



LAB MANUAL 4

Getting Started with GrovePI & Raspberry PI (Installation with Led blink)

What is GrovePi+

GrovePi+ is add-on board with 15 Grove 4-pin interfaces that brings Grove sensors to the Raspberry Pi. It is the newest version compatible with Raspberry Pi model B/B+/A+/2/3/4 perfectly.

GrovePi+ is an easy-to-use and modular system for hardware hacking with the Raspberry Pi, no need for soldering or breadboards: plug in your Grove sensors and start programming directly. Grove is an easy to use collection of more than 100 inexpensive plug-and-play modules that sense and control the physical world. By connecting Grove Sensors to Raspberry Pi, it empowers your Pi in the physical world. With hundreds of sensors to choose from Grove families, the possibilities for interaction are endless.

1. Compatible with Raspberry Pi model B/B+/A+/2/3/4
2. Faster SPI and higher reliability UART connections
3. Easier to assemble camera cables and LCD cables
4. Simplified procedures of firmware update



Fig: GrovePi+ Board

Reference: [GrovePi+ add-on for Raspberry Pi – Seeed Studio](#)

Set-up in 4 simple steps

Step 1: Slip the GrovePi+ board over your Raspberry Pi

Step 2: Connect the Grove modules to the GrovePi+ board

Step 3: Upload your program to Raspberry Pi

Step 4: Begin taking in the world data

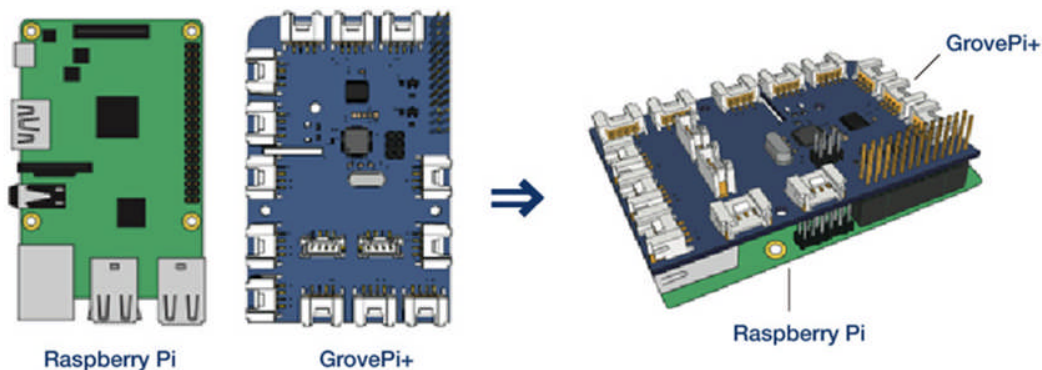


Fig: GrovePi+ Board and Raspberry Pi interface
Reference: [GrovePi+ add-on for Raspberry Pi – Seeed Studio](#)

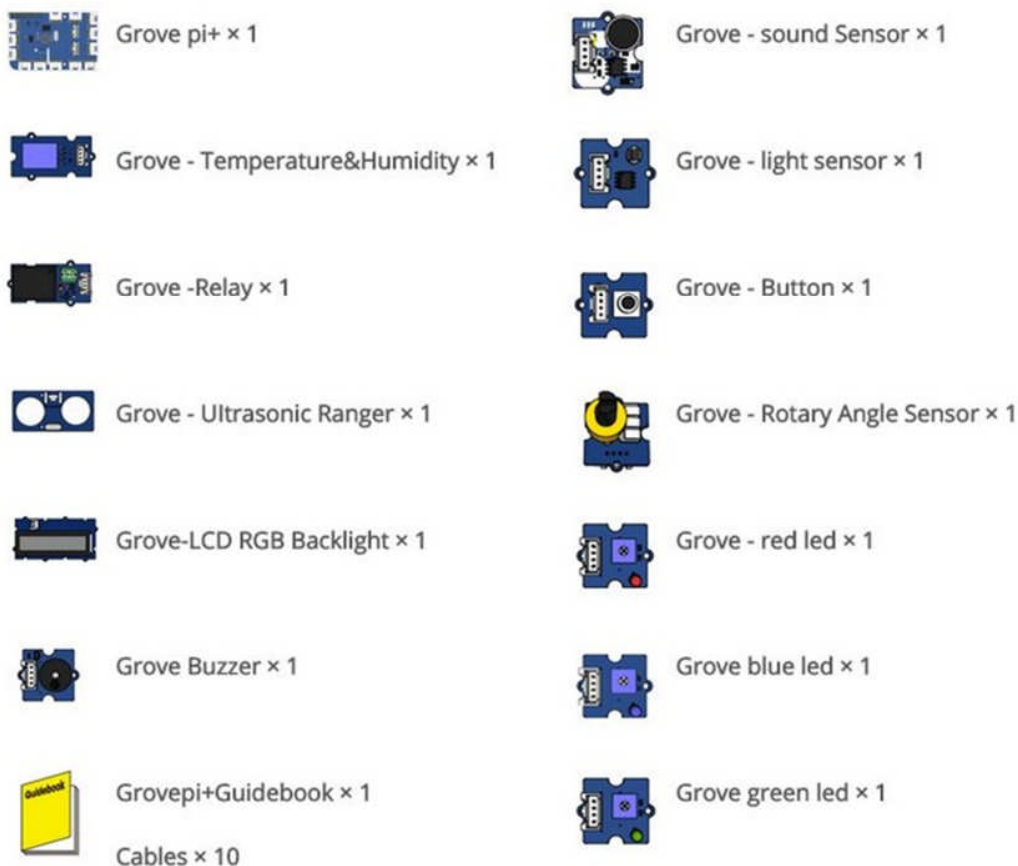
Features:

- 7 digital Ports
- 3 analogue Ports
- 3 I2C ports
- 1 Serial port connect to GrovePi
- 1 Serial port connect to Raspberry Pi
- Grove header Vcc output Voltage: 5Vdc

The GrovePi Starter Kit gets you up and running with the GrovePi quickly. The starter kit bundles the most popular sensors for education and hobbyists, and lets you start playing and prototyping hardware with Raspberry Pi. No soldering required!

The GrovePi Starter Kit package includes:

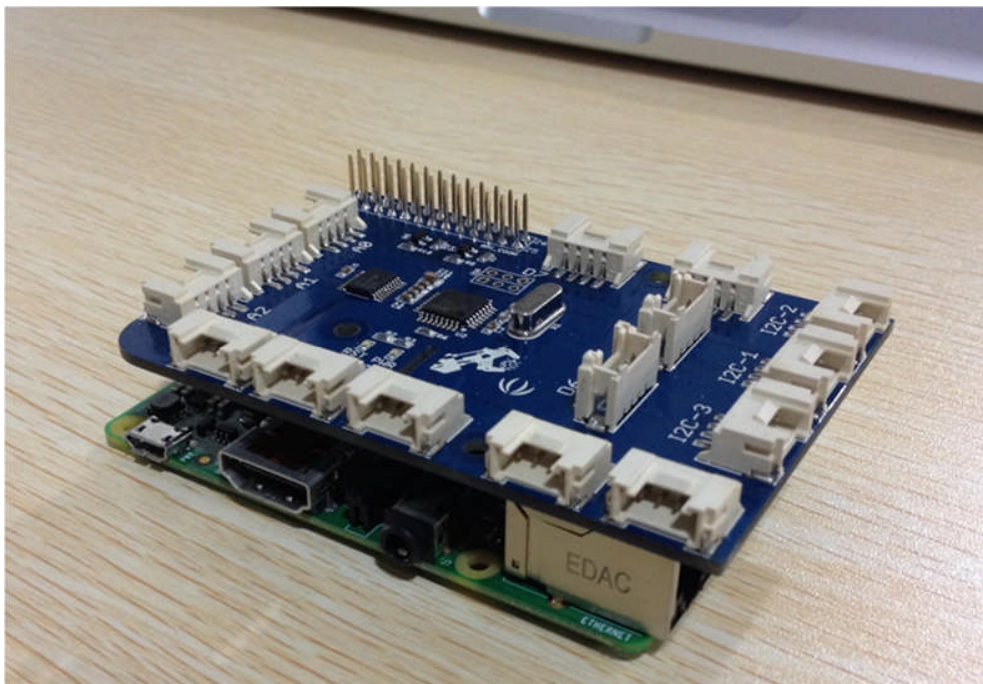
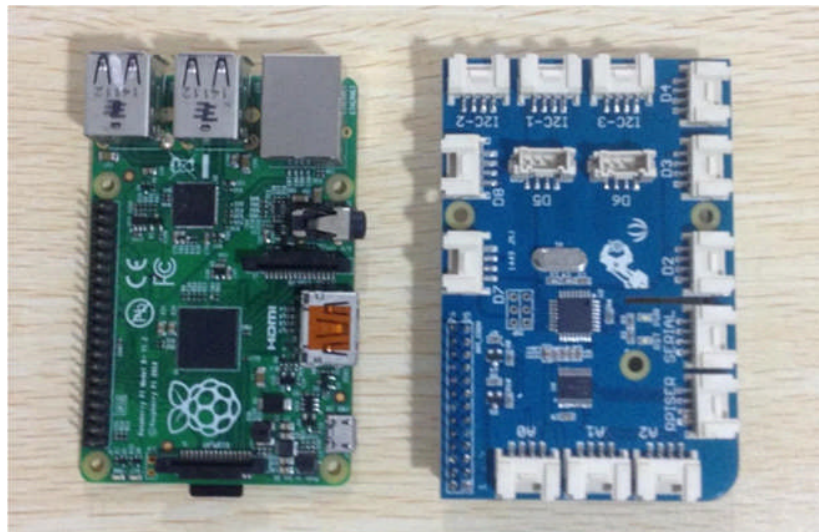
1. GrovePi+ Board
2. 12 different Grove sensors and modules
3. Grove cables for connecting the sensors to the GrovePi board.



Reference: [starter-Kit-content.jpg \(758×647\) \(dexterindustries.com\)](#)

Hardware connection for GrovePi+ to raspberry Pi

First, mount your GrovePi on the Raspberry Pi. The GrovePi slides over top of the Raspberry Pi as shown in the picture below.



Ensure that the pins are properly aligned when stacking the GrovePi.

Powering up the Raspberry Pi

To power the GrovePi+ and the Raspberry Pi, you can use the micro-USB power port on the Raspberry Pi.

Remember to use a good power adapter capable of supplying 1A at 5V and you should be fine with the power.

If you want to run the GrovePi+ in a standalone configuration, then you should use a USB power bank

Setup the Software on the Raspberry Pi

Next we will install the software on the Raspberry Pi. There are two options for installation:

1. You can use our BrickPi Image.
2. Use your own image. If you already have your own flavor of linux running on the Raspberry Pi, you can use our bash script to setup for the GrovePi.

Using the BrickPi Image

- Download the Brick Pi Image and install the image on your SD card. [Here is the link to the BrickPi Page with steps to configure the SD card.](#) You will need a minimum of 4GB SD Card for this installation.
- Clone the Github repository at an appropriate location in Raspbian
git clone <https://github.com/DexterInd/GrovePi.git>
 - Run the bash script in the Scripts folder to configure the Raspbian. [Here is the tutorial for setting up with the Script.](#)
 - Restart your Raspberry Pi.

Configuring your own image

- Clone and install GrovePI repository
- `curl -kL dexterindustries.com/update_grovepi | bash`
- `sudo pip install cffi && sudo pip3 install cffi`
- `curl -kL dexterindustries.com/update_grovepi | bash`

NOTE : Do the next command only after connecting GrovePi Shield on Raspberry Pi

Update Firmware

- `cd ~/Dexter/GrovePi/Firmware`
- `bash firmware_update.sh`

Running Tests (Optional)

- Check version
- `python`
- `>>import grovepi`
- `>>grovepi.version()`

Press “Enter” to start when you are prompted.

- The script will download packages from the internet which are used by the GrovePi. Press “y” when the terminal prompts and asks for permission to start the download.
- The Raspberry Pi will automatically restart when the installation is
- Now when the Raspberry pi is powered down, stack the Grove Pi on top of the Raspberry Pi and power on the Raspberry Pi. A green light should power up on the Grove Pi. (Ensure that the pins are properly connected before powering the Raspberry Pi)
- Now to check that the script was correctly installed. We will check that the Raspberry Pi is able to detect the Grove pi: run i2cdetect

```
sudo i2cdetect -y
```

- If you have an Original Raspberry Pi (Sold before October 2012) – the I2C is port 0

```
sudo i2cdetect -y
```

- If you can see a “04” in the output, this means the Raspberry Pi is able to detect the GrovePi

To test the Grove Pi, connect a Grove LED to port D4 and run the blink example

```
cd GrovePi/Software/Python  
python grovepi_blink.py
```

If everything is installed correctly, the LED should start
Code grovepi_blink.py-

```
# GrovePi LED blink Example
```

```
import time  
from grovepi import *
```

```
# Connect the Grove LED to digital port D3
```

```
led = 3

pinMode(led,"OUTPUT")
time.sleep(1)

while True:
    try:
        #Blink the LED
        digitalWrite(led,1)      # Send HIGH to switch on LED
        print ("LED ON!")
        time.sleep(1)

        digitalWrite(led,0)      # Send LOW to switch off LED
        print ("LED OFF!")
        time.sleep(1)

    except KeyboardInterrupt:    # Turn LED off before stopping
        digitalWrite(led,0)
        break
    except IOError:              # Print "Error" if communication error
        encountered
        print ("Error")
```