categories to choose between:

CATEGORY	DESCRIPTION
Acoustic	Patches with an acoustic character like flutes, violins, guitars, ethnic sounds, bells, mallets etc. Doesn't necessarily have to be emulations of existing instruments



CATEGORY	DESCRIPTION
Sequencer	Sounds which use sequencer modules to produce melodic and/or rhythmic lines.
Bass	All sorts of bass sounds
Classic	Traditional "clean" analog types of polyphonic synth sounds based on the classic waveforms
Drum	Drum and percussion sounds
Fantasy	Melodic effects sounds and textures, often with rhythmic modulations
FX	Atonal effects sounds like water, laser guns, explosions etc. Sometimes with heavy modulations.
Lead	Sounds meant for lead lines. Usually monophonic sounds. Also lead "chord mem- ory" sounds
Organ	Different types of organ sounds
Pad	Melodic polyphonic "chord" sounds with fairy slow attacks like strings, choirs etc.
Piano	Different types of electric and acoustic piano emulations
Synth	All sorts of melodic polyphonic synth sounds
Audio In	All sorts of Patches that make use of the Audio Ins of the synth.
User1	Reserved for your own Sound Category
User2	Reserved for your own Sound Category

To store a Patch in a specific Category and change the Patch name, do like this:

- 1. Hold down SHIFT and press STORE (Store as...). The STORE LED starts flashing and the DISPLAY shows the current Category or, if no Category was selected, 'No Cat'.
- 2. Select Category with the ROTARY DIAL. Let's say we select 'Acoustic' in this example. Note that you can't revert to 'No Cat' after you have selected another Catergory for your Patch.


3. Press the DOWN NAVIGATOR button once and select letters for the Patch name by turning the ROTARY DIAL. Change the cursor position with the LEFT (and RIGHT) NAVIGATOR buttons.

Alternatively, press and hold the DOWN NAVIGA-TOR button and select letters with the ROTARY DI-AL. Each time you release the DOWN NAVIGATOR button the cursor in the DISPLAY advances one step.

Repeat the procedure for the entire Patch name. If you want to delete a letter/position and thus move all the letters to the right of the cursor one step back, hold down SHIFT and press the LEFT NAVI-GATOR (DEL) button. (This function is the same as using the Delete key on a computer keyboard.) If you want to move all letters to the right of the cursor one step forward and thus make room for more letters, hold down SHIFT and press the RIGHT NAVIGATOR (INS) button. (Press a SLOT button to cancel the Storing operation).



- 4. Press STORE again. The STORE LED continues to flash. Select memory location by turning the ROTARY DIAL. Switch between Banks pressing the UP/DOWN NAVIGATOR buttons. As you scroll through the memory locations, you can see the Patch names in the DISPLAY. This prevents you from overwriting a Patch that you want to keep.
- 5. Press STORE again to store your Patch. (To cancel the operation, press the FOCUS/COPY button.)

Note! If you started to save a Patch by only pressing the Store button and then change your mind and want to change Category and/or name, you can press Shift+Store right after you pressed Store the first time. This way you don't have to abort the initial storing procedure but can continue right away.

# COPYING PATCHES

### FROM ONE MEMORY LOCATION TO ANOTHER

Copying a Patch from one memory location to another is just a variation of storing. You just change the memory location after you pressed **STORE** the fist time as described in "Store a Patch" on page 67.

Of course you could also copy a Patch to a new memory location and change the Patch name and/or Category. Just follow the instructions in the paragraph "Storing with new Category and/or new Patch name" on page 67.

### FROM ONE SLOT TO ANOTHER

You can also copy a Patch from one Slot and paste it into another Slot. Do like this:

Press and hold the FOCUS/COPY button and while holding it, press the SLOT button containing the Patch you want to copy. Release all buttons. Press and hold SHIFT+FOCUS/COPY (Paste) and while holding them press the destination SLOT button.

Note: The copied Patch is not stored in any memory location after this operation. It is only copied to the new Slot's edit buffer.



# **RENAME A PATCH**

Renaming a Patch is the same as saving the Patch with a new name to the same memory location. Just follow the instructions in the paragraph "Storing with new Category and/or new Patch name" on page 67 and select the same memory location.

# DELETE A PATCH

Deleting Patches from the internal memory of the synth can only be done from the Editor. Please refer to "Delete a Patch" on page 46.

# ACTIVATE SEVERAL SLOTS

Due to the Sound engine architecture of the Nord Modular G2, which always tries to optimize the Patch Load and voice allocation resources, there are some things to bear in mind:

In live and sequencing situations you may want to quickly (without any silence) switch between Patches by simply accessing another SLOT. In order for the Sound engine to "prepare" for this, it has to calculate the entire Slot configuration in advance. Therefore, you need to activate all the Slots you plan to use, with their Patches loaded, in advance.

Activate the Slots you want to use by holding down the SHIFT button and pressing the SLOT button(s) you



plan to use. The ACTIVESLOTS/FOCUS LEDS for each active Slot will light up, indicating they're used in the total Sound engine calculation. The LED for the currently focused Slot will flash to indicate it's selected for editing. Now, when you press another SLOT button to play another active Patch, there will be no silence since the Sound engine has already calculated the entire Slot configuration. If you switch between Slots which haven't been previously enabled with the ActiveSlots/Focus function, the Sound engine has to recalculate every time you change Slot and thus cause a brief moment of silence.

# LAYERING PATCHES

First of all you have to activate the Slots you plan to use as described above. Then, simultaneously press the SLOT buttons containing the Patches you want to layer. Alternatively, double-click the SLOT buttons, one by one, to add them to the layer. The KEYBOARD AS-SIGN LED for each selected Slot in the layer will light up. The ACTIVE/FOCUSED SLOTS LED for the currently focused Slot will flash to indicate it's selected for editing. The Patches in the active Slots will now sound when you play the keyboard or send MIDI Note data



on the MIDI IN on the Global MIDI Channel (see "MIDI Glob Ch" on page 80). Change focused Slot by pressing another active SLOT button. Deselect a Slot from the layer by double-clicking the SLOT button you want to exclude from the layer. (See more about layering Patches in "Performances" on page 74). Note that every time you load a Patch into any Slot, there will be a brief moment of silence when the Sound engine recalculates and optimizes the Patch data.

### CHANGING EDIT FOCUS BUT NOT KEYBOARD FOCUS

By default, changing keyboard focus by pressing a Slot button in a layer automatically also changes the edit focus. By 'edit focus' we mean the Slot which holds the Patch currently enabled for editing from the front panel (and from the Editor). In some situations you may want to have the edit focus on a Patch in a Slot which is different from the Patch you're playing from the keyboard. Then, Hold down the FOCUS/COPY button and press the desired SLOT button. This will change the edit focus but not the keyboard focus. In the pic-



ture to the right, Slot A has edit focus and Slot C has keyboard focus.

## MORPH GROUPS

The Morph function lets you continuously control defined ranges of several parameters in a Patch, using only a single control source. This lets you produce radical changes in a sound in a very fast and easy way. Nord Modular G2 features eight separate Morph groups per Patch. You may assign a total of 25 parameters to these 8 Morph groups in each Patch. A parameter can also be assigned so several Morph groups (all 8 if you like), and thus be controlled differently from several sources. Also, if you use several Variations in a Patch, the Morph group assignments can be different for each Variation. The control sources are Keyboard Velocity, Keyboard Range, Keyboard Aftertouch, Control Pedal, Sustain/Switch Pedal, Modulation Wheel, Pitch/Control Stick and/or any ASSIGNABLE KNOB on the front panel.

### ASSIGN PARAMETERS TO A MORPH GROUP

In the example below we will assign the A, D, S and R parameters of an ADSR Envelope module to the MOD WHEEL. However, the procedure is exactly the same for the other parameters and Morph groups as well. First we press the PATCH button and navigate down to the EnvADSR1 module. This figure shows the current parameter settings:

- 1. Press the MORPH button to the right of the VARIA-TIONS buttons. The MORPH LED lights up.
- 2. Now, press the WHEEL Morph button (the VARIA-TION 1 button). All circular LED GRAPHS on the front panel will go blank and the Wheel Morph LED will flash.
- 3. Turn the parameter KNOBS you want to assign to the Wheel Morph group. The first and last LED of the Morph range will light up. A Morph range can be either negative or positive according to your choice. The "zero" Morph value is the parameter's initial setting. In this example we assign the A, D, S, and R parameters of the EnvADSR1 module.

When you are ready with the assignments, release

the WHEEL Morph button and the LED GRAPHS will light up again to show the regular settings. Now, the Wheel Morph LED will light steadily to indicate that there are parameters assigned to this Morph group. To continue the Morph assignment, navigate to other module parameters to assign. Then, press the MORPH button again and repeat the procedure.

Note that you can also assign parameters directly from the Parameter Pages to Morph groups. In other words, you don't have to enter Patch Edit mode if the parameters you want to morph are already assigned to a Parameter Page.

To change the initial parameter value(s) and thus move the entire Morph range (sector), just change the parameter value without pressing any MORPH GROUP button (just as you would change an unassigned parameter).

The Wheel, Aftertouch, Control Pedal, Sustain Pedal and Pitch Stick Morphs will show the actual parameter values when you change the source value is the morphed parameters are currently displayed in the ASSIGNABLE DISPLAYS. The Velocity and Keyboard Morphs don't show the actual parameter values as you play on the keyboard. It's made this way because it gets irritating after a while to watch all flickering LEDs as you play.



Note: If you have assigned the same parameter to several Morph groups and control the parameter simultaneously from the different Morph group control sources, the parameter values will be added together. This means that the parameter value can go beyond the ranges set for each individual Morph group.

Tip! If you want to enter "Morph Assign" mode without needing to hold the MORPH GROUP button you can double-click the MORPH GROUP button. Click again to exit Morph Assign mode.

### DEASSIGN PARAMETERS FROM A MORPH GROUP

- 1. Navigate to the morphed parameter you wish to deassign.
- 2. Press the MORPH button. Then, hold the MORPH GROUP button. The parameters assigned to that Morph group will indicate their morph ranges.
- 3. Turn the parameter KNOB you wish to deassign until it meets the initial (start) value. The LED graph will go blank to indicate that the parameter has been deassigned from the Morph group.

To deassign all assigned parameters from a Morph group, hold down SHIFT and press the corresponding MORPH GROUP button (Morph Clear).

### EDIT PARAMETERS IN A MORPH GROUP

The Morph range will always start at the current position of the parameter. The relationship between the setting of the parameter and the Morph range will be fixed, even if you move the setting of the parameter after a Morph range has been set.

#### EDIT A MORPHED PARAMETER WHICH IS ASSIGNED TO A PARAMETER PAGE

Press the corresponding PARAMETER PAGE button to display the desired morphed parameter. You can edit the morph range (the size of the sector) by first pressing the MORPH button and then holding down the MORPH GROUP button and turning the morphed KNOB.

#### EDIT A MORPHED PARAMETER WHICH IS NOT ASSIGNED TO A PANEL KNOB

Press the PATCH button to enter Patch Edit Mode. Navigate to the parameter you wish to edit. You can edit the morph range (the size of the sector) by first pressing the MORPH button and then holding down the MORPH GROUP button and turning the morphed KNOB.

### COPY A MORPH GROUP FROM ONE SOURCE TO ANOTHER

The special Copy/Paste function can be used to copy an entire Morph Group with all its assigned parameters from one Morph source to another. To copy and paste a Morph Group, do like this: First, press the MORPH button. Then, press and hold the FOCUS/COPY button and while holding it, press a MORPH GROUP button. Release all buttons. Press and hold SHIFT+FOCUS/COPY (Paste) and while holding them, press the new destination MORPH GROUP button. Now, all parameters have been copied and pasted to the new source.

### MORPH GROUPS IN SEPARATE VARIATIONS

Each Variation in a Patch can have its own unique Morph group assignments.

### COPY MORPH GROUPS BETWEEN VARIATIONS

All Morph groups in a Variation are automatically copied together with the rest of the parameter values when you copy a Variation to another Variation as described on page 66.

### A WORD ABOUT KEYBOARD MORPH

Keyboard Morph lets you control the Morphed parameters differently depending on where on the keyboard you play. The minimum source value is the lowest key of the Nord Modular G2 keyboard when no Octave Shift is used, i.e. note C2, and maximum is the highest key, i.e C5. When you transpose the keyboard up or down, the Keyboard Morph range will extend beyond the set Morph limits.

### MORPHING CLOCK-SYNCHED MODULE PARAMETERS

It's not possible to Morph a clock-synched parameter. You can assign and set a Morph range on a clock-synched parameter, but Morphing it will have no effect.

### PERFORMANCES

### WHAT IS A PERFORMANCE?

A Performance is a complete setup (combination) of four Patches - one in each Slot. The Nord Modular G2 has 1024 memory locations for Performances (8 Banks with 128 memory locations each). Since a Performance can be quite large (around 15-20 kB), it's not likely that you will be able to use all Performance memory locations. The Banks should therefore be considered more like "folders" to store different projects in. A Performance contains information about which Slots should be active, layered and also any Keyboard Split settings. A Performance also contains information about a number of other settings. Later in this chapter follows a detailed list of what settings are saved in a Performance.

Note that the edits and settings you make for each individual Patch in a Performance do not affect the original Patch in any way. The Performance memory is completely separate from the Patch memory. The Patches saved in a Performance are only copies of the Patches from the Patch memory.

### ENTERING PERFORMANCE MODE

Enter Performance mode by pressing the PERFORM-ANCE MODE button.



### LOAD A NEW PERFORMANCE FROM THE INTERNAL MEMORY

Load the new Performance into the Slots by first turning the ROTARY DIAL to select the Performance. If you like you can also switch between Banks by pressing the UP/DOWN NAVIGATOR button. Then load the selected Performance into the Slots by pressing the PATCH LOAD button. Now, you can try out other Performances of the internal memory and edit parameters as described above. To revert to "Patch mode", press the PERFORMANCE button.

Note that selecting a new Performance changes a lot of parameters. This might lead to unexpected behavior!



### CREATING A PERFORMANCE

First of all you need to activate the Slots you plan to use for your Performance. Do this by holding SHIFT and pressing the SLOT buttons you want to include as described in "Layering Patches" on page 71.

#### SELECTING PATCHES FOR THE SLOTS

To select Patches as base in a Performance, do like this:

- 1. In Performance Mode, hold down the desired SLOT button (A in this example). The SLOT LED flashes to indicate that it's the active Slot. The DISPLAY shows the name of the Patch in Slot A (if any).
- 2. Select a new Patch for the Slot by holding down the SLOT A button and scrolling with the ROTARY DIAL. To switch between Patch Banks, hold down the SLOT A button and use the UP/DOWN NAVI-

GATOR buttons. Repeat the procedure for the other Slots.

Note! Do not press the Patch Load button during this operation. The Patch is automatically loaded to the Slot as soon as you release the Slot button.

If you want to assign or deassign a Patch in an active Slot to be controlled by the keyboard (Keyboard Assign), double-click the SLOT button you want to include/exclude. If you want to include an unused Slot or deactivate an active Slot, Press SHIFT+SLOT button.

### EDITING A PERFORMANCE

This is done just as in Patch (non-Performance) mode as described in "Edit a Patch" on page 62. To activate a Slot for editing, simply press the desired SLOT button. The LED below it flashes to indicate it's the currently active Slot.

Note that when you save the Performance you save edited copies of Patches within the Performance. The original Patches (from the Patch memory) that you may have used as base for the Performance are not affected in any way.



### GLOBAL (PERFORMANCE) PARAMETER PAGES

Each Performance can have a separate set of programmable Parameter Pages, in addition to the Parameter Pages of each Patch in the Performance. Hold down SHIFT and press the PATCH SETTINGS button to access Global Parameter Page 1, Column 1. Now, 8 new Performance parameters can be assigned to the AS-SIGNABLE KNOBS and/or ASSIGNABLE BUTTONS. If you want to access the Programmable Parameter Pages of each individual Patch, hold down SHIFT and press the PATCH SETTINGS button again. Now, the first Parameter Page of the Patch in the focused Slot is shown



in the ASSIGNABLE DISPLAYS. You can freely assign module parameters from any of the Slots to the Global Parameter Pages. See "Assign parameters to panel controls" on page 64 for info on how to assign parameters to the Parameter Pages.

### KEYBOARD SPLIT

The Keyboard Split function allows you to split the keyboard in two sections, each playing separate Patches. When Keyboard Split is activated, Slots A and B will be played from the lower part of the keyboard, while Slots C and D will be played from the upper part. The Keyboard Split function is a pure synth "performance feature" and doesn't exist in this way in the Editor. Activate Keyboard Split function by pressing the **KB SPLIT** button:



#### SETTING THE SPLIT POINT

You set the Split Point (the key where the keyboard should be split) by holding down SHIFT and pressing the KB SPLIT button. The lowest KEYBOARD SPLIT LED above the keyboard will light up to indicate the split position. Hold down SHIFT and press the KB



SPLIT button again to move the split point to the next position. The next Keyboard Split LED will light up instead above the keyboard.

#### COMBINING SPLIT AND LAYER

Since Slots A and B will be played from the lower part of the split point and Slots C and D from the upper part, you can split the keyboard and play layers of two Patches on each "keyboard half". Just select Patches for all Slots, and activate Keyboard Split.

### KEYBOARD ZONE

It's also possible to set separate note ranges for each of the Slots in a Performance. This is done in the System menu. Please refer to "Keyboard Zone" on page 80.

### STORING A PERFORMANCE

Note! When the Nord Modular G2 is shipped from factory, Memory Protect is set to 'On'. To be able to store Performances, first disable the Memory Protect function. See "Memory Prot" on page 81.

#### STORING WITHOUT CHANGING THE NAME

- 1. Press the **STORE** button once. The **LED** above it starts flashing.
- 2. Select memory location by turning the ROTARY DIAL. Switch between Banks 1-8 by pressing the UP/DOWN NAVIGATOR buttons. As you scroll through the memory locations, you can see the Performance names in the DISPLAY. This prevents you from overwriting a Performance that you want to keep.



3. Press STORE again to store your Performance. (To cancel the operation, press the FOCUS/COPY button.)

#### STORING WITH THE POSSIBILITY TO CHANGE THE NAME

1. Hold down SHIFT and press STORE (Store as...). The LED starts flashing and the DISPLAY shows the name of the current Performance. Select letters with the ROTARY DIAL and change the cursor position with the LEFT and RIGHT NAVIGATOR buttons. 

Matter Level
Me Level
System
Parts
Development
Dev

Alternatively, press and hold the DOWN NAVIGA-TOR button and select letters with the ROTARY DI-AL. Each time you release the DOWN NAVIGATOR

button the cursor in the DISPLAY advances one step. Repeat the procedure for the entire Performance name. If you want to delete a letter/position and thus move all the letters to the right of the cursor one step back, hold down SHIFT and press the LEFT NAVIGATOR (DEL) button. (This function is the same as using the Delete key on a computer keyboard.) If you want to move all letters to the right of the cursor one step forward and thus make room for more letters, hold down SHIFT and press the RIGHT NAVIGATOR (INS) button. (Press the FOCUS/COPY button to cancel the Storing operation).

- 2. Press STORE again. The LED continues flashing. Select memory location by turning the ROTARY DIAL. Switch between Banks 1-8 by pressing the UP/DOWN NAVIGATOR buttons. As you scroll through the memory locations, you can see the Performance names in the DISPLAY. This prevents you from overwriting a Performance that you want to keep.
- 3. Press STORE again to store your Performance. (To cancel the operation, press the FOCUS/COPY button.)

The Patches you use in the Performance Slots are saved complete with all parameter settings, Keyboard Split info and Parameter Pages (also Global) configurations when the Performance is saved. The above

point means that there is no need to store the Patches separately. As soon as you save the Performance, all Patches that it uses are also saved, within the Performance. This also means that if you later change any of your Patches, in Patch mode, the Patches in the Performances are not affected in any way.

### EXTRACTING PATCHES FROM A PERFORMANCE

As stated earlier, the Patches used in the Slots of a Performance are *not* references to regular, existing Programs, but separate Patches "on their own". You will find several unique sounds in the factory Performances; sounds that you will not find in any of the internal Patch locations. You may want to extract such a Patch, to save as a single Patch in the Patch memory.

#### EXTRACT A PATCH AND SAVE IT

- 1. Select the Performance containing the sound you want to extract.
- 2. Press the PERF MODE button to exit Performance mode.
- 3. Press the SLOT button to activate the Slot (ACTIVE SLOTS/FOCUS LED is flashing) containing the desired Patch.
- 4. Press STORE. The LED above the STORE button starts flashing
- 5. Select Patch memory location by turning the ROTARY DIAL. Switch between Banks by pressing the UP/DOWN NAVIGATOR buttons. As you scroll through the memory locations, you can see the Patches in the DISPLAY. This prevents you from overwriting a sound that you want to keep.
- 6. Press STORE again to store your Patch. (To cancel the operation, press a SLOT button.) The Patch is now stored as a single Patch.

#### EXTRACT A PATCH, RENAME IT AND SAVE IT

- 1. Select the Performance containing the sound you want to extract.
- 2. Press the PERF MODE button to exit Performance mode.
- 3. Press the SLOT button to activate the Slot (ACTIVE SLOTS/FOCUS LED is flashing) containing the desired Patch.
- 4. Hold down SHIFT and press STORE (Store as...). The LED above the Store button starts flashing.
- 5. Select Category with the ROTARY DIAL.
- 6. Press the DOWN NAVIGATOR button once and select letters for the Patch name by turning the ROTARY DIAL. Change the cursor position with the LEFT (and RIGHT) NAVIGATOR buttons.

Alternatively, press and hold the DOWN NAVIGATOR button and select letters with the ROTARY DI-AL. Each time you release the DOWN NAVIGATOR button the cursor in the DISPLAY advances one step.

Repeat the procedure for the entire Patch name. If you want to delete a letter/position and thus move all the letters to the right of the cursor one step back, hold down SHIFT and press the LEFT NAVIGA-

TOR (DEL) button. (This function is the same as using the Delete key on a computer keyboard.) If you want to move all letters to the right of the cursor one step forward and thus make room for more letters, hold down SHIFT and press the RIGHT NAVIGATOR (INS) button. (Press a SLOT button to cancel the Storing operation).

- 7. Press STORE again. The STORE LED continues to flash. Select memory location by turning the ROTARY DIAL. Switch between Banks pressing the UP/DOWN NAVIGATOR buttons. As you scroll through the memory locations, you can see the Patch names in the DISPLAY. This prevents you from overwriting a Patch that you want to keep.
- 8. Press STORE again to store your Patch. (To cancel the operation, press a SLOT button.) The Patch is now stored as a single Patch.

### DELETING PERFORMANCES

Deleting Performances from the internal memory of the synth can only be done from the Editor. Please refer to "Deleting Performances in the synth" on page 56.

### EXITING PERFORMANCE MODE

To exit Performance mode, press the **PERF MODE** button. Now you return to the regular Patch mode. You will note that the Patches you used in the latest Performance are still present in the Slots, also in Patch mode. However, if you want to continue using them as separate Patches, you have to save each of the Patches separately in Patch mode.

# THE SYSTEM FUNCTIONS

Press the SYSTEM button to access the system parameters and functions. The System menu is divided into three "sections": parameters which are unique for the currently focused Patch (indicated in the DISPLAY by '|Pa' in the upper right corner), parameters which are unique for the currently active Performance (indicated in the DIS-PLAY by '|Pe' in the upper right corner) and parameters which are



global for the entire synth (indicated in the DISPLAY by '|Sy' in the upper right corner). Select function with the DOWN NAVIGATOR button.

### PATCH FUNCTIONS (PA)

#### SUSTAIN PEDAL ON/OFF

Select if you want the Sustain Pedal functionality on or off in the Patch. If set to On, a connected sustain pedal will control both sustain and any parameters assigned to the Switch Morph group. Select On or Off with the **ROTARY DIAL**.

Sustain	Pedal	Pa
<u>O</u> n		

#### VIBRATO RATE

Select Vibrato Rate for the Patch. Range: 4.00-8.00 Hz. (The Vibrato Amount is set in the Patch Settings "menu" for the Patch. See "Edit Patch Settings" on page 63).

Vibrato	Rate	Pa
<u>6</u> .02 Hz		

### PERFORMANCE FUNCTIONS (PE)

#### KEYBOARD ZONE

Here you can set individual note ranges for each of the Slots in a Performance. Press desired SLOT button and set lower note limit with the ROTARY DIAL. Press the RIGHT NAVIGATOR button and set the highest note limit with the ROTARY DIAL. Then, repeat the proce-

dure for the other Slots by pressing the corresponding SLOT buttons. It's also possible to have overlapping keyboard zones. Note that these ranges are also affected by any Keyboard Split setting you have in your Performance (see "Keyboard Split" on page 76). When you store your Performance, these settings will be stored with it.

### SYSTEM FUNCTIONS (SY)

#### MIDI SLOT CH

Set the MIDI channel for each SLOT (A-D). The set channels will be used for receiving and transmitting MIDI data. If you select 'Off', the Slot will not receive or transmit any MIDI data at all. Press desired SLOT button and set MIDI channel with the ROTARY DIAL. Then,

repeat the procedure for the other Slots by pressing the corresponding SLOT buttons. Note that in Performance Mode, the internal keyboard will *send* on all Slot's MIDI channels that have Keyboard Assign.

#### MIDI LOCAL

Turn the MIDI Local Control on or off. Select Local On to be able to control the synth from the internal keyboard and the pedals. MIDI data is also transmitted via the **MIDI OUT** jack. In the Local Off mode, the keyboard and pedal actions are transmitted only via MIDI

and do not control the synth itself. Local Off should be used with external sequencers if the **MIDI OUT** jack of Nord Modular G2 is routed back, via the external sequencer, to the **MIDI IN** jack. If Echo is active in the sequencer, "double notes" will appear when playing the keyboard in Local On mode. Select On or off with the **ROTARY DIAL**.

#### MIDI GLOB CH

Here you set the Global MIDI Channel for the synth. The Global MIDI Channel should be used for receiving MIDI note data and control data (Mod Wheel, Aftertouch, Velocity, Aftertouch and Pedals) as well as sending and receiving MIDI Program Change messages

in Performance mode. Select Global MIDI Channel with the ROTARY DIAL. Range: Channel 1-16, Off.

#### MIDI SYSEX ID

Here you can set an 'Instrument SysEx ID'. This is very useful if you're sending SysEx dumps of sounds from a sequencer to the Nord Modular G2 and have several G2 synthesizers MIDI connected. Let's say you have two G2 synthesizers. These two instrument models have

the same 'Manufacturer ID' and 'Model ID' in the SysEx protocol. By defining separate SysEx ID's on each of the two synths, you will be able to "direct" the SysEx dumps from the sequencer to one of the G2's while the other one will ignore the dumps. Just make sure that you define a separate SysEx ID before dumping the sounds to the sequencer. Select Instrument SysEx ID with the **ROTARY DIAL**. Range: 1-16, All

**B**3

Pe

Sy

4

Sy

Sy

Ch

3

Slot

2

MIDI Local

MIDI Glob

Keyboard Zone

C-1

MIDI

1

On



Ch



### MIDI CLK SEND

Here you choose whether or not to send out MIDI Clock to the **MIDI OUT** jack of the synth. Sending out a MIDI Clock signal will only work when you use the internal Master Clock as clock source. Select On or Off with the **ROTARY DIAL**.

#### MIDI CLK RECV

Here you choose whether or not to accept external MIDI Clock signals received on the MIDI IN jack of the synth. If set to 'On', the Master Clock of the synth will automatically sync to any incoming MIDI Clock. Select On or Off with the **ROTARY DIAL**.

#### MIDI PRG CHNG

Here you select how the synth should handle Program Change and Bank Select (Controller #32) MIDI messages. Select Off, Send (only), Receive (only) and Send and Receive with the **ROTARY DIAL**.

### MIDI CTRL

Here you select how the synth should handle MIDI Controller messages. Select Off, Send (only), Receive (only) and Send and Receive with the **ROTARY DIAL**.

#### SUST PED POL

Different sustain pedals use different polarity to activate the sustain switch. Select between 'Open' and 'Closed' with the **ROTARY DIAL**.

#### CTRL PED GAIN

Different control/expression pedals have different characteristics. Here you can select Gain to adjust the control pedal functionality of the synth to your specific expression pedal. Select range (x1.00-x1.50) with the ROTARY DIAL.

#### MASTER TUNE

Use this function to tune the synth to other instruments. The range is from -6 to +6 semitones and fine adjustment from -100 to +100 cents. 100 cents is one semitone. All Oscillator modules are affected by the Master Tune function. Select tuning with the **ROTARY DIAL**.

#### MEMORY PROT

Select memory protection for the entire internal Patch and Performance memory. Select On or Off with the **ROTARY DIAL**.

#### SYNTH NAME

Here you can name your synth. Select characters with the ROTARY DIAL and change the "cursor" position with the left/right NAVIGA-TOR buttons. Alternatively, press and hold the DOWN NAVIGATOR button and select letters with the ROTARY DIAL. Each time you re-

lease the DOWN NAVIGATOR button the cursor in the DISPLAY advances one step. Repeat the procedure for the entire Synth name. If you want to delete a letter/position and thus move all the letters to the right of the cursor one step back, hold down SHIFT and press the LEFT NAVIGATOR (DEL) button. (This func-

MIDI	Clk	Send	Sy
Off			

MIDI	Clk	Recv	Sy
<u>o</u> ff			

MIDI Prg Chng |Sy <u>S</u>end & Receive

MIDI	Ct	trl	Sy
Send	&	Receive	

Sust	Ped	Pol	Sy
<u>O</u> pen			

Ctrl	Ped	Gain	Sy
x <u>1</u> .00	)		

Master	Tune	Sy
<u>0</u> semi	. 0	cent



Synth Name

ModularG2

Sy

tion is the same as using the Delete key on a computer keyboard.) If you want to move all letters to the right of the cursor one step forward and thus make room for more letters, hold down SHIFT and press the RIGHT NAVIGATOR (INS) button.

### DUMP ONE

Hold down SHIFT and press the SYSTEM button to send a MIDI SysEx dump of the Patch in the focused Slot, or of an entire Performance in Performance Mode. Note that an average MIDI SysEx dump of a Patch is approximately 5 kB and that of a Performance nearly 20 kB. This means the recording device - a sequencer, for example - must be prepared for this amount of data.



# 9. WORKING WITH THE EDITOR

💕 File Edit Patch Performance Synth Setup Tools Window Help -

In the Editor, the usual Windows98SE/2000/XP keyboard commands are available. The drop-down menus can be accessed by pressing the Alt key and the underlined letter in the menu bar. The functions in the drop-down menus can then be accessed by pressing the key corresponding to the underlined letter in the drop-down menus.

Most of the commands can also be accessed by pressing the Ctrl key together with the letter shown next to the command name in the drop-down lists.

# FILE MENU

### NEW PATCH

Creates a new, empty Patch window. If connected to the synth, the currently active Slot will be cleared to host your new Patch. See "Creating your first Patch" on page 36 for info on how to create a Patch.

### NEW PERFORMANCE

Creates 4 new, empty Patch windows. If connected to the synth, all 4 Slots will be automatically activated and cleared to host your new Performance. Slot A will be assigned to the keyboard. The synth will also switch to Performance Mode. See "Creating a Performance in the Editor" on page 54.

### 

Brings up the file selector and allows you to open a Patch or Performance file from disk. Select between Patch and Performance files from the 'Files of type' drop-down selector. Select a file and click Open to open and download the Patch/Performance to the Slot(s) in the synth. Note that if you open a Patch in Performance mode with the synth connected, the selected Patch will be opened and downloaded in Slot A and all other Slots will be cleared.

#### NEW TO

Creates a new, empty Patch window in a selectable Slot of the connected synth, or in Performance Mode. If connected to the synth, the selected Slot will be cleared to host your new Patch. See "Creating your first Patch" on page 36.

### OPEN TO

Brings up the file selector and allows you to open a Patch file from disk and download to a selectable Slot. Select a file and click Open to open and download the Patch to the selected Slot in the synth. This command is useful when you select Patches when creating a Performance.

#### SAVE

This command will save the current Patch or Performance to a storage disk on the computer. If the Patch or Performance wasn't opened from the computer using the File|Open command (see above) or if you changed the Name in the Toolbar, you will be prompted for a file name and destination folder. Patches that are saved from the Editor automatically gets the extension '.pch2' and Performances '.prf2'.

### SAVE AS

This command will prompt you for a file name and destination folder before saving the Patch or Performance to disk. This is useful for renaming a Patch file before saving it, leaving any original Patch intact on the disk. Patches that are saved from the Editor automatically gets the extension '.pch2' and Performances '.prf2'.

### SAVE ALL

This command will save all open Patches and/or Performances to a storage disk on the computer. If a Patch or Performance has not been saved before, you will be prompted for a file name. Patches that are saved from the Editor automatically gets the extension '.pch2' and Performances '.prf2'.

### SAVE FROM

This command will let you save a Patch from a selectable Slot to disk. You will also get the opportunity to rename the Patch file before saving it, leaving any original Patch intact on the disk. Patches that are saved from the Editor automatically gets the extension '.pch2'. This command is useful if you want to extract a Patch from a Performance and save it as a single Patch on the computer.

#### SAVE INITPATCH

This command will save the current Patch as an InitPatch to a storage disk on the computer. An InitPatch can be used as a "template" Patch to recall instantly by pressing the Init buttons in the Toolbar (see "Init 1&2" on page 97).

#### RECENT FILES

Here you can choose to open any of the most recently opened Patches.

#### QUIT

Quits the Editor software. Any unsaved Patches will automatically be deleted. Closing a Patch in the Editor or quitting the Editor will not remove Patches that have been downloaded to a Slot in the synth.

### EDIT MENU

#### UNDO

Click to undo your latest operations/commands.

#### REDO

Click to step back through the latest Undo operations. Works like a reversed 'Undo' function.

### Сит

Cuts out one or several modules, including their common cable connections and parameter settings, and places in the clipboard memory.

### COPY

Copies one or several modules, including their common cable connections and parameter settings, and places in the clipboard memory.

### PASTE

Pastes one or several modules, including their common cable connections and parameter settings, that previously have been cut or copied to the clipboard memory. The Paste command results in a cursor with a small '+' sign attached to it. Place the cursor where you want in the Patch window and click to paste the module(s).

### CLEAR

Deletes one or several selected modules (and their mutual cable connections) from the Patch window.

### PASTE PARAMS

This command should be used if you only want to paste a copied module parameter values to another module of the same type. You can also select several modules in one Variation, select Copy and then Paste Params in another Variation.

### SELECT ALL

Selects all modules in the most recently used section of the Patch window for clearing, copying, moving etc.

# PATCH MENU

### PATCH SETTINGS

Opens up the Patch Settings floating window. The Patch Settings parameters can be different for different Variations. (These functions are also available for editing on the synth if you press the PATCH SETTINGS button. See "Edit Patch Settings" on page 63).



#### SUSTAIN PEDAL

Select if a sustain pedal/foot switch connected to the SUSTAIN PEDAL input on the rear panel of Nord Modular G2 should act as a Sustain pedal and On/Off switch or only as an On/Off switch. Note! If you use it only as an on/off switch (the 'Off' alternative), you have to assign the switch to module parameters in a Patch to the Foot Switch Morph group (see "Morph groups" on page 51).

#### OCTAVE SHIFT

Here you select the octave setting of the Patch. This information is saved with the rest of the Patch data in the Patch. Note that this setting is active only if you play the Patch from a Nord Modular G2 keyboard version.

#### ARPEGGIATOR

Select Period (sync division) for the Arpeggiator in relation to the Master Clock rate with the knob. Activate/stop the Arpeggiator with the radio buttons below the knob. Note that the Master Clock doesn't have to be active for the Arpeggiator to run. Select Direction with the right knob and Range with the radio buttons below the knob.

The Arpeggiator uses MIDI Song Position Pointer when synched to an external MIDI Clock, which means that if you record an arpeggio in an external sequencer, it will always play back the pattern exactly the same way it was recorded - even if you start the sequencer in the middle of the sequence.

#### VIBRATO

This is a separate vibrato which affects all modules in the Patch set to Keyboard Tracking. Set the Vibrato amount, in cents of a semitone, with the knob and select control source (Aftertouch, Mod Wheel or Off) with the radio buttons below the knob. Set the Vibrato rate with the knob below the radio buttons.

### GLIDE

The Glide function is mainly intended for use in mono or legato (see "Voice Mode" on page 99). The glide characteristics can be described as "constant rate". "Constant rate" means that the greater the "distance" between two subsequent notes, the longer the glide time. Turn the knob to adjust the glide rate and press the radio buttons to select glide mode. 'Normal' means the glide is always active and 'Auto' that glide is active only when you play legato (you press a new key before you release the previous key).

Note: If you use Glide in polyphonic mode, the glide will be unpredictable and perceived as more or less random. This is because the glide is between voices rather than between keys. The glide will therefore be from the available voices' latest note values to the new notes rather than from the previously pressed keys.

#### BEND

Set the Pitch bend range, in semitones, with the knob. The pitch bend will affect all modules in the Patch set to Keyboard Tracking when you bend the PITCH STICK or receive pitch bend data from MIDI. Switch on/off the pitch bend function with the radio buttons below the knob.

### TEXTPAD

Brings up the Textpad floating window. Here you can type in text (description, comments s etc.) about the Patch.

### DELETE UNUSED MODULES

Select this function to clear all unused modules in the Patch. This is useful if you have edited an existing Patch and want to get rid of any superfluous modules.

### DOWNLOAD TO SLOT

Brings up a dialog box in which you can choose to download the currently active Editor Patch to a selectable Slot in the connected synth.

# PERFORMANCE MENU

### PERFORMANCE SETTINGS

Brings up the Performance Settings floating window. Here you can edit the common Performance parameters.

#### ΝΑΜΕ

Type in the Performance name and press Enter. The name will also be shown in the 'Perf' display box in the Toolbar.

#### SLOTS ENABLE

Click in the check boxes for each of the Slots you want to include in the Performance.

erformance Settings 🛛 🛛 🔀				
Name RedMonday_DZ	Master Clock Rate (BPM) 150 👗 🕫 Stop C Run		🛓 🖲 Stop 🔿 Run	
Slots		🗌 Keyb	oard Range	
Enable Keyboard	Hold	Lower	Upper	
🔽 Slot A 🛛 🔽		0	127	
🔽 Slot B	Γ	0	127	
🔽 Slot C 🛛 🗖	Γ	0	127	
Slot D	Г	0	127	

#### KEYBOARD

Click in the check boxes for each of the Slots you want to play from the internal keyboard of the synth and/or respond to MIDI Note data on the Global MIDI Channel (see "MIDI Settings" on page 88).

#### Hold

Click in the check box to activate Keyboard Hold for each of the Slots in the Performance.

#### KEYBOARD RANGE

Activate the Keyboard Range function by clicking in the Keyboard Range check box. Set any keyboard note ranges for each of the Slots in the Performance. It's possible to have overlapping keyboard ranges for several Slots if you like. If the Keyboard Range function is not active, all enabled Slots will respond to notes in the entire MIDI note range (C-1 to G9).

#### MASTER CLOCK

Here you can select the Master Clock Rate for your Performance. You can also select whether to have the Master Clock active or not when you upload your Performance by clicking in the Stop or Run box.

#### DOWNLOAD

If you have been working on a couple of Performances in Local mode (synth unconnected) and you want to download one of the Performances after having established contact with the synth, you can use the Download command.

# SYNTH MENU

#### SYNTH SETTINGS

The Synth Settings window provides you with functions that apply to all Patches and Performances loaded to the four Slots of the synth. Any settings that you make will be activated instantly and automatically stored in the synth when you click the OK button. If you press Cancel, all parameters will revert to their original settings. (Some of these functions are also available for editing from the synth if you press the SYSTEM button).

Synth Settings - Port 1					
Name ModularG2 MIDI channel Slot A 1	MIDI Settings Global Channel 16 Sysex ID 17 Send Arp Send Clock Ignore External Clock Controllers Program Change Receive Receive Send V Send	Tune Master Tune 440.00Hz Semi 0 + Cent 0 + Global Octave Shift C C C C Control pedal gain: x1.00 +	File Memory Protect Sort By Program Number Alphanumeric Category Pedal polarity Pedal polarity Copen Closed		
🔽 Local On		OK Ca	ncel Help		

#### NAME

Type in a name for your connected synth and press Enter. This is especially useful if you run several Nord Modular G2 synthesizers from the Editor. The name will also be displayed in the Synth Name display box in the Toolbar.

#### MIDI CHANNEL

Set the MIDI channel for each Slot. This channel will be used for reception and transmission of MIDI messages.

#### MIDI Active check box:

Click in the corresponding check box to activate the Slot to receive and transmit MIDI messages.

#### LOCAL ON

Click the Local On check box to turn the MIDI Local Control on. Select Local On to be able to control the synth from the internal keyboard and the pedals. MIDI data is also transmitted via the MIDI OUT jack. In the Local Off mode, the keyboard and pedal actions are transmitted only via MIDI and do not control the synth itself. Local Off should be used with external sequencers if the MIDI OUT jack of Nord Modular G2 is routed back, via the external sequencer, to the MIDI IN jack. If Echo is active in the sequencer, "double notes" will appear when playing the keyboard in Local On mode.

#### MIDI SETTINGS

#### Global Channel:

Here you set the Global MIDI Channel for the synth. The Global MIDI Channel should be used for sending and receiving MIDI note data and for sending control data (Mod Wheel, Aftertouch, Velocity, Aftertouch and Pedals) as well as sending and receiving MIDI Program Change messages in Performance mode. Select Global MIDI Channel by clicking the arrow buttons.

### SysEx ID:

Here you can set an 'Instrument SysEx ID'. This is very useful if you're sending SysEx dumps of sounds from a sequencer to the Nord Modular G2 and have several G2 synthesizers MIDI connected. Let's say you have two G2 synthesizers. These two instrument models have the same 'Manufacturer ID' and 'Model ID' in the SysEx protocol. By defining separate SysEx ID's on the two synths, you will be able to "direct" the SysEx dumps from the sequencer to one of the G2's while the other one will ignore the dumps. Just make sure that you define a separate SysEx ID before dumping the sounds to the sequencer. Select Instrument SysEx ID by clicking on the arrow buttons.

### Send Clock:

Here you choose whether or not to send out MIDI Clock to the **MIDI OUT** jack of the synth. Sending out a MIDI Clock signal will only work when you use the internal Master Clock as clock source. **Ignore External Clock:** 

Here you choose whether or not to accept external MIDI Clock signals received on the MIDI IN jack of the synth. If unchecked, the Master Clock of the synth will automatically sync to any incoming MIDI Clock.

#### Controllers: Receive and Send:

Here you select how the synth should handle MIDI Controller messages. Select Off, Send and Receive by clicking in the respective check boxes.

#### Program Change:

Here you select how the synth should handle Program Change and Bank Select (Controller #32) MIDI messages. Select Off, Send and Receive by clicking in the respective check boxes.

### TUNE

#### Master Tune:

Use this function to tune the synth to other instruments. The range is from -6 to +6 semitones and fine adjustment from -100 to +100 cents. 100 cents is one semitone. All Oscillator modules are affected by the Master Tune function. Select tuning with the respective arrow buttons.

#### **Global Octave Shift:**

Click in the check box to activate Global Octave Shift which means that the octave shift will affect all Slots when controlled from the internal keyboard. Set octave shift range (-2 to +2 octaves) by clicking in the corresponding box.

#### CONTROL PEDAL GAIN

Different control/expression pedals have different characteristics. Here you can select Gain to adjust the control pedal functionality of the synth to your specific expression pedal. Select range (x1.00-x1.50) with the arrow buttons.

#### FILE

#### Memory Protect:

Select memory protection for the entire internal Patch and Performance memory by clicking in the check box.

#### Sort By:

Select if you want Patches in the internal memory of the synth to be displayed by Program Number, Alphanumerical or by Category by clicking the desired box. See "Search for and load a Patch" on page 61 for more info on how to use the different Sort Modes on the synth.

#### PEDAL POLARITY

Different sustain pedals use different polarity to activate the sustain switch. Select between 'Open' and 'Closed' by clicking the desired box.

### UPLOAD ACTIVE SLOT

This command will upload the Patch from the currently active Slot in the synth to the Editor. This is useful if you have closed the Patch in the Editor earlier and want to edit the Patch in the Slot again. A new Patch window will be created for the uploaded Patch.

### SAVE IN SYNTH

This function lets you save the Patch or Performance of the active Patch window in any of the synthesizer's memory locations.

Select Bank and Patch location from the drop-down menus. Click Save to execute and exit the dialog box, or Cancel to exit without saving.

### BANK UPLOAD (FROM MODULAR)

This feature is a quick way of saving a complete Patch or Performance bank from the synth memory to disk without needing to upload and save each Patch/Performance separately.

- 1. Select Type (Patch or Performance) and which bank to upload (1-32 for Patches or 1-8 for Performances).
- 2. Click Browse Location to select a destination folder on the computer.
- 3. In the 'File name' field, you can type in your own file name. By default, a Patch file is named PatchBank# and a Performance Bank PerfBank# with the # representing the Bank number you have selected to upload.

Click Save. Now all sounds of the selected bank are saved individually together with a Patch list file with the extension '.pchList'. The original memory location of each Patch is also saved with the 'List' file, so you can download them to the correct memory location later. As the sounds are uploaded from synth, a progress bar indicates the elapsed time.

### Tip!

Don't save several Bank files in the same folder on the computer. The Bank file is saved together with all individual Patch/Performance files. If several Bank files should contain the same Patch/Performance name(s), these files will be renamed with a post-fix number and could cause confusion when downloading the Bank files back to the synthesizer. To avoid this problem, save each Bank file in a separate folder on the computer.

Save In Synth	
Save "RendezVousBass"	Save
In Synth: Modular	Cancel
Bank: Bank 4	
Patch: 1 4you 💌	

Bank Upload From ModularG2							
Bank	C. Performance	e 🖲 Patch					
Location							
Select destination							
Browse Location							
		More info					
Start upload	Stop	Exit					

### BANK DOWNLOAD (TO MODULAR)

1. Select source by clicking on one of the two buttons:

'Browse for Bank file' lets you select a Bank file (.pch-List) previously saved on the computer. Browse and select the pchList file you want to download to a bank in the synth.

'Browse for folder' lets you select a folder containing separate Patch or Performance files. The folder doesn't have to contain a pchList file. The sound files of the selected folder will be downloaded to the synth in alphabetical order. If a folder should contain more than 128 sound files the "overflowing" files will be ignored. Note that the folder could also contain other file types, but only Patch or Performance files will be downloaded to the synth.

Bank Download To ModularG2					
Location Select source					
Browse for Bank file Browse for folder					
Bank Type C Performance C Patch					
WARNING! All patches in the bank will be erased.					
Start download Stop Exit					

2. Select which bank (1-32 for Patches or 1-8 for Performances) to replace with your selected bank.

If you selected 'Browse for Bank file', click Open to select the file and prepare for downloading the Patches or Performances to their original memory location within the selected bank.

If you selected 'Browse for folder', click OK to select the folder and prepare for downloading the Patches or Performances, in alphabetical order, to the selected bank.

3. Click the 'Start download' button. A progress bar indicates the elapsed time as the files are stored in the Nord Modular G2 internal memory. They will remain in the internal memory as if they were stored one by one using the **STORE** button or the 'Store' function of the Browser (see page 94) in the Editor.

#### Note!

The entire memory bank you chose to download to will be overwritten in the Nord Modular G2 synthesizer. Even if the bank you download from the computer doesn't contain Patches/Performances in all memory locations, all previously stored sounds in the Nord Modular G2 synthesizer bank will be erased. Therefore, it could be wise to consider the banks in the synthesizer more like folders on the computer. When you download an entire bank to the synthesizer it would be similar to deleting and replacing a folder on the computer, i.e. the whole content of the bank (folder) would be erased and replaced.

### SEND CONTROLLER SNAPSHOT

Use this command to send all assigned MIDI Controller values to the **MIDI OUT** of the synthesizer. This is very useful if you are recording in a sequencer program and want to make sure the sound sounds exactly as you want.

# SETUP MENU

### OPTIONS

The functions in this dialog box affects the configuration of the Editor. The parameters are automatically saved when you exit the Options window by clicking OK.

### CABLE STYLE

This is where you can adjust the appearance of the Patch cables in the Editor. Choose between Straight 3D, Curved 3D, Straight Thin and Curved Thin.

Editor Options						
Cable style C Straight 3D C Curved 3D C Straight Thin C Curved Thin	Knob control C Circular Horizontal Vertical					
	Cancel Help					

### KNOB CONTROL

Here you select if you want the knob and slider parameters in the Editor Patch window to respond to Circular, Horizontal or Vertical motions with the mouse.

### MORPH W/DOUBLE CLICK

Click this check box to enable Morph group assignment of module parameters by double-clicking the parameter(s). If unchecked, you have to Ctrl-click a parameter (or right-click and select from pop-up) to assign it to a Morph group.

# TOOLS MENU

### PARAMETER PAGES

This function activates the Parameter Pages floating window. The Parameter Pages window is a graphical representation of the AS-SIGNABLE KNOBS and BUT-TONS of the synth's front panel. The Parameter Pages



gives you both visual indication and the possibility to edit the parameters currently assigned to an AS-SIGNABLE KNOB/BUTTON. Any assigned module parameters show up with their name and current value in the corresponding display box.

Click-hold an assigned knob in the Parameter Pages window and change its value, just like you would change a module parameter. As you can see, the assigned module parameter will change its value, also visually, when the knob is changed. If you turn an ASSIGNABLE KNOB on the synth's front panel, the knob in the Parameter Pages window and the corresponding module parameter will change, also visually. Change Parameter Page by clicking on another Page and/or Column button. In Performance mode you can also choose to display the Global Parameter Pages by clicking the Global Parameter Pages.

### PARAMETER OVERVIEW

Brings up the Parameter Overview floating window which displays all Parameter Pages at once. It's also possible to assign module parameters to any of the knobs/buttons in this window by click-holding a display box and dragging and dropping on a module parameter in the Patch window. If you like, you can also move parameter assignments by click-holding on a display box and then dragging the cursor to another display box and releasing the mouse button. Display the Global Pages by clicking the Global Pages button to the top right of the window.

F	ar	ameter Overview			X
ľ	٨	0.00			Global Pages
	ĥ	Dasz@shaw.ca	A_Var_Sel	B_Var_Sel	C_Var_Sel
	Ľ	Var Seq	Source	Source	Source
	2		A_Sel div	B_Sel_div	C_Sel_div
	1		Divider	Divider	Divider
	3				
L	в	LFO			
	1	A Var pattn Step 1 Step 2	Step 3 Step 4	Step 5 Step 6	Step 7 Step 8
	_	A Var pattn			
	2	Step 9 Step 10	Step 11 Step 12	Step 13 Step 14	Step 15 Step 16
L		A Var pattn			
	3	Pulse Cycles	Length Clear	Random Pol	
	С	Env			
		B Var Pattn			
	1	Step 1 Step 2	Step 3 Step 4	Step 5 Step 6	Step 7 Step 8
		B Var Pattn			
	2	Step 9 Step 10	Step 11 Step 12	Step 13 Step 14	Step 15 Step 16
L		D.V D.H.			

### VIRTUAL KEYBOARD

This activates the Virtual Keyboard window. This window can be used to play a Patch without using the synth keyboard. Click



on the keys of the Virtual Keyboard to play single notes. The selected note will be indicated by a black dot on the corresponding key. The note will sustain if you keep the mouse button depressed, just like pressing a key on a real keyboard.

You can expand the keyboard to cover the whole MIDI note range simply by placing the cursor on either side of the window frame. When the double-arrow appears, click-drag horizontally to desired size. You can also show/hide the button bar by resizing the Virtual Keyboard window.

The four buttons to the left are used to scroll up and down the keyboard, either one octave (the doublearrow buttons) or one note (the single-arrow buttons) at a time.

Click on the 'Drone' button to make the next played note start sounding "infinitely". Click the Drone button again to disengage.

Click on the 'Repeat' button to make the last played note play repeatedly. Click the Repeat button again to disengage.

### FILE BROWSER

This function activates the File Browser floating window. The File Browser gives a very good overview of all Patches and Performances currently stored in the internal memory of the connected synth, as well as of Patches and Performances stored on the computer. The Patch and Perf tabs of the File Browser are automatically updated as soon as you perform any of the operations described below, even if they are done from the synth's front panel. The File Browser can be used to save and load Patches and Performances both from disk and the internal memory of the synth.

There are three tabs in the File Browser window:

### Disk

Click on the Disk tab to view folders and Patch/Performance files stored on the computer. Double-click on a folder to step down one level in the hierarchy. Click the "arrow up" button to the upper right corner to step up one level in the hierarchy. Click the refresh (double arrows) button to rescan disks and/or folders to update the Disk tab contents list.

### Load a Patch or Performance to active Slot(s):

Double-click on a Patch or Performance file to automatically load the Patch/Performance to the active Slot(s) in the synth and open up the Patch/Performance in the Editor Patch window. This is the same as using File|Open. You can also use the Up and Down arrow keys to select Patch/Performance and load by pressing Enter.

### Load Patch or Performance to Slot or store in internal memory:

By right-clicking on a Patch in the Disk tab you can choose to either load the selected Patch to any of the Slots of the connected synth and open the Patch in the Editor Patch window, or to save the selected Patch in an internal memory location. The last function is exactly the same as storing a Patch using the **STORE** button and the **ROTARY DIAL** on the Nord Modular G2 front panel (see "Store a Patch" on page 67).

### Ратсн

Click on the Patch tab to view Patch Banks and Patches stored in the internal memory of the connected synth.

### Load a Patch to active Slot:

Double-click on a Patch to automatically load the Patch to the active Slot in the synthesizer and open up the Patch in the Editor Patch window. This function is exactly the same as loading a Patch using the PATCH LOAD button and the ROTARY DIAL on the Nord Modular G2 front panel (see "Load a Patch from memory" on page 61). You can also use the Up and Down arrow keys to select Patch and load by pressing Enter. You can also open and close the content of an entire Bank by clicking the Bank icon or selecting it (with the arrow keys or the mouse) and pressing Enter.

### Store or delete Patch from internal memory:

By right-clicking on a Patch in the Patch tab you can choose to either store the Patch of the active Slot in the selected memory location, or to delete the selected Patch from its memory location, or change Sort Mode.



### Store Patch of active Slot to a selected bank:

By right-clicking on a Bank icon in the Patch tab you can choose to store the Patch of the active Slot in one of the selected bank's memory locations, or delete the entire Bank with all its Patches, or change Sort Mode.

#### PERF.

Click on the Perf tab to view Performance Banks and Performances stored in the internal memory of the connected synth.

#### Load a Performance:

Double-click on a Performance to automatically load the Performance to the Slots in the synthesizer and open up the Performance in the Editor. This function is exactly the same as loading a Performance using the PATCH LOAD button and the ROTARY DIAL on the Nord Modular G2 front panel (see "Load a new Performance from the internal memory" on page 75). You can also use the Up and Down arrow keys to select Performance and load by pressing Enter. You can also open and close the content of an entire Bank by clicking the Bank icon or selecting it (with the arrow keys or the mouse) and pressing Enter.

#### Store or delete Performance from internal memory:

By right-clicking on a Performance in the Performance tab you can choose to either store the Performance of the active Slots in the selected memory location, or to delete the selected Performance from its memory location, or change Sort Mode.

#### Store Performance of active Slot to a selected Bank:

By right-clicking on a Bank icon in the Performance tab you can choose to store the Performance of the active Slots in one of the selected Bank's memory locations, or delete the entire Bank with all its Performance, or change Sort Mode.

#### BANK ICONS IN THE PERF. AND PATCH TABS

By right-clicking a Bank icon in the Perf. or Patch tabs you can choose to either store the Patch or Performance of the active Slot(s) to any of the selected Bank's memory locations, delete all Patches or Performances of the entire Bank from the internal memory of the synth, or change Sort Mode for the Patches/Performances of the entire internal memory of the synth.

#### AUTO ASSIGN MIDI CONTROLLERS

It's possible to automatically assign MIDI controllers to all parameters of selected modules. Select the modules you want to assign MIDI controllers to, select Auto Assign MIDI Controllers. Now, all parameters of the selected modules will be automatically assigned to MIDI controller numbers.

### DEASSIGN MIDI CONTROLLERS

If you want to deassign MIDI Controllers of specific modules, select the modules and choose Deassign MIDI Controllers.

### EXTENDED TOOLBAR

Select whether to show or hide the lower part of the Toolbar.

# WINDOW MENU

### CLOSE

Closes the current Patch window. Closing a Patch in the Editor will not affect Patches in the synth.

### CLOSE ALL

Closes all the Patch windows. Closing a Patch in the Editor will not affect Patches in the synth.

### CASCADE

Arrange multiple Patch windows in a cascaded configuration.

### TILE HORIZONTALLY

Arrange multiple Patch windows in a horizontally tiled configuration.

### TILE VERTICALLY

Arrange multiple Patch windows in a vertically tiled configuration.

### TILE ACTIVE SLOTS

Arrange the Patch windows of the currently active Slots in the connected synth.

### TILE ALL SLOTS

Arrange the Patch windows of all four Slots in the connected synth.

### CURRENTLY OPEN PATCHES/PERFORMANCES

Here, all Patches and Performances that are open in the Editor are shown. You can select any of the open Patches/Performances by clicking on them. Note that selecting an open Patch or Performance from this list automatically makes it active in the synthesizer.

# HELP MENU

### **CONTENTS/SEARCH/INDEX**

This will launch the G2 Help file and display the sections Contents, Search or Index.

If you right-click on a module or a parameter in the Patch window, you can bring up the help text for individual modules by choosing Help from the popup menu (see "Module popup" on page 101 and "Parameter popup" on page 102). Putting a module or parameter in focus and pressing the function key F1 will bring up the help text for that specific module.

### KEYBOARD SHORTCUTS

Launches the Keyboard Shortcuts section of the G2 Help file.

ModularG2

### Авоит

Displays a copyright note, tells you about the author and informs you about the Editor version.

# TOOLBAR

Perf: BCHydro_DZLW Master Clock: 102 (I) Run A B C D ModularG2 Prf						
Nete   In/Out   Note   Osc   LFO   Env   Shaper   Filter   Mixer   Switch   Level   Logic   Seq   FX   Delay   MIDI     Init	VA 13.9 43.8	$\bigcirc$	Morph Groups	$\bigcirc$	$\bigcirc$	$\bigcirc$
	Group 1	Group 2 Group 3 Vel Keyb	Group 4 Group 5 Aft Tch Pedal	Group 6 Foot Sw	Group 7 P.Stick	Group 8 Group 8

### PERF: (NAME)

when the connected synth is in Performance Mode, or when the synth is disconnected, you can enter a name for your current Performance by clicking in the Perf box, typing in a name and pressing Enter. When the connected synth is in Patch mode, this box is disabled for editing.

### MASTER CLOCK

Set the tempo for the Master Clock in BPM (Beats Per Minutes) by clicking the arrow buttons. Start and stop the Master Clock by clicking the Run button. Note that the Master Clock settings affects Patches in all four Slots in the synth. If the Master Clock is set to sync to external MIDI Clock (see "Synth Settings" on page 87), the display box background will turn red and the current MIDI Clock rate will be displayed. When synched to external MIDI Clock, the tempo arrow buttons are disabled.

### CONNECTION INDICATORS

Here, the connected Nord Modular G2 synth is visible. The name is shown in the box to the right of the Slot buttons. You can activate any Slot of the connected

synth and edit the Patch by clicking on the Slot button. You can select/deselect several Slots on the same instrument by Shift-clicking on the corresponding Slot buttons. If several Slots have been selected, this is indicated by blue buttons in the Toolbar. The currently active Slot has a white frame around it. Note that only one Patch can be active in the Editor at the same. If you want to change the Keyboard Assign settings (to select which Slot(s) should be controlled from the keyboard), Ctrl-click the Slot button(s).

ABCD

### Prf

The Prf button indicates if the connected synth is in Performance Mode or not. You can switch mode in the connected synth by clicking the Prf button.

#### New

Creates a new, empty Patch window. If connected to the synth, the currently active Slot will be cleared to host your new Patch. See "Creating your first Patch" on page 36 for info on how to create a Patch.



Prf

### INIT 1&2

Click on the Init 1 or Init 2 buttons to open one of the Init Patches (see "Save InitPatch" on page 84 for info on how to create Init Patches). If connected to the synth, the selected Init Patch will be downloaded to the currently active Slot.

Init 1	2-01
Init 2	<b>F</b>

### MODULE GROUP TABS

9. Working with the Editor: Toolbar

The Module group tabs are located in the left section of the Toolbar. Click on a tab to select a module group. The module icons of the selected module group are shown below the

tabs. As you move the cursor over each module icon, a preview of the module with the module name is shown.

#### PATCH LOAD AND MEMORY

The Patch Load indicators indicate how much Sound engine resources the Patch uses. The VA indicator shows the Patch Load for the Voice Area (upper part of the Patch window), and the FX indicator for the FX Area (lower part of the Patch window). The reason for having two separate Patch Load indicators is because it makes it easier for the user to calculate the maximum polyphony

of a Patch. If you run out of Sound engine power in a Patch (if 100% Load is exceeded in any of the Areas), the corresponding Patch Load indicator turns red and the outputs of the synth will be muted. Delete one or several modules to reduce the Patch Load.

The two Memory indicators basically have the same functionality as the Patch Load indicators but display the use of memory in the Patch. The same applies to these indicators; if any of them go above 100%, the outputs of the synth will be muted. Delete one or several modules that uses memory (Delays and Reverb) to reduce the Memory load.

#### UNDO & REDO

The Undo (to the left) and Redo buttons can be used to undo or redo changes you made in the Patch. The Redo function works like a "reversed" Undo.

#### COLOR

You can choose to automatically color any new modules you drag to the Patch window. Select a color from the Color selector in the Toolbar. Any new modules you add to the Patch window will now get the selected color. You can also highlight any modules in the

Patch window and then click on the "paint bucket" icon, or select a new color from the drop-down list, to apply the color to the module(s).

#### MORPH GROUPS

There are eight Morph groups available in each Patch and you may assign a total of 25 Patch parameters to these Morph groups. You can assign

aram-Group 1 Group 2 Group 3 Group 4 Group 5 Group 6 Group 7 Group 8 Wheel Vel Keyb Aft Tch Pedal Foot Sw P.Stick Group 8 gn

Morph Groups

each Morph group to any of the predefined controls MOD WHEEL, Keyboard Velocity, Keyboard Note Values, Aftertouch, Control Pedal, Foot Switch, PITCH STICK, or to ASSIGNABLE KNOBS on the front panel. If you want to assign a Morph group to an ASSIGNABLE KNOB instead of the predefined control source, simply click the Group button below the Morph group knob in the Toolbar. Then, right-click the Morph group knob and select Assign|Page X|Knob. The Group buttons can also be renamed by right-

++++		++		۲a		
icon,	a preview of	the modul	e with the	module	e name	e is









clicking and selecting 'Edit name'. You can also assign the Morph group knob to a MIDI controller by right-clicking and selecting MIDI Controller Assign. See "Morph groups" on page 51 for more info about Morph groups.

# PATCH WINDOW

At the top of every Patch window are a number of parameters that relates to the specific Patch you're editing.

### PATCH NAME

Here is the name for the active Patch shown. Click in the box to key in a Patch name. Press Enter on the computer keyboard to enter the name and exit the Patch name box. To exit without changing the

name, press Esc. If the Patch is active in a Slot of the synth, the name will be shown in the MAIN DISPLAY as well. A standard English character set is available. Any illegal characters that you may type will be substituted with empty spaces.

### CATEGORY

Select sound category for the active Patch from the drop-down list. See "Selecting Sound Category for the Patch" on page 45 for more info.

### VOICE MODE

The actual polyphony of a Patch is displayed in the Voice Mode display box. The requested number of voices is displayed within parenthesis. Select number of voices with the arrow buttons (mono, legato, 2-32). Note that every time you change the

number of voices, the Sound engine has to recalculate the Patch data which will cause a brief moment of silence. Should your request for polyphony exceed the actual capacity of the Sound engine, the system assigns the highest possible amount of voices to the Patch instead. See "Voices, mono- and polyphonic Patches" on page 35 for more info.

### VAR

Select one of the 8 Patch Parameter Variations by clicking the corresponding Variation button. Click the Init button to load the Variation Init settings for the Patch. See "Creating

Patch parameter Variations" on page 47 for info on how to create Variations. The Variation buttons are hard-wired to MIDI Controller #70.

### PATCH LEVEL

Set the total output level from the Patch with the knob. Mute the output from the Patch by clicking the On/Off button. The Patch Level knob is hard-wired to MIDI Controller #7.

#### VISIBLE CABLES

Click on any of the seven colored buttons to select which cable group(s) should be visible/invisible in the Patch. "Invisible" cable connections will be indicated by a colored dot on

9. Working with the Editor: Patch window



Levrel

Var. 1 2 3 4 5 6 7



8

Init

Sequencer



the in- and outputs of the connected modules. The white button represents any remaining connections after you have broke a part of a cable chain (see figure below).



Let's say you want to break the cable between the 'LFOA1' output and the 'OSCA1' Pitch input in the upper picture. Since this cable is part of a serial cable chain, the Editor will keep the remaining cable chain. In the lower picture, the remaining cable chain is shown. As you can see, the three remaining inputs are still connected. This won't result in any practical functionality, but will make it easier to route the serial chain elsewhere in the Patch. These non-functional input-to-input connections are indicated by white cable color. Click on the white cable button to make these remaining connections visible/invisible. As soon as you route any of the remaining connected inputs to an output, the cable color will change to the output's color.

### HIDE ALL CABLES

Click the H button to hide all visible cables in the active Patch. "Invisible" cable connections will be indicated by a colored dot on the in- and outputs of the connected modules. Pressing the space bar on the computer keyboard performs the same operation.

### SHAKE CABLES

Click on the S button to reposition - shake - the cables in a Patch. This can be useful if it is hard to see where the cables are actually connected, or if they hide visual information (display boxes etc.) in the Patch. Pressing the Ctrl key and the space bar on the computer keyboard performs the same operation.

#### PATCH WINDOW SPLIT BAR

#### 

Click-hold on the Patch window split bar and drag up or down to resize the two Patch sections, the Voice and FX Areas. Click on the up arrow button to the left in the bar to show only the Voice Area, and on the down arrow button to show only the FX Area. Click on the double arrow button to place the split bar in the middle of the screen, showing both Areas. Press V on the computer keyboard to toggle between the current split position and viewing only the Voice Area.

# USEFUL FUNCTIONS IN THE EDITOR

### PATCH WINDOW POPUP

Right-clicking on the background of the Patch window brings up a popup with the following alternatives:

#### CUT/COPY/PASTE

Use to cut and paste or copy and paste module(s) in the Patch window or between different Patch windows.

#### INSERT

Brings up a sub menu which features the different module groups including their modules. Select desired module by clicking on it from the list. A phantom frame appears and the cursor gets a plus-sign next to it. Place the phantom frame where you want the module to be placed in the Patch window and click to drop the module.

#### DISCONNECT PERFORMANCE

Select to disconnect your active Performance from the Slots and continue working on it locally in the Editor.

#### SLOT A/B/C/D/LOCAL

Select the Slot to use for your active Patch by selecting Slot X from the popup. If you want to disconnect your active Patch from a Slot, select Local.

### MODULE POPUP

Right-clicking on the background of a module brings up the module popup.

#### CUT/COPY/PASTE/PASTE PARAMS

Use to cut and paste or copy and paste module(s) in the Patch window or between different Patch windows. Use the Copy and Paste Params to copy all parameter values from a module and paste the values to another module of the same type.

#### RENAME

Allows you to rename the module. Type in a new name and press Enter. Press Esc to cancel the operation.

#### ASSIGN

Select to assign all module parameters to one (or more, if necessary) Parameter Pages.

#### GLOBAL ASSIGN

Select to assign all module parameters to one (or more, if necessary) Global Parameter Pages.

#### HELP

Brings up the context-sensitive help-text for the selected module type.

#### DELETE

Allows you to delete the module from a Patch. All the cables that are connected to and from the module will be deleted as well. Any serial connections of cables will be rerouted.

### PARAMETER POPUP

Right-clicking on a module parameter brings up the parameter popup.

#### DEFAULT VALUE

Resets the parameter to the fixed parameter default value.

#### MORPH ASSIGN

Allows you to assign or deassign the parameter to/from one of the 8 available morph groups.

#### EDIT NAME

Allows you to rename a renamable module parameter (the On/Off buttons on Mixer/Switch modules, for example). Type in a new name and press Enter. Press Esc to cancel the operation.

#### Assign

Select to assign the module parameter to a knob/button on a Parameter Page.

#### GLOBAL ASSIGN

Select to assign the module parameter to a knob/button on a Global Parameter Page.

#### MIDI CONTROLLER

Allows you to assign one of the available MIDI controllers to the parameter. Selecting Remove clears an assignment.

#### HELP

Brings up the context-sensitive help text file for the selected module.

### CABLE POPUP

Right-clicking on a cable connection brings out the cable popup.

#### DISCONNECT

Deletes the connection. Any remaining cable chains will be rerouted.

#### BREAK

Breaks a serial connection between a selected input connector and the previous connector in the serial chain. The rest of the serial chain will remain unaffected, meaning that the first part of the chain will still work, and the last part will be connected but non-functional (input-to-input connection(s) only). If you choose to break a connection at an output, the connection(s) between the output and the first input of one or more serial chains will be removed. The rest of the chain(s) will remain connected but non-functional (input-to-input connection(s) only).

Any non-functional input-to-input connections are indicated by white cable color.

#### COLOR

The six available cable colors are identified by their names.

- Audio cables are red
- Control cables are blue
- Logic cables are yellow
- Logic cables at full bandwidth are orange
- User1 cables are green
- User2 cables are purple

You can choose another color (name) for a cable in this popup. Changing cable type will not affect the functionality in any way, just the appearance. Cables in a serial cable chain will always have the same color. Cables in a branch connection may have different colors. It's possible to show and hide cables of different colors in the Patch to make Patching easier. See "Visible cables" on page 99.

#### DELETE

Deletes the entire serial cable chain that the connection is part of. If you want to delete a complete branch connection, this must be done from the cable origin of the branch.

#### DELETE UNUSED CABLES

Deletes all non-functional input-to-input connections (white cables) in the Patch.

### **COMPUTER KEYBOARD SHORTCUTS**

Any commands that can be launched from the computer keyboard are shown next to the command/function name in the menu drop-down lists. In addition to these keyboard commands there are a number of "special functions" keys.

### "SPECIAL FUNCTIONS" KEYS

#### ESC

Abort operations such as dragging modules, connecting/rerouting cables, escaping from dialog boxes etc.

### DELETE

Delete selected modules from the Patch window.

### 1-8

Select Variation.

### v

Toggle between the current Patch window view and viewing only the Voice Area.

### F

Toggle between the current Patch window view and viewing only the FX Area.

UP ARROW KEY

Increase a focused parameter's value.

#### DOWN ARROW KEY

Decrease a focused parameter's value.

### LEFT/RIGHT ARROW KEYS

Navigate between parameters of a focused module.

#### CTRL+UP ARROW KEY

Increase a focused parameter's Morph range (if it is assigned to a Morph group).

#### GTRL+DOWN ARROW KEY

Decrease a focused parameter's Morph range (if it is assigned to a Morph group).

#### SHIFT+ARROW KEYS

Navigate between modules in the Patch window.

#### SPACE

Toggle between hiding and showing all patch cables.

### CTRL+SPACE

Shake (reposition) the patch cables.

### R

Master Clock run and stop.
### THE FUNCTION KEYS

You can get a read-out of all parameter settings, Morph range, Morph group assignment, Knob and MIDI controller assignment in a patch by pressing the function keys F5 to F12.

#### F1

Brings up the Help file for the Editor. Pressing F1 after highlighting a module will bring up the help text for the specific module type.

#### F5

Every parameter value in the patch are displayed in hintboxes. Parameters assigned to a Morph group will display their respective Morph range, starting with the initial parameter value.

### F7

Any Morph group assignments will be displayed in hintboxes.

#### F8

The KNOB/BUTTON assignments are displayed in hintboxes. The initial letter indicates the Parameter Page, the first number indicates the Column and the last number indicates the KNOB/BUTTON.

#### F9

Any MIDI Controller assignment are displayed in hintboxes.

#### F12

The current MIDI values (0-127) of all parameters are displayed in hintboxes.

# **10. MIDI** IMPLEMENTATION

# MIDI CONTROLLERS

In the Nord Modular G2, MIDI Controllers have to be manually or automatically assigned to module parameters separately for each Patch. In other words, there exists no preconfigured MIDI Controller list except for the special parameters described below. Here are some general rules for MIDI Controllers:

- The reception and transmission of MIDI Controllers can be turned on/off. See "MIDI Ctrl" on page 81 and "Synth Settings" on page 87.
- All parameters use the entire control range 0-127. For button parameters and for some other parameters the range is divided into equally big "sections" depending on the number of states of the parameter. For example, the Oscillator A waveform selectors can have 6 different "positions" and are therefore divided into 6 equally large sections between the values 0 and 127.
- The Patch Level parameter is transmitted and received as Controller 7.
- Bank Select messages are transmitted and received as Controller 32.
- Variation selection is transmitted and received as Controller 70.
- If the Expression Pedal input is used with an expression pedal, this is transmitted and received as Controller 11.
- If the Sustain Pedal input is used for sustain, this is transmitted as Controller 64 (Damper Pedal)

# SYSTEM EXCLUSIVE IMPLEMENTATION

The Nord Modular G2 supports MIDI SysEx dump and download of single Patches and Performances. Refer to "Dump One" on page 82.

# MIDI IMPLEMENTATION CHART

Model: Clavia Nord Modular G2 OS V1.1x

Date: 2004-02-18

Fur	nction	Transmitted	Recognized	Remarks
Basic Channel	Default Channel	1 – 16 1 – 16	1 – 16 1 – 16	
Mode	Default Messages Altered	Mode 3 ×	Mode 3 ×	
Note Number	True Voice	0 – 127 ******	0 – 127 0 – 127	
Velocity	Note ON Note OFF	O v = 1 – 127 O	O v = 1 – 127 O	
Aftertouch	Key Channel	× 0	х 0	
Pitch Bend	l	0	0	
Control Change		0	0	See the MIDI Implementation section.
Prog Change Bank Selee	True # ct True #	O 0 – 127 O 0 – 31	O 0 – 127 O 0 – 31	MIDI CC#32
System Exclusive		0	0	
System	: Song Pos	×	0	When using external sync of Master Clock
Common	: Song Sel : Tune	× ×	× ×	
System Real Time	: Clock : Commands	0 ×	0 ×	
Aux : Lo Mes- : All sages : Ac : Re	cal ON/OFF Notes Off tive Sense eset	× × × ×	× × × ×	
Notes				

Mode 1: OMNI ON, POLY Mode 3: OMNI OFF, POLY Mode 2: OMNI ON, MONO Mode 4: OMNI OFF, MONO O: Yes X: No

# **11. MODULE REFERENCE**

The Nord Modular G2 modules are grouped in 15 module groups, which you access by clicking on the tabs in the toolbar. The modules are visually identified with illustrations. When you place the cursor over an illustration, a module preview and a brief description appears.

In/Out	Note	Osc	LFO	Env	Shaper	Filter	Mixer	Switch	Level	Logic	Seq	FX	Delay	MIDI
2-OUT 4	-OUT 2	-IN 4-I	N FX	IN K	BD MONO I	DEVICE S ♥		DET N-BAR						

Each time you add a module to a patch, Nord Modular G2 mutes the outputs for a short moment when it recalculates and optimizes the Sound engine data. Theoretically, you could use up to 254 modules in each patch, 127 in the Voice Area and 127 in the FX Area, but you will probably run out of Patch Load before that. It is possible to use several modules of the same type in both Areas of a Patch, except for the 'FX Input' module which can only be used in the FX Area.

In this Module Reference chapter, we begin the description of each module group by explaining parameters that are common for the specific group. If you don't find descriptions of certain parameters together with the individual modules, check the module group introduction parts.

# IN/OUT GROUP

This group contains modules that gives you access to incoming keyboard information. You will also find modules that route audio signals to and from the four physical audio IN and OUT jacks of Nord Modular G2 and modules that allow you to route audio signals between the Voice Area and the FX Area and modules than route audio signals to the Audio Bus channels, which are shared by all four Slots of the Nord Modular G2.

### COMMON IN/OUT MODULE PARAMETERS AND DEFINITIONS

#### AUDIO SIGNAL CHANNELS

There are a number of different audio signal channels in the Nord Modular G2 system. First, you have 4 separate Audio In channels which routes audio signals from the four AUDIO IN and the XLR MIC IN-PUT jacks of the synth to the four Slots. There are also 4 separate Audio Out channels which are hardwired to the four AUDIO OUT jacks of the synth. In each Patch you can also route 4 separate audio signals from the Voice Area to the FX Area (see "FX In" on page 112).

In addition to these audio signal channels, there are 4 global audio Bus channels which can be shared by Patches in the four Slots of the synth. In other words, the audio Bus concept makes it possible to send and receive audio signals internally between Patches in the four Slots. This is especially useful when creating multi-Slot Performances. The audio Bus channels can freely be used by both the Voice Area and the FX Area. This means that you could actually route audio back from the FX Area to the Voice Area if



you like. In the figure below, the different audio signal channels in the Nord Modular G2 system are described:

Note that the four audio Bus channels are parallel and can be used by Patches in the Slots in no specific order.

#### NOTES ABOUT USING THE AUDIO IN SOURCES

The 'In' selector routes **line level** audio signals from the IN 1-4 inputs on the rear panel of Nord Modular G2 to your patch. You can also use a dynamic microphone in the XLR MIC INPUT on the rear panel. This input has a built-in preamp and you control the input gain with the MIC GAIN knob on the front panel. If you use a dynamic microphone in the XLR MIC INPUT, the line level IN 1 jack will automatically be disabled. The MIC INPUT signal can then be patched from the Out 1 (or L) output of the Input modules. A total of four separate audio signals can be patched into the system at a time.

If you use the IN 1-4 inputs it's important that you amplify the input signals to line level externally to get good sound quality. If you put in too low a signal and amplify it, using for example the Pad scroll button or the Amplifter module, the sound quality won't be good. The reason for this is that the internal amplification is digital, and a low analog input signal will result in low resolution. A low resolution signal that is digitally amplified will sound distorted.

Note: If you want to process a stereo input signal, any processing modules (filters etc.) has to be duplicated in the patch and process one "channel" each.

#### PAD

The Pad scroll button on the Input and Output modules can be used to attenuate or amplify the signals. On the Input modules you can select between 0dB, -6dB, -12dB and +6dB and on the Output modules between 0dB, +6dB, +12dB and +18dB.

Pad DdB

#### 

Click the On/Off button to mute the signal(s) of the In/Out module. Blue color indicates 'On' and gray 'Mute'

#### LEVEL METERS

The level meters on the Input modules displays the following signal levels: green LEDs between -40dB and 0dB, yellow LEDs between >0dB and +11dB and red LED at >11dB.

U



This module can be used to patch stereo signals to the Audio Outs, the FX Area or the audio Buses.



#### SOURCE SELECTOR BUTTONS

Here you select the signal destination: Audio Out channels 1/2 or 3/4, FX Area channels 1/2 or 3/4 or audio Bus channels 1/2 or 3/4. Note that you cannot use the FX channels when the module is placed in the FX Area. See also "Common In/Out module parameters and definitions".

# **4-0**UT

2-0 UT

This module can be used to patch individual signals to different destinations: the Audio Out, the FX Area or the Global Buses.



#### SOURCE SELECTOR BUTTONS

Here you select the signal destination: Audio Out channels 1-4, FX Area channels 1-4 or audio Bus channels 1-4. Note that you cannot use the FX channels when the module is placed in the FX Area. See also "Common In/Out module parameters and definitions".

### 2-1N

This module can be used to route stereo signals from the Audio Ins or the audio Buses.



#### SOURCE SELECTOR BUTTONS

Here you select the signal source: Audio In channels 1/2 or 3/4 or audio Bus channels 1/2 or 3/4. See also "Common In/Out module parameters and definitions".

### **4-I**N

This module can be used to route individual signals from the Audio Ins or the audio Buses.



#### SOURCE SELECTOR BUTTONS

Here you select the signal source: Audio In channels 1-4 or audio Bus channels 1-4. See also "Common In/Out module parameters and definitions".

# FX IN

This module should be used when you want to route audio signals from the Voice Area to the FX Area. Since the FX



In module processes the sum of all voices from the Voice Area, the volume depends on the number of notes you play simultaneously. See an example of how to use the Voice and FX Areas in "Voice Area and FX Area" on page 44. See also "Common In/Out module parameters and definitions".

### KEYBOARD

The Keyboard voice module gives you access to a few basic and important signals associated with the keyboard on Nord



Modular G2, or a keyboard connected to

the synth via MIDI In. The signals are generated from each key played and affect one voice at a time.

#### Рітсн

This blue output provides you with a complete pitch (note number + any pitch bend and/or glide) signal from the Nord Modular G2 keyboard or from the MIDI IN port. This signal is also hardwired to every module that has a KBT control or button. This is also the output for any pitch bend data that appears at the Nord Modular G2 MIDI IN port. The pitch bend will be scaled together with the note information, with the ratio of the pitch Bend Range parameter. This ratio is set in the Patch Settings menu, see "Patch Settings" on page 85.

E4 (MIDI note 64), which is the middle E on the Nord Modular G2 keyboard when the OCT SHIFT selector is in the center position, represents an output signal level of 0 units. MIDI note 0 (C-1) represents -64 units and MIDI note 127 (G9) represents +63 units. Signal: **Bipolar**.

#### Νοτε

This blue output provides pure Note number data without any additional pitch bend or glide data. E4 (MIDI note 64), which is the middle E on the Nord Modular G2 keyboard when the OCT SHIFT selector is in the center position, represents an output signal level of 0 units. MIDI note 0 (C-1) represents -64 units and MIDI note 127 (G9) represents +63 units. Signal: **Bipolar**.

### GATE

This yellow output sends a high logic signal (+64 units) every time a key is pressed on the keyboard, or a MIDI note-on is received at the **MIDI IN** port. The logic signal switches back to zero (0 units) when the key is released. If a sustain pedal is activated, the logic signal will be high for as long as the pedal is pressed. Signal: **Logic**.

### LIN & EXP VELOCITY

These blue outputs transmits the note-on velocity signals from the keys that you play on the Nord Modular G2 or any velocity that is received on the **MIDI** IN port. The velocity response of the Nord Modular G2 keyboard is linear on the Lin Vel output and exponential on the Exp Vel output. Signal: **Unipolar Positive**.

#### RELEASE VELOCITY

This blue output provides you with the release velocity signal from the keys that you play on the Nord Modular G2, or any release velocity that is received via MIDI. The release velocity response of the Nord Modular G2 keyboard is linear. Signal: **Unipolar Positive**.

#### MONOKEY

This module provides three different control signals. The signals are generated from the last/lowest/highest note (de-

<b>₩MonoKey1</b>				Ditah Cata	Ual
	Last	Lo	Hi		ver

pending on the alternative below) played

and affect all allocated voices, in contrast to the Keyboard module described above.

#### LAST/LO/HI

Select which notes should be output. 'Last' will output the data from the latest key played. 'Lo' will output data from the lowest key played and 'Hi' from the highest key played.

Tips! The Lo and Hi alternatives are perfect for creating a polyphonic Patch with a separate sound for the bass (Lo) or lead (Hi) lines. Patch the Pitch and Gate outputs (see below) to the bass/lead sound oscillator(s) Pitch input and the Envelope Gate input. Disable the Oscillator KBT and Envelope KB functions.

#### Рітсн

This blue output provides you with a complete pitch (note number + any pitch bend and/or glide) signal from the last/lowest/highest note (depending on the alternative above) played on the keyboard, or received at the MIDI IN port.

E4 (MIDI note 64), which is the middle E on the Nord Modular G2 keyboard when the OCT SHIFT selector is in the center position, represents a signal level of 0 units. MIDI note 0 (C-1) represents -64 units and MIDI note 127 (G9) represents +63 units. Signal: **Bipolar**.

#### GATE

This yellow output sends a high (+64 units) logic signal every time a key is pressed on the keyboard or a MIDI note-on is received at the **MIDI** IN port. The logic signal switches back to zero (0 units) when the last key is released. You can use this signal to start envelopes in the single-trigger fashion. If a sustain pedal is activated, the logic signal will be high for as long as the pedal is pressed. Signal: Logic.

#### VEL

This blue output provides you with a control signal from the last/lowest/highest (depending on the alternative above) note-on velocity. The velocity response of the Nord Modular G2 keyboard is linear from this output. Signal: **Unipolar Positive**.

#### DEVICE

The Device module represents a number of physical controls on the synth and routes their respective control signals for use in the Patch.

🗑 Devic	e1	Control	Sustain	Pitch
Wheel	After Touch	Pedal	Pedal	Stick
•	•	•	٠	•

#### WHEEL

The blue Wheel output provides a positive control signal according to the position of the MOD WHEEL. Signal: Unipolar Positive.

#### AFTERTOUCH

The blue Aftertouch output provides a positive control signal according to the current Keyboard Aftertouch value. Signal: **Unipolar Positive**.

#### CONTROL PEDAL

The blue Control Pedal output provides a positive control signal according to the position of a connected Control/Expression pedal. Signal: **Unipolar Positive**.

#### SUSTAIN PEDAL

THe yellow Sustain Pedal output provides a logic high signal (+64 units) as soon as a connected sustain pedal is depressed. Signal: Logic.

#### Рітсн Ѕтіск

The blue Pitch Stick output provides both the negative and positive control signal range of the PITCH STICK. It will output a signal as soon as the PITCH STICK is moved. Signal: **Bipolar**.

#### STATUS

The Status module is an extremely useful module for controlling things in a Patch. It gives you the possibility to gate events



when you load a Patch and also when you switch between Variations in the Patch. It also gives you the possibility to control your Patch depending on which individual voice is used.

#### PATCH ACTIVE

Provides you with a high logic signal (+64 units) as soon as a Patch is loaded into a Slot. This signal can be used to start/gate events in the Patch that you want to start automatically after Patch load. Signal: Log-ic.

#### VAR. ACTIVE

Provides you with a high logic signal (+64 units) as soon as a Variation is active. When you switch between Variations, the signal drops to 0 for a short while and then immediately raises to +64 units again. This signal can be used to start/gate events in the Patch that you want to start automatically after you switch between Variations. Signal: Logic.

#### VOICE NO.

The blue Voice No output sends out a Ctrl signal value for the voice number currently used. This means you can control each voice in a polyphonic patch separately. The Ctrl values for the voice numbers sent out from the Voice No output corresponds to the ranges of the Ctrl inputs of the Multiplexer modules in the Switch group (see page 163) and also the Volt input of the Volt Sequencer module (see page 184). The output Ctrl signal output values are these: Voice 1: 0, Voice 2: 4, Voice 3: 8, Voice 4: 12, Voice 5: 16, Voice 6: 20, Voice 7: 24, Voice 8: 28, Voice 9: 32, Voice 10: 36, Voice 11: 40, Voice 12: 44, Voice 13: 48, Voice 14: 52, Voice 15: 56, Voice 16: 60, Voice 17: 64, Voice 18: 68, Voice 19: 72, Voice 20: 76, Voice 21: 80, Voice 22: 84, Voice 23: 88, Voice 24: 92, Voice 25: 96, Voice 26: 100, Voice 27: 104, Voice 28: 108, Voice 29: 112, Voice 30: 116, Voice 31: 120 and Voice 32: 124.

As you can see, the output Ctrl signal has double the range compared to general control signals. This means that if you want to control general control signal applications you need to add a negative offset for Voice 17 and above to not hit the +64 units "headroom" of the control signal inputs.

#### EXAMPLE 1: 4 SEPARATELY DETUNED VOICES

Let's say we want to simulate an old analog 4 voice synthesizer which has slightly different oscillator tunings for each voice. Sounds familiar? We use the Status module and the Volt Sequencer module and patch the Voice No output to the Volt input of the Volt Sequencer. Then, we set the Voice Mode in the Patch window to 4 voices. We click the Clr button on the Volt Sequencer to set each step to 0 units. Then, we set each of the four first steps of the Volt Sequencer slightly differently. Then we patch the Volt Sequencer control signal output to the Oscillator A Pitch modulation input and raise the attenuator knob a bit. Now, play and add a key at a time till you play a 4 note chord. Each of the voices sound slightly detuned as we would expect. Release one of the keys and press it again. Now, the same voice sounds again with its unique tuning.



#### EXAMPLE 2: 4 VOICES AND 4 WAVEFORMS

By using the Voice No output of the Status module in combination with the Ctrl input of an 8-1Multiplexer module, you can even create polyphonic Patches that have completely different sounds for each individual voice. In this example we have created a 4 voice polyphonic Patch with separate oscillators and waveforms for each voice.



Gate

Vel

RelVel

## NOTEDETECT

This module can detect a note, either from the Nord Modular G2 keyboard or from the **MIDI** INPUT. A logic high sig-

nal will be transmitted, together with a velocity control signal, when the selected key is detected. The logic signal will switch to zero, and a release velocity control signal will be sent, when the selected key is released. The Note Detect module is global and affects all voices assigned in a patch. The behavior is similar to the MonoKey module described on page 113. The Note detect module is not affected by the polyphony of the patch. It will detect notes, even if you run out of polyphony.

🗑 NoteDet1

Note

F4

#### **Note Knob**

Select the note to be detected. Range: C-1 to G9.

#### OUTPUTS

Gate signal: Logic. Velocity (linear Velocity signal): Unipolar Positive. RelVel (linear Release Velocity signal): Unipolar Positive.

# NAME

The Name module hasn't any "musical" function in the Patch except for "visual

help and guidance". It's very handy if you, for example, want to describe a group of modules in the Patch window. Just place the Name module together with the modules in the group, right-click on the Name module and select 'Rename' from the pop-up and give it an appropriate name. Then press Enter to apply the name to the module.

Tip! To distinguish a group of modules in the Patch from other modules, you can also use the Color feature described on page 42.

# NOTE GROUP

### NOTEQUANT

This module will quantize the values of a continuous control signal to produce discrete, semitone steps. The total range of the incoming signal can be attenuated at the input.



Displays the note range. Range: 0 to +/-64 semitones. Note that for the display box to show the correct limits, it is assumed that the input signal uses the full range -64 to +64 semitones.

#### RANGE KNOB

Set the signal range with the knob.

#### NOTES DISPLAY BOX

Displays the selected quantization grid (interval) in semitones. Range: Off, 1-127.



Name1

#### NOTES

Set the desired quantization grid (interval), in semitones, with the buttons. Range: Off and 1 to 127 semitones.

#### IN

The blue control signal input.

**Оит** Signal: **Bipolar**.

#### KEYQUANT

This module quantizes the values of a continuous control signal and generates note values according to a user-defined key. It is great for arpeggio-like effects.



#### RANGE DISPLAY BOX

Displays the set key range. For the display to show the correct note value, it is assumed that the input signal uses its whole dynamic range (+/- 64 units).

#### RANGE KNOB

Set the key range in semitones. Range +/- 64 semitones.

#### NOTES

Set the desired key by clicking the notes you want to quantize to. The note interval for the shown octave is automatically duplicated across the whole key Range.

#### CAPTURE

Select 'Evenly' with this button to force the module to "split up" the key quantization grid in equally big sections per octave.



#### IN

The Range control signal input.

#### Оит

Signal: Bipolar.

#### EXAMPLE

The example below shows the principle for creating a simple arpeggiator. LFO A is set to generate a triangle wave, since this signal has linear, symmetrical ramps. This guarantees even change of control values over time. We have pressed four Note buttons and selected a Range of +/-32 semitones on the KeyQuant module. The output signal from the KeyQuant module is routed to the unattenuated Pitch input of the Osc A module to ensure correct semitone intervals.

We have selected Capture 'Evenly' to make the notes be output at a steady rate when controlled from the Triangle wave LFO.



# PARTQUANT

The Partial Quantizer module generates a control signal which will transpose an Oscillator to one of its harmonic partials. 😨 PartQuant1 🛛 🛃 💽 💿 - 🗆 🗩

The range of the partial generator is 0 to

+/- 64 partials in steps of 0.5 partials. Note that the practical limit of Nord Modular G2 is +/- 32 partials. If the range is set above +/- 32 partials, the oscillator will remain on its 32nd partial until the control signal amplitude has decreased below +/- 32 partials.

#### RANGE DISPLAY BOX

Displays the control signal range set with the attenuator knob. For the display to show the correct range, it is assumed that the input signal uses its whole dynamic range (+/- 64 units). Values exceeding +/- 32 partials are shown with an asterisk, indicating that the practical output limit is exceeded.

#### RANGE KNOB

Set the control signal range. Range +/- 64 units.

#### INPUT

The blue control signal input.

Оит

Signal: Bipolar.

### NOTESCALER

This module works like a control signal attenuator. You set the output peak-topeak limits in semitones. This could be useful if you want to "tune" the output

▼NoteScal..1 0-Oct 📿 ●-□-■

from a controller. The Note Scaler works with either uni- or bipolar signals.

#### DISPLAY BOX

Displays the note range limits. Useful musical intervals will be indicated in the parenthesis (octaves, fifths etc.). Range: 0 to +/-64 semitones. Note that for the display box to show the correct limits, it is assumed that the input signal uses the full range -64 to +64 semitones.

#### RANGE KNOB

Set the semitone range with the slider. Range: 0 to +/-64 semitones.

#### IN

The blue control signal input.

#### Оитрит

Signal: Bipolar.

#### GLIDE

This module can provide a smooth, gliding transition between the values of a incoming control signal. You can select if you want the glide effect to be linear (dif-



ferent time depending on the range between adjacent input values) or logarithmic (basically the same time regardless of the range between adjacent input values). Note! To make a legato introduced portamento, you have to use the Glide function in the Patch|Patch Settings window described on page 86

#### ACTIVE (LOGIC INPUT AND KNOB)

Patch a high logic signal here to activate the gliding transition between the input signal levels (if the Active button is off). If no connection is made, the portamento can be controlled with the Active button.

#### Тіме

Set the transition (glide) time with the knob. Range: 5.3 ms to 1355 ms (Time mode) or 0-127 (Rate mode).

#### SHAPE

Select 'Lin' (different time depending on the range between adjacent input values) or 'Log (basically the same time regardless of the range between adjacent input values).

#### IN

The input of the Portamento module where you could patch the Pitch control signal from the Keyboard module (see page 112), for example. Dynamic Control/Audio.

#### Оитрит

Dynamic Control/Audio. Signal: Bipolar.

#### PITCHTRACK

The Pitch Tracker module can detect the pitch of a monophonic input signal and generate a pitch control signal output as well as a logic pulse for every period of the input signal. The module also features a



gate function with selectable threshold which outputs a Gate signal when the input level exceeds the

threshold value. The Pitch Tracker is not very sensitive to overtone content of the input signal but FM signals cannot be correctly tracked due to the constantly shifting input frequency.

#### INPUT

The input of the PitchTrack module. Signal: Dynamic Control/Audio.

#### PERIOD

Outputs a high logic pulse for every new period of the input signal. Signal: Logic.

#### Рітсн

Signal: Bipolar

#### GATE

Outputs a high logic Gate signal when the input signal level exceeds the Threshold level (see below). Signal: Logic.

#### THRESHOLD

Set the threshold level for the input signal to generate the Gate signal (see above).

# ZEROCNT

The Zero Crossing Counter module can be used for detecting the pitch of an input signal. Note that the input signal has to be

fairly simple regarding harmonic content since it's the zero crossings of the signal which are being detected. An FM input signal, for example, won't generate a steady Pitch output signal because the zero crossing interval varies constantly. It's also necessary that the input signal is bipolar, i.e. contains both positive and negative levels. An input signal that never crosses the 0 level value won't generate any Pitch control signal. The practical pitch detection range is 40 Hz to 16 kHz

#### INPUT

The input of the ZCounter module. Dynamic Control/Audio.

#### Рітсн

Signal: Bipolar

#### LEVSCALER

This is a level scaler mainly intended for modulation signals in FM applications. You can use it to scale an audio signal level based on input note values. You set a break point key and different amplifica
 ▼LevScaler1
 6.0dB
 D#4
 3.8dB

 Note
 KBT
 L
 BP → R
 V

 On
 On
 ▼
 On

tion/attenuation slopes for the sections on either side of the break point. This module is also suitable for creating variable Keyboard Tracking using the control signal output.

#### Νοτε

Patch this input to e.g. the Pitch or Note outputs of the Keyboard input module (see page 112). Alternatively, use the KBT function (see below).



#### КВТ

This is the hard-wired connection between the LevScaler Note control input and the keyboard (and the MIDI input). If KBT is activated the LevScaler will track the keyboard at the rate of one semitone for each key. If KBT is not activated, the keyboard will not affect the LevScaler Note control.

#### LOWER

Set the amplification/attenuation slope for the lower key section with the knob. The value is displayed in the corresponding display box. Range: +/-8.0 dB per octave.

#### BP

Set the break point note number. The value is displayed in the corresponding display box. Range: C-1 to G9.

#### UPPER

Set the amplification/attenuation slope for the upper key section with the knob. The value is displayed in the corresponding display box. Range: +/-8.0 dB per octave.

#### GRAPH

Displays the two gain slopes and the break point graphically. The Y-axis represents the output level (log-arithmic) and the X-axis the entire note range (C-1 to G9). the horizontal line represents the +64 units (0 dB) output level.

#### CONTROL SIGNAL OUTPUT

The output value is the combined result of the note input and scaling values. a 0 dB value corresponds to a +64 units output value, -8 dB attenuation corresponds to 0 units output value and a +8 dB amplification value corresponds to +256 units output value. Signal: Unipolar.

#### INPUT

The **Dynamic Audio/Control** signal input to the internal gain control function. Patch for example an Oscillator signal here.

#### Оитрит

The output of the amplified/attenuated input signal. Signal: Bipolar.

# THE OSCILLATOR GROUP

The Nord Modular G2 oscillators produce sound constantly. If you connect an oscillator output to a mix bus, it will generate a constant sound - just as you would expect. If you want the behaviour of a traditional synthesizer, i.e. to generate sound only when you play on the keyboard, patch the output of the oscillator to the audio signal input of an envelope generator. Then, patch the audio signal output of the envelope generator to an Output module. Finally, trig/gate the envelope generator from the keyboard.

#### COMMON OSCILLATOR PARAMETERS

#### WAVEFORM RADIO BUTTONS

Oscillator A and B both have waveform selectors of radio button type. The waveforms of these oscillators are the "basic" subtractive square/pulse, sawtooth, triangle and sine wave. All waveforms in Oscillator A and B are instantly available which means that you can switch waveform without any interruption.



### WAVEFORM DROP-DOWN SELECTORS

Oscillator C and D have drop-down waveform selectors. The different waveforms of these oscillators are not instantly available as in the "radio button" oscillators described above. The advantage of this is that these oscillators often use less Patch Load. However, changing wave-

form in these oscillators will force the Sound engine to recalculate and thus cause a brief moment of silence. Note that Oscillators with drop-down waveform selectors can have only one waveform for all 8 Variations. If you want different waveforms in different Variations, use oscillators with radio buttons instead.

#### WAVEFORM DROP-DOWN SELECTORS WITH GRAPHS

The Shape, Pulse and Sync Oscillators have drop-down waveform selectors with graphical display of the wave shape. In order to optimize the Patch Load in these types of oscillators, the oscillators need to recalculate every time you switch waveform. This will force the

Sound engine to cause a brief moment of silence. Note that Oscillators with drop-down waveform selectors can have only one waveform for all 8 Variations. If you want different waveforms in different Variations, use oscillators with radio buttons instead

#### SEMI/FREQ/FAC/PART SCROLL BUTTON

Click this button to switch the frequency control modes between Semitone, Frequency, Partial and Factor mode. The respective mode is also shown in the Display box. The following ranges and characteristics are valid for the different modes:

- Semitone range: -64 to + 64 (C-1 to G9) relative to the input value on an unattenuated Pitch input on the oscillator module. If the KBT button is on, the Semitone value is relative to the note played on the keyboard (or received via MIDI). If KBT is not active and no Pitch modulation is present, the factor value is relative to the note E4.
- Frequency range: 8.176 Hz to 12.55 kHz if KBT is not active and no Pitch modulation is present.
- Factor range: x0.0248 to x38.055 relative to the input value on an unattenuated Pitch input on the oscillator module. If the KBT button is on, the factor is relative to the note played on the keyboard (or received via MIDI). If KBT is not active and no Pitch modulation is present, the factor value is relative to the note E4.
- Partial range: 0 Hz and 1:64 to 64:1 relative to the input value on an unattenuated Pitch input on the oscillator module. If the KBT button is on, the partial is relative to the note played on the keyboard (or received via MIDI). If KBT is not active and no Pitch modulation is present, the partial value is relative to the note E4.

The lowest value in Partial mode is 0 Hz. A signal at 0 Hz doesn't generate any sound on its own but is very useful to frequency modulate. Bipolar linear frequency modulation of a 0 Hz signal will generate both positive and negative - 180 degrees phase shifted - frequencies and create very interesting timbres. Oscillator B and C plus the two Shape Oscillators feature FM inputs. In these oscillators, you can set the Partial to 0 Hz and then frequency modulate the signal by selecting 'FM Lin' and connecting a modulator signal to the FM input.



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### THE SEMI (OR FREQ/PART/FAC) KNOB

Changes the coarse tuning of the oscillator. Ranges: depending on frequency display mode (see above).

#### THE CENT KNOB

Adjust the fine tuning of the oscillator. The range is +/- half a semitone divided into 100 steps. Click on the triangle above the knob to reset the fine tuning to the current coarse tuning value (see above).

#### PITCH MODULATION

There are one or more Dynamic Control/Audio inputs for modulating the pitch on the oscillators. There can also be a pitch modulation attenuator next to the input of Attenuator Type II. See "Pitch modulation" on page 33 for more info.

#### SYNC MODULATION

The Sync input is used for synchronizing the oscillator with a control source, which could be another oscillator, an LFO or the keyboard gate signal. Synchronization forces the oscillator to restart its waveform cycle, in sync with the signal of the controlling device. The

oscillator will restart whenever a signal present at the sync input increases from 0 units to anything above 0 units. The oscillator signal usually restarts on the 0 crossing from negative to positive value after having received a sync signal.

The pitch of the controlling oscillator will interact with the controlled oscillator pitch. For a traditional synthesizer sync-sound, start with the two oscillators to the same pitch and connect only the sync-controlled oscillator to an output. Turning the tuning knob or modulating the pitch of the sync-controlled oscillator will produce radical changes in the timbre. See "Sync" on page 34 for more information.

#### SHAPE AND SHAPE MODULATION

Use the Shape knob to set the initial shape of waveform. The shape range is from 50% to 99%.

There is also an input for controlling the shape of the selected waveform from a modulator, starting at the initial value set with the Shape control. The modulation amount is

determined by the rotary knob next to the input of Attenuator Type I. See page 33 for modulation examples.

#### FM LIN/FM TRK

Some oscillators feature an FM scroll button in combination with an FM input and an attenuator of Attenuator Type II. A signal on the FM input will affect the oscillator signal frequency according to the following:

'M Lin



Shape

50%



Semi



**₩**OscB1

🗩 🕇 Sync

FM Lin in the Nord Modular G2 system is deep linear frequency modulation. FM Lin modulation generates varying "size" of the frequency bands when you change the oscillator pitch. In FM Trk, or Tracking Frequency Modulation, all frequency bands tracks the oscillator pitch equally across the note range.



Frequency A low-pitched FM Trk modulated signal



Frequency

See "Frequency modulation (FM)" on page 34 for more info.

#### КВТ

KBT, KeyBoard Tracking, is the hard-wired connection between the oscillator pitch and the keyboard (and the MIDI input). If KBT is activated the oscillator will track the keyboard at the rate of one semitone for each key. If KBT is not activated, the keyboard will not affect the oscillator frequency.

#### ON/OFF

Click to mute the output of the oscillator. Blue button color indicates that the oscillator is on

#### Оитрит

The signal output on the oscillator. Signal: Bipolar



KBT On

# OscA

This oscillator can produce one of six waveforms: Sine, Triangle, Sawtooth, Square, 25% Pulse or 10% Pulse. The oscillator has two pitch modulation inputs. See also "Common Oscillator parameters".

# OscB

OscillatorB can produce one of five waveforms: Sine, Triangle, Sawtooth, Pulse with selectable asymmetric pulse width, Pulse with selectable symmetric pulse width and Double Sawtooth. The oscillator has two pitch modulation inputs, one frequency modulation input,





one sync modulation input and a Shape modulation input.

#### SHAPABLE WAVEFORMS

The fourth waveform is Pulse with selectable pulse width. This is the type of waveform found in most analog synthesizers. At 50% Shape setting, the signal is a perfect Square, at 75% a Pulse with 25/ 75% pulse width and at 99% a Pulse with 1/99% pulse width. When the Shape is modulated with negative values, the signal is "mirrored".



The fifth waveform is Double Sawtooth. At 50% Shape setting,

the signal consists of two Sawtooth waves in phase with each other, at 75% two Sawtooth waves slightly phase shifted and at 99% two Sawtooth waves 90 degrees phase shifted When the Shape is modulated with negative values, the signal is "mirrored". See also "Common Oscillator parameters".

# OscC

This oscillator produces one of six available waveforms. It also has two pitch modulation input. The oscillator has the same waveforms as OscA but uses less Patch



Load because of the waveform drop-down selection system which forces the oscillator to optimize and recalculate every time you select a new waveform. See also "Common Oscillator parameters".

# OscD

This oscillator is similar to OscillatorC but has less modulation inputs. See also "Common Oscillator parameters".

# OscPM

The Phase Modulation Oscillator uses the same basic technology for signal generation as the DX7. By constantly modulating the phase of a signal, an "FM" type of signal is generated. The frequency





bands track the basic pitch similar to the 'FM Trk' modulation in OscB and C described above but with slightly different characteristics. The OscPH also features inputs for pitch modulation and sync. See also "Common Oscillator parameters".

# OSCSHPA

This Shape oscillator is able to generate a vast variety of waveform shapes. There are six basic waveforms to choose between and since you can transform and modulate the shape of these waveforms, it's possible to generate very interesting signals with very varying harmonic con-



tent. The principle for all Sinewave based signals is to start with a signal with a pure sinewave and then, by gradually transforming the signal, adding more overtones and creating a more complex and rich signal. The sonic result of changing the shape is similar to running a complex signal through a filter and changing the cutoff frequency. The oscillator also has inputs for modulating pitch and frequency (FM) as well as sync.

#### WAVEFORMS AND SHAPES

Sine1 is a phase modulated sine wave. At 50% Shape setting, the signal is a perfect sine wave and at 99% similar to a sawtooth wave. When the Shape is modulated with negative values, the signal is "mirrored".

Sine2 is a Sine -> Double Sine signal. At 50% Shape setting, the signal is a pure sine wave and at 99% Shape setting, the first half of the period almost covers the entire period length and the second half is a very narrow "spike". When the Shape is modulated with negative values, the signal is "mirrored".

Sine3 is a Sine -> Odd harmonics signal. At 50% Shape setting, the signal is a perfect sine wave and at 99% a lot of odd harmonics have been added. When the Shape is modulated with negative values, the signal is limited at pure sine wave shape.

Sine4 is a Sine -> Even harmonics signal. At 50% Shape setting, the signal is a perfect sine wave and at 99% a lot of even harmonics have been added. When the Shape is modulated with negative values, the signal is limited at pure sine wave shape.



TriSaw is a Triangle -> Sawtooth signal. At 50% Shape setting, the signal is a perfect Triangle and at 99% a perfect Sawtooth. When the Shape is modulated with negative values, the signal is "mirrored".

The last signal is a Pulse with selectable **symmetric** pulse width. At 50% Shape setting, the signal is a perfect Square, at 75% a Pulse with 25% symmetric pulse width and at 99% a Pulse with 1% symmetric pulse width. When the Shape is modulated with negative values, the signal is "mirrored". See also "Common Oscillator parameters" and "Shape Oscillator tips" (below).

# OscSHPB

This Shape oscillator is able to generate a vast variety of waveform shapes. There are eight basic waveforms to choose between and since you can transform and modulate the shape of these waveforms, it's possible to generate very interesting



and varying signals. The OscShpB oscillator also has inputs for Sync and FM modulation for even greater sonic variations.

#### WAVEFORMS AND SHAPES

Sine1 is a phase modulated sine wave. At 50% Shape setting, the signal is a perfect sine wave and at 99% similar to a sawtooth wave. When the Shape is modulated with negative values, the signal is "mirrored".

Sine2 is a Sine -> Double Sine signal. At 50% Shape setting, the signal is a pure sine wave and at 99% Shape setting, the first half of the period almost covers the entire period length and the second half is a very narrow "spike". When the Shape is modulated with negative values, the signal is "mirrored".

Sine3 is a Sine -> Odd harmonics signal. At 50% Shape setting, the signal is a perfect sine wave and at 99% a lot of odd harmonics have been added. When the Shape is modulated with negative values, the signal is limited at pure sine wave shape.

Sine4 is a Sine -> Even harmonics signal. At 50% Shape setting, the signal is a perfect sine wave and at 99% a lot of even harmonics have been added. When the Shape is modulated with negative values, the signal is limited at pure sine wave shape.

TriSaw is a Triangle -> Sawtooth signal. At 50% Shape setting, the signal is a perfect Triangle and at 99% a perfect Sawtooth. When the Shape is modulated with negative values, the signal is "mirrored".



Double Saw signal. At 50% Shape setting, the signal consists of two Sawtooth waves in phase with each other, at 75% two Sawtooth waves slightly phase shifted and at 99% two Sawtooth waves 90 degrees phase shifted. When the Shape is modulated with negative values, the signal is "mirrored".

Pulse is a Pulse with selectable **asymmetric** pulse width. This is the type of pulse waveform found in most analog synthesizers. At 50% Shape setting, the signal is a perfect Square, at 75% a Pulse with 25%/75% pulse width and at 99% a Pulse with 1%/99% pulse width. When the Shape is modulated with negative values, the signal is "mirrored".

SymPulse is a Pulse with selectable **symmetric** pulse width. At 50% Shape setting, the signal is a perfect Square, at 75% a Pulse with 25% symmetric pulse width and at 99% a Pulse with 1% symmetric pulse width. When the Shape is modulated with negative values, the signal is "mirrored". See also "Common Oscillator parameters" and "Shape Oscillator tips" (below).

#### SHAPE OSCILLATOR TIPS

With the Shape Oscillators A and B it's very easy to create an "analog style" sound without using a Filter. Connect the OscShpB module according to the picture, select the Sine1 waveform and assign the Shape knob to an ASSIGNABLE KNOB. Play on the keyboard and turn the ASSIGNABLE KNOB to increase the overtone content. The effect is very similar to running a sawtooth wave into a filter and increasing the Filter Cutoff Frequency value.



# OSCDUAL

The Dual Oscillator actually contains two oscillators plus a sub oscillator. Two main oscillators with Pulse and Sawtooth waves and a sub oscillator with a Square wave. The Pulse and Sawtooth oscillators have the same pitch whereas the sub oscillator pitch is one octave be-



low. The pulse width of the Pulse oscillator can be modulated as well as the Phase of the Sawtooth signal. The Soft button affects the sub oscillator and reduces the overtone content of its signal. See also "Common Oscillator parameters".

Tip! The Dual Oscillator is perfect for creating a basic "analog" synth. Connect the modules according to the figure to the right and you're there. The LFO controls both the width of the Pulse wave as well as the Phase of the Sawtooth wave and gives the sound a nice "chorusing" effect. Don't forget to activate the KBG function of the Envelope module to be able to gate the envelope from the keyboard.



# STRINGOSC

The String Oscillator is a little different from the other oscillators. One significant difference is that **it requires an input signal** to begin to oscillate. The Sting Oscillator is basically a pitch con-



trolled delay line with feedback, with controls for decay and damping of the feedback signal. The String Oscillator is ideal for simulating plucked strings. With this module it's quite easy to simulate an acoustic string instrument like a guitar, for example (see example below).

#### DECAY

Set the decay time of the internal feedback signal through the delay line. The higher the decay value, the longer it will take for the signal to decay to silence.

#### DAMP

Set the high frequency damping of the internal feedback signal through the delay line. The higher the damp value, the more mellow the signal. See also "Common Oscillator parameters".

#### PATCH EXAMPLE

The Sting Oscillator requires some sort of input signal or a pulse to start oscillating. In this example we want to simulate a plucked string instrument. We feed a short noise burst via an ADR Envelope to the input of the StingOsc and then to the Output module. Set all the module parameters according to the picture and you will get sort of a "plucked string" sound when you play the keyboard.

<b>▼</b> Noise1	white 📿 Colored 🛛 🕅 🖗
● Gate ● FR	0.5m 24.0m Shape
StringOsc1  Pitch +0 +  KBT	0 Semi Cent Decay Damp
20utput1 0     0     Pad +6dB 1/2	Jt Fx Bus L

# OSCPERC

This oscillator generates percussive sounds. The pitch of the sound can be modulated from external sources.



#### TRIG INPUT

Use this input to trig the sound. Any signal that increases from 0 units or less, to anything above 0 units will trig the sound. The red color of the input indicates that it also accepts full audio frequency signals.

#### DCY

Sets the decay time of the sound.

#### CLICK

With the Click knob you can add a clicking sound to the attack of the sound.

#### PUNCH

Adds a distinct attack to the sound by doubling the frequency of the first period of the signal.

# DRUMSYNTH

The Drum synth module is designed to generate classic analog drum sounds. It consists of a master and a slave oscillator in combination with a noise source and a multimode noise filter. The global parameters include a bend function and a click and noise mixer.



#### TRIG

The yellow Trig input trigs the Drum synth module each time it receives a signal that changes from 0 units or below to

anything above 0 units. This signal could come from a gate output of a Keyboard or Sequencer module, for example. A green LED indicates when a trig signal is received.

#### VEL MODULATION INPUT

This blue control input is used to receive velocity information from an external source. The input velocity signal will affect Master and Slave Oscillator Level, Noise Filter Sweep, Bend Amount, Click Level and Noise Level. Maximum input velocity will force the parameters to reach their current settings.

#### PITCH MODULATION INPUT

This blue control input is used to receive pitch data from an external module such as a Keyboard or Sequencer module, for example.

#### MASTER AND SLAVE DISPLAY BOXES

The Master display box shows the master pitch in Hz, and the Slave display box the pitch ratio related to the master pitch. Range: Master: 20.0 Hz to 784 Hz. Slave: 1:1 to 6.26.

#### MASTER AND SLAVE KNOBS

These are the parameters of the two oscillators that generate the basic drum waveform.

**Tune:** The tune of the Master can be set between 20.0 and 784 Hz. The Slave ranges from 1 to 6.26 times the Master frequency.

**Dcy:** Decay determines the decay time for each oscillator. Range: 0.5 ms to 45 s. **Lev:** With the Level knobs you set the respective volume of the two oscillators.

#### Noise Filter

Here you can filter and affect the noise component of the Drum synth module.

Freq: With the Freq knob you set the cutoff frequency of the noise. Range: 10 Hz to 15.8 kHz.

**Res:** With the Res knob you set the resonance amount around the cutoff frequency.

**Swp:** With the Sweep knob you set a sweep range for the cutoff frequency. The setting results in a sweep from a high cutoff frequency down to the frequency you set with the Freq knob. Range: 0 to 5 octaves. **Dcy:** The Decay knob sets the noise sweep and decay time. Range: 0.5 ms to 45 s.

HP/BP/LP: Click on the HP, BP or LP button to select filter mode: highpass, bandpass or lowpass.

#### BEND

Bend is a global function for the Master and Slave oscillators.

**Amt:** With the Amt knob you set the bend amount, i.e. the frequency range to bend through. The bending always start from the higher frequency and sweeps down in frequency. Range: 0 to 5 octaves. **Dcy:** With the Dcy knob you set the bend decay time. The bend time can be considered more as a bend rate, since the actual decay time is determined by the Decay knobs of the two oscillators. Range: 0.5 to 45 s.

#### CLICK

With the Click knob you can add a clicking sound to the attack of the sound.

#### Noise

With the Noise knob you set the noise level in the total mix.

#### PRESET

Here you can choose between a number of factory presets by clicking on the up or down buttons. The preset name is shown in the display box.

#### Noise

This sound source generates noise, selectable from white to colored.



#### WHITE/COLORED

Set the color of the noise with the control knob. Colored noise contains less high frequency energy than white noise. See also "Common Oscillator parameters".

#### OSCMASTER

The Master Oscillator doesn't generate any audio signal. Instead, it generates a Pitch control signal which can be used to control other Oscillator modules on their



Pitch inputs. The combination of the Master Oscillator with a number of other Oscillators makes it possible to simultaneously tune all connected Oscillators from the Master Oscillator instead of having to tune each individual connected Oscillator.

# OPERATOR

The Operator module consists of a sinewave oscillator in combination with a Level & Rate amplitude envelope generator and a keyboard level scaler. The Operator module has the same functionality as an 'operator' in the well-known DX7 synthesizer. Several Operator modules can be used together with the DXRouter module to form a six operator FM synthesis engine. See page 168 for example.



#### RATIO/FIXED

Select Ratio to set the frequency as a multiple relative to the input value on the Pitch input. Select Fixed to set the frequency as a fixed number of Hz relative

to the Pitch input value. If the KBT button is on, the value is relative to the note played on the keyboard (or received via MIDI). If KBT is not active and no Pitch modulation is present, the value is relative to the note E4.

#### DETUNE

Here you can fine adjust the pitch in even smaller steps than with the Fine knob. Range -7 to 7.

#### FM INPUT

A modulator connected to the FM input will modulate the operator frequency in a linear fashion.

#### PM INPUT

Input for pitch modulation. An input value of +32 units will generate zero modulation. An input value of 0 units will generate 0 Hz pitch output from the Operator and an input value of +64 units will generate a pitch twice as high as the Operator pitch. If left unconnected, the modulation will be zero.

#### VEL

Select velocity sensitivity with the arrow buttons for the velocity signal received at the Vel input. Range 0-7 where 7 is the highest sensitivity.

### RATESCALE

Select the envelope rate scaling with the arrow buttons for the note signals received at the Note input. Range 0-7. The higher the RateScale value, the faster the envelope rates at higher notes.

### GATE INPUT

A signal at the Gate input will gate the envelope.

#### NOTE INPUT

A signal present at the Note input will affect all the rates of the envelope if the RateScale value is higher than 0 (see above). It will also affect the Keyboard Level Scaler (see below).

### R1-R4 & L1-L4

Here you set the rates (R) and Levels (L) of the envelope. The lower the Rate values, the longer it will take for the envelope to reach the next Level. L3 is the level at which the envelope will sustain. Note that

the Level settings also affect the Rates. The greater the difference between two adjacent Level settings, the longer it will take to "travel" between the Levels. If two adjacent Level settings are the same, the Rate value between these levels is of no importance.

#### AMod

This is the function for modulating the amplitude with a bipolar control signal. Patch a control signal to the AMod input and set the sensitivity with the arrow buttons. Range 0-7 where 7 is the highest sensitivity.

#### VEL INPUT

Here you control the levels of the level & rate envelope generator. The velocity sensitivity is set with the Vel arrow buttons as described above. Note that lower envelope levels means that the entire envelope cycle becomes faster!

#### BRPOINT

Set the break point note number for the Keyboard Level Scaler. The value is displayed in the corresponding display box. Range: A-1 to C8.

#### -LIN/-EXP/+EXP/+LIN

Click to select Linear or Exponential attenuation or amplification characteristics of the level scaling.

#### L-DEPTH

Set the amplification/attenuation slope for the lower key section with the arrow buttons. The value is displayed in the corresponding display box.

#### R-DEPTH

Set the amplification/attenuation slope for the upper key section with the arrow buttons. The value is displayed in the corresponding display box.

#### GRAPH

Displays the two gain slopes and the break point graphically. The Y-axis represents the output level and the X-axis the entire note range (A-1 to C8). the horizontal line represents the 0 dB output level.

# LFO GROUP

LFOs, Low Frequency Oscillators are good sources for periodic modulation. The waveforms they produce can be used for vibrato, tremolo or as clock sources. Some of the LFOs in Nord Modular G2 have a very wide frequency range, from very low to audible frequencies.

# COMMON LFO PARAMETERS

### WAVEFORM RADIO BUTTONS

LFO A, B and ShpA have waveform selectors of radio button type. All waveforms in these LFOs are instantly available by clicking the desired waveform button.

#### WAVEFORM DROP-DOWN SELECTORS

LFO C has a drop-down waveform selector. The different waveforms of LFO C are not instantly available as in the "radio button" LFO described above. The advantage of this is that LFO C uses less Patch Load. However, changing waveform in LFO C will force the Sound

engine to recalculate and thus cause a brief moment of silence. So if you're looking for lower Patch Load, use this LFO instead of the "radio button" one.

#### WAVEFORM GRAPH

LFO B and ShpA have graphical display of the waveform with phase and shape (LFO ShpA). The yellow number to the bottom left indicates the current Phase setting in degrees.

#### RATE LO/RATE HI/BPM/CLK/RATE SUB SCROLL BUTTON

Selects one of three ranges of the LFO rate: Rate Lo (normal), Rate Hi and Rate Sub, plus BPM and Master Clock Sync mode. The Rate Lo range is from 62.9 secs/cycle to 24.4 Hz,

the Rate Hi range is from 0.26 Hz to 392 Hz, the Rate Sub range is from 699 secs/cycle 5.46 secs/cycle. The BPM range is from 24 to 214. The Clk sync mode automatically locks on to the synth's Master Clock and here you set the intervals between 64:1 and 1:64T. The 'T' (triplet) indicates that the note value is 1/1.5 times the original note value and the 'D' (dotted) indicates that the note value is 1.5 times the original note value. Note that the Clk sync mode is only available in the LfoB and LfoShpA modules.

### RATE

Set the rate of the LFO with the knob. The Output LED will show you an approximation of the rate, while the display box will indicate the exact frequency in Hertz, seconds, BPM or Sync factor.

#### PHASE

Set the phase of the LFO signal. The phase is shown, in degrees, in the Display Box and also in the Graph. The phase can also me modulated from an external source. The modulation amount can be attenuated with the knob of [Attenuator Type I].

#### PITCH MODULATION INPUT

There are one or more **Control** signal inputs for a modulation source to control the pitch of the LFO. There can also be a modulation attenuator next to the input of [Attenuator Type II].



0.64Hz









# 11. Module reference: LFO group

# RST INPUT

An input signal which goes from 0 units or below to anything above 0 units will force the LFO to restart its waveform cycle.

# SNC OUTPUT

The Snc (Sync) output sends out a high logic signal every time a new waveform period starts. This signal can be used to restart other LFOs on their Rst input (see above) in order to sync the rates and phase lock the signals.

# POLY/MONO

Mono mode synchronizes the LFO modules in polyphonic patches to each other. This means Poly that if you play a chord, the module will control all voices in sync. The preset setting of this parameter is Poly. Note that if you use the Clk (clock sync) rate mode (LfoB and LfoShpA), Mono mode will synchronise the frequency and the phase of the LFOs, whereas Poly mode will only sync the frequency of the LFOs.

# **KBT** SCROLL BUTTON

KBT, KeyBoard Tracking, is the hard-wired connection between the LFO rate/pitch and the keyboard (and the MIDI input). Click to select Off, 25%, 50%, 75% or 100%. If KBT is set to 100%, the LFO will track the keyboard at the rate of one semitone for each key. If KBT is set to Off, the keyboard will not affect the LFO rate. Note that if you use the Clk (clock sync) rate mode (LfoB and LfoShpA), the KBT setting will have no effect.

# **OUTPUT TYPE SCROLL BUTTON**

With the Output Type scroll button you determine how the LFO signal should be output. There are six different alternatives:

- Bip: Bipolar signal ranging from -64 to +64 units, peak to peak.
- BipInv: Bipolar signal ranging from -64 to +64 units, peak to peak but 180 degrees phase shifted compared to the 'Bip' alternative above.
- Pos: Positive Unipolar signal ranging from 0 to +64 units, peak to peak.
- PosInv: Positive Unipolar signal ranging from 0 to +64 units, peak to peak but 180 degrees phase shifted compared to the 'Pos' alternative above.
- Neg: Negative Unipolar signal ranging from 0 to -64 units, peak to peak.
- NegInv: Negative Unipolar signal ranging from 0 to -64 units, peak to peak but 180 degrees phase shifted compared to the 'Neg' alternative above.

# ON/OFF

Click to mute the output of the LFO. Blue button color indicates On.

Φ



Snc



+

Bip.

BipInv:

Pos:

PosInv:

Neg:

NegInv:

### Оитрит

The signal output on the LFO. Signal: **Bipolar or Unipolar** depending on Output Type selection (see above).

## LFOA

LFO A produces one of six different control signals. The rate of the LFO can be modulated from external sources.



#### WAVEFORMS

Select waveform with the radio buttons. The waveforms are: Sine, Triangle, Sawtooth, Square, Random Steps and Random. The Random Steps signal is "colored" meaning that the effect is more gentle than a true random signal. It contains less radical differences between adjacent values. The Random signal is a smooth random control signal. See also "Common LFO parameters".

#### LFOB

LFO B generates one of four different control signals. The phase of the signal can be controlled and modulated. The rate of the LFO can be modulated by a modulation source and the keyboard. The wave cycle can also be forced to re-



start via the Rst input. See also "Common LFO parameters".

### LF0**C**

This LFO produces one of six selectable waveforms. The rate of the LFO can be modulated. LfoE has the same wave



shapes as LfoA but uses less Patch Load because of the drop-down waveform selector. See also "Common LFO parameters".

### LFOSHPA

LfoShpA generates one of six different shapable control signals. The shape and phase of the signal can be controlled and modulated. The rate of the LFO can be modulated by a modulation source and the keyboard. The wave cycle can also be forced to restart via the

TLfoShpA1	
Rst Dir Poly	Rate Lo Shape Phase
	0.64Hz 🕛 🔎 🗜
Snc Pitch	

Rst input. It's also possible to alter the rate and "direction" of the signal via the Dir input (see below).

#### WAVEFORMS AND SHAPES

Select one of six shapable LFO waveforms by clicking one of the radio buttons. The waveforms are:

'Sine' is a sine>sawtooth type of signal. At 50% Shape, the signal is a pure sine wave. At 1% Shape, the signal is a "down sawtooth" and at 99% Shape, an "up sawtooth" signal.

'CosBell' is a cosine signal with variable "width". At 1% Shape, the signal has a very narrow peak which expands with increasing Shape amount up to 99%, where the signal is a pure (co)sine wave.

'TriBell' is a triangle wave with variable "width". At 1% Shape, the signal has a very narrow peak which expands with increasing Shape amount up to 99%, where the signal is a pure triangle wave.

'Saw>Tri' is a variable sawtooth>triangle wave. 1% Shape, the signal is a "down sawtooth" which transforms into a triangle wave and then to an "up sawtooth" with increasing Shape amount.



'Tri>Square' is a triangle wave which gradually transforms into a square wave with increasing Shape amount.

'Pulse' is a regular pulse wave with adjustable pulse width, from 1% to 99%.

#### DIR

The Dir input can be used to continuously control the rate and "direction" of the LFO signal. Let's say we have set the LFO rate to 200 Hz. An input offset value of +64 units on the Dir input will then make the LFO run at 200 Hz. An input offset value of 0 units will force the LFO to stop completely and an input offset value of -64 units will force the LFO to run at -200 Hz, i.e. produce a 180 degrees phase shifted LFO signal. See also "Common LFO parameters".

# CLKGEN

The Clock Generator module generates a stream of logic signals. The Clock Generator can either act on its own or use the Master Clock signal. If you want to sync to external MIDI clock, you must select Master Clock as Source and



then sync the Master Clock to external MIDI Clock (see "Synth Settings" on page 87). For examples on how to use the Clock Generator together with Sequencer modules, see "Sequencing examples" on page 184.

#### RESET INPUT

The yellow Reset input forces the clock generator to restart each time it receives a signal that changes from 0 units or below to anything above 0 units. This signal could come from a Gate output of a Keyboard module, for example. When the clock generator is reset, it also transmits a high logic signal on the Sync output.

#### CLOCK SOURCE

Click the scroll button to select Internal or Master Clock signal. If Master is selected, the tempo is selected in the Master Clock section in the Toolbar.

#### Swing

Set the desired swing factor of the output clock signal. Range: 50%-75%.

#### Темро кнов

Set the desired tempo, in beats per minute, with the knob. Range: 24 to 214 BPM. The tempo is shown in the display box to the left of the knob. If Master is selected as Clock Source (see above), the tempo is selected in the Master Clock section in the Toolbar.

#### 

Starts and stops the output of clock pulses.

#### SYNC EVERY NN BEATS

Here you set the interval for sending a logic pulse on the Sync output of the Clock Generator module. This logic pulse can be used for resetting the sequencer modules in Nord Modular G2 to the "first beat in the bar". If you do not use the Sync function, the sequencer modules have no chance of knowing where they are in a bar. By using the Sync function, it will never take longer than the set number of beats for the sequencer modules to realign themselves if you decide to start your sequencer modules in the middle of a song.

If you are synchronizing Nord Modular G2 to a MIDI Clock source, this function will keep track of any incoming MIDI Song Position Pointer messages.

#### ACTIVE OUTPUT

This yellow output provides you with a logic high signal when the Click Generator is switched on in Internal Clock Source mode. If you have selected Master Clock Source, the Active output will send a logic high signal as soon as a MIDI Start or MIDI Continue command is received at the **MIDI** IN port. The logic signal will switch back to zero when Nord Modular G2 receives a MIDI Stop signal at the **MIDI** IN port.

Signal: Logic.
## 1/96 оитрит

This yellow output transmits 96 clock pulses per note (or 24 clock pulses for each quarter note). Signal: Logic.

## 1/16 оитрит

This yellow output transmits 16 clock pulses per note (or 4 clock pulses for each quarter note). Signal: Logic.

## SYNC OUTPUT

This yellow output provides you with a logic pulse, which is calculated from the Clock signal, at a rate set by the 'Sync every nn beats' parameter mentioned above. The Sync function provides a method of telling the Nord Modular G2 sequencer modules where the first beat in a bar is. Patch this output to the Rst (reset) input of the sequencer modules. This function is absolutely essential to use if you plan to synchronize patches in different slots to each other, or if you want to synchronize Nord Modular G2 to an external sequencer. Signal: Logic.

• Try to make a habit out of always using this function if you are using more than one sequencer module in a patch, especially if you want to mix modules clocked with e.g. triplet resolutions with other modules clocked with eighth or sixteenth notes.

See also "Common LFO parameters".

# ENVELOPE GROUP

An envelope generator generates a control signal which varies over time. This control signal can be used to control a filter or an amplifier, for example. The envelope starts when it receives a trig or gate signal and it closes when the trig/gate signal switches back to zero. During the active stages, some envelopes can be retriggered. The output control signal from an envelope is usually unipolar, with a range of 64 units (+ or -), but can also be bipolar. All Nord Modular G2 envelope generators also feature a built-in envelope controlled amplifter (known as VCA's in analog synths). This makes it possible to patch in an oscillator signal directly to the envelope generator and take out an amplified signal with the desired level "contour".



- If the logic gate signal at the Gate input on an ADSR envelope generator switches to zero before the envelope has completed one or more of the stages, the envelope will jump directly to the release stage.
- If an envelope is restarted before all the stages were completed, it will (by default) restart the attack from the current envelope level of the release stage.

# COMMON ENVELOPE GENERATOR PARAMETERS

# KB BUTTON

This is the hard-wired gate signal "connection" with the keyboard. By activating the KeyBoard gate function, there is no need to patch a logic gate signal cable to the Gate input from the Gate output of the Keyboard module. The LED lights up while the envelope is receiving a gate signal from the keyboard or via MIDI IN.

# GATE INPUT

A high logic signal appearing at this yellow input will start and can keep the envelope in an open-gate state for as long as the Gate signal is high. The LED lights up while the envelope is receiving a signal with a value greater than 0 units. If the Gate signal switches to 0 before the



envelope has completed one or more of the stages, the envelope will jump directly to the corresponding level in the release stage.

电) † Trig 🖸

## TRIG INPUT

A high logic signal appearing at this yellow input will trig the envelope. The LED lights up while the envelope is receiving a signal with a value greater than 0 units. A triggered envelope only needs a short high logic signal to start. When the envelope has started after a Trig signal, it will proceed to the very end of the cycle even if the Trig signal drops to zero



By default, when you release a key and then press is again, the envelope will restart the attack stage at the current release level and not from zero. This is normally the behavior you would want in an amplitude envelope. However, for pitch and filter envelopes it's often more desirable if the envelope always restarts at zero level. Click the N/R button to force the envelope to always restart the attack stage at zero level.



## AM INPUT

A control signal input used for controlling the overall amplitude of the envelope. If you want a velocity sensitive envelope, patch any of the Velocity output of the Keyboard module to the AM input of the Envelope module.

#### SHAPE SCROLL BUTTON

Set the characteristics of the attack and decay/release stage(s) of the envelope by clicking this scroll button. There are four alternatives: Logarithmic Attack & Exponential Decay/Release, Linear Attack & Exponential

Decay/Release, Exponential Attack & Decay/Release and Linear Attack & Decay/Release.

#### A(TTACK)

Sets the attack time. When the envelope receives a high logic signal at the Gate input, the output control signal from the envelope rises up to the maximum value, 64 units. The time to get from 0 to 64 units is the attack time. If the logic Gate signal drops to zero before the envelope has completed the attack stage, it will skip the decay and sustain stages and immediately proceed with the release stage. The attack time is displayed in milliseconds or seconds in the corresponding display box. Range: 0.5 ms to 45 s.



AM

#### D(ECAY)

Sets the decay time. After the envelope has completed the attack part, it will drop down to the sustain level with the decay time. The decay is exponential. If the sustain level is 64, the decay stage will not be needed, there is simply nothing to decay down to. If the logic Gate signal drops to zero before the envelope has completed the decay stage, it will immediately proceed with the release stage. The decay time is displayed in milliseconds or seconds in the corresponding display box. Range: 0.5 ms to 45 s.



## S(USTAIN)

Sets the sustain level. This level will be held (sustained) for as long as the logic Gate signal is high. When the logic Gate signal drops to zero, the envelope will proceed with the release stage. The sustain level is displayed in 'units' in the corresponding display box. Range: 0 to 64 units

## H(old

Sets the time the envelope should remain at maximum level. The hold time is displayed in milliseconds or seconds in the corresponding display box. Range: 0.5 ms to 45 s.

## R(ELEASE)

Sets the release time. When the logic Gate signal drops to zero, the envelope will decrease from the sustain level to zero with the release time. The release is exponential (or selectable between exponential and linear in some modules). The release time is displayed in milliseconds or seconds in the corresponding display box. Range: 0.5 ms to 45 s.

## ATTACK/DECAY/SUSTAIN/HOLD/RELEASE MODULATION

Some Envelope Generators feature control signal inputs for modulating the envelope segments. You can adjust the level of each control signal by turning the corresponding rotary knob of [Attenuator Type I]. Note that the A, D, H and R control inputs handles bipolar control signals. Positive control signals shortens the times and negative control signals increase the times. With the H parameter it is the other way around.

## GRAPHS

All Envelope Generator modules features a graph which displays the envelope shape. Any sustain level is indicated with an orange line; the rest of the envelope segments are green. There is also a yellow horizontal line which indicates the zero level of the envelope. 54.3m







+

### OUTPUT TYPE SCROLL BUTTON

With the Output Type scroll button you determine how the envelope control signal should be output and affect the envelope controlled amplifter. There are six different alternatives:

• Pos: Positive Unipolar signal starting from 0 units, going up to +64 units and then down to 0 units again.	Pos:	•	+64 0 -64
• <b>PosInv</b> : Positive Unipolar signal starting from +64 units, going down to 0 units and then up to +64 units again, i.e. an inverted signal.	PosInv:	•	+64 0 -64
• Neg: Negative Unipolar signal starting from -64 units, going up to 0 units and then down to -64 units again.	Neg:	+	+64 0 -64
• NegInv: Negative Unipolar signal starting from 0 units, going down to -64 units and then up to 0 units again.	NegInv:	•	+64 0 -64
• <b>Bip</b> : Bipolar signal with a range of 64 units and its sustain level at 0 (the MultiEnv can have user definable sustain level in this mode).	Bip:	<b>†</b>	+64 0 -64
• <b>BipInv</b> : Bipolar inverted signal with a range of 64 units and its sustain level at 0 (the MultiEnv can have user definable sustain level in this mode).	BipInv:	ŧ	+64 0 -64

Note! The Multi-Envelope module has full range (-64 to 64 units) in Bipolar and Inverted Bipolar mode.

#### INPUT

The **Dynamic Control/Audio** signal input. Here you can patch a bipolar signal to the envelope controlled amplifter.

#### Оитрит

The **Dynamic Control/Audio** signal output from the envelope controlled amplifter. Signal: **Bipolar**.

## ENV OUTPUT

The blue control signal output from the envelope generator. Signal: **Unipolar or Bipolar**.

## ADSR-ENV

This is a regular four-stage ADSR (Attack, Decay, Sustain and Release) envelope. The ADSR Envelope is well suited for controlling audio signal amplitude, pitch and filter cut-off frequency, for example. See also "Common Envelope Generator parameters".



Εην

# H-ENV

This is a Hold Envelope. It has a Hold time control and an AM input. The Hold Envelope has an extremely short attack

EnvH1 Εην ●†Trigo ●AM 1.02s

and decay times which makes it suitable for controlling the initial pitch of percussive and transient sounds. Note: If you use the Hold Envelope for controlling the amplitude of an audio signal, there may be a clicking sound in the beginning and end due to the extremely short attack and decay times. If you want to be able to control Attack and Release times, check out the "AHD-Env". See also "Common Envelope Generator parameters".

# D-ENV

This is a Decay Envelope. It has a Decay time control and an AM modulation input. The Decay Envelope has an extreme-

Env ●†Trige ●AM 7.30s

ly short attack time which makes it suitable for controlling the amplitude of percussive and transient sounds. Other applications could be to control Pitch, Filter and FM modulation. If you want to be able to control Attack time, check out the "ADR-Env". See also "Common Envelope Generator parameters".

EnvD1

# ADR-ENV

This is an envelope with two or three stages, Attack and Decay or Attack, Sustain and Release. In AR mode, the Sustain level is fixed at maximum level.



## GATE/TRIG SCROLL BUTTON

Select whether the envelope should be gated or trigged.

## DCY/REL

Click to change from Attack and Decay stages to Attack, Sustain and Release stages. The Sustain level is fixed at maximum level.

## END OUTPUT

This yellow logic output sends out a high logic signal as soon as the envelope has completed its stages. This signal can be useful for gating or triggering other modules. Another interesting application is that you could connect this output directly to the Gate/Trig input and



thus create a repeating envelope signal - like a sort of "LFO" (see figure). Note that you have to select 'Trig' mode for this to work. See also "Common Envelope Generator parameters".

# AHD-ENV

The Attack-Hold-Decay envelope is an envelope with three stages: Attack, Hold and Release. The AHD Envelope is well suited for audio gating applications, for example. See also "Common Envelope Generator parameters".

# ADDSR-ENV

This is what you could call an enhanced ADSR-envelope. It features Attack, Decay, Break, Decay, Break and Release controls. The sustain segment is selectable between the first and second Brake stage.

#### SUSTAIN SCROLL BUTTON

Click to select stage L1 or L2 as sustain segment.

## L1 & L2

These are level parameters. The L1 or L2 segment can be selected to act as sustain stage and will then represent the level at which the envelope will be held (sustain) when the Gate signal is high. See also "Common Envelope Generator parameters".

# MULTI-ENV

The Multi stage envelope is a 5-segment time and level envelope with selectable sustain segment.

## L1-L4

By turning the rotary knobs L1 to L4 you can set the amplitude of each of the four level segments in the envelope. The enve-

lope always ends at the L4 level, which can indeed be different from the initial start level.







When you then restart the envelope at the L4 stage, the start level will be the same as L4. If the R button is depressed, the envelope will always restart at zero level. The levels can be either unipolar or bipolar as described above. The levels are displayed in units in the corresponding display box. Ranges: 0 to 64 units (unipolar) or -64 to +64 units (bipolar).

## т1-т4

Here you set the times between the four level stages.

## SUSTAIN SCROLL BUTTON

By clicking the Sustain scroll button you define the sustain segment. This segment can be any of the four level segments, or, if you wish, none at all. The sustain segment works like in an ordinary ADSR envelope, i.e this is the level that sustains as you hold down the key(s). After releasing the key(s) the envelope will continue till the end of T4 and stop at the L4 level. Range: None and L1 to L4. See also "Common Envelope Generator parameters".



The filled T1 segment indicates the restarted (bipolar) envelope without the R button depressed and the dotted line with the R button depressed.

# AHDMOD-ENV

The AHDMod envelope is an Attack-Hold-Decay envelope with control signal inputs for modulating Attack, Hold and Release times. The Shape characteristics of this envelope is fixed to Linear Attack & Exponential Decay/Release. See also "Common Envelope Generator parameters".

#### 

# ADSRMod-ENV

The Mod Envelope is an ADSR envelope with control signal inputs for modulating Attack, Decay, Sustain and Release from external sources. The Shape characteristics of this envelope is fixed to Linear Attack & Exponential Decay/Release. See also "Common Envelope Generator parameters".



# SHAPER GROUP

In the Shaper module group you will find modules that changes the shape of an input audio signal in different ways. Distortion modules can be found here, for example.

#### COMMON SHAPER PARAMETERS

#### INPUT

The Dynamic Control/Audio signal input on the Shaper modules.

#### Оитрит

Signal: Bipolar or Unipolar Control/Audio.

#### MODULATION INPUT

The **Dynamic Control/Audio** signal modulation input on the Shaper modules. The modulation amount can be attenuated with the knob of [Attenuator Type I].

#### GRAPH

Displays the shape function graphically. The Y-axis represents the output signal values, and the X-axis the input signal values.

#### ON/BYPASS

Click the On/Bypass button to bypass the input signal from the effect. Blue button color indicates 'On' and gray 'Bypass'.

#### CLIP

This module can produce digital distortion by decreasing the clip level limit(s) below the normal headroom.



#### SHAPE

Toggle switch for the Symmetric and Asymmetric mode. If this is set to 'Asym', only the positive peaks of a signal will be clipped. If this is set to 'Sym', both the positive and the negative peaks of a signal will be clipped.

#### CLIP LEV

Sets the initial clip level limit(s). See also "Common Shaper parameters".

#### OVERDRIVE

This module distorts an audio signal by amplifying the input signal and force it to hit the headroom. The special amplification characteristics makes this module produce a warm, tube like distortion.



#### SHAPE

Toggle switch for the Symmetric and Asymmetric mode. If this is set to 'Asym', only the positive peaks of a signal will be clipped. If this is set to 'Sym', both the positive and the negative peaks of a signal will be clipped.

#### Түре

Select type of overdrive by clicking this scroll button. The alternatives are: Soft, Hard, Heavy and Fat.







## Overdrive

Sets the initial overdrive amount. See also "Common Shaper parameters".

## SATURATE

This module shapes an input signal in a logarithmic fashion. You can choose between four different transformation curve characteristics.



#### CURVE

Choose between four different transformation curve characteristics. Curve 1 is a smooth logarithmic transformation and Curve 4 is a hard transformation.

#### AMOUNT

Sets the initial shape amount. See also "Common Shaper parameters".

## SHPEXP

This module shapes an input signal in an exponential fashion. You can choose between four different transformation curve characteristics.



## CURVE

Choose between four different transformation curve characteristics. Curve x2 is a smooth exponential transformation and Curve x5 is a hard transformation.

#### AMOUNT

Sets the initial shape amount. See also "Common Shaper parameters".

## WAVEWRAPPER

This module amplifies a signal until it hits the headroom. Instead of clipping the signal, it folds down, "wraps

around". The waveform of the signal

will be heavily transformed, with a lot of new overtones, which gives it distortion- and/or FM-like characteristics.

WaveWra..1

#### WRAP

Sets the initial wrap amount. See also "Common Shaper parameters".

## SHPSTATIC

This module transforms a signal using one of four different amplification/attenuation characteristics. The curves on the buttons describes the transformation

functions, i.e the amplification/attenuation of each value of the input signal.



Output value

Input value

## SHAPE BUTTONS

Set the desired transformation characteristics with the selectors, Log2, Log1, Exp1 or Exp2.

- As mentioned, the Shaper affects each single value of an incoming signal, not the total level. To show this more clearly, take a look at the figures below. The X-axis in the diagram represents the incoming signal values, and the Y-axis the output values.
- If a sine wave is sent to the input of the Shaper, and the Log2 curve is selected, the resulting wave on the output would be more like a square wave.



## RECTIFIER

The Rectifier (diode processing) module can be set to discard of any positive or negative input levels, or if you want to transform these to only positive or only negative levels.

Rect1	
	● <u></u> ● <u>●</u>

#### SELECTOR

Sets the operation of the module. The first position discards of any negative input signal levels, the second position discards of any positive input signal levels, the third position transforms (mirrors) any negative signal levels to positive levels and the fourth position transforms (mirrors) any positive signal levels to negative levels. See also "Common Shaper parameters".

# FILTER GROUP

A filter is one of the primary tools for coloring the sound in a synthesizer. It can attenuate and amplify different frequencies in oscillator waveforms and other signals, and drastically change the timbre of the sound. Most of the Nord Modular G2 filters can be dynamically controlled from various modulation sources.

In Nord Modular G2 you have several different filter modules to choose from, ranging from traditional LP/HP/BP filters to complex special filters such as the Vocoder and the Vocal filter.

## COMMON FILTER PARAMETERS

#### PITCH MODULATION INPUT

There are one or more **Control** or **Dynamic Control/Audio** signal inputs for a modulation source to control the cutoff frequency of the filter. There can also be a pitch modulation attenuator next to the input of **Attenuator Type II**. If the attenuator knob has a triangle above it, click it to select 1:1 keyboard tracking of the cutoff frequency if the input is connected to the Note output of the Keyboard module (see page 112). See "Pitch modulation" on page 33 for more info.



KBT SCROLL BUTTON KBT, KeyBoard Tracking, is the hard-wired connection between the cutoff frequency and the

keyboard (and the MIDI input). Click to select Off, 25%, 50%, 75% or 100% ratio. If KBT is set to 100%, the cutoff frequency will track the keyboard at the rate of one semitone for each key. If KBT is set to Off, the keyboard will not affect the cutoff frequency at all.

## FREQ KNOB

11. Module reference: Filter group

With this you set the filter cutoff frequency (or center frequency for Bandpass and Bandreject filters). The frequency is shown in the corresponding Display Box. The range is 13.76 Hz to 21.1 kHz.

## **RESONANCE/RES KNOB**

This is a function that emphasizes the frequencies that is at, or close to, the set cutoff frequency. If set to 127, the filter starts to self-oscillate and produces a sine wave. The Resonance is shown in the corresponding Display Box. Range: 0 to 127 units.

## GC BUTTON

This is the Gain Compensation parameter. When activated, it will lower the gain of the signal inside the filter if the resonance is increased, something that otherwise will boost the level within

the filter. If several sound sources are processed in a filter and the resonance control is raised, clipping of the signal might occur inside the filter. Activating the GC parameter will reduce the levels, to reduce the risk of any unwanted clipping.

## DB/OCT RADIO BUTTONS

Here you select the filter roll-off (slope). The roll-off for a 1-pole filer is 6 dB/octave, 12 dB/octave for a 2-pole filter, 18 dB/octave for a 3-pole filer and 24 dB/octave for a 4-pole filter. Generally, the filter roll-off increases by 6 dB/octave for every pole a filter has.

## FILTER GRAPH

Some filter modules feature a graph to visually display the current filter characteristics. The X-axis represents the frequency and the Y-axis the level. The gray horizontal line represents the 0 dB level.

## FILTER DROP-DOWN SELECTOR

Some filter modules have a drop-down roll-off selector. The different slopes of these modules are not instantly available as in the modules with dB/Oct radio buttons. The advantage of this is that these modules uses less Patch Load. However, changing roll-off in these modules will force the Sound engine to recalculate and thus cause a brief moment of silence. So if you're looking for lower Patch Load, use these filter modules instead of the "radio button" ones.

## INPUT

The Audio signal input of the filter module

## **ON/BYPASS**

Click the On/Bypass button to bypass the input signal from the effect. Blue button color indicates 'On' and gray 'Bypass'.

## Оитрит

The output from the filter. Signal: Bipolar.

ιοτατ



Resonance

квт

Off

Frea












GC

# LP-FILTER

This is a non-resonant lowpass filter with selectable slope (6/12/18/24/30/36 dB/ Oct.) and a modulation input for cut-off frequency modulation. Note that chang-

▼FitLP1 KBT Off ● Q 4.43kHz Q ● ── ▼ ♥

ing slope will force the Sound Engine to recalculate and thus cause a brief moment of silence. See also "Common Filter parameters".

## HP-FILTER

This is a non-resonant highpass filter with selectable slope (6/12/18/24/30/36 dB/Oct.) and a modulation input for cut-off frequency modulation. **Note that** 



changing slope will force the Sound Engine to recalculate and thus cause a brief moment of silence. See also "Common Filter parameters".

# FLTNORD

This is a dynamic synthesizer filter with a slope of either 12 or 24 dB/octave. It is a multi-mode filter, providing a highpass, a lowpass, a bandpass or a bandreject filter. The cut-off frequency and the resonance can be modulated from external sources.



## FREQ MODULATION

The blue **Dynamic Control/Audio** signal input for modulating the filter frequency from a control source. The modulation amount is determined by the rotary knob next to the input of **Attenuator Type III**. See "Frequency modulation (FM)" on page 34 for more info about frequency modulation.

#### FILTER TYPE SELECTOR

Select the filter type with the buttons. (This selector cannot be assigned to a Morph group). HP is a Highpass filter, BP is a Bandpass filter and LP is a Lowpass filter. BR is a Band reject filter. When the BR filter is selected, the Resonance knob will control the width of the frequency band to be rejected.

#### RESONANCE MODULATION

The blue Control signal input for modulating the resonance from a control source. The modulation amount is determined by the rotary knob next to the input of **Attenuator Type I**. See also "Common Filter parameters".

## FLTCLASSIC

This is a lowpass filter which simulates classic analog synthesizer filters. The main difference between this filter and other lowpass filters is the more narrow resonance peak found in analog lowpass filters. The slope is selectable between 12,



18 or 24 dB/octave. The cut-off frequency can be modulated from external sources. See also "Common Filter parameters".

# FLTMULTI

This is a multimode filter with a selectable slope of 6 or 12 dB/octave and resonance control. It is a multi-mode filter with three outputs: one highpass (HP), one lowpass (LP) and one bandpass (BP). All three outputs can be used simultane-



ously. The cut-off frequency and the resonance can be modulated from external sources. See also "Common Filter parameters".

# FLTSTATIC

This is a static filter with selectable modes (LP/BP/HP), frequency and resonance controls. The slope is fixed at 12 dB/octave. See also "Common Filter parameters".



# WAHWAH

Wah-Wah modulation is often used for electric guitars to get that characteristic "talking guitar" sound. Basically, the Wah-Wah modulation is a lowpass type



of filter that can be swept across the frequency range. During the sweep, the filter's characteristics also changes. The Sweep can also be modulated from an external source on the Control signal input. The control signal can be attenuated with the knob [Attenuator Type I]. See also "Common Filter parameters".

💎 WahWah1

# FLTVOICE

The Voice Filter module is designed to simulate the vocal tract. You can select between a number of preset vowels and change and modulate them to generate really amazing effects. Waveforms with a lot of overtones, such as sawtooth or



pulse waves, are best suited to be used with the Voice Filter.

## RES

This function emphasizes the frequency peaks of the vowels. The more resonance, the more clearly the vowels appear. Click on the green triangle above the rotary knob to reset to a medium value.

## FREQ

Sets the initial center frequency offsets of the vowels. The practical result of turning this knob would be like pitch-shifting a sampled voice. Click on the green triangle above the rotary knob to reset to a medium value.

#### FREQUENCY MODULATION INPUT [ATTENUATOR TYPE II]

The input for modulating the center frequency offset from a control source. The modulation amount is determined by the rotary knob next to the inputs.

#### VOWEL DISPLAY BOXES

Displays the three different selected vowels. Presets: A, E, I, O, U, Y, AA, AE, OE.

#### VOWEL NAVIGATOR BUTTONS

Selects the vowels to be used. You can select up to three vowels and navigate between these with the navigator knob (see below). Presets: A, E, I, O, U, Y, AA, AE, OE.

#### VOWEL MODULATION INPUT [ATTENUATOR TYPE I]

The input for modulating the navigation between the selected vowels. The knob next to the input is used for attenuating the input level.

#### VOWEL NAVIGATOR KNOB

Navigates between the vowels you selected with the vowel selectors. Note that this is a transformation function - not a mix function.

#### GAIN

The Gain knob is used for attenuating the input level [Attenuator Type I]. See also "Common Filter parameters".

## VOCODER

The Vocoder module is a 16 band vocoder with the ability to reroute the analysis bands. The basic principle of a vocoder is to filter a synthesizer sound with the help of another sound - a human voice for example. The result when filtering a synth sound with a voice would be a "singing" synthesizer. The actual notes that come out of the vocoder are the notes played on the synthesizer. To reach this effect



the analysis frequency spectrum is divided into separate frequency bands, in this case 16. These 16 frequency bands work like 16 bandpass filters, each controlling a defined frequency band of the synthesizer bank. An envelope follower for each band determines the amplitude changes of the modulated sound. With this vocoder module it is possible to reroute the analysis bands to any of the frequency bands of the synthesis bank, creating really interesting frequency combinations.

Of course you can use any kind of sound in the analysis bank to shape the synthesizer sound. Some like to use drum sounds to get percussive synth sounds, for example. Feel free to experiment.

#### ANALYSIS BANK CTRL INPUT

Patch the signal you want to use as "modulator" to the red audio signal input on the upper left of the module. In the "standard vocoder application" here is where you patch the vocal signal.

#### Mon

Click on this button to bypass the modulator (Ctrl) signal to the output.

## EMP ON/OFF

Click on the Emp On/Off button to emphasize the high frequencies of the analysis signal. This is a very useful function to get a more even frequency response in the modulated sound.

#### GRAPH

This graph shows the routing between the Analysis and Synthesis bands.

#### REROUTE BUTTONS

Click on the up and down buttons to reroute each of the synthesizer signal's frequency bands to any of the frequency bands of the Analysis bank.

#### PRESETS

Click on the Preset buttons to reroute all Synthesis bands the number of steps indicated on the buttons. The Inv button inverts the band routing, i.e routes the Analysis band 1 to Synthesis band 16 and so on. The Rnd button reroutes all bands completely randomly - great for experiments!

#### SYNTHESIZER INPUT

The red audio signal input to the lower right is where you patch the synthesizer audio signal.

# EQ 1

The Eq1 module offers parametric equalization with controls for center frequency, gain and bandwidth.



#### FREQ

With the Freq knob you change the center frequency. Range: 20 Hz to 16.1 kHz.

#### GAIN

With the Gain knob you change the gain at the center frequency. Range -18 to +18 dB.

## вw

Use the BW knob to set the bandwidth around the center frequency. Range 2 to 0.02 octaves.

## LEVEL

With the Level knob you attenuate the input signal [Attenuator Type I]. See also "Common Filter parameters".

## EQ2BAND

The 2 band EQ is a treble and bass equalizer with gain controls for 80Hz and 12kHz plus a master level control.



## LVL

With the Lvl knob you attenuate the input signal [Attenuator Type I].

#### LO GAIN

With the Lo gain knob you change the gain at 80Hz. Range -18 to +18 dB.

#### HI GAIN

With the Hi gain knob you change the gain at 12kHz. Range -18 to +18 dB. See also "Common Filter parameters".

## EQ3BAND

The 3 band EQ is a treble and bass equalizer with sweepable Mid frequency plus gain controls for the Mid band and for the fixed 80Hz and 12kHz frequency bands. It has also a master level control.



#### LO GAIN

With the Lo gain knob you change the gain at 80Hz. Range -18 to +18 dB.

#### MID GAIN

With the Mid Gain knob you change the gain at the Mid frequency (see below). Range -18 to +18 dB.

#### MID FREQ

With the Mid Freq control you change the center frequency of the Mid band. Range: 100Hz to 8.00 kHz.

#### HI GAIN

With the Hi gain knob you change the gain at 12kHz. Range -18 to +18 dB.

#### LVL

With the Lvl knob you attenuate the input signal [Attenuator Type I]. See also "Common Filter parameters".

## FLTPHASE

This is a 14 pole phase filter with peak spread control and adjustable feedback. It features six allpass filters which displace the phase 180 degrees each. It is possible to select the number of allpass filters (1-6) to be used, giving from one to six notches/peaks.



#### SPREAD

With the Spread rotary knob you set the distance between the peaks. The peak distance can be modulated from an external source using the blue control signal input and the level attenuator [Attenuator Type I].

#### FB

With the Feedback knob you set the phaser feedback, i.e the signal feedback to the allpass filters. You can have a negative or positive feedback. At the 12 o'clock position feedback is zero. Click on the green triangle above the knob to set the feedback to 0. The feedback can be modulated from an external source using the blue control signal input and the level attenuator [Attenuator Type I].

## Notch

By clicking on the up and down arrow buttons you select the number of notches (allpass filters). 1 to 6 notches can be selected.

## Түре

Click to select Notch, Peak or Deep. In Notch mode, the signal notches are attenuated. In Peak mode, the signal peaks are amplified and in Deep mode, the signal notches and peaks are attenuated and amplified. The different frequency characteristics are displayed in the graph (see below).

## LEVEL KNOB

To the right of the module is the input level attenuator [Attenuator Type I].

# FLTCOMB

This is a Comb filter with adjustable feedback.

## FREQ

With the Freq knob you set the distance, in Hz, between the peaks/notches.

## FB

With the Feedback knob you set the signal feedback to the comb filter. You can have a negative or positive feedback. At the 12 o'clock position feedback is zero. Click on the green triangle above the knob to set the feedback to 0. The feedback can be modulated from an external source using the blue control signal input and the level attenuator [Attenuator Type I].

## TYPE

Click to select Notch, Peak or Deep. In Notch mode, the signal notches are attenuated. In Peak mode, the signal peaks are amplified and in Deep mode, the signal notches and peaks are attenuated and amplified. The different frequency characteristics are displayed in the graph (see below).

## LEVEL KNOB

To the right of the module is the input level attenuator [Attenuator Type I].



# MIXER GROUP

The mixer modules in Nord Modular G2 can mix audio signals as well as control signals. If you connect several sound sources to a mixer with high or amplified levels, the signal may distort. If this happens, attenuate the input signals.

# COMMON MIXER PARAMETERS

## INPUTS

All Mixer module inputs are Dynamic Control/Audio signal inputs. This means they adapt the module bandwidth to the bandwidth of the incoming signal(s). As soon as you patch an audio signal to one input, the entire Mixer module will automatically "update" to Audio bandwidth for highest possible quality. This also results in the module using more Patch Load.

# OUTPUT(s)

Dynamic Control/Audio depending on the input signals. Signal: Bipolar.

## OUTPUT LEVEL METER(S)

The level meter(s) on some modules displays the following signal levels: green LEDs between -40dB and 0dB, yellow LEDs between >0dB and +11dB and red LED at >11dB.

## CHAIN INPUT(S)

Dynamic Control/Audio signal inputs for patching in extra audio signals. These signals will be mixed with the rest of the input signals and sent directly to the output. Signals on the Chain inputs cannot be attenuated or muted in the Mixer module. You could use the Chain inputs to patch in output signals from another Mixer module, for example.

## EXP/LIN/LOG

Click this scroll button to switch between Exponential, Linear and dB characteristics, Linear [Attenuator Type I] and Exponential/dB [Attenuator Type II] characteristics of the Attenuator knobs/sliders of the mixer (see below)

## PAD

Click the Pad scroll button to attenuate the levels on all mixer inputs by -6 dB (or -12dB). This is useful to prevent clipping when you use a lot of the mixer inputs.

## ATTENUATOR KNOBS

By default, all Attenuator knobs have logarithmic characteristics [Attenuator Type II] with the range -infinity to 0 dB. In some mixer modules you can change the characteristics to linear [Attenuator Type I] by clicking the Lin button described above.

## CHANNEL ON/OFF BUTTONS

Some mixers feature On/Off buttons to enable/disable the inputs. A blue button means that the channel is enabled. These On/Off buttons can also be labelled for better overview. Right-

click on an On/Off button and select 'Edit name'. Type in the new name and press Enter. Note that the name cannot be longer than 7 characters because of the size of the ASSIGNABLE DISPLAYS on the synth. The Channel On/Off buttons cannot be assigned to a Morph Group.

$$\stackrel{1}{\bullet} \stackrel{2}{\bullet} \stackrel{3}{\bullet} \stackrel{4}{\bullet}$$



Exp



Pad DdB







# MIX1-1A

This mixer has one Dynamic Control/ Audio signal input, a chain input and one output. The mixer has an On/Off button for enabling/disabling the input.

Mix1-1A1 Ch 1 Chain Exp

The On/Off button can be labelled. See also "Common Mixer parameters".

# MIX1-15

This mixer has stereo Dynamic Control/ Audio signal inputs, stereo chain inputs and stereo outputs. The mixer has an On/Off button for enabling/disabling



the inputs. The On/Off button can be labelled. See also "Common Mixer parameters".

# MIX2-1A

This mixer has two Dynamic Control/ Audio signal inputs and one output. Each input is equipped with a separate attenuation control. The mixer has an

Mix2-1A1 Ch 2 Ch 1 Chain Exp.

78.1

On/Off button per channel for enabling/disabling the inputs. The On/Off buttons can be labelled. See also "Common Mixer parameters".

Mix2-1B1

Ochain Exp.

# MIXER2-1B

This mixer has two Dynamic Control/ Audio signal inputs and one output. Each input is equipped with a separate attenuation control. Each channel also

has a separate control for inverting the input signal.

## INV

Click the Inv button(s) to invert the input signal(s) polarity, i.e. phase shift them 180 degrees. See also "Common Mixer parameters".

Mix4-1A1

🗃 Mix4-1B1

Chain Exp

# MIX4-1A

This mixer has four Dynamic Control/ Audio signal inputs and one output. See also "Common Mixer parameters".

# MIX4-1B

This mixer has four Dynamic Control/ Audio signal inputs, one Chain input and one output. Each input is equipped



•)

•





**78.1** 

## MIX4-1C

This mixer has four **Dynamic Control**/ **Audio** signal inputs, one Chain input and one output. Each input is equipped with a separate attenuation control. The mixer has an On/Off button for each channel for enabling/disabling the input.



Each On/Off button can be labelled. The mixer also has a -6 dB button for attenuating all inputs by another -6 dB. See also "Common Mixer parameters".

# MIX4-1 S

This stereo mixer has four **Dynamic Control/Audio** signal input pairs, two Chain inputs and a stereo output. Each input pair is equipped with a separate attenuation control. The mixer has an On/ Off button for each channel for enabling/



disabling the input pair. Each On/Off button can be labelled. See also "Common Mixer parameters".

# MIX8-1A

This mixer has eight **Dynamic Control**/ **Audio** signal inputs and one output.



#### PAD SCROLL BUTTON

Click to select 0, -6 or -12 dB attenuation on all input channels. See also "Common Mixer parameters".

## MIX8-18

This mixer has eight Dynamic Control/ Audio signal inputs, one Chain input and one output. Each input is equipped with a separate attenuation control. The mixer also has a -6 dB button for attenuating all inputs by another -6 dB. See also "Common Mixer parameters".



## MIXFADER

This mixer has eight Dynamic Control/ Audio signal inputs, one Chain input and one output. Each input is equipped with a separate attenuation slider. The mixer has an On/Off button for each channel for enabling/disabling the input. Each On/Off button can be labelled. The mixer also has a -6 dB button for attenuating all inputs by another -6 dB. See also "Common Mixer parameters".



## MIXSTERED

This mixer has six Dynamic Control/ Audio signal inputs and a stereo output. Each input is equipped with a separate attenuation control of [Attenuator Type II] and a Pan knob. The mixer also has a Master Level knob for the output signal. See also "Common Mixer parameters".

## PAN

This module takes an input signal and outputs it in a stereo panorama.



#### Log/Lin

Switch between Linear and Logarithmic characteristics for the L/R knob. 'Lin' is suitable for control signals and 'Log' for audio signals.

Log

#### PAN MODULATION INPUT

The Dynamic Control/Audio modulation input of the Pan module. Connect a modulator to modulate the position of the signal in the two outputs. The amount of modulation is controlled with the knob [Attenuator Type I].

#### L/R KNOB

Sets the initial pan position. Click on the triangle to reset the initial position to an equal amount of the incoming signal at both the outputs.

#### LINEAR

Click to select linear Pan characteristics instead of logarithmic. See also "Common Mixer parameters".

## X-FADE

This mixer can be modulated by a control signal to produce a crossfade between two incoming signals.



#### Log/Lin

Switch between Linear and Logarithmic characteristics for the 1/2 knob. 'Lin' is suitable for control signals and 'Log' for audio signals.

#### X-FADE MODULATION INPUT

The **Dynamic Control/Audio** modulation input of the X-fade module. Connect a modulator here. The amount of modulation is controlled with the knob [Attenuator Type I].

#### 1/2 кнов

Sets the initial mix of the two signals. Clicking on the triangle will set the mix to an equal amount of both signals.

#### LINEAR

Click to select linear crossfade characteristics instead of logarithmic. See also "Common Mixer parameters".

LUR

# FADE 1-2

This is a fader with one input and two outputs, and a fader rotary knob to fade the input signal between the two outputs.

# ▼Fade1-21

## FADE MODULATION INPUT

The **Dynamic Control/Audio** modulation input of the X-fade module. Connect a modulator here. The amount of modulation is controlled with the knob [Attenuator Type I].

## L/R KNOB

With the L/R knob you fade the input signal between the two outputs. In the 12 o'clock position both outputs are silent. See also "Common Mixer parameters".

# FADE2-1

This is a fader with two inputs and one output, and a fader rotary knob to fade between the two input signals.



## FADE MODULATION INPUT

The **Dynamic Control/Audio** modulation input of the X-fade module. Connect a modulator here. The amount of modulation is controlled with the knob [Attenuator Type I].

## 1/2 KNOB

With the 1/2 knob you fade the between the two input signals. In the 12 o'clock position the output is silent. See also "Common Mixer parameters".

# SWITCH GROUP

In the Switch group you will find different types of switches for signal routing tasks and Control/Audio signal multiplexers etc.

## COMMON SWITCH PARAMETERS

## CTRL OUTPUT WITH DISPLAY BOX AND CTRL INPUT

The Ctlr/Control Output combined with a Display Box is a special feature of the Switch modules. It's especially designed to work with the Ctrl Inputs of the Multiplexer modules. As soon as you activate a Switch module by clicking on a button, for example, the Ctrl Output sends out a control signal offset depending on which button you select. The offset value is also shown in the Display Box. This control signal offset can then be

0 Ctrl

patched and used to activate the corresponding "channel" in a Multiplexer module. Let's have a look at the following example:

Let's say we want to be able to activate the channel in the 1-8Mux module that corresponds to the button we select in the 8-1Switch module.

1. Connect the Ctrl output of the 8-1Switch to the Ctrl input of the 1-8Mux.

🔽 8-1Switch1	1	In 1	In 2	In 3	In 4
	5	ln 5	In 6	In 7	In 8
Control	1	9 2	9 3	• 4	•
<b>q</b> 4		5 🗩	6 🗩	7 🗩	8 🗩 🖻
🔽 1-8Mux1		19 3	20 30 4	<b>50</b> 60	70 80
(Decarl					

- 2. Now, click on the In 2 button of the 8-1Switch and note that the second LED of the 1-8Mux is lit.
- 3. Click on the In 8 button of the 8-1Switch and note that the last LED of the 1-8Mux is lit instead.

The special thing about this Ctrl signal is that it's defined by the different "states" of the Switch module, i.e. which Channel Select button is currently depressed. The Switch module sends out the Ctrl signal value 0 for the initial state (no button or button 1 depending on type of Switch module), value 4 for the next state, value 8 for the next and so on. The maximum Ctrl signal value a Switch module can send is 28 when button number 8 is selected on an 8-1Switch or 1-8Switch module. The Ctrl input on the 8-1Mux and 1-8Mux modules responds according to these Ctrl signal ranges: 0<4 =channel 1 active, 4 < 8 = channel 2 active, 8 < 12 = channel 3 active and so on up to 28 and above, which will activate channel 8. The reason for this pre-defined Ctrl value ranges is that a Switch module button should always correspond to the same channel number on a Mux module, regardless of number of buttons/channels on the module.

#### INPUTS

All Mixer module inputs are Dynamic Control/Audio signal inputs. This means they adapt the module bandwidth to the bandwidth of the incoming signal(s). As soon as you patch an audio signal to one input, the entire Mixer module will au-

tomatically "update" to Audio bandwidth for highest possible quality. This also results in the module using more Patch Load.

#### OUTPUT(S)

Dynamic Control/Audio depending on the input signals. Signal: Bipolar

## CHANNEL SELECT RADIO BUTTONS

Most Switch modules feature radio buttons to select channel. A blue Channel Select button means that the channel is enabled and all other channels are disabled. These Channel Select buttons can also be labelled for better overview. Right-click

on a Channel Select button and select 'Edit name'. Type in the new name and press Enter. Note that the name cannot be longer than 7 characters because of the size of the ASSIGNABLE DISPLAYS on the synth. The Channel Select radio buttons cannot be assigned to a Morph Group.

## SWONDFFM

The Momentary OnOff Switch is perfect for manual triggering of different things in the Patch - especially when you

assign the On button to an ASSIGNABLE BUTTON on the synth panel. When you click the On button, the switch "closes" for just a brief moment and then automatically "opens" again. If no signal is patched to the input, the output will send the value 64 units when the switch closes. See also "Common Switch parameters".

Sw0n0ff..1

0 Ctrl

## SWONDFFT

The Toggling OnOff Switch is perfect for manual activating different things in the Patch - especially when you assign



the On button to an ASSIGNABLE BUTTON on the synth panel. When you click the On button, the switch "closes" and when you click again the switch "opens". If no signal is patched to the input, the output will send the value 64 units when the switch closes. See also "Common Switch parameters".

Sw0n0ffT1



On

In 6

🗩 On

# Sw2-1M

The 2-1SwitchMom module has two inputs, one output and one momentary Switch button which can also be labelled. See also "Common Switch parameters".

# Sw2-1

The 2-1Switch has two inputs, one output and two Channel Select radio buttons which can also be labelled. See also "Common Switch parameters".

# Sw4-1

The 4-1Switch has four inputs with an attenuator each, one output and four Channel Select radio buttons which can also be labelled. See also "Common Switch parameters".

## Sw8-1

The 8-1Switch has eight inputs with an attenuator each, one output and eight Channel Select radio buttons which can also be labelled. See also "Common Switch parameters"

## Sw1-2M

The 1-2SwitchMom module has one input, two outputs and one momentary Switch button which can also be la-

belled. See also "Common Switch parameters".

# Sw1-2

The 1-2Switch has one input, two outputs and two Channel Select radio buttons which can also be labelled. See also "Common Switch parameters"

## Sw1-4

The 1-4Switch has one input with an attenuator, four outputs and four Channel Select radio buttons which can also be labelled. See also "Common Switch parameters"

🗑 Sw4-11	1 🗩	2 🗩	3 🗩	4 🗩	
	In 1	ln 2	In 3	In 4	1

In 2

In 1

Switch

Sw2-1M1

0 Ctrl

Sw2-11

🗾 0 Ctrl

• 0

🗑 Sw8-11	1 🕘	2 🗩	3 🗩	4 🕘	
	5.	) 6 💌	7.	8 🤊	2
Con <u>trol</u>	1 In 1	In 2	In 3	In 4	
• 0	5 In 5	In 6	In 7	In 8	





Sw1-41	Out 1	Out 2	Out 3	Out 4
Control In	) 1	2 💽	3 💽	4 💽

Out 3

Out 7

Out 4

Out 8

# Sw1-8

The 1-8Switch has one input, eight outputs and eight Channel Select radio buttons which can also be labelled. See also "Common Switch parameters"

# VALSW2-1

The 2-1 Value Switch switches between two inputs at a definable Control signal input value.



Out 2

Out 6

Out 1

Out 5

5

#### CTRL VALUE ARROW BUTTONS

Set the lower limit where the switch should change to the On input channel. Range: 0-64 units in steps of 1 unit. See also "Common Switch parameters".

Sw1-81

## VALSW1-2

The 1-2 Value Switch directs an incoming control/audio signal between two outputs at a definable Control signal input value.

🔽 ValSw1-21	Ctrl Value	On		On
Otrl		-0	۲	

#### CTRL VALUE ARROW BUTTONS

Set the lower limit where the switch should redirect the input signal to the On output. Range: 0-64 units in steps of 1 unit. See also "Common Switch parameters".

## WINDSW

The Window Switch "closes" when an incoming Control signal value is within the range set with the From and To pa-

可 WindSw1		1
Otrl	20.0 💟 40.0 💭 🕘 🔊 🛀	

rameters. When the switch closes, a high logic gate signal is also output from the yellow logic output.

#### FROM KNOB

Set the lower limit where the switch should close. Range: 0.0-64.0 units in steps of 0.5 units. Note: if the From value is higher than the To value, the switch never closes.

#### То кнов

Set the upper limit where the switch should open. Range: 0.0-64.0 units in steps of 0.5 units. Note: if the From value is higher than the To value, the switch never closes.

#### GATE OUTPUT

The yellow logic output sends out a high logic gate signal when the switch is closed. See also "Common Switch parameters".

# Mux8-1

The 8-1 Multiplexer has eight inputs and one output. The channels are enabled by sending a control signal on the Ctrl input. See also "Common Switch parameters".

## Mux1-8

The 1-8Multiplexer has one input and eight outputs. The channels are enabled by sending a control signal on the Ctrl input. See also "Common Switch parameters"

Ctrl	۲	10	20	3 <b>0</b>	40	50 •	6 <b>0</b>	70	80

## Mux8-1X

The 8-1 X-Fade Multiplexer has eight inputs and one output. The channels are enabled by sending a control signal on the Ctrl input. You can also define the amount of crossfade between adjacent

💟 Mi	ux8-	1X1							X-Fade	
Ctrl	10	20	30	40	50	60	70	80	0	
-	-	-	~	-	-	-	-	-	$\sim$	

Sample and Hold

channels with the X-Fade knob. The crossfade function is displayed in the graph. See also "Common Switch parameters".

S&H1

Mux8-11

DCtrl

# SAMPLE&HOLD

This module takes samples of the values of an incoming signal. The sampling of the input signal occurs every time a sig-

nal shifting from 0 units or below to anything above 0 units appears at the leftmost input. Inbetween these "trig" signals, the module transmits the value of the latest sample to the output. See also "Common Switch parameters".

To create the traditional Sample & Hold or random LFO synthesizer effect, connect the output of a white noise generator module to the input of the Sample & Hold module and trig the Sample & Hold module with an LFO. Connect the output of the Sample & Hold module to a Pitch modulation input of an oscillator according to the figure below:



## TRACK&HOLD

This module is similar to the Sample&Hold module described above, but with one difference. Instead of just tak-



ing a single sample at a time, the Track&Hold module acts like a combination of a switch and a Sam-

ple&Hold module. As soon as a signal at the leftmost input is shifting from 0 units or below to anything above 0 units, the switch closes and the input signal is routed to the output. When the signal at the leftmost input switches to 0 units or below, the module transmits the value of the latest input sample to the output. See also "Common Switch parameters".

# DXROUTER

The DXRouter module is intended for use with the Operator modules described on page 134. It works exactly like the Algorithm selector on the DX7 synthesizer, i.e. it routes the Operator output signals either to Operator FM inputs or to the audio mix output and allows for different types of FM synthesis.



## FEEDBACK

Select the internal feedback amount for the connected Operator. An internal feedback loop is indicated with orange lines in the DXRouter graph. Range 0-7.

## ALGORITHM

Select one of 32 different algorithms (connection paths) for the connected Operator modules. These 32 algorithms corresponds to the factory algorithms of the DX7 synthesizer. The algorithms are shown in the graph.

## EXAMPLE

Below is an example of the DXRouter module used together with six Operator modules to form a basic DX7 configuration. Connect each Operator output to the corresponding input of the DXRouter module. Connect each output of the DXRouter module to the corresponding FM input of each Operator.



In the example above, algorithm 5 is used. If you look in the graph you can see that the output signals of Operators 1, 3 and 5 are mixed to the DXRouter output. You can also see that Operator 2 is frequency modulating Operator 1, Operator 4 is frequency modulating Operator 3 and Operator 6 is frequency modulating Operator 5. Operator 6 also has an internal feedback loop as indicated by the orange line. The internal feedback amount of Operator 6 in this algorithm can be set with the Feedback selector on the DXRouter module.

# LEVEL GROUP

The Level group features modules for adding, subtracting, multiplying and modulating signal levels i the Patch.

## COMMON LEVEL MODULE PARAMETERS

#### INPUT(S)

The Dynamic Control/Audio signal input(s) of the Level modules.

#### Оитрит

The **Dynamic Control/Audio** signal (depending on input signal type) output of the Level modules. Signal: Bipolar

## **BIP/UNI BUTTON**

Click the Uni(polar) button to change the output signal from bipolar to unipolar. When you switch to unipolar, the Level knob (see below) resolution is doubled.

#### LEVEL KNOB

Set the modulation signal level. In unipolar mode (see above), the Level knob resolution is doubled

## CONSTANT

The Constant Value module produces a constant control signal at a selectable offset level. See also "Common Level module parameters".



## CONSTSWM

The Momentary Constant Switch module produces a control signal at a selectable offset level when you click the Switch button. Note that the Switch button is

ta-BiP \$Switch () 0

momentary, i.e. clicking it will activate the output signal only for a short while. The Switch button can also be renamed. See also "Common Level module parameters".

💎 Constant1

BiP

## CONSTSWT

The Toggling Constant Switch module produces a control signal at a selectable



BiP

n

offset level when you click the Switch button. The Switch button can also be renamed. See also "Common Level module parameters".

# LevAdd

The LevAdd module can be used to add or subtract an offset (bias) to a signal. See also "Common Level module parameters".



## LEVCONV

The Level Converter module can be used to change polarity of an incoming signal and then output it at selectable polarity and/or phase-shifted 180 degrees.

TevConv1	In signal type			
	BiPol	Pos	Neg	

## BIPOL, POS AND NEG RADIO BUTTONS

Use these radio buttons to "instruct" the module which type of input signal to expect. This is important because otherwise the conversion won't be what you'd expect. (Of course, you won't harm the system by selecting the "wrong" signal type).

#### OUTPUT TYPE SCROLL BUTTON

Select the type of conversion by clicking the scroll button. The figure below shows the output signal types:



## LEVAMP

This module can amplify or attenuate a signal.

LevAmp1	() x1.00	●⊳⊳∎
---------	----------	------

## AMPLIFICATION KNOB

Select the desired amplification/attenuation with the knob. Any value above 1.0 amplifies the signal, any value below attenuates it. Range: 0.25 to 4.0 times the input level. See also "Common Level module parameters".

## LEVMULT

The Level Multiplier module performs the same functions as a traditional VCA, a voltage controlled amplifier, in a analog system would do. It multiplies two



incoming signals (input 1 x input 2 = output). It can also function as a ring modulator (see example below). See also the LevMod module later in this chapter

#### INPUTS

Patch two separate signals to each of the inputs. A signal with a level of 0 units at any of the inputs will close the gain control function, a signal with a level of +64 units at any of the inputs will open the gain control function completely. A signal with a level of -64 units at any of the inputs will invert the polarity of the output signal. See also "Common Level module parameters".

#### RING MODULATOR PATCH EXAMPLE

You can easily create a ring modulator by using two oscillators and the GainCont module described above. Connect the modules according to the figure. OscA is the modulator and OscB the carrier in this example. See also the RingMod module below.

♥ OscA1 ● Pitch 786.83Hz ● ♥ KBT	<u>NANGLE</u> MØ
🗑 OscB1	
●†Sync 329.63Hz KBT	Shape
Pitch Freq Cent FM Lin	50%
	●∅ ⋈ጆ
🗑 GainCont1	
El2Output1 out Ex	Pue I P
Pad +6dB 1/2 3/4 1/2 3/4 1	1/2 3/4 M

## LEVMOD

The Level Modulator can be used to control an audio signal amplitude from an LFO or Envelope, for example. It can also generate new overtones in a sound if you run two separate audio signals to the



respective inputs. The module has a function which lets you transform the signal gradually from unmodified, via amplitude- to balanced modulation.

## MOD DEPTH INPUT AND KNOB

You can modulate the AM/Bal depth with a modulation source connect to this input. The amount of modulation can be attenuated with the knob [Attenuator Type I].

#### D/AM/BAL.

Set the modulation amount with this rotary knob. In the 12 o'clock position you get maximum amplitude modulation, and past this position, ring modulation occurs.

#### Mod

Patch the unipolar or bipolar modulator (LFO, Envelop or Oscillator) to this input.

#### IN

Patch the bipolar carrier (Oscillator or other sound generator) to this input

## RING MODULATOR EXAMPLE

To illustrate what ring (balanced) and amplitude modulation can do to a sound, we have created an example with three sine waves, one carrier and two different modulators (Ring (Balanced) and Amplitude (Unipolar)). The graphs to the left show the amplitude as a function of time, and to the right the amplitude as a function of the frequency.

Amplitude Modulation:



 $Fin 2 A multiple Multiple Multiple for the formula <math>f_C$  frequency

Fig 3. Amplitude Modulation

## Balanced (Ring) Modulation:





As you can see in the figures above, the main practical difference between amplitude- and ring modulation is the sideband amplitudes and the appearance of the carrier wave in the frequency spectrum. Another difference is that the resulting ring modulation wave phase-shifts 180 degrees every half modulator period. If more complex waveforms are used for amplitude- or ring modulation, sidebands will be generated for each partial of the wave. See also "Common Level module parameters".

## ENV-FOLLOW

This module will extract an envelope from a signal, i.e follow the amplitude envelope of an incoming signal. When a signal at the input of this module in-



creases in amplitude, this module "follows" the amplitude with the time set as Attack time. When a signal decreases, it "follows" the amplitude with the time set as Release time. The input of this module is a **Dynamic Control/Audio** signal input and the output signal is a **Positive Unipolar** control signal. See also "Common Level module parameters".

# NOISEGATE

The Noise Gate can be used to "filter out" low signal levels, background noise in an external audio signal, for example. When an input signal rises above the set Threshold value, the gate opens with the



time set with the Atk knob. When the input signal decreases below the set Threshold value, the gate closes with the set Rel time. The LED above the output indicates when the input signal is being throughput. The module also has a built-in envelope follower with a separate output for the envelope control signal.

## 

Outputs a unipolar envelope signal based on the input signal. Signal: Positive Unipolar. See also "Common Level module parameters".

# COMPLEV

This module produces a high logic signal by comparing a **Dynamic Control**/ **Audio** signal level to a level limit set by you. If the value of a signal appearing at



the input equals, or is greater than the value set in the window, the module produces a high logic signal. The logic signal will switch back to zero when the incoming signal drops to a level below the set value.

## LEVEL LIMIT KNOB

Set the level limit for the comparison with the knob. Range: -64 to +64 units. The value is shown in the Display Box. See also "Common Level module parameters".

## COMPSIG

This module produces a high logic signal by comparing two **Dynamic Control/Audio** input signals. If the value of a signal appearing at the A input equals,



or is greater than the value of a signal appearing at the B input, the module outputs a high logic signal. The logic signal will remain high for as long as the incoming signals meet the condition. See also "Common Level module parameters".

## MINMAX

The MinMax module compares two input signals and outputs the highest levels on the Max output and the lowest levels on the Min output. See also "Common Level module parameters".



## EXAMPLES

The figures to the right shows how two input signals A and B generate the Max and Min output signals in two different situations:

Example 1: Two bipolar input signals processed to one Max and one Min bipolar output signal.

Example 2: One bipolar and one negative "DC" offset input signal processed to one Max and one Min bipolar output signal.





## Морамт

The Modulation amount control module can be used to change the characteristics of a control signal before routed to a control signal input of a module. This



is very useful for adjusting Velocity sensitivity of Filter frequency envelope control, for example (see Application Example below).

## м/1-м

Click the m/1-m button to output the signal patched to the input at full level when the Mod depth knob is at its minimum value. If the 1-m function is inactive, the signal patched to the input won't be output at all at minimum Mod depth value (see example below).

## MOD INPUT

Patch the control signal you want to multiply with the input signal here (see example below). See also "Common Level module parameters".

## EXAMPLE

Let's say we want to modulate the amplitude of an LFO signal with an Envelope control signal and be able to control the total output level of the resulting signal with the Mod depth knob.



#### APPLICATION EXAMPLE

This example shows how you can use the ModAmt module for tailor-making velocity sensitive filter envelope control. Make sure you enable the '1-m' function on the ModAmt module. Control the velocity sensitivity with the Mod depth knob. If you set the Mod depth to 12 o'clock, hitting the keys hard will open the Filter Envelope completely. Hitting the keys very light will still force the Filter Envelope to open "half-ways". If you set the Mod depth to max, hitting the keys hard will open the Filter Envelope completely, just like described above. Hitting the keys very light won't make the Filter Envelope open at all. If you assign the Mod depth knob to an ASSIGNABLE



KNOB on the synth panel, you can now adjust the velocity sensitivity a lot more easily than using the Velocity Morph function.
# LOGIC GROUP

These modules can modulate and generate logic signals in a number of different ways. A logic signal can have two states: high, which corresponds to a value of +64 units and low, which corresponds to 0 units. Read more about logic signals in "Logic signals, yellow and orange connectors" on page 29.

# COMMON LOGIC MODULE PARAMETERS

# LOGIC SIGNAL INPUT(S)

The Dynamic Control/Audio signal input(s). If you input an audio signal, the color of the input(s) and logic signal output(s) change color to orange to indicate that the module has adapted itself for audio rate bandwidth. Any input signal changing from 0 units or below to anything above 0 units will be interpreted as a

'high logic' signal on the input(s). Any input signal changing from anything above 0 units to 0 units or below will be interpreted as a 'low logic' signal on the input(s).

# LOGIC SIGNAL OUTPUT(S)

The Dynamic Control/Audio signal (depending on input signal bandwidth) output(s). Can output either a low logic signal (0 units) or a high logic signal (+64 units).

# CLOCK SIGNAL INPUT(S)

The Dynamic Control/Audio clock signal input(s). A clock signal input with a single arrow next to it will only react when an input signal changes from 0 units or below to anything above 0 units. A clock signal input with a double-arrow next to it will react when the input signal crosses the 0 level in both directions (positive to negative and negative to positive).

# RST INPUT

The Dynamic Control/Audio Reset signal input is used to reset a module to its initial value. The Reset signal input will only react when an input signal changes from 0 units or below to anything above 0 units.

# FUNCTION DROP-DOWN SELECTORS

Click the Function drop-down selector to alter the processing function of the module. Note that changing function with drop-down selectors will force the Sound engine to recalculate and thus cause a brief moment of silence.

# GATE

This module features two independent logic gates. Each gate has two inputs and one output and you select gate type from the drop-down selectors. The gate types

are: AND, NAND, OR, NOR, XOR and XNOR. The respective gate functions are described with truth tables when you click the drop-down selector. See also "Common Logic module parameters".

Gate1

# INVERT

The Invert module hold two independent logic inverters. When an incoming signal is between >0 and +64 units, the

Invert1 ●───●● ∍⊢≫⊷

AND

















output transmits a low logic signal (0 units). When an incoming signal is between 0 and -64 units it transmits a logic high signal (+64 units). See also "Common Logic module parameters".

FlipFlop1

# FLIPFLOP

The FlipFlop module can be described as a "logic switch with memory function"

The module can perform two different types of flipflop techniques: the 'Set-Reset' and the 'D-Type with Reset'. To describe the respective functions of these flip-flops, let's have a look at the diagrams to the right. See also "Common Logic module parameters". The Set-Reset flip-flop works according to the flow-chart and table to the right. The 'X' in the table means it doesn't matter if the value is '0' or '1'.

A toggling signal (Tgl) alternates between '0' and '1' on the positive edge of every full Clock period.

The D-type flip-flop<br/>outputs what's current-<br/>DRst<br/>Dly on the D input on the<br/>positive edge of each<br/>Clk pulse - if Rst is '0'<br/> $\overline{0}$  $\bigcirc$ <br/> $\bigcirc$ (see the time diagram<br/>to the right). $\bigcirc$ 



# 

The Clock Divider module can be used for dividing incoming clock pulses (or zero-crossings) by a factor set by you.

The module transmits a high logic pulse

after it has received a user-defined number of zero-crossing transitions.

# DIVIDER

Set the desired division with the buttons. Range: 1 to 128. The denumerator is shown in the Display box.

# **CLKDIVFIX**

The Fixed Clock Divider module divides an incoming clock signal (or bipolar signal) to three fixed resulting signals. This provides you with an easy way of



)†Rst

Clk

extracting 8 note, 8 note-triplets and 16th note clock pulses from a clock signal, for example.

# 8, T8 & 16

The outputs where, for example, 24 incoming pulses are divided to 2, 3 and 4 pulses respectively. Signal: Logic. See also "Common Logic module parameters".

# PULSE

This module can use a signal that increases from 0 units or below to anything greater than 0 units, or the other way around, to produce a high logic sig-



nal. You set the duration of the generated high logic signal with the knob. You can select between Positive and Negative Edge Pulse trig from the drop-down selector. Note that changing trig type will force the Sound engine to recalculate and thus cause a brief moment of silence.

### DELAY TIME MODULATION

A **Dynamic Control/Audio** input for modulating the Delay time. The modulation amount can be attenuated with the knob of [**Attenuator Type I**].

### SUB/LO/HI SCROLL BUTTON

Select Delay time ranges by clicking this scroll button.

### PULSE TIME KNOB

Set the Pulse time with the knob. Range (Sub): 0.10 ms to 1.00 s, (Lo): 1.04 ms to 10.00 s, (Hi): 10.4 ms to 100.0 s. If the module receives another level change, (from 0 units or below to anything greater than 0 units, or the other way around) during the Pulse period, it will extend the duration, with the value set with the knob.

### PULSE TYPE DROP-DOWN SELECTOR

Select Pulse Type between Positive Edge Pulse trig and Negative Edge Pulse trig. See also "Common Logic module parameters".

# LOGICDELAY

This module delays a signal that increases from 0 units or below to a value greater than 0 units, and produces a high logic output signal. The type of delay



can be selected by clicking the Delay Type drop-down selector. Note that changing Delay Type will force the Sound engine to recalculate and thus cause a brief moment of silence.

# DELAY TIME MODULATION

A **Dynamic Control/Audio** input for modulating the Delay time. The modulation amount can be attenuated with the knob of [**Attenuator Type I**].

# SUB/LO/HI SCROLL BUTTON

Select Delay time ranges by clicking this scroll button.

#### DELAY TIME KNOB

Set the delay time with the knob. Range (Sub): 0.10 ms to 1.00 s, (Lo): 1.04 ms to 10.00 s, (Hi): 10.4 ms to 100.0 s.

# DELAY TYPE DROP-DOWN SELECTOR

Select Delay Type between Positive Edge Delay (only the positive edge of the input signal is delayed), Negative Edge Delay (only the negative edge of the input signal is delayed) and Cycle Delay (the entire input signal cycle is delayed). See also "Common Logic module parameters".

# 8COUNTER

The 8-Counter outputs a high logic signal, sequentially through outputs 1-8, for every incoming clock pulse. See also "Common Logic module parameters".

# BINCOUNTER

The BinCounter is an 8 bit binary counter which outputs high logic signals, in "binary order", for every incoming clock pulse. See also "Common Logic module parameters".



# ADCONV

The ADConv module is an 8 bit A/D converter of '2's compliment' type. The module outputs high logic signals on its outputs depending on the current input

1		0	1	
signal lev	vel.	Note that	the module accepts	bipolar input signals and that the 128 value LED indicates
when the	e in	put signal	is negative. See also	"Common Logic module parameters".

# DACONV

The DAConv module is an 8 bit D/A converter of '2's compliment' type. The module outputs a bipolar signal with values depending on the current logic



input signals. Note that the module can output bipolar signals and that a high signal on input 8 results in a negative output signal. See also "Common Logic module parameters".

# SEQUENCER GROUP

The sequencer modules can perform different functions during the course of a specified time. The sequencer modules in the Nord Modular G2 system has (up to) 16 steps each. They can easily be linked together in series to provide longer sequences and they can be clocked by various clock sources, originating from other modules or from the Master/MIDI clock. The sequencer modules can be synchronized to each other in a number of ways. Read more about some of the possible combinations with the sequencer modules at the end of this chapter.

# COMMON SEQUENCER PARAMETERS

# CLK INPUT

This is the **Dynamic Control/Audio** signal input for incoming clock pulses. An incoming signal which goes from 0 units or below to anything above 0 units will advance the sequencer one step.

# RST INPUT

This is a yellow input where a high logic signal will restart the sequencer (force it to step 1 again). The restart isn't performed until the next the clock pulse is received at the Clk input. This guarantees perfect timing.

# LOOP INPUT

This is a yellow input where a high logic signal will restart the sequencer (force it to step 1 again). The Loop input can be used to patch a Link signal from the last sequencer module in a serial connection (see below).

# PARK INPUT

This is a yellow input where a high logic signal/pulse will park, i.e. stop the sequencer. The sequencer will restart at step 1 when a high logic signal is present on the Rst or Loop input (see above).

# GATE INPUT(S)

These inputs can be used to patch the Trig/Gate output (see below) signals from the previous sequencer module when you use several sequencers in series. The input signals will simply be mixed or throughput to the module's Trig/Gate outputs (see below).

# CONTROL SIGNAL INPUT

These inputs can be used to patch the Control signal output (see below) signals from the previous sequencer module when you use several sequencers in series. The input signals will simply be mixed or throughput to the module's Control signal outputs (see below).

# LOOP/1-CYCLE BUTTON

Click to switch between Loop mode and 1-Cycle mode. In Loop mode, the sequencer restarts at step 1 immediately after the last step in the sequence. In 1-Cycle mode, the sequencer only runs from step 1 to the last step and then stops.

#### STEPS ARROW BUTTONS

Set the last step in the sequence. The sequencer will return to step 1 if Loop mode is on, or stop if Loop mode is off. Set the last step with the arrow buttons. Range: 1 to 16 steps.





Loop	
۲	











# STEP BUTTONS

Click on the buttons to make the sequencer send a Trig/Gate signal each time it passes the step. Note that the two Step button rows on the Event Sequencer work in parallel.

### STEP LEDS

The Step LEDs indicate the current step in the sequence.

#### CONTROL SIGNAL ARROW BUTTONS/SLIDERS

You set the control signal level of each step by moving the vertical slider or clicking the arrow buttons that appear below each slider when you move the cursor over it. Note that when you click-hold to move the slider, the cursor becomes invisible. Range: +/- 64 units in bipolar mode and 0-64 units in unipolar mode (see the Uni

button description below).

#### T/G BUTTON

Toggle between Trig and Gate mode with these buttons. In the Trig mode, every step transmits its own logic signal, at a 50% duration cycle. In the Gate mode, two or more adjacent activated steps will mix into a "longer" logic signal.

#### LINK OUTPUT

This yellow output transmits a high logic signal whenever the sequencer goes beyond the last step in the sequence. This signal can be used for linking several sequencers in series. See more about linking at the end of this chapter.

#### CLR BUTTON

Pressing this button will reset all control values to 0.

#### RND BUTTON

This produces a random set of control signal values for each of the 16 steps.

#### **BIP/UNI BUTTON**

Selects uni- or bipolar control signals of the output of the sequencer.

#### TRIG/GATE SIGNAL OUTPUT(S)

Signal: Logic

#### CONTROL SIGNAL OUTPUT

Signal: Unipolar or Bipolar.

# SEQEVENT

This basic step sequencer features two parallel rows of 16 steps. Each step can send two separate logic pulses on the two separate outputs. Activate a step by clicking on one or more of the 32 available trigger buttons. See also "Common Sequencer parameters".

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●)Clk _ Pet	12	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Link
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# SEQVAL

This is a sequencer which sends one control signal value for each step. The value for each step is shown in the corresponding display box. In Unipolar mode (the Uni button depressed), the values are displayed in steps of 0.5 units. Every half-step (.5) is indicated by a dot to the right of the full step value. For example, the value 5.5 is displayed as '5.'. There is also a row of Step buttons for sending



out a Trig/Gate signal for every step in the sequence. See also "Common Sequencer parameters".

# SEQLEV

This is a Level Sequencer which sends a control signal level for each step. There is also a row of Step buttons for sending out a Trig/Gate signal for every step in the sequence. See also "Common Sequencer parameters".

# SEQNOTE

This is a Note Sequencer which sends a (bipolar) control signal value for each step. If you route this control signal to an unattenuated Pitch modulation input on an Oscillator module, the note value displayed in the hint box will correspond exactly to the output Oscillator Pitch. There is also a row of Step buttons for sending out a Trig/Gate signal for every step in the sequence.

# **REC CONTROL AND TRIG**

INPUTS Patching the Note output of the Keyboard module to the Rec control signal input and the Gate output of the Keyboard module to the Rec Trig input enables you to use the keyboard or incoming MIDI Note messages to program the steps in the sequence. Pressing a key will advance the edit point to the next step. The control signal from the keyboard will be recorded and present at the sequencer output. When the sequencer reaches the last step, the it will return to step 1 and you can re-record if you like. The sequencer may also be running while you program the steps, if there is a clock signal present on the Clk input. Any new key press will then be recorded at the current step in the sequence.

# PIAND ROLL WINDOW AND MARKERS

Each step in the sequence is displayed as a row of keyboard keys, with the grey lines representing the black keys and the white fields representing the white keys. You set the control signal level (note number) of



each step by clicking on the desired "key" in the window. Where in the total keyboard range the notes are placed is determined with the Magnifier and Octave selector described below. I note values should be outside the currently visible keyboard range, these will be indicated by triangular arrows in the window.

### MAGNIFIER

Click on the Magnifier to select the visible keyboard range in the Note Sequencer between 1, 2 and 3 octaves. Note that if you click the Rnd button to randomly distribute note values, the notes will be distributed only within the range selected with the Magnifier control.

### OCTAVE SELECTOR

Click the Octave selector to select the highest note in the Piano roll window. Range: C0-C7. See also "Common Sequencer parameters".

# SEQCTR

The Control Sequencer is special in the way that instead of controlling the step advancement by incoming clock pulses, they are controlled by incoming control signal values. This makes it possible to control the step advancement, and directions, totally freely. There is also a row of Step buttons for sending out a Trig/Gate signal for every step in the sequence.



#### CTR INPUT

The **Dynamic Control/Audio** signal input for controlling the step numbers. The steps respond to the following input signal values: Step 1: 0 to <4, Step 2: 4 to <8, Step 3: 8 to <12, Step 4: 12 to <16, Step 5: 16 to <20, Step 6: 20 to <24, Step 7: 24 to <28, Step 8: 28 to <32, Step 9: 32 to <36, Step 10: 36 to <40, Step 11: 40 to <44, Step 12: 44 to <48, Step 13: 48 to <52, Step 14: 52 to <56, Step 15: 56 to <60 and Step 16: 60 to 64.

Example: To simulate the behavior of a "regular" clock-synched sequencer, patch a positive unipolar inverted sawtooth LFO signal at full range to the Volt input.

#### XFADE SCROLL BUTTON

Another special feature of the Volt Sequencer module is the ability to crossfade in a linear fashion between values of adjacent steps. Click the XFade scroll button to select degree of crossfade. Values: Off, 25%, 50% and 100%. See also "Common Sequencer parameters".

# SEQUENCING EXAMPLES

#### GENERAL INFORMATION

• Gate or trigger the envelopes in the patch with something if you want the sequencer to play notes. If you are using every step in the sequence, you can use the same clock source as a trigger for the envelopes, as well as the clock source for the sequencer modules. A more versatile way is to gate/trig the envelope from use the sequencer's Trig/Gate output.

- If the oscillators are still under the keyboard tracking control, KBT, you are able to transpose a sequence by playing keys on the Nord Modular G2 keyboard or by using incoming MIDI notes. The resulting key of such a transposition is calculated from the "middle" E key (MIDI note number 64) on Nord Modular G2, when the octave shift function is in the middle position. If a filter is using the keyboard tracking control, a transposition might close the filter and reduce the sound from Nord Modular G2.
- Each sequencer module can represent one control signal for each step, a total of 16 different control signals for each module. If you want a polyphonic performance, use two or more sequencers, running parallel, with oscillators and envelopes, filters etc., to match the number of sequencers. You can also try to use a polyphonic patch with a sequence. If you play a chord, the entire chord will follow the sequence, if the oscillators are under keyboard tracking control.
- If you are going to have multiple sequencer modules synchronized to each other in a patch, it is good practice to use only one clock source. Connect a cable from the clock source to the first module and continue to the next etc. It is also important that you reset the sequencers or the Clock generator so they can be aligned properly.
- If you want to synchronize the Nord Modular G2 sequencers with an external MIDI sequencer, you must use the Master Clock as the clock source in the patch. The Master Clock is available at the clock output on the Clock module in the LFO group when you select 'Master' as Clock source.
- It is possible to have sequencers with different Last step values, running in parallel or in series. You can also use different clock divisions to e.g. mix 16th notes with 8th note triplets.

# PARALLEL CONNECTION

Connect the sequencer modules to the same clock source. If you want to make sure that the sequencers are aligned to each other, connect the Clock Generator Sync output signal to the sequencers' Rst inputs. The Sync signal will reset the sequencers to the first step after a set number of beats. In the case with 16 step sequences, set the Clock Generator Sync parameter to 'Sync every 4 beats'

In this example the Rst signal (green cable) to the sequencers is taken from the Sync output of the Clock Generator module to the Ctrl Sequencer and the Event Sequencer. Both Sequencers in this example have the Loop mode turned on. This doesn't really matter in this setup since the Rst signal received from the Clock Generator Sync output will reset them to step 1 after 16 steps (every 4 beats) anyway.



# SERIAL CONNECTION 1

In this example we have created a 32 step sequence based on two "serially connected" Ctrl Sequencer modules.



The Loop mode of the sequencers in this example must be set to off, otherwise they will continue to loop after their last steps and this is not what we want. When the signal from the first sequencer's Link output resets the second sequencer, the second sequencer will start sequencing its 16 steps. The first sequencer will be inactive until it receives a Sync signal on its Rst input from the Clock Generator. Note that the Sync parameter of the Clock Generator is set to 8 beats. If set to the default 4 beats, the first sequencer will automatically restart after 16 steps even though Loop mode is off.

To be able to route the control signals from both sequencers to a common destination without needing to use a mixer module, connect the Control signal Out from the first sequencer to the Control signal In of the second sequencer. This way, the control signal from the first sequencer will be throughput via the second sequencer's Control signal Out even when it's not running.

# SERIAL CONNECTION 2 - WITH KEYBOARD RESTART

In some situations you may want to restart a sequencer by pressing a new key on the keyboard, for example when sequencing a bass line. In a serial connection you can do like this to make it work:



Connect the Gate output of the Keyboard module to the first sequencer's Rst input (green cable). We don't use the Clock Generator's Sync output because we want to manually restart the sequence. To make the first sequencer start over again after the second sequencer's last step, we patch the second sequencer's Link output to the first sequencer's Loop input (purple cable). This way the whole sequence will loop automatically. Now, if we press a new key when the sequence is somewhere between steps 17 and 32 we

want the second sequencer to stop (Park) immediately when the first sequencer restarts. Therefore, we patch the Keyboard Gate signal also to the Park input of the second sequencer (green cable).

### MIXING DIFFERENT TIME SIGNATURES

You may also mix different divisions of the clock pulses. Instead of using the 1/16 output on the Clock Generator module, we now use the 1/96 output instead. The advantage of having 96 pulses for each note is that 96 is divisible with 3 and 4. In this example, the clock signal is taken from the Clock Generator module's 1/96 output which outputs 96 pulses per note. It is divided with the Clock Divider module with two different division ratios, 16 and T8. The divider module is reset by the logic signal from the Sync output on the Clock Generator module. This reset signal is also used on the two sequencer modules (green cable). The Sync ratio is set to every 4 beats.



The upper module is set to a 16th note performance

with 16 as the Last step. It receives the clock pulse from the "16" output of the Clock Divider module, which in this example divides the Clock signal into 16 pulses for every note (4 pulses for every quarter note). The lower module is set to an 8 note triplet performance. The Last step is set to 12 and it receives its clock from the T8 output, 3 pulses for each quarter note (purple cable). The lower module will sequence 12 steps during the same time as the upper module sequences 16.

The loop mode in both of the modules could be on or off, they will reset to step 1 when they receive the Rst signal from the Sync output of the Clock Generator module in any case. By combining the settings of the loop mode, the Last step and the signals at the Rst inputs and the Link outputs on various sequencer modules, you can create quite advanced sequencer performances.

# SYNCHRONIZING SEQUENCERS IN DIFFERENT PATCHES TO EACH OTHER

It is absolutely necessary that the sequencers in a patch use the Master Clock as the clock source if the patch is to be synchronized to another patch, in another slot. Therefore, select 'Master' as source on the

Clock Generator modules in the two slots. The sequencers should also use the Sync output from the Clock Generator module as the Rst source to ensure proper alignment to the first beat in the bar.

📽 Empty Patch in Slot C on Mo 🖃 🗖 🔀	🖤 Empty Patch in Slot B on Mo 🔳 🗖
Patch Empty Patch No Cat 🛛 Mode Mono 📮	Patch Name EmptyPatch NoCat IMode Mor
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In this example, slot A and B are loaded with the same patch and they run in perfect sync with each other.

# FX GROUP

The FX modules are useful tools for changing and transforming audio signals. Among the FX modules you'll find effect modules like the Reverb, Flanger, Phaser etc. Feel free to experiment with these on control signals as well.

# COMMON FX GROUP PARAMETERS

# INPUT

The Audio or Dynamic Control/Audio signal input of the FX module.

# ON/BYPASS

Click the On/Bypass button to bypass the input signal from the effect. Blue button color indicates 'On' and gray 'Bypass'.

# Оитрит

The output from the FX module. Signal: Bipolar

# STCHORUS

The Stereo Chorus module simulates the effect of multiple detuned stereo voices. It has one Audio signal input and stereo outputs.



C

# DETUNE

Sets the detune depth of the chorus effect.

# AMOUNT

Adjusts the balance between the dry signal and the wet "chorused" signal. See also "Common FX group parameters".

# PHASER

The Phaser is based on the Nord Electro phaser effects and simulates a vintage type of phaser. The phaser effect has a very characteristic "sweep" effect.



# Түре

Click to select Type I or Type II. The Type I phaser has three notches and Type II has two.

# RATE

With the Rate knob you set the rate of the built-in LFO. Range: 62.9 s/cycle to 24.4 Hz.

# FEEDBACK

With the Feedback knob you set the phaser feedback, i.e the "depth" of the notches. See also "Common FX group parameters".

# FLANGER

The Flanger is based on the Nord Electro flanger effect and simulates a vintage type of flanger. The flanger effect is a very characteristic type of "sweep" effect. It's quite similar to the phaser effect but has a little different characteristics.



# RATE

Set the flanger sweep rate. Range: 62.9 s/cycle to 24.4 Hz.

# RANGE

Set the frequency range in which the flanger should operate. Range:

# FEEDBACK

Set the signal feedback and thus increase the flanger effect depth. See also "Common FX group parameters".

# DIGITIZER

The Digitizer module continuously samples an incoming signal at a selectable sample rate and bit resolution. The module can e.g. sample a clean audio signal and transform it down to a dirty 8 bit, 5



kHz signal. Great for "low-fi" effects with lots of aliasing.

# SAMPLE RATE

Set desired sample rate in Hz with the knob to the right of the display box. Range: 32.70 Hz to 50.2 kHz. You can modulate the sample rate from a modulation source patched to the control signal input to the

left of the display box. Attenuate the modulation signal with the knob to the left of the display box [Attenuator Type I].

# QUANTIZATION (BITS)

Select the bit resolution with the arrow buttons. Range: 1 to 12 bits and Off. 'Off' means full resolution, i.e. 24 bits. The resolution is shown in the display box. See also "Common FX group parameters".

# FREQSHIFT

This is a Frequency Shifter. The module takes an input audio signal and generates a copy of all input signal partials. This "copy" can then be frequency shifted in a selectable number of Hz up or down.



Since the frequencies are shifted linearly

(as opposed to pitch shifting), the resulting signal will contain a lot of inharmonic frequencies. This is great for creating far out "ring modulator" type of effects. The Frequency Shifter is also very useful for adding "richness" to a sound. For example, adding just a slight amount of frequency shifting will make the sound a lot richer.

# SHIFT

Set the amount of frequency shifting of the "copy" of the input signal with the Shift knob. The shifting is linear frequency shifting as opposed to pitch shifting. A low Shift amount will give results similar to pitch shifting whereas high Shift amounts will generate inharmonic signals. The Shift amount can be controlled from an external source via the control signal input. The modulation amount can also be attenuated [Attenuator Type I].

# HI/LO/SUB SCROLL BUTTONS

Select range for the frequency shifting of the input signal copy.

# Міх

With the Mix knob you determine which part of the input signal copy to output through the Mix output (see below). Range: from only frequencies below the input signal pitch to only frequencies above the input signal pitch. The Mix can be controlled from an external source via the control signal input. The modulation amount can also be attenuated [Attenuator Type I].

# O DEGREE OUTPUT

The output of the unaffected input signal. Like a bypass, if you like. Signal: Bipolar

# 90 DEGREES OUTPUT

The output of the input signal, phase shifted 90 degrees. Signal: Bipolar

# Up оитрит

The output of the upper frequency shifted band. Signal: Bipolar

# DOWN OUTPUT

The output of the lower frequency shifted band. Signal: Bipolar

# Міх оцтрит

The output of the mix of the input signal and the frequency shifted signal. Signal: **Bipolar**. See also "Common FX group parameters".

# REVERB

The Reverb module is a stereo reverb with selectable reverb type, time and brightness. The module also features a Dry/Reverb mix control.



### Тіме

Set the reverb time. The time is shown in the display box. Range: 1.1 ms to 17.58 s.

#### BRIGHTNESS

Set the high frequency content of the reverberated signal with the knob.

### DRY/WET

Set the mix of dry and reverberated signal to be sent to the stereo outputs. See also "Common FX group parameters".

#### Түре

Select reverb type between Small, Medium, Large and Hall with the drop-down selector. Note that changing reverb type will force the Sound Engine to recalculate and thus cause a brief moment of silence.

# COMPRESSOR

The stereo Compressor module compresses an input signal by amplifying weak signals attenuating strong signals and thus reducing the dynamic range. The practical result of a compressed signal is that the volume is more even over time. A compressor can be very useful on

Compre1	🕑 Sid	e Chain	Gai	in Redu	uction	
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-12dB 4.0:1	0.53m	250m	0dB	9	•	€
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a drum mix or basses to make the sound sit "right in your face". It can also be very useful on a final mix to add more presence and "punch" to the mix.

#### SIDE CHAIN

The Side Chain input is used for an external audio signal to control the compressor. The Side Chain signal will not be mixed with the other input signals, it will just be used to control the compressor. Activate the Side Chain function by pressing the Side Chain button.

#### THRESH

With the Thresh knob you set the threshold above which compression is activated, i.e the minimum input value to activate the compression. Range: -30 to 11 dB and Off.

#### RATIO

With the Ratio knob you set the compression ratio above the set Threshold level. 1.0:1 means no compression and 80:1 maximum compression. Range: 1.0:1 to 80:1.

#### ATTACK

With the Attack knob you set the response time of the compressor, i.e the time between input signal above the Threshold level and compressor activation. Range: Fast (0.5 ms) to 767 ms.

# RELEASE

With the Release rotary knob you set the release time, i.e the time it takes for the compressor to return to the original input level. Range: 125 ms to 10.2 s.

# REF LVL

With the Ref Level knob you set the level to compress the stereo signals towards. Range: -30 to +12 dB.

# GAIN REDUCTION LEDS

This LED indicator shows the gain reduction of the sum of the left and right channels in dB. See also "Common FX group parameters".

# DELAY GROUP

The Delay module group features a variety of audio delay modules, from basic static delay lines to modulatable stereo delays with feedback and filter controls. The delay modules are designed for use with audio signals but of course you can use them for other types of signals as well.

# COMMON DELAY GROUP PARAMETERS

# RANGE DROP-DOWN SELECTOR

To optimize the total use of RAM memory in the synth, there is a Range drop-down selector with which you can choose the maximum delay Time for your application. The ranges are: 5 ms, 25 ms, 100 ms, 500 ms, 1.0 s, 2.0 s and 2.7 s. For example, if you only plan to

use a maximum delay Time of 0.4 seconds, select the 500 ms Range. Note that changing Range will force the Sound Engine to recalculate and thus cause a brief moment of silence.

# TIME KNOB WITH DISPLAY BOX

Set the delay Time (or Master Clock Sync factor/divisor) with this knob. The Time/ Sync factor/divisor is shown in the corresponding Display Box.

# DELAY TIME MODULATION

In some modules, the delay time can be modulated from an external source. The modulation amount can also be attenuated with the corresponding knob of [Attenuator Type I]. Note that modulating the time of a delayed audio signal will also affect the pitch. This can generate quite interesting effects.

If you want to modulate the delay time from the minimum value (0.01 ms) to the maximum value (depending on the Range setting described above) with a positive envelope (that produces a positive unipolar control signal with a peak to peak level swing from 0 units to +64 units), set the initial delay time to 0.01 ms and the mod-amount to 100.

If you want to modulate the delay time from the minimum value (0.01 ms) to the maximum value (depending on the Range setting described above) with an LFO (that produces a bipolar control signal with a peak to peak level swing from -64 units to +64 units), set the initial delay time to 50% of maximum Range and the mod-amount to 50. Increasing the setting of the mod-amount will force the delay time to stay at minimum and maximum delay times for as long as it takes for the modulation signal to get within the delay time range again.



Range

5ms



# TIME/CLK SCROLL BUTTON

Click this scroll button to change between Time and Clk (Master Clock sync). The Time Display Box(es) will change according to what you select. The Clk sync mode automatically locks on to the synth's Master Clock and here you set the intervals between 1/64T and 2/1. The

'T' (triplet) indicates that the note value is 1/1.5 times the original note value and the 'D' (dotted) indicates that the note value is 1.5 times the original note value. Note that the Clk sync mode is only available in the DelayQuad, DelayA, DelayB and DlyStereo modules. Also note that if the delay time (based on the current Master Clock rate and the Sync factor) should exceed the selected 'Range' time (see above), the actual delay time will automatically be divided by two.

### INPUT(S)

The Audio or Dynamic Control/Audio signal input(s) of the Delay module.

#### в

Click the On/Bypass button to bypass the input signal from the effect. Blue button color indicates 'On' and gray 'Bypass'.

DlySingle..1

Range 5ms

# OUTPUT(S)

The output(s) from the FX module. Signal: Bipolar

# DLYSINGLEA

A static single delay with selectable time control. See also "Common Delay group parameters".

# DLYSINGLEB

A single delay with selectable time control. The delay time can also be modulated from an external source. See also "Common Delay group parameters".

# DELAYDUAL

A 2-tap delay with selectable time controls for each tap. The individual delay times can also be modulated from external sources. See also "Common Delay group parameters".

# DELAYQUAD

A 4-tap delay with selectable time controls for each tap. The individual delay times can also be modulated from external sources. There is also an additional fifth output with a fixed delay time at the currently selected Range. See also "Common Delay group parameters".



Time

2.68ms





Θ

# DLYEIGHT

An 8-tap delay with selectable time control between the taps. Note that the 8 taps are "in sequence", i.e. between the input signal and the first tap, the delay corresponds to the displayed time. Then,



it takes twice this time for the second tap to output the signal and three times the set delay time for the third tap to output the signal, and so on. In this module, the displayed Range setting refers to the total time between the input signal and the last tap (output 8) and with the Time knob you set the delay time between adjacent taps. See also "Common Delay group parameters".

# DLYSHIFTREG

The Delay Shift Register basically works like a Sample & Hold module, with the difference that for every new sample, it



shifts the previous sample one step to the right among the eight outputs. This can be useful for "storing" keyboard Note data, for example. See also "Common Delay group parameters".

# DLYCLOCK

The Clocked Delay Register basically works like the Delay Shift Register above but with only one output. With the Sam-



ple Delay knob you set how many Clock pulses is required to output the sampled value. For example, if you have set the Sample Delay to 72, the value will be output 72 Clock pulses later. See also "Common Delay group parameters".

# DELAYA

This is a single channel audio delay with Feedback and Filter controls. You can also set the mix between delayed signal and input signal with the Dry/Wet knob. See also "Common Delay group parameters".



# DELAYB

This is a single channel audio delay with Feedback and Filter controls. You can also set the mix between delayed signal and input signal with the Dry/Wet knob. The delay Time, Feedback amount and Dry/Wet mix can also be modulated



from external sources. See also "Common Delay group parameters".

# DLYSTERED

This is a stereo audio delay with separate Time controls for Left and Right outputs, Feedback, X-Feedback (cross feedback between the two stereo channels) and Filter controls. You can also set the mix between delayed signal and input signal with the Dry/Wet knob. See also "Common Delay group parameters".



# MIDI GROUP

The MIDI module group contains modules for sending and receiving various types of MIDI data, both internally between Patches in the four Slots and to and from external MIDI equipment. This makes it possible, for example, to automatically control external synths from the G2 sequencer modules. The modules can use the public "external" MIDI channels '1-16' (for use mainly with external MIDI gear), the four internal MIDI channels 'Slot A-D' and also 'This' which is a short-cut to the Slot's current MIDI channel. This gives you great flexibility of "synching up" functions in Patches in different Slots to each other and also for interacting with external MIDI equipment.

# COMMON MIDI MODULE PARAMETERS

### CHAN(NEL) SELECTOR AND DISPLAY BOX

Click the arrow buttons to select MIDI Channel. The selected channel is displayed in the display box. MIDI Receive alternatives: Channel 1-16, This (a "short-cut" to the Slot's current MIDI channel), Keyboard. MIDI Send alternatives: Channel 1-16, This (a "short-cut" to the Slot's current MIDI channel), Slot A-D

# CTRL SELECTOR

Click the arrow buttons to select MIDI Controller#. The selected CC# is displayed in the display box.



Chan

# CTRLSEND

The MIDI Controller Send module can be used to send out MIDI Controller values on a specific MIDI Controller# on a selected MIDI channel.

#### SEND INPUT AND OUTPUT

A signal which goes from 0 units or below to anything above 0 units on the yellow input will force the module to send out the current offset Value on the selected MIDI CC# and MIDI channel. Right after the reception of the trig signal, the yellow output will transmit a logic pulse. This pulse can be used for triggering a transmission of a MIDI Program Change message from the PCSend module described below. Use the CtrlSend module to transmit a Bank Select message and then automatically force a PCSend module to transmit a MIDI Program Change message.



# VALUE

Manually select the Value you want the module to send with the knob. By patching a positive unipolar control signal to the Value control signal input, you can control the Value from an external source. Range: 0-127 units in steps of 1 unit. See also "Common MIDI module parameters".

- Note that if you want to send only the values on the Value input, set the knob to '0'. Otherwise the value selected with the knob will be added as an offset to the input signal.
- Note that as soon as the Value changes, either by manually turning the knob or by inputting a changing control signal, the module will output MIDI data even if the logic Send input is not activated.

# APPLICATION EXAMPLES

The CtrlSend module can be used in different types of applications. Here are some basic examples:

1. For assigning and sending a MIDI CC# from a KNOB on the synth panel:



Just drag and drop a CtrlSend module to the

Patch window, select MIDI Ctrl number, MIDI Channel and then assign the Value knob to an ASSIGNABLE KNOB on the synth panel. Turning the KNOB will then send MIDI CC data to the MIDI OUT of the synth. A very simple solution to be able to control external MIDI gear from the G2 panel. Tip! To make it easier to see in the ASSIGNABLE DISPLAY which parameter you control, you can rename the module from 'CtrlSend1' to e.g. 'FilterCutoff'. Then, the ASSIGNABLE DISPLAY will show 'FilterCutoff'.

2. For sending a series of different MIDI Controllers to external MIDI gear:

Connect several CtrlSend modules in series where each module sends a certain value on a certain MIDI CC# on selectable MIDI channels. In this example, the first module sends the value 64 for MIDI CC#7 on MIDI channel 1.

The send of the se	Ctrl 7	Value	Chan I
Ctrisenti2	▲ Ctrl	Value	Chan
	▼ 11	127	I
CtrlSend3	Ctrl	Value	Chan
Send-D-	21		Gran

Right after this, the second module sends the value 127 for MIDI CC#11 on MIDI channel 1. Finally, the third module sends the value 50 for MIDI CC#21 on MIDI channel 3. This application is perfect for sending initial MIDI information to external MIDI equipment.

3. For sending continuous MIDI Controller data to Patches in other Slots and/or to external MIDI gear:

Patch, for example, the Control signal output of a CtrlSeq module and let it modulate the filter cutoff frequency on a MIDI connected Nord Lead 3. Select the correct MIDI CC# and correct MIDI channel and make sure the Value knob is set to '0'. As the CtrlSeq runs. it will continuously send different Control signal values



to the CtrlSend module, which in turn will output the MIDI CC data on the MIDI OUT. In these type of applications you don't have to use the logic Send input of the CtrlSend module since the Value changes continuously.

# PCSEND

The PCSend module is used for sending out MIDI Program Change messages on a selected MIDI channel.



### SEND INPUT AND OUTPUT

A signal which goes from 0 units or below to anything above 0 units on the yellow input will force the module to send out the current Program number on the selected MIDI channel. Right after the reception of the trig signal, the yellow output will transmit a logic pulse. This pulse can be used for triggering a transmission of a MIDI Program Change message from another PCSend module, for example.

#### PROGRAM

Manually select the Program number you want the module to send with the knob. By patching a positive unipolar control signal to the Program control signal input, you can control the Program number from an external source. Range: 0-127 in steps of 1. See also "Common MIDI module parameters".

- Note that if you want to send only the Program value on the Program input, set the knob to '0'. Otherwise the Program number selected with the knob will be added as an offset to the input signal.
- Note that as soon as the Program number changes, either by manually turning the knob or by inputting a changing control signal, the module will output MIDI data even if the logic Send input is not activated.

#### APPLICATION EXAMPLE

The PCSend module is perfect in combination with the CtrlSend module for sending combined MIDI Bank Select and Program Change messages: Use the CtrlSend module to first transmit a Bank Se-

lect message (MIDI CC#32) and then automatically



force the PCSend module to transmit a MIDI Program Change message. By serial connecting the modules you make sure the Bank Select message is sent prior to the Program Change message. The message order is important for external synths to respond correctly. Of course, you can expand this serial connection by adding more CtrlSend and PCSend modules.

#### NOTESEND

The NoteSend module is used for sending out MIDI Note On and Off messages on a selected MIDI channel. The module can also send out Velocity values.



#### GATE INPUT

A signal which goes from 0 units or below to anything above 0 units on the yellow Gate input will force the module to send out the current Velocity and Note values on the selected MIDI channel. When the Gate signal goes back to 0 units or below, the module sends a MIDI Note Off message on the selected MIDI channel.

# VEL

Manually select the Velocity value you want the module to send with the knob. By patching a positive unipolar control signal to the Vel control signal input, you can control the Velocity from an external source. Range: 0-127 units in steps of 1 unit. See also "Common MIDI module parameters".

- Note that if you want to send only the Velocity values on the Vel input, set the knob to '0'. Otherwise the value selected with the knob will be added as an offset to the input signal.
- Note that the Velocity value is not sent out until a high logic signal is present on the Gate input.

# Νοτε

Manually select the MIDI Note number you want the module to send with the knob. By patching a positive unipolar control signal to the Note control signal input, you can control the Note number from an external source. Range: C-1 to G9 in steps of 1 semitone.

- Note! Always set the knob to 'E4' if you're inputting regular bipolar Note data, e.g. from the Note Sequencer module, otherwise the transmitted MIDI notes will be transposed.
- Note that the Note number is not sent out until a high logic signal is present on the Gate input.

### APPLICATION EXAMPLE

The NoteSend module in combination with the NoteSeq module makes it possible to automatically send out the sequencer's note data to a Patch in another Slot or to external MIDI equipment. Connect the NoteSeq Control signal output to the NoteSend Note input and the NoteSeq Trig signal output to the NoteSend Gate input. **Note that the NoteSeq Gate button (G) must not be activated.** If you need longer Gate input pulses on the NoteSend module, use a logic Pulse module between the NoteSeq and Note-Send modules to increase the periods. Set desired Ve-



locity level with the knob and set the Note number to 'E4'. Select MIDI channel on the NoteSend module and you're set.

# CTRLRCV

The MIDI Controller Receive module can be used to control things in the Patch based on incoming external MIDI Controller data.

TriRev1	Ctrl 7	Lan Chan ▼ 1	Rev ●	Val
---------	-----------	-----------------	----------	-----

# RCV OUTPUT

Every time a new MIDI CC value is received on the selected CC# and MIDI channel, a high logic pulse is output from the Rcv output. This signal can be used to trig different events in the Patch, for example from external button parameters.

#### VAL OUTPUT

The Val output transmits the MIDI CC values received on the selected CC# and MIDI channel. See also "Common MIDI module parameters".

Chan

Gate

Vel

# NOTERCV

The MIDI Note Receive module works like sort of a MIDI Note detector and can be used for controlling things in the

Patch when receiving a specific incoming MIDI Note number. These modules are perfect when you want to control parts of the Patch from different MIDI channels.

🗑 NoteRcv1

#### NOTE KNOB

Set the MIDI Note number to respond to. All other received MIDI Note numbers are disregarded.

#### GATE OUTPUT

Every time a MIDI Note On message is received on the selected Note number and MIDI channel, the Gate output transmits a high logic signal. When a MIDI Note Off message is received on the selected Note number and MIDI channel, the Gate output transmits a low logic signal.

#### VEL OUTPUT

The Vel output transmits the MIDI Velocity values received on the selected Note number and MIDI channel. See also "Common MIDI module parameters".

### NOTEZONE

The Note Zone module can be used for receiving MIDI Note data within a selected note range on a selected MIDI channel and then transmit the notes on a different MIDI channel, transposed or



Note

G-1

non-transposed. A number of NoteZone modules can be used for creating very flexible master keyboard functionality, both from the G2's internal keyboard and from external MIDI master keyboards.

#### RCV CHAN

Select the MIDI channel to receive MIDI Note data, Velocity and Keyboard Gate data from.

#### NOTE MIN & MAX

Set the incoming MIDI Note range with the Min and Max arrow buttons. Only the notes within the set range will be recognized.

#### LET THRU

Here you can select what MIDI data to recognize: 'Notes Only' will recognize MIDI Note data but disregard any incoming MIDI Controller data. 'Notes+Ctrls' will recognize both incoming MIDI Note data and MIDI Controller data.

#### SEND TRANS

Set any Note Transposition for the transmitted Note zone with the Trans arrow buttons.

#### SEND CHAN

Select which MIDI channel to send the notes (and Controllers). See also "Common MIDI module parameters".

### APPLICATION EXAMPLE

Let's say we want to create a "master keyboard" setup consisting of four key zones on the internal keyboard, with each zone sending on a separate MIDI channel. Simply drag and drop four NoteZone modules to the Patch window. Set the Rcv Channel to 'Keyb' on each of the four modules to route the internal keyboard to the modules. Then, set desired Note range for each of the modules (the Note zones can overlap each other if you like). Finally, set the MIDI channels you want the different Note zones to transmit on. If you want to transpose any of the Note zones, change the Trans value on each of the mod-

VoteZone1 Let thru Notes Only
Rev Chan Min Max Send Trans Chan Keyb C2 C2 G2
VoteZone2 Let thru Notes Only
Rcv ▲ Chan ▲ Min ▲ Max Send ▲ Trans ▲ Chan ↓ Keyb ♥ G#2 ♥ E3
VoteZone3 Let thru Notes Only
NoteZone3   Let thru   Notes Only     Rov   Chan   Min   Max   Send   Trans   Chan     Keyb   F3   C4   7   3
Image: NoteZone3   Let thru   NoteS Only     Rev   Chan   Min   Max   Send   Trans   Chan     Keyb   F3   C4   7   3     NoteZone4   Let thru   Notes Only

ules. In this example, NoteZone3 sends out notes transposed by +7 semitones.

# 12. SYNTHESIS BASICS

# SUBTRACTIVE SYNTHESIS

Subtractive synthesis is one of the oldest and most widely spread forms of synthesizing sounds. It is the method employed in such classics as the Moog synthesizers, the Sequential Prophet-5 and 10, Arp synthesizers, most Oberheim synthesizers, the Roland Jupiter models, the TB-303 etc.; the list is practically endless. Even new digital instruments such as workstations and sample playback devices employ many of the basic principles of subtractive synthesis.

With the Nord Modular G2 system, Clavia introduces a new concept: a modern digital instrument that combines a faithful reproduction of the behaviour of the old analog favourites with the convenience and stability of the newer designs.

The purpose of this chapter is to give you a quick introduction to the basics of subtractive synthesis. If you'd like to know more, there are number of books written on the subject.

# MODULES - THE BUILDING BLOCKS

Subtractive synthesis started its life in *modular synthesizers*, large cabinets housing separate electronic modules, connected via patch cords. With the advancement of technology, the functionality of many of these modules could be put onto one single circuit board. But functionality-wise, subtractive synthesizers are still built out of the same modules (or building blocks) as they were decades ago. We will now take a closer look at these building blocks. Let's first talk about three basic modules that actually create and process sound:

# OSCILLATOR

The Oscillator is one of the few modules in a synthesizer that actually *produces* any sound, (most of the other modules only *shape* the sound from the oscillator.) The oscillator is a bit like the string on a string instrument, it vibrates to create sound.

# FILTER

The signal from the oscillator can be sent through a Filter which shapes the *timbre* of the sound to make it "bright", "dull", "thin", etc.

# AMPLIFIER

The Amplifier shapes the volume of the sound making it "soft" or "hard", "slow" or "short".

In addition to these three basic modules, all synthesizers also have "modulators", devices that can make the volume, timbre pitch and other qualities of sound vary continuously when you play a key. It is these modulators that basically add animation to the sound, taking it from a dull organ drone to a dynamic and interesting timbre. The two most common modulators are Envelopes and LFOs:

#### ENVELOPE GENERATOR

An envelope generator is used to give a sound a "shape". If you apply an envelope to the amplifier (which controls the volume) you are able to make the sound for example slowly fade in and then fade out when you press and hold a key.

# LFO

LFO is an abbreviation for Low Frequency Oscillator. It is used for repeating variations in a sound, such as vibrato or tremolo.

# CONNECTIONS

There are many ways in which the modules outlined below can be connected in a synthesizer, but the one in the picture below is a basic and common one, used in some older synthesizers.



Note that the horizontal lines indicate the way the sound travels. The vertical lines indicate control signals. The envelopes for example only *modulate* (control) the oscillator, filter and amplifiers, they do not affect the sound directly.

# THE OSCILLATORS AND WAVEFORMS

The two basic qualities of an oscillator is waveform and pitch.

# Рітсн

The length of a waveform period determines the pitch (frequency) of the sound. The shorter the period, the higher the pitch. If you for example make the oscillator play at a frequency of 440Hz, there will be 440 periods of identical Sawtooth waves generated per second.



Normally there are three ways to change the frequency of an oscillator:

- By changing the frequency settings on the oscillator.
- By playing the keyboard. The keyboard is connected to the oscillator via the KBT (Keyboard Tracking) parameter so that pressing different key produces different pitches. In some cases this connection can be turned off, so that the oscillator always plays the same pitch, regardless of which key is pressed.

• By Modulation. Modulation allows you to make the pitch vary "automatically". The most common example is probably to use an LFO to make pitch go up and down, to create a vibrato. But you can also put the pitch under envelope control, or make the pitch vary with your striking force (velocity).

# WAVEFORM

The waveform of the oscillator affects its harmonic content and thereby its "characteristics" (timbre). The three most common waveforms are sawtooth, pulse wave and triangle.

Looking at the shape of a waveform tells very little about how it sounds. Instead, there's a better way to draw it, called a *spectrum*. Let's introduce some quick theory:

Mathematically, all waveforms can be considered as built from a number of *harmonics*, added together.

Each of the harmonics consists of a *sine wave*, the purest and simple waveform there is (a sine wave has no harmonics at all). In other words, if you add a number of sine waves together, each one with its own pitch (frequency) and volume (amplitude), then you can build any waveform you like.

The lowest harmonic is called the *fundamental*. The fundamental determines the basic pitch of the sound. If the fundamental has a frequency of 440Hz, we will perceive the entire sound as having a pitch of 440Hz.

Other harmonics are then added to the fundamental, called *overtones*. Normally the first overtone appears at a frequency twice the fundamental (in our example 880 Hz). The next harmonic appears at a frequency three times the fundamental (in our example 1320Hz) and so on.

In a spectral display of a waveform you can see the *frequency* (pitch) of each harmonic and its *amplitude* (level). This is done by drawing each harmonic as a line raising up from a horizontal scale.

Each line's position on this scale indicates the harmonic's frequency. The line furthest to the left is the fundamental, the next is the first harmonic etc. To make life easier, one usually doesn't label the horizontal scale with frequency in Hz, but rather with the number of the harmonic. The height of each line represents the amplitude of each harmonic.

If you understand the principle, you also understand that if the harmonics with high numbers have a high amplitude, the sound will be perceived as bright.

Let's take a look at some common waveforms and their spectra.

In the illustrations below, only some of the first harmonics are displayed. In reality, waveforms like these have an infinite amount of harmonics.

# SAWTOOTH

The Sawtooth wave has a simple spectrum. All harmonics are present in the wave, in proportional values. As you can see, the high harmonics have a fairly high amplitude, which makes this waveform sound bright.



#### TRIANGLE

The triangle wave does not have very strong harmonics. Furthermore they only appear at odd harmonic numbers. The first fact makes the tone pure, a bit like a flute, and the second fact gives the sound a slightly "hollow" character.



#### PULSE WAVE

The pulse wave is slightly more complicated, because it is not *one* waveform, it is many different ones. A pulse wave is a waveform that during one period jumps once between full positive amplitude and full negative and then back. The thing that can be varied is *where* within the period you jump from maximum to minimum amplitude. Let's look at three examples:



In the first, the jump happens 5% in from the beginning of the period. This is referred to as a pulse wave with a 5% *pulse width* (sometimes called *duty cycle*). The second wave has a pulse width of 10%. The third wave has a pulse width of 50%.

This third wave is a special case of the pulse wave, called a *square wave*, and this has one peculiarity, it only contains odd number harmonics, which gives it a "hollow" quality.

On many synthesizers (including the Nord Lead) the pulse width can be adjusted, to set the timbre of the pulse wave. The more narrow the pulse width, the more "thin" the sound will be.

You can also have the pulse width vary continuously, for example from an LFO or envelope. This is referred to as *pulse width modulation*. Modulating pulse widths from an LFO creates a rich, chorus-like effect often used in "string" sounds.

# ABOUT INHARMONIC SPECTRA

Above we have only discussed spectra where the overtones appear at perfect harmonics. While this is true for the basic waveforms discussed above, it is definitely not true for all sound. If you for example use the frequency modulation (FM) or Ring Modulation capabilities in the Nord Modular G2, with two oscillators set to an "unusual" interval (not octaves or fifths, for example), you will get a spectrum where the overtones appear at frequencies somewhere *between* the perfect harmonics. This results in an *inharmonic* sound, which often sounds "metallic".



# SYNC

One some instruments (including the Nord Modular G2), two Oscillators can be *synchronized*. If you for example synchronize Oscillator 2 to Oscillator 1, Oscillator 2 will start over with a new period of the waveform, each time Oscillator 1 does so. If Oscillator 2 then has a higher frequency than 1, it will get a complex waveform that depends both on its own pitch and on that of the other oscillator.



When sync is applied, the basic pitch of Oscillator 2 is locked to that of Oscillator 1. If you change the pitch of Oscillator 1 you will affect the basic pitch of both oscillators. Furthermore, when you vary the

pitch of the synchronized oscillator (Oscillator 2), this will be perceived as a change in timbre, rather than in pitch.

This leads to a spectrum with deep resonances at Osc2's harmonics, like this:



If you go even further and let the pitch of the synchronized oscillator vary continuously, for example from an LFO or envelope, you will change the harmonic content of the sound in an interesting and very characteristic way.

# THE FILTER

The filter in a synthesizer is used to remove or emphasize frequencies in a spectrum. A filter is a bit like an amplifier (a volume control) that is applied differently to different parts of the spectrum. For example, a filter might make low frequencies louder, while at the same time making high frequencies weaker. Applying such a filter would make a sound have more bass and less treble.

Let's imagine a sound with a spectrum where all harmonics are available at full level. It would look like this:



Let's now pass this spectrum through a *lowpass* filter (this type of filter is discussed in more detail below). The filter has a characteristic, which can be drawn as a curve.



As you can see the curve is flat in the low register (which means it doesn't affect this part of the spectrum at all) and then, at a certain point, gradually starts falling. When applied to the wave above, this filter cuts away some of the high frequency material in the wave, like this:



# FILTER TYPES

There are many types of filters, all with their different purposes. We will here discuss the three most common ones.

# LOWPASS FILTER

The Lowpass filter dampens high frequencies and let's low frequencies pass through unaffected, as in the example above. It is the most common synthesizer filter, since it can be used to "round off" the sharp sound of sawtooth waves and pulse waves.



# HIGHPASS FILTER

This is the opposite of the lowpass filter. It let's the high frequencies of the sound pass through and cuts off the low frequencies. This removes "bass" from a sound, without affecting the high end.



# BANDPASS FILTER

This let's frequencies in a certain range of the spectrum (the band) pass through while dampening frequencies both below and above this range. This accentuates the mid-range of a sound.



### NOTCH FILTER

This filter type (also known as Band Reject) can be seen as the opposite of a band pass filter. It cuts off frequencies in a "mid-range" band, letting the frequencies below and above through.



# ROLL-OFF (SLOPE)

Filters of one and the same type (lowpass, highpass etc.) can have different characteristics. One of the factors determining the exact filter curve is the *roll-off*, which is measured in *dB/Octave* ("decibels per octave") or *poles*. The simplest possible filter has a roll-off of 6dB/octave, which is referred to as "1 pole". The next step up is 12dB (2 poles), 18db (3 poles) etc.

The most common synth filters are the 12dB and 24dB lowpass filters. The difference between the two can be studied in the graph below. The 12dB filter let's more of the high frequency pass through which gives the sound a brighter and "buzzier" character than the 24dB filter does.



In the Nord Modular G2, the Nord Filter filter can be switched between 12 and 24dB modes. For sounds with high resonance (see below), similar to those in the Roland TB-303, we recommend the 12dB variation. For most other sounds we recommend 24dB.

# CUTOFF FREQUENCY

The most important parameter for a filter is its *cutoff frequency*, which is the setting that determines *where* in the frequency material it should start cutting. If the cutoff frequency in a low pass filter is set to a very low value, only the lowest harmonics (the bass) will pass through. If you raise the cutoff all the way up, *all* frequencies will be let through, as the figure below illustrates.



Changing the cutoff frequency is often referred to as "sweeping the filter". This is probably one of the most important ways of shaping the timbre of a synthesizer sound. By using an envelope you can for example have a high cutoff at the beginning of a sound which is then gradually lowered (the filter "closes" as the sound decays). This would emulate the way most plucked string sound (piano, guitar etc.) behave; the amplitude of the harmonics decreases as the sound decays.

# KEYBOARD TRACKING

When you play different pitches, the oscillators produce different frequencies. This means that the overtones in the waveform appear at different frequencies. The cutoff frequency of the *filter* however, is fixed. This means that different overtones will be cut off at different pitches. To be more precise, the further up the keyboard you play, the muddier the sound will be.

To remedy this problem many synthesizers have a parameter called *Filter Keyboard Tracking*. When this is activated, the filter Cutoff Frequency varies with which key you play, just as the oscillator frequency does. This ensures a constant harmonic spectrum for all keys.



# RESONANCE

Resonance in a filter is created by connecting the output of the filter to its input, in other words setting up a "feedback loop". The amount of feedback is then controlled with a Resonance parameter on the front panel of the instrument.

When you apply resonance, the frequencies just around the cutoff point of the filter will be emphasized (louder). As you increase the Resonance further and further, the filter will start to behave more an more like a bandpass filter, where only the frequencies around the cutoff point are let through. The filter will start to "ring", which means it almost sounds like it is *adding* frequencies to the sound. If the Resonance is then raised even further (on some synthesizers) the filter will start to self-oscillate, that is produce sound of its own, just like an oscillator.



High Resonance values are also visible in the waveform. They appear as a "superimposed" waveform with a frequency equivalent to the filter's cutoff frequency. The three examples above show the same wave with increased resonance.



If you add Resonance to a sound and then vary the Cutoff frequency (for example with an envelope) you will get a very typical synthesizer sound.

# THE AMPLIFIER

An amplifier is most often used at the final stage of a synth signal chain, to control volume. By modulating the amplifier with an envelope, the sound can be given its basic "shape". In fact, the "volume shape" is one of the most important factors to how we identify the sound. By setting up a proper volume envelope you can make a sound "soft", "hard", "plucked" "static" etc.



The volume envelope curve (to the left) determines how the amplitude of the waveform changes over time.

# ENVELOPES

# ADSR-ENVELOPE

Envelopes are used to modulate pitch, amplitude, filter cutoff and other parameters in a sound. This is used to give the sound a varying character from the moment the key is pressed to the moment it is released.

The classic synthesizer envelope has four parameters, Attack, Decay, Sustain and Release, and is therefore often referred to as an "*ADSR-envelope*".

When you press a key, the envelope is *triggered*. This means is starts rasing from zero to maximum level. How long this should take, depends on the *Attack* setting. If the Attack time is set to "0", the envelope will instantly reach full level. If it is raised it will take longer.

If you for example have an envelope controlling volume, raising the attack will give the sound a "softer" character. If you have the envelope routed to the filter, it might give the sound a "wah" type of start.


After the envelope has reached full level, it starts to fall back again. How long this should take, is set with the *Decay* parameter.



The level of the envelope does not necessarily have to fall all the way back to zero level at the end of the Decay. Instead, the ADSR-envelope has a *Sustain* setting used to determine the level the envelope should rest at, after the Decay. If you for example want to create a flute sound, you would have a fairly high Sustain setting on your Volume envelope, since a flute tone basically stays at a steady level for as long as you play it. On the other hand, for a piano sound, you would want a Sustain level of "0", since a piano sound decays to silence if you hold the key long enough.



Please note that the Sustain parameter represents a *level*, but all other envelope parameters represent *times*.

As described above, the envelope stays at the Sustain level until the key is released. It then falls back to zero level. The time it should take for this to happen is set with the *Release* parameter, which works just as the Decay, only it is not applied until you lift your finger off the keys.



• If you set Sustain to full level, the Decay setting is of no importance since the volume of the sound is never lowered:



• If you set Sustain to 0, the sound will become silent after the Decay phase is finished. With short Attacks moderate Decay times, this can be used to simulate the behaviour of a plucked string instrument (guitar, piano etc.) where the sound always decays to silence after a while:



• If you release a key before the envelope has reach its sustain, it will immediately "jump" to the Release. The effect of this can be studied in the illustration below:



Often envelope levels can be made to vary with how hard you play the keys. This is used to make a sound vary with your playing style, for example to make the sound brighter (filter envelope) or louder (amplifier envelope).

### AD-ENVELOPE

A simpler form of envelope has Attack and Decay parameters only, and is therefore called an AD-envelope. In effect, the AD-envelope behaves like an ADSR-envelope with Sustain set to 0 (see the picture above). This type of envelope, often with amount and inversion controls, is suitable when you want to affect the start of the sound only.

Typically, the AD-envelope can be made to modulate the FM amplitude or the pitch of an oscillator, to create a different timbre during the attack stage of the sounds.

# LFOs

An LFO is an oscillator, just like the ones that produce the sound in a synthesizer, but with two main differences:

- The LFO produces very low frequencies, most often below the hearing range (up to 20Hz).
- The LFO is not used to produce sound, instead it is connected to other modules to provide modulation of parameters. If you for example route an LFO to pitch, you get a vibrato. If you route it to the filter's cutoff frequency you get a wah-wah type of effect. And if you route it to the amplifier of an instrument you get a tremolo.

The three basic parameters for an LFO are Waveform, Rate (frequency) and Amount:

- The waveform determines the type of vibrato, for example "regular" (triangle or sine), ramp (saw-tooth) or random.
- The Rate determines the speed of the vibrato.
- The Amount controls to what degree the LFO affects its destination.

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## ADDITIVE SYNTHESIS

Additive synthesis basically is the opposite of Subtractive synthesis. Instead of using waveforms with rich harmonic content, such as sawtooth and pulse waves, and attenuating and amplifying different parts of the harmonics with filters, you build your waveforms by adding together a number of sine waves. This is how tonewheel organs work, for example.

### CREATING A WAVEFORM

To show the basic principle of additive synthesis, lets create a "rough" triangle wave out of several sine waves. The triangle wave does not have very strong harmonics. Furthermore they only appear at odd harmonic numbers. The first fact makes the tone pure, a bit like a flute, and the second fact gives the sound a slightly "hollow" character. Since a "perfect" triangle wave consists of an infinite number of sine waves, it's not practically possible to get a perfect result, but we can get pretty close. In the example below, we use six different sine waves to create our triangle wave. Note that the levels of the different oscillator harmonics is only schematic. The resulting waveform shape is also a rough estimation:



Why should you use additive synthesis to create complex waveforms, when you can easily get similar or even better results using subtractive synthesis, you may ask. Here is an important difference:

• With additive synthesis, you have total control over each single harmonic in the waveform. This makes it possible to really tailor-make your waveform. With subtractive synthesis, you can only control segments of the harmonic content.

# OTHER SYNTHESIS AND MODULATION METHODS

#### FM SYNTHESIS

FM stands for Frequency Modulation and is a method for adding harmonic and inharmonic frequencies to a sound by modulating its frequency with another signal. A signal routed to an FM input on a module affects the pitch by modulating it linearly in the **frequency** scale as opposed to Pitch modulation where you modulate the frequency in the **note** scale. The difference in frequency between carrier and modulator wave determines the density of partials in the sound. The level of the modulator wave determines the total bandwidth of the sound.

The practical result of FM is often a "metallic" or "bell" type of sound. The most common wave to do FM on is a pure sine wave, but any type of waveform can be used, both as modulator and carrier (wave to be modulated). Complex waveforms will generate more frequencies than simpler waves.

#### AM SYNTHESIS

AM stands for Amplitude Modulation and is a method for adding frequency bands by modulating the amplitude of the carrier wave. To illustrate what amplitude modulation actually does to a sound, we have created a simple example with two sine waves, one carrier and one modulator. The graphs to the left show the amplitude as a function of time, and to the right the amplitude as a function of the frequency.



Fig 2. AM Modulator wave



Fig 3. Amplitude Modulation

### RING MODULATION

Ring modulation is similar to AM, but instead of using a unipolar (goes from zero level to positive levels) modulator wave, a bipolar modulator wave is used. In the example below we use the same carrier wave as in the AM example. We also use the same frequency of the modulator wave, only now it's bipolar



Fig 2. RM Modulator wave



Fig 3. Ring Modulation

As you can see in the figures above, the main practical difference between amplitude- and ring modulation is the sideband amplitudes and the appearance of the carrier wave. Another difference is that the resulting ring modulation wave phase-shifts 180 degrees every half modulator period.

If more complex waveforms are used for amplitude- or ring modulation, sidebands will be generated for each partial of the signal.

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