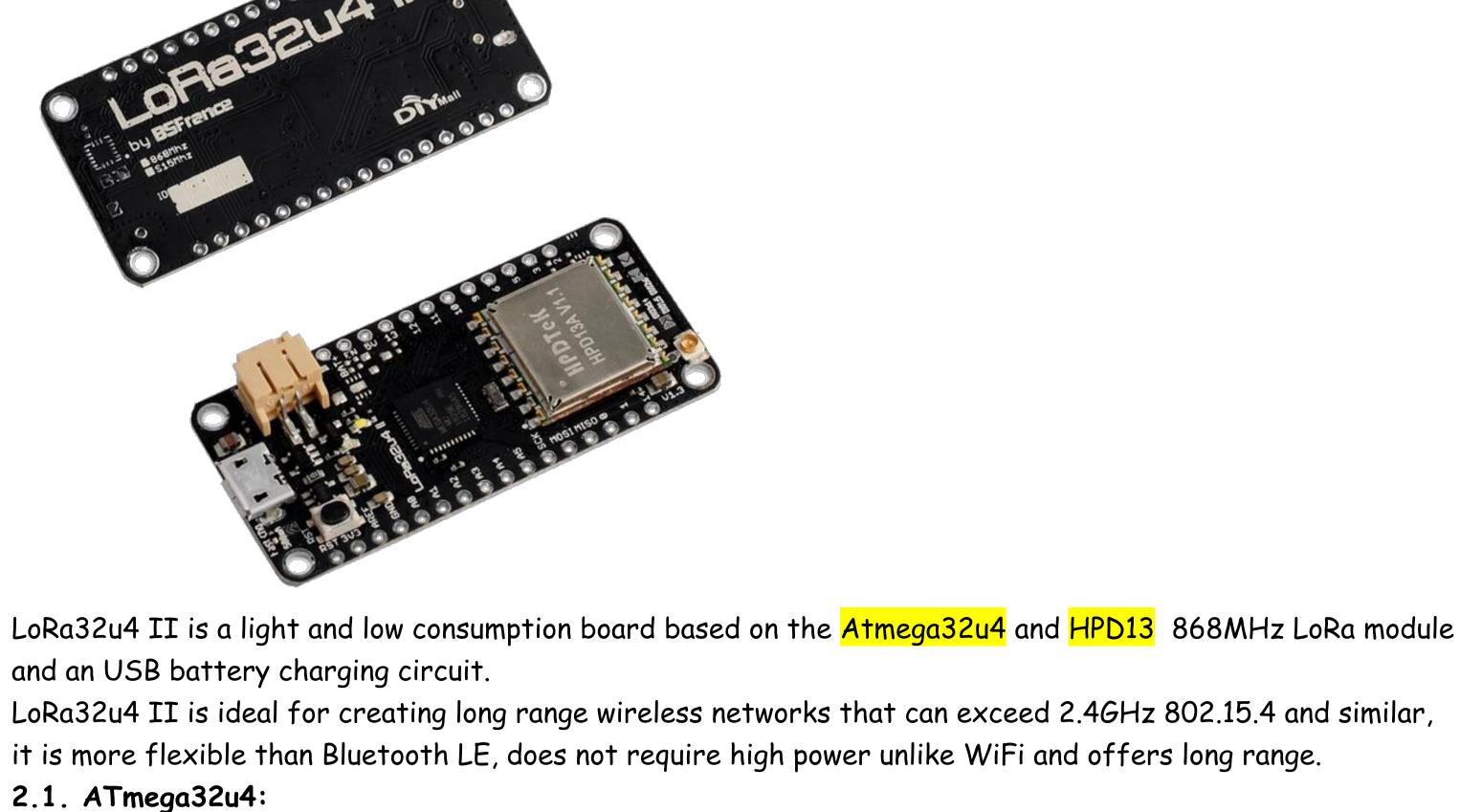
## Introduction to LoRa32u4 II

## 1. What Is LoRa@?

LoRa (short for long range) is a spread spectrum modulation technique derived from chirp spread spectrum (CSS) technology. LoRa devices and wireless radio frequency technology is a long range, low power wireless platform that has become the de facto technology for Internet of Things (IoT) networks worldwide. LoRa devices and the open LoRaWAN® protocol enable smart IoT applications that solve some of the biggest challenges facing our planet: energy management, natural resource reduction, pollution control, infrastructure efficiency, disaster prevention, and more. LoRa devices and the LoRaWAN protocol have amassed several hundred known uses cases for smart cities, smart homes and buildings, smart agriculture, smart metering, smart supply chain and logistics, and more.

2. LoRa32u4 II: Just one of the LoRa devices!



Serial communication, debugging and programming capabilities without the need for an external FTDI chip, it can also act as an HID device (mouse, keyboard, USB MIDI device, etc).

The ATmega32u4 is clocked at 8 MHz and 3.3 V. This chip has 32kB of flash, 2kB of RAM and built-in USB to

This board is also equipped with a LiPo and Liion charging circuit and a standard battery interface. It is fully compatible with Arduino. A white user LED is tied to pin 13. An orange LED is used for charging status.

2.2. HPD13: HPD13 wireless module, using high-performance, highly integrated RF transceiver chip SX1276 design. Advanced LoRaTM spread spectrum communication technology to ensure that the module communication distance and anti-jamming capability greatly improved, and also achieved a very low current consumption. In

the LoRaTM mode, the HPD13 provides higher reception sensitivity performance, more robust anti-jamming capability, and improved communication distance and reliability compared to the same transmit and receive modules on the market. In normal (G) FSK mode, it also provides industry-specific receiver sensitivity, as well

## as very high communication rates.

ATmega32u4 @ 8MHz with 3.3V logic/power 3.3V regulator with 500mA peak current output USB native support, comes with USB bootloader and serial port debugging Built in 100mA lipoly charger with charging status indicator LED Reset button HPD13 Specs: Receive current: 10 ~ 14mA Interface Type: SPI

LoRa Module control

🛜 Used by the LoRa radio module too!

Digital RSSI function Automatic frequency correction

Automatic gain control Radio wake-up function

Operating temperature: -40 ° C to +85 ° C

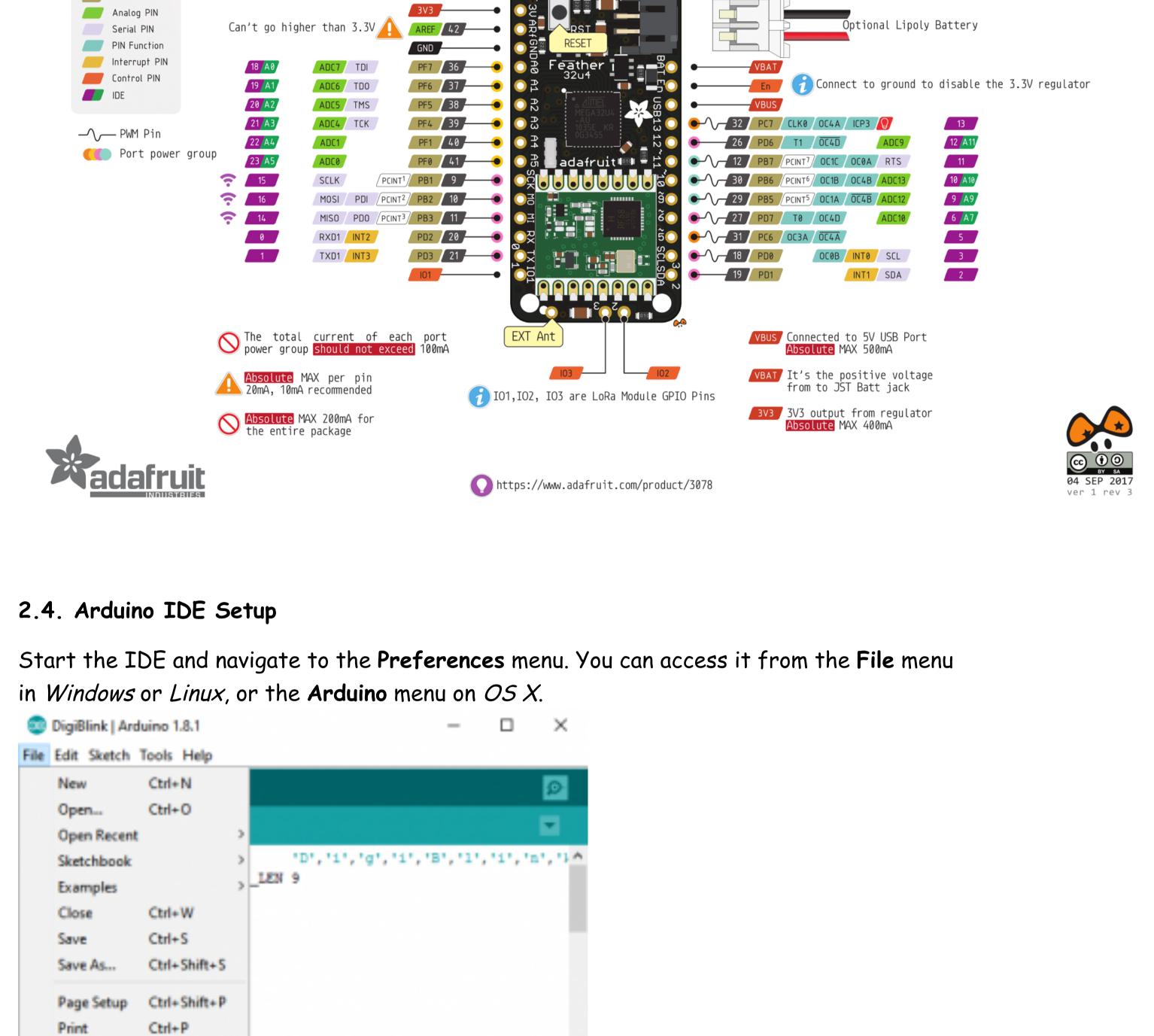
Low voltage detection and temperature sensor

Highly configurable packet handlers

2.3. Pinout

Fast wakeup with frequency hopping

32u4 LoRa



×

USB JACK Micro Type B

## <

pinMode(2,OUTPUT);

Ctrl+Comma

Ctrl+Q

Preferences

Preferences

Verify cade after upload

Check for updates on startup

Save when verifying or uploading

(selft only when Arduino is not running)

More preferences can be edited directly in the file

C: Lisers lifeed AppData/Local Anduno 25/preferences.fort

'32u4 and 8 MHz clock speed.

Serial Plotte

Port "CDM4"

Get Board Info

Burn Bootloader

Programmer "AVR ISP"

and select the Type as Contributed.

WiFi101 Firmway Updater

Board: 'Digispark (Default - 16.5mhz)'

Update sketch files to new extension on save (.pde :> .ino)

Additional Boards Manager URLs: https://adefruit.github.is/arduino-board-index/backage\_adefruit\_index\_ison

Manager by navigating to the Tools->Board menu.

OH+Shift=L

Boards Manager.

Arduino Yún

Arduino Nane

Arduino Mega ADK Arduino Leonardo

Arduino Leonardo ETH

Arduino/Genuino Micro

Arduino Esplora

Arduino Ethernet

LilyPad Arduine US8

LilyPad Arduine

Arduino Mini

Arduino Fio

Arduino BT

Arduino AVR Boards

Arduino/Genuino Uno

Arduino Duemillaneve or Diecimila

Arduino/Genuino Mega or Mega 2500

Enter a comma separeted list of urls

Use external editor

#define USB C

byte in = 0;

int Blue = 0; int Bed = Or

int Green - 0

int next = 0;

void setup()

void loop() setSize():

Sourds Manager

Type Contributed

Ard Epistable

Wrbuino Cartified Partner

Archaine Pertente 87.

Windows 10 InT Corp.

And Arduno

Online.help Place Info

Online, help Black Info

DigiTSB.b

pinMode(0,00TFUT):

pinMode (1, OUTPUT); pinMode (2, OUTPUT);

DigitSB.refresh();

in = DigitSB.read();

if (next -- 0) [

if (DigiUSB.available() > 0) {

Filter your search.

Ardsine mbed-enabled Boards by Ardsins

Windows 18 Let Core by Hierasoft. LeT Boards included in this package:

Boards included in this package:

do (Hibrari OK) by Archaise.

Get Board Info

Burn Bootloader

Programmen "AVR ISP"

int next - 0:

void setup[]

void loop() ( setSlue();

DigiUSB.b

pinNode (0, OUTSUI);

pinMode (1, OUTSUI);

pinMode(2, OUTSUI);

DigiUSB.refresh();

2.5. LED Blinking

if (DigiDSB.available() > 0) {

setBlue():

in = 0;

DigiBlink | Arduino 1.8.1

DigiBlink

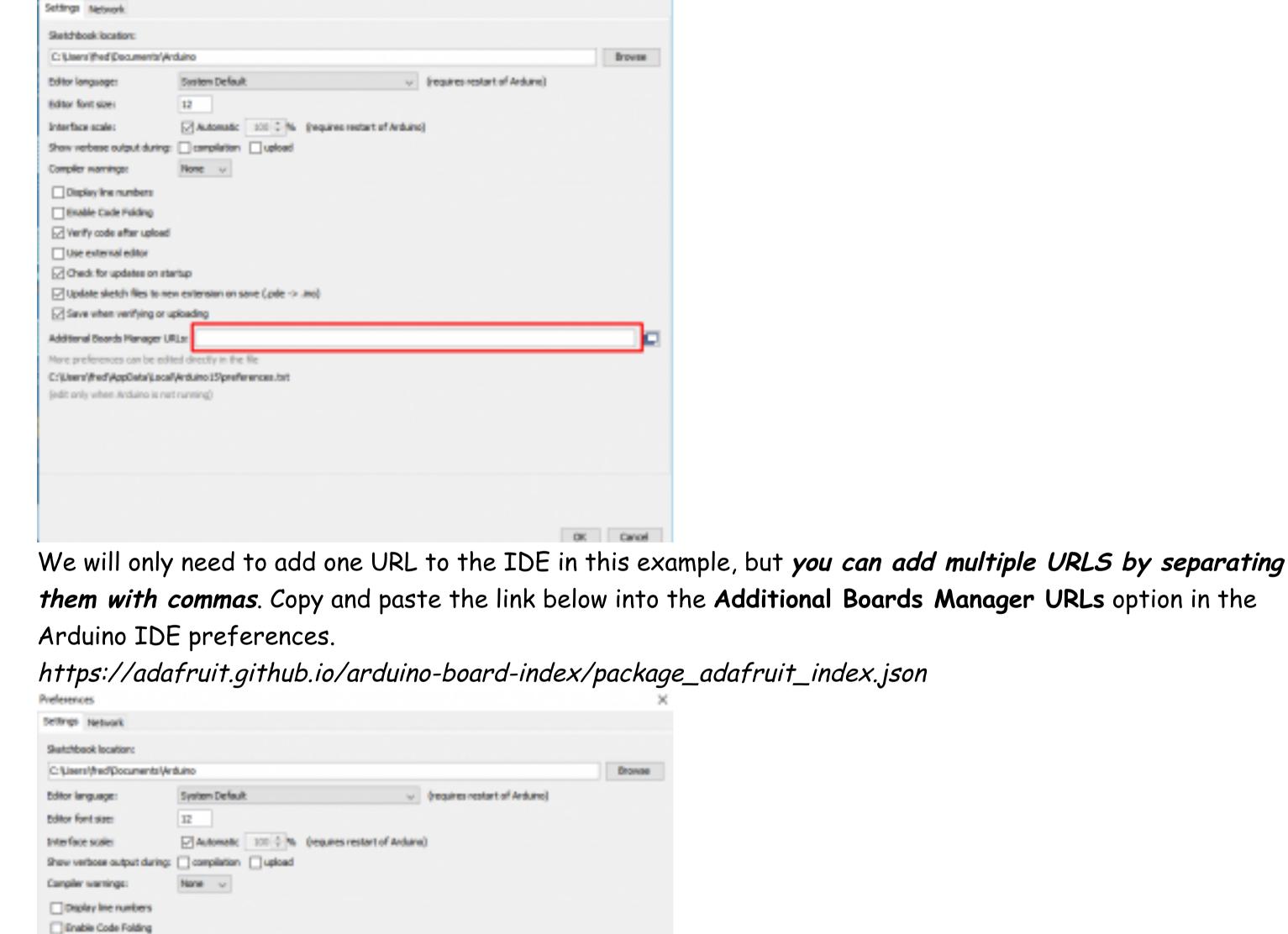
File Edit Sketch Toels Help

Auto Format

Archive Sketch

ix Encoding & Reload

setBlue();



A dialog will pop up just like the one shown below.

DigiBlink | Arduino 1.8.1 File Edit Sketch Tools Help Auto Format Ctrl+T Ochive Sketch Digi@link Fix Excoding & Reload "B", "K" #define USB\_C Ctrl+Shift+M

Since the Feather 32u4 uses an ATmega32u4 chip running at 8 MHz, you can pretty easily get it working with

the Arduino IDE. Many libraries (including the popular ones like NeoPixels and display) work great with the

Now that you have added the appropriate URLs to the Arduino IDE preferences, you can open the Boards

OK Cancel

You will then be able to select and install the boards supplied by the URLs added to the preferences. In the

Once the Board Manager opens, click on the category drop down menu on the top left hand side of the window

example below, we are installing support for Adafruit AVR Boards, but the same applies to all boards installed with the Board Manager. Boards Manager Type Contributed Adelruit AVR Boards by Adelruit Boards included in this package: Adafruit Plara, Adafruit Samma SM4s, Adafruit Buefruit More, Adafruit Feather 32u4, Adafruit Metro, Adafruit Metro Mini, Adafruit Bayditay 32u4, Adafruit Pro Trinkat SV/16889c (USS), Adafruit Pro Trinkat SV/12889c (USS), Adafruit Pro Trinkat SV/16891c (PTDI). Adafruit Pro Trinket 31/12M42 (FTDI), Adafruit Trinket 8MKs, Adafruit Trinket 16M4s. History Info. 1.4.13 ~ Install Next, close and reopen the Arduino IDE to ensure that all of the boards are properly installed. You should now be able to select and upload to the new boards listed in the Tools->Board menu. DigiBlink | Arduino 1.8.1 File Edit Sketch Tools Help Ctrl+T Auto Format Archive Sketch DigiBlink Fix Encoding & Reload #define USB\_C "1", 'n", 'R" Serial Monitor Ctrl+Shift+M #define USB\_C Serial Plotter Ctrl+Shift+L #include <Dig byte in = Or WiFi101 Firmware Updater int Blue - Or int Red - Or Board: "Arduino/Genuino Uno" int Green -Arduino NG or older Part: "COM4"

in = DigiUSB.read(); Adafruit Trinket (ATtiny85 @ 16MHz) if (next -= 0) [ ARREST -- THEY'D Adafruit Metro

Plug in the Feather 32u4 and wait for it to be recognized by the OS (just takes a few seconds). It will create

a serial/COM port, you can now select it from the dropdown, it'll even be 'indicated' as Feather 32u4!

Arduine Rebot Centrol

Arduine Rebot Motor

Adafruit Circuit Playground

Arduino Gemma

Arduino Yún Mini

Arduino Uno Wifi

Adafruit Boards

Adafruit Flora

Lining One

Arduino Industrial 101

Adafruit Feather 32u4

Adalnuit Feather 328P

Adefruit Gemma (ATtiny85 @ 8MHz)

Adafruit Trinket (ATtiny85 @ 8MHz)

,'1','n','k' #define USB\_C Smal Monitor Ctrl+Shift+M #define USB C Ctrl+Shift+L Serial Plotter #include <Dig byte in = 0; Wiff 101 Firmware Updater int Blue = 0; int Red = 0; Board: "Adafruit Feather 32u4" int Green = 0 Serial ports Port Get Board Info COM17 (Adafruit Feather 32u4) int next - 0: Programmer: "AVR ISP" void setup() **Burn Bootloader** DigiUSB.b pinMode (0, OUTFUI); pinMode (1, OUTPUI); pinNode (2, OUTFUT); Code void setup() {

Ctrl+T

Now you can upload your first blink sketch!

# pinMode(13, OUTPUT); void loop() { digitalWrite(13, HIGH);

Pin 9 works as GPIO but it will stay at HIGH state after stopping.

## 3. Note on Pinout Pin 5 doesn't work as GPIO

digitalWrite(13, LOW);

delay(1000);

delay(1000);