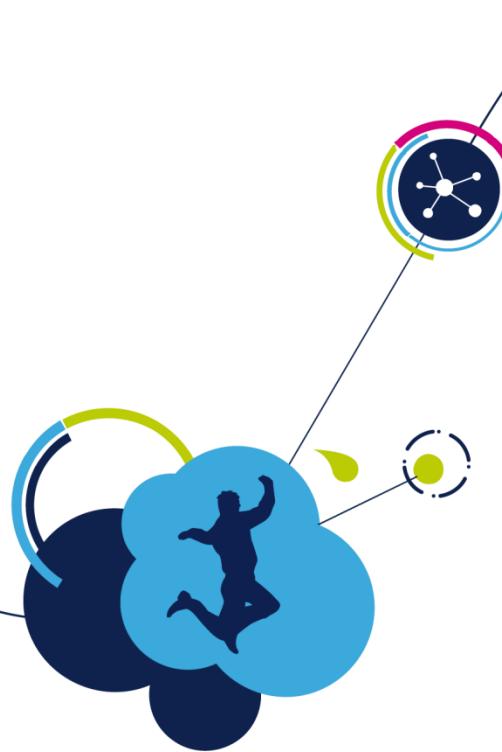


STM32G4 Technique Training

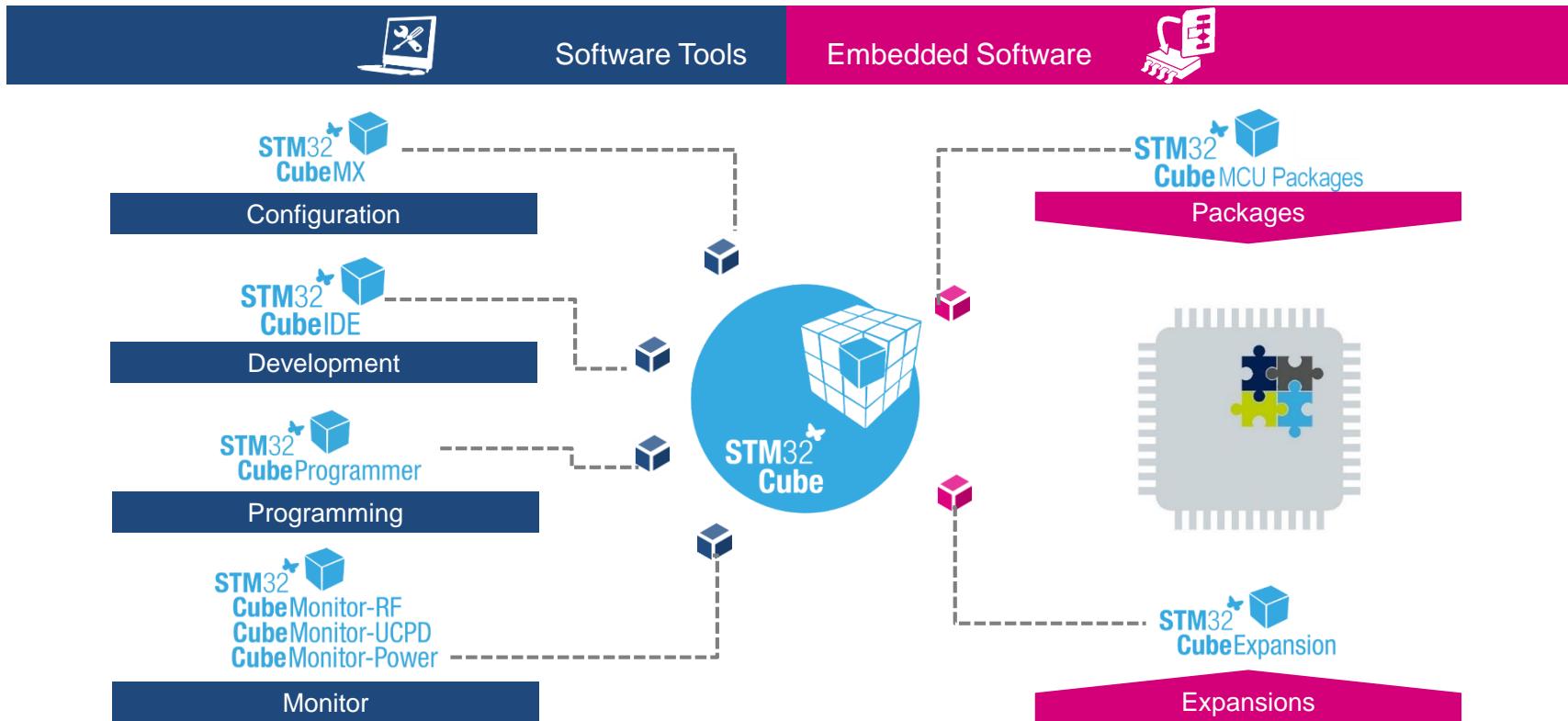
- STM32CubeMX
- STM32CubeIDE
- STM32CubeProgrammer
- STM32CubeMonitor - Power



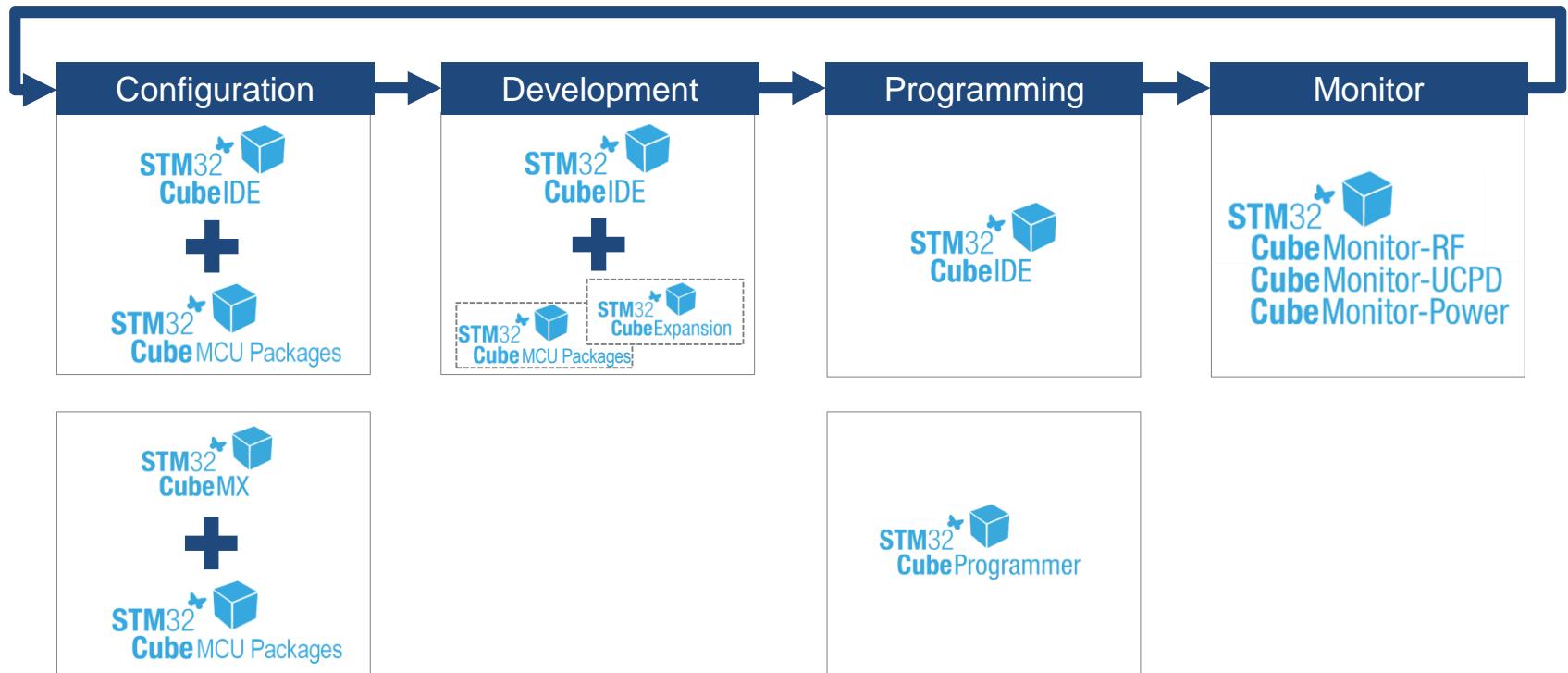
STM32Cube

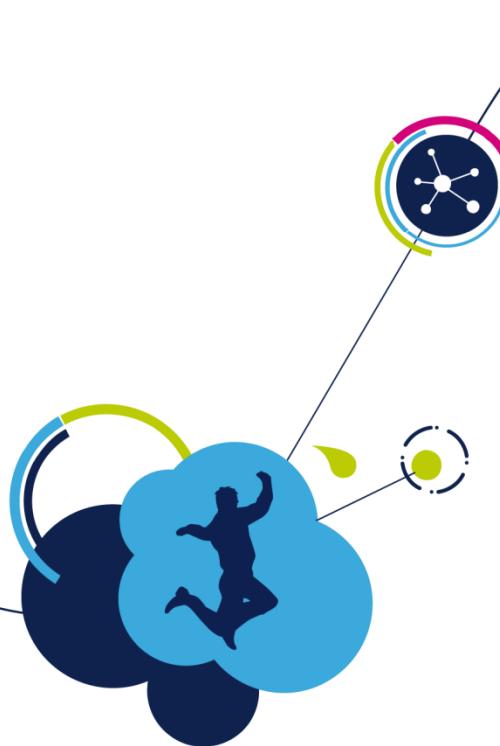
STM32Cube Ecosystem

3



4-Step Iterative Development Process

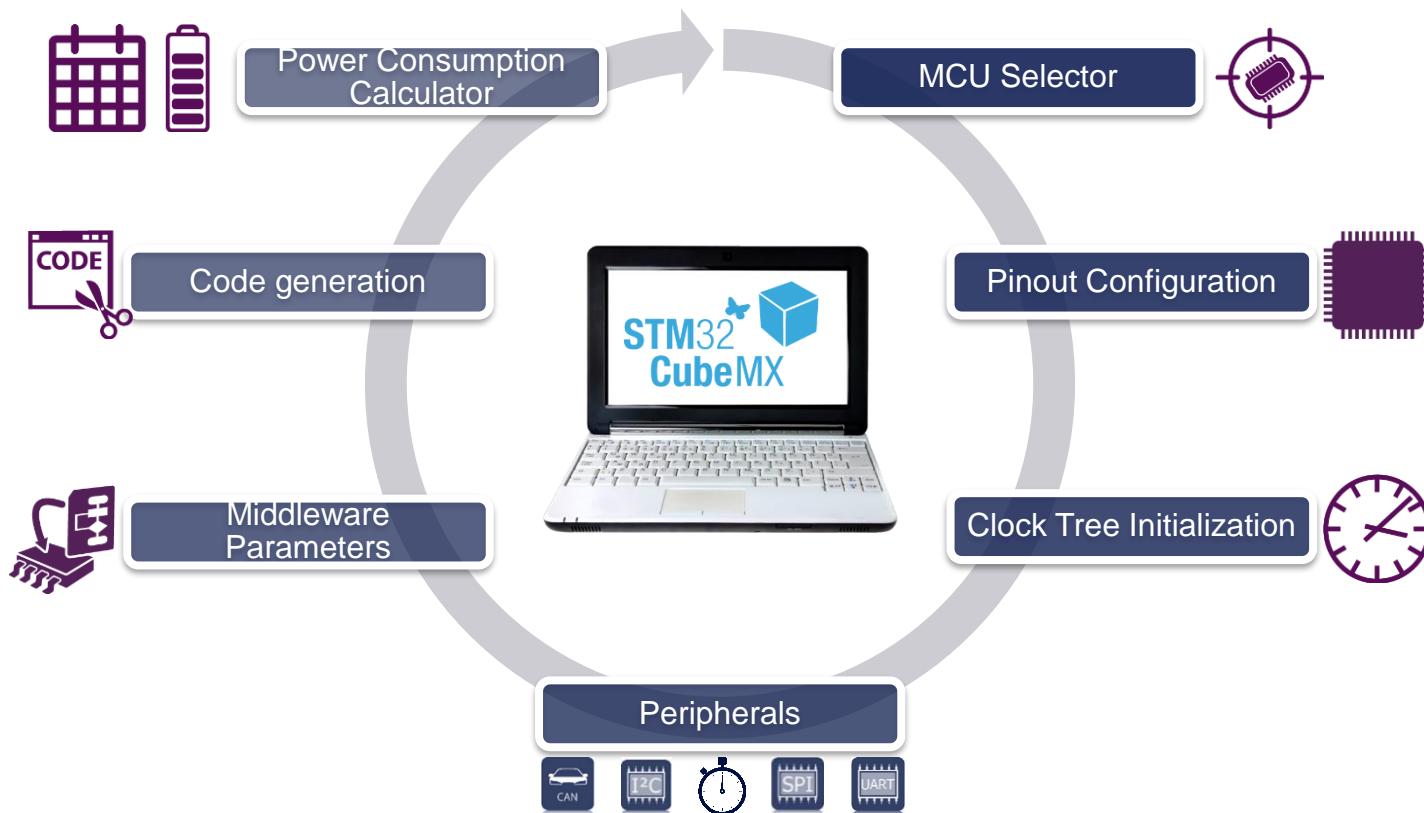




STM32CubeMX

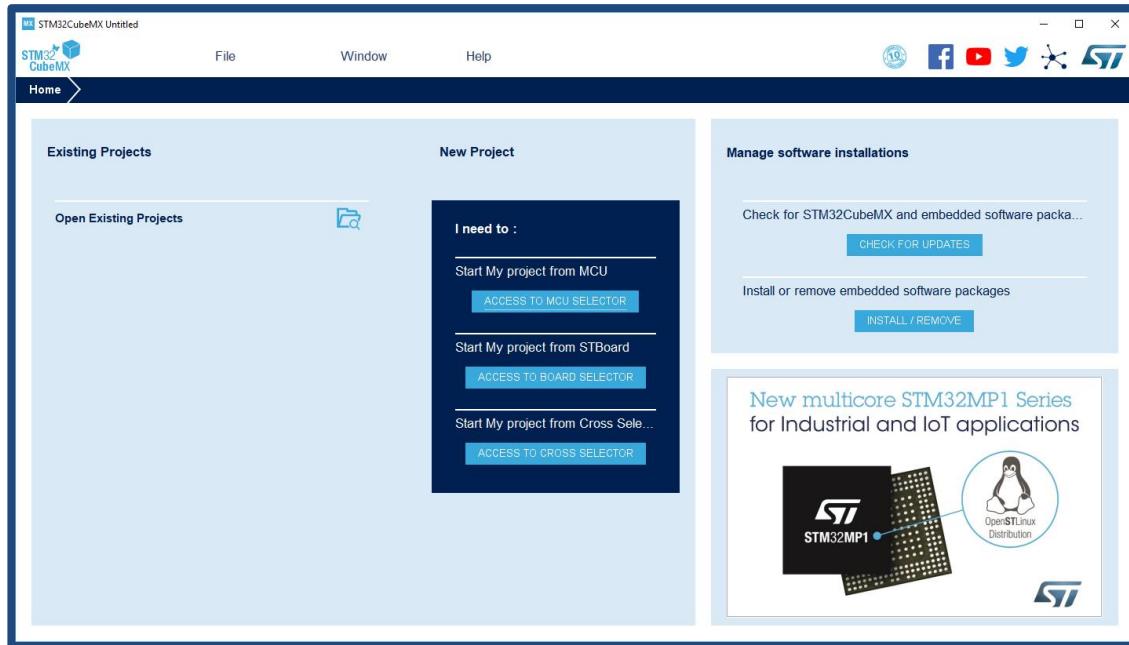
Major Steps

6



MCU Selection

7



MCU
SELECTOR

BOARD
SELECTOR

CROSS
SELECTOR

MCU Selector

8



MX New Project from a MCU/MPU

MCU/MPU Selector | Board Selector | Cross Selector

MCU/MPU Filters

Part Number Search

Core

Series

Check/Uncheck All

- STM32F0
- STM32F1
- STM32F2
- STM32F3
- STM32F4
- STM32F7
- STM32G0
- STM32G4
- STM32H7
- STM32L0
- STM32L1

Features | Block Diagram | Docs & Resources | Datasheet | Buy | Start Project

More than 1 million STM8 & STM32 boards sold

ST MCU Finder
All STM32 & STM8 MCUs in one place

MCUs/MPUs List: 72 items

Display similar items

*	Part No	Ref.	Mark.	Unit...	Board	Pack.	Flash	RAM	IO	Freq	GFX...	CO...	DDR	DEB...	FM...	HDP	HMAC	MDS	PKA	PWR	RF	SHA	TAMP
★	STM32H757ZI	ST...	Ev...	0.0	WL...	204...	102...	101	480...	0.0	0	0	1	0	0	0	0	0	1	0	0	0	
★	STM32H757XI	ST...	Act...	10...	STM32H...	TFB...	204...	102...	168	480...	0.0	0	0	1	0	0	0	0	0	1	0	0	
★	STM32H757II	ST...	Ev...	0.0	LQF...	204...	102...	114	480...	0.0	0	0	1	0	0	0	0	0	1	0	0	0	
★	STM32H757BI	ST...	Ev...	0.0	LQF...	204...	102...	141	480...	0.0	0	0	1	0	0	0	0	0	1	0	0	0	
★	STM32H757AI	ST...	Act...	9...	UF...	204...	102...	114	480...	0.0	0	0	1	0	0	0	0	0	1	0	0	0	

Board Selector

9



MX New Project from a MCU/MPU

MCU/MPU Selector | Board Selector | Cross Selector

Vendor >

Type >

Discovery

Evaluation Board

Nucleo144

MCU/MPU Series >

STM32F2

STM32F3

STM32F4

STM32F7

STM32H7

STM32L4

STM32L4+

Other >

Peripheral >

Features Large Picture Docs & Resources

★  ST MCU Finder
All STM32 & STM8 MCUs in one place

Boards List: 5 items

*	Overview	Part No	Type	Marketing Status	Unit Price (US\$)	Mounted Device	MCU/MPU	Kit Contents	Included in...
★		NUCLEO-H743ZI	Nucleo144	Active	23.0	STM32H743ZITx	STM32H7		
★		NUCLEO-H743ZI2	Nucleo144		0.0	STM32H743ZITx	STM32H7		
★		NUCLEO-H745ZI-Q	Nucleo144	Active	29.0	STM32H745ZITx	STM32H7		

Cross Selector

10



MX New Project from a MCU/MPU

MCU/MPU Selector | Board Selector | Cross Selector

Comparing MSP430F436-LQFP100 by Texas Instruments with STMicroelectronics solutions

Used ? Import... Category Parametric MSP430F436-LQFP100 STM32L073V8Tx STM32L083V8Tx

Used ?	Import...	Category	Parametric	MSP430F436-LQFP100	STM32L073V8Tx	STM32L083V8Tx
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Product	Public Price	3.700 USD (for 10K)	1.985 USD (for 10K)	2.055 USD (for 10K)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	busArch	16 bit	32 bit	32 bit
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	core	MSP430 at 8 MHz	ARM Cortex-M0+ at 32 MHz	ARM Cortex-M0+ at 32 MHz
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	package	QFP100	QFP100	QFP100
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	GPIO	48 io	84 io	84 io
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	Temperature range	-40 °C to 85 °C	-40 °C to 105 °C	-40 °C to 85 °C
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	Voltage range	1.80 V to 3.60 V	1.65 V to 3.60 V	1.65 V to 3.60 V
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	RAM	1 KB	20 KB	20 KB
<input type="checkbox"/>	<input type="checkbox"/>	System Core	eeprom	No info	3072 B	3072 B
<input checked="" type="checkbox"/>	<input type="checkbox"/>	System Core	flash	24 KB	64 KB	64 KB

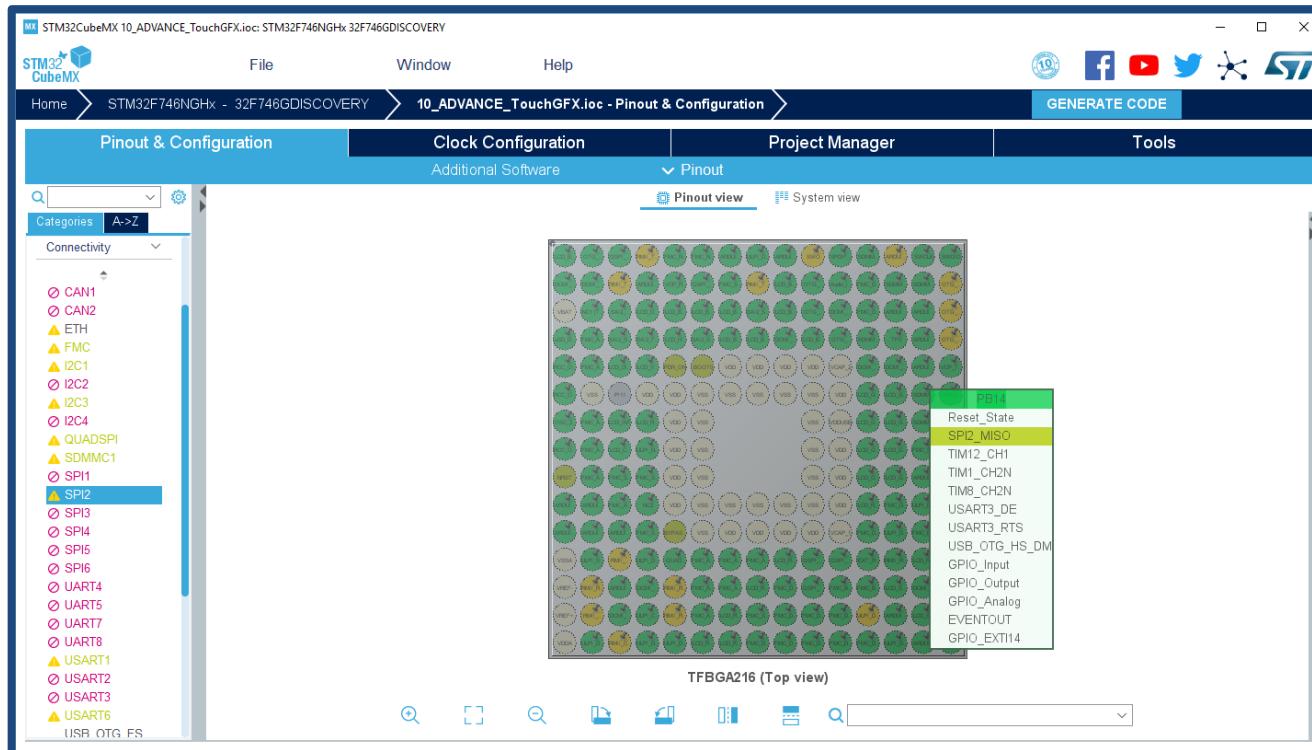
Matching ST candidates (500)

Part number	Match
STM32L073V8Tx	90 %
STM32L083V8Tx	90 %
STM32L073VBTx	90 %
STM32L083VBTx	90 %
STM32L073VZTx	90 %
STM32L083VZTx	90 %
STM32L152V8TxA	90 %
STM32L152VBTxA	89 %
STM32L152VCTx	89 %
STM32L433VCTx	89 %
STM32L162VCTx	89 %
STM32L443VCTx	89 %
STM32L162VDTx	88 %
STM32L152VDTx	88 %
STM32L152VDTx	88 %
STM32L152VETx	88 %
STM32L162VETx	88 %
STM32L072V8Tx	88 %
STM32L071V8Tx	88 %
STM32L476VCTx	88 %

Hide unused Show unused Reset comparison Copy to clipboard

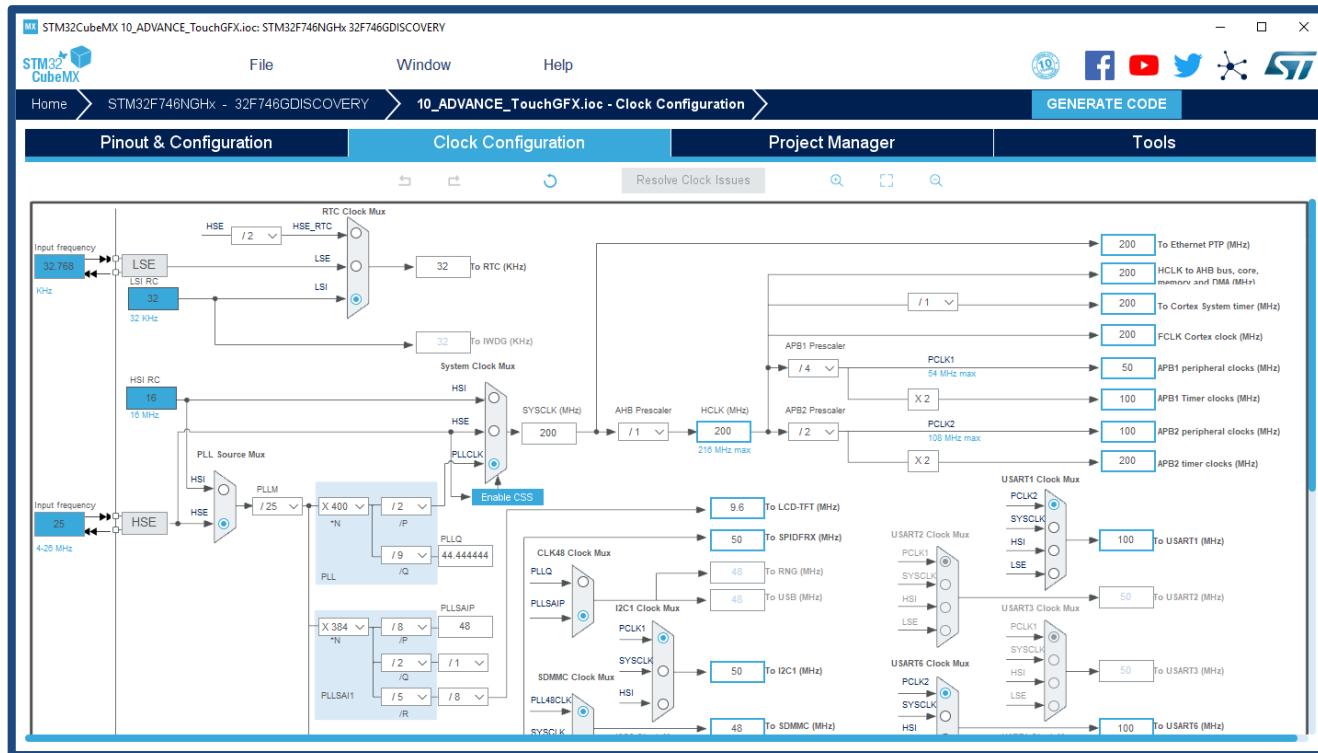
Pinout Configuration

11



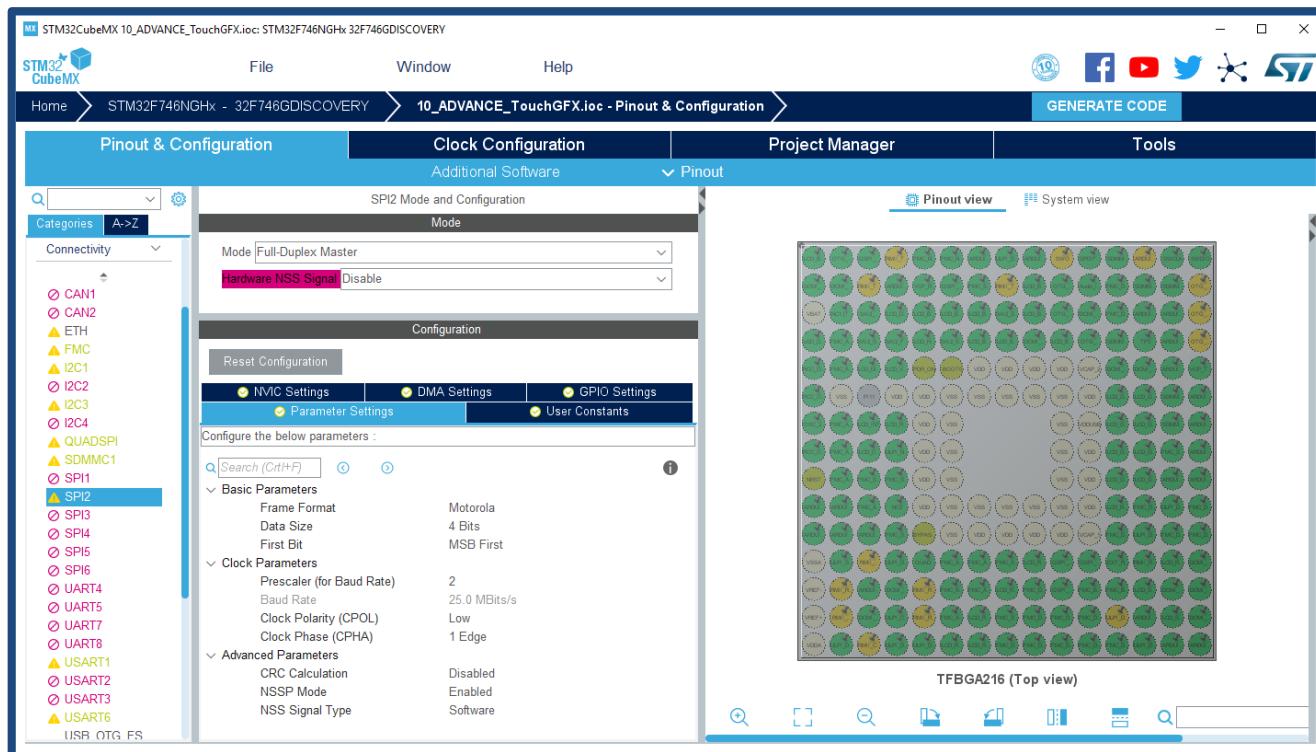
Clock Tree Configuration

12



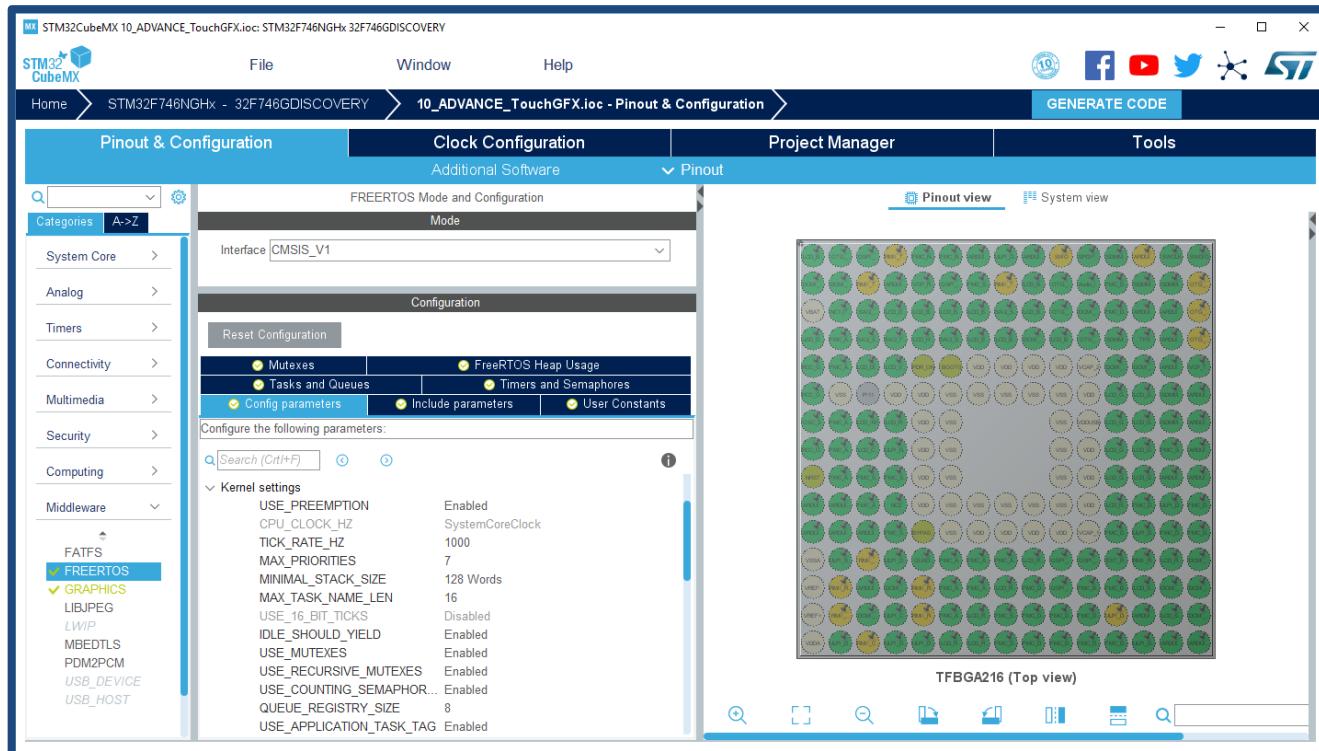
Peripheral Parameters

13

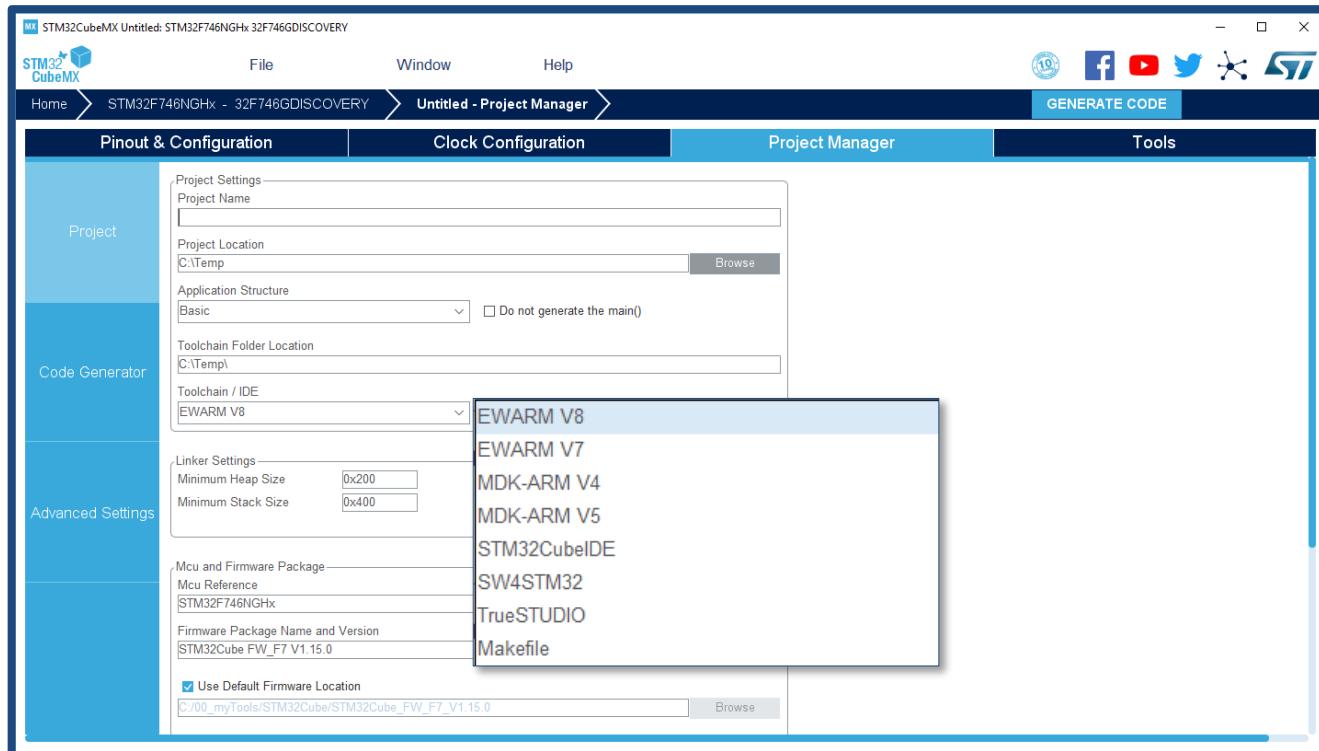


Middleware Parameters

14



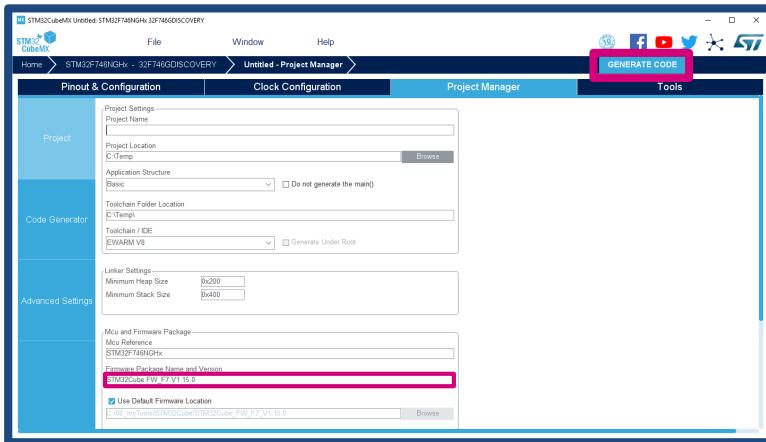
Code Generation



Power Consumption Calculator

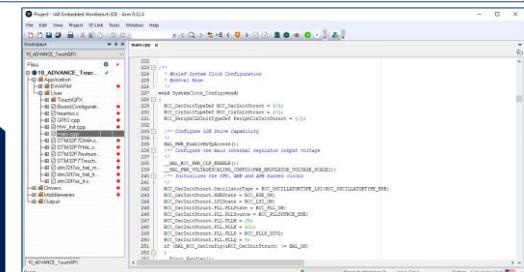
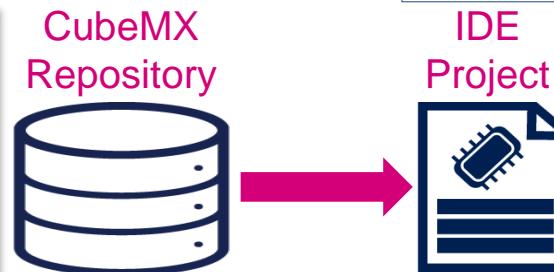
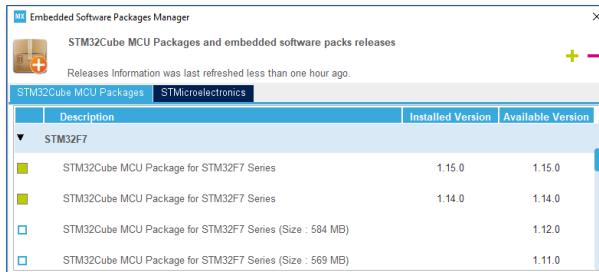


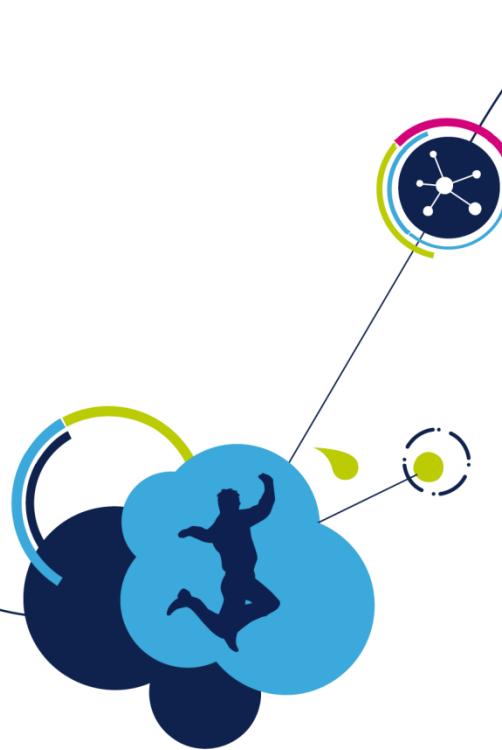
CubeMX Repository



After pressing “GENERATE CODE”:

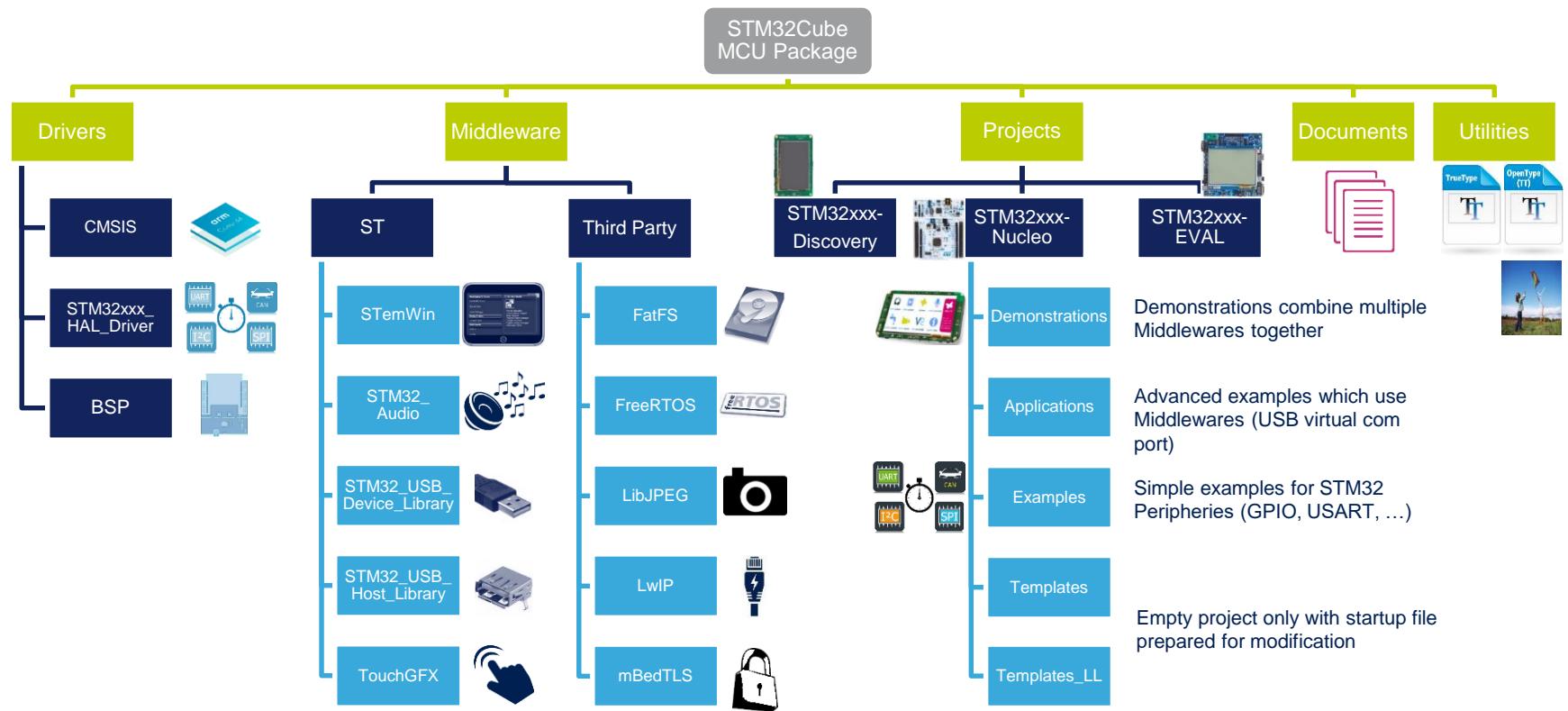
1. CubeMX grabs necessary peripheral drivers based on your pinout/peripheral configuration from STM32Cube MCU Package in CubeMX Repository
2. CubeMX grabs necessary middleware based on your middleware configuration from STM32Cube MCU Package in CubeMX repository
3. Generate IDE project





STM32Cube MCU Packages

STM32CubeMCU Package Organization



STM32Cube MCU Packages

Family	LL API	HAL API	FreeRTOS	FatFS	STenWin	TouchGFX	USB Host	USB Device	LwIP mBedTLS	Touch Sense	UDBPD	OpenAMP	BLE Stack	OpenThread Stack
<u>STM32CubeF0</u>	V	V	V	V	V			V		V				
<u>STM32CubeF1</u>	V	V	V	V	V			V	V	V				
<u>STM32CubeF2</u>	V	V	V	V	V		V	V	V					
<u>STM32CubeF3</u>	V	V	V	V	V			V		V				
<u>STM32CubeF4</u>	V	V	V	V	V	V	V	V	V					
<u>STM32CubeF7</u>	V	V	V	V	V	V	V	V	V					
<u>STM32CubeH7</u>	V	V	V	V	V	V	V	V	V					
<u>STM32CubeG0</u>	V	V	V	V							V			
<u>STM32CubeL0</u>	V	V	V	V				V		V				
<u>STM32CubeL1</u>	V	V	V	V	V		V	V		V				
<u>STM32CubeL4</u>	V	V	V	V	V	H2 2019	V	V		V				
<u>STM32CubeWB</u>	V	V	V	V				V		V		V	V	V
<u>STM32CubeMP1</u>	V	V	V								V			

STM32Cube Examples Overview

21

For each board, a set of examples are provided with preconfigured projects for EWARM, MDK-ARM and TrueSTUDIO toolchains.

The right side figure shows the projects structure for STM324xG-EVAL board, which is identical for other boards.

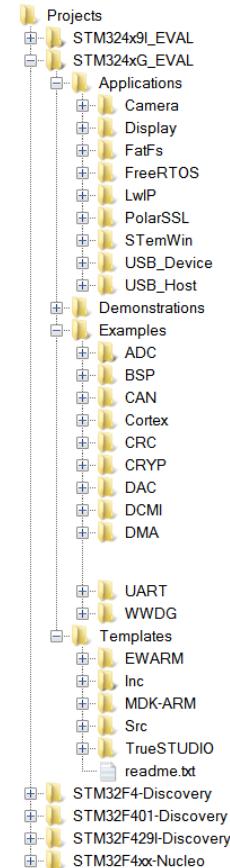
The examples are classified depending on the STM32Cube level they apply to, and are named as below:

- examples in level 0 are called **Examples**, that uses HAL drivers without any Middleware component
- examples in level 1 are called **Applications**, that provides typical use cases of each Middleware component
- examples in level 2 are called **Demonstration**, that implements all the HAL, BSP and Middleware components

Template project is provided to build quickly any firmware application on a given board.

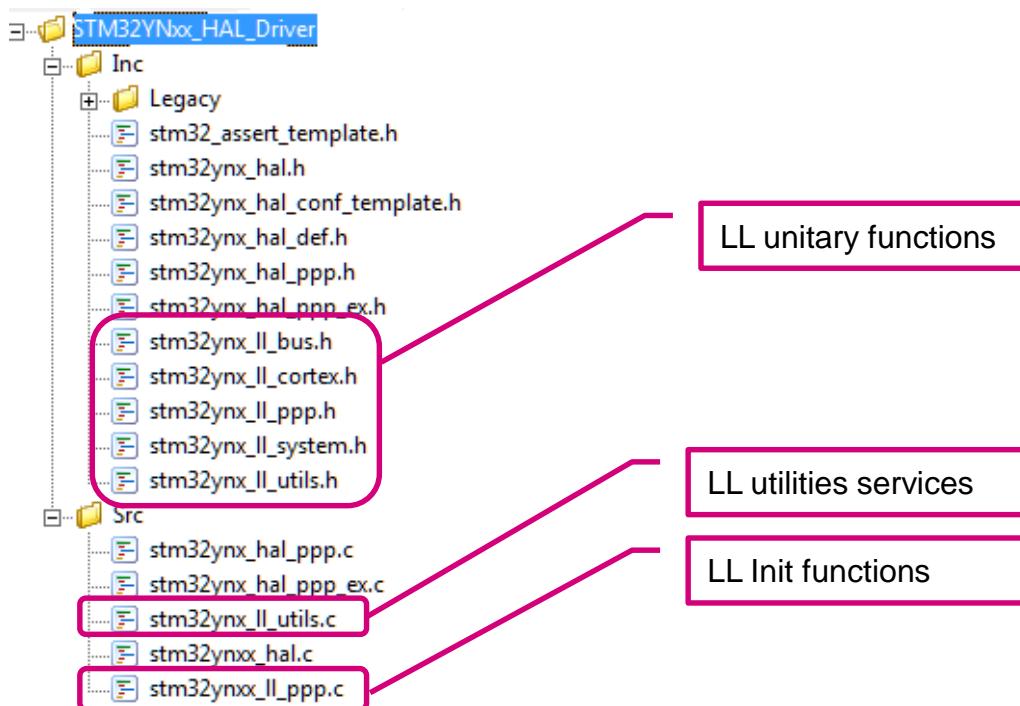
All examples have the same structure,

- **\Inc** folder that contains all header files
- **\Src** folder for the sources code
- **\EWARM**, **\MDK-ARM** and **\TrueSTUDIO** folders contain the preconfigured project for each toolchain.
- **readme.txt** describing the example behavior and needed environment to make it working



LL Files

LL drivers are located in the Src/Inc HAL Driver folders



Benchmark – Results

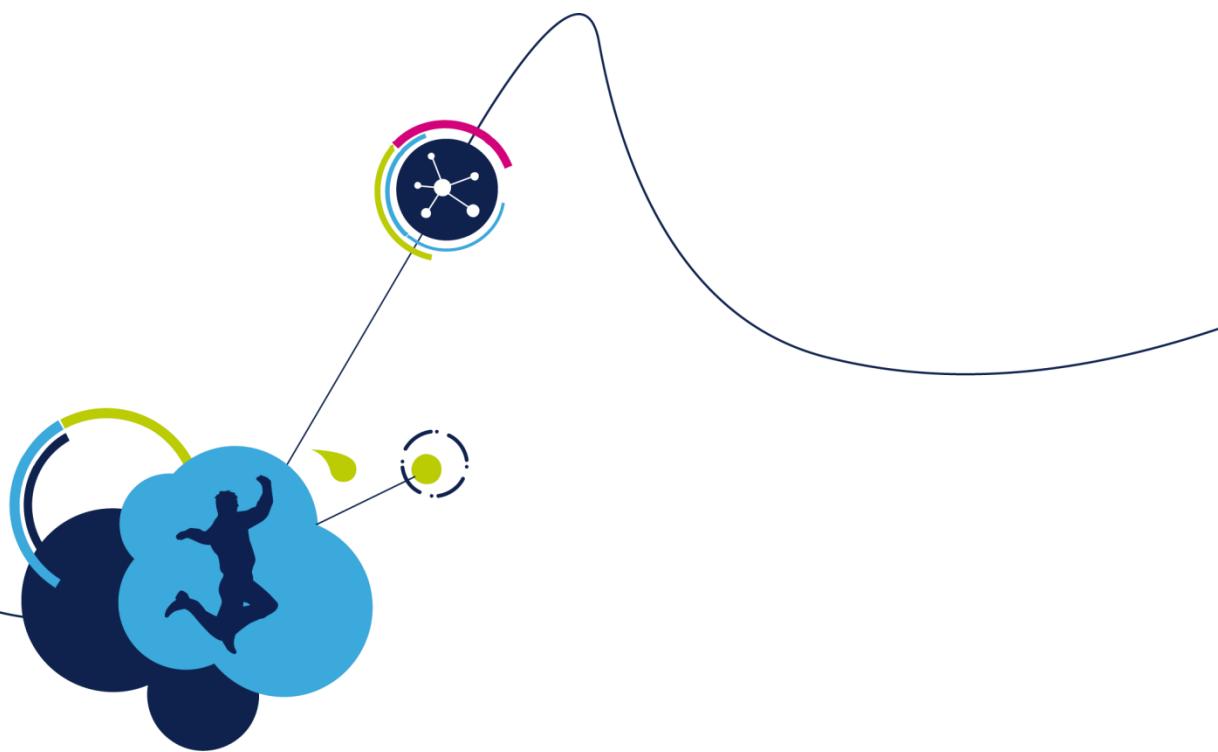
		SPL	CUBE HAL	CUBE LL
GPIO Led Blinking	ROM Code Size (kBytes) (1)	1.40	3.74	1.36
	RAM Used (Bytes) (2)	8	28	4
TIM PWM Output	ROM Code Size (kBytes) (1)	2.11	5.52	1.57
	RAM Used (Bytes) (2)	28	68	12
ADC DMA	ROM Code Size (kBytes) (1)	2.11	9.90	2.04
	RAM Used (Bytes) (2)	8	76	8

(1) If examples use reset clock

- SPL: Gain of 160 bytes (comment function `SetSysClock`)
- HAL: Gain de 2024 bytes (comment function `SystemClock_Config`)
- LL: Gain de 188 bytes (comment function `SystemClock_Config`)

(2) Stack Size (0x200) of 1024 bytes should be add to given figures

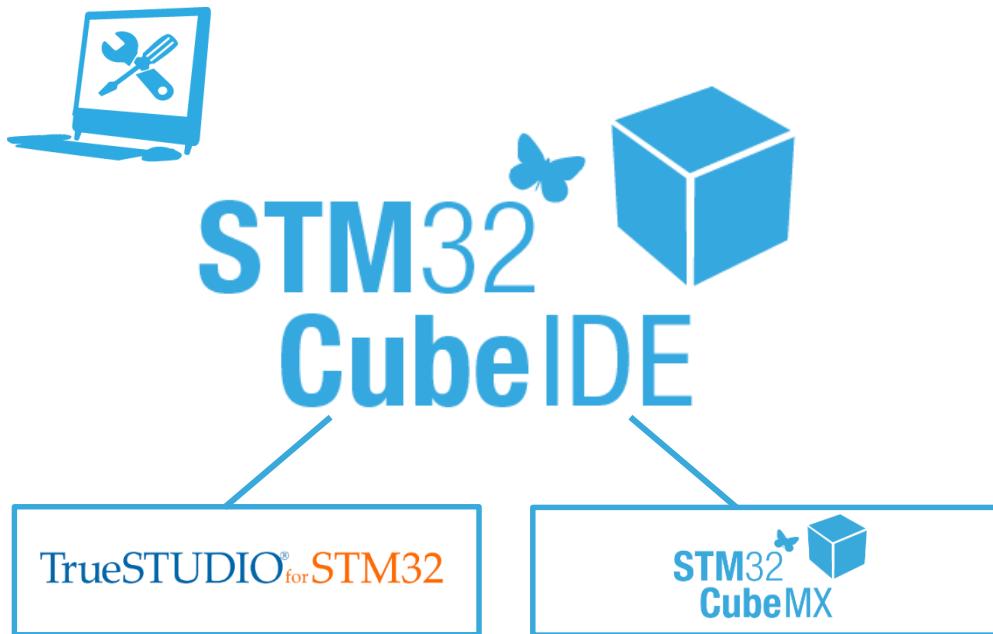
- **LL** offer **smaller footprint & high performance** but **less portability & require expertise**
- **HAL** offer **high level API (hide complexity) & portability** but **higher footprint & less performance**



STM32CubeIDE

The Ultimate STM32Cube Development Tool

25

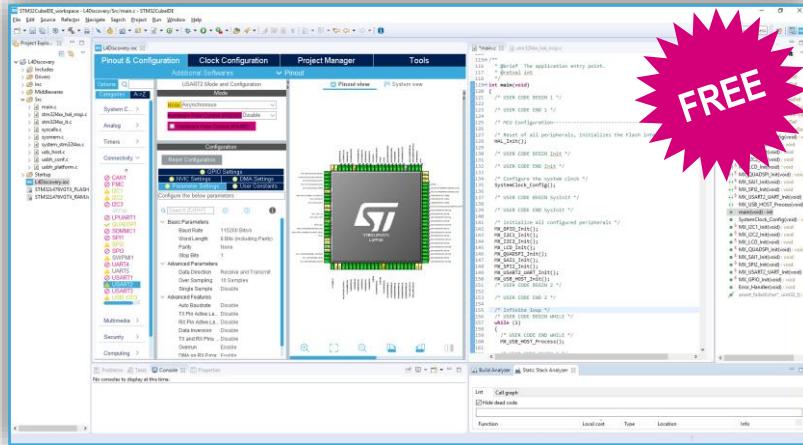


Integrated Solution

TrueSTUDIO based environment

STM32CubeIDE integration

Free Multi-platform Development Tool



Free for Commercial Development

Eclipse/GCC Based

Multi Operating System Support

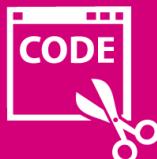
One Tool for All Your Development on STM32

27

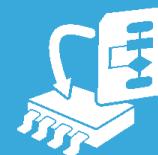
Chipset / Board
Configuration



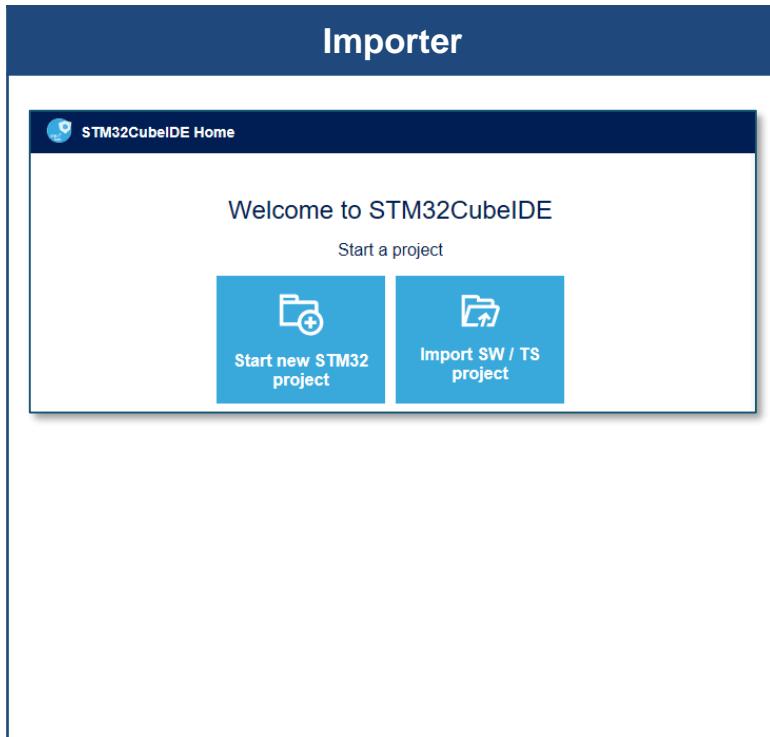
Code
Development



Validation
Debug



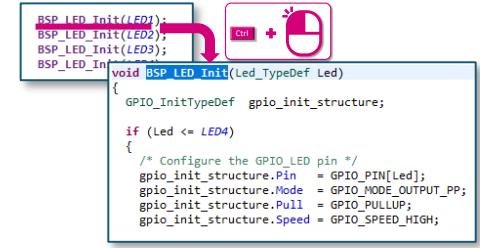
Project Management



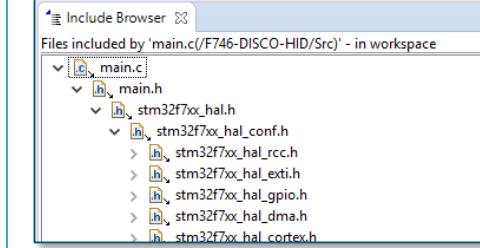
Code Editor – Navigation (1)



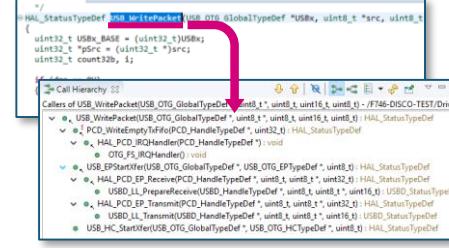
Symbol Hyperlink



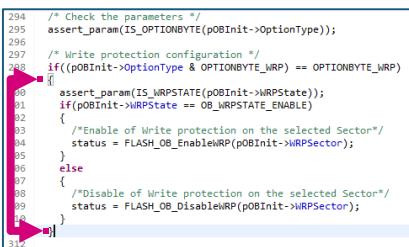
Include Browser



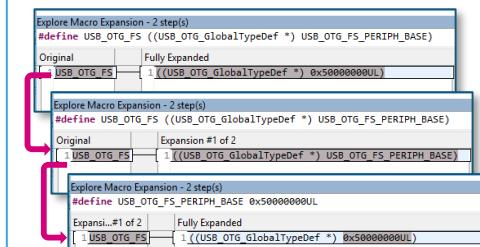
Call Hierarchy



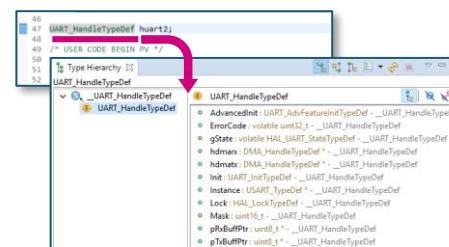
Brace Navigation



Macro Expansion Browser



Type Hierarchy

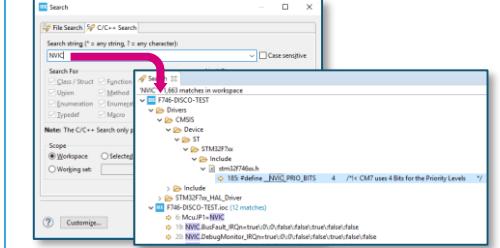


Code Editor – Navigation (2)

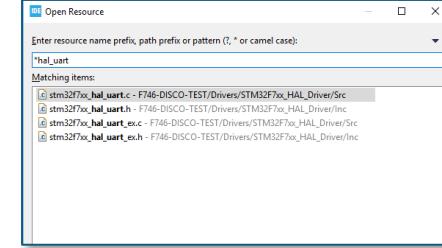


Outline View

Powerful Search



Open Resource



Task Tags

Bookmark

Minimap



```
startup_stm32746ngxs:
81    movs r1, #0
82    b LoopCopyDataInit
83
84CopyDataInit:
85    ldr r3, _sdata
86    ldr r3, [r3, r1]
87    str r3, [r0, r1]
88    adds r1, r1, #4
89
90LoopCopyDataInit:
91    ldr r0, _edata
92    ldr r3, =edata
93    adds r2, r0, r1
94    cmp r2, r3
95    bne CopyDataInit
96    ldr r2, =sbo5
97    b LoopFillZeroBss
```

Code Editor – Writing



Highlight Inactive Code

```

157 #if defined ( __ICCARM__ ) /* IAR Compiler */
158 #endif /* __ICCARM__ */
159 #endif /* __attribute__((aligned)) */
160 /* USB standard device descriptor. */
161 /* USB standard device descriptor. */
162 #include "usb_desc.h" __attribute__((aligned))
163
164 #define USB_DESC_TYPE_DEVICE, /*DeviceDescriptorType*/
165 #define (USB0_LPM_ENABLED == 1) /*bcdUSB */ /* changed to USB version 2.01
166 in order to support LPM L1 suspend
167 resume test of USBCV3.0*/
168
169 /*else
170 #endif /* (USB0_LPM_ENABLED == 1) */
171 #endif /* USB0_LPM_ENABLED */
172 #endif /* (USB0_LPM_ENABLED == 1) */
173 #endif /* USB0 */
174 #endif /* USB0 */
175 /*DeviceClass*/
176 /*DeviceSubClass*/
177 /*MaxPacketSize0*/
178 /*MaxEP0_Size,
179 L0B7E(USB0_VID),
180 HIBYTE(USB0_VID),
181 /*IdVendor/
182 /*IdVendor/

```

Auto-Complete

```

/* USER CODE BEGIN 2 */
97 HAL_GPIO
98
99
100 /* Infini
101   HAL_GPIO_DeInit(GPIOx, uint32_t GPIO_Pin): void
102   HAL_GPIO_EXTI_Callback(uint16_t GPIO_Pin): void
103   HAL_GPIO_Init(GPIO_TypeDef * GPIOx, GPIO_InitTypeDef * GPIO_InitStruct): void
104   HAL_GPIO.LockPin(GPIO_TypeDef * GPIOx, uint16_t GPIO_Pin): HAL_Status
105   HAL_GPIO.ReadPin(GPIO_TypeDef * GPIOx, uint16_t GPIO_Pin): GPIO_PinS
106   HAL_GPIO.TogglePin(GPIO_TypeDef * GPIOx, uint16_t GPIO_Pin): void
107   HAL_GPIO.WhitePin(GPIO_TypeDef * GPIOx, uint16_t GPIO_Pin, GPIO_PinS
108   # HAL_MODULE_ENABLE
109
110
111 /**
112  * @brief < >
113  * @retval
114

```

Syntax Highlight

```

116 void SystemClock_Config(void)
117 {
118   RCC_OscInitTypeDef RCC_OscInitStruct = {0};
119   RCC_ClkInitTypeDef RCC_ClkInitStruct = {0};
120   RCC_PeriphCLKInitTypeDef PeriphClkInitStruct = {0};
121
122   /* Configure the main internal regulator output voltage
123   */
124   HAL_RCC_PWR_CLK_ENABLE();
125   HAL_PWR_VOLTAGESCALING_CONFIG(PWR_REGULATOR_VOLTAGE_SCALE3);
126   /* Initializes the CPU, AHB and APB busses clocks
127
128   RCC_OscInitStruct.OscillationType = RCC_OSCILLATORTYPE_HSI|RCC_OSCILLA
129   RCC_OscInitStruct.HSEState = RCC_HSE_ON;
130   RCC_OscInitStruct.HSISState = RCC_HSIS_ON;
131   RCC_OscInitStruct.HSICalibrationValue = RCC_HSICALIBRATION_DEFAULT;
132   RCC_OscInitStruct.PLL.PLLState = RCC_PLL_ON;
133   RCC_OscInitStruct.PLL.PLLSource = RCC_PLLSOURCE_HSE;
134   RCC_OscInitStruct.PLL.PLLM = 15;
135   RCC_OscInitStruct.PLL.PLLN = 144;

```

File Diff/Compare

The screenshot shows a 'C Compare' interface with two panes. The left pane lists files: 'StdDefTask', 'SystemClock_Config', 'cmsis_os.h', 'fatty.h', and 'usb_device.h'. The right pane shows the differences between 'F746-DISCO-TEST/Src/main.c' and 'F746-DISCO-TEST-2/Src/main.c'. The differences are highlighted in red and green, indicating additions and deletions respectively.

Block Select

The screenshot shows a code editor with a red arrow pointing to a block of code. The code is enclosed in a red box and includes multiple 'HAL_GPIO_TogglePin' calls and a 'while' loop. The code is annotated with comments: /* USER CODE BEGIN 2 */ and /* Infinite loop */.

Code Style

The screenshot shows the 'Formatter' preferences dialog. The 'Active profile' dropdown is set to 'K&R [built-in]'. Other options include 'BSD [built-in]', 'GNU [built-in]', and 'Whitesmiths [built-in]'. A preview window shows a sample C code snippet with syntax highlighting. The 'Editor' tab is also visible.

Build Tools



Build Analyzer

Build Analyzer Static Stack Analyzer Search

F769-DISCO-ITCM.elf - /F769-DISCO-ITCM/Debug - May 10, 2019 3:28:29 PM

Memory Regions Memory Details

Region	Start address	End address	Size	Free	Used	Usage (%)
FLASH	0x08000000	0x08200000	2048 KB	2043.22 KB	4.78 KB	0.23%
RAM	0x20000000	0x20080000	512 KB	510.45 KB	1.55 KB	0.30%
ITCMRAM	0x00000000	0x00004000	16 KB	15.48 KB	528 B	3.22%

Build Analyzer Static Stack Analyzer Search

F769-DISCO-ITCM.elf - /F769-DISCO-ITCM/Debug - May 10, 2019 3:28:29 PM

Memory Regions Memory Details

Name	Run address (VMA)	Load address (LMA)	Size
ITCMRAM	0x00000000		16 KB
FLASH	0x08000000	0x0800110c	528 B
ITCMRAM	0x00000000	0x0800110c	528 B
.isr_vector	0x08000000	0x08000000	60 B
.text	0x0800003c	0x0800003c	4,16 KB
.rodata	0x080010e0	0x080010e0	16 B
.ARM	0x080010f0	0x080010f0	8 B
.preinit_array	0x080010f8	0x080010f8	0 B
.init_array	0x080010f8	0x080010f8	4 B
.fini_array	0x080010fc	0x080010fc	4 B
data	0x20000000	0x08001100	12 B
RAM	0x20000000		512 KB
.data	0x20000000	0x08001100	12 B
.bss	0x2000000c		32 B
_user_heap_stack	0x2000002c		1.5 KB

Static Stack Analyzer

Build Analyzer Static Stack Analyzer Search

F769-DISCO-ITCM.elf - /F769-DISCO-ITCM/Debug - May 10, 2019 3:28:29 PM

List Call graph

Hide dead code

Function	Type	Location	Info
SystemClock_Config	STATIC	main.c:108	
NVIC_EncodePriority	STATIC	core_cm7.h:2071	
HAL_RCC_GetSysClockFreq	STATIC	stm32f7xx_hal_rcc.c:982	
HAL_NVIC_SetPriority	STATIC	stm32f7xx_hal_rcc.c:344	
HAL_RCC_OscConfig	STATIC	stm32f7xx_hal_rcc.c:165	
_NVIC_SetPriorityGrouping	STATIC	core_cm7.h:1865	
HAL_RCC_ClockConfig	STATIC	stm32f7xx_hal_rcc.c:703	
HAL_InitTick	STATIC	stm32f7xx_hal.c:231	

Build Analyzer Static Stack Analyzer Search

F769-DISCO-ITCM.elf - /F769-DISCO-ITCM/Debug - May 10, 2019 3:28:29 PM

List Call graph

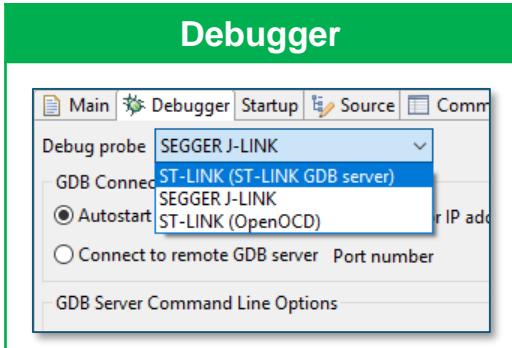
Function	Depth	Max cost	Local cost	Type	Location
LoopFillZero	7	208	0	STATIC	stm32f7xx_it.c:182
SysTick_Handler	0	8	8	STATIC	stm32f7xx_it.c:70
NMI_Handler	0	4	4	STATIC	stm32f7xx_it.c:128
UsageFault_Handler	0	4	4	STATIC	stm32f7xx_it.c:169
PendSV_Handler	0	4	4	STATIC	stm32f7xx_it.c:113
HardFault_Handler	0	4	4	STATIC	stm32f7xx_it.c:83
HAL_IncTick	0	4	4	STATIC	stm32f7xx_hal.c:290
SVC_Handler	0	4	4	STATIC	stm32f7xx_it.c:143
DebugMon_Handler	0	4	4	STATIC	stm32f7xx_it.c:156
MemManage_Handler	0	4	4	STATIC	stm32f7xx_it.c:98
BusFault_Handler	0	4	4	STATIC	stm32f7xx_it.c:113
Reset_Handler	0	0	0	STATIC	stm32f7xx_it.c:113
__init	0	0	0		

Headless Build

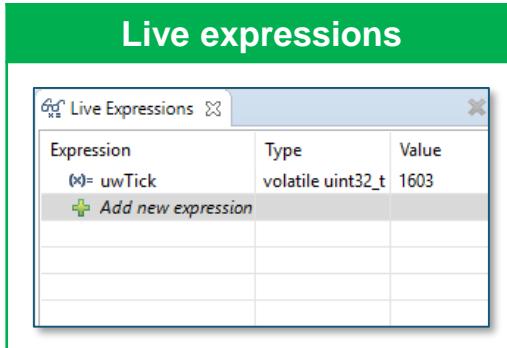
- Build project without opening IDE
- Continuous Integration
- No GUI shown but build system becomes active
- Supported for makefile and managed projects



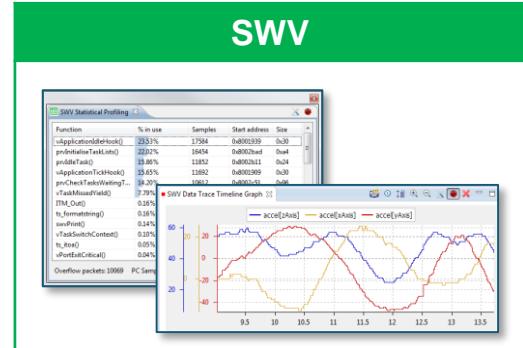
Debugger



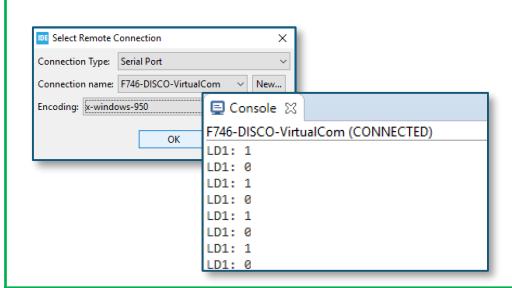
Live expressions



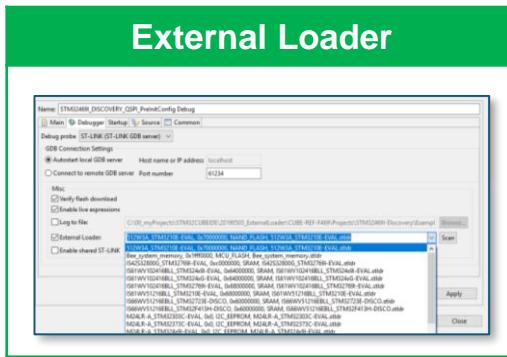
SWV



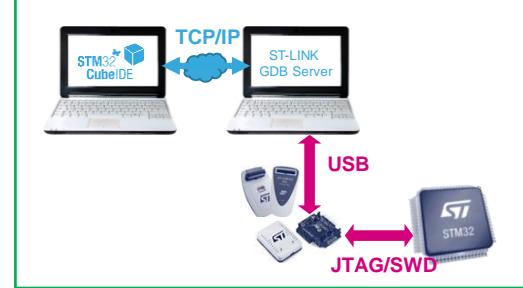
Integrated UART Terminal

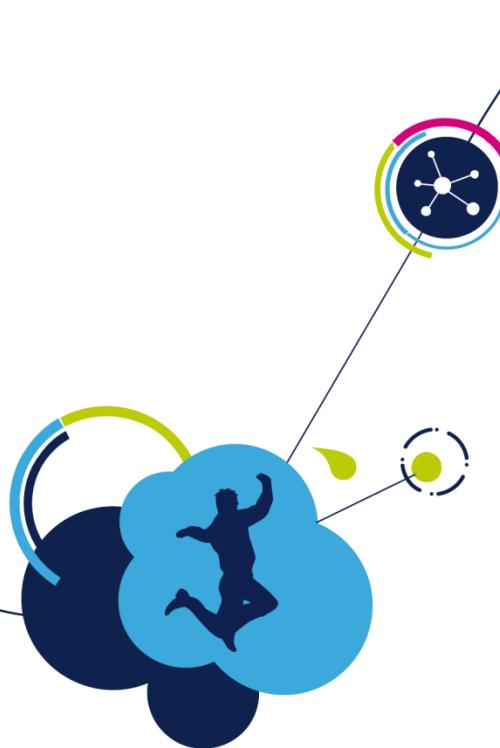


External Loader



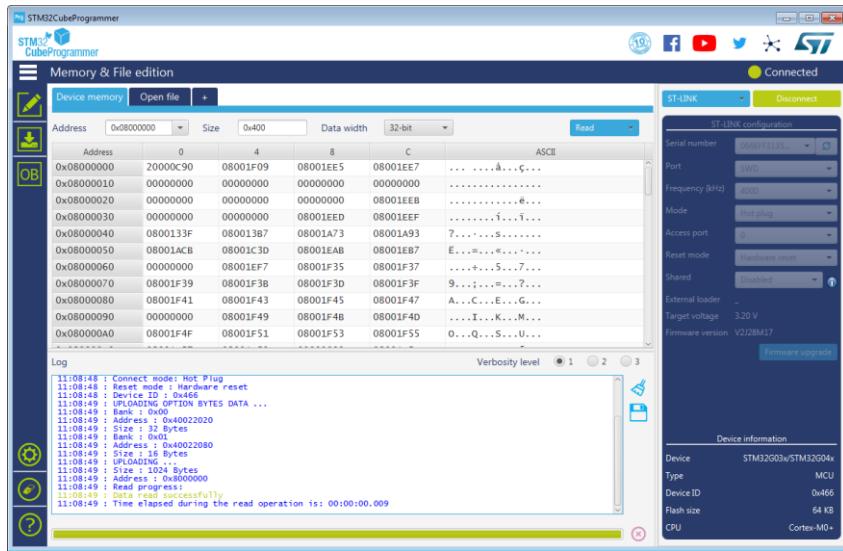
Remote Debug





STM32CubeProgrammer

All-in-one Programming Software Tool



Multi-platform
(Windows, Linux, macOS)

Intuitive Graphical
User Interface

STLink Direct Support
(JTAG, SWD)

Automatic Mode

Option Bytes
Program & Upload

Command Line Interface
for Scripting

Internal / External
Flash Services

API DLL
for Custom Integration

Bootloader Interface Support
(USB, UART, SPI, I2C,
CAN)

Trusted Package Creator
(secure programming)

Easier, Faster, Affordable

Stand-alone or On-board

Multi-path Bridge

All-in-one STM32CubeProgrammer
Software Tool

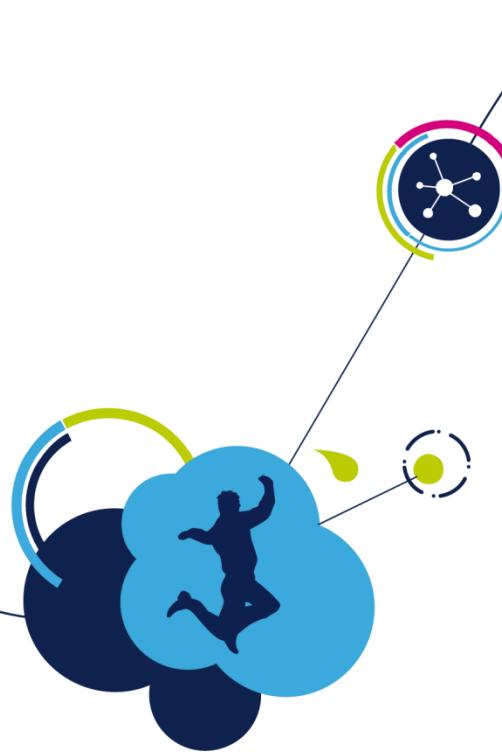
Large choice of STM32 Software
Tools partners



STLINK Comparison

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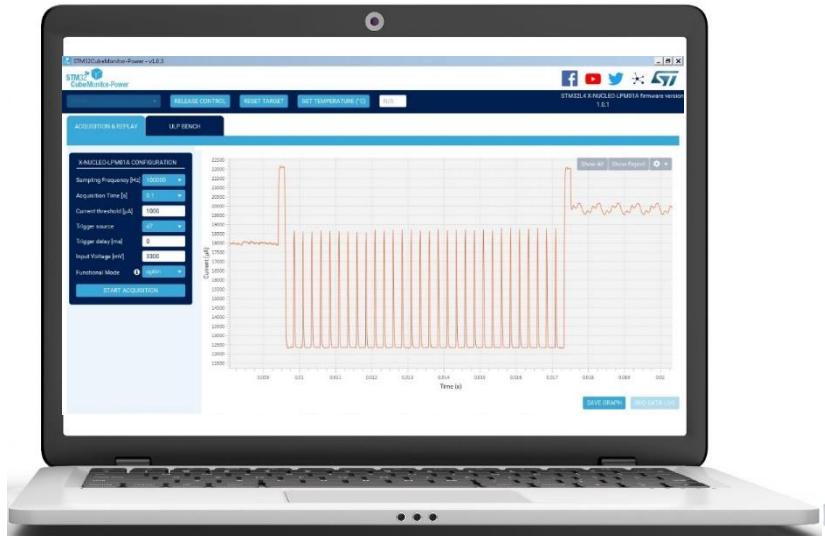
Feature	ST-LINK/V2	STLINK-V3SET
USB	FS (12 Mbits/s)	HS (480 Mbits/s)
CPU	STM32F1	STM32F7
SWD max freq	4.6 MHz	14 MHz
JTAG max freq	9 MHz	27 MHz
Drag&Drop Flash Programming	V2-1 only	Yes
SWD Max Read Data Rate	120 kBytes/s	512 kBytes/s
Reference Price	USD\$21	USD\$35



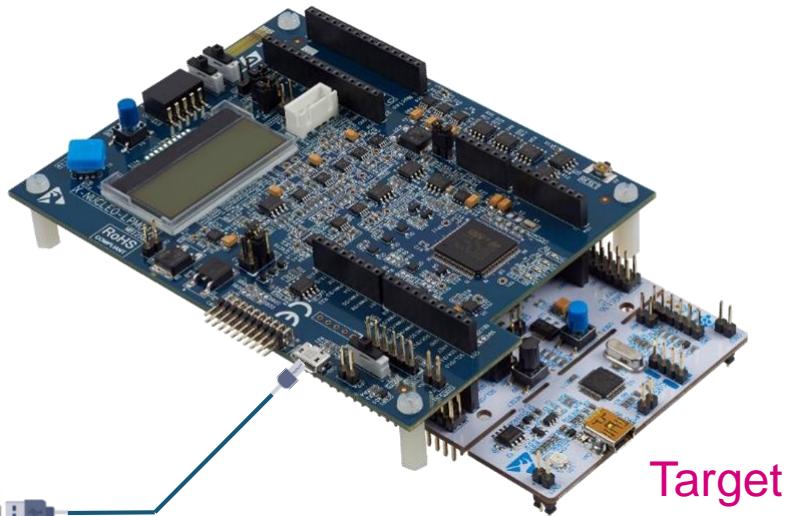
STM32CubeMonitor - Power

STM32CubeMonitor-Power

39



Power Shield



Target

Power Shield

40

STM32
CubeMonitor-Power

X-NUCLEO-LPM01A



Ultra-low power consumption measurements

Compatible with all Nucleo form factors (32 / 64 / 144)

Graphical analysis with STM32CubeMonitor-Power tool

Custom test sessions with scripting

Reference tool for EEMBC ULPMark benchmark



STM32 Power Profiling



Ultra-low-power Consumption Measurements

- Supply target board from 1.8V to 3.3V
- Dynamic current from 100 nA to 50 mA
- Static current from 1 nA to 200 mA
- Accuracy approximately 2%

Intuitive User Experience

- Two operating modes (**stand-alone** or **PC-controlled**)
- Graphical PC application (reference: STM32CubeMonPwr)

Resale Price (RRP) 70\$

Official EEMBC Energy Monitor v2.0

Direct computation of ULPMark scores



- The Power Consumption Calculator (PCC) uses a database of typical values to estimate power consumption, DMIPS, and battery life of STM32 MCUs.
- It includes a GUI tool integrated into the STM32CubeMX
- Highly configurable scenarios with validity check are available
- Use the battery selector or define a custom battery
- Facilitates comparison with other MCUs or other power options
- Import, export and generate reports

Using the PCC

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General PCC configuration panel

Sequence configuration

Result overview

myproject.ioc*: STM32G070RBTx

File Window Help

STM32G070RBTx myproject.ioc - Tools GENERATE CODE

Pinout & Configuration Clock Configuration Project Manager Tools

Sequence Table

Step	Mode	V _{DD}	Range/Scale	Memory	CPU/Bu...	Clock Config	Peripherals	Step Current	Duration
1	RUN	1.8	Range1-High	FLASH	16 MHz	HSE BYP	ADC1fs_10_ksp...	2.55 mA	1 ms
2	STANDBY	1.8	NoRange	FLASH	16 MHz	HSI	RTC*	770 nA	1 ms
3	LOWPOWER_RUN	1.8	NoRange	FLASH	2 MHz	HSI Regulator_LP	GPIOA GPIOB GPIO...	496.73 μ A	1 ms
4	LOWPOWER_SLEEP	1.8	NoRange	Flash-Po...	1 MHz	HSI Regulator_LP	IOPORT_Bus RTC ...	243.3 μ A	2 ms
5	VBAT	3.0	NoRange	FLASH	16 MHz	HSI Regulator_LP	RTC*	2 nA	1 ms
6	RUN	1.8	Range2-Medium	SRAM1 FI...	4 MHz	HSE BYP	GPIOA GPIOB GPIO...	559.26 μ A	1300 μ s
7	SLEEP	1.8	Range2-Medium	FLASH	8 MHz	HSE BYP	GPIOA GPIOB GPIO...	489.02 μ A	2 ms
8	STOP0	3.0	NoRange	Flash-Po...	16 MHz	HSI_KERON	IWDG* RTC*	308 μ A	500 μ s

Display

Plot: All Steps

Consumption Profile by Step

Consumption (mA)

Time (ms)

Legend: Idd by Step (magenta line), Average Current (blue line)

Sequence Time / Ta Max 11 ms / 129.7 °C

Battery Life Estimation 1 year, 7 months, 7 days, 11 hours

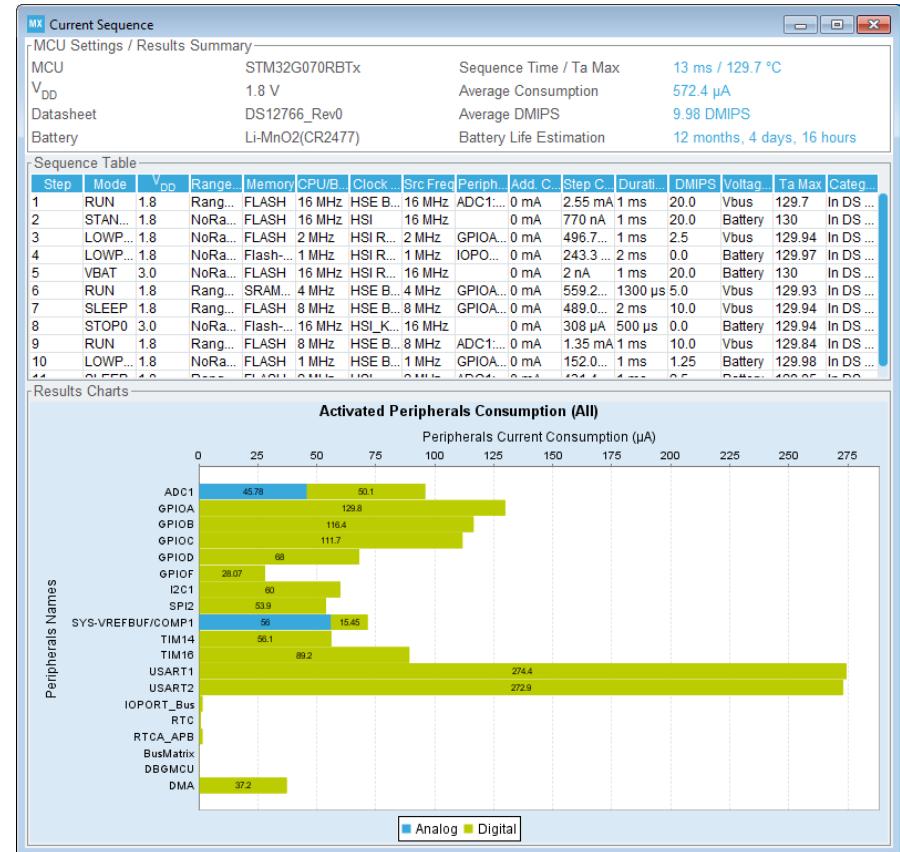
Average Consumption 624.37 μ A

Average DMIPS 11.93 DMIPS

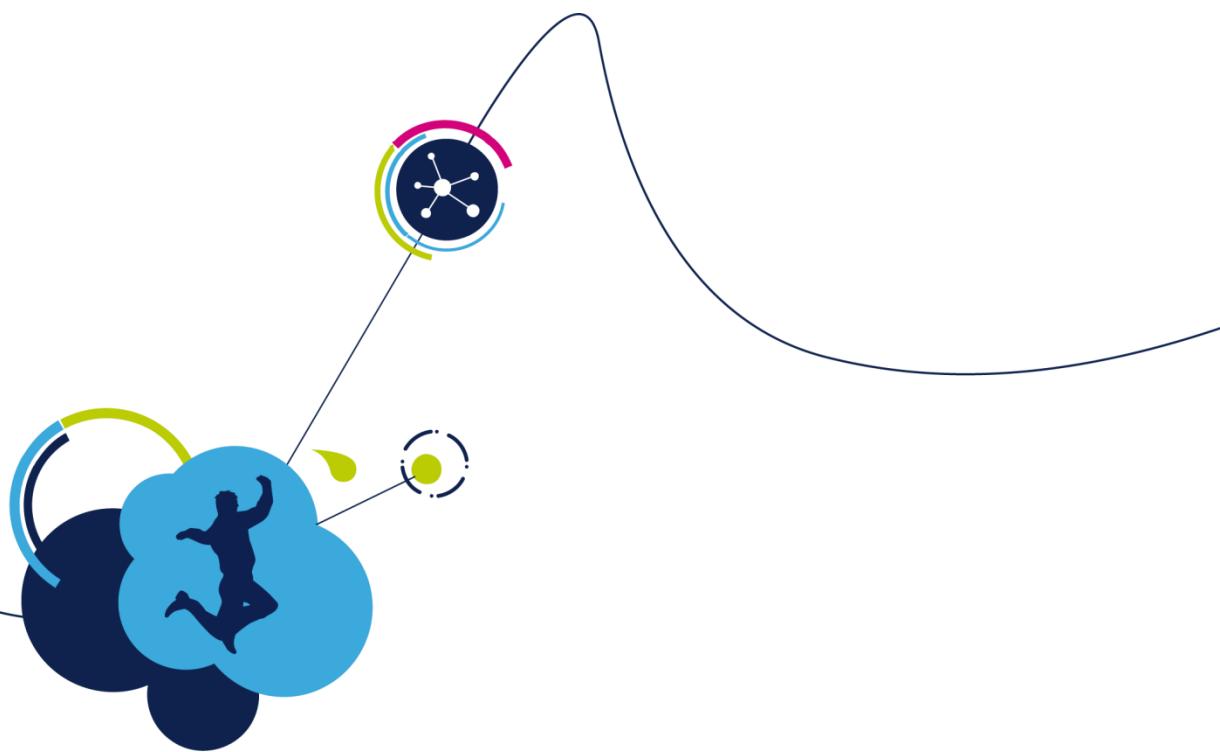
Sequence consumption profile display

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- It's possible to detach the charts to external display for presentation purposes.
- Several different views selectable
 - Plot current vs time
 - Pie chart
 - Consumption of peripherals



- For more details, please refer to the following resources
 - UM1718 – User manual
 - DB2163 – Product specifications
 - TN0072 – Product technical note
 - RN0094 – Product release note
- STM32CubeMX tool is downloadable from www.st.com/stm32cube
- STM32CubeMX needs Java RE
 - Check release notes of the particular version for additional requirements.
 - Multiplatform tool runs on Windows, Linux and macOS
 - Download from www.java.com/en/download/

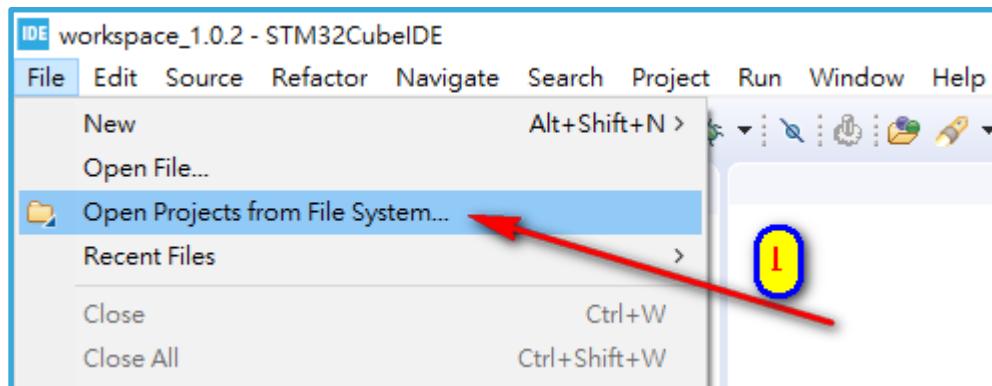


LAB1 - Demonstration Firmware

LAB1 – Demonstration

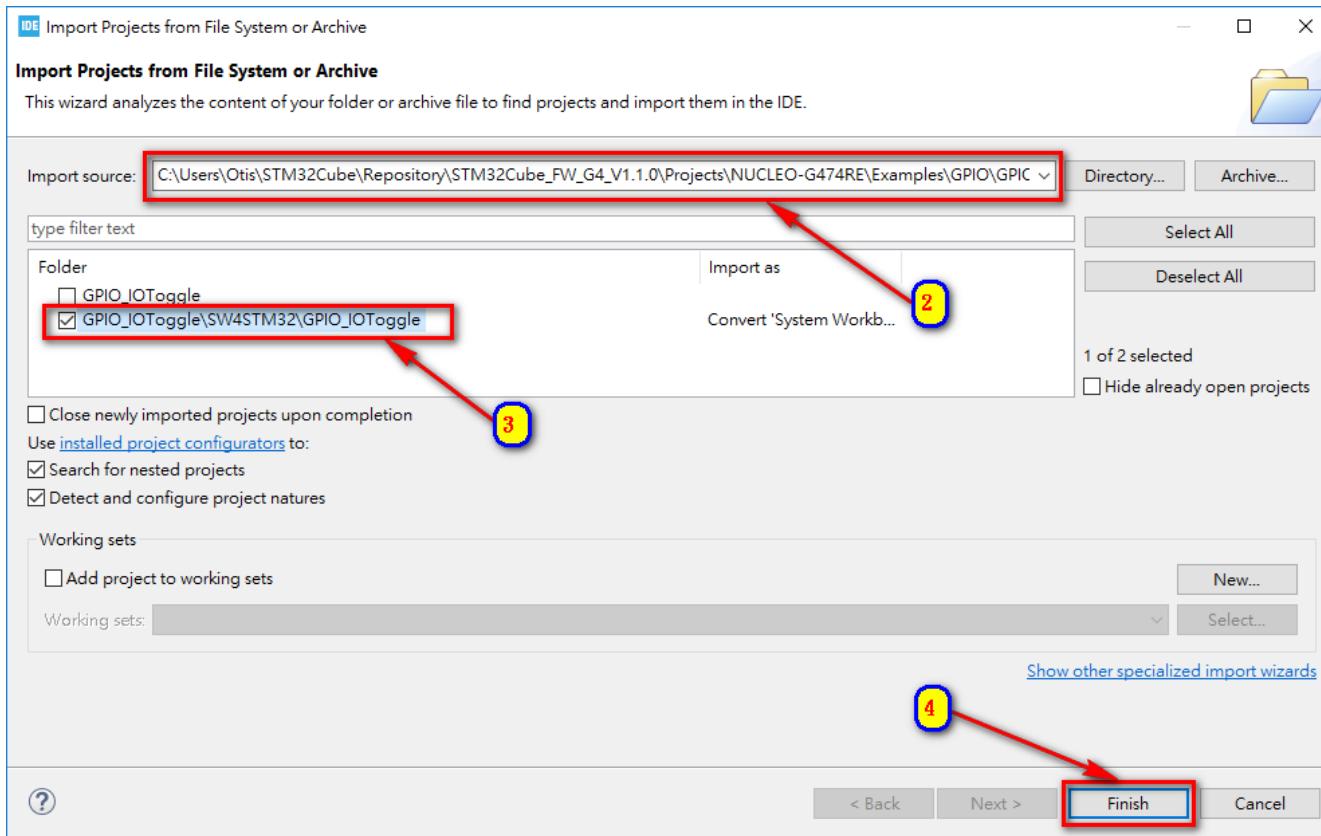
47

- STM32CubeIDE
 - Open Projects from File System.

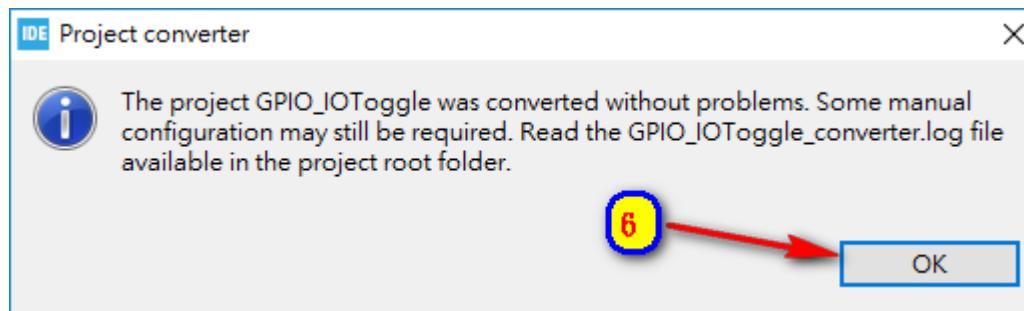
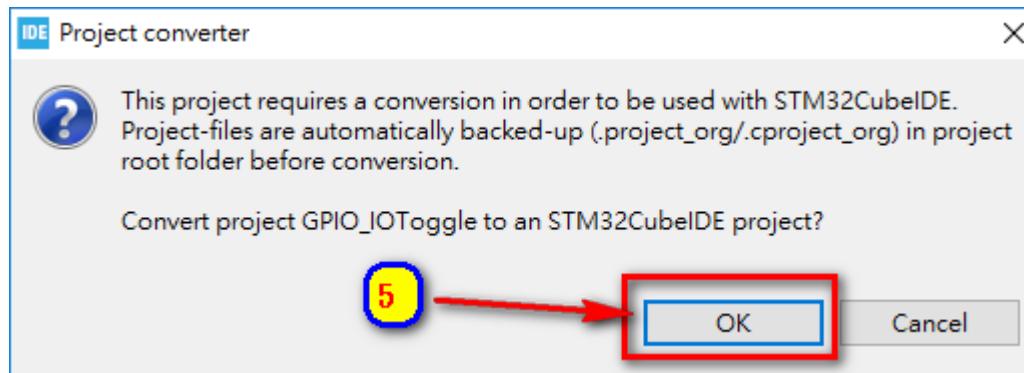


- STM32CubeIDE

- Import Projects from File System.
- C:\Users\Otis\STM32Cube\Repository\STM32Cube_FW_G4_V1.1.0\Projects\NUCLEO-G474RE\Examples\GPIO\GPIO_IOToggle



- STM32CubeIDE
 - Project converter to CubeIDE

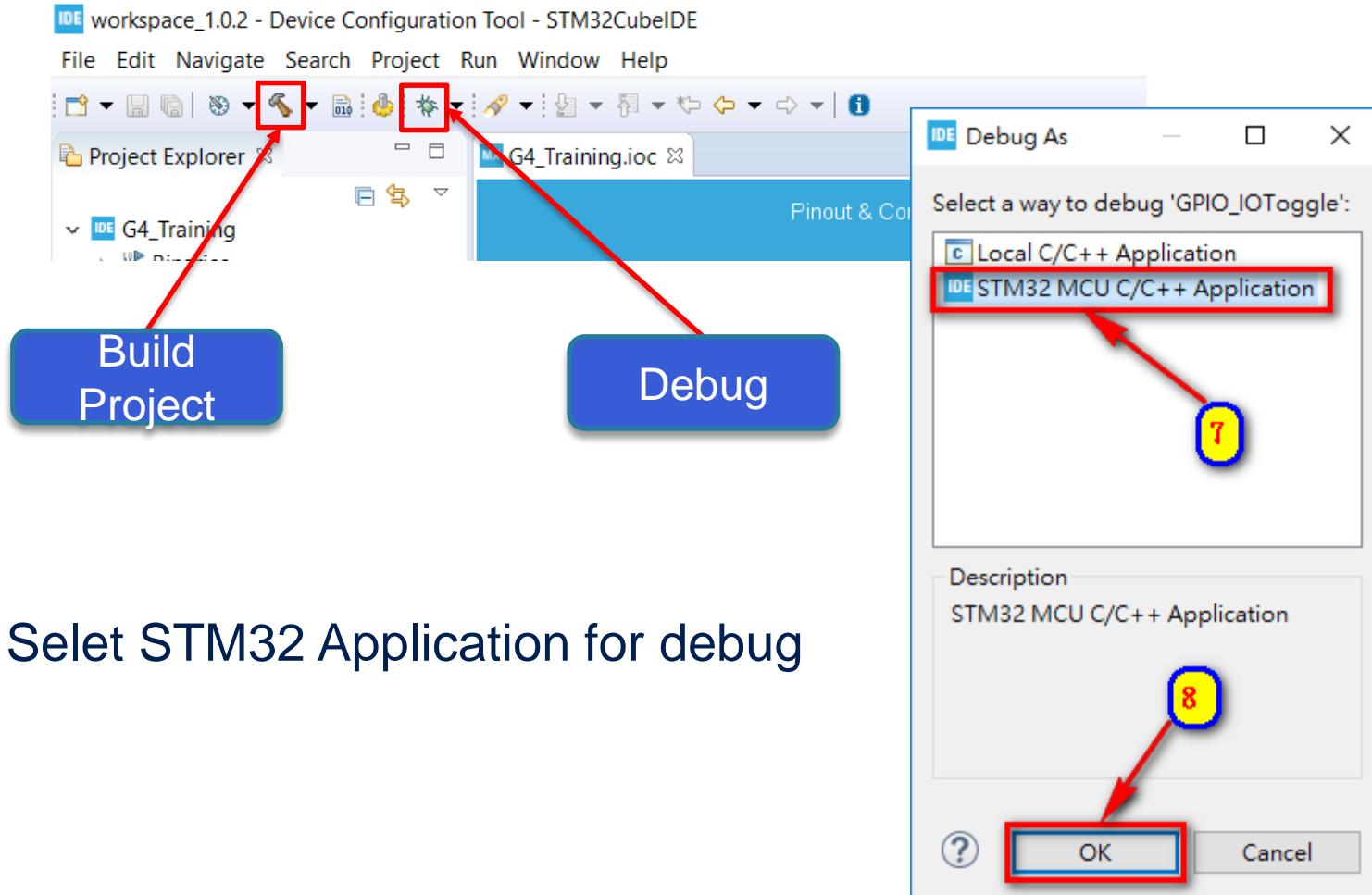


LAB1 – Demonstration

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- STM32CubeIDE

- Build the project by click “Make” and then “Download and Debug”.

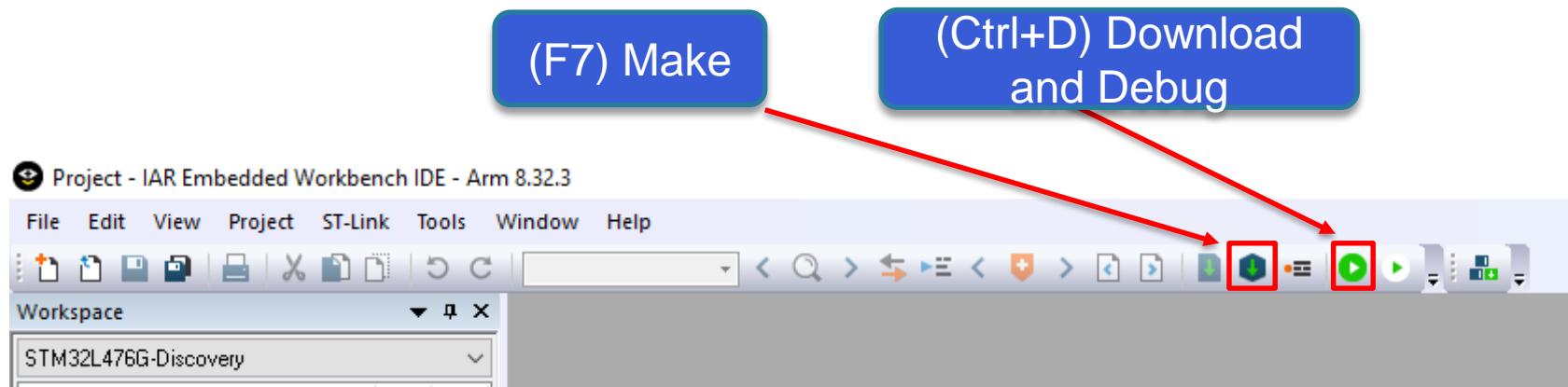


- Select STM32 Application for debug

LAB1 – Demonstration

- If IAR EWARM

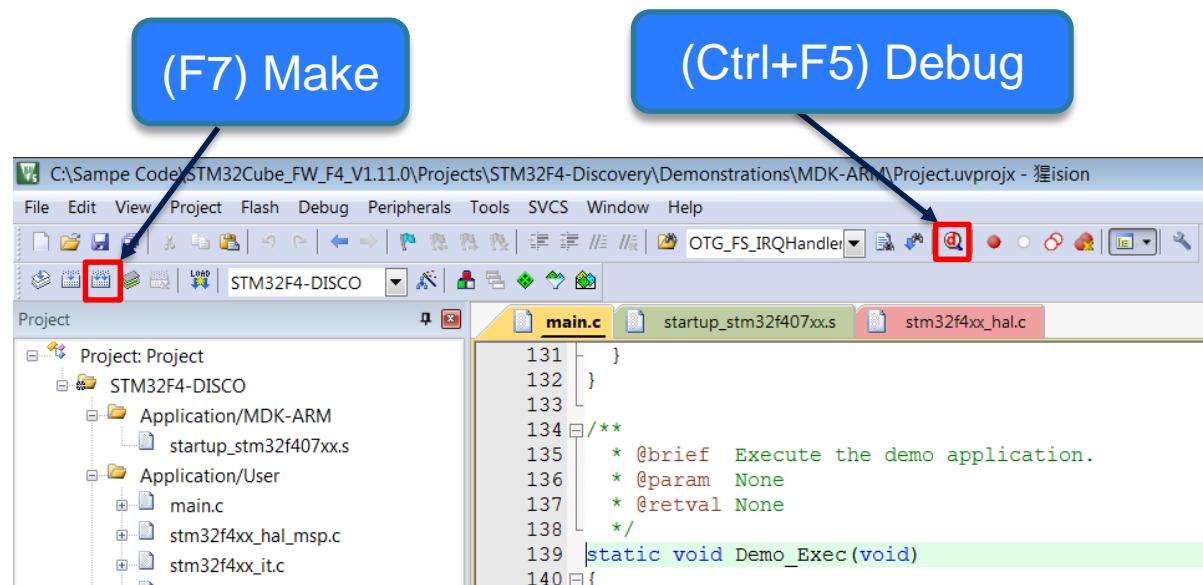
- Build the project by click “Make” and then “Download and Debug”.



LAB1 – Demonstration

- If MDK-ARM (Keil)

- Build the project by click “Make” then “Download and Debug”.



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