1. Description

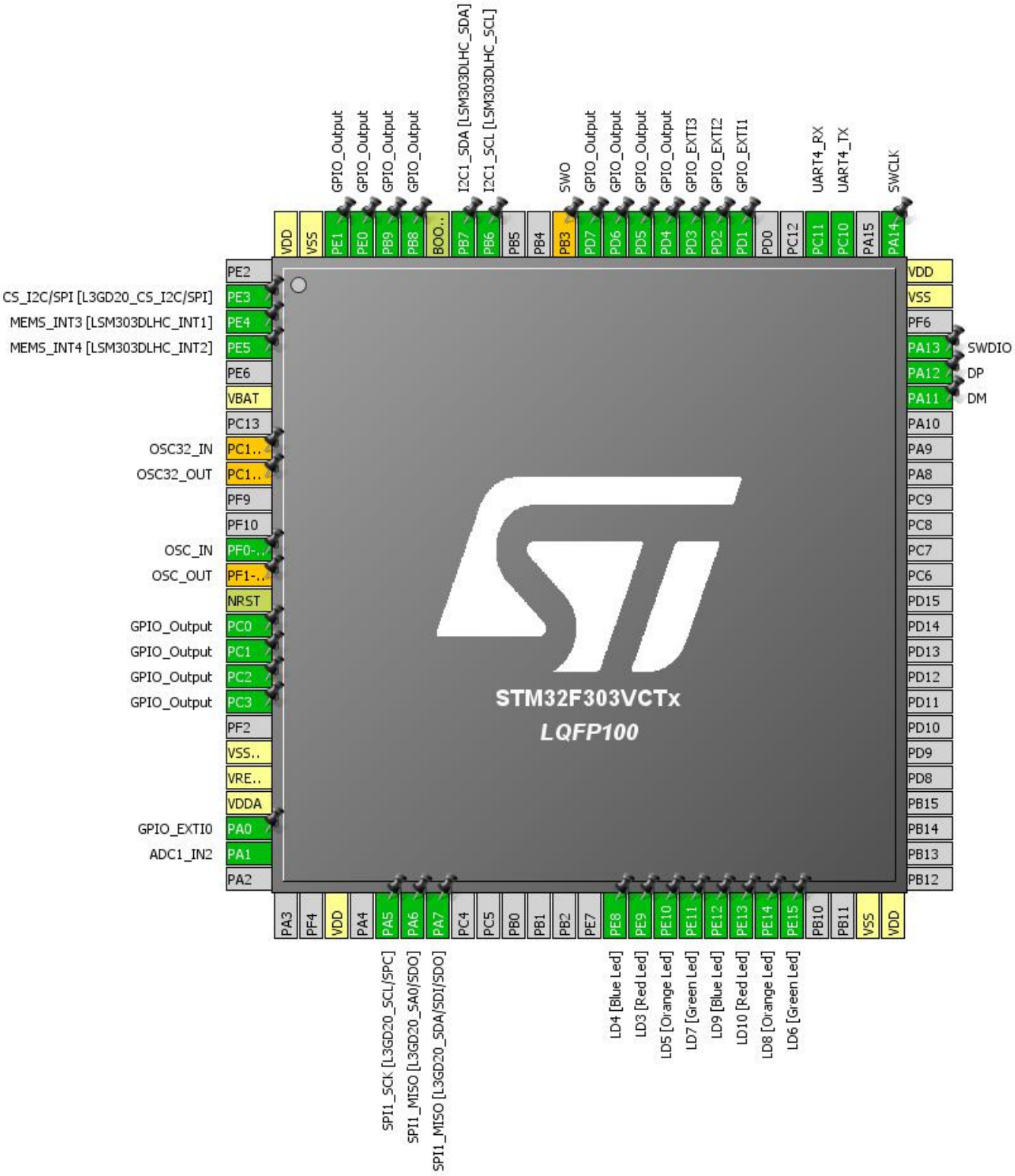
1.1. Project

Project Name	KeyPad
Board Name	STM32F3DISCOVERY
Generated with:	STM32CubeMX 4.24.0
Date	01/24/2020

1.2. MCU

MCU Series	STM32F3
MCU Line	STM32F303
MCU name	STM32F303VCTx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration



3. Pins Configuration

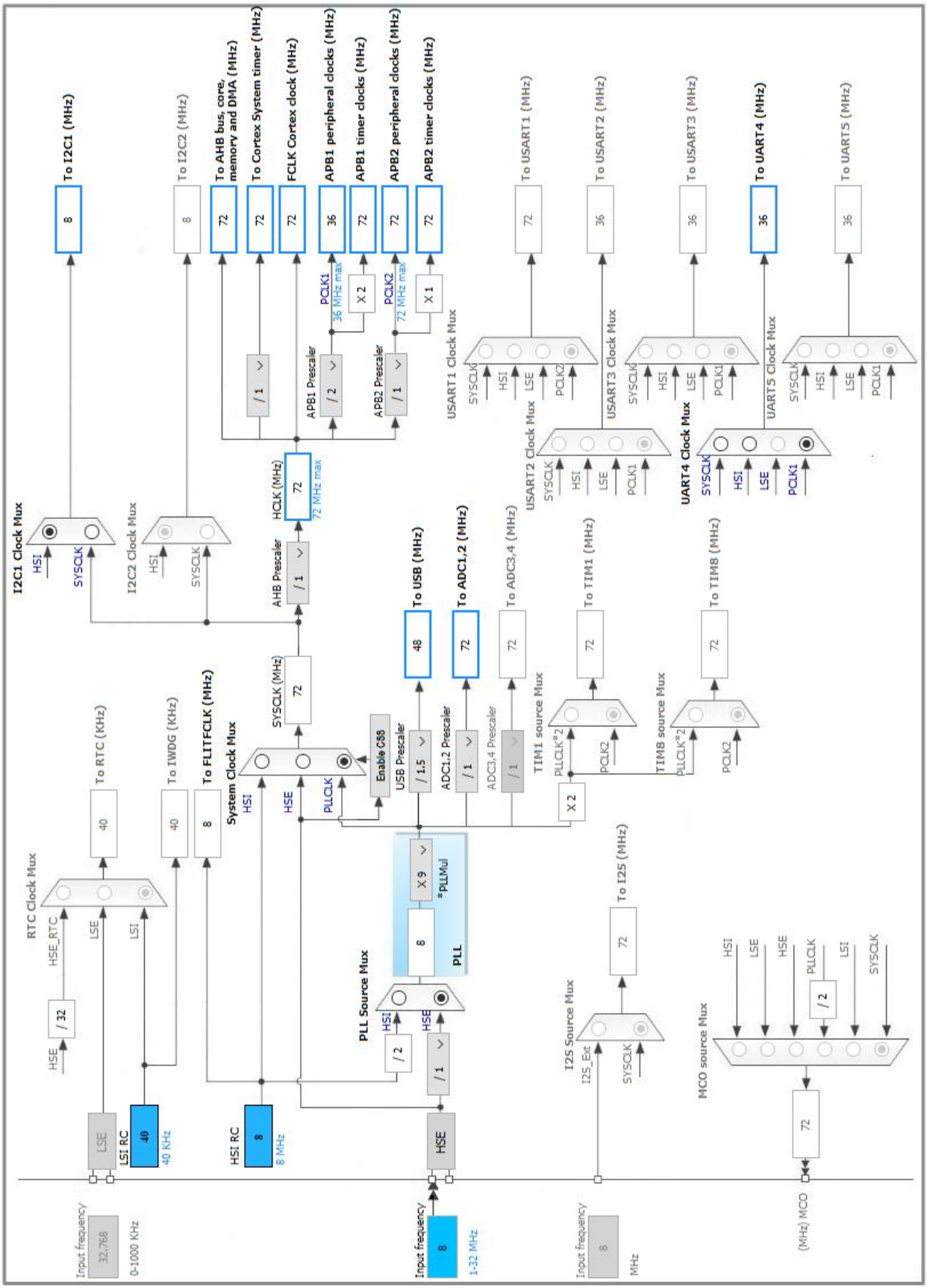
Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
2	PE3 *	I/O	GPIO_Output	CS_I2C/SPI [L3GD20_CS_I2C/SPI]
3	PE4	I/O	GPIO_EXTI4	MEMS_INT3 [LSM303DLHC_INT1]
4	PE5	I/O	GPIO_EXTI5	MEMS_INT4 [LSM303DLHC_INT2]
6	VBAT	Power		
8	PC14-OSC32_IN **	I/O	RCC_OSC32_IN	OSC32_IN
9	PC15-OSC32_OUT **	I/O	RCC_OSC32_OUT	OSC32_OUT
12	PF0-OSC_IN	I/O	RCC_OSC_IN	OSC_IN
13	PF1-OSC_OUT **	I/O	RCC_OSC_OUT	OSC_OUT
14	NRST	Reset		
15	PC0 *	I/O	GPIO_Output	
16	PC1 *	I/O	GPIO_Output	
17	PC2 *	I/O	GPIO_Output	
18	PC3 *	I/O	GPIO_Output	
20	VSSA/VREF-	Power		
21	VREF+	Power		
22	VDDA	Power		
23	PA0	I/O	GPIO_EXTI0	
24	PA1	I/O	ADC1_IN2	
28	VDD	Power		
30	PA5	I/O	SPI1_SCK	SPI1_SCK [L3GD20_SCL/SPC]
31	PA6	I/O	SPI1_MISO	SPI1_MISO [L3GD20_SA0/SDO]
32	PA7	I/O	SPI1_MOSI	SPI1_MISO [L3GD20_SDA/SDI/SDO]
39	PE8 *	I/O	GPIO_Output	LD4 [Blue Led]
40	PE9 *	I/O	GPIO_Output	LD3 [Red Led]
41	PE10 *	I/O	GPIO_Output	LD5 [Orange Led]
42	PE11 *	I/O	GPIO_Output	LD7 [Green Led]
43	PE12 *	I/O	GPIO_Output	LD9 [Blue Led]
44	PE13 *	I/O	GPIO_Output	LD10 [Red Led]
45	PE14 *	I/O	GPIO_Output	LD8 [Orange Led]
46	PE15 *	I/O	GPIO_Output	LD6 [Green Led]
49	VSS	Power		

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
50	VDD	Power		
70	PA11	I/O	USB_DM	DM
71	PA12	I/O	USB_DP	DP
72	PA13	I/O	SYS_JTMS-SWDIO	SWDIO
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	SWCLK
78	PC10	I/O	UART4_TX	
79	PC11	I/O	UART4_RX	
82	PD1	I/O	GPIO_EXTI1	
83	PD2	I/O	GPIO_EXTI2	
84	PD3	I/O	GPIO_EXTI3	
85	PD4 *	I/O	GPIO_Output	
86	PD5 *	I/O	GPIO_Output	
87	PD6 *	I/O	GPIO_Output	
88	PD7 *	I/O	GPIO_Output	
89	PB3 **	I/O	SYS_JTDO-TRACESWO	SWO
92	PB6	I/O	I2C1_SCL	I2C1_SCL [LSM303DLHC_SCL]
93	PB7	I/O	I2C1_SDA	I2C1_SDA [LSM303DLHC_SDA]
94	BOOT0	Boot		
95	PB8 *	I/O	GPIO_Output	
96	PB9 *	I/O	GPIO_Output	
97	PE0 *	I/O	GPIO_Output	
98	PE1 *	I/O	GPIO_Output	
99	VSS	Power		
100	VDD	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

IN2: IN2 Single-ended

5.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Clock Prescaler	ADC Asynchronous clock mode
Resolution	**ADC 6-bit resolution ***
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data overwritten
Low Power Auto Wait	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 2
Sampling Time	**601.5 Cycles ***
Offset Number	No offset
Offset	0

ADC_Injected_ConversionMode:

Enable Injected Conversions	Enable
Number Of Conversions	0

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. I2C1

I2C: I2C

5.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x2000090E

Slave Features:

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

5.3. RCC

High Speed Clock (HSE): BYPASS Clock Source

5.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	2 WS (3 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

5.4. SPI1

Mode: Full-Duplex Master

5.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**4 ***
Baud Rate	**18.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software

5.5. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.6. TIM2

Clock Source : Internal Clock

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**899 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**799 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection TRGO	Reset (UG bit from TIMx_EGR)

5.7. UART4

Mode: Asynchronous

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
Single Sample	Disable

Advanced Features:

TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

5.8. USB

mode: Device (FS)

5.8.1. Parameter Settings:

Basic Parameters:

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

Power Parameters:

Low Power	Disabled

Battery Charging	Disabled

*** 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	PA1	ADC1_IN2	Analog mode	No pull up pull down	n/a	
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	Pull up	**High ***	I2C1_SCL [LSM303DLHC_SCL]
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull up	**High ***	I2C1_SDA [LSM303DLHC_SDA]
RCC	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	OSC_IN
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull up pull down	**High ***	SPI1_SCK [L3GD20_SCL/SPC]
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull up pull down	**High ***	SPI1_MISO [L3GD20_SA0/SDO]
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull up pull down	**High ***	SPI1_MISO [L3GD20_SDA/SDI/SDO]
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
UART4	PC10	UART4_TX	Alternate Function Push Pull	No pull up pull down	**High ***	
	PC11	UART4_RX	Alternate Function Push Pull	No pull up pull down	**High ***	
USB	PA11	USB_DM	Alternate Function Push Pull	No pull up pull down	**High ***	DM
	PA12	USB_DP	Alternate Function Push Pull	No pull up pull down	**High ***	DP
Single Mapped Signals	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	OSC32_IN
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	OSC32_OUT
	PF1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	OSC_OUT
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	SWO
GPIO	PE3	GPIO_Output	Output Push Pull	No pull up pull down	Low	CS_I2C/SPI [L3GD20_CS_I2C/SPI]
	PE4	GPIO_EXTI4	**External Event Mode with Rising edge trigger detection ***	No pull up pull down	n/a	MEMS_INT3 [LSM303DLHC_INT1]
	PE5	GPIO_EXTI5	**External Event Mode**	No pull up pull down	n/a	MEMS_INT4 [LSM303DLHC_INT2]

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
			with Rising edge trigger detection *			
	PC0	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PC1	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PC2	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PC3	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PA0	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull up pull down	n/a	
	PE8	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD4 [Blue Led]
	PE9	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD3 [Red Led]
	PE10	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD5 [Orange Led]
	PE11	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD7 [Green Led]
	PE12	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD9 [Blue Led]
	PE13	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD10 [Red Led]
	PE14	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD8 [Orange Led]
	PE15	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD6 [Green Led]
	PD1	GPIO_EXTI1	External Interrupt Mode with Rising edge trigger detection	**Pull down ***	n/a	
	PD2	GPIO_EXTI2	External Interrupt Mode with Rising edge trigger detection	**Pull down ***	n/a	
	PD3	GPIO_EXTI3	External Interrupt Mode with Rising edge trigger detection	**Pull down ***	n/a	
	PD4	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PD5	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PD6	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PD7	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PB8	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PB9	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PE0	GPIO_Output	Output Push Pull	No pull up pull down	Low	
	PE1	GPIO_Output	Output Push Pull	No pull up pull down	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
Pre-fetch 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	0	0
System tick timer	true	0	0
EXTI line1 interrupt	true	1	0
EXTI line2 and Touch Sense controller	true	1	0
EXTI line3 interrupt	true	1	0
PVD interrupt through EXTI line16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line0 interrupt	unused		
ADC1 and ADC2 interrupts	unused		
USB high priority or CAN_TX interrupts	unused		
USB low priority or CAN_RX0 interrupts	unused		
TIM2 global interrupt	unused		
I2C1 event global interrupt / I2C1 wake-up interrupt through EXTI line 23	unused		
I2C1 error interrupt	unused		
SPI1 global interrupt	unused		
UART4 global interrupt / UART4 wake-up interrupt through EXTI line 34	unused		
USB high priority interrupt remap	unused		
USB low priority interrupt remap	unused		
Floating point unit interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F3
Line	STM32F303
MCU	STM32F303VCTx
Datasheet	023353_Rev13

7.2. Parameter Selection

Temperature	25
Vdd	3.6

8. Software Project

8.1. Project Settings

Name	Value
Project Name	KeyPad
Project Folder	C:\Users\Mobin\Documents\STMicroelectronics\Projects\Test1\FinalProject
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F3 V1.9.1

8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	Copy all used libraries into the project folder
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

9. Software Pack Report