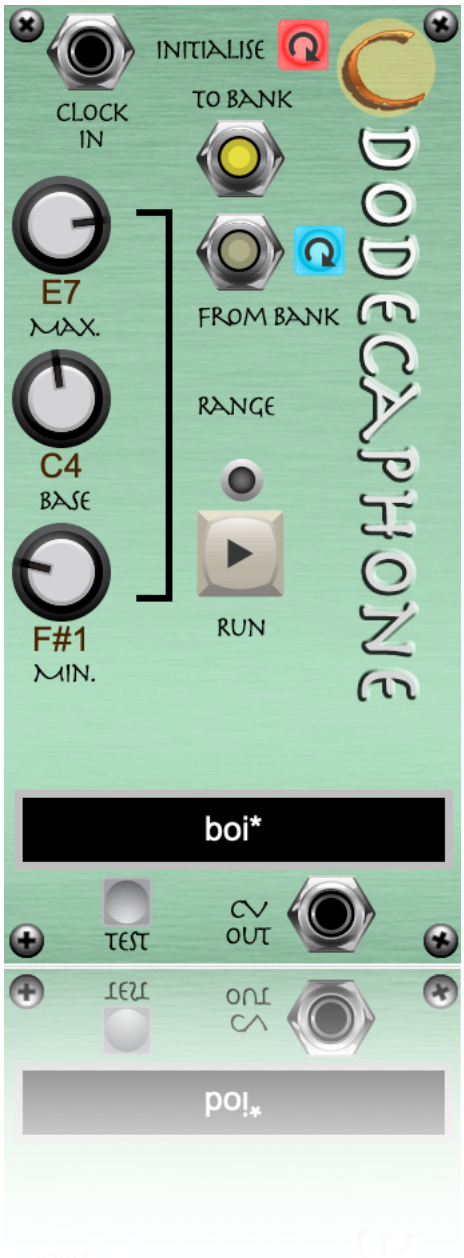
Centripidity

Dodecaphone



Introduction

The Dodecaphone is a monophonic, semi-random sequencer based on Schoenberg's rule for serial composition, or Dodecaphony.

Schoenberg

In the early twentieth century there was a movement away from the traditional orchestral music traditions of major versus minor keys, conventional harmony and even the notion of a piece of music having any key centre at all. The idea is that the music should be *atonal* with all twelve notes in the chromatic scale having equal weight and importance within a piece.

Schoenberg is one of the earliest, and best know, proponents of this approach and he developed a series of rules that a composer must follow to achieve this end.

The starting point of any piece of atonal music, using the Schoenberg rules, is the tone row, or series as it is sometimes called. The tone row is a sequence of twelve pitches containing every note in the chromatic scale exactly once. The row must be played in its entirety before any other notes can be employed and the piece continues by repeating the row or any combination of various transformations of the row. In each case the chosen transformation must be played right through before the next row begins.

In addition to the original (**Prime**) row, the following transformations are permitted:

- **Retrograde**: the same notes as the Prime row but played in reverse.
- **Inversion**: the Prime row but with all of the intervals between note inverted.
- **Retrograde Inversion**: the Prime row inverted and reversed.

In addition, the Prime row and any of its transformations may be transposed by any number of semitones.

This sequencer randomly creates one of the 9,985,920 possible, genuinely unique Prime rows and then, based on user input through a simple text-based language, plays through the row and any of its transformation and/or transpositions as specified.

The Interface

Initialise Button
Each time this is pressed a new initial row is randomly generated and the sequencer is stopped.

Clock Input
On each rising edge (that exceeds 3V) a new note in the sequence is triggered.

Phone Bank Interface
A helper module, the ***Phone Bank***, connects to the ***Dodecaphone*** via this interface.

More details are available in the help file for ***Phone Bank*** but, essentially, that module allows starting rows to be stored so this module can reproduce the same sequence when it is reloaded, rather than randomly generating a new Prime row each time it starts up.

Pitch Limit Controls
These knobs set the pitch limits for the sequencer. It will never output a note above the settings on the Max knob nor below that of the Min knob.

Because this sequencer is based on a 12-tone row the Max and Min settings will always be at lea tone full octave apart.

Base Note
The generated rows are atonal, nonetheless, each must have a starting note and this control specifies that starting point.

Run Panel
Pressing this button, or sending a positive edge of over 3V into the adjacent jack, starts the sequencer and the LED lights to show that it is running. When loaded, the sequencer is always starts stopped.

Pressing the Run button when the sequencer is running, or providing another positive edge to the input, will stop the program.

Progress Display
This window displays the current state of the running sequence. In particular, it shows:

- Which program step is running,
- The command (character) being executed,
- The particular transformation of the row that is playing and,
- Any transposition that is being applied.

This window will only appear when the sequencer is running.

Pitch Output
The generated Pitch CV appears from this jack.

Test Button
When the sequencer is set running it will first check the entered program to ensure that it is syntactically correct and, if any are found, will report errors and terminate the run.

If you wish to ensure that the program is valid before commencing a run then press this button. The syntax will be checked and any errors found will be reported.

Program Window
The program which controls the sequence of row to be played is entered here as a text string. The sequencer will step through each of the twelve-tone rows specified here and then, upon completion of the program, return to the beginning and repeat it until manually stopped by pressing the Run button.

The syntax of the language is explained below.

Programming

Programming the Dodecaphone simply involves creating a string containing a series of *tokens* that specifying the operations to be performed in order. The possible operations are:

- Play the Prime row or one of its transformations.
- Specify a transposition for the next row to be played.
- Specify a transposition for all subsequent rows to be played.
- Randomly create a new Prime row.

Tokens

The tokens used for each of these operations is as follows:

- Play the Prime row or one of its transformations:
  - P or O - Prime/Original row.
  - R - Retrograde row
  - I - Inverted row
  - B - Retrograde Inversions (both)
  - * - Randomly select from one of the above
- Transpose the next row:
  - (n) - The next row will be played n semitones from what it would otherwise be played.
    - Note that n may be a positive or negative integer
- Transpose all subsequent rows:
  - [n] - All subsequent rows will be played n semitones from the original.
    - Note that n may be a positive or negative integer
    - Transpositions are not cumulative so [3]…..[5] means that the next row will be transposed up 5 semitones and not 8.
- Randomly create a new Prime row:
  - N

Note that program strings are not case sensitive.

Example

prb(3)I(11)b[-2]prb*(1)*n[7]i(-4)p

Sequence of Events

When the module is loaded and the above program is executed the following occurs:

- Loading the module creates a new, random Prime row.
- P - plays that Prime row.
- R - plays the Retrograde of that row.
- B - plays the Retrograde Inversion of the row.
- (3)I - plays the Inversion of the row three semitones above its original pitch.
- (11)B - plays the Retrograde Inversion of the Prime row eleven semitones above its original pitch.
- [2] - until further notice, all rows will be played two semitones below the original, so…
- P - the Prime is played two semitones below its original pitch.
- R - the Retrograde is played two semitones below its original pitch.
- B - the Retrograde Inversion is played two semitones below its original pitch.
- * - any of the Prime, Retrograde, Inversion or Retrograde Inversion is played at random, two semitones below original pitch.
- (1)* - a randomly selected transformation (p, r, I, b) is selected and played one semitone below original pitch.
  - [-2] + (1)
- [7] - all subsequent rows will be played seven semitones above the original until further notice.
- I - the Inverted row is played seven semitones above the original.
- (-4)P - the Prime row is played three semitones above the original: [7] + (-4)
- The sequence has ended and so will now repeat with no transposition from the original Prime row.