

FREQUENCY CENTRAL POLYGRAF USER MANUAL

Polygraf is a step sequencer that features record/edit and playback functionality across 32 different patterns of up to 16 steps.



Terminology

Patterns: Polygraf has 30 Patterns (Patterns 1 to 30) that can be overwritten/edited, and 2 Patterns (Patterns 31 and 32) that cannot be changed. Patterns are composed of up to 16 *Steps* (but can be recorded to be shorter).

Steps: Polygraf has four binary outputs (can be *High* or *Low*), labelled *One*, *Two*, *Four*, and *Eight*. A *Step* outputs a specific combination of *High/Low* for each output. During playback, clocking advances Polygraf to the next *Step* (or wraps around to *Step 01* if there isn't one). Individual output configuration can be uniquely represented as a 0 to 15 number known as the *State*.

State: A unique combination of On/Off for all of the outputs. There are 16 possible combinations thus 16 possible *States*. We number these 00 to 15. A *State's* identifying number can be determined by adding the value of the outputs that are *On*. E.g. if outputs *One* and *Four* are *On* (and *Two* and *Eight* are *Low*) then the number is 05 (because *One* + *Four* = 5).

State Examples:

<i>One</i>	<i>Two</i>	<i>Four</i>	<i>Eight</i>	<i>State</i>
				00
•				01
	•			02
•	•			03
		•		04
•		•		05
	•	•		06
•	•	•		07
			•	08
•			•	09
	•		•	10
•	•		•	11
		•	•	12
•		•	•	13
	•	•	•	14
•	•	•	•	15

Gates / Triggates / Triggers

Polygraf features a three position switch, labelled Gates and Triggers. It determines how the outputs function.

GATES



Gates: When the switch is in the up position, Polygraf is in Gates mode. When in this mode, an output remains High for the duration of the step. If an output is set to High for the current step, and is set to High for next step too, then it will continue to be High, uninterrupted. This mode is intended to be used when interfacing with devices that constantly evaluate the state of the output, for example *Cryptograf*.

TRIGS

GATES



Triggers: When the switch is in the down position, Polygraf is in Triggers mode. When in this mode, an output only remains High for a short ~5ms pulse. This mode is intended to be used when interfacing with devices that exclusively respond to a rising edge, for example *Seismograf*.

TRIGS

GATES



Triggates: When the switch is in the middle position, Polygraf is in Triggates mode. When in this mode, an output remains High for the duration of the step, but pulses Low for ~15µs between steps. This is a compromise which allows the Polygraf to act like Gates that also feature Triggers-like rising edges for each step. Triggates isn't as good at triggering things as Triggers mode because of the delay before the rising edge (and because rarely some slow-to-respond devices might not detect the trigger event), and it isn't as good at Gates because the signal temporarily goes low when it shouldn't - Triggates is a compromise to allow Polygraf to control devices that have different input schemes simultaneously (eg *Seismograf* and *Cryptograf* together).

TRIGS

Pattern Chaining

When in Play mode, Polygraf's STATE potentiometer is used to determine the pattern chaining mode. The potentiometer acts as a four position switch. When changing between positions on the switch, Polygraf's 7 segment displays briefly indicate which position you are in, eg briefly showing '02' to indicate the second position.


In the first position, Polygraf just repeats the same pattern over and over (assuming the pattern input does not change).
(1)

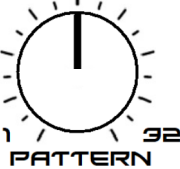
In the second position, Polygraf plays the pattern currently selected with the pattern input, and when that pattern is complete, it plays the next sequential pattern (pattern 32 rolls over to play pattern 01). This mode allows you to play a 32 step pattern.
(1,2)


In the third position, Polygraf plays the pattern selected with the pattern input three times, before then playing next sequential pattern. This allows you to play a different pattern for the 4th pattern.
(1,1,1,2)


In the fourth position, Polygraf plays the pattern currently selected with the pattern input, and then the three sequential patterns after it. This mode allows you to play a 64 step pattern.
(1,2,3,4)

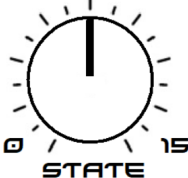
Recording a new sequence (Complete overwrite)


a.  Enter Write mode by switching the Play/Write switch to Write.


b.  Select the Pattern that you want to overwrite by turning the Pattern knob. Polygraf's 7 segment display will reflect the pattern that you have chosen. It is not possible to overwrite Patterns 31 or 32, as these follow a fixed pattern.

c.  Press the Step button to confirm the Pattern that you have selected. The 7 segment display will switch to displaying 01, representing that you are now recording Step 1 of your Pattern.
Note: If Patterns 31 or 32 were selected when the Step button was pressed, then the 7 segment display will briefly flash between 99 and 00 to represent that those patterns cannot be changed, and Polygraf will remain in the Pattern selection phase **(b.)**.


 If you selected the wrong Pattern or press Step accidentally, you can Edit/Reset back to the Pattern selection phase **(b.)**. This is not possible if you have already written a Step 01 (ie, you have already completed phase **(c.)**).

d.  Select the State that you want this step to have. As you change the State selector, the numeric representation of the state that you have selected will be shown on the 7 segment displays for 30ms, before reverting back to displaying the number of the Step that you are writing.


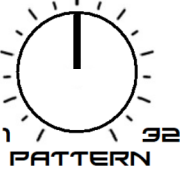



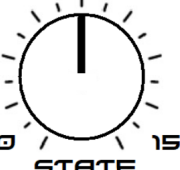


e.  Press the Step button to confirm the State that you have selected for the given Step, and have Polygraf write this to memory. This is a destructive action that clears the Pattern that was previously stored here, and cannot be undone.

 If you decide that you want to go back and re-record previous Step(s), you can press Edit/Reset. This can be repeated to go back and re-record all the way from Step 01 if you wish.

Example: You have just written Step 03 (and thus are in State selection **(d.)** for Step 04), but realise that you selected an incorrect State for Step 02. Press Reset twice - the 7 segment display will show 02, showing that you are recording Step 02. Select the corrected State and Step again. You will now be recording Step 03.

f.  Repeat **(d.)** and **(e.)** until either:
The Pattern has 16 completed Steps (the 7 segment display will be flashing quickly between 99 and 00 to indicate this)
or
You have written all the steps that you want in the Pattern, and you would like the Pattern to have less than 16 steps.
Then switch the Play/Write switch to Play to confirm your sequence length and exit Write mode.

Editing steps in an existing sequence

- a.**  Enter Write mode by switching the Play/Write switch to Write.
- b.**  Select the Pattern that you want to overwrite by turning the Pattern knob. Polygraf's 7 segment display will reflect the pattern that you have chosen. It is not possible to overwrite Patterns 31 or 32, as these follow a fixed pattern.
- c.**  Press the Edit/Reset button to confirm the Pattern that you have selected. The 7 segment display will switch to displaying Step 01, and the State stored in Step 01 of the Pattern you have selected will be output.
- Note: If Patterns 31 or 32 were selected when the Step button was pressed, then the 7 segment display will briefly flash between 99 and 00 to represent that those patterns cannot be changed, and Polygraf will remain in the Pattern selection phase (**d.**).
- d.**  If the Step that you want to edit is not being output, press the Step button to output the next step.
- After Step 16, pressing Step loops back around to Step 1. (You can repeatedly press Step to play through the whole pattern).
- e.**  Once Polygraf is outputting the Step that you want to edit, press the Edit/Reset button to begin to edit that step.
- f.**  Select the State that you want this step to have. As you change the State selector, the numeric representation of the state that you have selected will be shown on the 7 segment displays for 30ms, before reverting back to displaying the number of the Step that you are writing.
- g.**  Press the Step button to confirm the State that you have selected for the given Step, and have Polygraf overwrite the existing Step in memory. The next Step will be output.
- h.**  Repeat **d.** through **g.** until you have completely edited the Pattern to your liking. Then switch the Play/Write switch to Play to exit Write mode.

Preset Patterns

The Polygraf PIC ships with preset Patterns. Some patterns are intended to be used to trigger Drums and Percussion, whilst others are more for Utility purposes that would work well with **Cryptograf**.

Table of these Patterns are listed below – the first column indicates the intended instrument.

Pattern 01 - 'Vienna'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•						•		•	•						
Two	SD													•			
Four	CH					•											
Eight	OH														•		

Pattern 02 - 'Enola'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•			•	•	•		•	•	•		•	•	•		•
Two	SD			•				•				•					
Four	CH	•	•	•	•	•	•	•	•	•	•	•	•		•		•
Eight	OH													•		•	

Pattern 03 - 'Boiled'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•	•					•	•								
Two	SD					•								•		•	
Four	CH	•		•	•	•	•	•	•		•	•	•	•			
Eight	OH															•	

Pattern 04 - 'Machine'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•	•	•	•	•		•	•	•		•	•	•			
Two	SD					•								•			
Four	CH	•	•			•	•			•	•			•			
Eight	OH			•				•				•					

Pattern 05- 'DSS' by [Sunshine Jones](#)

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•							•			•					
Two	SD					•								•			
Four	CH	•	•	•	•		•	•	•	•	•	•	•			•	•
Eight	OH					•								•			

Pattern 06 - 'Stets Beat' by [Sunshine Jones](#)

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•															
Two	SD					•					•			•			
Four	CH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Eight	OH			•				•	•			•				•	

Pattern 07 - 'Liddel Beat' by [Sunshine Jones](#)

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•				•				•				•			
Two	SD					•								•			
Four	CH			•				•				•				•	•
Eight	LC								•			•					

Pattern 08 - 'Jauques' by [Sunshine Jones](#)

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•				•				•				•		•	
Two	CP			•		•	•		•			•		•	•		•
Four	CH	•				•				•				•			
Eight	OH			•				•				•				•	

Pattern 09 - 'Stripped 1' by [Sunshine Jones](#)

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•				•				•				•			
Two	CP					•								•			
Four	LC	•	•			•											
Eight	HC								•		•					•	•

Pattern 10 - 'Stripped 2' by [Sunshine Jones](#)

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•															
Two	RS									•							
Four	MC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Eight	HC															•	•

Pattern 11 - 'Rick's Beat 1'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•	•		•	•				•	•		•	•			
Two	SD			•				•				•				•	
Four	CH	•	•		•	•				•	•		•	•			
Eight	OH															•	

Pattern 12 - 'Rick's Beat 2'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•			•			•		•			•				
Two	SD					•								•		•	•
Four	CH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Eight	OH																•

Pattern 13 - 'Rick's Beat 3'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•	•													•	
Two	SD									•			•				
Four	CH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Eight	OH					•		•								•	

Pattern 14 - '[DivKid](#)'s Beat 1'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•						•		•			•				
Two	SD					•								•			•
Four	CH	•	•	•	•		•		•		•	•			•	•	
Eight	OH			•				•			•				•		

Pattern 15 - 'DivKid's Beat 2'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•		•			•					•					
Two	SD					•								•			
Four	CH		•				•	•			•			•		•	•
Eight	OH				•					•		•			•		

Pattern 16 - 'DivKid's Beat 3'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•			•					•							
Two	SD					•						•		•			
Four	CH		•					•					•				•
Eight	P			•					•		•					•	

Pattern 17 - 'DivKid's Beat 4'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•							•	•							
Two	SD					•								•	•		•
Four	CH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Eight	OH			•				•				•				•	

Pattern 18 - 'DivKid's Beat 5'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•				•				•				•		•	
Two	SD				•			•						•			•
Four	CH			•			•		•			•	•			•	•
Eight	HP	•				•				•			•	•			

Pattern 19 - 'DivKid's Beat 6'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•							•		•						
Two	SD				•	•								•			
Four	CH	•					•	•		•		•		•		•	
Eight	P			•		•							•				

Pattern 20 - 'Penthouse'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•				•	•			•				•	•		
Two	SD			•				•				•				•	
Four	CH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Eight	A																•

Pattern 21 - 'Enough'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•						•									
Two	SD					•			•					•	•		
Four	CH			•	•			•	•	•		•	•			•	
Eight	OH			•								•					•

Pattern 22 - 'CAGE'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	*																
Two	*																
Four	*																
Eight	*																

Pattern 23 - 'Things'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•				•	•		•	•				•	•		
Two	SD			•				•				•				•	•
Four	CH									•	•	•	•				
Eight	OH													•	•	•	•

Pattern 24 - 'Motorik'

		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
One	BD	•	•		•	•	•		•	•	•		•	•	•		•
Two	SD			•				•				•				•	
Four	CH	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Eight	OH	•	•		•	•	•		•	•	•		•	•	•	•	

