



<- CV Out Channel I

<- CV Out Channel II

<- RANGE POT

<- LOOP-LOCK POT

<- BIT SHIFT POT

<- CLOCK CH II

<- CLOCK CH I

Operation:

KIEL, or the Klima-Idein Expander Link, is a 2hp expander module for use with the atmospheric logic module Klima, or the optic gate trigger Idein. Based on a Parallel-In-Parallel-Out (PIPO) shift register circuit, KIEL receives gate outputs from *either* of the aforementioned modules (not both) through a connector on the back panel. It converts these gates into two related, though separate, channels of random stepped control voltages. The controls on the front panel allow you to set the global voltage range of both channels, modify which gates control which bits for different flavors of randomness and loop sequences in steps of 8 or 16. Finally, two independent clock inputs for each channel allow for asynchronous stepping. Ultimately, KIEL allows you to add melodies and dynamic voltages to accompany the gates and triggers produced by Klima and Idein.

How it works:

The operation of KIEL is straightforward and operates on a bit-wise principle. Each of the input gates that KIEL receives from either Klima or Idein toggles a single bit of a 4-bit value. When the module detects a clock trigger, this 4-bit value is processed to produce a finer resolution 10-bit value. This value is then sent to a DAC (Digital to Analogue Converter) and output as voltage between 0 and 6V.

The **Bit Shift** control on the front panel allows you to change which bit gets set by each atmospheric data or light color. This simply allows for some slight modification of what kind of voltages you get at your output. When the potentiometer is fully counterclockwise, both channels output the same value, including a locked loop sequence, and are clocked to Channel I's clock. As you move this potentiometer clockwise, both channels run independently of one another: Channel I shifts its incoming bits to the right (unless it is locked into a loop), wrapping the previous least significant bit (LSB) around to the most significant bit (MSB) position, while Channel II remains independent and outputs random voltage clocked at its own input.

The **Loop-Lock** control allows you to lock in a sequence at Channel I. When turned fully counterclockwise, KIEL runs freely, producing random stepped voltages. At the noon position, an 8-step sequence of the last 8 voltages is locked and with the potentiometer fully clockwise, the last 16 steps will loop.

The **RANGE** control sets the global voltage output of both channels from 0 to 6V.

Clocking the device is automatic when using Klima. When this is the case, the clock source comes directly from the comparator output of the Klima module by way of the back-panel connector. However, **an external clock source is necessary when using KIEL with Idein**, as Idein has no internal clock of its own. You can, of course, patch one of Idein's outputs into KIEL's clock input which would mean a new stepped voltage is produced upon a threshold crossing of a particular color.

Note that Clock I is normalled to Clock II. This means that, if no clock is present at the clock input II, all channels will step according to the clock signal at Clock I.

Features

- 2mm aluminum front panel
- Reverse polarity protection
- Small footprint
- 2 Channel Stepped Random CV
- Expander for KLIMA and IDEIN modules