# RN0071

## CoreFFT v7.0 Release Notes

Microsemi
Power Matters.

**Microsemi Corporate Headquarters**
One Enterprise, Aliso Viejo,
CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996
E-mail: sales.support@microsemi.com
www.microsemi.com





## About Microsemi

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, Calif., and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

51300071-9/11.16

# 1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

## 1.1 Revision 9.0

Updated changes related to CoreFFT v7.0.

## 1.2 Revision 8.0

Updated changes related to CoreFFT v6.4.

## 1.3 Revision 7.0

Updated changes related to CoreFFT v6.3.

## 1.4 Revision 6.0

Updated changes related to CoreFFT v6.2.

## 1.5 Revision 5.0

Updated changes related to CoreFFT v6.1.

## 1.6 Revision 4.0

Updated changes related to CoreFFT v5.0.

## 1.7 Revision 3.0

Updated changes related to CoreFFT v4.0.

## 1.8 Revision 2.0

Updated changes related to CoreFFT v3.0.

## 1.9 Revision 1.0

Revision 1.0 was the first publication of this document. Created for CoreFFT v2.0.

# Contents

# 2 CoreFFT v7.0 Release Notes

## 2.1 Overview

These release notes accompany the production release of CoreFFT v7.0. This document provides details about the features, enhancements, system requirements, supported families, implementations, and known issues and workarounds.

## 2.2 Features

- Highly configurable DirectCore register transfer level (RTL) generator
- Choice of Radix-2 In-place architecture or Radix-22 Streaming Fast Fourier Transform (FFT)
- Forward and inverse complex FFT
- Transform sizes: 32-, 64-, 128-, 256-, 512-, 1,024-, 2,048-, 4,096-, 8,192-, and 16384-point (in-place architecture), 16-, 32-, 64-, 128-, 256-, 512-, and 1,024-point (streaming architecture)
- 8- to 32-bits I/O real and imaginary data and twiddle coefficients
- Two's complementary I/O data
- Natural input and output sample order
- Selection of conditional or unconditional block floating point scaling (in-place architecture), pre-defined scaling schedule (streaming architecture)
- Embedded RAM-block based twiddle look-up table (LUT)
- Built-in memory buffers
- Handshake signals to facilitate easy interface to the user circuitry

## 2.3 Delivery Types

CoreFFT is freely distributed with Microsemi Libero SoC. Complete HDL source code is provided for the core and testbenches.

## 2.4 Supported Families

- PolarFire
- RTG4™
- SmartFusion®2
- IGLOO®2

## 2.5 Supported Tool Flows

- CoreFFT v7.0 requires Libero® System-on-Chip (SoC) software v11.7 or later.
- Supports Windows® and Linux operating systems

## 2.6 Installation Instructions

The CoreFFT CPZ must be installed into Libero software. This is done automatically through the Catalog update function in Libero, or the CPZ file can be manually added using the Add Core catalog feature. Once the CPZ file is installed in Libero, the core can be configured, generated, and instantiated within SmartDesign for inclusion in the Libero project.

Refer to the *Libero SoC Online Help* for further instructions on core installation, licensing, and general use.

## 2.7 Documentation

This release contains a copy of the *CoreFFT Handbook*. The handbook, describes the core functionality and gives step-by-step instructions on how to simulate, synthesize, and place-and-route this core, and also implementation suggestions. Refer to the *Libero SoC Online Help* for instructions on obtaining IP documentation.

For updates and additional information about the software, devices, and hardware, visit the Intellectual Property pages on the Microsemi SoC Products Group website: visit:

http://www.microsemi.com/products/fpga-soc/design-resources/ip-cores.

## 2.8 Supported Test Environments

The following test environments are supported:

- VHDL user testbench
- Verilog user testbench

## 2.9 Resolved History

Table 1 lists the release history for CoreFFT.

***Table 1 •*** **Release History**

| Version | Date | Changes |
|---|---|---|
| 7.0 | November 2016 | Support for PolarFire family and In-place FFT size of 16384 is added. The Unscaled Streaming architecture option is added. |
| 6.4 | February 2015 | Support for RTG4 family is added. |
| 6.3 | September 2013 | Support for Linux and new devices is added. |
| 6.2 | June 2013 | Support for IGLOO2 family is added. |
| 6.1 | March 2013 | Support for SmartFusion2 family is added. |
| 5.0 | May 2011 | Streaming FFT architecture is added. The v5.0 release supports RTAX-DSP family only. |
| 4.0 | May 2010 | As listed in the Table 8. The v4.0 release supports RTAX-DSP family only. |
| 3.0 | May 2007 | Configurable 8- to 16-bit data precision. |
| 2.0 | September 2005 | Initial release. |

## 2.10 Resolved Issues in the v7.0 Release

**Table 2 • Resolved Issues in the v7.0 Release**

| SAR Number | Changes |
|---|---|
| 64614 | Remove unnecessary ordering info from handbook. |
| 75800 | Add support for PolarFire devices. |
| 75982 | Clarify Streaming FFT bit resolution. |
| 76070 | Add streaming FFT support for Full precision (Unscaled mode) and Controlled Scale Schedule modes. |
| 77985 | Add support for 16K-pt FFT on In-Place implementation. |

## 2.11 Resolved Issues in the v6.4 Release

**Table 3 • Resolved Issues in the v6.4 Release**

| SAR Number | Changes |
|---|---|
| 43888 | Provide support for all devices of supported families. |
| 47549 | Indicate device type used for utilization and performance data of the handbook. |
| 59864 | Fix VHDL code causing synthesis failure. |
| 62324 | Add RTG4 support. |

## 2.12 Resolved Issues in the v6.3 Release

**Table 4 • Resolved Issues in the v6.3 Release**

| SAR Number | Changes |
|---|---|
| 50390 | Eliminate REN signal toggling on RTAX-DSP devices. |
| 50391 | Improve Streaming FFT performance. |

## 2.13 Resolved Issues in the v6.2 Release

**Table 5 • Resolved Issues in the v6.2 Release**

| SAR Number | Changes |
|---|---|
| 48056 | Support for IGLOO2 family. |

## 2.14 Resolved Issues in the v6.1 Release

**Table 6 • Resolved Issues in the v6.1 Release**

| SAR Number | Changes |
|---|---|
| 38287 | Support for SmartFusion2 family. |
| 29129 | Support for multiple FFT instances. |

## 2.15 Resolved Issues in the v5.0 Release

***Table 7 •*** **Resolved Issues in the v5.0 Release**

| SAR Number | Changes |
|---|---|
| 32053 | Add streaming architecture. |

## 2.16 Resolved Issues in the v4.0 Release

***Table 8 •*** **Resolved Issues in the v4.0 Release**

| SAR Number | Changes |
|---|---|
| 11570 | Eliminate module names reserved by Libero IDE for other purposes. |
| 11732 | Resolve the core installation issues. |
| 13857 | Indicate in documentation the core output latency. |

## 2.17 Resolved Issues in the v3.0 Release

There were no SARs resolved in the v3.0 release.

## 2.18 Resolved Issues in the v2.0 Release

As this is the initial version, there were no SARs resolved in the v2.0 release.

## 2.19 Discontinued Features and Devices

CoreFFT v7.0 does not support RTAX-DSP (RTAX2000D, RTAX4000D) devices. These devices are supported in CoreFFT v6.3 or earlier versions.

## 2.20 Known Limitations and Workarounds

There are no known limitations and workarounds.

# 3 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.

## 3.1 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**

## 3.2 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.

## 3.3 Technical Support

For Microsemi SoC Products Support, visit
http://www.microsemi.com/products/fpga-soc/design-support/fpga-soc-support.

## 3.4 Website

You can browse a variety of technical and non-technical information on the Microsemi SoC Products Group home page, at http://www.microsemi.com/products/fpga-soc/fpga-and-soc.

## 3.5 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.

### 3.5.1 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.

### 3.5.2 My Cases

Microsemi SoC Products Group customers may submit and track technical cases online by going to My Cases.

### 3.5.3 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. Visit About Us for sales office listings and corporate contacts.

## 3.6 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@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.