

Lab: Estimation of power consumption

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Objective:

- Use the Power tool inside the STM32CubeIDE to estimate the average power consumption of the application

Power Supply and Power Source Selection

- Using any project done in Device Configurator of STM32CubeIDE



- Click on the Tools tab and select PCC

- Select **3V** for **VDD**

T_A 25°C / V_{DD} 3.0V

$T_{Ambient}$ 25°C

V_{DD}

- In the **Battery Selection** section, select **AA Alkaline** batteries (2 in series, 1 in parallel) as the power source for the application

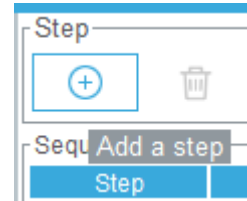
Alkaline(AA LR6) (2x1)

Capacity	2850.0 mAh
Self Discharge	0.3 %/month
Nominal Voltage	3.0 V
Max Cont Current	1000.0 mA

Adding a RUN mode step

- Add a step to our power sequence:

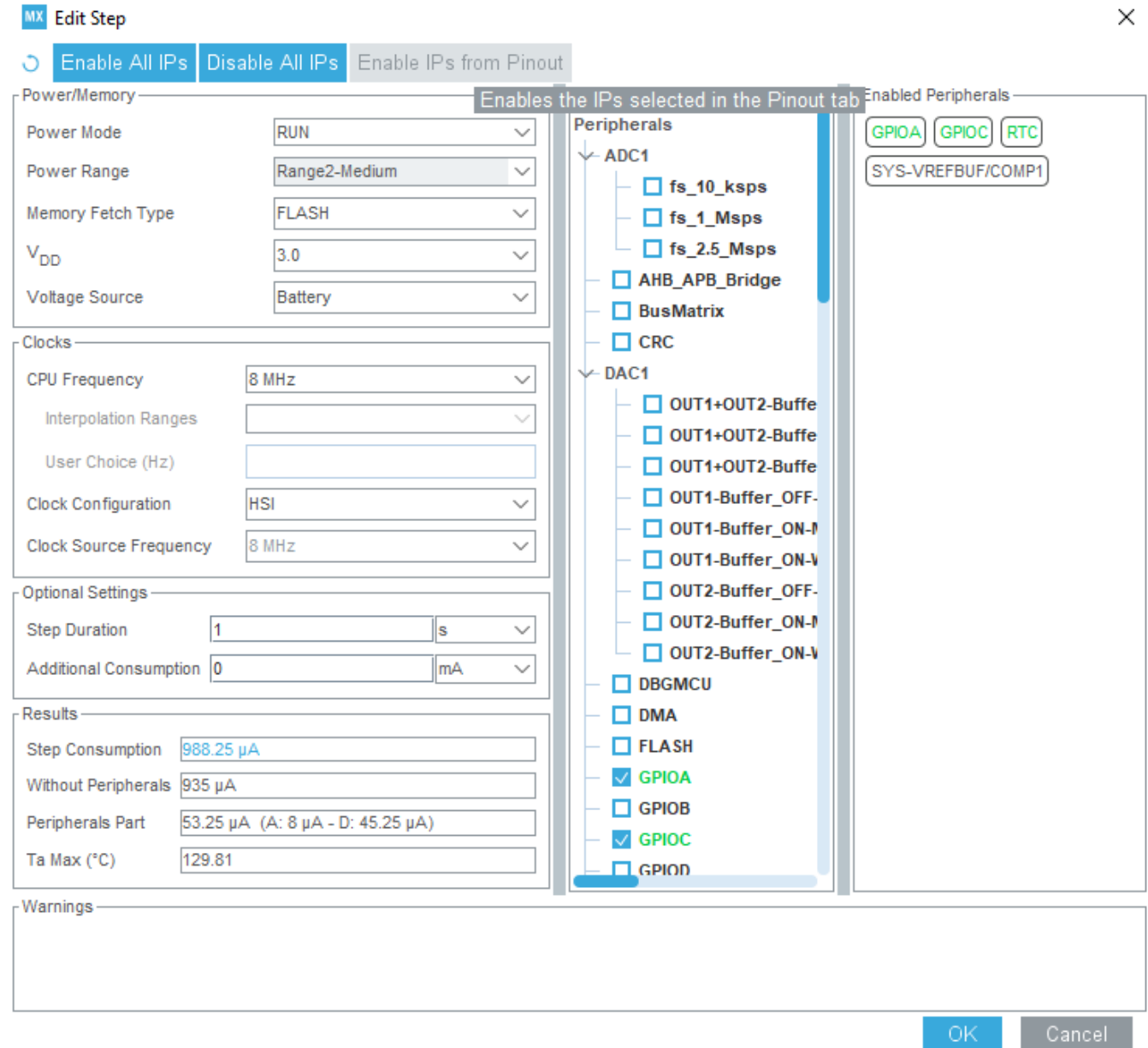
- Click: Step.. Add



- Configure a first step: RUN mode

- 8.0 MHz Range2 RUN mode
- from Flash at 3V from battery
- HSI clock
- Enable IPs from Pinout function
- Duration: 1 second
- Click "Add"

- Resulting step consumption should be 988.25uA



MX Edit Step

Enable All IPs | Disable All IPs | Enable IPs from Pinout

Power/Memory

Power Mode: RUN

Power Range: Range2-Medium

Memory Fetch Type: FLASH

V_{DD}: 3.0

Voltage Source: Battery

Clocks

CPU Frequency: 8 MHz

Interpolation Ranges:

User Choice (Hz):

Clock Configuration: HSI

Clock Source Frequency: 8 MHz

Optional Settings

Step Duration: 1 s

Additional Consumption: 0 mA

Results

Step Consumption: 988.25 μ A

Without Peripherals: 935 μ A

Peripherals Part: 53.25 μ A (A: 8 μ A - D: 45.25 μ A)

Ta Max (°C): 129.81

Warnings

Peripherals

ADC1

- ☐ fs_10_ksp
- ☐ fs_1_Msp
- ☐ fs_2.5_Msp
- ☐ AHB_APB_Bridge
- ☐ BusMatrix
- ☐ CRC

DAC1

- ☐ OUT1+OUT2-Buffer
- ☐ OUT1+OUT2-Buffer
- ☐ OUT1+OUT2-Buffer
- ☐ OUT1-Buffer_OFF-
- ☐ OUT1-Buffer_ON-M
- ☐ OUT1-Buffer_ON-V
- ☐ OUT2-Buffer_OFF-
- ☐ OUT2-Buffer_ON-M
- ☐ OUT2-Buffer_ON-V

DBGMCU

DMA

FLASH

☒ GPIOA

☒ GPIOB

☒ GPIOC

☐ GPIOD

Enabled Peripherals

GPIOA | GPIOC | RTC

SYS-VREFBUF/COMP1

OK | Cancel

Add a STOP1 mode step

- **Add a second step: STOP1 mode**

- STOP1 mode
- Flash is Power Down mode at 3V
- Clocks HSI 16 MHz
- RTC enabled (to wakeup the system)
- Duration: 5 seconds
- Click “Add”
- Resulting step consumption should be 3.4 uA

MX

New Step

×

↻

Enable All IPs

Disable All IPs

Enable IPs from Pinout

Power/Memory

Power Mode

STOP1

▼

Power Range

NoRange

▼

Memory Fetch Type

Flash-PowerDown

▼

V_{DD}

3.0

▼

Voltage Source

Battery

▼

Clocks

CPU Frequency

16 MHz

▼

Interpolation Ranges

▼

User Choice (Hz)

Clock Configuration

HSI

▼

Clock Source Frequency

16 MHz

▼

Optional Settings

Step Duration

5

s

▼

Additional Consumption

0

mA

▼

Results

Step Consumption

3.4 μ A

Without Peripherals

3.4 μ A

Peripherals Part

0 nA (A: 0 nA - D: 0 nA)

Ta Max (°C)

130

Warnings

Peripherals Selection

Peripherals

☐ IWDG*

☐ LPTIM1*

☐ LPTIM2*

☒ RTC*

Enabled Peripherals

RTC*

Add

Cancel

Add a Wakeup from STOP1 mode step

- **Add a last step: Wakeup from STOP1 mode**

- VDD = 3V
- Voltage source: Battery
- Click “Add”
- Resulting step consumption should be 1.21 mA

MX New Step

☒ Enable All IPs
 ☐ Disable All IPs
 ☐ Enable IPs from Pinout

Power/Memory

Power Mode: WU_FROM_STOP1

Power Range: NoRange

Memory Fetch Type: Flash-PowerDown

V_{DD}: 3.0

Voltage Source: Battery

Clocks

CPU Frequency: 16 MHz

Interpolation Ranges:

User Choice (Hz):

Clock Configuration: HSI

Clock Source Frequency: 16 MHz

Optional Settings

Wakeup time: 9.0 μ s

Additional Consumption: 0 mA

Results

Step Consumption: 1.21 mA

Without Peripherals: 1.21 mA

Peripherals Part: 0 nA (A: 0 nA - D: 0 nA)

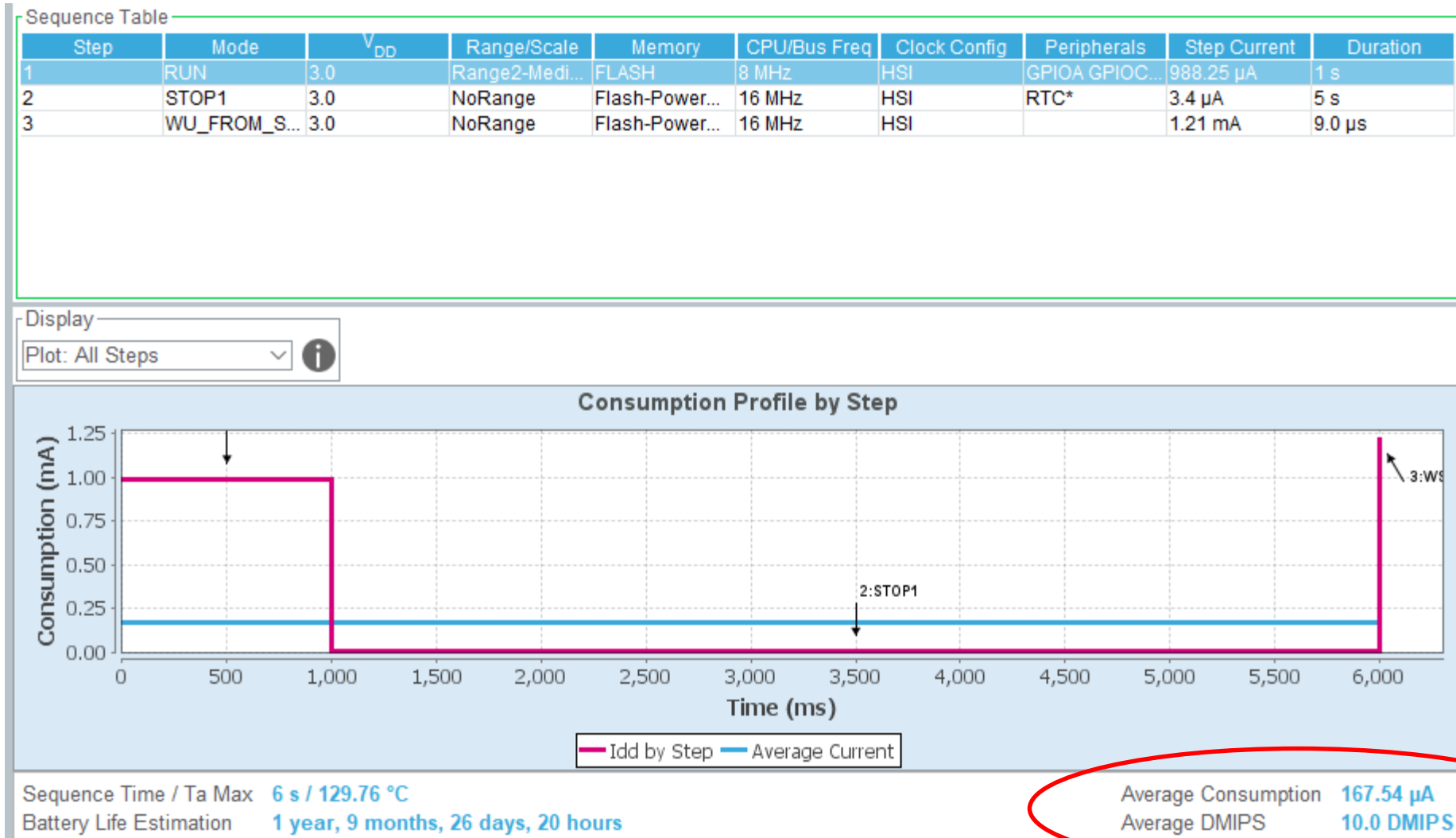
Ta Max (°C): 129.76

Warnings

Peripherals Selection – Peripherals

Average Current Consumption Result

- **Note: the Current consumption numbers are for the MCU only.**




Thank you



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