
SmartFusion2 Oscillators

Configuration



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Introduction

There are three oscillator blocks in the SmartFusion2 device that can be used in different use models:

- On-chip 25/50 MHz RC Oscillator - This oscillator generates a 50MHz waveform when the core supply voltage is 1.2V and 25MHz when the supply voltage is 1.0V. The device core voltage can be selected from the Libero SoC Device Settings dialog box.
- On-chip 1 MHz RC Oscillator
- Main Crystal Oscillator

The SmartFusion2 oscillators can be used as:

- Dedicated input sources to the FPGA fabric Clock Conditioning Circuitry (CCC)
- Clock sources to any FPGA fabric resource
- Dedicated clock sources to the Micro-controller Sub-system (MSS). You can use the MSS configurator to:
 - Select one of these oscillators as the clock source during Flash*Freeze
 - Select one of these oscillators as the clock source to the Real Time Clock (RTC) block

If you intend to use an oscillator as part of your design you must instantiate and configure the Chip Oscillators core, as described in this document. To configure how the oscillators are used in the MSS, refer to the MSS configurator handbook and the MSS CCC and RTC sub-block handbooks.

Note: The MSS Watchdog block is always clocked by the 25/50 MHz oscillator and you do not need to instantiate the Chip Oscillators core in your design and connect it to the MSS to use the Watchdog.

Configurator Overview

The configurator dialog box is organized as follows:

- The Configuration window displays all the configuration options.
- The Preview box shows you a high level block diagram of how your current configuration relates to the various chip components driven by the various oscillators selected for your design (Figure 1).

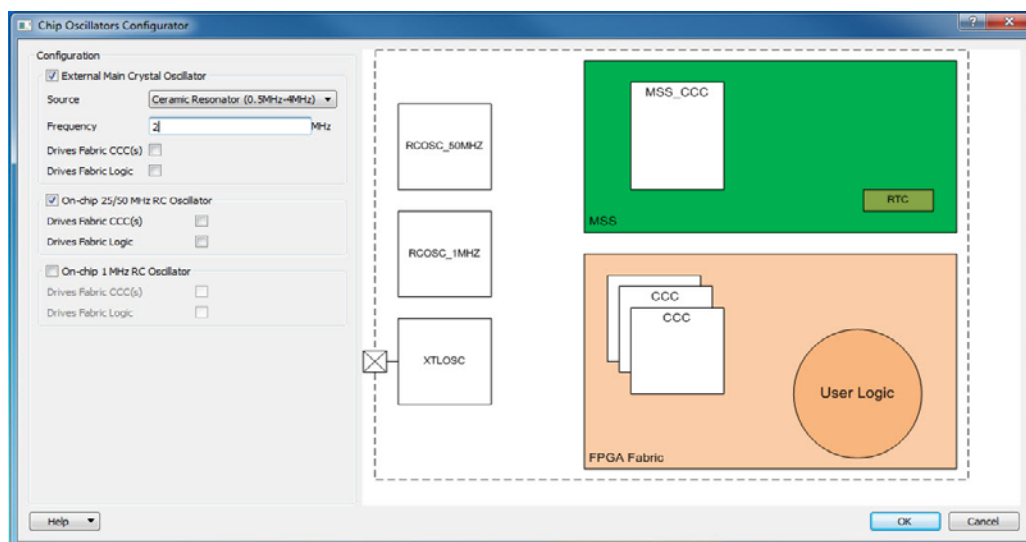


Figure 1 • Oscillators Configuration

1 – Selecting Oscillators and their Connectivity

For each oscillator that you plan to use in your design you must:

1. Select the oscillator by checking the appropriate check-box (Figure 1-1)



Figure 1-1 • Select the Oscillator

2. Select the resource type - FPGA Fabric CCC(s) and/or FPGA Fabric Logic - to which the selected oscillator(s) will be connected (as shown in Figure 1-2).

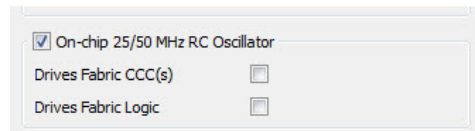


Figure 1-2 • Select the Resource

Each oscillator and each type of logic connects to a port that is exposed on the instance of this core. Each exposed port can only be connected in SmartDesign to a port that matches the type of connection (oscillator and connectivity type) implied by the configuration you make in this core.

For instance, if you configure an FPGA fabric CCC to use the main crystal oscillator, the input port exposed on the CCC for the main crystal oscillator - XTLOSC_CCC_IN - can only be driven by the output port - XTLOSC_CCC_OUT - of the Clock Oscillators core (Figure 1-3).

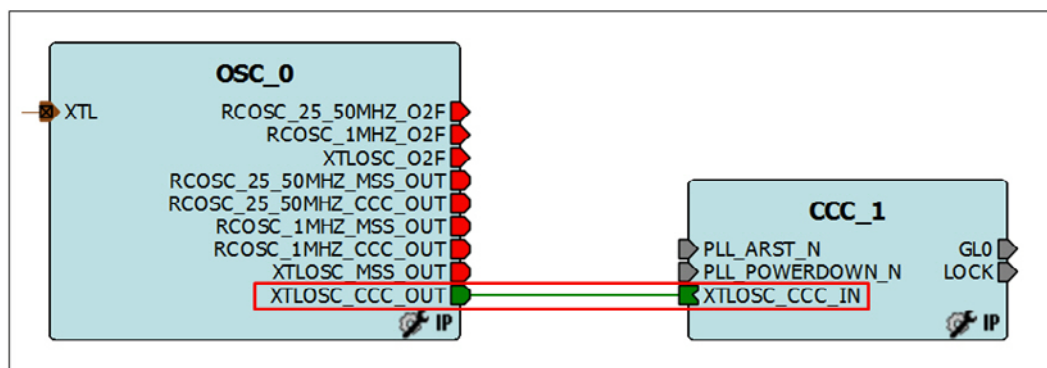
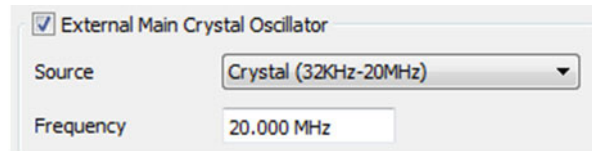


Figure 1-3 • Crystal Oscillator to CCC Connection

2 – Configuring the Main Crystal Oscillator

You must configure the source of the crystal oscillator as well as its frequency (as shown in [Figure 2-1](#)).



External Main Crystal Oscillator

Source: Crystal (32KHz-20MHz)

Frequency: 20.000 MHz

Figure 2-1 • Configuring the Main Crystal Oscillator

The source may be one of the following:

- **Crystal** - The source is an external Crystal. In this configuration the clock frequency must be between 32 KHz and 20 MHz.
- **Ceramic Resonator** - The source is a ceramic resonator. In this configuration the clock frequency must be between 0.5 MHz and 4 MHz.
- **RC Network** - The source is an external RC circuit connected to the main crystal oscillator external pins. In this configuration the clock frequency must be between 32 KHz and 4 MHz.

In all cases, refer to the Microsemi [SmartFusion2 Microcontroller Subsystem User's Guide](#) for details about how the external component (crystal, ceramic resonator and RC network) must be connected on the board to the SmartFusion2 device.

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.



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