

## 1. Description

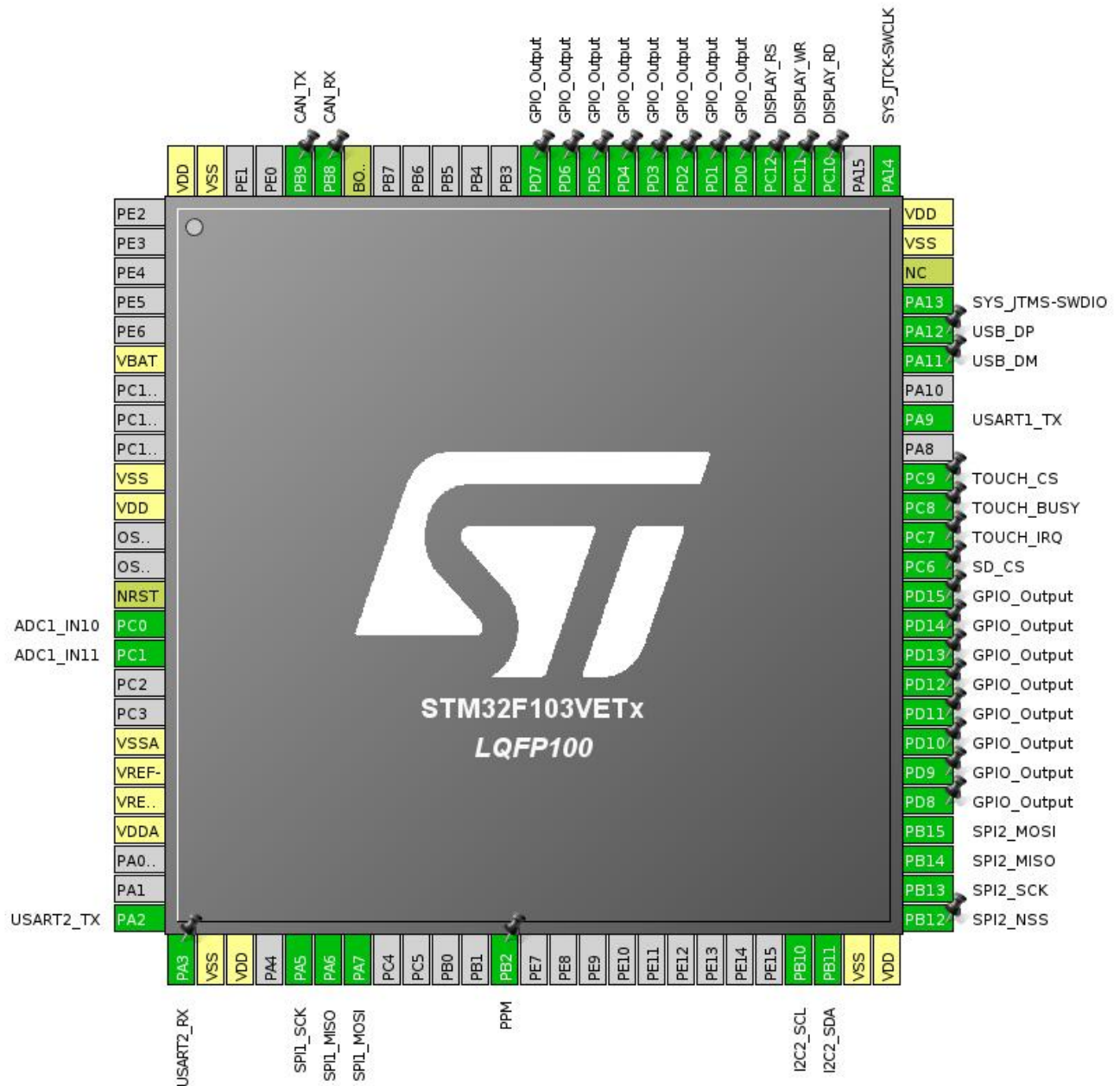
### 1.1. Project

Project Name	Teststand
Board Name	Teststand
Generated with:	STM32CubeMX 4.23.0
Date	01/25/2019

### 1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103VETx
MCU Package	LQFP100
MCU Pin number	100

## 2. Pinout Configuration



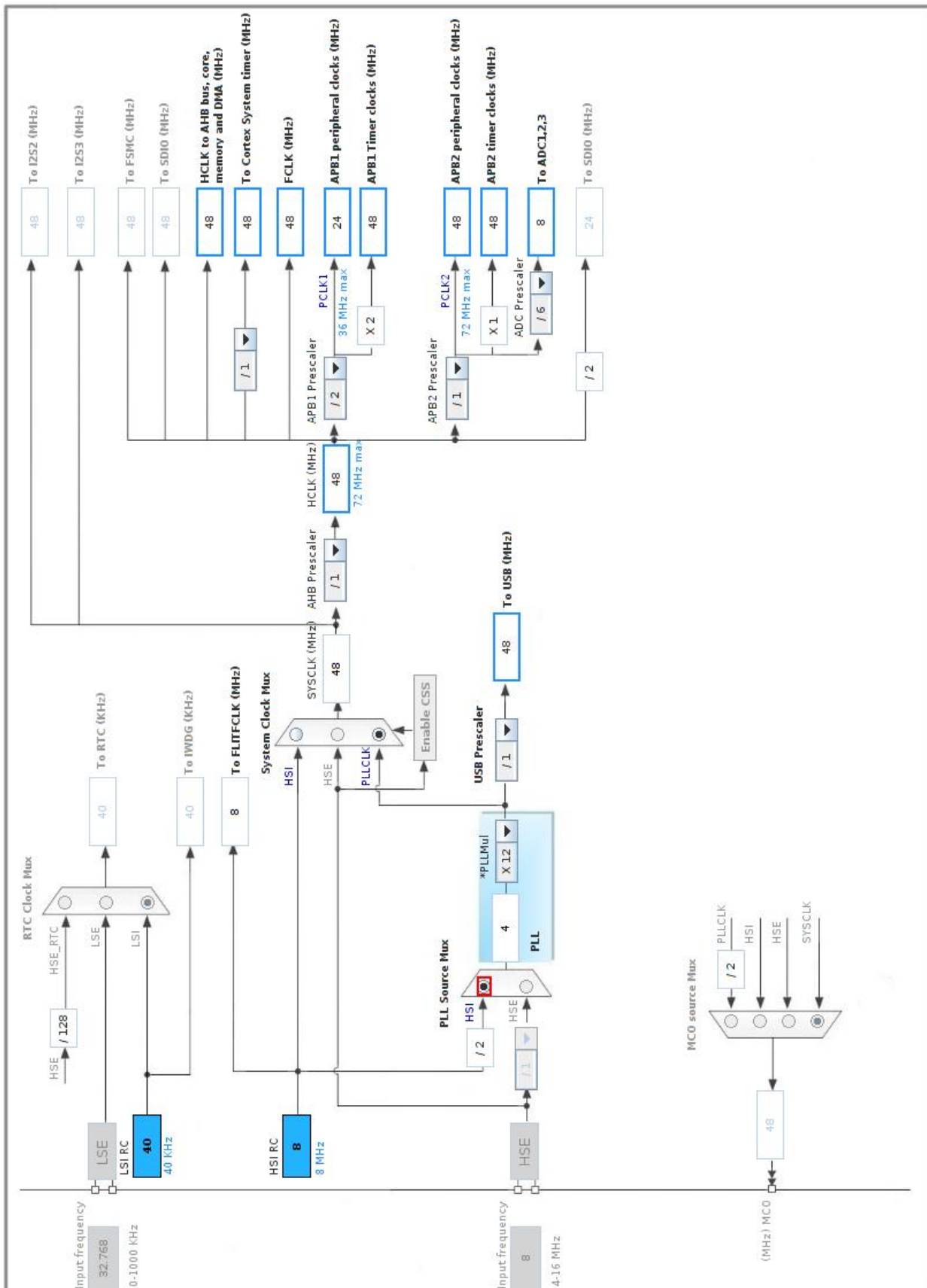
### 3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
10	VSS	Power		
11	VDD	Power		
14	NRST	Reset		
15	PC0	I/O	ADC1_IN10	
16	PC1	I/O	ADC1_IN11	
19	VSSA	Power		
20	VREF-	Power		
21	VREF+	Power		
22	VDDA	Power		
25	PA2	I/O	USART2_TX	
26	PA3	I/O	USART2_RX	
27	VSS	Power		
28	VDD	Power		
30	PA5	I/O	SPI1_SCK	
31	PA6	I/O	SPI1_MISO	
32	PA7	I/O	SPI1_MOSI	
37	PB2 *	I/O	GPIO_Output	PPM
47	PB10	I/O	I2C2_SCL	
48	PB11	I/O	I2C2_SDA	
49	VSS	Power		
50	VDD	Power		
51	PB12 *	I/O	GPIO_Output	SPI2_NSS
52	PB13	I/O	SPI2_SCK	
53	PB14	I/O	SPI2_MISO	
54	PB15	I/O	SPI2_MOSI	
55	PD8 *	I/O	GPIO_Output	
56	PD9 *	I/O	GPIO_Output	
57	PD10 *	I/O	GPIO_Output	
58	PD11 *	I/O	GPIO_Output	
59	PD12 *	I/O	GPIO_Output	
60	PD13 *	I/O	GPIO_Output	
61	PD14 *	I/O	GPIO_Output	
62	PD15 *	I/O	GPIO_Output	
63	PC6 *	I/O	GPIO_Output	SD_CS
64	PC7 *	I/O	GPIO_Input	TOUCH_IRQ

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
65	PC8 *	I/O	GPIO_Input	TOUCH_BUSY
66	PC9 *	I/O	GPIO_Output	TOUCH_CS
68	PA9	I/O	USART1_TX	
70	PA11	I/O	USB_DM	
71	PA12	I/O	USB_DP	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	NC	NC		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
78	PC10 *	I/O	GPIO_Output	DISPLAY_RD
79	PC11 *	I/O	GPIO_Output	DISPLAY_WR
80	PC12 *	I/O	GPIO_Output	DISPLAY_RS
81	PD0 *	I/O	GPIO_Output	
82	PD1 *	I/O	GPIO_Output	
83	PD2 *	I/O	GPIO_Output	
84	PD3 *	I/O	GPIO_Output	
85	PD4 *	I/O	GPIO_Output	
86	PD5 *	I/O	GPIO_Output	
87	PD6 *	I/O	GPIO_Output	
88	PD7 *	I/O	GPIO_Output	
94	BOOT0	Boot		
95	PB8	I/O	CAN_RX	
96	PB9	I/O	CAN_TX	
99	VSS	Power		
100	VDD	Power		

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

## 4. Clock Tree Configuration



## 5. IPs and Middleware Configuration

### 5.1. ADC1

mode: IN10

mode: IN11

#### 5.1.1. Parameter Settings:

##### ADCs\_Common\_Settings:

Mode Independent mode

##### ADC\_Settings:

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode Disabled

Discontinuous Conversion Mode Disabled

##### ADC\_Regular\_ConversionMode:

Enable Regular Conversions Enable

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

Rank 1

Channel Channel 10

Sampling Time 1.5 Cycles

##### ADC\_Injected\_ConversionMode:

Number Of Conversions 0

##### WatchDog:

Enable Analog WatchDog Mode false

### 5.2. CAN

mode: Mode

#### 5.2.1. Parameter Settings:

##### Bit Timings Parameters:

Prescaler (for Time Quantum) 16

Time Quantum 666.6666666666666 \*

Time Quanta in Bit Segment 1 1 Time

Time Quanta in Bit Segment 2	1 Time
Time for one Bit	<b>2000 *</b>
ReSynchronization Jump Width	1 Time

**Basic Parameters:**

Time Triggered Communication Mode	Disable
Automatic Bus-Off Management	Disable
Automatic Wake-Up Mode	Disable
No-Automatic Retransmission	Disable
Receive Fifo Locked Mode	Disable
Transmit Fifo Priority	Disable

**Advanced Parameters:**

Operating Mode	Normal
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## 5.3. I2C2

### I2C: I2C

#### 5.3.1. Parameter Settings:

**Master Features:**

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

**Slave Features:**

Clock No Stretch Mode	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0
General Call address detection	Disabled

## 5.4. SPI1

### Mode: Full-Duplex Master

#### 5.4.1. Parameter Settings:

**Basic Parameters:**

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

**Clock Parameters:**

Prescaler (for Baud Rate)	4 *
Baud Rate	12.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

**Advanced Parameters:**

CRC Calculation	Disabled
NSS Signal Type	Software

## 5.5. SPI2

**Mode: Full-Duplex Master**

### 5.5.1. Parameter Settings:

**Basic Parameters:**

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

**Clock Parameters:**

Prescaler (for Baud Rate)	2
Baud Rate	12.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

**Advanced Parameters:**

CRC Calculation	Disabled
NSS Signal Type	Software

## 5.6. SYS

**Debug: Serial Wire**

**Timebase Source: TIM7**

## 5.7. USART1

**Mode: Single Wire (Half-Duplex)**



### 5.7.1. Parameter Settings:

#### Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

#### Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

## 5.8. USART2

### Mode: Asynchronous

### 5.8.1. Parameter Settings:

#### Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

#### Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

## 5.9. USB

### mode: Device (FS)

### 5.9.1. Parameter Settings:

#### Basic Parameters:

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	8 Bytes

#### Power Parameters:

Low Power	Disabled
Link Power Management	Disabled

Battery Charging Disabled

## 5.10. FATFS

mode: User-defined

### 5.10.1. Set Defines:

#### Version:

FATFS version R0.11

#### Function Parameters:

FS_READONLY (Read-only mode)	Disabled
FS_MINIMIZE (Minimization level)	Disabled
USE_STRFUNC (String functions)	Enabled with LF -> CRLF conversion
USE_FIND (Find functions)	Disabled
USE_MKFS (Make filesystem function)	Enabled
USE_FASTSEEK (Fast seek function)	Enabled
USE_LABEL (Volume label functions)	Disabled
USE_FORWARD (Forward function)	Disabled

#### Locale and Namespace Parameters:

CODE_PAGE (Code page on target)	Multilingual Latin 1 (OEM)
USE_LFN (Use Long Filename)	Disabled
MAX_LFN (Max Long Filename)	255
LFN_UNICODE (Enable Unicode)	ANSI/OEM
STRF_ENCODE (Character encoding)	UTF-8
FS_RPATH (Relative Path)	Disabled

#### Physical Drive Parameters:

VOLUMES (Logical drives)	1
MAX_SS (Maximum Sector Size)	512
MIN_SS (Minimum Sector Size)	512
MULTI_PARTITION (Volume partitions feature)	Disabled
USE_TRIM (Erase feature)	Disabled
FS_NOFSINFO (Force full FAT scan)	0

#### System Parameters:

FS_TINY (Tiny mode)	Disabled
FS_NORTC (Timestamp feature)	Dynamic timestamp
NORTC_YEAR (Year for timestamp)	2015
NORTC_MON (Month for timestamp)	6
NORTC_MDAY (Day for timestamp)	4
WORD_ACCESS (Platform dependent access option)	Byte access

FS_REENTRANT (Re-Entrancy)	Enabled
FS_TIMEOUT (Timeout ticks)	1000
SYNC_t (O/S sync object)	osSemaphoreId
FS_LOCK (Number of files opened simultaneously)	2

## 5.11. FREERTOS

**mode: Enabled**

### 5.11.1. 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
TOTAL_HEAP_SIZE	3072
Memory Management scheme	heap_4

#### Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Disabled
USE_DAEMON_TASK_STARTUP_HOOK	Disabled

CHECK\_FOR\_STACK\_OVERFLOW Disabled

**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

## 5.11.2. 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

## 5.12. USB\_DEVICE

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

### 5.12.1. 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

#### Class Parameters:

USB CDC Rx Buffer Size	2048
USB CDC Tx Buffer Size	2048

### 5.12.2. 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	PC0	ADC1_IN10	Analog mode	n/a	n/a	
	PC1	ADC1_IN11	Analog mode	n/a	n/a	
CAN	PB8	CAN_RX	Input mode	No pull-up and no pull-down	n/a	
	PB9	CAN_TX	Alternate Function Push Pull	n/a	High *	
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	n/a	High *	
	PB11	I2C2_SDA	Alternate Function Open Drain	n/a	High *	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	n/a	High *	
	PA6	SPI1_MISO	Input mode	No pull-up and no pull-down	n/a	
	PA7	SPI1_MOSI	Alternate Function Push Pull	n/a	High *	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	High *	
	PB14	SPI2_MISO	Input mode	No pull-up and no pull-down	n/a	
	PB15	SPI2_MOSI	Alternate Function Push Pull	n/a	High *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART1	PA9	USART1_TX	Alternate Function Open Drain	n/a	High *	
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	High *	
	PA3	USART2_RX	Input mode	No pull-up and no pull-down	n/a	
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
GPIO	PB2	GPIO_Output	Output Push Pull	n/a	Low	PPM
	PB12	GPIO_Output	Output Push Pull	n/a	Low	SPI2_NSS
	PD8	GPIO_Output	Output Push Pull	n/a	Low	
	PD9	GPIO_Output	Output Push Pull	n/a	Low	
	PD10	GPIO_Output	Output Push Pull	n/a	Low	
	PD11	GPIO_Output	Output Push Pull	n/a	Low	
	PD12	GPIO_Output	Output Push Pull	n/a	Low	
	PD13	GPIO_Output	Output Push Pull	n/a	Low	
	PD14	GPIO_Output	Output Push Pull	n/a	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD15	GPIO_Output	Output Push Pull	n/a	Low	
	PC6	GPIO_Output	Output Push Pull	n/a	Low	SD_CS
	PC7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	TOUCH_IRQ
	PC8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	TOUCH_BUSY
	PC9	GPIO_Output	Output Push Pull	n/a	Low	TOUCH_CS
	PC10	GPIO_Output	Output Push Pull	n/a	Low	DISPLAY_RD
	PC11	GPIO_Output	Output Push Pull	n/a	Low	DISPLAY_WR
	PC12	GPIO_Output	Output Push Pull	n/a	Low	DISPLAY_RS
	PD0	GPIO_Output	Output Push Pull	n/a	Low	
	PD1	GPIO_Output	Output Push Pull	n/a	Low	
	PD2	GPIO_Output	Output Push Pull	n/a	Low	
	PD3	GPIO_Output	Output Push Pull	n/a	Low	
	PD4	GPIO_Output	Output Push Pull	n/a	Low	
	PD5	GPIO_Output	Output Push Pull	n/a	Low	
	PD6	GPIO_Output	Output Push Pull	n/a	Low	
	PD7	GPIO_Output	Output Push Pull	n/a	Low	

## 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
USB low priority or CAN RX0 interrupts	true	5	0
TIM7 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
USB high priority or CAN TX interrupts	unused		
CAN RX1 interrupt	unused		
CAN SCE interrupt	unused		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	unused		
USART1 global interrupt	unused		
USART2 global interrupt	unused		

\* User modified value



## ***7. Power Consumption Calculator report***

### 7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103VETx
Datasheet	14611_Rev12

### 7.2. Parameter Selection

Temperature	25
Vdd	3.3

## 8. Software Project

### 8.1. Project Settings

Name	Value
Project Name	Teststand
Project Folder	/home/jan/Projekte/Teststand/Software/Teststand
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.1

### 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)	Yes