



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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