

*TMS320 DSP
DESIGNER'S NOTEBOOK*

'C3x Block Repeat

APPLICATION BRIEF: SPRA196

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'C3x Block Repeat



Abstract

The setup time for a repeat block is four cycles. This document shows how a designer can move most of the setup to an initialization phase and reduce the overhead during algorithm execution. Code examples are given comparing the standard algorithm to the faster algorithm.



Design Problem

The setup time for a repeat block is four cycles. How can I move most of the setup to an initialization phase and reduce the overhead during algorithm execution?

Solution

The repeat block requires that: (1) the RM bit in the status register be set, and (2) the RE, RS, and RC registers be loaded. All but the RM can be pre-initialized. During program execution, the RM bit can be set with an OR instruction. Example 1 and Example 2 show samples for comparison. The algorithm in Example 2, which contains the preinitialized RE and RS registers, will execute faster. If executed repeatedly, the cycle savings could be significant.

Example 1. Standard RPTB Initialization

```
        .text
        .
        .
        LDI N-1,RC
        RPTB InnerLoop (1)
        . ; first loop inst
        .
        .
InnerLoop: . ; last loop inst
        .
```

Note: RPTB InnerLoop is a 4-cycle instruction.

Example 2. Faster RPTB Execution

```
        ; initialize pointers to RS and RE
        .data
RPTBEndAddr .word RPTBEnd
RPTBStartAddr .word RPTBStart
        ; initialize RE and RS
        .text
        LDP RPTBEndAddr
        LDI @RPTBEndAddr,RE
        LDP RPTBStartAddr
        LDI @RPTBStartAddr,RS
        .
        .text
        .
        LDI N-1,RC
        OR 0100,ST ;RM =1 (2)
RPTBStart . ; first loop inst
        .
RPTBEnd . ; last inst
```

Note: OR 0100h,ST is a 1-cycle instruction.