The following document contains information on Cypress products. The document has the series name, product name, and ordering part numbering with the prefix “MB”. However, Cypress will offer these products to new and existing customers with the series name, product name, and ordering part number with the prefix “CY”.

How to Check the Ordering Part Number

1. Go to www.cypress.com/pcn.
2. Enter the keyword (for example, ordering part number) in the **SEARCH PCNS** field and click **Apply**.
3. Click the corresponding title from the search results.
4. Download the Affected Parts List file, which has details of all changes

For More Information

Please contact your local sales office for additional information about Cypress products and solutions.

About Cypress

Cypress is the leader in advanced embedded system solutions for the world's most innovative automotive, industrial, smart home appliances, consumer electronics and medical products. Cypress' microcontrollers, analog ICs, wireless and USB-based connectivity solutions and reliable, high-performance memories help engineers design differentiated products and get them to market first. Cypress is committed to providing customers with the best support and development resources on the planet enabling them to disrupt markets by creating new product categories in record time. To learn more, go to www.cypress.com.

May 27, 2011

Datasheet Errata for the MB9B500/400/300/100/MB9A100 Series Gap between Watch Counter Value and Real Time at Return in Timer Mode, FM3 Family 32-Bit Microcontroller

This document describes the errata for the MB9B500/400/300/100/MB9A100 series Gap between Watch Counter Value and Real Time at Return in Timer Mode, FM3 Family 32-Bit Microcontroller. Compare this document to the device's data sheet for a complete functional description.

Contact your local Cypress Sales Representative if you have questions.

Part Numbers Affected

Part Number
MB9B500/400/300/100/MB9A100 Series

Description

It has found that there is a gap between the value of the counter and the real time at the return by the interrupt in the sub-timer mode or the low speed CR timer mode.
This document describes the root case and the workaround.

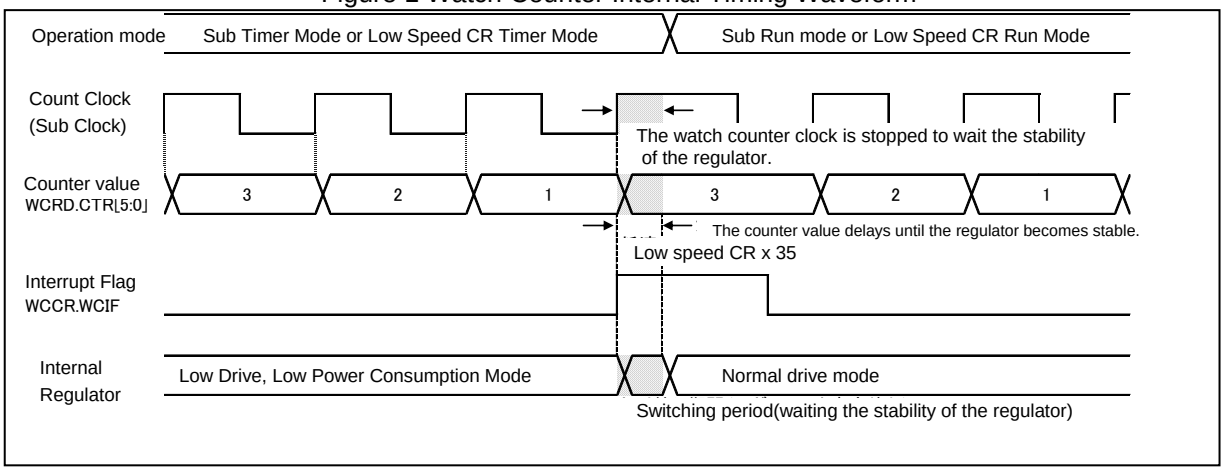
Applicable Devices

Series Name	MB Part Number
MB9B500 series	MB9BF504N,MB9BF505N,MB9BF506N MB9BF504R,MB9BF505R,MB9BF506R
MB9B400 series	MB9BF404N,MB9BF405N,MB9BF406N MB9BF404R,MB9BF405R,MB9BF406R
MB9B300 series	MB9BF304N,MB9BF305N,MB9BF306N MB9BF304R,MB9BF305R,MB9BF306R
MB9B100 series	MB9BF102N,MB9BF104N,MB9BF105N,MB9BF106N MB9BF102R,MB9BF104R,MB9BF105R,MB9BF106R
MB9A100 series	MB9AF102N,MB9AF104N,MB9AF105N MB9AF102R,MB9AF104R,MB9AF105R

Details

When the watch counter using the sub-crystal oscillator is used in the sub timer mode or the low speed CR timer mode, the value of the watch counter has a “Low speed CR x 35clock” delay (about 350us at waiting for the stability of the regulator) at the return by the interrupt. As a result, a gap occurs between the value of the counter and the real time.
The following figure shows the timing waveform.

Figure 1 Watch Counter Internal Timing Waveform



Root Cause

The internal regulator operates with low drive and low power consumption in the sub timer mode or the low speed CR timer mode.
When the interrupt is requested, the mode of the internal regulator is switched to the normal drive mode. At this time, a switching time for the stability of the regulator is required.
This MCU is designed for keeping down the voltage variation of the regulator by reducing the current. To achieve it, the clock to the watch counter is stopped in the period.

At a result, the value of the watch counter delay until the time for the stability of the regulator as shown in the Figure 1. Therefore, a gap occurs between the value of the counter and the real time.

Occurrence Condition

When both of (1) and (2) described in below is applicable, the gap occurs.

(1) CPU Operation Mode

- The gap occurs in the sub timer mode or the low speed CR mode.

  It does not occur in the following mode.
  - Run modes (PLL, main, high speed CR, sub, and low speed CR)
  - Sleep modes (PLL, main, high speed CR, sub, low speed CR)
  - PLL timer mode
  - Main timer mode
  - High speed CR timer mode
  - Stop mode

(2) Return Factor

- The gap occurs when any of the following interrupt is requested for the return in the sub timer mode or the low speed CR timer mode.

- NMI interrupt
- External interrupt
- Hardware Watchdog Timer interrupt
- USB Wakeup interrupt
- Watch Counter interrupt
- Low-voltage detection interrupt

- The gap does not occur in the standby return by the reset because the value of the counter is cleared.

Work Around

- When the extremely accuracy is required for the count time of the watch counter, use the sub sleep mode or the low speed CR sleep mode.

Document History Page

Document Title: Datasheet Errata for the MB9B500/400/300/100/MB9A100 Series Gap between Watch Counter Value and Real Time at Return in Timer Mode, FM3 Family 32-Bit Microcontroller Document Number: 002-06782			
Rev.	**ECN No.**	**Orig. of Change**	**Description of Change**
**	-	NNAK	Initial release.
*A	5690135	NNAK	Migrated to Cypress format

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

© Cypress Semiconductor Corporation, 2011-2017. 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, 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.