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# STM32MP25 Microprocessor

**Generate a minimal devicetree with CubeMX v6.13  
for OpenSTLinux v6.0**

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# Objectives and Contents

## Creation of MP25 device trees for TF-A, OPTEE, U-Boot, Kernel

- To be used with OpenSTLinux v6.0 “st-image-weston” image
- Using CubeMx v6.13
- Based on STM32MP257F-EV1 C01 board

1. CubeMx project creation and configuration
2. User-code section configurations in device trees
3. Build with Developer Package and Test
4. Messages to be fixed by more configurations
5. To be completed for your board

# 1 CubeMx project creation and configuration

# 1.1 CubeMx project creation

## Start Project with CubeMx

New Project

I need to :

Start My project from MCU

[ACCESS TO MCU SELECTOR](#)

Start My project from ST Board

[ACCESS TO BOARD SELECTOR](#)

Start My project from Example

[ACCESS TO EXAMPLE SELECTOR](#)

# 1.1 CubeMx project creation

## Select MP25 Part Number, and “Start Project”

MX New Project from a MCU/MPU

MCU/MPU Selector | Board Selector | Example Selector | Cross Selector

MCU/MPU Filters

Commercial Part Number: **STM32MP257FAI3**

PRODUCT INFO

- Segment
- Series
- Line
- Marketing Status
- Price
- Package
- Core
- Coprocessor

STM32MP2 Series

**STM32MP257FAI3**

**MPU with Dual Arm Cortex-A35 @1.5GHz, Cortex-M33 @400MHz, 3xEthernet (2+1 switch), 3xFD-CAN, LVDS/DSI, H.264, 3D GPU, AI/NN, Secure Boot, Cryptography, DRAM enc/dec, PKA**

Unit Price for 10kU (US\$) : **16.02**

Board: **STM32MP257F-EV1**

TFBGA 436 18x18x1.2 P 0.8 mm

STM32MP25x/F devices are based on the high-performance single or dual-core Arm® Cortex®-A35 64-bit RISC core operating at up to 1.5 GHz. The Cortex®-A35 processor includes a 32-Kbyte L1 instruction cache for each CPU, a 32-Kbyte L1 data cache for each CPU, and a 512-Kbyte L2 cache. The Cortex®-A35 processor uses a highly efficient 8-stage in-order pipeline that has been extensively optimized to provide full Armv8-A features while maximizing area and power efficiency.

STM32MP25x/F devices also embed a Cortex®-M33 32-bit RISC core operating at up to 400 MHz frequency. The Cortex®-M33 core features a floating point unit (FPU) single precision which supports Arm® single-precision data-processing instructions, and data types. The Cortex®-M33 supports a full set of DSP instructions, TrustZone®, and a memory protection unit (MPU) which enhances application security.

The devices also embed a Cortex®-M0+ 32-bit RISC core operating at up to 200 MHz frequency (16 MHz when running from backup regulator). This processor is located in the SmartRun domain, and can

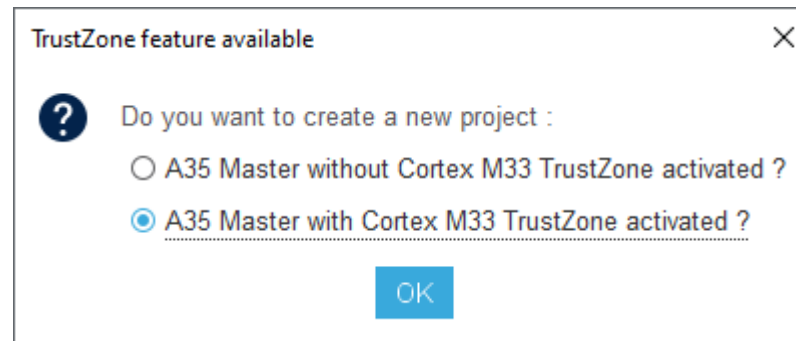
MCUs/MPUs List: 1 item

	Commercial Part No	Part No	Reference	Marketing Status	Unit Price for 10kU (US\$)	Board	Package	Flash	RAM	Frequency
☆	<b>STM32MP257FAI3</b>	STM32MP257F	STM32MP257FAIx	Preview	16.02	STM32MP257F-EV1	TFBGA 436 18x18x1.2 P 0...	0 kBytes	808 kBytes	1500 MHz

Export

# 1.1 CubeMx project creation

## With M33 TrustZone ?



### **With Cortex M33 TrustZone activated:**

TrustZone firmware device tree files will be generated at  
<Project\_folder>\CM33\DeviceTree\<project\_name>\tf-m\

**This presentation example is « With Cortex M33 TrustZone activated »**

# 1.1 CubeMx project creation

## Basic project settings

Pinout & Configuration	Clock Configuration	RIF	Project Manager	Tools
Project	<div>Project Settings</div> <div>Project Name: <input type="text" value="ev1-v6.0"/></div> <div>Project Location: <input type="text" value="C:\kyao\SharedFolderVMMP2_CubeMx"/> <input type="button" value="Browse"/></div> <div>Application Structure: <input type="text" value="Advanced"/> <input type="checkbox"/> Do not generate the main()</div> <div>Toolchain Folder Location: <input type="text" value="C:\kyao\SharedFolderVMMP2_CubeMx\ev1-v6.0\"/></div> <div>Toolchain / IDE: <input type="text" value="STM32CubeIDE"/> <input checked="" type="checkbox"/> Generate Under Root</div>			
Code Generator				
Advanced Settings	<div>Linker Settings</div> <div>Minimum Heap Size: <input type="text" value="0x200"/></div> <div>Minimum Stack Size: <input type="text" value="0x400"/></div> <div>Thread-safe Settings</div> <div>CortexM33NS</div> <div><input type="checkbox"/> Enable multi-threaded support</div> <div>Thread-safe Locking Strategy: <input type="text" value="Default - Mapping suitable strategy depending on RTOS selection."/></div>			

Main device tree file name will be: <part\_number>-<project\_name>-mx.dts  
Inside the file: compatible = "st,<part\_number>-<project\_name>-mx";

# 1.2 CubeMx project configuration

## Special symbols

- ⊗ Error to be fixed
- ⚠ Warning to be checked



# 1.2 CubeMx project configuration : modules

## System Core module : Cortex M33 : enabled

Pinout & Configuration

Clock Configuration

RIF

Project M

Software Packs

Pinout

CategoriesA->Z

System Core

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
<input checked="" type="checkbox"/> CORTEX_M33			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
DCACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> DDR_CTRL_PHY		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GIC			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
GPIO							
HPDMA1			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HPDMA2			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HPDMA3			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ICACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CORTEX\_M33 Mode and Configuration

Mode

Boot time:

A35 ROM

A35S (TF-A BL2)

A35S (OP-TEE)

A35NS (U-Boot)

A35NS (Linux)

M33S (TF-M)

M33NS (Cube)

Runtime contexts:

☒

☐

☒

☒

☐

☐

☒ Activated

So that M33 firmware can be loaded and started from U-boot and Linux

# 1.2 CubeMx project configuration : modules

## System Core module : DDR : Board specific

Pinout & Configuration

Clock Configuration

RIF

Project

Software Packs

Pinout

DDR\_CTRL\_PHY Mode and Configuration

Mode

Boot time:

Runtime contexts:

A35 ROM

A35S (TF-A BL2)

A35S (OP-TEE)

A35NS (U-Boot)

A35NS (Linux)

M33S (TF-M)

M33NS (Cube)

DDR Type

DDR Width

DDR Density

This DDR density is per 16bit device (per 16bit channel for LPDDR4)

Total Density = 32Gbits

Configuration

Parameter Settings

Mapping

User Constants

Configure the below parameters :

Search (Ctrl+F)

Show Advanced Parameters

SYSTEM PARAMETERS

Speed\_Bin

ATx Impedance

ODT Impedance

Tx Impedance

phyvref

training\_sequence

version

package

memclk

Burst Length (BL)

device\_width

Row,Bank, Column Address Mapping configurati... RBC

USER INPUT BASIC

System Core

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
CORTEX_M33							
DCACHE							
DDR_CTRL_...							
GIC							
GPIO							
HPDMA1							
HPDMA2							
HPDMA3							
ICACHE							
IPCC1							
IWDG1							
IWDG2							
IWDG3							
IWDG4							
LPDMA1							
NVIC_NS							
RCC							
SYS_NS							
SYS_S							
WWDG1							
WWDG2							

Analog

DDR type, width, density,  
Speed bin,  
DDR\_A8 to DDR\_A31 mapping  
Must be corresponding to your  
board

Configuration

Parameter Settings

Mapping

User Constants

Configure the below parameters :

Search (Ctrl+F)

Show Advanced Parameters

Check

OK

A8

A9

A10

A11

A12

A13

A14

A15

A16

A17

A18

A19

A20

A21

A22

A23

A24

OK

A3

BA1

A12

A6

A0

A2

A8

-

ACTN

BG0

-

WEN

BA0

A4

A10

# 1.2 CubeMx project configuration : modules

## System Core modules : HPDMA1/2/3

Pinout & Configuration

Clock Configuration

RIF

Project

Software Packs

Pinout

HPDMA1 Mode and Configuration

Mode

Boot time: A35 ROM A35S (TF-A BL2) A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

Runtime contexts: A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

Channel 15 - 32 Words Internal FIFO / 2D addressing Disable

Channel 14 - 32 Words Internal FIFO / 2D addressing Disable

Channel 13 - 32 Words Internal FIFO / 2D addressing Disable

Configuration

Reset Configuration

Features

HPDMA1 features

Features A35 ROM A35S (TF-A BL2) A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch... HPDMA1 ch...

System Core

A35 ROM A35S (TF-A BL2) A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

CORTEX\_M33 DCACHE DDR\_CTRL\_... GIC GPIO HPDMA1 HPDMA2 HPDMA3 ICACHE IPCC1 IWDG1 IWDG2 IWDG3 IWDG4 LPDMA1 NVIC\_NS RCC SYS\_NS SYS\_S WWDG1 WWDG2

All channels of HPDMA123: disabled, Assigned to Linux

# 1.2 CubeMx project configuration : modules

## System Core modules : IPCC1 : enabled

Pinout & Configuration

Clock Configuration

RIF

Project

Software Packs

Pinout

IPCC1 Mode and Configuration

Mode

Boot time:

Runtime contexts:

A35 ROM

A35S (TF-A BL2)

A35S (OP-TEE)

A35NS (U-Boot)

A35NS (Linux)

M33S (TF-M)

M33NS (Cube)

Activated

Configuration

Reset Configuration

Parameter Settings

Features

GIC Settings

NVIC Settings

IPCC1 features

Features	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
CPU1 channel 1							
CPU1 channel 2							
CPU1 channel 3							
CPU1 channel 4							
CPU1 channel 5							
CPU1 channel 6							
CPU1 channel 7							
CPU1 channel 8							
CPU1 channel 9							
CPU1 channel 10							
CPU1 channel 11							
CPU1 channel 12							
CPU1 channel 13							
CPU1 channel 14							
CPU1 channel 15							
CPU1 channel 16							
CPU2 channel 1							
CPU2 channel 2							
CPU2 channel 3							

System Core

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
CORTEX_M33							
DCACHE							
DDR_CTRL_...							
GIC							
GPIO							
HPDMA1							
HPDMA2							
HPDMA3							
ICACHE							
IPCC1							
IWDG1							
IWDG2							
IWDG3							
IWDG4							
LPDMA1							
NVIC_NS							
RCC							
SYS_NS							
SYS_S							
WWDG1							
WWDG2							

Analog

Timers

CPU1 ch1-12:  
for linux  
CPU1 ch13-16:  
for optee  
CPU2 ch1-16:  
for linux

# 1.2 CubeMx project configuration : modules

## System Core modules : WatchDog

Pinout & Configuration

Clock Configuration

RIF

P

Software Packs

Pinout

Search

Categories A->Z

System Core

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
✓ CORTEX_M33			✓	✓	✓		
DCACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ DDR_CTRL_...		✓	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GIC			✓	✓	✓		
GPIO			✓	✓	✓		
HPDMA1			✓	✓	✓	✓	✓
HPDMA2			✓	✓	✓	✓	✓
HPDMA3			✓	✓	✓	✓	✓
ICACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ IPCC1			✓		✓		✓
✓ IWDG1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
IWDG2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
IWDG3						<input type="checkbox"/>	<input type="checkbox"/>
IWDG4						<input type="checkbox"/>	<input type="checkbox"/>
LDMA1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IWDG1 Mode and Configuration

Mode

Boot time:

Runtime contexts:

A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☒ Activated

CubeMx v6.13 limitation  
This presentation example will enable IWDG1 in optee device tree

Configuration

Reset Configuration

IWDG1 activated for TF-A and OPTEE, IWDG2/3/4 not activated  
This presentation example will enable arm\_wdt for U-Boot and Linux in device tree.

# 1.2 CubeMx project configuration : modules

## System Core modules : RCC : External clock source : board specific

Pinout & Configuration | Clock Configuration | RIF | F

Software Packs | Pinout

RCC Mode and Configuration

Mode

Boot time: A35 ROM A35S (TF-A BL2) A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

Runtime contexts:

High Speed Clock (HSE) Crystal/Ceramic Resonator

Low Speed Clock (LSE) Crystal/Ceramic Resonator

Master Clock Output 1

Master Clock Output 2

Audio Clock Input (I2S\_CKIN)

Configuration

Reset Configuration

Features GIC Settings NVIC Settings GPIO Settings

Parameter Settings User Constants

RCC features

Features (RCC Resource ID)	A35 R...	A35S (TF-A_BI	A35S (OP-TEE	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
CK_KER_ETHSWREF (60)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CK_MCO1 (61)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CK_MCO2 (62)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CK_CPU1_EXT2F (63)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CK_SYS_PLL1_66_78 (64)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FCALC (65)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSRST (66)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BOOT_STDB (67)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RDCR (68)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSClk (69)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HSE is a must

LSE is recommended for OpenSTLinux v6.0 (if no LES, see section 5)

FCALC should be activated for OPTEE, for "st-image-weston" image

# 1.2 CubeMx project configuration : modules

System Core modules : GIC / SYS\_NS / SYS\_S / ... : as default for bring-up

Software Packs

Pinout

Search

Categories A->Z

System Core

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
✓ CORTEX_M33			✓	✓	✓		
DCACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ DDR_CTRL_...		✓	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GIC			✓	✓	✓		
GPIO							
HPDMA1			✓	✓	✓	✓	✓
HPDMA2			✓	✓	✓	✓	✓
HPDMA3			✓	✓	✓	✓	✓
ICACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ IPCC1			✓		✓		✓
✓ IWDG1	✓	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
IWDG2	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
IWDG3						<input type="checkbox"/>	<input type="checkbox"/>
IWDG4						<input type="checkbox"/>	<input type="checkbox"/>
LPDMA1	✓	✓	✓	✓	✓	✓	✓
NVIC_NS							✓
✓ RCC	✓	✓	✓	✓	✓	✓	✓
✓ SYS_NS							✓
✓ SYS_S						✓	
WWDG1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WWDG2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

SYS\_NS Mode and Configuration

Mode

Boot time: A35 ROM

Runtime contexts: A35S (TF-A BL2) A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

Timebase Source SysTick

Configuration

Warning: This peripheral has no parameters to be configured.

# 1.2 CubeMx project configuration : modules

## Analog modules : Activate only DTS

Home > STM32MP257FAlx > ev1-yao.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | RIF | Project

Software Packs | Pinout

Categories: A->Z

System Core >

Analog

	A35 R...	A35S (TF-A BL)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
ADC1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADC2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADC3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ DTS		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VREFBUF		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Timers >

Connectivity >

Multimedia >

DTS Mode and Configuration

Mode

Boot time: A35 ROM

Runtime contexts:

A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

✓ Activated

To assign it to U-Boot, need to firstly assign to Linux  
Same for other modules

Configuration

Reset Configuration

Parameter Settings | GIC Settings

Interrupt Table	Supported	Triggered On
Temperature sensor global interrupt	<input checked="" type="checkbox"/>	High level

DTS (Digital Temperature Sensors) is used by «st-image-weston» image for CPU temperature monitoring and CPU dynamic frequency management



# 1.2 CubeMx project configuration : modules

## Timers modules : RTC

The screenshot displays the STM32CubeMX configuration tool. The 'Pinout & Configuration' tab is active, showing a list of modules on the left and the 'RTC Mode and Configuration' panel on the right.

**RTC Mode and Configuration**

**Mode**

Boot time: A35 ROM, A35S (TF-A BL2), **A35S (OP-TEE)**, A35NS (U-Boot), A35NS (Linux), M33S (TF-M), M33NS (Cube)

Runtime contexts: ☒ A35S (OP-TEE), ☒ A35NS (U-Boot), ☒ A35NS (Linux), ☒ M33NS (Cube)

☒ Activate Clock Source  
☐ Activate Calendar  
Alarm A: Disable  
Alarm B: Disable  
☐ Timestamp  
WakeUp: Disable  
Calibration: Disable  
☐ Reference clock detection

**Configuration**

Reset Configuration

Parameter Settings | GIC Settings | **Features**

**RTC features**

Features	A35 ROM	A35S (TF-A BL2)	<b>A35S (OP-TEE)</b>	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
Alarm A					<input checked="" type="checkbox"/>		
Alarm B					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
WakeUp timer					<input checked="" type="checkbox"/>		
Timestamp					<input checked="" type="checkbox"/>		
Calibration		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Initialization		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

Clock source should be activated, for OpenSTLinux OPTEE

Features assignement for OpenSTLinux st-image-weston image

# 1.2 CubeMx project configuration : modules

## Timers modules : STGEN : activated as default

The screenshot displays the STM32CubeMX software interface, specifically the 'Pinout & Configuration' tab. The 'Timers' module is selected, and the 'STGEN' (Secure TrustZone Global Entry Node) is highlighted as activated. The configuration is shown for the A35S (OP-TEE) runtime context.

**Timers Configuration Table:**

	A35 R...	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
LPTIM1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ RTC			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
✓ STGEN	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
TAMP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
TIM1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**STGEN Mode and Configuration:**

Mode: A35S (OP-TEE) is selected.

Boot time: A35 ROM ☒ A35S (TF-A BL2) ☐ A35S (OP-TEE) ☐ A35NS (U-Boot) ☐ A35NS (Linux) ☐ M33S (TF-M) ☐ M33NS (Cube) ☐

Runtime contexts: A35S (OP-TEE) is selected.

☒ Activated

**Configuration:**

Warning: This peripheral has no parameters to be configured.

# 1.2 CubeMx project configuration : modules

Timers modules : Tamper : only allocate resource to OPTEE/TF-M

Pinout & Configuration | Clock Configuration | RIF | Project M

Software Packs | Pinout

Categories | A->Z

Analog >

Timers >

	A35 R...	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
LPTIM1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LPTIM5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ RTC			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
✓ STGEN	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
TAMP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
TIM1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIM10		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TAMP Mode and Configuration

Mode

Boot time: A35 ROM ☒ A35S (TF-A BL2) ☒ A35S (OP-TEE) ☒ A35NS (U-Boot) ☐ A35NS (Linux) ☐ M33S (TF-M) ☒ M33NS (Cube) ☐

Runtime contexts: A35S (OP-TEE) ☒ A35NS (U-Boot) ☐ A35NS (Linux) ☐ M33S (TF-M) ☒ M33NS (Cube) ☐

Tamper 1 Disable  
Tamper 2 Disable  
Tamper 3 Disable  
Tamper 4 Disable  
Tamper 5 Disable  
Tamper 6 Disable  
Tamper 7 Disable  
Tamper 8 Disable

Configuration

TAMP features

Features	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
Resource 0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resource 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resource 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

# 1.2 CubeMx project configuration : modules

## Connectivity modules : I2C for PMIC : board specific

Pinout & Configuration

Clock Configuration

RIF

Project

Software Packs

Pinout

Search

Categories A->Z

Connectivity

	A35 R...	A35S (TF-A BL)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
ETH1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ETH2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FDCAN1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FDCAN2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FDCAN3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FMC							
I2C1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2C2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2C3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2C4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2C5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2C6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> I2C7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2C8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I3C1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I2C7 Mode and Configuration

Mode

Boot time:

A35 ROM

A35S (TF-A BL2) ☒

A35S (OP-TEE) ☒

A35NS (U-Boot) ☐

A35NS (Linux) ☐

M33S (TF-M) ☐

M33NS (Cube) ☐

Runtime contexts:

I2C I2C

Configuration

Reset Configuration

Parameter Settings

GIC Settings

GPIO Settings

Search Signals

Search (Ctrl+F)

☐ Show only Modified Pins

Pin N...	Signal on Pin	Pin Context...	GPIO...	GPIO...	Maxi...	Retime	Invert	Doub...	Delay...	Dela...	Inver...	Use...	Mo...
PD14	I2C7_SDA	A35S,A35S	Altern...	No p...	Low	n/a	n/a	n/a	n/a	n/a	n/a	<input checked="" type="checkbox"/>	
PD15	I2C7_SCL	A35S,A35S	Altern...	No p...	Low	n/a	n/a	n/a	n/a	n/a	n/a	<input checked="" type="checkbox"/>	

Only for TF-A and OPTEE

To assign it to TF-A and OPTEE, need to firstly assign to OPTEE and then to TF-A. Same for other modules

# 1.2 CubeMx project configuration : modules

## Connectivity modules: Boot Device : board specific

Pinout & Configuration

Clock Configuration

RIF

Project Manager

Software Packs

Pinout

SDMMC2 Mode and Configuration

Mode

Boot time: Runtime contexts:

A35 ROM A35S (TF-A BL2) A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

Mode MMC 8 bits Wide bus

Configuration

Reset Configuration


Parameter Settings GIC Settings GPIO Settings

Search Signals

Search (Ctrl+F)

Show only Modified Pins

Pi...	Signal	Pin C...	GPIO ...	GPIO ...	Maxi...	Retime	Invert ...	Doubl...	Delay...	Delay...	Invert ...	User ...	Modifie
PE6	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE7	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE8	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE9	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE10	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE11	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE12	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE13	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE14	SDM...	A35S...	Altern...	No pu...	Very ...	n/a	n/a	n/a	n/a	n/a	n/a		✓
PE15	SDM...	A35S...	Altern...	No pu...	Medium	n/a	n/a	n/a	n/a	n/a	n/a		✓

  
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# 1.2 CubeMx project configuration : modules

## Connectivity modules : UART for debug console : board specific

The screenshot displays the STM32CubeMX configuration interface. On the left, the 'Pinout & Configuration' tab is active, showing a list of modules. The 'USART2' module is selected and highlighted in blue. On the right, the 'USART2 Mode and Configuration' settings are shown. The 'Runtime contexts' section is highlighted with a red box, and the 'A35S (OP-TEE)' context is currently disabled. A red arrow points from a text box on the right to this context, indicating a limitation where it must be added manually in the device-tree.

Module	Pinout	Configuration	Mode	Hardware Flow Control (RS232)	Hardware Flow Control (RS485)
SPI7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SPI8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UCPD1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USART1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ USART2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
USART3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USART6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ USB3DR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
USB_HS		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

USART2 Mode and Configuration

Mode

Boot time: A35 ROM A35S (TF-A BL2) **A35S (OP-TEE)** A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

Runtime contexts:

Mode Asynchronous

Hardware Flow Control (RS232) Disable

☐ Hardware Flow Control (RS485)

Configuration

Reset Configuration

Parameter Settings GIC Settings DMA Settings GPIO Settings

Search Signals

Search (Ctrl+F)

☐ Show only Modified Pins

Pin	Signal	Pin C	GPIO	GPIO	Maxi	Retime	Invert	Doubl	Delay	Delay	Invert	User	Modifie
PA4	USA...	A35S...	Altern...	No pu...	Low	n/a	n/a	n/a	n/a	n/a	n/a		<input checked="" type="checkbox"/>
PA8	USA...	A35S...	Altern...	Pull-up	n/a	n/a	n/a	n/a	n/a	n/a	n/a		<input checked="" type="checkbox"/>

CubeMx limitation  
To be added manually in device-tree

# 1.2 CubeMx project configuration : modules

## Connectivity modules: USB3DR for programming

Pinout & Configuration

Clock Configuration

RIF

Project M

Software Packs

Pinout

USB3DR Mode and Configuration

Mode

Boot time: Runtime contexts:

A35 ROM A35S (TF-A BL2) A35S (OP-TEE) A35NS (U-Boot) A35NS (Linux) M33S (TF-M) M33NS (Cube)

USB2 only Device mode

USB2 and USB3 Disable

OVRCUR

VBUSEN

Configuration

Reset Configuration

Parameter Settings

GPIO Settings

Search Signals

Search (Ctrl+F)

Show only Modified Pins

Pin Name	Signal	Pin C	GPIO	GPIO	Maxi	Retime	Invert	Doub	Dela	Del	Inver	U	M
USB3DR_DM	USB3...	A35N...	Analo...	No pu...	n/a	n/a	n/a	n/a	n/a	n/a	n/a		✓
USB3DR_DP	USB3...	A35N...	Analo...	No pu...	n/a	n/a	n/a	n/a	n/a	n/a	n/a		✓
USB3DR_TXRTUNE	USB3...	A35N...	Analo...	No pu...	n/a	n/a	n/a	n/a	n/a	n/a	n/a		✓

Multimedia

Security

Computing

Middleware and Software Packs

Categories A->Z

SPI7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SPI8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UART9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UCPD1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USART1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ USART2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USART3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USART6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ USB3DR	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
USBH_HS		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# 1.2 CubeMx project configuration : modules

## Multimedia modules : as default

Pinout & Configuration

Clock Configuration

RIF

Project Ma

Software Packs

Pinout

Search

Categories A->Z

Multimedia

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
CSI		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DCMI		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DCMIIPP		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DSIHOST				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
GPU		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I2S1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2S2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I2S3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LTDC			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
LVDS		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PSSI		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAI1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAI2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAI3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAI4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SPDIFRX		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VDEC		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VENC		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DSIHOST Mode and Configuration

Mode

Boot time:

Runtime contexts:

A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

DSIHost Disable

Configuration

DSIHOST features

Features	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
DSI_CMN		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DSI_TRIG		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DSI_RDFIFO		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

  
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24



# 1.2 CubeMx project configuration : modules

## Security modules : must for bring-up

Pinout & Configuration

Clock Configuration

RIF

Software Packs

Pinout

Search

Categories A->Z

Timers

Connectivity

Multimedia

Security

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
✓ BSEC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRYP1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRYP2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ HASH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTFDEC1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTFDEC2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ PKA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ RNG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ SAES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PKA Mode and Configuration

Mode

Boot time:

Runtime contexts:

A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☒ Activated

Configuration

Warning: This peripheral has no parameters to be configured.

**BSEC+HASH+PKA+RNG+SAES for TF-A**  
Do not forget to select 'activated' check box

# 1.2 CubeMx project configuration : modules

Computing / Middleware and Software Packs / Trace-Debug modules : no need for bring-up

Pinout & Configuration

Clock Co

Categories A->Z

Computing

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
ADF1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRC		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MDF1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Middleware and Software Packs

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
FREERTOS							<input type="checkbox"/>
OPENAMP							<input type="checkbox"/>
USBPD		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
X-CUBE-AI							

Trace and Debug

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
DEBUG		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDP		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# 1.2 CubeMx project configuration : modules

## Power and Thermal modules : PWR : allocate features for TF-A and OPTEE

Pinout & Configuration

Clock Configuration

RIF

P

Software PacksPinout

Search

CategoriesA-Z

System Core

Analog

Timers

Connectivity

Multimedia

Security

Computing

Middleware and Software Packs

Trace and Debug

Power and Thermal

Utilities

Other

A35 ROM

A35S (TF-A BL2)

A35S (OP-TEE)

A35NS (U-Boot)

A35NS (Linux)

M33S (TF-M)

M33NS (Cube)

☒

PWR

☒

☒

☒

☒

☒

☒

PWR Mode and Configuration

Mode

Boot time:Runtime contexts:

A35 ROM

A35S (TF-A BL2)

A35S (OP-TEE)

A35NS (U-Boot)

A35NS (Linux)

M33S (TF-M)

M33NS (Cube)

☒

Wake-Up 1

☐

Wake-Up 2

☐

Wake-Up 3

☐

Wake-Up 4

☐

Wake-Up 5

☐

Wake-Up 6

Power Voltage Detector InDisable

Configuration

Reset Configuration

Parameter Settings

Features

GIC Settings

GPIO Settings

PWR features

Features	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
Voltage mo...		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RAM and I...		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CPU1 pow...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CPU2 pow...		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CPU3 pow...		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VDD eMMC		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VDD SD		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wake up 1			<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wake up 2			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wake up 3			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wake up 4			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Assign features to TF-A and OPTEE

«Wake-Up 1» used by PMIC in OPTEE

# 1.2 CubeMx project configuration : modules

## Utilities and Other modules : no need for bring-up

Pinout & Configuration

Clock Co

Search

Categories A->Z

- Analog
- Timers
- Connectivity
- Multimedia
- Security
- Computing
- Middleware and Software Packs
- Trace and Debug
- Power and Thermal
- Utilities
- Other

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
RESMGR_UT...							<input type="checkbox"/>

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
BOOT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ETHSW							
SERC		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# 1.2 CubeMx project configuration : modules

## System Core modules : GPIO : check configuration

The screenshot shows the STM32CubeMX Pinout & Configuration window. The left pane displays the System Core modules table, and the right pane shows the GPIO Mode and Configuration for PA4 and PA8.

**System Core Modules Table:**

	A35 ROM	A35S (TF-A BL2)	A35S (OP-TEE)	A35NS (U-Boot)	A35NS (Linux)	M33S (TF-M)	M33NS (Cube)
✓ CORTEX_M33			✓	✓	✓		
DCACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ DDR_CTRL_...		✓	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GIC			✓	✓	✓		
GPIO							
HPDMA1			✓	✓	✓	✓	✓
HPDMA2			✓	✓	✓	✓	✓
HPDMA3			✓	✓	✓	✓	✓
ICACHE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
✓ IPCC1			✓		✓		✓
✓ IWDG1	✓	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
IWDG2	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
IWDG3						<input type="checkbox"/>	<input type="checkbox"/>
IWDG4						<input type="checkbox"/>	<input type="checkbox"/>
LPDMA1	✓	✓	✓	✓	✓	✓	✓
NVIC_NS							✓
✓ RCC	✓	✓	✓	✓	✓	✓	✓
✓ SYS_NS							✓
✓ SYS_S						✓	
WWDG1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WWDG2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**GPIO Mode and Configuration:**

Group By Peripherals:

Search Signals:  ☐ Show only Modified Pins

Pin...	Signal on Pin	Pin Context ...	GPIO mode	GPIO Pull...	Max...	Reti...	In...	...	...	...
PA4	USART2_TX	A35S,A35N...	Alternate Function Push Pull	No pull-up...	Low	n/a	n/a	n/a	...	✓
PA8	USART2_RX	A35S,A35N...	Alternate function Push Pull	Pull-up	n/a	n/a	n/a	n/a	...	✓

**PA8 Configuration:**

Pin Context Assignment: A35S,A35NS,A35NS

GPIO Pull-up/Pull-down: Pull-up

GPIO mode: Alternate function Push Pull

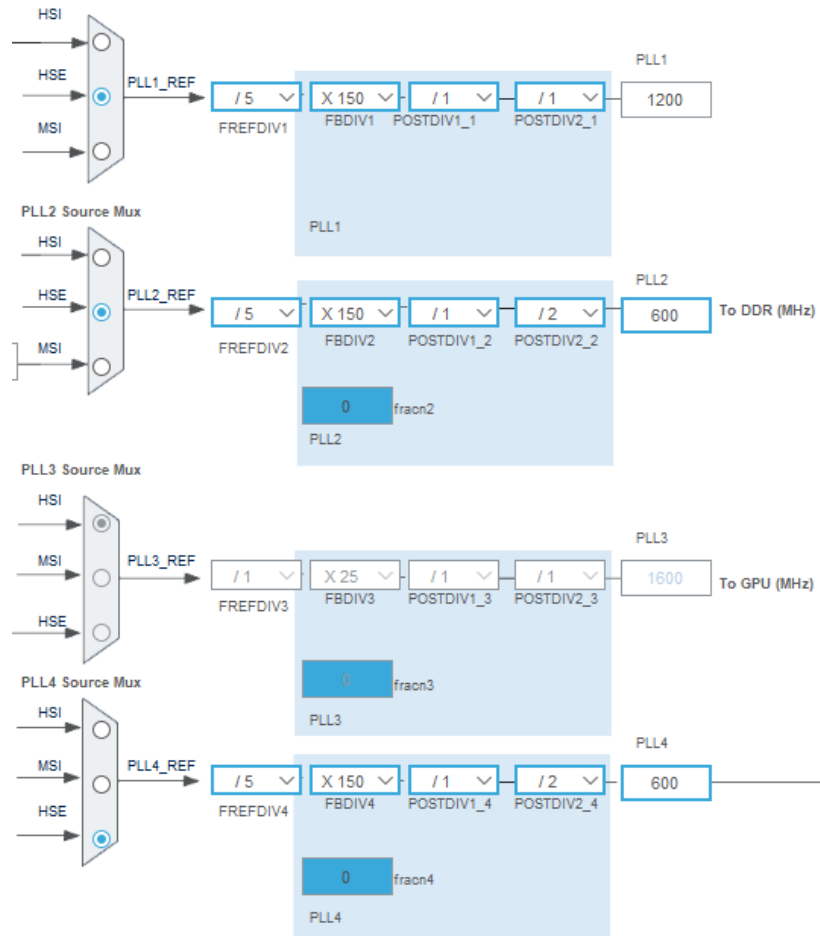
User Label:

U-Boot console (USART2) RX pull-up is recommended, if not external pull-up, to avoid faulty 0x00 input

Make sure GPIO mode and pull-up/pull-down are good to make the board working

# 1.3 CubeMx project configuration: Clocks

## PLLs



PLL1 is reserved for A35 subsystem  
1200MHz is for all STM32MP25x

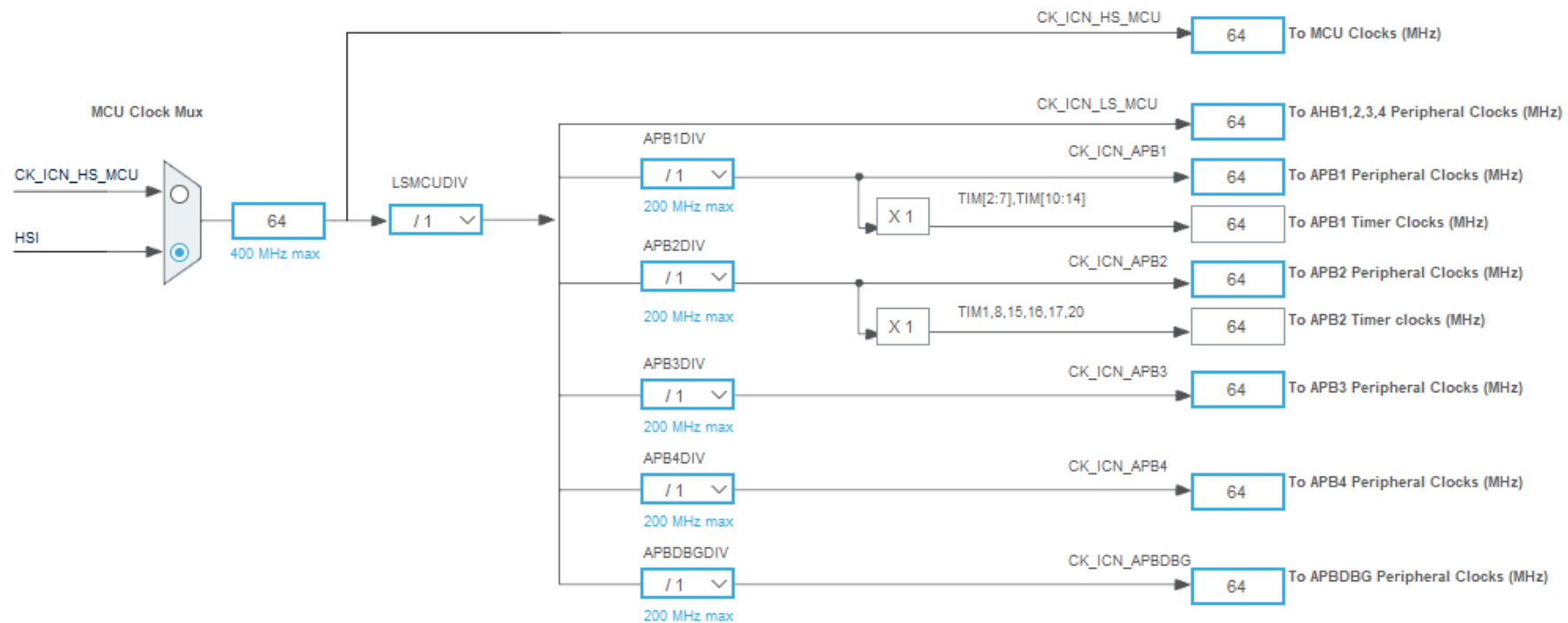
PLL2 is reserved for DDR subsystem  
600MHz here means 1200MHz for memclk

PLL3 is reserved for GPU-NPU subsystem

PLL4/5/6/7/8 are for FlexClkGen, selected firstly by a FlexClkGen channel, then their setting can be modified

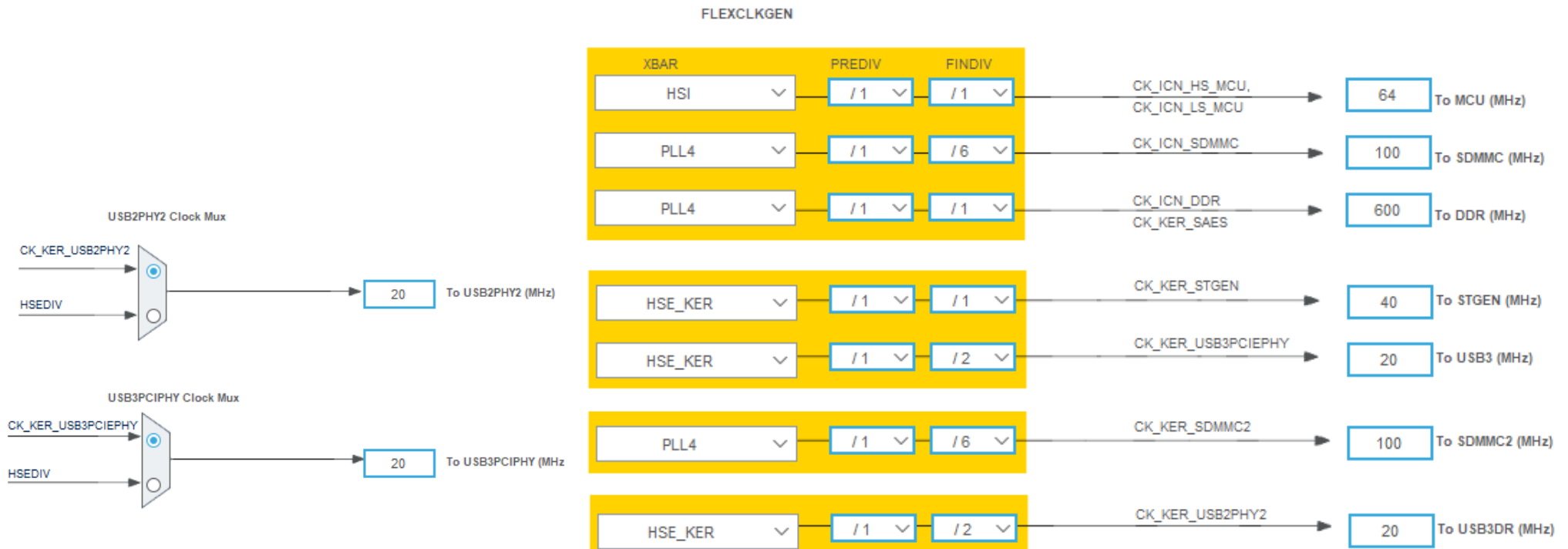
# 1.3 CubeMx project configuration: Clocks

## MCU (M33) Subsystem: as default for bring-up



# 1.3 CubeMx project configuration: Clocks

## FlexClkGen



Use PLL4 to provide good clock rate to SDMMC and DDR interconnect

Use HSE\_KER to provide good clock rate to STGEN, ComboPHY, USB3DR, USB2PHY2

Others as default



## 1.3 CubeMx project configuration: RIF

## RIMU: Master Ports on BUS: CID (Caller ID) number

Pinout & Configuration

Clock Configuration

RIF

Project Manager

Global lock : OFF

RIF Configuration

Peripherals (RISUP)

Domains (RIMU)

External memories (RISAF)

Internal memories (RISAB)

RIMU IP	RIMU ID	CID SELECTION	MASTER CID	SECURE	PRIVILEGE
DCMIIP	10	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
ETH1	6	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
ETH2	7	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
ETR	0	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>
GPU	9	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
LTDC_L1L2	11	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>
LTDC_L3	12	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>
LTDC_ROT	13	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>
PCIE	8	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
SDMMC1	1	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
SDMMC2	2	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>
SDMMC3	3	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
USB3DR	4	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>
USBH	5	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
VDEC	14	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>
VENC	15	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>

For those RIMU IP's master ports on bus:

- its CID number can be selected, otherwise

- it inherit the CID which access to its slave port on bus. except LTDC

Hardware

Cortex-A75

Cortex-A75

For those RIMU IP's master ports on bus:

- its CID number can be selected, otherwise
- it inherit the CID which access to its slave port on bus, except LTDC

## HPDMA, LPDMA master ports on bus:

- it inherit the CID who access to its slave port on bus

## Hardcoded CIDs:

## Cortext A35 : CID1

## Cortex M33 : CID2

## Cortex M0+ : CID3

# 1.3 CubeMx project configuration: RIF

## Reserved memory: RISAF

Pinout & Configuration

Clock Configuration

RIF

Project Manager

Tools

RISAF Configuration

Peripherals (RISUP)

Domains (RIMU)

External memories (RISAF)

RISAF1 (BkPSRAM)

RISAF2 (OCTOSPI1&2)

RISAF4 (DDR)

RISAF5 (PCIE)

RISAF region ID	Region name	Start address	Region size	Secure	Encrypt	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
						R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	bl31_lowpower	0x42000000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	tfm-tls	0x42001000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RISAF1 (BkPSRAM)

RISAF2 (OCTOSPI1&2)

RISAF4 (DDR)

RISAF5 (PCIE)

RISAF region ID	Region name	Start address	Region size	Secure	Encrypt	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
						R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	TFM-code	0x80000000	0x100000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	CM33-Cube-fw	0x80100000	0x800000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	TFM-data	0x80900000	0x100000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	CM33-Cube-data	0x80a00000	0x800000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	ipc-shmem	0x81200000	0x100000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	spare1	0x81300000	0xCC0000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	BL31-context	0x81400000	0x400000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	OP-TEE	0x82000000	0x2000000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	linuxkernel1	0x84000000	0x7c000000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	gpu-reserved	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	vdec-reserved	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	venc-reserved	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	LTDC-sec-layer	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	LTDC-sec-rotation	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	linuxkernel2	0x100000000	0x80000000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RISAF1 (BkPSRAM)

RISAF2 (OCTOSPI1&2)

RISAF4 (DDR)

RISAF5 (PCIE)

RISAF region ID	Region name	Start address	Region size	Secure	Encrypt	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
						R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	PCIE-device	0x10000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Memory types

R: Read  
W: Write  
P: Privilege

# 1.3 CubeMx project configuration: RIF

## Reserved memory: RISAF

RIF Configuration

BKPSRAM

Peripherals (RISUP)

DDR

Domains (RIMU)

External memories (RISAF)

PCIE

Pinout & Configuration

Clock Configuration

RIF

Project Manager

Tools

RISAF1 (BKPSRAM)		RISAF2 (OCTOSPI1&2)		RISAF4 (DDR)		RISAF5 (PCIE)																				
RISAF region ID	Region name	Start address	Region size	Secure	Encrypt	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
1	bl31_lowpower	0x42000000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2	TFM-ITS	0x42001000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
1	TFM-code	0x80000000	0x100000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2	CM33-Cube-fw	0x80100000	0x800000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3	TFM-data	0x80900000	0x100000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4	CM33-Cube-data	0x80a00000	0x800000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5	ipc-shmem	0x81200000	0x100000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6	spare1	0x81300000	0xCC0000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7	BL31-context	0x81f00000	0x40000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8	OP-TEE	0x82000000	0x2000000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9	linuxkernel1	0x84000000	0x7c000000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10	gpu-reserved	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11	vdec-reserved	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12	venc-reserved	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
13	LTDC-sec-layer	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
14	LTDC-sec-rotation	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
15	linuxkernel2	0x100000000	0x80000000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
RISAF1 (BKPSRAM)		RISAF2 (OCTOSPI1&2)		RISAF4 (DDR)		RISAF5 (PCIE)																				
RISAF region ID	Region name	Start address	Region size	Secure	Encrypt	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
1	PCIE-device	0x100000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Please do those settings for all boards  
«spare1»: R/W assignment can be adapted for your application  
«BL31-context»: can be also non-privilege

region size of gpu/vdec/venc/ltcdc-sec set to 0 here because not used in this example

Linuxkernel1/2 size should match the on-board DDR size, they are used by u-boot/linux

No region in PCIE space because PCIE module is not enabled



# 1.3 CubeMx project configuration: RIF

## Reserved memory: RISAB

RISAB1 ( SYSRAM1 )

RISAB2 ( SYSRAM2 )

RISAB3 ( SRAM1 )

RISAB4 ( SRAM2 )

RISAB5 ( RETRAM )

RISAB6 ( VDERAM )

ID	Name	Owner	Security	Privilege	Start address	Region size	CID Filtering	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
								R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	tfa_b31	TDCID	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0xa000000	0x20000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

RISAB1 ( SYSRAM1 )

RISAB2 ( SYSRAM2 )

RISAB3 ( SRAM1 )

RISAB4 ( SRAM2 )

RISAB5 ( RETRAM )

RISAB6 ( VDERAM )

ID	Name	Owner	Security	Privilege	Start address	Region size	CID Filtering	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
								R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	hpdma_lli	TDCID	<input type="checkbox"/>	<input type="checkbox"/>	0xa020000	0x20000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

RISAB1 ( SYSRAM1 )

RISAB2 ( SYSRAM2 )

RISAB3 ( SRAM1 )

RISAB4 ( SRAM2 )

RISAB5 ( RETRAM )

RISAB6 ( VDERAM )

ID	Name	Owner	Security	Privilege	Start address	Region size	CID Filtering	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
								R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	bsec_mirror	TDCID	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0xa040000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
2	cm33_sram1	TDCID	<input type="checkbox"/>	<input type="checkbox"/>	0xa041000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

RISAB1 ( SYSRAM1 )

RISAB2 ( SYSRAM2 )

RISAB3 ( SRAM1 )

RISAB4 ( SRAM2 )

RISAB5 ( RETRAM )

RISAB6 ( VDERAM )

ID	Name	Owner	Security	Privilege	Start address	Region size	CID Filtering	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
								R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	cm33_sram2	TDCID	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0xa060000	0x20000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

RISAB1 ( SYSRAM1 )

RISAB2 ( SYSRAM2 )

RISAB3 ( SRAM1 )

RISAB4 ( SRAM2 )

RISAB5 ( RETRAM )

RISAB6 ( VDERAM )

ID	Name	Owner	Security	Privilege	Start address	Region size	CID Filtering	Master CID0			Master CID1			Master CID2			Master CID3			Master CID4			Master CID5			Master CID6		
								R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P	R	W	P
1	cm33_retram	TDCID	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0xa080000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
2	DDR_param	TDCID	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0xa090000	0x1000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

SYSRAM1

SYSRAM2

SRAM1

SRAM2

RETRAM

Please use those setting as here for all board

# 1.3 CubeMx project configuration: RIF

## Reserved memory: not-used areas

Pinout & Configuration		Clock Configuration		RIF												
RIF Configuration	RISAF1 (BKPSRAM)   RISAF2 (OCTOSPI1&2)   RISAF4 (DDR)   RISAF5 (PCIE)															
	Peripherals (RISUP)	RISAF region ID	Region name	Start address	Region size	Secure	Encrypt	Master CID0			Master CID1			Master CID2		
								R	W	P	R	W	P	R	W	P
		1	PCIE-device	0x10000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		2		0x10000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		3		0x10000000	0x0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domains (RIMU)	4		0x10000000	0x10000000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
External memories (RISAF)																
Internal memories (RISAB)																

Name should be removed  
OR  
Size to be set to 0x0

For not-used areas in all RISAFs and RISABs

# 1.3 CubeMx project configuration: RIF

## RIF-Aware Ips: TAMP: TAMP\_BKP\_REG

Pinout & Configuration

RIF Configuration

Peripherals (RISUP)

Domains (RIMU)

External memories (RISAF)

Internal memories (RISAB)

RIF-Aware IPs

EXTI

FMC

GPIO

DMA

HSEM

IPCC

PWR

RCC

RTC

TAMP

Clock Configuration

RIF

Project Manager

Tools

TAMP

TAMP\_BKP\_REG

TAMP BKP_REG Zon...	Sub-Zone Na...	Start Address	Sub-Zone Si...	Nb Backup Regist...	CID of Resource 0		CID of Resource 1		CID of Resource 2	
					NS	S	NS	S	NS	S
Zone1 ReadS WriteS	Zone1-RIF1	0x46010100	0x60	24				RW		
	Zone1-RIF2	0x46010160	0x60	24						RW
Zone2 ReadNS WriteS	Zone2-RIF1	0x460101c0	0x60	24			RO	RO	RO	RO
	Zone2-RIF2	0x46010220	0x60	24			RO	RO	RO	RW
Zone3 ReadNS Write...	Zone3-RIF1	0x46010280	0x30	12	RO	RO	RW	RW	RO	RO
	Zone3-RIF0	0x460102b0	0x30	12	RW	RW	RO	RO	RO	RO
	Zone3-RIF2	0x460102e0	0x20	8	RO	RO	RO	RO	RW	RW

Update Sub-Zone Size as here, for OpenSTLinux v6.0 BSPs

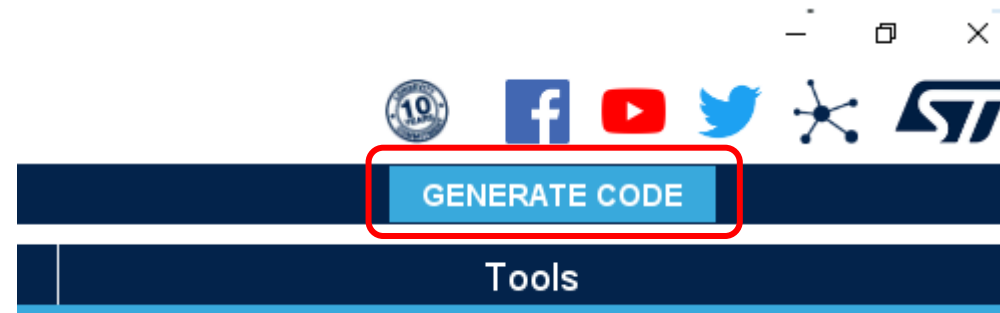
# 1.3 CubeMx project configuration: RIF

Others (RISUP, RIMU, ...) : as default

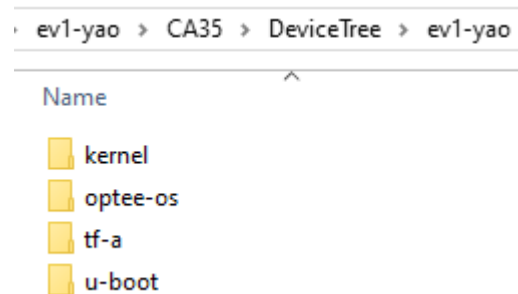
Pinout & Configuration		Clock Configuration		RIF		Project Manager	
RIF Configuration	<div><input checked="" type="checkbox"/> Global lock : OFF</div>						
	⚙ Peripherals	ID	CID	Secure	Privilege	Lock	
	ADC12	58	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	ADC3	59	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	ADF1	55	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	COMBOPHY	67	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	CRC	109	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	CRYP1	96	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	CRYP2	97	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	CSI	86	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Peripherals (RISUP)	DCMI_PSSI	88	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DCMI_PP	87	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DSI_CMN	81	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DSI_RDIFIFO	123	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DSI_TRIG	122	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	DTS	107	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	ETH1	60	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	ETH2	61	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Domains (RIMU)	ETHSW_ACM_CFG	71	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	ETHSW_ACM_MSGBUF	72	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	ETHSW_DEIP	70	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	FDCAN	56	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	GICV2M	112	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	GPU	79	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	HASH	95	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	HDP	57	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
External memories (RISAF)	I2C1	41	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I2C2	42	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I2C3	43	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I2C4	44	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I2C5	45	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I2C6	46	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I2C7	47	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I2C8	48	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Internal memories (RISAB)	I3C1	114	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I3C2	115	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I3C3	116	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	I3C4	117	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	ICACHE_DCACHE	118	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# 1.4 Generate Device Trees

Generate device tree files : device tree files location



## Device tree files location





## 2 User-code section configurations in device trees

## 2.1 User-code section in **tf-a/<part\_number>-<project\_name>-mx-fw-config.dts**

```
/* USER CODE BEGIN root */
dtb-registry {
    soc_fw-config {
        load-address = <0x0 0x81fc0000>;
        max-size = <0x40000>;
    };
    tos_fw {
        load-address = <0x0 0x82000000>;
        max-size = <0x2000000>;
    };
};
/* USER CODE END root */
```

Load-address and max-size must be the same as the reserved sections **bl31-context**

Load-address and max-size must be the same as the reserved section **op-tee**

## 2.1 User-code section in **tf-a/<part\_number>-<project\_name>-mx.dts**

### Debug UART : board specific

```
/* USER CODE BEGIN root */
aliases {
    serial0 = &usart2;
};
chosen {
    stdout-path = "serial0:115200n8";
};
/* USER CODE END root */
```

### VDDIOx HSLV permission, IWDGx freezing

```
/* USER CODE BEGIN root */
shadow-prov {
    compatible = "st,provisioning";
    hconf1_prov {
        // VDDIO2/1 HSLV allowed
        // IWDG4/3/2/1 freeze in Stop/Standby mode
        nvmem-cells = <&hconf1_otp>;
        st,shadow-value = <0x00018DB6>;
    };
};
/* USER CODE END root */
```

### Board ID OTP: board specific

```
/* USER CODE BEGIN bsec */
board_id: board_id@3d8 {
    reg = <0x3d8 0x4>;
};
/* USER CODE END bsec */
```

### DDR supply : board specific

```
/* USER CODE BEGIN ddr */
vdd-supply = <&vdd_ddr>;
vtt-supply = <&vtt_ddr>;
vpp-supply = <&vpp_ddr>;
vref-supply = <&vref_ddr>;
/* USER CODE END ddr */
```

### IWDG1 period

```
/* USER CODE BEGIN iwdg1 */
timeout-sec = <32>;
/* USER CODE END iwdg1 */
```

### Boot Device : board specific

```
/* USER CODE BEGIN sdmmc2 */
non-removable;
no-sd;
no-sdio;
st,neg-edge;
bus-width = <8>;
vmmc-supply = <&vdd_emmc>;
vqmmc-supply = <&vddio2>;
/* USER CODE END sdmmc2 */
```

### VDDIOx supply for UART / I2C / BootDevice : board specific

```
/* USER CODE BEGIN addons */
&pwr {
    vddio: vddio {
        vdd-supply = <&vddio_pmic>;
    };
    vddio2: vddio2 {
        vddio2-supply = <&v1v8>;
    };
};
/* USER CODE END addons */
```

## 2.1 User-code section in **tf-a/<part\_number>-<project\_name>-mx.dts**

```
/* USER CODE BEGIN i2c7 */
clock-frequency = <400000>;
```

```
pmic2: stpmic@33 {
    compatible = "st,stpmic2";
    reg = <0x33>;
    status = "okay";
```

```
regulators {
    compatible = "st,stpmic2-regulators";
```

```
    vddcpu: buck1 {
        regulator-name = "vddcpu";
        regulator-min-microvolt = <800000>;
        regulator-max-microvolt = <910000>;
        regulator-always-on;
```

```
};
```

```
    vddcore: buck2 {
        regulator-name = "vddcore";
        regulator-min-microvolt = <820000>;
        regulator-max-microvolt = <820000>;
        regulator-always-on;
```

```
};
```

```
    vddio_pmic: buck4 {
        regulator-name = "vddio_pmic";
        regulator-min-microvolt = <3300000>;
        regulator-max-microvolt = <3300000>;
```

```
};
```

```
    v1v8: buck5 {
        regulator-name = "v1v8";
        regulator-min-microvolt = <1800000>;
        regulator-max-microvolt = <1800000>;
```

```
};
```

```
    vdd_dds: buck6 {
        regulator-name = "vdd_dds";
        regulator-min-microvolt = <1200000>;
        regulator-max-microvolt = <1200000>;
```

```
};
```

### Power supplies : board specific

```
vref_dds: refdds {
    regulator-name = "vref_dds";
```

```
};
```

```
vdda1v8_aon: ldo1 {
    regulator-name = "vdda1v8_aon";
    regulator-min-microvolt = <1800000>;
    regulator-max-microvolt = <1800000>;
    regulator-always-on;
```

```
};
```

```
vdd_emmc: ldo2 {
    regulator-name = "vdd_emmc";
    regulator-min-microvolt = <3300000>;
    regulator-max-microvolt = <3300000>;
    regulator-always-on;
```

```
};
```

```
vtt_dds: ldo3 {
    regulator-name = "vtt_dds";
    st,regulator-sink-source;
```

```
};
```

```
vdd3v3_usb: ldo4 {
    regulator-name = "vdd3v3_usb";
    regulator-min-microvolt = <3300000>;
    regulator-max-microvolt = <3300000>;
    regulator-always-on;
```

```
};
```

```
vpp_dds: ldo5 {
    regulator-name = "vpp_dds";
    regulator-min-microvolt = <2500000>;
    regulator-max-microvolt = <2500000>;
```

```
};
```

```
};
```

```
/* USER CODE END i2c7 */
```

Make sure :  
DDR chip,  
BootDevice ,  
MP2 (VDDCPU,  
VDDDDR,  
VDDCORE,  
VDDIOx,  
VDDA18PLLx,  
VDDA18DDR,  
VDDA18AON,  
VDD33USB)  
are powered

## 2.2 User-code section in **optee-os/**<part\_number>-<project\_name>-mx.dts

### Including

```
/* USER CODE BEGIN includes */
// for STPMIC2
#include <dt-bindings/mfd/st,stmic2.h>
// UART console pins, wakeup_pins
#include "stm32mp25-pinctrl.dtsi"
/* USER CODE END includes */
```

### VDDIOx HSLV permission, IWDGx freezing

```
/* USER CODE BEGIN root */
shadow-prov {
    compatible = "st,provisioning";
    hconf1_prov {
        // VDDIO2/1 HSLV allowed
        // IWDG4/3/2/1 freeze in Stop/Standby mode
        nvmem-cells = <&hconf1_otp>;
        st,shadow-value = <0x00018DB6>;
    };
};
/* USER CODE END root */
```

### Debug UART : board specific

```
/* USER CODE BEGIN root */
aliases {
    serial0 = &usart2;
};
chosen {
    stdout-path = "serial0:115200n8";
};
/* USER CODE END root */

/* USER CODE BEGIN addons */
&usart2 {
    pinctrl-names = "default";
    pinctrl-0 = <&usart2_pins_a>;
    status = "okay";
};
/* USER CODE END addons */
```

### SCMI regulators: board specific

```
/* USER CODE BEGIN addons */
// provided to u-boot/linux via scmi server-client
&scmi_regu {
    scmi_vdd_emmc: voldt-vdd-emmc {
        reg = <VOLTD_SCMI_STPMIC2_LDO2>;
        voldt-supply = <&vdd_emmc>;
    };
    scmi_vdd3v3_usb: voldt-vdd3v3-usb {
        reg = <VOLTD_SCMI_STPMIC2_LDO4>;
        voldt-supply = <&vdd3v3_usb>;
    };
};
/* USER CODE END addons */
```

### System configuration

```
/* USER CODE BEGIN iwdg1 */
timeout-sec = <32>;
status = "okay";
/* USER CODE BEGIN iwdg1 */

/* USER CODE BEGIN addons */
&cpu0 {
    cpu-supply = <&vddcpu>;
};

// RIF config
&risaf1 {
    status = "okay";
};
&risaf4 {
    status = "okay";
};
&risaf5 {
    status = "okay";
};
/* USER CODE END addons */
```

## 2.2 User-code section in **optee-os/**<part\_number>-<project\_name>-mx.dts

### 1.5GHz for stm32mp25xF

```
/* USER CODE BEGIN addons */
// 1500MHz is only for STM32MP25xF
&pll1 {
    pll1_cfg_1500Mhz: pll1-cfg-1500Mhz {
        cfg = <375 5 1 2>;
        src = <MUX_CFG(MUX_MUXSEL5, MUXSEL_HSE)>;
    };
};
&rcc {
    st,clk_opp {
        st,ck_cpu1 {
            cfg_1 {
                hz = <1500000000>;
                st,clksrc = <0>;
                st,pll = <&pll1_cfg_1500Mhz>;
            };
            cfg_2 {
                hz = <1200000000>;
                st,clksrc = <0>;
                st,pll = <&pll1_cfg_1200Mhz>;
            };
        };
    };
};
/* USER CODE END addons */
```

### Internal regulators : board specific

```
/* USER CODE BEGIN addons */
&pwr {
    status = "okay";
    wakeup-gpios = <&gpioa 0
GPIO_ACTIVE_LOW>, <0>, <0>, <0>, <0>, <0>;

    vddio1: vddio1 {
        status = "okay";
        regulator-min-microvolt = <1800000>;
        regulator-max-microvolt = <3300000>;
        vddio1-supply = <&vddio_sdcard>;
    };
    vddio2: vddio2 {
        status = "okay";
        vddio2-supply = <&v1v8>;
        regulator-always-on;
    };
    vddio3: vddio3 {
        status = "okay";
        vddio3-supply = <&vddio_pmic>;
    };

    vddio4: vddio4 {
        status = "okay";
        vddio4-supply = <&vddio_pmic>;
    };
    vddio: vddio {
        status = "okay";
        vdd-supply = <&vddio_pmic>;
    };
    vdd33ucpd: vdd33ucpd {
        status = "okay";
        vdd33ucpd-supply = <&vdd3v3_usb>;
    };
    vdda18adc: vdda18adc {
        status = "okay";
        vdda18adc-supply = <&v1v8>;
    };
    vddgpu: vddgpu {
        status = "okay";
        vddgpu-supply = <&vddgpu_pmic>;
    };
};
/* USER CODE END addons */
```

## 2.2 User-code section in **optee-os/**<part\_number>-<project\_name>-mx.dts

### Power supplies : board specific

```
/* USER CODE BEGIN i2c7 */
clock-frequency = <400000>;

pmic2: stpmic2@33 {
    compatible = "st,stpmic2";
    reg = <0x33>;
    st,pmic-it-id = <IT_PKEY_FA IT_PKEY_RI>;
    st,notif-it-id = <0 1>;
    st,wakeup-pin-number = <1>;
    wakeup-parent = <&pwr>;
    status = "okay";

    regulators {
        compatible = "st,stpmic2-regulators";
        ldo1-supply = <&vddio_pmic>;

        vddcpu: buck1 {
            regulator-name = "vddcpu";
            regulator-min-microvolt = <800000>;
            regulator-max-microvolt = <910000>;
            regulator-always-on;
        };
        vddcore: buck2 {
            regulator-name = "vddcore";
            regulator-min-microvolt = <820000>;
            regulator-max-microvolt = <820000>;
            regulator-always-on;
        };
        vddgpu_pmic: buck3 {
            regulator-name = "vddgpu_pmic";
            regulator-min-microvolt = <800000>;
            regulator-max-microvolt = <900000>;
            regulator-over-current-protection;
        };

        vddio_pmic: buck4 {
            regulator-name = "vddio_pmic";
            regulator-min-microvolt = <3300000>;
            regulator-max-microvolt = <3300000>;
            regulator-always-on;
        };
        v1v8: buck5 {
            regulator-name = "v1v8";
            regulator-min-microvolt = <1800000>;
            regulator-max-microvolt = <1800000>;
            regulator-always-on;
        };
        vdd_ddr: buck6 {
            regulator-name = "vdd_ddr";
            regulator-min-microvolt = <1200000>;
            regulator-max-microvolt = <1200000>;
            regulator-always-on;
            regulator-pull-down;
        };
        v3v3: buck7 {
            regulator-name = "v3v3";
            regulator-min-microvolt = <3300000>;
            regulator-max-microvolt = <3300000>;
            regulator-always-on;
            regulator-over-current-protection;
        };
        vdda1v8_aon: ldo1 {
            regulator-name = "vdda1v8_aon";
            regulator-min-microvolt = <1800000>;
            regulator-max-microvolt = <1800000>;
            regulator-always-on;
        };

        vdd_emmc: ldo2 {
            regulator-name = "vdd_emmc";
            regulator-min-microvolt = <3300000>;
            regulator-max-microvolt = <3300000>;
            regulator-over-current-protection;
        };
        vtt_ddr: ldo3 {
            regulator-name = "vtt_ddr";
            regulator-always-on;
        };
        vdd3v3_usb: ldo4 {
            regulator-name = "vdd3v3_usb";
            regulator-min-microvolt = <3300000>;
            regulator-max-microvolt = <3300000>;
            regulator-always-on;
            regulator-over-current-protection;
        };
        vpp_ddr: ldo5 {
            regulator-name = "vpp_ddr";
            regulator-min-microvolt = <2500000>;
            regulator-max-microvolt = <2500000>;
            regulator-always-on;
        };
        vddio_sdcard: ldo8 {
            regulator-name = "vddio_sdcard";
            regulator-min-microvolt = <1800000>;
            regulator-max-microvolt = <3300000>;
        };
        vref_ddr: refddr {
            regulator-name = "vref_ddr";
            regulator-always-on;
        };
    };
};
/* USER CODE END i2c7 */
```

## 2.3 User-code section in **u-boot**/**<part\_number>**-**<project\_name>**-mx.dts

### Reserved memory : board specific

```
/* USER CODE BEGIN includes */
// reuse generated reserved memory regions
#include "../optee/stm32mp257f-ev1-v6.0-mx-resmem.dtsi"
/* USER CODE END includes */

/* USER CODE BEGIN addons */
/{
    reserved-memory{
        // removed because they are region used by u-boot / linux
        /delete-node/ linuxkernel1@84000000 ;
        /delete-node/ linuxkernel2@100000000 ;
    };
};
/* USER CODE END addons */
```

### UART console : board specific

```
/* USER CODE BEGIN root */
aliases {
    serial0 = &usart2;
};
chosen {
    stdout-path = "serial0:115200n8";
};
/* USER CODE END root */
```

### Boot device : board specific

```
/* USER CODE BEGIN sdmmc2 */
non-removable;
no-sd;
no-sdio;
st,neg-edge;
bus-width = <8>;
vmmc-supply = <&scmi_vdd_emmc>;
vqmmc-supply = <&scmi_vddio2>;
/* USER CODE END sdmmc2 */
```

### USB connection

```
/* USER CODE BEGIN usb2_phy2 */
vdd33-supply = <&scmi_vdd3v3_usb>;
/* USER CODE END usb2_phy2 */

/* USER CODE BEGIN addons */
&dwc3 {
    maximum-speed = "high-speed";
    usb-role-switch;
};
/* USER CODE END addons */
```

### System configuration

```
/* USER CODE BEGIN addons */
&a35ss_syscfg {
    status = "okay";
};

// watch dog
&arm_wdt {
    timeout-sec = <32>;
    status = "okay";
};

/* USER CODE END addons */
```

### Power supplies : board specific

```
/* USER CODE BEGIN addons */
// declare used regulators, from optee scmi server
&scmi_regu {
    scmi_vdd_emmc: regulator@18 {
        reg = <VOLTD_SCMIC2_STPMIC2_LDO2>;
        regulator-name = "vdd_emmc";
    };
    scmi_vdd3v3_usb: regulator@20 {
        reg = <VOLTD_SCMIC2_STPMIC2_LDO4>;
        regulator-name = "vdd3v3_usb";
    };
};
/* USER CODE END addons */
```



## 2.3 User-code section in **u-boot/<part\_number>-<project\_name>-mx-u-boot.dtsi**

Only included to build  
u-boot device tree

```
/* USER CODE BEGIN root */
aliases {
    // mmc0/1 used in flash layout file
    // matching to bootfs/mmc?_extlinux/
    mmc0 = &sdmmc1; // µSD card
    mmc1 = &sdmmc2; // eMMC
};
config {
    u-boot,mmc-env-partition = "u-boot-env";
};
fwu-mdata {
    compatible = "u-boot,fwu-mdata-gpt";
    fwu-mdata-store = <&sdmmc2>;
};
/* USER CODE END root */
```

```
/* USER CODE BEGIN addons */
&dwc3 {
    dr_mode = "peripheral"; // force it to device mode
};

&usart2 {
    bootph-all; // pre-relocation: used for message before relocation
};

&usart2_pins_mx {
    bootph-all;
};
/* USER CODE END addons */
```

## 2.3 User-code section in **kernel/<part\_number>-<project\_name>-mx.dts**

The parts same as  
that for u-boot

### UART console : board specific

```
/* USER CODE BEGIN root */
aliases {
    serial0 = &usart2;
};
chosen {
    stdout-path = "serial0:115200n8";
};
/* USER CODE END root */
```

### Boot device : board specific

```
/* USER CODE BEGIN sdmmc2 */
non-removable;
no-sd;
no-sdio;
st,neg-edge;
bus-width = <8>;
vmmc-supply = <&scmi_vdd_emmc>;
vqmmc-supply = <&scmi_vddio2>;
/* USER CODE END sdmmc2 */
```

### USB connection

```
/* USER CODE BEGIN usb2_phy2 */
vdd33-supply = <&scmi_vdd3v3_usb>;
/* USER CODE END usb2_phy2 */

/* USER CODE BEGIN addons */
&dwc3 {
    maximum-speed = "high-speed";
    usb-role-switch;
};
/* USER CODE END addons */
```

### Power supplies : board specific

```
/* USER CODE BEGIN addons */
// declare used regulators, from optee scmi server
&scmi_regu {
    scmi_vdd_emmc: regulator@18 {
        reg = <VOLTD_SCMI_STPMIC2_LDO2>;
        regulator-name = "vdd_emmc";
    };
    scmi_vdd3v3_usb: regulator@20 {
        reg = <VOLTD_SCMI_STPMIC2_LDO4>;
        regulator-name = "vdd3v3_usb";
    };
};
/* USER CODE END addons */
```

### System configuration

```
/* USER CODE BEGIN addons */
&a35ss_syscfg {
    status = "okay";
};

// watch dog
&arm_wdt {
    timeout-sec = <32>;
    status = "okay";
};

/* USER CODE END addons */
```

## 2.3 User-code section in **kernel/<part\_number>-<project\_name>-mx.dts**

These parts are different from u-boot devicetree

### Reserved memory : board specific

```
/* USER CODE BEGIN includes */
// reuse generated reserved memory regions
#include "../optee/stm32mp257f-ev1-v6.0-mx-resmem.dtsi"
/* USER CODE END includes */
```

```
/* USER CODE BEGIN addons */
/{
  reserved-memory{
    // Add vdev0xxx for m33_rproc
    /delete-node/ ipc-shmem-1 @81200000 ;

    ipc_shmem_1: ipc-shmem-1 @81200000 {
      compatible = "shared-dma-pool";
      reg = <0x0 0x81200000 0x0 0xf8000>;
      no-map;
    };

    vdev0vring0: vdev0vring0@812f8000 {
      compatible = "shared-dma-pool";
      reg = <0x0 0x812f8000 0x0 0x1000>;
```

```
      no-map;
    };
    vdev0vring1: vdev0vring1 @812f9000 {
      compatible = "shared-dma-pool";
      reg = <0x0 0x812f9000 0x0 0x1000>;
      no-map;
    };
    vdev0buffer: vdev0buffer@812fa000 {
      compatible = "shared-dma-pool";
      reg = <0x0 0x812fa000 0x0 0x6000>;
      no-map;
    };

    // removed because they are region used by u-boot / linux
    /delete-node/ linuxkernel1 @84000000 ;
    /delete-node/ linuxkernel2 @100000000 ;
  };
};
/* USER CODE END addons */
```

### m33\_rproc

```
/* USER CODE BEGIN m33_rproc */
mboxes = <&ipcc1 0x100>, <&ipcc1 0x101>, <&ipcc1 2>;
mbox-names = "vq0", "vq1", "shutdown";
memory-region = <&cm33_cube_fw>, <&cm33_cube_data>,
               <&ipc_shmem_1>, <&vdev0vring0>,
               <&vdev0vring1>, <&vdev0buffer>,
               <&cm33_sram2>;
st,syscfg-nsvtor = <&a35ss_syscfg 0xa8 0xffffffff80>;
/* USER CODE END m33_rproc */
```

## 2.4 User-code sections : Methods in this example

- `tf-a/<part_number>-<project_name>-mx-fw-config.dts` :
  - Inside the file because only one modified section
- `tf-a/<part_number>-<project_name>-mx.dts` :
  - all in one file : `<part_number>-<project_name>-mx-usercodes.dts`
    - To be simple
  - included at the end of `<part_number>-<project_name>-mx.dts`
    - So those setting are not over-written by others
- `optee-os/<part_number>-<project_name>-mx.dts`
  - Same method as above
- `u-boot/<part_number>-<project_name>-mx.dts`
  - Same method as above
- `u-boot/<part_number>-<project_name>-mx-u-boot.dtsi`
  - Same method as above
- `kernel/<part_number>-<project_name>-mx.dts`
  - Same method as above

# 3 Build with Developer Package and Test

# 3a. OpenSTLinux Developer Package - **DOWNLOAD**

Refer to:

<https://www.st.com/en/embedded-software/stm32mp2dev.html>

## Get Software

Part Number	Download	All versions
+ MP2-DEV-Arm	Get latest	Select version ▼
+ MP2-DEV-SRC	Get latest	Select version ▼
+ MP2-DEV-x86	Get latest	Select version ▼
+ MP2-DEV-x86-RUST	Get latest	Select version ▼

# 3a. OpenSTLinux Developer Package - **SETUP**

## 1. Unpack tar.gz archives

```
$ cd ~/OSTL_v6.0/DEVELOPER_PKG/Downloads/  
$ tar xzf en.SDK-x86_64-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz &  
$ tar xzf en.SOURCES-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz -C ../ &
```

## 2. Install cross compiler toolchain

```
$ cd stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk/  
$ sudo ./st-image-weston-openstlinux-weston-stm32mp2.rootfs-x86_64-toolchain-5.0.3-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.sh
```

## 3. Extract and patch firmware components (\*)

```
$ cd ../stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/  
$ git clone https://github.com/stm32-hotspot/STM32MPU-OSTL-DEV-helper.git  
$ ./STM32MPU-OSTL-DEV-helper/unpack.sh
```

(\*) Using the STM32MPU DEV helpers: <https://github.com/stm32-hotspot/STM32MPU-OSTL-DEV-helper>

# 3a. OpenSTLinux Developer Package - **BUILD**

## 1. Configure helper scripts:

- Edit the following scripts according with your configuration:
  - STM32MPU-OSTL-DEV-helper/make\_mp25x\_FIP.sh
  - STM32MPU-OSTL-DEV-helper/make\_mp25x\_KERNEL.sh

## 2. Build TF-A and FIP (\*):

```
$ ./STM32MPU-OSTL-DEV-helper/make_mp25x_FIP.sh
```

## 3. Build kernel (\*):

```
$ ./STM32MPU-OSTL-DEV-helper/make_mp25x_KERNEL.sh
```

## 4. Flash the board:

- Flash the board using the binary files collected in the **BUILD\_OUTPUT/** folder

(\*) Using the STM32MPU DEV helpers: <https://github.com/stm32-hotspot/STM32MPU-OSTL-DEV-helper>  
A minimal device tree is already available in the folder: **DEVICETREE/STM32MP25x\_CubeMX/**



# 3a. OpenSTLinux Developer Package - BUILD OUTPUT

- BUILD\_OUTPUT/tfa/tfa\_usb.stm32
- BUILD\_OUTPUT/tfa/tfa\_emmc.stm32
- BUILD\_OUTPUT/fip/fip.bin
- BUILD\_OUTPUT/fip/fip-ddr.bin
- BUILD\_OUTPUT/fip/fip\_usb.bin
- BUILD\_OUTPUT/kernel/Image.gz
- BUILD\_OUTPUT/kernel/stm32mp257f-dk.dtb
- BUILD\_OUTPUT/kernel/lib/modules/

```
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthga]$ ls -lh BUILD_OUTPUT/fip/* BUILD_OUTPUT/tfa/* BUILD_OUTPUT/kernel/*
-rw-r--r-- 1 gpaga gpaga 2.6M Dec  1 00:20 BUILD_OUTPUT/fip/fip.bin
-rw-r--r-- 1 gpaga gpaga 34K Dec  1 00:20 BUILD_OUTPUT/fip/fip-ddr.bin
-rw-r--r-- 1 gpaga gpaga 2.6M Dec  1 00:20 BUILD_OUTPUT/fip/fip_usb.bin
-rw-r--r-- 1 gpaga gpaga 5.8M Dec  1 00:00 BUILD_OUTPUT/kernel/Image.gz
-rw-r--r-- 1 gpaga gpaga 113K Dec  1 00:00 BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb
-rw-r--r-- 1 gpaga gpaga 120 Dec  1 00:20 BUILD_OUTPUT/tfa/metadata.bin
-rw-r--r-- 1 gpaga gpaga 195K Dec  1 00:20 BUILD_OUTPUT/tfa/tfa_emmc.stm32
-rw-r--r-- 1 gpaga gpaga 191K Dec  1 00:20 BUILD_OUTPUT/tfa/tfa_usb.stm32

BUILD_OUTPUT/kernel/lib:
total 4.0K
drwxr-xr-x 3 gpaga gpaga 4.0K Nov 30 22:51 modules
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthga]
```

## FLASH HELPERS

Opt	Part	Name	Type	Device	Offset	Binary
-	0x01	fsbl-boot	Binary	none	0x0	tf-a-usb.stm32
-	0x02	fip-ddr	FIP	none	0x0	fip-ddr.bin
-	0x03	fip-boot	FIP	none	0x0	fip.bin
P	0x04	fsbla1	Binary	mmc1	boot1	tf-a-emmc.stm32
P	0x05	fsbla2	Binary	mmc1	boot2	tf-a-emmc.stm32
P	0x06	metadata1	FWU_MDATA	mmc1	0x00080000	metadata.bin
P	0x07	metadata2	FWU_MDATA	mmc1	0x00100000	metadata.bin
P	0x08	<b>fip-a</b>	FIP	mmc1	0x00180000	fip.bin

# 3a. OpenSTLinux Developer Package – FLUSH OPTION1

```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux
gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]
cp -rvL BUILD_OUTPUT /mnt/c/Users/.../BUILD_OUTPUT/flash.bat'
BUILD_OUTPUT/flash.bat' -> '/mnt/c/Users/.../BUILD_OUTPUT/flash.bat'
BUILD_OUTPUT/flash.sh' -> '/mnt/c/Users/.../BUILD_OUTPUT/flash.sh'
BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_emmc.tsv' -> '/mnt/c/Users/.../BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_emmc.tsv'
BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_sdcard.tsv' -> '/mnt/c/Users/.../BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_sdcard.tsv'
BUILD_OUTPUT/FLASH_LAYOUT/metadata.bin' -> '/mnt/c/Users/.../BUILD_OUTPUT/FLASH_LAYOUT/metadata.bin'
BUILD_OUTPUT/kernel/Image.gz' -> '/mnt/c/Users/.../BUILD_OUTPUT/kernel/Image.gz'
BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb' -> '/mnt/c/Users/.../BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb'
BUILD_OUTPUT/fip/fip-ddr.bin' -> '/mnt/c/Users/.../BUILD_OUTPUT/fip/fip-ddr.bin'
BUILD_OUTPUT/fip/fip.bin' -> '/mnt/c/Users/.../BUILD_OUTPUT/fip/fip.bin'
BUILD_OUTPUT/tfa/metadata.bin' -> '/mnt/c/Users/.../BUILD_OUTPUT/tfa/metadata.bin'
BUILD_OUTPUT/tfa/tfa_emmc.stm32' -> '/mnt/c/Users/.../BUILD_OUTPUT/tfa/tfa_emmc.stm32'
BUILD_OUTPUT/tfa/tfa_sdcard.stm32' -> '/mnt/c/Users/.../BUILD_OUTPUT/tfa/tfa_sdcard.stm32'
BUILD_OUTPUT/tfa/tfa_usb.stm32' -> '/mnt/c/Users/.../BUILD_OUTPUT/tfa/tfa_usb.stm32'
gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]
```

Rif. [https://wiki.st.com/stm32mpu/wiki/STM32CubeProgrammer\\_flashlayout](https://wiki.st.com/stm32mpu/wiki/STM32CubeProgrammer_flashlayout)

- : no action

P : update = program the partition or the flash device

PE : do not update (also EP) = allow the GPT

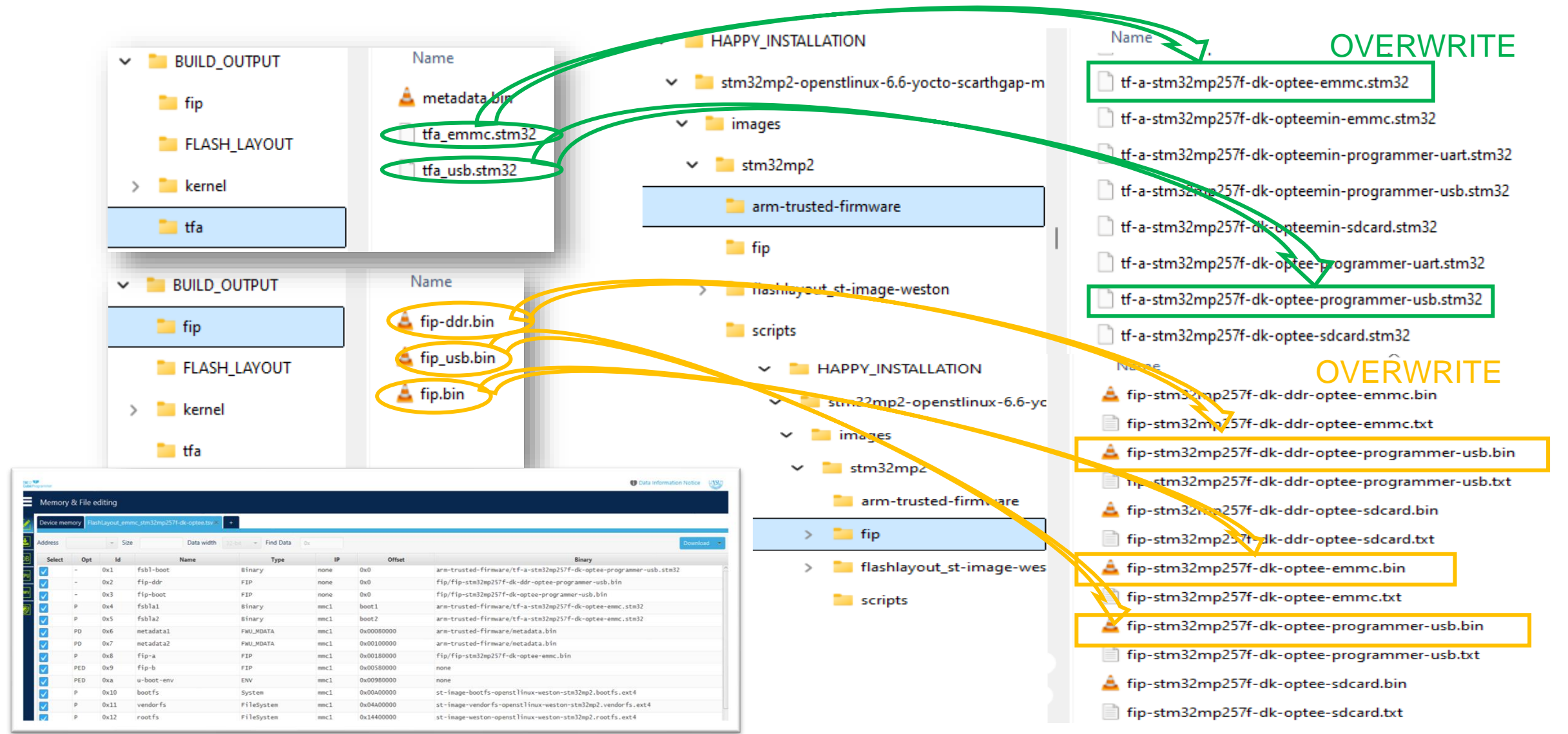
PD : delete and update (also DP)

PDE : delete and keep empty (also PED / DPE / DEP / EPD / EDP)

```
Command Prompt
C:\Users\... \BUILD_OUTPUT>flash.bat
C:\Users\... \BUILD_OUTPUT>"C:\Program Files\STMicroelectronics\STM32CubeProgrammer\bin\STM32CubeProgrammer_CLI.exe" -c port=USB1 -w FLASH_LAYOUT\flash.tsv
-----
STM32CubeProgrammer v2.17.0
-----
USB speed : High Speed (480MBit/s)
Manuf. ID : STM32CubeProgrammer
Product ID : DPU in HS Mode @Device ID /0x505, @Revision ID /0x2000
SN : 002F002C4136500800373653
DFU protocol: 1.1
Download in Progress:
File download complete
Time elapsed during download operation: 00:00:00.900
RUNNING Program ...
PartID: :0x08
Start operation done successfully at partition 0x08
Flashing service completed successfully
C:\Users\... \BUILD_OUTPUT>rem "C:\Program Files\STMicroelectronics\STM32CubeProgrammer\bin\STM32CubeProgrammer_CLI.exe" -c port=USB1 -w FLASH_LAYOUT\flash.tsv
```

flash_layout_emmc.tsv (~/BUILD_OUTPUT/FLASH_LAYOUT) - GVIM							
#Opt	Id	Name	Type	IP	Offset	Binary	
-	0x01	fsbl-boot	Binary		none	0x0	tfa/tfa_usb.stm32
-	0x02	fip-ddr	FIP		none	0x0	fip/fip-ddr.bin
-	0x03	fip-boot	FIP		none	0x0	fip/fip.bin
P	0x04	fsbla1	Binary		mmc1	boot1	tfa/tfa_emmc.stm32
P	0x05	fsbla2	Binary		mmc1	boot2	tfa/tfa_emmc.stm32
PE	0x06	metadata1	FWU_METADATA		mmc1	0x00080000	tfa/metadata.bin
PE	0x07	metadata2	FWU_METADATA		mmc1	0x00100000	tfa/metadata.bin
P	0x08	fip-a	FIP		mmc1	0x00180000	fip/fip.bin
PED	0x09	fip-b	FIP		mmc1	0x00580000	fip/fip.bin
PED	0x0A	u-boot-env	ENV		mmc1	0x00980000	none
PE	0x10	bootfs	System		mmc1	0x00A00000	none
PE	0x11	vendorfs	FileSystem		mmc1	0x04A00000	none
PE	0x12	rootfs	FileSystem		mmc1	0x14400000	none
PE	0x13	userfs	FileSystem		mmc1	0xD4400000	none

# 3a. OpenSTLinux Developer Package - FLUSH OPTION2



## 3b. Alternative method: Build with Developer Package

- 1) Assume the build environment with Developer Package is already prepared
- 2) Copy device tree files to external device tree folder  
And update external device tree folder u-boot/Makefile and linux/Makefile, To include <part\_number>-<project\_name>-mx.dtb
- 3) Linux/<part\_number>-<project\_name>-mx.dtb  
Generated by building of « dtbs » target
- 4) U-Boot
  - cd <U-boot source path>
  - make -f \$PWD/../Makefile.sdk DEPLOYDIR=\$FIP\_DEPLOYDIR\_ROOT/u-boot all  
UBOOT\_DEFCONFIG=stm32mp25\_defconfig DEVICE\_TREE=stm32mp257f-ev1-v6.0-mx  
FIP\_CONFIG="optee-emmc"
- 5) OPTEE
  - cd <OPTEE source path>
  - make -f \$PWD/../Makefile.sdk DEPLOYDIR=\$FIP\_DEPLOYDIR\_ROOT/optee all  
CFG\_EMBED\_DTB\_SOURCE\_FILE=stm32mp257f-ev1-v6.0-mx CFG\_WITH\_TUI=n  
CFG\_DRAM\_SIZE=0x100000000 FIP\_DEVICETREE=stm32mp257f-ev1-v6.0-mx FIP\_CONFIG="optee-emmc"
- 6) TF-A
  - cd <TF-A source path>
  - make -f \$PWD/../Makefile.sdk DEPLOYDIR=\$FIP\_DEPLOYDIR\_ROOT/arm-trusted-firmware all  
TF\_A\_DEVICETREE=stm32mp257f-ev1-v6.0-mx TF\_A\_CONFIG="optee-emmc optee-programmer-usb"  
FIP\_CONFIG="optee-emmc" STM32MP\_DDR4\_TYPE=1

## 3b. Test

- 1) Assume the on-board eMMC is programmed with Starter Package FlashLayout\_emmc\_stm32mp257f-ev1-optee.tsv
- 2) Boot STM32MP257F-EV1 MP2 from eMMC, stop at U-Boot console
- 3) In u-boot console, run « dfu 0 »  
On PC, use dfu-util to program the following binary files to eMMC tf-a / fip partitions:
  - arm-trusted-firmware/tf-a-stm32mp257f-ev1-v6.0-mx-optee-emmc.stm32
  - fip/fip-stm32mp257f-ev1-v6.0-mx-optee-emmc.binThey are in \$FIP\_DEPLOYDIR\_ROOT
- 4) In u-boot console, run « ums 0 mmc 1 »  
On Ubuntu PC,  
cp <linux\_source\_path>/../build/install\_artifact/boot/stm32mp257f-ev1-v6.0-mx.dtb /media/<user>/bootfs/
- 5) In u-boot console, run «reset» to reset the board  
Check the boot log messages ...

# 4 Messages to be fixed by more configurations

# 4 Messages to be fixed by more configurations

U-Boot:

stm32\_rifsc rifsc@42080000: phy@480c0000 not allowed on bus (-13)

stm32\_rifsc rifsc@42080000: vdec@480d0000 not allowed on bus (-13)

stm32\_rifsc rifsc@42080000: venc@480e0000 not allowed on bus (-13)

⇒ ComboPHY, VDEC, VENC modules to be activated for U-Boot

Net: No ethernet found.

⇒ Ethernet module to be activated for U-Boot

Linux:

stm32-rifsc 42080000.bus: phy@480c0000: Device driver will not be probed

stm32-rifsc 42080000.bus: vdec@480d0000: Device driver will not be probed

stm32-rifsc 42080000.bus: venc@480e0000: Device driver will not be probed

⇒ ComboPHY, VDEC, VENC modules to be activated for Linux

Board is not a valid BOARD (stm32mp257f-dk, stm32mp257f-ev1)

⇒ Only a warning: mismatch between device tree compatible

stm32-rproc 0.m33: pdds sys config not defined

stm32-rproc 0.m33: rsc tbl syscon not supported

stm32-rproc 0.m33: mbox\_request\_channel\_byname() could not locate channel named "detach"

remoteproc remoteproc0: cannot get detach mbox

⇒ As stm32mp257f-ev1.dtb, can be ignored for this moment

# 5 To be completed for your board



# 5 To be completed for your board

## Main steps:

- 1) In CubeMx project, Allocate related module for secure/non-secure domain, and active the module with its configuration.
- 2) Generate device tree by CubeMx, and compare to the wiki page to see what is missing.
- 3) Finally test on the target to confirm the functionalities.

1. **No LSE** : Select «Disable» in RCC->LSE in CubeMx, and then remove lse from optee device tree &rcc «clocks» and «clock-names» lists.
2. **RTC** : [RTC device tree configuration - stm32mpu](#)
3. **Regulators** : [Regulator overview - stm32mpu](#)  
**STPMIC2** : [stm32mp257f-ev1 example](#)
4. **Timer / PWM** : [TIM device tree configuration - stm32mpu](#)
5. **GPIO** : [GPIO device tree configuration - stm32mpu](#)  
**LED / Button** : [stm32mp257f-ev1 example](#)
6. **Serial** : [Serial TTY device tree configuration - stm32mpu](#)
7. **SPI + I2C/I3C** : [SPI device tree configuration - stm32mpu](#)  
[I2C device tree configuration - stm32mpu](#)  
[I3C device tree configuration - stm32mpu](#)

# 5 To be completed for your board

8. **NAND/NOR on OSPI** : [OCTOSPI device tree configuration - stm32mpu](#)  
[OCTOSPIM device tree configuration - stm32mpu](#)
9. **NAND/NOR on FMC** : [FMC device tree configuration - stm32mpu](#)
10. **eMMC/uSD-card** : [SDMMC device tree configuration - stm32mpu](#)
11. **USB : USBH + USB 3.0** : [USB3DR device tree configuration - stm32mpu](#)  
[USBH device tree configuration - stm32mpu](#)  
[COMBOPHY device tree configuration - stm32mpu](#)  
[USB2PHY device tree configuration - stm32mpu](#)
12. **Ethernet** : [Ethernet device tree configuration - stm32mpu](#)  
[Ethernet switch device tree configuration - stm32mpu](#)
13. **Audio** : [I2S device tree configuration - stm32mpu](#)  
[SAI device tree configuration - stm32mpu](#)  
[DFSDM device tree configuration - stm32mpu](#)  
[SPDIFRX device tree configuration - stm32mpu](#)
14. **Camera** : [CSI device tree configuration - stm32mpu](#)  
[DCMI device tree configuration - stm32mpu](#)  
[DCMIPP device tree configuration - stm32mpu](#)

# 5 To be completed for your board

- 17. **Display** : LTDC device tree configuration - stm32mpu  
DSI device tree configuration - stm32mpu  
LVDS device tree configuration - stm32mpu
- 18. **Graphic acceleration** : GPU device tree configuration - stm32mpu  
VDEC device tree configuration - stm32mpu  
VENC device tree configuration - stm32mpu
- 19. **ADC** : ADC device tree configuration - stm32mpu
- 20. **CAN** : FDCAN device tree configuration - stm32mpu
- 21. **WAKEUP pin** : How to configure PWR Wake-up pins - stm32mpu
- 22. **Tamper** : TAMP device tree configuration - stm32mpu
- 23. **Low Power modes** : to be done
- 24. **SRAM usage / DMA / M33\_rproc** : to be done
- 25. **Secure-boot** : to be done

# Thank you!