
STM32
CubeMX

1. Description

1.1. Project

Project Name	H7L3ABaseProject
Board Name	custom
Generated with:	STM32CubeMX 6.4.0
Date	04/20/2023

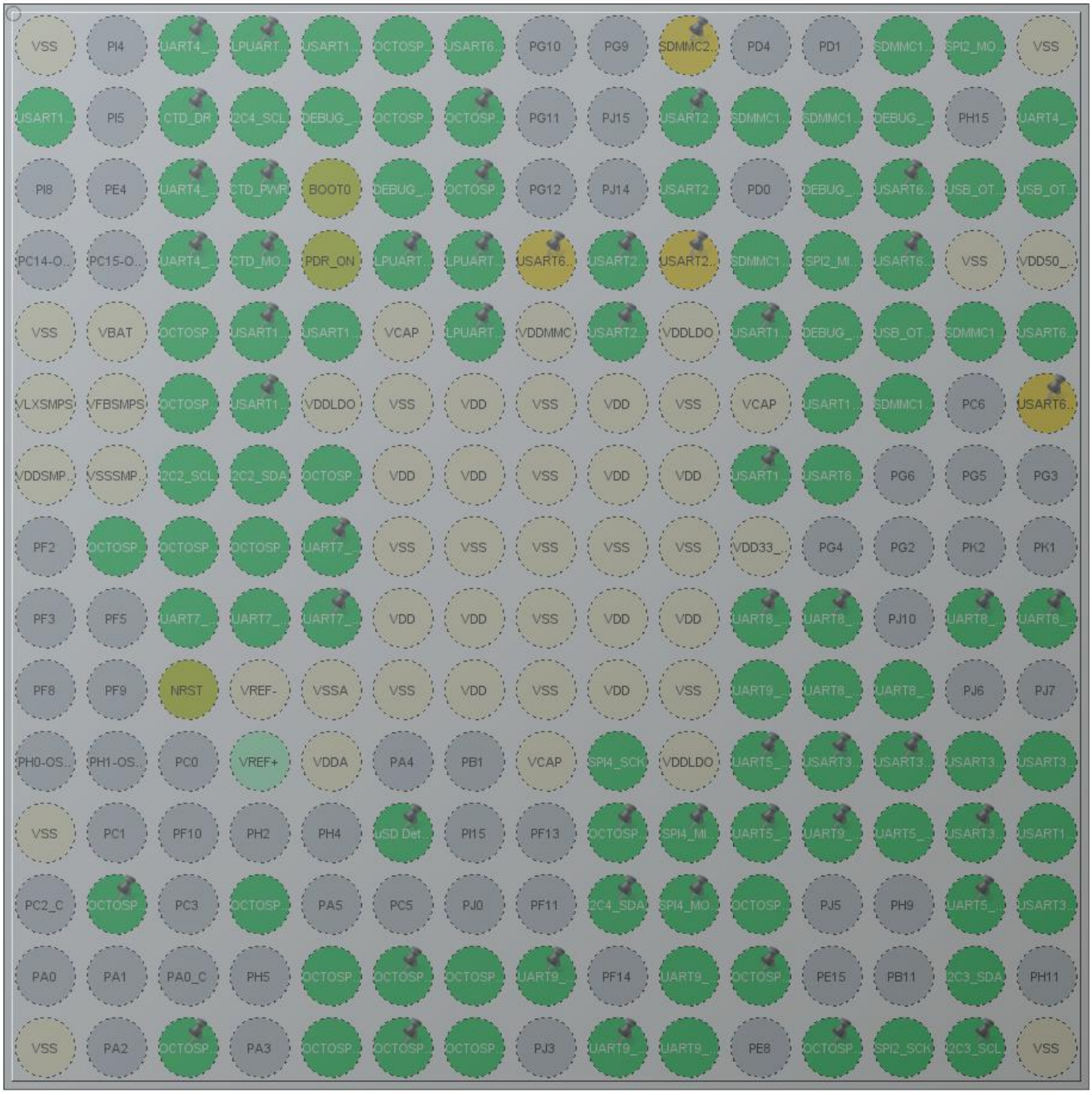
1.2. MCU

MCU Series	STM32H7
MCU Line	STM32H7A3/7B3
MCU name	STM32H7A3LIHxQ
MCU Package	TFBGA225
MCU Pin number	225

1.3. Core(s) information

Core(s)	Arm Cortex-M7

2. Pinout Configuration



TFBGA225 (Top view)

3. Pins Configuration

Pin Number TFBGA225	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
A1	VSS	Power		
A3	PB9	I/O	UART4_TX	
A4	PB6	I/O	LPUART1_TX	
A5	PG15	I/O	USART10_CK	
A6	PK5	I/O	OCTOSPIM_P2_NCS	
A7	PG14	I/O	USART6_TX	
A10	PD7 *	I/O	SDMMC2_CMD	
A13	PC10	I/O	SDMMC1_D2	
A14	PI3	I/O	SPI2_MOSI	
A15	VSS	Power		
B1	PE3	I/O	USART10_TX	
B3	PE0 **	I/O	GPIO_Output	CTD_DR
B4	PB8	I/O	I2C4_SCL	
B5	PB4	I/O	DEBUG_JTRST	
B6	PK6	I/O	OCTOSPIM_P2_DQS	
B7	PK3	I/O	OCTOSPIM_P2_IO6	
B10	PD6	I/O	USART2_RX	
B11	PD2	I/O	SDMMC1_CMD	
B12	PC12	I/O	SDMMC1_CK	
B13	PA14	I/O	DEBUG_JTCK-SWCLK	
B15	PH14	I/O	UART4_RX	
C3	PI6 **	I/O	GPIO_Input	UART4_FLT
C4	PE1 **	I/O	GPIO_Output	CTD_PWR
C5	BOOT0	Boot		
C6	PB3	I/O	DEBUG_JTDO-SWO	
C7	PK4	I/O	OCTOSPIM_P2_IO7	
C10	PD5	I/O	USART2_TX	
C12	PA15	I/O	DEBUG_JTDI	
C13	PI0 **	I/O	GPIO_Output	USART6_PWR
C14	PA12	I/O	USB_OTG_HS_DP	
C15	PA11	I/O	USB_OTG_HS_DM	
D3	PE5 **	I/O	GPIO_Output	UART4_PWR
D4	PI7 **	I/O	GPIO_Output	CTD_MODE
D5	PDR_ON	Reset		
D6	PB7	I/O	LPUART1_RX	
D7	PK7 **	I/O	GPIO_Output	LPUART1_PWR

Pin Number TFBGA225	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
D8	PG13 *	I/O	USART6_CTS	
D9	PJ13 **	I/O	GPIO_Output	USART2_PWR
D10	PD3 *	I/O	USART2_CTS	
D11	PC11	I/O	SDMMC1_D3	
D12	PI2	I/O	SPI2_MISO	
D13	PH13 **	I/O	GPIO_Input	USART6_FLT
D14	VSS	Power		
D15	VDD50_USB	Power		
E1	VSS	Power		
E2	VBAT	Power		
E3	PI9	I/O	OCTOSPIM_P2_IO0	
E4	PE6 **	I/O	GPIO_Input	USART10_FLT
E5	PE2	I/O	USART10_RX	
E6	VCAP	Power		
E7	PB5 **	I/O	GPIO_Input	LPUART1_FLT
E8	VDDMMC	Power		
E9	PJ12 **	I/O	GPIO_Input	USART2_FLT
E10	VDDLDO	Power		
E11	PI1 **	I/O	GPIO_Input	USART1_PWR
E12	PA13	I/O	DEBUG_JTMS-SWDIO	
E13	PA10	I/O	USB_OTG_HS_ID	
E14	PC9	I/O	SDMMC1_D1	
E15	PC7	I/O	USART6_RX	
F1	VLXSMPS	Power		
F2	VFBSMPS	Power		
F3	PI10	I/O	OCTOSPIM_P2_IO1	
F4	PC13 **	I/O	GPIO_Input	USART10_FLT
F5	VDDLDO	Power		
F6	VSS	Power		
F7	VDD	Power		
F8	VSS	Power		
F9	VDD	Power		
F10	VSS	Power		
F11	VCAP	Power		
F12	PA9	I/O	USART1_TX	
F13	PC8	I/O	SDMMC1_D0	
F15	PG8 *	I/O	USART6_RTS	
G1	VDDSMPS	Power		
G2	VSSSMPS	Power		

Pin Number TFBGA225	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
G3	PF1	I/O	I2C2_SCL	
G4	PF0	I/O	I2C2_SDA	
G5	PI11	I/O	OCTOSPIM_P2_IO2	
G6	VDD	Power		
G7	VDD	Power		
G8	VSS	Power		
G9	VDD	Power		
G10	VDD	Power		
G11	PA8 **	I/O	GPIO_Output	USART1_PWR
G12	PG7	I/O	USART6_CK	
H2	PI12	I/O	OCTOSPIM_P2_IO3	
H3	PF4	I/O	OCTOSPIM_P2_CLK	
H4	PI14	I/O	OCTOSPIM_P2_NCLK	
H5	PI13 **	I/O	GPIO_Output	UART7_PWR
H6	VSS	Power		
H7	VSS	Power		
H8	VSS	Power		
H9	VSS	Power		
H10	VSS	Power		
H11	VDD33_USB	Power		
J3	PF6	I/O	UART7_RX	
J4	PF7	I/O	UART7_TX	
J5	PC2 **	I/O	GPIO_Input	UART7_FLT
J6	VDD	Power		
J7	VDD	Power		
J8	VSS	Power		
J9	VDD	Power		
J10	VDD	Power		
J11	PJ11 **	I/O	GPIO_Input	UART8_FLT
J12	PK0 **	I/O	GPIO_Output	UART8_PWR
J14	PJ9	I/O	UART8_RX	
J15	PJ8	I/O	UART8_TX	
K3	NRST	Reset		
K4	VREF-	Power		
K5	VSSA	Power		
K6	VSS	Power		
K7	VDD	Power		
K8	VSS	Power		
K9	VDD	Power		

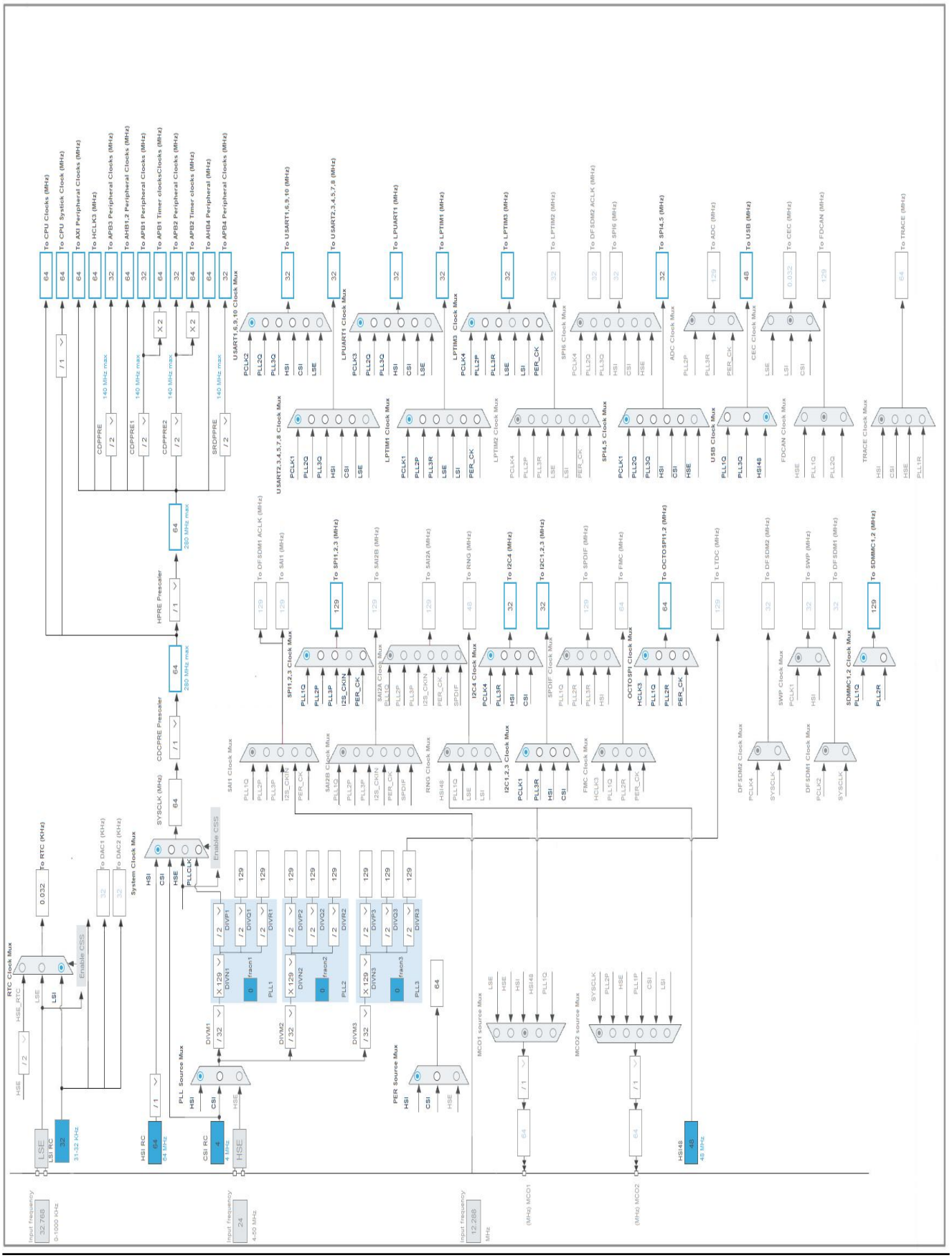
Pin Number TFBGA225	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
K10	VSS	Power		
K11	PD13	I/O	UART9_RTS	
K12	PD14	I/O	UART8_CTS	
K13	PD15	I/O	UART8_RTS	
L5	VDDA	Power		
L8	VCAP	Power		
L9	PE12	I/O	SPI4_SCK	
L10	VDDLDO	Power		
L11	PH12 **	I/O	GPIO_Input	UART5_FLT
L12	PD8	I/O	USART3_TX	
L13	PD10 **	I/O	GPIO_Input	USART3_FLT
L14	PD11	I/O	USART3_CTS	
L15	PD12	I/O	USART3_RTS	
M1	VSS	Power		
M6	PC4 **	I/O	GPIO_Input	uSD Detec
M9	PE7	I/O	OCTOSPIM_P1_IO4	
M10	PE13	I/O	SPI4_MISO	
M11	PH6 **	I/O	GPIO_Output	UART5_PWR
M12	PH10 **	I/O	GPIO_Output	UART9_PWR
M13	PB13	I/O	UART5_TX	
M14	PB14 **	I/O	GPIO_Output	USART3_PWR
M15	PB15	I/O	USART1_RX	
N2	PC3_C	I/O	OCTOSPIM_P1_IO0	
N4	PH3	I/O	OCTOSPIM_P1_IO5	
N9	PF15	I/O	I2C4_SDA	
N10	PE14	I/O	SPI4_MOSI	
N11	PE10	I/O	OCTOSPIM_P1_IO7	
N14	PB12	I/O	UART5_RX	
N15	PD9	I/O	USART3_RX	
P5	PA6	I/O	OCTOSPIM_P1_IO3	
P6	PB0	I/O	OCTOSPIM_P1_IO1	
P7	PJ1	I/O	OCTOSPIM_P2_IO4	
P8	PJ4	I/O	UART9_CTS	
P10	PG1	I/O	UART9_TX	
P11	PE9	I/O	OCTOSPIM_P1_IO6	
P14	PH8	I/O	I2C3_SDA	
R1	VSS	Power		
R3	PA1_C	I/O	OCTOSPIM_P1_DQS	
R5	PA7	I/O	OCTOSPIM_P1_IO2	

Pin Number TFBGA225	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
R6	PB2	I/O	OCTOSPIM_P1_CLK	
R7	PJ2	I/O	OCTOSPIM_P2_IO5	
R9	PF12 **	I/O	GPIO_Input	UART9_FLT
R10	PG0	I/O	UART9_RX	
R12	PE11	I/O	OCTOSPIM_P1_NCS	
R13	PB10	I/O	SPI2_SCK	
R14	PH7	I/O	I2C3_SCL	
R15	VSS	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. Software Project

5.1. Project Settings

Name	Value
Project Name	H7L3ABaseProject
Project Folder	\\ATLAS\ProjectLibrary\CPF\Electrical
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_H7 V1.9.1
Application Structure	Advanced
Generate Under Root	Yes
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	No
Backup previously generated files when re-generating	Yes
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No
Enable Full Assert	No

5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	MX_GPIO_Init	GPIO
2	MX_DMA_Init	DMA
3	SystemClock_Config	RCC
4	MX_USART1_UART_Init	USART1
5	MX_USART2_UART_Init	USART2
6	MX_I2C2_Init	I2C2
7	MX_I2C3_Init	I2C3
8	MX_I2C4_Init	I2C4
9	MX_IWDG1_Init	IWDG1
10	MX_LPTIM1_Init	LPTIM1
11	MX_LPTIM3_Init	LPTIM3

Rank	Function Name	Peripheral Instance Name
12	MX_LPUART1_UART_Init	LPUART1
13	MX_UART4_Init	UART4
14	MX_UART7_Init	UART7
15	MX_UART8_Init	UART8
16	MX_UART9_Init	UART9
17	MX_USART6_Init	USART6
18	MX_USART10_Init	USART10
19	MX_OCTOSPI1_Init	OCTOSPI1
20	MX_OCTOSPI2_Init	OCTOSPI2
21	MX_RTC_Init	RTC
22	MX_SPI2_Init	SPI2
23	MX_WWDG1_Init	WWDG1
24	MX_FATFS_Init	FATFS
25	MX_SDMMC1_SD_Init	SDMMC1
26	MX_SPI4_Init	SPI4
27	MX_UART5_Init	UART5
28	MX_USART3_UART_Init	USART3
29	MX_USB_OTG_HS_USB_Init	USB_OTG_HS

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32H7
Line	STM32H7A3/7B3
MCU	STM32H7A3LIHxQ
Datasheet	DS13139_Rev0

6.2. Parameter Selection

Temperature	25
Vdd	3.0

6.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

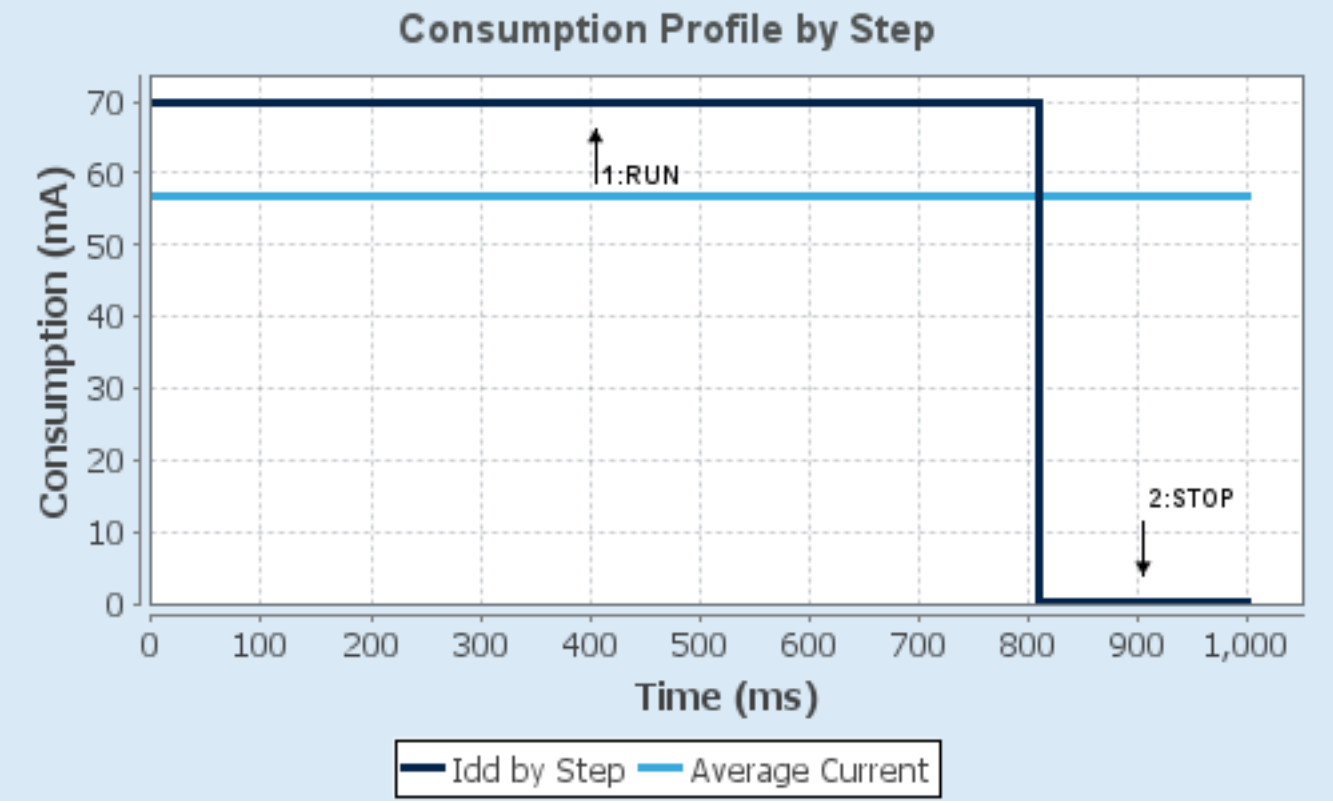
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.0	3.0
Voltage Source	Battery	Battery
Range	VOS0	SVOS5
SRDomain	DRUN	DSTOP
n/a	SRDRUN	SRDSTOP
Fetch Type	ITCM/DTCM/Cache	NA
CPU Frequency	280 MHz	64 MHz
Clock Configuration	HSE PLL	HSI Flash-ON
Clock Source Frequency	16 MHz	64 MHz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	69.92 mA	263.82 µA
Duration	810 ms	190 ms
DMIPS	599.0	0.0
Ta Max	115.56	124.96
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 s	Average Current	56.69 mA
Battery Life	2 days, 11 hours	Average DMIPS	599.2 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
70
60
50
40
30
20
10
0
1:RUN
2:STOP
0
100
200
300
400
500
600
700
800
900
1,000
Time (ms)
Idd by Step
Average Current

7. Peripherals and Middlewares Configuration

7.1. DEBUG

Debug: JTAG (5 pins)

7.2. I2C2

I2C: I2C

7.2.1. Parameter Settings:

Timing configuration:

Custom Timing	Disabled
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	**0x00707CBB ***

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

7.3. I2C3

I2C: I2C

7.3.1. Parameter Settings:

Timing configuration:

Custom Timing	Disabled
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	**0x00707CBB ***

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

7.4. I2C4

I2C: I2C

7.4.1. Parameter Settings:

Timing configuration:

Custom Timing	Disabled
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	**0x00707CBB ***

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

7.5. IWDG1

mode: Activated

7.5.1. Parameter Settings:

Watchdog Clocking:

IWDG counter clock prescaler	4
IWDG window value	4095
IWDG down-counter reload value	4095

7.6. LPTIM1

Mode: Counts internal clock events

7.6.1. Parameter Settings:

Clock:

Clock Prescaler	Prescaler Div1

Preload:

Update Mode	Update Immediate

Trigger:

Trigger Source	Software Trigger

7.7. LPTIM3

mode: Mode

7.7.1. Parameter Settings:

Clock:

Clock Prescaler	Prescaler Div1

Preload:

Update Mode	Update Immediate

Trigger:

Trigger Source	Software Trigger

7.8. LPUART1

Mode: Asynchronous

7.8.1. Parameter Settings:

Basic Parameters:

Baud Rate	209700
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Single Sample	Disable
ClockPrescaler	1

Fifo Mode	FIFO mode disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.9. OCTOSPI1

Mode: HyperBus(TM)

Clock: Port1 CLK

Chip Select: Port1 NCS

Data Strobe: Port1 DQS (RWDS)

Data [3:0]: Port1 IO[3:0]

Data [7:4]: Port1 IO[7:4]

7.9.1. Parameter Settings:

Generic:

Fifo Threshold	1
Dual Quad mode	Disable
Memory Type	HyperBus(TM)
Device Size	32
Chip Select High Time	1
Free Running Clock	Disable
Clock Mode	Low
Wrap Size	Not Supported
Clock Prescaler	1
Sample Shifting	None
Delay Hold Quarter Cycle	Disable
Chip Select Boundary	0
Clock Chip Select High Time	0
Delay Block	Disable
Maximum Transfer	0
Refresh Rate	0

HyperBus(TM):

RW Recovery Time	0
Access Time	0
Write Access Latency	Disable
Latency Mode	Variable

7.10. OCTOSPI2

Mode: HyperBus(TM)

Clock: Port2 CLK

HyperBus(TM) 1.8V Inverted Clock: Port2 NCLK

Chip Select: Port2 NCS

Data Strobe: Port2 DQS (RWDS)

Data [3:0]: Port2 IO[3:0]

Data [7:4]: Port2 IO[7:4]

7.10.1. Parameter Settings:

Generic:

Fifo Threshold	1
Dual Quad mode	Disable
Memory Type	HyperBus(TM)
Device Size	32
Chip Select High Time	1
Free Running Clock	Disable
Clock Mode	Low
Wrap Size	Not Supported
Clock Prescaler	1
Sample Shifting	None
Delay Hold Quarter Cycle	Disable
Chip Select Boundary	0
Clock Chip Select High Time	0
Delay Block	Disable
Maximum Transfer	0
Refresh Rate	0

HyperBus(TM):

RW Recovery Time	0
Access Time	0
Write Access Latency	Disable
Latency Mode	Variable

7.11. RCC

7.11.1. Parameter Settings:

Power Parameters:

SupplySource	PWR_DIRECT_SMPS_SUPPLY
Power Regulator Voltage Scale	Power Regulator Voltage Scale 3

RCC Parameters:

TIM Prescaler Selection	Disabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000
CSI Calibration Value	16
HSI Calibration Value	32

System Parameters:

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

PLL range Parameters:

PLL1 input frequency range	Between 2 and 4 MHz
PLL1 clock Output range	Wide VCO range

7.12. RTC

mode: Activate Clock Source

mode: Activate Calendar

7.12.1. Parameter Settings:

General:

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

Calendar Time:

Data Format	BCD 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	0

7.13. SDMMC1

Mode: SD 4 bits Wide bus

7.13.1. Parameter Settings:

SDMMC parameters:

Clock transition on which the bit capture is made	Rising transition
SDMMC Clock output enable when the bus is idle	Disable the power save for the clock
SDMMC hardware flow control	The hardware control flow is disabled
SDMMC clock divide factor	0
Is external transceiver present ?	no

7.14. SPI2

Mode: Full-Duplex Master

7.14.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**64.5 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software
Fifo Threshold	Fifo Threshold 01 Data
Tx Crc Initialization Pattern	All Zero Pattern
Rx Crc Initialization Pattern	All Zero Pattern
Nss Polarity	Nss Polarity Low
Master Ss Idleness	00 Cycle
Master Inter Data Idleness	00 Cycle

Master Receiver Auto Susp	Disable
Master Keep Io State	Master Keep Io State Disable
IO Swap	Disabled

7.15. SPI4

Mode: Full-Duplex Master

7.15.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**16.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software
Fifo Threshold	Fifo Threshold 01 Data
Tx Crc Initialization Pattern	All Zero Pattern
Rx Crc Initialization Pattern	All Zero Pattern
Nss Polarity	Nss Polarity Low
Master Ss Idleness	00 Cycle
Master Inter Data Idleness	00 Cycle
Master Receiver Auto Susp	Disable
Master Keep Io State	Master Keep Io State Disable
IO Swap	Disabled

7.16. SYS

Timebase Source: SysTick

7.17. UART4

Mode: Asynchronous

7.17.1. 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
ClockPrescaler	1
Fifo Mode	FIFO mode disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.18. UART5

Mode: Asynchronous

7.18.1. 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
ClockPrescaler	1

Fifo Mode	FIFO mode disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.19. UART7

Mode: Asynchronous

7.19.1. 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
ClockPrescaler	1
Fifo Mode	FIFO mode disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.20. UART8

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

7.20.1. 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
ClockPrescaler	1
Fifo Mode	FIFO mode disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.21. UART9

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

7.21.1. 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
ClockPrescaler	1
Fifo Mode	FIFO mode disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.22. USART1

Mode: Asynchronous

7.22.1. 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
ClockPrescaler	1
Fifo Mode	Disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.23. USART2

Mode: Asynchronous

7.23.1. 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
ClockPrescaler	1
Fifo Mode	Disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.24. USART3

Mode: Asynchronous

Hardware Flow Control (RS232): CTS/RTS

7.24.1. 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
ClockPrescaler	1
Fifo Mode	Disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.25. USART6

Mode: Synchronous Master

7.25.1. 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
ClockPrescaler	1
Slave Mode	Disable
Fifo Mode	Disable

Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

Clock Parameters:

Clock Polarity	Low
Clock Phase	One Edge
Clock Last Bit	Disable

7.26. USART10

Mode: Synchronous Master

7.26.1. 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
ClockPrescaler	1
Slave Mode	Disable
Fifo Mode	Disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

Clock Parameters:

Clock Polarity	Low
Clock Phase	One Edge
Clock Last Bit	Disable

7.27. USB_OTG_HS

Internal FS Phy: OTG/Dual_Role_Device

7.28. WWDG1

mode: Activated

7.28.1. Parameter Settings:

Watchdog Clocking:

WWDG counter clock prescaler	1

WWDG window value	64
WWDG free-running downcounter value	64

Watchdog Interrupt:

Early wakeup interrupt	Disable

7.29. FATFS

mode: SD Card

7.29.1. Set Defines:

Version:

FATFS version	R0.12c

Function Parameters:

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

Locale and Namespace Parameters:

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

Physical Drive Parameters:

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

System Parameters:

FS_TINY (Tiny mode)	Disabled
FS_EXFAT (Support of exFAT file system)	Disabled
FS_NORTC (Timestamp feature)	Dynamic timestamp

FS_REENTRANT (Re-Entrancy)	Disabled
FS_TIMEOUT (Timeout ticks)	1000
FS_LOCK (Number of files opened simultaneously)	2

7.29.2. Advanced Settings:

SDIO/SDMMC:

SDMMC instance	SDMMC1
Use dma template	Disabled
BSP code for SD	Generic

7.29.3. Platform Settings:

Detect_SDIO	PC4

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
DEBUG	PB4	DEBUG_JTRST	n/a	n/a	n/a	
	PA14	DEBUG_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	DEBUG_JTDO-SWO	n/a	n/a	n/a	
	PA15	DEBUG_JTDI	n/a	n/a	n/a	
	PA13	DEBUG_JTMS-SWDIO	n/a	n/a	n/a	
I2C2	PF1	I2C2_SCL	Alternate Function Open Drain	**Pull-up ***	Low	
	PF0	I2C2_SDA	Alternate Function Open Drain	**Pull-up ***	Low	
I2C3	PH8	I2C3_SDA	Alternate Function Open Drain	**Pull-up ***	Low	
	PH7	I2C3_SCL	Alternate Function Open Drain	**Pull-up ***	Low	
I2C4	PB8	I2C4_SCL	Alternate Function Open Drain	No pull-up and no pull-down	Low	
	PF15	I2C4_SDA	Alternate Function Open Drain	No pull-up and no pull-down	Low	
LPUART1	PB6	LPUART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB7	LPUART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
OCTOSPI1	PE7	OCTOSPIM_P1_IO4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC3_C	OCTOSPIM_P1_IO0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH3	OCTOSPIM_P1_IO5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE10	OCTOSPIM_P1_IO7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PA6	OCTOSPIM_P1_IO3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PB0	OCTOSPIM_P1_IO1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE9	OCTOSPIM_P1_IO6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PA1_C	OCTOSPIM_P1_DQS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PA7	OCTOSPIM_P1_IO2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB2	OCTOSPIM_P1_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE11	OCTOSPIM_P1_NCS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
OCTOSPI2	PK5	OCTOSPIM_P2_NCS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PK6	OCTOSPIM_P2_DQS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PK3	OCTOSPIM_P2_IO6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PK4	OCTOSPIM_P2_IO7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI9	OCTOSPIM_P2_IO0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI10	OCTOSPIM_P2_IO1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI11	OCTOSPIM_P2_IO2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI12	OCTOSPIM_P2_IO3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF4	OCTOSPIM_P2_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI14	OCTOSPIM_P2_NCLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PJ1	OCTOSPIM_P2_IO4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PJ2	OCTOSPIM_P2_IO5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
SDMMC1	PC10	SDMMC1_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD2	SDMMC1_CMD	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC12	SDMMC1_CK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC11	SDMMC1_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC9	SDMMC1_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC8	SDMMC1_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
SPI2	PI3	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PI2	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB10	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
SPI4	PE12	SPI4_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE13	SPI4_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE14	SPI4_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Low	
UART4	PB9	UART4_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PH14	UART4_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
UART5	PB13	UART5_TX	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
	PB12	UART5_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
UART7	PF6	UART7_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PF7	UART7_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
UART8	PJ9	UART8_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PJ8	UART8_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD14	UART8_CTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD15	UART8_RTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
UART9	PD13	UART9_RTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PJ4	UART9_CTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PG1	UART9_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PG0	UART9_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB15	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART2	PD6	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD5	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART3	PD8	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD11	USART3_CTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD12	USART3_RTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD9	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART6	PG14	USART6_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PC7	USART6_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PG7	USART6_CK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART10	PG15	USART10_CK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE3	USART10_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE2	USART10_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USB_OTG_HS	PA12	USB_OTG_HS_DP	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA11	USB_OTG_HS_DM	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA10	USB_OTG_HS_ID	Alternate Function Push Pull	No pull-up and no pull-down	Low	
Single Mapped Signals	PD7	SDMMC2_CMD	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG13	USART6_CTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD3	USART2_CTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PG8	USART6_RTS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
GPIO	PE0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CTD_DR
	PI6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	UART4_FLT
	PE1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CTD_PWR
	PI0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USART6_PWR
	PE5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	UART4_PWR
	PI7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CTD_MODE

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PK7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LPUART1_PWR
	PJ13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USART2_PWR
	PH13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USART6_FLT
	PE6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USART10_FLT
	PB5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LPUART1_FLT
	PJ12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USART2_FLT
	PI1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USART1_PWR
	PC13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USART10_FLT
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USART1_PWR
	PI13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	UART7_PWR
	PC2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	UART7_FLT
	PJ11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	UART8_FLT
	PK0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	UART8_PWR
	PH12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	UART5_FLT
	PD10	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USART3_FLT
	PC4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	uSD Detec
	PH6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	UART5_PWR
	PH10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	UART9_PWR
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USART3_PWR
	PF12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	UART9_FLT

8.2. DMA configuration

DMA request	Stream	Direction	Priority
USART2_RX	DMA1_Stream2	Peripheral To Memory	Low
USART2_TX	DMA1_Stream3	Memory To Peripheral	Low

USART2_RX: DMA1_Stream2 DMA request Settings:

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

USART2_TX: DMA1_Stream3 DMA request Settings:

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

8.3. BDMA1 configuration

nothing configured in DMA service

8.4. BDMA2 configuration

nothing configured in DMA service

8.5. MDMA configuration

nothing configured in DMA service

8.6. NVIC configuration

8.6.1. NVIC

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 stream2 global interrupt	true	0	0
DMA1 stream3 global interrupt	true	0	0
Window watchdog interrupt	unused		
PVD and PVM interrupts through EXTI line	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
SPI2 global interrupt	unused		
USART1 global interrupt	unused		
USART2 global interrupt	unused		
USART3 global interrupt	unused		
SDMMC1 global interrupt	unused		
UART4 global interrupt	unused		
UART5 global interrupt	unused		
USART6 global interrupt	unused		
I2C3 event interrupt	unused		
I2C3 error interrupt	unused		
FPU global interrupt	unused		
UART7 global interrupt	unused		
UART8 global interrupt	unused		
SPI4 global interrupt	unused		
OCTOSPI1 global interrupt	unused		
LPTIM1 global interrupt	unused		
I2C4 event interrupt	unused		
I2C4 error interrupt	unused		
HSEM1 global interrupt	unused		
LPTIM3 global interrupt	unused		
UART9 global interrupt	unused		

Interrupt Table	Enable	Preenmption Priority	SubPriority
USART10 global interrupt	unused		
LPUART1 global interrupt	unused		
Window watchdog reset interrupt	unused		
ECC diagnostic Global Interrupt	unused		
OCTOSPI2 global interrupt	unused		

8.6.2. NVIC Code generation

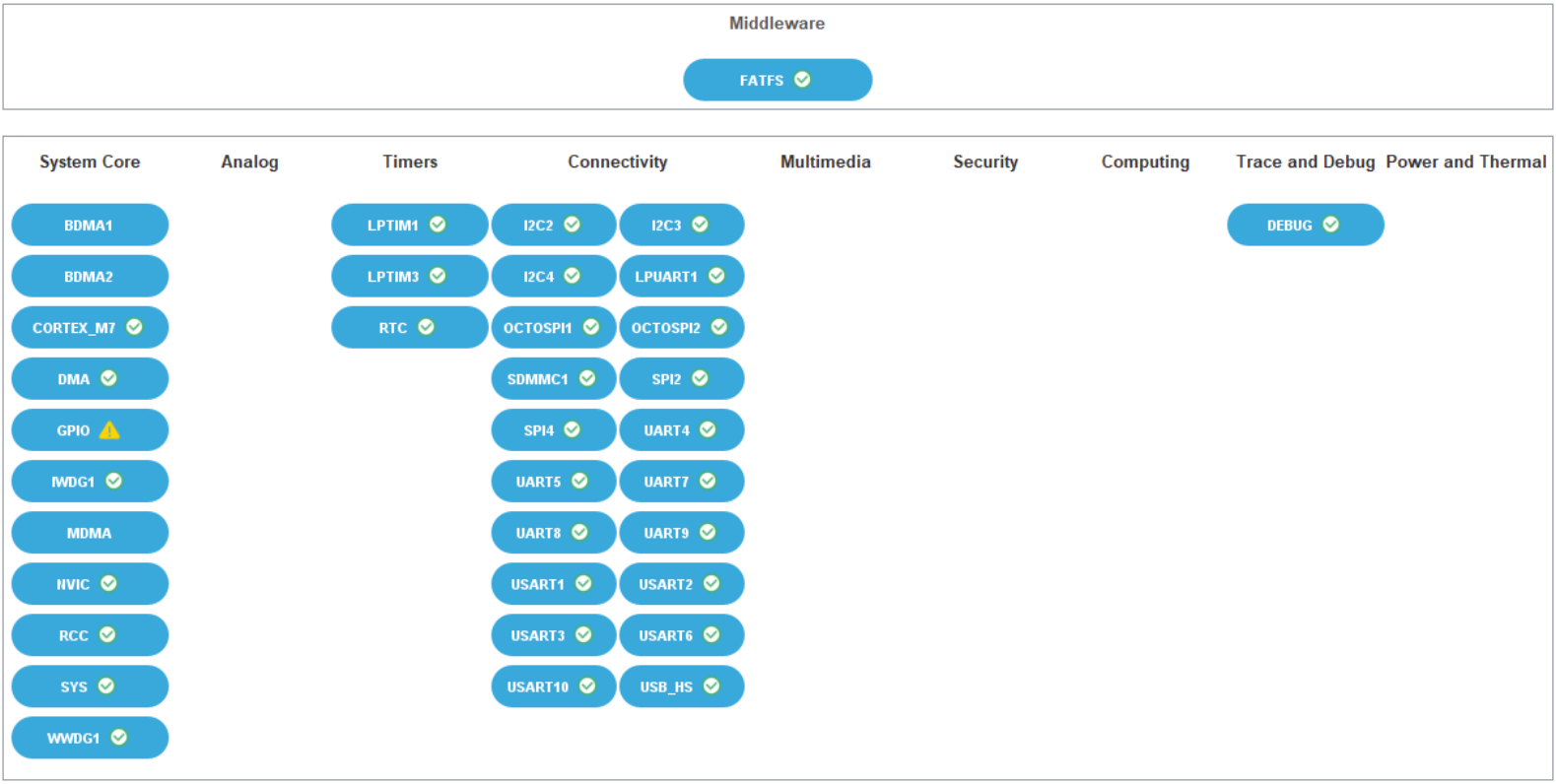
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Pre-fetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
DMA1 stream2 global interrupt	false	true	true
DMA1 stream3 global interrupt	false	true	true

*** User modified value**

9. System Views

9.1. Category view

9.1.1. Current



10. Docs & Resources

Type	Link
Datasheet	http://www.st.com/resource/en/datasheet/DM00674683.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00463927.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00237416.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00598144.pdf
Application note	http://www.st.com/resource/en/application_note/CD00167594.pdf
Application note	http://www.st.com/resource/en/application_note/CD00211314.pdf
Application note	http://www.st.com/resource/en/application_note/CD00259245.pdf
Application note	http://www.st.com/resource/en/application_note/CD00264342.pdf
Application note	http://www.st.com/resource/en/application_note/CD00264379.pdf
Application note	http://www.st.com/resource/en/application_note/DM00042534.pdf
Application note	http://www.st.com/resource/en/application_note/DM00072315.pdf
Application note	http://www.st.com/resource/en/application_note/DM00073742.pdf
Application note	http://www.st.com/resource/en/application_note/DM00073853.pdf
Application note	http://www.st.com/resource/en/application_note/DM00081379.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129215.pdf
Application note	http://www.st.com/resource/en/application_note/DM00151811.pdf
Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf
Application note	http://www.st.com/resource/en/application_note/DM00220769.pdf
Application note	http://www.st.com/resource/en/application_note/DM00226326.pdf
Application note	http://www.st.com/resource/en/application_note/DM00236305.pdf
Application note	http://www.st.com/resource/en/application_note/DM00257177.pdf
Application note	http://www.st.com/resource/en/application_note/DM00272912.pdf
Application note	http://www.st.com/resource/en/application_note/DM00272913.pdf
Application note	http://www.st.com/resource/en/application_note/DM00287603.pdf
Application note	http://www.st.com/resource/en/application_note/DM00315319.pdf

Application note	http://www.st.com/resource/en/application_note/DM00327191.pdf
Application note	http://www.st.com/resource/en/application_note/DM00354244.pdf
Application note	http://www.st.com/resource/en/application_note/DM00354333.pdf
Application note	http://www.st.com/resource/en/application_note/DM00356635.pdf
Application note	http://www.st.com/resource/en/application_note/DM00380469.pdf
Application note	http://www.st.com/resource/en/application_note/DM00393275.pdf
Application note	http://www.st.com/resource/en/application_note/DM00395696.pdf
Application note	http://www.st.com/resource/en/application_note/DM00407776.pdf
Application note	http://www.st.com/resource/en/application_note/DM00431633.pdf
Application note	http://www.st.com/resource/en/application_note/DM00493651.pdf
Application note	http://www.st.com/resource/en/application_note/DM00525510.pdf
Application note	http://www.st.com/resource/en/application_note/DM00535045.pdf
Application note	http://www.st.com/resource/en/application_note/DM00536349.pdf
Application note	http://www.st.com/resource/en/application_note/DM00600614.pdf
Application note	http://www.st.com/resource/en/application_note/DM00606249.pdf
Application note	http://www.st.com/resource/en/application_note/DM00623136.pdf
Application note	http://www.st.com/resource/en/application_note/DM00625700.pdf
Application note	http://www.st.com/resource/en/application_note/DM00660346.pdf
Application note	http://www.st.com/resource/en/application_note/DM00725181.pdf