

# CONDUCTIVE LABS

Electronic Music Instruments

## the **NDLR**





### Specifications are Subject to Change:

The information contained in this manual is believed to be correct at the time of printing. However, Conductive Labs LLC reserves the right to change or modify any of the specifications without notice or obligation to update the hardware that has been purchased.

### Warning:

The product may be able to produce sound levels that could cause permanent hearing loss when used in combination with synthesizers, headphones and/or speakers. It may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate at high volume levels.

### Please Note:

Conductive Labs LLC is not responsible for and is not covered by the manufacturer's warranty any fees incurred due to a lack of knowledge relating to how a function or feature works and are therefore the owner's responsibility. Please read this manual completely before requesting service.

### Precautions, not limited to:

1. Read and follow all instructions.
2. Unplug before cleaning and only use a soft and dry cloth only. Do not use any cleaners.
3. Do not use the instrument near water or moisture, such as a bathtub, sink, swimming pool or similar place.
4. Do not expose the instrument to hot sunlight.
5. Do not spill any kind of liquid onto the instrument.
6. Do not place the instrument in an unstable position where it might accidentally fall. Do not place heavy objects on the instrument.
7. Do not open or insert anything into the instrument that may cause a fire or electrical shock.
8. Always contact Conductive Labs LLC if you have an issue. You will invalidate your warranty if you open and remove the cover.
9. Do not use the instrument when there is a gas leak nearby.
10. Conductive Labs LLC is not responsible for any damage or data loss caused by improper operation of the instrument.
11. Do not TAUNT The NDLR!

**Not following the above Precautions will void the manufacturer's warranty.**

# Special Thanks

To the Kickstarter and Indiegogo project supporters – we would have never continued without you!

To the friends and family for enduring countless hours of insanely boring details  
of The NDLR's trials and tribulations.

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and The NDLR Beta Testers!

And to our significant others for their support and understanding!

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Our lawyers are now ecstatic, try to have a nice day. 😊

GREAT THINGS HAPPEN OUTSIDE OF  
YOUR COMFORT ZONE

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## Welcome

Thank you for purchasing The NDLR from Conductive Labs!

You are in the driver's seat now with your NDLR from Conductive Labs. You can create innovative music using as many of your synths as you want! You are in control by taking advantage of technology to make it easier to visualize your sonic complexities.

On the following pages are all the nuts and bolts of The NDLR. There's a lot of depth to The NDLR, and with all those synths you are planning to hook up, the complexity level of some setups will be beyond what this manual will cover. In those cases your first step should be to check out our user forum at: <https://www.conductivelabs.com/forum>

## Introduction

The NDLR is like having a conductor directing multiple parts: Drone, Pad, Motif 1 & Motif 2. The NDLR keeps all the parts in the same Key and Mode and in time. It also removes the barrier of having to use scale and chord theory, in real time, on multiple synths.

The NDLR can be used in a broad spectrum of scenarios. For example:

- A simple, single connection of The NDLR to a mono synth.
- The NDLR connected to an iPad or PC playing soft synths.
- Several synths of different types on multiple MIDI channels, which may require a MIDI splitter (thru box) not included.
- A complex studio setup with The NDLR at the hub, sending notes to several synths while being sync'd to a rhythm source, transposing inbound keyboard notes, and driven by multiple MIDI controllers.



## Quick Start

1. Plug The NDLR into any USB power source. The NDLR draws less than 100mA so even USB battery sources work for days.
2. Connect your favorite synth to the 5 pin MIDI 'A' out  
Or connect The NDLR to your PC using USB and launch a soft synth.
3. Set Motif 1's MIDI channel and port on The NDLR (Settings 1 menu) to the same MIDI channel and port as your synth.
4. Connect your synth to powered speakers or a mixer.
5. Press the Motif 1 On button (bottom right on The NDLR)
6. Press any of the Chord buttons – and you're NOODLING!

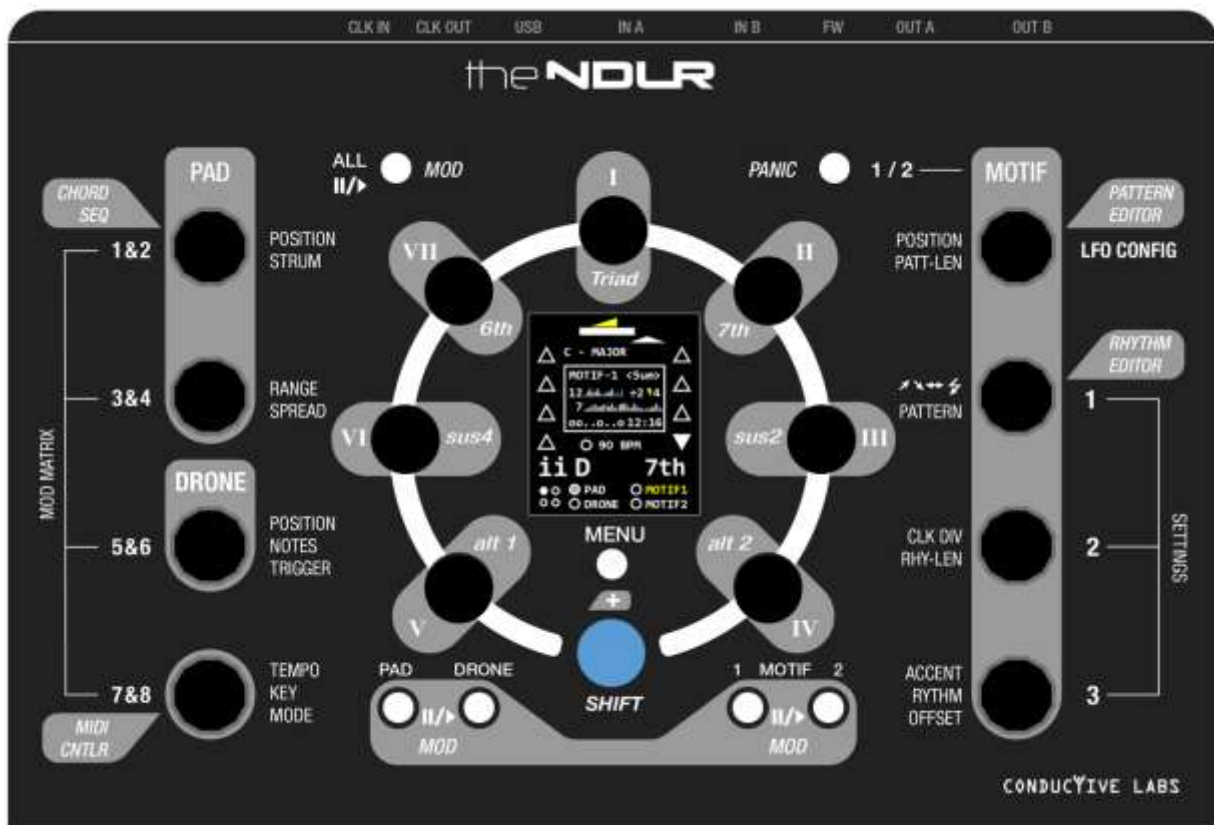


## Product Features

- 4 synchronized parts: Pad, Drone & two Motifs
- All 4 parts play in the same Key, Mode and Chord and rhythmically in sync
- Always play in Key - one button chord changes (I-VII + Triad-7<sup>th</sup>-sus...)
- Pad (2 encoders) parameters – Position and Range
- Drone (1 encoder) parameters – Position, Notes (Root-5<sup>th</sup>-8ve), and Trigger
- Motifs (4 encoders) parameters – Pattern, Patt-Len, Position, Arp Variation, Rhythm, Rhy-Len, Clk Div, Accent, and Offset
- Separate and global on/off buttons for all 4 parts
- Single layer menu-ing system
- Global Presets - 1 preset + 8 user slots
- Pattern and Rhythm editors - 20 presets + 20 user slots for each
- Modulation Matrix with 8 slots
- 9 Modulation Sources - 3 LFOs + 5 preset modulators + MIDI in mod controls
- 33 Modulation Destinations - nearly all The NDLR parameters + 127 MIDI CC's
- Separate and global on/off for each modulation slot for all 4 parts
- 2 MIDI In & Out (5-pin) ports + 4 USB MIDI In & Out ports (single cable)
- All MIDI I/O ports and channels configurable in menus
- Chord degree and type controllable via MIDI keyboard controller
- Nearly all The NDLR parameters are controllable via MIDI CC's
- MIDI Note Thru Transpose from "C Maj" to current key & mode
- MIDI Note and MIDI CC pass through on all non-NDLR MIDI channels (MIDI merge)
- Clock In and Out and MIDI Play/Pause configurable in menus
- Firmware updates via USB

## Hardware Overview

Let's run through all the hardware controls.



### Front Panel Controls

#### Front Panel Buttons

**Shift** - Pressing the blue *Shift* button in conjunction with other buttons offer additional options which are explained below. The *ITALICIZED labeled* buttons on The NDLR require the blue *Shift* button.

**Shift - Tap Tempo** – Tapping on the blue *Shift* button 4 or more times will set the Tempo. Setting the tempo this way is limited to 40 to 300 BPM. Values lower than 40 need to be set using the Tempo encoder 4.

**Shift (during boot-up)** – Holding the blue *Shift* button while booting will freeze the splash screen. This can provide as much time as you need to read the firmware version or serial number.

**Shift + Menu (during boot-up)** – Pressing the blue *Shift* button + MENU button while The NDLR is booting up will bring you to the Boot Menu. This menu has four global parameters to set, such as "Reset The NDLR" which will erase all the Presets, Patterns, & Rhythms.

**Play/Pause (x4)** – Pressing a Play/Pause button toggles one of the four parts (Drone, Pad, Motif 1 or Motif 2). There are Play/Pause state indicators on the bottom of the screen for each part.

Pressing *Shift-Play/Pause* (labeled 'MOD') toggles on/off any modulations that target that part. A red ring shows around the part's indicator. Also modulations are often animated on the top of the screen in the three parts stripes. The Play/Pause buttons are found across the bottom of The NDLR.

**Play/Pause All** – Pressing the Play/Pause All button toggles all four parts (Drone, Pad, Motif 1 and Motif 2) on/off. There are Play/Pause indicators on the bottom of the screen for each part. Pressing *Shift-Play/Pause All* (labeled 'MOD') toggles on/off **ALL** modulations, including the system modulations like Key and Mode. A red ring shows around all the part's indicators. The Play/Pause All button is found above the left side encoders.

**Menu** – Pressing the Menu button will toggle Menu mode. Pressing the *Shift-Menu* buttons will toggle The NDLR into the Editor mode. Once in Editor mode the encoder buttons select the Editor highlighted in a gray "call-out". The Menu and Editor descriptions are on the outside of the encoders. The Menu button is found directly below the screen.

**Motif 1/2** – Pressing the Motif 1/2 button toggles all four right-side encoders to either control Motif 1 or Motif 2. This is indicated on the screen by highlighting the selected motif in yellow.

Pressing *Shift-Motif 1/2* (labeled "Panic") turns off all MIDI notes on all MIDI channels and ports in case there are any unwanted stuck 'on' notes.

The Motif 1/2 button is found above the right-side encoders.

## Chord Buttons

Pressing a Chord button at any time will change all the notes that The NDLR is sending out for all four parts. The chord degree, sonority, name and type are indicated just above Play/Pause state indicators toward on the bottom of the screen.

The Chord buttons are arranged in a circle around the screen and are numbered 1-7 in Roman numerals to indicate the chord degrees. This is the same numbering system often used to describe chord progressions like 1-4-5 (**I-IV-V**).

Example – In the key of 'C' major:

I chord = C-E-G

II chord = D-F-A

V chord = G-B-D

The Roman numerals shown on the screen will change from uppercase (sonority of the chord = Major), to lowercase (sonority of the chord = minor or diminished).

Example – In the key of 'C' major:

C-E-G = I chord (major)

D-F-A = **ii** chord (minor)

G-B-D = **V** chord (major)

B-D-F = **vii°** chord (diminished)

When a chord is changed all the notes for all four parts (Drone, Pad, Motif 1 and Motif 2) are automatically changed to fit the key and mode for that chord. Because The NDLR always keeps the notes in key, the arpeggios may sound slightly different when a chord changes between major and minor. This is because intervals between the notes are different in major and minor chords.

Pressing a *Shift-Chord* button will change the chord type. Buttons I - VII correspond to: Triad, 7th, sus2, alt2, alt1, sus4, & 6th. Notice that the new chord type is indicated in blue text, this is because the chord type does not take effect until the next chord is chosen, then the text changes back to white. The chord type is indicated just above the Play/Pause state indicators toward on the bottom of the screen.

### Encoders Knobs

Rotating the infinite encoders will increase or decrease the value of the corresponding option. Pressing down on the encoder engages the encoder's built-in button.

**Left Encoders** - On the left side of The NDLR the top two encoders control the Pad options. The third encoder controls the Drone options and the fourth encoder controls Tempo, Key and Mode options.

**Right Encoders** - On the right side of The NDLR all four encoders control the Motif options. Note: there is an additional button above the right encoders, Motif 1/2, that toggles the encoders between Motif 1 or Motif 2.

The encoders set the values for the four parts (Drone, Pad, Motif 1 and Motif 2), labeled on the inside of the encoders. Each encoder has up to three options. Pressing down on the encoder button to cycle through the options and the corresponding arrows on the screen indicate the label choice: top (▲), middle (◀), or bottom (▼).

In Menu or *Shift-Menu (Editor)* mode, rotating the encoders sets the value for each corresponding menu options. Pressing down on one of the eight encoders selects one of the eight corresponding menus. The Menu and *Shift-Menu (Editor)* option labels are on the outside of the encoders.

## Rear Panel Connections

### USB (Type B)

The NDLR is powered by a USB 2.0 type B connector, the included USB cable can be plugged into a USB power adapter (not included), a USB port on a computer, tablet or into a UBS battery pack.

The USB connection also provides MIDI connectivity to a computer or tablet. The NDLR will appear as 4 separate MIDI 'ports' over the USB cable, like having 4 MIDI-out and 4 MIDI-in cables. This is particularly useful when using software synths. Each synth app can be assigned to a different MIDI port and no additional MIDI management software is required. Each of The NDLR's 4 parts can be assigned to any of the 4 USB MIDI out ports on any of the 16 channels in System Menu 1.

### MIDI (5-pin connectors)

There are 2 MIDI 5-pin OUT jacks. These jacks are used to connect The NDLR to MIDI enabled synths, a computer, or a tablet. Each of The NDLR's 4 parts can be assigned to either of the 2 MIDI out ports on any of 16 channels in Settings 1 menu.

There are 2 MIDI 5-pin IN jacks. These jacks are used to connect MIDI controllers/keyboards to The NDLR. Many of The NDLR's functions can be controlled via MIDI CC messages (see the MIDI implementation table in the Appendix).

### CLK IN (1/8" / 3.5mm mono jacks)

"Clock In" must be enabled in the Settings 3 menu. It must be set for "ClkIn CV". Once this is set The NDLR uses the input pulse signal as it's internal "heart beat". CLK IN receives 5V pulses (RISING edge) only at 24 (PPQ) Pulses per Quarter Note in ver 1.0. Do not connect any signal with greater than 5V, it could damage The NDLR.

NOTE: If no external clock is present The NDLR will appear not to function. Also, notes can get stuck "on" if the MIDI clock tick messages stop while notes are playing.

### CLK OUT (1/8" / 3.5mm mono jacks)

CLK OUT sends a 5V pulse signal. The pulse PPQ can be set in the "Clk Out" box in the Settings 2 menu for: 1, 2, 4, & 24 PPQ. The CLK OUT can also be divided by ratios of the internal clock – 1:1, 1:2, 1:4, 1:8, 1:16, 1:32. The CLK OUT is enabled by a jack detect circuit in The NDLR.

### Firmware Update Button

Get The NDLR firmware updates from [ConductiveLabs.com](http://ConductiveLabs.com). Instruction on how to load the firmware is on the Downloads page. Firmware update software must be run from a computer (Windows, Mac or Linux).

Summary:

1. Download and install the firmware loader (1st time only).
2. Download the .HEX.zip (firmware) file.
3. Unzip the .HEX.zip (firmware) file.
4. In the loader app click File and open the .HEX file.

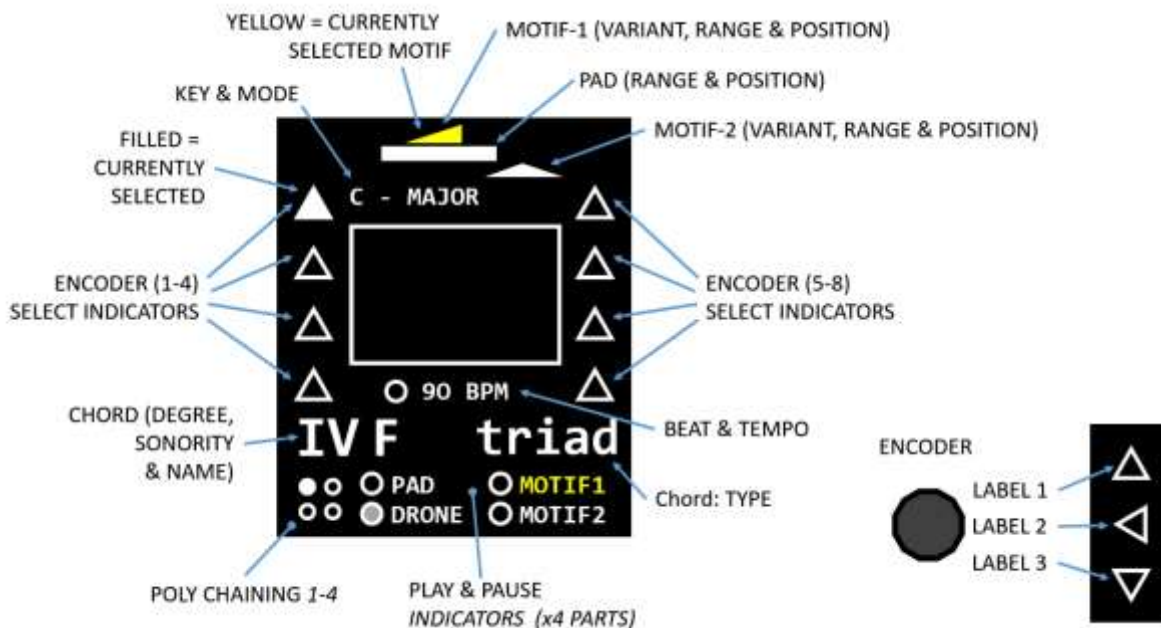
5. In the loader app click on the Auto button (1st time only).
6. On The NDLR, use a toothpick or pen to briefly press the recessed FW button (located between the MIDI jacks).

## Screen Review

The NDLR has a color screen that not only allows you to see what you've configured, but to visualize what's happening in real time. Below we'll walk through all the screen combinations, provide labels and explanations for the more complex visualizations.

### Main Screen

The Main screen elements described below are always visible, the center box 'Sub Screen' changes to match the encoder being used.



### Top Stripes

There are 3 stripes across the top of the main screen that correspond to parts: Motif 1, Pad and Motif 2. The stripe's width informs the number of notes being played by that particular part. The stripe's position indicates the octave the notes are being played. The stripe's shape indicates the play order variation (forward, backward, ping-pong, etc.).

### Indicator Arrows

There are 2 columns of 4 arrows, these are the knob assignment indicators. The solid arrow indicates the currently selected knob. The direction of the arrow shows the current function for each knob written next to each knob. Knobs can have up to 3 functions each.

### Key Mode: Tempo

Just below the Top Stripes are the current Key and Mode (e.g. “C – Major”). Just below the Sub Screen box is the BPM (beats per minute) and tempo indicator. The tempo will blink Blue on every 4th  $\frac{1}{4}$  note and Red on all other  $\frac{1}{4}$  notes. When the clock is coming from an external source it will display “Ext BPM”.

### Current Chord Info

Below the tempo indicator is the current chord info. The Roman numeral is the chord degree. You may have heard of a 1-4-5 (I-IV-V) chord progression. If the Roman numeral is upper case it is a major chord, lower case is minor, lower with a ° is diminished. The chord name follows (e.g. C, Bb, G#, etc). Lastly is the chord type - triad, 7<sup>th</sup>, 6<sup>th</sup>, sus2, & sus4.

### Part Play/Pause Indicator

At the bottom of the screen there are the Pad, Drone, Motif 1 and Motif 2 Play/Pause indicators.

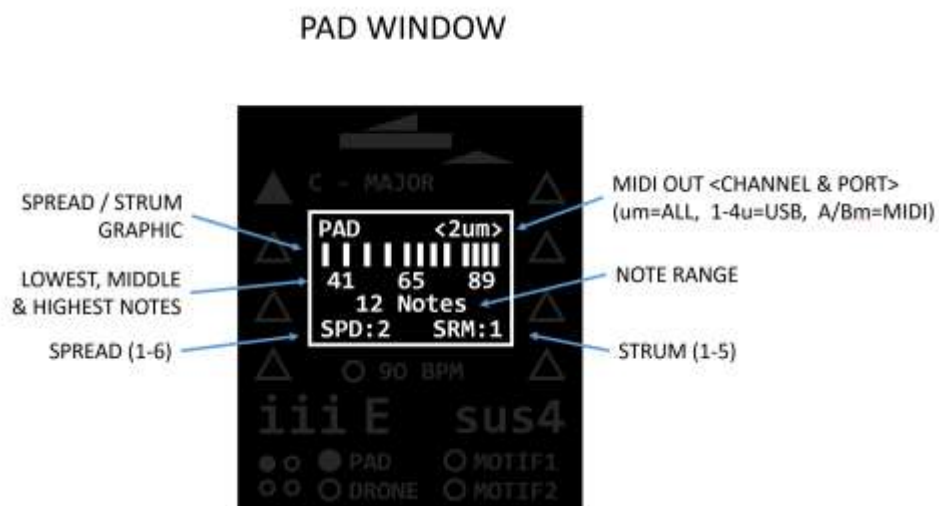
### Poly Chain

To the left of the play/pause indicators are 4 dots “:.”. Each lit circle indicates the number of consecutive MIDI channels the Pad notes will play on. This is settable in the Settings 3 menu.

## Center Sub Screens

There are 4 sub-screens: Pad, Drone, T-K-M (Tempo, Key and Mode) and Motifs 1/2. In general, the parameter being modified is highlighted in yellow.

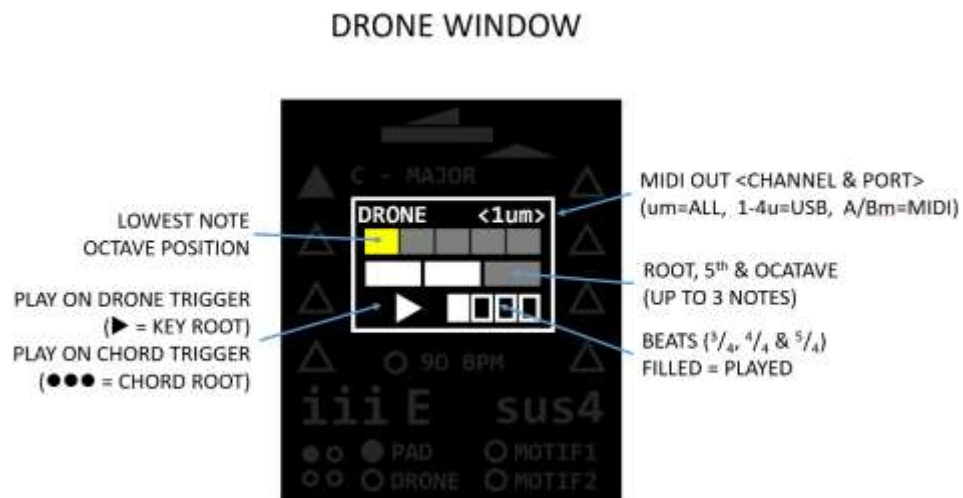
- **Pad Sub Screen** – The top row shows the current MIDI channel. Below that is the Min, Middle and Max MIDI note number of the Pad. It also shows the number of notes in the Range. Spread (chord voicing) and Strum. This info is also graphically displayed in the middle stripe at the top of the screen.





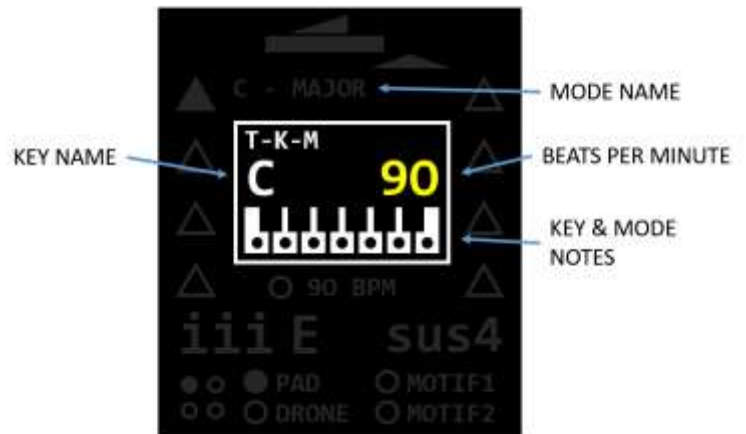
- **Drone Sub Screen** –This area shows the Drone note Position, Notes and Trigger. The top row shows the current MIDI channel. Next row is a graphic that has 5 boxes that correspond to 5 octaves. The third row has 3 boxes that correspond to which combination of notes are played: root, 5th and octave. The fourth row has two areas. The first area is either a 'play' triangle or chord dots, the second area is the triggering rhythms. The 'play' triangle means the Drone note (+ 5th & octave) will be based on the root of the currently selected Key and NOT change with chord changes. The dots mean the Drone note (+ 5th & octave) will be based on the root of the currently selected chord.

The triggering rhythms shows a series of boxes; the number of boxes loosely represents beats per measure: 3/4, 4/4, & 5/4. The filled in boxes represent when the Drone note(s) are played. When all 4 boxes are empty it means that the Drone note(s) are only triggered when the Drone is turned on or with a chord change. Notes are turned off when the Drone is turned off.

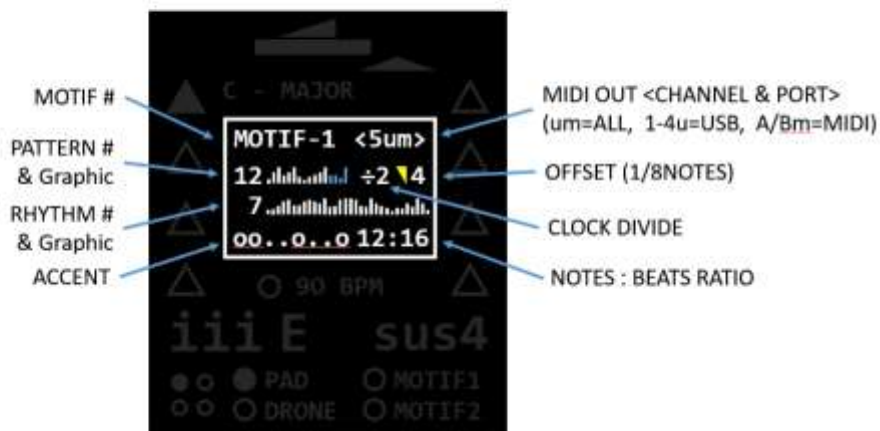


- **Tempo – Key – Mode Sub Screen** – This area shows the Key name, the Key/Mode notes, and the tempo (BPM). The Key and Tempo shown is the same in the main screen area. The Mode name is shown on the main screen next to the Key. What is unique about this Sub Screen is the keyboard graphic. Dots will appear on the keyboard notes that are in the Key and Mode chosen.

## TEMPO, KEY & MODE WINDOW



## MOTIF 1 & 2 WINDOW



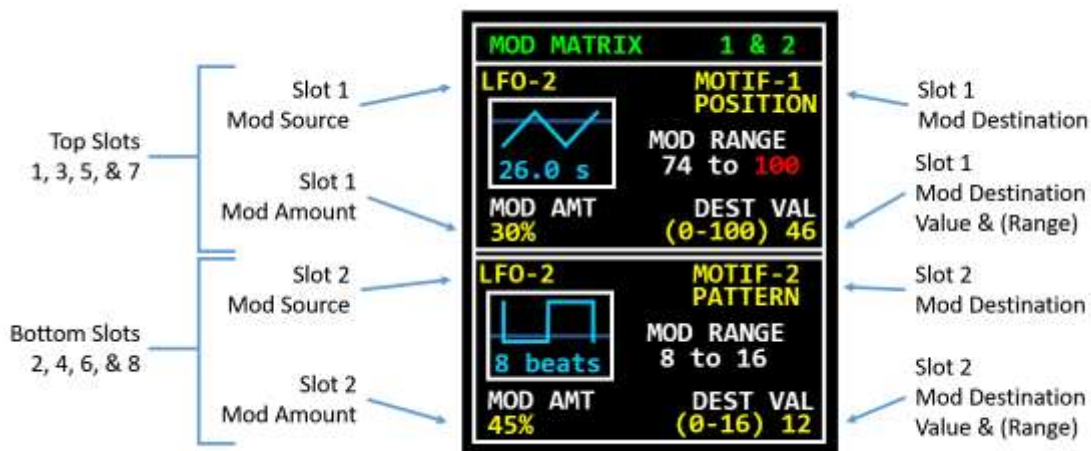
- **Motifs Sub Screen** – This area shows all 9 parameters and is toggled between Motif 1 or 2. Toggling the Motif 1/2 button will change the Motif number on the top line. Next to that is the current MIDI channel. On the second line is the Pattern number and a bar graph representation for the note values in that Pattern. The Pattern bars are also highlighted to show the Pattern length. Next is the clock divide “÷n” and offset. On the third line is the Rhythm number and a bar graph representation for the beat velocities, rests, and ties. The Rhythm is also highlighted to show the Rhythm length. The fourth line shows the Accent which can be the Rhythm or Motif velocities or preset rhythmic velocity choices. Finally, is the notes:beats ratio.

## Menus

To enter a menu press the MENU button just below the display. To select any of the eight menus press on the encoder knob (which is also a button) that corresponds with the menu desired. The menus are labeled along the outside edge of the encoders. The left four encoders correspond with the Modulation Matrix. Each menu has two Modulation Slots: Menu 1 = slots 1 & 2, Menu 2 = slots 3 & 4, Menu 3 = slots 5 & 6, and Menu 4 = slots 7 & 8. The right four encoders are the LFO CONFIG (top) and the three system SETTINGS menus. Roughly speaking: Settings 1 = MIDI config, Settings 2 = velocity config, and Settings 3 = general settings.

### Modulation Matrix Slots (1-8) – Encoders 1 - 4

Each Mod Matrix menu has 2 of the available 8 slots. The 4 controls for each modulation slot are Mod Source, Mod Destination, Mod Amount, and Destination Value. In addition to these parameters this menu shows the wave shape, the rate (seconds – not sync'd / beats – sync'd), and probability (horizontal blue line) of the Mod Source.



Be careful not to “sweep” the Modulation Destinations with the modulator active, this can make many unwanted parameter changes! To make the modulator inactive select:  
Mod Source = SRC OFF & Mod Amount = 0.

Note that destinations with small ranges can appear to modulate less smoothly. If precise modulation is desired try using the SEQ wave shape in the LFO. The SEQ is the same as a Pattern which is editable in the Pattern editor.

### Mod Sources:

**SRC OFF** – no mod source selected.

**LFO 1-3** – configurable in the “LFO CONFIG” menu.

**MOD 1-5** – preset (fixed) modulators.

**MIDI INPUTS** – Velocity, Pitch Bend, Mod Wheel, After Touch – inbound MIDI values

from The NDLR Control MIDI channel (Settings 3 menu).  
**MIDI CC#'s 70-74** – inbound MIDI values from The NDLR Control MIDI channel (Settings 3 menu).

*Mod Destinations:*

**KEY & MODE**

**Chord - DEGREE & TYPE**

**Pad - POSITION, RANGE, VELOCITY, & ON/OFF**

**Drone - POSITION, TYPE, TRIGGER, & ON/OFF**

**Motif (1/2) - POSITION, PATT LEN, VARIANT, PATTERN, CLK DIV, ACCENT, RHYTHM, VELOCITY, & ON/OFF**

**Motif (1&2) - VELOCITY LOW & HUMANIZE**

**CC #'s 1-127**

*Mod Amount:*

This is the percentage of the modulator that is multiplied by the Destination Amount. This is also dependent on the Mod Source in these ways:

**The Sine wave** is Bi-Polar and the modulation amount swings positive and negative. This means that the Destination Value is the center value and any changes to this value will change the Min and Max values of the Mod Range in the display.

**All the other wave shapes** are **unipolar** and the modulation amount swings positive only. This means that the Destination Value is the lowest value and any changes to this value will change only the Max value of the Mod Range in the display.


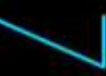

When the **SEQ #** is chosen the Destination Value is replaced (not multiplied) by the sequence step value. This means that the Destination Value has no effect. This is handy for creating chord progressions by setting the exact values. The SEQs are Patterns editable in the [Pattern Editor](#).

*Destination Value:*

The destination value is the same value used when directly changing parameters from the Main Screen. It was added in this menu for convenience. Changing the destination value will move the beginning and end of the range.

The destination value range is important because it informs the range of valid values for all the destinations. Useful to know if creating a SEQ (in the Pattern Editor) with specific target values.

## LFO Config – Encoder 5

| LFO CONFIG             |  |
|------------------------|--|
| RATE<br>4.6 s<br>LFO-1 | SHAPE<br> |
| 12.0 s<br>LFO-2        |           |
| 16 beats<br>LFO-3      |           |
| 100<br>LFO-1 PROB      | 100<br>LFO-2 PROB  |

**LFO Configuration** - This menu is to set the LFO values

Left side:

1-3. LFO 1-3 Rates can be set in *seconds* which IS NOT sync'd to the Tempo or set in *beats* which IS sync'd to the Tempo. The available not sync'd rates are 0.4s to 4.8s (increments of 0.2s) then 5.0s to 40.0s (increments of 1.0s). The available sync'd rates are 1 beat to 48 beats.

Right Side:

5-7. LFO 1-3 Wave Shapes can be sine, saw, ramp, saw tooth, square, pulse (80/20), random, SEQ (Pattern 1-40).

Bottom:

4&8. LFO 1 & 2 Probability is a percent chance that the Mod Destination Value would be affected by the LFO value. LFO 3 has a fixed probability of 100%.

## Settings (Menus 1-3) – Encoders 6-8

| SETTINGS 1/3                         |   |
|--------------------------------------|---|
| MIDI Chs<br><b>4</b> ALL<br>Pad (+3) | <b>15</b> ALL<br>NDLR Cntl                  |
| <b>1</b> ALL<br>Drone                | <b>16</b> ALL<br>KB Trans                   |
| <b>2</b> ALL<br>Motif-1              | <b>ON</b><br>Blk Keys                       |
| <b>3</b> ALL<br>Motif-2              | MIDI Out:<br><b>ALL PORTS</b><br>Start/Stop |

**Settings Menu 1/3** – This menu is mostly MIDI configuration

Left side:

1-4. MIDI channel/port for Pad, Drone, Motif-1 and Motif-2. As you turn the encoder the MIDI channel number stays the same for all the MIDI 'port' choices. The 'Pad (+3)' means that if Polychain is set to 2, 3, or 4 that additional consecutive MIDI channels will be used to send MIDI notes for the Pad.

Right Side:

1. MIDI channel for NDLR Control – inbound MIDI channel to control The NDLR with CC messages and "NoteOn" (on all in-ports). These are generally not sent through to the MIDI out-ports.  
CC messages for Chord degree and type, Key and Mode are sent out on this channel (on all out-ports) to enable multiple "chained" NDLRs.
2. MIDI channel for NDLR Transpose – inbound MIDI channel for NoteOn events (on all in-ports) in the key of "C" and transposes to the current NDLR Key & Mode and sends transposed NoteOn events out on the same MIDI channel (on all out-ports).
3. Black Control Keys On/Off (see section Controlling The NDLR via MIDI).
4. Select MIDI port(s) to send MIDI Start, Stop, Continue messages. Caution these can cause synths to start and stop their sequencers etc... which may cause havoc or silence!

| SETTINGS 2/3       |                  |
|--------------------|------------------|
| 2<br>Humanize      | 127<br>Pad Vel   |
| 24 PPQ<br>ClkInPPQ | 127<br>Mot 1 Vel |
| 1 PPQ<br>Clk Out   | 127<br>Mot 2 Vel |
| 1:1<br>ClkOut Div  | 75%<br>Vel Low   |

### Settings Menu 2/3 – This menu is mostly Velocities

Left side:

1. Humanize adds some random variation to the velocities used in the Accent option.
2. Clock In PPQ is fixed to 24 PPQ in ver 1.0.
3. Clock Out sets to PPQ for the CV clock – 1,2,4, & 24.
4. Clock Out Divider sets the ratio of the internal clock to the pulse sent out – 1:1, 1:2, 1:4, 1:8, 1:16, 1:32.

Right Side:

- 1-3. Pad, Motif 1, and Motif 2 velocity settings – 1-127.
4. Velocity Low sets the low bound of the Motif 1 and Motif 2 velocities used in the Accent option.

| SETTINGS 3/3                |                             |
|-----------------------------|-----------------------------|
| GLOB LOAD<br>0<br>Shift Enc | GLOB SAVE<br>1<br>Shift Enc |
| 1<br>P-Chains               | 1/4 NOTE<br>Pad Qnt         |
| INTERNAL<br>Clock           | 5 'A'<br>Volca Vel          |
| YES<br>Chrd Invrt           | INSTALLED<br>FW v1.0        |

### Settings Menu 3/3 – This menu is mostly for general configuration

Left side:

1. Load Global Preset – preset 0 is the factory preset, 1-8 are for user presets.
2. Poly Chains – sets the number of MIDI channels the Pad notes are spread across.
3. Clock Select – select the Internal or an external clock source.
4. Chord Invert – inverts chords to minimize tonal movement.

Right Side:

1. Save Global Preset – presets 1-8 are for user presets.
2. Pad Quantization – quantize the timing of when the Pad notes sound after pushing a chord button.
3. Korg Volca Velocity MIDI out channel – send the velocity associated with all notes sent on the particular MIDI channel to CC 41 for Korg Volca FMs.

## Editors (*Shift* + Menu)

To use any of the Editors hold the blue *Shift* button and press on the Menu button. The last Editor used will be shown. To change to a different Editor press the encoder knob button that the callout points to.



*Ex. Callout*

### Pattern Editor

Edit Patterns to be used by the Motifs or as a sequence in an LFO. There are three Pattern types: Chord, Scale and Chromatic. (**Pattern Editor**)

### Rhythm Editor

Edit Rhythms to be used by the Motifs. The Rhythm is a list beats that store velocities including a rest (no note played) and tie (last note continues). (See [Rhythm Editor](#) for details)

### Chord Sequencer

Not implemented in ver 1.0

### MIDI Controller

Not implemented in ver 1.0

## The NDLR Setup Examples

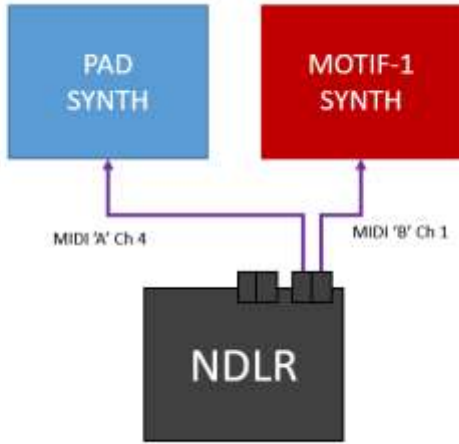
In this section we'll outline some NDLR physical setups. These examples aren't meant to be exhaustive but should help with some of the more common ways you're likely to use The NDLR with other hardware and software. If you're having trouble, the first thing to double check if all your MIDI channels and ports on the synths match the MIDI channels and port in the Settings 3 menu! Labeling your synths with their MIDI port assignments can make life with The NDLR much simpler.

Before we start plugging them in, what type of synths work best for each part?

- When learning The NDLR it is a good idea to use simple patches with a short attack and release. This way each note is distinct.
- Use a polyphonic synth for the PAD part. The NDLR can play lots of notes in a chord, so lots of voices can be used if you have a synth that is massively poly. The PAD can play from 1 note up to 49 notes.
- For the Drone part, connect a synth that can play long, evolving ambient pads. But just about anything can drone with a long or endless decay. The Drone part can play 1 to 3 notes (polyphonic).
- Connect mono synths or use mono patches for the Motif parts. The motif's play one note at a time.

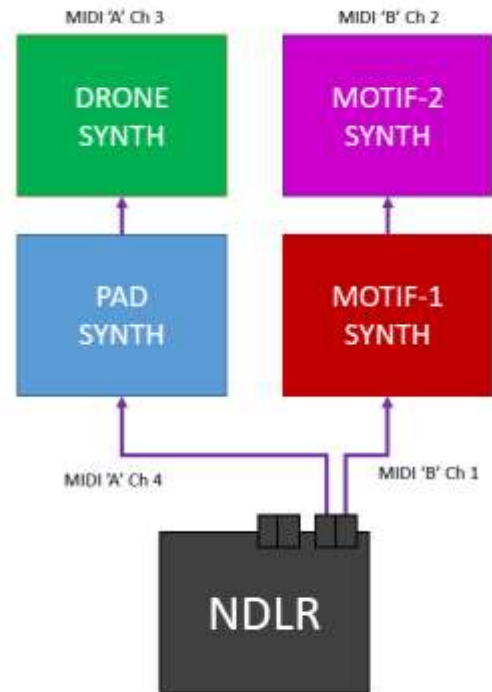


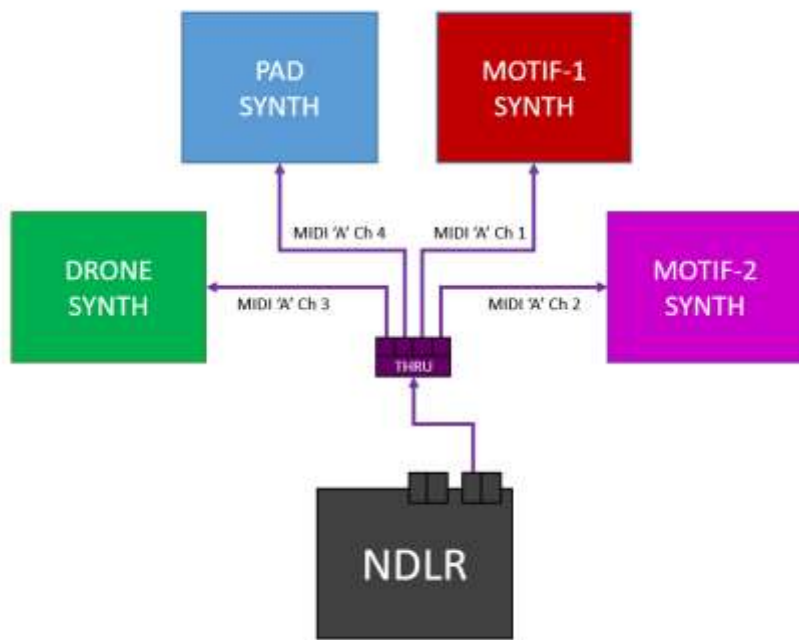
## Hardware Synth Connections



The most basic setup is The NDLR and two hardware synths. There are two MIDI outputs on The NDLR, so connect each synth to an output. Settings 1 menu is where the MIDI channels are set for The NDLR.

Another basic setup is The NDLR and four hardware synths. There are two MIDI outputs on The NDLR, so connect each synth to an output, then connect the 3<sup>rd</sup> and 4<sup>th</sup> synth using the MIDI THRU connectors. Settings 1 menu is where the MIDI channels are set for The NDLR.

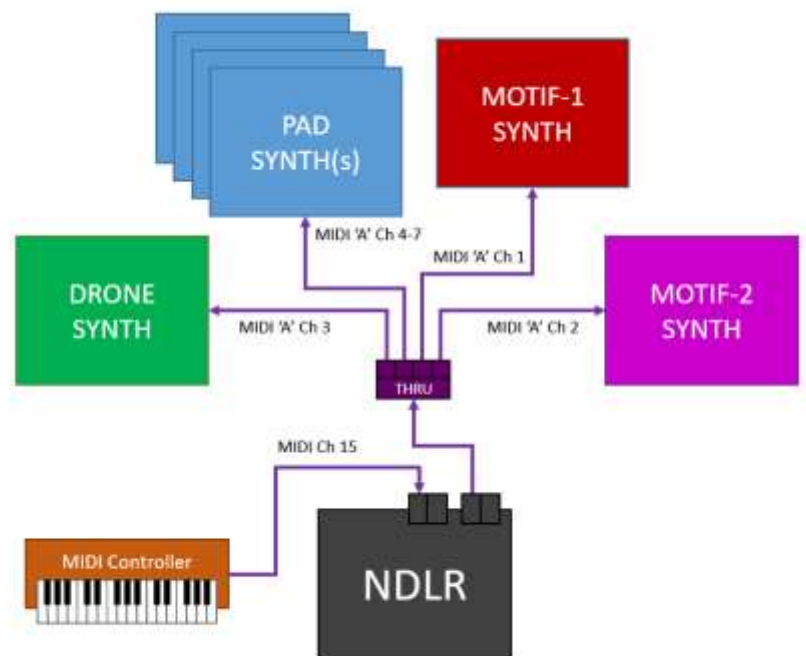




Adding a MIDI splitter (THRU box) will provide a more direct and flexible setup. The second MIDI output of The NDLR can be used for more synths to double-up on part assignments. Settings 1 menu is where the MIDI channels are set for The NDLR.

Using the Poly-chaining feature for the PAD part enables multi-timbral synths (blue), synths that can play more than one patch at a time.

A MIDI controller keyboard can be added to control The NDLR or can be used as a transposed keyboard. Settings 1 menu is where the MIDI channels are set for The NDLR.



## Software Synth Connections

### iPad

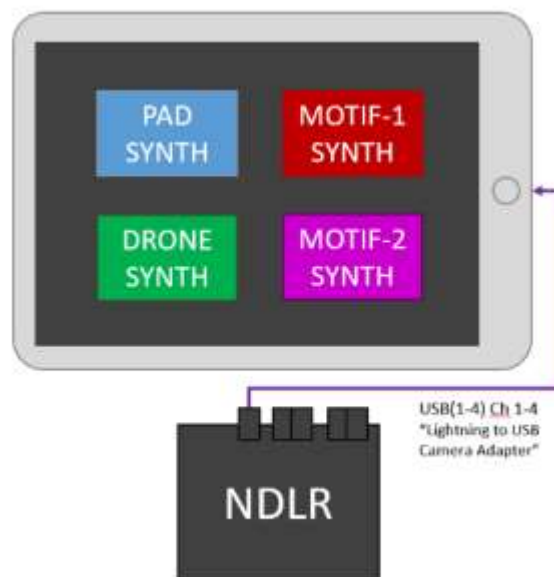
The iPad needs to be a **USB host controller** to accommodate plugging in The NDLR directly. Apple has connection kits/cables to do this.

There are a couple ways to connect The NDLR to a “Lightning” based iPad. The first way is using the “Lightning to USB Camera Adapter”, however this forces The NDLR to draw power from the iPad’s battery. The second way is using the “Lightning to USB-C cable + Camera Adapter”. This breakout cable enables both a USB connection (for The NDLR) and a power connection, so both the iPad and The NDLR can use AC power (indefinitely).

For older 40 pin iPads the “Camera Connection Kit” is a great way to connect The NDLR to an iPad.

Note: these solutions are solid, but the devices may need to be plugged in in a certain order. The best known process is, plug in the Camera Connection dongle first, then The NDLR.

There are also several “cradles” for the iPad that have USB 5 Pin connectors. We have tested the Griffin StudioConnect (40 Pin version).



### Software Synths/Drum Machines/MIDI Controllers

There are a ton of great sounding software synths for the iPad as well as drum/rhythm machines, even super cool MIDI (CC) controllers. The NDLR supports four MIDI ports over USB.

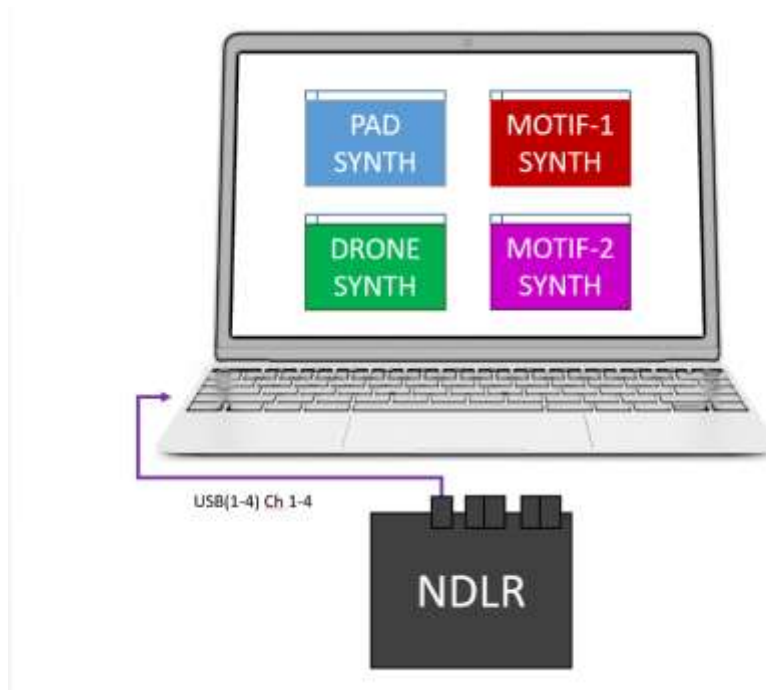
This makes it easy to connect The NDLR to individual synths on the iPad without needing virtual MIDI channel splitting, etc...

1. Plug The NDLR to the iPad.
2. Open the soft synth.
3. Choose a MIDI Port and Channel: NDLR PORT 1, NDLR PORT 2, NDLR PORT 3, or NDLR PORT 4, channels 1-16.
4. Choose the same MIDI Port and Channel on The NDLR (Settings 1 menu).

### PC Soft Synths

The NDLR supports four MIDI ports over USB. This makes it easy to connect The NDLR to individual (stand-alone) synths on the PC without needing a DAW or virtual MIDI channel splitting.

1. Plug The NDLR to the PC.
2. Open the soft synth.
3. Choose a MIDI Port and Channel: NDLR PORT 1, NDLR PORT 2, NDLR PORT 3, or NDLR PORT 4, channels 1-16.
4. Choose the same MIDI Port and Channel on The NDLR (Settings 1 menu).



### DAWs (VST, AU, etc.)

Follow the steps above for soft synths and setup the DAW's instrument channels for MIDI Port and Channel and choose the same MIDI Port and Channel on The NDLR (Settings 1 menu).

Configuring each DAW and synth plug-in is different, refer to your DAW's manual for setting up MIDI instrument tracks.

## MIDI Controllers and MIDI Message Flow

### Using The NDLR with MIDI Controllers

Plug a MIDI controller or MIDI keyboard into either of The NDLR MIDI-in ports or with software via the USB port(s). Next set the MIDI controller and the 'NDLR CNTL' MIDI channel found in the Settings 1 menu to the same MIDI channel.



Note: The NDLR is NOT a USB "Host Controller", however if it is plugged into a USB host controller it can send and receive MIDI messages via USB on four separate USB MIDI Ports. This is useful for connecting to PC based soft synths (VSTs, AU...), DAWs, or soft controllers. Also The NDLR works great connected to an iPad this way.

The NDLR can be controlled in two ways, by MIDI CC messages and by MIDI NoteOn/Off messages...

**MIDI CC (Control Change) Messages:** CC message values can control many of The NDLR's parameters. The CC message numbers and values can be found in the "MIDI implementation table" below in [Appendix A](#).

When MIDI CC messages are received on The NDLR's *MIDI Control channel* (Settings 1 menu) on any port (5 Pin or USB) they are NOT passed through. If the CC messages are received on any other MIDI channel on any port (5 Pin or USB) they are passed through according to the **MIDI Note & Message Thru Port Mapping** table below.

**MIDI Keyboard Control (Using NoteOn/Off):** The NDLR also listens for NoteOn/Off messages on the *MIDI Control channel* (Settings 1 menu) on any port (5 Pin or USB). White keys (C5-B6) map to the Chord Degrees in this order: C=I, D=II, E=III, F=IV... Black Keys (C#5-D#6) map the Chord Type buttons in this order: alt1 – alt2, triad – 7<sup>th</sup> – 6<sup>th</sup>, sus2 – sus4. NoteOn/Off messages can be generated by keyboard keys, sequencers, arpeggiators, etc so have fun attaching whatever gear you have to The NDLR.

Note: The 'Blk Keys' On/Off toggle (Settings 1 menu) enables/disables controlling the Chord Type. The choice to control the Chord Degrees is separated from the Chord Types when using NoteOn/Off messages. This is useful with analogue sequencers like the Korg SQ-1 that are hard to know the output values.

When MIDI NoteOn/Off messages are received on The NDLR's *MIDI Control channel* (Settings 1 menu) on any port (5 Pin or USB) they are NOT passed through.

If NoteOn/Off messages are received on The NDLR's *MIDI Transpose channel* (Settings 1 menu) the notes will be transposed before sending through (see Transposing Inbound Notes from a MIDI Keyboard below).

If the NoteOn/Off messages are received on any other MIDI channel on any port (5 Pin or USB) they are passed through according to the **MIDI Note & Message Thru Port Mapping** table below.

**MIDI Pitch Bend or After Touch:** If MIDI Pitch Bend or After Touch messages are received on any MIDI channel on any port (5 Pin or USB) they are passed through according to the **MIDI Note & Message Thru Port Mapping** table below.

**MIDI Program Change:** If MIDI Program Change messages are received on any MIDI channel on any port (5 Pin or USB) they are passed through according to the **MIDI Note & Message Thru Port Mapping** table below.

## Transposing Inbound Notes from a MIDI Controller

Plug a MIDI keyboard or sequencer controller into either of the 5 Pin MIDI-in ports or via the USB port(s). Next set the MIDI controller and the 'KB Trans' (Settings 1 menu) to the same MIDI channel. The NDLR will transposes the inbound notes from the key of 'C' (white keys – C to B) into the Key and Mode that The NDLR is set for. The notes received will be passed through on the 'KB Trans' MIDI channel (Settings 1 menu) according to the **MIDI Note & Message Thru Port Mapping** table below.

## Miscellaneous MIDI Message Topics

**MIDI Thru:** All\* MIDI NoteOn/Off messages and CC messages are passed through The NDLR on the channel received on and on the port according to the table below.

\*Exceptions are for messages received on the *MIDI Control channel*, these messages are NOT passed through. Or if received on the *MIDI Transpose channel*, the notes are transposed and sent through on the channel received on and on the port according to the table below.

Note: It is assumed that any passed through NoteOn messages will be followed by a matching NoteOff messages.

*MIDI Note & Message Thru Port Mapping*

| <b>In Port</b> | <b>Out Port(s)</b>    |
|----------------|-----------------------|
| 5 Pin A        | 5 Pin A & USB Port(1) |
| 5 Pin B        | 5 Pin B & USB Port(2) |
| USB Port(1)    | 5 Pin A & USB Port(1) |
| USB Port(2)    | 5 Pin B & USB Port(2) |
| USB Port(3)    | USB Port(3)           |
| USB Port(4)    | USB Port(4)           |

**MIDI Stop/Start/Continue (SSC):** Often sequencers and arpeggiators will send out MIDI SSC messages when being used. The NDLR accepts these messages ONLY on the MIDI 5 Pin port B and USB port 1, all SSC messages on other ports are IGNORED. This provides some configuration flexibility without a lot of extra menu settings.

Many popular sequencers do NOT send MIDI clock tick messages when its sequencer is stopped or paused, and will send MIDI clock tick messages when its sequencer is playing. If The NDLR is configured to use external clock but there isn't MIDI clock tick messages, pressing any NDLR Part's play button will "arm" but will NOT play until MIDI clock tick messages are received. Also, notes can get stuck "on" if the clock stops while notes are playing.

If The NDLR receives a **Stop** message it will stop ALL Parts that are playing and "disarm" them. The Part's play/pause indicator will be black.

If The NDLR receives a **Pause** message it will stop ALL Parts that are playing but leave them "armed". The Part's play/pause indicator will remain blue.

If The NDLR receives a **Play** message it will play any "armed" Parts.

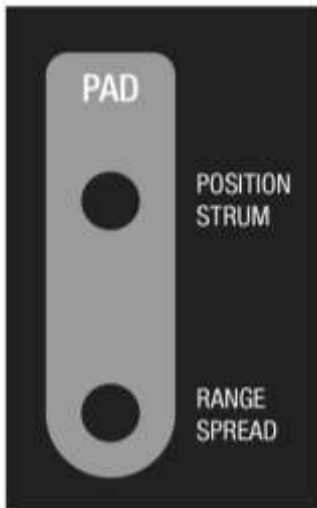
**Stuck Notes:** MIDI is a half-duplex communication protocol. This means when MIDI messages are sent there is no acknowledgement from the receiving synth, which can cause stuck notes. Synth with less robust MIDI implementations are most prone to stuck notes. In all cases, The NDLR sends the appropriate NoteOff messages, but some synths may not respond properly resulting in notes not being turn off. If this should occur use the *Shift-PANIC* button that turns off all notes of all channels and all ports. If you use *Panic* while The NDLR is playing, it will just keep playing and the stuck notes will be gone.

## Part Descriptions

Below we discuss each of The NDLR's four parts: Pad, Drone, Motif 1, & Motif 2 in detail.

### Pad

The Pad plays all the notes of the chord at the selected Position and within the selected Range. An obvious synth patch choice for the Pad are a "strings" voice. The longer the patch's attack the subtler the Pad becomes. The four controls for the Pad are Position, Spread, Range, and Strum. However, Spread and Strum are not implemented as of v1.0.



#### Setup

**MIDI Channel** – it is vital to know which MIDI channels the synths are on. Labeling your synths with their assigned channel is our number 1 tip!

Select the Pad MIDI Channel and MIDI port from Settings 1 menu. The MIDI channel choice is 1-16. The MIDI port choices are: All, USB 1-4, and 5 Pin MIDI port A or B.

**On/Off** – the Pad can be turned on/off with the Pad  $||/>$  button on the bottom left side of the blue *Shift* button, next to the Drone button.

**Modulation On/Off** – all the Pad's modulators can be turned on/off with the *Shift-Pad*  $||/>$  button on the bottom left side of the blue *Shift* button, next to the Drone button.

#### Position

The Position of the Pad note(s) is anywhere between MIDI octaves (0-7) and is the center note of the Range. As the Position is moved, notes that are no longer in Range are turned off and the new notes that are in Range are turned on. As a result, the chords get "inverted" as the position changes. Ex. A three note Range starts as C3-E3-G3, as the position is moved up it becomes E3-G3-C4, and so on.

#### Strum (not implemented in v1.0)

The Pad notes can be strummed to play notes rapidly in succession giving a strum like effect.

#### Range

The number of Pad note(s) played can vary from 1 to 22. Of course 22 note polyphony would be required of the synth!

#### Spread

The Pad notes can be spread out to play a more open "voicing". If there are 4 or less notes being played they will always be stacked in thirds. Otherwise there are 5 settings: 1) stacked by thirds, 2) root only in bass octaves, open voicing in mid-low octaves, closed voicing in mid-high octaves, & root only in high octaves, 3) root only in bass octaves and closed voicing in 4th octave, 4) 50%



chance for any Pad note to be played, 5) root only in bass octaves, root and 5ths above, 6) root only in bass octaves, 3rds or 7ths above.

## Pad Related Menu Options

### *Poly-Chain (Settings 3 menu)*

Splits the consecutive notes in a Pad across 1, 2, 3 or 4 MIDI channels. If Poly Chain > 1 then consecutive MIDI channels start at the PAD MIDI channel (on the same port) and count up.

Example: Set Pad MIDI ch to 4, set Pad Range to 3, set Polychain to 3...

Plays: C on MIDI ch 4, E on MIDI ch 5, & G on MIDI ch 6

Tip: slowly moving the Pad Position up and down (a good modulation target) while Polychain is >1 with a varied choice of pad patches makes a great wash of sound with the subtlety of notes turning on and off.

### *Chord Invert (Settings 3 menu)*

With this setting on, the chords will automatically invert as the chord buttons are pressed going up the chord degrees (I-VII).

### *Pad Quant (Settings 3 menu)*

This determines when the notes of the chord are triggered. The choices are: 1/4 note, 1/8 note and No Quantization.

### *Pad Velocity (Settings 2 menu)*

Pad Velocity can be set to 0 (no sound)-127 (loudest).

## Drone

The Drone can be used to create a sustained or repeated note or tone-cluster. An obvious synth patch choice for the Drone is an infinite long modulated/evolving voice. The three controls for the Drone are Position, Notes, and Trigger.



### Setup

**MIDI Channel** – it is vital to know which MIDI channels the synths are on. Labeling your synths is our number 1 tip!

Select the Drone MIDI Channel and MIDI port from the Settings 1 menu. The MIDI channel choice is 1-16. The MIDI port choices are: All, USB 1-4, and 5 Pin MIDI port A or B.

**On/Off** – the Drone can be turned on/off with the Drone  $||/>$  button on the bottom left side of the blue *Shift* button, next to the Pad button.

**Modulation On/Off** – all the Drone’s modulators can be turned on/off with the *Shift-Drone*  $||/>$  button on the bottom left side of the blue *Shift* button, next to the Pad button.

### Position

The Position of the Drone note(s) is one of five octaves (MIDI octave 0-4).

### Notes

The Drone can play up to three notes: root, 5<sup>th</sup> and octave. The combinations are: root, root + octave, root + 5<sup>th</sup>, root + 5<sup>th</sup> + octave.

### Trigger

The Drone note(s) can be triggered in one of two ways. Root mode or Chord mode.

Root mode is designated by a ‘play’ ► triangle in the Drone sub window. When the Drone is played (turned on) the root note (+ 5<sup>th</sup> and/or octave) will remain playing until the Drone is turned off. The Drone note(s) will NOT change when different chord degrees are selected. If the Drone trigger has a cadence selected then the note(s) will retrigger on the cadence rhythm. The cadence rhythms are:

no cadence - on one - on one & two - on one & three - on two & four - on one through four - on one of three - on one of five.

Chord mode is designated by a row of ‘dots’ in the Drone sub window, these are to resemble the chord buttons. When the Drone is played (turned on) the root note (+ 5<sup>th</sup> and/or octave) will remain playing until the Drone is turned off. If a different chord degree is selected the Drone note(s) will change and be based on the root of the chord (NOT the root of the Key). If the Drone trigger has a cadence selected then the note(s) will retrigger on the cadence rhythm. The cadence rhythms are:

no cadence - on one - on one & two - on one & three - on two & four - on one through four - on one of three - on one of five - down of one & up of two & up of three & up of four - up of two & up of three & down of four - down of one & up of two & down of three & down of four.

## Motif 1 & 2

The Motifs are the sequenced arpeggios of The NDLR. This is different from a sequencer in that the notes played come from a list of ascending notes based on the chord, Key and Mode selected. The Position setting chooses the starting point in that list. A Pattern is very similar to the order of notes when an arpeggio's variation is set to "as played" (as opposed to up, down, or ping-pong). Obvious synth patch choices for the Motifs are Bass and Lead voices. There are nine controls for each Motif: Position, Pattern Length, Variation, Pattern, Clock Divide, Rhythm Length, Accent, Rhythm, and Offset.

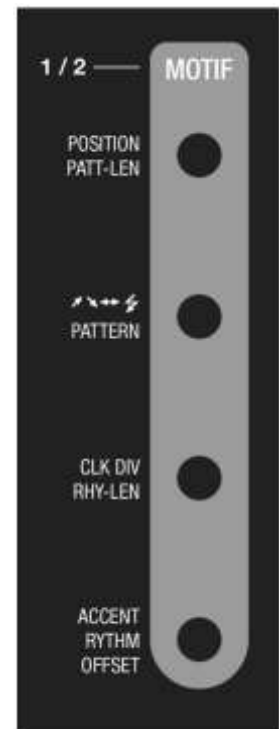
### Setup

**MIDI Channel** – it is vital to know which MIDI channels the synths are on. Labeling your synths is our number 1 tip!

Select the MIDI Channel and MIDI port for each Motif from Settings 1 menu. The MIDI channel choice is 1-16. The MIDI port choices are: All, USB 1-4, and 5 Pin MIDI port A or B.

**On/Off** – the Motifs can be turned on/off with the Motif 1 or 2  $||/>$  buttons on the bottom right side of the blue *Shift* button.

**Modulation On/Off** – all the Motif's modulators can be turned on/off with the *Shift-Motif 1 or 2*  $||/>$  buttons on the bottom right of the blue *Shift* button.



### Position

The Position of the 1<sup>st</sup> note of Motif is anywhere between MIDI octaves 0-3 plus the note's value. As the Position is moved, the notes lower than the 1<sup>st</sup> note and the notes higher than the last note (based on the Pattern Length) are no longer played.

### Pattern Length

This is the number of notes played starting from the 1<sup>st</sup> note of the Pattern. Pattern Lengths can be up to 16 notes. All Patterns have 16 notes even if they are not played.

### Variation ( $\nearrow \searrow \leftrightarrow \swarrow$ )

This is the order in which the Pattern notes are played. The order choices are: Forward, Backward, Ping-Pong, Ping-Pong (w/ 1<sup>st</sup> & last notes repeated), Odd then Even, and Random.

### Pattern

This is the order of notes played from the list of ascending notes based on the chord, Key and Mode. The list of notes can be one of three types: Chord notes, Scale notes, or Chromatic notes.

There are 20 preloaded Patterns (1-20) and 20 user writeable Patterns (21-40).

### Clock Divide

This is the rate in which the Motif notes are played relative to the beat and is based off the Tempo (BPM). The choices are: 1/1, 1/2, 1/4, 1/8 and triplets 1/3 (1/4T) & 1/6 (1/8T).

## Rhythm Length

This is the number of beats used in a Rhythm. Rhythm Length can have 4-32 beats. All Rhythms have 32 beats even if they are not counted.

## Accent

The Accent chooses which velocity to use for the notes in the Pattern. The choices for Accent are: Rhythm Velocity (built into the Rhythm), Humanized Velocity (built-in Rhythm velocity + random variation), Motif Velocity (fixed velocity set in menu), and 7 assorted *velocity patterns* that replace the Rhythm or Motif velocity.

See *Humanized* and *Velocity Low* in section Motif Related Menu Options below.

## Rhythm

The Rhythm is similar to a Step Sequence, where each note is played on a specific beat, which can be a clock divided. Each beat is either a rest, a tie, or a note velocity (1-127). The actual notes played come from the Pattern list. If the notes:beats ratio is evenly divisible it will keep the Pattern list “locked” to the Rhythm. Examples: 4:4, 4:16, 3:12...

There are 20 preloaded Rhythms (1-20) and 20 user writeable Rhythms (21-40).

## Offset

This setting offsets the two motifs in time by  $1/16^{\text{th}}$  beats; 0,  $1/16^{\text{th}}$ ,  $1/8^{\text{th}}$ , or  $3/16^{\text{ths}}$ . There is only one Offset setting shared between motifs. When resetting the offset to 0 the motifs are re-sync'd.

## Motif Related Menu Options

### *Motif 1 Velocity (Settings 2 menu)*

Motif Velocity can be set to 0 -127.

### *Motif 2 Velocity (Settings 2 menu)*

Motif Velocity can be set to 0 -127.

### *Velocity Low (Settings 2 menu)*

Sets the low velocity for both Motif 1 & 2. Used in the Accent option. Ex. “ooOooOoO”, where o = low velocity and O = normal velocity.

## Tempo – Key – Mode



### Tempo

There are four ways to set the tempo (10 to 300 BPM):

- 1) Rotating the encoder.
- 2) Holding the blue *Shift* button while rotating the encoder – this does not change the actual tempo until the blue *Shift* button is released, even though the tempo value is displayed on the screen.
- 3) Tapping 4 or more times on the blue *Shift* button, which is limited to (40 to 300 BPM).
- 4) Setting via CC 72 (see the MIDI implementation table in the Appendix).

The Tempo screen indicator blinks on the beat (& off on the  $\frac{1}{2}$  beat). The blue beat indicates the down beat, this is the beat used to sync the parts. It occurs every 4<sup>th</sup> beat but there really isn't much of a notion of time signature in The NDLR. However, the Drone part has some cadences that pulse in 4/4, 3/4, and 5/4 which may not align with the blue beat indicator.

The Tempo is only set-able when in *Internal* clock mode. Otherwise it is a slave to the inbound clock signal. NOTE: if the clock is set to an external source and that source is NOT sending clock pulses The NDLR will appear not to work.

The Tempo cannot be modulated.

### Key

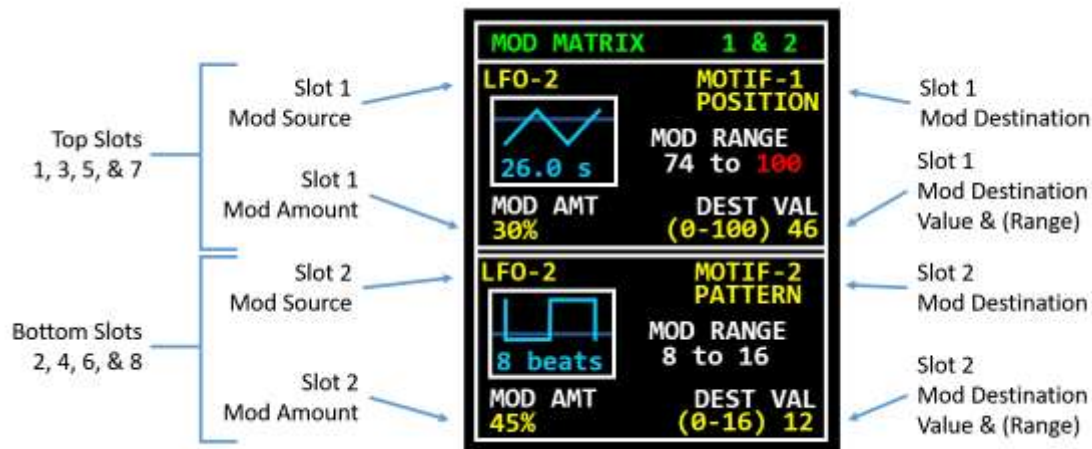
The Key can be set to any of the 12 keys. They are arranged so that when the encoder is rotated the Keys move through the circle of 5ths (C, G, D, A, E, B, F#, Db, Ab, Eb, Bb, & F). Holding the blue *Shift* button while rotating the encoder does not change the actual Key until the blue *Shift* button is released, even though the Key is displayed on the screen.

### Mode

The Mode can be set to any of the 16 modes and scales. Rotating the encoder moves through them in the following order: Major, Dorian, Phrygian, Lydian, Mixolydian, Minor (Aeolian), Locrian, Gypsy Min, Harmonic Minor, Minor Pentatonic, Whole Tone, Tonic 2nds, Tonic 3rds, Tonic 4ths, and Tonic 6ths. Holding the blue *Shift* button while rotating the encoder does not change the actual Mode until the blue *Shift* button is released, even though the Mode is displayed on the screen.

## Modulation Matrix

The Mod Matrix enables routing Mod Sources to The NDLR parameters. It is spread across four menus, press the Menu button and click on encoders 1-4. Each menu has two modulation slots, one on the top and one on the bottom. Each slot has four values: Mod Source, Mod Destination, Mod Amount, & the Mod Destination's current value. Use the two encoders to the left and the two to the right to change the



values.

### Modulation Sources:

There are 12 modulation sources: LFO 1-3, Mod 1-5, MIDI controller inputs (Velocity, Pitch Bend, Mod Wheel, & After Touch). Details to follow...

#### 3 LFOs:

The 3 LFO's are configurable in the LFO Config menu, press the Menu button and click on the top right encoder. LFO's 1 & 2 have three settings: Rate, Wave Shape, and Probability. LFO 3 has two settings: Rate and Wave Shape.

**Rate:** asynchronous (0.4sec – 40sec) or synchronous (1 – 48 beats).

**Wave Shape:** sine, triangle, ramp, saw tooth, square, pulse (80/20), random, SEQ (Pattern 1-40).

**Sine** is *bi-polar* – it swings equally above and below the Destination value by the Mod Amount. The values are limited to the min and max values allowed for the Destination.

**Triangle, ramp, saw tooth, square, & pulse** are *unipolar* – they swing above the Destination value by the Mod Amount. The upper value is limited to the max value allowed for the Destination.

**Random** is a random value between the Destination value and the Mod Amount. The upper value is limited to the max value allowed for the Destination.

**SEQ (Pattern 1-40)** is a value directly from the Pattern values. The values are limited to the min and max values allowed for the Destination.

Chord patterns: 1-20

Scale patterns: 1-40

Chromatic patterns: 1-60

**Probability:** a percentage (1-100) of the likelihood that the modulation will occur. Adds a little bit of unpredictability to modulations.

#### *5 Mod Presets:*

There are 5 modulation preset sources: Mod 1 - Mod 5. These are preset LFO's and cannot be changed by the user.

**Mod 1** - 40 Secs, Triangle, 50% probability

**Mod 2** - 48 Beats, Sine, 100% probability

**Mod 3** - 32 Beats, Ramp-up, 90% probability

**Mod 4** - 8 Beats\*, Sample & Hold (random), 75% probability (\*holds for 8 Beats/sample)

**Mod 5** - 8 Beats, Square, 15% probability

#### *MIDI Inputs:*

MIDI controller inputs (Velocity, Pitch Bend, Mod Wheel, & After Touch) are mapped from 0-127 to 1-100%. They are **unipolar** – they only swing above the Destination value by the mapped percent. The upper value is clamped to the max value allowed for the Destination.

The MIDI inputs are expected to be on the inbound MIDI channel set in Settings 1 menu: NDLR Cntl (default is channel 15) on any of the six MIDI ports (MIDI 5 Pin ports A & B and MIDI-USB ports 1-4).

#### **Modulation Destinations:**

There are 34 modulation destinations plus 127 CC message destinations:

Global: KEY and MODE

Chord: DEGREE and TYPE

Pad: POSITION, RANGE, VELOCITY, & ON/OFF

Drone: POSITION, TYPE, TRIGGER, & ON/OFF

Motif (1 & 2): POSITION, PATTERN LENGTH, VARIANT, PATTERN, CLOCK DIVIDE, ACCENT, RHYTHM, VELOCITY, ON/OFF, VELOCITY LOW, & HUMANIZE

CC messages 1-127 – in this situation the Destination Value encoder is used to set the outbound CC message MIDI channel and port.

#### Modulation Amount:

Enables the user to set a value of 0-100%. For **bi-polar** sources sets the min and max values equally. For **unipolar** sources sets the max value, the min value is set by the Destination Value.

#### Destination Value:

Enables the user to set the Destination Value without exiting the Mod Matrix.

#### Modulation Play/Pause:

Using the *Shift – All Play/Pause* button (just above the VII button) will Play/Pause all the modulations. A red circle will appear around all the Play/Pause indicators on the bottom of the screen. Note that this will also pause all the 'Global' modulation destinations, such as Chord Degree or Type, Key or Mode.

Using the *Shift – Play/Pause* buttons (along the bottom middle) will affect all the modulations for each specific part. A red circle will appear around the corresponding part's Play/Pause indicator on the bottom of the screen.

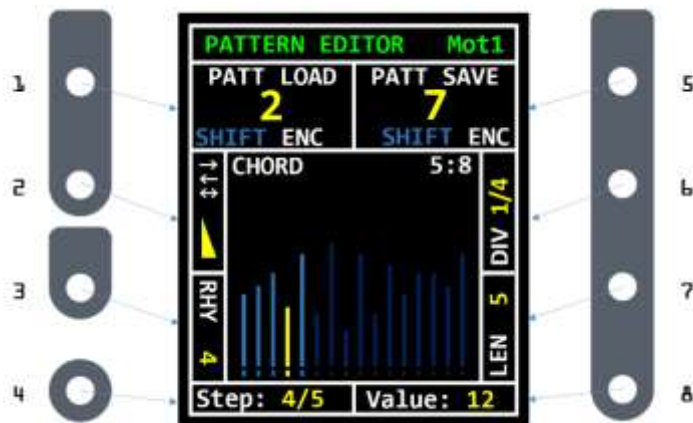
When a part is not playing the modulation will also be paused, although it will not be indicated.



## Pattern Editor

(Shift-Menu Encoder 5)

The Pattern editor enables the user to create a list of note values for the Motifs and to use in the modulation matrix (see Modulation Matrix section). The selected Motif (1 or 2) is shown in the upper right of the display (Mot1 or Mot2). In the middle area of the display there are 16 vertical bars. The height of each bar is the note value. There are three pattern note types: CHORD, SCALE, & CHROMATIC, shown in the upper left of the middle area.



The Pattern and Rhythm work together to make the Motifs. The Pattern is a list of note values and the Rhythm defines the note velocity, REST, or TIE. Each note in the Pattern is paired to a beat (non-Rest) in the Rhythm.

If the Pattern Length is different from the Rhythm Length an interesting effect occurs that the Pattern notes shift relative to the Rhythm. If all the beats in a Rhythm are the same, the effect is not noticeable. The

notes:beats ratio (Ex. 8:12) is in the upper right side of the middle window. It is helpful to know the ratio when adjusting the Pattern Length or Rhythm Lengths. The ping-pongs and random variation will affect the note number. If a beat is a REST it is not counted in the beats number.

All of The NDLR buttons can be used while in the Pattern editor including the Chord Degrees and Types and selecting the Motif.

Here are some details “behind the scenes” of how the pattern numbers map to the specific note numbers. The NDLR takes care of all the music theory and the buttons and knobs enable you to freely express. In the table below the top row are the CHORD Pattern numbers, the middle row the Note Values, assuming a C Maj triad is selected. The bottom row the Note Values are assuming a F7 is selected. For a C Maj triad (C-E-G) the pattern of 2, 1, 2, 4, 5, 6, 3, 3 maps to notes E1, C1, E1, C2, E2, G2, G1, G1. For an F7th (F-A-C-E) the same pattern maps to notes A1, F1, A1, E1, F2, A2, C1, C1.

|             |    |    |    |    |    |    |    |    |
|-------------|----|----|----|----|----|----|----|----|
| Chord #'s   | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| C Maj Notes | C1 | E1 | G1 | C2 | E2 | G2 | C3 | E3 |
| F7 Notes    | F1 | A1 | C1 | E1 | F2 | A2 | C2 | E2 |

### Load/Save Patterns – Encoders 1 & 5

Patterns can be loaded and saved using encoders 1 and 5. The first 20 Patterns are fixed and the second 20 are writeable. To LOAD a Pattern rotate encoder 1 to select the Pattern number (1-40), then hold down the blue *Shift* button and press encoder 1 button. To SAVE a Pattern rotate encoder 5 to select the Pattern number (21-40), then hold down the blue *Shift* button and press encoder 5 button. A message will display when the SAVE or LOAD is complete.

### Variation – Encoder 2

To change the Motif's Pattern Variation rotate encoder 2 (see Pattern Variations for more info). The Variation glyph is shown on the upper left hand side of the display in the 'Variation' box. This box is rotated 90 degrees.

### Clock Division – Encoder 6

To change the Motif's Clock Division rotate encoder 6 (see Clock Division for more info). The Clock Division fraction (Ex. 1/4) is shown on the upper right hand side of the display in the DIV box. This box is rotated 90 degrees.

### Rhythm – Encoder 3

To change the Motif's Rhythm rotate encoder 3 (see Rhythm for more info). The Rhythm number is shown on the lower left hand side of the display in the RHY box. This box is rotated 90 degrees.

### Length – Encoder 7

To change the Pattern's Length rotate encoder 7 (see Pattern Editor intro section for more info). The Pattern Length value (1-16) is shown on the lower left hand side of the display in the LEN box. This box is rotated 90 degrees.

### Step (select) – Encoder 4

To edit a particular step rotate encoder 4 and the selection highlighted yellow will move along the steps. The step number selected is shown at the bottom of the display in the Step box. (Ex. 4/5 = Step#/PatternLen). Use the Value encoder 8 to change the height (note value) for any step.

To change the Pattern note type (CHORD, SCALE, or CHORMATIC), turn the Step encoder 4 anti-clockwise and the Pattern note type will be displayed. Use the Value encoder 8 to change the type. For Pattern note type CHORD the note values refer to the notes in the current chord selected. Note: for a triad there are 3 note per chord per octave, 4 for the 7th. For the SCALE pattern type the note values refer to the notes in the mode or scale. The CHORMATIC pattern type refers to all 12 tones per octave.

### Value (edit) – Encoder 8

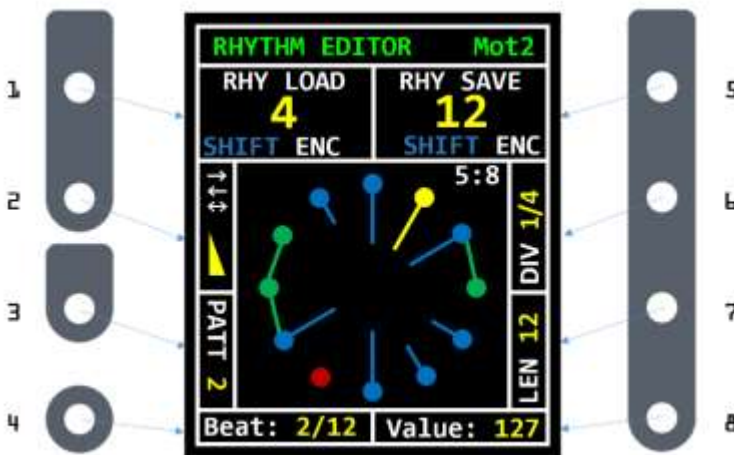
To change the note value rotate encoder 8 and the currently selected step's line height will correspond to the note value. The value is shown at the bottom of the display in the Value box: CHORD (1-20), SCALE (1-40), & CHROMATIC (1-60).

If changing the Pattern note type (CHORD, SCALE, or CHORMATIC), turn the Value encoder 8 to choose.

## Rhythm Editor

(Shift-Menu Encoder 6)

The Rhythm editor enables the user to manipulate the beats in which the Motif notes are played. The selected Motif (1 or 2) is shown in the upper right of the display (Mot1 or Mot2). In the middle area of the display there will be a circle of dot beats. From each dot there is a line pointing towards the center, the length of the line is the velocity value. Beats can also be a REST, colored red, which skips playing a note from the pattern on that beat. They can also be a TIE, colored green, which connects beats. The connected beats only play a single note from the Pattern. These values are shown at the bottom of the display in the Value box.



The Rhythm and Pattern work together to make the Motifs. The Rhythm defines the note velocity, Rest, or Tie. The Pattern is a list of note values. Each beat is paired with a note value. When a beat is played a note at it's value is played with it, when the next beat is played the next note from the Pattern is played.

If the number of beats is different from the number of notes an interesting effect occurs that the Pattern notes shift relative to the

Rhythm. If all the beats in a Rhythm are the same, the effect is not noticeable. The notes:beats ratio (Ex. 8:12) is in the upper right side of the middle window. It is helpful to know the ratio when adjusting the Rhythm or Pattern lengths. The ping-pongs and random variations will also affect the note number. If a beat is a Rest it is not counted in the beats number.

All of The NDLR buttons can be used while in the Rhythm editor including the Chord Degrees and Types and selecting the Motif.

### Rhythm Load / Save – Encoders 1 & 5

Rhythms can be loaded and saved using encoders 1 and 5. The first 20 Rhythms are fixed and the second 20 are writeable. To LOAD a Rhythm rotate encoder 1 to select the Rhythm number (1-40), then hold down the blue *Shift* button and press encoder 1 button. To SAVE a Rhythm rotate encoder 5 to select the Rhythm number (21-40), then hold down the blue *Shift* button and press encoder 5 button. A message will display when the SAVE or LOAD is complete.

### Variation – Encoder 2

To change the Motif's Pattern Variation rotate encoder 2 (see Pattern Variations for more info). The Variation glyph is shown on the upper left hand side of the display in the 'Variation' box. This box is rotated 90 degrees.

### Clock Division – Encoder 6

To change the Motif's Clock Division rotate encoder 6 (see Clock Division for more info). The Clock Division fraction (Ex. 1/4) is shown on the upper right hand side of the display in the DIV box. This box is rotated 90 degrees.

### Pattern – Encoder 3

To change the Motif's Pattern rotate encoder 3 (see Pattern for more info). The Pattern number is shown on the lower left hand side of the display in the PATT box. This box is rotated 90 degrees.

### Length – Encoder 7

To change the Rhythm's Length rotate encoder 7 (see Rhythm Editor intro section for more info). The Rhythm Length value (4-32) is shown on the lower left hand side of the display in the LEN box. This box is rotated 90 degrees.

### Beat (select) – Encoder 4

To edit a particular beat rotate encoder 4 and the selection highlighted yellow will move around the beat circle. The beat number selected is shown at the bottom of the display in the Beat box. (Ex. 2/12 = beats/notes).

### Value (edit) – Encoder 8

To change the velocity value or to choose REST or TIE rotate encoder 8 and the selected beat's line will correspond with the velocity value. If a REST is selected there is no velocity line and the beat dot is red. If a TIE is selected the beat dot is yellow and the velocity line connects with the previous beat dot. The value is shown at the bottom of the display in the Value box (1-127, Tie, Rst).

The velocity value that is sent out with the MIDI NoteOn event is effected by the Accent type and is not always the exact value you set in the Rhythm editor. The TIES and RESTS always effect when the note is played.

## Chord Sequencer

(Shift-Menu Encoder 1)

We wanted to make sure that this future feature would be clearly marked on the user interface so we made to choice to screen print it although this feature is not implemented as of ver 1.0

## MIDI Controller

(Shift-Menu Encoder 4)

We wanted to make sure that this future feature would be clearly marked on the user interface so we made to choice to screen print it although this feature is not implemented as of ver 1.0.

## Tips and Tricks

### Setup and Getting Started

1. Label your synths with the MIDI channel they receive on! This info is invaluable when assigning The NDLR's parts to the synths.  
TIP: I use a black Post-it notes with a white marker pen! I trim the paper to fit on the synth and try to only use the sticky part of the Post-it.
2. Connecting multiple synth without a MIDI "splitter" aka thru box. The NDLR has two MIDI out ports. Also synths often have "MIDI Thru" jacks which is an exact copy of the MIDI messages on the MIDI In jack. Use MIDI Thru to daisy chain a few synths.  
TIP: MIDI Out is NOT the same as MIDI Thru, unless there is a synth setting that say so.
3. When first getting familiar with The NDLR it's a great idea to try only one Part (Pad, Drone, or Motif) at a time, plugged into one synth with a patch that has a very short attack and release (like a piano). Get to know that part's parameters by experimentation. Then add Parts one at a time and experiment with their interplay.  
TIP: Sometimes not using all the Parts is the best thing for a jam or song.
4. Enjoy finding patches on your synths that play well together. I find it takes about 15 minutes or so to get everything sonically dialed in.
5. Arrange The NDLRs parts across the octave ranges for a less cluttered sound.
6. Add some movement to the Parts using the modulation matrix. I like to target the Part's position with a really slow moving LFO.
7. Stuck notes: The NDLR sends the proper NoteOff events however we have seen that synths can get stuck notes... if this happens the *PANIC* button will turn of all notes, on all channels, on all ports.

## Rhythms & Patterns

1. To fully explore each Pattern move through each beat and watch the velocity value. With a velocity sensitive synth the patterns really add a great deal of rhythmic variety.
2. In a Rhythm a beat with a velocity of 1 is different from a REST. The REST skips the note in the Pattern, the vel=1 plays it silently, this is especially apparent with a velocity sensitive synth.
3. When exploring Rhythms its useful to use a metronome by using the other motif to play simple downbeat with a single note (Pattern Len = 1)
4. Try making a complex Rhythm first, then copy it to the previous Rhythm number and reduce the complexity. Repeat until a very simple Rhythm is reached. Now as the Rhythm is changed over those Rhythm numbers a simple to complex Rhythm will emerge.
5. Try making a complex Pattern first, then copy it to the previous Pattern number and reduce the complexity. Repeat until a very simple Pattern is reached. Now as the Pattern is changed over those Pattern numbers a simple to complex Pattern can emerge.

## MIDI Real Time Messages

1. MIDI Stop/Start/Continue messages are only accepted on MIDI ports 5 Pin **Port B** and USB(1).

## Chord Degree & Type

1. A chord sequence (chord progression) can be made using an external sequencer CC'ing the Chord Degree(CC26) and Chord Type(CC27) parameters with exact values of the degree and type.

## External Clock

1. If The NDLR is set to use an external clock and there are no MIDI clock tick messages coming in from that clock, The NDLR will not play any notes. Also, notes can get stuck "on" if the MIDI clock tick messages stop while notes are playing.
2. "Arming" the Parts - When The NDLR is configure to receive an external clock from a MIDI controller, like the Arturia BeatStep Pro or KeyStep, first "Arm" the parts you want to play by pressing the Play/Pause buttons. The parts you arm will start when the external controller's Start button is pressed. When The NDLR receives clock and a MIDI Start command the part(s) will start playing.

FOR MORE TIPS & TRICKS BE SURE TO VISIT THE NDLR FORUMS AT:

[ConductiveLabs.com/forum](http://ConductiveLabs.com/forum)

## Appendix

### A. MIDI CC (Control Change) Implementation

NOTE: CC messages 75-79 (4Bh-4Fh) are used as inputs sources (#12-#16) to the Modulation Matrix

#### GENERAL

| CC (Dec) | CC (Hex) | Target  | Range         | Range Description  |
|----------|----------|---|---------------|--|
| 26       | 0x1A     | Chord Degree                                    | 1-6           | I, II, III, IV, V, VI, & VII   |
| 27       | 0x1B     | Chord Type                                      | 1-6           | Triad, 7 <sup>th</sup> , sus2, alt1, alt2, sus4, & 6 <sup>th</sup>   |
| NoteOn   | N/A      | Chord Degree                                    | C-B notes     | White keys map to Chord Degrees: I-VII<br>Inbound on NDLR 'Control' MIDI Channel   |
| NoteOn   | N/A      | Chord Type                                      | C#3-D#4 notes | Black keys map to Chord Types:<br>alt1 & alt2 - triad, 7 <sup>th</sup> & 6 <sup>th</sup> - sus2 & sus4<br>Inbound on NDLR 'Control' MIDI Channel   |
| 57       | 0x39     | Black Keys Control On/Off                       | 1-127         | On inbound NDLR control MIDI channel, the black keys map to the Chord Types. On = 0-62, Off = 63-127<br>Note: useful when using a Korg SQ-1 as the inbound NDLR controller and only want to send white key NoteOn value (for Chord degree changes) |
| 69       | 0x45     | Chord Inversion                                 | 0-127         | On = 0-62, Off = 63-127  |
| 73       | 0x49     | Key   | 1-12          | C, G, D, A, E, B, F#, Db, Ab, Eb, Bb, & F (circle of 5ths)   |
| 74       | 0x4A     | Mode / Scale                                    | 0-15          | Major, Dorian, Phrygian, Lydian, Mixolydian, Minor (Aeolian), Locrian, Gypsy Min, Harmonic Minor, Minor Pentatonic, Whole Tone, Tonic 2nds, Tonic 3rds, Tonic 4ths, Tonic 6ths   |
| 72       | 0x48     | Tempo   | 5-127         | Beats Per Minute x2 (10-254 BPM)   |
| 68       | 0x44     | Clock-In Mode                                   | 0-7           | 0=Internal, 1-2=5-Pin MIDI A-B, 3-6=USB 1-4, & 7=Clock In CV   |
| 61       | 0x3D     | Clock Out CV PPQ                                | 1-4           | 1, 2, 4, & 24  |
| 62       | 0x3E     | Clock Out CV Divide                             | 0-6           | 1/1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64   |
| 58       | 0x3A     | Send MIDI Start / Stop / Continue to MIDI Ports | 0-8           | 0=All Ports, 1-4=MIDI USB 1-4, 5=MIDI USB ALL, 6-7=5-Pin MIDI A-B, 8=5-Pin MIDI A & B  |
| 59       | 0x3B     | Humanize  | 1-10          |  |
| 56       | 0x38     | Inbound Keyboard Transpose MIDI Channel         | 1-16          | Transposes the inbound notes of the key of C to the current NDLR selected key. Inbound MIDI channel on all ports.  |
| 71       | 0x47     | Korg Volca FM Note Velocity MIDI Channel & Port | 0-32          | Outputs the note Velocity on CC 41<br>0=Off, 1=Ch1 5-Pin MIDI A, 2=Ch1 5-Pin MIDI B, 3=Ch2 5-Pin MIDI A, 4=Ch2 5-Pin MIDI B,...  |

## PAD

| CC (Dec) | CC (Hex) | Target                    | Range | Range Description   |
|----------|----------|---------------------------|-------|---|
| 28       | 0x1C     | Pad Position              | 1-100 |   |
| 29       | 0x1D     | Pad Strum                 |       | NOT IMPLEMENTED AS of HW ver 1.0  |
| 30       | 0x1E     | Pad Range                 | 1-100 |   |
| 31       | 0x1F     | Pad Spread                |       | NOT IMPLEMENTED AS of HW ver 1.0  |
| 51       | 0x33     | Pad MIDI Port and Channel | 0-111 | Ch1=0-6, Ch2=7-13, Ch3=14-20, Ch4=21-27, Ch5=28-34, Ch6=35-41, Ch7=42-48, Ch8=49-55, Ch9=56-62, Ch10=63-69, Ch11=70-76, Ch12=77-83, Ch13=84-90, Ch14=91-97, Ch15=98-104, Ch16=105-111<br>Ports (Ex 0-6) = All Ports, MIDI USB 1-4, 5-Pin MIDI A-B |
| 63       | 0x3F     | Pad Velocity              | 1-127 |   |
| 67       | 0x43     | Inter-leaved Poly Chain   | 1-4   | Splits the consecutive notes in a Pad across 1-4 MIDI channels. If Poly Chain > 1 then consecutive MIDI channels start at the PAD MIDI channel (on the same port) and count up.   |
| 70       | 0x46     | Pad Quantization          | 1-3   | 1/4 note beat, 1/8 note beat, & none  |
| 85       | 0x55     | Pad Pause / Play toggle   | 0-127 | Pause = 0-62, Play = 63-127   |

## DRONE

| CC (Dec) | CC (Hex) | Target                      | Range | Range Description   |
|----------|----------|-----------------------------|-------|---|
| 32       | 0x20     | Drone Position              | 2-6   | Octaves 2-6   |
| 33       | 0x21     | Drone Type                  | 1-4   | 1=Root, 2=Root + Octave, 3=Root + 5 <sup>th</sup> , & 4=Root + Octave + 5 <sup>th</sup>   |
| 34       | 0x22     | Drone Trigger               | 1-19  | Key Root based Drone (1-8) & Chord based Drone (9-19)   |
| 52       | 0x34     | Drone MIDI Port and Channel | 0-111 | Ch1=0-6, Ch2=7-13, Ch3=14-20, Ch4=21-27, Ch5=28-34, Ch6=35-41, Ch7=42-48, Ch8=49-55, Ch9=56-62, Ch10=63-69, Ch11=70-76, Ch12=77-83, Ch13=84-90, Ch14=91-97, Ch15=98-104, Ch16=105-111<br>Ports (Ex 0-6) = All Ports, MIDI USB 1-4, 5-Pin MIDI A-B |
| 86       | 0x56     | Drone Pause / Play toggle   | 0-127 | Pause = 0-62, Play = 63-127   |



## MOTIF 1

| CC (Dec) | CC (Hex) | Target                          | Range | Range Description   |
|----------|----------|---------------------------------|-------|---|
| 35       | 0x23     | Motif1 Position                 | 1-10  |   |
| 36       | 0x24     | Motif1 Pattern Length           | 1-16  | Number of notes played from the Pattern starting at #1  |
| 37       | 0x25     | Motif1 Variation – Pattern Play | 1-6   | Forward, backward, Ping-Pong, Ping-Pong (w/repeats), Odd-Even, & Random   |
| 38       | 0x26     | Motif1 Pattern                  | 1-40  | 1-20 internal, 21-40 user (over writable)   |
| 39       | 0x27     | Motif1 Clock Divide             | 1-6   | 1/1, 1/2, 1/4, 1/8, & triplets 1/3 & 1/6  |
| 40       | 0x28     | Motif1 Rhythm Length            | 4-32  | beats   |
| 41       | 0x29     | Motif1 Accent                   | 1-10  | Rhythm Velocity (read from the Rhythm), Humanized Velocity (read from the Rhythm + random variation), Motif Velocity (fixed velocity set in menu), & 7 assorted <i>velocity patterns</i>  |
| 42       | 0x2A     | Motif1 Rhythm                   | 1-40  | 1-20 internal, 21-40 user (over writable)   |
| 53       | 0x35     | Motif1 MIDI Port and Channel    | 0-111 | Ch1=0-6, Ch2=7-13, Ch3=14-20, Ch4=21-27, Ch5=28-34, Ch6=35-41, Ch7=42-48, Ch8=49-55, Ch9=56-62, Ch10=63-69, Ch11=70-76, Ch12=77-83, Ch13=84-90, Ch14=91-97, Ch15=98-104, Ch16=105-111<br>Ports (Ex 0-6) = All Ports, MIDI USB 1-4, 5-Pin MIDI A-B |
| 64       | 0x40     | Motif1 Velocity                 | 1-127 |   |
| 66       | 0x42     | Motif Low Velocity              | 1-100 | Sets the low bound of the Motif1 velocity used in the Accent option (same value used for Motif2)  |
| 87       | 0x57     | Motif1 Pause / Play toggle      | 0-127 | Pause = 0-62, Play = 63-127   |

Note: Offset not accessible via CC

## MOTIF 2

| CC (Dec) | CC (Hex) | Target                          | Range | Range Description   |
|----------|----------|---------------------------------|-------|---|
| 43       | 0x2B     | Motif2 Position                 | 1-10  |   |
| 44       | 0x2C     | Motif2 Pattern Length           | 1-16  | Number of notes played from the Pattern starting at #1  |
| 45       | 0x2D     | Motif2 Variation – Pattern Play | 1-6   | Forward, backward, Ping-Pong, Ping-Pong (w/repeats), Odd-Even, & Random   |
| 46       | 0x2E     | Motif2 Pattern                  | 1-40  | 1-20 internal, 21-40 user (over writable)   |
| 47       | 0x2F     | Motif2 Clock Divide             | 1-6   | 1/1, 1/2, 1/4, 1/8, & triplets 1/3 & 1/6  |
| 48       | 0x30     | Motif2 Rhythm Length            | 4-32  | beats   |
| 49       | 0x31     | Motif2 Accent                   | 1-10  | Rhythm Velocity (read from the Rhythm), Humanized Velocity (read from the Rhythm + random variation), Motif Velocity (fixed velocity set in menu), & 7 assorted <i>velocity patterns</i>  |
| 50       | 0x32     | Motif2 Rhythm                   | 1-40  | 1-20 internal, 21-40 user (over writable)   |
| 54       | 0x36     | Motif2 MIDI Port and Channel    | 0-111 | Ch1=0-6, Ch2=7-13, Ch3=14-20, Ch4=21-27, Ch5=28-34, Ch6=35-41, Ch7=42-48, Ch8=49-55, Ch9=56-62, Ch10=63-69, Ch11=70-76, Ch12=77-83, Ch13=84-90, Ch14=91-97, Ch15=98-104, Ch16=105-111<br>Ports (Ex 0-6) = All Ports, MIDI USB 1-4, 5-Pin MIDI A-B |
| 65       | 0x41     | Motif2 Velocity                 | 1-127 |   |
| 66       | 0x42     | Motif Low Velocity              | 1-100 | Sets the low bound of the Motif2 velocity used in the Accent option (same value used for Motif1)  |
| 88       | 0x58     | Motif2 Pause / Play toggle      | 0-127 | Pause = 0-62, Play = 63-127   |

Note: Offset not accessible via CC

## B. Specifications

### Requirements:

- USB Power Supply not included; The NDLR runs on 5V DC, 90mA. Suitable USB power includes; PCs (but maybe not older laptops with low voltage USB), high quality USB phone charger, or USB battery pack.
- The NDLR comes with a USB cable. You can purchase longer or shorter cables as needed, with USB A to USB B connectors.
- The NDLR is a sophisticated MIDI controller, it does NOT make any sound on its own, it only sends MIDI messages and requires a sound module(s) to hear notes played.
- MIDI Synthesizer(s); The NDLR can play synths with a MIDI input including vintage synths, modern synths, mono and polyphonic synths, software synthesizers, on an iPad, PC, stand-alone or VSTs in a DAW. Note that some vintage synths or synths with poor MIDI implementations may be prone to getting stuck notes. Use the Panic button (all notes off) on The NDLR if needed.
- To connect several synths to The NDLR and for the best MIDI performance we recommend using an active MIDI “Thru” device, also known as a MIDI Splitter.
- Some of The NDLR’s features send velocity info, if velocity is not supported on your synth or the patch selected on the synth does not respond to velocity, these features will not appear to work..
- The NDLR can be controlled with external MIDI controllers and/or sequencers. See The NDLR Setup Examples above.

### Physical Layout:

- Dims: Size 9.0” x 6.3” x 2.8" (~23.2 x 25.5 x 3.7cm)
- Color LCD Screen 1.8” (128x160)
- 8 Rotary Encoders w/ press switch
- 7 Chord Buttons
- 4 Play/Pause Buttons (PAD, Drone, Motif 1, & Motif 2)
- Motif 1 or Motif 2 Toggle Button. Shifted Panic - all Notes Off
- Global Play/Pause Button
- Shift & Menu Buttons
- Recessed Firmware Update Button on back panel (upgrades via USB)

### Physical Input/Output:

- 2x MIDI 5-Pin Inputs
- 2x MIDI 5-Pin Outputs
- 1x USB w/ 4 Virtual USB MIDI I/O ports + Power
- 1x Clock Out 1/8th inch jack
- 1x Clock In 1/8th inch jack

### C. A Very Basic MIDI NoteOn/Off Review

The most rudimentary way The NDLR plays synths is by sending NoteOn and NoteOff MIDI messages.

The NoteOn message has three parts: Which note to play, how hard to hit the key, and which instrument to play on. The NoteOff message has the same three parts but “how hard” is always zero. There are no ‘response’ MIDI messages, so once a NoteOn or NoteOff message is sent there is no way of knowing if it was ever received and whether or not the note is on or off!

When trying to understand how a message protocol works I like to imagine a scenario where humans replace the computers and further imagine the actual English conversation. Here is a version of sending MIDI messages done by humans, no machines...

A conductor is sitting at a desk alone in a control room with a simple melody written on a staff. In 3 separate “synth” rooms each has a person with a synth. There is an intercom system so the control room talks to all three rooms at the same time. The conductor’s job is to have them play a song together. So the conductor starts by reading aloud...

| Time  | The human says...                     | The NDLR says...              |
|-------|---------------------------------------|-------------------------------|
| 00:00 | room 1: play middle C softly          | midiA.sendNoteOn (60, 32, 1)  |
| 00:02 | room 2: play A above middle C softly  | midiA.sendNoteOn (72, 32, 2)  |
| 00:03 | room 1: stop playing middle C         | midiA.sendNoteOff (60, 0, 1)  |
| 00:04 | room 3: play F above middle C medium  | midiA.sendNoteOn (65, 64, 3)  |
| 00:05 | room 1: play E above middle C hard    | midiA.sendNoteOn (64, 127, 1) |
| 00:08 | room 1: stop playing E above middle C | midiA.sendNoteOff (64, 0, 1)  |
| 00:08 | room 2: stop playing A above middle C | midiA.sendNoteOff (72, 0, 1)  |
| 00:08 | room 3: stop playing F above middle C | midiA.sendNoteOff (60, 0, 1)  |

... good thing there’s The NDLR for all this!

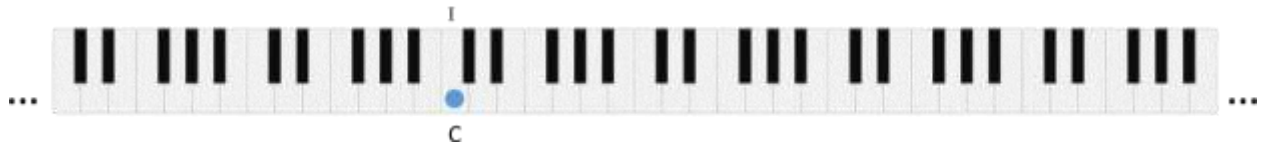
In order to get your NDLR (the conductor) setup, it has to be plugged into the synths with MIDI cables (the intercom) and both The NDLR’s 4 ‘parts’ and the synths need to be set to the same MIDI channels (the room numbers). When you press the play button, The NDLR sends the list of NoteOns and NoteOffs through the MIDI cables to the synths.

D. How The NDLR Picks Notes

Step 1. Choose a starting note to be the 'Key'

Ex: C, D, F#, or B<sup>b</sup>

Ex: "C"

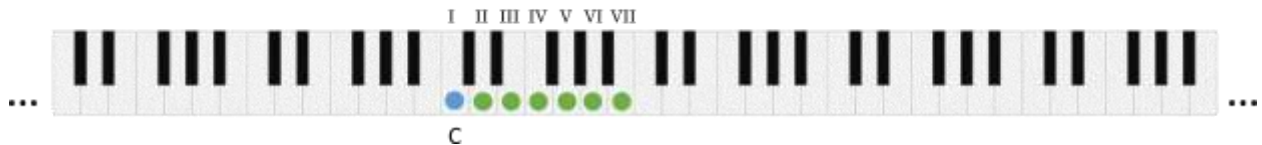


Step 2. In addition to the Key...

choose a 'Mode' or 'Scale'

Ex: Major, Minor, Lydian, or Whole Tone

Ex: "Major" = C, D, E, F, G, A & B

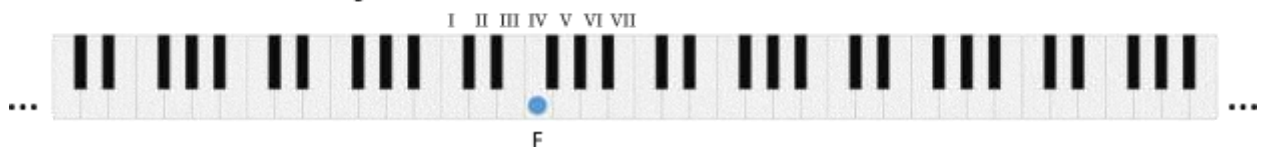


Step 3. From that pool of notes...

choose the root of the chord (Degree)

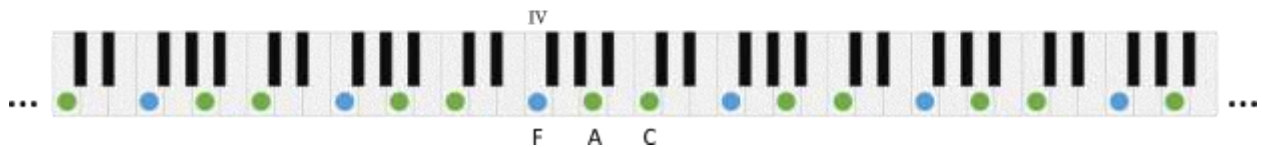
Ex: IV, iii, V, or iiv

Ex: "IV" = F Maj



Step 4. In addition to the chord Degree...  
 choose a chord 'Type'  
 Ex: Triad, 7<sup>th</sup>, sus4, or 6<sup>th</sup>

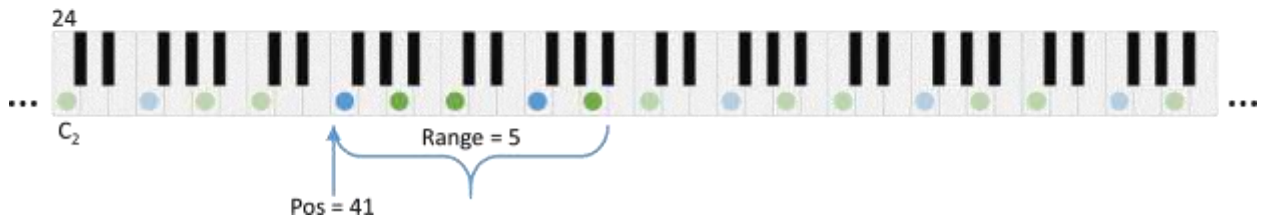
Ex: "F Maj triad" = F-A-C



All 4 NDLR Parts use the same note pool...

Ex: Pad - Position (41) & Range (5)

"F Maj"



Ex: Pad - Position (48) & Range (3)

"F Maj"



As the Position changes so does  
 the inversion of the chord

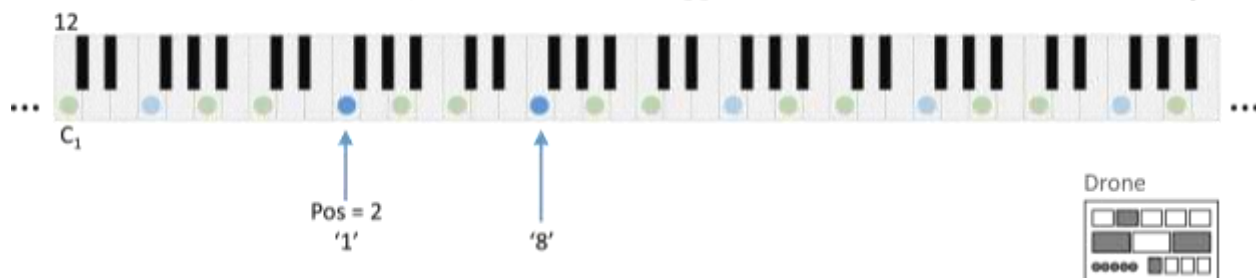
Ex: Drone - Position (1), Notes (1) & Trigger (chord)

"F Maj"



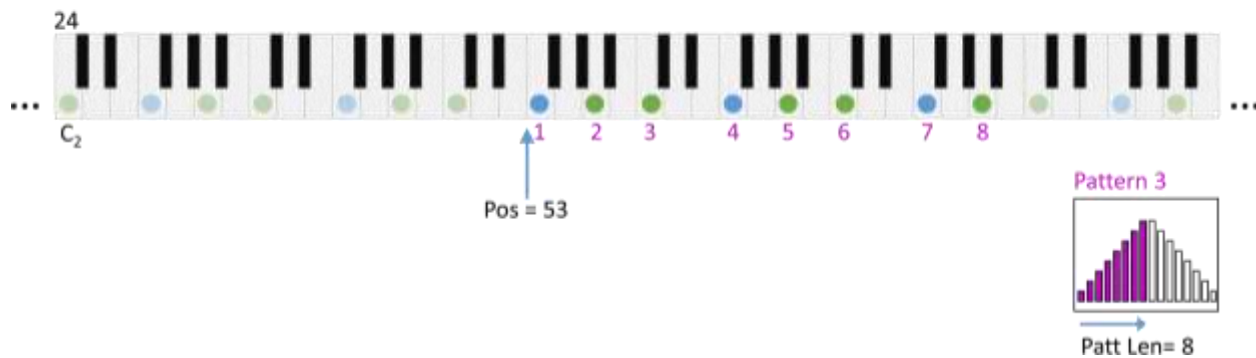
Ex: Drone - Position (2), Notes (1 & 8) & Trigger (chord)

"F Maj"



Ex: Motif - Position(53), Patt(3) & Patt-Len(8)

"F Maj"



Ex: Motif - Position(45), Patt(12) & Patt-Len(6)

"F Maj"

