Code_Flash_Sector_Data_Updating for KIT_T2G-B-H_LITE

Customer training workshop

Q3 2024

Scope of work

- This code example demonstrates the use of the Flash HAL driver to perform code flash read/write/erase basic operate and update sector data online. The running steps of erase/write/read operations to the code flash memory are logged on a UART terminal emulator

- **Device**
  - The TRAVEO™ T2G CYT4BF8CDS device is used in this code example

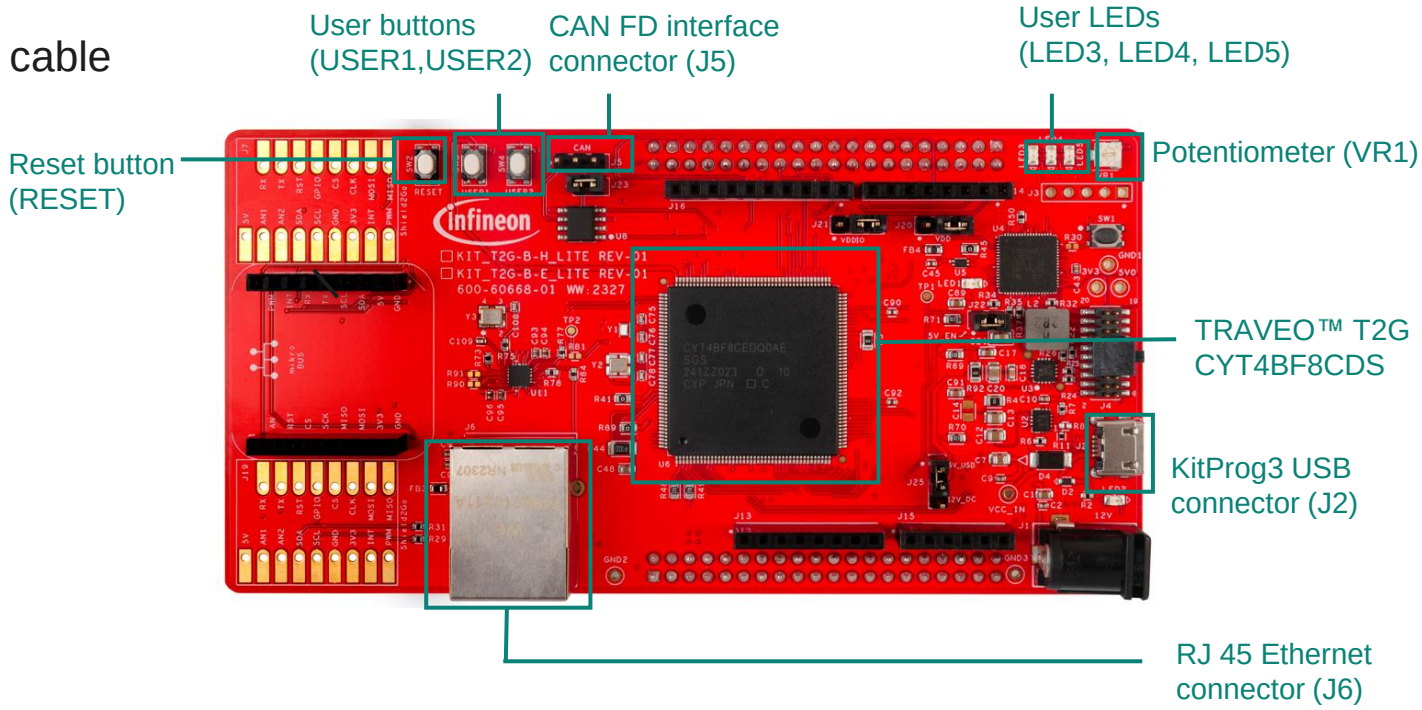
- **Board**
  - The TRAVEO™ T2G KIT_T2G-B-H_LITE board is used for testing

Introduction

- **Code Flash has the following features:**
  - Supports optional memory size: 4 MB, 6 MB, and 8 MB
  - Programming and erasing functions
  - ECC function: 64b + 8b
  - Erase sector size of 32 KB for large sector and 8 KB for small sector
  - Program size: 64b, 256b, and 4096b
  - Supports Single Bank and Dual Bank modes
  - Supports reading while programming/erasing
  - Endurance of 1k
  - Retention of 20 years

Hardware setup

– This code example has been developed for the KIT_T2G-B-H_LITE board
– Connect the PC to the board using the provided USB cable through the KitProg3 USB connector (J2)



Implementation

- The flash memory provides nonvolatile storage for user firmware, user configuration data, and the bulk data storage.
- This driver allows data to be read from and written to flash. It also provides the ability to obtain information about the address and characteristics of the flash block(s) contained on the device.
- During flash write time, the device should not be reset (including XRES pin, software reset, and watchdog), or unexpected changes may be made to portions of the flash. Also, the low-voltage detect circuits should be configured to generate an interrupt instead of a reset.
- In this example, the flash HAL driver is configured to read sector data from the target sector and programming these data to other empty sectors. Then, erase the target sector, readback source data from the empty sector, and process data (modify some data value), and program the processed data to the target sector.

- **Follow these steps to configure this code example:**
  - STDOUT setting
  - Disabling data cache of the CPU
  - Initialize code flash
  - Access to the code flash

- **STDOUT setting**
  - Call the ***cy_retarget_io_init()*** function to use UART as STDOUT
    - Initialize P0.1 as UART TX, P0.0 as UART RX (these pins are connected to the KitProg3 COM port)
    - The serial port parameters change to 8N1 and 115200 baud

Implementation (contd.)

- **Disabling data cache of the CPU**
  - To ensure this code example's behavior is as intended, the data cache of the CPU is disabled by calling the ***SCB_DisableCache()*** function

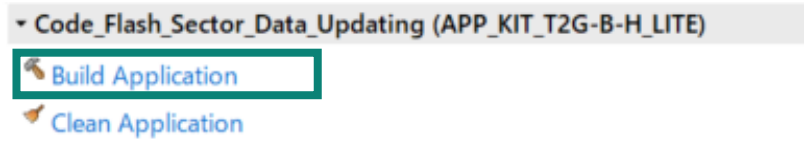
- **Initialize code flash**
  - First, the ***cyhal_flash_init()*** function initializes the code flash
  - Then, the ***Cy_Flashc_MainWriteEnable()*** function enables write operation of code flash

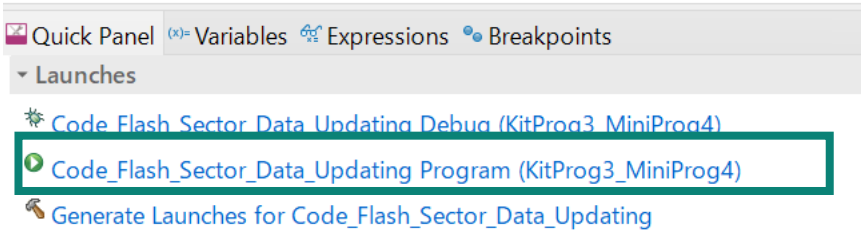
- **Access to the code flash**
  - Before writing, the code flash sector to be written should be erased by calling the ***cyhal_flash_erase()*** function
  - The ***cyhal_flash_program()*** function is used for the write operation, giving the target address and the data to be written as argument
  - This code example uses ***cyhal_flash_read()*** to read out the data from code flash, but you can also use ***memcpy()*** to do so because the code flash is mapped in the address which CPU can access. The difference is only that the HAL function checks whether the specified address is included in code flash.

Compiling and programming

1. Connect to power and USB cable
2. Use Eclipse IDE for ModusToolbox™ software for compiling and programming
3. For compilation:
   a. Select the target application project in the Project Explorer
   b. In the Quick Panel, scroll down, and click **Build Application** in Code_Flash_Sector_Data_Updating (APP_KIT_T2G-B-H_LITE)
4. Open a terminal program and select the KitProg3 COM port. Set the serial port parameters to 8N1 and 115200 baud.
5. For programming:
   a. Select the target application project in the Project Explorer
   b. In the Quick Panel, scroll down, and click **Code_Flash_Sector_Data_Updating Program (KitProg3_MiniProg4)** in the Launches

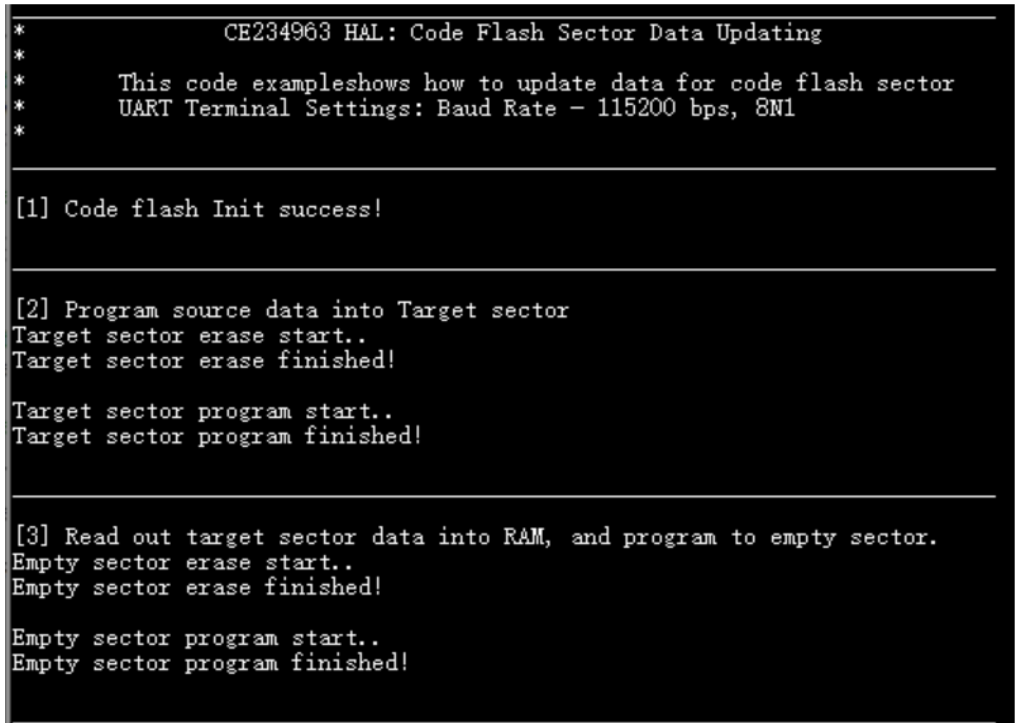
KitProg3 USB connector (J2)





Run and test

1. After successful programming, the application starts automatically. Observe that the message “CE234963 HAL: Code Flash Sector Data Updating" is displayed on the UART terminal.
2. Observe the results in the terminal window as shown in the figure.



References

- **Datasheet**
  - CYT4BF TRAVEO™ T2G 32-bit Automotive MCU based on Arm® Cortex®- M7 dual
- **Architecture reference manual**
  - TRAVEO™ T2G Automotive MCU body controller high architecture reference manual
- **Registers reference manual**
  - TRAVEO™ T2G Automotive MCU: TVII-B-H-8M body controller high registers reference manual
- **PDL/HAL**
  - Peripheral driver library (PDL)
  - Hardware abstraction layer (HAL)
- **Training**
  - TRAVEO™ T2G training

Revision History

Revision	ECN	Submission Date	Description of Change
**	7841075	2022/11/28	Initial release
*A	8080731	2024/10/08	Replaced development board from KIT_T2G-B-H_EVK to KIT_T2G-B-H_LITE