

Best Practice for WRR Command for SPI Devices

AN200381 describes precautions that need to be considered to minimize the risk of corrupting the configuration and status registers caused by power loss or system reset after a command to modify the nonvolatile and OTP bits is issued (WRR command).

1 Introduction

Cypress SPI NOR Flash devices offer status registers (SR1 and SR2) and configuration registers (CR1) to query the status and control the features of the memory device and allowing user configuration. As described in the [data sheet](#) some of the bits can be modified, others are read-only. Furthermore, some of the bits are volatile, others are non-volatile; some bits can be programmed only once, others may be modified from a logical 0 to 1 and back.

This document describes precautions that need to be considered to minimize the risk of corrupting the configuration and status registers caused by power loss or system reset after a command to modify the non-volatile and OTP bits is issued (WRR command).

2 Write Registers (WRR) Command

As described in the [data sheet](#), the WRR command is used to write and modify the contents of the status register (SR1) and configuration register (CR1) at the same time. Since these registers control the lock status of the memory device as well as the configuration of the I/O, it is crucial to maintain a stable operating condition while the command is executed. The internally timed program operation is running an algorithm to maintain a normal read window and stable data. A power loss event during this operation may corrupt the register settings. This can cause a locked or misconfigured device. Besides the described power event, a reset could cause the same issue. Once the device is locked or misconfigured the user application may not be able to recover.

3 Best Practice

Cypress recommends minimizing the number of program operations using the WRR command. It is common practice to set the flash configuration registers during production to a permanent state, which is unlikely to be modified during the product life cycle, in order to avoid additional use of the WRR command.

It is strongly recommended to maintain a stable power supply condition, e.g. don't connect or disconnect a large load to the power supply, after the WRR command is issued. The memory device should not undergo any Reset operations once the WRR command has been issued.

Document History Page

Document Title: AN200381 - Best Practice for WRR Command for SPI Devices				
Document Number: 002-00381				
Rev.	ECN No.	Orig. of Change	Submission Date	Description of Change
**	–	–	01/29/2014	Initial version
*A	4994199	MSWI	10/29/2015	Updated in Cypress template
*B	5414975	AHCL	08/25/2016	Updated to make the document generic to SPI devices Updated title Updated template

Worldwide Sales and Design Support

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturers' representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

Products

ARM® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Lighting & Power Control	cypress.com/powerpsoc
Memory	cypress.com/memory
PSoC	cypress.com/psoc
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless/RF	cypress.com/wireless

PSoC® Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#)

Cypress Developer Community

[Forums](#) | [Projects](#) | [Video](#) | [Blogs](#) | [Training](#) | [Components](#)

Technical Support

cypress.com/support

MirrorBit®, MirrorBit® Eclipse™, ORNAND™, EcoRAM™ and combinations thereof, are trademarks and registered trademarks of Cypress Semiconductor Corp. All other trademarks or registered trademarks referenced herein are the property of their respective owners.



Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709

Phone : 408-943-2600
Fax : 408-943-4730
Website : www.cypress.com

© Cypress Semiconductor Corporation, 2011-2016. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.