SC16IS752 I2C to UART For IW416 Bluetooth Application

-Hardware_Connections

1. Platform

- iMX8MP-EVK (LPDDR4 version)
- Schematic
  - SPF-46881_A1 (For SOM)
  - SPF-46370_B1 (For Base Board)

2. IW416 (WiFi & Bluetooth)

- IW416 Evaluation Board
- WIB3_ADAPTER_V1_1 (Base Board)
- RD-IW416-QFN-WIB3-2A-V2-schematics-Rev1 (IW416 SOM board)

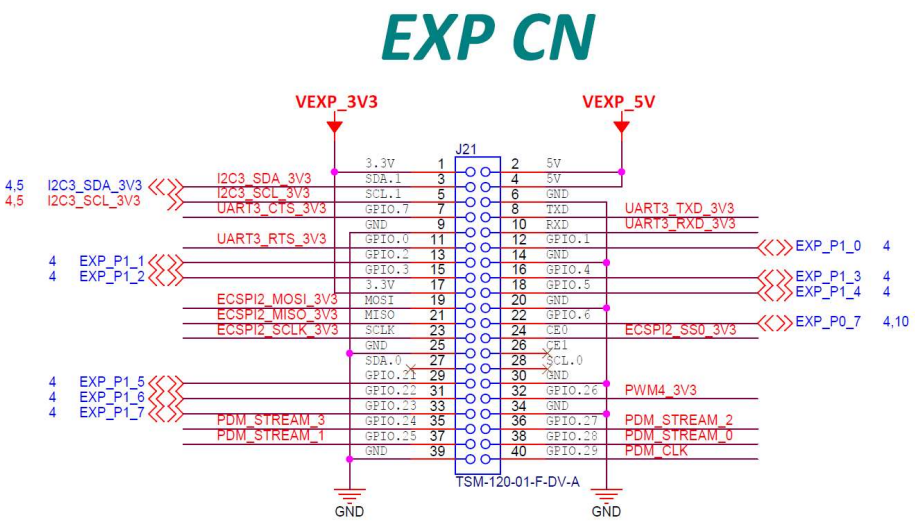
3. SC16IS752 module

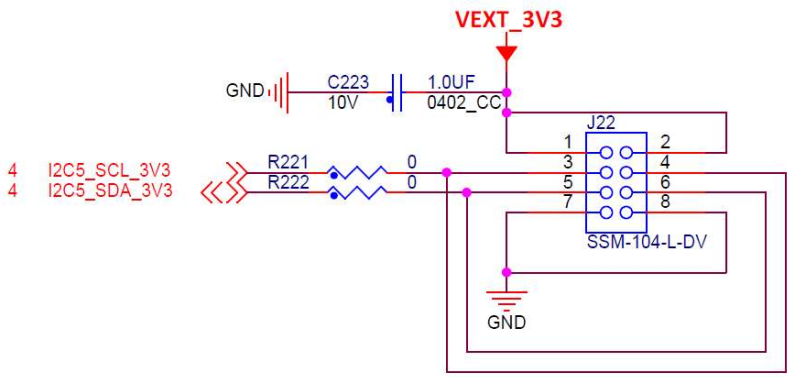
- Designed by third party

4. Hardware Settings

(1) iMX8MP-EVK

We will use 2 connectors on i.MX8M-EVK base board, J21 & J22.





① **For J22, the following pins will be used**

- **PIN1** , 3.3V power
- **PIN2**, 5V power
- **PIN3** & PIN5 , I2C interface with 3.3V IO
- **PIN7/8/10/11**, UART interface
- **PIN22**, PCA6416, U1, P0_7 Pin
- **PIN32**, i.MX8MP GPIO3_19

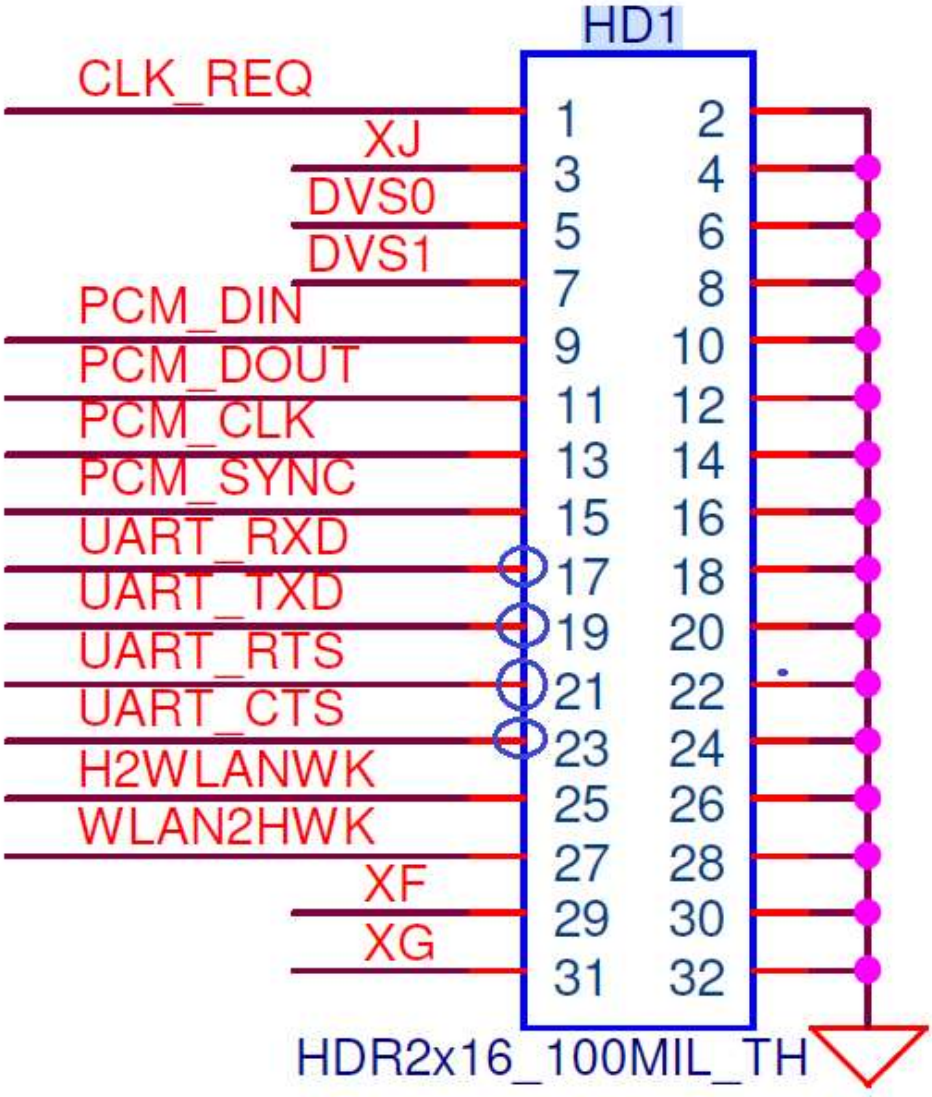
② **For J22, the following PINs will be used**

- **PIN1**, 3.3V Power
- **PIN7**, GND

(2) IW416 Evaluation Board

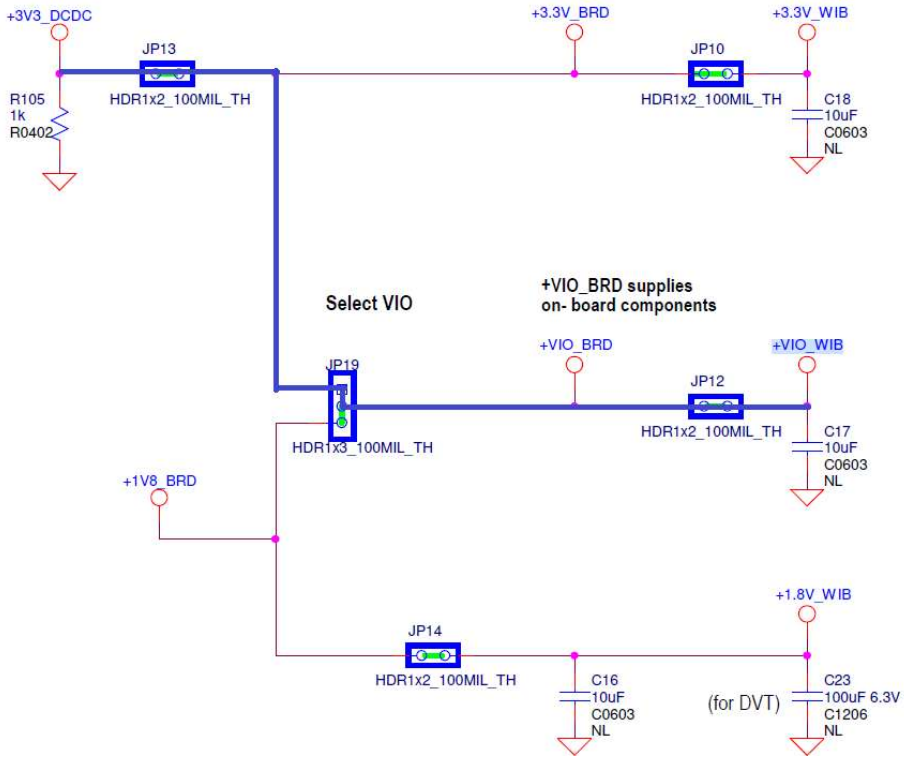
- UART signals on WIB3 board

IW416 UART signals are wired to HD1 connector of WIB3 board. See below, please!



- **IW416 UART IO Level setting**

IW416 EVK supports 2 IO voltage settings, 1.8V or 3.3V. Before using it, the IO voltage setting must be ready.



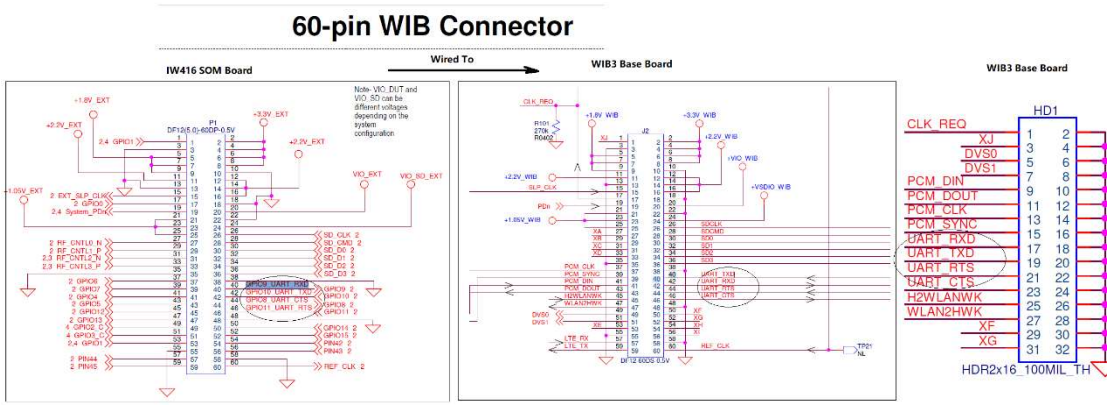
VIO_WIB determines IW416 IO level, Because we need 3.3V UART, so here, JP13 needs a jumper, JP19 pin1 & pin2 needs a jumper, JP12 needs a jumper, VIO_WIB will be 3.3V

See bold blue line in above schematic, please!

- **IW416 UART signals to WIB3 board**

If a user is using IW416 EVK board, she must pay attention to UART signals name on HD1 of WIB3 board, otherwise *it is very easy to make mistakes on connections*.

IW416 Chip UART signals	*HD1 on WIB3*
GPIO10_UART_TXD	*UART_RXD*
GPIO9_UART_RXD	*UART_TXD*
GPIO11_UART_RTS	*UART_CTS*
GPIO8_UART_CTS	*UART_RTS*

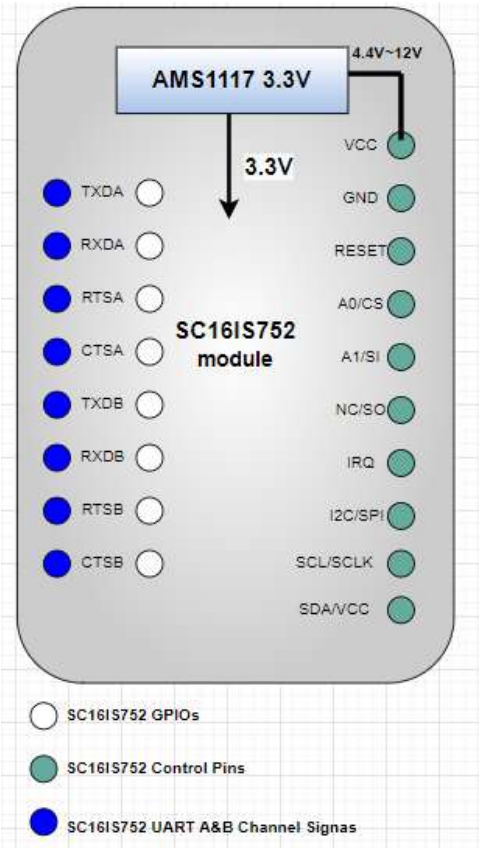


① **For HD1 Connector of WIB3 board, the following PINs will be used**

- PIN17, UART_RXD (IW416 Chip UART TXD, Output)
- PIN19, UART_TXD (IW416 Chip UART RXD, Input)
- PIN21, UART_RTS (IW416 Chip UART_CTS, Input)
- PIN23, UART_CTS (IW416 Chip UART_RTS, Output)

(3) SC16IS752 I2C To Dual UARTs

In order to save time, here we use sc16is752 module designed by 3rd party, diagram is like below.



[Descriptions For Control Pins]

① **VCC**

It requires the range of power input is 4.4V~12V, Here 5V will be used

② **RESET**

3.3V IO Level, Active Low, use a Host GPIO to control it. The pin is pulled up to High on the module.

③ **I2C/SPI**

The pin is used to select I2C or SPI interface, High is for I2C, Low is for SPI.

④ **A0/CS & A1/SI PINs**

They are used to set I2C slave address. A0/CS =LOW, A1/SI=HIGH, address=0x49, the address setting is used in the case. More detailed information, see sc16is752 datasheet, please!

⑤ **IRQ**

The pin is Open Drain, it should be pulled up externally, and it has been done on the module.

⑥ **SCL & SDA PINs**

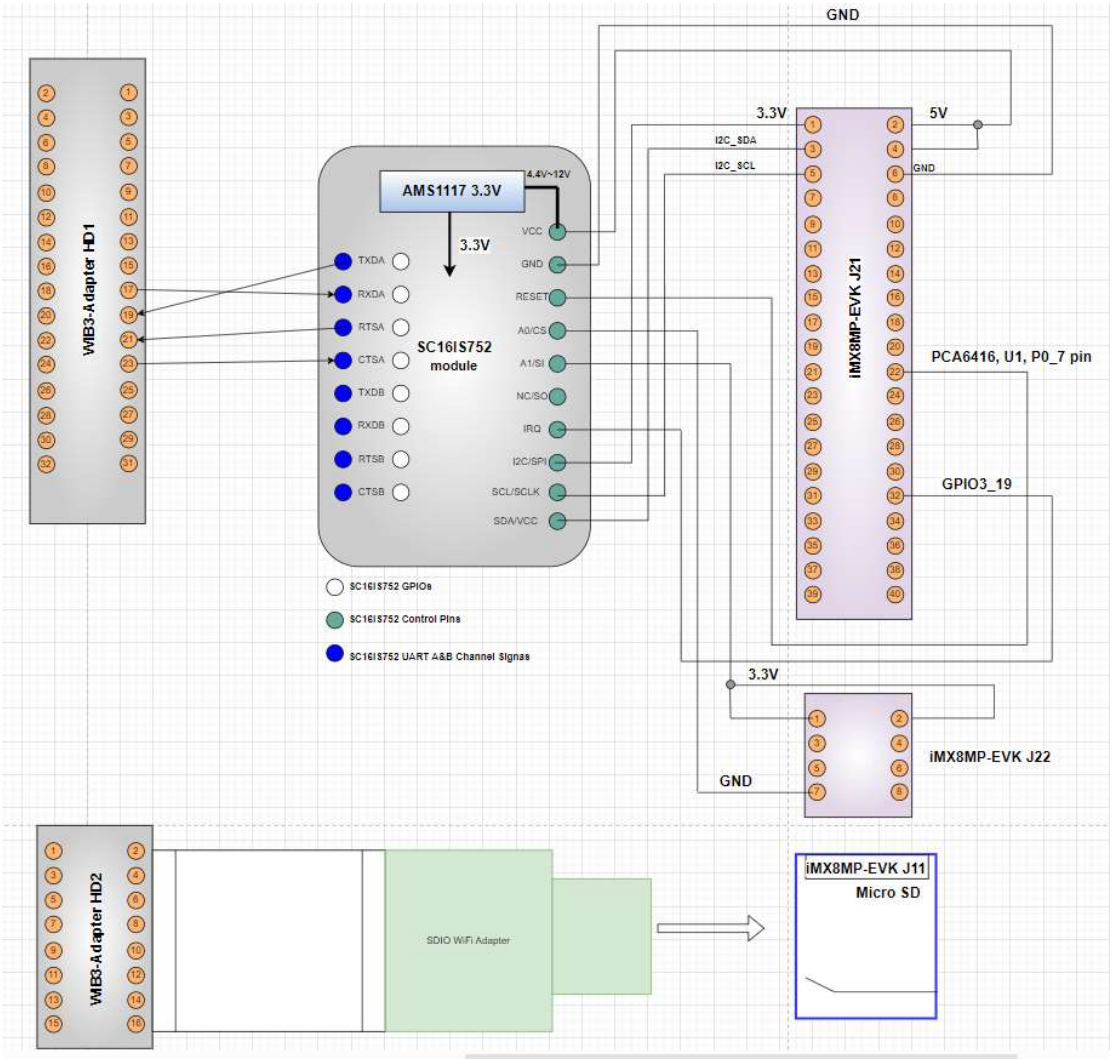
I2C interface, SCL is serial clock, and SDA is serial data line.

[Note]

All signals' IO level is 3.3V.

5. Hardware Connections

① SC16IS752 UART A channel to IW416 Bluetooth UART



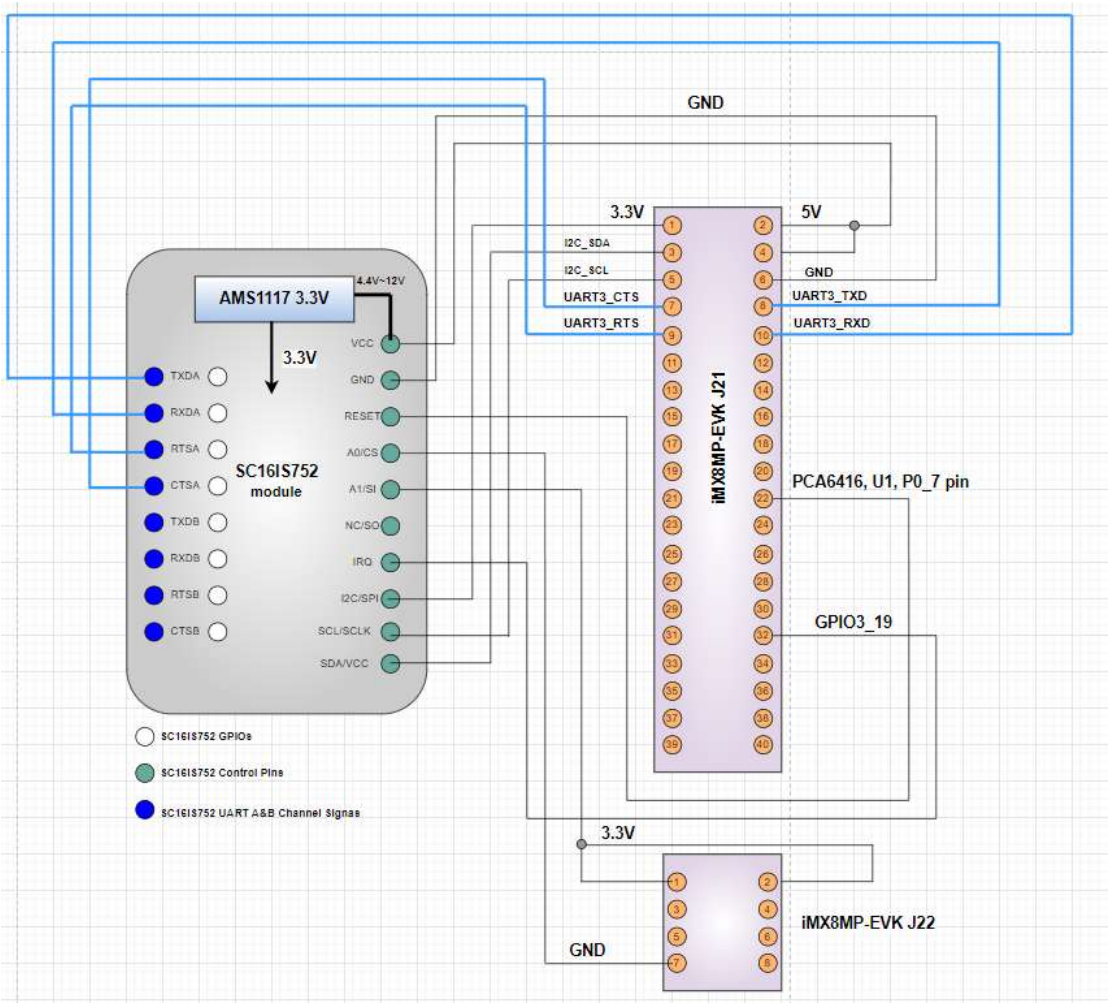
[Note]

- SC16IS752 external crystal
  According to SC16IS752 datasheet, external crystal is up to 24MHz. In the case, external crystal is 14.7456MHz.

- SDIO WiFi Adapter
  IW416-EVK board provides SDIO signals on HD2 header, SDIO WiFi adapter can convert SDIO signals to Micro-SD card plug, then users can debug or integrate wifi to system through Micros-SD slot provided by Imx8mp-evk. In our debugging, Combo firmware(WiFi+Bluetooth) will be used, so WiFi is connected to i.MX8MP-EVK.

Not all users select SC16IS752 for Bluetooth connections, they maybe use it for UART communications or RS485/RS232 etc, so for debugging purpose, the following connection may be needed.

② SC16IS752 UART A channel to UART3 of i.MX8MP



NXP TIC Connectivity Team
Weidong Sun
Nov-01-2024