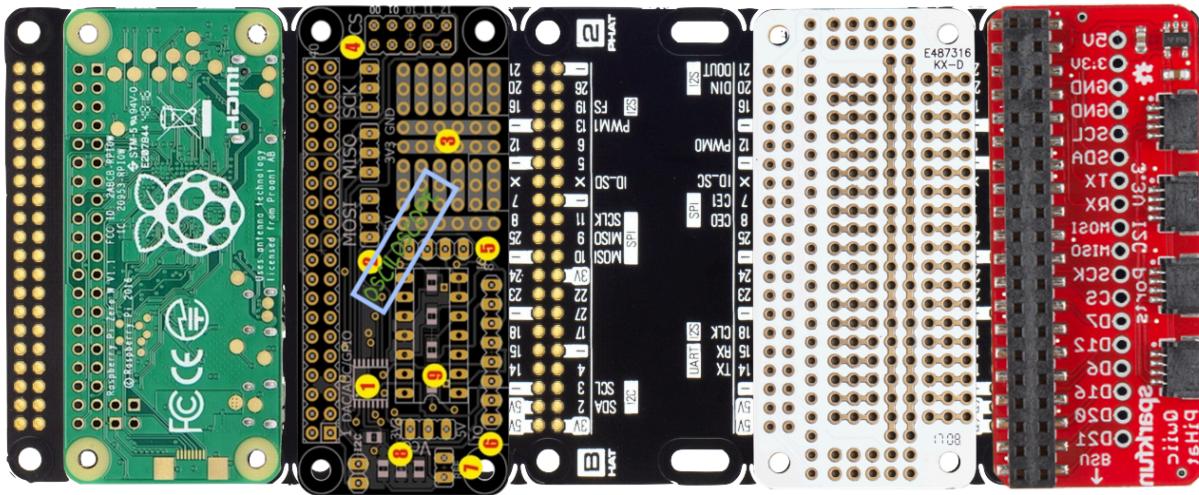


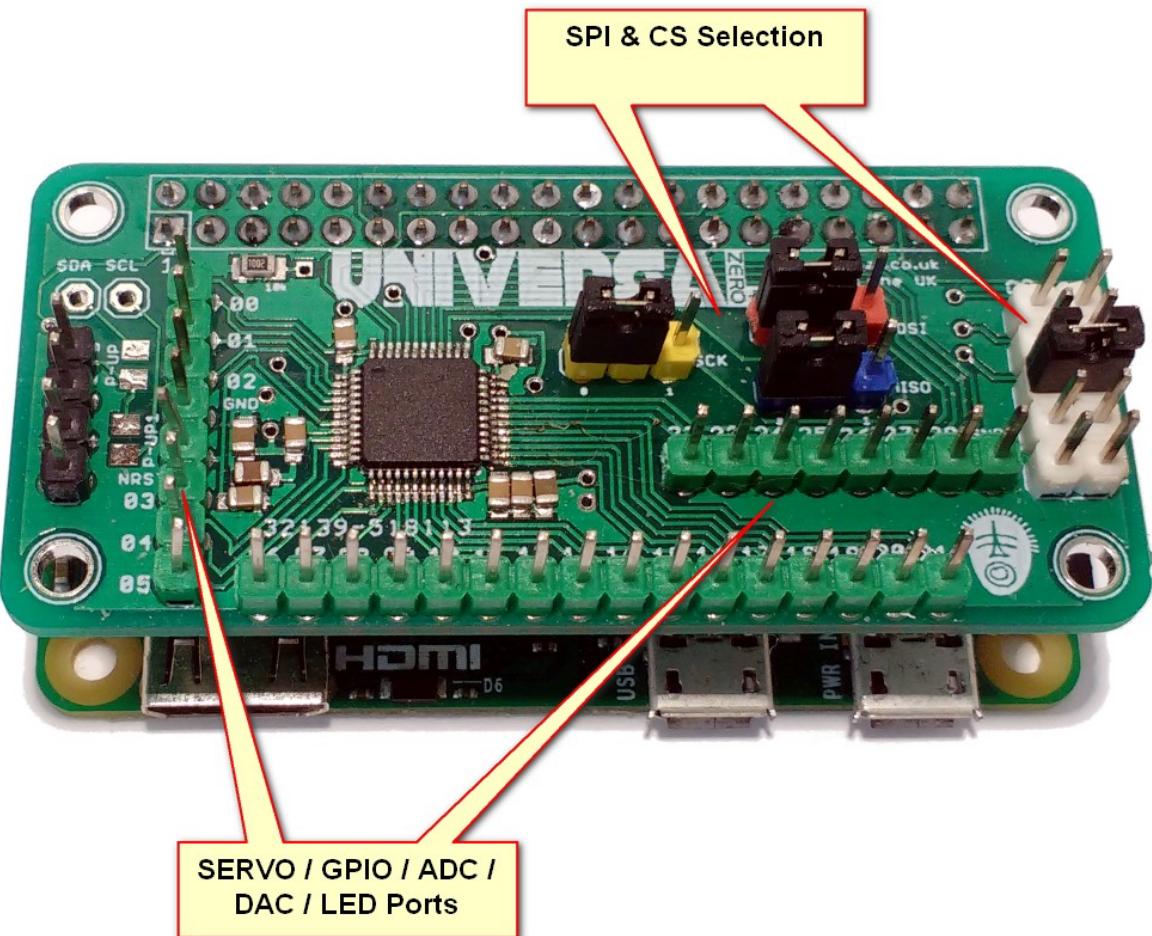
## STAGE III ANALOG I/O & SCOPE



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**Analog I/O**  
**\$22**

Universal zero 8 pin ADC / DAC or GPIO Raspberry pHat. Software configurable. All in one DAC, analog (ADC) or GPIO expansion RPi pHat



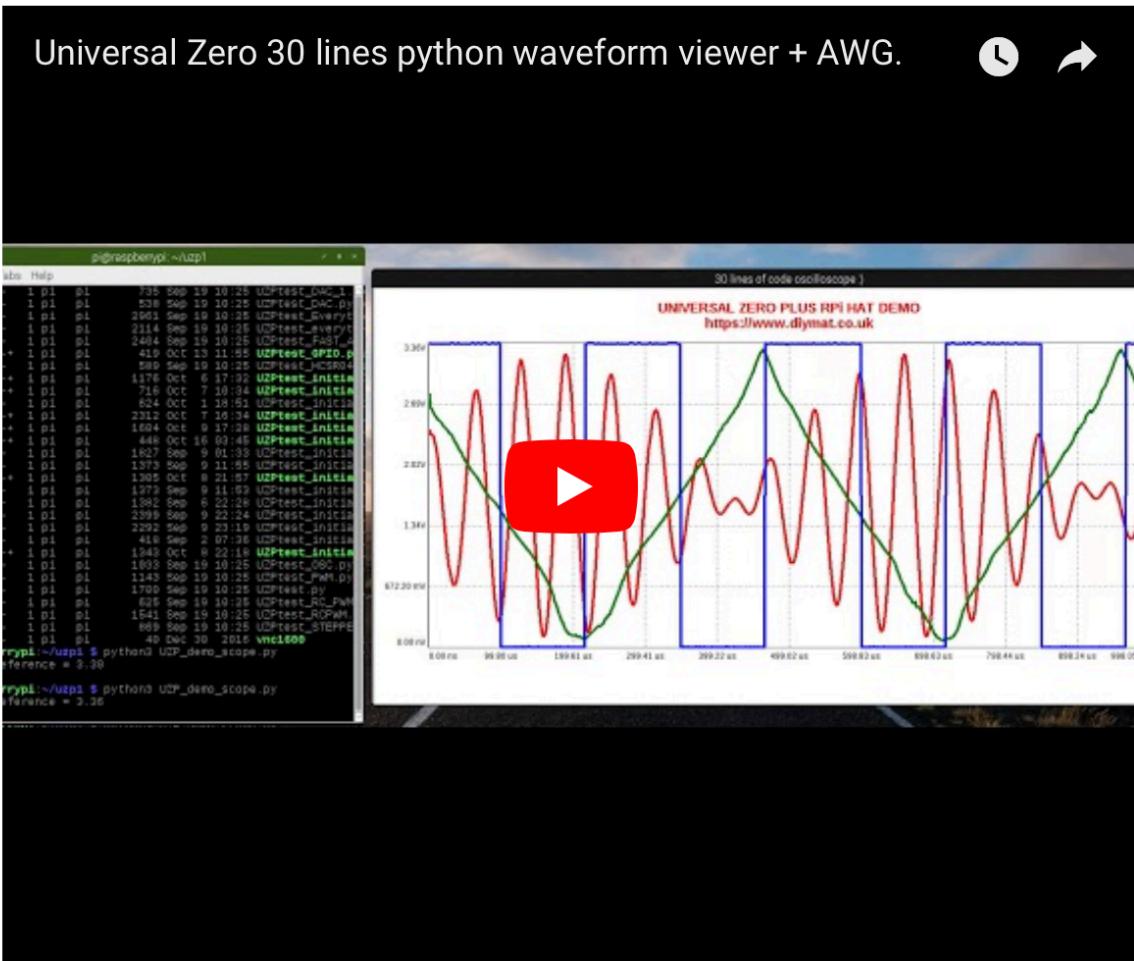
It is one of the most advanced I/O Raspberry Pi HATs. Integrates **GPIO**, **ADC**, **DAC**, **PWM**, **SERVO** and **WS2812** LEDs controller.

#### Main features:

- 29x GPIO ports
- 15x ADC ports (4x 5MSPS)
- 2x DAC 5MSPS

- 19x PWM ports
- 16x SERVO ports
- 4x WS2812 LED ports (up to 700 LEDs each)
- 4x stepper motor control ports

It is extremely easy to code. In 30 lines of code it is possible to create Arbitrary Waveform Generator, PWM and oscilloscope:



## Waveform generation:

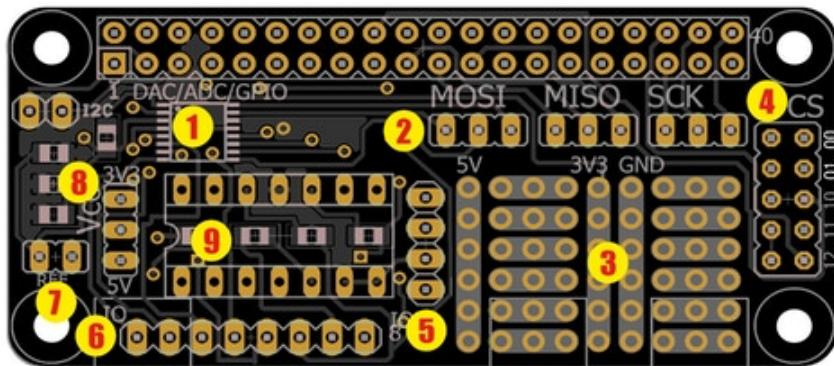
```

Waveform generation
1 uzp0.DACInit(uzp0.DAC1, obuff = 0, generate = 1)
2 uzp0.DACInit(uzp0.DAC2, obuff = 0, generate = 1)
3 for i in range(0, nsamples):
4     samples.append(2048 + 1900 * math.cos(i*2*3.14/nsamples) * ma
5     if i < nsamples / 2:
6         samples1.append(100 + i * 3900 / (nsamples / 2))
7     else:
8         samples1.append(4000 - (i - nsamples / 2) * 3900 / (nsan
9
10 uzp0.DACGenerate(uzp0.DAC1, nsamples, samples, frequency = DAC
11 uzp0.DACGenerate(uzp0.DAC2, nsamples, samples1, frequency = 2 *
12 uzp0.DACStart(uzp0.DAC1)
13 uzp0.DACStart(uzp0.DAC2)

```

# UNIVERSA<sup>L</sup><sub>ZERO</sub>

9 OPTIONAL EXTERNAL BUFFER



1 ADC/DAC/GPIO IC

5 BUFFERED PORTS

2 SPI PORT SELECTION (SPI0 or SPI1)

6 I/O PORTS

3 PROTOTYPING AREA

7 ADC / DAC External Vref

4 CS (chip select) SELECTION

8 Vcc SELECTION (3.3V / 5V)