NES12ER

8-bit synthesizer

Operating manual

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User manual

1.1 Overview

1.2 The NESIZER

1.2.1 Sound channels

At the heart of the NESIZER is the NES APU chip, usually called 2A03 (or 2A07 if you use a chip from the PAL NES). The APU has five separate sound channels:

- **SQ1** and **SQ2**: These produce square waves with three selectable *duty cycles* (pulse widths).
- **TRI**: This channel produces triangular waves, but with a low 4 bit amplitude resolution. This results in the characteristic aliased NES bass and flute tones.
- **NOISE**: This channel produces various forms of noise. The noise can be white noise, or pitched noise if the *LOOP* mode is engaged.
- **DMC**: This channel can output 7-bit samples at a quick rate. The sampling rate is 16 kHz in the NESIZER .

1.2.2 Modulation

Because the 2A03 is put under much tighter control in the NESIZER than in a NES or Famicom console, the NESIZER features extensive modulation capabilities.

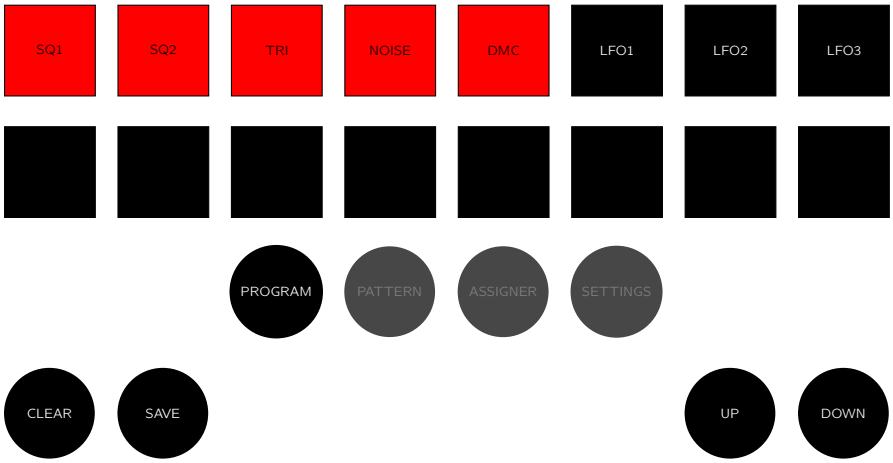
- Three separate low frequency oscillators **LFO1**, **LFO2**, **LFO3** with selectable waveforms (ramp up, ramp down, sine wave, triangle wave or square wave)
- Dedicated ADSR envelope generators for the square and noise channels

- Portamento / glide for the square and triangle channels

1.3 PROGRAM mode

This is the active mode when the NESIZER starts up. When in other modes, press the PROGRAM button to switch to this mode.

In the programming mode, the various parameters of the sound channels and LFOs can be changed. A set of channel and LFO settings are collectively known as a *patch*, to adhere to the long tradition of synthesizer nomenclature. The NESIZER can save patches to memory, and has room for 100 patches.



1.3.1 Loading patches

To load a patch, press either UP or DOWN. To go quickly up or down, press and hold the respective button. The current patch number is shown on the numeric display.

1.3.2 Saving patches

To save a patch, press SAVE. The button will start to blink to indicate that you can select where to store the new patch. Use the *DATA* knob or UP and DOWN to select where to store the patch. Press SAVE again to store the patch at the selected location.

Note: When channel and LFO settings are changed, these are not saved until you press SAVE.

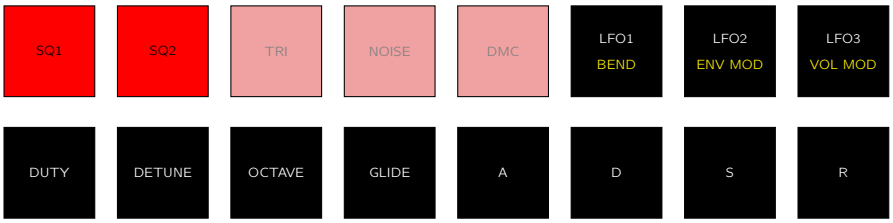
1.3.3 Enabling and disabling channels

To enable or disable a channel, press the corresponding channel button. When a channel is disabled, it does not produce sound when being triggered by the sequencer or incoming MIDI data.

1.3.4 Changing channel parameters

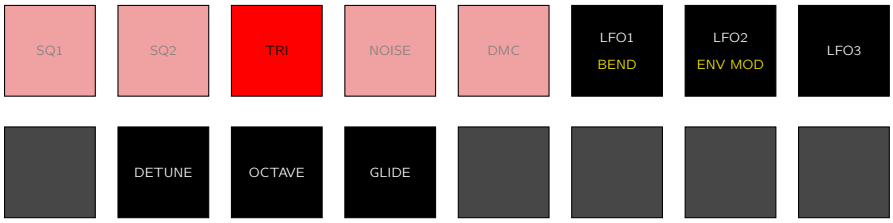
To change a channel's parameter, press and hold the desired channel's button, and the desired parameter button. For example, to change the attack of the square 1 channel, press [SQ1] and [A]. The button LEDs will start to blink to indicate which channel parameter is being changed. Use the [UP] and [DOWN] buttons to change the parameter value. When you have the desired value, press [SET].

Square channels



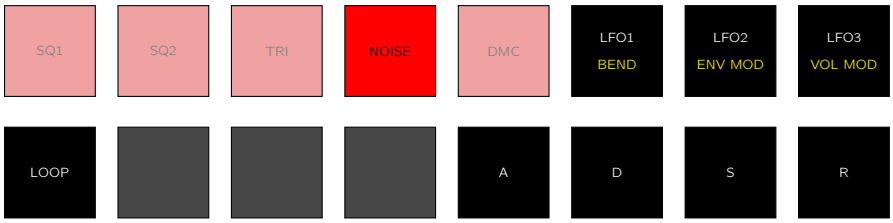
Parameter	Description	Range
LFO1	Intensity of modulation by LFO1	0 - 99
LFO2	Intensity of modulation by LFO2	0 - 99
LFO3	Intensity of modulation by LFO3	0 - 99
DUTY	Duty cycle	0 - 3
DETUNE	Detuning	-9 - 9
OCTAVE	Octave	-4 - 4
GLIDE	Portamento glide time	0 - 99
A	Volume envelope attack	0 - 99
D	Volume envelope decay	0 - 99
S	Volume envelope sustain	0 - 15
R	Volume envelope release	0 - 99
BEND (page 2)	Bend wheel intensity in semitones	0 - 24
ENV MOD (page 2)	Pitch envelope modulation amount	-9 - 9
VOL MOD (page 2)	Volume modulation by LFO3	0 - 16

Triangle channel



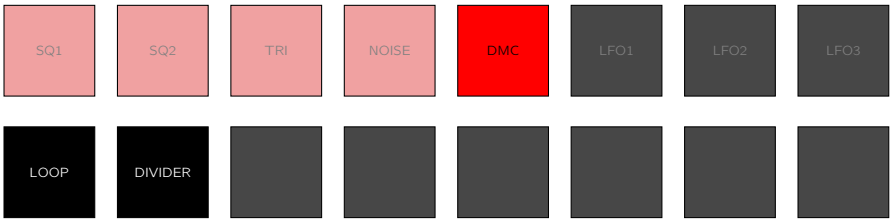
Parameter	Description	Range
LFO1	Intensity of modulation by LFO1	0 - 99
LFO2	Intensity of modulation by LFO2	0 - 99
LFO3	Intensity of modulation by LFO3	0 - 99
DETUNE	Detuning	-9 - 9
OCTAVE	Octave	-4 - 4
GLIDE	Portamento glide time	0 - 99
BEND (page 2)	Bend wheel intensity in semitones	0 - 24
ENV MOD (page 2)	Pitch envelope modulation (noise envelope)	-9 - 9

Noise channel



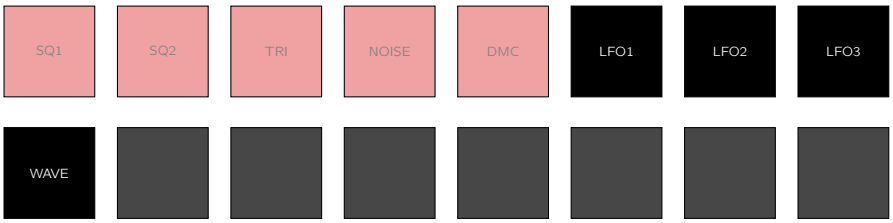
Parameter	Description	Range
LFO1	Intensity of modulation by LFO1	0 - 99
LFO2	Intensity of modulation by LFO2	0 - 99
LFO3	Intensity of modulation by LFO3	0 - 99
LOOP	Looped noise	on/off
A	Volume envelope attack	0 - 99
D	Volume envelope decay	0 - 99
S	Volume envelope sustain	0 - 15
R	Volume envelope release	0 - 99
BEND (page 2)	Bend wheel intensity (in steps)	0 - 15
ENV MOD (page 2)	Pitch envelope modulation amount	-9 - 9
VOL MOD (page 2)	Volume modulation by LFO3	0 - 16

DMC channel



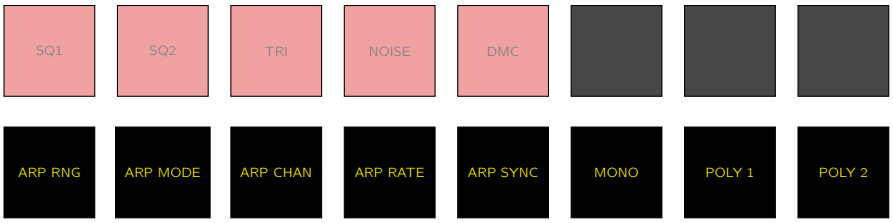
Parameter	Description	Range
LOOP	Play samples in loop	on/off
DIVIDER	Divider for sample rate	1 - 4

LFOs



Parameter	Description	Range
WAVE	LFO waveform	1 - sine 2 - ramp up 3 - ramp down 4 - square 5 - triangle

1.3.5 Note assignment and arpeggiator



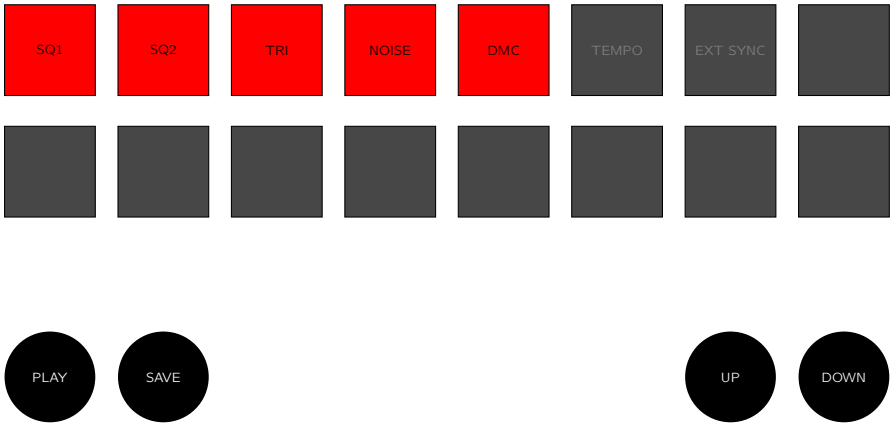
1.4 SEQUENCER

¡WORK IN PROGRESS¿

In the sequencer mode, 16-note sequence patterns can be created and played back. The sequencer is somewhat more complicated to use than the programmer. The user interface employs several *levels*.

1.4.1 Selection mode

When first entering the sequencer, it is at the *selection layer*. This is where you select a pattern for playback or editing, as well as adjusting tempo.



Selecting a sequence

To select a new pattern, first make sure you are at the top level and not already editing a pattern. If you are, close the current pattern by pressing BACK. Use UP and DOWN to select the pattern you want to edit. To edit the selected pattern, press the button for the channel you want to edit. The sequencer will then enter editing mode.

Playing back a sequence

To play back a selected sequence, press PLAY. The sequence will loop indefinitely. Press PLAY again to stop it.

Editing a sequence

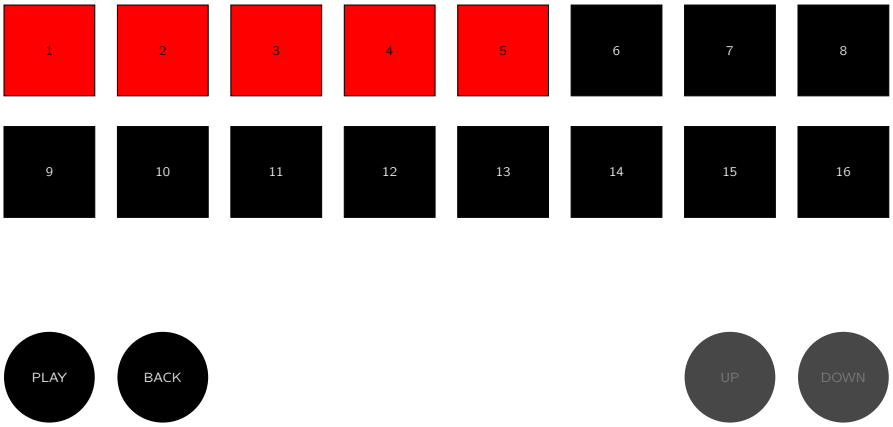
To edit a pattern in the selected sequence, press the channel button corresponding to the one you want to edit. The sequencer will then enter pattern editing mode.

Saving a sequence

Any changes you have done to a sequence will not be saved until you press SAVE. Saving sequences is done exactly the same way as saving programs.

1.4.2 Pattern editing mode

When in pattern editing mode, the buttons take on the following functions:



To help you remember which channel's pattern you're currently editing, the display will indicate a number ranging from 1 to 5, corresponding to SQ1, SQ2, TRI, NOISE and DMC, respectively.

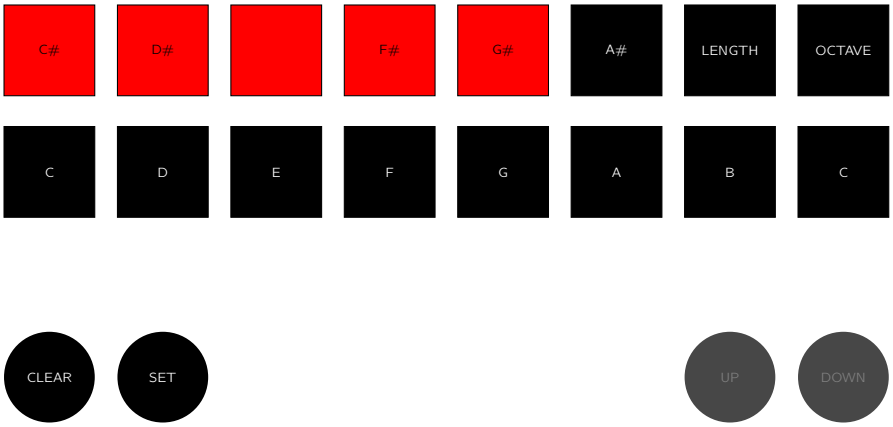
Each of the 16 top buttons represent a position in the pattern. To place a note at a particular position in the pattern, press the corresponding button. The sequencer will then enter note entering mode. The next section details how you enter a note.

After a note has been entered, the button's LED will light up to indicate that a note is present at that position in the pattern.

When you're done working on the channel's pattern, press BACK to go back to selection mode.

1.4.3 Note entering mode

When a note has been selected in a pattern, the buttons now take on the following functions:

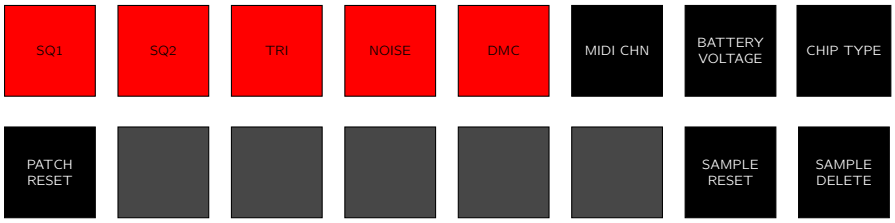


To select a note, either use the front panel buttons as a rudimentary keyboard or play one via MIDI on of the assigned channels. After the note has been entered, you can manipulate its length (1, 1/2 or 1/4) by pressing [LENGTH] and while holding it pressing [UP] or [DOWN]. Use [OCTAVE] to transpose the note up and down in a similar way.

When you're done, press [SET] to store the note. If you want to delete the note, press [CLEAR]. In either case, the sequencer will return to the pattern editing mode.

1.5 SETTINGS

When in the settings mode, various aspects of how the NESIZER operates can be changed. In this mode, the buttons have the following functions:



[UP] and [DOWN] can be used to select a sample number. Sample numbers that are occupied are marked with a dot on the display. A selected sample can be deleted by pressing [DELETE].

1.5.1 MIDI

The NESIZER can be controlled externally using MIDI.

Assigning MIDI channels

Each of the five sound channels can be assigned to any of the 16 MIDI channels, and will then only respond to incoming messages on the selected channel.

To select a MIDI channel, enter the *SETTINGS* mode by pressing [SETTINGS]. Hold down [MIDI CHANNEL] and then press the desired channel's button. The LEDs will flash and you can select one of the 16 MIDI channels using the [UP] and [DOWN] buttons. If you select the value 0, the sound channel will not listen to any MIDI channel.

1.5.2 Checking the battery voltage

The NESIZER uses a battery for keeping the RAM storing the patches and samples alive when main power is disconnected. To check the battery's voltage, press and hold BATTERY VOLTAGE. As long as the button is pressed, the battery's voltage will be shown in the display. If the battery voltage is below 2.6 V, it should be replaced.

1.5.3 Checking the 2A03 type

To see which 2A03 chip is being used, press the LFO3 button. One of the following numbers will show up:

- 12: Genuine RP2A03
- 15: 2A03 clone, i.e. 6527P
- 16: 2A07 (PAL version of 2A03)

1.5.4 Resetting patches

Press PATCH RESET to delete all patches. Every patch will be initialized to a basic patch with no channels enabled, square duty cycles set at 50% and full envelope sustain levels with no attack, decay or release.

1.5.5 Maintaining samples

When in SETTINGS mode, the up and down buttons are used to select DMC samples. A dot appearing on the display indicates that the selected sample location is occupied. When an occupied sample is selected, it can be deleted by pressing SAMPLE DELETE. All samples can be erased by pressing SAMPLE RESET.