

1. Description

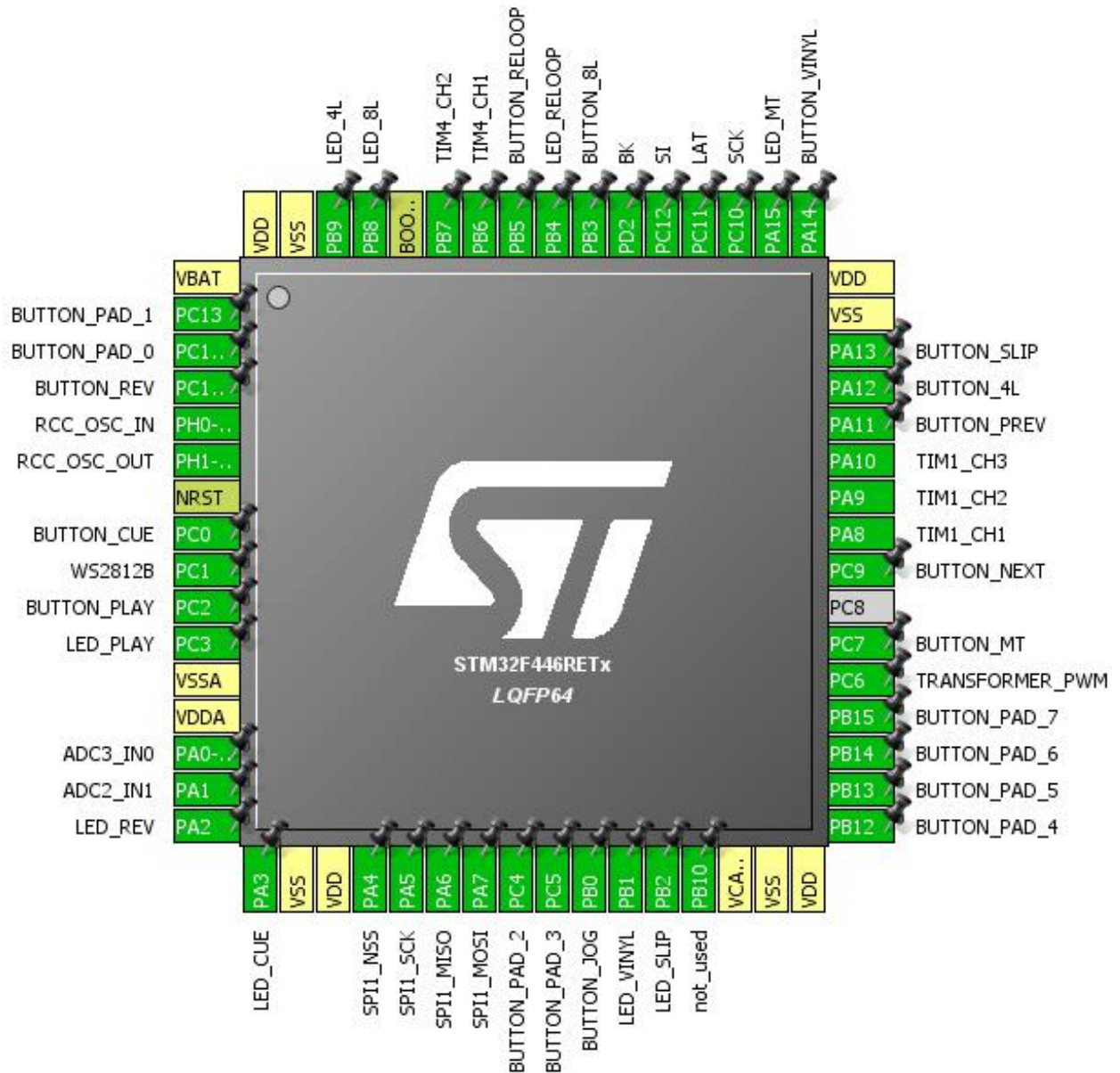
1.1. Project

Project Name	XDJ_DECK_UCOM
Board Name	XDJ_DECK_UCOM
Generated with:	STM32CubeMX 4.25.1
Date	03/17/2025

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F446
MCU name	STM32F446RETx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



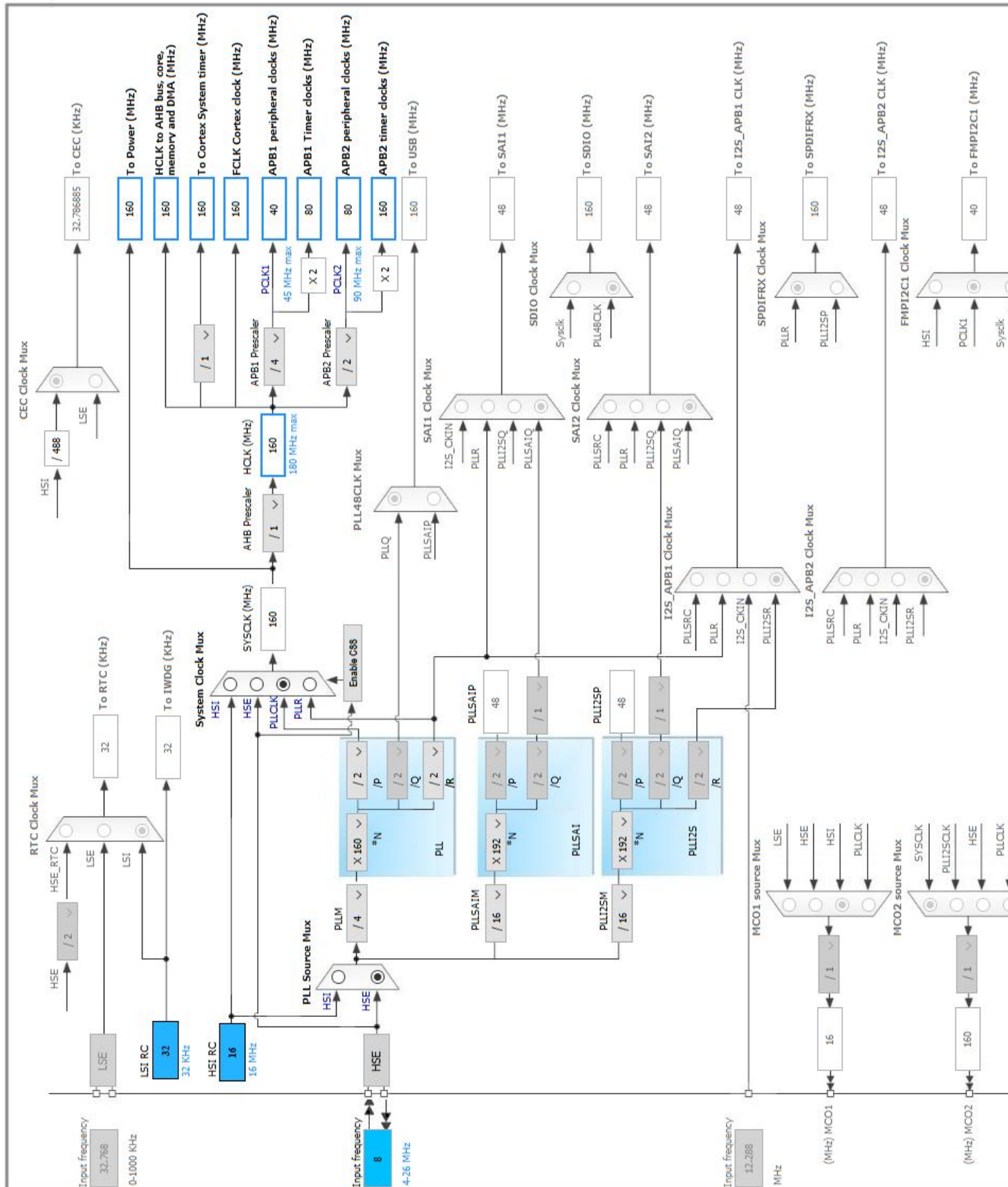
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13 *	I/O	GPIO_Input	BUTTON_PAD_1
3	PC14-OSC32_IN *	I/O	GPIO_Input	BUTTON_PAD_0
4	PC15-OSC32_OUT *	I/O	GPIO_Input	BUTTON_REV
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Input	BUTTON_CUE
9	PC1	I/O	SPI2_MOSI	WS2812B
10	PC2 *	I/O	GPIO_Input	BUTTON_PLAY
11	PC3 *	I/O	GPIO_Output	LED_PLAY
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP	I/O	ADC3_IN0	
15	PA1	I/O	ADC2_IN1	
16	PA2 *	I/O	GPIO_Output	LED_REV
17	PA3 *	I/O	GPIO_Output	LED_CUE
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	SPI1_NSS	
21	PA5	I/O	SPI1_SCK	
22	PA6	I/O	SPI1_MISO	
23	PA7	I/O	SPI1_MOSI	
24	PC4 *	I/O	GPIO_Input	BUTTON_PAD_2
25	PC5 *	I/O	GPIO_Input	BUTTON_PAD_3
26	PB0 *	I/O	GPIO_Input	BUTTON_JOG
27	PB1 *	I/O	GPIO_Output	LED_VINYL
28	PB2 *	I/O	GPIO_Output	LED_SLIP
29	PB10	I/O	SPI2_SCK	not_used
30	VCAP_1	Power		
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Input	BUTTON_PAD_4
34	PB13 *	I/O	GPIO_Input	BUTTON_PAD_5
35	PB14 *	I/O	GPIO_Input	BUTTON_PAD_6
36	PB15 *	I/O	GPIO_Input	BUTTON_PAD_7

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
37	PC6	I/O	TIM3_CH1	TRANSFORMER_PWM
38	PC7 *	I/O	GPIO_Input	BUTTON_MT
40	PC9 *	I/O	GPIO_Input	BUTTON_NEXT
41	PA8	I/O	TIM1_CH1	
42	PA9	I/O	TIM1_CH2	
43	PA10	I/O	TIM1_CH3	
44	PA11 *	I/O	GPIO_Input	BUTTON_PREV
45	PA12 *	I/O	GPIO_Input	BUTTON_4L
46	PA13 *	I/O	GPIO_Input	BUTTON_SLIP
47	VSS	Power		
48	VDD	Power		
49	PA14 *	I/O	GPIO_Input	BUTTON_VINYL
50	PA15 *	I/O	GPIO_Output	LED_MT
51	PC10	I/O	SPI3_SCK	SCK
52	PC11 *	I/O	GPIO_Output	LAT
53	PC12	I/O	SPI3_MOSI	SI
54	PD2 *	I/O	GPIO_Output	BK
55	PB3 *	I/O	GPIO_Input	BUTTON_8L
56	PB4 *	I/O	GPIO_Output	LED_RELOOP
57	PB5 *	I/O	GPIO_Input	BUTTON_RELOOP
58	PB6	I/O	TIM4_CH1	
59	PB7	I/O	TIM4_CH2	
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	LED_8L
62	PB9 *	I/O	GPIO_Output	LED_4L
63	VSS	Power		
64	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC1

mode: Vrefint Channel

5.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Clock Prescaler PCLK2 divided by 4

Resolution 12 bits (15 ADC Clock cycles)

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode Disabled

Discontinuous Conversion Mode Disabled

DMA Continuous Requests Disabled

End Of Conversion Selection EOC flag at the end of single channel conversion

ADC_Regular_ConversionMode:

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

External Trigger Conversion Edge None

Rank 1

Channel Channel Vrefint

Sampling Time 3 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions 0

WatchDog:

Enable Analog WatchDog Mode false

5.2. ADC2

mode: IN1

5.2.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode
ADC_Settings:	
Clock Prescaler	PCLK2 divided by 4
Resolution	12 bits (15 ADC Clock cycles)
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	EOC flag at the end of single channel conversion
ADC_Regular_ConversionMode:	
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 1
Sampling Time	3 Cycles
ADC_Injected_ConversionMode:	
Number Of Conversions	0
WatchDog:	
Enable Analog WatchDog Mode	false

5.3. ADC3

mode: IN0

5.3.1. Parameter Settings:

ADCs_Common_Settings:	
Mode	Independent mode
ADC_Settings:	
Clock Prescaler	PCLK2 divided by 4
Resolution	12 bits (15 ADC Clock cycles)
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	EOC flag at the end of single channel conversion
ADC_Regular_ConversionMode:	

Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 0
Sampling Time	3 Cycles
ADC_Injected_ConversionMode:	
Number Of Conversions	0
WatchDog:	
Enable Analog WatchDog Mode	false

5.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.4.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	5 WS (6 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
Power Over Drive	Disabled

5.5. SPI1

Mode: Full-Duplex Slave

Hardware NSS Signal: Hardware NSS Input Signal

5.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Clock Polarity (CPOL)	High *
Clock Phase (CPHA)	2 Edge *

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Input Hardware

5.6. SPI2

Mode: Transmit Only Master

5.6.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	16 *
Baud Rate	2.5 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.7. SPI3

Mode: Transmit Only Master

5.7.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	16 *
Baud Rate	2.5 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.8. SYS

Timebase Source: SysTick

5.9. TIM1

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

5.9.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	159 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	999 *
Internal Clock Division (CKD)	Division by 2 *
Repetition Counter (RCR - 8 bits value)	0

Trigger Output (TRGO) Parameters:

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

Break And Dead Time management - BRK Configuration:

BRK State	Disable
BRK Polarity	High

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

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	500 *
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	500 *
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

PWM Generation Channel 3:

Mode	PWM mode 1
Pulse (16 bits value)	500 *
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

5.10. TIM3

Clock Source : Internal Clock

Channel1: PWM Generation CH1

5.10.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	4 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	159 *
Internal Clock Division (CKD)	No Division

Trigger Output (TRGO) Parameters:

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

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

5.11. TIM4

Combined Channels: Encoder Mode

5.11.1. Parameter Settings:

Counter Settings:

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

Trigger Output (TRGO) Parameters:

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

Encoder:

Encoder Mode	Encoder Mode TI1
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____ Parameters for Channel 1 ____

Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	1 *

____ Parameters for Channel 2 ____

Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	1 *

5.12. TIM5

mode: Clock Source

5.12.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	7 *
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	1900 *
Internal Clock Division (CKD)	Division by 2 *

Trigger Output (TRGO) Parameters:

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

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC2	PA1	ADC2_IN1	Analog mode	No pull-up and no pull-down	n/a	
ADC3	PA0-WKUP	ADC3_IN0	Analog mode	No pull-up and no pull-down	n/a	
RCC	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA4	SPI1_NSS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Low	
SPI2	PC1	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	WS2812B
	PB10	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	not_used
SPI3	PC10	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	SCK
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	SI
TIM1	PA8	TIM1_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA9	TIM1_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA10	TIM1_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM3	PC6	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	TRANSFORMER_PWM
TIM4	PB6	TIM4_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB7	TIM4_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
GPIO	PC13	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_1
	PC14-OSC32_IN	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_0
	PC15-OSC32_OUT	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_REV
	PC0	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_CUE
	PC2	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PLAY
	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_PLAY

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_REV
	PA3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_CUE
	PC4	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_2
	PC5	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_3
	PB0	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_JOG
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_VINYL
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_SLIP
	PB12	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_4
	PB13	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_5
	PB14	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_6
	PB15	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PAD_7
	PC7	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_MT
	PC9	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_NEXT
	PA11	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_PREV
	PA12	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_4L
	PA13	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_SLIP
	PA14	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_VINYL
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_MT
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very High *	LAT
	PD2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very High *	BK
	PB3	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_8L
	PB4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_RELOOP
	PB5	GPIO_Input	Input mode	Pull-up *	n/a	BUTTON_RELOOP
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_8L
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LED_4L

6.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI1_RX	DMA2_Stream0	Peripheral To Memory	High *
SPI1_TX	DMA2_Stream3	Memory To Peripheral	High *
SPI2_TX	DMA1_Stream4	Memory To Peripheral	Low
SPI3_TX	DMA1_Stream5	Memory To Peripheral	Low

SPI1_RX: DMA2_Stream0 DMA request Settings:

Mode: **Circular ***
 Use fifo: Disable
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte

SPI1_TX: DMA2_Stream3 DMA request Settings:

Mode: **Circular ***
 Use fifo: Disable
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte

SPI2_TX: DMA1_Stream4 DMA request Settings:

Mode: Normal
 Use fifo: Disable
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte

SPI3_TX: DMA1_Stream5 DMA request Settings:

Mode: Normal

Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	Enable *
Peripheral Data Width:	Byte
Memory Data Width:	Byte

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
DMA1 stream4 global interrupt	true	1	0
DMA1 stream5 global interrupt	true	1	0
TIM4 global interrupt	true	2	0
TIM5 global interrupt	true	3	0
DMA2 stream0 global interrupt	true	0	0
DMA2 stream3 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1, ADC2 and ADC3 interrupts	unused		
TIM1 break interrupt and TIM9 global interrupt	unused		
TIM1 update interrupt and TIM10 global interrupt	unused		
TIM1 trigger and commutation interrupts and TIM11 global interrupt	unused		
TIM1 capture compare interrupt	unused		
TIM3 global interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	unused		
SPI3 global interrupt	unused		
FPU global interrupt	unused		

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F446
MCU	STM32F446RETx
Datasheet	027107_Rev6

7.2. Parameter Selection

Temperature	25
Vdd	null

8. Software Project

8.1. Project Settings

Name	Value
Project Name	XDJ_DECK_UCOM
Project Folder	C:\Keil_v5\My_Project\XDJ_DECK_UCOM
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F4 V1.21.0

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	Yes
Backup previously generated files when re-generating	No
Delete previously generated files when not re-generated	No
Set all free pins as analog (to optimize the power consumption)	No

9. Software Pack Report