



# Witty Pi 4 HAT – RTC & Power Management for Raspberry Pi

Product ID: 5704



## Description

Witty Pi 4 is an add-on board that adds real-time clock and power management to your Raspberry Pi. It can define your Raspberry Pi's ON/OFF sequence and significantly reduce energy usage. Witty Pi 4 is the fourth generation of Witty Pi, and it has these hardware resources onboard:

- Factory calibrated and temperature compensated real-time clock with  $\pm 2$ ppm accuracy.
- Dedicated temperature sensor with 0.125 °C resolution.
- On-board DC/DC converter that accepts up to 30V DC.

- AVR 8-bit microcontroller (MCU) with 8 KB programmable flash.

Note: Witty Pi's software is developed and tested under Raspberry Pi OS (the former Raspbian). If you want to use Witty Pi on other Linux distributions, you may not be able to install the software without error. This is due to the fact that different Linux distributions have different packages installed by default, and their default users may have different privilege settings too. You may need to modify the software installation script or even the software itself; however, this will need you to have some knowledge of BASH programming.

#### ACCURATE REAL TIME CLOCK AND ON/OFF SCHEDULING

The real time clock (RTC) on Witty Pi 4 has been calibrated in the factory, and Witty Pi 4's firmware also makes temperature compensation for the crystal. This makes the RTC very accurate, and the actual annual error is limited to  $\pm 2$ ppm. When your Raspberry Pi boots up, the time stored in the RTC will overwrite the system time. As a result, your Raspberry Pi knows the correct time even without accessing the Internet. You can schedule the startup and/or shutdown of your Raspberry Pi and make it a time-controlled device. You can even define a scheduled script to schedule a complicated ON/OFF sequence for your Raspberry Pi.

Scheduling the ON/OFF sequence for Raspberry Pi is the most popular feature of Witty Pi, and it is extremely useful for battery-powered systems. By only turning on Raspberry Pi when necessary, the battery can be used way much longer with Witty Pi installed.

#### TEMPERATURE CONTROLLED DEVICE

The temperature sensor on Witty Pi 4 has 0.125 °C resolution. The temperature data is used for compensating the crystal and makes the RTC more accurate.

You can also specify the action (startup or shutdown) when the temperature goes above or below the preset threshold. This means you can also make your Raspberry Pi a temperature-controlled device!

#### DC/DC CONVERTER AND E-LATCHING POWER SWITCH

Witty Pi 4 comes with a DC/DC converter on board, which allows you to power your device with 6~30V power supply. You can also power your device with 5V via the USB type C connector.

Witty Pi 4 also implements an e-Latching power switch, which is very similar to the power switch on your PC/Laptop computer. You can gracefully turn on/off your Raspberry Pi with a single tap on the button. The software running in the background

will execute the shutdown command before the power gets cut; this avoids the data corruption caused by a hard shutdown.

Witty Pi 4 supports all Raspberry Pi models that have the 40-pin GPIO header, including A+, B+, 2B, Zero, Zero W, Zero 2 W, 3B, 3B+, 3A+, and 4B. You will need to solder the 40-pin header to Zero/Zero W/Zero 2 W model beforehand, so they can make a reliable connection with Witty Pi.

## SINGLE I2C DEVICE

Witty Pi 4 uses MCU to emulate a single I2C device with default address 0x08 and also map all I2C registers in real time clock and temperature sensor as virtual I2C registers in the same device. You can access all I2C registers in real time clock and temperature sensor via the single I2C device emulated by Witty Pi 4.

The advantage of this new design is that Witty Pi 4 hides other I2C devices (real time clock, temperature sensor) and becomes the proxy of them to talk to Raspberry Pi. Because the I2C address used by Witty Pi 4 can be changed to any value, you can always avoid the I2C address conflicting.

## UWI SUPPORT

Witty Pi 4 is fully supported by UWI (UUGear Web Interface), and you can access your Witty Pi 4 on any device that has network access.

## SOFTWARE INSTALLATION:

You just need to run these two commands in your Raspberry Pi to install Witty Pi 4's software:

```
pi@raspberrypi:~ $ wget https://www.uugear.com/repo/WittyPi4/install.sh
```

```
pi@raspberrypi:~ $ sudo sh install.sh
```

The software and firmware of Witty Pi 4 are open-sourced. You can find the source code on [GitHub](#).

Each Witty Pi 4 package contains:

- Witty Pi 4 board x 1
- 30cm 22AWG XH 2.54 cable x 1

- M2.5 x 11mm Copper Standoff x 4
- M2.5 screws x 8

Note: Coin cell battery is not included, to make shipping a lot easier for folks abroad. You can get one locally or add one from the Adafruit shop if you need.

YouTube link:

[https://www.youtube.com/watch?t=193&v=E0\\_pR\\_ordNo&embeds\\_euri=https%3A%2F%2Fwww.adafruit.com%2F&feature=emb\\_imp\\_woyt](https://www.youtube.com/watch?t=193&v=E0_pR_ordNo&embeds_euri=https%3A%2F%2Fwww.adafruit.com%2F&feature=emb_imp_woyt)

## Technical Details

Specifications:

Dimension	65mm x 56mm x 19mm
Weight	23g (net weight without accessories)
Microcontroller	ATtiny841 ( <a href="#">datasheet</a> )
Realtime Clock	PCF85063A ( <a href="#">datasheet</a> ), calibrated in factory.
Temperature Sensor	LM75B ( <a href="#">datasheet</a> )
DC/DC Converter	MP4462 ( <a href="#">datasheet</a> )
MOSFET Switch	AO4616 ( <a href="#">datasheet</a> )
Battery	CR2032 (for time keeping when power supply is disconnected)
Power In	DC 5V (via USB type C connector) or DC 6V~30V (via XH2.54 connector)
Output Current	Up to 3A for Raspberry Pi and its peripherals
Standby Current	~0.5mA
Operating Environment	Temperature -30°C~80°C (-22°F~176°F) Humidity 0~80%RH, no condensing, no corrosive gas

[User Manual](#)