KNOBULA

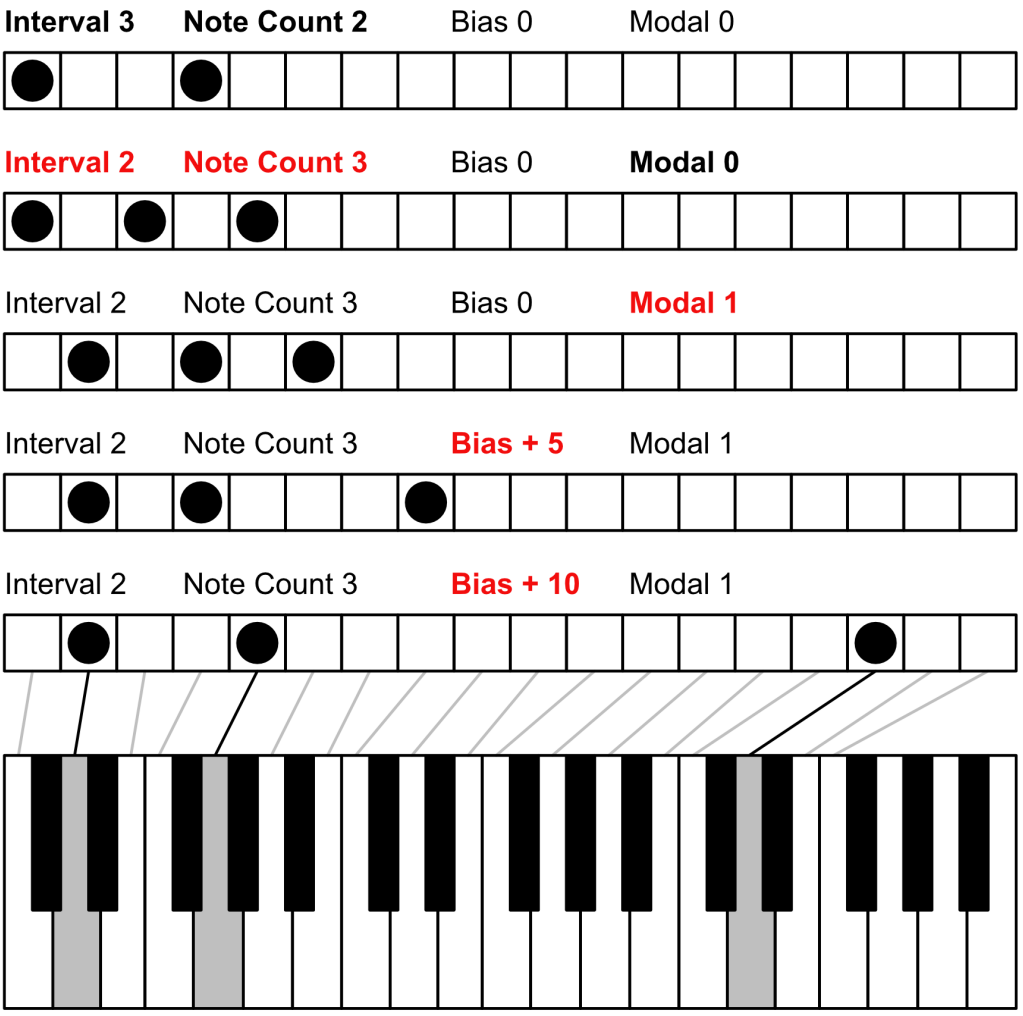
Chord Pilot

Instruction Manual

Contents

Introduction

Chord Pilot is a midi controller for discovering, generating and arranging chords. It is aimed at all types of music creators working at any level of musicianship and technical ability. It is designed to provide a novel way of performing music and a convenient way of reproducing chords on demand.
The fundamental principle behind Chord Pilot is that of an imaginary pair of hands that can be manipulated into various finger positions which are then used to play notes on a virtual keyboard. Below is an example of how a chord is constructed in Chord Pilot using dots on a grid that can be moved using Interval, Note Count, Bias and Modal before finally being 'conformed' into a musical scale, in this graphic the musical scale is a heptatonic scale, representing seven white notes on the keyboard.



The end result can further be transposed using the Circle control which changes the pitch and retains musical relationship between the notes.
Creating chords this way, with less focus on the theory and more on the sound, results in stacks of unusual chords and arpeggios that are otherwise impossible to describe in traditional chord notation and even harder to play with human hands.

You won’t find any controls for key signature, major Dorian 7th diminished or inversions with Chord Pilot, although there are ways some of those attributes can be accessed. Chord Pilot is about experimentation, discovery and happy accidents. So don’t be put off if some of the Pilots chords are a bit discordant or ‘jazzy’ at first, because as you get to know the device you’ll start to discover sweet spots that resonate with your own musical tastes, and you might be inspired to try new musical directions all together. Whatever you do come up with can be stored into one of 192 different chord presets which can be recalled quickly and conveniently either by hand or by CV/Gate control as single chords, chord progressions, arpeggiated midi sequences and rhythmic stabs. Chords can also be simply transferred in sets of 8 into one of our polyphonic synth modules for use later on.

Getting Started

Power

Connect the unit to a standard Eurorack +- 12v power supply using the ribbon cable provided.

Midi

Connect the Midi Out of the unit to the Midi In of any midi synthesiser. A stereo trs to trs cable is provided for connecting to Knobula synth modules such as Poly Cinematic or any synth that uses the trs-A standard. By default Chords are output on midi channel one.

Playing Chords

Press the Audition button to preview a chord set by the controls. The audition button always plays a chord according to the current settings of the knobs and switches on the front panel. With the Buttons switch set to Preset, previously saved chords can be triggered from the 8 illuminated Preset Buttons that surround the audition button, with the Buttons switch set to Modal or Circle the Preset buttons will play variations of the Audition chord. With the audition button held down, try changing some of the knob settings, the chord will update as settings are changed and you can begin to experiment with different parameters.

CV Gate Connections

Connecting a gate signal to gate input allows you to automate Chord Pilot by triggering the device from other modules. A control voltage connected to the Buttons input can select different chord presets, different modal settings or circle settings. A control voltage can be connected to the Bias input for creating variations of chords.

Transposing Chords

Using the Circle encoder you can transpose the pitch of a chord 3 ways:

Circle of 5ths

By default turning the encoder will transpose the chord up or down a perfect fifth and the result is stored as a chord parameter with each preset.

Octave Shift

Holding down the Bank button whilst turning the Circle encoder will transpose the whole Chord up or down an octave. This value is saved with each chord.

Master Transpose

Pushing in the circle encoder whilst turning it will transpose the entire output of the Chord Pilot to a maximum +/- 12 semitones. This value is not stored with a preset and is totally independent. It is best used when you wish to get a chord to fit a given key without having to edit every individual preset.

Knobs

All knob settings are saved as part of a preset except for the Strum setting which is always live.

Interval

Sets the distance between each finger in the chord. Lower values around 1,2 or 3 produce more manageable results.

Bias

Changes how evenly distributed the note intervals are across the chord. Turning Bias to the right spreads fingers apart more towards the top of the chord and turning to the left bunches them together towards the lower end. With the control in the centre the notes are all evenly spaced apart according to the interval setting.

Note Count

Sets the number of notes in a chord. 3 or 4 is a good number to start with. Higher numbers, up to 8 notes, can be achieved for more epic sounds but at a higher risk of sounding discordant. *Sometimes the Chord Pilot algorithm cancels duplicated notes so you may not always hear the actual number of notes set on this control.*

Bass Note

Steals a note from the chord and places it in the octave below. Turn the knob to select which note is chosen to play in the bass octave. With the knob turned fully to the left it has no effect and all notes are left where they were.

Modal

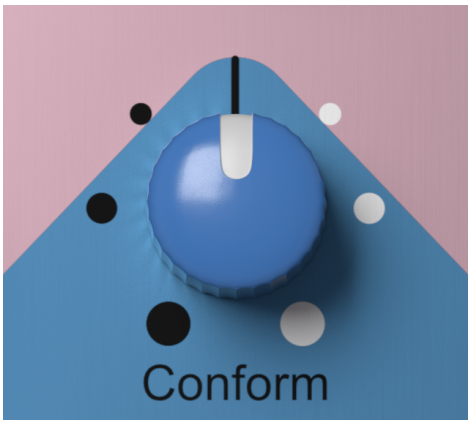
Shifts the whole chord shape up or down the grid. This is not the same as transposing the pitch of the chord because the pitch relationships between keys on our grid are not necessarily equal intervals. Furthermore instead of notes playing many octaves apart, they can also wrap around the octave as we shift, keeping notes bunched together. Modal is also available to access live on the buttons using the button switch.

Circle

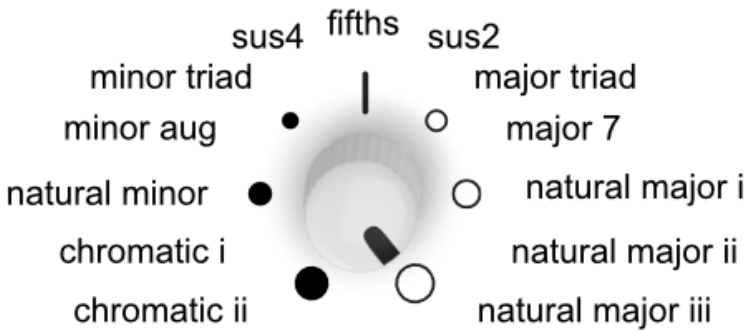
Transposes the chord up or down by a fifth or by any other customisable amount. Circle variations are accessible live using the preset buttons when the button selector switch is set to circle. Holding down Bank while turning the Circle encoder will shift the chord up or down by whole octaves.

Conform

Conform takes the chord shape you've created and conforms it to a known scale of notes. Turn the control to the right for more pleasant sounding major scales, turn to the left for darker, more minor sounding notes, and turn towards the centre to make notes become progressively straighter and harmonious. Forcing notes to play within a restricted scale may sometimes incur duplicated notes which will be disregarded by Chord Pilot's algorithm, or notes may be pushed an octave up or down as the algorithm automatically inverts a chord. This will depend on the complexity of the generated chord and the scale it is conformed to.



The closest musical names that describe the scales selectable from the Conform control are as follows.



Scales variants are shown with i,ii or iii and each one offers a different distribution of the notes, either bunching the notes together with chord inversions (i) or spreading the notes further apart in higher octaves (iii).

Strum

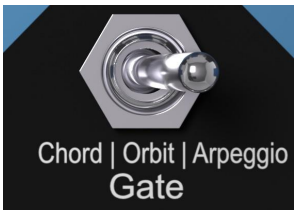
Chord Pilot can strum chords like a harp or a guitar. Use this control to set the speed of the strum function. Strumming is available for both Chord Mode and Orbit mode, but the strum control is only active in Chord Mode (set by the Gate switch). When the Gate switch is set to Orbit this control instead sets the number of chords in the chord progression and the strum amount is inherited from the setting in Chord Mode. When the Gate switch is set to Arpeggio

the strum control acts as a speed control arpeggio *and orbit*. If an external gate or clock is connected then the strum control acts as a selector switch for Arpeggio types.

Gate Switch	**Strum Knob Function**	**Strum Knob Function**	**Notes**
	Internal Clock	***External Gate In***	
Chord	Strum Speed	Strum Speed	Off - 4Hz
Orbit	Sequence Length	Sequence Length	(Strum Speed is inherited from Chord Mode)
Arpeggio	Arpeggio/Orbit tempo	Arpeggio Type	up & down, up only, down only, random, shuffle, shuffle8.

Toggle Switches

Gate Switch



Chord

Pressing an Audition or Preset button plays the chord for as long as the button is pressed. When a gate signal is patched to the Gate input the preset buttons can select a preset but will not play until a Gate is detected. *Note this affects the ability to select a Preset to edit whilst an external gate is connected, see Edit Mode.*

Orbit

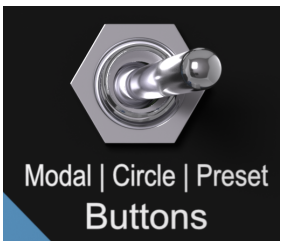
Orbit plays each chord button in a sequence, starting with the first button you press and continuously orbiting the Audition Button in a clockwise direction according to the internal clock speed set in Arpeggio mode or on every gate signal detected at the gate input. The Strum knob can be used to adjust the sequence length from 1 to 8 steps. When a gate signal is patched into the Gate input the selected chord will play only when a gate signal is detected and cannot be manually triggered from the button. *Note, the Strum speed during Orbit is inherited from the value set in Chord Mode.*

Arpeggio

Pressing a Preset Button will play the chord as an arpeggio, playing each note in sequence, with the speed set by the Strum knob. When a gate signal is patched into the Gate input the arpeggio steps through each note with each gate detected, the Strum knob in this instance selects between different arpeggio styles.
Arpeggio Styles are:

1. Up and down
2. Up
3. Down
4. Random Order
5. Shuffled Order, press audition to re-shuffle.
6. 8 Note Shuffled Order, rest notes are inserted where there are not enough notes in the chord, press audition to re-shuffle.

Buttons Switch



The Button switch determines the function of the preset buttons and the Buttons Input cv control.

Modal

Audition chords using the Preset Buttons with each button representing a different mode as found on the modal knob. A control voltage at the Buttons input will select between different modal positions.

Circle

Audition chords using the Preset Buttons with each button representing a different transposition from the Circle knob. A control voltage at the buttons input will select between Circle values.

Preset

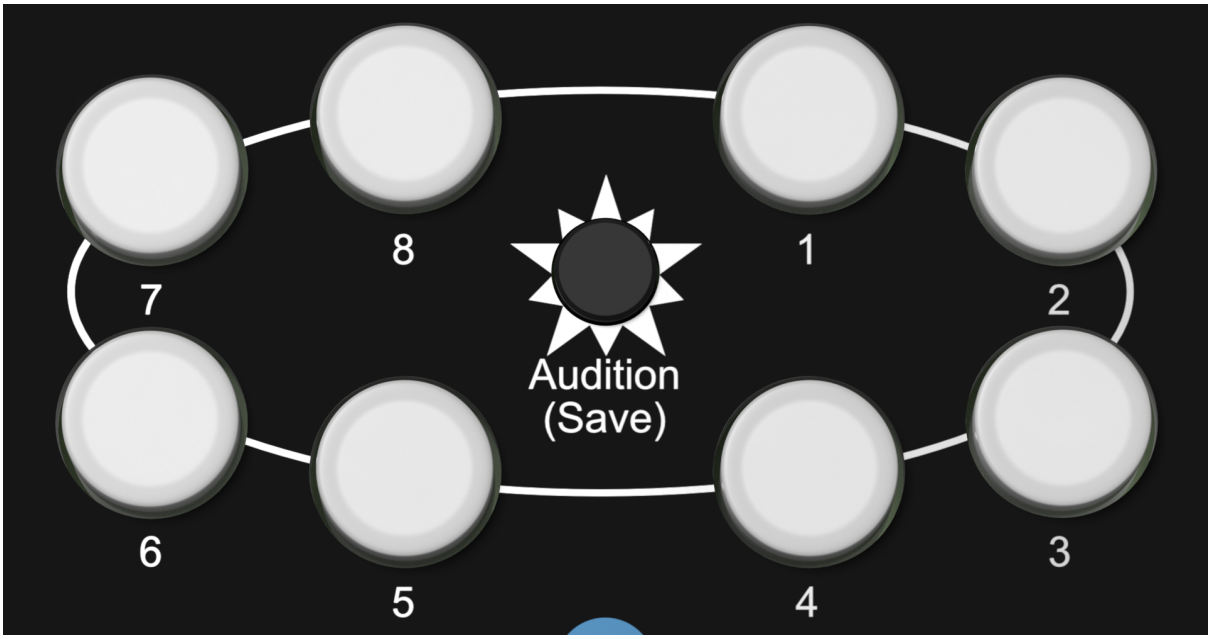
Illuminated buttons play stored presets. A control voltage at the buttons input will select between different presets and play them when a Gate signal is detected.

Bank Set Switch

A | B | C

Chord Pilot can store a total of 192 unique chords into memory presets. Presets are stored in 3 sets of 64 chords, each set can be quickly selected using this toggle switch. Within each set there are 8 banks of 8 chords, a bank can be selected by holding the bank/dump button and pressing one of the 8 preset buttons.

Push Buttons



Preset Buttons 1-8

These 8 illuminated push buttons surround the Audition button and are performance orientated to give you instant recall of stored presets or modal/circle variations of the chord settings on the panel. The buttons can also be selected over CV through the Buttons input. Use the Buttons switch to select the required function of the preset buttons.

Audition (Save)

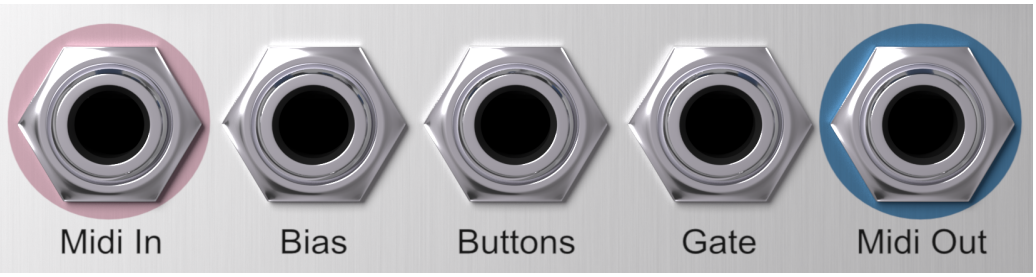
This little button is at the very centre of the Chord Pilot experience. Pressing it will play a chord using whichever settings are live on the controls, and keeping it held down will update the chord as parameters are changed.
To save a chord, hold this button down and select a Preset Button as a destination for your chord to be saved into.

Bank

To change the active bank for playback and loading/saving, hold down the Bank button and select a Preset Button from 1-8, representing the 8 banks. There are 3 sets of 8 banks in Chord Pilot accessible using the 3 way Bank Select switch, each bank contains 8 chords making a total of 192 chord memories.
To transfer the current bank of 8 chords to a Knobula synthesiser such as Poly Cinematic, press and hold the Bank button whilst also pressing Audition(Save). All 8 chords in the selected bank will be transferred instantly and silently to the chord bank of the synth in a

single midi system exclusive message, thereby freeing up your Chord Pilot to use with other devices

Inputs and Outputs



Midi In

If you’re using a keyboard or a midi sequencer with Chord Pilot you can connect the midi here. Chord Pilot’s buttons can be triggered and pitched using an external controller, or the midi input can be merged with Chord Pilot's chords to form an accompaniment depending on the setting of the midi mode in the preferences.

Midi Out

Connect this to any midi device using a trs type A cable. Chord Pilot will output on midi channel 1 by default. Midi out channel can be changed in the Preferences. Bias
CV control of the Bias parameter.

Buttons

CV control of the preset button value. When combined with the Buttons switch you can assign the incoming control voltage to select either a chord preset, a modal value or a circle value for incredibly powerful generative music control.

Gate

A gate signal at this input will play a chord depending on the setting of the Gate Switch.

Preset Edit Mode

To enter Preset Edit mode, ensure that the Buttons switch is first set to Preset, then hold down the Preset Button you wish to edit and press the Circle encoder button.

Editing Parameters of a Saved Chord Preset

First enter edit mode by holding down the Preset Button of the chord you wish to edit and pressing the Circle encoder button. The Preset Buttons will begin to flash, with each active note represented by an illuminated Preset Button, with up to 8 possible active notes. You can hear each note of the chord individually by pressing any of the active buttons and you can hear all the notes played at once as a chord by pressing the Audition button. Turning any of the knobs a few degrees will reactivate that control and allow you to change the structure of the chord. To save the edited chord, first exit edit mode by pressing the encoder button again and then press Audition and a destination preset button at the same time.

Editing Individual Notes

Whilst in edit mode the Preset Buttons will each represent a single note in the chord. To change a note’s pitch value hold down the relevant Button and turn the Circle encoder to change the pitch up or down. Once a note pitch is edited it is displayed as a brighter button and the pitch value is locked.

To exit chord edit mode without saving press the encoder again. To save the edited chord, press the Audition (Save) button and select a destination button to save the edited chord to. This method can also be used to copy and paste chords without editing them.

Preferences

To enter the Preferences mode press and hold the Bank button and press the Circle encoder knob, the Preset buttons will flash to indicate Preferences Mode is active. Press a Preset Button to enter that particular preference and turn the Circle encoder to change the value. Press the encoder once again to store that value and exit the Preferences mode. Preference values are displayed using the 8 buttons as indicators ; values 1-8 are shown by illuminating each button 1-8 respectively and values 9-16 are shown by illuminating all buttons except one where 9 is button 1 darkened, 10 is button 2 darkened etc.

1. Circle Transpose Amount

Use the encoder to increase or decrease the step value that the Circle increments by. Default value is 7 which is a musical fifth.

2. Midi Channel Output

Select a midi channel to transmit and receive all midi data on, default is midi channel 1.

3. Midi in Mode

Choose between different midi functionality when using an external midi controller or keyboard.

1.Chord Control Input (default)

Playing a key between C2 and C4 plays the last chord, transposed up to an octave up or down with C3 (middle C) being the original pitch. White notes from A1 to B2 play the Audition button and the 8 Preset Buttons.

2. Midi Thru Only

Allows you to accompany Chord Pilot by merging the midi input with the chords at the midi output.

4. Knob Edit Mode

Sets the operating style of the knobs when editing presets. When recalling presets onto the front panel you can select the way Chord Pilot activates knobs and reads their values.

1.Movement

When knob movement is detected by a few degrees the knob becomes active and that value is read.

2.Matching

When the knob is turned it is only activated when it’s position matches the stored preset value.

5.Backup and Restore

Entering this mode will prime Chord Pilot to listen out for a system exclusive restore message at the midi input.
Restore will load all data including 192 chords and Preferences via midi in.

To back up the Chord Pilot, whilst in this mode, press Audition (Save).

Cheat Sheet

Function	Action 1	Action 2
chord edit mode	While switched to Buttons Preset mode, Hold down a preset button and briefly press the Circle encoder knob at the same time	Press a glowing button to select which note to edit with the circle encoder, or turn any control to reactivate it.
preferences	push bank and circle encoder button simultaneously	press preset button to enter specific preference Use encoder to change value and press to save/exit
midi bank dump	Push Bank and Audition simultaneously	
Chord Octave adjust	Hold Bank and turn Circle encoder	
Master Transpose (Not saved with chord)	Push and turn Circle encoder	

Firmware Update Procedure

Visit the Download page at knobula.com to download the latest firmware in the form of a .wav audio file.

Switch the Chord Pilot on whilst holding down the Audition button and Preset Button 1 at the same time, the unit should now be in bootloader mode.

Connect an audio cable from your computer to the Buttons input of Chord Pilot and press play on the audio file, making sure the volume is at a reasonable level, the lights on the Chord Pilot should light up in a circular motion until the audio file has finished after about 30 seconds. The Chord Pilot is now updated.