Nios II Embedded Design Suite Release Notes

11.15.2013

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These release notes cover versions 12.1 through 13.1 of the Altera® Nios® II Embedded Design Suite (EDS). These release notes describe the revision history for the Nios II EDS.

For the most recent list of errata for the Nios® II EDS, refer to the Knowledge Base page of the Altera website. Also, you can use the **Knowledge Base** to search for errata based on the product version affected and other criteria.

Related Information

Altera Knowledge Base

Product Revision History

The following table shows the revision history for the Nios II EDS.

Table 1: Nios II Embedded Design Suite Revision History

Version	Date	Description
13.1	November 2013	• Verified with the Quartus II software v13.1 • GCC upgraded to v4.7.3 • Enhancedfloating point custom instruction support • ECC support • Universal boot copier
13.0	May 2013	Verified with the Quartus II software v13.0
12.1	December 2012	• Verified with the Quartus II software v12.1 • Nios II C-to-Hardware (C2H) Acceleration Compiler discontinued

For more information about Nios II EDS features, refer to the *Nios II Processor Reference Handbook* and the *Nios II Software Developer's Handbook*.

Related Information

- **Nios II Processor Reference Handbook**
- **Nios II Software Developer's Handbook**

Nios II IDE and Nios II C2H Compiler End of Life

The Quartus II software no longer includes the Nios II IDE or the Nios II C-to-Hardware (C2H) Acceleration Compiler.

These products are discontinued. The Nios II Software Build Tools (SBT), including the Nios II SBT for Eclipse, is the recommended flow for all Nios II software development.

You can download past versions of the Nios II IDE and the Nios II C2H Compiler legacy tools from the **Altera Download Center**. Altera supports Nios II C2H Compiler licensees for up to one year after v12.1. To obtain support, you must have a current license for the Nios II C2H Compiler v12.0 or v11.1.

Related Information

Altera Download Center

GCC Upgraded to 4.7.3

In v13.1, the Nios II Software Build Tools (SBT) have been updated to support the v4.7.3 version of GCC.

There are command line option differences between GCC v4.7.3 and the previously supported version. If you have an existing project created with a previous version, you need to update your makefiles or regenerate your board support package (BSP).

Note: GCC v4.7.3 adds several new warnings and messages. If you used the `-Werror` command-line option in the previous version, you might see unexpected errors generated by the new warnings.

For details about the Nios II GCC 4.7.3 implementation, refer to **Nios II GNU toolchain upgrade from GCC 4.1.2 to GCC 4.7.3** in the Altera **Knowledge Base**.

The Free Software Foundation provides a guide to porting to GCC 4.7, documenting common issues. This guide can be found on **GCC, the GNU Compiler Collection**, under **Porting to GCC 4.7**. Full GCC release notes are available under **GCC Releases**.

Related Information

- **Altera Knowledge Base**
- **GCC, the GNU Compiler Collection**

Enhanced Floating Point Custom Instruction Support

In v13.1, Qsys adds an option to select a new floating point custom instruction set component, Floating Point Hardware 2.

To take advantage of software support for the Floating Point Hardware 2 instructions, include **altera_nios_custom_instr_floating_point_2.h**, which forces GCC to call newlib math functions (rather than GCC built-in math functions). Altera recommends that you recompile newlib with for optimum performance.

Note: Do not use the `–mcustom -fpu-cfg` command-line option for GCC. This option does not support the Floating Point Hardware 2 instructions.

The Nios II software build tools (SBT) add individual `–mcustom` commands to the makefile to support the Floating Point Hardware 2 custom instructions.

ECC Support

Starting in v13.1, the Nios II Processor parameter editor lets you enable ECC protection for the RAMs in the processor core and the instruction cache.

By default, ECC is not enabled on reset. Therefore, software must enable ECC protection. Software can also inject ECC errors into RAM data bits to support testing of the ECC exception handler and event bus.

The Nios II Hardware Abstraction Layer (HAL) is extended to support ECC initialization and exception handling.

Universal Boot Copier

In v13.1, the Nios II boot copier is upgraded to support more types of flash devices.

The upgraded boot copier is called the universal boot copier.

The Nios II boot copier copies the application binaries from flash devices to volatile memory. The flash memory is laid out with the FPGA image at the lowest memory address, followed by the Nios II application binary images.

In previous product releases, the FPGA image size was fixed for each device family. However, for devices in the Cyclone V, Stratix V, and Arria V families, the image size varies depending on the following variables:

- Flash type: Quad-output (EPCQ) or single-output (EPCS) Enhanced Programmable Configuration device
- Flash device capacity: 128 or 256 Mbits
- Compression
- Serial peripheral interface (SPI) configuration: ×1 or ×4
- Device layout: single or cascaded

It is difficult for the boot copier to identify the current combination so that it can use the appropriate image size, and any algorithm might fail to support future configurations.

To solve this problem, a header is added to the FPGA image to specify the image size. By using the image size from the header, the universal boot copier can work with any flash configuration in current or future devices.

The **sof2flash** utility is updated to support the universal boot copier.

This change does not impact to the ability of the FPGA control block to automatically program the FPGA image at power-on.