

Overview

Time's Arrow is a 16-step control voltage pattern sequencer designed for fast and intuitive creation of unique patterns. By blending traditional step sequencing controls and parameters with controlled randomization, Time's Arrow allows you to generate a nearly endless variety of step sequence patterns.

While Time's Arrow can be used as a traditional sequencer – allowing you to modify and set events such as notes, accents, ties, gates/rests, and slides, you can also generate new patterns at the click of a button. Time's Arrow can randomize each individual event based on pre-programmed probabilities.

You can stop here...but randomness can be so...random. It's unique and interesting, but potentially useless without the ability to control it. Time's Arrow gives you a unique set of tools to chisel and sculpt generated patterns in fine detail – and this is what really sets Time's Arrow apart.

Time's Arrow allows you take each event in a generated sequence and manually adjust it; sequences can be transposed, slipped forward or backward in time, and note events can be run through the onboard quantizer. Finally, Time's Arrow allows you not only to randomize notes, accents, ties, gates/rests, and slides (or any combination thereof), but to control the probability of randomization for each event independently.

Get inspired, then take ownership.

Major Features

- Adjustable sequence length from 1 - 16 steps
- Internal quantizer with 15 selectable scales
- Constant time slide (303 style)
- Buffered output voltages from 0 - 8v
- Transpose input
- Forward, backward, ping pong, pendulum, random, and "drunken walk" sequence modes
- Firmware optimized for extremely low jitter and tight timing
- Manual or CV triggered synchronized randomization of notes, accents, ties, gates, slides, and octave offsets
- Independent probability settings for notes, accents, ties, gates, and slides
- Sync/reset input & output
- Random stepped CV output (0-5v)
- Global transpose by semitones or octaves
- "Slip" sequences forward or backward
- Save global settings to EEPROM
- Skiff Friendly
- Awesome Buttons
- Cat Approved



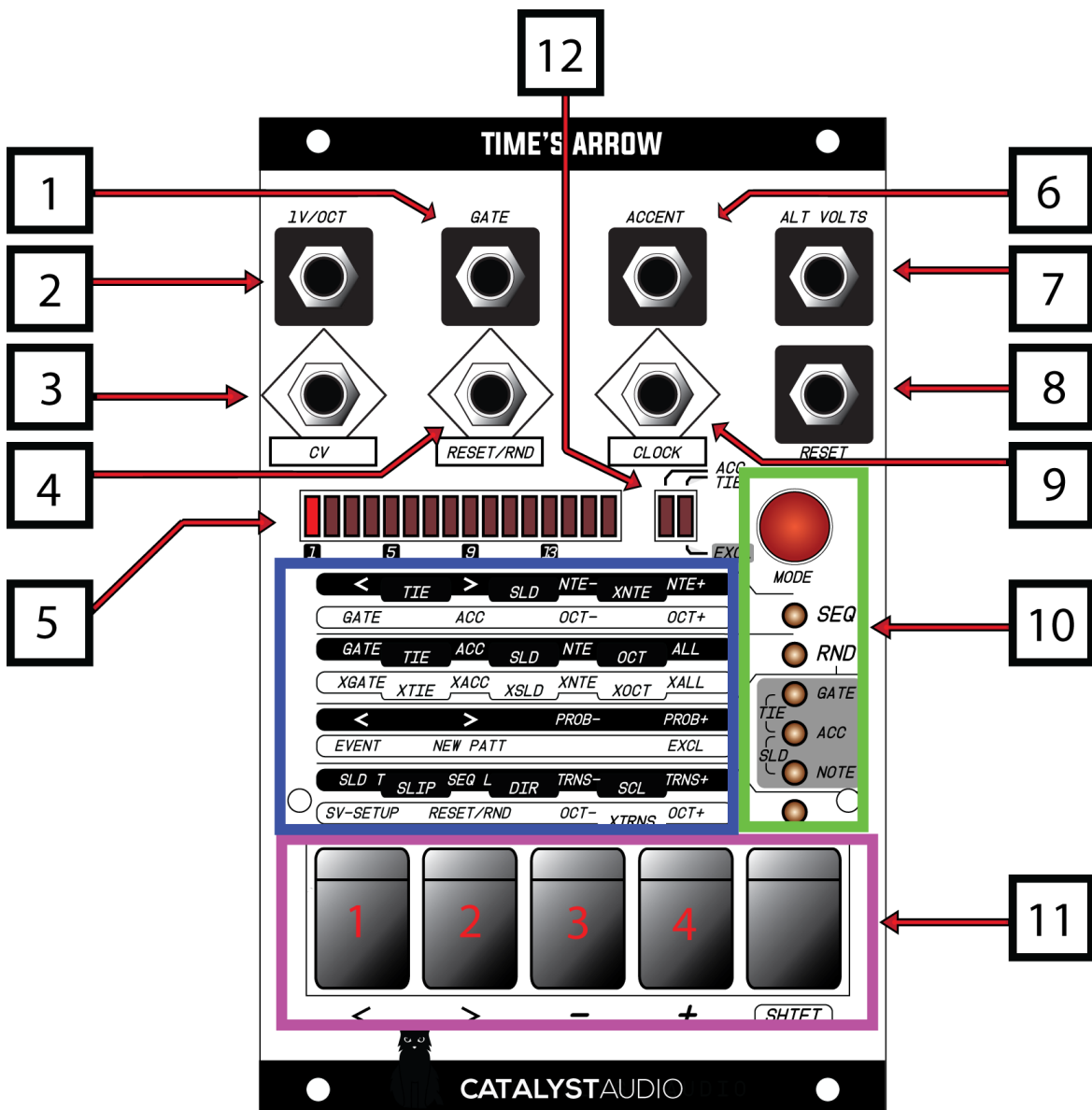
Installation

Time's Arrow is designed to work with the eurorack modular system as specified by doepfer musicalelectronics and described here.

- Always turn off the case power supply and unplug the power cord before installing or removing any modules.
- Find an available 16hp of rack space, connect the power cable from Time's Arrow to your case power busboard/supply. Make sure that you are connecting the cable with the proper orientation!!!
- If you look at the Time's Arrow circuit board, it will clearly indicate which side of the cable should have the red stripe. This is the -12v side. Time's Arrow has been designed with protection to ensure that plugging it in backward SHOULD not destroy it, but lets not test it ok? Simply make sure that the -12v on the module goes to -12v in your case. If you are unsure which side of your case busboard provides -12v, contact the case manufacturer and verify the proper orientation before applying power.

First steps.

- Connect the 1/v out to a oscillator's 1/v input.
- Connect the gate output to an envelope.
- Connect the output of the envelope to a vca's cv input
- Connect the output of the oscillator to the VCA's audio input.
- Connect a clock to Time's Arrow's clock input. (A square wave LFO should work)
- You should now be hearing what is probably a very annoying tone from your vca's output.



1. GATE OUTPUT

Outputs a constant voltage (5+ Volts) for each step of the sequence that contains a gate event. The duration that the gate is high (outputting a voltage) follows the clock duty cycle.

2. 1V/Oct OUTPUT

Outputs a quantized control voltage. The range is from 0v to 8v.

3. CV INPUT

This input allows a 1v/oct calibrated voltage to offset or transpose the sequence. The input responds to positive voltages from 0 to 2v.

4. RESET INPUT

A pulse applied to this input will (depending on the reset/randomize mode settings) reset the sequence to step 1, randomize all events according to their probability settings, or do both simultaneously.

5. LED Step indicator



This Led bar serves as the main visual indication of what is going on within the sequencer. In most modes,

- The bright LED will indicate the step that is currently playing;
- The dim LEDs will indicate steps that contain a gate (will play);
- The flashing LED will indicate the step that is currently selected for editing.
- While in the Utility mode, the steps often serve to indicate a selected value (from 1-16)

6. ACCENT OUT

Outputs a high voltage (5+ volts) on each step of the sequence that contains an accent event AND a gate event. The accent output duration mirrors the gate duration.

7. ALTERNATE VOLTS OUTPUT

Outputs a series of randomized, stepped, non-quantized voltages. The range is from 0v to 5v.

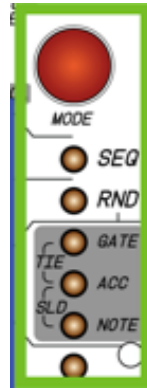
8. RESET OUTPUT

Outputs a short (10ms) trigger on the rising edge of step 1

9. CLOCK INPUT

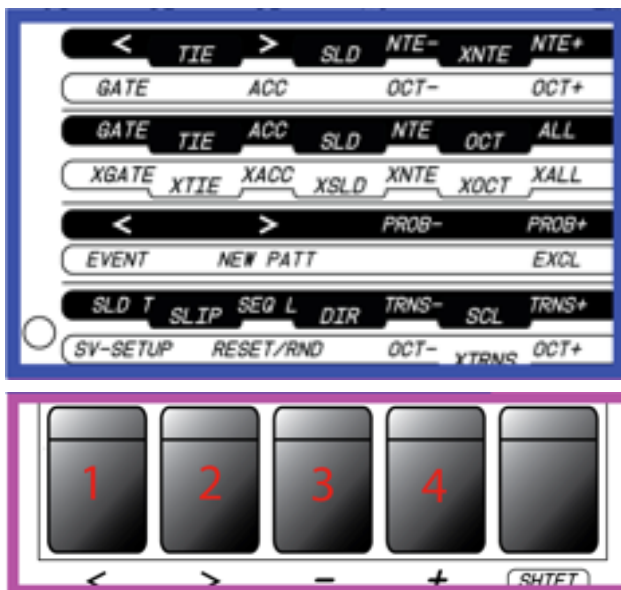
A trigger (or gate) applied to the clock input will advance the sequencer to the next step.

10. MODE BUTTON / MODE LED's



Steps through the 8 available modes. Holding down SHIFT and pressing the Mode Button will step backwards.

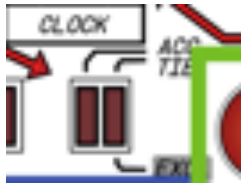
11. EDIT BUTTONS



These 4 Buttons and Shift are used to edit various aspects of the sequencer as indicated by the table above them. Buttons are pressed in various combinations, also indicated by the table.

- Functions in the black bars are accessed by pressing the indicated button,
- Functions in the clear surround are accessed by holding shift while pressing the button(s)
- Functions that are offset between two buttons are accessed by pushing both of the adjoining buttons together.

12. ACCENT, TIE, EXCLUDE indicator



In most modes these LEDs will light up to indicate that the currently playing step has an accent or a tie associated with it.

When editing an event's probability, the right LED indicates if the current step is excluded from randomization.

MODES

The Sequencer has 6 different modes; the EDIT buttons will perform different functions based on the selected mode.

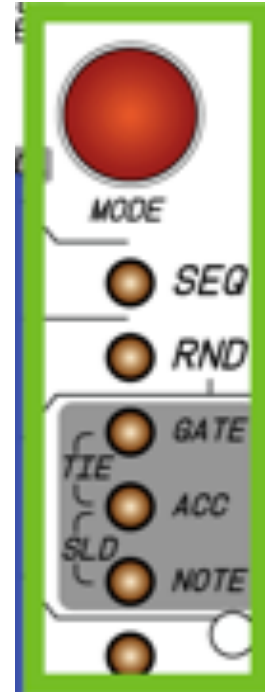
TIP: You can step through the modes in reverse order by holding shift while pressing the mode button.

Mode 1 (SEQ)

Mode one is where the “hands on” editing of a sequence is done. This mode is essentially a linear step sequencer.

Each step contains information about 5 individual events - notes, gates, accents, ties and slides, which can be turned on or off for each particular step.

- The step that is being edited is indicated by the flashing LED.
- Dim led's indicate which steps contain gates, and the bright LED indicates the current step.
- While the sequence is playing, the accent and tie indicator LED's will show which steps contain these events.



In Mode 1 the buttons perform these functions-

Pressing buttons 1 or 2 will adjust the selected step to edit.

Pressing button 1 while holding shift will toggle the selected step's gate on/off.

Pressing buttons 1 & 2 together will place a tie on the currently selected step.

Pressing button 2 while holding shift will place an accent on the currently selected step.

Pressing buttons 2 & 3 together will place a slide on the currently selected step.

Pressing buttons 3 or 4 will adjust the currently selected step's note up or down. (Note that this is influenced by the current quantize settings, the selected note will automatically jump to the next “in scale” note. Setting quantize to chromatic will defeat this function.)

Pressing buttons 3 & 4 together will reset all programmed notes to their default

Pressing buttons 3 or 4 while holding shift will adjust the selected note up or down by one octave.

Mode 2 (RND)

Mode two is where new sequences can be quickly generated and manipulated.

Each event, (notes, gates, accents, ties and slides) can be generated independently. Additionally, each event has independent settings that determine the probability of that event occurring. Unlike most other sequencers or sample and hold type modules, Time's Arrow will allow you to create new patterns for each event that will persist until overwritten with a new pattern.

While the sequencer is running, pressing any of the buttons will set the associated event to be randomized (according to it's individual probability and exclude settings) the next time the sequencer loops around to the first step.

Button 1 will set gates to be randomized.
Buttons 1 & 2 together will set ties to be randomized
Button 2 will set accents to be randomized
Buttons 2 & 3 together will set slides to be randomized
Button 3 will set the notes to be randomized
Buttons 3 & 4 together will randomize the Octave offsets
Button 4 will set ALL events to be randomized.

Likewise- holding shift while performing any of the above actions will reset that event to it's default (which is off for everything except gates. Gates are on by default)

Octave offsets

This mode also features an additional setting that allows you to independently randomize the octaves of the played notes (+/- 1 octave). The octave randomization is a bit different than the other events. Whereas the other events are regenerated independently each time, the octave randomization is cumulative, meaning that each time the octaves are randomized, the octave offsets are added or subtracted to the octave offsets that are already there. This has the effect of increasing the overall variation in the sequence as the offsets start to add together. If it all becomes too much, simply use the "xoct" to clear all the octave offsets and start over.

Using the "All" function is essentially equivalent to pressing all the buttons at once, it will set ALL the events to randomized (according to their individual probability settings and excludes) on the next step one.

XALL will clear all randomization and set the sequence back to a default state. (All gates on, 16th notes, 2v output).

Event Modes (3, 4, 5, 6, 7)

The Next 5 modes (indicated in grey) GATE, TIE, ACCent, SLiDe, and NOTE all function in the same way.

In the Event Modes

- The bright LED indicates the currently playing step.
- The dim LED's indicate the steps that contain the current mode's events.
- The flashing LED will indicate the step that is currently selected for editing.

In these modes you can set individual events on or off (same as Mode 1), immediately generate a new pattern of events, set the probability for the event occurring when a new sequence is generated, and set or clear excludes.

In these 5 modes-

< >

Button 1 and button 2 are used to select the current step to be edited.

EVENT

Pressing button 1 while holding shift will toggle the event on that particular step on/off.

NEW PATT

Pressing button 2 while holding shift will immediately generate a new random pattern for that event

PROB+ PROB-

Button 3 will decrease the probability of the associated event occurring in a sequence by 10%. Likewise, button 4 will increase the probability of the associated event occurring by 10%. By adjusting the probability settings it is possible to set an event to always occur (100%) or never occur (0%). This can be helpful when using the ALL function in mode 2, or via the reset/RND input.

EXCL

Pressing button 4 while holding shift will set an exclude on the currently selected

edit step.

What is an exclude?

Excludes allow you to set certain steps to be excluded from randomization whenever a new pattern is generated. For example, you might want to make sure that there will always be a note playing on the downbeat of your sequence. You would achieve this by selecting the Gate mode, navigate to step 1, set step one to the desired state (on in this case) and then use shift+button 4 to set an exclude on that step. (indicated by the xclude LED) Now every time that the gate sequence is regenerated, step 1 will be excluded and will stay in the state that you set it in (on). Changing an events probability setting will not alter the excluded events. Excludes apply to all modes- so if you regenerate the sequence in mode 2 it will still be excluded, if you use " randomize All" it will still be excluded, If you regenerate via the reset/randomize input it will still be excluded.. etc...

Individual excludes are turned off in the same way as they were turned on. Navigate to the step and simply use shift+button 4 to make sure the exclude indicator LED is off.

CLR-EXCL

Pressing button 3 while holding shift will clear all of the excludes applying to that event, so you can start fresh without needing to go through and check/undo all 16 steps.

UTILITY MODE

This mode is where the default behavior of many sequencer functions can be set.

SLD T

Pressing button 1 will temporarily change the 16 step display to show the current slide time setting, use the left arrow (button 1) to decrease the slide time and right arrow (button 2) to increase the slide time. After three seconds without adjustment the display will revert back to it's normal mode.

SLIP

Pressing button 1 and button 2 together will enter slip mode. Slip allows you to slide the current sequence backward or forward in time. After entering this mode use the right and left arrows to move the sequence. The brightly lit LED indicates step one of the current sequence, allowing you to see how far forward or backward you have shifted or "slipped" the sequence. After three seconds without adjustment the display will revert back to it's normal mode.

Seq L

Pressing button 2 will enter the sequence length submode. This submode allows you to set the length of the sequence from 1 step to 16 steps or any number inbetween. When you enter this mode the display will show a bright LED indicating the last step of the sequence.

After three seconds without adjustment the display will revert back to it's normal mode.

DIR

Pressing button 2 and button 3 together will enter the direction submode. This submode allows you to set the mode that governs the sequence direction (or lack thereof). The left and right arrows select from 6 possible sequence modes.

1. Forward
2. Backward
3. Pingpong (only plays first and last steps once before reversing)
4. Pendulum (plays first and last steps twice before reversing)
5. Random
6. Random walk (50% chance of going forward or backward to next step)

After three seconds without adjustment the display will revert back to it's normal mode.

Trans+ and Trans-

Pressing button 3 will transpose the output of the sequencer down by 1 semitone. Pressing button 4 will transpose the output of the sequencer up by 1 semitone. As opposed to the note+ or note- in mode 1 (or the CVinput), this transposition happens AFTER the quantizer. This allows you to set a particular scale via the SCL function and then use the transposition setting to alter the key.

SCL

Pressing button 3 and button 4 together will enter the scale submode. This submode allows you to select from 1 of 16 potential scales/quantization maps. The LED bar indicates the currently selected scale.

1. chromatic
2. minor

3. major
4. harmonic minor
5. Spanish gypsy
6. Arabic/Bhairav
7. Hungarian Minor
8. Melodic Minor
9. Major Pentatonic
10. Minor Pentatonic
11. Phrygian
12. Spanish
13. Wholetone
14. Super Locrian
15. Dark Minor
16. Octaves

After three seconds without adjustment the display will revert back to it's normal mode.

SV-Setup

Pressing button 1 while holding shift will write all of the current utility mode settings, probability settings, and excluded events to the modules internal memory.

This saves the current setup as the new default and these settings will be loaded on all power ups until it is overwritten. This does not save the sequence data!

Load Setup

Pressing button 1 & 2 while holding shift will reload the current saved/default setup.

(This is not included on the front panel as it is not an intended feature of the module and may alter/destroy the currently playing sequence, but it may be useful for some users.)

RESET/RND

Pressing button 2 while holding shift will enter the Reset/Random submode. This submode allows you to determine how the module responds to a trigger into the RESET/RND input. Use buttons 1 and 2 to adjust the setting.

1. Indicates that the module will reset to the first step when receiving a trigger at this input.
2. Indicates that the module is set to randomize all events (according to their probability and exclude settings) when it receives a trigger at this input
3. Indicates that the module is set to both reset to step one AND randomize all events whenever it receives a trigger at this input.

OCT+ OCT-

Pressing button 3 while holding shift will transpose the output of the sequencer down by 1 octave. (Post-quantizer).

Pressing button 4 while holding shift will transpose the output of the sequencer up by 1 octave. (Post-quantizer).

XTRANS

Pressing buttons 3 and 4 while holding shift will resets all TRNS and OCT settings back to their default (0).

Calibration

This module has been calibrated before shipment and should not need to be recalibrated.

Only change the calibration settings if you understand what you are doing and why you want to do this!

Calibration of 1/v oct output

While in utility mode

Push Button 1 & Button 4 to enter the calibration mode.

Make sure nothing is plugged into the clock input.

(or your calibration settings will be wrong)

Select the octave to adjust using buttons 1 or 2, and use buttons 3 or 4 to fine tune the voltage output.

Use button 1 & shift to save the calibration settings.

The module has been calibrated to have a 1/v oct response before being shipped. In order to account for manufacturing tolerances of the DAC used in Time's Arrow, each module's calibration is matched to its own individual DAC. This should not need to be recalibrated unless replacing the DAC.

While in the calibration mode you can press Button 2 & Button 3 to reload the default octave settings.

The default octave settings are based off of the DAC's data sheet specifications, this will likely be close to 1/v per octave, but due to manufacturing tolerances it might be slightly off, this is why the ability to adjust the v/oct scaling is included.

Reload factory defaults

While in utility mode

Press button 1 & button 3 while holding shift.

Do NOT save (it won't break anything if you do, it just won't work)

turn the power off,

turn the power back on and the module should boot up to its default state.