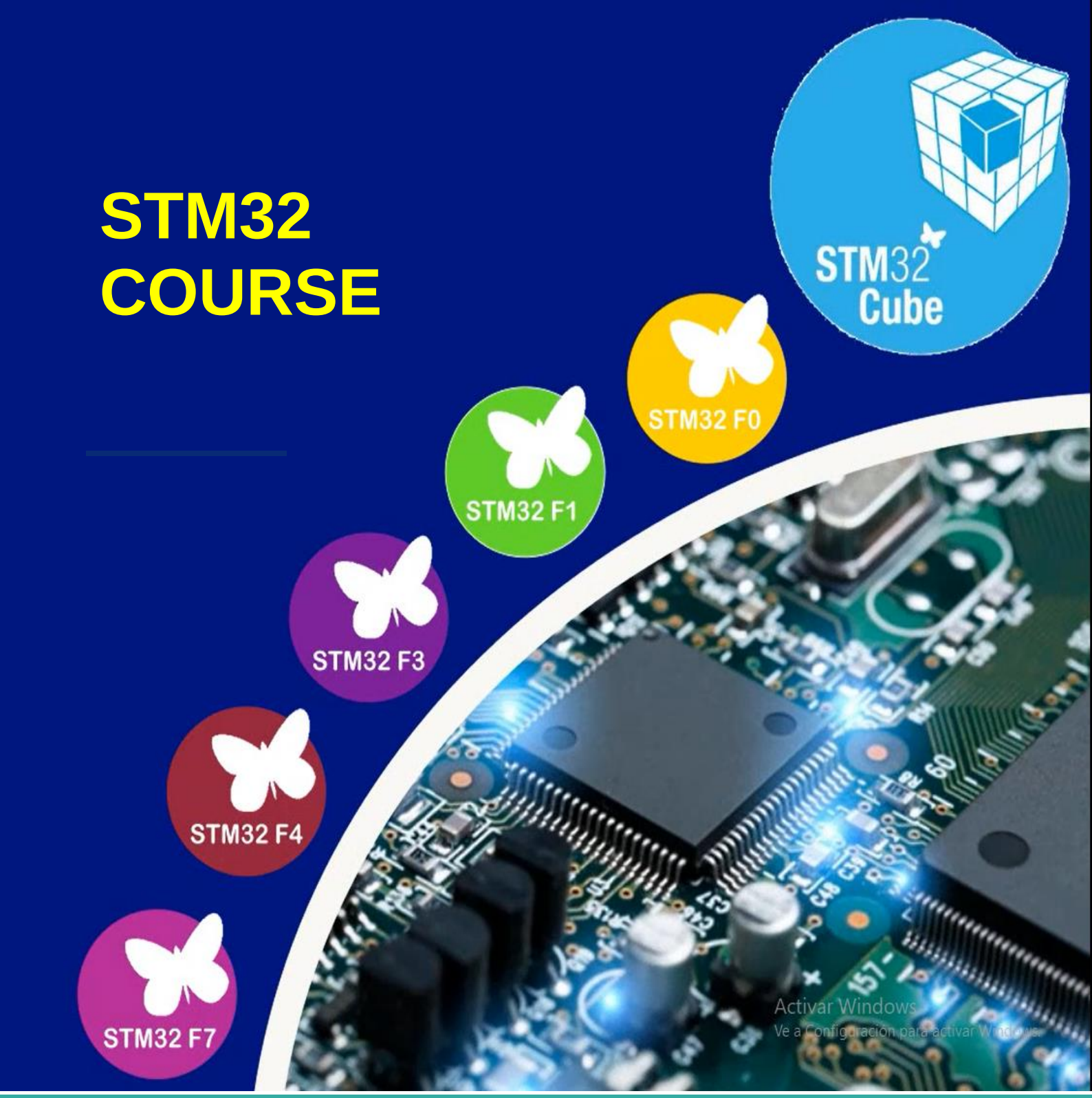
STM32 COURSE



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005 IWDG Independent WatchDog

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SECTION 5

005 IWDG Independent WatchDog

What will we learn?

In this video we will learn about the use of the IWDG peripheral (Independent WatchDog) which is a programmable time timer which has the ability to restart our microcontroller completely, this is very useful to be able to regain control if for some reason the CPU fails recover the correct execution of the code of our application (It is lost in an unwanted loop), we will calculate the time required to satisfy our needs.

> ***"We will use HAL Drivers, which will help us greatly to port and recycle code routines from one processor in one Family to another in another Family."***

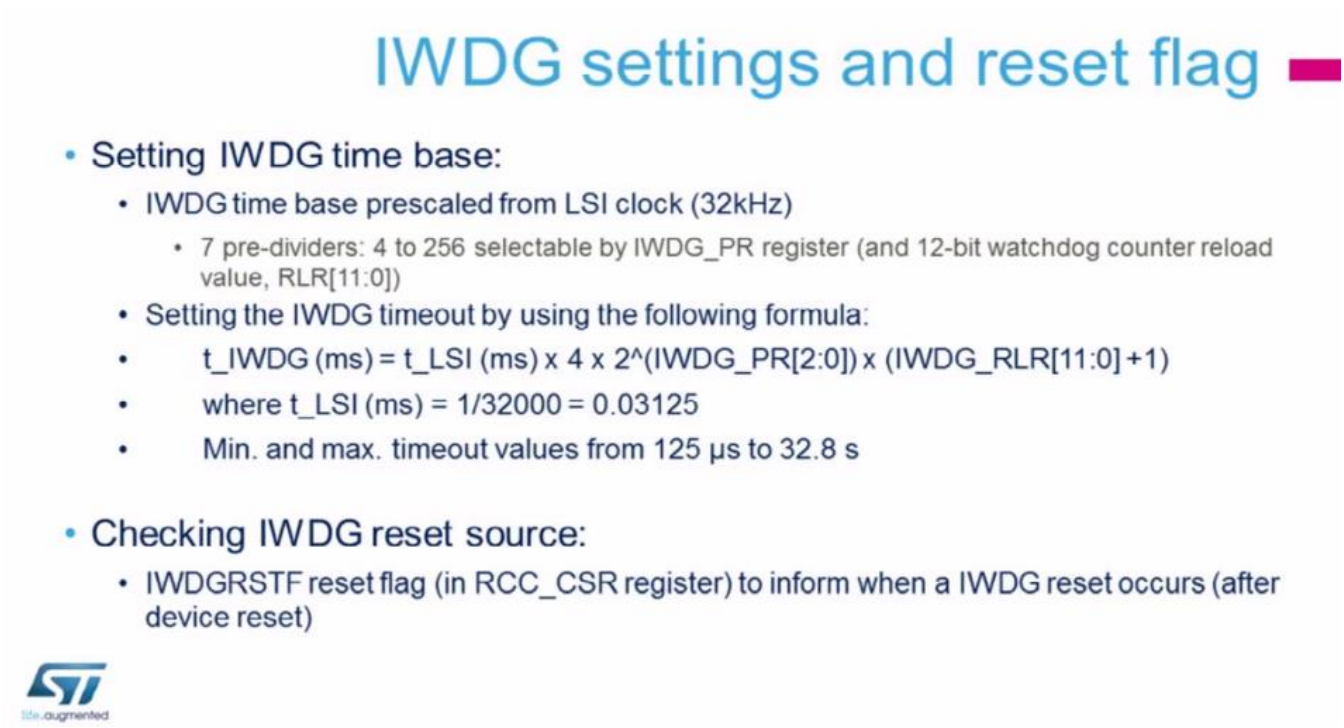
Key points

COMO FUNCIONA

The IWDG is a down counter that can take from 125 microseconds to 32.8 seconds, which once configured its register begins its countdown, once the counter reaches 0, the microcontroller automatically restarts.

This serves to prevent the CPU from getting stuck in an erroneous loop, thus having to always inform or report to the IWDG that everything is fine in the code by resetting its counter to the configured value, the value to take will depend on the time a complete cycle was executed of our program.

CALCULATING THE COUNTER TIME



In the equation:

TimeOut(mS) = (Factor1) * (Factor2) * (Factor3)

where:

Factor1: t_LSI(mS)

As our LSI is 32KHz converting to milliseconds we have:

t_LSI = 1/32000 = 32.25 us = 0.03125 ms

Factor2: 4 x 2 ^ (IWDG_PR[2:0])

The maximum value for this register is 256

Where IWDG_PR we only occupy 3 bits, max 0b111

Which indicate the Prescaler to use: 4, 8, 16, 32, 64, 128 y 256

IWDG_PRESCALER_4

IWDG_PRESCALER_8

IWDG_PRESCALER_16

IWDG_PRESCALER_32

IWDG_PRESCALER_64

IWDG_PRESCALER_128

IWDG_PRESCALER_256

Factor3: (IWDG_RLR[11:0] + 1)

Where IWDG_RLR 12 bits (can have value from 0 to 65535)

EXAMPLE

For a time of 1 second.

1000 ms = (0.03125 ms) * (4 x 2 ^ (PR)) * (RL + 1)

We assume the PR (Prescaler) value of 256

Solving for and solving RL we have:

Rl = 124