



intel RN-1138 Nios II Embedded Design Suite User Guide

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intel RN-1138 Nios II Embedded Design Suite



About this Document

- This document provides information about the following in context to the Intel®
- Quartus® Prime software version:
- Nios® II Embedded Design Suite (EDS)
- Nios II Processor IP
- Embedded IP cores
- This document covers Nios II release information for the Intel Quartus Prime software version 16.1 and later.
For any previous release information, refer to the Nios II
- Embedded Design Suite Release Notes (Archived).

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Nios II Embedded Design Suite (EDS)

Release Information for Nios II EDS

Intel Quartus Prime Software Version	Intel Quartus Prime Variant	Updates

22.1	Standard Edition	<p>Nios II Toolchain upgrades for Intel Quartus Prime Standard Edition:</p> <ul style="list-style-type: none"> • Binutils • ex-pat • gcc • gdb • isl • ncurses • newlib
22.3	Pro Edition	<p>Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition:</p> <ul style="list-style-type: none"> • gcc • newlib
22.2	Pro Edition	<p>Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition:</p> <ul style="list-style-type: none"> • ex-pat • gdb • ncurses
22.1	Pro Edition	<p>Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition:</p> <ul style="list-style-type: none"> • Binutils • gcc • gdb
21.3	Pro Edition	<p>Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition:</p> <ul style="list-style-type: none"> • ex-pat • gcc • newlib
21.2	Pro Edition	<p>Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition:</p> <ul style="list-style-type: none"> • Binutils • gdb • gmp • mpc

21.1	Standard Edition	<p>Nios II Toolchain upgrades for Intel Quartus Prime Standard Edition:</p> <ul style="list-style-type: none"> • Binutils • ex-pat • gcc • gdb • gmp • mpc • mfr • newlib
<i>continued...</i>		

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Intel Quartus Prime Software Version	Intel Quartus Prime Variant	Updates
20.4	Pro Edition	<ul style="list-style-type: none"> • Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: <ul style="list-style-type: none"> — gcc — mfr • Commercial version of MicroC/OS-II is under Apache 2.0 Open-Source Licensing, for more information refer to the Micrium Licensing Web page.
20.1.1	Standard Edition	<ul style="list-style-type: none"> • Nios II Toolchain upgrades for Intel Quartus Prime Standard Edition: <ul style="list-style-type: none"> — gcc — gdb — GMP — mfr — nurses — newlib

20.3	Pro Edition	<ul style="list-style-type: none"> Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: — binutils — gcc — gdb
20.2	Pro Edition	<ul style="list-style-type: none"> Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: — gcc — GMP — nurses — newlib
20.1	Pro and Standard Edition	<ul style="list-style-type: none"> Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: — binutils — ex-pat — gcc — gdb — mfr Nios II Toolchain upgrades for Intel Quartus Prime Standard Edition: — binutils — ex-pat — gcc — gdb — mfr
19.4	Pro Edition	<ul style="list-style-type: none"> Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: — ex-pat
19.3	Pro Edition	<ul style="list-style-type: none"> Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: — ex-pat The clog library is removed from the toolchain for the Intel Quartus Prime Pro Edition.
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Intel Quartus Prime Software Version	Intel Quartus Prime Variant	Updates
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19.2	Pro Edition	<ul style="list-style-type: none"> • In the Intel Quartus Prime Pro Edition, the Windows* version of Nios II EDS, Cygwin has been removed and replaced with Windows Subsystem for Linux* (WSL). <p>For installation instructions, refer to the <i>Installing Windows Subsystem for Linux (WSL) on Windows</i> sections in the <i>Nios II Software Developer Handbook</i>.</p> <ul style="list-style-type: none"> • Known Issue: warpath: <Nios II EDS installation directory or Nios II project directory> No such file or directory • Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: <ul style="list-style-type: none"> — binutils — ex-pat — gcc — gdb — isl — mpc — mfr — nurses — newlib
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19.1	Pro and Standard Edition	<ul style="list-style-type: none"> You must manually install Eclipse from the Eclipse download page to get the Nios II development environment running. <p><i>Note:</i> Nios II Eclipse plug-ins are delivered in Intel Quartus Prime with the necessary installer and readme files.</p> <p>For installation instructions, refer to the <i>Installing Eclipse IDE into Nios II EDS</i> section in the <i>Nios II Software Developer Handbook</i>.</p> <ul style="list-style-type: none"> Nios II Toolchain upgrades for Intel Quartus Prime Standard Edition: <ul style="list-style-type: none"> — binutils — ex-pat — gcc — gdb — GMP — isl — mpc — mfr — nurses — newlib The clog library is removed from the toolchain for the Intel Quartus Prime Standard Edition. In the Intel Quartus Prime Standard Edition, the Windows version of Nios II EDS, Cygwin has been removed and replaced with Windows Subsystem for Linux (WSL). <p>For installation instructions, refer to the <i>Installing Windows Subsystem for Linux (WSL) on Windows</i> sections in the <i>Nios II Software Developer Handbook</i>.</p> <ul style="list-style-type: none"> Known issue: nios2-elf-gcc.exe: error: CreateProcess: No such file or directory
18.1	Pro and Standard Edition	<ul style="list-style-type: none"> Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: <ul style="list-style-type: none"> — gcc
continued...		

Intel Quartus Prime Software Version	Intel Quartus Prime Variant	Updates
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18.0	Pro and Standard Edition	<ul style="list-style-type: none"> • Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: <ul style="list-style-type: none"> — binutils — gcc — gdb — GMP — isl — mfr — newlib
17.1	Pro and Standard Edition	<ul style="list-style-type: none"> • Nios II Software Build Tools (SBT): Upgrade of Eclipse to v4.5 for Intel Quartus Prime Pro Edition and Intel Quartus Prime Standard Edition • New driver for Intel XWAY PHY11G PEF7071 Ethernet PHY for Intel Quartus Prime Pro Edition and Intel Quartus Prime Standard Edition • Nios II Software Build Tools (SBT): Windows 10 host support in Intel Quartus Prime Pro Edition and Intel Quartus Prime Standard Edition software • Nios II Toolchain upgrades for Intel Quartus Prime Pro Edition: <ul style="list-style-type: none"> — binutils — ex-pat — gcc — gdb — GMP — mfr — newlib • Bug fix: <ul style="list-style-type: none"> — The issue causing locale to be broken on new lib 2.4.0 when using small lib is fixed.
17.0	Pro and Standard Edition	<ul style="list-style-type: none"> • Nios II Software Build Tools (SBT)—Windows 10 support added in Intel Quartus Prime Pro Edition.

16.1	Pro and Standard Edition	<ul style="list-style-type: none"> Nios II Toolchain upgrades: <ul style="list-style-type: none"> — gcc — isl — mpc — mfr Bug fixes: <ul style="list-style-type: none"> — The handling of the -mgpopt=option setting has been changed. It is now under the full control of the BSP editor and there is a flag for it in the public.mk file. — nios2-app-compile no longer fails when -mgpopt is set to “global” and the log level is set to “-1”. <p>For more information about the GCC releases, refer to the GCC, the GNU Compiler Collection website.</p>
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Nios II Toolchain Versions

Nios II Toolchain Versions for the Intel Quartus Prime Pro Edition

Intel Quartus Prime Pro Edition	Nios II Toolchain Versions										
	binutils	clog	ex-pat	gcc	gdb	GMP	isl	mpc	mfr	nurses	newlib
22.3	2.37.50	—	2.4.6	11.3.1	11.2.90	6.2.1	0.20	1.2.1	4.1.0	6.3	4.2.0
22.2	2.37.50	—	2.4.6	11.2.1	11.2.90	6.2.1	0.20	1.2.1	4.1.0	6.3	4.1.0
22.1	2.37.50	—	2.4.1	11.2.1	11.1.90	6.2.1	0.20	1.2.1	4.1.0	6.2	4.1.0
21.4	2.35.50	—	2.4.1	10.3.1	10.1.90	6.2.1	0.20	1.2.1	4.1.0	6.2	4.1.0
21.3	2.35.50	—	2.4.1	10.3.1	10.1.90	6.2.1	0.20	1.2.1	4.1.0	6.2	4.1.0
21.2	2.35.50	—	2.2.9	10.2.1	10.1.90	6.2.1	0.20	1.2.1	4.1.0	6.2	3.3.0
21.1	2.33.50	—	2.2.9	10.2.1	9.2.90	6.2.0	0.20	1.1.0	4.1.0	6.2	3.3.0
20.4	2.33.50	—	2.2.9	10.2.1	9.2.90	6.2.0	0.20	1.1.0	4.1.0	6.2	3.3.0
20.3	2.33.50	—	2.2.9	10.1.1	9.2.90	6.2.0	0.20	1.1.0	4.0.2	6.2	3.3.0

Intel Quartus Prime Standard Edition	Nios II Toolchain Versions										
	binutils	clog	ex-pat	gcc	gdb	GMP	isl	mpc	mfr	nurses	newlib
18.0	2.25	0.18.1	2.1.0	5.3	7.10	6.0.0	0.14	1.0.3	3.1.3	5.9	2.2
17.1	2.25	0.18.1	2.1.0	5.3	7.10	6.0.0	0.14	1.0.3	3.1.3	5.9	2.2
17.0	2.25	0.18.1	2.1.0	5.3	7.10	6.0.0	0.14	1.0.3	3.1.3	5.9	2.2
16.1	2.25	0.18.1	2.1.0	5.3	7.10	6.0.0	0.14	1.0.3	3.1.3	5.9	2.2
16.0	2.25	0.18.1	2.1.0	5.2	7.10	6.0.0	0.12.2	1.0.2	3.1.2	5.9	2.2

Nios II Processor IP Core

Release Information for Nios II Processor IP Core

Intel Quartus Prime Software Version	Key Updates
20.4	<ul style="list-style-type: none"> No change.
20.3	
20.2	
20.1	
19.4	No change
19.3	Added support for Intel Agilex™ devices.
19.2	<ul style="list-style-type: none"> No change.
19.1	
18.1	<ul style="list-style-type: none"> No change.
18.0	
17.1	<ul style="list-style-type: none"> Added support for Intel Stratix® 10 and Intel Cyclone® 10 LP devices.
17.0	<ul style="list-style-type: none"> Added support for the Nios II processor in Intel Quartus Prime Pro Edition, and Platform Designer.
16.1	<ul style="list-style-type: none"> The Nios II Processor is supported as a pre-release (beta) version in Intel Quartus Prime Pro Edition because of the changes required to support IP components in Platform Designer. Nios II Classic is no longer supported in Intel Quartus Prime Pro Edition.

For more information about the Nios II Processor core, refer to the Nios II Processor Reference Guide.

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Embedded IP Cores

Release Information for Embedded IP Cores

Intel Quartus Prime Software Version	Key Updates
22.3	<ul style="list-style-type: none">Added support for new IP core in Intel Quartus Prime: Lightweight UART IP Core.Added new ECC Error Injection features for AXI mode: On-Chip RAM II Intel FPGA IP Core.Added fix on supported devices: Intel FPGA GMII to RGMII Converter Core.Added supported devices: Intel FPGA HPS GMII to TSE 1000BASE-X/SGMII PCS Bridge Core.Enabled configurable flash timeout value: Intel FPGA Serial Flash Controller II Core and Intel FPGA Generic QUAD SPI Controller II Core.
22.2	Added a new ECC option to the On-Chip Memory II (RAM or ROM) component.
22.1	<ul style="list-style-type: none">Added support for a new IP core in Intel Quartus Prime: Cache Coherency Translator.Added support for dual AXI ports for On-Chip Memory II RAM/ROM.

21.3	<ul style="list-style-type: none"> • Added support for new IP core in Intel Quartus Prime: <i>On-Chip Memory II (RAM or ROM)</i>. • Added Nios V Processor support except for the following IP cores: <ul style="list-style-type: none"> — SDRAM Controller Core — Tri-State SDRAM Core — Compact Flash Core — EPCS Serial Flash Controller Core — 16207 LCD Controller Core — Scatter-Gather DMA Controller Core — Video Sync Generator and Pixel Converter Cores — Avalon®-ST Test Pattern Generator and Checker Cores — Avalon-MM DDR Memory Half Rate Bridge Core — Modular ADC Core — Modular Dual ADC Core — Intel FPGA Avalon Mutex Core — Vectored Interrupt Controller Core
20.4	<ul style="list-style-type: none"> • No change.
20.3	<ul style="list-style-type: none"> • No change.
20.2	<ul style="list-style-type: none"> • Added a new parameter for <i>eSPI to LPC Bridge Core</i>.
20.1	<ul style="list-style-type: none"> • Added support for new IP core in Intel Quartus Prime: <i>Intel FPGA MII to RMI Conv erter Core</i>.
19.4	<ul style="list-style-type: none"> • No change.
19.3	<ul style="list-style-type: none"> • No change.
19.2	<ul style="list-style-type: none"> • No change.
19.1	<ul style="list-style-type: none"> • Added support for new IP core in Intel Quartus Prime: <i>Intel FPGA HPS EMAC to M ulti-rate PHY GMII Adapter Core</i>.
18.1	<ul style="list-style-type: none"> • Added support for new IP core in Intel Quartus Prime: <i>eSPI to LPC Bridge IP Core</i>.
<i>continued...</i>	

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Intel Quartus Prime Software Version	Key Updates
18.0	<ul style="list-style-type: none"> Added support for new IP core in Intel Quartus Prime: <i>Intel eSPI Slave IP Core</i>. Added a new parameter for <i>Modular Scatter-Gather DMA Core</i>.
17.1	<ul style="list-style-type: none"> mSGDMA optimizations for Intel Stratix 10 devices in Intel Quartus Prime Pro Edition software version 17.1. CMSIS support for embedded IP in Intel Quartus Prime Pro Edition software version 17.1. EPCQA device support for EPCQ Controller and Generic QSPI Controller IP in Intel Quartus Prime Standard Edition software version 17.1. Bug Fix: <ul style="list-style-type: none"> — Intel Avalon FIFO IP —Incorrect back pressure behavior during reset state and data loss when FIFO is an almost full issue is fixed. Intel FPGA Triple-Speed Ethernet (TSE) niche driver to support mSGDMA updated. Redundant software example <code>simple_socket_server_rgmii</code> removed

17.0	<ul style="list-style-type: none"> • Added new Streaming (Avalon-ST) Freeze Bridges for Partial Reconfiguration (PR) support. • New improved data performance Serial flash controller II and Generic Quad SPI controller II IP cores. • Added Avalon-ST Freeze Bridges as PR solution IP. • All Embedded IP cores now support Intel Cyclone 10 device compilation. • Bug fixes: <ul style="list-style-type: none"> — I2C Slave to Avalon-MM Master—MM master write data corruption due to overrun of internal I2C slave RX shifting logic issue fixed — Intel FPGA Avalon FIFO IP—Incorrect back pressure behavior during reset state and data loss when FIFO is almost full issue fixed — EPCQ Controller—Incorrect back pressure behavior during reset state issue fixed • Generic QSPI Controller IP: <ul style="list-style-type: none"> — Modified to enable support for multiple instances in one Platform Designer design. — The N25Q016 flash device is now supported. • Serial Flash Controller IP—EPCS4 flash device is now supported. • The following IP cores (from Intel Quartus Prime Standard Edition) are not present in the Intel Quartus Prime Pro Edition: <ul style="list-style-type: none"> — Intel FPGA Avalon New SDRAM Controller — Intel FPGA SDRAM Tristate Controller — Intel FPGA Avalon EPCS Flash Controller — Intel FPGA Avalon Compact Flash Controller — Intel FPGA Avalon Half Rate Bridge — Intel FPGA Avalon Pixel Converter — Intel FPGA Avalon Video Sync Generator — Intel FPGA Avalon LCD 16207 — Intel FPGA Avalon SGDMA — Intel FPGA Avalon DMA — Intel FPGA Modular ADC — Intel FPGA SM Bus Controller
16.1	<ul style="list-style-type: none"> • A new IP core named Avalon I2C Master has been added to the Platform Designer (Standard) library. • The 16550 UART IP has been enhanced to support a user-defined TX FIFO level trigger. • Freeze controller and bridge IPs have been added to the IP library.

- For more information about the respective IP cores, refer to the Embedded Peripherals
- IP User Guide.
- For information about Nios V, refer to the Nios V Processor Intel FPGA IP Release Notes.
- Related Information
- Nios V Processor Intel FPGA IP Release Notes

Embedded Peripherals IP User Guide Archives

- For the latest and previous versions of this user guide, refer to Embedded Peripherals
- IP User Guide. If an IP or software version is not listed, the user guide for the previous IP or software version applies.
- IP versions are the same as the Intel Quartus Prime Design Suite software versions up to v19.1. From Intel Quartus Prime Design Suite software version 19.2 or later, IP cores have a new IP versioning scheme.

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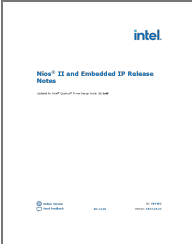
Document Revision History for the Nios II and Embedded IP Release Notes

Document Version	Changes
2022.10.31	Added information for the Intel Quartus Prime Standard Edition software version 22.1.
2022.09.26	Added information for the Intel Quartus Prime Pro Edition software version 22.3.
2022.06.20	Added information for the Intel Quartus Prime software version 21.1 to 22.2.
2022.04.04	Added information for the Intel Quartus Prime software version 22.1.
2021.10.18	Added information for the Intel Quartus Prime software version 21.3.
2020.12.14	Added information for the Intel Quartus Prime software version 20.4.












2020.10.30	Added information for the Intel Quartus Prime software version 19.3 to 20.3.
2019.07.01	Added information for the Intel Quartus Prime software version 19.2.
2019.04.10	Added information for the Intel Quartus Prime software version 19.1.
2018.09.24	Added information for the Intel Quartus Prime software version 18.1.
2018.05.07	Added information for the Intel Quartus Prime software version 18.0
2017.12.05	Added information for the Intel Quartus Prime software version 17.1.
2017.05.08	Added information for the Intel Quartus Prime software version 17.0.
2016.11.07	Added information for the Intel Quartus Prime software version 16.1.

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Documents / Resources

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References

-  [Eclipse Downloads | The Eclipse Foundation](#)
-  [FPGA Knowledge Base Articles Search](#)
-  [1. Introduction](#)
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-  [1. About this Document](#)
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-  [1. Nios® V Processor Intel® FPGA IP Release Notes](#)
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