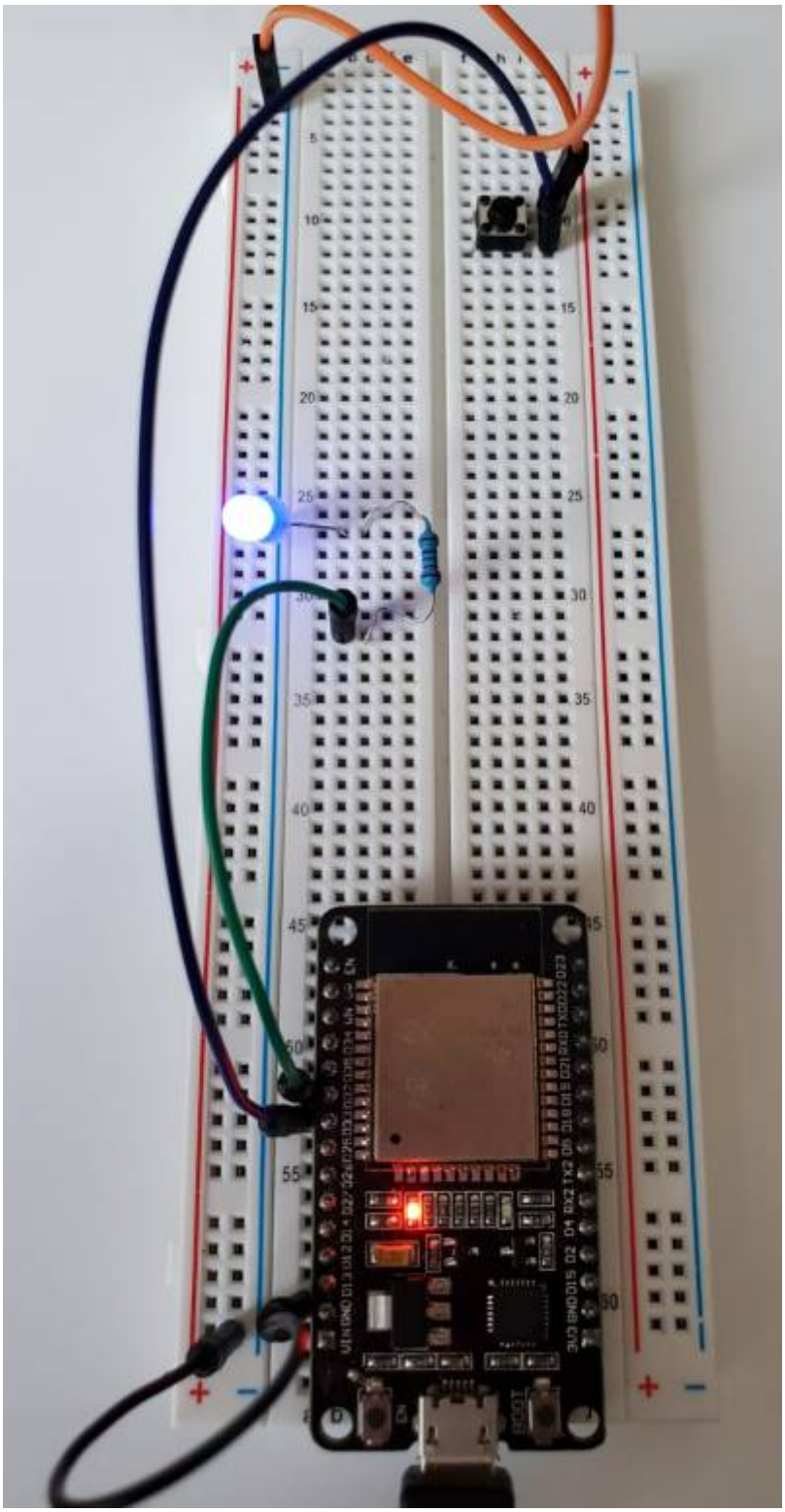
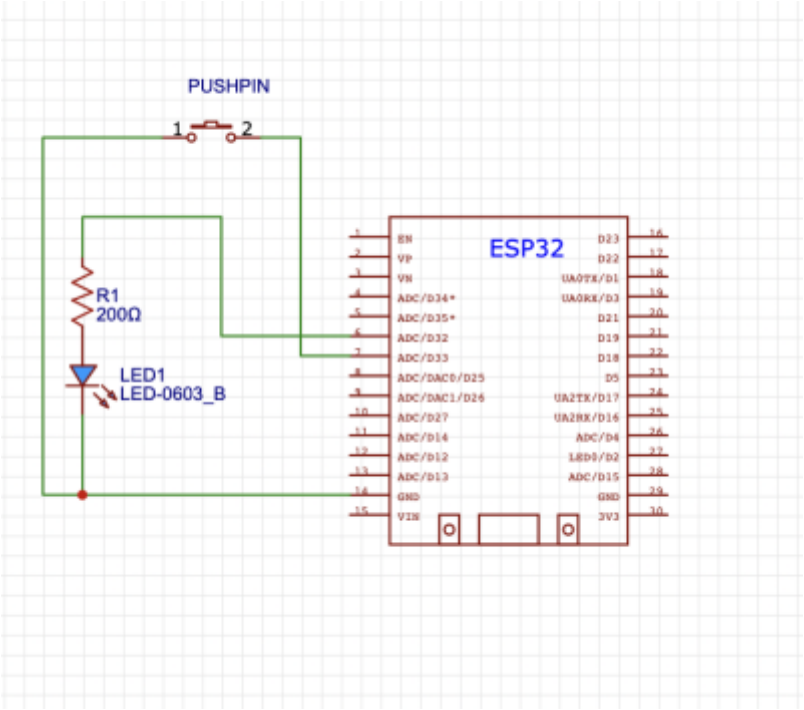
Build



Schematics



Code & Description

```
*//There are 2 ways to wake up a system, those are called Interrupts.
*//hardware Interrupts are based on external events where signals are sent
to the GPIO.
*//Software Interrupts occur when we program the device, like through a wake
up alarm or timer.

#define uS_TO_S_FACTOR 1000000          *//Equation to convert milliseconds
to Minutes
#define TIME_TO_SLEEP  10               *//Determined amount of minutes at
sleep

RTC_DATA_ATTR int bootCount = 0;

*//Data has to be stored in the Real time Clock (RTC) fast memory because
the CPU memory is wiped on every boot.
*// The amount of data has to be minimal due to size limitations : 8bit fast
memory and 8bit Slow memory.

*//Power outages and resetting the board will erase the RTC memory,
therefore its use should be limited to non essential information.
*//Therefore we decided to just Keeping data of times awaken in internal
RTC, this will help us see if any issues occur.



**********Wake Up Print
************************************************************
```

```
void print_wakeup_reason(){                          *//Set up to list reasons
for system wake-up
  esp_sleep_wakeup_cause_t wakeup_reason;

  wakeup_reason = esp_sleep_get_wakeup_cause();   *//System wakes up due to
3 reasons

  switch(wakeup_reason)
  {
    case ESP_SLEEP_WAKEUP_EXT0 : Serial.println("PUSHED BUTTON caused the
system to WAKEUP"); break;
    case ESP_SLEEP_WAKEUP_TIMER : Serial.println("TIMER caused the system to
WAKEUP"); break;
    default : Serial.printf("DeepSleep didn't wake up ESP32:
%d\n",wakeup_reason); break;   *//Initial Boot will yield this reason
  }
}

*//We made the system wake up due to the internal timer and a pushed button,
*// the reason for the push button is that in the case we can take a
measurement at our will without having to wait for the timers.
*//An external clock could be added to the device, however Grafana already
designates time and date of transferred data.

void setup(){
  Serial.begin(115200);
  delay(1000);

  pinMode(32,OUTPUT);          *//Illuminates a LED when the system is awake.
For visual confirmation.

  pinMode(33,INPUT_PULLUP);

   *//ESP32 has pull-up resistors built on the pins, when we activate it
   *//it avoids the use of external resistors
   *//INPUT_PULLUP keeps the signal HIGH by default
   *//floating currents which can produce erroneous readings are avoided by
pull up/down resistors



  for(int i=0;i<5;i++)
{
  digitalWrite(32,HIGH);       *// These are the parameters for the LED
flashing
  delay(1000);
  digitalWrite(32,LOW);
  delay(1000);
  }
```

```
  ++bootCount;
  Serial.println("Reboot count number: " + String(bootCount));     *//We
want to know how many times the system has booted
                                                                   *//easy
way to know if there are issues internal or battery
                                                                   *//issues

  print_wakeup_reason();



  esp_sleep_enable_ext0_wakeup(GPIO_NUM_33,0);

*//During Sleep only Pins connected to the RTC are operational
*//A General Purpose Input/output pin are used to perform digital readings
and output functions.
*//By default those pins have no predefined purpose.
*//The pin used has to be named after their GPIO




  esp_sleep_enable_timer_wakeup(TIME_TO_SLEEP * uS_TO_S_FACTOR);
*//conversion factor to minutes

  Serial.println("ESP32 is going into DeepSleep for " +
String(TIME_TO_SLEEP) +    *//Script detailing the process
  " Seconds");


  Serial.println("Going to sleep now.....");
  delay(1000);
  Serial.flush();
*//To avoid mistakes in data transmission by
*//clearing buffer
  esp_deep_sleep_start();

}
```

Results

```
rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0030,len:1344
load:0x40078000,len:13516
load:0x40080400,len:3604
entry 0x400805f0
Reboot count number: 1
DeepSleep didn't wake up ESP32: 0
ESP32 is going into DeepSleep for 10 Seconds
Going to sleep now......
ets Jun  8 2016 00:22:57

rst:0x5 (DEEPSLEEP_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0030,len:1344
load:0x40078000,len:13516
load:0x40080400,len:3604
entry 0x400805f0
Reboot count number: 2
TIMER caused the system to WAKEUP
ESP32 is going into DeepSleep for 10 Seconds
Going to sleep now......
ets Jun  8 2016 00:22:57

rst:0x5 (DEEPSLEEP_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0030,len:1344
load:0x40078000,len:13516
load:0x40080400,len:3604
entry 0x400805f0
Reboot count number: 3
PUSHED BUTTON caused the system to WAKEUP
ESP32 is going into DeepSleep for 10 Seconds
Going to sleep now......
ets Jun  8 2016 00:22:57
```

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