



SPDIFRX internal peripheral



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A quality version of this page, approved on 4 February 2020, was based off this revision.

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1 Article purpose

The purpose of this article is to:

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



2 Peripheral overview

The **SPDIFRX** peripheral, is designed to receive an S/PDIF flow compliant with IEC-60958 and IEC-61937. The SPDIFRX receiver provides two separated paths to retrieve the audio data and the user and channel information.

2.1 Features

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

2.2 Security support

The SPDIFRX is a **non secure** peripheral.



3 Peripheral usage and associated software

3.1 Boot time

The SPDIFRX is not used at boot time.

3.2 Runtime

3.2.1 Overview

The SPDIFRX instance can be allocated to:

- the Arm[®]Cortex[®]-A7 non-secure for use in Linux with ALSA framework
- the Cortex-M4 for use in STM32Cube with STM32Cube SPDIFRX driver

Chapter #Peripheral assignment exposes which instance can be assigned to which context.

3.2.2 Software frameworks

Domain	Peripheral	Software components		Comment
OP-TEE	Linux	STM32Cube		
Audio	SPDIFRX		ALSA framework	STM32Cube SPDIFRX driver

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 the *STM32CubeMX* tool for all internal peripherals, and then manually completed (particularly for external peripherals), according to the information given in the corresponding software framework article.

3.2.3.1 Configuration in Cortex-A7 non-secure software

When the Arm[®]Cortex[®]-A7 core operates in non-secure access mode, the SPDIFRX is controlled by the Linux kernel framework. Refer to the *SPDIFRX Linux driver* to drive the SPDIFRX through Linux kernel ALSA framework. Refer to *Soundcard configuration* and *SPDIFRX device tree configuration* to configure the SPDIFRX through Linux kernel device tree^[1].

3.2.3.2 Arm[®]Cortex[®]-M4 software configuration

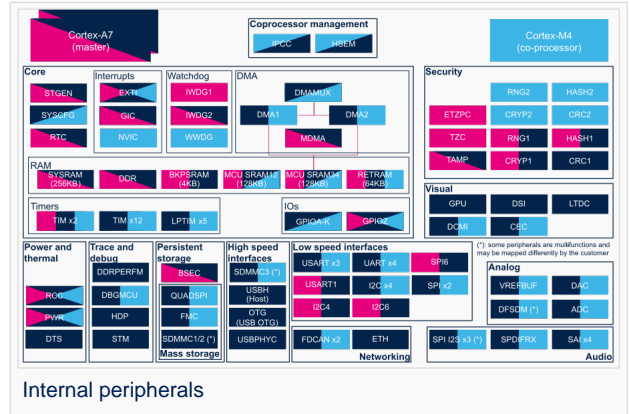
3.2.4 Peripheral assignment

Check boxes illustrate the possible peripheral allocations supported by STM32 MPU Embedded Software:

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Domain	Peripheral	Runtime allocation		Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)	
Audio	SPDIFRX	SPDIFRX		Assignment (single choice)



4 How to go further

The STM32H7 SPDIFRX training ^[2], introduces the STM32 S/PDIF Receiver interface on the STM32H7. This training also applies to the STM32 MPU SPDIFRX internal peripheral.



5 References

- Device tree
- STM32H7 SPDIFRX training

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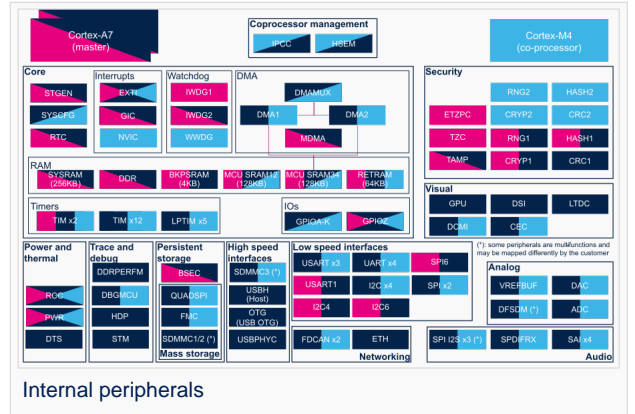
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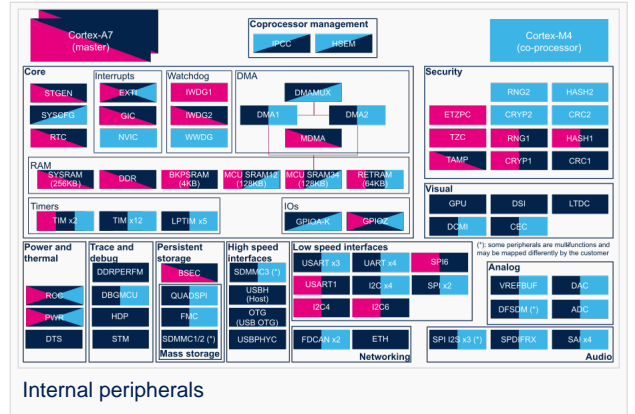
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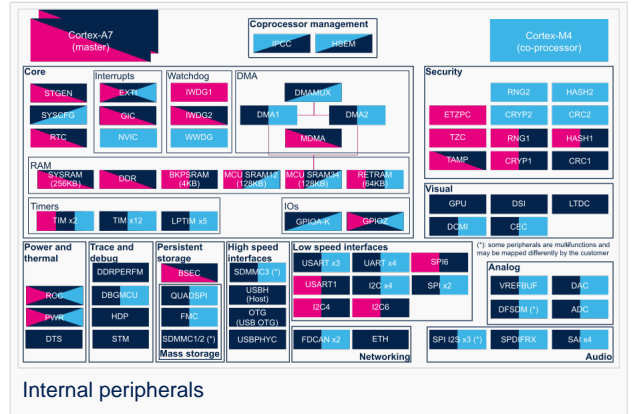
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Domain	Peripheral	Runtime allocation		Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)	
Audio	SPDIFRX	SPDIFRX		Assignment (single choice)



4 How to go further

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- Device tree
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3 Peripheral usage and associated software

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The SPDIFRX instance can be allocated to:

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3.2.2 Software frameworks

Domain	Peripheral	Software components		Comment
OP-TEE	Linux	STM32Cube		
Audio	SPDIFRX		ALSA framework	STM32Cube SPDIFRX driver

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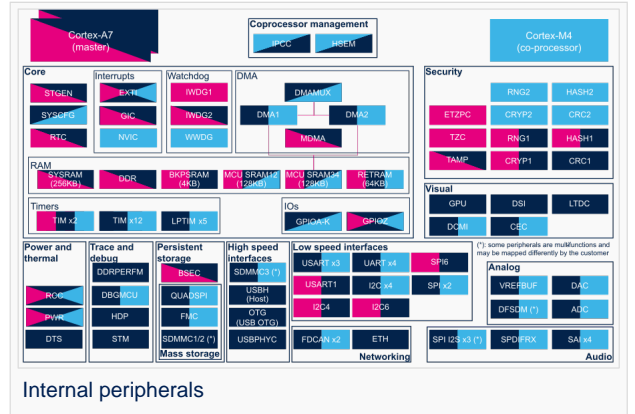
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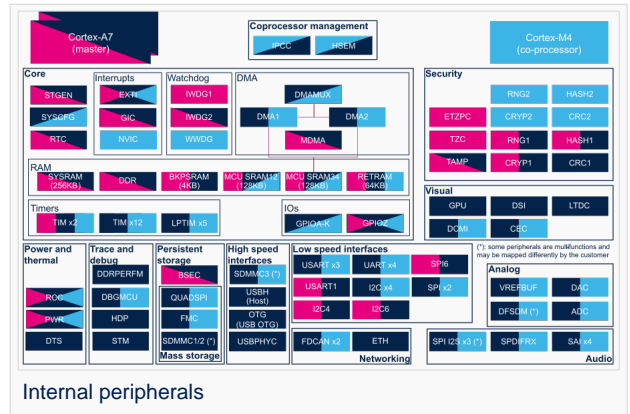
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OP-TEE	Linux	STM32Cube		
Audio	SPDIFRX		ALSA framework	STM32Cube SPDIFRX driver

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 the *STM32CubeMX* tool for all internal peripherals, and then manually completed (particularly for external peripherals), according to the information given in the corresponding software framework article.

3.2.3.1 Configuration in Cortex-A7 non-secure software

When the Arm®Cortex®-A7 core operates in non-secure access mode, the SPDIFRX is controlled by the Linux kernel framework. Refer to the *SPDIFRX Linux driver* to drive the SPDIFRX through Linux kernel ALSA framework. Refer to *Soundcard configuration* and *SPDIFRX device tree configuration* to configure the SPDIFRX through Linux kernel device tree^[1].

3.2.3.2 Arm®Cortex®-M4 software configuration

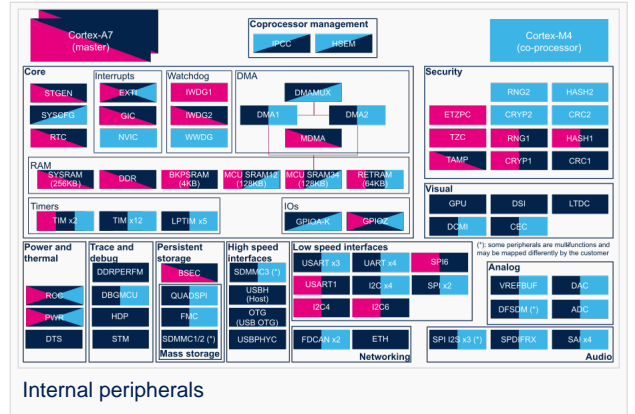
3.2.4 Peripheral assignment

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*.



Domain	Peripheral	Runtime allocation		Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)	
Audio	SPDIFRX	SPDIFRX		Assignment (single choice)



4 How to go further

The STM32H7 SPDIFRX training ^[2], introduces the STM32 S/PDIF Receiver interface on the STM32H7. This training also applies to the STM32 MPU SPDIFRX internal peripheral.



5 References

- Device tree
- STM32H7 SPDIFRX training

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Stable: 23.09.2020 - 13:22 / Revision: 12.06.2020 - 13:25

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1 Article purpose

The purpose of this article is to:

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



2 Peripheral overview

The **SPDIFRX** peripheral, is designed to receive an S/PDIF flow compliant with IEC-60958 and IEC-61937. The SPDIFRX receiver provides two separated paths to retrieve the audio data and the user and channel information.

2.1 Features

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

2.2 Security support

The SPDIFRX is a **non secure** peripheral.



3 Peripheral usage and associated software

3.1 Boot time

The SPDIFRX is not used at boot time.

3.2 Runtime

3.2.1 Overview

The SPDIFRX instance can be allocated to:

- the Arm[®]Cortex[®]-A7 non-secure for use in Linux with ALSA framework
- the Cortex-M4 for use in STM32Cube with STM32Cube SPDIFRX driver

Chapter #Peripheral assignment exposes which instance can be assigned to which context.

3.2.2 Software frameworks

Domain	Peripheral	Software components		Comment
OP-TEE	Linux	STM32Cube		
Audio	SPDIFRX		ALSA framework	STM32Cube SPDIFRX driver

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 the *STM32CubeMX* tool for all internal peripherals, and then manually completed (particularly for external peripherals), according to the information given in the corresponding software framework article.

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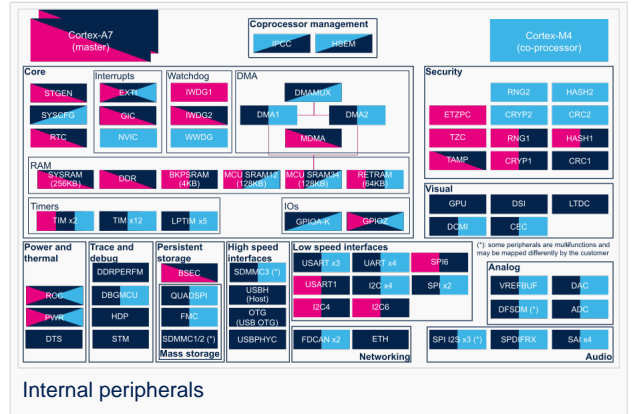
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Internal peripherals

Domain	Peripheral	Runtime allocation		Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)	
Audio	SPDIFRX	SPDIFRX		Assignment (single choice)



4 How to go further

The STM32H7 SPDIFRX training ^[2], introduces the STM32 S/PDIF Receiver interface on the STM32H7. This training also applies to the STM32 MPU SPDIFRX internal peripheral.



5 References

- Device tree
- STM32H7 SPDIFRX training

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- briefly introduce the SPDIFRX peripheral and its main features
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The SPDIFRX instance can be allocated to:

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OP-TEE	Linux	STM32Cube		
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3.2.3.2 Arm[®]Cortex[®]-M4 software configuration

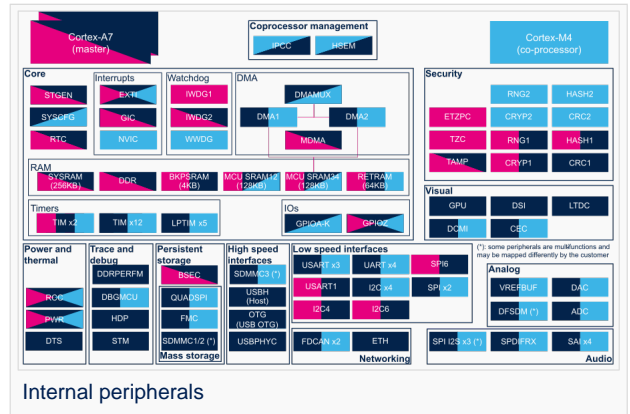
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Internal peripherals

Domain	Peripheral	Runtime allocation		Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)	
Audio	SPDIFRX	SPDIFRX		Assignment (single choice)



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The STM32H7 SPDIFRX training ^[2], introduces the STM32 S/PDIF Receiver interface on the STM32H7. This training also applies to the STM32 MPU SPDIFRX internal peripheral.



5 References

- Device tree
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3.2.2 Software frameworks

Domain	Peripheral	Software components		Comment
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Audio	SPDIFRX		ALSA framework	STM32Cube SPDIFRX driver

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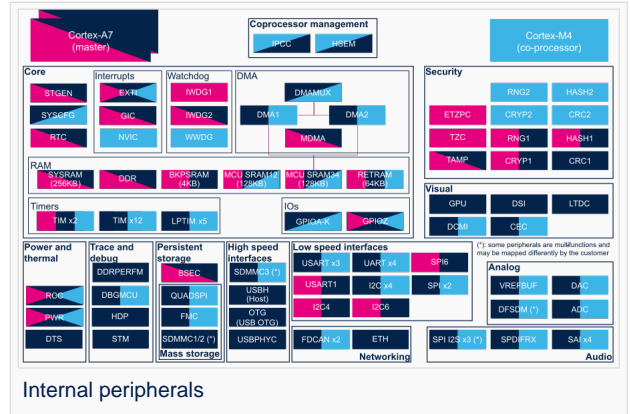
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Internal peripherals

Domain	Peripheral	Runtime allocation		Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)	
Audio	SPDIFRX	SPDIFRX		Assignment (single choice)



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Domain	Peripheral	Software components		Comment
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When the Arm[®]Cortex[®]-A7 core operates in non-secure access mode, the SPDIFRX is controlled by the Linux kernel framework. Refer to the *SPDIFRX Linux driver* to drive the SPDIFRX through Linux kernel ALSA framework. Refer to *Soundcard configuration* and *SPDIFRX device tree configuration* to configure the SPDIFRX through Linux kernel device tree^[1].

3.2.3.2 Arm[®]Cortex[®]-M4 software configuration

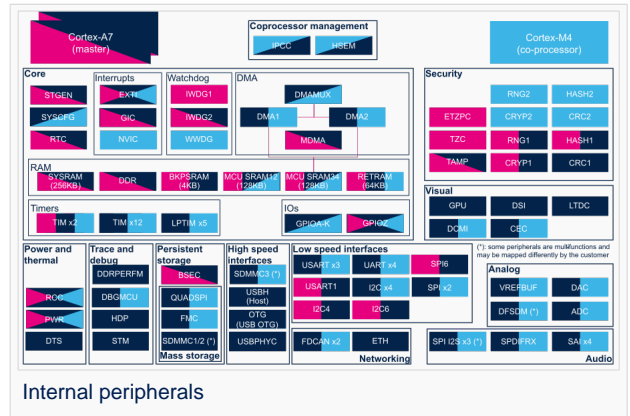
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Domain	Peripheral	Runtime allocation		Comment
Instance	Cortex-A7 secure (OP-TEE)	Cortex-A7 non-secure (Linux)	Cortex-M4 (STM32Cube)	
Audio	SPDIFRX	SPDIFRX		Assignment (single choice)



4 How to go further

The STM32H7 SPDIFRX training ^[2], introduces the STM32 S/PDIF Receiver interface on the STM32H7. This training also applies to the STM32 MPU SPDIFRX internal peripheral.



5 References

- Device tree
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