

1. Description

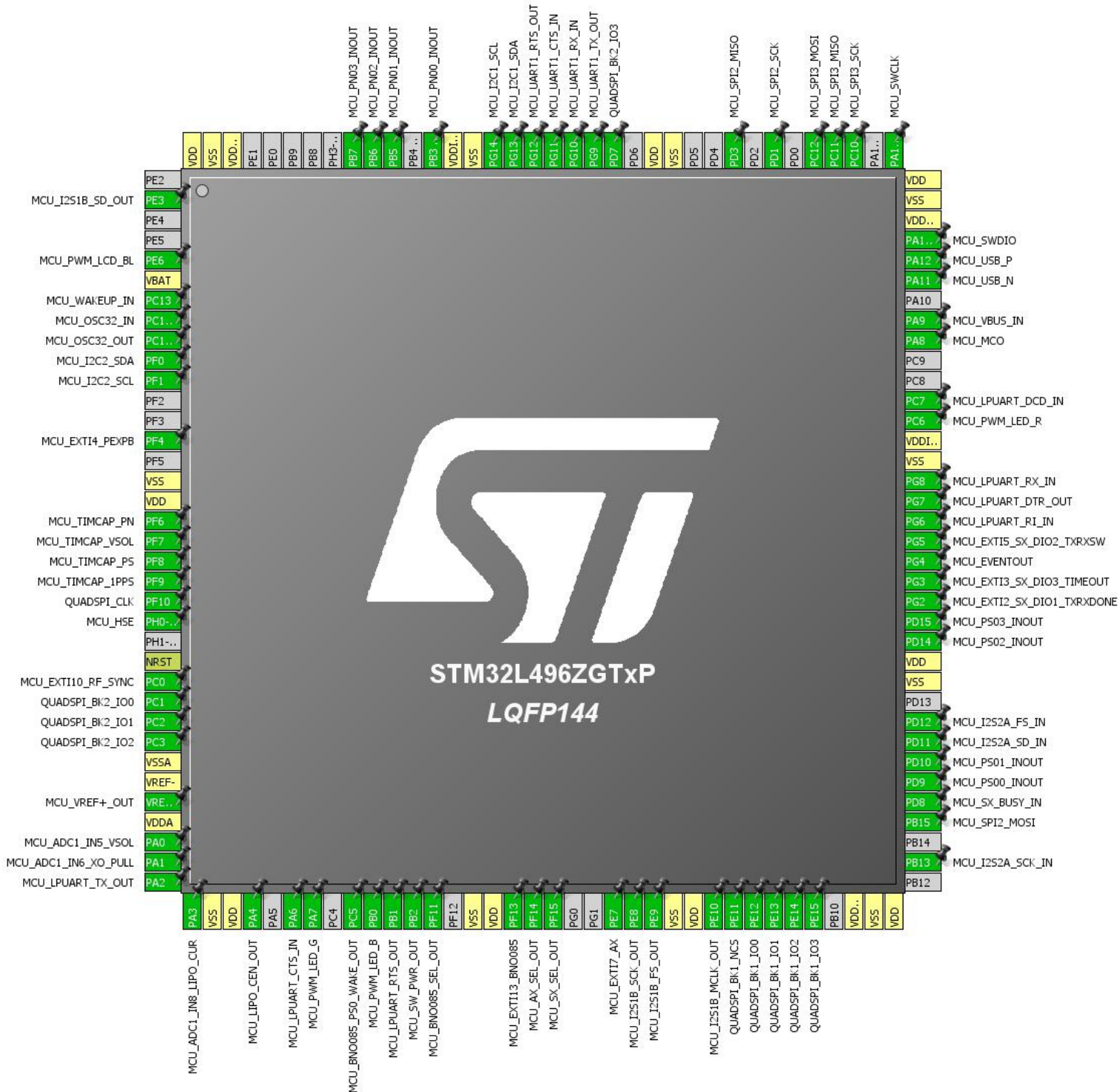
1.1. Project

Project Name	HFT-Core-Module_TrueSTUDIO
Board Name	HFT-Core-Module_TrueSTUDIO
Generated with:	STM32CubeMX 4.27.0
Date	11/03/2018

1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x6
MCU name	STM32L496ZGTxP
MCU Package	LQFP144
MCU Pin number	144

2. Pinout Configuration



3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
2	PE3	I/O	SAI1_SD_B	MCU_I2S1B_SD_OUT
5	PE6	I/O	TIM3_CH4	MCU_PWM_LCD_BL
6	VBAT	Power		
7	PC13	I/O	SYS_WKUP2	MCU_WAKEUP_IN
8	PC14-OSC32_IN (PC14)	I/O	RCC_OSC32_IN	MCU_OSC32_IN
9	PC15-OSC32_OUT (PC15)	I/O	RCC_OSC32_OUT	MCU_OSC32_OUT
10	PF0	I/O	I2C2_SDA	MCU_I2C2_SDA
11	PF1	I/O	I2C2_SCL	MCU_I2C2_SCL
14	PF4	I/O	GPIO_EXTI4	MCU_EXTI4_PEXPB
16	VSS	Power		
17	VDD	Power		
18	PF6	I/O	TIM5_CH1	MCU_TIMCAP_PN
19	PF7	I/O	TIM5_CH2	MCU_TIMCAP_VSOL
20	PF8	I/O	TIM5_CH3	MCU_TIMCAP_PS
21	PF9	I/O	TIM5_CH4	MCU_TIMCAP_1PPS
22	PF10	I/O	QUADSPI_CLK	
23	PH0-OSC_IN (PH0)	I/O	RCC_OSC_IN	MCU_HSE
25	NRST	Reset		
26	PC0	I/O	GPIO_EXTI0	MCU_EXTI10_RF_SYNC
27	PC1	I/O	QUADSPI_BK2_IO0	
28	PC2	I/O	QUADSPI_BK2_IO1	
29	PC3	I/O	QUADSPI_BK2_IO2	
30	VSSA	Power		
31	VREF-	Power		
32	VREF+	MonolO	VREFBUF_OUT	MCU_VREF+_OUT
33	VDDA	Power		
34	PA0	I/O	ADC1_IN5	MCU_ADC1_IN5_VSOL
35	PA1	I/O	ADC1_IN6	MCU_ADC1_IN6_XO_PULL
36	PA2	I/O	LPUART1_TX	MCU_LPUART_TX_OUT
37	PA3	I/O	ADC1_IN8	MCU_ADC1_IN8_LIPO_CUR
38	VSS	Power		
39	VDD	Power		
40	PA4 *	I/O	GPIO_Output	MCU_LIPO_CEN_OUT
42	PA6	I/O	LPUART1_CTS	MCU_LPUART_CTS_IN
43	PA7	I/O	TIM3_CH2	MCU_PWM_LED_G

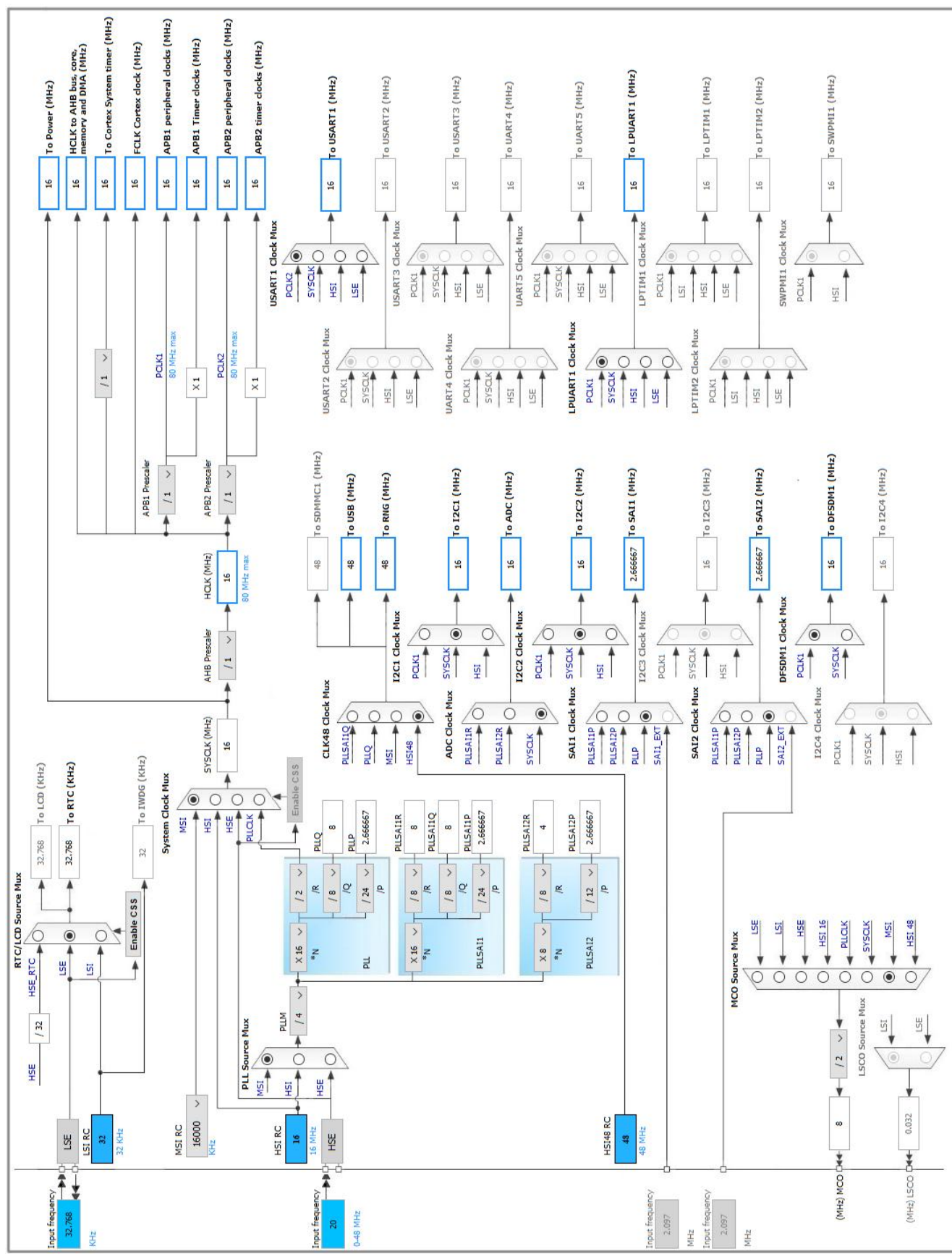
Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
45	PC5 *	I/O	GPIO_Output	MCU_BNO085_PS0_WAKE_OUT
46	PB0	I/O	TIM3_CH3	MCU_PWM_LED_B
47	PB1	I/O	LPUART1_RTS	MCU_LPUART_RTS_OUT
48	PB2 *	I/O	GPIO_Output	MCU_SW_PWR_OUT
49	PF11 *	I/O	GPIO_Output	MCU_BNO085_SEL_OUT
51	VSS	Power		
52	VDD	Power		
53	PF13	I/O	GPIO_EXTI13	MCU_EXTI13_BNO085
54	PF14 *	I/O	GPIO_Output	MCU_AX_SEL_OUT
55	PF15 *	I/O	GPIO_Output	MCU_SX_SEL_OUT
58	PE7	I/O	GPIO_EXTI7	MCU_EXTI7_AX
59	PE8	I/O	SAI1_SCK_B	MCU_I2S1B_SCK_OUT
60	PE9	I/O	SAI1_FS_B	MCU_I2S1B_FS_OUT
61	VSS	Power		
62	VDD	Power		
63	PE10	I/O	SAI1_MCLK_B	MCU_I2S1B_MCLK_OUT
64	PE11	I/O	QUADSPI_BK1_NCS	
65	PE12	I/O	QUADSPI_BK1_IO0	
66	PE13	I/O	QUADSPI_BK1_IO1	
67	PE14	I/O	QUADSPI_BK1_IO2	
68	PE15	I/O	QUADSPI_BK1_IO3	
70	VDD12	Power		
71	VSS	Power		
72	VDD	Power		
74	PB13	I/O	SAI2_SCK_A	MCU_I2S2A_SCK_IN
76	PB15	I/O	SPI2_MOSI	MCU_SPI2_MOSI
77	PD8 *	I/O	GPIO_Input	MCU_SX_BUSY_IN
78	PD9 *	I/O	GPIO_Input	MCU_PS00_INOUT
79	PD10 *	I/O	GPIO_Input	MCU_PS01_INOUT
80	PD11	I/O	SAI2_SD_A	MCU_I2S2A_SD_IN
81	PD12	I/O	SAI2_FS_A	MCU_I2S2A_FS_IN
83	VSS	Power		
84	VDD	Power		
85	PD14 *	I/O	GPIO_Input	MCU_PS02_INOUT
86	PD15 *	I/O	GPIO_Input	MCU_PS03_INOUT
87	PG2	I/O	GPIO_EXTI2	MCU_EXTI2_SX_DIO1_TX RXDONE
88	PG3	I/O	GPIO_EXTI3	MCU_EXTI3_SX_DIO3_TIM EOUT

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
89	PG4 *	I/O	EVENTOUT	MCU_EVENTOUT
90	PG5	I/O	GPIO_EXTI5	MCU_EXTI5_SX_DIO2_TX RXSW
91	PG6 *	I/O	GPIO_Input	MCU_LPUART_RI_IN
92	PG7 *	I/O	GPIO_Output	MCU_LPUART_DTR_OUT
93	PG8	I/O	LPUART1_RX	MCU_LPUART_RX_IN
94	VSS	Power		
95	VDDIO2	Power		
96	PC6	I/O	TIM3_CH1	MCU_PWM_LED_R
97	PC7 *	I/O	GPIO_Input	MCU_LPUART_DCD_IN
100	PA8	I/O	RCC_MCO	MCU_MCO
101	PA9	I/O	USB_OTG_FS_VBUS	MCU_VBUS_IN
103	PA11	I/O	USB_OTG_FS_DM	MCU_USB_N
104	PA12	I/O	USB_OTG_FS_DP	MCU_USB_P
105	PA13 (JTMS/SWDIO)	I/O	SYS_JTMS-SWDIO	MCU_SWDIO
106	VDDUSB	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14 (JTCK/SWCLK)	I/O	SYS_JTCK-SWCLK	MCU_SWCLK
111	PC10	I/O	SPI3_SCK	MCU_SPI3_SCK
112	PC11	I/O	SPI3_MISO	MCU_SPI3_MISO
113	PC12	I/O	SPI3_MOSI	MCU_SPI3_MOSI
115	PD1	I/O	SPI2_SCK	MCU_SPI2_SCK
117	PD3	I/O	SPI2_MISO	MCU_SPI2_MISO
120	VSS	Power		
121	VDD	Power		
123	PD7	I/O	QUADSPI_BK2_IO3	
124	PG9	I/O	USART1_TX	MCU_UART1_TX_OUT
125	PG10	I/O	USART1_RX	MCU_UART1_RX_IN
126	PG11	I/O	USART1_CTS	MCU_UART1_CTS_IN
127	PG12	I/O	USART1_RTS	MCU_UART1_RTS_OUT
128	PG13	I/O	I2C1_SDA	MCU_I2C1_SDA
129	PG14	I/O	I2C1_SCL	MCU_I2C1_SCL
130	VSS	Power		
131	VDDIO2	Power		
132	PB3 (JTDO/TRACESWO) *	I/O	GPIO_Input	MCU_PN00_INOUT
134	PB5 *	I/O	GPIO_Input	MCU_PN01_INOUT
135	PB6 *	I/O	GPIO_Input	MCU_PN02_INOUT
136	PB7 *	I/O	GPIO_Input	MCU_PN03_INOUT

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
142	VDD12	Power		
143	VSS	Power		
144	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC1

IN5: IN5 Single-ended

IN6: IN6 Single-ended

IN8: IN8 Single-ended

mode: Temperature Sensor Channel

mode: Vbat Channel

mode: Vrefint Channel

5.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Clock Prescaler Asynchronous clock mode divided by 1

Resolution ADC 12-bit resolution

Data Alignment Right alignment

Scan Conversion Mode Enabled

Continuous Conversion Mode Disabled

Discontinuous Conversion Mode Disabled

DMA Continuous Requests **Enabled ***

End Of Conversion Selection End of single conversion

Overrun behaviour Overrun data preserved

Low Power Auto Wait Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions Enable

Enable Regular Oversampling **Enable ***

Oversampling Right Shift No bit shift for oversampling

Oversampling Ratio **Oversampling ratio 16x ***

Regular Oversampling Mode Oversampling Continued Mode

Triggered Regular Oversampling Single trigger for all oversampled conversions

Number Of Conversion **4 ***

External Trigger Conversion Source Regular Conversion launched by software

External Trigger Conversion Edge None

Rank 1

Channel **Channel Vrefint ***

Sampling Time **12.5 Cycles ***

Offset Number No offset

Rank **2 ***

Channel	Channel 8 *
Sampling Time	12.5 Cycles *
Offset Number	No offset
<u>Rank</u>	3 *
Channel	Channel Vbat *
Sampling Time	247.5 Cycles *
Offset Number	No offset
<u>Rank</u>	4 *
Channel	Channel Temperature Sensor *
Sampling Time	12.5 Cycles *
Offset Number	No offset
ADC_Injected_ConversionMode:	
Enable Injected Conversions	Disable
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. CRC

mode: Activated

5.2.1. Parameter Settings:

Basic Parameters:

Default Polynomial State	Enable
Default Init Value State	Enable

Advanced Parameters:

Input Data Inversion Mode	None
Output Data Inversion Mode	Disable
Input Data Format	Bytes

5.3. DFSDM1

mode: Parallel input

mode: Parallel input

5.3.1. Filter 0:

regular channel selection:

regular channel selection

Continuous Mode

Trigger to start regular conversion

Fast Mode

Dma Mode

Channel 0 *

One Shot Mode *

Software trigger

Disable

Disable

injected channel selection:

Channel0 as injected channel

Disable

Channel1 as injected channel

Disable

Channel2 as injected channel

Disable

Channel3 as injected channel

Disable

Channel4 as injected channel

Disable

Channel5 as injected channel

Disable

Channel6 as injected channel

Disable

Channel7 as injected channel

Disable

Filter parameters:

Sinc Order

FastSinc filter type

Fosr

1

losr

1

5.3.2. Filter 1:

regular channel selection:

regular channel selection

Continuous Mode

Trigger to start regular conversion

Fast Mode

Dma Mode

Channel 1 *

One Shot Mode *

Software trigger

Disable

Disable

injected channel selection:

Channel0 as injected channel

Disable

Channel1 as injected channel

Disable

Channel2 as injected channel

Disable

Channel3 as injected channel

Disable

Channel4 as injected channel

Disable

Channel5 as injected channel

Disable

Channel6 as injected channel

Disable

Channel7 as injected channel

Disable

Filter parameters:

Sinc Order	FastSinc filter type
Fosr	1
losr	1

5.3.3. Filter 2:

regular channel selection:

regular channel selection	- None -
---------------------------	----------

injected channel selection:

Channel0 as injected channel	Disable
Channel1 as injected channel	Disable
Channel2 as injected channel	Disable
Channel3 as injected channel	Disable
Channel4 as injected channel	Disable
Channel5 as injected channel	Disable
Channel6 as injected channel	Disable
Channel7 as injected channel	Disable

5.3.4. Filter 3:

regular channel selection:

regular channel selection	- None -
---------------------------	----------

injected channel selection:

Channel0 as injected channel	Disable
Channel1 as injected channel	Disable
Channel2 as injected channel	Disable
Channel3 as injected channel	Disable
Channel4 as injected channel	Disable
Channel5 as injected channel	Disable
Channel6 as injected channel	Disable
Channel7 as injected channel	Disable

5.3.5. Channel 0:

Channel 0 Parallel input selection:

Multiplexer_Internal_CH0	Data are taken from internal register
--------------------------	---------------------------------------

Channel 0 parameters:

Data Packing	Standard data packing mode
Right Bit Shift	0x00 *

5.3.6. Channel 1:

Channel 1 Parallel input selection:

Multiplexer_Internal_CH1 Data are taken from internal register

Channel 1 parameters:

Data Packing Standard data packing mode

Right Bit Shift **0x00 ***

5.4. I2C1

I2C: I2C

5.4.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Fast Mode *
I2C Speed Frequency (KHz)	400
Rise Time (ns)	120 *
Fall Time (ns)	25 *
Coefficient of Digital Filter	3 *
Analog Filter	Enabled
Timing	0x00300711 *

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

5.5. I2C2

I2C: I2C

5.5.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Fast Mode *
I2C Speed Frequency (KHz)	400

Rise Time (ns)	120 *
Fall Time (ns)	25 *
Coefficient of Digital Filter	3 *
Analog Filter	Enabled
Timing	0x00300711 *

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

5.6. LPUART1

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

5.6.1. Parameter Settings:

Basic Parameters:

Baud Rate	209700
Word Length	7 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Single Sample	Disable

Advanced Features:

Auto Baudrate Mode	Disable
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

5.7. QUADSPI

QuadSPI Mode: Dual Bank with Quad Lines

Chip Select for Dual bank: Enable Chip Select 1 for both banks

5.7.1. Parameter Settings:

General Parameters:

Clock Prescaler	2 *
Fifo Threshold	1
Sample Shifting	No Sample Shifting
Flash Size	1
Chip Select High Time	1 Cycle
Clock Mode	Low
Dual Flash	Enabled

5.8. RCC

High Speed Clock (HSE): BYPASS Clock Source

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

mode: Master Clock Output

CRS SYNC: CRS SYNC Source USB

5.8.1. Parameter Settings:

System Parameters:

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

RCC Parameters:

HSI Calibration Value	64
MSI Calibration Value	0
MSI Auto Calibration	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000
LSE Drive Capability	LSE oscillator low drive capability

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 2 *
-------------------------------	-----------------------------------

CRS Parameters:

CRS Synchro Divider	1
CRS Synchro Polarity	Active on rising edge

CRS Synchro Reload Value Type	Automatic
CRS Synchro frequency (Hz)	1000
Error limit Value	34
HSI48 Calibration Value	32

5.9. RNG

mode: Activated

5.10. RTC

mode: Activate Clock Source

mode: Activate Calendar

Alarm A: Internal Alarm A

Alarm B: Internal Alarm B

WakeUp: Internal WakeUp

5.10.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	31 *
Synchronous Predivider value	1023 *

Calendar Time:

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

Calendar Date:

Week Day	Monday
Month	January
Date	1
Year	18 *

Alarm A:

Hours	0
Minutes	0
Seconds	0
Sub Seconds	0

Alarm Mask Date Week day	Enable *
Alarm Mask Hours	Enable *
Alarm Mask Minutes	Enable *
Alarm Mask Seconds	Enable *
Alarm Sub Second Mask	All Alarm SS fields are masked.
Alarm Date Week Day Sel	Date
Alarm Date	1
Alarm B:	
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
Wake UP:	
Wake Up Clock	RTCCLK / 16
Wake Up Counter	0

5.11. SAI1

Mode: Master with Master Clock Out

mode: I2S/PCM Protocol

5.11.1. Parameter Settings:

SAI B:

Basic Parameters	
Audio Mode	Master Transmit
Output Mode	Stereo
Companding Mode	No companding mode
SAI SD Line Output Mode	Driven
Protocol Parameters	
Protocol	I2S Standard
Data Size	16 Bits
Number of Slots (only Even Values)	2
Clock Parameters	

Master Clock Divider	Enabled
Audio Frequency	192 KHz
Real Audio Frequency	93.75 KHz *
Error between Selected	-51.17 % *
Advanced Parameters	
Fifo Threshold	Half Full *
Output Drive	Disabled
Synchronization External	Disabled

5.12. SAI2

Mode: Asynchronous Slave

mode: I2S/PCM Protocol

5.12.1. Parameter Settings:

SAI A:

Basic Parameters

Audio Mode	Slave Receive
Output Mode	Stereo
Companding Mode	No companding mode
SAI SD Line Output Mode	Driven

Protocol Parameters

Protocol	I2S Standard
Data Size	16 Bits
Number of Slots (only Even Values)	2

Clock Parameters

Advanced Parameters

Fifo Threshold	One Quarter Full *
Output Drive	Disabled
Synchronization External	Disabled

5.13. SPI2

Mode: Full-Duplex Master

5.13.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits *

First Bit	MSB First
Clock Parameters:	
Prescaler (for Baud Rate)	2
Baud Rate	8.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge
Advanced Parameters:	
CRC Calculation	Disabled
NSSP Mode	Disabled *
NSS Signal Type	Software

5.14. SPI3

Mode: Full-Duplex Master

5.14.1. Parameter Settings:

Basic Parameters:	
Frame Format	Motorola
Data Size	8 Bits *
First Bit	MSB First
Clock Parameters:	
Prescaler (for Baud Rate)	2
Baud Rate	8.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge
Advanced Parameters:	
CRC Calculation	Disabled
NSSP Mode	Disabled *
NSS Signal Type	Software

5.15. SYS

Debug: Serial Wire

mode: System Wake-Up 2

Power Voltage Detector In: Power Voltage Detector In (Internal analog voltage)

VREFBUF Mode: Internal voltage reference

Timebase Source: TIM2

5.15.1. Parameter Settings:

Programmable_Voltage_Detector_Settings:

PVD detection Level	PWR PVD LEVEL 5 (2.8 V) *
PWR PVD Mode	basic mode is used

Voltage_Reference_Buffer_Settings:

Trimming Mode	User Trimming *
Trimming Value	5 *
Internal Voltage reference scale	SCALE 0: around 2.048 V

5.16. TIM3

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

5.16.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	65535 *
Internal Clock Division (CKD)	No Division
auto-reload preload	Enable *

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)

Clear Input:

Clear Input Source	Disable
--------------------	---------

PWM Generation Channel 1:

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

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0

Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 3:

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

PWM Generation Channel 4:

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

5.17. TIM5

Clock Source : Internal Clock

Channel1: Input Capture direct mode

Channel2: Input Capture direct mode

Channel3: Input Capture direct mode

Channel4: Input Capture direct mode

5.17.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	1599999999 *
Internal Clock Division (CKD)	No Division
auto-reload preload	Enable *

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)

Input Capture Channel 1:

Polarity Selection	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0

Input Capture Channel 2:

Polarity Selection	Rising Edge
IC Selection	Direct

Prescaler Division Ratio	No division
Input Filter (4 bits value)	0

Input Capture Channel 3:

Polarity Selection	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0

Input Capture Channel 4:

Polarity Selection	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0

5.18. TIM16

mode: Activated

Channel1: Input Capture direct mode from Remap

5.18.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	65535 *
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Enable *

Input Capture Channel 1:

Polarity Selection	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0
TI1 remap capabilities for TIM16	TIM16 Channel 1 is connected to LSE *

5.19. TIM17

mode: Activated

Channel1: Input Capture direct mode from Remap

5.19.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	65535 *
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Enable *

Input Capture Channel 1:

Polarity Selection	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0
TI1 remap capabilities for TIM17	TIM17 Channel 1 is connected to MSI internal clock

5.20. USART1

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

5.20.1. Parameter Settings:

Basic Parameters:

Baud Rate	38400 *
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:

Auto Baudrate	Disable
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

5.21. USB_OTG_FS

Mode: Device_Only

Activate_VBUS: VBUS sensing

5.21.1. Parameter Settings:

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	64 Bytes
Enable internal IP DMA	Disabled
Low power	Disabled
Battery charging	Disabled *
Link Power Management	Enabled *
Use dedicated end point 1 interrupt	Disabled
VBUS sensing	Enabled
Signal start of frame	Enabled *

5.22. FREERTOS

mode: Enabled

5.22.1. Config parameters:

Versions:

FreeRTOS version	10.0.1
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	32 *
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Enabled *
USE_COUNTING_SEMAPHORES	Enabled *

QUEUE_REGISTRY_SIZE	64 *
USE_APPLICATION_TASK_TAG	Enabled *
ENABLE_BACKWARD_COMPATIBILITY	Disabled *
USE_PORT_OPTIMISED_TASK_SELECTION	Enabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic
TOTAL_HEAP_SIZE	0x8000 *
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Enabled *
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Enabled *
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Option1 *

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	Enabled *
USE_TRACE_FACILITY	Enabled *
USE_STATS_FORMATTING_FUNCTIONS	Enabled *

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	16 *
TIMER_TASK_STACK_DEPTH	256

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

5.22.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled

vTaskCleanUpResources	Enabled *
vTaskSuspend	Enabled
vTaskDelayUntil	Enabled *
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Enabled *
xSemaphoreGetMutexHolder	Enabled *
pcTaskGetTaskName	Enabled *
uxTaskGetStackHighWaterMark	Enabled *
xTaskGetCurrentTaskHandle	Enabled *
eTaskGetState	Enabled *
xEventGroupSetBitFromISR	Enabled *
xTimerPendFunctionCall	Enabled *
xTaskAbortDelay	Enabled *
xTaskGetHandle	Enabled *

5.23. USB_DEVICE

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

5.23.1. 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)	Disabled *
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message
USBD_LPM_ENABLED (Link Power Management)	1: Link Power Management supported

Class Parameters:

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

5.23.2. Device Descriptor:

Device Descriptor:

VID (Vendor Identifier)	0x483
-------------------------	-------

LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	HSMA HFT Laborities *
Device Descriptor FS:	
PID (Product Identifier)	0x5740
PRODUCT_STRING (Product Identifier)	HFT-Core_Module *
SERIALNUMBER_STRING (Serial number)	000000000001 *
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	PA0	ADC1_IN5	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	MCU_ADC1_IN5_VSOL
	PA1	ADC1_IN6	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	MCU_ADC1_IN6_XO_PULL
	PA3	ADC1_IN8	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	MCU_ADC1_IN8_LIPO_CUR
I2C1	PG13	I2C1_SDA	Alternate Function Open Drain	No pull-up and no pull-down *	High *	MCU_I2C1_SDA
	PG14	I2C1_SCL	Alternate Function Open Drain	No pull-up and no pull-down *	High *	MCU_I2C1_SCL
I2C2	PF0	I2C2_SDA	Alternate Function Open Drain	No pull-up and no pull-down *	High *	MCU_I2C2_SDA
	PF1	I2C2_SCL	Alternate Function Open Drain	No pull-up and no pull-down *	High *	MCU_I2C2_SCL
LPUART1	PA2	LPUART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_LPUART_TX_OUT
	PA6	LPUART1_CTS	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_LPUART_CTS_IN
	PB1	LPUART1_RTS	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_LPUART_RTS_OUT
	PG8	LPUART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_LPUART_RX_IN
QUADSPI	PF10	QUADSPI_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC1	QUADSPI_BK2_IO0	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC2	QUADSPI_BK2_IO1	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC3	QUADSPI_BK2_IO2	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PE11	QUADSPI_BK1_NCS	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PE12	QUADSPI_BK1_IO0	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	

HFT-Core-Module_TrueSTUDIO Project
Configuration Report

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PE13	QUADSPI_BK1_IO1	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PE14	QUADSPI_BK1_IO2	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PE15	QUADSPI_BK1_IO3	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PD7	QUADSPI_BK2_IO3	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
RCC	PC14-OSC32_IN (PC14)	RCC_OSC32_IN	n/a	n/a	n/a	MCU_OSC32_IN
	PC15-OSC32_OUT (PC15)	RCC_OSC32_OUT	n/a	n/a	n/a	MCU_OSC32_OUT
	PH0-OSC_IN (PH0)	RCC_OSC_IN	n/a	n/a	n/a	MCU_HSE
	PA8	RCC_MCO	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_MCO
SAI1	PE3	SAI1_SD_B	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	MCU_I2S1B_SD_OUT
	PE8	SAI1_SCK_B	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	MCU_I2S1B_SCK_OUT
	PE9	SAI1_FS_B	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	MCU_I2S1B_FS_OUT
	PE10	SAI1_MCLK_B	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	MCU_I2S1B_MCLK_OUT
SAI2	PB13	SAI2_SCK_A	Alternate Function Push Pull	Pull-down *	Medium *	MCU_I2S2A_SCK_IN
	PD11	SAI2_SD_A	Alternate Function Push Pull	Pull-down *	Medium *	MCU_I2S2A_SD_IN
	PD12	SAI2_FS_A	Alternate Function Push Pull	Pull-down *	Medium *	MCU_I2S2A_FS_IN
SPI2	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_SPI2_MOSI
	PD1	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_SPI2_SCK
	PD3	SPI2_MISO	Alternate Function Push Pull	Pull-down *	Very High *	MCU_SPI2_MISO
SPI3	PC10	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_SPI3_SCK
	PC11	SPI3_MISO	Alternate Function Push Pull	Pull-down *	Very High *	MCU_SPI3_MISO
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	MCU_SPI3_MOSI
SYS	PC13	SYS_WKUP2	n/a	n/a	n/a	MCU_WAKEUP_IN

HFT-Core-Module_TrueSTUDIO Project
Configuration Report

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	VREF+	VREFBUF_OUT	n/a	n/a	n/a	MCU_VREF+_OUT
	PA13 (JTMS/SWDIO)	SYS_JTMS-SWDIO	n/a	n/a	n/a	MCU_SWDIO
	PA14 (JTCK/SWCLK)	SYS_JTCK-SWCLK	n/a	n/a	n/a	MCU_SWCLK
TIM3	PE6	TIM3_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_PWM_LCD_BL
	PA7	TIM3_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_PWM_LED_G
	PB0	TIM3_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_PWM_LED_B
	PC6	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_PWM_LED_R
TIM5	PF6	TIM5_CH1	Alternate Function Push Pull	Pull-down *	Low	MCU_TIMCAP_PN
	PF7	TIM5_CH2	Alternate Function Push Pull	Pull-down *	Low	MCU_TIMCAP_VSOL
	PF8	TIM5_CH3	Alternate Function Push Pull	Pull-down *	Low	MCU_TIMCAP_PS
	PF9	TIM5_CH4	Alternate Function Push Pull	Pull-down *	Low	MCU_TIMCAP_1PPS
USART1	PG9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_UART1_TX_OUT
	PG10	USART1_RX	Alternate Function Push Pull	Pull-up *	Low	MCU_UART1_RX_IN
	PG11	USART1_CTS	Alternate Function Push Pull	Pull-down *	Low	MCU_UART1_CTS_IN
	PG12	USART1_RTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_UART1_RTS_OUT
USB_OTG_FS	PA9	USB_OTG_FS_VBUS	Input mode	Pull-down *	n/a	MCU_VBUS_IN
	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	High *	MCU_USB_N
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	High *	MCU_USB_P
GPIO	PF4	GPIO_EXTI4	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI4_PEXPB
	PC0	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI10_RF_SYNC
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_LIPO_CEN_OUT
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_BNO085_PS0_WAKE_OUT
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_SW_PWR_OUT
	PF11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_BNO085_SEL_OUT
	PF13	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI13_BNO085
	PF14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_AX_SEL_OUT
	PF15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_SX_SEL_OUT
	PE7	GPIO_EXTI7	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI7_AX
	PD8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_SX_BUSY_IN
	PD9	GPIO_Input	Input mode		n/a	MCU_PS00_INOUT

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
				Pull-down *		
	PD10	GPIO_Input	Input mode	Pull-down *	n/a	MCU_PS01_INOUT
	PD14	GPIO_Input	Input mode	Pull-down *	n/a	MCU_PS02_INOUT
	PD15	GPIO_Input	Input mode	Pull-down *	n/a	MCU_PS03_INOUT
	PG2	GPIO_EXTI2	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI2_SX_DIO1_TXRXDONE
	PG3	GPIO_EXTI3	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI3_SX_DIO3_TMEOUT
	PG4	EVENTOUT	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_EVENTOUT
	PG5	GPIO_EXTI5	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI5_SX_DIO2_TXRXSW
	PG6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_LPUART_RI_IN
	PG7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_LPUART_DTR_OUT
	PC7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_LPUART_DCD_IN
	PB3 (JTDO/TRACESWO)	GPIO_Input	Input mode	Pull-down *	n/a	MCU_PN00_INOUT
	PB5	GPIO_Input	Input mode	Pull-down *	n/a	MCU_PN01_INOUT
	PB6	GPIO_Input	Input mode	Pull-down *	n/a	MCU_PN02_INOUT
	PB7	GPIO_Input	Input mode	Pull-down *	n/a	MCU_PN03_INOUT

6.2. DMA configuration

DMA request	Stream	Direction	Priority
SAI2_A	DMA1_Channel6	Peripheral To Memory	Low
SAI1_B	DMA2_Channel7	Memory To Peripheral	Low
ADC1	DMA1_Channel1	Peripheral To Memory	Low
SPI3_RX	DMA2_Channel1	Peripheral To Memory	Low
SPI3_TX	DMA2_Channel2	Memory To Peripheral	Low

SAI2_A: DMA1_Channel6 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Word
Memory Data Width: Word

SAI1_B: DMA2_Channel7 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Word
Memory Data Width: Word

ADC1: DMA1_Channel1 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Half Word
Memory Data Width: Half Word

SPI3_RX: DMA2_Channel1 DMA request Settings:

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

Memory Data Width: Byte

SPI3_TX: DMA2_Channel2 DMA request Settings:

Mode: Normal

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
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
EXTI line2 interrupt	true	5	0
DMA1 channel1 global interrupt	true	5	0
DMA1 channel6 global interrupt	true	5	0
ADC1 and ADC2 interrupts	true	5	0
TIM2 global interrupt	true	0	0
I2C1 event interrupt	true	5	0
I2C1 error interrupt	true	5	0
I2C2 event interrupt	true	5	0
I2C2 error interrupt	true	5	0
RTC alarm interrupt through EXTI line 18	true	5	0
DMA2 channel1 global interrupt	true	5	0
DMA2 channel2 global interrupt	true	5	0
USB OTG FS global interrupt	true	5	0
DMA2 channel7 global interrupt	true	5	0
SAI1 global interrupt	true	5	0
SAI2 global interrupt	true	5	0
HASH and RNG global interrupts	true	5	0
PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/35/36/37/38	unused		
RTC wake-up interrupt through EXTI line 20	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line0 interrupt	unused		
EXTI line3 interrupt	unused		
EXTI line4 interrupt	unused		
EXTI line[9:5] interrupts	unused		
TIM1 update interrupt and TIM16 global interrupt	unused		
TIM1 trigger and commutation interrupts and TIM17 global interrupt	unused		

Interrupt Table	Enable	Preenmption Priority	SubPriority
TIM3 global interrupt		unused	
SPI2 global interrupt		unused	
USART1 global interrupt		unused	
EXTI line[15:10] interrupts		unused	
TIM5 global interrupt		unused	
SPI3 global interrupt		unused	
DFSDM1 filter0 global interrupt		unused	
DFSDM1 filter1 global interrupt		unused	
LPUART1 global interrupt		unused	
QUADSPI global interrupt		unused	
FPU global interrupt		unused	
CRS global interrupt		unused	

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32L4
Line	STM32L4x6
MCU	STM32L496ZGTxP
Datasheet	029173_Rev2

7.2. Parameter Selection

Temperature	25
Vdd	3.6

7.3. SMPS Selection

SMPS	SMPS1_User
Vin	3.3 V
Vout	1.2 V
OffCurrent	250.0 nA
QCurrent	500.0 nA
Efficiency	85 %

7.4. Sequence

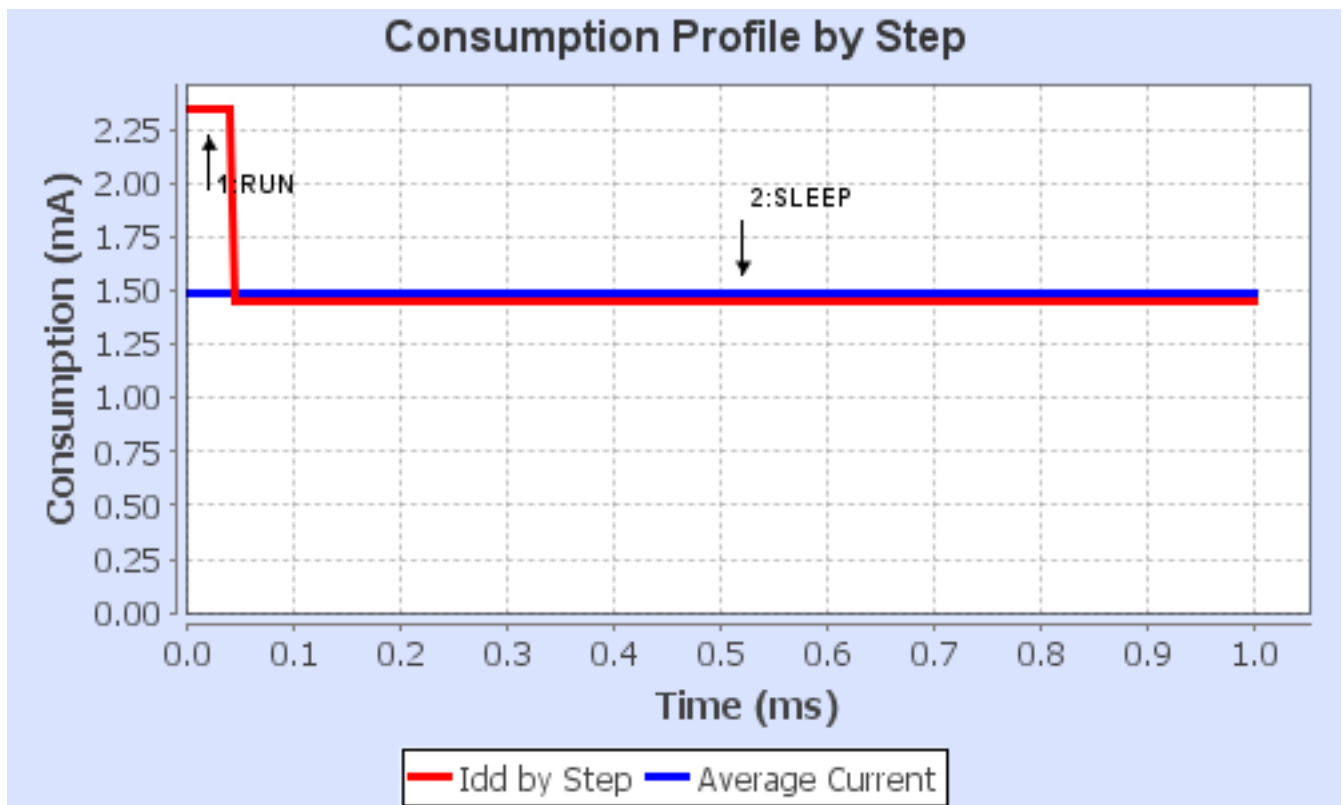
Step	Step1	Step2
-------------	-------	-------

Mode	RUN	SLEEP
SMPS	CONNECTED	CONNECTED
Vdd	3.6	3.6
Voltage Source	Battery	Battery
Range	Range2-Medium	Range2-Medium
Fetch Type	FLASH	FLASH
Clock Configuration	HSE BYP ART Flash-ON	HSE BYP ART Flash-ON
Clock Source Frequency	24 MHz	24 MHz
CPU Frequency	24 MHz	24 MHz
Peripherals	ADC1:fs_10_ksp ADC3:fs_10_ksp CRC DFSDM1 GPIOA GPIOB GPIOC GPIOD GPIOE GPIOF GPIOG GPIOH I2C1 I2C2 I2C3 I2C4 RNG RTC SAI1 SAI2 SPI1 SPI3 SYS- VREFBUF/COMP1:COMP_H igh_Speed- Square_VREFBUF_OFF TIM3 TIM5 TIM16 TIM17 USART1 USART2 USART3 USB_OTG_FS	ADC1:fs_10_ksp ADC3:fs_10_ksp CRC DFSDM1 GPIOA GPIOB GPIOC GPIOD GPIOE GPIOF GPIOG GPIOH I2C1 I2C2 I2C3 I2C4 RNG RTC SAI1 SAI2 SPI1 SPI3 SYS- VREFBUF/COMP1:COMP_H igh_Speed- Square_VREFBUF_OFF TIM3 TIM5 TIM16 TIM17 USART1 USART2 USART3 USB_OTG_FS
Additional Cons.	0 mA	0 mA
Average Current	2.34 mA	1.45 mA
Duration	0.04 ms	0.96 ms
DMIPS	0.0	0.0
Ta Max	104.73	104.83
Category	Measurements	Measurements

7.5. RESULTS

Sequence Time	1 ms	Average Current	1.49 mA
Battery Life	0	Average DMIPS	30.0 DMIPS

7.6. Chart



8. Software Project

8.1. Project Settings

Name	Value
Project Name	HFT-Core-Module_TrueSTUDIO
Project Folder	Z:\nfs_ds_nfs\git\HFT-Core-Module__SW_1V1\SW
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_L4 V1.13.0

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	Yes
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