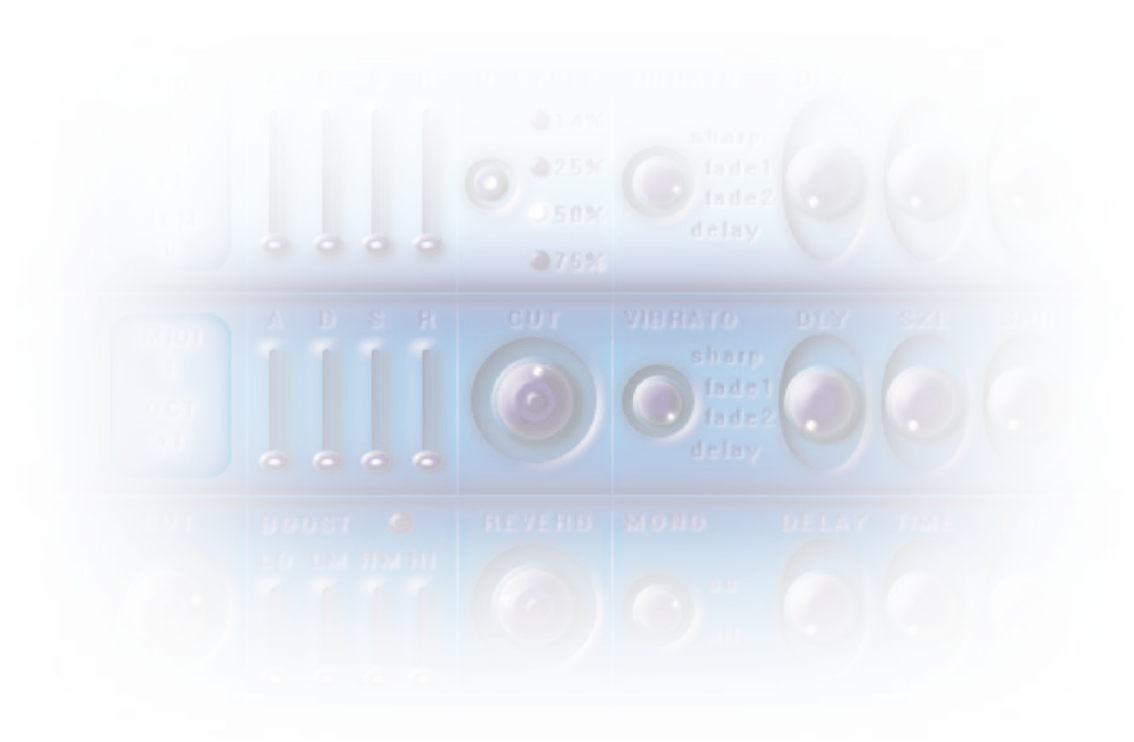




neochip



User Manual
v1.0

Manual: Julian G Harding

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1. Welcome to Neochip

Welcome to the Neochip User Manual.

If you are experienced with synthesis, or can't wait to get started, you can get a quick overview by skimming through this text reading only that which is highlighted blue.

However if you are relatively new to synthesis, or a little unsure of how to use Neochip, please read on!

Neochip is a freeware, 3 oscillator subtractive synthesiser based on the sound characteristics of Nintendo's™ *Nintendo Entertainment System*™. The sound in the console was produced by a chip codenamed 2A03. Neochip is capable of reproducing authentic 2A03 style sounds, as well as using the capabilities of the chip as a starting point for creative sound design.

The *Nintendo Entertainment System*™ has given us some of the finest console music of all time, from composer Koji Kondo's timeless melodies in Nintendo's 1985 classic *Super Mario Brothers*™, to Hirokazu Tanaka's the dark and forboding soundscapes, which accompany Samus Aran's spacebound adventures in *Metroid*™ (1986). Neochip translates some of the distinctive sounds of the NES chip to VSTi format, and allows users of Windows VST compatible hosts to enjoy these distinctive and evocative timbres, as well as a few extras.

Neochip emulates 3 of the *Nintendo Entertainment System's*™ 5 sound channels: 2 Pulse Waveforms with 4 mode fixed percentage duty cycle, and one triangle waveform. These Waveforms are switchable bit-crushed to a fixed bit depth and sample rate. Neochip does not emulate the 2A03 random frequency noise channel, or the PCM Sample player channel.

The Master channel contains a Master low pass Cut, a fixed frequency Boost section, a Reverb mix knob, and an analogue style unsynchronised Delay. These effects allow the user to create pleasing timbres on the front panel, without having to chain plugins in the host sequencer. The user can also access a preset list via your host, containing a number of presets which will help you to get started making great Neochip sounds.

Whether you want traditional *NES* style sounds, deep bass, blazing leads, or future-retro chiptune textures, Neochip is the synth for you.

2. Installation

Neochip only functions withit Microsoft Windows. Remove any previous versions of Neochip, and unpack 'Espertone Neochip v1.0.zip' to your VST plugin directory (ie. C://VstPlugins) and refresh your host. Users of Image Line's™ FL Stidio™ should un-check 'Reset Plugins on Transport' in their General settings tab for better response.

3. Oscillator Overview

3.1. The PULSE Oscillators



3.1.1. MIDI, OCT, & SEM

The first section allows the user to set the MIDI input channel for the oscillator, as well as the pitch output relative to the pitch recieved by Neochip. Click on these numbers to cycle through the possible options:

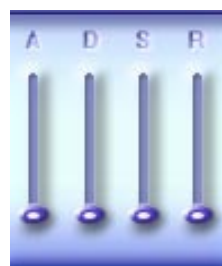
MIDI CHANNEL: 1 to 16
OCTAVE: -2 to +3
SEMITONE: -11 to +11



3.1.2. ADSR

Next in line is the ADSR Volume Envelope. Drag the 4 sliders control the Attack, Decay, Sustain, & Release curve of each oscillator.

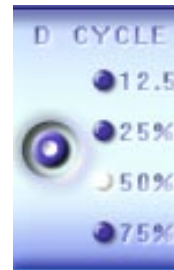
USE THE ADSR EVELOPE TO
CONTROL THE VOLUME OF A
NOTE OVER TIME.



3.1.3. D CYCLE

The D CYCLE control selects from the four Duty Cycle, or 'Pulse Width' modes which were produced by the 2A03 chip. Each has it's own distinctive sound, though 75% sounds identical to 25% when played alone, as it is a signal of inverted phase. To cycle through the available options, press the small button located in the recess under D CYCLE.

USE THE D CYCLE BUTTON
TO SELECT AVAILABLE PULSE
WIDTHS.



3.1.4. VIBRATO - DLY, SZE, & SPD

The VIBRATO controls allow the user to add delayed onset vibrato to each Oscillator. Rotate the small selector switch to choose how the vibrato begins: Sharp for instant Vibrato, Fade 1 & 2 for smooth onset, and Delay for sharp but delayed onset.

SELECT THE ONSET STYLE OF
VIBRATO BY ROTATING THE
SELECTOR KNOB.



The DLY knob controls how long the Vibrato takes to sound, timed from when the note begins. The SZE knob determines the Size of the vibrato in pitch, and finally the SPD knob determines how fast the pitch oscillates.

DLY, SZE & SPD CONTROL THE
DELAY, SIZE, & SPEED OF THE
VIBRATO EFFECT.



3.1.5. LVL

Finally, the LVL knob controls the output volume of the oscillator, use it to balance the output of each oscillator.

USE THE LVL KNOB TO BALANCE
THE OUTPUT OF THE DIFFERENT
OSCILLATORS



3.2. The TRIANGLE Oscillator

Neochip's triangle oscillator functions in an identical way to the Pulse Oscillators, except that it always outputs a Triangle shaped waveform, has no SEM control, and replaces the D CYCLE selector with a CUT knob.



3.2.1. CUT

The CUT knob controls a low pass filter dedicated to the Triangle oscillator. This filter removes high frequencies as it is turned anti-clockwise. This allows for delicate layering of the triangle timbre beneath the two Pulse oscillators, creating interesting sonic textures.

The cut circuit can be switched on and off by pressing the button in the centre of the knob. To rotate the knob, click on the edge and drag up or down.

THE CUT KNOB CONTROLS
A LOWPASS FILTER FOR THE
TRIANGLE WAVE ONLY. CLICK
THE CENTRE TO SWITCH IT ON
AND OFF.



ON



OFF

4. The MASTER Channel

Neochip's Master channel allows the user to apply a variety of effects to the signals produced by the oscillators, shaping the sound beyond the capabilities of the 2A03 chip. Each effect can be applied to any degree, or switched off altogether for a more authentic sound.



4.1. Master Controls

4.1.1. CUT

The CUT knob controls a low pass filter dedicated to the whole output of Neochip. This filter removes high frequencies as it is turned anti-clockwise, perfect if your sound is a little too harsh.

The cut circuit can be switched on and off by pressing the button in the centre of the knob. To rotate the knob, click on the edge and drag up or down.

THE CUT KNOB CONTROLS A LOWPASS FILTER FOR THE MAIN OUTPUT. CLICK THE CENTRE TO SWITCH IT ON AND OFF.



ON



OFF

4.1.2. BOOST

The BOOST section of Neochip allows the user to control the frequency content of a sound by boosting preset bands. Dragging the sliders upwards boosts the corresponding band by a number of decibels. The BOOST function can be used to introduce distortion at high slider levels, especially when boosting the LO band and playing notes in a low octave.

The bands are:

LO	<150Hz low shelf	LM	300Hz broad peak
HM	1.5kHz broad peak	HI	3.5kHz high shelf

The BOOST circuit can be switched on and off using the small button located to the right of BOOST.

YOU CAN BOOST A PARTICULAR FREQUENCY BAND BY DRAGGING THE CORRESPONDING SLIDER UPWARDS. USE THE SMALL BUTTON TO SWITCH THE BOOST CIRCUIT ON AND OFF.



ON



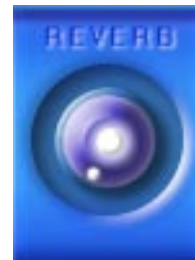
OFF

4.1.3. REVERB

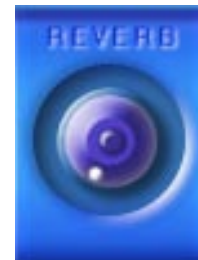
The REVERB knob let the user mix a preset stereo reverb into their sound. Turn the knob clockwise for more Reverb, anti-clockwise for less. Subtle settings can provide a very slight stereo enhancement to the sound, more drastic settings place the sound in a broad, dark space.

The REVERB circuit can be switched on and off by pressing the button in the centre of the knob. To rotate the knob, click on the edge and drag up or down.

TURN THE REVERB KNOB TO ADD DARK REVERB TO THE MIX. USE THE SMALL BUTTON TO SWITCH THE REVERB CIRCUIT ON AND OFF.



ON

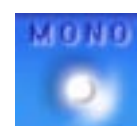


OFF

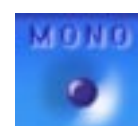
4.1.4. MONO

When the MONO button is set to on, the user can only play one note at a time (monophonic mode). When it is set to off the user can play multiple notes at once (polyphonic mode).

USE THE MONO BUTTON TO SWITCH MONOPHONIC MODE ON AND OFF



ON

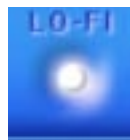


OFF

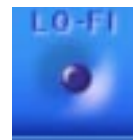
4.1.5. LO-FI

With the LO-FI button on, Neochip's prest bit-crusher is engaged. Combined with a little MASTER CUT this can give you a much more authentic nes sound. It can also be used for some fun sound effects when notes are played at very high frequencies.

USE THE LO-FI SWITCH TO
ACTIVATE THE BIT CRUSHER,
FOR LOW QUALITY SOUND.



ON



OFF

4.1.6. DELAY, TIME, FBK

These 3 knobs control Neochip's analogue style delay. The DELAY knob controls the amount of Delay signal in the mix. TIME sets the time between the delayed repeats. The FBK knob sets the amount of delayed repetitions after the initial note. You can switch the DELAY circuit on and off by pressing the small button in the centre of the DELAY knob. To turn the knob, click the edge and mouse up and down.

Please note that the DELAY effect only applies to the two Pulse channels.

CONTROL NEOCHIP'S ANALOGUE
DELAY WITH THE 3 STANDARD
DELAY PARAMETERS, DELAY
AMOUNT, TIME, & FEEDBACK.



4.1.7. LVL

Use the LVL knob to control the Master output level of Neochip. If you find your particular settings are creating distortion, try reducing the level of the LVL knob.

USE THE LVL KNOB TO CONTROL
THE MASTER OUTPUT LEVEL OF
NEOCHIP.



4.1.8 ESPERTONE

Click the Espertone logo button to visit the Espertone website for news, updates, products, and related companies and projects.

PRESS THE ESPERTONE SYMBOL
TO VISIT THE WEBSITE.



5. TIPS AND TRICKS

Neochip is an accesable and relatively simple synthesiser, and those with previous experience in synthesis will have no problem creating satisfying patches in minutes. For those with little or no experience, here are a few tips for creating nice sounds with Neochip:

Fifths: Try setting Pulse Two's SEM control to +5, this will give you a satisfying fifth harmony, evocative of the far east! This classic sound is always sure to please.

High Whistle: Try cutting the Triangle wave about half way, and setting its OCT to +2 or +3. If you balance it right, the triangle wave can add a nice accompanying high pitched whistle to your patch. Load the patch called 'Furyo' for an example.

Bass: The Triangle can be used in a low octave with a LO BOOST to create some strong low end power in a patch. See the patch 'Bass Drive' for a good example.

Ultra High Octave Sample FX: Set LO-FI on all of the OCT controls to +3 and play high up the keyboard. Do you hear that the notes aren't quite musical? This is because the bitcrushing effect used to create used to emulate the NES removes so much sound detail that very high frequencies cannot be produced. Neochip tries its best to output the desired frequency but fails quite spectacularly, the resultant noises being reminiscent of those in an old sci-fi movie. Try the Preset 'Screamers' for an example of this effect.

These are just some of the pleasing effects that be created with Neochip, by far the best way of finding good sounds is experimentation. Start with a preset and tweak from there, or use the FULL RESET preset to forge a sound from nothing.

As well as creating new sonic textures, Neochip can also be used to very closely emulate the original 2A03 chip, using the AUTHENTIC MODE preset, detailed in the next section.

5.1. AUTHENTIC MODE

Load the preset called AUTHENTIC MODE to use Neochip for basic NES emulation. This mode has Pulse One triggered by MIDI Channel 1, Pulse Two triggered by MIDI Channel 2, and the Triangle wave triggered by MIDI channel 3. Each channel is in monophonic mode. A subtle Master CUT has been applied, along with a little HI boost, and LO-FI mode is active. These three effects setting give a sound very close to that of the original 2A03 chip.

AUTHENTIC MODE cannot recreate every nuance of NES sound, but gives the user seperate MIDI control over each oscillator for multi part sequencing. Combined with a little automation of D CYLCE and VIBRATO controls one can create NES music which is a very close approximation of the real thing.

Users of FL Studio™ version 7.0 and up can open 'Neochip Authentic - Zelda(tm) Theme.flp' which can be found where Neochip has been vextracted. This is a sequencing of the Title Theme from the NES game *The Legend of Zelda*™ which is extremely close to the original, and also a template which allows FL Studio users to start using Authentic mode without long setup times.

6. Version History / Known Issues

Neochip v1.0 is the first full release version of Neochip. Neochip has been tested with most of the popular and up to date sequencers available, however some of the known issues and fixes include:

FL Users - Should de-activate 'Reset Plugins on Transport' in their General settings tab for better performance with Neochip.

Very rare MASTER DELAY malfunction resulting in loss of PULSE channel output - FIX: de-activate and re-activate the MASTER DELAY.

1.0 First Full Release - 1st May 2007

- Automation tags completed
- Updated GUI

0.9b Private In-house Beta

- Small range adjustments and various CPU optimisations
- Updated GUI

0.8b Second Public Beta Release - 29th April 2007

- Changed Duty Cycle selection to 12.5% (more authentic value)
- Added Lo-Fi on/off switch
- Removed Effect On/Off Switching floating point error (caused pops during patch change)
- Improved Presets
- Updated GUI

0.7b First Public Beta Release - 28th April 2007

- Added on/off switches to Triangle: Cut, & Master: Reverb, Cut, & Delay
- Added Switchable EQ Boost Circuit
- Added 32 Presets
- Added custom sliders
- Updated GUI

0.6b Second Private Beta

- Added custom Octave and Semitone controls
- Implemented MIDI assignable Oscillators
- Added Master Level control
- Improved all level algorithms
- Updated GUI

0.5b Initial Private Beta

Future updates may be forthcoming. Click the ESPERTONE button on Neochip to visit the Espertone website and check the latest version.

6.1. Reporting Issues

If you experience a particular compatability problem or error when using neochip, do not hesitate to contact Espertone Media via email at:

espertone@hotmail.co.uk

Credits & Links

Neochip ©2007 Julian G Harding designed and created using [SynthEdit](#), for Espertone Media.

Many thanks to [Jeff McKlintock](#) for Synthedit, and [Dave Haupt](#), [Butch Kratzer](#), [Lance Putnam](#), & [Peter Schoffhauzer](#) for 3rd party Modules.

Extra thanks go to all members of the [Modular Synthesis forum at www.kvraudio.com](#) and to Eric of [Novaflash](#) for assisting with bug testing.

Many thanks to Laguna Rising and Moppel for Beta testing.

Please send any feedback to espertone@hotmail.co.uk,

Happy music making from all at [Espertone Media](#)!