Programming and Debug Tools

PolarFire v2.0

Release Notes

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Microsemi

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Revision History

Revision 1.1

Added Known Issue 5.4 SmartDebug Errors on Open/Create Project.
Added Known Issue 5.8 Installation on Windows 7.

Revision 1.0

This is the initial publication of these Release Notes.

Contents

1 PolarFire™ v2.0 Programming and Debug Tools Release Notes

The Libero® system on chip (SoC) PolarFire™ v2.0 release is software for designing with Microsemi PolarFire FPGAs. PolarFire FPGAs are the fifth generation nonvolatile FPGA devices from Microsemi, built on 28-nm flash technology. The PolarFire cost-optimized FPGAs deliver lowest power at mid-range densities.

For more information about Libero SoC PolarFire devices, see the Microsemi website.

The Programming and Debug Tools installer is intended for laboratory and production environments where Libero is not installed or needed. The installer installs the following tools:
- FlashPro (Available on Windows only)
- FlashPro Express
- SmartDebug

1.1 What's New in this Release

This release includes the following new features and enhancements.

1.1.1 Programming

Programming includes the following features and enhancements:
- SPI Flash Programming -- Allows programming of the SPI Flash device connected to the PolarFire device through the JTAG programming interface.
- DirectC
  - Added support for DAT file export
  - Supports SPI and JTAG programming
- Added FlashPro Express standalone support

For details about these features and enhancements, see the following:
- Libero SoC PolarFire Online Help
- FlashPro Express Online Help
- FlashPro Express User Guide

1.1.2 SmartDebug

SmartDebug includes the following new features and enhancements:
- In Libero SoC PolarFire v2.0, SmartDebug has been significantly enhanced to help debug XCVR designs on the board.
- Eye Monitor -- Allows creation of an eye diagram to measure signal quality on the receiver lane. Eye Monitoring estimates the horizontal eye-opening at the receiver serial data sampling point and helps the user select an optimum data sampling point at the receiver. The Eye Monitor feature is non-invasive, and supports both CDR and DFE modes.
- Signal Integrity Widget – Allows users to modify Signal Integrity parameters after programming the device. It is used in conjunction with the Eye Monitor to improve the Eye Plot and ensure the best possible eye area. Once optimal Signal Integrity parameters have been reached, they can be exported into a PDC file that can be used as input to the Libero Constraints Manager tool for generating the final Design Initialization client data.
- Custom DFE Solution – This feature should be used to optimize DFE coefficients on lanes when data rates are greater than 5Gbps. It is used in conjunction with the Eye Monitor to

improve Eye Plot and ensure the best possible eye area. DFE coefficients can also be exported into a custom configuration file that can be used as input to the Design and Memory Initialization tool for generating the final Design Initialization client data.

- SmartBERT - The CoreSmartBERT core provides a broad-based evaluation and demonstration platform for PolarFire transceivers. Parameterizable to use different transceivers and clocking topologies in native PMA mode, the SmartBERT core can also be customized to use different line rates and reference clock rates. Data pattern generators and checkers are included for each Transceiver lane, giving several different Pseudo-random binary sequences.
- Added support to view sNVM clients as organized in the sNVM configurator.
- Programming flow support in Standalone SmartDebug
- Demo mode support – SmartDebug can be invoked without hardware connected

For details, see the PolarFire SmartDebug User Guide.

1.2   System Requirements

- 64-bit OS
    - Windows 7, Windows 8.1, or Windows 10 OS
    - RHEL 5, RHEL 6, RHEL 7, CentOS 5 , CentOS 6, or CentOS 7
        - Programming is not supported on RHEL 5, CentOS 5
- A minimum of 32 GB RAM

Note: Setup instructions for using Libero SoC on Red Hat Enterprise Linux OS are available on the Libero SoC Documents web page. As noted in that document, installation step 2 now includes running a shell script (bin/check_linux_req.sh) to confirm the presence of all required runtime packages.

Note: Support for the following operating systems will cease after December 2017. For more information, refer to PCN17031.

- RedHat Enterprise Linux 5.x through 6.5
- CentOS 5.x through 6.5

2 Device Support

Libero SoC PolarFire Device Support (Devices and packages in **bold** are new in v2.0)

Device	Package	Speed Grade	Core Voltage	Required License
MPF500T_ES	**FCG784_Eval**	-1, STD	1.0/1.05V	Eval/Platinum
	FCG1152_Eval	-1, STD	1.0/1.05V	Eval/Platinum
MPF500TS_ES	**FCG784_Eval**	-1, STD	1.0 /1.05V	Eval/Platinum
	FCG1152_Eval	-1, STD	1.0 /1.05V	Eval/Platinum
MPF300T_ES	FCG484	-1, STD	1.0 /1.05V	Eval/Platinum
	FCG1152	-1, STD	1.0 /1.05V	Eval/Platinum
	FCSG536	-1, STD	1.0 /1.05V	Eval/Platinum
	FCVG484	-1, STD	1.0 /1.05V	Eval/Platinum
	FCG784	-1, STD	1.0/1.05V	Eval/Platinum
MPF300TS_ES	FCG484	STD	1.0 /1.05V	Eval/Gold/Platinum
		-1	1.0 /1.05V	Eval/Gold/Platinum
	FCG1152	STD	1.0 /1.05V	Eval/Platinum
		-1	1.0 /1.05V	Eval/Gold/Platinum
	FCSG536	-1, STD	1.0 /1.05V	Eval/Platinum
	FCVG484	-1, STD	1.0 /1.05V	Eval/Platinum
	FCG784	-1, STD	1.0 /1.05V	Eval/Platinum
MPF200T_ES	**FCSG325_Eval**	-1, STD	1.0 /1.05V	Eval/Gold/Platinum
	FCSG536_Eval	-1, STD	1.0 /1.05V	Eval/Gold/Platinum
	FCVG484_Eval	-1, STD	1.0 /1.05V	Eval/Gold/Platinum
	FCG484_Eval	-1, STD	1.0 /1.05V	Eval/Gold/Platinum
	FCG784_Eval	-1, STD	1.0 /1.05V	Eval/Gold/Platinum
MPF200TS_ES	**Fully Bonded Package**	-1, STD	1.0 /1.05V	Eval/Gold/Platinum
	FCSG325_Eval	-1, STD	1.0/1.05V	Eval/Platinum
	FCSG536_Eval	-1, STD	1.0/1.05V	Eval/Platinum
	FCVG484_Eval	-1, STD	1.0/1.05V	Eval/Platinum
	FCG484_Eval	-1, STD	1.0/1.05V	Eval/Platinum
	FCG784_Eval	-1, STD	1.0/1.05V	Eval/Platinum
MPF100T_ES	**FCSG325_Eval**	-1, STD	1.0/1.05V	Eval/Silver/Gold/Platinum
	FCVG484_Eval	-1, STD	1.0/1.05V	Eval/Silver/Gold/Platinum
	FCG484_Eval	-1, STD	1.0/1.05V	Eval/Silver/Gold/Platinum
MPF100TS_ES	**Fully Bonded Package**	-1, STD	1.0 /1.05V	Eval/Silver/Gold/Platinum
	FCSG325_Eval	-1, STD	1.0/1.05V	Eval/Platinum
	FCVG484_Eval	-1, STD	1.0/1.05V	Eval/Platinum
	FCG484_Eval	-1, STD	1.0/1.05V	Eval/Platinum

See the Licensing web page for licensing details.

3   Design Migration – Cores

For information about design migration and cores for this release, see the Libero SoC PolarFire v2.0 Release Notes.

4   Resolved Issues

The following table lists the customer-reported SARs resolved in Libero PolarFire v2.0. Resolution of previously reported "Known Issues and Limitations" is also noted in this table.

Customer Case #	Description
N/A	Eye Monitor: Eye Diagram UI: Core Team Feedback
N/A	PolarFire Transceiver UI: Too many clicks to add all lanes for debugging
N/A	Update needed for Phy reset in XCVR SmartDebug
N/A	SmartDebug standalone flow -- Export DDC file in Libero does not support bitstream option

5   Known Issues and Limitations

5.1   SPI Flash Programming

This release includes the following limitations:

- Only the Micron SPI Flash is currently supported with the Evaluation Kit.
- The verify time is currently not optimized. It is recommended to authenticate the SPI bitstreams with system services for quicker verification.
- This tool erases the SPI flash prior to programming, and currently does not support Data Storage clients for user data. It is recommended to program the SPI flash with Libero prior to programming other data on the SPI flash.
- Programming time is currently not optimized. It is recommended to not have huge gaps between clients in the SPI flash, since gaps are currently programmed with 1's.

  The following table lists the ERASE, PROGRAM, and VERIFY/READ times for different client sizes. All times are in hh:mm:ss.

  Note: Depending on the SPI-Flash memory silicon version, you may observe a shorter erase time.

	SPI Size	ERASE	PROGRAM	VERIFY/READ	TCK	Programmer
Data client size	1MB	0:3:55	0:2:08	0:14:00	4MHz	FlashPro5
	9 MB	0:3:55	0:17:22	2:46:29	4MHz	FlashPro5
Full SPI Memory Device	128 MB	0:3:55	4:15:50	38:58:42	4MHz	FlashPro 5

- Using the embedded FlashPro5 programmer on the PolarFire Eval Kit may more than double SPI flash programming times. This issue will be resolved in the PolarFire v2.1 release.

  Workaround: Use an external FlashPro5 programmer instead of the embedded programmer.
- The external FlashPro5 programmer TCK is fixed at 4MHz for SPI flash programming. The embedded FlashPro5 programmer is fixed at 1MHz for SPI flash programming.

  The TCK frequency in the Programmer Setting is not applicable for SPI-Flash Programming. This issue will be resolved in the PolarFire v2.1 release.
- SPI Bitstream content option "Filled with 1s" does not work for the SPI Flash. "Generate SPI Flash Image" and "Export SPI Flash Image" will fail if this option is selected.

  Workaround: Specify content to be "SPI Bitstream file for IAP", "SPI Bitstream file for Recovery/Golden", or "SPI Bitstream file for Auto Update".

5.2   SPI-Slave Programming

SPI-Slave programming is not supported for PolarFire.

5.3   SmartDebug

This release includes the following limitations:

- Standalone SmartDebug: Non Microsemi Devices in chain: Microsemi devices present in chain along with non-Microsemi devices cannot be debugged using standalone SmartDebug.

   Workaround: Users should use SmartDebug through Libero flow to debug Microsemi Devices

- Standalone SmartDebug: ID Code of Microsemi device cannot be read when non-Microsemi device is connected in chain when using standalone SmartDebug

- Logical View: The logical view cannot be reconstructed for:

   o LSRAM/uSRAM for port widths of x1 inferred through RTL.

   o LSRAM/uSRAM configurations when a single net of output bus is used i.e. A_DOUT[0]/B_DOUT[0] for DPSRAM/uSRAM and RD[0] for TPSRAM and others are unused. The memories can be read/write using physical view.

   o LSRAM/uSRAM configurations inferred using IP Cores CoreAHBLtoAXI (Verilog flow), CoreFIFO (Verilog and VHDL flow).

   o HDL modules inferring RAM blocks are instantiated in SmartDesign.

- Eye Monitor, for XCVR configured in CDR mode, introduces errors into the data upon entering and leaving the Eye Monitor function if DFE and EM blocks are turned off in normal operation to save power.

- SmartBERT IP does not work when lanes are configured at 250Mbps data rate.

- The Custom DFE solution does not work when the transceiver is configured in 8B10B PCS mode

   Workaround: Perform the following steps to obtain the expected eye output with PLOT_EYE.

   1. Assert PCS RX RESET.
   2. Optimize DFE.
   3. Plot Eye
   4. De-Assert PCS RX RESET

5.4   SmartDebug Errors on Open/Create Project

In Standalone SmartDebug, error messages were reported when users tried to create new projects or open projects. This was fixed in a new Standalone Programming and Debug installer (now available – see the download links in section 6 Download Programming and Debug Tools PolarFire v2.0 Software).

5.5   Job Manager

Job Manager is not supported in the PolarFire v2.0 release.

5.6   Installation on Local Drive Only

This release is intended for installation only on a local drive. The Installer might report permission rights problems if the release is installed across a networked drive.

5.7   Installation

C++ installation error can be ignored. Required files will install successfully.

On some machines, the InstallShield Wizard displays a message stating:

The installation of Microsoft Visual C++ Redistributable Package (x86) appears to have failed. Do you want to continue the installation?

Click Yes and the software is installed successfully.

5.8 Installation on Windows 7

During PolarFire v2.0 installation on Windows 7 machines, you may see pop-up warning messages about shortcuts toward the end of installation process.

These messages can be safely ignored. Click OK to close the pop-up windows and the installation will proceed and complete as expected. All Windows shortcuts will appear correctly.

5.9 Antivirus Software Interaction

Many antivirus and HIPS (Host-based Intrusion Prevention System) tools will flag executables and prevent them from running. To eliminate this problem, users must modify their security setting by adding exceptions for specific executables. This is configured in the antivirus tool. Contact the tool provider for assistance.

Many users are running Libero SoC successfully with no modification to their antivirus software. Microsemi is aware of issues for some antivirus tool settings that occur when using Symantec, McAfee, Avira, Sophos, and Avast tools. The combination of operating system, antivirus tool version, and security settings all contribute to the end result. Depending on the environment, the operation of Libero SoC, ModelSim ME and/or Synplify Pro ME may or may not be affected.

All public releases of Libero are tested with several antivirus tools before they are released to ensure that they are not infected. In addition, Microsemi's software development and testing environment is also protected by antivirus tools and other security measures.

6 Download Programming and Debug Tools PolarFire v2.0 Software

The following are available for download:

[Programming and Debug Tools PolarFire v2.0 for Linux](#)

[Programming and Debug Tools PolarFire v2.0 for Windows](#)

Note: Installation requires administrative privileges.