EC2x-Quecopen

Switch Configuration of SPI and UART

LTE Module Series

Rev. EC2x-Quecopen_ Switch_Configuration_of_SPI-UART

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Status: Preliminary

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About the Document

History

Revision	Date	Author	Description
1.0	2018-06-01	Matthew MA	Initial

Contents

1 Introduction

From the perspective of user development, this document introduces how to switch the pin function when SPI and UART pins are multiplexed, which helps customers flexibly configure their peripheral resources for easy and fast development.

2 Pin Multiplexing Introduction

The EC2X platform provides a 4-line SPI interface which can also be configured as UART functions. Customers can configure them according to their needs.

2.1. SPI-UART Multiplexed Pin

SPI-UART multiplexed pins are shown as follow, also can refer to ***Quectel_EC20 R2.1_QuecOpen_GPIO_Assignment_Speadsheet***.

Table 1: SPI-UART Multiplexed Pin

Pin Name	Pin Number	Mode 1 (As default)	Mode 2	Mode 3	Reset Status	Wakeup Interrupt	Mark
SPI_CS_N	37	SPI_CS_N_BLSP6	GPIO_22	UART_RTS_BLSP6	B-PD,L	YES	
SPI_MOSI	38	SPI_MOSI_BLSP6	GPIO_20	UART_TXD_BLSP6	B-PD,L	YES	
SPI_MISO	39	SPI_MISO_BLSP6	GPIO_21	UART_RXD_BLSP6	B-PD,L	YES	
SPI_CLK	40	SPI_CLK_BLSP6	GPIO_23	UART_CTS_BLSP6	B-PU,H	NO	BOOT_CONFIG_4

GPIO20, GPIO21, GPIO22, GPIO23 can be multiplexed by SPI6 and UART6, please note that SPI6 and UART6 are based on the node number in DTS.

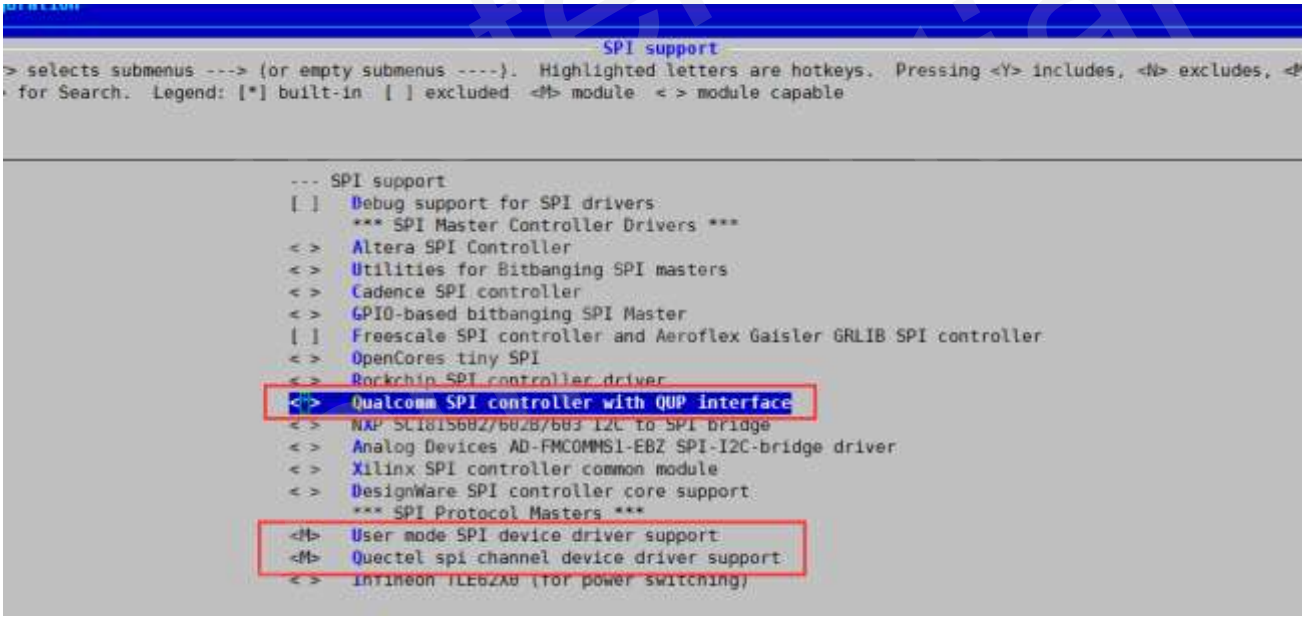
3 Linux Kernel Configuration

In Linux systems, if users want to use peripherals, must have peripheral drivers. The main peripheral drivers are usually compiled directly into the kernel and when the system starts up, the peripherals would be loaded. The loading process is completed by the driver program.

3.1. SPI Driver Configuration

Under SDK directory, execute below command.

```
$ make kernel_menuconfig
```

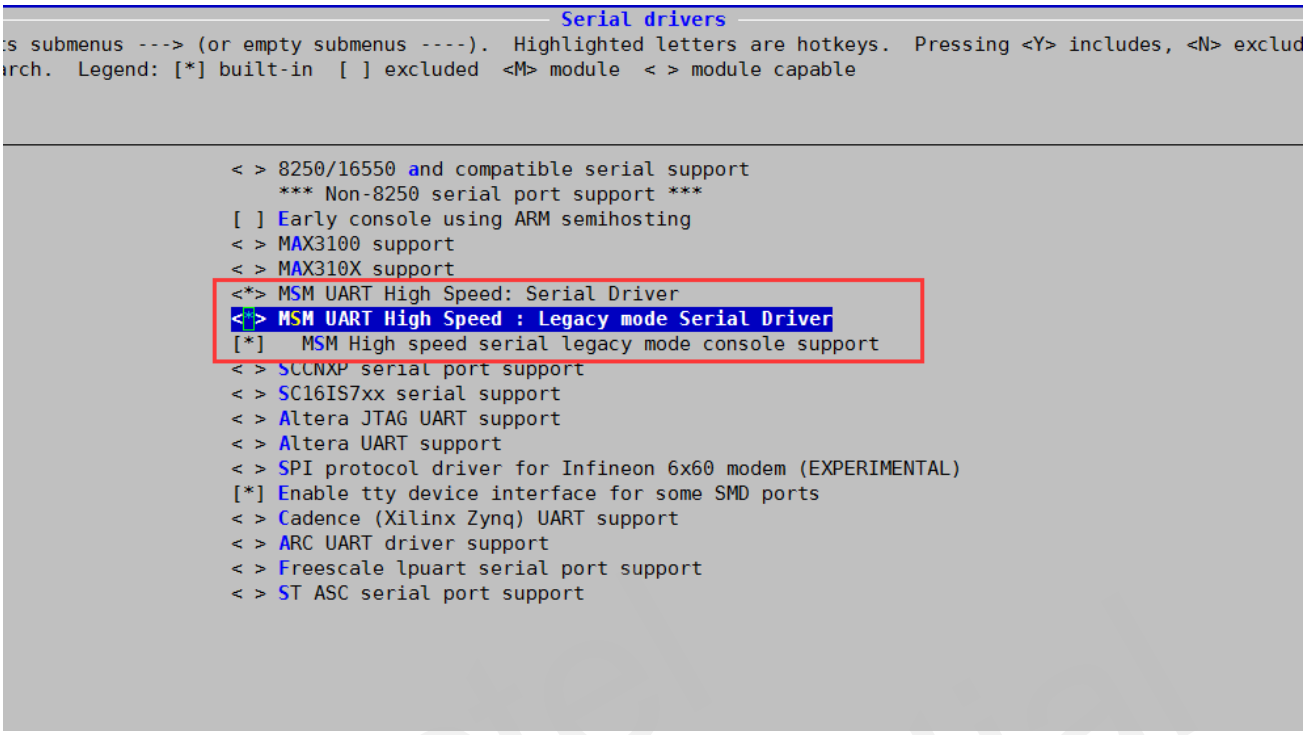


Make sure the configuration in the red frame is completed. The first part is configured with the SPI bus driver, so that the EC2X platform can drive the SPI bus, the second is the SPI general device driver, the user can send and receive SPI through this driver, and the third is the 6-line SPI driver, which is up to the user to decide whether or not to configure it.

3.2. UART Driver Configuration

Under SDK directory, execute below command.

```
$   make kernel_menuconfig
```



Make sure the configuration in the red frame is completed, in which, the second part is the uart driver for the multiplexed pins.

4 Switch Configuration of SPI and UART

At this time, there are already UART driver and SPI driver in kernel, please configure them in DTS to determine the use of GPIO20-23.

4.1. SPI Configuration

The UART driver in Linux already exists, when the user wants to use GPIO 20~23 as the UART, as long as it is enabled in DTS, Linux can load it normally.

Refer to Figure 1, the corresponding node number of SPI in DTS is 6, in the kernel directory, find file mdm9607-mtp.dtsi in the arch/arm/boot/dts/qcom/ directory, this file is the master switch of the peripheral. Find the SPI node with node number 6 and set status to “ok” to enable SPI, meanwhile, find the UART node with node number 6 and set status to “disabled” to disable UART. At this time, the function of GPIO20-23 is SPI.

```
00049:
00050: &spi_6 {
00051:     status = "ok";
00052: };
00053:
00054: &blsp1_uart3 {
00055:     status = "ok";
00056: };
00057:
00058: &blsp1_uart2 {
00059:     status = "ok";   //if need, user can enable by themselves
00060:     pinctrl-names ="sleep", "default";
00061:     pinctrl-0 = <&blsp1_uart2_sleep>;
00062:     pinctrl-1 = <&blsp1_uart2_active>;
00063: };
00064:
00065: &blsp1_uart6 {
00066:     status = "disabled";
00067: };
```

4.2. UART Configuration

Refer to Figure 1, the corresponding node number of UART in DTS is 6, in the kernel directory, find file mdm9607-mtp.dtsi in the arch/arm/boot/dts/qcom/ directory, this file is the master switch of the peripheral. Find the UART node with node number 6 and set status to “ok” to enable UART, meanwhile, find the SPI node with node number 6 and set status to “disabled” to disable SPI. At this time, the function of GPIO20-23 is UART.

```
00050: &spi_6 {
00051:     status = "disabled";
00052: };
00053:
00054: &blsp1_uart3 {
00055:     status = "ok";
00056: };
00057:
00058: &blsp1_uart2 {
00059:     status = "ok";   //if need, user can enable by themselves
00060:     pinctrl-names ="sleep", "default";
00061:     pinctrl-0 = <&blsp1_uart2_sleep>;
00062:     pinctrl-1 = <&blsp1_uart2_active>;
00063: };
00064:
00065: &blsp1_uart6 {
00066:     status = "ok";
00067: };
00068:
```

4.3. Function Verification

Please refer to ***Quectel_EC2X-QuecOpen_SPI_Guidelines*** and ***Quectel_EC2X-QuecOpen_UART_Guidelines*** to verify the corresponding function.