

# Customer training workshop: MCWDT\_Interrupt for KIT\_T2G-B-H\_EVK

TRAVEO™ T2G CYT4BF series Microcontroller Training  
V1.0.0 2022-06



Please read the [Important notice and warnings](#) at the end of this document

## Scope of work

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- › This example shows how to configure MCWDT Subcounter0/1 and Subcounter2 operation with interrupt.
  
- › Device
  - The TRAVEO™ T2G CYT4BFBCH device is used in this code example.
  
- › Board
  - The TRAVEO™ T2G KIT\_T2G-B-H\_EVK board is used for testing.

# Introduction

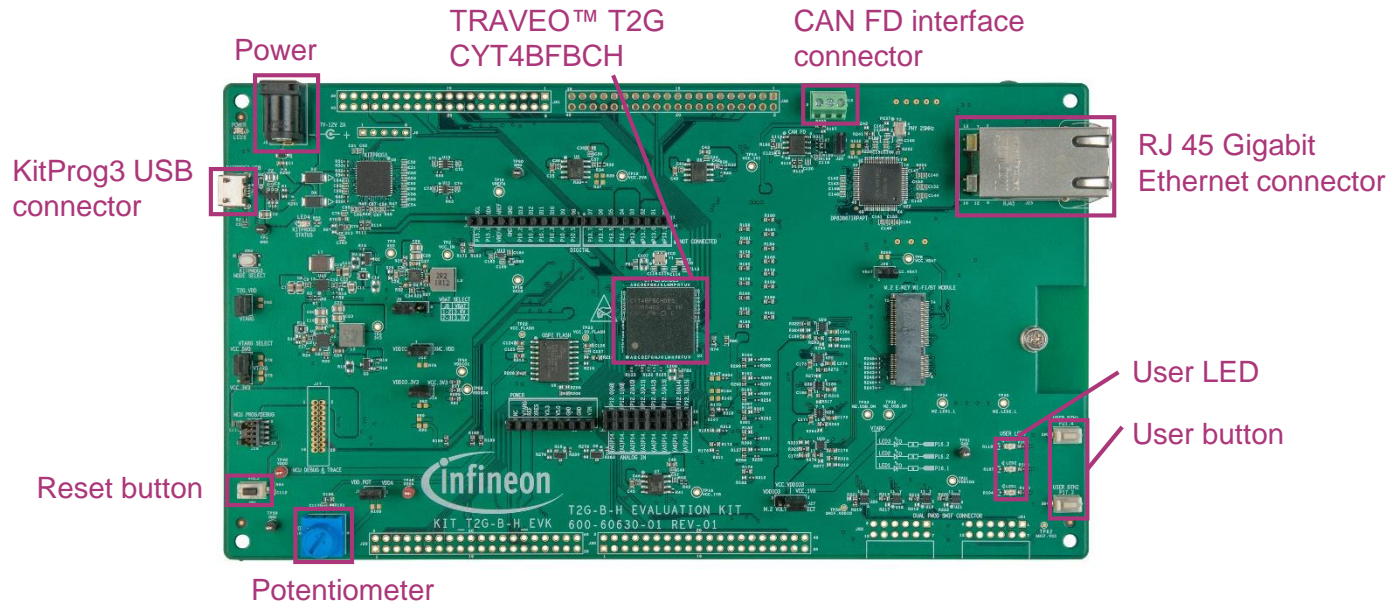
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## › **Watchdog Timer has the following features:**

- 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

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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.

## Implementation (contd.)

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### 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

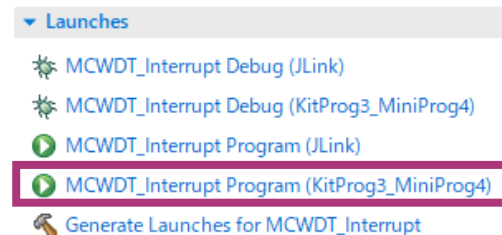
1. Connect the board to your PC using the provided USB cable through the KitProg3 USB connector.
2. Use Eclipse IDE for ModusToolbox™ software for compiling and programming
3. Compile
  - a) Select the target application project in Project Explorer.
  - b) In the Quick Panel, scroll down and click “Build 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

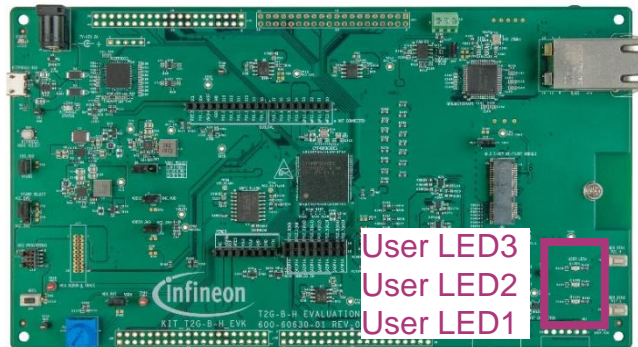
- a) Select the target application project in the Project Explorer
- b) In the Quick Panel, scroll down and click “MCWDT\_Interrupt Program (KitProg3\_MiniProg4)” under Launches





# 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:

```

COM4 - Tera Term VT
ファイル(F) 編集(E) 設定(S) 制御(C) ウィンドウ(W) ヘルプ(H)

***** VMC7000 MCU: Multi-Counter Watchdog Timer Example *****
*
MCWDT initialization is complete. USE LED blinking
  
```

# References

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## 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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Revision	ECN	Submission Date	Description of Change
**	7782883	2022/07/07	Initial release

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