LEDs Again

The Embedded Discovery Book

Chapter 8

LEDs again

In the last section, I gave you initialized (configured) peripherals (I initialized them in aux7::init). That's why just writing to BSRR was enough to control the LEDs. But, peripherals are not initialized right after the microcontroller boots.

LEDs again

In this section, you'll have more fun with registers. I won't do any initialization and you'll have to initialize configure GPIOE pins as digital outputs pins so that you'll be able to drive LEDs again.

GPIOE

gpioe.odr.write

LEDs again / Power

```
p/x *gpioe
odr: stm32f30x::gpioc::ODR {
    register: vcell::VolatileCell<u32> {
      value: core::cell::UnsafeCell<u32> {
        value: 0x0 }
      }
    }
```

Power

- **Turns out that, to save power, most peripherals start in a powered off state -- that's their state right after the microcontroller boots.**
- **The Reset and Clock Control (RCC) peripheral can be used to power on or off every other peripheral.**

Power

You can find the list of registers in the RCC register block in:

Section 9.4.14 - RCC register map - Page 166 - Reference Manual

The registers that control the power status of other peripherals are:

- **AHBENR**
- **APB1ENR**
- **APB2ENR**

Power

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Each bit in these registers controls the power status of a single peripheral, including GPIOE.

Configuration

After turning on the GPIOE peripheral. The peripheral still needs to be configured. In this case, we want the pins to be configured as digital outputs so they can drive the LEDs; by default, most pins are configured as digital inputs.

Configuration

You can find the list of registers in the GPIOE register block in:

Section 11.4.12 - GPIO registers - Page 243 - Reference Manual

The register we'll have to deal with is: MODER.

Configuration

```
    gpioe.moder.modify(|_, w| {
        w.moder8().output();
        w.moder9().output();
        w.moder10().output();
        w.moder11().output();
        w.moder12().output();
        w.moder13().output();
        w.moder14().output();
        w.moder15().output()
    });
```