



## Clock device tree configuration



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## 1 Article purpose

This article explains how to configure the **RCC** internal peripheral when it is assigned to the Linux<sup>®</sup>OS. In that case, it is controlled by the **Common Clock** framework.

The configuration is performed using the **device tree** mechanism that provides a hardware description of the RCC peripheral, used by the `clk-stm32mp1` Linux driver and by the **Common Clock** framework.

## 2 DT bindings documentation

The RCC is a multifunction device.

Each function is represented by a separate binding document:

- generic DT bindings<sup>[1]</sup> used by the **Common Clock** framework.
- vendor clock DT bindings<sup>[2]</sup> used by the `clk-stm32mp1` driver: this binding document explains how to write device tree files for clocks.

## 3 DT configuration

### 3.1 DT configuration (STM32 level)

The STM32MP1 Clock node is located in the `stm32mp157c.dtsi`<sup>[3]</sup>. See **Device tree** for more explanations.

### 3.1.1 clocks node

These clocks have a fixed frequency (generally they are oscillators)

```

clocks {
    clk_hse: clk-hse {
        #clock-cells = <0>;
        compatible = "fixed-clock";
        clock-frequency = <24000000>;
    };

    clk_hsi: clk-hsi {
        #clock-cells = <0>;
        compatible = "fixed-clock";
        clock-frequency = <64000000>;
    };

    clk_lse: clk-lse {
        #clock-cells = <0>;
        compatible = "fixed-clock";
        clock-frequency = <32768>;
    };

    clk_lsi: clk-lsi {
        #clock-cells = <0>;
        compatible = "fixed-clock";
        clock-frequency = <32000>;
    };

    clk_csi: clk-csi {
        #clock-cells = <0>;
        compatible = "fixed-clock";
        clock-frequency = <4000000>;
    };

    ...
};

```

### 3.1.2 STM32MP1 Clock node

We need to specify the number of cells in a clock specifier.

For the STM32MP1 this number should be 1 and is configured via 'clock-cells' property in rcc node.

```

rcc: rcc@50000000 {
    compatible = "st,stm32mp1-rcc", "syscon";
    #clock-cells = <1>;
    #reset-cells = <1>;
    reg = <0x50000000 0x1000>;
    ...
};

```



**This device tree part is related to STM32MP1 microprocessors. It must be kept as is, without being modified by the end-user.**



## 3.2 DT configuration (board level)

If a Linux driver needs a clock, it has to be added in its DT node:

`clocks = <phandle>` : List of phandle and clock specifier pairs, one pair for each clock input to the device. Note: if the clock provider specifies '0' for `#clock-cells`, then only the phandle portion of the pair will appear.

- Example:

```
usart3: serial@4000f000 {
    compatible = "st,stm32h7-usart";
    reg = <0x4000f000 0x400>;
    interrupt-names = "event", "wakeup";
    interrupts-extended = <&intc GIC_SPI 39 IRQ_TYPE_LEVEL_HIGH>,
        <&exti 28 I>;
    clocks = <&rcc USART3_K>;
    wakeup-source;
    power-domains = <&pd_core>;
    status = "disabled";
};
```

## 4 How to configure the DT using STM32CubeMX

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

The **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 they are preserved from one generation to another. Refer to [STM32CubeMX user manual](#) for further information.

## 5 References

Please refer to the following links for additional information:

- [Documentation/devicetree/bindings/clock/clock-bindings.txt](#) , Clock device tree bindings
- [Documentation/devicetree/bindings/clock/st,stm32mp1-rcc.txt](#) , STM32MP1 clock device tree bindings
- [stm32mp157c.dtsi](#) STM32MP157C device tree file

Operating System

Reset and Clock Control

Device Tree



Clock device tree configuration

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Generic Interrupt Controller

Serial Peripheral Interface