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IWDG (Independent Watchdog)

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Introduction

- The Independent Watchdog (IWDG) is a hardware peripheral in STM32 microcontrollers, including the STM32F4 series, designed to ensure the system's integrity by generating a system reset in case of a software failure or malfunction.
- The IWDG acts as a safety net, providing a mechanism to reset the microcontroller if the software fails to reload the watchdog counter within a specified timeframe.

Applications

- **Embedded Systems**
  - In scenarios where the microcontroller is deployed in environments with varying conditions or subjected to external disturbances, the IWDG helps maintain the system's stability.
- **Critical Systems**
  - Applications where system failure is unacceptable, such as in medical devices, automotive safety systems, or industrial control systems.
- **Remote Systems**
  - In systems where the microcontroller is in a remote or inaccessible location, the IWDG can ensure that the system resets itself in case of software lockup.
- **Battery-Powered Devices**
  - In battery-powered devices, the IWDG can help prevent the microcontroller from getting stuck in an unrecoverable state, preserving battery life.

Registers

- **IWDG_KR (Key Register)**
  - Used to enable write access to the IWDG_PR (Prescaler), IWDG_RLR (Reload Register), and IWDG_WINR (Window Register).
- **IWDG_PR (Prescaler Register)**
  - Configures the prescaler value to divide the input clock to the IWDG.
- **IWDG_RLR (Reload Register)**
  - Specifies the value to be loaded into the IWDG counter.
- **IWDG_SR (Status Register)**
  - Indicates the status of the IWDG, including whether a reset is pending.
- **IWDG_WINR (Window Register)**
  - Configures the window value for windowed watchdog mode.