

True purpose of an alarm clock

More often than not, when you set an alarm to ring in the morning, the intention is to get out of bed at the time of ringing. It seems my brain didn't get the memo and just has me go back to sleep at the very moment I hit the "shut up I'm trying to sleep" button. For this reason, I've decided to make it so my alarm would only stop ringing if I physically get out of bed and ring again if I get back in bed.

Hardware/Software

- 4 Load cells '[4x quarter bridge cells](#)' [@Amazon](#)
- Analog to digital convert '[HX711 ADC](#)' [@Amazon](#) (A cheap one is already included in the above link)
- Wifi RX/TX module '[ESP8266-01s](#)' [@Amazon](#)
 - ESP8266-01s Breakout adapter [@Amazon](#) (not mandatory but recommended)
 - A addapter board to program the ESP8266. The one I bought has been discontinued but something like this [@Amazon](#) should work nicely.
- DC Barel Jack '[DC-005-5A-2.5](#)' [@LCSC](#)
- Prototyping board [@Amazon](#) (not mandatory but it makes the wiring much cleaner)

Software pre-requisites

Home assistant, ESPHome, Node RED

Wiring board

(click to open in a new tab)

ESPHome node YAML configuration & uploading

```
esphome:
  name: bed_occupancy
  platform: ESP8266
  board: esp01_1m

wifi:
  ssid: "__REDACTED__"
  password: "__REDACTED__"

# Enable fallback hotspot (captive portal) in case wifi connection fails
ap:
  ssid: "Bed Occupancy Fallback Hotspot"
  password: "__REDACTED__"
# Example configuration entry
sensor:
  - platform: hx711
```

```
name: "HX711 Value"
dout_pin: TX
clk_pin: RX
gain: 128
update_interval: 1s
```

The `wifi` and `wifi.ap` are pretty standard. If you don't know how it works, checkout the well made [wifi getting started guide](#) over at ESPHome.com

The above configuration will set `RX` as the clock pin, `TX` as the data pin and poll for a new value once every second. You can change the `update_interval` to suit your need. If you are using a model of ESP that isn't the ESP8266-01s you MAY need to change the `TX` and `RX` values.

C# code

C# platform

My automations are written in c# using the [HomeAssistantNet](#) HASSIO plugin. If you have never used this plugin, checkout [the wiki](#). It is very well written. I chose to use C# because it is a language I am very familiar with, but all this should be possible to do using the normal script or the NodeRED plugin if you prefer.

The way this works:

```
graph TD; A-->B; A-->C; B-->D; C-->D;
```

Mounting in frame & installation under bed

Configuration of alarm clock & lights

Other oportunities & future developpements

Dynamic wakeup time

Replace the hard-coded wakeup time with a dynamic API call to a calendar/microsoft teams for example. This would allow the alarm to be triggered at different times depending on the next day's schedule =

Sleep cycles/quality analysis & sync wakeup

Using this system, it would be possible to analyse sleep patterns to determine the sleep stage & trigger the alarm at the best time for a seamless wakeup