Customer training workshop: MCWDT_Interrupt for KIT_T2G-B-H_EVK

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Scope of work

› This example shows how to configure MCWDT Subcounter0/1 and Subcounter2 operation with interrupt.

› Device
  – The TRAVEO™ T2G CYT4BFBCCH device is used in this code example.

› Board
  – The TRAVEO™ T2G KIT_T2G-B-H_EVK board is used for testing.
Introduction

› **Watchdog Timer has the following features:**
  - Up to four MCWDTs, each supporting:
    - LFCLK (ILO0, ILO1, WCO, LPECO, or ECO) as the input clock source
    - Fault and device reset generation if not serviced within a configurable interval
    - Periodic interrupt/wakeup generation in Active, Sleep, and DeepSleep power modes
    - Three independent counters: two 16-bit counters and one 32-bit counter
    - Warning threshold generates an interrupt to request servicing
    - Window mode
    - Running and freezing timers during DeepSleep mode
    - Debug
Hardware setup

› This code example has been developed for the KIT-T2G-B-H-EVK board.
› Connect your PC to the board using the provided USB cable through the KitProg3 USB connector.
Implementation

This example shows how to configure MCWDT_0 Subcounter0/1 and Subcounter2 operations with interrupt.

Follow these steps to configure this code example:

› STDOUT setting
› Initialize the MCWDT_0
› Set up the interrupt handler
› Enable the MCWDT_0 counters

STDOUT setting

› The cy_retarget_io_init() function initializes the GPIO for UART once.
  - Initialize P13.1 as UART TX, P13.0 as UART RX (these pins are connected to KitProg3 COM port)
  - The serial port parameters becomes to 8N1 and 115200 baud
Implementation (contd.)

Initialize the MCWDT_0

› Call the `Cy_MCWDT_Init()` function to initialize the MCWDT_0.
  - The configuration of MCWDT is set in `MCWDT_0_config` that can be changed using device configurator
  - Subcounter0/1 is set to generate interrupt when the counter matches to warning threshold value (=32000)
  - Subcounter2 is set to generate interrupt when bit15 of the counter toggles

Set up the interrupt handler

› Call the `Cy_SysInt_Init()` function to set up `ISR_MCWDT_0()` as the ISR.
  - The ISR reads the status of the interrupt by calling the `Cy_MCWDT_GetInterruptStatusMasked()` function
  - Then it controls each user LED by calling `Cy_GPIO_Inv()` depends on cause of interrupt
    - If the cause is MCWDT Subcounter0, user LED1 (P16.1) is toggled.
    - If the cause is MCWDT Subcounter1, user LED2 (P16.2) is toggled.
    - If the cause is MCWDT Subcounter2, user LED3 (P16.3) is toggled.
  - Clear interrupt by calling the `Cy_MCWDT_ClearInterrupt()` function.
Enable the MCWDT_0 counters

› Unlocks the MCWDT_0 configuration registers by calling the `Cy_MCWDT_Unlock()` function.
› Set MCWDT_0 interrupt mask register by calling the `Cy_MCWDT_SetInterruptMask()` function.
› Enables MCWDT_0 counters by calling the `Cy_MCWDT_Enable()` function.
› Locks out configuration changes to MCWDT_0 registers by calling the `Cy_MCWDT_Lock()` function.
Compiling and programming

1. Connect the board to your PC using the provided USB cable through the KitProg3 USB connector.

2. Use Eclipse IDE for ModusToolbox™ software for compiling and programming.

3. Compile
   a) Select the target application project in Project Explorer.
   b) In the Quick Panel, scroll down and click “Build MCWDT_Interrupt Application” in MCWDT Interrupt(KIT-T2G-B-H-EVK).

4. Open a terminal program and select the KitProg3 COM port. Set the serial port parameters to 8N1 and 115200 baud.

5. Programming
   a) Select the target application project in the Project Explorer.
   b) In the Quick Panel, scroll down and click “MCWDT_Interrupt Program (KitProg3_MiniProg4)” under Launches.
Run and test

1. After programming, the application starts automatically. Confirm that user LED1, LED2, and LED3 are blinking.

1. The terminal application displays the following message:
References

Datasheet
› CYT4BF datasheet 32-bit Arm® Cortex®-M7 microcontroller TRAVEO™ T2G family

Architecture technical reference manual
› TRAVEO™ T2G automotive body controller high family architecture technical reference manual

Registers technical reference manual
› TRAVEO™ T2G automotive body controller high registers technical reference manual

PDL/HAL
› PDL
› HAL

Training
› TRAVEO™ T2G Training
## Revision History

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<th>ECN</th>
<th>Submission Date</th>
<th>Description of Change</th>
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<td>7782883</td>
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