Bluetooth Tutorial

# Raspberry Pi as a Bluetooth gateway

## Hardware

Raspberry Pi 3 as an integrated Bluetooth chip. It’s easy to configure it out of the box. But in case you want to use the integrated Bluetooth with another serial communication device as the same time, you will have a lot of troubles. I tried to configure it without success in couple of hours. In fact, Raspberry Pi 3 introduced WiFi and Bluetooth compared to Raspberry Pi 2, but at the same time, uses the UART to connect to the Bluetooth chip. So, the GPIO pins can only access software UART with require a specific frequency to fix the baud rate (250MHz). So, the performance of your Raspberry will be poor. If you are interested by this problem, you can find good slides about the [Raspberry Pi 3 + UART / Bluetooth issues](https://fr.slideshare.net/yeokm1/raspberry-pi-3-uartbluetooth-issues).

To be able to use the Bluetooth protocol, you must not use the multi-protocol bridge, or any other serial devices connected to the Raspberry Pi 3. If you need to configure Bluetooth with any other serial device at the same time, you will need to add a USB Bluetooth dongle to your Raspberry Pi. For this tutorial, I tried the [Bluetooth CSR 4.0 dongle](https://www.gotronic.fr/art-dongle-bluetooth-csr-4-0-21938.htm) and the [Trendnet Bluetooth dongle](https://www.trendnet.com/langfr/products/product-detail?prod=170_TBW-106UB) which are both recognized as device 0a12:0001.

In any case, you can use the Raspberry Pi 3 integrated Bluetooth chip if you don’t already use the serial port for any other device communication.

## Software

### Setup

First, to be sure to have the last release of Bluetooth drivers and tools, you need to install or update the Bluetooth package and start the Bluetooth service:

sudo apt-get install bluetooth bluez bluez-tools rfkill rfcomm

sudo systemctl start bluetooth.service

sudo systemctl enable bluetooth.service

With this package (and, in fact, the bluez package which is a dependency of the Bluetooth one, provides drivers and tools to interact with Bluetooth devices). You have 3 main commands provided by [Bluez](http://www.bluez.org/): hciconfig, to configure the basic properties of Bluetooth adapters, hcitool to search and detect nearby Bluetooth devices, and hcidump for a low-level debugging of communication setup and data transfer.

The command hcitool dev should provide you the information about the MAC address of your Bluetooth device.

$ hcitool dev

Devices:

hci0 00:1A:7D:DA:71:13

To verify that you Bluetooth device is not already in use, you can use the following command:

sudo rfkill list

In case it’s used (blocked), you can unblock it with the following command:

sudo rfkill unblock bluetooth

You can now bring up the Bluetooth device and start scanning for near Bluetooth devices:

sudo hciconfig hci0 up

hcitool scan

In our case, the device, we what to connect with is the one with MAC address: 00:0E:EA:CF:4E:5E.

### Pairing

For security reasons, Bluetooth devices will only talk to each other if they have been "introduced" first. This is the pairing mechanism. To pair devices, you need to use the following command:

sudo bluetoothctl