Watchdog Functions

Note: When executing an operation (e.g. writing Control or Clear register) that requires synchronization, the Synchronization Busy bit in the Status register (STATUS.SYNCBUSY) will be set immediately, and cleared when synchronization is complete. Use this line to wait for synchronization

```
while(GCLK->STATUS.bit.SYNCBUSY);
```

- Enable
  - Enable the WDT in the microcontroller WDT->CTRL.bit.ENABLE = 1;
- Disable
  - Disable the WDT to set up configuration to prevent run-time changes to the registers WDT->CTRL.reg = 0; // Disable watchdog for config
- Clear
  - Clearing the WDT, which also means kicking the WDT, prevents the WDT from resetting and keep your program running WDT->CLEAR.reg = WDT_CLEAR_CLEAR_KEY;

The procedure for setting up the WDT

1. Find out the registers needed (By reading datasheet)
2. Map the register address to code (Done by Arduino Core)
3. Configure the related registers (Code) See Section 17.6 of the SAMD21 datasheet for details.

- Configuration of the clock source
  - You need first to select the clock source and configure source clock frequency
  - For details see Section 14.8.3 of the SAMD21 datasheet

```
// Generic clock generator 2, divisor = 32 (2^(DIV+1))

GCLK->GENDIV.reg = GCLK_GENDIV_ID(2) | GCLK_GENDIV_DIV(5);
// Enable clock generator 2 using low-power 32KHz oscillator.
// With /64 divisor above, this yields 512Hz(ish) clock.
GCLK->GENCTRL.reg = GCLK_GENCTRL_ID(2) |
                    GCLK_GENCTRL_GENEN |
                    GCLK_GENCTRL_SRC_OSCULP32K |
                    GCLK_GENCTRL_DIVSEL;
while(GCLK->STATUS.bit.SYNCBUSY); // Think about why this is used
// WDT clock = clock gen 2
GCLK->CLKCTRL.reg = GCLK_CLKCTRL_ID_WDT |
                    GCLK_CLKCTRL_CLKEN |
                    GCLK_CLKCTRL_GEN_GCLK2;
```

- Disable the WDT before configuring it
- Then you need to initiate the period of your watchdog and other configurations

```
    WDT->CONFIG.bit.PER    = period;   // Set period for chip reset from the
datasheet
    WDT->INTENCLR.bit.EW   = 1;      // Disable early warning interrupt
    WDT->CTRL.bit.WEN      = 0;      // Disable window mode
```

- Enable the WDT
    - You can clear it but don’t disable it

References

1. SparkFun SAMD21 Pro RF Hookup Guide: https://learn.sparkfun.com/tutorials/sparkfun-samd21-pro-rf-hookup-guide?_ga=2.127628877.1139230921.1561643965-144910588.1557512622#setting-up-arduino
2. SparkFun Pro RF Documentation: https://www.sparkfun.com/products/14916