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## I2S device tree configuration



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## 1 Article purpose

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This article explains how to configure the SPI/I2S internal peripheral when it is assigned to the **Linux® OS**. In that case, it is controlled by the **ALSA** framework.

The configuration is performed using the **device tree** mechanism that provides a hardware description of the I2S peripheral, used by the **I2S linux driver**.

If the peripheral is assigned to another execution context, refer to [How to assign an internal peripheral to a runtime context](#) article for guidelines on peripheral assignment and configuration.



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## 2 DT bindings documentation

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STM32 I2S device tree bindings <sup>[1]</sup> describes all the required and optional configuration properties.



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## 3 DT configuration

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This hardware description is a combination of STM32 microprocessor <sup>[2]</sup> and board device tree files. See the [Device tree](#) for an explanation of the device tree file split.

**STM32CubeMX** can be used to generate the board device tree. Refer to [How to configure the DT using STM32CubeMX](#) for more details.

### 3.1 DT configuration (STM32 level)

The I2S node is declared in `stm32mp151.dtsi`<sup>[2]</sup>. It describes the hardware parameters such as register addresses, interrupt, clock, and DMA. This set of properties may not vary for a given STM32MPU.

#### Warning

This device tree part is related to STM32 microprocessors. It must be kept as is, without being modified by the end-user.

### 3.2 DT configuration (board level)

The I2S is an audio peripheral, which can be used as a component of a soundcard through Linux<sup>®</sup> kernel ALSA framework. This part of the device tree allows the configuration of the I2S to implement a soundcard. Refer to [soundcard configuration](#) for examples of I2S configuration for various boards.



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## 4 How to configure the DT using STM32CubeMX

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The STM32CubeMX tool can be used to configure the STM32MPU device and get the corresponding platform configuration device tree files.

STM32CubeMX may not support all the properties described in the above DT bindings documentation paragraph. If so, the tool inserts **user sections** in the generated device tree. These sections can then be edited to add some properties and are preserved from one generation to another. Refer to the STM32CubeMX user manual for further information.

### Warning

STM32CubeMX does not allow the generation of all the nodes required to configure a soundcard. The soundcard node and the codec nodes have to be filled manually through user sections.



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## 5 References

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- Documentation/devicetree/bindings/sound/st,stm32-i2s.yaml
- 2.02.1 arch/arm/boot/dts/stm32mp151.dtsi

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Operating System

Integrated Interchip Sound

Device Tree

Direct Memory Access