

NOH



PIANIST - User Manual

V1.2

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Specs-

The NOH Modular Pianist is a complex and voiced chord sequencer with 8 v/oct outputs available for polyphony. It has the following specs:

- Height- 3U
- Width- 8HP
- Depth- 30mm
- Power- +12V (50mA) // -12V (10mA)

Description-

The NOH Modular Pianist is a voiced chord sequencer. It outputs 8 v/oct signals with dynamic and dependent chord voicings for coherent progressions. The module has an internal clock but can be externally clocked for tempo syncing. The sequencer is controlled with a directional joystick, an OLED screen, and has live capabilities with multi-function gate inputs. It is aimed at musicians and experimentalists looking to incorporate harmonic composition to modular, but has a lot of beginner-friendly tools.

Giving Power to the Module-

Supplying voltage to the module requires a 10-pin (5x2) ribbon cable. The cable should be connected to the header on the back of the module. **Care should be taken in matching -12V, usually associated with the red stripe on the ribbon cable, to the “-12V” or the stripe indication on the board.**

- HARDWARE -

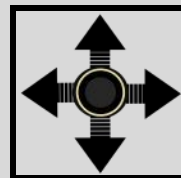
The module is controlled through a 128x64 pixels oled screen. The 4D joystick controls the interface, in addition to two buttons giving access to important functions.



- The **GATE** button triggers a momentary change in the sequence. The action is selectable and more information will be given in the 'software' section. It is off when the module is in editing mode.



- The **PLAY/STOP** button gets the user from the main editing mode to the sequencing mode, and back again. The button will light up to indicate that the module is currently in sequencing mode.



- UP - DOWN
- LEFT - RIGHT
- PUSH BUTTON

Pushing the joystick lets the user select and edit within the menu.

The module has three gate inputs. Two of them give gate access to the buttons (**GATE** and **PLAY/STOP**), while the third is a clock input. Finally, the clock is outputted on the right-most jack output with an LED blinking at the speed of the clock (shown below).



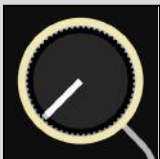
GATE - this enables the momentary changes to be externally controlled.



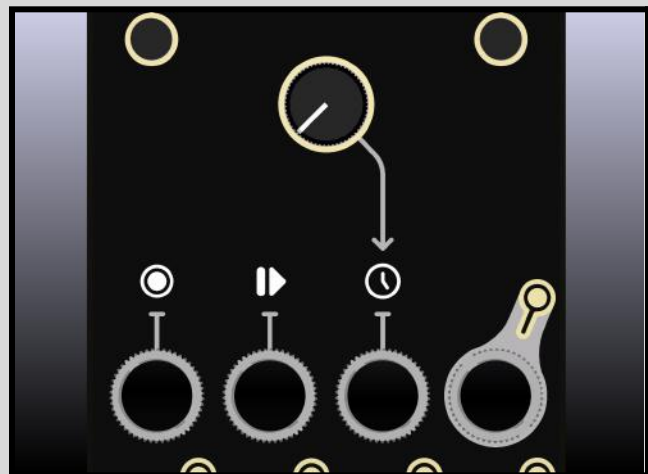
PLAY/STOP - this enables the sequence to be precisely started.



CLOCK - this input will replace the internal clock, for tempo syncing.



CLOCK SPEED - this controls the clock speed for the internal clock. The range is approximately -
10 [bpm] - 210 [bpm]



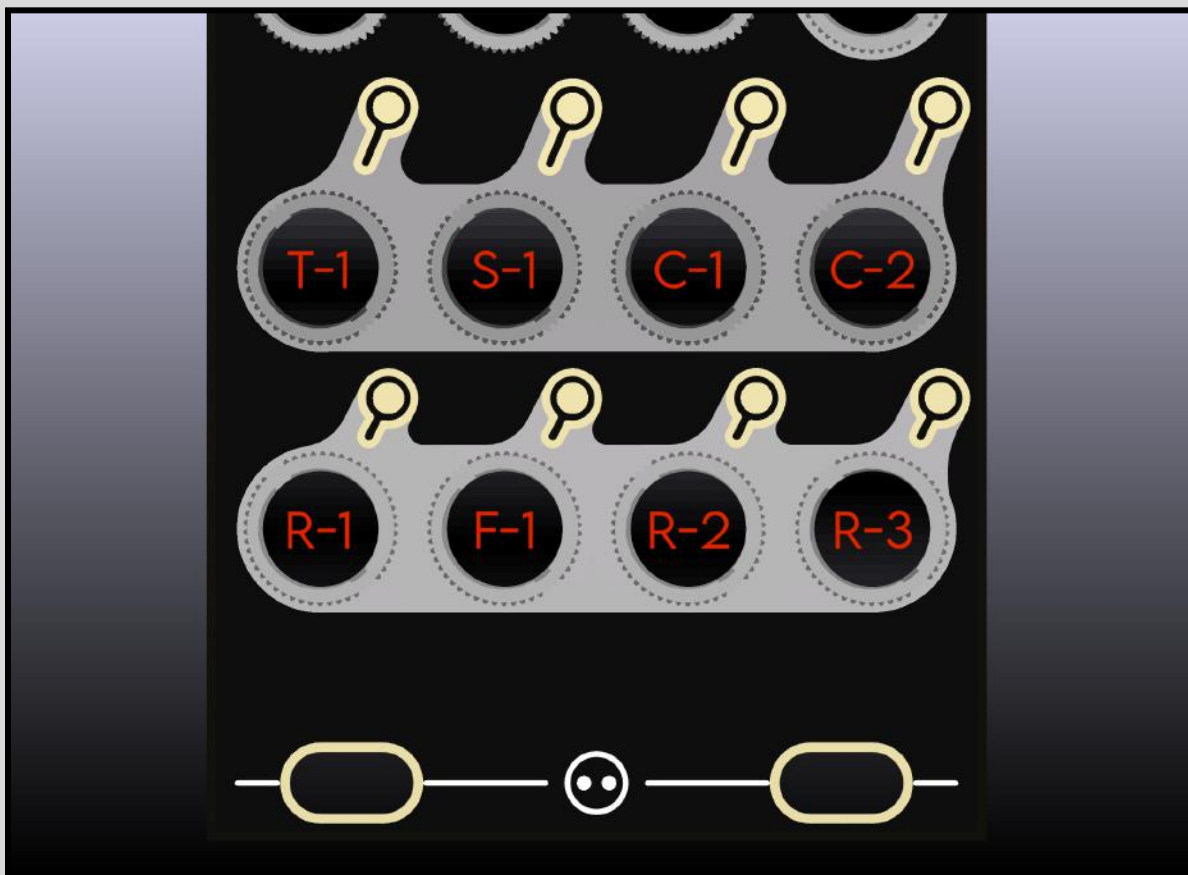
NOTE - every gate input has a minimum 'HIGH' voltage of at least **[2V]** required.

V/OCT OUTPUTS-

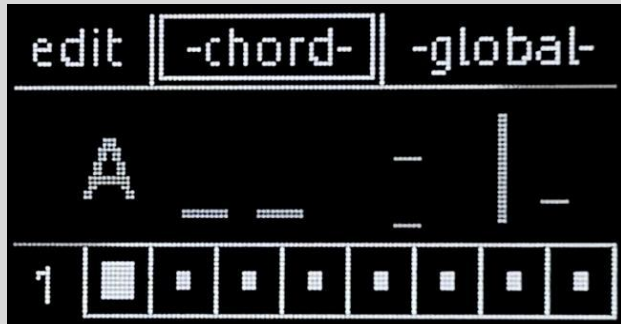
The module has 8 v/oct outputs available for the user to create a chord with the note polyphony they want. It is not necessary to use all 8 outputs, so long as the user is aware of what chord component they are using. The outputs are organised as such -

REF	T-1	S-1	C-1	C-2
COMPONENT	THIRD	SEVENTH	1ST-COLOUR	2ND-COLOUR
OCTAVE	variable	variable	variable	variable
NOTE	N/A	Becomes the <u>fifth</u> if the chord does not have a seventh	Becomes the <u>fifth</u> if the chord does not have a colour1	Becomes the <u>third</u> if the chord does not have a colour2
REF	R-1	F-1	R-2	R-3
COMPONENT	ROOT	FIFTH	ROOT	ROOT
OCTAVE	0	0	1	variable
NOTE	If the chord has an 'over' note, it will follow it	N/A	If the chord has an 'over' note, it will follow it	If the chord has an 'over' note, it will NOT follow it

More details on how they behave and change will be given in the software section.



- SOFTWARE -



After powering up the rack, the module will light up the GATE button to indicate that it is booting.

Once the module is done booting, it will display what will be referred to as the 'main' menu.

Here, the module is in 'EDITING' mode. The clock will not affect the outputs, they will only follow and output the chord that is currently being edited.

The joystick navigates within the menu, for example in the image above the user is currently on the chord icon. Pressing the joystick would then access this 'chord' menu. In order to use the module in its intended purpose-

All oscillators need to be tuned to the exact same pitch before patching the sequencer.



- ROOT -

- The root of the chord can be changed, and while accidentals are only flats (Db, Eb, Gb, ...) they are equivalent to the sharps within the 12-TET system. [C# ≡ Db] ; [D# ≡ Eb] ; [F# ≡ Gb] ; [...]

- The roots are obviously relative to how the oscillators are tuned, so **tuning all oscillators to either A1[55Hz] or A2[110Hz] is recommended.**



- THIRD -

- The third determines the main quality of the chord, it affects the third (**T-1**), the fifth (**F-1**), and the seventh (**S-1**).

- This requires some knowledge of music theory, but the module has a scale quantization option (explained later on) which can lock the third of chords if the user wants to be locked to a scale.

[_]	[M]	[+]	[m]	[o]	[∅]
DOMINANT	MAJOR	AUGMENTED	MINOR	DIMINISHED	HALF-DIM
Maj3, min7	Maj3, Maj7	Maj3, #5, min7	min3, min7	min3, b5, bb7	min3, b5, min7



- SEVENTH -

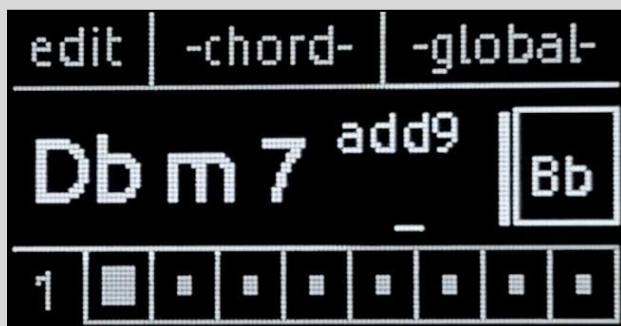
- The seventh determines whether the chord is a simple triad or if a seventh is added to it.
- The seventh (**S-1**) will follow the chord quality (as explained above) and is a simple way to add colour and complexity to the chord progression.



- COLOURS -

- The module has two colour options and two outputs for those (**C-1**) and (**C-2**).
- Some colour options will not output on those outputs, but rather change another one - the third (**T-1**), the fifth (**F-1**), or the seventh (**S-1**)
- Experimenting with colours is recommended.

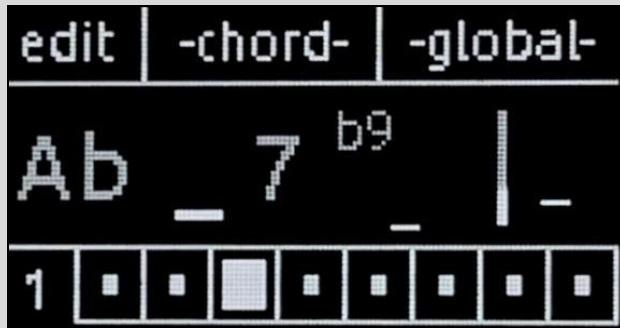
COLOUR TYPES AND WHAT OUTPUT THEY CHANGE								
REF	[_]	[sus2]	[sus4]	[b5]	[#5]	[b6]	[add6]	[min7]
OUTPUT	N/A	T-1	T-1	F-1	F-1	Colour	Colour	S-1
REF	[maj7]	[oct.]	[b9]	[add9]	[#9]	[b11]	[add11]	[#11]
OUTPUT	S-1	Colour	Colour	Colour	Colour	Colour	Colour	Colour



- OVER -

- The over determines what root the chord will be put against, for example the image on the left will output a Dbmin7(add9) chord but with Bb as the root and **NOT** the expected Db root.
- This 'over' note will change both lower roots (**R-1**) and (**R-2**) so either of those need to be taken into account for chords over a different root.

These are the basic tools to edit and compose a specific chord, it should give access to a lot of widely used chords. It is recommended that the user experiments with colours and figure out what sounds good/bad to the ear within the context of a progression.



- PAGES AND CELLS -



The module has 32 slots (or 'cells') for the user to input 32 different chords. The user can access 8 of them at a time by pressing on one of the 8 available squares.



There are 4 pages of 8 cells accessible. To change pages, the user needs to select the page indicator and go to the right one.

- EDIT MENU -

The edit menu is accessed from the main menu by pressing on 'edit'.



- COPY / PASTE -

- The edit menu is for fast access to chord editing and to speed up the process of entering a chord progression.
- Copy/Pasting a chord will only copy its components, it will copy forward the chord details in the 'chord' menu (explained later on).

FAST PASTE SHORTCUT

Once a chord is copied, the user can **FAST PASTE** by pressing on the cell they want to copy the chord to, while holding the joystick pressed for about 1 second.



- CLEAR / CLEAR ALL -

- **CLEAR** - clearing a chord will reset it to the default chord with default settings (even the ones in the 'chord' menu).
- **CLEAR ALL** - clearing the entire 32 chords will basically reset it to the default settings. However, it will **NOT** clear the settings set in 'global' settings.

To exit the edit menu, the user simply presses 'back' and returns to the main menu.

- CHORD MENU -

The chord menu is accessed from the main menu by pressing on 'chord'.

What will be referred to as the 'upper chord' comprises - **(R-3),(T-1),(S-1),(C-1), and (C-2)**.

- back -	A 1	clear
VOICE	SHIFT	SPRD.
on	-	-
go to	- -	then 2

- CHORD NAVIGATION -

- For quick access to different chords, the chord navigation lets the user jump from different chords to edit multiple ones without having to return to the main menu every time.

- The information displayed is both the current root of the chord, and its cell number (e.g. on the left, the selected chord is the 1st with a root on 'A')

- back -	A 1	clear
VOICE	SHIFT	SPRD.
off	-	-
go to	- -	then 2

- VOICING -

- This function essentially creates gravity around a centre note (currently v1.2, it is 'D' an octave above). This puts all chords, whatever they are, towards the same range for coherent progressions.

- Every note of the upper chord (**R-3**), (**T-1**), (**S-1**), (**C-1**), and (**C-2**) will be shifted up or down by an octave to be closer to the gravity note.

- back -	A 1	clear
VOICE	SHIFT	SPRD.
off	-5	-
go to	- -	then 2

- SHIFT -

- Shifting a chord up will take the lowest note of the upper chord and move it up by an octave. Shifting down will do the opposite with the highest note.

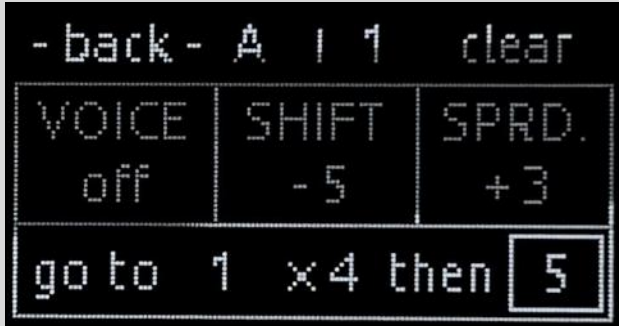
- The shifting range goes from -10 to +10, but this is bound by the 0-5V output capability of the modules. Additionally, shifting will be done on top of voicing if there is a voicing.

- back -	A 1	clear
VOICE	SHIFT	SPRD.
off	-5	+3
go to	- -	then 2

- SPREAD -

- Spreading a chord keeps the lowest note where it is, and incrementally spreads the top notes of the upper chord higher and higher. The upper chord then becomes wide and across several octaves.

- A good exercise is to shift down the chord and spread it as much, this gives a full-sounding chord.



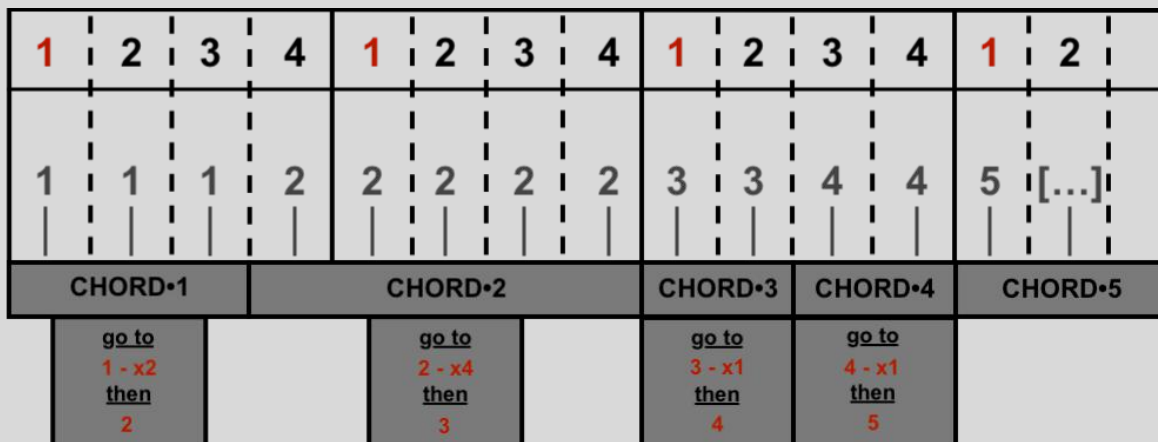
- NEXT CHORD DIRECTION -

- By default, the sequencer goes from chord 1 to 2, to 3, [...] but the chord direction can be edited.
- There are a lot of musically coherent options for where a chord goes after it's been played. The user can select where it first goes next, how many times this is repeated, and where it goes after the repetitions are completed.

GO TO	<ul style="list-style-type: none"> • 'Go to' sets where the chord goes right after it has been played. • This can be any chord, even going to itself is possible for repetition. <p>SHORTCUT - Keeping this pressed for ~1 sec will set it automatically to the current chord being edited (for looping the chord)</p>
REPEAT	<ul style="list-style-type: none"> • 'Repeat' sets how many times it will go to the chord set in 'Go to'. • This can be set to repeat 0 times up to 15 times.
THEN	<ul style="list-style-type: none"> • 'Then' sets where the chord goes after the repetitions are completed. • By default, this is set to the next chord in line to follow a linear sequence, but can be set to jump around or go back to chord n•1 to loop. • TIP - if nothing is set as 'Go to' the chord will go directly to what is set here <p>SHORTCUT - Keeping this pressed for ~1 sec will set it automatically to the 1st chord (for looping the sequence)</p>

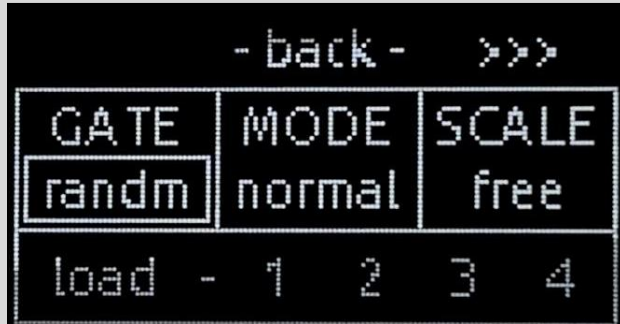
The example below makes use of this system. It changes chords at different beats within a 4/4 time signature. Here the clock is at x1ppq (quarter notes), but the user can achieve more resolution with faster clocks (8th notes, 16th notes, triplets, etc.).

NB: the number of repeats is one less than the number of beats the chord stays on.



- GLOBAL MENU -

The global menu is accessed from the main menu by pressing on 'global'.

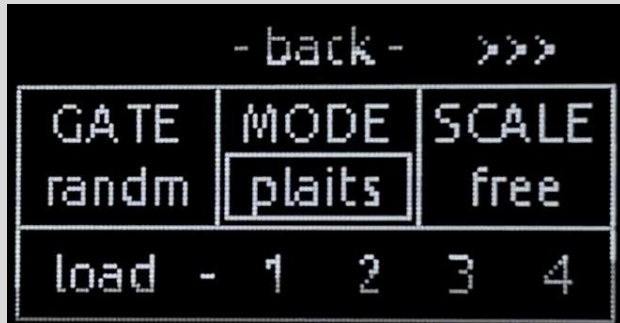


- GATE -

- The gate input can have 6 different momentary effects on the sequence, however they only work when the module is in sequencing mode.

- Each function (apart from the FREEZE function) will only apply to the next chord in the sequence and **NOT** the current one. This is important to keep in mind for performances.

FUNCTION	COLOUR	DESCRIPTION
RESET	red	The reset function will bring the sequence back to the 1st chord, and the sequence will then act as if it had just been started.
RANDOM	purple	<p>The random function will randomise both colours (C-1) and (C-2) with a colouring that matches the quality of the chord -</p> <ul style="list-style-type: none"> • (C-1) will always be randomised • (C-2) has a 50% chance of being randomised, and will never randomise to the colour set in (C-1) • This randomisation is dependent on whether the chord is major, minor, dominant, etc. to give a coherent colour to the chord.
SHIFT	green	<p>The shift function will shift the chord by one or two octaves -</p> <ul style="list-style-type: none"> • the chord will be shifted up by an octave 75% of the time. • the chord will be shifted up by two octaves 25% of the time.
SPREAD	yellow	<p>The spread function will spread the chord from 0 to 3 times -</p> <ul style="list-style-type: none"> • a random number between 0 and 3 is generated each time this function is called, and the chord will be spread for that amount.
FREEZE	cian	<p>The freeze function will make the sequencer ignore the clock as long as the freeze stays high -</p> <ul style="list-style-type: none"> • This function is the only which is NOT latching, freezing the sequence is done by keeping the gate input high.
JUMP	blue	<p>The jump function will make the sequence jump to a random chord selected from a user settable range of 1 up to 32 chords-</p> <ul style="list-style-type: none"> • The user settable range is explained further on PAGE 14 • the repeats will NOT be reset, the sequence just jumps.



- MODE -

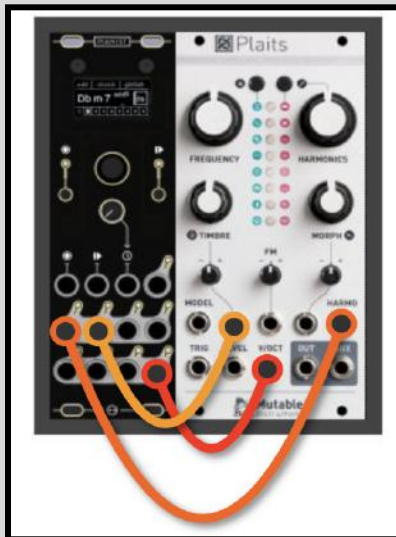
- The module is compatible with common chord modules, currently (v1.2) these modules are -
- Qu-bit electronix - **CHORD v2** → 'chord'
- Mutable Instruments - **PLAITS** → 'plaits'
- Music Thing Modular - **Chord Organ** → 'organ'



- CHORD v2 -

- For a proper operation-
- **(R-3)** connects to the **(V/OCT)**
- **(T-1)** connects to **(QUALITY)**
- **(S-1)** connects to **(VOICING)**
- **(QUALITY)** and **(VOICING)** knobs are fully CCW (0).

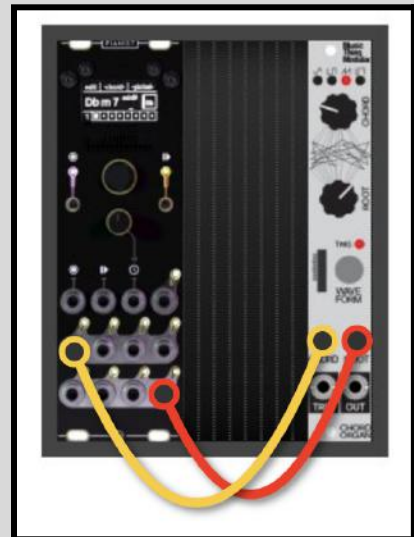
• **PATCH TIP** - Chord v2 can be used in 'triad' mode, and **(C-1)** connected to the **(LEAD)** input. This way Chord v2 can be used normally, but an added colour will be added to the chord.



- PLAITS (CHORD) -

- For a proper operation-
- **(R-3)** connects to **(V/OCT)**
- **(T-1)** connects to **(HARMO)**
- **(S-1)** connects to **(TIMBRE)**
- **(HARMONIC)** knob fully down
- **(TIMBRE)** knob at 20%
- **(TIMBRE)** attenuverter open

• Plaits has a limited number of chord types available. It cannot do augmented, diminished, nor half-diminished chords. Instead, they will all be transformed to the third quality (maj/min) with the seventh on **(C-1)**. 'SPREAD' will not work in this mode.



- CHORD ORGAN -

- For a proper operation-
- **(R-3)** connects to **(ROOT)**
- **(T-1)** connects to **(CHORD)**
- **(CHORD)** knob fully down
- leave the table of chord in its **FACTORY SETTING**

• The Chord Organ has a limited number of chord types. It cannot do dominants or half-diminished chords. Instead, they will all be transformed to the third quality (maj/dim) with the seventh on **(C-1)**. 'SPREAD' and 'SHIFT' will not work in this mode.

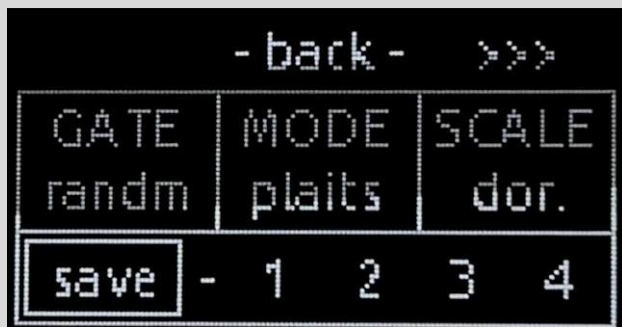
Check what chord types each module can/cannot produce on their relative manuals



- SCALE -

- The scale option locks the editing to a set scale or mode (although the 'mode' word was not used to prevent confusion with the mode option).
- Currently (v1.2), scales can be in any root. If the user wants to change the root of the scales, they can access that option in the 2nd page of the global menu. This is explained later on.

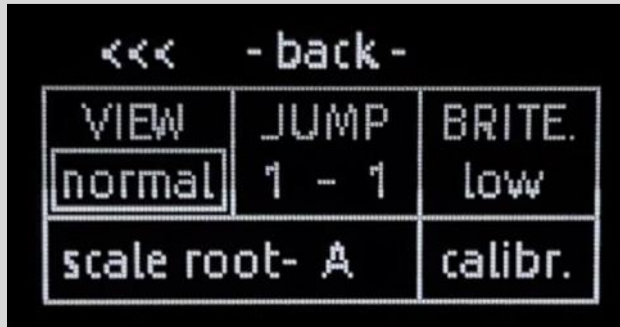
Relative Degree	I	II	III	IV	V	VI	VII
MAJOR	maj	min	min	maj	dom	min	∅
MINOR	min	∅	maj	min	min	maj	dom
DORIAN	min	min	maj	dom	min	∅	maj
PHRYGIAN	min	maj	dom	min	∅	maj	min
LYDIAN	maj	dom	min	∅	maj	min	min
MIXOLYDIAN	dom	min	∅	maj	min	min	maj
LOCRIAN	∅	maj	min	min	maj	dom	min
FREE	This mode is the default one, no quantization.						



- LOAD / SAVE & PRESETS-

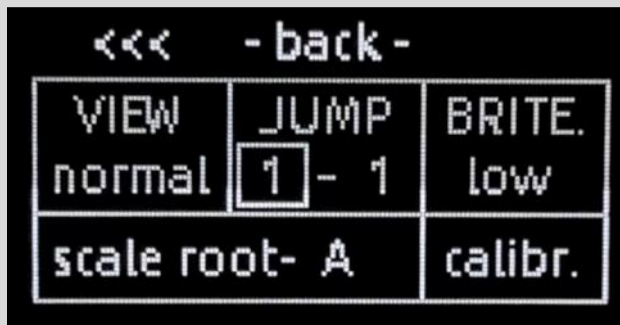
- The module has 4 slots to load/save sequences. **THERE ARE NO AUTO-SAVES**
- Currently (v1.2), when the module powers on it will load slot n°1 to the session automatically.
- Pressing on 'load' or 'save' lets the user change what action to do (loading or saving), and pressing on one of the four slots will do that action on it.

SLOT	TITLE	DESCRIPTION
[1]	[empty]	A blank canvas to start new projects.
[2]	Time Remembered	A modal jazz standard composed by Bill Evans, recorded for the 1st time in 1962.
[3]	Undone	A colourful piece composed by Elizabeth Gounari as a study of melodic voicings.
[4]	Prelude in C major	Composed by J.S. Bach (BWV 846) in 'The Well -Tempered Clavier', a great chord progression.



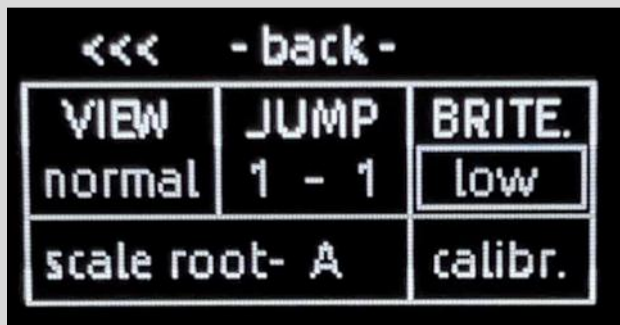
- VIEW -

- This option changes what is displayed when the module is in sequencing mode.
- NORMAL and NONE will be explained in details within their section later on.
- This option is saved within the load/save slots.



- JUMP RANGE -

- The user settable jump range links to the gate function 'JUMP'. It sets the min and max chord slots that the Pianist will randomly jump to.
- TIP- with more than one chord, this function is great for probabilistic and generative sequencing. With one chord exactly, this becomes deterministic which is musically and structurally efficient.

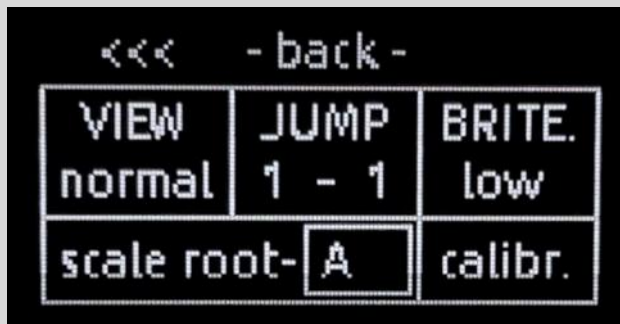


- BRIGHTNESS -

- This option gives access to three different levels of brightness -

LOW, MEDIUM, and FULL

- This option is not saved in the load/save slots.



- SCALE ROOT -

- This option selects the root at which the scale option (see above -SCALE-) will apply. By default it is set to A, but can be any of the 12 notes.
- TIP- The scale options in the Pianist are there as an aid for fast and musical compositions, but should still be seen as musically constraining and limited. A FREE exploration of chord compositions is recommended as much as possible.

The two pages within the 'global' menu are navigated with the top-right or top-left arrows (depending on what page is currently being displayed).



- CALIBRATION MENU -

The calibration menu is accessed from page 2 of the global menu by pressing on “calibr.”



- CHANNEL -

• There are 8 channels (the 8 outputs) to be selected from, they go in order from top to bottom and from left to right.

1-(**T-1**) | 2-(**S-1**) | 3-(**C-1**) | 4-(**C-2**)
5-(**R-1**) | 6-(**F-1**) | 7-(**R-2**) | 8-(**R-3**)



- VOUT -

• In calibration mode, all outputs are outputting the same voltage, this voltage can be selected from the VOUT option. This is to help with calibration, or test the outputs at different levels. The levels are -

0.25V | 1V | 2V | 3V | 4V | 5V

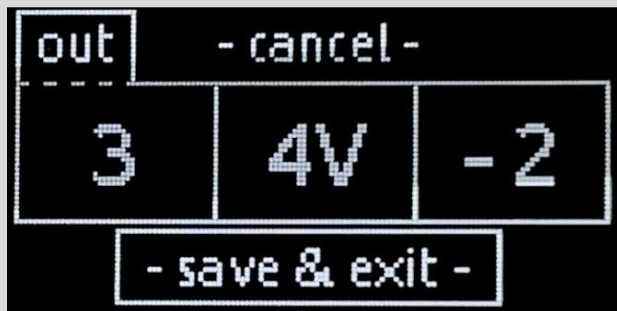


- OFFSET -

• This is where the offset for the selected channel is edited and calibrated.

• This ranges from -15 to +15, and is the smallest step that outputs can increment or decrement.

• The whole range should never be needed (only 1 or 2 offsets), but is available for experimentation.



- SAVING -

• Once calibration or editing is completed, it needs to be saved to take effect on the outputs.

• pressing 'cancel' will obviously not save the changes and revert them to how they were before.

• These settings will always load on start-up.

- SEQUENCING MODE -

The sequencing mode is accessed when the 'PLAY/STOP' button or input is pressed.



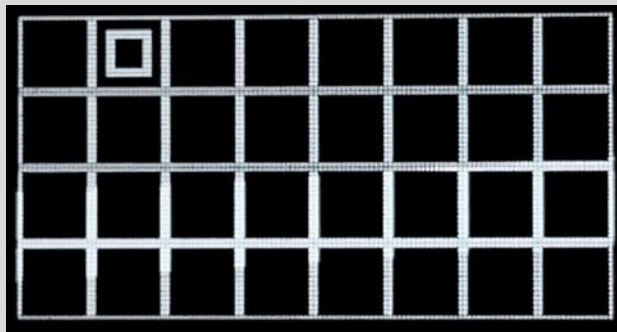
- NORMAL MODE -

• This is the default view. It gives a wide range of information and is most suitable for performances or keeping track of where the sequence is.

MAX CLOCK SPEED:
20[Hz] - 1,200[bpm]

CURRENT CHORD INFORMATION

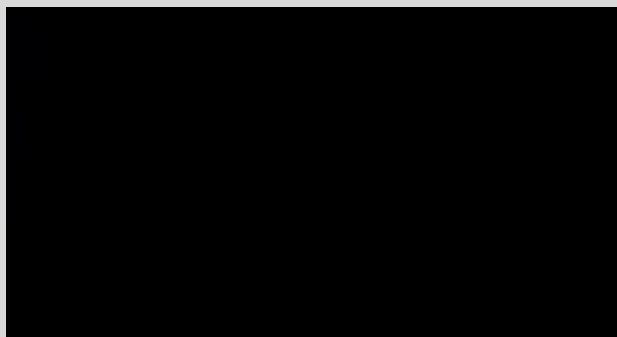
CURRENT CHORD NUMBER	NEXT CHORD	ROOT OF NEXT CHORD
----------------------	------------	--------------------



- CELLS MODE -

• This view displays all 32 chord cells on the screen. The current chord being sequenced will be indicated by a rectangle inside it. This mode has been **REMOVED** since v1.2.

MAX CLOCK SPEED:
20[Hz] - 1,200[bpm]



- NONE MODE -

• This view will not display anything, and will also turn the output LEDs off. This is for two reasons-

- The clock speed can now go into audio rates
- If the sequencer is to be played for several hours with no interruption, this acts as a screensaver

MAX CLOCK SPEED:
200[Hz] - 12,000[bpm]

- FIRMWARE UPDATES -

This is an update log for the Pianist firmware updates.

The initial release of the Pianist firmware (V1.0) will have its version printed on the second page of the GLOBAL menu bottom right as 'v1.0'. All further versions will have their version printed in the CALIBRATION menu on the top right as 'v1.x'.

V1.0	<ul style="list-style-type: none"> • Initial Release.
V1.1	<ul style="list-style-type: none"> • New Chord Organ Mode for compatibility with the Music Thing Modular Chord Organ • New option to change the root of the scale selected, to help composing on all 12 roots. • Increased the “go to” repeats up to “x15” for clocks up to 4ppqn (16th notes). • Load/Save option goes back to ‘load’ after exiting the global menu to prevent accidental saves. • clock skip warning turned off by default because unplugging an external clock could trigger it. • fixed visual bugs on displaying the roots.
V1.2	<ul style="list-style-type: none"> • PAGE functions have been replaced with a brand new generative/random JUMP function. • Copy/pasting a chord now also copies over the chord parameters from the CHORD menu. • CELLS view and warning messages have now been fully removed • New shortcuts for the GO TO and THEN options in the CHORD menu. Holding the GO TO pressed for ~1 sec will set it to the current chord being edited, and the THEN will be set to 1. • Bug fix for the copy/paste option quantizing the root even in FREE mode (un-quantized).

Note - Please find how to update the firmware of the NOH-Modular Pianist on the **BUILD GUIDE** document, available on the module's product page [here](#).

- MISCELLANEOUS -

This is for aspects of the software that englobes all menus and modes.

SCREEN SAVER -

The screensaver is only active in 'editing' mode. **It will turn the screen off between 6 to 8 minutes after being idle**, and the user can turn the screen back on by moving the joystick around (the centre button will not wake the screen up).

Because the screensaver is only enabled in editing mode, it is recommended that the view for sequencing is set to 'NONE' if the sequencer is to be used in sequencing mode for an extensive amount of time (i.e. several hours with no interruption). Alternatively, setting the brightness to low will also help increase the screen's lifespan.

PUSHING THE MODULE TO ITS LIMIT -

As detailed in the 'sequencing mode' section, there is a maximum clock speed the module can run at before there is a risk of clock skipping. Going over this maximum will not break the module, but **will simply expose the sequence to the risk of not syncing properly to the clock, and only switching chords on random clock ticks.**

With no gate input causing momentary changes, and in 'NONE' view, the module can reach up to at least **300[Hz]**, but this is not a specification and the maximum clock speed will depend on how much computation you require every step.

COPYING IN CHORD PROGRESSIONS -

The chord inputs are made to be compatible with most chords used in pop music, rock, jazz, and other genres using more or less complex chords within the 12-TET system. For example, The Real Book is a perfect resource for finding chord progressions as the way they are notated resembles the chord notation standard that this module uses.

Obviously, this module is oriented towards people with a certain amount of musical knowledge, specifically in harmony and harmonic progression. However, the scale quantization coupled with randomness' dependency of chord quality should give a good entry point to beginners or experimentalists wanting a quick way to have coherent progressions.

Even though the module is bound to the 12-TET, the 'CALIBRATION' menu can be a tool to gain access to microtonality through constant offset of the pitch CV.

- ENDING NOTES -

The Pianist benefited from the help and support of amazing people -

Thomas Guillory -

Ideas and technical support during software development

Elizabeth Gounari -

Prototype testing and composing the default preset present in save slots

Izaak Hollander -

Helping with the Chord Organ Compatibility by lending the module

Thank you for reading through the user manual of the NOH-Modular Pianist

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