1. Description

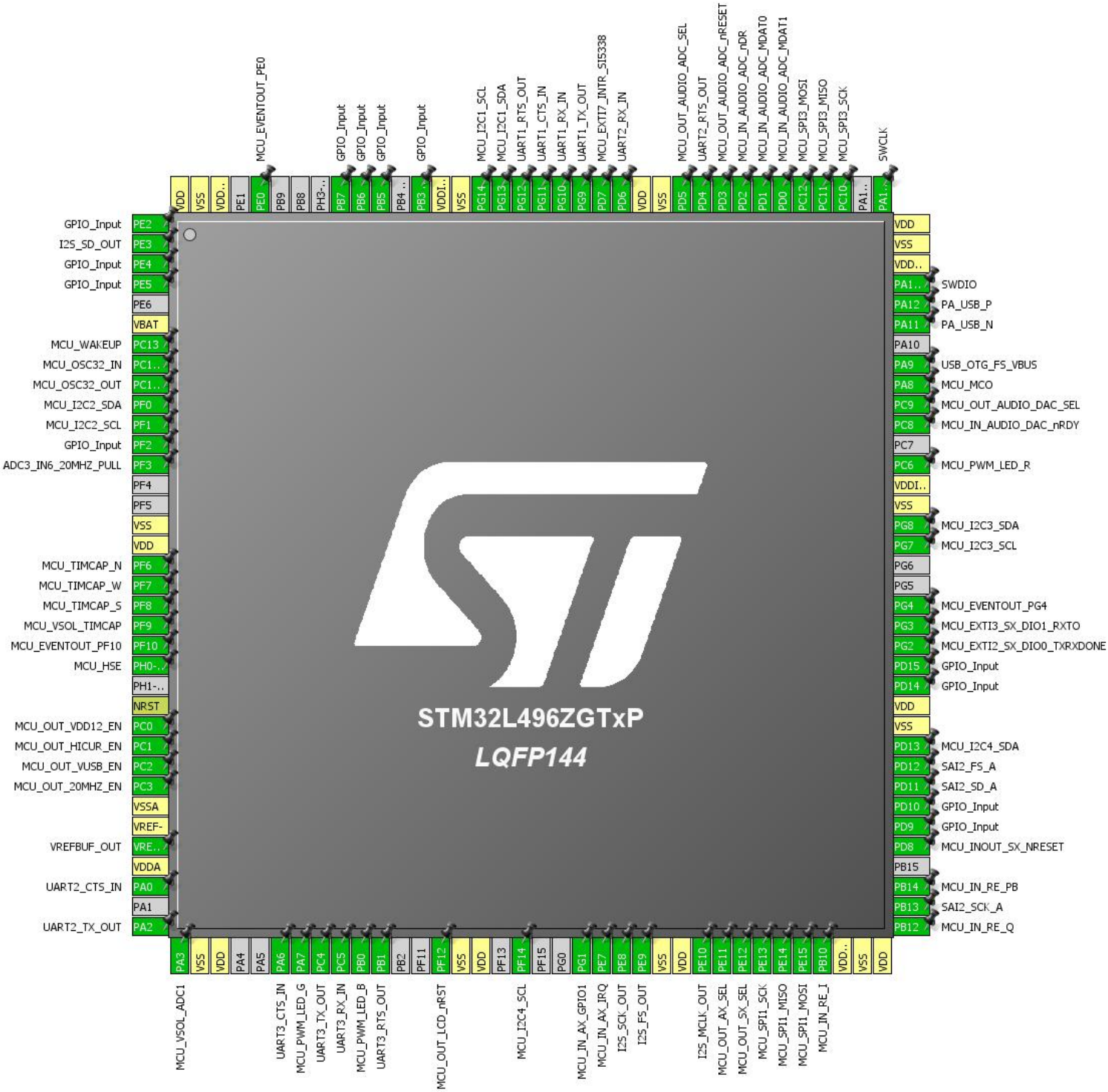
1.1. Project

Project Name	HFT-Core-Module_TrueSTUDIO
Board Name	HFT-Core-Module_TrueSTUDIO
Generated with:	STM32CubeMX 4.26.1
Date	08/26/2018

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
1	PE2 *	I/O	GPIO_Input	
2	PE3	I/O	SAI1_SD_B	I2S_SD_OUT
3	PE4 *	I/O	GPIO_Input	
4	PE5 *	I/O	GPIO_Input	
6	VBAT	Power		
7	PC13	I/O	SYS_WKUP2	MCU_WAKEUP
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
12	PF2 *	I/O	GPIO_Input	
13	PF3	I/O	ADC3_IN6	ADC3_IN6_20MHZ_PULL
16	VSS	Power		
17	VDD	Power		
18	PF6	I/O	TIM5_CH1	MCU_TIMCAP_N
19	PF7	I/O	TIM5_CH2	MCU_TIMCAP_W
20	PF8	I/O	TIM5_CH3	MCU_TIMCAP_S
21	PF9	I/O	TIM5_CH4	MCU_VSOL_TIMCAP
22	PF10 *	I/O	EVENTOUT	MCU_EVENTOUT_PF10
23	PH0-OSC_IN (PH0)	I/O	RCC_OSC_IN	MCU_HSE
25	NRST	Reset		
26	PC0 *	I/O	GPIO_Output	MCU_OUT_VDD12_EN
27	PC1 *	I/O	GPIO_Output	MCU_OUT_HICUR_EN
28	PC2 *	I/O	GPIO_Output	MCU_OUT_VUSB_EN
29	PC3 *	I/O	GPIO_Output	MCU_OUT_20MHZ_EN
30	VSSA	Power		
31	VREF-	Power		
32	VREF+	MonoIO	VREFBUF_OUT	
33	VDDA	Power		
34	PA0	I/O	USART2_CTS	UART2_CTS_IN
36	PA2	I/O	USART2_TX	UART2_TX_OUT
37	PA3	I/O	ADC2_IN8, ADC1_IN8	MCU_VSOL_ADC1
38	VSS	Power		
39	VDD	Power		
42	PA6	I/O	USART3_CTS	UART3_CTS_IN
43	PA7	I/O	TIM3_CH2	MCU_PWM_LED_G

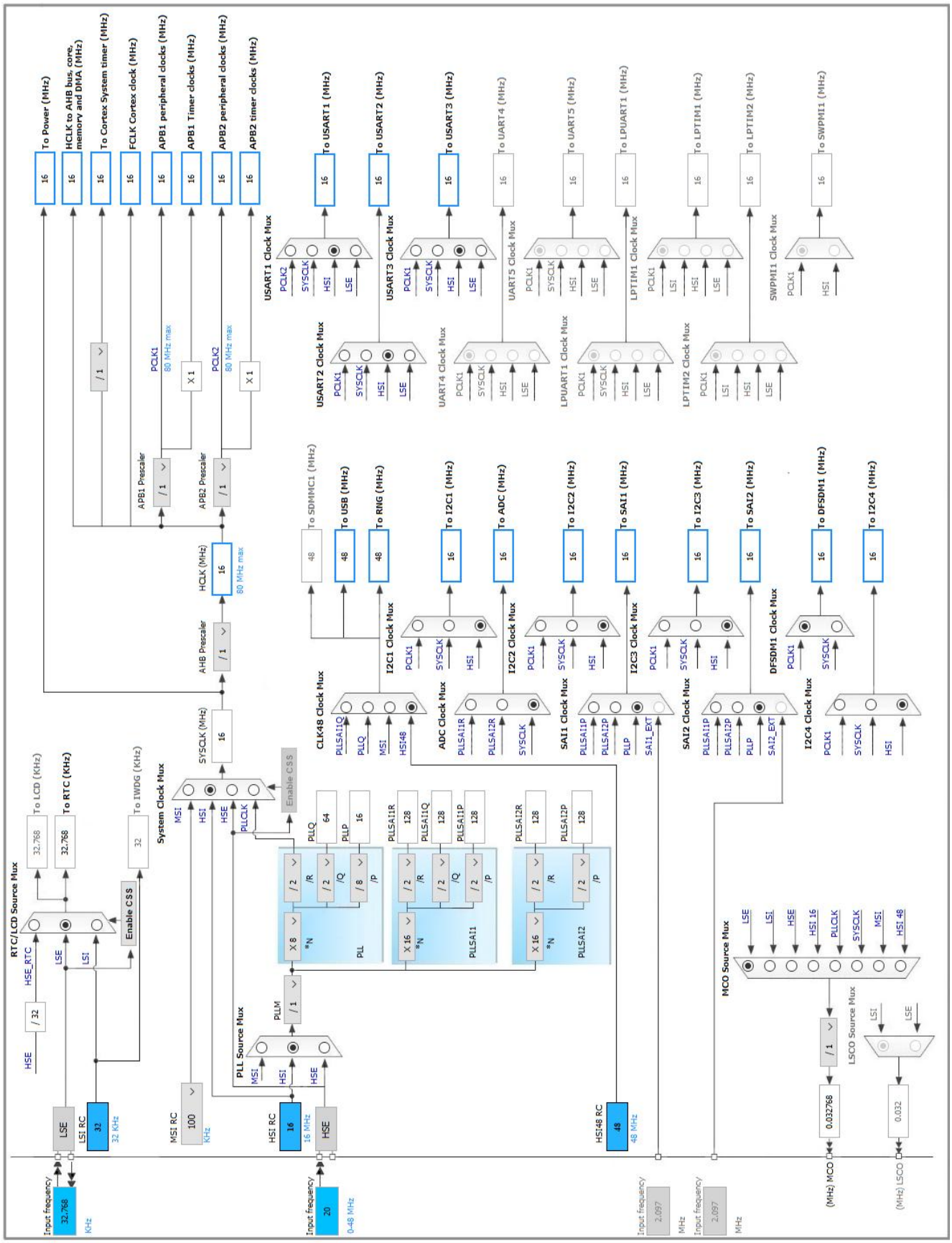
Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
44	PC4	I/O	USART3_TX	UART3_TX_OUT
45	PC5	I/O	USART3_RX	UART3_RX_IN
46	PB0	I/O	TIM3_CH3	MCU_PWM_LED_B
47	PB1	I/O	USART3_RTS	UART3_RTS_OUT
50	PF12 *	I/O	GPIO_Output	MCU_OUT_LCD_nRST
51	VSS	Power		
52	VDD	Power		
54	PF14	I/O	I2C4_SCL	MCU_I2C4_SCL
57	PG1 *	I/O	GPIO_Input	MCU_IN_AX_GPIO1
58	PE7 *	I/O	GPIO_Input	MCU_IN_AX_IRQ
59	PE8	I/O	SAI1_SCK_B	I2S_SCK_OUT
60	PE9	I/O	SAI1_FS_B	I2S_FS_OUT
61	VSS	Power		
62	VDD	Power		
63	PE10	I/O	SAI1_MCLK_B	I2S_MCLK_OUT
64	PE11 *	I/O	GPIO_Output	MCU_OUT_AX_SEL
65	PE12 *	I/O	GPIO_Output	MCU_OUT_SX_SEL
66	PE13	I/O	SPI1_SCK	MCU_SPI1_SCK
67	PE14	I/O	SPI1_MISO	MCU_SPI1_MISO
68	PE15	I/O	SPI1_MOSI	MCU_SPI1_MOSI
69	PB10 *	I/O	GPIO_Input	MCU_IN_RE_I
70	VDD12	Power		
71	VSS	Power		
72	VDD	Power		
73	PB12 *	I/O	GPIO_Input	MCU_IN_RE_Q
74	PB13	I/O	SAI2_SCK_A	
75	PB14 *	I/O	GPIO_Input	MCU_IN_RE_PB
77	PD8 *	I/O	GPIO_Input	MCU_INOUT_SX_NRESET
78	PD9 *	I/O	GPIO_Input	
79	PD10 *	I/O	GPIO_Input	
80	PD11	I/O	SAI2_SD_A	
81	PD12	I/O	SAI2_FS_A	
82	PD13	I/O	I2C4_SDA	MCU_I2C4_SDA
83	VSS	Power		
84	VDD	Power		
85	PD14 *	I/O	GPIO_Input	
86	PD15 *	I/O	GPIO_Input	
87	PG2	I/O	GPIO_EXTI2	MCU_EXTI2_SX_DIO0_TX RXDONE

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
88	PG3	I/O	GPIO_EXTI3	MCU_EXTI3_SX_DIO1_RX TO
89	PG4 *	I/O	EVENTOUT	MCU_EVENTOUT_PG4
92	PG7	I/O	I2C3_SCL	MCU_I2C3_SCL
93	PG8	I/O	I2C3_SDA	MCU_I2C3_SDA
94	VSS	Power		
95	VDDIO2	Power		
96	PC6	I/O	TIM3_CH1	MCU_PWM_LED_R
98	PC8 *	I/O	GPIO_Input	MCU_IN_AUDIO_DAC_nRD Y
99	PC9 *	I/O	GPIO_Output	MCU_OUT_AUDIO_DAC_S EL
100	PA8	I/O	RCC_MCO	MCU_MCO
101	PA9	I/O	USB_OTG_FS_VBUS	
103	PA11	I/O	USB_OTG_FS_DM	PA_USB_N
104	PA12	I/O	USB_OTG_FS_DP	PA_USB_P
105	PA13 (JTMS/SWDIO)	I/O	SYS_JTMS-SWDIO	SWDIO
106	VDDUSB	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14 (JTCK/SWCLK)	I/O	SYS_JTCK-SWCLK	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
114	PD0 *	I/O	GPIO_Input	MCU_IN_AUDIO_ADC_MD AT1
115	PD1 *	I/O	GPIO_Input	MCU_IN_AUDIO_ADC_MD AT0
116	PD2 *	I/O	GPIO_Input	MCU_IN_AUDIO_ADC_nDR
117	PD3 *	I/O	GPIO_Output	MCU_OUT_AUDIO_ADC_n RESET
118	PD4	I/O	USART2_RTS	UART2_RTS_OUT
119	PD5 *	I/O	GPIO_Output	MCU_OUT_AUDIO_ADC_S EL
120	VSS	Power		
121	VDD	Power		
122	PD6	I/O	USART2_RX	UART2_RX_IN
123	PD7	I/O	GPIO_EXTI7	MCU_EXTI7_INTR_SI5338
124	PG9	I/O	USART1_TX	UART1_TX_OUT
125	PG10	I/O	USART1_RX	UART1_RX_IN
126	PG11	I/O	USART1_CTS	UART1_CTS_IN

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
127	PG12	I/O	USART1_RTS	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	
134	PB5 *	I/O	GPIO_Input	
135	PB6 *	I/O	GPIO_Input	
136	PB7 *	I/O	GPIO_Input	
140	PE0 *	I/O	EVENTOUT	MCU_EVENTOUT_PE0
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

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	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 preserved
Low Power Auto Wait	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Enable Regular Oversampling	Disable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	**Channel Temperature Sensor ***
Sampling Time	2.5 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. ADC3

IN6: IN6 Single-ended

5.2.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Asynchronous clock mode divided by 1
Resolution	ADC 12-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 preserved
Low Power Auto Wait	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Enable Regular Oversampling	Disable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 6
Sampling Time	2.5 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

5.3. CRC

mode: Activated

5.3.1. 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

5.4. DFSDM1

mode: Parallel input

mode: Parallel input

5.4.1. Filter 0:

regular channel selection:

regular channel selection	**Channel 0 ***
Continuous Mode	Continuous Mode
Trigger to start regular conversion	Software trigger
Fast Mode	Disable
Dma Mode	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
Iosr	1

5.4.2. Filter 1:

regular channel selection:

regular channel selection	**Channel 1 ***
Continuous Mode	Continuous Mode
Trigger to start regular conversion	Software trigger
Fast Mode	Disable
Dma Mode	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
Iosr	1

5.4.3. 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

5.4.4. 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

5.4.5. 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 ***

5.4.6. 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 ***

5.5. DMA2D

mode: Activated

5.5.1. Parameter Settings:

Basic Parameters:

Transfer Mode	Memory to Memory
Color Mode	ARGB8888
Output Offset	0

Foreground layer Configuration:

DMA2D Input Color Mode	ARGB8888
DMA2D ALPHA MODE	No modification of the alpha channel value
Input Alpha	0
Input Offset	0

DMA2D ALPHA Inversion	Regular Alpha
DMA2D Red and Blue swap	Regular mode (RGB or ARGB)

5.6. I2C1

I2C: I2C

5.6.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	**Fast Mode ***
I2C Speed Frequency (KHz)	400
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x0010061A ***

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

5.7. I2C2

I2C: I2C

5.7.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	**Fast Mode ***
I2C Speed Frequency (KHz)	400
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x0010061A ***

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

5.8. I2C3

I2C: I2C

5.8.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	**Fast Mode ***
I2C Speed Frequency (KHz)	400
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x0010061A ***

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

5.9. I2C4

I2C: I2C

5.9.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	**Fast Mode ***
I2C Speed Frequency (KHz)	400
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x0010061A ***

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

5.10. 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

5.10.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	**Enabled ***
Data Cache	Enabled
Flash Latency(WS)	0 WS (1 CPU cycle)

RCC Parameters:

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

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

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

5.11. RNG

mode: Activated

5.12. RTC

mode: Activate Clock Source
mode: Activate Calendar
Alarm A: Internal Alarm A
Alarm B: Internal Alarm B
WakeUp: Internal WakeUp

5.12.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

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

5.13. SAI1

Mode: Master with Master Clock Out

mode: I2S/PCM Protocol

5.13.1. 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	0
Error between Selected	0
Advanced Parameters	
Fifo Threshold	Empty
Output Drive	Disabled
Synchronization External	Disabled

5.14. SAI2

Mode: Asynchronous Slave

mode: I2S/PCM Protocol

5.14.1. 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	Empty
Output Drive	Disabled
Synchronization External	Disabled

5.15. SPI1

Mode: Full-Duplex Master

5.15.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	**8 Bits ***
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**4 ***
Baud Rate	**4.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled

NSSP Mode	Enabled
NSS Signal Type	Software

5.16. SPI3

Mode: Full-Duplex Master

5.16.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	**8 Bits ***
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**4 ***
Baud Rate	**4.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software

5.17. 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

5.17.1. Parameter Settings:

Programmable_Voltage_Detector_Settings:

PVD detection Level	PWR PVD LEVEL 0 (2.0 V)
PWR PVD Mode	basic mode is used

Voltage_Reference_Buffer_Settings:

Trimming Mode	Factory Trimming
Internal Voltage reference scale	SCALE 0: around 2.048 V

5.18. TIM1

Clock Source : Internal Clock

5.18.1. 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
Repetition Counter (RCR - 8 bits value)	0
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)
Trigger Event Selection TRGO2	Reset (UG bit from TIMx_EGR)

5.19. TIM3

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

5.19.1. 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
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

5.20. 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

5.20.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	0
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

5.21. TIM16

mode: Activated

5.21.1. 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
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Disable

5.22. TIM17

mode: Activated

5.22.1. 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
Repetition Counter (RCR - 8 bits value)	0

auto-reload preload	Disable

5.23. USART1

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

5.23.1. 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

5.24. USART2

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

5.24.1. 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

5.25. USART3

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

5.25.1. 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

5.26. USB_OTG_FS

Mode: Device_Only

Activate_VBUS: VBUS sensing

5.26.1. 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 ***

5.27. FREERTOS

mode: Enabled

5.27.1. 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	**Enabled ***
QUEUE_REGISTRY_SIZE	**16 ***
USE_APPLICATION_TASK_TAG	**Enabled ***
ENABLE_BACKWARD_COMPATIBILITY	

	Disabled *
USE_PORT_OPTIMISED_TASK_SELECTION	Enabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled

Memory management settings:

Memory Allocation	Dynamic
TOTAL_HEAP_SIZE	**16384 ***
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	**Option2 ***

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

5.27.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	**Disabled ***
vTaskCleanUpResources	Disabled
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	Disabled
xTaskGetHandle	**Enabled ***

5.28. USB_DEVICE

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

5.28.1. 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

5.28.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	**HSMA HFT Laborities ***

Device Descriptor FS:

PID (Product IDentifier)	22336
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	PA3	ADC1_IN8	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	MCU_VSOL_ADC1
ADC3	PF3	ADC3_IN6	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	ADC3_IN6_20MHZ_PULL
I2C1	PG13	I2C1_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C1_SDA
	PG14	I2C1_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C1_SCL
I2C2	PF0	I2C2_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C2_SDA
	PF1	I2C2_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C2_SCL
I2C3	PG7	I2C3_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C3_SCL
	PG8	I2C3_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C3_SDA
I2C4	PF14	I2C4_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C4_SCL
	PD13	I2C4_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	MCU_I2C4_SDA
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	Low	I2S_SD_OUT
	PE8	SAI1_SCK_B	Alternate Function Push Pull	No pull-up and no pull-down	Low	I2S_SCK_OUT
	PE9	SAI1_FS_B	Alternate Function Push Pull	No pull-up and no pull-down	Low	I2S_FS_OUT
	PE10	SAI1_MCLK_B	Alternate Function Push Pull	No pull-up and no pull-down	Low	I2S_MCLK_OUT
SAI2	PB13	SAI2_SCK_A	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD11	SAI2_SD_A	Alternate Function Push Pull	No pull-up and no pull-down	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD12	SAI2_FS_A	Alternate Function Push Pull	No pull-up and no pull-down	Low	
SPI1	PE13	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	MCU_SPI1_SCK
	PE14	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	MCU_SPI1_MISO
	PE15	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	MCU_SPI1_MOSI
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	No pull-up and no 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
	VREF+	VREFBUF_OUT	n/a	n/a	n/a	
	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
TIM3	PA7	TIM3_CH2	Alternate Function Push Pull	**Pull-down ***	Low	MCU_PWM_LED_G
	PB0	TIM3_CH3	Alternate Function Push Pull	**Pull-down ***	Low	MCU_PWM_LED_B
	PC6	TIM3_CH1	Alternate Function Push Pull	**Pull-down ***	Low	MCU_PWM_LED_R
TIM5	PF6	TIM5_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_TIMCAP_N
	PF7	TIM5_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_TIMCAP_W
	PF8	TIM5_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_TIMCAP_S
	PF9	TIM5_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_VSOL_TIMCAP
USART1	PG9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART1_TX_OUT
	PG10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART1_RX_IN
	PG11	USART1_CTS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART1_CTS_IN
	PG12	USART1_RTS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART1_RTS_OUT
USART2	PA0	USART2_CTS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART2_CTS_IN

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART2_TX_OUT
	PD4	USART2_RTS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART2_RTS_OUT
	PD6	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART2_RX_IN
USART3	PA6	USART3_CTS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART3_CTS_IN
	PC4	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART3_TX_OUT
	PC5	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART3_RX_IN
	PB1	USART3_RTS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART3_RTS_OUT
USB_OTG_FS	PA9	USB_OTG_FS_VBUS	Input mode	No pull-up and no pull-down	n/a	
	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	PA_USB_N
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	PA_USB_P
GPIO	PE2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PE4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PE5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PF2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PF10	EVENTOUT	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_EVENTOUT_PF10
	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_VDD12_EN
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_HICUR_EN
	PC2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_VUSB_EN
	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_20MHZ_EN
	PF12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_LCD_nRST
	PG1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_AX_GPIO1
	PE7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_AX_IRQ
	PE11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_AX_SEL
	PE12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_SX_SEL
	PB10	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_RE_I
	PB12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_RE_Q
	PB14	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_RE_PB
	PD8	GPIO_Input	Input mode	**Pull-up ***	n/a	MCU_INOUT_SX_NRESET

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PD10	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PD14	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PD15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PG2	GPIO_EXTI2	External Interrupt Mode with Rising edge trigger detection	**Pull-down ***	n/a	MCU_EXTI2_SX_DIO0_TXRXDONE
	PG3	GPIO_EXTI3	External Interrupt Mode with Rising edge trigger detection	**Pull-down ***	n/a	MCU_EXTI3_SX_DIO1_RXTO
	PG4	EVENTOUT	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_EVENTOUT_PG4
	PC8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_AUDIO_DAC_nRDY
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_AUDIO_DAC_SEL
	PD0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_AUDIO_ADC_MDAT1
	PD1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_AUDIO_ADC_MDAT0
	PD2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_IN_AUDIO_ADC_nDR
	PD3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_AUDIO_ADC_nRESET
	PD5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MCU_OUT_AUDIO_ADC_SEL
	PD7	GPIO_EXTI7	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_EXTI7_INTR_SI5338
	PB3 (JTDO/TRACESWO)	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PE0	EVENTOUT	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCU_EVENTOUT_PE0

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
RTC wake-up interrupt through EXTI line 20	true	5	0
TIM2 global interrupt	true	0	0
RTC alarm interrupt through EXTI line 18	true	5	0
DFSDM1 filter0 global interrupt	true	0	0
DFSDM1 filter1 global interrupt	true	0	0
USB OTG FS global interrupt	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		
EXTI line2 interrupt	unused		
EXTI line3 interrupt	unused		
ADC1 and ADC2 interrupts	unused		
EXTI line[9:5] interrupts	unused		
TIM1 break interrupt and TIM15 global interrupt	unused		
TIM1 update interrupt and TIM16 global interrupt	unused		
TIM1 trigger and commutation interrupts and TIM17 global interrupt	unused		
TIM1 capture compare interrupt	unused		
TIM3 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
SPI1 global interrupt	unused		
USART1 global interrupt	unused		
USART2 global interrupt	unused		
USART3 global interrupt	unused		
ADC3 global interrupt	unused		

Interrupt Table	Enable	Preenmption Priority	SubPriority
TIM5 global interrupt	unused		
SPI3 global interrupt	unused		
I2C3 event interrupt	unused		
I2C3 error interrupt	unused		
SAI1 global interrupt	unused		
SAI2 global interrupt	unused		
HASH and RNG global interrupts	unused		
FPU global interrupt	unused		
CRS global interrupt	unused		
I2C4 event interrupt	unused		
I2C4 error interrupt	unused		
DMA2D 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 %

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\SW\TrueSTUDIO
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_L4 V1.12.0

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	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

9. Software Pack Report