

## Overview

This document lists the release notes for the Nios® II Development Kit version 5.1 Service Pack 1. Release notes are divided into the following categories:

- New Features & Enhancements
- Device & Host Support
- Installation and Licensing Instructions
- Nios II Processor Cores
- SOPC Builder
- Nios II IDE
- Flash Programmer
- Target Software
- Example Designs

## New Features & Enhancements

The Nios II Development Kit version 5.1 Service Pack 1 provides enhancements and fixes to version 5.1. This service pack includes both Nios II 5.1 Patch 1 and Patch 2 provided on the Nios II 5.1 Errata page at [www.altera.com](http://www.altera.com).

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

## Device & Host Support

This release supports the following Altera® device families:

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

This release supports the following host environments:

- Quartus® II software version 5.1 Service Pack 1
- Windows XP Professional, Windows 2000, 32-bit Linux 8.0, and Enterprise 3 (64-bit not supported)
- ModelSim® versions supported on Windows: 6.0c OEM, 6.0e OEM, 6.1 SE, 6.1a SE, 6.1b SE, 6.1c SE

- ModelSim versions supported on Linux: 6.0c OEM, 6.0e OEM

## Installation and Licensing Instructions

This section describes how to install the tools necessary to develop Nios II systems.

### Installing the Nios II Development Tools Version 5.1 Service Pack 1 on Windows

To install the service pack, you must have the Quartus II software version 5.1 Service Pack 1 and Nios II version 5.1 installed. You must have administrative privileges to install the Nios II development tools. See the *Quartus II Installation & Licensing Guide* for Quartus II system requirements and installation procedures.

To install the Nios II development tools on a Windows computer, perform the following steps:

1. Exit the Quartus® II software and Nios II IDE before continuing.
2. Download the service pack file to your hard drive.
3. Run the executable service pack file from your hard drive.
4. Follow the on-screen instructions to install the service pack.

### Installing the Nios II Development Tools Version 5.1 Service Pack 1 on Linux

To install the service pack, you must have the Quartus II software version 5.1 Service Pack 1 and Nios II version 5.1 installed. You must have administrative privileges to install the Nios II development tools. See the *Quartus II Installation & Licensing Guide* for Quartus II system requirements and installation procedures.

Before installing the Nios II development tools on Linux, ensure that the shell has the `DISPLAY` environment variable pointing to a valid X server. Otherwise, the installer generates the following error:

```
Updating SOPC Builder components... Exception in thread "main"
java.lang.InternalError: Can't connect to X11 window server using ':0.0' as the value
of the DISPLAY variable.
at sun.awt.X11GraphicsEnvironment.initDisplay(Native Method)
at sun.awt.X11GraphicsEnvironment.<clinit>(Unknown Source)
at java.lang.Class.forName0(Native Method)
at java.lang.Class.forName(Unknown Source)
at java.awt.GraphicsEnvironment.getLocalGraphicsEnvironment(Unknown Source)
at java.awt.Font.initializeFont(Unknown Source)
at java.awt.Font.<init>(Unknown Source)
at sopc_wizard.sopc_ui.<clinit>(sopc_ui.java:31)
```

To install the Nios II Service Pack 1 on a Linux workstation, perform the following steps:

1. Exit the Quartus II software and Nios II IDE before continuing.
2. Download the platform-specific service pack file into a temporary directory.
3. Change directory into the temporary directory.

4. Type the following commands at a command shell:

```
tar -xf niosii_51sp1_linux.tar
cd niosii_51sp1_linux
./install
```

The installation script guides you through the installation procedure.

### 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 Nios II

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 back to a prior version of the Nios II development tools, you can reinstall the previous version 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_51` - If you are using Nios II version 5.1 or 5.1 SP1, ensure that `SOPC_BUILDER_PATH_51` points to the installation directory of Nios II version 5.1.
- `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 Development Kit. 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.

### Fixed data cache issue

An issue with the Nios II data cache, with a line size of 16 or 32 bytes/line, that caused memory corruption was fixed. The corruption would have occurred when the following actions were taken:

1. The processor issued a store instruction that maps to any word except the last on a data cache line.
2. The processor issued a second store instruction that maps to the last word on the same cache line that was used by the first instruction.

## 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 5.1 Service Pack 1. The *Quartus II Handbook, Volume 4: SOPC Builder* contains complete documentation for SOPC Builder.

### Fixed issue with accessing tri-state bridge connected to off-chip devices

With SOPC Builder in version 5.1 of the Quartus II software, Avalon read transfers to a tristate bridge that connected to off-chip devices, including SDRAM, might have locked the system indefinitely. For example, if SDRAM memory and flash memory shared the same tristate bridge, the system might have hung after an initial access to one of the memories. This service pack fixes this issue.

### Fixed issue with flash flow failure in the SOPC Builder board description editor

The flash flow in the board description editor is used to create board descriptions that can be used by the Nios II IDE flash programmer for a custom board. In Quartus II version 5.1 in the SOPC Builder board description editor, if you used only the flash flow, and did not provide a board netlist, the resulting board description was missing entries required for successful system generation in SOPC Builder. A subsequent attempt to generate in SOPC Builder caused the following error:

```
C:/altera/quartus51/sopc_builder/bin/europa/e_project.pm 310 CALLED
(e_project::device_family) WHERE <=== 'expected exactly one argument' OCCURRED on
C:/altera/quartus51/sopc_builder/bin/europa/e_project.pm 1313
```

This service pack fixes this issue.

### **Fixed VHDL simulation issue**

In the Quartus II software version 5.1, the SOPC Builder VHDL simulation models had an issue that caused the input clock to the system to drive X instead of high or low logic values. The setup\_sim.do was corrected to indicate a resolution of picoseconds which resolves this issue.

## **Nios II IDE**

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

### **Fixed issue with memory inspection during multiprocessor debug**

A problem with inspecting memory during multiprocessor debug sessions in the Nios II IDE version 5.1 was fixed. In the Nios II IDE version 5.1, if you launched a multiprocessor debug session and selected any logical memory address in the Memory view, the debug session would terminate.

### **Fixed an internal error when creating new project in Nios II IDE**

An internal error caused by an SOPC\_BUILDER\_PATH environment variable containing a path to a component located at the root level of the drive was fixed.

### **Enhanced profiler**

A problem with gprof sometimes reporting incorrect call hierarchy information in the call graph output was fixed. A problem with the Show Source command was also corrected.

## **Flash Programmer**

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

### **Fixed flash programming failure issue**

An issue in the Nios II version 5.1 flash programmer that caused it to fail during programming was fixed. Depending on the initial contents of flash, the flash programmer sometimes failed to erase correctly when programming files of a certain length into flash. This was usually seen on flash files created from Stratix II EP2S60 SOF files which are of the length that could have triggered this failure. During programming, there was a long pause (>20 seconds), followed by the error "Program failed. Leaving target processor paused".

### **Fixed flash erase failure issue**

An issue with the Nios II version 5.1 flash programmer and HAL flash routines failing to erase certain sectors of flash was addressed. This service pack contains a modified flash programmer and modified HAL code that significantly reduces the chance of this problem occurring. This problem has only been encountered on the Nios

Development Board, Stratix, Stratix Professional, and Cyclone Editions, which all use the AMD AM29LV065D flash device.

## 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.

### **Corrected Lightweight IP (lwIP) code to fix issue when hardware divide is enabled**

An issue was corrected that caused applications that used lwIP running on a Nios II processor core with hardware divide enabled, such as the web server example in the Nios II IDE, to hang when acquiring an IP address from DHCP.

## Example Designs

### **Hardware Example Designs**

*Updated full\_featured example design for the Nios Development Board, Cyclone II Edition*

The full\_featured design was updated to use the Altera DDR Controller version 3.3.1 and address the data cache issue discussed in Nios II Processor section.

*Updated small example design*

In the small example design in version 5.1 of the Nios II development tools, the `reset_n` and `clk` signals were swapped in the top-level schematic. This has been corrected in the service pack.

### **Software Example Designs**

*On Linux, list of software example templates in the Nios II IDE New Project Wizard was alphabetized.*