单线串列传输通信

NuMicro® 32 位系列微控制器范例代码介绍

文件信息

代码简述	使用 UART TX 和 RX 短路仿真 Single Wire 通讯传输
BSP 版本	M480 Series BSP CMSIS v3.03.001
开发平台	NuMaker-PFM-M487 v3.0

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1 功能介绍

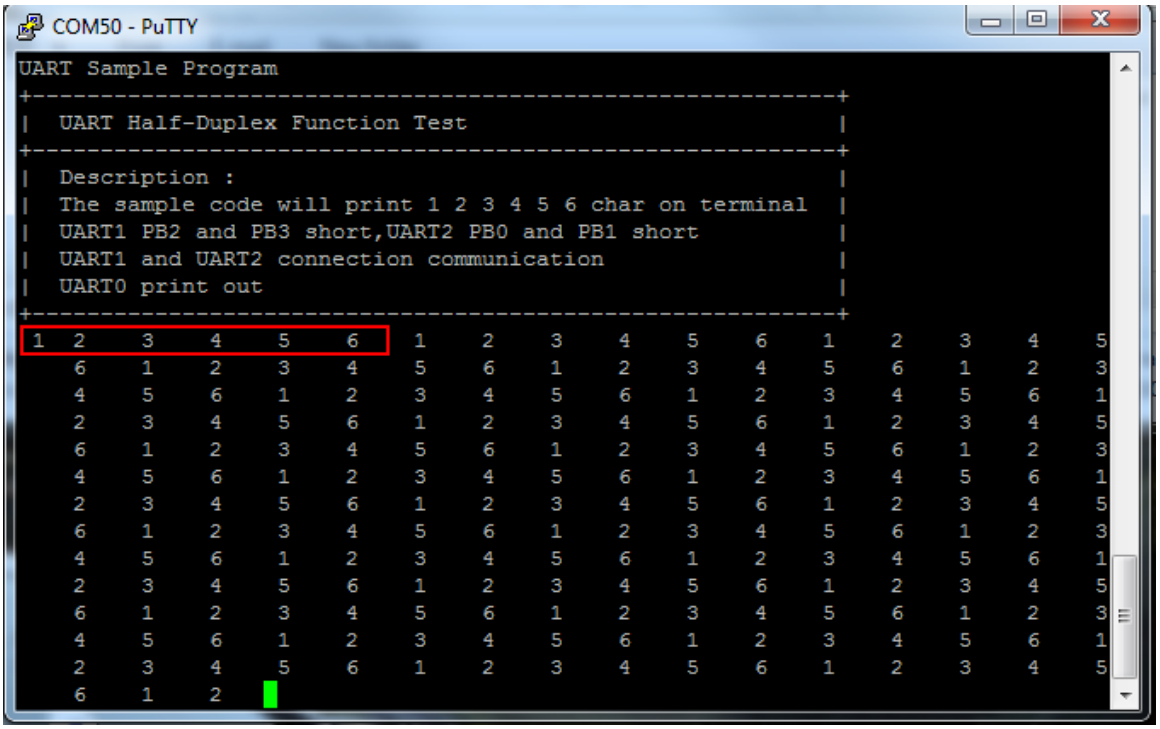
1.1 简介

此范例是利用将UART TX端和UART RX短路起来，来仿真UART Single Wire 通讯传输。

1.2 原理

本范例是分别是利用将两个 UART Port 的 TX 跟 RX 端短路(Short)，再将两个UART短路端对接起来，来仿真单线的通讯模式。其中若要做 TX 传送数据的功能，需要将短路端的 RX 的 MFP(Multi-function pin)设定变为GPIO mode 将 IO 设定为 Input mode，同理若要做 RX 接收数据功能，需要将短路端的 TX 的 MFP(Multi-function pin)设定变为GPIO mode，将 IO 设定为Input mode，来达成在UART半双工的单线传输模式。

1.3 执行结果


COM50 - PuTTY
UART Sample Program
+--+
| UART Half-Duplex Function Test |
+--+
| Description : |
| The sample code will print 1 2 3 4 5 6 char on terminal |
| UART1 PB2 and PB3 short,UART2 PB0 and PB1 short |
| UART1 and UART2 connection communication |
| UART0 print out |
+--+
1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5
6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3
4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1
2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5
6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3
4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1
2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5
6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3
4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1
2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5
6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3
4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1
2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5
6 1 2

2 代码介绍

2.1.1 UART 初始化设定

```
void UART_Init()
{


       /* Reset UART0 IP */
       SYS_ResetModule(UART0_RST);
      /* Configure UART0 and set UART0 baud rate */
       UART_Open(UART0, 115200);
      /* Reset UART1 IP */
       SYS_ResetModule(UART1_RST);
      /* Configure UART1 and set UART1 baud rate */
       UART_Open(UART1, 115200);
      /* Reset UART2 IP */
       SYS_ResetModule(UART2_RST);
      /* Configure UART2 and set UART2 baud rate */
       UART_Open(UART2, 115200);


}
```

2.1.2 UART2 TX and UART1 RX Single Wire 设定

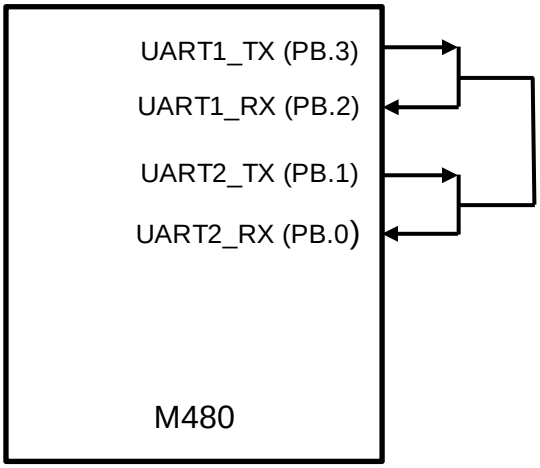
```
void UART2TX_UART1RX()
{

      /* Set input mode for UART2 RX  */
       GPIO_SetMode(PB, BIT0, GPIO_MODE_INPUT);
      /* Set input mode for UART1 TX  */
       GPIO_SetMode(PB, BIT3, GPIO_MODE_INPUT);
      /* Set PB1 multi-function pins for UART2 TXD*/
       SYS->GPB_MFPL &= ~(SYS_GPB_MFPL_PB1MFP_Msk|SYS_GPB_MFPL_PB0MFP_Msk);
       SYS->GPB_MFPL |= (SYS_GPB_MFPL_PB1MFP_UART2_TXD);
      /* Set PB2 multi-function pins for UART1 RXD*/
       SYS->GPB_MFPL &= ~(SYS_GPB_MFPL_PB2MFP_Msk | SYS_GPB_MFPL_PB3MFP_Msk);
       SYS->GPB_MFPL |= (SYS_GPB_MFPL_PB2MFP_UART1_RXD);

}
```

2.1.3 UART1 TX and UART2 RX Single Wire 设定

```
void UART2RX_UART1TX()
{
      /* Set input mode for UART1 RX  */
       GPIO_SetMode(PB, BIT2, GPIO_MODE_INPUT);
      /* Set input mode for UART2 TX  */
       GPIO_SetMode(PB, BIT1, GPIO_MODE_INPUT);
      /* Set PB0 multi-function pins for UART2 RXD*/
       SYS->GPB_MFPL &= ~(SYS_GPB_MFPL_PB1MFP_Msk|SYS_GPB_MFPL_PB0MFP_Msk);
       SYS->GPB_MFPL |= (SYS_GPB_MFPL_PB0MFP_UART2_RXD);
     /* Set PB3 multi-function pins for UART1 TXD*/
       SYS->GPB_MFPL &= ~(SYS_GPB_MFPL_PB2MFP_Msk | SYS_GPB_MFPL_PB3MFP_Msk);
       SYS->GPB_MFPL |= (SYS_GPB_MFPL_PB3MFP_UART1_TXD);
}
```

3 软件与硬件环境

- 软件环境
  - BSP 版本
    - M480 Series BSP CMSIS v3.03.001
  - IDE 版本
    - Keil uVersion 5.24
- 硬件环境
  - 电路组件
    - NuMaker-PFM-M487 v3.0
    - Micro USB
  - 示意图



4 目录信息

- EC_M480_UART_SingleWire_V1.00
  - Library — Sample code header and source files
    - CMSIS — Cortex® Microcontroller Software Interface Standard (CMSIS) by Arm® Corp.
    - Device — CMSIS compliant device header file
    - StdDriver — All peripheral driver header and source files
  - SampleCode
    - ExampleCode — Source file of example code

5 如何执行范例程序

1. 根据目录信息章节进入 ExampleCode 路径中的 KEIL 文件夹，双击 UART_SingleWire.uvproj。
2. 进入编译模式接口
   a. 编译
   b. 下载代码至内存
   c. 进入 / 离开除错模式
3. 进入除错模式接口
   a. 执行代码

6 修订纪录

Date	Revision	Description
Jul. 11, 2019	1.00	1. 初始发布.

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