1. Description

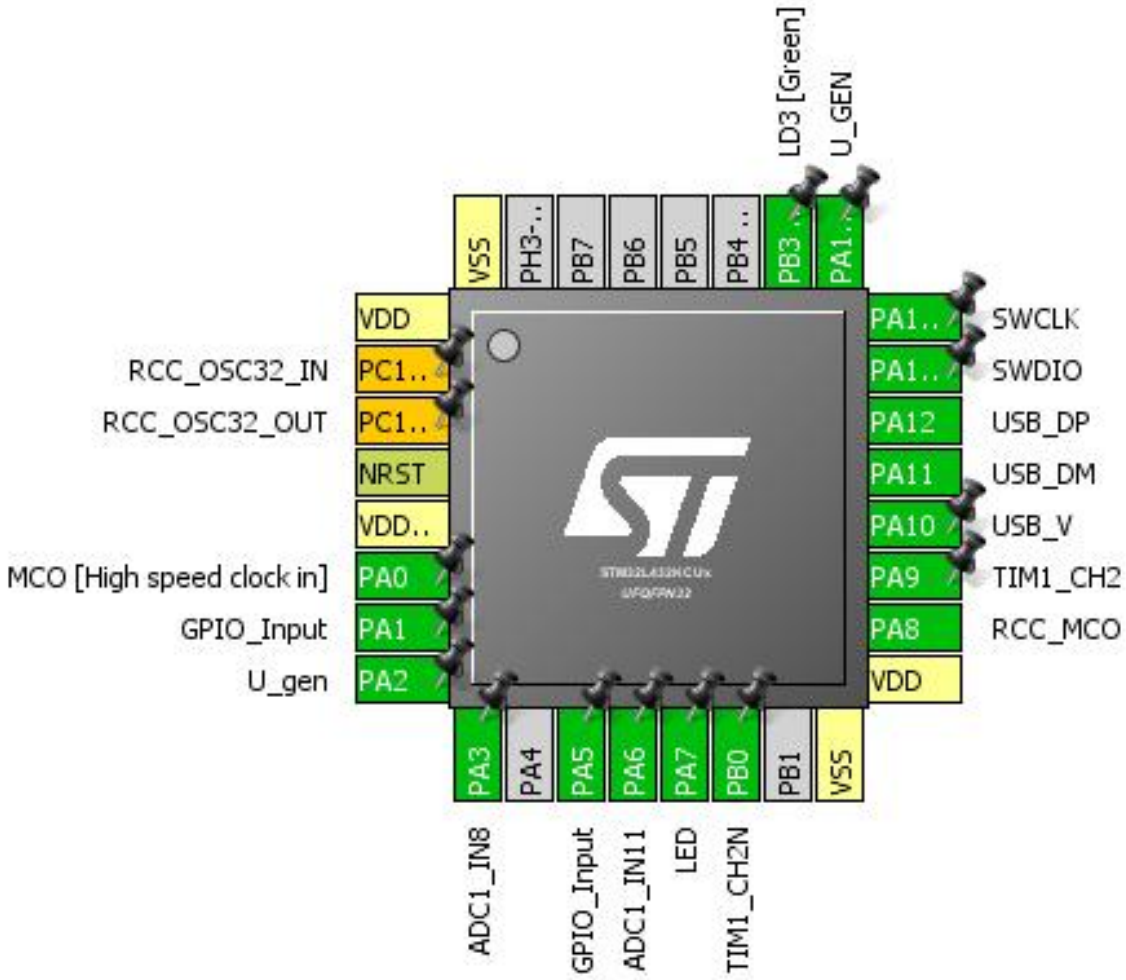
1.1. Project

Project Name	PAM
Board Name	NUCLEO-L432KC
Generated with:	STM32CubeMX 4.22.0
Date	07/18/2017

1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x2
MCU name	STM32L432KCUx
MCU Package	UFQFPN32
MCU Pin number	32

2. Pinout Configuration



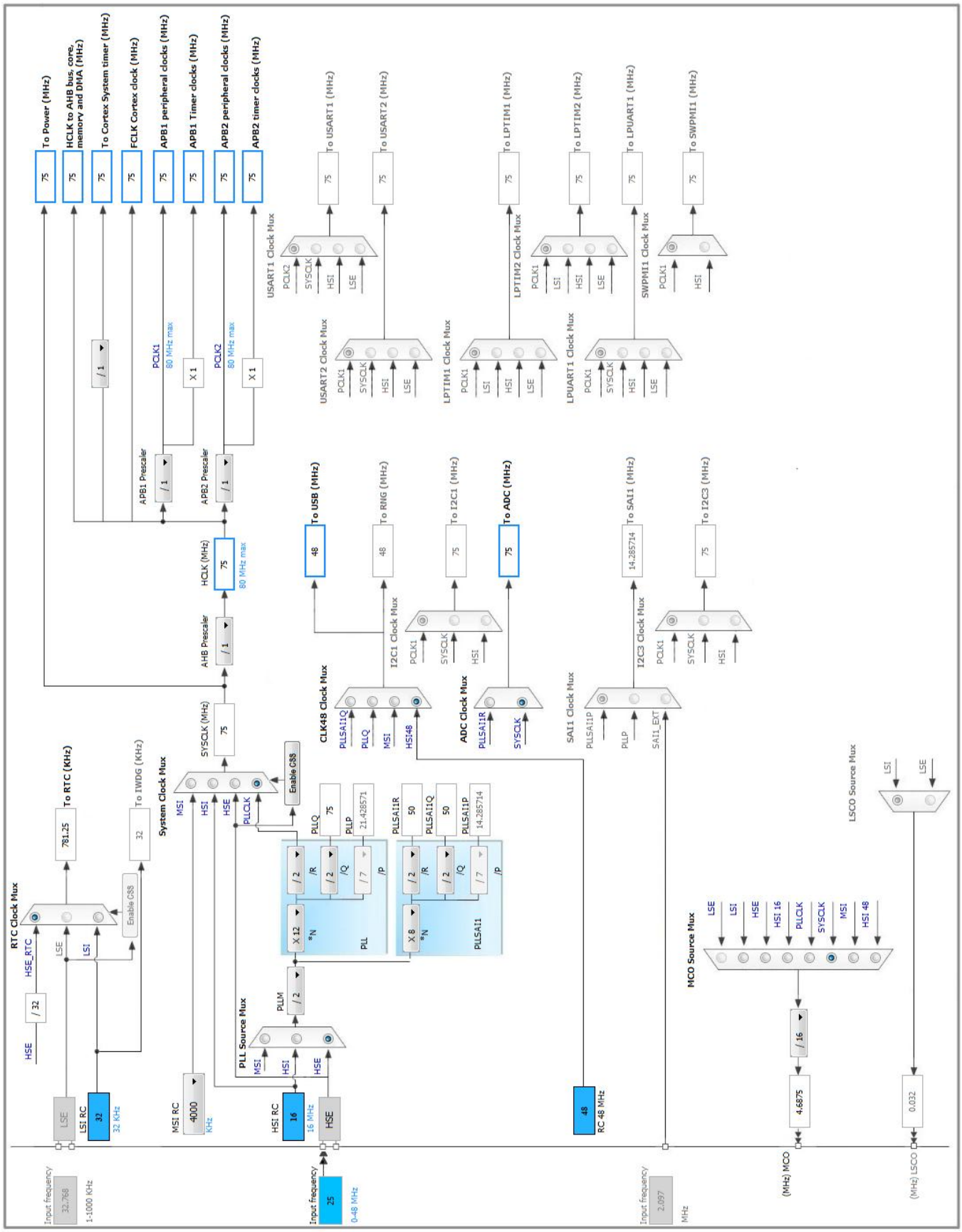
3. Pins Configuration

Pin Number UFQFPN32	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
2	PC14-OSC32_IN (PC14) *	I/O	RCC_OSC32_IN	
3	PC15-OSC32_OUT (PC15) *	I/O	RCC_OSC32_OUT	
4	NRST	Reset		
5	VDDA/VREF+	Power		
6	PA0	I/O	RCC_CK_IN	MCO [High speed clock in]
7	PA1 **	I/O	GPIO_Input	
8	PA2 **	I/O	GPIO_Output	U_gen
9	PA3	I/O	ADC1_IN8	
11	PA5 **	I/O	GPIO_Input	
12	PA6	I/O	ADC1_IN11	
13	PA7 **	I/O	GPIO_Output	LED
14	PB0	I/O	TIM1_CH2N	
16	VSS	Power		
17	VDD	Power		
18	PA8	I/O	RCC_MCO	
19	PA9	I/O	TIM1_CH2	
20	PA10 **	I/O	GPIO_Input	USB_V
21	PA11	I/O	USB_DM	
22	PA12	I/O	USB_DP	
23	PA13 (JTMS-SWDIO)	I/O	SYS_JTMS-SWDIO	SWDIO
24	PA14 (JTCK-SWCLK)	I/O	SYS_JTCK-SWCLK	SWCLK
25	PA15 (JTDI) **	I/O	GPIO_Output	U_GEN
26	PB3 (JTDO-TRACESWO) **	I/O	GPIO_Output	LD3 [Green]
32	VSS	Power		

** The pin is affected with an I/O function

* The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC1

IN8: IN8 Single-ended

IN11: IN11 Single-ended

5.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	**Synchronous clock mode divided by 4 ***
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Conversion Mode	Enabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	**End of sequence of conversion ***
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	**Disable ***

ADC_Injected_ConversionMode:

Enable Injected Conversions	**Enable ***
Enable Injected Oversampling	Disable
Number Of Conversions	**2 ***
External Trigger Source	**Timer 6 Trigger Out event ***
External Trigger Conversion Edge	Trigger detection on the rising edge
Injected Conversion Mode	None
Injected Queue	Injected Queue Disable
Rank	1
Channel	Channel 8
Sampling Time	**24.5 Cycles ***
Offset Number	No offset
Rank	**2 ***
Channel	**Channel 11 ***
Sampling Time	**24.5 Cycles ***
Offset Number	No offset

Analog Watchdog 1:

Enable Analog WatchDog1 Mode	false

Analog Watchdog 2:

Enable Analog WatchDog2 Mode	false

Analog Watchdog 3:

Enable Analog WatchDog3 Mode	false

5.2. RCC

mode: High Speed Clock (HSE)

mode: Master Clock Output

5.2.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Disabled
Data Cache	Enabled
Flash Latency(WS)	4 WS (5 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
MSI Auto Calibration	Disabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

5.3. RTC

mode: Activate Clock Source

mode: Activate Calendar

mode: Alarm A

5.3.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	**124 ***
Synchronous Predivider value	**6249 ***

Calendar Time:

Data Format	BCD data format
Hours	0
Minutes	0
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	**Storeoperation Set ***

Calendar Date:

Week Day	Monday
Month	January
Date	1
Year	0

Alarm A:

Hours	0
Minutes	0
Seconds	0
Sub Seconds	0
Alarm Mask Date Week day	Disable
Alarm Mask Hours	Disable
Alarm Mask Minutes	Disable
Alarm Mask Seconds	Disable
Alarm Sub Second Mask	All Alarm SS fields are masked.
Alarm Date Week Day Sel	Date
Alarm Date	1

5.4. SYS

Debug: Serial Wire

Timebase Source: TIM7

5.5. TIM1

Clock Source : Internal Clock

Channel2: PWM Generation CH2 CH2N

5.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**266 ***
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0

Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves
Trigger Event Selection TRGO	Reset (UG bit from TIMx_EGR)
Trigger Event Selection TRGO2	Reset (UG bit from TIMx_EGR)

Break And Dead Time management - BRK Configuration:

BRK State	Disable
BRK Polarity	High
BRK Filter (4 bits value)	0
BRK Sources Configuration	
- Digital Input	Disable
- COMP1	Disable
- COMP2	Disable

Break And Dead Time management - BRK2 Configuration:

BRK2 State	Disable
BRK2 Polarity	High
BRK2 Filter (4 bits value)	0
BRK2 Sources Configuration	
- Digital Input	Disable
- COMP1	Disable
- COMP2	Disable

Break And Dead Time management - Output Configuration:

Automatic Output State	Disable
Off State Selection for Run Mode (OSSR)	Disable
Off State Selection for Idle Mode (OSSI)	Disable
Lock Configuration	Off
Dead Time	**2 ***

Clear Input:

Clear Input Source	Disable

PWM Generation Channel 2 and 2N:

Mode	PWM mode 1
Pulse (16 bits value)	**133 ***
Fast Mode	Disable
CH Polarity	High
CHN Polarity	High

CH Idle State	Reset
CHN Idle State	Reset

5.6. TIM6

mode: Activated

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**2499 ***

Trigger Output (TRGO) Parameters:

Trigger Event Selection	**Update Event ***

5.7. USB

mode: Device (FS)

5.7.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	64 Bytes
Physical interface	Internal Phy
Sof Enable	Disabled

Power Parameters:

Low Power	Disabled
Link Power Management	Disabled
Battery Charging	Disabled

5.8. FREERTOS

mode: Enabled

5.8.1. Config parameters:

Versions:

FreeRTOS version	9.0.0
CMSIS-RTOS version	1.02

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	7
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Disabled
USE_COUNTING_SEMAPHORES	Disabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Enabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled

Memory management settings:

Memory Allocation	**Dynamic / Static ***
TOTAL_HEAP_SIZE	**6000 ***
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	**Enabled ***
USE_TICK_HOOK	**Enabled ***
USE_MALLOC_FAILED_HOOK	**Enabled ***
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	**Option2 ***

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	Disabled
USE_TRACE_FACILITY	Disabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Disabled

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

5.8.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Disabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Disabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Disabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Disabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

5.9. USB_DEVICE

Class For FS IP: Communication Device Class (Virtual Port Com)

5.9.1. Parameter Settings:

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SUPPORT_USER_STRING (Enable user string descriptor)	Disabled

USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message
USBD_LPM_ENABLED (Link Power Management)	1: Link Power Management supported

5.9.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product IDentifier)	22336
PRODUCT_STRING (Product Identifier)	STM32 Virtual ComPort
SERIALNUMBER_STRING (Serial number)	00000000001A
CONFIGURATION_STRING (Configuration Identifier)	CDC Config
INTERFACE_STRING (Interface Identifier)	CDC Interface

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PA3	ADC1_IN8	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	
	PA6	ADC1_IN11	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	
RCC	PA0	RCC_CK_IN	n/a	n/a	n/a	MCO [High speed clock in]
	PA8	RCC_MCO	Alternate Function Push Pull	No pull-up and no pull-down	Low	
SYS	PA13 (JTMS-SWDIO)	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14 (JTCK-SWCLK)	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
TIM1	PB0	TIM1_CH2N	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PA9	TIM1_CH2	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
Single Mapped Signals	PC14-OSC32_IN (PC14)	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT (PC15)	RCC_OSC32_OUT	n/a	n/a	n/a	
GPIO	PA1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PA2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	U_gen
	PA5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PA7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Very High ***	LED
	PA10	GPIO_Input	Input mode	**Pull-down ***	**n/a**	USB_V
	PA15 (JTDI)	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	U_GEN
	PB3 (JTDO-TRACESWO)	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Very High ***	LD3 [Green]

6.2. DMA configuration

nothing configured in DMA service

6.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriority
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
Memory management fault	true	0	0
Prefetch fault, memory access fault	true	0	0
Undefined instruction or illegal state	true	0	0
System service call via SWI instruction	true	0	0
Debug monitor	true	0	0
Pendable request for system service	true	15	0
System tick timer	true	15	0
ADC1 global interrupt	true	5	0
TIM1 break interrupt and TIM15 global interrupt	true	5	0
RTC alarm interrupt through EXTI line 18	true	5	0
TIM6 global interrupt, DAC channel1 and channel2 underrun error interrupts	true	5	0
TIM7 global interrupt	true	0	0
USB event interrupt through EXTI line 17	true	5	0
PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/35/36/37/38	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 update interrupt and TIM16 global interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
FPU global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32L4
Line	STM32L4x2
MCU	STM32L432KCUx
Datasheet	028798_Rev1

7.2. Parameter Selection

Temperature	25
Vdd	3.0

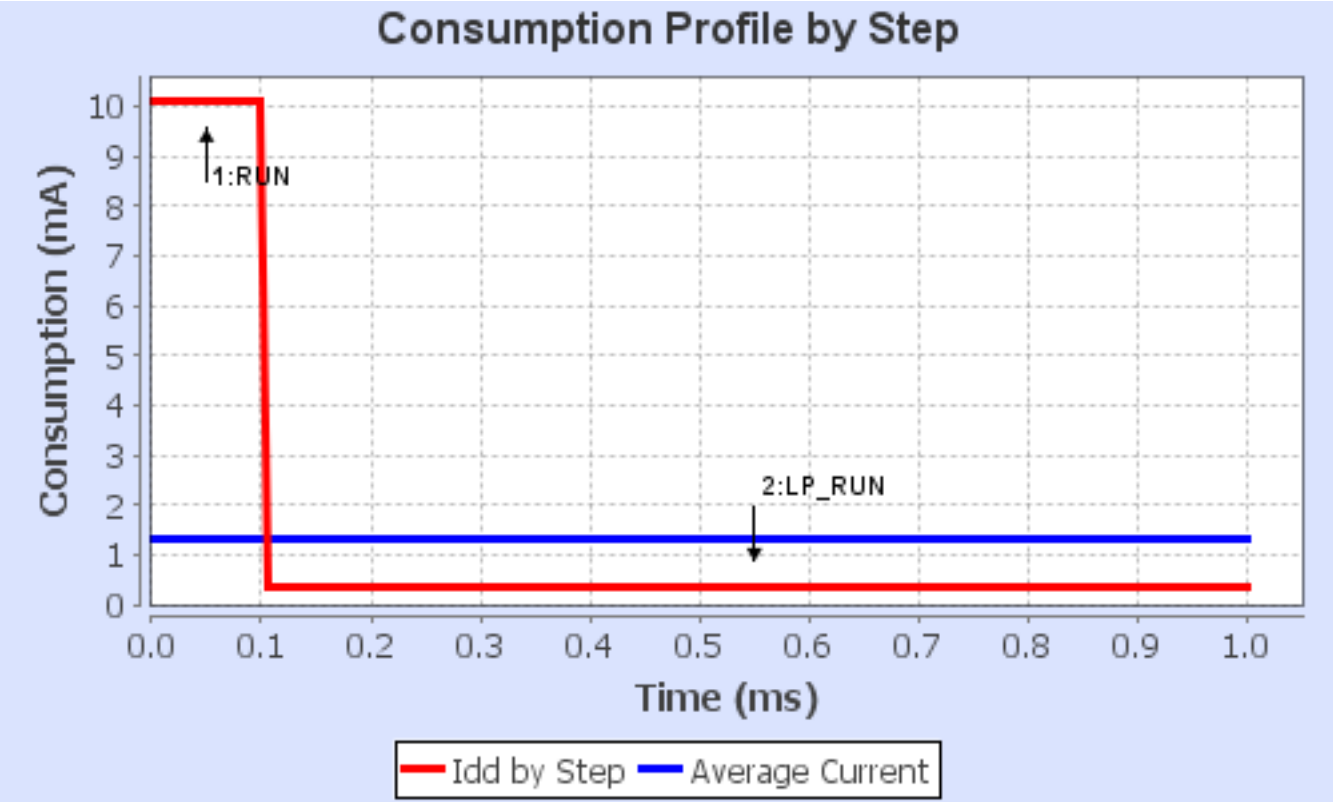
7.3. Sequence

Step	Step1	Step2
Mode	RUN	LOWPOWER_RUN
Vdd	3.0	3.0
Voltage Source	Battery	Battery
Range	Range1-High	NoRange
Fetch Type	FLASH	FLASH
Clock Configuration	HSE BYP PLL ART	MSI ART
Clock Source Frequency	4 MHz	2 MHz
CPU Frequency	80 MHz	2 MHz
Peripherals	ADC1:fs_1_Msps GPIOA GPIOB GPIOC RTC SYS-VREFBUF/COMP1:COMP_High_Speed-Square_VREFBUF_OFF TIM1	ADC1:fs_10_ksps GPIOA GPIOB GPIOC RTC SYS-VREFBUF/COMP1:COMP_High_Speed-Square_VREFBUF_OFF TIM1
Additional Cons.	0 mA	0 mA
Average Current	10.09 mA	332.8 µA
Duration	100 µs	900 µs
DMIPS	0.0	0.0
Ta Max	103.82	104.96
Category	In DS Table	In DS Table

7.4. RESULTS

Sequence Time	1 ms	Average Current	1.31 mA
Battery Life	0	Average DMIPS	12.25 DMIPS

7.5. Chart



8. Software Project

8.1. Project Settings

Name	Value
Project Name	PAM
Project Folder	D:\SVN\Project\PAMv2
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_L4 V1.8.1

8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	No
Backup previously generated files when re-generating	No
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No