姚文祥(Joseph Yiu)关于 YIELD 指令的邮件

因由：

2011 年 1 月在圣塔克拉拉会展中心的 RTECC（Real-Time & Embedded Computing Conference)展会上，我问 ARM 展台的产品经理 Robert Boys 先生：为什么 Cortex-M3 不支持 YIELD 指令。他说：没有这回事（it is not true）。

回家后，我找到了姚文祥的原文，当晚给 Bob Boys 发了一份邮件，并告知，我想借用 YIELD 实现实时多任务的切换，而不借助于 RTOS。

Robert Boys 把邮件转给了 ARM 权威姚文祥，姚先生第二天给我回了邮件，说明 YIELD 指令是为具有"**硬件多线程处理能力**"的处理器而预设的。目前还没有这样的处理器，所以等效于 NOP。

Joseph 还说到，可用 Cortex-M 的 SVC 来实现这种切换。这与我以前的想法一致，所以我回应说：我知道怎么办了。

原文（已抹去邮箱地址）：

From: Joseph Yiu
Sent: Friday, January 28, 2011 3:14 AM
To: fy_zhu
Cc: Bob Boys
Subject: RE: A Question about the YIELD instruction of the ARM Cortex-M

Dear Mr Zhu,

The yield instruction is usually used with processors with hardware multi-threading capability. Since none of the existing Cortex-M processors have this feature, this instruction is executed as NOP on all current Cortex-M processors.

In systems with hardware multi-threading, the processor itself is aware of the contexts available and therefore can handle the switching of its threads in hardware rather than need to have software intervention. Status registers will likely to be available (if this feature is available) so that OS task scheduler can then put the task in a "waiting" queue.

In traditional OS design, instead of using the yield instruction, you can add an API in your OS which call SVC service. When the OS receive such request, it know that the task can be put in a "waiting" queue and switch to another task immediately.

Hope this help.
Regards,
Joseph

From: FY_ZHU
Sent: Thursday, January 27, 2011 8:06 PM
To: Bob Boys

利用中断或异常实现协程多任务的切换

-- 微控制器中基于协程的实时协作多任务方法 (5) 附件　朱丰毅 2013-02

Cc: 朱 丰毅

Subject: A Question about the YIELD instruction of the ARM Cortex-M

Hi, Mr. Robert Boys,

I’m glad seeing you at RTECC show today.

I had worked with 8051 for many years. Now I want to move to the Cortex-M0/M3. I consider to use a simple method to implement multi-task switching without RTOS in a compact real-time system. I believe that the YIELD instruction of Cortex-M series may be useful .

But in the book <The definitive guide to the ARM Cortex-M3>, Joseph Yiu wrote , number of Thumb instructions are not supported in the Cortex-M3 and the hint instruction YIELD behaves as NOP . I also hope , as you said , it is not true .

I can’t find more detailed description about this hint instruction YIELD in ARM’s user documents .
My questions are ,
How does the YIELD instruction of the Cortex-M work in detail ?
(how to indicate to hardware: MCU core? By setting flags ? Interrupt ?)
Which architectures of the Cortex-M support the the YIELD instruction (if the Cortex-M3 does not)?
(in multi-processor system ONLY ? or also in uniprocessor system ?)

Would you please give me some hints and examples ?

Best regards,

Fengyi ZHU

Jan 27, 2011

注：
本文是
《利用中断或异常实现协程多任务的切换》
[-- 微控制器中基于协程的实时协作多任务方法 (5)]
的附件。见 http://blog.chinaaet.com/detail/31933.html

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