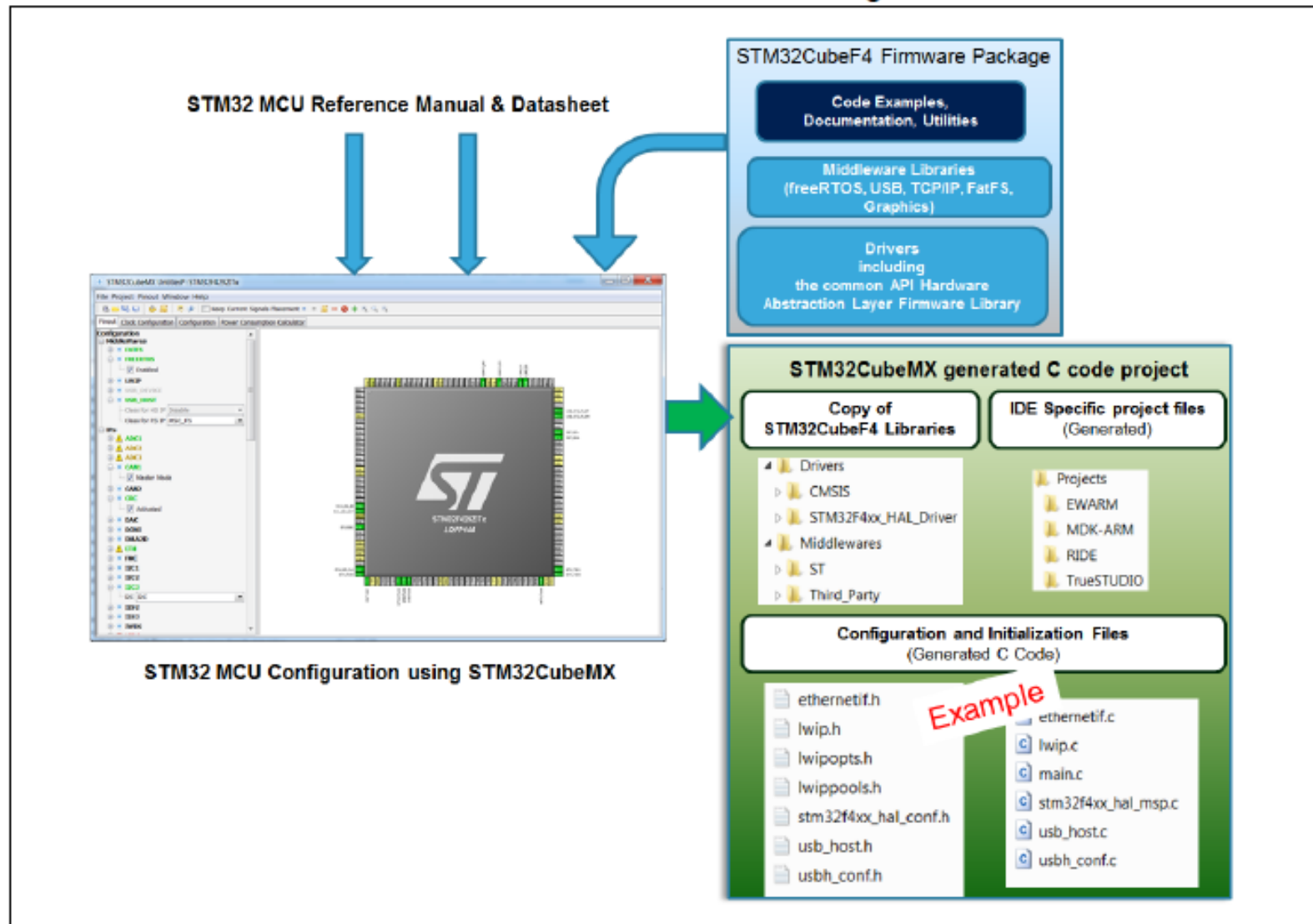


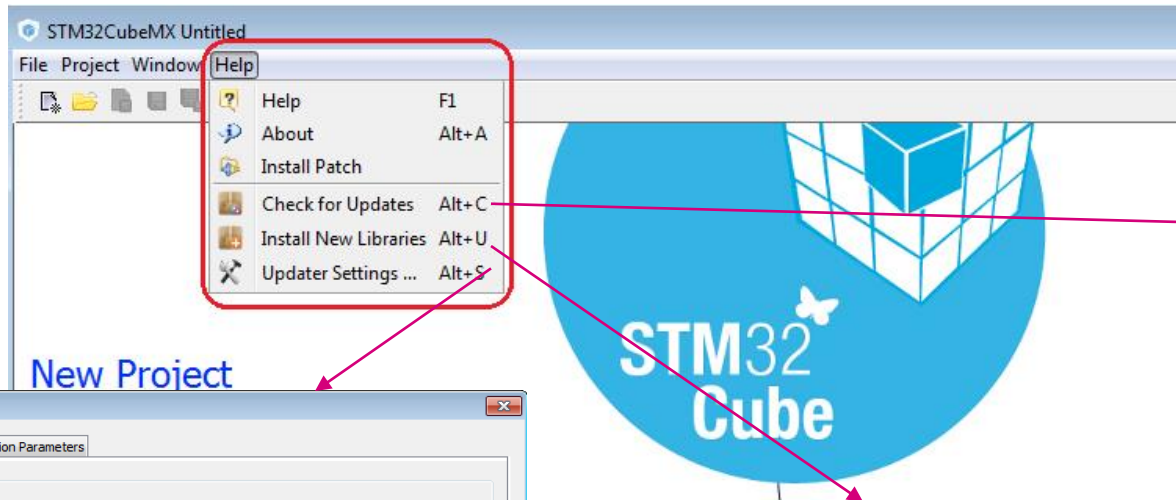
# Hands-On n.5

## CubeMX & STM32F7 Library

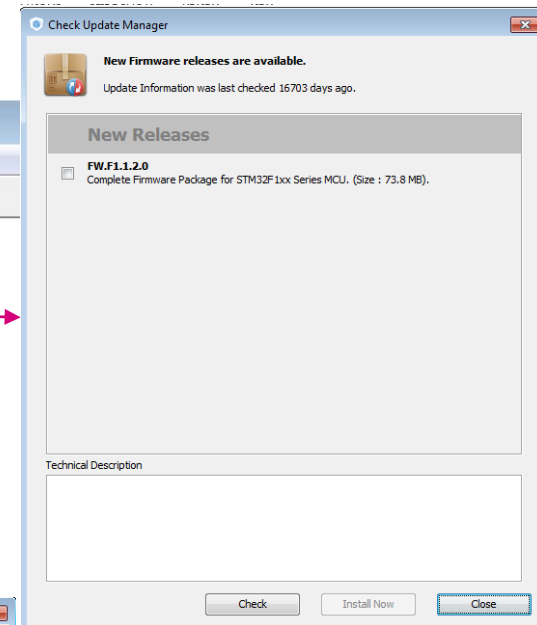
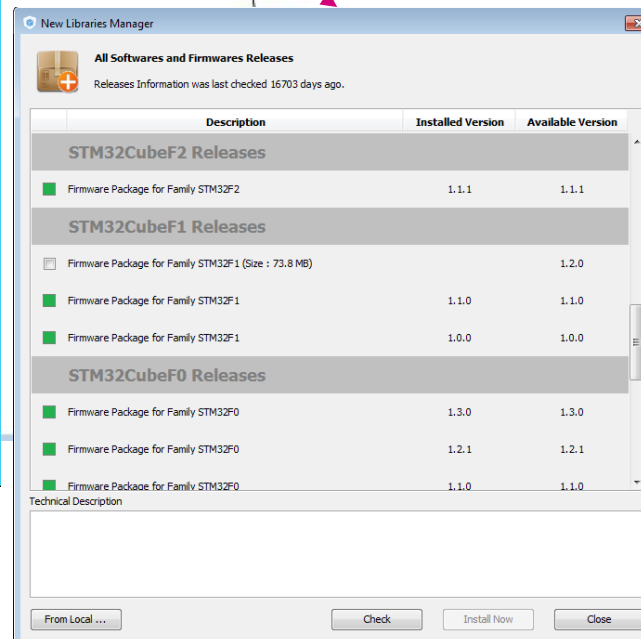
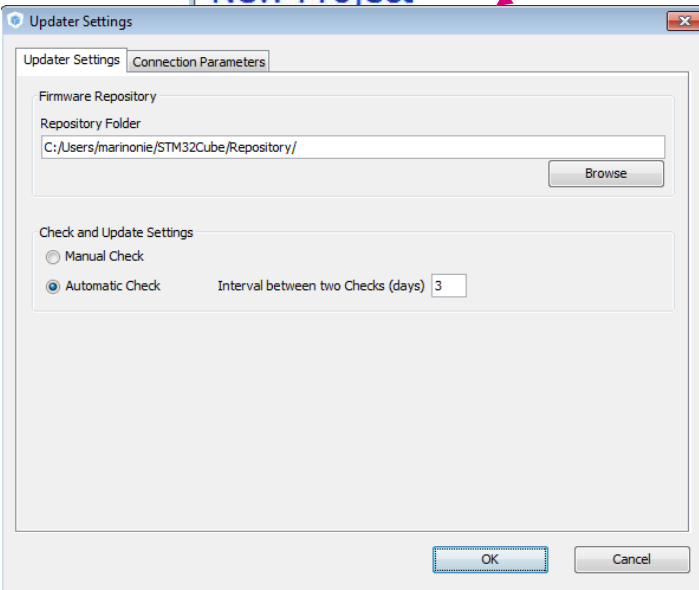


## Overview of STM32CubeMX C code generation flow





New Project



# CubeMX – New Project

5

STM32CubeMX Untitled

File Project Window Help

New Project

MCU Selector Board Selector

Board Filter

Vendor : STMicronics

Type of Board : Discovery

MCU Series : STM32F7

☐ Initialize all IP with their default Mode

Peripheral Selection

Peripherals	Nb	Max
Accelerometer	<input type="checkbox"/>	N/A
Analog I/O	0	0
Audio Line In	<input type="checkbox"/>	N/A
Audio Line Out	<input type="checkbox"/>	N/A
Button	0	1
CAN	0	0
Camera	<input type="checkbox"/>	N/A
Compass	<input type="checkbox"/>	N/A
Digital I/O	0	128
Eeprom	<input type="checkbox"/>	N/A
Ethernet	<input type="checkbox"/>	N/A
Flash Memory	0	0
Graphic Lcd Display	<input type="checkbox"/>	N/A
Gyroscope	<input type="checkbox"/>	N/A
IrDA	<input type="checkbox"/>	N/A
Joystick	<input type="checkbox"/>	N/A
Lcd Display	<input type="checkbox"/>	N/A
Led	0	2
Light Sensor	<input type="checkbox"/>	N/A
Memory Card	<input type="checkbox"/>	N/A
Micro	0	0
Potentiometer	<input type="checkbox"/>	N/A
Pressure Sensor	<input type="checkbox"/>	N/A
RS-232	0	0
RS-485	<input type="checkbox"/>	N/A
SRAM/SDRAM	0	1

Boards List: 1 Item

Type	Reference	MCU
Discovery	STM32F746G-DISCO	STM32F746NGHx

OK Cancel

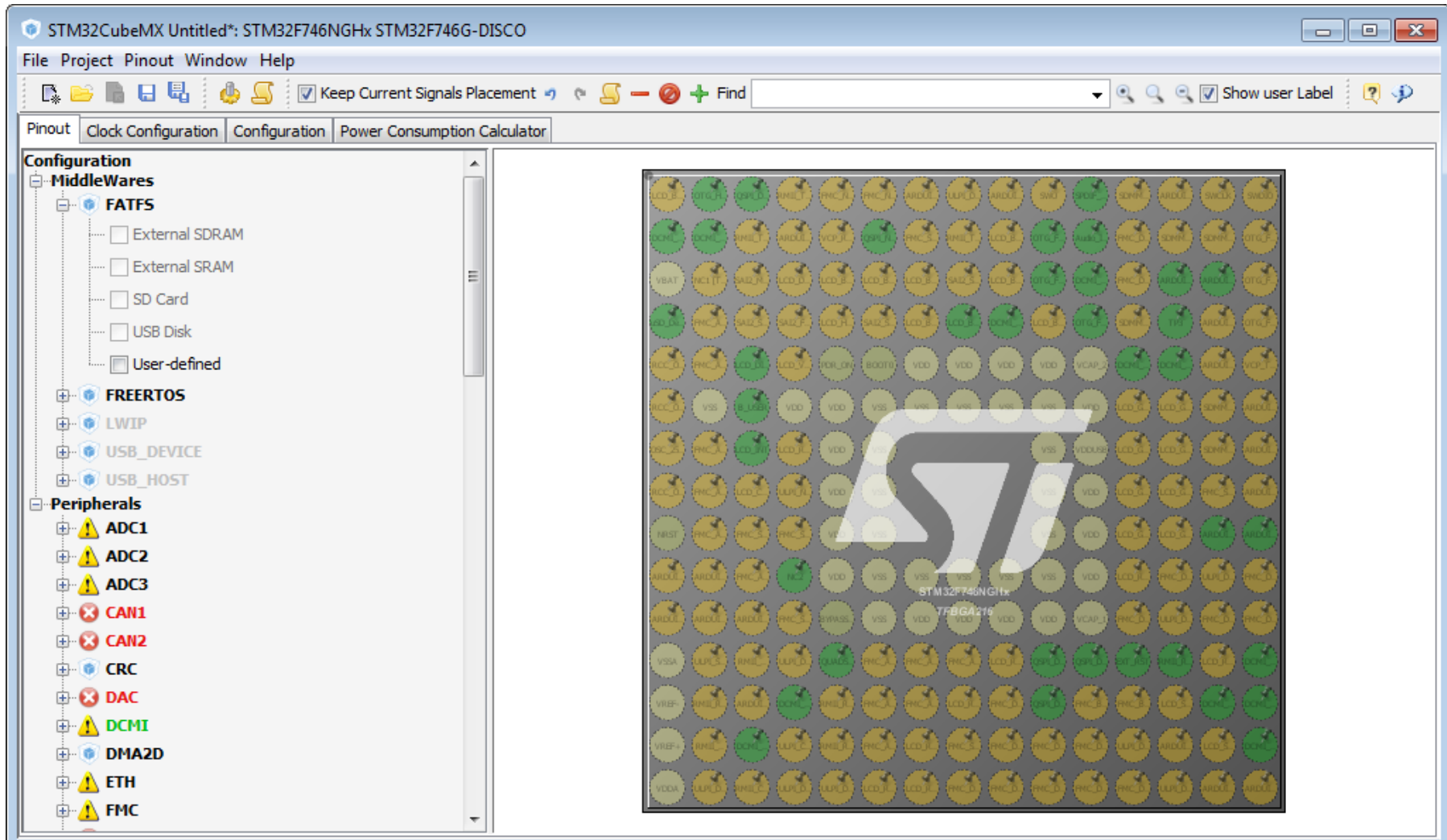
New Project

Load Project

Help

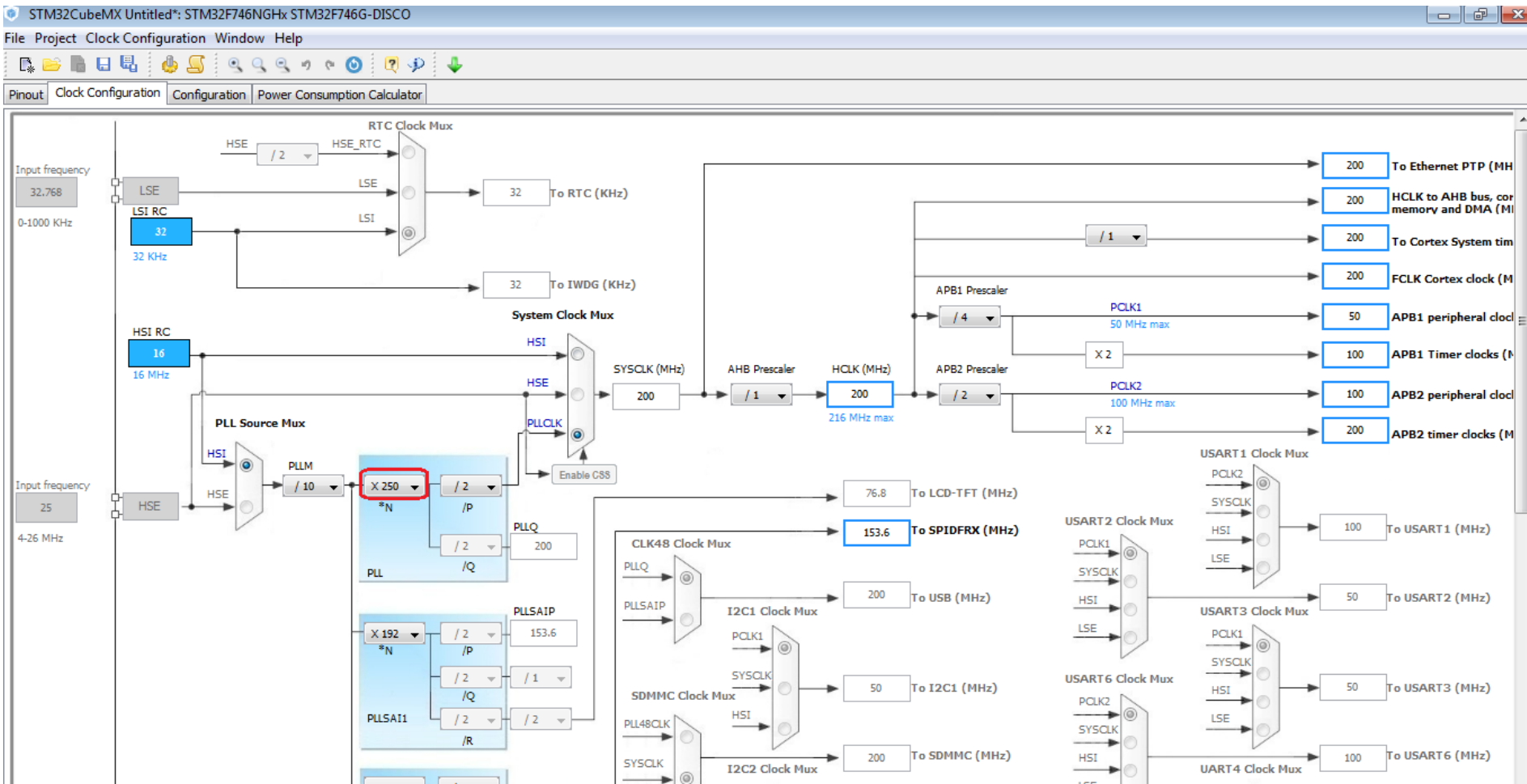
# CubeMX – New Project

6



# CubeMX – New Project

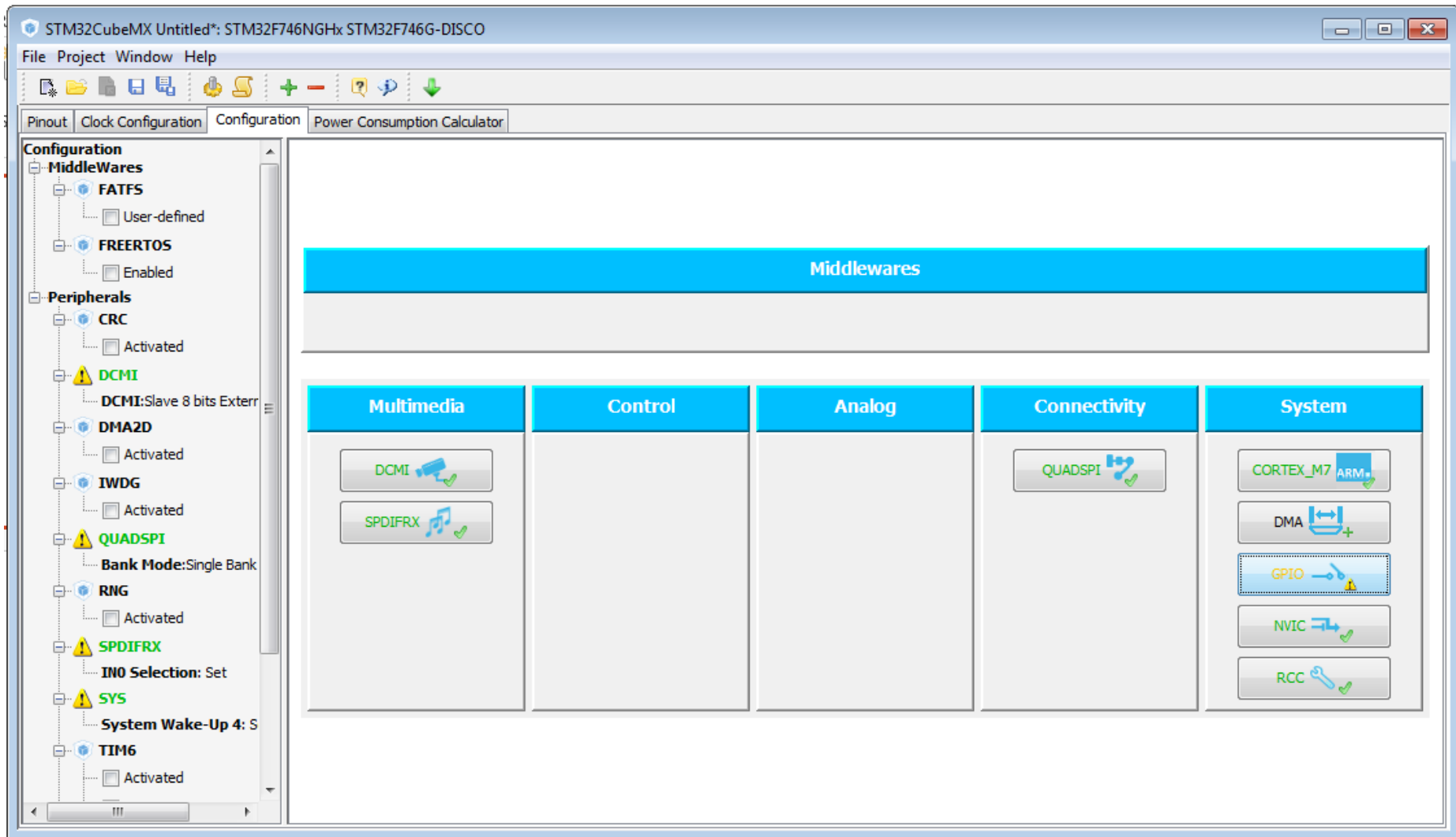
7





# CubeMX – New Project

8





# CubeMX – New Project

9

STM32CubeMX Untitled\*: STM32F746NGHx STM32F746G-DISCO

File Project Power Window Help

Pinout Clock Configuration Configuration Power Consumption Calculator

**Microcontroller Selected**

Series: STM32F7  
Line: STM32F7x6  
MCU: STM32F746NGHx  
[Datasheet](#): 027590\_Rev1

**Parameter Selection**

Ambient Temperature (... 25  
Vdd Power Supply (V): 3.3

**Battery Selection**

Select Battery

Battery: Alkaline(AA LR6)  
Capacity: 2850.0 mAh  
Self Discharge: 0.3 %/month  
Nominal Voltage: 1.5 V  
Max Cont Current: 1000.0 mA  
Max Pulse Current: 0.0 mA

In Series: 1  
In Parallel: 1

**Information Notes**

**Sequence**

Load Save Delete Compare

Transitions checker  
☐ Enabled Show log

**Sequence Table**

Step	Mode	Vdd	Range...	Memory	CPU/B...	Clock ...	Src Freq	Periph...	Add. ...	Step C...	Duration	DMIPS	Voltag...
1	RUN	3.3	Scale1-...	ITCM/R...	200.0 ...	HSE PLL	4.0 MHz	ADC1 D...	0 mA	98.34 mA	1 ms	428.00...	Battery
2	SLEEP	3.3	Scale3-...	RAM/FL...	25.0 MHz	HSE	4.0 MHz	LPTIM1	0 mA	5.01 mA	1 s	53.500...	Battery

**Step**

Add Delete Duplicate Up Down Undo Redo

**Display**

Plot: All Steps Ext. D

**Results Charts**

Consumption Profile by Step

Consumption (mA)

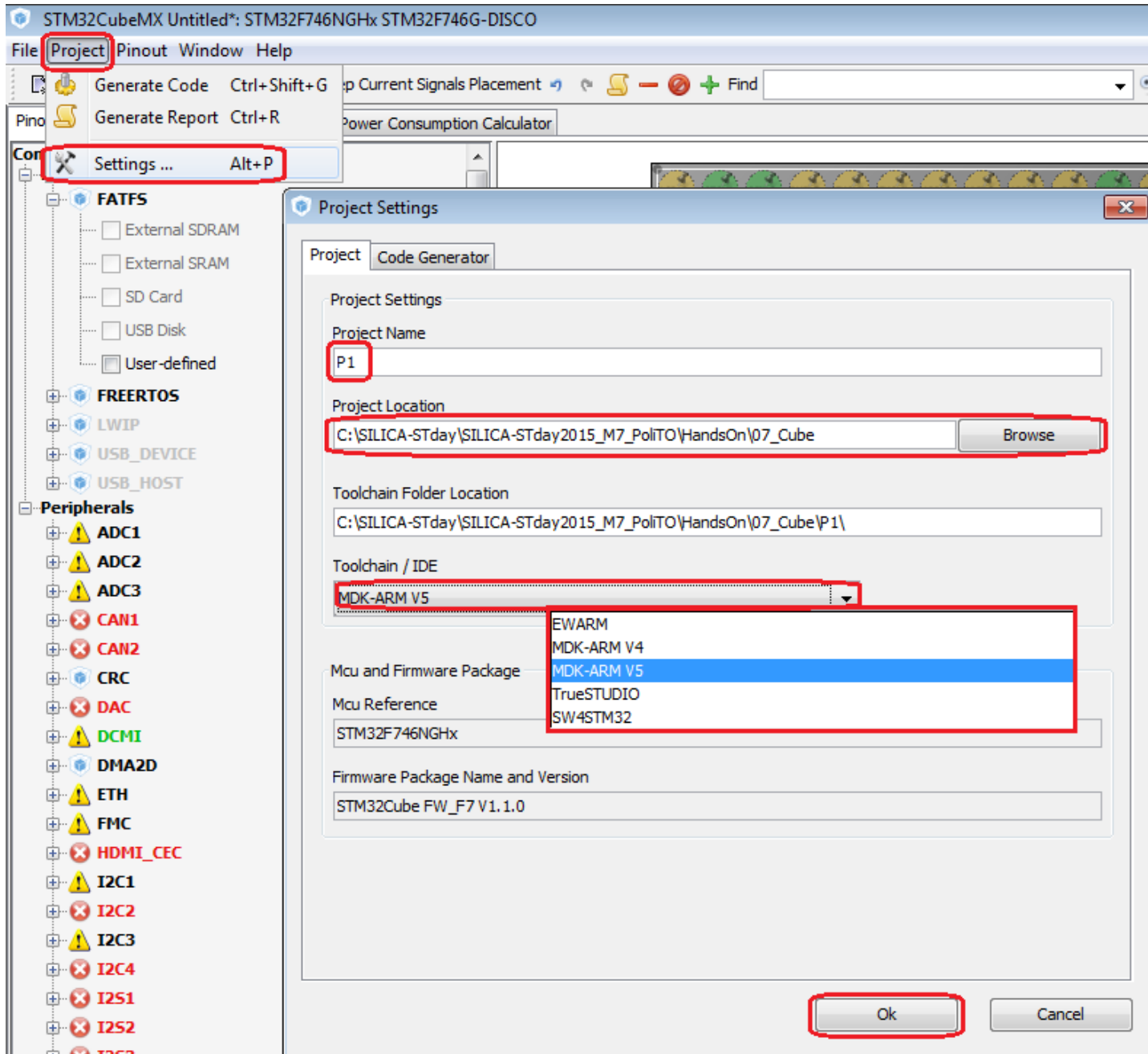
Time (ms)

Sequence Average Current

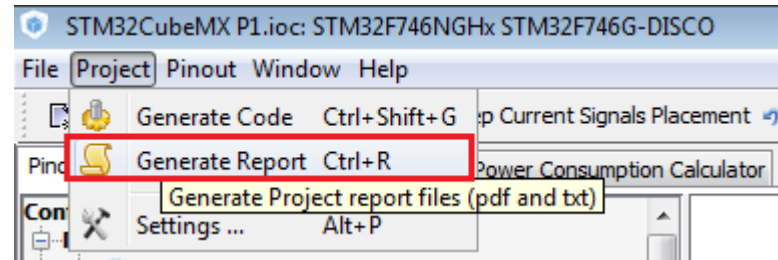
**Results Summary**

Total Sequence Time 1 s  
Battery Life Estimation 23 days & 5 hours

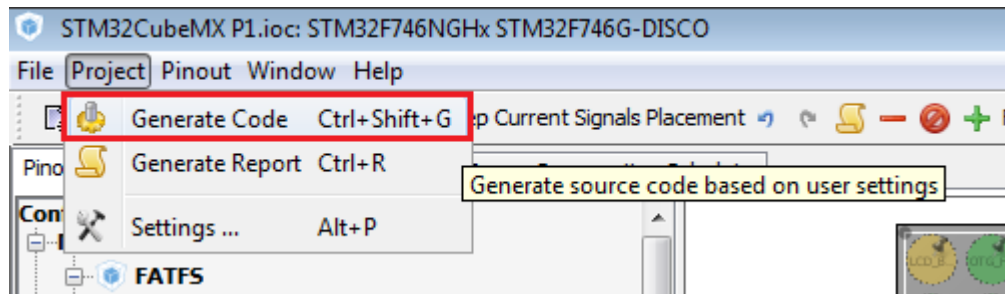
Average Consumption 5.1 mA  
Average DMIPS 53.87 DMIPS



Generate Report

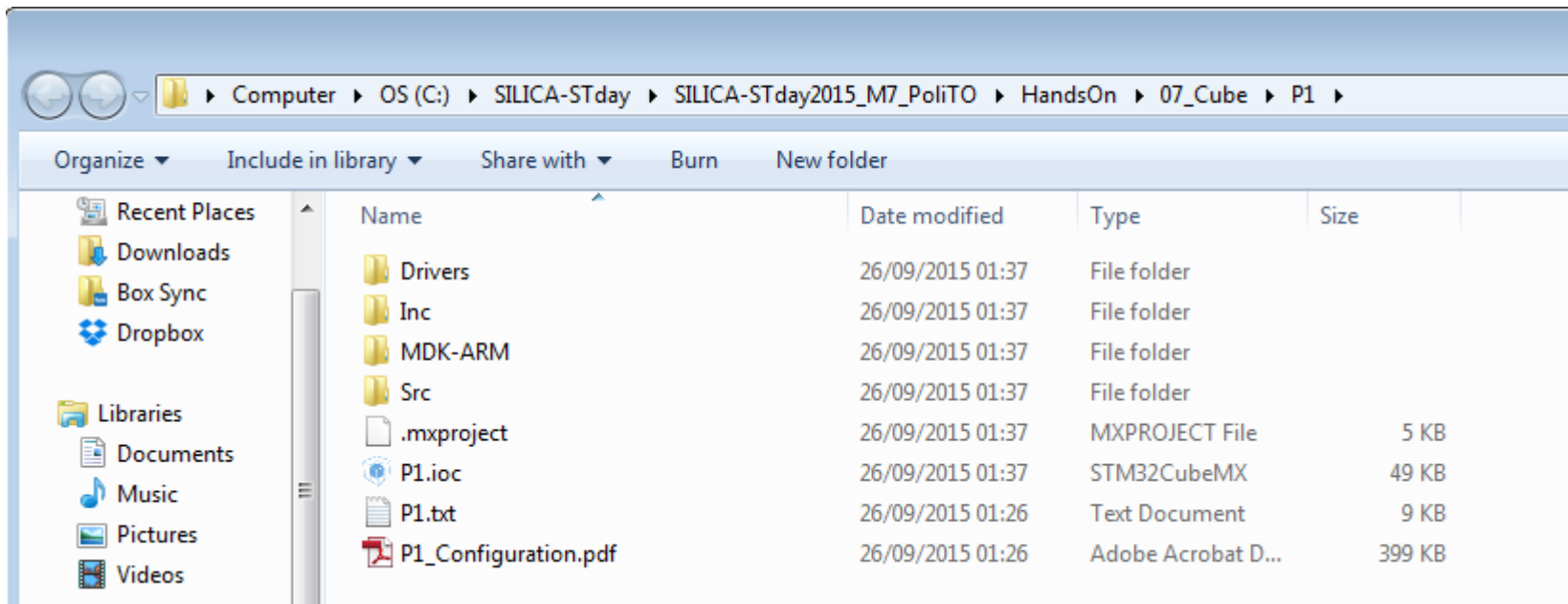


Generate Project

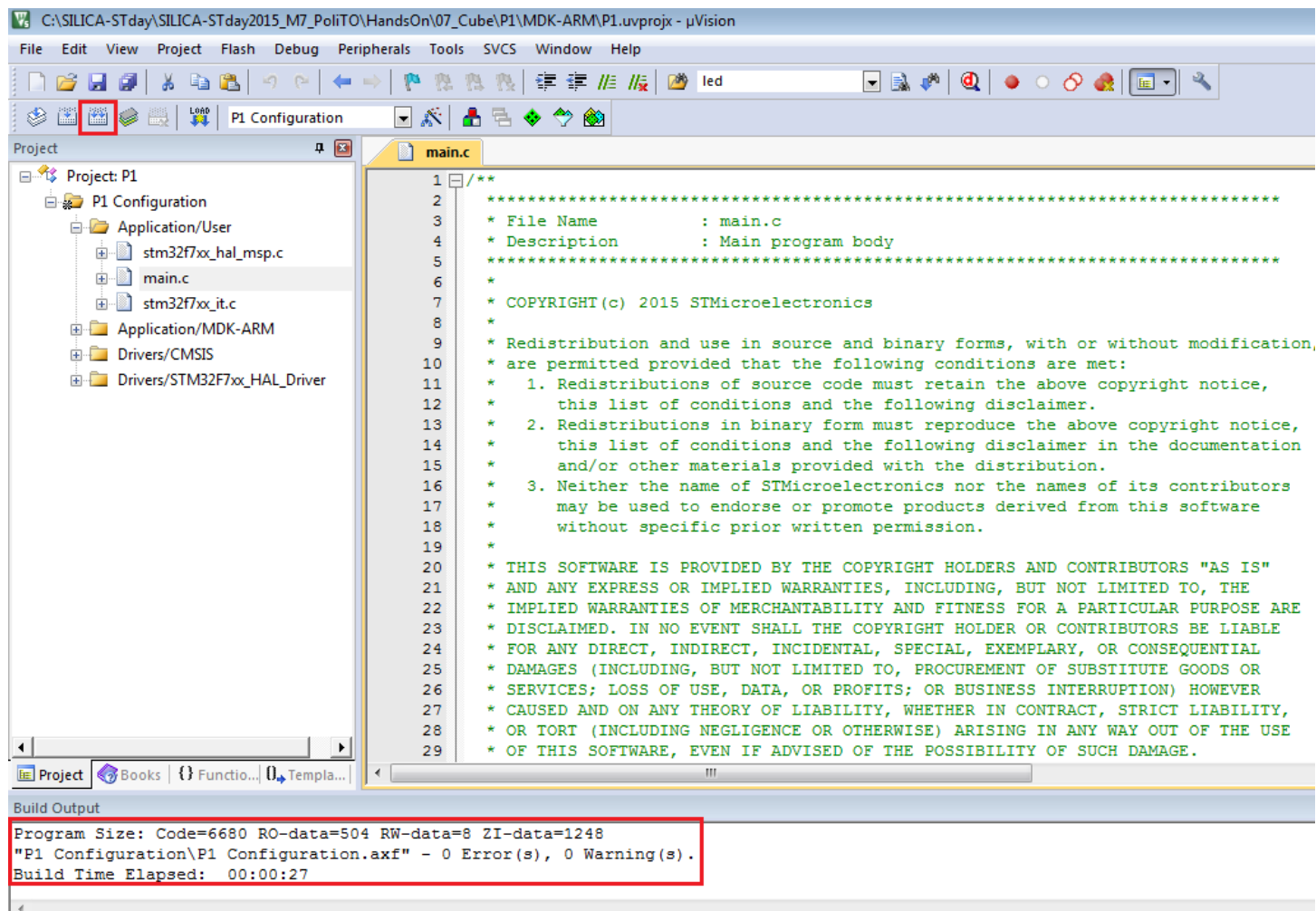


We assume that your project folder is named **P1**

Close CUBE and inspect the directory where you saved your Cube project.



- **Open the project**
  - Go in the directory where you have saved the project P1 and open the directory: **MDK-ARM**
  - Double click on: **P1.uvprojx** and compile it.



Insert the **red** code (see below) in while(1) - File **main.c**

```
while (1)
```

```
{
```

```
/* USER CODE END WHILE */
```

```
    // LCD_BL_CTRL
```

```
    HAL_GPIO_TogglePin(GPIOK, GPIO_PIN_3);
```

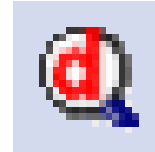
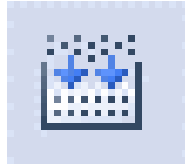
```
    /* Insert delay 500 ms */
```

```
    HAL_Delay(500);
```

```
/* USER CODE BEGIN 3 */
```

```
}
```

```
/* USER CODE END 3 */
```



+



- Compile and run the program.
- What do you see ?



CubeMX doc and sw

STM32Fx Library

STM32F7 Library

Description of STM32F7xx HAL drivers









UM1718 - STM32CubeMX for STM32 configuration and initialization C code generation

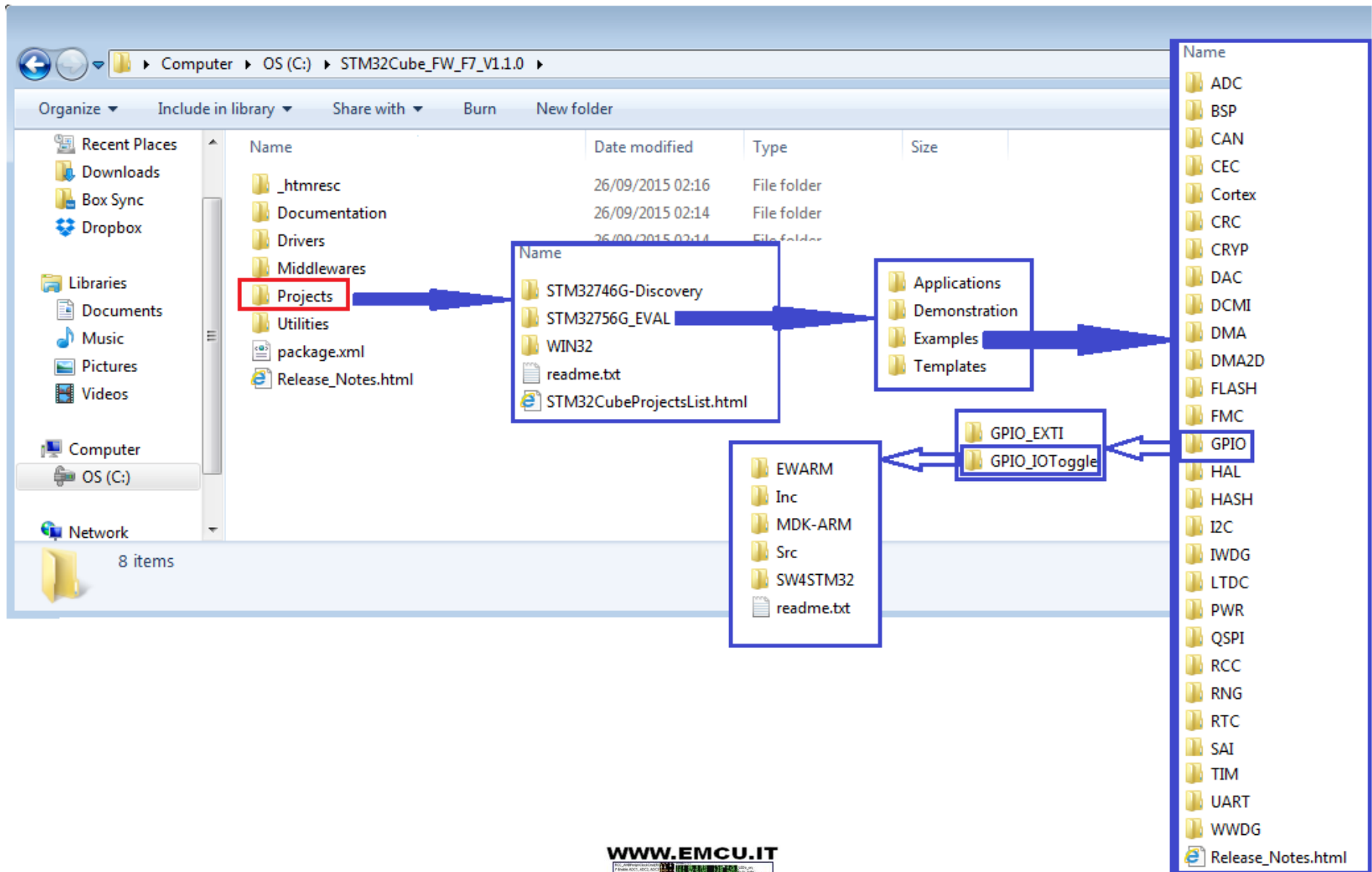
VIDEO - How to migrate STM32Cube\_Library based application between two STM32 series

# STM32F7 Library

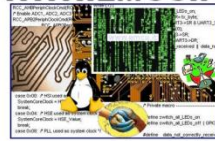
Unzip the STM32F7 Library: **stm32cubef7.1.1.0.zip**  
that is here:

C:\...\SILICA-STday2015\_M7\_PoliTO\Tools\STM32CubeMX

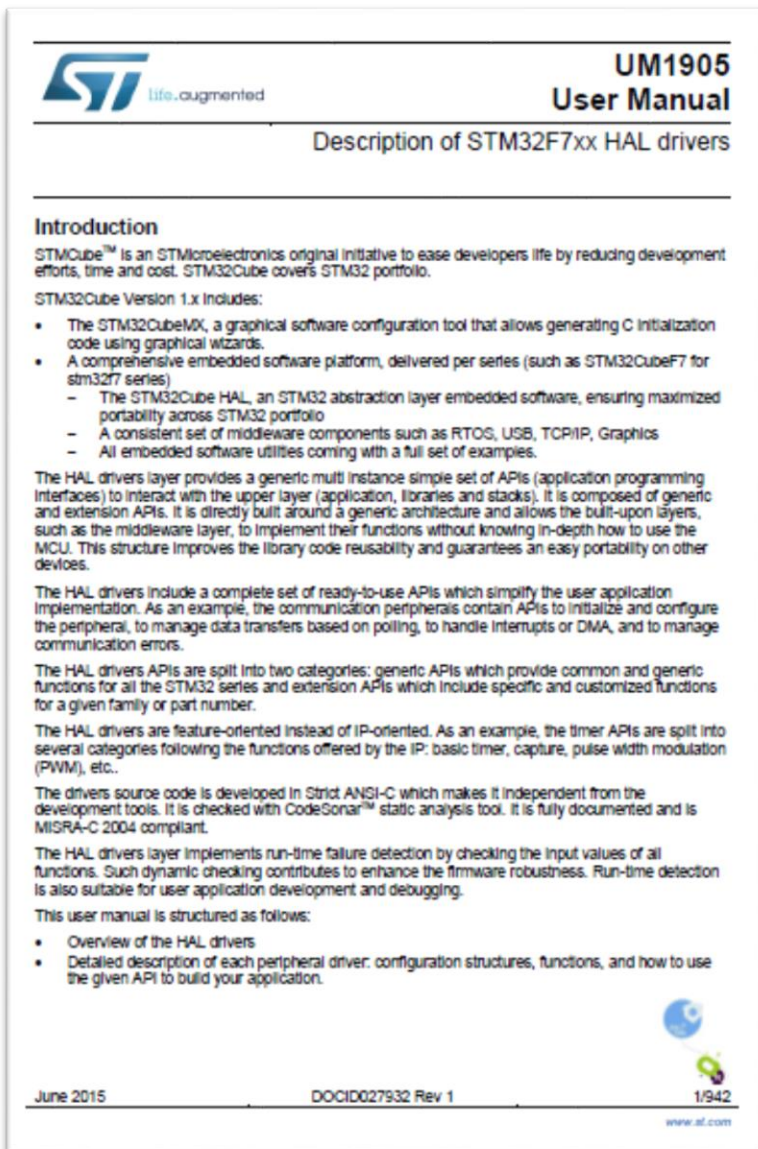
Name	Date modified	Type	Size
 _htmresc	26/09/2015 02:16	File folder	
 Documentation	26/09/2015 02:14	File folder	
 Drivers	26/09/2015 02:14	File folder	
 Middlewares	26/09/2015 02:14	File folder	
 Projects	26/09/2015 02:16	File folder	
 Utilities	26/09/2015 02:16	File folder	
 package.xml	26/06/2015 15:26	XML Document	1 KB
 Release_Notes.html	24/06/2015 12:39	HTML Document	72 KB



WWW.EMCU.IT



## UM1905 - User Manual Description of STM32F7xx HAL drivers (Library)



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## HAL GPIO Generic Driver

UM1905

### 23.2.4 IO operation functions

This section contains the following APIs:

- HAL\_GPIO\_ReadPin()
- HAL\_GPIO\_WritePin()
- HAL\_GPIO\_TogglePin()
- HAL\_GPIO\_LockPin()
- HAL\_GPIO\_EXTI\_IRQHandler()
- HAL\_GPIO\_EXTI\_Callback()

### 23.2.5 HAL\_GPIO\_Init

**Function Name** void HAL\_GPIO\_Init (GPIO\_TypeDef \* GPIOx, GPIO\_InitTypeDef \* GPIO\_Init)

**Function Description** Initializes the GPIOx peripheral according to the specified parameters in the GPIO\_Init.

- Parameters**
- GPIOx: where x can be (A..K) to select the GPIO peripheral.
  - GPIO\_Init: pointer to a GPIO\_InitTypeDef structure that contains the configuration information for the specified GPIO peripheral.

**Return values** • None

### 23.2.6 HAL\_GPIO\_DeInit

**Function Name** void HAL\_GPIO\_DeInit (GPIO\_TypeDef \* GPIOx, uint32\_t GPIO\_Pin)

**Function Description** De-initializes the GPIOx peripheral registers to their default reset values.

- Parameters**
- GPIOx: where x can be (A..K) to select the GPIO peripheral.
  - GPIO\_Pin: specifies the port bit to be written. This parameter can be one of GPIO\_PIN\_x where x can be (0..15).

**Return values** • None

### 23.2.7 HAL\_GPIO\_ReadPin

**Function Name** GPIO\_PinState HAL\_GPIO\_ReadPin (GPIO\_TypeDef \* GPIOx, uint16\_t GPIO\_Pin)

**Function Description** Reads the specified input port pin.

- Parameters**
- GPIOx: where x can be (A..K) to select the GPIO peripheral.
  - GPIO\_Pin: specifies the port bit to read. This parameter can be GPIO\_PIN\_x where x can be (0..15).

**Return values** • The input port pin value.

### 23.2.8 HAL\_GPIO\_WritePin

**Function Name** void HAL\_GPIO\_WritePin (GPIO\_TypeDef \* GPIOx, uint16\_t GPIO\_Pin, GPIO\_PinState PinState)

**Function Description** Sets or clears the selected data port bit.

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# Need more info ?

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For more info contact:

**[enrico.marinoni@avnet.eu](mailto:enrico.marinoni@avnet.eu)**

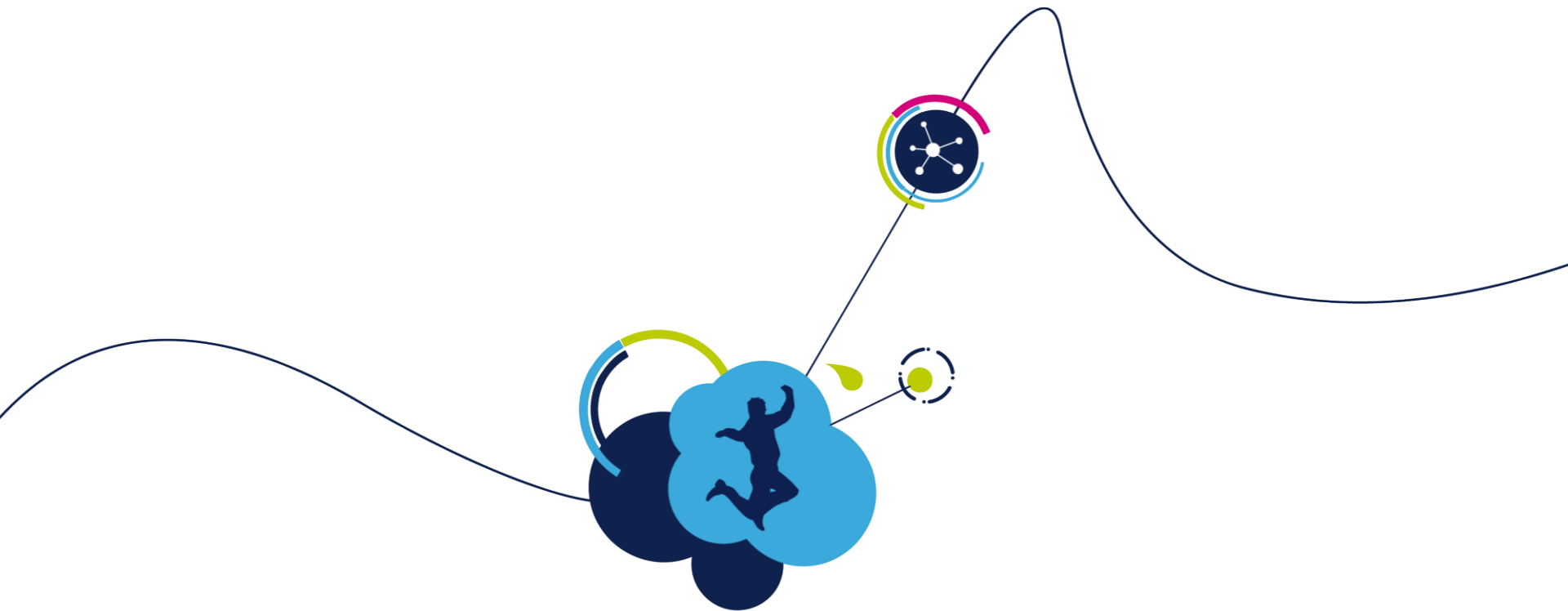
(Digital FAE for STM - MCU, WireLess (IoT), MEMS, PLM, etc)

**[roberto.rossetti@avnet.eu](mailto:roberto.rossetti@avnet.eu)**

(B.D.M.)







# Thank you

[www.st.com/stm32](http://www.st.com/stm32)