



RTC internal peripheral



# RTC internal peripheral

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## 1 Article purpose

The purpose of this article is to

- briefly introduce the RTC peripheral and its main features
- indicate the level of security supported by this hardware block
- explain how it can be allocated to the three runtime contexts and linked to the corresponding software components
- explain, when needed, how to configure the RTC peripheral.

## 2 Peripheral overview

The **RTC** peripheral is used to provide the date and clock to the application. It supports programmable alarms and wake up capabilities.

### 2.1 Features

Refer to [STM32MP15 reference manuals](#) for the complete list of features, and to the software components, introduced below, to know which features are really implemented.

### 2.2 Security support

The **RTC** peripheral is a **secure** peripheral.



## 3 Peripheral usage and associated software

### 3.1 Boot time

By default after a backup domain power-on reset (performed at boot time), all RTC registers can be read or written in both secure and non-secure modes.

In OpenSTLinux distribution, the first stage bootloader (FSBL, running in secure mode) keeps this default configuration, leaving full control to Linux® at runtime.

The **RTC** peripheral is able to generate two interrupts:

- A secure interrupt, connected to the Arm® Cortex®-A7 GIC, not used in OpenSTLinux distribution.
- A non-secure interrupt, connected both to Arm® Cortex®-A7 GIC and Cortex-M4 NVIC: this interrupt is used on Linux® and by default in OpenSTLinux distribution.

The **RTC** peripheral is part of the backup domain which reset and clock are controlled via the **RCC** by the first stage bootloader (FSBL, running in secure mode) at boot time.

The RTC reset occurs when the backup domain is reset. To avoid clearing the **TAMP** register contents, this is only done on cold boot, not on wake up.

### 3.2 Runtime

#### 3.2.1 Overview

The **RTC** peripheral can be allocated to the Arm® Cortex®-A7 non-secure core to be used under Linux® with RTC framework.

#### 3.2.2 Software frameworks

Do	Peri	Software frameworks			Comment
mai Cor tex -A7 no sec ure (O P- TE E)	Cor tex -A7 no n- sec ure (Li nux )	Cortex-M4  (STM32Cube)			
Co re	RT C		Linux RTC framework		

### 3.2.3 Peripheral configuration

The configuration is applied by the firmware running in the context to which the peripheral is assigned. The configuration can be done alone via [STM32CubeMX](#) tool for all internal peripherals, and then manually completed (especially for external peripherals) according to the information given in the corresponding software framework article.

For Linux kernel configuration, please refer to [RTC device tree configuration](#).

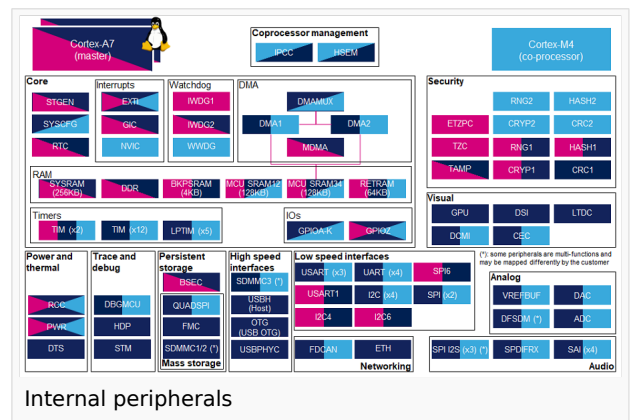
### 3.2.4 Peripheral assignment

**Check boxes** illustrate the possible peripheral allocations supported by [STM32 MPU Embedded Software](#):

- means that the peripheral can be assigned ( ) to the given runtime context.
- is used for system peripherals that cannot be unchecked because they are statically connected in the device.

Refer to [How to assign an internal peripheral to a runtime context](#) for more information on how to assign peripherals manually or via [STM32CubeMX](#).

The present chapter describes STMicroelectronics recommendations or choice of implementation. Additional possibilities might be described in [STM32MP15 reference manuals](#).



Do	Per	Runtime allocation			Comme
ma	in	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)		
ch	era				
te	x-				
A	7				
In	se				
st	cu				
a	re				
nc	(				
e	O				
	P				
	T				
	E				
	E)				
					RTC is mandatory to resyn



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Do	Per	Runtime allocation				Comme
ma in e	iph era c	RTC				nt ch ze ST GEN after exiting low- power mode s.

Real Time Clock

First Stage Boot Loader

Open Portable Trusted Execution Environment