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STM32[✈] CubeIDE



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STM32CubeIDE - Overview



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Apa itu **STM32CubeIDE** ?

- **STM32CubeIDE** adalah software IDE (integration development environment) resmi dari ST microelectronics (STM) yang dapat digunakan untuk mengembangkan (develop) aplikasi embedded systems.
- **STM32CubeIDE** adalah *free* software, sehingga dapat dimanfaatkan oleh pengguna mikrokontroler STM32 tanpa harus membayar lisensinya.
- Di dalam **STM32CubeIDE**, sudah terintegrasi software yang sebelumnya merupakan software yang terpisah, software tersebut adalah **STM32CubeMX**.
- **STM32CubeMX** adalah software yang berguna untuk melakukan konfigurasi atau pengaturan fitur **mikrokontroler STM32** yang akan digunakan dalam pembangunan proyek *embedded system*, sebelum melakukan langkah *generate* program.

Workspace_RTOS_using_STM32CubeIDE_v1.10.1 - Device Configuration Tool - STM32CubeIDE

File Edit Navigate Search Project Run Window Help

Project Explorer × rtos_project2.ioc ×

- led_kedipkedip (in Workspace_STM32CubeIDE)
- rtos_project1
- rtos_project2
 - Binaries
 - Includes
 - Core
 - Drivers
 - Middlewares
 - Debug
 - rtos_project2.ioc
 - rtos_project2 Debug.launch
 - STM32F401RETX_FLASH.Id
 - STM32F401RETX_RAM.Id

rtos_project2.ioc - Pinout & Configuration

Pinout & Configuration Clock Configuration Project Manager Tools

Software Packs Pinout

GPIO Mode and Configuration

Configuration

Group By Peripherals

GPIO RCC SYS USART

Search Signals

Search (Ctrl+F) ☐ Show only Modified Pins

Pin...	Signal	GPIO	GPIO	GPIO	Maxim...	User L...	Modified
PC0	n/a	High	Output ...	No pull...	Low	LED2	<input checked="" type="checkbox"/>
PC1	n/a	High	Output ...	No pull...	Low	LED4	<input checked="" type="checkbox"/>
PC2	n/a	High	Output ...	No pull...	Low	LED6	<input checked="" type="checkbox"/>
PC3	n/a	High	Output ...	No pull...	Low	LED8	<input checked="" type="checkbox"/>
PC6	n/a	n/a	Input m...	No pull...	n/a	PushB...	<input checked="" type="checkbox"/>
PC8	n/a	n/a	Input m...	No pull...	n/a	PushB...	<input checked="" type="checkbox"/>

Select Pins from table to configure them. Multiple selection is Allowed

Pinout view System view

STM32F401RETX LQFP64

Console ×

No consoles to display at this time.

STM32CubeMX di dalam STM32CubeIDE

- STM32CubeMX merupakan *graphical user interface* (GUI) yang memudahkan penggunaan STM32CubeIDE dalam **mengenerasi kerangka program** (*Code generator*) aplikasi mikrokontroler STM32, sehingga pekerjaan membuat desain program (*firmware*) aplikasi *embedded systems* menjadi lebih mudah dan cepat.
- Dengan STM32CubeMX, pengguna STM32CubeIDE dapat melakukan, yaitu:
 1. Memilih STM32 *board* atau *chip* mikrokontroler yang digunakan,
 2. Melakukan konfigurasi pin I/O,
 3. Melakukan konfigurasi fitur mikrokontroler STM32 yang digunakan (GPIO, Timer, USART, ADC, dll) .

Workspace_RTOS_using_STM32CubeIDE_v1.10.1 - rtos_project2/Core/Src/main.c - STM32CubeIDE

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Project Explorer

- led_kedipkedip (in Workspace_STM32CubeIDE_v1.10.1)
- rtos_project1
- rtos_project2
 - Binaries
 - Includes
 - Core
 - Inc
 - freertos.c
 - main.c
 - stm32f4xx_hal_msp.c
 - stm32f4xx_hal_timebase_tim.c
 - stm32f4xx_it.c
 - syscalls.c
 - sysmem.c
 - system_stm32f4xx.c
 - Startup
 - Drivers
 - Middlewares
 - Debug
 - rtos_project2.ioc
 - rtos_project2 Debug.launch
 - STM32F401RET_FLASH.ld
 - STM32F401RET_RAM.ld

rtos_project2.ioc

```

1  /* USER CODE BEGIN Header */
2  /**
3   *
4   * @file          : main.c
5   * @brief         : Main program body
6   *
7   * @attention
8   *
9   * Copyright (c) 2022 STMicroelectronics.
10  * All rights reserved.
11  *
12  * This software is licensed under terms that can be found in the LICENSE file
13  * in the root directory of this software component.
14  * If no LICENSE file comes with this software, it is provided AS-IS.
15  *
16  */
17  /*
18  /* USER CODE END Header */
19  /* Includes -----*/
20  #include "main.h"
21  #include "cmsis_os.h"
22
23  /* Private includes -----*/
24  /* USER CODE BEGIN Includes */
25
26  /* USER CODE END Includes */
27
28  /* Private typedef -----*/
29  /* USER CODE BEGIN PTD */
30
31

```

Template program yang ter-generate dengan STM32CubeMX

Build Console [rtos_project2]

```

make -j4 all
arm-none-eabi-size rtos_project2.elf
text  data  bss  dec  hex filename
20772  24  20496  41292  a14c rtos_project2.elf
Finished building: default.size.stdout

17:56:31 Build Finished. 0 errors, 0 warnings. (took 773ms)

```

Build Analyzer

Static Stack Analyzer

FreeRTOS Task List

rtos_project2.elf - /rtos_project2/Debug - Jul 19, 2022, 9:27:57 PM

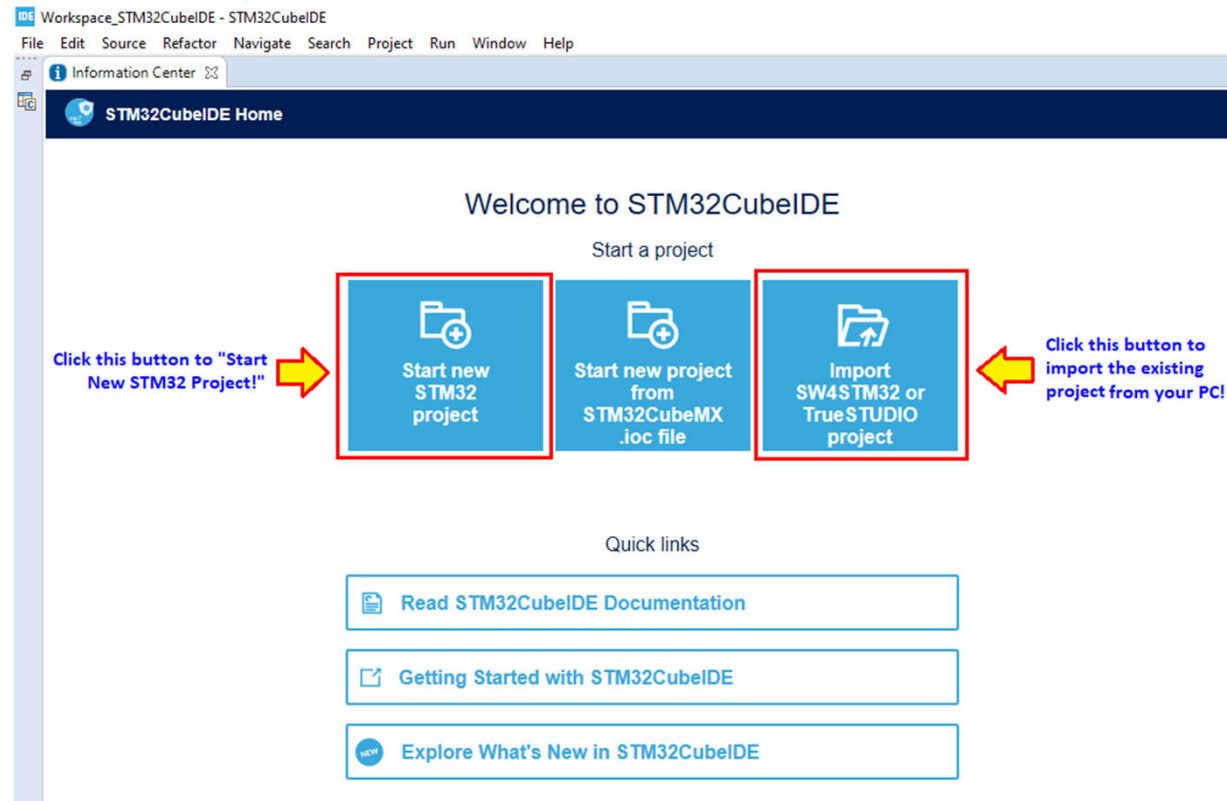
Region	Start address	End address	Size	Free	Used	Usage (%)
RAM	0x20000000	0x20018000	96 KB	75.97 KB	20.03 KB	20.87%
FLASH	0x08000000	0x08080000	512 KB	491.69 KB	20.31 KB	3.97%

**Apa yang Dapat Kita Lakukan
dengan STM32CubeIDE ?**

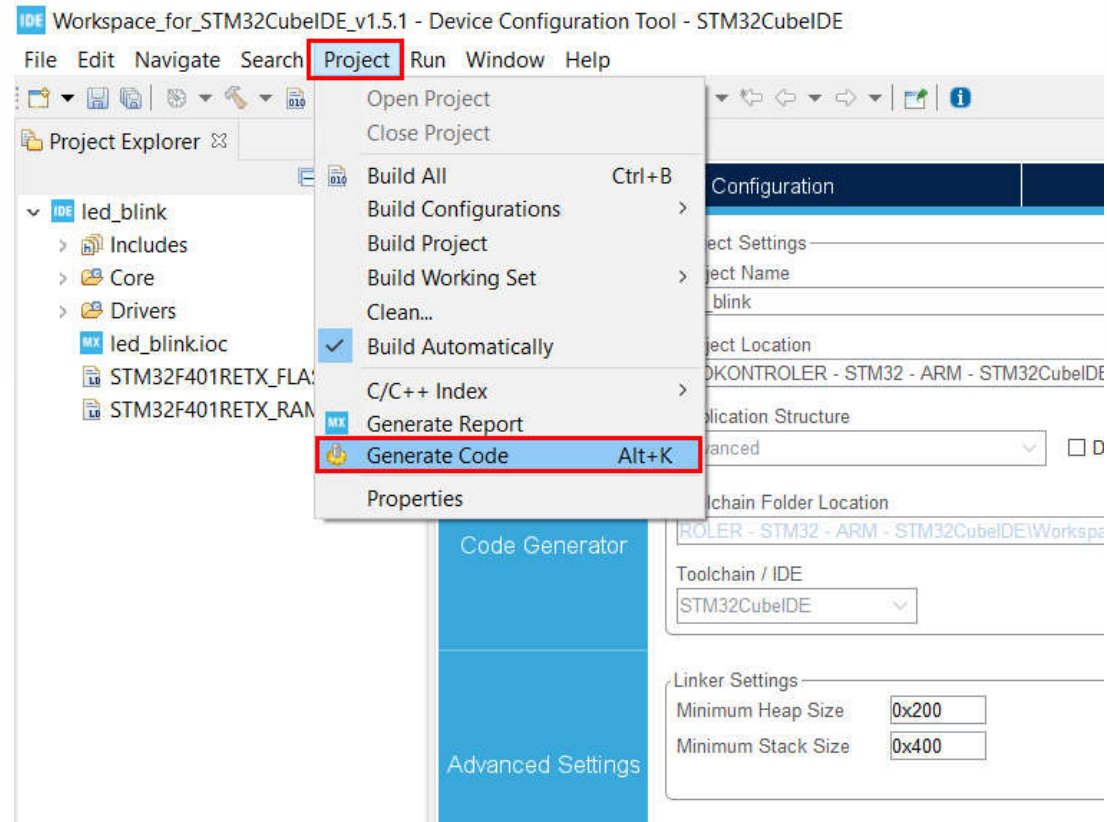


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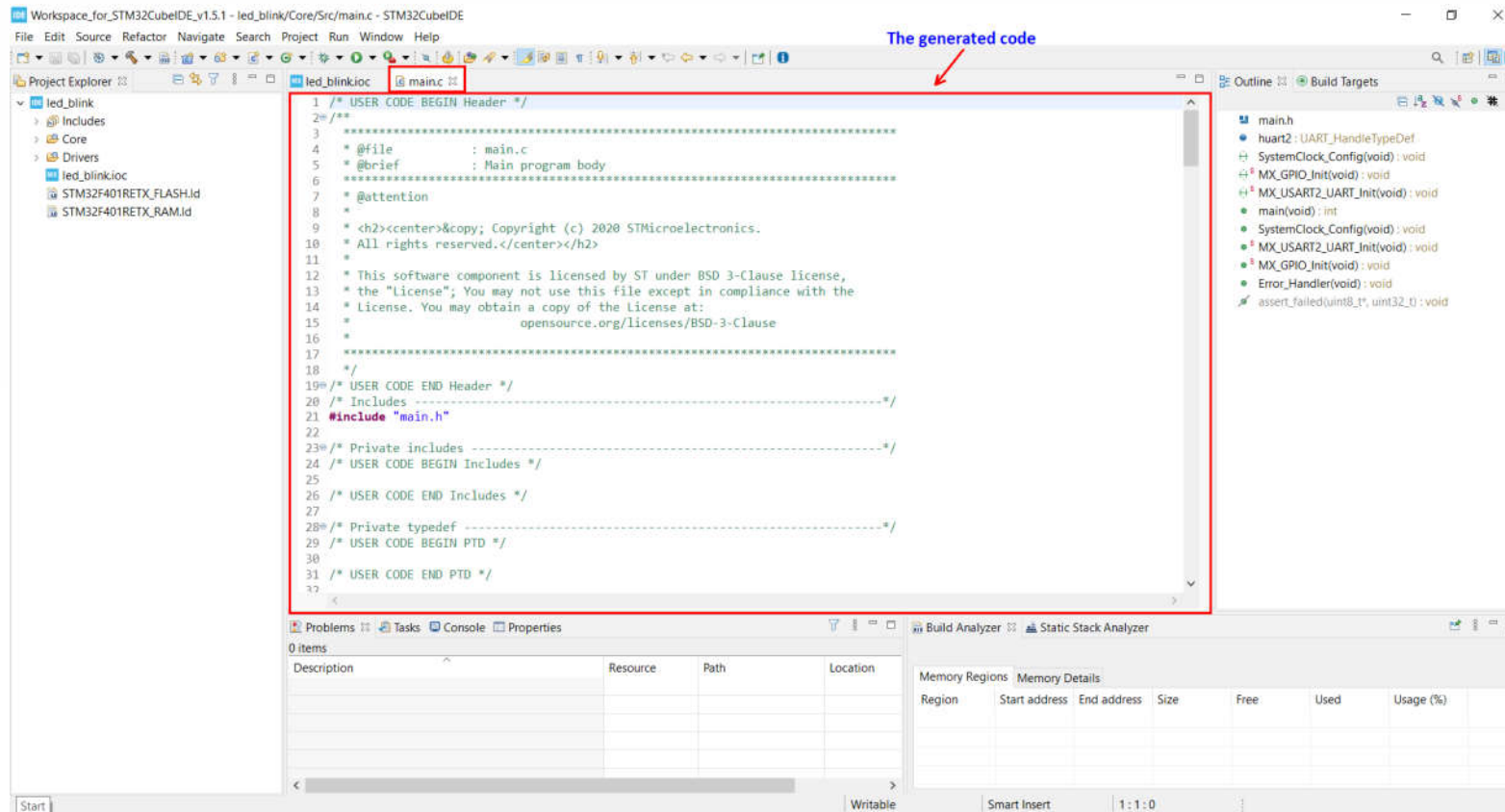
1. Membuat Proyek Baru atau Impor Proyek



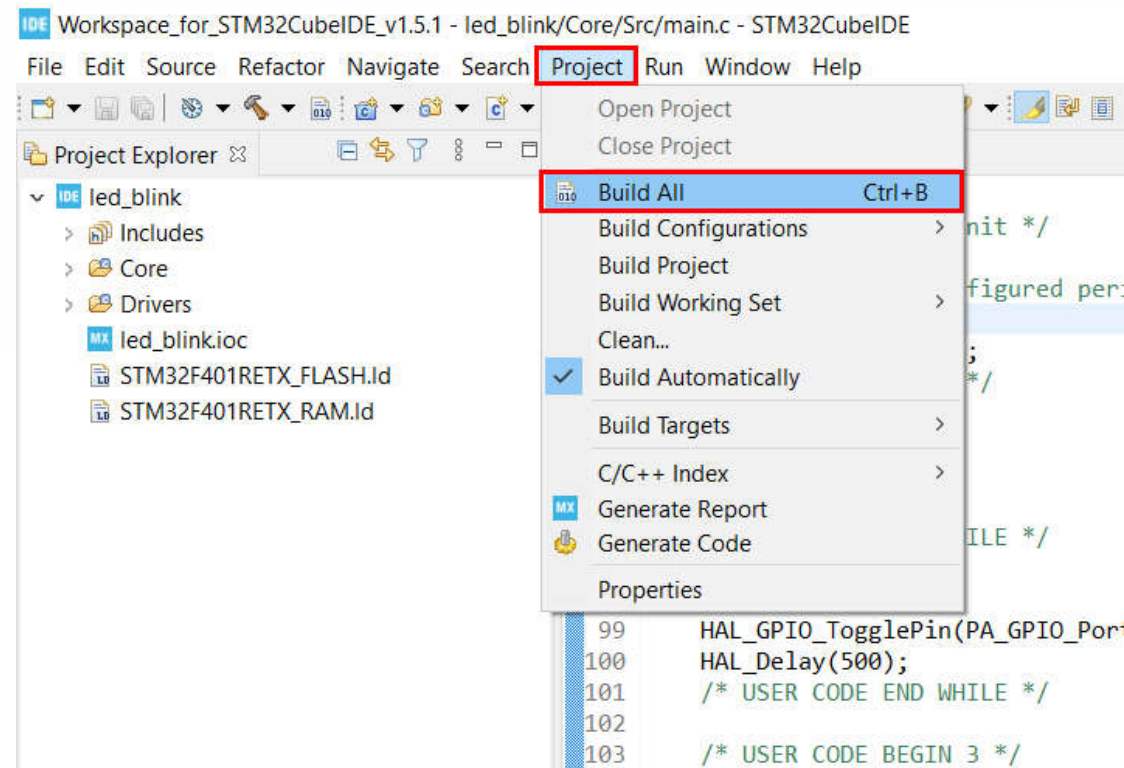
2. Generate Code



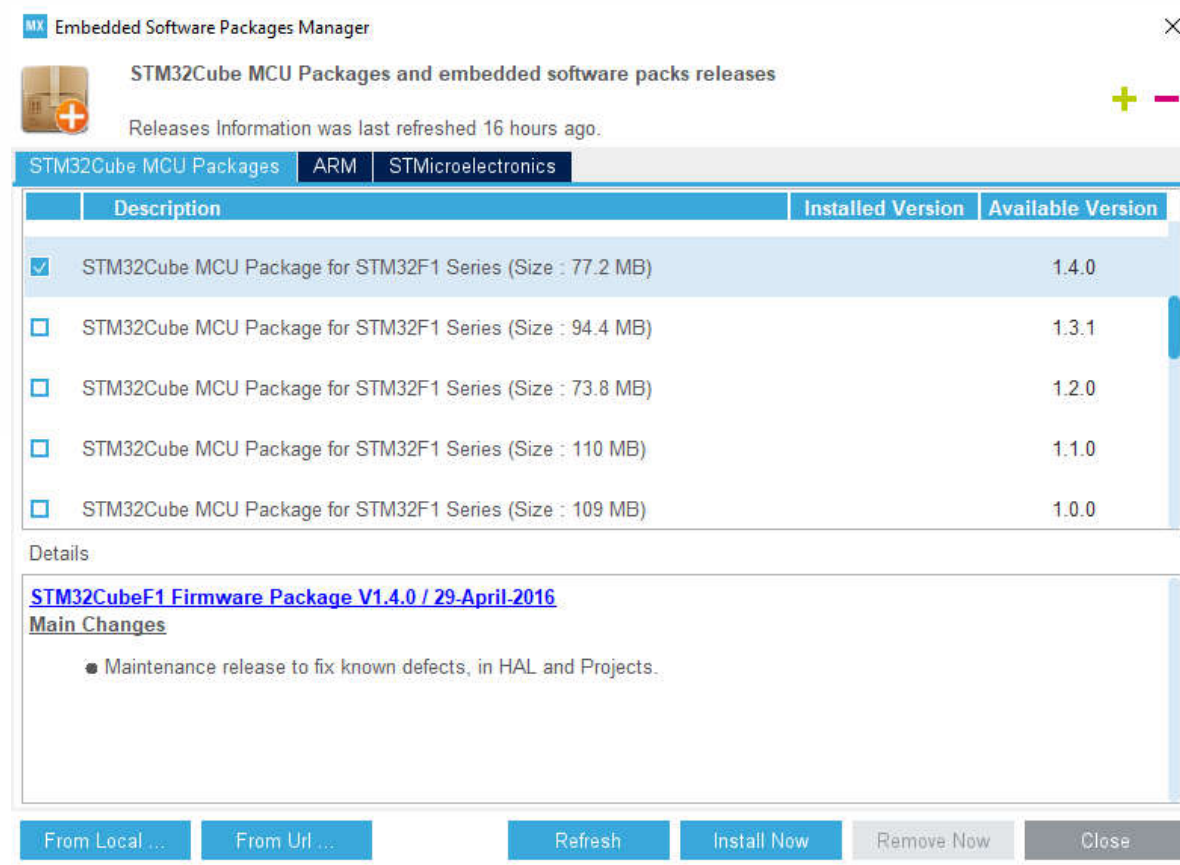
3. Menulis/Edit Program Pada Text Editor



4. Build/Compile Program



5. Menginstal Paket Firmware STM32Cube MCU



6. Menganalisis Proyek

Build Analyzer

Static Stack Analyzer

led_blink.elf - /led_blink/Debug - Dec 24, 2020 10:13:52 PM

Memory Regions

Region	Start address	End address	Size	Free	Used	Usage (%)
RAM	0x20000000	0x20018000	96 KB	94.39 KB	1.61 KB	1.68%
FLASH	0x08000000	0x08080000	512 KB	503.93 KB	8.07 KB	1.58%

Build Analyzer Static Stack Analyzer

led_blink.elf - /led_blink/Debug - Dec 24, 2020 10:13:52 PM

List Call graph

☒ Hide dead code

Function	Local cost	Type	Location	Info
SystemClock_Config	88	STATIC	main.c:112	
UART_SetConfig	56	STATIC	stm32f4xx_hal_uart.c:3061	
MX_GPIO_Init	48	STATIC	main.c:190	
HAL_UART_MspInit	48	STATIC	stm32f4xx_hal_msp.c:88	
NVIC_EncodePriority	40	STATIC	core_cm4.h:1863	
HAL_GPIO_Init	40	STATIC	stm32f4xx_hal_gpio.c:171	
HAL_RCC_GetSysClockFreq	40	STATIC	stm32f4xx_hal_rcc.c:876	
HAL_NVIC_SetPriority	32	STATIC	stm32f4xx_hal_cortex.c:165	
HAL_RCC_OscConfig	32	STATIC	stm32f4xx_hal_rcc.c:221	
HAL_Delay	24	STATIC	stm32f4xx_hal.c:389	
__NVIC_SetPriorityGrouping	24	STATIC	core_cm4.h:1657	
HAL_RCC_ClockConfig	24	STATIC	stm32f4xx_hal_rcc.c:582	
HAL_MspInit	16	STATIC	stm32f4xx_hal_msp.c:64	

7. Debug & Upload Program ke Mikrokontroler

Workspace_for_STM32CubeIDE_v1.5.1 - led_blink/Core/Src/main.c - STM32CubeIDE

File Edit Source Refactor Navigate Search Project Run Window Help

Debug Project Explorer

led_blink Debug [STM32 Cortex-M C/C++ Application]

led_blinkelf [cores: 0]

Thread #1 [main] 1 [core: 0] (Suspended: Breakpoint)

main() at main.c:75 0x8004d8

arm-none-eabi-gdb (8.1.0.20180315)

ST-LINK (ST-LINK GDB server)

Activated toolbar when Debug is running

Debug perspective displayed when the debug running

Variables, Breakpoints, Registers, SFRs view

Register	Address	Value
> GPIOH		
> GPIOE		
> GPIOB		
> GPIOC		
> GPIOA		
> MODER	0x40020000	0xa8000000
> OTYPER	0x40020004	0xa8000000
> OSPEEDR	0x40020008	0xa8000000
> PUPDR	0x4002000c	0xa8000000
> IDR	0x40020010	0xa8000000
> ODR	0x40020014	0xa8000000
> BSR	0x40020018	0xa8000000
> LCKR	0x4002001c	0xa8000000
> AFR	0x40020020	0xa8000000
> AFRH	0x40020024	0xa8000000

Peripheral: SysTick
Base address: 0xe000e010

Description:
System Timer registers

Download verified successfully

The program/code has downloaded into STM32 microcontroller chip successfully

Terima kasih



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Referensi

STM32CubeIDE: The First Free ST IDE with STM32CubeMX Built-in

<https://blog.st.com/stm32cubeide-free-ide/>