

Unit Testing code that touches the HW registers

This article guides you on how to unit-test code that reads or writes hardware registers of your SJ development board.

```
// Typical code
int get_ultrasonic_pulse_width(void) {
    // Send a pulse width
    LPC_GPI01->CLR = (1 << 2);
    delay_us(10);
    LPC_GPI01->SET = (1 << 2);

    const uint32_t previous = time_now();
    while (LPC_GPI01->PIN & (1 << 3)) {
        ;
    }

    return time_delta(previous);}

```

Before we solve the problem, let us write better code that is self expressive and does not require comments to understand its intent.

```
static void send_pulse_to_ultrasonic(void) {
    const uint32_t ultrasonic_pulse_pin = (1 << 2);
    LPC_GPI01->CLR = ultrasonic_pulse_pin;
    delay_us(10);
    LPC_GPI01->SET = ultrasonic_pulse_pin;
}

```

```

static void wait_for_ultrasonic_pulse_to_bounce_back() {
    while (LPC_GPI01->PIN & (1 << 3)) {
        ;
    }
}
// Notice the clarity of this function compared to the previous code snippet
int get_ultrasonic_pulse_width(void) {
    send_pulse_to_ultrasonic();

    const uint32_t previous = time_now();
    wait_for_ultrasonic_pulse_to_bounce_back();
    return time_delta(previous);}

```

And the next level:

```

// Separate header file to abstract the hardware, such that we can mock out this API
// file: ultrasonic_pins.h
void ultrasonic_pins__set_pulse(bool true_for_logic_high);
bool ultrasonic_pins__get_input_pin_value(void);

```

```

#include "ultrasonic_pins.h"
static void send_pulse_to_ultrasonic(void) {
    // This can now move to ultrasonic_pins.c
    // const uint32_t ultrasonic_pulse_pin = (1 << 2);
    ultrasonic_pins__set_pulse(true);
    delay_us(10);
    ultrasonic_pins__set_pulse(false);
}
static void wait_for_ultrasonic_pulse_to_bounce_back() {
    while (ultrasonic_pins__get_input_pin_value()) {
        ;
    }
}
int get_ultrasonic_pulse_width(void) {
    send_pulse_to_ultrasonic();
}

```

```
const uint32_t previous = time_now();  
wait_for_ultrasonic_pulse_to_bounce_back();  
return time_delta(previous);}
```

Revision #6

Created 6 years ago by [Preet Kang](#)

Updated 6 years ago by [Preet Kang](#)