thc   programmable pulse matrix   manual

PROGRAMMABLE PULSE MATRIX

PERMUTATION OUTPUTS

clock and all A&B B&C C&D sum HI

start xor all A⊕B B⊕C C⊕D sum LO

INDIVIDUAL OUTPUT

A B

C D

INPUTS

INPUT SECTION

CLOCK RATE C.V.

START /STOP POSITION

RATE

slow fast

TEMPO KNOB

ACTIVE PATTERN ● A ● B ● C ● D

SELECTION MATRIX

LENGTH

LENGTH SELECT

performance

hold

remote enable

ABCD

PATTERN SELECT

PULSE SELECTION MATRIX

START/STOP

START/ STOP

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PROGRAMMABLE PULSE MATRIX CONTROLS

PROGRAMMABLE PULSE MATRIX MANUAL

Thank you for purchasing the Programmable Pulse Matrix (PPM). The following page is a summary of functions, controls and how to use your new trigger sequencer.

BASIC FUNCTIONS

The PPM is a four layer trigger sequencer. Each layer is accessed by pressing the PATTERN SELECT button. Active pattern is displayed by the four LEDs above the PULSE SELECTION MATRIX, labelled A, B, C, and D.

The PULSE SELECTION MATRIX is arranged in four rows of four. Where the top left button is step 1 and the lower right button is step 16. As shown below —

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Connect output A, in the INDIVIDUAL OUTPUT section, to the trigger input of a 281e. Make sure that led A is the active pattern and program events using the PULSE SELECTION MATRIX. Set the TEMPO KNOB to about 2 o'clock, press START/STOP to run the sequence, and the 281e should output an envelope at each of the programmed events. Press START/STOP again to stop the playback.

The length of pattern A can be adjusted at anytime by pressing the LENGTH key to the right of the PULSE SELECTION MATRIX. The length of the sequence is displayed by the number of leds that light up. If 14 steps is desired, press second button in the last row. Which should light all the leds except the last two. Pressing START/STOP now will cause the sequence to go from step 1 to step 14. Press LENGTH again to exit to the normal input mode.

The INPUT SECTION is for external control of the PPM. CLOCK and START/STOP are pulse input jacks. CLOCK will advance the sequence one step for each pulse. START/STOP will either start or stop the sequence depending on which mode it is in. RATE C.V. will adjust the tempo. POSITION will select position in the sequence depending on voltage level. Input a triangle wave from a 281e into the POSITION and the leds in the PULSE SELECTION MATRIX should scan from step 1 to step 16 accordingly.

COMPLEX PROGRAMMING

The PPM offers permutations of the programmed layers. These are available in the PERMUTATION OUTPUTS. By utilizing boolean logic two or more patterns are compared and the selected function is then outputted at named jack. For example — The third jack in the top row labelled A&B is the boolean function AND between pattern A and B. A practical example:

Connect output A&B to the trigger input of a 281e. Select pattern A by using the PATTERN SELECT button. Press the LENGTH button and make pattern A 4 steps long in the PULSE SELECTION MATRIX. Exit length mode by pressing LENGTH again. Program a set of events on pattern A between steps 1 and 4 in the PULSE SELECTION MATRIX.

Select pattern B and repeat above, only make pattern B 3 steps long, and again program a set of events in pattern B between steps 1 and 3. Press START/STOP to run the sequence.

Now looking at the 281e it will output a sequence that is 12 steps long.

The boolean function AND compares the two patterns. If there's an event in both triggers at the same time the output will be true and a trigger will be generated. If only one pattern has a event the output will be false and there will be no output.

Say for example that the patterns were programmed in the following way (Where a black square indicated an event) —
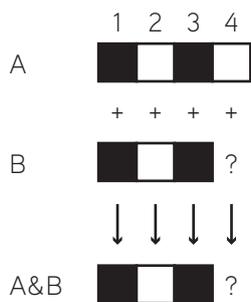

Above is only steps 1 to 3, what happens at step 4? Since B is at it's end it will loop back to step one again causing the sequence —
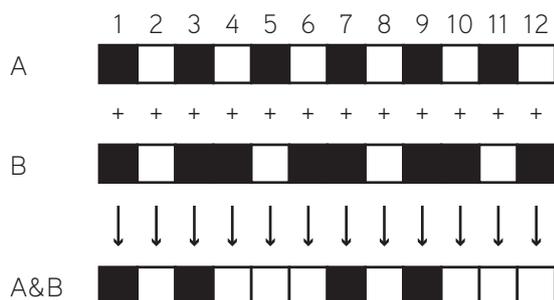
It takes 12 steps for the A and B sequences to repeat (because the lowest common denominator of 3 and 4 is 12). Changing the length of pattern B to 5 instead of 3 makes the sequence 20 steps long. Since 4 x 5 = 20.

Increasing the length to something like 13 and 14 makes the sequence 182 steps long before it repeats. So you can build very long repeating patterns with only a few steps with the permutations outputs.

The top row features AND outputs, which means that both patterns has to have both events active. The bottom row of the PERMUTATION OUTPUTS is XOR, which is the sort of the opposite of AND (not really, that would be NAND). But the XOR function outputs an event if the other pattern does not have an event at the active step. So the output would be the following —
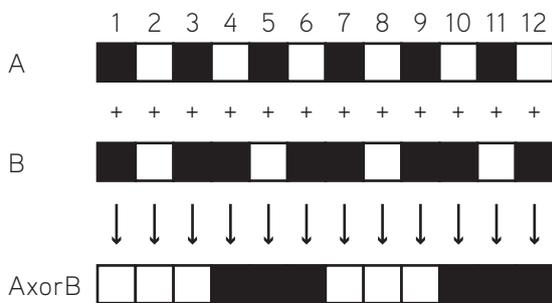
Compared to the AND output —
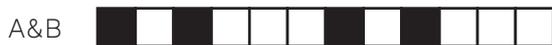
The other outputs in the PERMUTATION SECTION is — CLOCK which outputs a pulse on every step. START which is +5V as long as sequence is running. AND ALL and XOR ALL which preforms the AND function between all patterns and XOR between all patterns (if you set the length of A to 16, B to 15, C to 14, and D to 13 the ALL output will take 43,680 steps to repeat).

The blue outputs SUM HI and SUM LO is the binary sum of the four outputs to the left of the jacks. This gives each sequence a corresponding CV output.

OTHER FUNCTIONS
The PPM is compatible with the Buchla e-series preset manager. So if a 206e or a 225e module is present, you can store and recall patterns. The PATTERN SELECT button doubles as a REMOTE ON control. Hold for a few seconds and the SELECTION MATRIX will flash either a X or a O depending on if the remote control is on or off. The led in the PATTERN SELECT button will also turn off is remote control is disabled.

Performance mode is available by holding the LENGTH switch for a few seconds. In this mode the SELECTION MATRIX functions as performance selection. Which makes it possible to store up to 16 different performances. Pattern A selects when to loop from the selected performance to the next. This means that some patterns with a odd number in reference to pattern A might not loop at end of sequence.

SUMMARY

The PPM offers quite complex pattern control with a simple interface. The key is to use the length feature in combination with the permutation outputs.

Please enjoy!

Jon — thc