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7546 群

总线冲突检测功能

1. 要点

本篇资料举例介绍了如何使用 7546 群单片机的总线冲突检测功能。

2. 说明

该应用说明适用于以下单片机和使用条件：

适用单片机： 7546 群

振荡频率： 8 MHz

关于 SFR 寄存器的配置，此参考程序可能包含一些对未使用功能位的操作。请用户根据系统的使用情况设置这些位的值。

3. 内容

3.1 总线冲突检测功能

总线冲突检测中断功能允许串行 I/O1 检测传输过程中的总线冲突。

如果在时钟同步或者时钟异步（UART）串行 I/O 模式开始接收，就与接收移位时钟的上升沿同步，进行发送管脚 TxD_1 和接收管脚 RxD_1 的比较。在比较结果不一致的情况下，发出总线冲突检测中断请求。

在时钟同步模式，发送数据的冲突检测在发送数据的 LSB 和 MSB 之间进行；在 UART 模式，发送数据的冲突检测在发送数据的开始位和停止位之间进行。无论内部时钟还是外部时钟的情况，都能检测总线冲突。

注意：在串行 I/O1 以双工通信模式运行时，可以使用总线冲突检测功能；在串行 I/O1 以半双工通信运行时，必须禁止总线冲突检测中断。

时序图如图 1 所示。

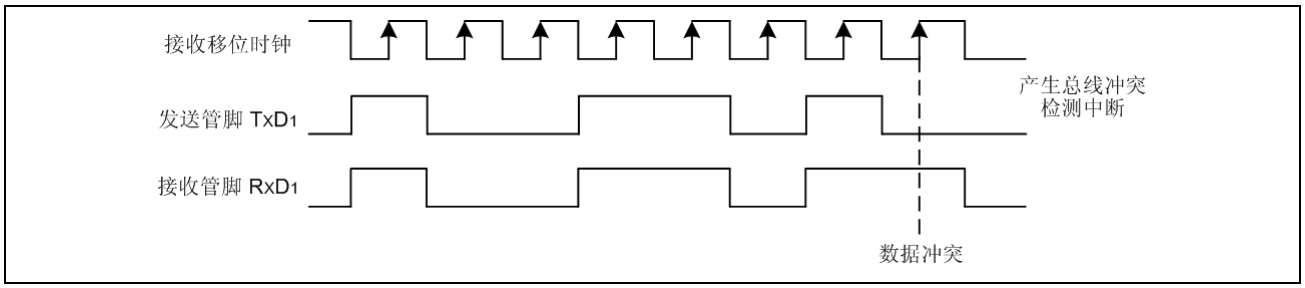


图 1　时序图

3.2 应用实例

在本例中，使用 UART1 总线冲突检测（U1BC）功能在多机系统中，对来自不同单片机的 UART 发送请求进行仲裁。系统描述如下。

- 使用 $P1_1/TxD_1$ 的 N 沟道开路输出功能；
- 所有单片机的 RxD_1 和 TxD_1 管脚都连接到同一条单线总线上。在这条总线上配有上拉电阻（内部或外部）；
- 总是允许接收，即使在发送中。

连接图如图 2 所示。

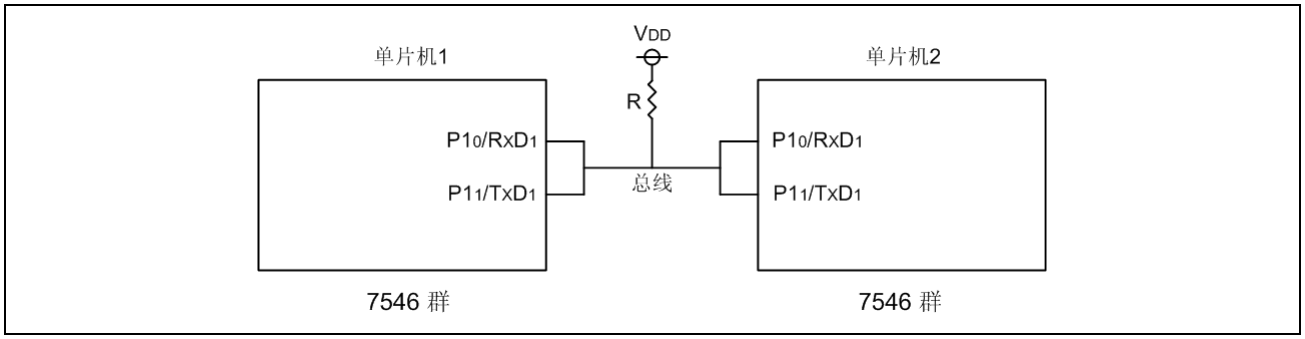
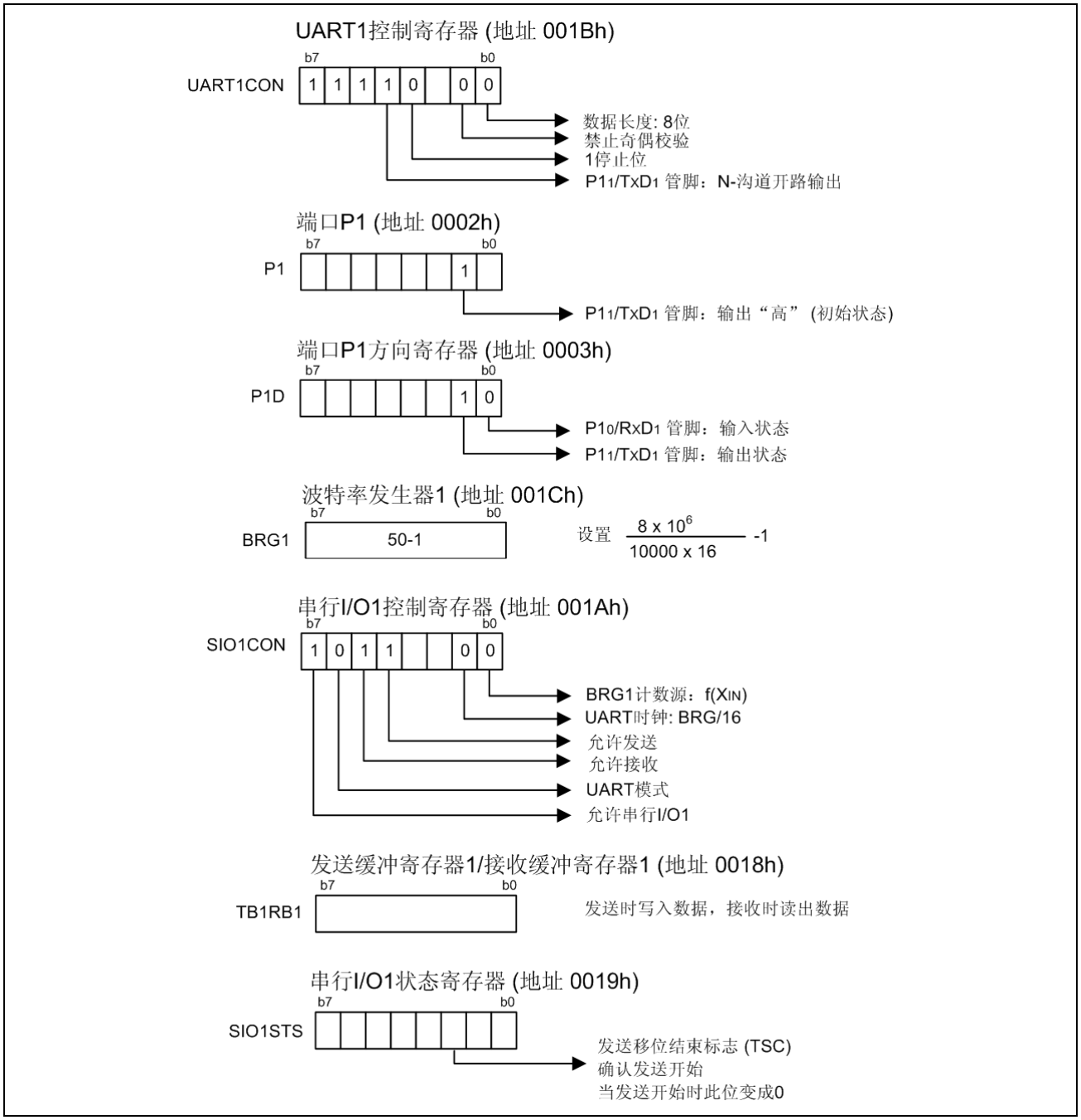


图 2　连接图

带有上拉电阻的 N 沟道开路输出总线允许多个带有不同输出电平的 TxD 管脚连接到一起。在这样的总线上，“低”电平信号比“高”电平信号具有更高的优先级。也就是说，如果“高”、“低”电平被同时输出到总线时，“高”电平会被“低”电平取代。这时，通过 TxD 输出“高”电平的设备实际通过 RxD 收到的是“低”电平。TxD 和 RxD 的不一致会触发 U1BC 中断，这表示它在仲裁中失败。

本系统包括两个 M37546 单片机。发送和接收的波特率都是 10KHz。每一个设备在完成系统的初始化以后独立地启动发送程序。一旦其中一个开始发送，另一个就会进入接收状态。如果两个单片机同时（或在相隔很短时间内）启动发送，那么就会发生仲裁。仲裁从起始位开始逐位比较两个单片机的输出，如果在某一位上两个单片机所发送的数据不同，按照上面所介绍的规则，输出“高”电平的单片机将失去总线的控制权并且立刻停止发送。

相关寄存器设定方法如图 3 所示，主函数流程图如图 4 所示，中断处理函数流程图如图 5 所示。



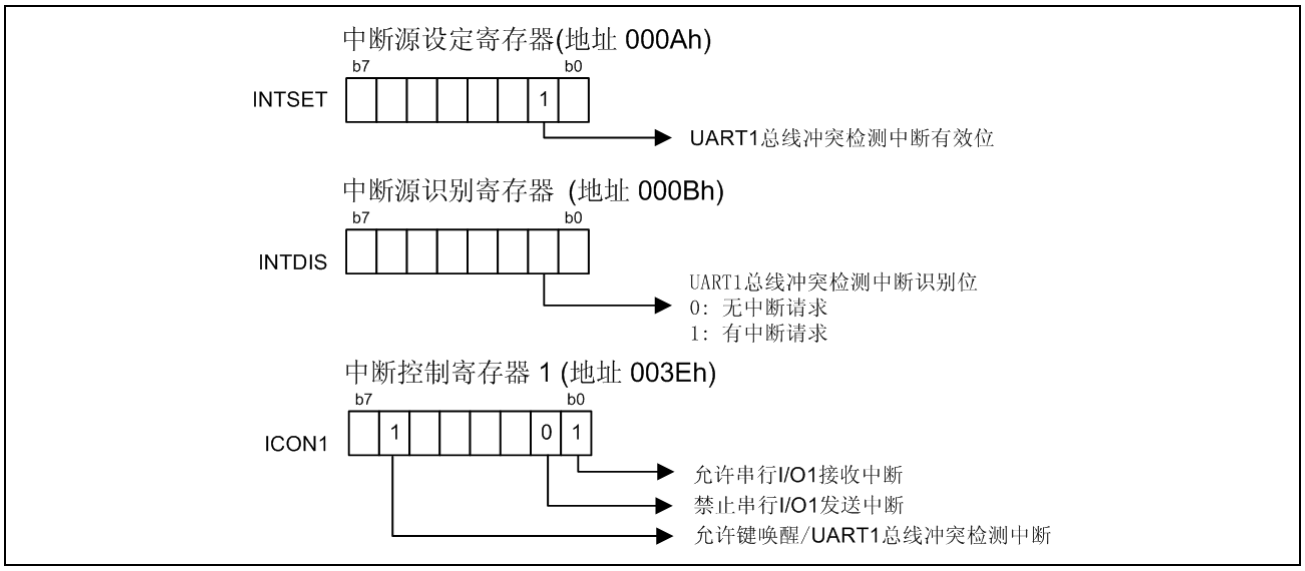


图 3　相关寄存器设定方法

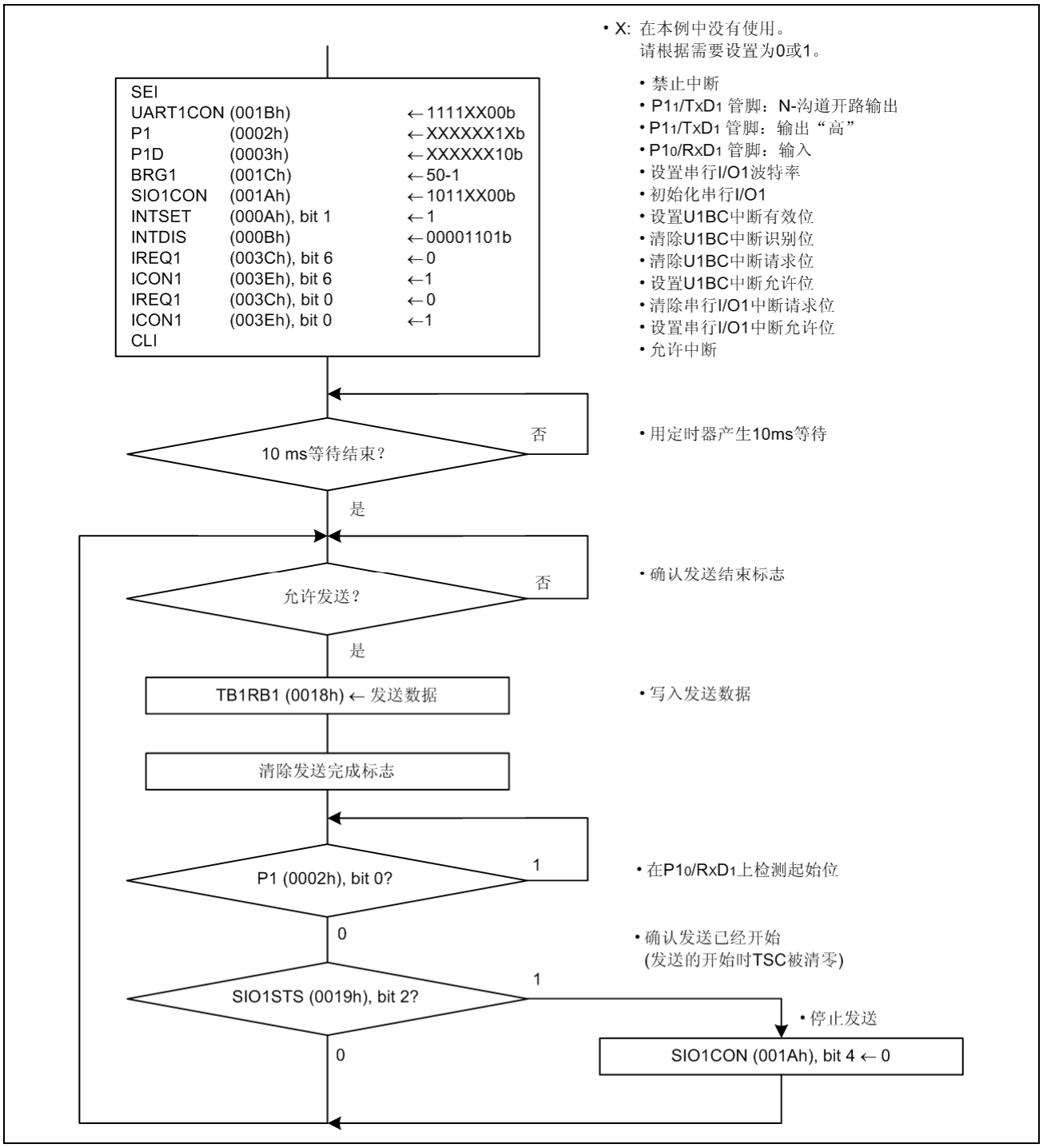

• X: 在本例中没有使用。
请根据需要设置为0或1。
SEI
UART1CON (001Bh) ← 1111XX00b
P1 (0002h) ← XXXXXX1Xb
P1D (0003h) ← XXXXXX10b
BRG1 (001Ch) ← 50-1
SIO1CON (001Ah) ← 1011XX00b
INTSET (000Ah), bit 1 ← 1
INTDIS (000Bh) ← 00001101b
IREQ1 (003Ch), bit 6 ← 0
ICON1 (003Eh), bit 6 ← 1
IREQ1 (003Ch), bit 0 ← 0
ICON1 (003Eh), bit 0 ← 1
CLI
• 禁止中断
• P11/TxD1 管脚：N-沟道开路输出
• P11/TxD1 管脚：输出“高”
• P10/RxD1 管脚：输入
• 设置串行I/O1波特率
• 初始化串行I/O1
• 设置U1BC中断有效位
• 清除U1BC中断识别位
• 清除U1BC中断请求位
• 设置U1BC中断允许位
• 清除串行I/O1中断请求位
• 设置串行I/O1中断允许位
• 允许中断
10 ms等待结束?
否
是
• 用定时器产生10ms等待
允许发送?
否
是
• 确认发送结束标志
TB1RB1 (0018h) ← 发送数据
• 写入发送数据
清除发送完成标志
P1 (0002h), bit 0?
1
0
• 在P10/RxD1上检测起始位
• 确认发送已经开始
(发送的开始时TSC被清零)
SIO1STS (0019h), bit 2?
1
0
• 停止发送
SIO1CON (001Ah), bit 4 ← 0

图 4　主函数流程图

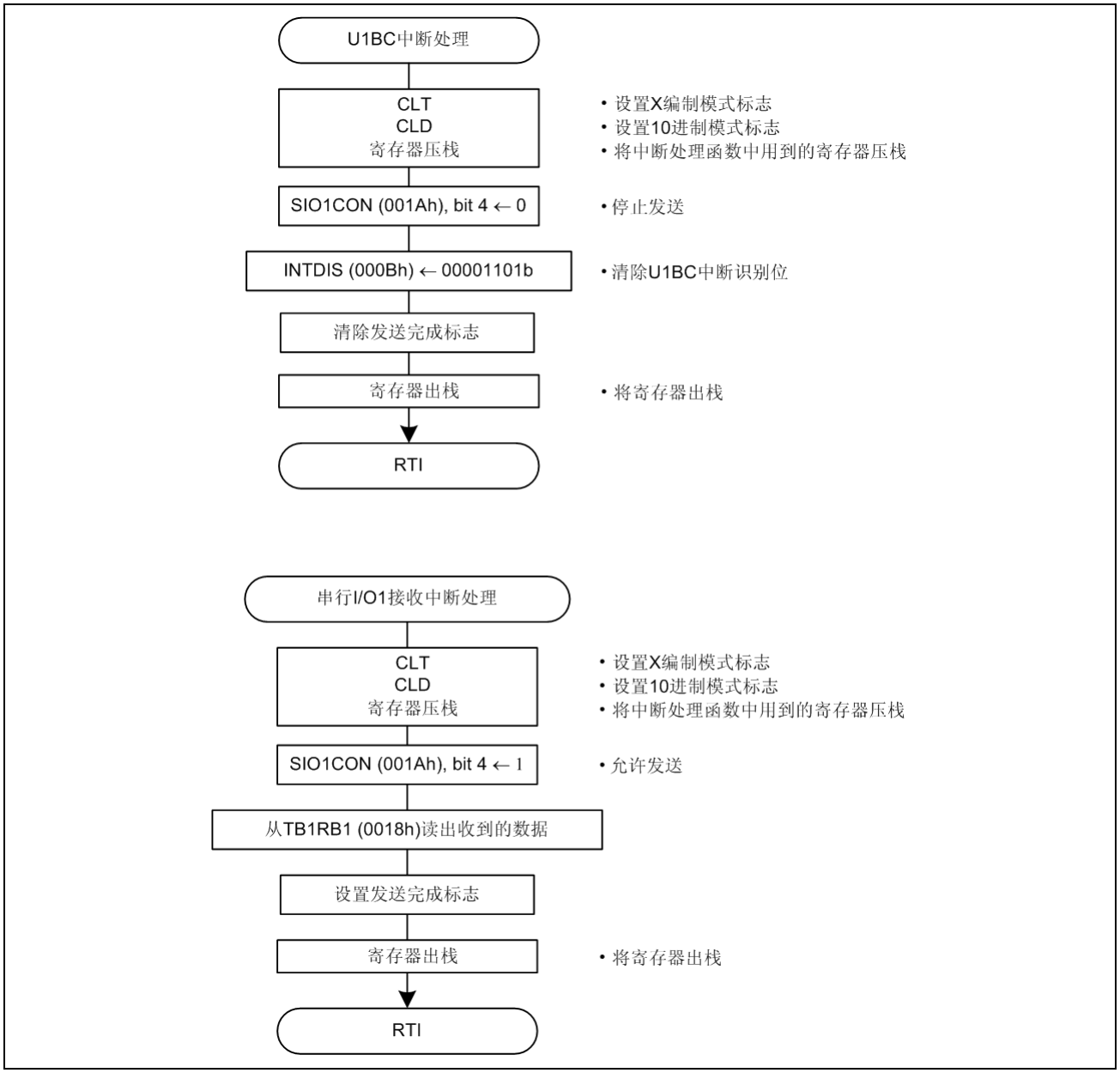


图 5　中断处理函数流程图

4. 参考例程

请从瑞萨科技网站上下载参考例程。

在 7546 群的网页上单击左边的“Application Notes”下载应用笔记。

5. 参考文献

数据手册

7546 群硬件手册

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