NATIVE INSTRUMENTS

PRO-53

Operation Manual

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Special thanks to the Beta Test Team, who were invaluable not just in tracking down bugs, but in making this a better product.

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About the Native Instruments Pro-53

The Pro-53 Window

Congratulations on your purchase of the Native Instruments PRO53 software synthesizer. The PRO-53 combines the incredible sound of classic polysynths with the convenience of a software plug-in.

The Sequential Circuits™ Prophet-5™ provided a standard for fat, deep and smooth synthetic sounds. Engineers at Native Instruments carried out a detailed analysis of its analog circuitry and developed a digital equivalent incorporating all salient features even down to the waveform of the A-440 test tone.

The Native Instruments PRO-53 combines the sonic properties of the unique Prophet-5™ with the flexibility of software. In addition to the features of the original, the PRO-53 has:

- No fixed limit on polyphony.
- Increased preset storage.
- Velocity sensitivity.
- MIDI automation of all parameters.

The Native Instruments PRO-53 integrates perfectly into the computer-based virtual studio. It can be used as a stand-alone module, turning your computer into a synthesizer. It can also be used with Steinberg's popular VST 2.0™ and ASIO™ interfaces as a sequencer plug-in. The PRO-53 runs on both the Macintosh™ and Windows™ platforms.

If you are familiar with classic 80's synthesizers, you will probably feel at home with the PRO-53. However, when using this software, there are a few new rules to follow:

It is unnecessary to directly connect the PRO-53 to your AC wall socket. It won't help the sound, and could harm your computer. Modern technology allows Native Instrument to draw sufficient power directly from your computer's power supply.

A "road case" for your PRO-53 is also unnecessary. We suggest that you place the installation CD in a safe place, but there is little danger of the synthesizer itself being damaged when moved between locations.

Do not attempt to remove the ground prong from the power plug. There isn't a power plug. There isn't a ground prong, either. If you are removing a ground prong from a power plug – it's from something else… STOP NOW!!!

Test Driving the Standalone Pro-53

Once you have installed and set up the PRO-53 software, you are ready to use the program for playback. Run the program by selecting the PRO-53 application.

MIDI Note Playback

If you have a MIDI keyboard connected to your computer, and you have its MIDI port as an available MIDI inport, you should be able to play the keyboard and hear the output of the PRO-53. If you move your keyboard's Pitch Bend and Mod Wheels, you will see the on-screen keyboard emulate your movements.

To make adjustments to the on-screen controls, you manipulate them with the mouse. For "knob-style" controls, you press your mouse button on the control, then move the mouse up to increase or down to decrease the control setting. For "push-button" controls, you simply click on the button to change its setting.

Retracting Keyboard

Your PRO-53 is equipped with a retractable keyboard as standard. You can fold it out by clicking on the PRO-53 name-plate, and then play on the keys and with the pitch and modulation wheels. To fold it away, click on the PRO-53 name-plate once more.

The PRO-53 VST Plug-In will put a banner display in its window when you click on the NI logo.

Selecting Programs

The PRO-53 puts a broad range of sounds at your fingertips, giving you rapid access to a library of 512 programs. They are divided into 8 files each containing 8 banks of 8 programs. You can activate a sound by selecting its file, bank and program number in the PROGRAMMER section. The programs (sometimes called presets or patches) are identified by the PROGRAM display. The first digit represents the File, the second is the Bank and the third is the Program.

To change the current program number (without changing the bank or file), you click on the numbered button that corresponds to the patch you wish to use. When you change programs, you will notice that the last number of the PROGRAM display changes to the selected number and all of the knobs and switches on the front panel change to match the new program settings.

To change banks, first click the BANK button. The button will be lit, and the next PROGRAM SELECT button you click will change the bank selected (and change the middle number on the display). Again, the front panel controls change to match the settings of the newly selected program.

Finally, you can change the selected FILE accessed by clicking on the FILE button. In this case, the FILE button will light, and you make a selection by clicking one of the of PROGRAM SELECT buttons. This will change the first number in the PROGRAM display. The light in the FILE button goes off and the BANK button goes on, allowing you to select a new BANK.

You can also select the FILE, BANK and PROGRAM numbers directly in the display by clicking the mouse on one of the three digits and draging it up and down with the mouse button held.

Note that the numbering scheme is octal, meaning that the numbers only go up to 8. So, even though the display goes up to 888, there are in fact 512 (= 8x8x8) program memories.

The PROGRAM NAME field shows the name of the currently selected preset. You can edit the name by clicking on the display, typing a new name and pressing Enter.

MIDI Response

The MIDI response of the PRO-53 is similar to any standard MIDI synthesizer. Once you have MIDI reception set up correctly, you will find that the PRO-53 will respond to the complete range of MIDI notes.

Unlike the Prophet-5™, the PRO-53 will also respond to MIDI Note Velocity input. If your keyboard is able to send velocity message, and if the current patch is set to respond to velocity changes (by having the VEL switch set ON), you will find the filter and output levels affected by how hard you strike the keys.

The PRO-53 is also able to have all of the on-screen controls manipulated by MIDI controller messages. The MIDI controllers used to change settings are:

On-screen Control	MIDI number
Poly-Mod	
Filt Env	20
Osc B	21
Destination - Freq A	22
Destination - Pulse Width A	23
Destination - Filter	24
LFO	
MIDI	25
Freq	26
Shape – Saw	27
Shape – Tri	28
Shape – Pulse	29
Wheel Mod	
Source Mix	34

On-screen Control	MIDI number
Mixer	
Osc A	45
Osc B	46
Noise	47
Ext In	48
Filter	
Cutoff	70
Resonance	71
Env Amt	72
Kbd	73
Attack	75
Decay	76
Sustain	77
Release	78

On-screen Control	MIDI number
Destination – Freq A	35
Destination – Freq B	36
Destination – Pulse Width A	37
Destination – Pulse Width B	38
Destination – Filter	39
Oscillator A	
Freq	40
Shape – Saw	41
Shape – Pulse	42
Pulse Width	43
Sync	44
Oscillator B	
Freq	50
Fine	51
Shape – Saw	52
Shape – Triangle	53
Shape – Pulse	54
Pulse Width	55
Lo Freq	56
Keyboard	57
Voice Section	
Glide	5
Unison	59

On-screen Control	MIDI number
Amplifier	
Attack	80
Decay	81
Sustain	82
Release	83
Global Section	
Release(enable)	85
Velocity(enable)	86
Analog	87
Master Tuning	88
A-440	89
Volume	7
Delay	
Time	105
Spread	106
Depth	107
Rate	108
Feedback	110
LPF	111
HPF	112
Inv	113
On	115
Wet	116
Sync	117
MIDI	118

Polyphony, Unison Mode and Voice Selection

The number of simultaneous voices (polyphony) available from a standard synthesizer is fixed – you can only have as many voices as the hardware allows. The PRO-53, on the other hand, allows you to vary the amount of polyphony based on the speed of your processor.

The number of voices is easily changed on the front panel of the PRO-53. Place your mouse pointer on the VOICES display. Hold down the mouse button and drag the mouse up to increase the number of voices or down to reduce the number of voices. This setting is global to the PRO-53, and does not change when a new program is selected.

The allocation of voices by the PRO-53 synthesis engine is relatively complex. In general, any new MIDI note message will attempt to find a voice for synthesis playback. If that note is already being played, the same voice will be reused. If this was not successful, the engine will try to use a voice that is not currently playing a sound. If all voices are being used, the "earliest note" (the one that has been held the longest) will be stopped and allocated to the new note. This is called "last note priority", and is the most often-used allocation method of polyphonic synthesizers.

Note: Only voices which are actually playing will put load on the processor. The VOICES setting puts an upper limit on the PRO53's CPU load. When fewer voices are playing, the CPU load will be less.

Unison Mode allows the PRO-53 to react like a monophonic synthesizer; with all voices sounding the currently playing note. For example, if you are using 16 voices of polyphony, and are in Unison Mode, playing a note will force 16 voices to play the same tone – that's 32 oscillators!. This yields a very full lead or bass sound, and also allows use of the Glide function for portamento (gliding) effects. To create a "fatter" Unison Mode sound, the PRO-53 subtly detunes each voice. The detuning gives a doubling effect that can be used to create a very powerful sound.

Since a few unison voices provide a thicker sound, you will be tempted to increase the VOICES setting to very high numbers. Try it – you will get some great effects. However, each voice uses additional system and CPU resources.

If you are using the PRO53 with a software sequencer on the same machine, you may want to keep the number of voices at a moderate number to allow the sequencer to run efficiently.

Program Editing and Saving

Much of the interest in analog synthesizers is based on their ease of programming. By having a knob or button for each parameter, you can quickly tweak a program to your needs.

Editing the current PRO-53 patch is quite easy: you move the knobs or adjust the switch settings to change the synthesizer's sound. Knob settings are changed by clicking on the control, then moving the mouse up or down to change the value. Button controls are changed by clicking on them. The effect of any panel change can be immediately heard when you play a connected MIDI controller or sequencer.

For extra fine control while working with knob positions, hold down the Shift key while clicking on a knob. This will increase the mouse movement needed to turn the knob.

If you prefer to use a rotary motion of the mouse to turn the knobs (the same way that knobs work in Cubase) you can put the PRO53 in that mode by clicking on the NI logo while holding down the Shift key. You can change the movement method of a knob temporarily from linear to circular by holding down the Alt key while clicking on the knob.

Once you've created a sound you want to keep, you can save its contents into a program (also called a preset or patch). To store the settings into a program, click the RECORD button (which will light up), then click one of the PROGRAM SELECT buttons.

If you want to save the program into a different FILE or BANK, you can select the FILE and BANK locations after you have hit the RECORD button. This will move you to the new FILE and/or BANK, and will save the program once you select a PROGRAM location. Program saving is not complete until you select a PROGRAM slot. Only then will the light in the RECORD button go out. If you deactivate the RECORD button by clicking on it, you will cancel the operation and the program memory will remain unchanged.

Also see FILE (LOAD and SAVE) on page 29.

Prophet-5 Sys-Ex

The operation of synthesis engine of the PRO-53 is so close to the famous Prophet-5™, that it can even receive the old MIDI System Exclusive preset dump format and reproduce the sounds faithfully.

To send the current sound from a Prophet-5™ with a built-in Sequential Circuits™ MIDI interface, press the Programmer button 2 while holding down the Record button. Then you need to press any note on the keyboard. If the Prophet-5™ is correctly connected to a computer running the standalone PRO-53, its knobs and buttons will move corresponding to the transmitted sound. All you need to do then is give the sound a proper name and store it in the PRO-53's memory and/or as a file.

The Application Menu

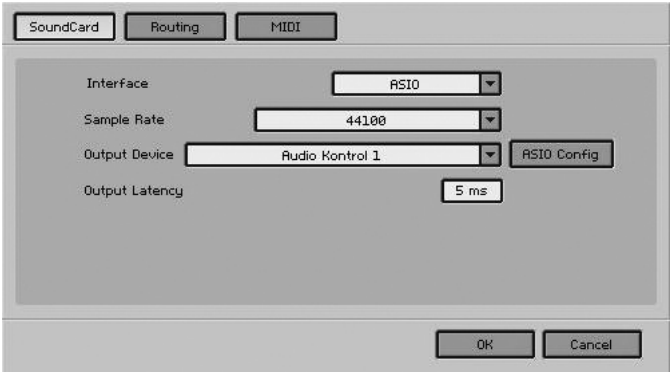
When Pro-53 is used as a stand-alone application, i.e. not as a plug-in within a host, it features a general application menu like most programs do. Most importantly, the menu provides access to the program's preference settings (where your audio interface is set up) and to the Service Center (where you can activate your copy of Pro-53).

The following explanations follow the Windows version of Pro-53. The menu is structured slightly different on Mac OS X, according to the operating system's standards. The menu items, however, are the same for both platforms.

File Menu

The Open and Save commands of the File Menu are equivalent to the Load and Save buttons described on page 29.

The Audio and MIDI settings entry brings up the Audio Setup dialog. Using the dialog you can set your system's audio interface options. In particular, you can define the soundcard which is used for audio output. More detailed information on setting up your system is given within the separate Setup Guide.



The Exit entry of the File Menu quits the stand-alone version of Pro-53. Note that changes you made to a sound are lost if you didn't save the sound before, using the Save command.

Help Menu

The entry Launch Service Center starts the separate Service Center application. With this program you can easily activate your copy of Pro-53 using the internet. It also conveniently lists all updates for Pro-53 available for download.

The Open Manual entry shows this text as a PDF on your computer.

Clicking the entry Visit Pro-53 on the Web opens your internet browser and loads the homepage of Pro-53. Here you'll find additional information about the application. As long as Pro-53 is not activated, the entry is followed by Buy Pro-53, which opens the Native Instruments online shop within your internet browser.

The entry About Pro-53, finally, brings up the 'about' dialog. Here the application's version number is displayed.

The NI logo menu

Clicking on the NI logo opens a menu with the following entries:

Dump CCs

This command causes a controller dump of all PRO-53 parameters. The PRO-53 transmits the MIDI CC and its value for the current state of each control.

Enable Automatic Dump

Enable this option for automatically dumping all parameters as MIDI controllers every time you do a program change. This is useful when using the PRO-53 with controllers like the IBK 10Control or Doepfer Pocket Dial.

Load Microtuning

It is possible to use microtonal scales with the PRO-53. Use this command to get a File Open... dialog for loading a Microtuning file. There are a number of Microtunings available in the Presets folder of your PRO-53 installation. You can edit the files with a text editor and make your own scales. Save your file under any name with the file extension *.p5m. The currently used Microtuning applies to all programs and will be saved with a song or session. To reset the PRO-53 to the standard equal tempered scale, use the Reset Microtuning command from the NI logo menu.

Reset Microtuning

This comnmand resets the PRO-53 to the equal tempered scale.

Load Controllermap

The MIDI controller numbers assigned to the PRO-53 parameters by default can be remapped. There is a file called “Controlmap.txt” in the PRO-53 installation folder. This file is loaded automatically whenever you open the PRO-53 (plug-in or stand alone).

There is a number of additional controller maps located in the PRO-53 installation folder. You can load one by using the Load Controllermap command. Be aware that after a restart of the PRO53, the default map Controlmap.txt is used again unless you edit this file (see below).

To make your own custom assignments you can edit the file “Controlmap.

txt" with a text editor and save it under the same name. Do not change the definitions of the controllers, only modify the numbers which are on the right side of each equal sign. Use the additional option *64 (attached directly to a CC number) for buttons which you want to be activated on even values and deactivated on odd values (this only makes sense for buttons). If the file "Controlmap.txt" contains any entry which isn't supported by the PRO-53 you will get an error message the next time you open the PRO-53, and the controller map is not used in this case.

If you have a PhatBoy, Kawai Macro Control, Nord Lead II , Yamaha DX200 or CS2x, you can use one of the supplied controller maps. Just delete the file "Controlmap.txt", make a copy of "PhatBoyMap.txt", for example, and rename the copy to "Controlmap.txt".

There are also MIDI files with Sysex data for configuring the Kenton Control Freak and 10control for use with the PRO-52 at its default configuration (DefaultMap.txt).

Save Controllermap

After you have created your own controller assignment with the use of the MIDI Learn mode, you can store the assignments as a mapping file under a new name. Remember that you have to overwrite the file Controlmap.txt if you would like to load the new map as default whenever you launch the PRO-53.

View Controllermap

Opens a text editor with a list of all mapped PRO-53 parameters. You can view the current mapping and print it out.

Enable MIDI Learn Mode

Activates the MIDI learn mode. The MIDI learn mode is active until you choose Disable MIDI Learn Mode in the NI logo menu.

In MIDI Learn mode you can assign controls on the PRO-53 panel to MIDI CCs. Just touch a control on the panel so that its name appears in the readout for the program name in the Programmer. Send a MIDI CC (either from an external MIDI device or from a controller track of your sequencer) to assign the control.

In MIDI learn mode it is also possible to enter CC numbers numerically. Therefore select a panel control by clicking on it, click on the controller name or current CC number in the program name readout and enter a new value with the computer keyboard.

Switch to Circular/Linear Mode

This option toggles between two mouse modes for setting knob values with the mouse. If you choose Circular, you can click on a knob and move the mouse clockwise to increase a value and counter clockwise to decrease it. If you choose Linear, you can click on a knob and move the mouse upwards to increase a value and downwards to decrease it.

Show/Hide keyboard

Click this option once to hide the virtual keyboard below the PRO-53 panel. Click it again to show it.

Show CPU usage

When you select this option the program name readout in the Programmer section shows the current CPU usage of the PRO 53. Note that the current number of played voices and the Unison mode affect the CPU usage.

Click on Stop Showing CPU usage in the NI logo menu to leave this display mode.

About Pro-53

Opens the PRO-53 about window where you can find the version number of the software and some additional information.

Front Panel Functions

Editing Operations

The PRO-53 is a fully editable synthesizer, able to produce several voices of audio. The PRO-53 implements a complete synthesizer for each voice that is playing – each voice has sound sources, filters, modulators and an output stage. The front panel controls allow you to edit each of the components in the synthesized voices.

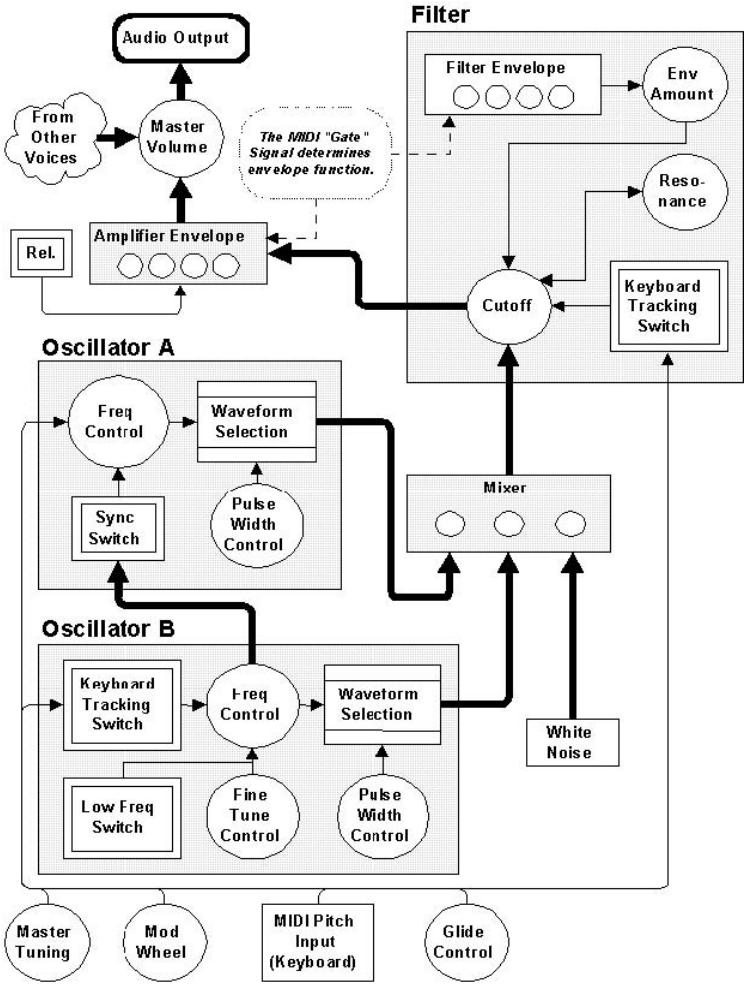
It would be impractical to edit each voice individually. Since the PRO-53 has over 40 editable functions per voice, a 16-voice synthesizer would have 600+ knobs and switches. Not practical.

Instead (and like the classic synthesizers of the 80's), the front panel of the PRO-53 has a user interface for a single voice. When editing from the front panel, all voices produced by the PRO-53 will use these same settings. While this might seem limiting, it allows for a much more usable editing system. If all voices did not use the same program settings, you would never be able to tell which notes in a chord would have any specific tone.

This section of the manual will cover the flow of signals through the PRO-53 synthesis engine and the function of each knob and switch on the front panel. This is not a tutorial on synthesis; rather, it is an overview of the PRO-53 editing tools. In the subsequent section , we will experiment with the editing functions to understand the use of these tools.

Signal Flow

This chart illustrates the signal flow within the PRO-53:



Oscillator A

Oscillator A is the tone source that usually represents the "primary" pitch of a program. Its pitch is controlled by incoming MIDI data, and would normally be used as the fundamental tone of a programmed sound. The controls available for Oscillator A are:

FREQUENCY

The FREQ knob controls the base pitch of this sound source. It is limited to semitone increments, and can be varied over four octaves.

Waveshape (Sawtooth and Pulse switches)

Oscillator A can produce both sawtooth (ramp-like) and pulse (square-like) waveforms. You can select either waveform, both waveforms or no waveform. If both waveforms are chosen, the output of this module will be an even mix of sawtooth and pulse waveforms. If neither waveform is selected, there will be no output from Oscillator A.

PW (Pulse Width)

If the pulse wave is selected, the Pulse Width (PW) control will determine the percentage width of the "positive" side of the pulse. This has the effect of adjusting the harmonic content of the waveform. The Pulse Width control allows for settings from 1% (fully left) to 99% (fully right). When this control is centered, the result is a standard square wave.

SYNC

When activated, the SYNC setting will force Oscillator A to "hard synchronize" with Oscillator B. Synchronization forces this oscillator's waveform to "restart" each time Oscillator B's waveform begins. The result of synchronization is the creation of interesting waveforms by either reinforcing harmonics of the controlling oscillator, or adding new, unusual harmonics to the output signal.

It is important to note that, when in Sync mode, the frequency settings of Oscillator A only adjust the timbre of the oscillator – Oscillator B alone determines the pitch of the sound.

A will follow the pitch of incoming MIDI notes. Settings of Oscillator B are simply used to change the harmonic content of this oscillator.

Oscillator B

Oscillator B is used as both a sound and modulation source. In addition to having more waveforms and finer frequency control, Oscillator B can be used as an LFO (Low Frequency Oscillator). This module can also be "disconnected" from the incoming MIDI stream, allowing it to operate independent of the pitch being played.

FREQUENCY

The FREQ control on Oscillator B works identically to that found on Oscillator A. It increments the frequency by semi-tones, and provides a +/- 2 octave range. When the LO FREQ control is on, this control allows the frequency to be varied from roughly 0.3 Hz (one cycle every three seconds) to 30 Hz.

FINE

The fine control knob allows the tuning of Oscillator B to be adjusted continuously over a range of one semitone. When this control is turned fully counter-clockwise, there is no effect on the oscillator frequency.

Waveshape (Sawtooth, Triangle and Pulse switches)

Oscillator B can produce sawtooth, triangle and pulse waveforms. You can select any combination of waveforms, and the output will be an even mix of the selected waveform. If no waveform is selected, there is no output from the Oscillator B module.

PW (Pulse Width)

If the pulse wave is selected for output, the Pulse Width (PW) control works the same as in Oscillator A. As with Oscillator A, the Pulse Width control has no effect on waveforms other than the pulse wave.

LO FREQ (Low Frequency switch)

When selected, this switch turns Oscillator B into a Low Frequency Oscillator. The frequency range varies from 0.3 Hz to 30 Hz, with the rate selected using the FREQUENCY and FINE controls.

KEYB (Keyboard Switch)

When "ON", the Keyboard switch forces Oscillator B to be controlled by incoming MIDI note messages. If turned off, the frequency can only be controlled by the front panel knobs, MIDI continuous controllers and the modulation functions.

Mixer

The mixer section allows you to determine the relative volume of each of the oscillators, as well as allowing for white noise to be included in the signal. The output of the Mixer is a single audio signal, which is subsequently sent to the filter.

OSC A (Oscillator A)

This knob controls the level of the OSCILLATOR A tone passed to the filter.

OSC B (Oscillator B)

This controls the level of the OSCILLATOR B audio passed to the filter. If you are using OSCILLATOR B only as a modulation source, you will want to turn this control completely counterclockwise.

NOISE

The NOISE control mixes white noise into the signal stream. White noise is a randomly generated audio signal where all frequencies are of equal level. Using white noise as a signal allows you to simulate non-tonal instruments (such as cymbals and wind noises).

EXT IN

When using the PRO-53 as a VST-Effect (as opposed to a VST-Instrument), an external audio signal can be routed through its filters, amplifiers and effect. When EXT IN is turned up, any input signal is added in with the PRO-53's

oscillator signal at the Mixer. You still need to play some notes, though, to make sure that the amplitude envelope opens up and allows the signal to go through. Even if you have the oscillators turned off, you can use note pitch to control the filter cutoff by turning up filter keyboard tracking (KEYB).

Filter

The PRO-53 filter section provides harmonic control with a 24 dB/oct low pass resonant audio filter. In addition to cutoff and resonance controls, the filter section includes a dedicated filter envelope with variable modulation effect.

HPF

The Filter can operate in two modes: Low Pass (LPF) or High Pass (HPF). When the HPF button is off, the filter is Low Pass mode, in which the high frequency components of the sound are greatly reduced. When HPF is activated, the filter is in High Pass mode, in which the low frequencies are greatly reduced. The result is that you get thin, airy sounds instead of full, warm sounds.

CUTOFF

The filter's CUTOFF control determines the frequency at which the filter begins to affect the program's harmonic content. In LPF mode frequencies below the cutoff setting will be passed through the filter circuitry unchanged. The effect of the filter is to "clamp down" on high frequency components of the sound. In HPF mode frequencies above the cutoff setting will be passed through.

RESONANCE

The addition of Resonance to a filter provides a peculiarity to the filter's function – it adds a slight "boost" in gain at the filter cutoff point. When used in moderation, this gives the effect of accenting the cutoff frequency of the output signal. When at a high level, however, the Resonance control will actually cause self-oscillation within the filter circuitry, producing an audible tone at the cutoff frequency. When used in conjunction with the KEYB control, you can actually "play" the filter as if it were an oscillator.

ENV AMOUNT (Envelope Amount)

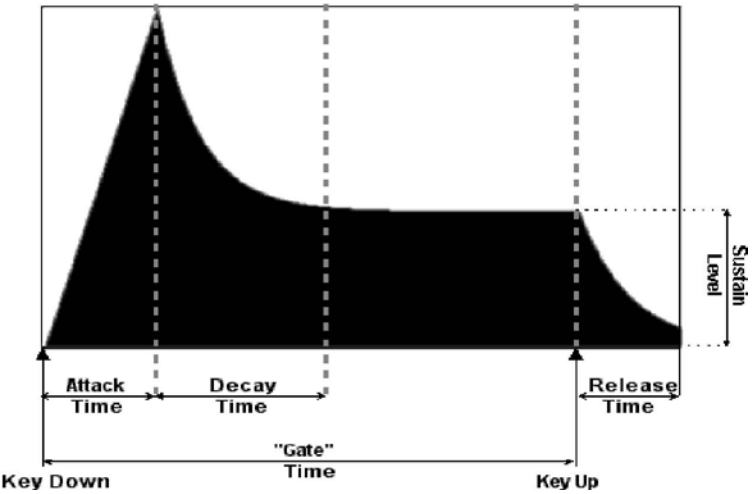
This control determines the level of envelope control over the cutoff frequency. When turned counter-clockwise, the Filter Envelope will have no effect on the cutoff frequency. When set to its highest level, the envelope will exert extensive control over the cutoff. Filter Envelope modulation of the filter is often used to provide the "thump" in bass notes or the stabbing sound of synthesized brass.

KEYB (Keyboard)

The KEYB knob determines how much the cutoff frequency of each voice will follow the MIDI note pitch. When this is engaged, the actual filter cutoff will vary based on the currently playing note. When the Keyboard knob is turned counter-clockwise, the filter cutoff will be the same regardless of the note played. This function is often called "key tracking". You will often use key tracking when creating patches that span the entire keyboard (such as strings, brass or synth pads).

Envelope Controls (ATTACK, DECAY, SUSTAIN, RELEASE)

The four Filter Envelope controls determine the ADSR envelope modulation of the filter cutoff. They are used to describe the following "path":



Envelope Signal

Modifying the Filter Envelope controls can provide a great range of effects on the output sound. Example Two in the the chapter "Exploring Patches" (Brass Ensemble on page 40) provides a few examples of the flexibility of the Filter Envelope.

The ATTACK setting determines the amount of time, from the initial key press, for the envelope to reach its maximum level. If set to a low setting, the envelope will cause a quick leap in the filter level. If set at a higher setting, the envelope will "swell" to its maximum level.

The DECAY setting describes the amount of time to fall from maximum setting to the SUSTAIN level. If the SUSTAIN setting is at maximum, the DECAY time will have no impact. However, if the SUSTAIN setting is less than maximum, the decay time will cause a drop in level over the selected time.

The SUSTAIN setting, unlike the other settings, is not time-based. Rather, it determines the control level for the duration of time that the note is being held.

The RELEASE setting determines the amount of time it will take the sound to "fade out" once a key is released. At the minimum setting, the note will stop immediately on key release. As the RELEASE value is increased, the sound takes longer to drop to silence.

If the RELEASE switch (see page 28) is off, then the RELEASE knob here will have no effect.

INV

When the INV button is activated, the action of the filter envelope on the filter is inverted. Normally (INF off), when ENV AMT is turned up, the filter's Cutoff rises in the Attack stage and drops back in the Decay and Release stages. However, with INV on, the Cutoff drops during the Attack stage and comes back up in the Decay and Release stages. This can be useful for effect sounds.

Amplifier

The amplifier controls provide a dedicated ADSR envelope for the output amplitude.

Envelope Controls (ATTACK, DECAY, SUSTAIN, RELEASE)

The Amplifier Envelope controls work in a similar fashion to the Filter Envelope controls. However, instead of modifying the filter cutoff, this envelope modifies the output volume of the program. Using these controls, you can markedly change the sound of a patch, varying a sound from a legato pad to popping bass. Example One in the chapter "Exploring Patches" section (String Patch) will provide several examples of the variety of effects available with the Amplifier Envelope.

HOLD

When you switch on the HOLD button, a ghostly hand presses a key (middle C) and doesn't let go. You can press more keys, if you like, and they all get held until you turn off the HOLD button. This is useful when adjusting sounds, so you don't have to keep holding down notes to hear anything. Also when using Pro-53fx as an effects plug-in to process audio through the filter and effects. Many VST hosts cannot send MIDI Notes to effects plug-ins, but with the HOLD button, Pro-53 can make a sound even without MIDI Notes. The HOLD function is also especially useful together with the LFO ENV-TRIG feature, to make Pro-53 play rhythmically even without any MIDI input.

Please note that the held notes are also released when you release the MIDI foot pedal.

Other Controls and Displays

The controls found below the Oscillator B section display and control the PRO-53's voicing section.

GLIDE

When Unison Mode is engaged, the GLIDE knob determines the amount of time it takes the PRO-53 to slide from the previous note's pitch to a new pitch. This is the portamento effect that is common among monophonic synthesizers. The range of this function is from 0 seconds (when turned counter-clockwise) to 5 seconds (fully engaged).

UNISON

Engaging the UNISON switch will place the PRO-53 into Unison Mode (as described in the chapter "Polyphony, Unison Mode and Voice Selection" on page 11).

VOICES

This display shows the number of voices of polyphony available to the PRO-53 synthesis engine. It also functions as the control for changing the amount of polyphony. To adjust this setting, click and hold the mouse button on the display, then drag the mouse up or down to change the value.

ANALOG

In actual analog electronic circuitry, small deviations from the design specification are always present. For example this is the reason that analog oscillators are always slightly detuned. This behaviour can be emulated in the PRO-53 with the ANALOG knob. By turning it up, some amount of random deviation is introduced throughout the synth engine. This random detuning is particularly noticeable in Unison mode, where the tuning variances will cause a monophonic patch to thicken.

When ANALOG is turned to minimum, the PRO-53 is in "digital" mode where all signals in the synthesis engine are in mathematically precise calibration.

VEL (Velocity Sensitivity)

The Velocity switch determines if the incoming MIDI note velocities will control the envelope functions. When engaged, velocity will vary the amplifier envelope by 90%, and the filter envelope by 70%. The use of velocity control can help add "touch" to the programmed sound.

RELEASE

The Release control determines if the "Release Time" settings of the filter and amplifier envelopes are used. When this button is enabled, the envelope release times work as expected. When the button is disabled, release times are set to their minimal positions. This control could be operated by a footswitch, which would allow you to simulate the use of a "sustain pedal" for the appropriate type of sound.

FILE (LOAD and SAVE)

The buttons called LOAD and SAVE in the FILE section let you import new sounds into the PRO-53 or store your own sounds to disk.

You can choose whether to save all 512 programs, the selected file (64 programs), the selected bank (8 programs) or just the one selected program. Similarly for loading from a file and overwriting a number of memory locations. By clicking on the LOAD or SAVE button, you open a Dialog in which you can choose a file on disk and (under Windows) select the file type. The filename extension *.p5a is for all 512 sounds, *.p5f is for a File, *.p5b is a Bank and *.p5p is a singla Program.

The current File, Bank and Program numbers are given by the three digits in the PROGRAMMER display. So if the display shows 253, for example, loading a File (*.p5f) will overwrite all 64 sounds in File 2, a Bank (*.p5b) will go into the fifth Bank of File 2 and a single Program (*.p5p) goes into position 253.

Likewise, the SAVE button will store File 2, the fifth Bank of File 2 or just Program 253. The stored sounds can later be loaded into the PRO-53 at any position.

The output control section (located below the amplifier envelope controls) adds controlling the output volume. Additionally, an incoming MIDI indicator and TUNE button are provided.

TUNE

The tuning control allows you to change the “Master Tuning” of the entire PRO-53. The range of this knob is +/-1 semitone.

A-440

When the A-440 switch is engaged, a tuning standard is mixed with the output of the PRO-53. This will allow you to tune other electronic or acoustic instruments to the PRO-53, or to check the tuning of the synthesizer engine.

This tone can also be useful for verifying that you are properly routing audio from this device.

VOLUME

Overall output level is controlled with the Volume knob. This is a global setting which is not stored in programs.

MIDI

The MIDI indicator will flash whenever MIDI input is received by the PRO-53. This can be useful in verifying that you are properly routing MIDI data to this device.

Modulation Routing

Before discussion about the modulation controls (the LFO, Poly-Mod and Wheel-Mod synthesizer sections), it will be useful to cover the extensive modulation routing of the PRO-53 synthesizer engine. Modulation allows certain signals to control the functionality of other signal-producing sections.

The modulation routing system is extremely complex. The section the chapter "Exploring Patches" will help decipher the meaning of these modulation sections. Also, each modulation section has a diagram that (hopefully) will help you understand the various available control routings.

LFO

The LFO module provides a modulation signal for the Wheel-Mod control sections. An LFO, short for Low Frequency Oscillator, is an oscillator that runs below audio rate (below 20 cycles per second). In addition to standard LFO functionality, the PRO-53's LFO will also sync to MIDI Clock.

ENV-TRIG

When ENV-TRIG activated, the LFO automatically retriggers any held notes. When HOLD is also on, you don't even need to hold down any notes by hand. By activating MIDI sync mode, the automatically played notes always fit to the tempo of the song. In the first half of each LFO cycle, the Envelopes are in the Attack and Decay stages, and in the second half of the cycle they are in the Release stage. Then it repeats...

MIDI SYNC

When MIDI SYNC is activated, and MIDI clocks are being received by the PRO-53, the LFO FREQUENCY knob will work in “quantized” mode (described below).

FREQUENCY

The Frequency control determines the rate of the LFO oscillation. When at its minimum setting, the LFO cycles at about 0.04 Hz (1 cycle every 25 seconds). At its maximum setting, the LFO will achieve a 20Hz (20 cycles per second) rate.

When MIDI SYNC is turned on, the Frequency control will “lock” the LFO to the nearest appropriate tempo. As the Frequency control is increased, the locking function will select a larger quantization value. It is sensitive to 1/16 and 1/8 note values, as well as triplet figures.

Waveshape (Sawtooth, Triangle and Square switches)

The Waveshape switches determine what type of output will be created by the LFO. The sawtooth waveform is used for situations where you want only a rising modulation. The triangle wave, probably the most popular LFO waveform, provides both rising and falling slopes. Finally, the square wave will alternate between two setting (example: British police sirens).

When all buttons are off, the output of the LFO is a constant. With this, the Mod-Wheel can be used to directly make a filter sweep, for example.

Sample & Hold Mode

When all three waveform selector switches in the LFO are turned on, the LFO enters the Sample&Hold mode. The ouput waveform is now a continuous series of steps where the value changes once every LFO cycle to a random value. This can be used to good effect to bring some life to the sound (in a machine kind of way), because the random LFO signal never exactly repeats itself.

This is especially effective when combined with the LFO ENVTRIG mode, so that you get a different Filter Cutoff every time the notes retrigger.

Poly-Mod

The Poly-Mod section provides a modulation system unique among polysynths. The Poly-Mod system can use both the filter envelope and the Oscillator B signals to control three different signals: The frequency of Oscillator A, the Pulse Width of Oscillator A and the Filter Cutoff.

FILT ENV (Filter Envelope Input)

The FILT ENV input determines the level of effect that the filter envelope will have on the Poly-Mod output. When set to the minimum position, the filter envelope will not be used. When set to the maximum, the filter envelope will have a great effect as a signal modulator.

OSC B (Oscillator B)

Using an oscillator as a modulation source can create FM- and LFO-type effects. The OSC B setting will determine how much effect the output of Oscillator B will have on the selected modulation destination.

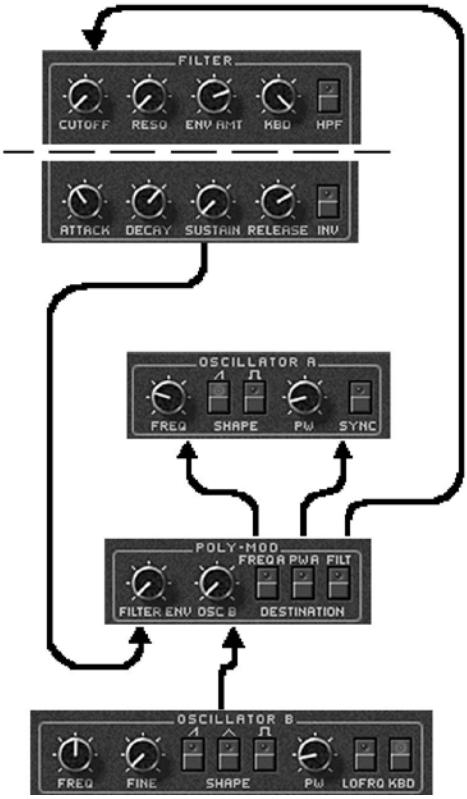
DESTINATION (FREQ A, PW A and FILT switches)

The destination switches determine which signals the Poly-Mod system modulates. If FREQ A is selected, the frequency of Oscillator A will be affected. Depending on the settings of the FILT ENV and OSC B controls, you will be able to create pitch slides, FM clanging or wild pitch LFO effects.

Selecting the PW A switch will cause the Poly-Mod system to affect the Pulse Width of Oscillator A. This is most often used to add thickness to a sound.

The FILT destination switch will allow the Poly-Mod section to modulate the Filter Cutoff setting. Modulating the filter cutoff will allow you to create LFO-or FM-based filter effects, as well as increasing the effect of the filter envelope.

Poly-Mod routings are shown in the following diagram:



Wheel-Mod

WHEEL-MOD controls determine the effect of incoming MIDI Modulation Wheel control messages. This section can use either the LFO or a Pink Noise signal (or a mixed combination) as input, and can modify the frequency or pulse width of both oscillators as well as the filter cutoff. In all cases, the current position of the "Mod Wheel" will determine the amount of modulation.

LFO/NOISE

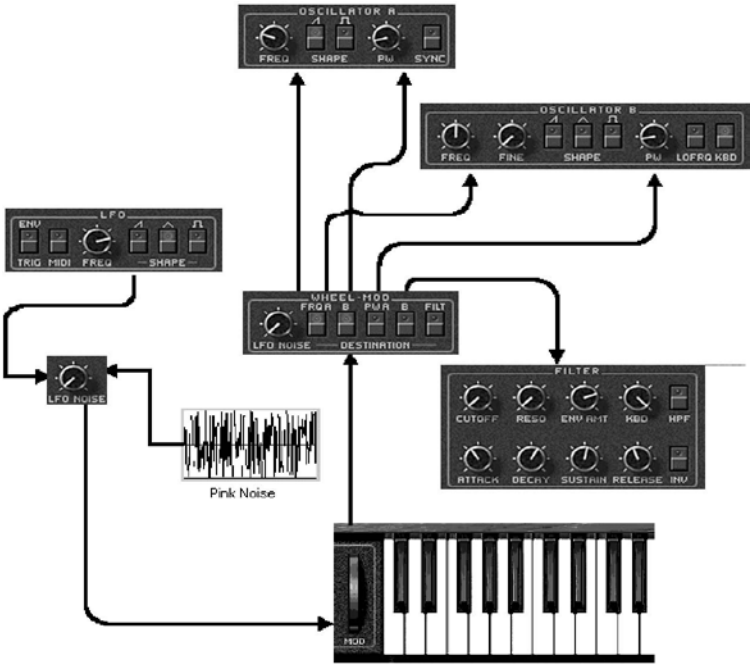
The LFO/NOISE fader determines the mix of the modulation sources applied with the Mod Wheel. When turned counter-clockwise, the modulation source is the output of the LFO section. When completely clockwise, the source is the output of a pink noise generator. When placed between these extremes, the source is a mixture of the two signals.

Destination (FREQ A, B, PW A, PW B, FILT switches)

The destination switches determine the signals that will be affected by the Mod Wheel position. Selecting the FREQ A or [FREQ] B destinations will allow you to apply LFO or noise modulation to the frequencies of oscillator A and B, respectively. This can provide interesting pitch and timbre alterations.

The PW A and PW B switches provide modulation of the pulse with of the two oscillators. This can add great depth to you patch when using the pulse waveshapes on the oscillators. Finally, the FILTER switch will allow you to add LFO and noise modulation of the filter cutoff. This can create long sweeping or warbling filter effects by simply moving the modulation wheel.

Wheel-Mod routing may be illustrated by the following diagram:



Delay Effect

The PRO-53 incorporates a powerful and flexible digital effects unit. It processes the sound generated by the synthesis voices to thicken and liven up the sound with such popular effects as chorus, flanging or echo. These effects or combinations of them, in subtle shades or extreme amounts, can be set up be adjusting the controls in the DELAY EFFECT section of the panel.

What you have here isn't just one delay processor, you have four in parallel!

That's the secret behind the exceptional sound. This works in much the same way as the UNISON button which gives a powerful sound to the voices by stacking them on the same note. You will see below how you have full control over the "detuning" of the four delays to control the thickness of the effect.

TIME

The TIME knob sets the basic delay time of the digital delay lines that are at the heart of the effect. When set fully counter-clockwise, the delay time is very short (1 msec), as used for flanging effects. Turning the knob up one third, you get the short delay times (10 msec) used for chorus effects. At two thirds (100 msec) you are in the region of slapback echo and at fully clockwise (1 sec) you have a long echo.

SPREAD

The delay times of the four delay lines can be "spread out" to different values by adjusting this knob. When SPREAD is set fully counter-clockwise, all delays have the same basic time (but they can be modulated individually, see below). With SPREAD at maximum, one delay is at double the basic time, another is at zero, and the other two are in between. You get a nice rhythmic pattern of echoes with SPREAD centered.

With SPREAD at zero you get a hard sound, especially with flanging. Turn up SPREAD for a generally more diffuse sound.

DEPTH

Turn up this knob to engage the effect's LFOs for modulating the delay time. Chorus and flanging work by delay modulation. In fact you can have a long delay time (echo) and modulation (chorus) at the same time!

RATE

The rate of LFO modulation can be adjusted here in the range of 0.25 Hz to 25 Hz. The faster the rate, the stronger the modulation effect.

FEEDBACK

Turn up this knob to route the output of the effect back into its input. Use this for echoes with many repeats or swirly flanger sounds.

LPF

The effect signal passes through a Low Pass Filter. Here you can adjust its cutoff frequency to attenuate the treble. When the LPF knob is set to maximum the filter has no effect. As you reduce the cutoff setting, more and more high frequency content is removed from the delayed signal.

HPF

The effect signal also passes through a High Pass Filter. Here you can adjust its cutoff frequency to attenuate the bass. When the HPF knob is set to minimum the filter has no effect. As you increase the cutoff setting, more and more low frequency content is removed from the delayed signal.

WET

The sound passing through the delays ("wet") is mixed in with the original unprocessed sound ("dry"). This knob determines how much of the two sounds you finally hear. With WET at minimum, you don't hear any effect signal. With WET at maximum, you hear only the signal coming through the delays. For chorus and flanging you want both to be at the same level, so you set the knob to the middle position.

ON

This button switches the delay effect on. When you are not using the effects section, be sure to turn this button off to save some CPU load.

INV

This button is used to invert the phase of the audio signals going through the delays. The two position give a subtle change of sound as different frequencies are cancelled out when mixing the dry and wet signal, especially with flanging.

SYNC

Each of the four delays has a separate LFO for modulating the delay time. When SYNC is switched on, the four LFOs are perfectly synchronised. This gives a harder sound, especially for flanging.

Another effect of the SYNC button is on the delay times when SPREAD is active. With SYNC on, the delays are spread in a regular pattern, perfect for rhythmic echoes. With SYNC off, the delay times are irregular, for diffuse reverb-like sound.

MIDI

The delay can be synchronised to the MIDI tempo, just like with the main LFO (at the left end of the panel). Switch on the MIDI button and the delay time is quantised to straight or triplet notes at the current song tempo. Depending on the setting of the TIME knob, you get repeats at quarter-notes, eighth-notes, sixteenth-notes etc.

Exploring Patches

In this section of the manual, we will work with a number of the preset patches that are included with the Native Instruments PRO-53. In addition to pointing out interesting patches, we will also experiment with some of the PRO-53's settings, and will use the unique analog control functions to widely alter these patches to create new and interesting sounds.

String Patch and the Amplifier Envelope

Select patch 412 from the default programs. You can select this patch by pressing the FILE button in the PROGRAMMER section, then pressing (in order) the 4, 1 and 2 PROGRAM SELECT buttons. If you play a few notes, you will find that a simple synthstring sound is created. The PRO-53 should have AMPLIFIER settings similar to the following snapshot:

To better understand the use of the Amplifier Envelope, let's experiment with a variety of settings. First, move the ATTACK control (in the AMPLIFIER section) to the 4 o'clock position. If you play a chord, you will notice that the sound swells to a crescendo, rather than simply starting as soon as you hit the keyboard. The ATTACK control determines the amount of time that it takes for a patch to move from silence to its full volume.

With the ATTACK control still at the 4 o'clock position, move the RELEASE setting to a 3 o'clock position. Now hit a few notes. The volume still swells to full volume. However, when you release the keys, you will notice that the volume slowly fades away. This is a great example of the RELEASE function – it determines the amount of time it takes for the sound to fade out.

Next, move the SUSTAIN control to the 9 o'clock position. If you play a chord again, you will notice that the volume still swells, but then moves to a much lower volume. Unlike the other controls, the SUSTAIN knob controls the level of the output – it represents the level of gain that is used while you are holding the keys down. Changing this value will alter the "held" volume of the patch.

Keeping the SUSTAIN control at the 9 o'clock position, change the DECAY property to the 3 o'clock position. Again, hit and hold a chord. After the initial swell (from the ATTACK setting), you will hear a slow fade as the volume

moves to the SUSTAIN level. This is due to the DECAY controls function – a setting that controls the time to move from the full "ATTACK-level" setting to the "SUSTAIN-level" setting. It allows us to create sounds with initial swells that also fade into lower-level pads.

If you now turn the SUSTAIN control to its minimum setting, you will now hear only the ATTACK and DECAY sections of the envelope. By turning off the SUSTAIN level, holding the keys will have no effect. Remember, SUSTAIN is a level control! By turning this off, we have reduced the "held" volume to zero. Move the ATTACK setting to its lowest and the DECAY setting to the 12 o'clock position. We have changed the patch to simulate a "plucked" string section sound. Altering the DECAY setting will allow you to create many different orchestral and string effects.

Brass Ensemble Patches and the Filter Section

Patch 426, when selected, will create the sound of a synthetic horn section. When you play a chord, the sound gives you an initial bright hit, then becomes both quieter and "duller" as it is held. The filter settings of this PRO-53 patch should resemble the following:

As seen in the previous example, the amplifier envelope can modulate the output levels to provide the level changes. However, this patch also uses the filter section to create the impression of a horn stab. Let's experiment with the filter section to create some different horn section sounds.

The PRO-53 has an implementation of a low-pass filter. This type of filter works by reducing the level of any frequency above the "cutoff" point. This is useful in any situation where the high harmonics of the oscillators needs to be controlled.

First, using the FILTER CUTOFF knob, change the point at which the filter becomes active. If you have the CUTOFF at a very high setting, you will notice almost no filter effect – all of the high harmonics of the brass sound are allowed through to the audio output. On the other hand, if you have the

CUTOFF setting very low, almost no sound will be heard. In this case, not only are the harmonic levels being reduced, but the fundamental tones are reduced as well. Reset the CUTOFF to its original position.

Next, use the RESONANCE knob to adjust the filter resonance. At low settings, there is not much to notice. As you increase the setting, however, you will find that the sound takes on a sharper tone. Once you push the RESONANCE setting to a high level, the sound will change to a ringing squeal.

The use of resonance in a filter provides an abrupt level increase just before the filter cutoff point. It is normally used to emphasize the frequency of the CUTOFF control. However, when placed at a high setting, the increased gain will cause the filter to "selfoscillate", and create a completely new tone. Since the frequency of the tone is based on the CUTOFF setting, you can manipulate this sound with the keyboard, with the FILTER ENVELOPE or with the CUTOFF knob.

In this horn patch, we are using the FILTER ENVELOPE to control the filter CUTOFF setting. The amount of control is based on the ENV AMOUNT knob. If you manipulate this setting, you will hear a greater amount of change in both the initial "hit" brightness as well as a more pronounced dulling of the sound as a note (or chord) is held.

Leaving the ENV AMOUNT knob at a pretty high setting, adjust the settings of the ATTACK, DECAY, SUSTAIN and RELEASE settings. These envelope settings work just as the amplifier envelope did, but only affect the sound of the filter. If you set the ATTACK time setting to a longer period, the sound will change to from a "hit" to a "swell". The DECAY time setting, along with a relatively low SUSTAIN level setting, will give the feeling of the horns "falling" to the lower level.

Use of the filter envelope's RELEASE setting is a bit tricky, since it is dependent on the amplifier's RELEASE setting. For example, if (as in this case) the amplifier's RELEASE setting is short, and the filter RELEASE setting is long, the output sound will be "turned off" before you could hear any change made by the filter envelope. In general, the filter envelope's RELEASE setting should be less than the amplifier RELEASE setting unless you never want to hear the result of the filter release.

The use of the filter section, and especially the filter envelope, can have a dramatic impact on the sound of your patch. When developing your own sounds, or when you modify existing sound, try to use the filter section to fine tune the PRO-53's output to fit your music.

Solo Horn Patches and Vibrato Effects

Select patch 411 for an example of a trumpet-like sound.

With any solo horn sound, a useful vibrato is very important. Play a note on a connected keyboard, and use the modulation wheel to bring in some vibrato. This is done using the WHEEL-MOD section in combination with the LFO system. In this patch example, we will work with the LFO section to apply different vibrato effects.

First, take a look at the WHEEL-MOD section. Notice that the LFO/NOISE fader is turned completely to LFO. This means only the LFO is used to affect the vibrato sound. Also note that the DESTINATION switches used for Wheel-Mod are set to the FREQ A and B routings. These settings will route the LFO modulation to the pitch setting of the two oscillators.

Just to experiment with the Wheel-Mod setting, move the LFO/ NOISE fader toward the NOISE setting while holding a note (and keeping the Mod Wheel set high). You will hear the smooth vibrato change to a rougher effect. This is based on the change of the modulation source from smooth LFO to rough noise. Return the setting to LFO for the remainder of the example.

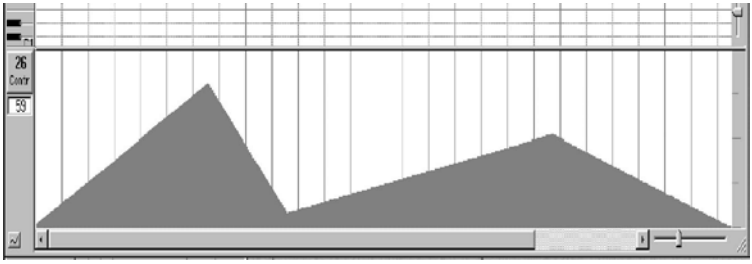
Next, examine the LFO settings. The frequency is set at about the halfway position, and the shape is set to the Triangle waveform. With the Mod Wheel still set "high", hit a note on your MIDI controller. As the note is sounding, change the FREQUENCY setting. The vibrato rate will speed up or slow down as you turn the knob. Set the FREQUENCY to a relatively slow setting, so that we can pay close attention to the difference in shapes.

Change the SHAPE setting to the sawtooth waveform (the first switch). Again play the note while keeping the Mod Wheel setting "high". You will notice that the vibrato changes to more of a ramped effect. While this can be useful as an effect, it doesn't really work as a vibrato source.

Next, change the SHAPE setting to the square waveform. Playing a note (with mod wheel engaged) now creates a warbling pitch. Again, this isn't really a useful vibrato sound, but will be useful for sound effects.

One useful effect when using a synth-horn is to vary the vibrato depth and frequency while you are holding a note. Using the mod wheel, you can easily adjust the vibrato depth. However, we need to find a way to adjust the frequency without being tied to the mouse. If you are using a sequencer to drive the PRO-53, or if you have a programmable MIDI fader box (such as the IBK 10Control, Doepfer Regelwerk or Peavey PC1600), you can control the mod wheel using MIDI Continuous Controller messages.

MIDI controller 26 can control the LFO Frequency setting. If you are using a fader box, you would use the programming interface to set the control to CC#26. Within a sequencer, you can select MIDI CC#26 for editing, and draw in controller changes. Within Cubase, you can select the Note Edit screen, and "draw" the MIDI Controller movements on-screen:



Using this method will allow you to animate the sound of your mixes, and can add a new life to the tracks you are creating.

Electric Piano Patch and Oscillator Tuning

Patch 424 is a pretty typical example of an electric piano patch. The patch has the following oscillator and mixer settings:

This patch uses the sound of both oscillators to create a deeper sound. One way to greatly affect a patch is to alter the oscillator tuning. Using the FINE setting on Oscillator B, adjust the tuning slightly. If you play your MIDI controller while adjusting this control, you will find that the sound changes from a chorus sound, to a "honky-tonk" sound, right through to a downright ugly detuned sound. Once you are done experimenting with the FINE control, reset it to the "in-tune" position for the next experiment.

Now, to create a bit of a different effect, let's adjust the frequency of OSCILLATOR B to provide a greater pitch change. Using the FREQUENCY knob, slowly increase the pitch setting. You will hear one of the tones slowly step one note at a time. Move up seven steps (an interval of a "fifth"), and you will find a natural harmony being created. Using a tuned "fifth" is a

common soloing technique. Play some notes, and even hit some simple chords – OSCILLATOR B's detuning provides both thicker lead lines and interesting chord inversions.

While you are at it, you should adjust the relative volumes of the MIXER section. By varying the levels, you can alter the detuned sound, and can change the apparent intensity of the effect. You can use the controller technique found in the previous tutorial to automate these tuning and mixing effect – just use the controller chart found on page 9 / 10 to control the frequency, tuning and mixing controls.

Sync Patches

Patch 417 is a common analog sound – the "sync" lead patch made popular by The Cars, and a popular rude techno sound. With this patch, we find the SYNC setting in use.

Turning the SYNC switch on forces the waveform of Oscillator A to restart at the beginning of each cycle of Oscillator B. This is commonly called a "hard sync". When the tuning of the oscillators are close to each other, the SYNC switch will tend to force them to "lock" into tune. However, if the tunings are very different, you will find that the sync function causes a "brash" sound, full of clangorous harmonics.

Experiment with the FREQUENCY and shape controls of Oscillator A. You will find that the sound will vary wildly with very small control changes. When you find a setting that you like, save the results – exact duplication of sync sounds can be very difficult, and it's easy to lose a great sync-based patch by over-tweaking your sound.

Manipulating the FREQUENCY setting of Oscillator B will now control the tuning of the sound. This is because Oscillator B controls the "resetting" of the output waveform, and therefore its perceived pitch.

Solo Synth Patches

Select patch 421, where you will find a classic analog monosynth sound. The voicing section looks like this:

When you play the patch, you will notice that only one note will sound at a time. Engaging the UNISON switch causes this behavior. Turn off the UNISON switch, and you will see that the PRO-53 reverts to a standard polyphonic synth sound.

Re-engage the UNISON switch, and the PRO-53 again acts as a monosynth. Next to the UNISON switch is the GLIDE control. This determines the amount of time that it takes for a sound to move from the previous note to any new note that you hit. Move this control to a reasonably high setting, and play some notes on the high and low ranges of the keyboard. You will hear the pitch slowly sweep to the new notes.

In many cases, you will want to use a GLIDE setting for monosynth patches. A very small setting can often add a bit of "life" an otherwise tired sound.

Polysynth Pad Patches

Patch 425 creates a wide, hollow-sounding polyphonic patch. This signature sound is created by the Poly-Mod section, used to modulate the Pulse Width of Oscillator A.

Notice that the Mixer section has Oscillator B completely turned off, and is therefore not being used as an audible waveform source. Oscillator B is being used as a "modulator", where it is used to affect another sound, and not create a sound itself.

In this patch, Oscillator B is being used as an LFO. We need to use Oscillator B, since you cannot use the LFO section for pulse width modulation without requiring use of the Mod Wheel. By creating a slow triangle wave, we can use the Poly-Mod section to affect the pulse width of Oscillator A.

Examine the Poly-Mod section. In addition to selecting PW A (Pulse Width of Oscillator A) as the modulation destination, you can also see that the OSC B knob is set at a moderately high level. Adjust this setting while playing a chord on your MIDI keyboard. This control effectively determines the "depth" of the modulation effect.

The Poly-Mod section is also using the FILTER ENVELOPE for modulation, which allows a slight change in the depth of the sound. If you adjust this setting, you will find that it has a varied effect on the modulation. This is due to the interaction of the two Poly-Mod sources. Because the sources are additive, the Poly-Mod section will often exhibit non-intuitive behavior. Rather than considering this a problem, look at it as an opportunity to keep the PRO-53 fresh and fun – even after years of use.

This concludes our patch experimentation. The PRO-53 is an extremely complex synthesizer, and we have only scratched the surface of its sonic palette. Take the time to experiment with the PRO-53, and save your favorite patches. If you create an especially interesting bank of sounds, feel free to share them with other users. Native Instruments provides a web site with patch information and user mailing lists.

You can find us at:

http://www.native-instruments.com

Enjoy your synth!

Glossary

Amplifier

A device that controls the level of an audio signal.

Analog

Creation of signals using non-digital electronic components. The PRO-53 emulates analog circuitry in program code.

Bank

A collection of eight programs. Banks are selected using the BANK button, and the programs contained within a bank are selected using the PROGRAM SELECT buttons.

Delay Line

A digital device that delays an audio signal passing through it. The signal takes a certain time to reach the output of the delay rather like sound takes a certain time to travel some distance. Like this, a delay can be used for echo effects. When the delay time is changing while the sound is playing, the doppler effect causes the pitch of the sound to change.

Envelope

A modulation source that is used to adjust levels over time. Both the amplifier and filter envelopes are ADSR envelopes, which determines changes in level during the Attack, Decay, Sustain and Release sections of a note's duration.

Filter

An effect that reduces a portion of a signal passed through it. The PRO-53 implements a low-pass filter – a filter that can be used to reduce high-frequency harmonics (while letting low frequency signals "pass through" the circuit).

Frequency

The number of cycles that an oscillator produces each second. When the frequency of an oscillator is in the "audible range" (20Hz – 20kHz), a tone is produced.

LFO

A Low Frequency Oscillator. An LFO is an oscillator that creates signals below the audible range. An LFO is typically used to modulate other signals.

Modulation

Using one signal to affect another. A synthesizer without modulation is somewhat boring. The PRO-53 provides a number of modulation sounces to increase the number and type of sounds that can be created.

Oscillator

An electrical circuit that creates a repeating signal. The oscillators in the PRO-53 utilize program code to simulate actual analog circuitry.

Polyphonic and Polyphony

"Polyphonic" means that a patch can play multiple voices simultaneously. In other words, you are able to play chords with the patch. The Sequential Circuits™ Prophet-5™ was one of the first synthesizers that allowed polyphonic play. "Polyphony" is generally used to describe the number of simultaneous voices that a synthesizer can play.

Polysynth

A shortened name for a polyphonic synthesizer.

Program

A program (also called a patch or preset) is the settings used by the PRO-53 to create a specific sound. Programs are selected using the PROGRAMMER section of the front panel.

Pulse Width

When using a pulse waveform, the pulse width determines what percentage of the signal is "high". In sonic terms, the pulse width is important in setting the harmonic content of a pulse wave tone.

Unison

Using multiple voices to play a single note.

Velocity

The intensity used to hit a MIDI key. If your MIDI controller supports velocity message, each note played will send a "velocity message" indicating how hard the key was struck. The PRO-53 can use velocity messages to alter the filter and amplifier envelope settings.

Voices

A complete synthesizer signal. The Prophet-5™ had five voices – in essence, there were five complete monophonic synths within a single keyboard. With the Native Instruments PRO-53, you can select the number of voices that will be available (generally limited by the speed of your computer).

Waveshape

The "path" that an oscillating signal describes. Common synthesizer waveshapes are the sine, sawtooth, triangle and pulse waves.