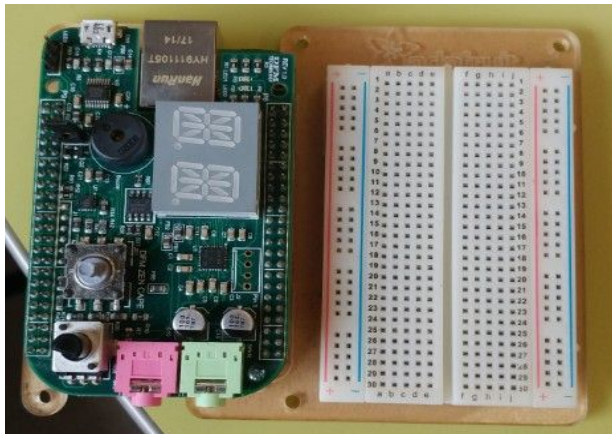


## How-To-Guide

### Wiring a fan and the relay to control by GPIO

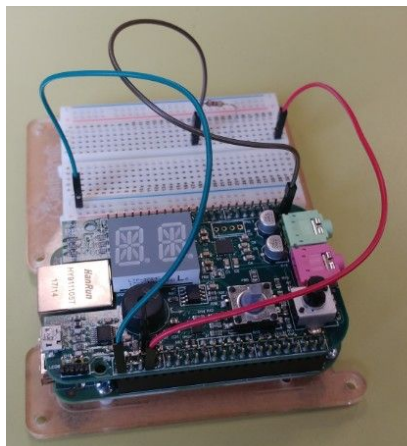
- For our group, controlling the fan's On/Off with GPIO is a challenging part. To do this:

1. Unplug power (micro-USB) from the BeagleBone



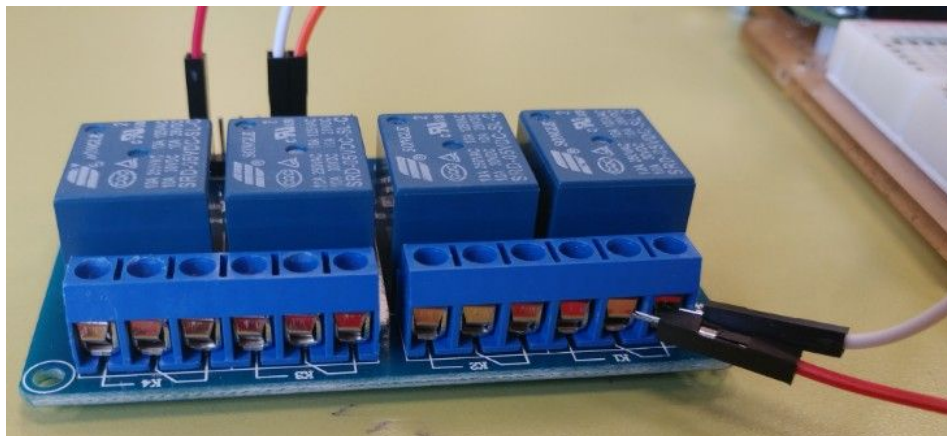
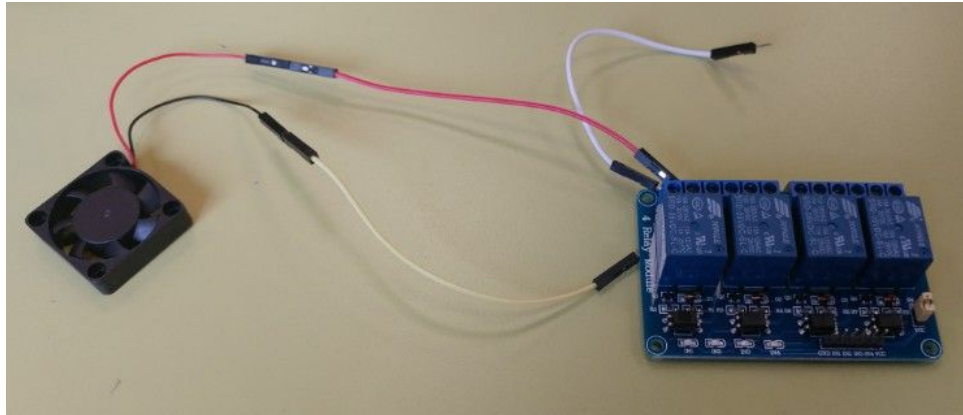
2. Wiring

- a. Beaglebone and breadboard



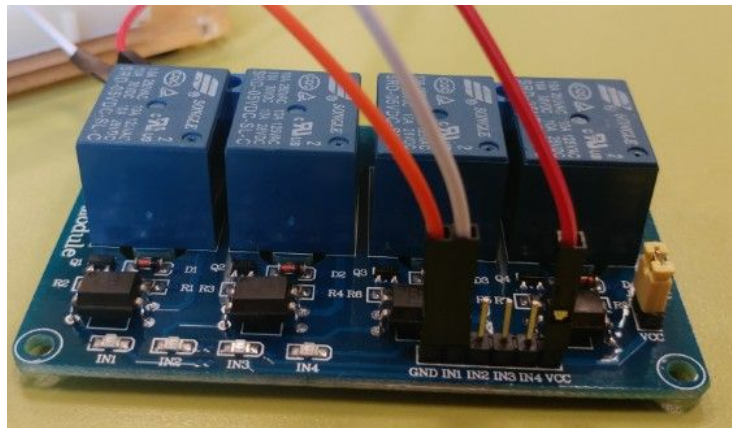
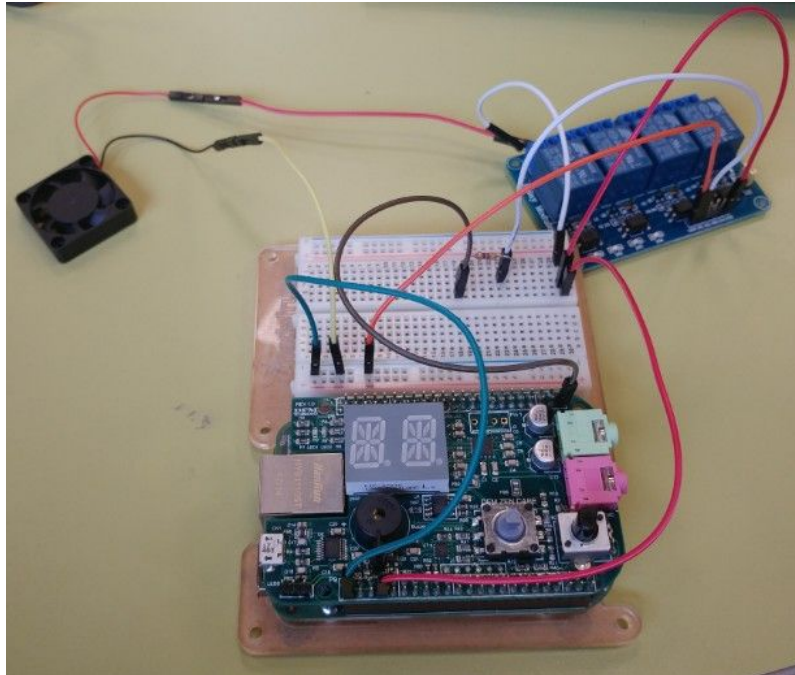
- i. Connect BBG's power pin P9\_7 that is SYS\_5V to f30 of your breadboard
- ii. Connect BBG's Ground pin P9\_1 that is DGND to - rail of the board
- iii. Connect BBG's GPIO 70 pin P9\_1 to f18 of the board
- iv. Insert 470 ohm resistor to g18 and g23 of the board (direction doesn't matter)

b. Relay and fan



- i. Connect fan's power cable (red) to relay's common terminal (terminal in the middle)
- ii. Connect a male to male cable to relay's normally open terminal (terminal in the left)
- iii. Connect a male to male cable to fan's Ground cable (black)

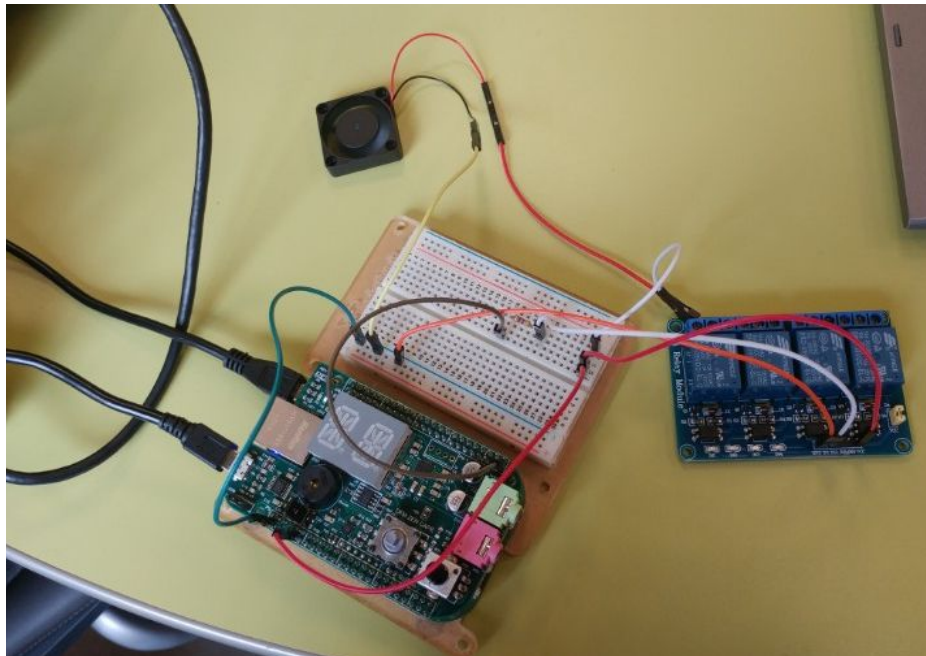
c. Connect remaining components



- i. Connect relay's VCC pin to board's g30 using male to female cable
- ii. Connect relay's IN1 pin to board's h23 using male to female cable
- iii. Connect relay's GND pin to - rail of the board (same rail used on a.ii)
- iv. Connect fan's ground pin to - rail of the board (same rail used on a.ii and c.iii)

### 3. Drive Fan via GPIO

- a. Boot your BeagleBone.



- b. Enable the pin for GPIO:  
# echo 70 > /sys/class/gpio/export
- c. Change to folder:  
# cd /sys/class/gpio/gpio70
- d. Set direction:  
# echo out > direction
- e. Turn on/off: It is active low, so turn on with:  
# echo 1 > value  
And turn off with:  
# echo 0 > value

```
ken@ken-VirtualBox: ~
root@xuann-beagle:~# echo 70 > /sys/class/gpio/export
root@xuann-beagle:~# cd /sys/class/gpio/gpio70
root@xuann-beagle:/sys/class/gpio/gpio70# echo out > direction
root@xuann-beagle:/sys/class/gpio/gpio70# echo 1 > value
root@xuann-beagle:/sys/class/gpio/gpio70# echo 0 > value
root@xuann-beagle:/sys/class/gpio/gpio70#
```

<Troubleshooting>

1. Double check your wiring circuit before power up.
2. See the below figure to make sure which GPIO pin to export for the fan.

## 65 possible digital I/Os

P9				P8			
Signal	1	2	Signal	Signal	1	2	Signal
DGND	1	2	DGND	GPIO_38	3	4	GPIO_39
VDD_3V3	3	4	VDD_3V3	GPIO_34	5	6	GPIO_35
VDD_5V	5	6	VDD_5V	GPIO_66	7	8	GPIO_67
SYS_5V	7	8	SYS_5V	GPIO_69	9	10	GPIO_68
PWR_BTN	9	10	SYS_RESETN	GPIO_45	11	12	GPIO_44
GPIO_30	11	12	GPIO_60	GPIO_23	13	14	GPIO_26
GPIO_31	13	14	GPIO_50	GPIO_47	15	16	GPIO_46
GPIO_48	15	16	GPIO_51	GPIO_27	17	18	GPIO_65
GPIO_5	17	18	GPIO_4	GPIO_22	19	20	GPIO_63
U3C2_B01	19	20	U3C2_B0A	GPIO_62	21	22	GPIO_37
GPIO_3	21	22	GPIO_2	GPIO_36	23	24	GPIO_33
GPIO_49	23	24	GPIO_15	GPIO_32	25	26	GPIO_61
GPIO_117	25	26	GPIO_14	GPIO_86	27	28	GPIO_88
GPIO_115	27	28	GPIO_113	GPIO_87	29	30	GPIO_89
GPIO_111	29	30	GPIO_112	GPIO_10	31	32	GPIO_11
GPIO_110	31	32	VDD_ADC	GPIO_9	33	34	GPIO_81
AIN4	33	34	GNDA_ADC	GPIO_8	35	36	GPIO_80
AIN6	35	36	AIN5	GPIO_78	37	38	GPIO_79
AIN2	37	38	AIN3	GPIO_76	39	40	GPIO_77
AIN0	39	40	AIN1	GPIO_74	41	42	GPIO_75
GPIO_20	41	42	GPIO_7	GPIO_72	43	44	GPIO_73
DGND	43	44	DGND	GPIO_70	45	46	GPIO_71
DGND	45	46	DGND				

3. If wiring more hardware, connect to same - rail of the board that is used.

<Reference>

Brian Fraser's "Wiring an LED Guide" is referred which can be found in "<http://www.cs.sfu.ca/CourseCentral/433/bfraser/other/WiringAnLEDGuide.pdf>"