
SmartFusion2 MSS

Watchdog Timer Configuration



Table of Contents

Configuration Options	3
Configuration Options	3
A Product Support	5
Customer Service	5
Customer Technical Support Center	5
Technical Support	5
Website	5
Contacting the Customer Technical Support Center	5
ITAR Technical Support	6

Configuration Options

The Watchdog Timer is an Advanced Peripheral Bus (APB) slave that guards against system crashes by requiring that it is regularly serviced by the ARM® Cortex™-M3 microcontroller or by a bus master in the field programmable gate array (FPGA) fabric. For complete details please refer to the Microsemi SmartFusion2 User's Guide.

Configuration Options

Enabling/Disabling the watchdog - The Watchdog Timer can be enabled or disabled by using Flash Bits or by using the ARM® Cortex™-M3 microcontroller firmware. Once disabled, the Watchdog Timer can only be re-enabled as a result of a power-up reset. On the MSS canvas, you can enable/disable the watchdog instance ([Figure 1](#)).



Figure 1 • Disabled Watchdog

Timeout - A control bit in the WDOGCONTROL register is used to determine whether the Watchdog Timer generates a reset or an interrupt, if a counter timeout occurs ([Figure 2](#)). The default setting is reset generation on timeout. When interrupt generation is selected, the WDOGTIMOUTINT output is asserted on timeout and remains asserted until the interrupt is cleared. When reset generation is selected, the Watchdog Timer does not directly generate the system reset signal. Instead, when the counter reaches zero, the Watchdog Timer generates a pulse on the WD_TIMEOUT output and this is routed to the reset controller to cause it to assert the necessary reset signals.

The pulse on the WD_TIMEOUT output is generated in the RCOSCCLK domain and has duration of one clock cycle. Use the Timeout behavior option to set the WDOGCONTROL register value loaded (Flash Bits) at POR and/or when the device is reset (DEV_RST_N is asserted/de-asserted).



Figure 2 • Timeout Configuration

Interrupt Port - If the Timeout behavior option has been set to Interrupt ([Figure 2](#)) you can expose the WD_TIMEOUT port to the FPGA fabric by checking the Expose WD_TIMEOUT port to Fabric check box.

Refresh Count - The WDOGLOAD register is used to store the value that is loaded into the counter each time the Watchdog Timer is refreshed ([Figure 3](#)). The six least significant bits of the WDOGLOAD register are always set to 0x3F, irrespective of what value is written to it. This effectively means that there is a lower limit on the value that can be written to the counter. Use the Refresh Count option to set the

WDOGLOAD register value loaded (Flash Bits) at POR and/or when the device is reset (DEVRST_N is asserted/de-asserted).

Refresh Count	0x1800000
---------------	--

Figure 3 • Refresh Count Configuration

Counter Threshold - The Watchdog Timer counter is refreshed by writing the value 0xAC15DE42 to the WDOGREFRESH register (Figure 4). This causes the counter to be loaded with the value in the WDOGLOAD. An appropriate value must be written to the WDOGLOAD System register before writing to the WDOGREFRESH register. Forbidden and permitted windows in time regulate when refreshing can occur.

The size of these windows is controlled by the value in the WDOGMVRP System register. When the counter value is greater than the value in the WDOGMVRP, refreshing the Watchdog Timer is forbidden. If a refresh is executed in these circumstances, the refresh is successful, but a reset or interrupt (depending on Operation mode selected) is also generated. When the counter value falls below the level programmed in the WDOGMVRP, refreshing of the Watchdog Timer is permitted.

It is possible to avoid having forbidden and permitted windows by ensuring that the value in the WDOGMVRP is greater than the value in the WDOGLOAD. Use the Refresh Count option to set the WDOGLOAD register value loaded (Flash Bits) at POR and/or when the device is reset (DEVRST_N is asserted/de-asserted).

Counter Threshold	0xFFFFFFFF
-------------------	---

Figure 4 • Counter Threshold Configuration

A – Product Support

Microsemi SoC Products Group backs its products with various support services, including Customer Service, Customer Technical Support Center, a website, electronic mail, and worldwide sales offices. This appendix contains information about contacting Microsemi SoC Products Group and using these support services.

Customer Service

Contact Customer Service for non-technical product support, such as product pricing, product upgrades, update information, order status, and authorization.

From North America, call 800.262.1060

From the rest of the world, call 650.318.4460

Fax, from anywhere in the world, 408.643.6913

Customer Technical Support Center

Microsemi SoC Products Group staffs its Customer Technical Support Center with highly skilled engineers who can help answer your hardware, software, and design questions about Microsemi SoC Products. The Customer Technical Support Center spends a great deal of time creating application notes, answers to common design cycle questions, documentation of known issues, and various FAQs. So, before you contact us, please visit our online resources. It is very likely we have already answered your questions.

Technical Support

Visit the Customer Support website (www.microsemi.com/soc/support/search/default.aspx) for more information and support. Many answers available on the searchable web resource include diagrams, illustrations, and links to other resources on the website.

Website

You can browse a variety of technical and non-technical information on the SoC home page, at www.microsemi.com/soc.

Contacting the Customer Technical Support Center

Highly skilled engineers staff the Technical Support Center. The Technical Support Center can be contacted by email or through the Microsemi SoC Products Group website.

Email

You can communicate your technical questions to our email address and receive answers back by email, fax, or phone. Also, if you have design problems, you can email your design files to receive assistance. We constantly monitor the email account throughout the day. When sending your request to us, please be sure to include your full name, company name, and your contact information for efficient processing of your request.

The technical support email address is soc_tech@microsemi.com.

My Cases

Microsemi SoC Products Group customers may submit and track technical cases online by going to [My Cases](#).

Outside the U.S.

Customers needing assistance outside the US time zones can either contact technical support via email (soc_tech@microsemi.com) or contact a local sales office. [Sales office listings](#) can be found at www.microsemi.com/soc/company/contact/default.aspx.

ITAR Technical Support

For technical support on RH and RT FPGAs that are regulated by International Traffic in Arms Regulations (ITAR), contact us via soc_tech_itar@microsemi.com. Alternatively, within [My Cases](#), select **Yes** in the ITAR drop-down list. For a complete list of ITAR-regulated Microsemi FPGAs, visit the [ITAR](#) web page.



Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo CA 92656 USA
Within the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996

Microsemi Corporation (NASDAQ: MSCC) offers a comprehensive portfolio of semiconductor solutions for: aerospace, defense and security; enterprise and communications; and industrial and alternative energy markets. Products include high-performance, high-reliability analog and RF devices, mixed signal and RF integrated circuits, customizable SoCs, FPGAs, and complete subsystems. Microsemi is headquartered in Aliso Viejo, Calif. Learn more at www.microsemi.com.

© 2012 Microsemi Corporation. All rights reserved. Microsemi and the Microsemi logo are trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.