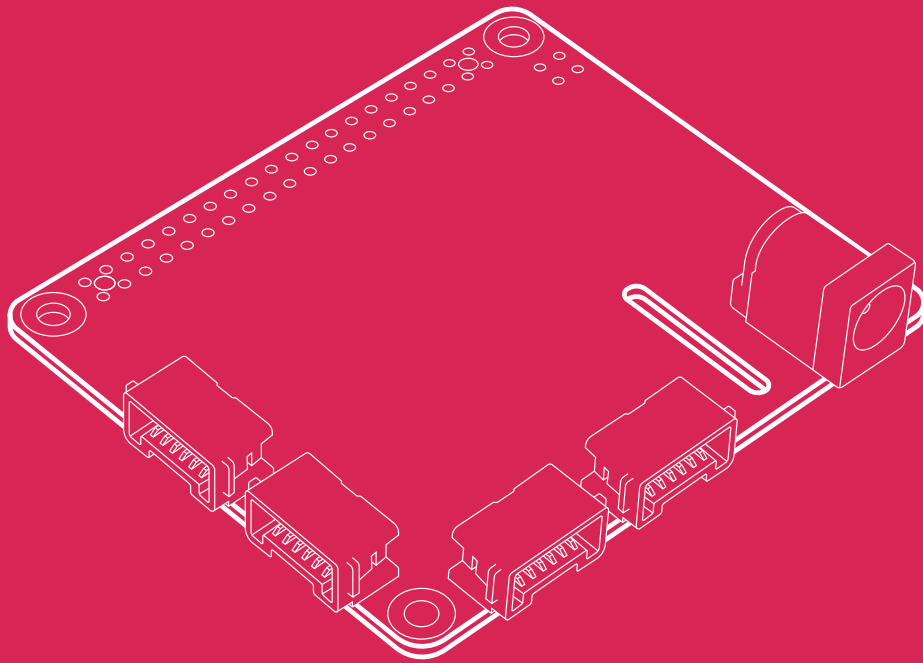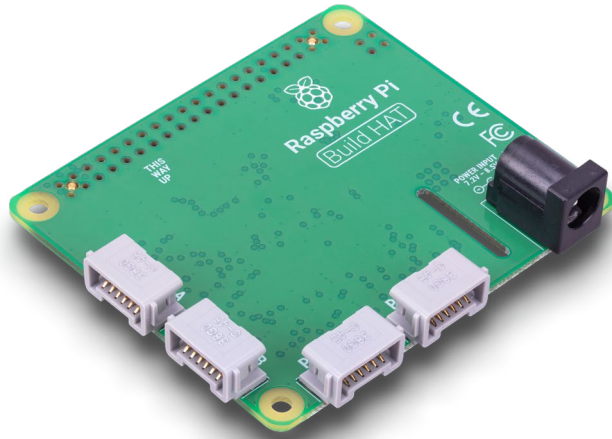# Raspberry Pi Build HAT

Published October 2021

Overview

The Raspberry Pi Build HAT is an add-on board designed in collaboration with LEGO® Education to make it easy to control LEGO® Technic™ motors and sensors with Raspberry Pi computers.

It provides four connectors for LEGO® Technic™ motors and sensors from the SPIKE™ Portfolio. The available sensors include a distance sensor, a colour sensor, and a force sensor. The angular motors come in a range of sizes and include integrated encoders that can be queried to find their position.

The Build HAT fits all Raspberry Pi computers with a 40-pin GPIO header, including — with the addition of a ribbon cable or other extension device — Raspberry Pi 400. Connected LEGO® Technic™ devices can easily be controlled in Python, alongside standard Raspberry Pi accessories such as a camera module.
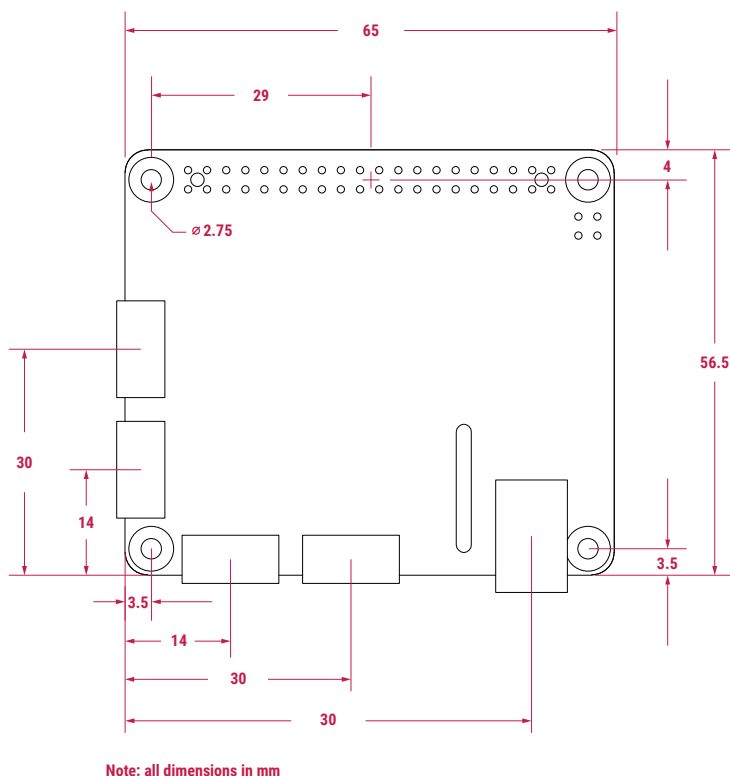
The Raspberry Pi Build HAT power supply, available separately, is designed to power both the Build HAT and Raspberry Pi computer along with all connected LEGO® Technic™ devices.

The LEGO® Education SPIKE™ Prime Set 45678 and SPIKE™ Prime Expansion Set 45681, available separately from LEGO® Education resellers, include a collection of useful elements supported by the Build HAT.

Specification

- Controls up to four LEGO® Technic™ motors and sensors included in the SPIKE™ Portfolio

- Fits onto any Raspberry Pi computer with a 40-pin GPIO header

- Easy-to-use Python library to control your LEGO® Technic™ devices

- Onboard Raspberry Pi RP2040 microcontroller manages low-level control of LEGO® Technic™ devices

- DC power connector: 2.1mm barrel jack, centre positive

- Requires an external 8V ±10% DC power source – like the Raspberry Pi Build HAT Power Supply, or a 7.5V battery pack – to power the Build HAT, Raspberry Pi computer (except Raspberry Pi 400), and connected LEGO® Technic™ devices

Physical specification
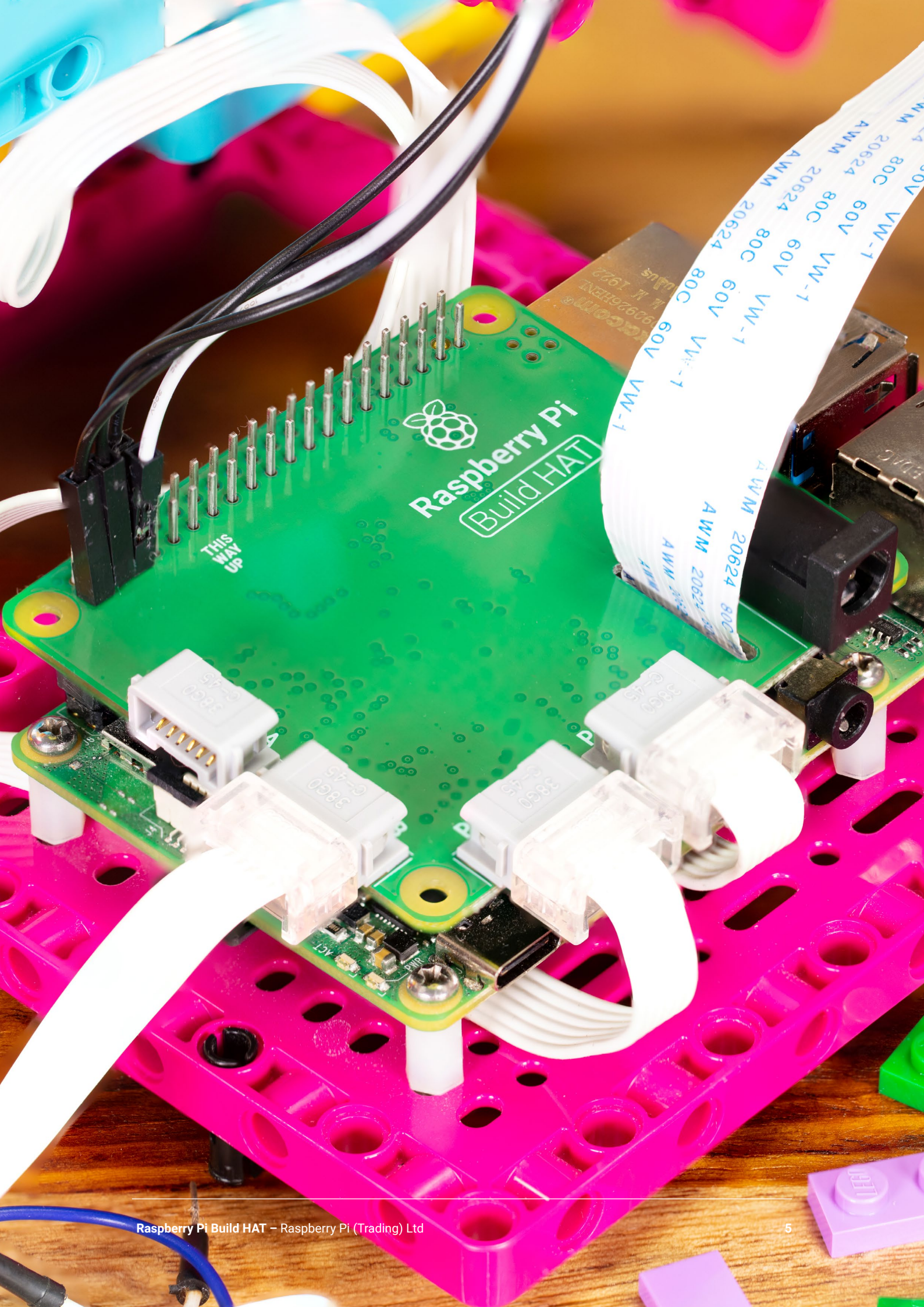

Note: all dimensions in mm

WARNINGS

- This product shall only be connected to a Raspberry Pi via the GPIO header.

- Any external power supply used with the Raspberry Pi Build HAT shall comply with relevant regulations and standards applicable in the country of intended use.

- This product should be operated in a well-ventilated environment, and if used inside a case, the case should not be covered.

- Whilst in use, this product should be placed on a stable, flat, non-conductive surface, and should not be contacted by conductive items.

- The connection of incompatible devices to the Raspberry Pi Build HAT may affect compliance, result in damage to the unit, and invalidate the warranty.

- The connection of incompatible devices to the GPIO connection of a Raspberry Pi computer may affect compliance and result in damage to the unit and invalidate the warranty.

- All peripherals used with this product should comply with relevant standards for the country of use and be marked accordingly to ensure that safety and performance requirements are met.

- The cables and connectors of all peripherals used with this product must have adequate insulation so that relevant safety requirements are met.

- Operation of this device requires adult supervision

SAFETY INSTRUCTIONS

To avoid malfunction or damage to this product, please observe the following:

- Do not expose to water or moisture, or place on a conductive surface whilst in operation.

- Do not expose to heat from any source; Raspberry Pi computers and the Raspberry Pi Build HAT are designed for reliable operation at normal ambient temperatures.

- Take care whilst handling to avoid mechanical or electrical damage to the printed circuit board and connectors.

- Whilst it is powered, avoid handling the printed circuit board, or only handle it by the corners to minimise the risk of electrostatic discharge damage.