

How to use printf() to print string to UART in KDS3.0 + KSDK1.3

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This document includes two chapters , chapter 1 is about how to use printf() to print string in KSDK1.3 project , the usage in project without MQX has been introduced on another document, you can find it here :

<https://community.freescale.com/docs/DOC-104349> , so in this DOC I only introduce how to use the printf() in KSDK MQX- Lite and KSDK MQX-Standard project .

Chapter 2 introduces how to check which UART port is used when use printf() to print string on the FRDM board and TOWER board .

1. Use printf() in KSDK MQX project

1.1 Use printf() in KSDK MQX-Lite project

1.2 Use printf() in KSDK MQX-Standard project

2. How to check which UART port is used when use printf()

2.1 How to check which UART port is used on FRDM board when use printf()

2.2 How to check which UART port is used on TOWER board when use printf()

2.2.1 Use the OpenSDA port on "TWR-K65F180M" board

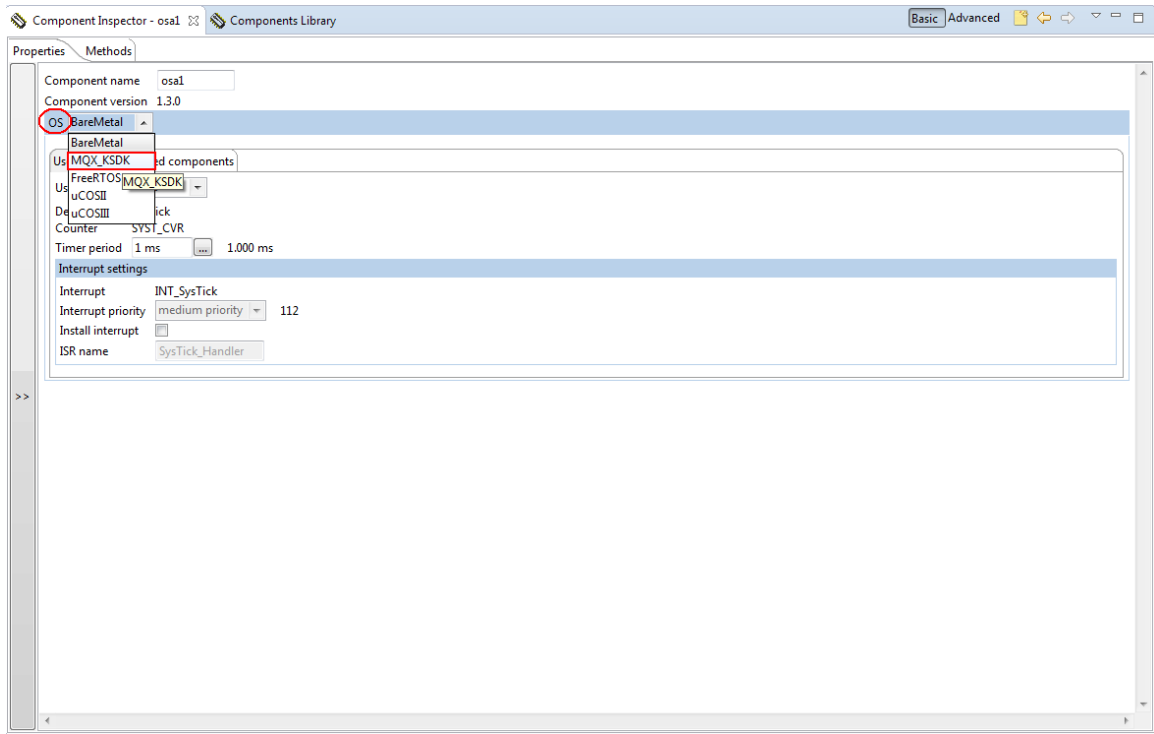
2.2.2 Use the UART port on "TWR – SER" board.

1. Use printf() in KSDK MQX project

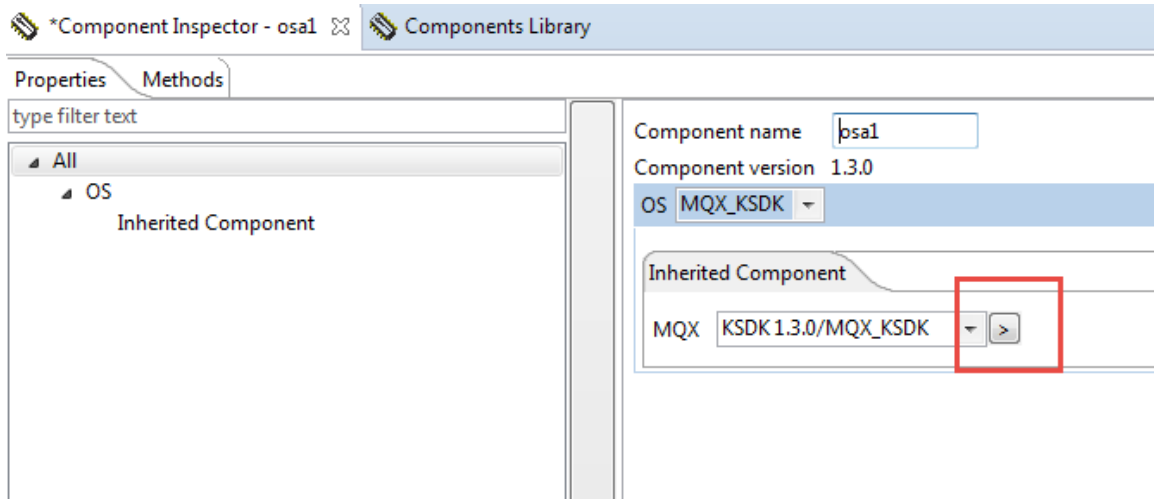
It includes two cases: KSDK MQX-Lite project and KSDK MQX-Standard project.

1.1 Use printf() in KSDK MQX-Lite project

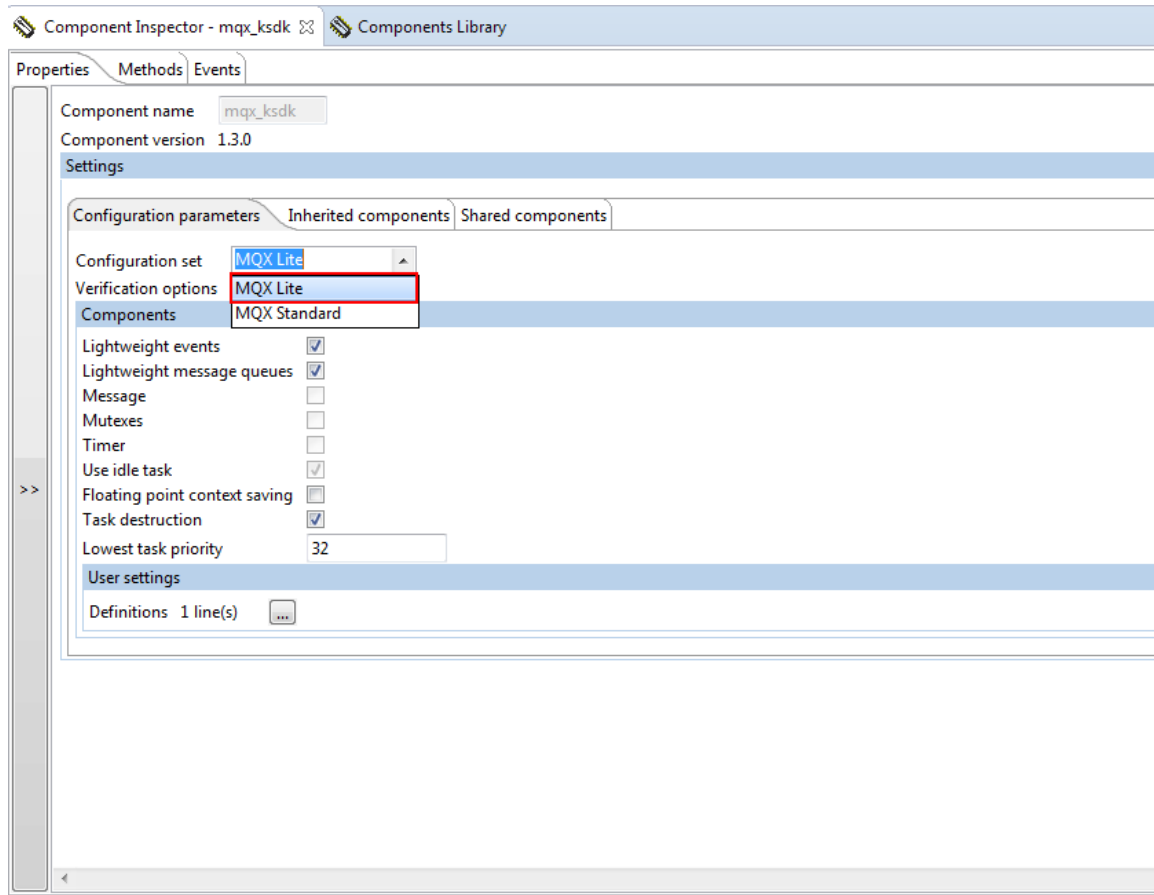
- Create a KSDK MQX-Lite project: after create the KSDK1.3 project with Processor Expert , Select the "MQX KSDK" in the OS option :



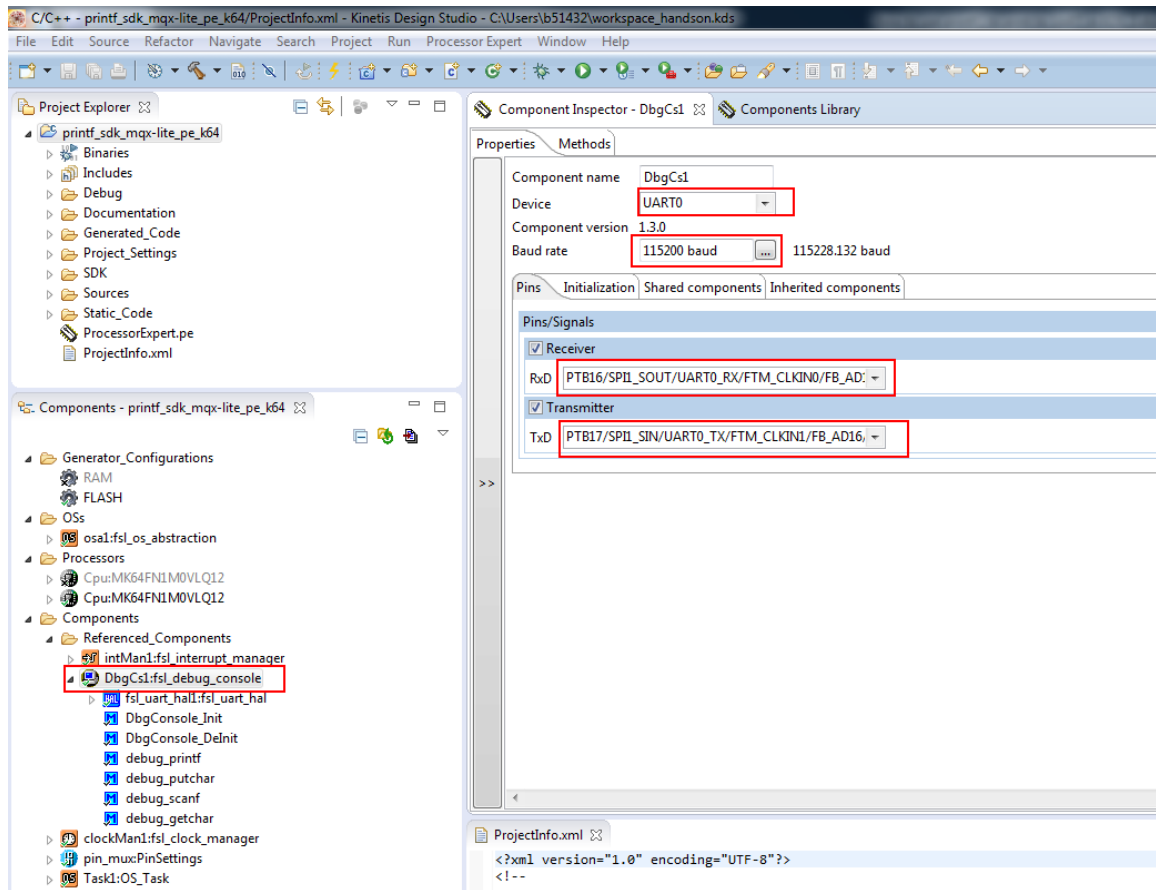
then click this:



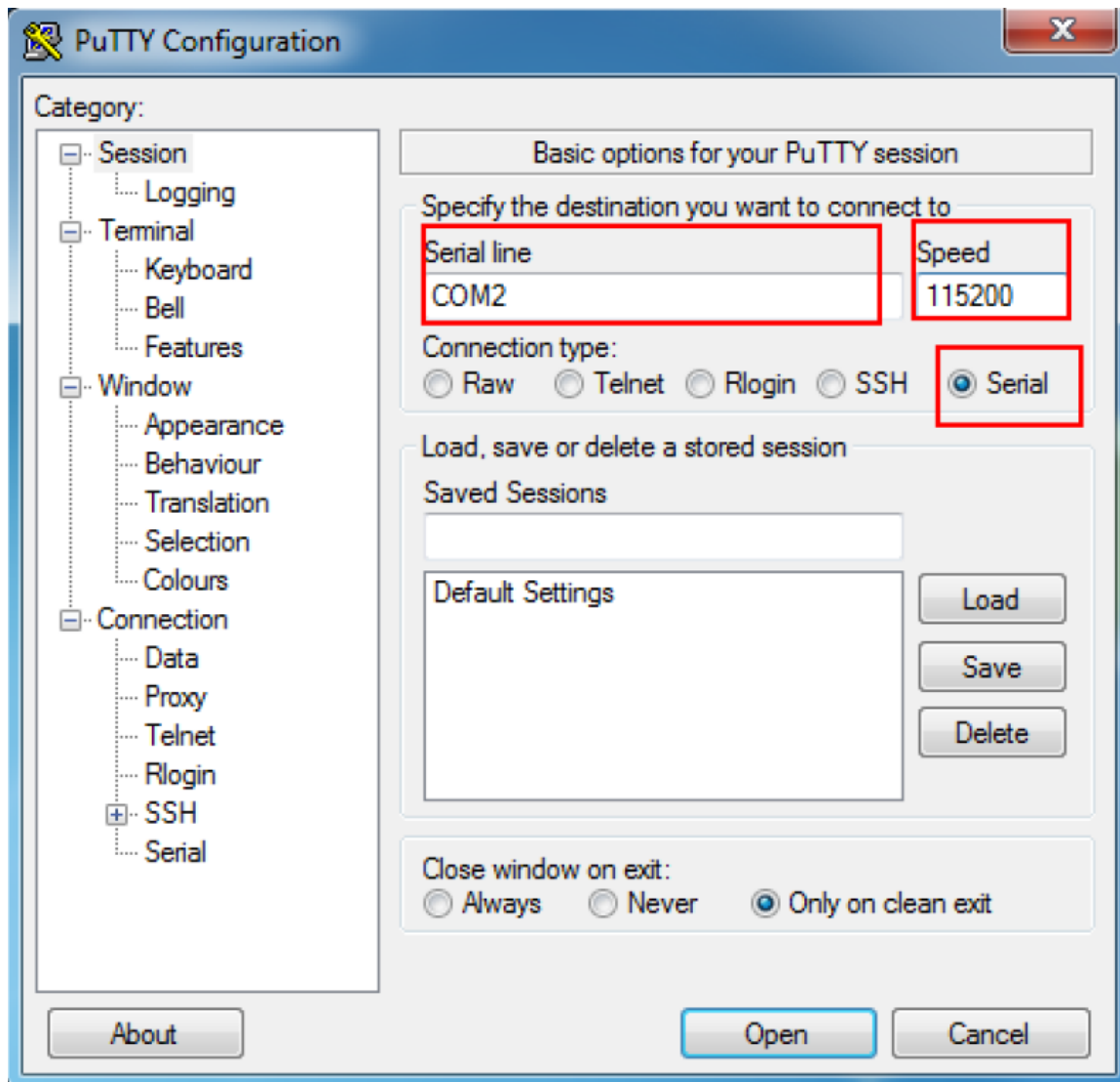
Select "MQX Lite":



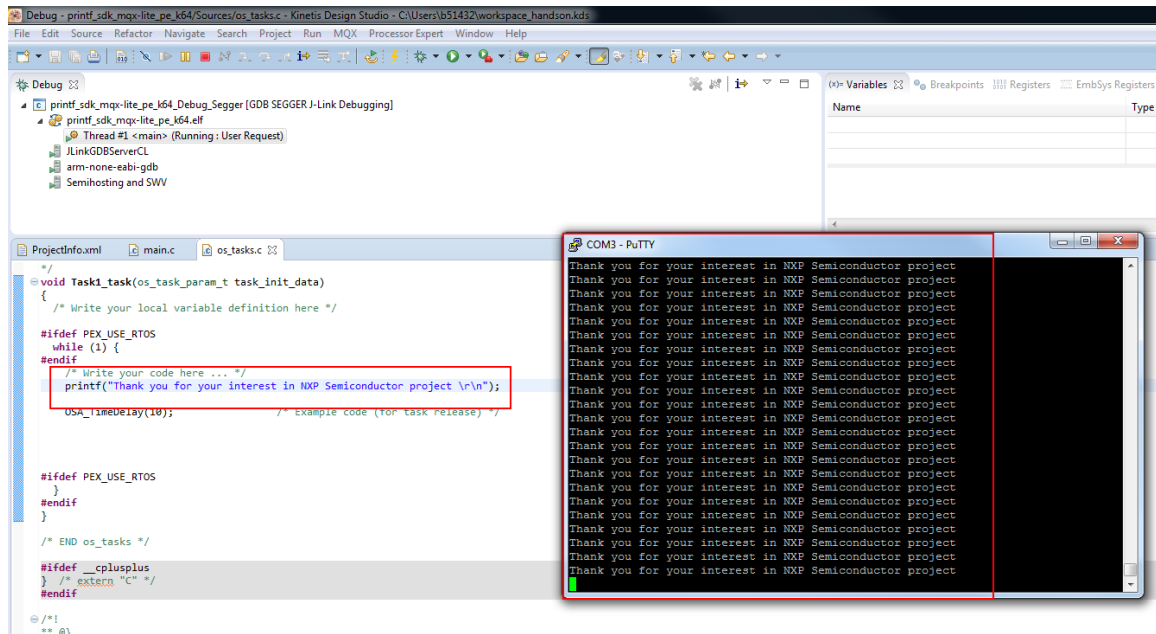
- In the Components window , we can see the component “fsl_debug_console”, double click this component , then the UART configuration view on show at the right , configure the UART: Device, Baud rate and pins. (For example for FRDM-K64 board)



- Configure the PuTTY: 1152000 baud, No parity, 8 data bits, 1 stop bit.

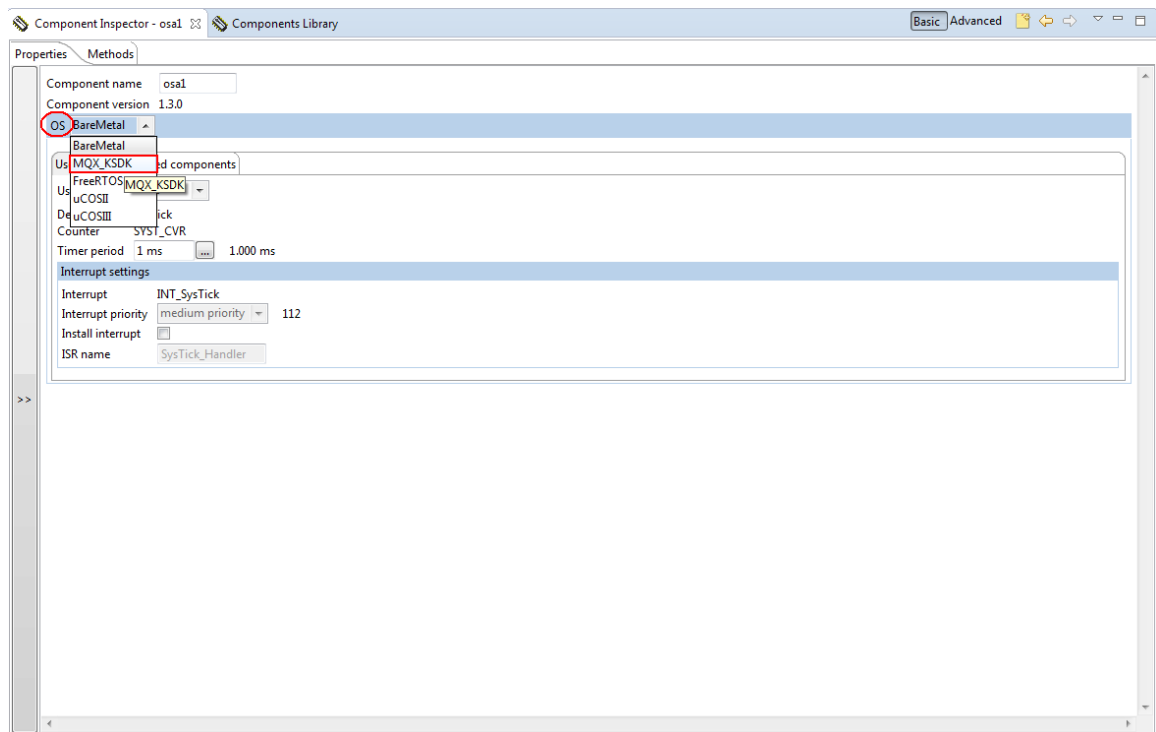


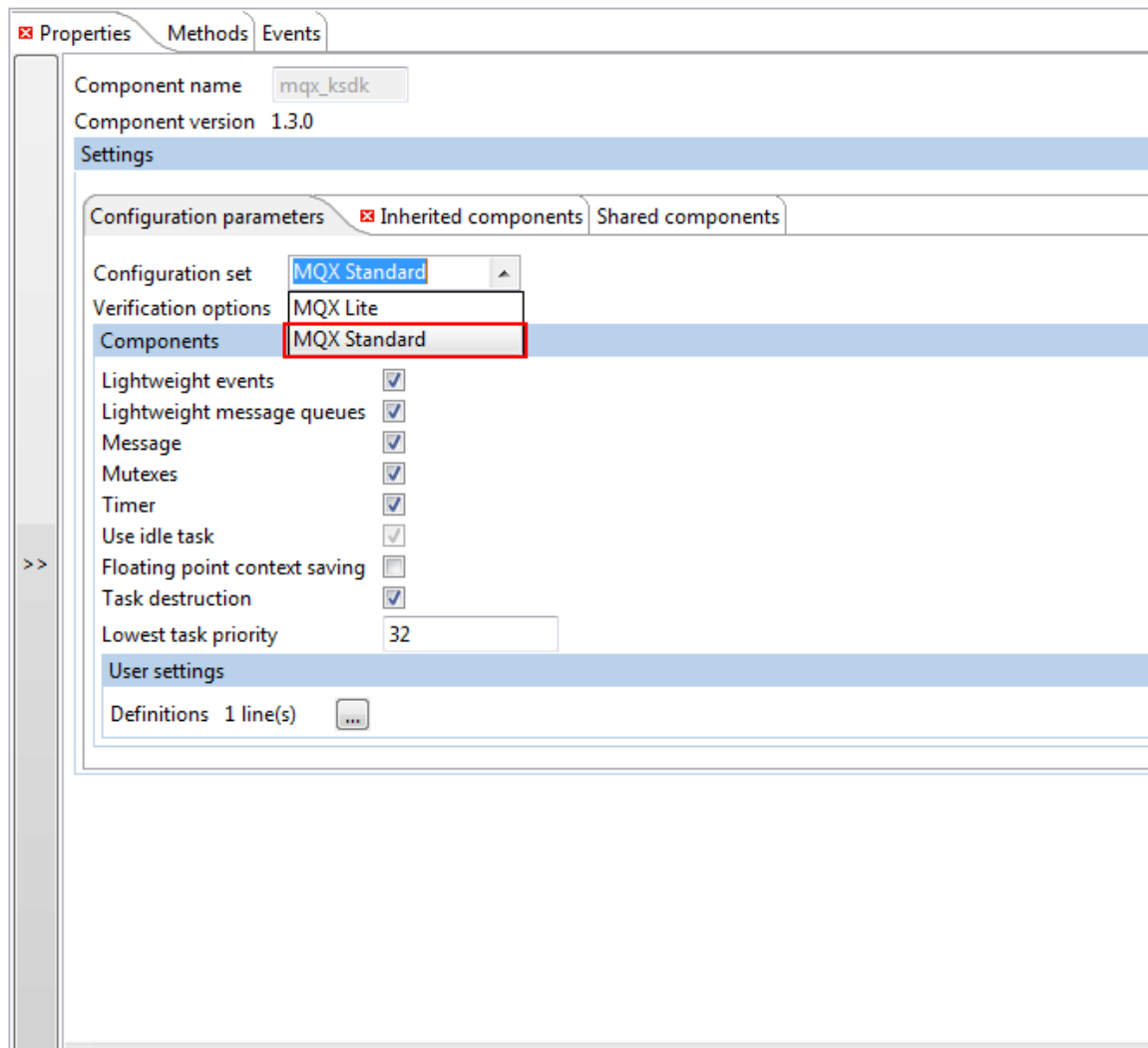
- Run the project, we can see the result on the PuTTY.



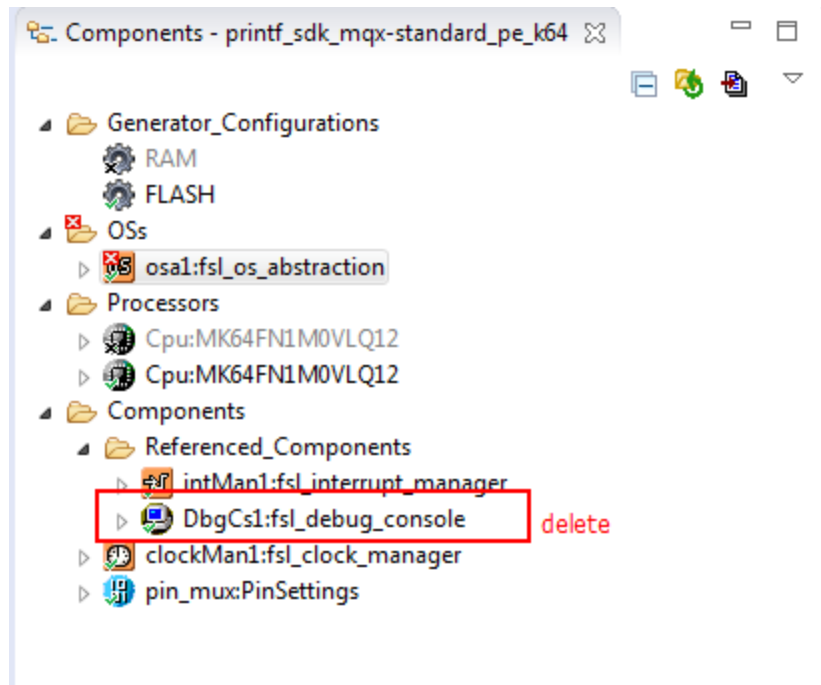
1.2 Use printf() in KSDK MQX-Standard project

- Create a KSDK MQX-Standard project: after create the KSDK1.3 project with Processor Expert , select the "MQX_KSDK" in the OS option, then select "MQX Standard"

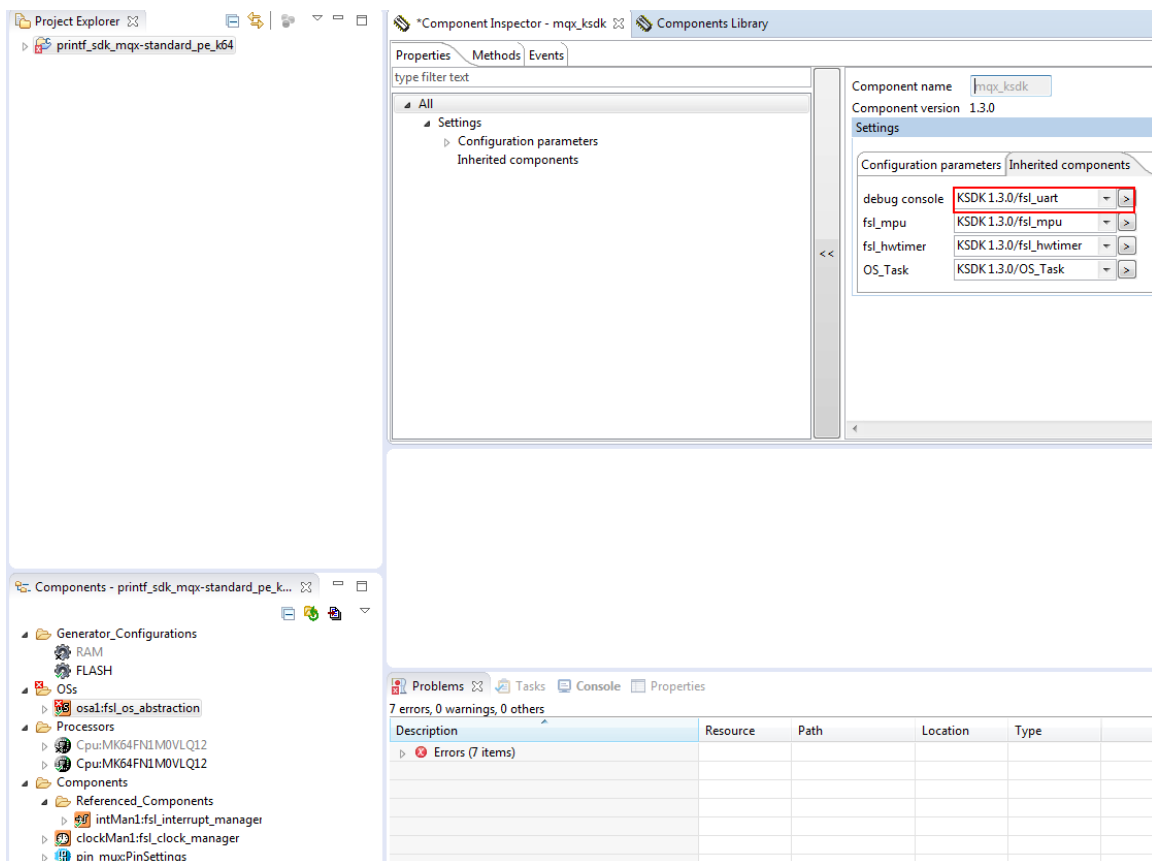




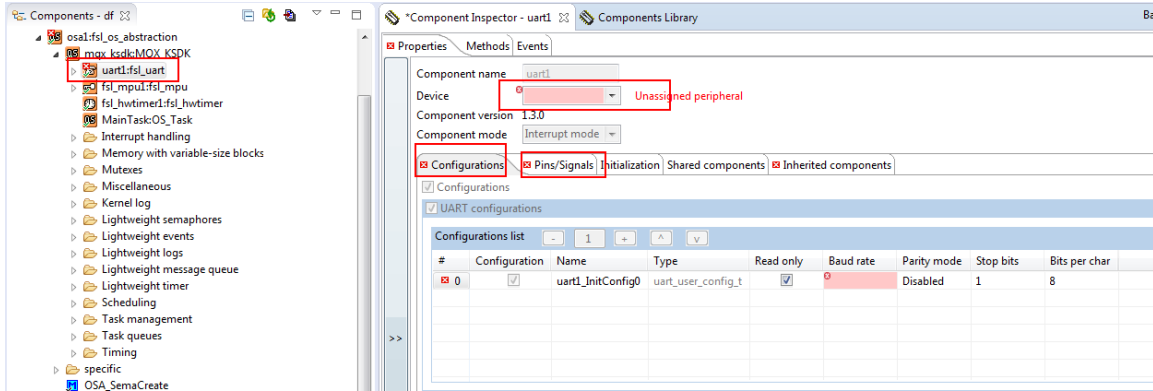
- Please delete the component of "fsl_debug_console" under the project, for in the MQX-Standard library, the project do not need this component to print, it have own driver for printf(), we only need configure the UART.



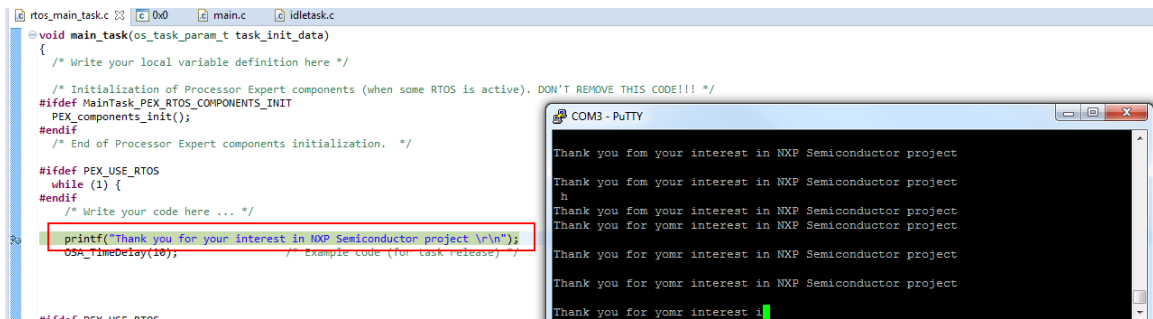
-In the debug console , please select “KSDK1.3.0/fsl_uart”



- Double click the component of “fsl_uart”, then configure it :



- Configure the PuTTY as I mentioned in the 1.1, run the project, we can see the result on the PuTTY.



In sum, only the project of “MQX standard” use it own driver for printf(), so we need delete the driver “fsl_debug_console”. In other SDK+PE projects , they all use the driver of “fsl_debug_console” for printf().

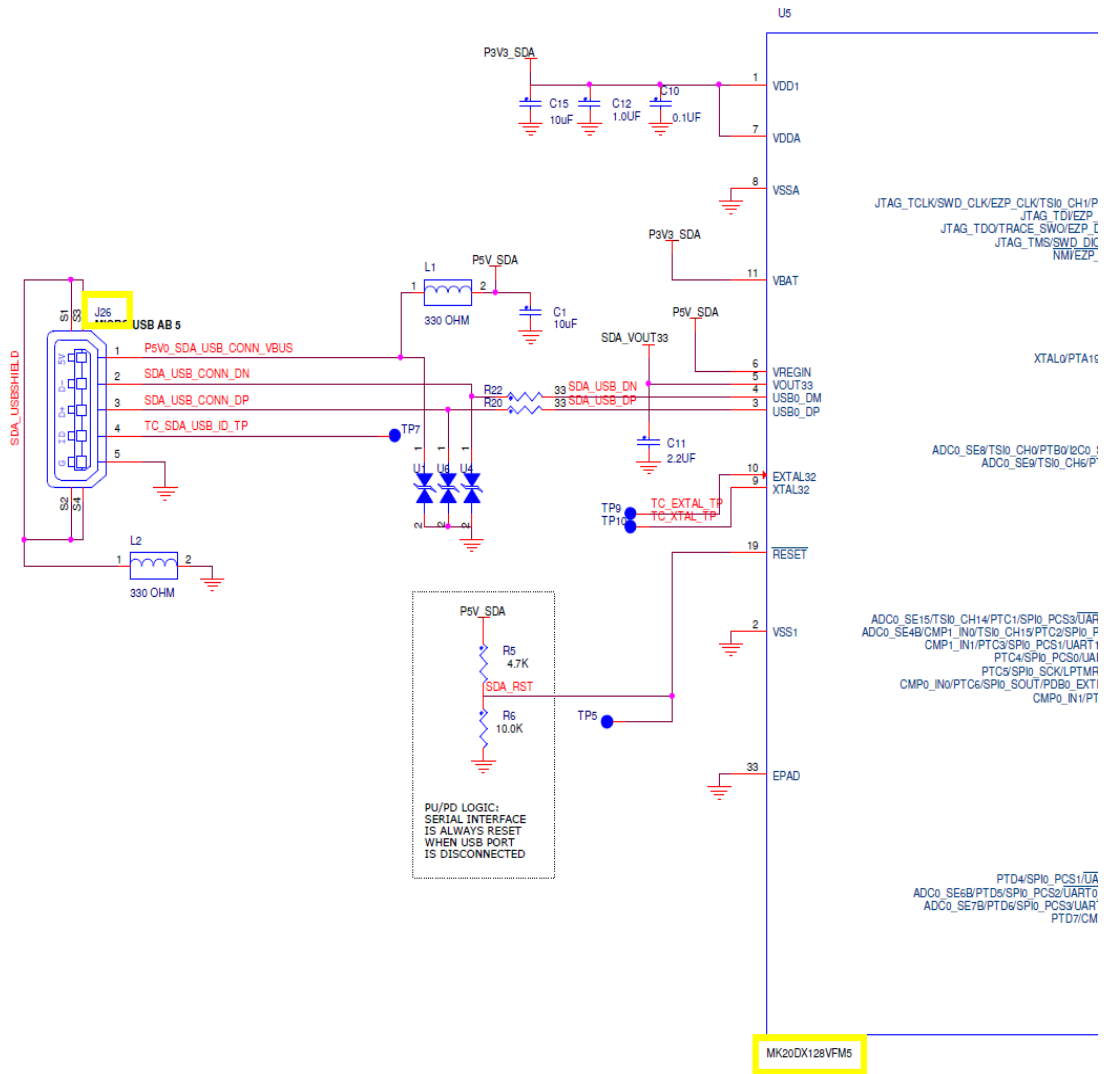
2. How to check which UART port be used when use printf()

When use kinetis demo boards , some customers don’t know which UART port should be used when use the printf() function, so I’d like to focus on the FRDM board and TOWER board about how to cofirm which UART port .

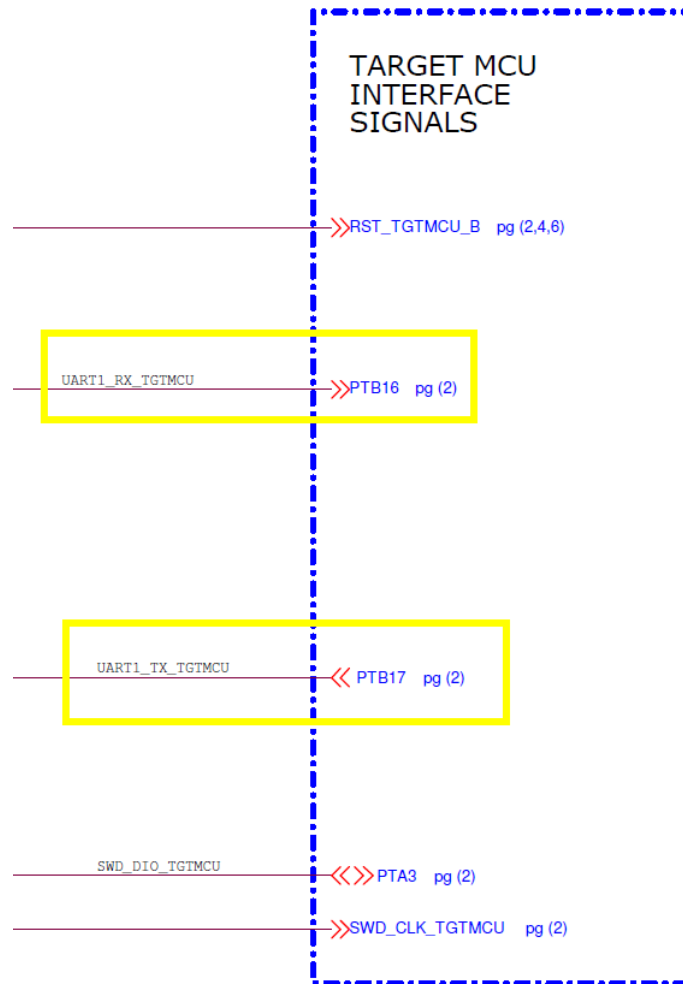
2.1 How to check which UART port be used on FRDM board when use printf()

For example the FRDM-K64F board:

- On the FRDM-K64F board , we use the OpenSDA port, that is J26 pin, then we search the “J26” on FRDM-K6 4F sch, we can see J26 connect to the chip of “MK20D128VFM5”



- Then continue to check which place the MK20D128VFM5 be connected, we can see it have two signals "UART1_RX_TGTMCU" and "UART1_TX_TGTMCU", they are connected to "PTB16" and "PTB17".



- Then continue to search the two pins “PTB16” and “PTB17” be connected to which UART port on the k64 chip ,the result is they are connected to UART0 of k64.

pg (3,4)	PTB[16..23]<<>>	PTB16	SPI1_SOUT/FB_AD17	62	PTB16/SPI1_SOUT/UART0_RX/FTM_CLKIN0/FB_AD17/EWM_IN
		PTB17	SPI1_SIN/FB_AD16	63	PTB17/SPI1_SIN/UART0_TX/FTM_CLKIN1/FB_AD16/EWM_OUT

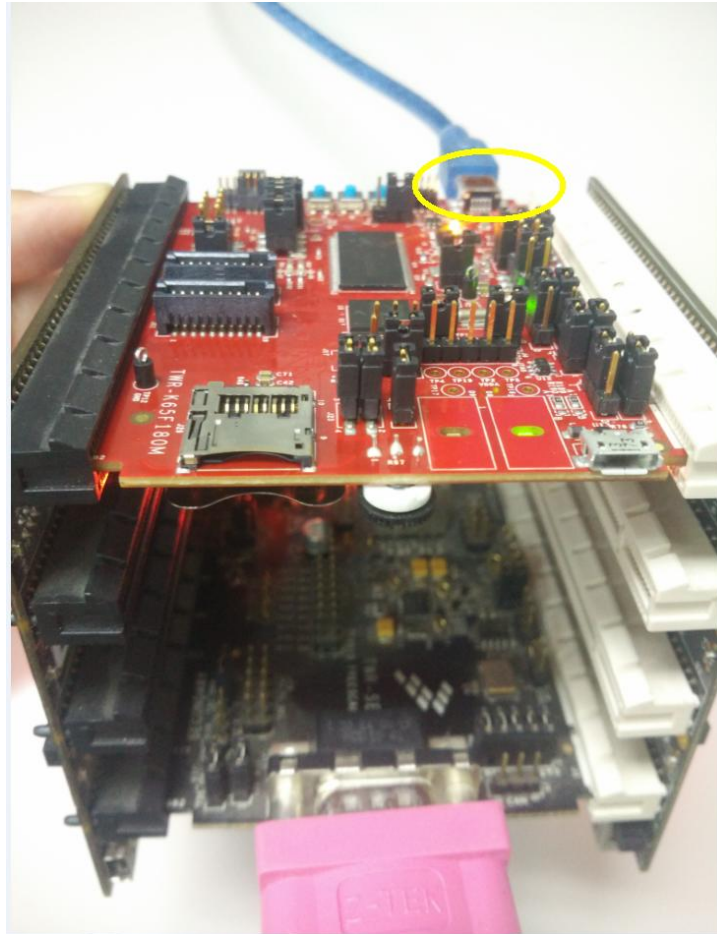
So on FRDM-K64F board, when we use printf() function, configure the UART0 , PTB16 pin as RX, PTB17 as TX.

2.2 How to check which UART port be used on TOWER board when use printf()

The Tower System includes four modules , the main board “TWR-xxx(chip name)”, two elevator modules “TWR-ELEV Primary” and “TWR-SELE Secondary”, and the “TWR-SER” module. In generally, there are two ports to print use UART on the TOWER demo board. One is use the OpenSDA on the main board, the other one is use the UART port on “TWR-SER” board.

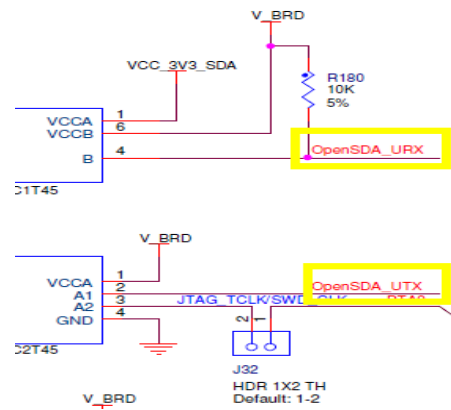
For example the TWR-K65F18M board:

2.2.1 Use the OpenSDA port on “TWR-K65F180M” board

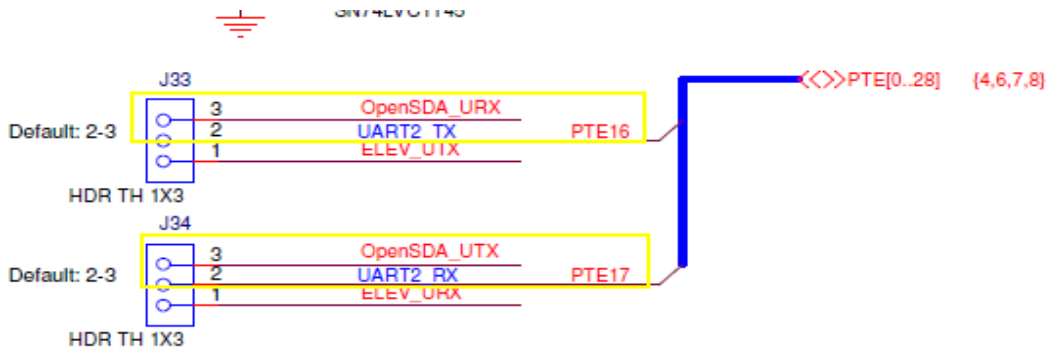


In this situation , it is the same with on FRDM board to check which UART port is used.

- Search J7 pin on “TWR-K65F180M” board, it is connected to “MK20DX128VFM5” chip, then we can find two signal on it “OpenSDA_URX” and “Open_UTX”.



- Then continue to check the two signals , we can see they can be connected to “UART2_TX” and “ UART2_RX “ through J33 and J34, please set jumper to connect the “2” and “3”.

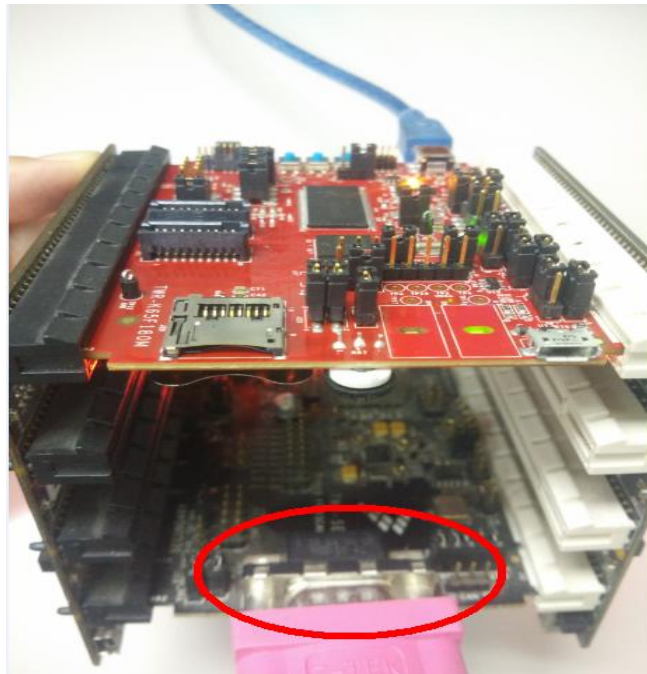


- Then search the PTE16 and PTE17 on K65 chip , they are connected to UART2 of the chip.

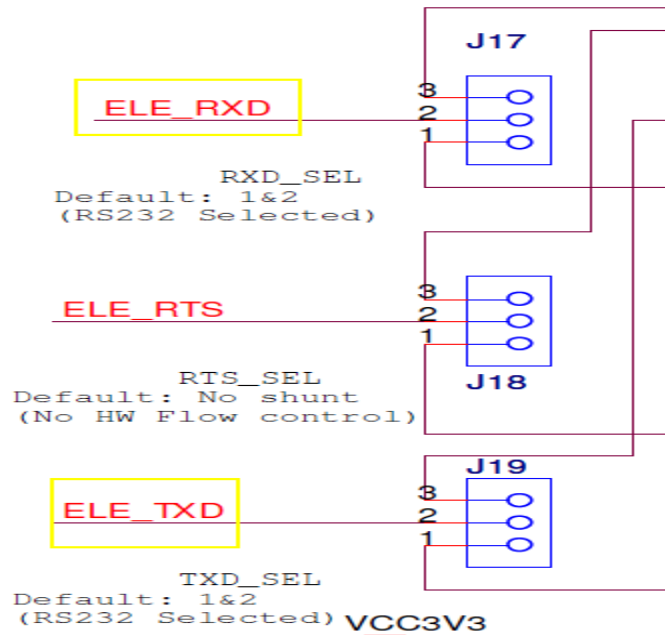
PTE11/I2C3_SCL/I2S0_TX_FSI/UART10_RTS/FTM3_CH0	H4	I2S0_TX_RCLK	PTE19
PTE12/I2S0_TX_BCLK/FTM3_CH1	H3	UART2_TX/SPI0_PCS0	PTE16
PTE16/ADC0_SE4A/SPI0_PCS0/UART2_TX/FTM_CLKIN0/FTM0_FLT3/TPM_CLKIN0	F5	UART2_RX/SPI0_SCK	PTE17
PTE17/ADC0_SE5A/LLWU_P19/SPI0_SCK/UART2_RX/FTM_CLKIN1/LPTMR0_ALT3/TPM_CLKIN1	F6	I2C0_SDA/SPI0_S0/IT	PTE18
PTE18/ADC0_SE6A/LLWU_P20/SPI0_S0/UART2_CTS/I2C0_SDA	F7	I2C0_SCL/SPI0_SIN	PTE19
PTE19/ADC0_SE7A/SPI0_SIN/UART2_RTS/I2C0_SCL/CMP3_OUT	L7	CAN1_TX/ADC0_SE17	PTE24
PTE24/ADC0_SE17/CAN1_TX/UART4_TX/I2C0_SCL/EWM_OUT	K7	CAN1_RX/ADC0_SE18	PTE25
PTE25/ADC0_SE18/LLWU_P21/CAN1_RX/UART4_RX/I2C0_SDA/EWM_IN	K8	ENET_1588_CLKIN	PTE26
PTE26/ENET_1588_CLKIN/UART4_CTS/RTC_CLKOUT/USB0_CLKIN	L8		PTE27
PTE27/UART4_RTS	M7		PTE28
PTE28			

So use the UART2 port, PTE16 pin as TX, PTE17 pin as RX.

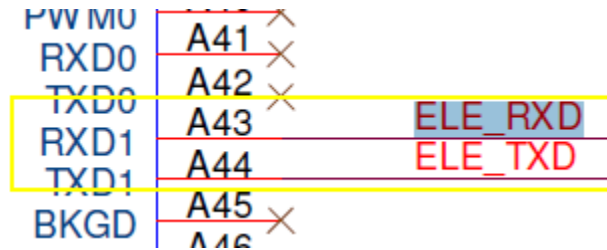
2.2.2 use the UART port on “TWR-SER” board.



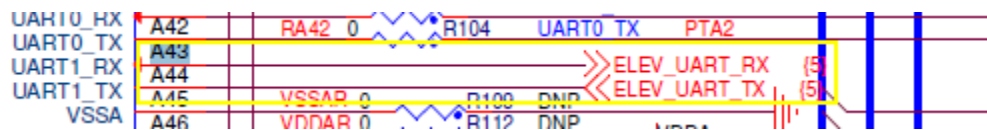
- Search the J8 on “TWR-SER”, we can see it have two signals “ELE_RXD” and “ELE_TXD”



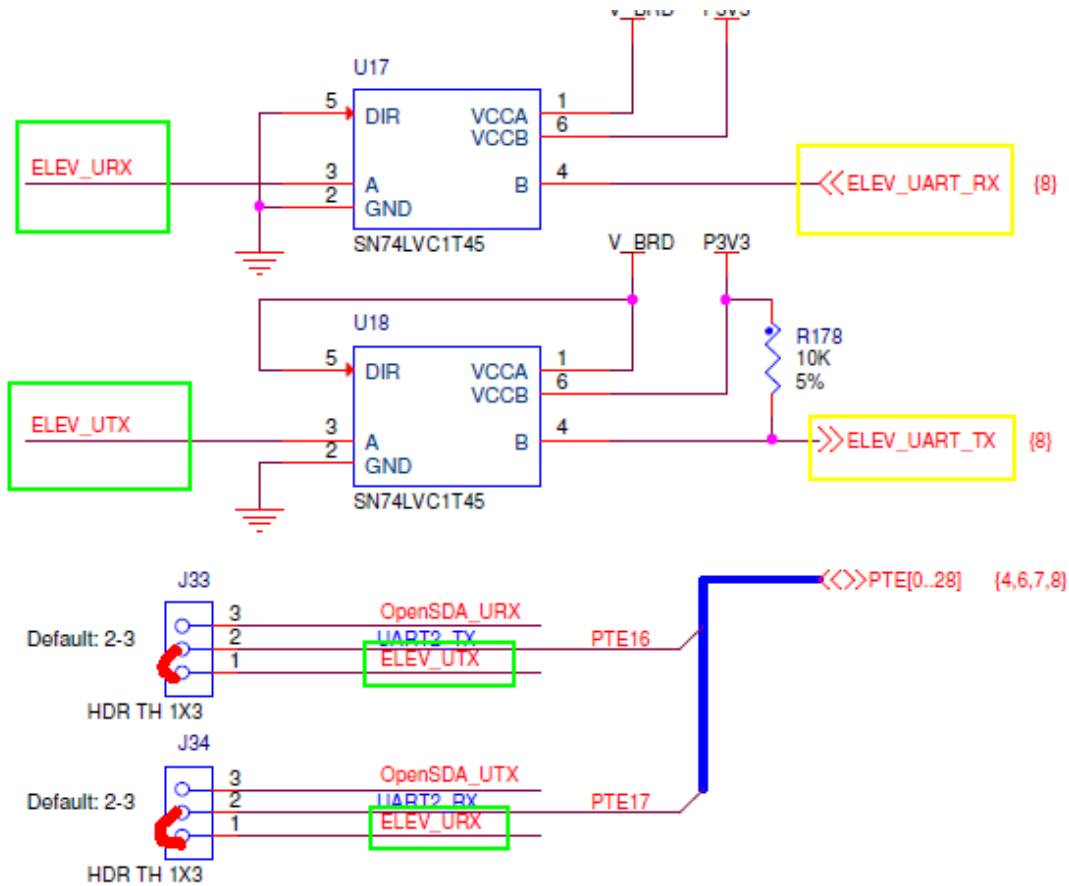
They are connected to the “A43” and “A44” of J1 .



- Then search “A43” and “A44” on TWR-K65F180M board, we can find they are connected to “ELEV_UART_RX” and “ELEV_UART_TX”.



- Then search “ELEV_UART_RX” and “ELEV_UART_TX” to continue find which UART port , we can see the two signals become signals “ELEV_URX” and “ELEV_UTX” through electric converter , the two signals can be connected to “PTE16” pin and “PTE17” pin through J33(1-2) and J34(1-2).



- So, connect the 1 and 2 of J33 J34 , we will use the PTE16 pin and PTE17 pin, we have find the two pins are the UART2 on the above section. That is to say the UART2. In fact , the connection between J7 on TWR-SER board and UART2 on K65F180M chip is the two elevator modules, while the label of the connection is the same on the four board(for example the "A43" and "A44") , so we can directly search it on TWR-K65F180M board , ignore searching it on the two elevator boards.