Watchdog Timer Overview

TI Precision Labs – Microcontrollers

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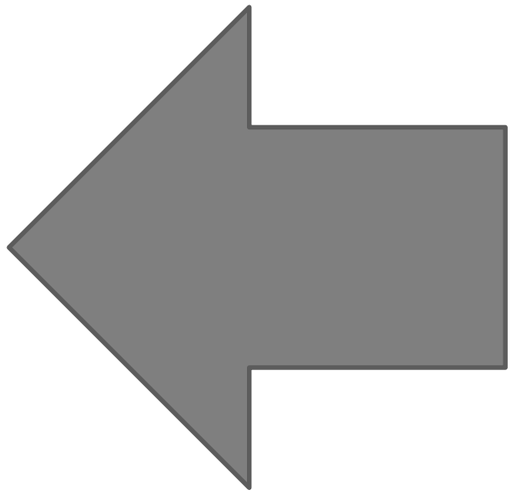
Watchdog timer (WDT) introduction

- WDT “watches” the program
  - Monitors MCU programs to see if they are out of control or have stopped operating properly
  - Controls system restart after software problem occurs
- Typical MCU WDT Features
  - *Interrupts*
  - *Window*
  - *Security*
  - *Fail-safe activation*



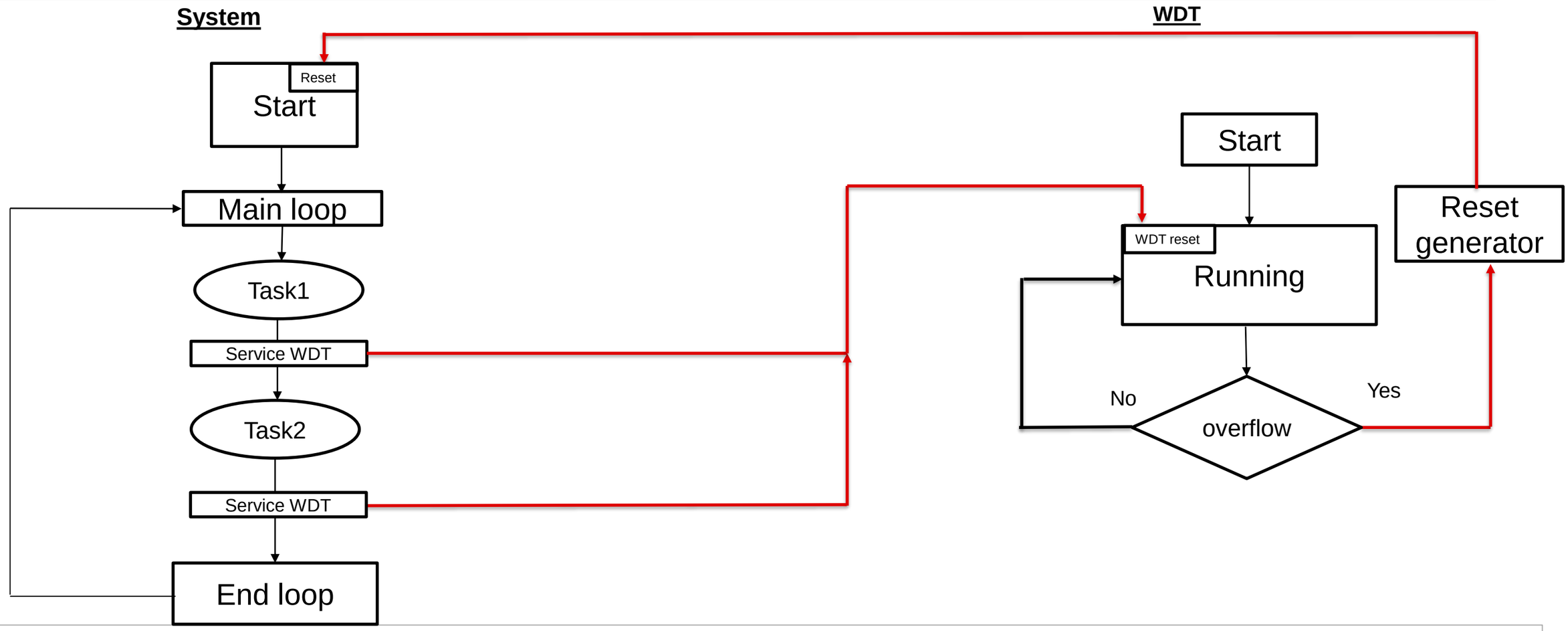
Or some combination of these

Why use WDT? flow chart

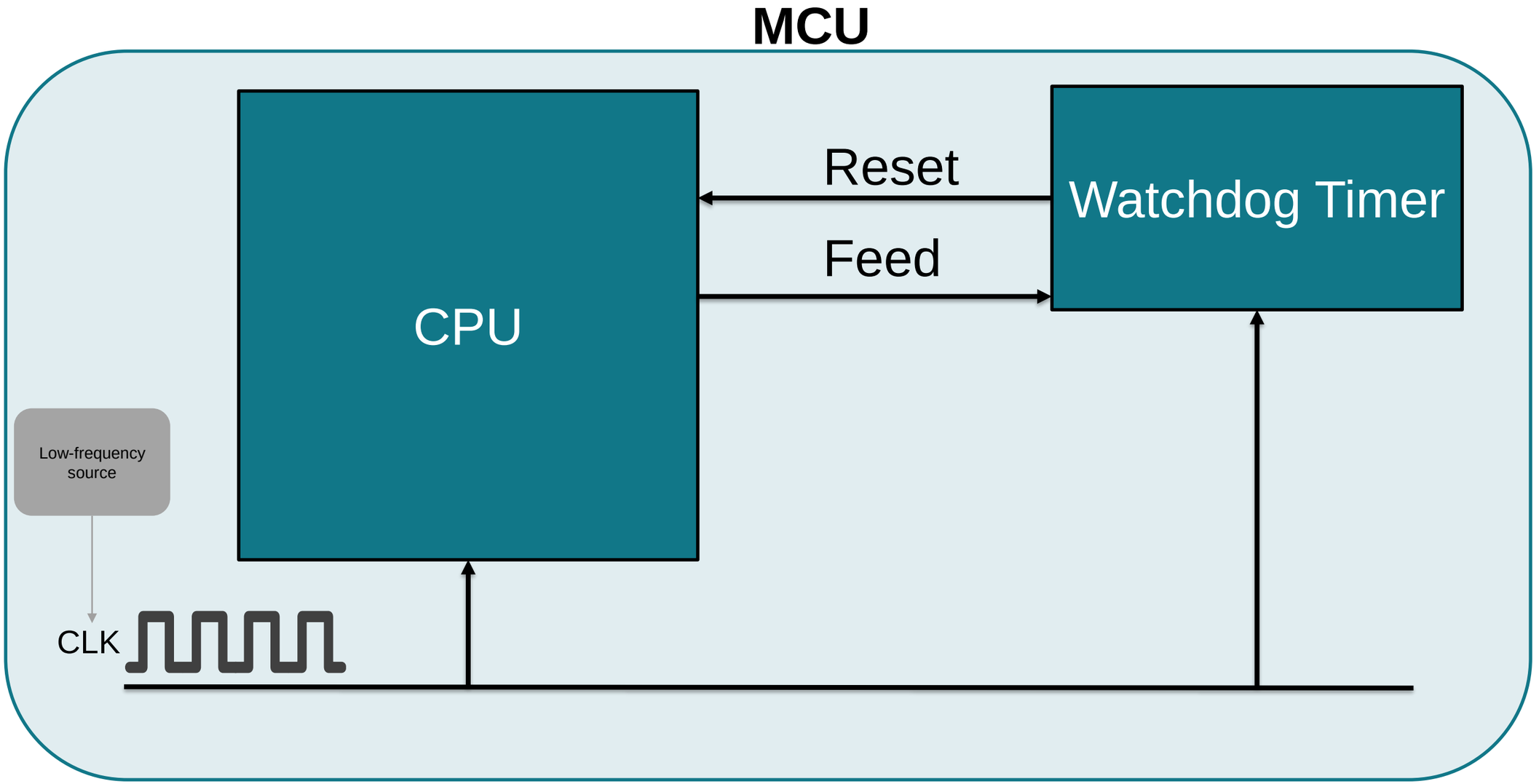
Monitor complex system

Maintain reliability

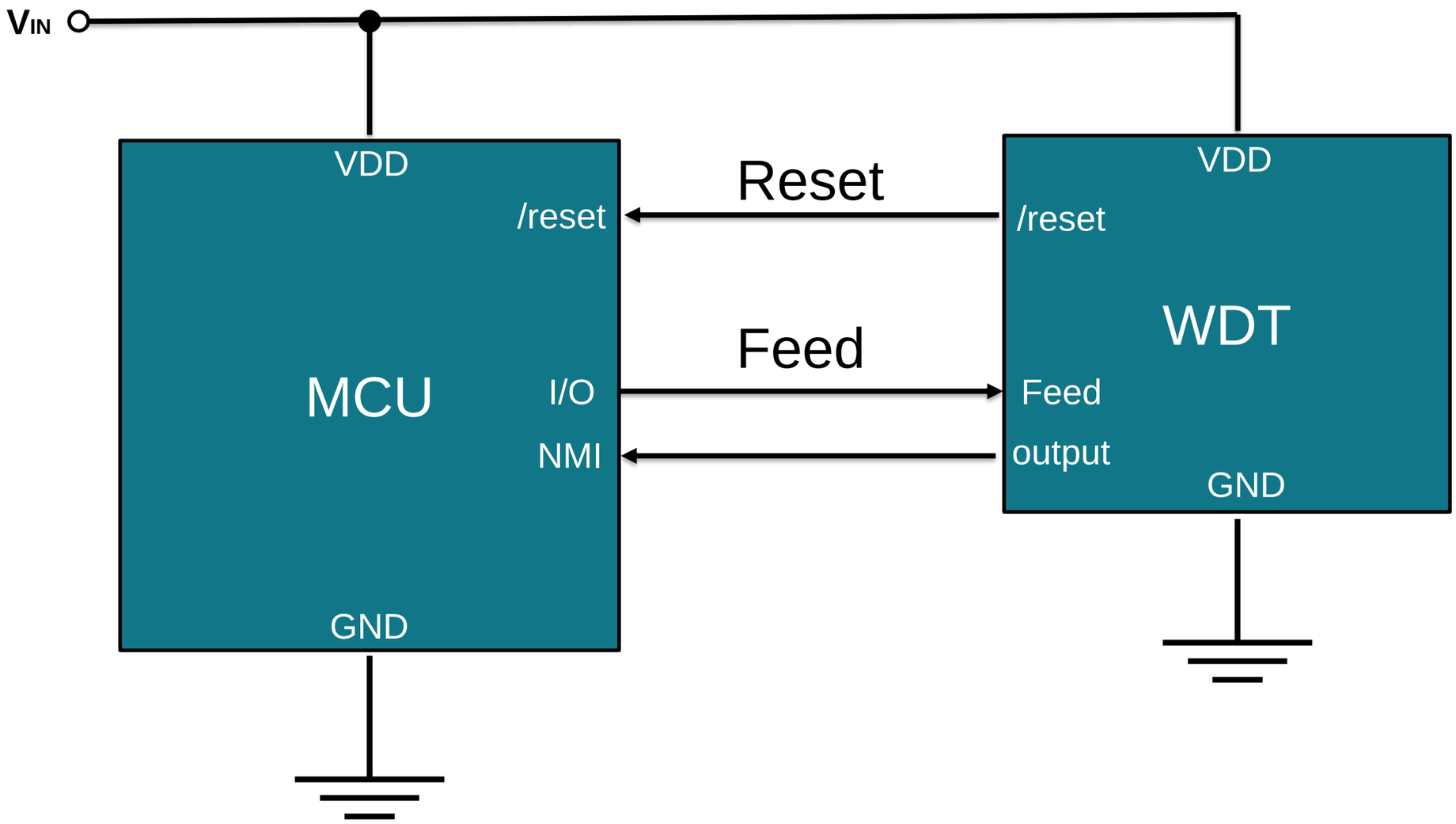
Functional safety standards



MCU integrated WDT block diagram



External WDT block diagram



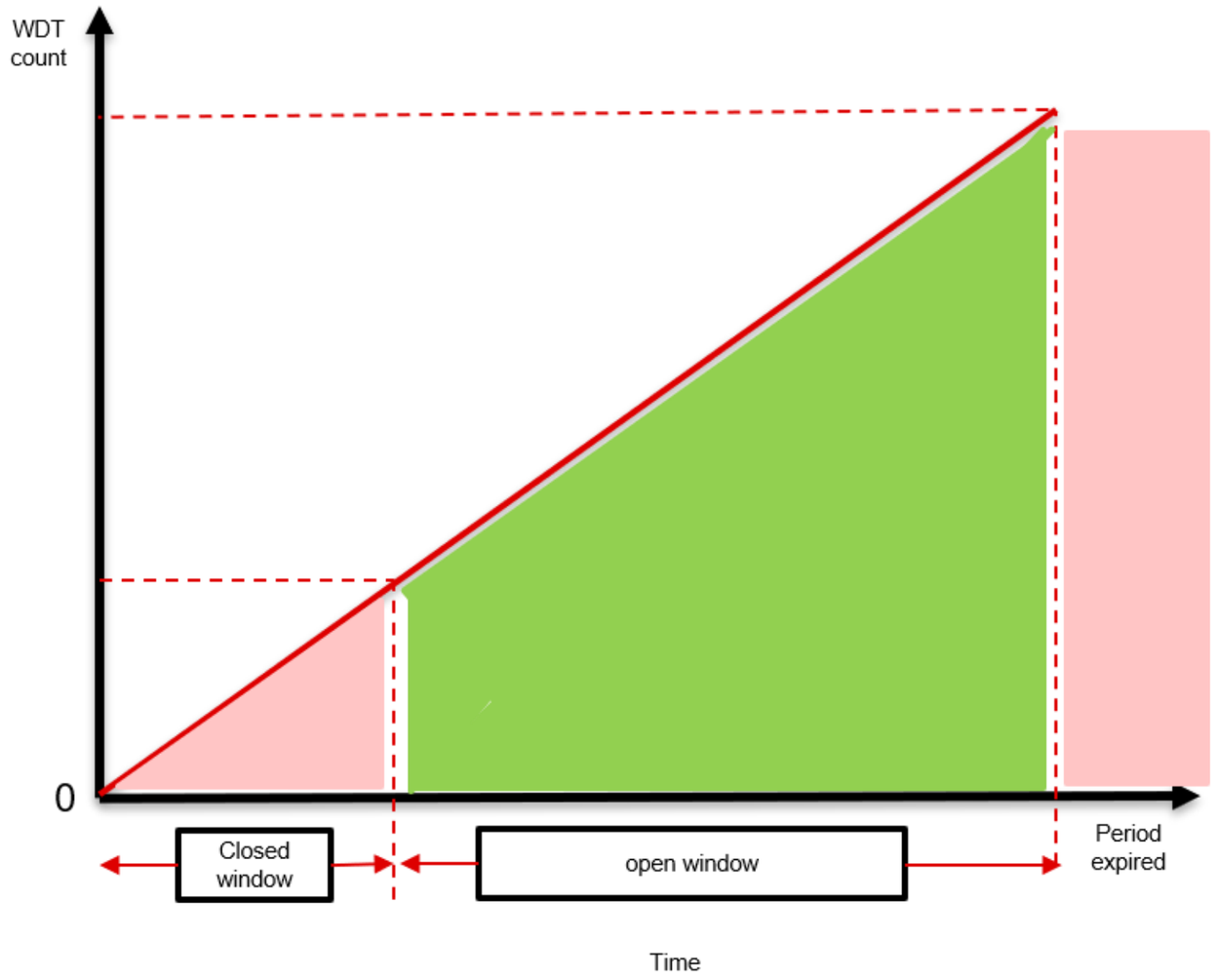
Features

Reset/Interrupt

- Generates system reset
- Enable interrupt to activate when counter reaches limit

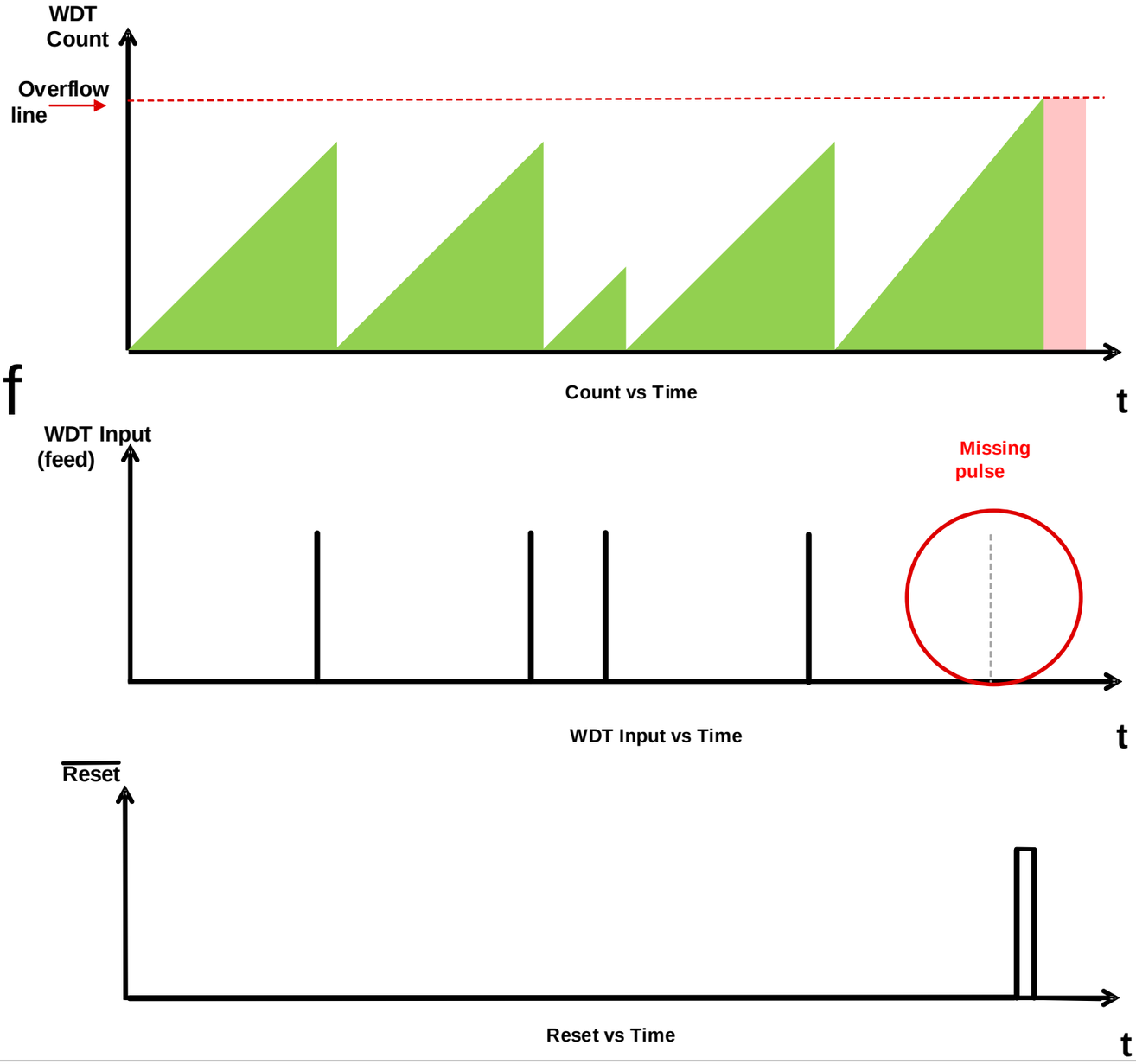
Window

- Alternative to standard time-out mode
- Set interval to check for
  - Missed pulse
  - Double pulse



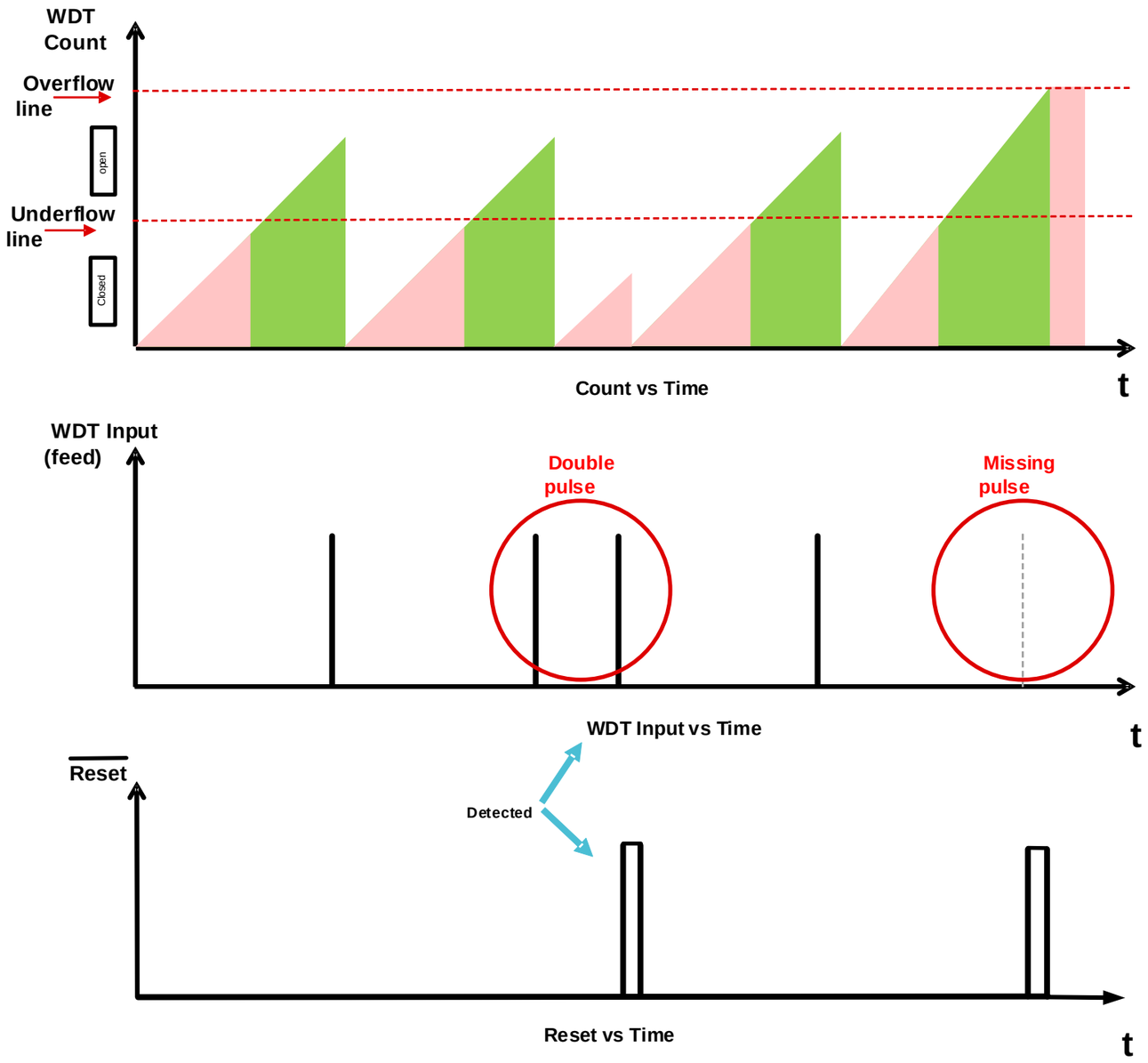
Standard WDT

- Single pulse operation
- Counts to a pre-defined limit
- May miss MCU early fault if the MCU inputs multiple signals in the set time limit



Windowed WDT

- Monitors configured min pulse and max pulse window
- Detects missed and multiple input signals from MCU within set interval
- Detects additional fault scenarios



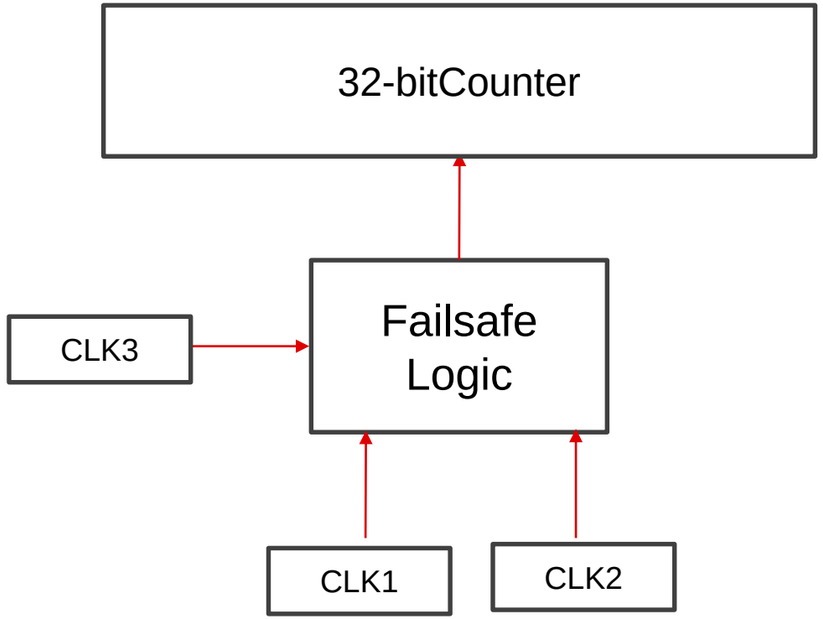
Features

Fail-safe Activation

- If malfunction occurs and WDT clock source fails, another is automatically selected

Security

- Control registers to prevent unintentional modification



Summary

- WDT overview
- Why use a WDT and flowchart
- Internal and external block diagrams
- Standard vs window
- Failsafe activation and security

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