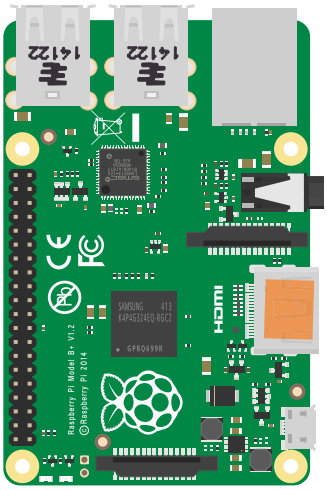
Raspberry Pi Datasheet



Functional description

OVERVIEW

The Raspberry Pi is a low-cost single-board Linux computer designed and produced by the Raspberry Pi Foundation.

This datasheet shows the conventions and pin mappings used when Particle firmware is running on the Raspberry Pi. For more information about the Raspberry Pi hardware itself, please visit the Raspberry Pi Foundation's Hardware documentation.

Hardware Variants

The Particle firmware is being developed on the **Raspberry Pi 3**.

The Particle Agent software also works on the Pi Zero, original Raspberry Pi and Raspberry Pi 2, but the differences in peripherals and pin mapping means that some firmware and libraries may not compile correctly on older hardware variants.

Firmware and library coverage for all versions of Raspberry Pi hardware will improve over time.

Operating System

The Particle firmware and agent (the supervisor for the firmware) expects Raspbian Jessie or later. Please visit our Getting Started Guide for instructions on updating your existing OS, or flashing a new SD card from scratch.

You can download the latest version of Raspbian for your Raspberry Pi from the Raspberry Pi Foundation, here.

Interfaces

PERIPHERALS AND GPIO

The Raspberry Pi 3 has general purpose IO pins, 4 PWM-capable pin and several buses (SPI, I2C and UART). It does not have analog input or output pins.

D7 User LED

> *The Raspberry Pi has a green activity LED next to the red power LED near the USB connector. Particle's firmware maps activity of the D7 LED, which is a blue physical LED on the Photon and Electron, to the green LED of the Raspberry Pi.*

RGB LED, SETUP AND RESET BUTTON

The Raspberry Pi doesn't have the RGB LED, SETUP or RESET button found on Particle devices. You can learn more about the state of your device by

- Running `particle-agent logs` in your terminal
- Logging into the Particle Console and investigating your Pi's device logs

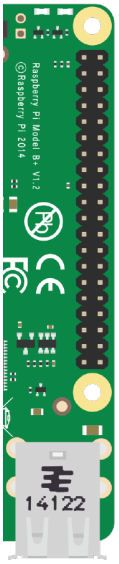
Pin definition

PIN NUMBERING

In the Particle firmware, pins are labeled from D0 to D15. The Broadcom pin numbers, also know as the BCM or GPIO pin numbers, are also available from GPIO0 to GPIO27.

Note: Since enabling and disabling peripherals like SPI and I2C can only be done at boot, the peripheral pins are considered dedicated pins and should not be used for digital I/O.

PIN OUT DIAGRAM



Peripherals	GPIO	Particle	Pin #			Pin #	Particle	GPIO	Peripherals
3.3V			1	X	X	2	5V		
I2C	GPIO2	SDA	3	X	X	4	5V		
	GPIO3	SCL	5	X	X	6	GND		
Digital I/O	GPIO4	D0	7	X	X	8	TX	GPIO14	UART
GND			9	X	X	10	RX	GPIO15	Serial 1
Digital I/O	GPIO17	D1	11	X	X	12	D9/A0	GPIO18	PWM 1
Digital I/O	GPIO27	D2	13	X	X	14	GND		
Digital I/O	GPIO22	D3	15	X	X	16	D10/A1	GPIO23	Digital I/O
3.3V			17	X	X	18	D11/A2	GPIO24	Digital I/O
SPI	GPIO10	MOSI	19	X	X	20	GND		
	GPIO9	MISO	21	X	X	22	D12/A3	GPIO25	Digital I/O
	GPIO11	SCK	23	X	X	24	CE0	GPIO8	SPI (chip enable)
GND			25	X	X	26	CE1	GPIO7	
DO NOT USE	ID_SD	DO NOT USE	27	X	X	28	DO NOT USE	ID_SC	DO NOT USE
Digital I/O	GPIO5	D4	29	X	X	30	GND		
Digital I/O	GPIO6	D5	31	X	X	32	D13/A4	GPIO12	Digital I/O
PWM 2	GPIO13	D6	33	X	X	34	GND		
PWM 2	GPIO19	D7	35	X	X	36	D14/A5	GPIO16	PWM 1
Digital I/O	GPIO26	D8	37	X	X	38	D15/A6	GPIO20	Digital I/O
GND			39	X	X	40	D16/A7	GPIO21	Digital I/O

PIN DESCRIPTION

Pin	Particle	Description
GPIO0		I2C data line used to identify Pi Hats (RESERVED FOR SYSTEM)
GPIO1		I2C clock line used to identify Pi Hats (RESERVED FOR SYSTEM)
GPIO2	SDA	I2C data line [2]
GPIO3	SCL	I2C clock line [2]
GPIO4	D0	Digital IO
GPIO5	D4	Digital IO
GPIO6	D5	Digital IO
GPIO7	CE1	SPI chip enable 1, digital IO
GPIO8	CE0	SPI chip enable 0, digital IO
GPIO9	MISO	SPI master-in slave-out [3]
GPIO10	MOSI	SPI master-out slave-in [3]
GPIO11	SCK	SPI clock [3]
GPIO12	D13/A4	Digital IO
GPIO13	D6	PWM-capable digital IO

GPIO14	TX	UART hardware serial transmit [1]
GPIO15	RX	UART hardware serial receive [1]
GPIO16	D14/A5	PWM-capable digital IO
GPIO17	D1	Digital IO
GPIO18	D9/A0	PWM-capable digital IO
GPIO19	D7	PWM-capable digital IO
GPIO20	D15/A6	Digital IO
GPIO21	D16/A7	Digital IO
GPIO22	D3	Digital IO
GPIO23	D10/A1	Digital IO
GPIO24	D11/A2	Digital IO
GPIO25	D12/A3	Digital IO
GPIO26	D8	Digital IO
GPIO27	D2	Digital IO

Notes:

[1]: Disabled by default on the Raspberry Pi 3. Must be enabled by adding `enable_uart=1` to `/boot/config.txt`

[2]: Disabled by default on the Raspberry Pi 3. Must be enabled by adding `dtparam=i2c_arm=on` to `/boot/config.txt`

[3]: Disabled by default on the Raspberry Pi 3. Must be enabled by adding `dtparam=spi=on` to `/boot/config.txt`