



This document lists the release notes for the Nios® II Embedded Design Suite (EDS) version 6.0.

**Table of Contents:**

<b>New Features &amp; Enhancements</b> .....	<b>2</b>
<b>Device &amp; Host Support</b> .....	<b>2</b>
<b>Installation and Licensing Instructions</b> .....	<b>2</b>
Installing the Nios II Embedded Design Suite Version 6.0 on Windows .....	3
Installing the Nios II Embedded Design Suite version 6.0 on Linux .....	3
Installing the USB-Blaster Download Cable on Linux .....	3
Using Previously Installed Versions of the Nios II EDS .....	3
Licensing .....	4
<b>Nios II Processor Cores</b> .....	<b>4</b>
Floating-point custom instructions .....	4
cpu_resetrequest and cpu_resettaken signals .....	4
flushi & initi instructions .....	4
<b>SOPC Builder</b> .....	<b>4</b>
Wider data width support .....	5
Master/slave connections retained while using Use option .....	5
<b>Nios II IDE</b> .....	<b>5</b>
Nios II C-to-Hardware Acceleration (C2H) Compiler support .....	5
Dual-ported memories .....	5
<b>Nios II C-to-Hardware Acceleration (C2H) Compiler</b> .....	<b>5</b>
<b>Flash Programmer</b> .....	<b>5</b>
<b>Target Software</b> .....	<b>6</b>
Boot from EPCS with Stratix II support .....	6
Legacy SDK not supported .....	6
<b>Example Designs</b> .....	<b>6</b>
Hardware Example Designs .....	6
Software Example Designs .....	6

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## New Features & Enhancements

The Nios II EDS version 6.0 addresses issues found in previous releases, and adds the following primary features:

- Nios II C-to-Hardware Acceleration (C2H) Compiler
- Floating-point custom instructions
- `cpu_resetrequest` and `cpu_resettaken` signals for individually resetting a Nios II processor core

The sections below provide a detailed list of all product updates.

## Device & Host Support

This release supports the following Altera® FPGA families:

- Stratix® II
- Stratix
- Cyclone™ II
- Cyclone

This release supports the following host environments:

- Quartus® II software version 6.0
- Windows XP Professional, Windows 2000, 32-bit Linux 8.0, and Enterprise 3 (64-bit not supported)
- ModelSim® versions supported on Windows: 6.0e OEM, 6.1d OEM, 6.1b SE, 6.1c SE, 6.1d SE
- ModelSim versions supported on Linux: 6.0e OEM, 6.1d OEM

## Installation and Licensing Instructions

This section describes how to install the Nios II EDS.

To install version 6.0 of the Nios II EDS, you must first install the Quartus II software version 6.0. You must have administrative privileges to install the Nios II EDS. See the *Quartus II Installation & Licensing Guide* for Quartus II system requirements and installation procedures.

If you have previous versions of the Nios II EDS installed on your system, Altera recommends that you uninstall the previous version(s) before installing version 6.0. If you need to retain a previous version on your system, install the Nios II EDS v6.0 to a different location.

## Installing the Nios II Embedded Design Suite Version 6.0 on Windows

To install the Nios II software on a Windows computer using the Nios II Embedded Design Suite CD-ROM, perform the following steps:

1. Insert the Compact disc into your CD-ROM drive. The Nios II setup program appears automatically. If the Nios II setup program does not start automatically, browse to the CD-ROM drive in the Windows Explorer, and run the program **launcher.exe**. at the top level of the CD.
2. Click **Install Nios II EDS**. The Nios II EDS installer starts and guides you through the installation process.

## Installing the Nios II Embedded Design Suite version 6.0 on Linux

To install the Nios II EDS on a Linux workstation using the Nios II Embedded Design Suite CD-ROM, perform the following steps:

1. Insert the Compact Disk into your CD-ROM drive. If the computer has problems reading the CD-ROM, you might have to mount the CD-ROM manually, by typing the following at a command shell:

```
mount /mnt/cdrom
```

2. Type the following commands at a command shell:

```
cd /mnt/cdrom
./install
```

The Nios II EDS installer starts and guides you through the installation process.

## Installing the USB-Blaster Download Cable on Linux

To use the USB-Blaster download cable on Linux systems, you need to set up the permissions by adding the following lines to **/etc/hotplug/usb.usermap**. You need to do this before plugging in your USB-Blaster.

```
#
# Altera USB-Blaster
#
usbblaster 0x03 0x09fb 0x6001 0x0 0x0 0x0 0x0 0x0 0x0 0x0 0x0 0x0
usbblaster 0x03 0x09fb 0x6002 0x0 0x0 0x0 0x0 0x0 0x0 0x0 0x0 0x0
```

Then add the following script as **/etc/hotplug/usb/usbblaster**.

```
#!/bin/sh
# USB-Blaster hotplug script.
# Allow any user to access the cable
chmod 666 $DEVICE
```

This script sets up your USB-Blaster permissions so that any user can access it. Type `chmod +x /etc/hotplug/usb/usbblaster` to make the script executable.

## Using Previously Installed Versions of the Nios II EDS

SOPC Builder and the Nios II IDE refer to the most recently installed version of components (such as the Nios II processor and peripherals) and their software drivers. To revert to a prior version of the Nios II development tools, you can reinstall the previous version of tools or modify the following environment variables.

- `SOPC_BUILDER_PATH` - Ensure that `SOPC_BUILDER_PATH` points to the installation directory of the desired Nios II version and no other Nios II versions.
- `SOPC_BUILDER_PATH_<version>` - Ensure that `SOPC_BUILDER_PATH_<version>` points to the installation directory of the corresponding Nios II version.
- `SOPC_KIT_NIOS2` - Ensure `SOPC_KIT_NIOS2` points to the installation directory of the desired Nios II version and no other Nios II versions.

If you have multiple versions of the Quartus II software installed, launch the supported version of Quartus II to ensure that the `QUARTUS_ROOTDIR` environment variable is updated.

## Licensing

You can create, compile and generate time-limited FPGA programming files for Nios II hardware systems without obtaining a license file. To generate non-time-limited FPGA programming files and flash programming files, you must obtain a license for the Nios II processor core and the Quartus II software. See the getting started material included with the Nios II Embedded Design Suite. You do not need a license if you will only develop software using the Nios II IDE.

## Nios II Processor Cores

This section describes changes to the Nios II processor cores.

### Floating-point custom instructions

The Nios II core now offers a set of optional predefined custom instructions that implement floating-point single-precision (32-bit) addition, subtraction, multiplication and division. For more information, see the chapters *Processor Architecture* and *Implementing the Nios II Processor in SOPC Builder* in the *Nios II Processor Reference Handbook*.

### `cpu_resetrequest` and `cpu_resettaken` signals

Optional signals to reset the Nios II CPU without affecting other components in the SOPC Builder system has been added to the Nios II processor cores. For more information, see chapters *Processor Architecture* and *Implementing the Nios II Processor in SOPC Builder* in the *Nios II Processor Reference Handbook*.

### `flushi` & `initi` instructions

The cycle count for `flushi` and `initi` instructions changed from 1 to 4 cycles for the Nios II/s and Nios II/f cores.

## SOPC Builder

This section describes changes to SOPC Builder which affect Nios II designers. For complete revision history of SOPC Builder and the Quartus II software, refer to the release notes for the Quartus II software version 6.0. The *Quartus II Handbook, Volume 4: SOPC Builder* contains complete documentation for SOPC Builder.

## Wider data width support

SOPC Builder now supports data bus widths of up to 1024 bits.

## Master/slave connections retained while using Use option

Version 6.0 fixes an issue that caused the master-slave connections to be lost when the **Use** button is turned off in the SOPC Builder table of active components. SOPC Builder now remembers the connections when the **Use** button is turned on again.

## Nios II IDE

This section describes changes to the Nios II integrated development environment (IDE).

### Nios II C-to-Hardware Acceleration (C2H) Compiler support

Refer to the C-to-Hardware Acceleration Compiler section.

### Dual-ported memories

In the Nios II IDE, dual-ported memories are now treated as if they have only one slave port. The '\_S1' and '\_S2' portions of generated labels have been dropped. This impacts both the generated files **system.h** and the linker command file. The software example Tightly Coupled Memory was impacted by this change. Any customized linker command files, and any source files which reference a dual-ported memory base address by its generated labels must be updated. For example, in the case of the Tightly Copuled Memory software design, **tcm.c** was modified to replace the symbol `TIGHTLY_COUPLED_DATA_MEMORY_S1_BASE` with the new label style, `TIGHTLY_COUPLED_DATA_MEMORY_BASE`.

## Nios II C-to-Hardware Acceleration (C2H) Compiler

The Nios II C-to-Hardware Acceleration (C2H) Compiler is introduced in the Nios II EDS version 6.0. The C2H Compiler is a tool that allows you to create custom hardware accelerators directly from ANSI C source code, which can often improve the execution performance by an order of magnitude. Contact your Altera representative to enable the OpenCore Plus evaluation for the C2H Compiler or purchase a license. Documentation on the C2H Compiler is available on the Nios II literature page, <http://www.altera.com/literature/lit-nio2.jsp>.

## Flash Programmer

This section describes changes to the flash programmer in the Nios II IDE.

There are no updates.

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## Target Software

This section describes changes to Altera-provided target software which runs on the Nios II processor, such as the hardware abstraction layer (HAL) system library.

### Boot from EPCS with Stratix II support

The EPCS serial configuration controller now fully supports Nios II systems in the Stratix II device family. You can boot your Nios II software from the flash memory in the EPCS device by assigning the processor reset address to the EPCS device.

### Legacy SDK not supported

Legacy SDK support has been removed from Nios II version 6.0. The option to enable Legacy SDK is no longer available in SOPC Builder.

## Example Designs

### Hardware Example Designs

#### *Fast design on-chip memory*

The **fast** examples designs for all development kits were changed to use a read latency of 2 instead of 1 for the on-chip memory.

### Software Example Designs

There are no updates.



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