

Motors

3 kinds:

- Mg 995
- mg90D
- Simple servo

How to connect to raspberry pi:

Use servo shield:

The one we've got is adafruit motor shield v2.3, for arduino, could run on raspberry pi using I2C but can only control 4 dc motors at a time.

The one we need:

Adafruit 16-channel PWM / Servo Hat for raspberry pi - mini Kit

Allows us to control 16 servos

Item list:

- 10x mg996R servos or mg90D
 - mg996R 180deg £9 each → recommended if we are scaling the hand, fixed point is 0 moves 0-180 deg)
 - mg90D 90deg £7 each → problem only 90 deg of movement
 - mg90S 180deg ~£5-6 each → not available on pi-hut may take time to ship, fixed point is centre (moves 90 deg in each direction)
 - Note order from pi-hut or component website, counterfeit servos are too common on amazon

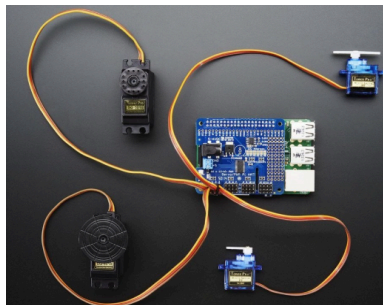
360 servos use continuous rotation thus pwm defines the speed and direction rather than position (360deg don't have a fixed point)



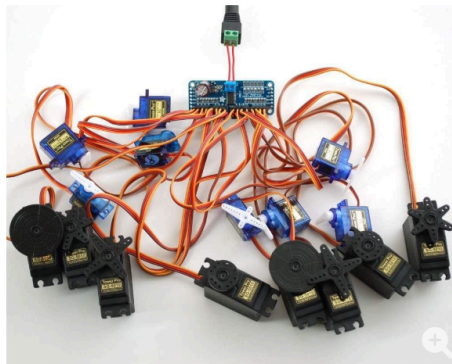
Recommended → MG996R

<https://thepihut.com/products/towerpro-servo-motor-mg996r-metal-gear-180>

- 16-channel PWM:
 - Waveshare 16-Channel Servo Driver HAT → £16.20
 - Pre assembled no need for soldering
 - Adafruit 16-Channel PWM/Servo HAT → £17.40 → recommended
 - Requires soldering
 - More reliable brand
 - Power adapter integrated



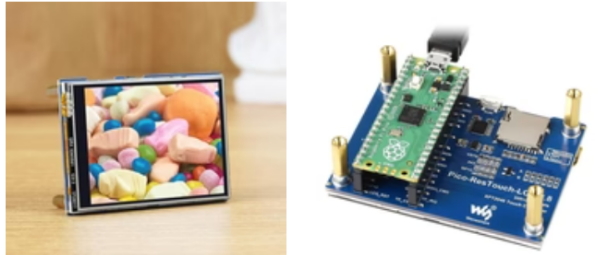
- Adafruit 16-Channel 12-bit PWM/Servo Driver - I2C interface (PCA9685): £14.70
 - Smaller
 - Connect power adapter through wiring (not built in)



<https://thepihut.com/products/adafruit-16-channel-12-bit-pwm-servo-driver-i2c-interface-pca9685>

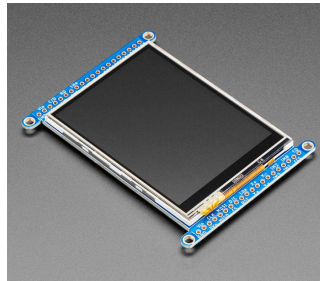
- 2 2.8" LCD screens:
 - Should use SPI TFT for faster response rate
 - Do we want to get it with breakout board or bare
 - Are we using screen with a pico or without
 - With pico cost → $17.6 + 4 = 21.6$

- Boarded tft → 29.6
- Bare tft → 17
- Pico screen



[2.8" Touchscreen IPS LCD Display for Raspberry Pi Pico \(320x240\) | The Pi Hut](#)

- Spi tft screen boarded



[2.8" TFT LCD with Touchscreen Breakout Board with MicroSD Socket \(ILI9341\) | The Pi Hut](#)

- With pico:
 - Offloads image rendering from pi
 - Added weight on the end of the arm
 - More complex communication raspberry pi ↔ pico x2
 - Less pins used on raspberry pi
 - Slight delay in rendering
- No pico:
 - Direct image rendering
 - Less complexity communication wise / code
 - Less complicated wiring

Face, 3.5",

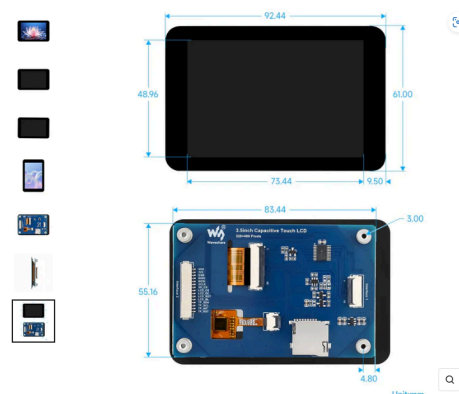
with pico, no need to worry about added weight face bigger than the hand, similar price and still small but more area to show the text

→ £27 + £4 = £31 (actual price £21.6 but out of stock in pi hut have to use amazon)



[Waveshare 3.5inch Touch Display Module for Raspberry Pi Pico 65K Colors 480×320 Pixels Resistive Touch Controller XPT2046 ILI9488 Driver Using SPI Bus : Amazon.co.uk: Business, Industry & Science](https://www.amazon.co.uk/Business-Industry-Science/Waveshare-3-5inch-Touch-Display-Module-for-Raspberry-Pi-Pico-65K-Colors-480x320-Pixels-Resistive-Touch-Controller-XPT2046-ILI9488-Driver-Using-SPI-Bus/dp/B08L5M5M5M)

Cheaper option and no pico, more complex:



[3.5" Capacitive Touch IPS LCD Display \(320 x 480\) | The Pi Hut](https://www.thepihut.com/products/3-5-inch-capacitive-touch-ips-lcd-display-320-x-480)

Pico:

We could add £2 for each pico and get them wireless and thus the raspberry pi can send the signals without needing to wire it towards

Then all we'd need to do is set up a simple server on the pico of each arm and have the pi connect to it and update it. (generally allows more flexibility in option wise)

Final list:

- 10x mg996r 180 servos: £90
<https://thepihut.com/products/towerpro-servo-motor-mg996r-metal-gear-180>
- 2x, 2.8" lcd ips pico screen: £35
[2.8" Touchscreen IPS LCD Display for Raspberry Pi Pico \(320x240\) | The Pi Hut](https://thepihut.com/products/2.8-inch-touchscreen-ips-lcd-display-for-raspberry-pi-pico-320x240)
- 1x, 3.5" display pico: £27
[Waveshare 3.5inch Touch Display Module for Raspberry Pi Pico 65K Colors 480×320 Pixels Resistive Touch Controller XPT2046 ILI9488 Driver Using SPI Bus : Amazon.co.uk: Business, Industry & Science](https://thepihut.com/products/waveshare-3.5-inch-touch-display-module-for-raspberry-pi-pico-65k-colors-480x320-pixels-resistive-touch-controller-xpt2046-il19488-driver-using-spi-bus)
- 3x pico, £15: or £21 if wireless
<https://thepihut.com/products/raspberry-pi-pico-2>
- Adafruit PCA9685 pwm 16-channel, £14.60
<https://thepihut.com/products/adafruit-16-channel-12-bit-pwm-servo-driver-i2c-interface-pca9685>

Total price: £181.60

Owned items:

- Raspberry pi 4B
- Raspberry pi camera module v2