Rockchip Developer Guide Linux FLEXBUS FSPI Mode

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Preface

Overview

This document introduces how to use FLEXBUS FSPI mode on Linux.

Product Version

Chipset	Kernel Version
All SOC support FLEXBUS	6.1

Intended Audience

This document (this guide) is mainly intended for:

Technical support engineers

Software development engineers

Revision History

Version	Author	Date	Change Description
V1.0.0	Jon Lin	2024-08-12	Initial version

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1. FLEXBUS FSPI Mode

1.1 Overview

FLEXBUS FSPI mode refers to the implementation of the corresponding functions by simulating RK FSPI (Flexible Serial Peripheral Interface) through FLEXBUS, such as:

- Single line output/quad line input, meeting the typical configuration for Linux MTD Quad SPI Flash driver

The key feature：

- A clock frequency up to 100MHz

1.2 Configuration

1.2.1 Kernel Configuration

FLEXBUS FSPI mode is implemented by the standard SPI framework driver and only implements the spi-mem structure, supporting external SPI Flash or peripherals that support the spi-mem protocol:

```
CONFIG_SPI=y
CONFIG_SPI_ROCKCHIP_FLEXBUS_FSPI=y
```

1.2.2 DTS Configuration

Taking the external SPI Nor flash sub-device as an example:

```
&flexbus {
    rockchip,flexbus0-opmode = <ROCKCHIP_FLEXBUS0_OPMODE_SPI>;
    rockchip,flexbus1-opmode = <ROCKCHIP_FLEXBUS1_OPMODE_NULL>;
    status = "okay";
};

&flexbus_fspi {
    pinctrl-names = "default";
    pinctrl-0 = <&flexbus0m1_pins &flexbus0_clk_pins
                 &flexbus0_d0_pins &flexbus0_d1_pins
                 &flexbus0_d2_pins &flexbus0_d3_pins>;
    status = "okay";

    flash@0 {
        compatible = "jedec,spi-nor";
        reg = <0>;
        spi-max-frequency = <100000000>;
        spi-rx-bus-width = <4>;
        spi-tx-bus-width = <1>;
    };
```

```
};
```

Explanation:

- mode_bits is SPI_RX_QUAD:
  - It supports configuring spi-rx-bus-width to 4
  - The default configuration is SPI mode 0, MSB mode, the relevant parameters of dts are not adjustable, please refer to the controller manual for further development

1.2.3 Driver File

The driver file is `drivers/spi/spi-rockchip-flexbus-fspi.c`.