

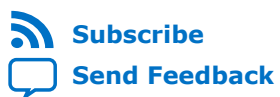


# Intel<sup>®</sup> Quartus<sup>®</sup> Prime Standard Edition

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## Version 21.1 Software and Device Support Release Notes

Updated for Intel<sup>®</sup> Quartus<sup>®</sup> Prime Design Suite: **21.1**



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# 1. Intel® Quartus® Prime Standard Edition Version 21.1 Software and Device Support Release Notes

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This document provides late-breaking information about Intel® Quartus® Prime Standard Edition Version 21.1.

For additional information about this software release, refer to the Intel Quartus Prime Standard Edition README file in the following location: `<installation directory>/quartus/readme.txt`

For information about operating system support, refer to the following web page: [Intel FPGA Operating System Support](#).

## Related Information

- [Intel Quartus Prime Pro Edition Software and Device Support Release Notes](#)
- [Download Center for FPGAs](#)

## 1.1. New Features and Enhancements

Intel Quartus Prime Standard Edition Software Version 21.1 includes functional and security updates. Keep your software up-to-date and follow the [technical recommendations](#) that help improve the security of your Intel Quartus Prime installation.

Intel Quartus Prime Standard Edition Software Version 21.1 includes the following new features and enhancements:

- Added support for the following simulation software:
  - Questa\*-Intel FPGA Edition  
This software replaces ModelSim\*-Intel FPGA Edition.
  - Questa-Intel FPGA Starter Edition  
This software replaces ModelSim-Intel FPGA Starter Edition.

## 1.2. Changes to Software Behavior

This section documents instances in which the behavior and default settings of the Intel Quartus Prime Standard Edition software have been changed from earlier releases of the Intel Quartus Prime Standard Edition software.

Refer to the Intel Quartus Prime Default Settings File (`.qdf`), `<Quartus Prime installation directory>/quartus/bin/assignment_defaults.qdf`, for a list of all the default assignment settings for the latest version of the Intel Quartus Prime software.

### 1.2.1. Deprecated Features and Functions

The functions and features listed in this section have been deprecated but not removed from Intel Quartus Prime Standard Edition Version 21.1 or earlier. Migrate your tools and processes to use the replacement or alternate features and functions before the deprecated features and functions are removed.

#### Features and Functions Deprecated as of Intel Quartus Prime Standard Edition Version 21.1

Support for the following operating systems is deprecated as of Intel Quartus Prime Standard Edition. Support for these operating systems might be removed in a future release:

- CentOS\* 7.5
- Red Hat\* Enterprise Linux\* 7

#### Features and Functions Deprecated as of Intel Quartus Prime Standard Edition Version 20.1

No features or functions have been deprecated in Intel Quartus Prime Standard Edition Version 20.1.

### 1.2.2. Removed Features and Functions

The functions and features listed in this section have been removed from Intel Quartus Prime Standard Edition Version 21.1 or earlier.

#### Features and Functions Removed from Intel Quartus Prime Standard Edition Version 21.1

- Removed ModelSim-Intel FPGA Edition and ModelSim-Intel FPGA Starter Edition  
This simulation software has been replaced by Questa-Intel FPGA Edition and Questa-Intel FPGA Starter Edition respectively.
- Removed support for 32-bit simulation software.  
This change removes support for the following simulation tools:
  - Aldec\* Active-HDL\* (32-bit)  
Use a 64-bit version of Aldec Active-HDL or use Aldec Riviera-PRO\* instead.
  - Mentor Graphics\* ModelSim PE  
Use Siemens\* EDA ModelSim SE or Siemens EDA Questa Advanced Simulator instead.
- Removed NicheStack TCP/IP Stack support.
- Removed support for Cadence\* Incisive\* Enterprise Simulator (IES).

#### Features and Functions Removed from Intel Quartus Prime Standard Edition Version 20.1

Support for the following software has been removed from Intel Quartus Prime Standard Edition Version 20.1 and later:

- DSP Builder for Intel FPGAs
- Intel FPGA SDK for OpenCL™ (\*)
- Intel FPGA RTE for OpenCL
- Intel High-Level Synthesis (HLS) Compiler

### 1.3. Operating System Support

Information about operating system support for the Intel Quartus Prime Design Suite is available on the Operating System Support page of the Intel FPGA website.

#### Operating System Support Changes in Intel Quartus Prime Standard Edition Version 21.1

Intel Quartus Prime Standard Edition Version 21.1 added support for the following operating systems:

- CentOS 8.0
- Red Hat Enterprise Linux 8
- SUSE\* Linux Enterprise Server 15
- Ubuntu\* Linux 20 LTS
- Windows Server\* 2019

Support for the following operating systems is deprecated as of Intel Quartus Prime Standard Edition. Support for these operating systems might be removed in a future release:

- CentOS 7.5
- Red Hat Enterprise Linux 7

Intel Quartus Prime Standard Edition Version 21.1 removed support for the following operating systems:

- Red Hat Enterprise Linux 6
- Ubuntu Linux 14 LTS

#### Related Information

[Operating System Support](#)

### 1.4. Memory Recommendations

A full installation of the Intel Quartus Prime Standard Edition software requires up to 40 GB of available disk space.

Intel recommends that your system be configured to provide virtual memory equal to the recommended physical RAM that is required to process your design.

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**Note:** Peak virtual memory might exceed these recommendations. These recommendations are based on the amount of physical memory required to achieve runtime within 10% of that achieved on hardware with an infinite amount of RAM.

**Table 1. Memory Requirements for Processing Designs**

These requirements are the same for both Windows and Linux installations.

Family	Device	Recommended Physical RAM
Intel Arria® 10	10AT115, 10AX115	48 GB
	10AT090, 10AX090	44 GB
	10AS066, 10AX066	32 GB
	10AS057, 10AX057	30 GB
	10AS048, 10AX048	28 GB
	10AX032, 10AS032	24 GB
	10AX027, 10AS027	22 GB
	10AX022, 10AS022	20 GB
Arria V	5AGXB5, 5AGTD7, 5AGXB7, 5ASXB5, 5ASTD5	16 GB
	5AGXB1, 5AGXB3, 5AGTD3, 5ASTD3, 5ASXB3	12 GB
	5AGXA7, 5AGTC7	10 GB
	5AGTC3, 5AGXA3, 5AGXA5	8 GB
	5AGXA1	6 GB
Arria V GZ	5AGZE7	16 GB
	5AGZE3, 5AGZE5	12 GB
	5AGZE1	8 GB
Arria II GX	EP2AGX260	6 GB
	EP2AGX95, EP2AGX125, EP2AGX190	4 GB
	EP2AGX65	2 GB
	EP2AGX45	1.5 GB
Arria II GZ	EP2AGZ350	8 GB
	EP2AGZ300	6 GB
	EP2AGZ225	4 GB
Intel Cyclone® 10 LP	10CL120	1.5 GB
	10CL080, 10CL055	1 GB
	10CL006, 10CL010, 10CL016, 10CL025, 10CL040	512 MB
Cyclone V	5CEA9, 5CGTD9, 5CGXC9	8 GB
	5CEA2, 5CGXC3, 5CEA4, 5CGXC4, 5CEA5, 5CGTD5, 5CGXC5, 5CSEA5, 5CSTD5, 5CSXC5, 5CSEA6, 5CSXC6, 5CEA7, 5CGTD7, 5CGXC7, 5CSEA2, 5CSEA4, 5CSXC2, 5CSXC4, 5CSTD6	6 GB
Cyclone IV GX	EP4CGX110, EP4CGX150	2 GB
<i>continued...</i>		

Family	Device	Recommended Physical RAM
	EP4CGX50, EP4CGX75	1.5 GB
	EP4CGX15, EP4CGX22, EP4CGX30	512 MB
Cyclone IV E	EP4CE115	1.5 GB
	EP4CE55, EP4CE75	1 GB
	EP4CE6, EP4CE10, EP4CE15, EP4CE22, EP4CE30, EP4CE40	512 MB
Intel MAX® 10	10M50	2 GB
	10M16	2 GB
	10M25	2 GB
	10M40	2 GB
	10M04, 10M08	1 GB
	10M02	512 MB
MAX V	All	512 MB
MAX II	All	512 MB
Stratix® V	5SEEB, 5SGXAB, 5SGXB9, 5SGXBB	28 GB
	5SGXA9, 5SEE9	24 GB
	5SGTC7, 5SGXA7, 5SGSD8	20 GB
	5SGSD5, 5SGXA5, 5SGXB5, 5SGSD6, 5SGXB6	16 GB
	5SGXA3, 5SGSD4, 5SGXA4, 5SGTC5	12 GB
	5SGSD3	8 GB
Stratix IV	EP4SGX530, EP4SE530, EP4SE820, EP4S40G5, EP4S100G5	12 GB
	EP4SE360 EP4SGX360, EP4S100G3, EP4S100G4	8 GB
	EP4SGX290	6 GB
	EP4SE230 EP4SGX110, EP4SGX230, EP4S40G2, EP4S100G2	4 GB
	EP4SGX70	2 GB

## 1.5. Device Support and Pin-Out Status

All production devices currently have full compilation, simulation, timing analysis, and programming support.

### 1.5.1. Changes in Device Support

## 1.6. Timing Model, Power Model, and Device Status

**Table 2. Timing Model, Power Model, and Device Status for Intel Arria 10 Devices**

Device Family	Device	Timing Model Status	Power Model Status	Device Status
Intel Arria 10	10AX016, 10AS016, 10AX022, 10AS022, 10AX027, 10AS027, 10AX032, 10AS032	Final – 16.1 <sup>(1)</sup> ( <sup>2</sup> )	Final – 17.0	Final – 17.0
	10AX048, 10AS048	Final – 16.0.2 <sup>(2)</sup>	Final – 17.0	Final – 17.0
	10AX057, 10AS057, 10AX066, 10AS066, 10AT090, 10AX090	Final – 16.0.1 <sup>(2)</sup>	Final – 16.0.1	Final – 16.0.1
	10AX115, 10AT115	Final – 16.0 <sup>(2)</sup>	Final – 16.0	Final – 16.0

**Table 3. Timing Model, Power Model, and Device Status for Intel Cyclone 10 Devices**

Device Family	Device	Timing Model Status	Power Model Status	Device Status
Intel Cyclone 10 LP	10CL006, 10CL010, 10CL016, 10CL025, 10CL040, 10CL055, 10CL080, 10CL120	Final – 17.0	Final – 17.1	Final – 17.1

**Table 4. Timing Model, Power Model, and Device Status for Intel MAX 10 Devices**

Device Family	Device	Timing Model Status	Power Model Status	Device Status
Intel MAX 10	10M02, 10M04, 10M08	Final – 15.1 <sup>(3)</sup>	Final – 15.1	Final – 15.1
	10M16, 10M25, 10M40, 10M50	Final – 15.1.2	Final – 15.1	Final – 15.1

The current version of the Intel Quartus Prime software also includes final timing and power models for the Arria II GX, Arria II GZ, Arria V, Arria V GZ, Arria V SoC, Cyclone IV E, Cyclone IV GX, Cyclone V, Cyclone V SoC, MAX II, MAX II Z, MAX V, Stratix IV, and Stratix V device families. Timing models for these device families became final in the Intel Quartus Prime software versions 11.1 or earlier.

## 1.7. IBIS Models

**Table 5. IBIS Model Status for the Intel Quartus Prime Standard Edition Software Release Version 21.1**

Beginning in the Intel Quartus Prime Standard Edition software version 16.0, device families have IBIS model statuses that are either Advance, Preliminary, or Final.

Device Family	IBIS Model Status
Intel Arria 10	Final – 16.1.2
Arria V	Correlated with PHY device operation – 14.0
Arria II GX	Correlated with PHY device operation – 11.1
<i>continued...</i>	

(1) Devices with a -1 speed grade were finalized in Intel Quartus Prime software version 17.0

(2) All military grade devices were finalized in Intel Quartus Prime software version 18.0.1.

(3) Timing model statuses for MAX 10 A6 speed grade parts remain as Preliminary.



Device Family	IBIS Model Status
Arria II GZ	Correlated with PHY device operation – 11.1
Intel Cyclone 10 LP	Final – 17.0
Cyclone V	Correlated with PHY device operation – 14.0
Cyclone IV E	Correlated with PHY device operation – 11.1
Cyclone IV GX	Correlated with PHY device operation – 11.1
Intel MAX 10	Final – 16.0
MAX V	Correlated with PHY device operation – 11.1
Stratix V	Correlated with PHY device operation – 13.0 SP1
Stratix IV	Correlated with PHY device operation – 11.1

Updated IBIS models are available online at the following web page: [IBIS Models for Intel Devices](#). This page is updated as IBIS models for devices become available or are updated.

## 1.8. EDA Interface Information

**Table 6. Synthesis Tools Supporting the Intel Quartus Prime Standard Edition Software Release Version 21.1**

Synthesis Tools	Version
Siemens EDA Precision*	Siemens EDA Precision versions that support the Intel Quartus Prime software are typically released after the release of the Intel Quartus Prime software. Contact Siemens EDA for versions of Siemens EDA Precision that support Intel Quartus Prime Standard Edition Software Release Version 21.1.
Synopsys* Synplify*, Synplify Pro*, and Synplify Premier	Synopsys Synplify, Synplify Pro, and Synplify Premier versions that support the Intel Quartus Prime software are typically released after the release of the Intel Quartus Prime software. Contact Synopsys for versions of Synopsys Synplify, Synplify Pro, and Synplify Premier that support Intel Quartus Prime Standard Edition Software Release Version 21.1.

**Table 7. Simulation Tools Supporting the Intel Quartus Prime Standard Edition Software Release Version 21.1**

The following simulation tools provide RTL and functional gate-level simulation. Only 64-bit simulation tools are supported.

Simulation Tools	Version
Aldec Active-HDL	11.1 (Windows* only)
Aldec Riviera-PRO	2019.10
Cadence Xcelium* Parallel Logic Simulation	20.09.002 (Linux* only)
Questa-Intel FPGA Edition*	2021.2
Siemens EDA ModelSim SE	2020.4
Siemens EDA Questa Advanced Simulator	2020.4
Synopsys VCS* and VCS MX	P-2019.06-SP2-5 (Linux only)

\*Questa-Intel FPGA Edition requires licensing daemon version 11.16.4.0 (or later). You can obtain the licensing daemon from the [Intel FPGA License Daemon Downloads](#) web page.

You can obtain Intel FPGA Edition of simulation tools from the Download Center for FPGAs.

### Operating System Support for Questa-Intel FPGA Edition Version 2021.2

- Red Hat Enterprise Linux 7 (64-bit)
- Red Hat Enterprise Linux 8 (64-bit)
- SUSE Linux Enterprise Server 12 (64-bit)
- Windows 10 (64-bit)

#### Related Information

[Download Center for FPGAs](#)

## 1.9. Antivirus Verification

The Intel Quartus Prime software release version 21.1 has been verified virus free with the following software:

#### Antivirus Verification Software

McAfee VirusScan Command Line for Linux64 Version: 6.1.3.242  
 AV Engine version: 6010.8670 for Linux64.  
 Dat set version: 10142 created Oct 19 2021

## 1.10. Software Issues Resolved

The following customer service requests were fixed or otherwise resolved in Intel Quartus Prime Standard Edition Version 21.1:

**Table 8. Issues Resolved in the Intel Quartus Prime Standard Edition Version 21.1**

Customer Service Request Numbers							
00502057	00509814	00513730	00516198	00532195	00533671	00537322	00537417
00546229	00551175	00571983	00574304	00574672	00575223	00586162	00587552
00591296	00593344	00600321	00600801	00600900	00605277	00606092	00616912
00620430	00644888	04615848	04725640	04733486	05039466	11304030	11412034

## 1.11. Software Patches Included in this Release

Intel Quartus Prime Standard Edition Version 21.1 contains the following patches for previous versions of Intel Quartus Prime Standard Edition software:

**Table 9. Software Patches included in Intel Quartus Prime Standard Edition Version 21.1**

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime Version 21.1	0.08	00606092
Intel Quartus Prime Version 20.4	0.22	00556452
<i>continued...</i>		

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime Version 20.3	0.72	00631741
Intel Quartus Prime Version 20.3	0.59	00600321
Intel Quartus Prime Version 20.3	0.09	-
Intel Quartus Prime Version 20.2	0.56	00600321
Intel Quartus Prime Version 20.2	0.48	-
Intel Quartus Prime Version 20.2	0.4	-
Intel Quartus Prime Version 20.1.1	1.02std	-
Intel Quartus Prime Version 20.1.1	1.01std	-
Intel Quartus Prime Version 20.1	0.49	-
Intel Quartus Prime Version 19.4	0.38	-
Intel Quartus Prime Version 19.3	0.68	-
Intel Quartus Prime Version 19.2	0.29	-
Intel Quartus Prime Version 19.1	0.56	00537322
Intel Quartus Prime Version 18.1.1	1.10std	-
Intel Quartus Prime Version 18.1.1	1.08std	00600801
Intel Quartus Prime Version 18.1	0.52	-
Intel Quartus Prime Version 18.1	0.19std	00607534
Intel Quartus Prime Version 18.0	0.17std	-
Intel Quartus Prime Version 17.1	0.33	-
Intel Quartus Prime Version 17.1	0.20std	-
Intel Quartus Prime Version 17.0.2	2.21std	-
Intel Quartus Prime Version 17.0.2	2.20std	00593344
Intel Quartus Prime Version 17.0.2	2.19std	00509814
Intel Quartus Prime Version 17.0.2	2.18std	00513730
Intel Quartus Prime Version 17.0	0.23std	-
Intel Quartus Prime Version 16.0.2	2.41	-
Intel Quartus Prime Version 16.0	0.22	-
Intel Quartus Prime Version 15.1.1	1.21	-
Intel Quartus Prime Version 14.1.1	1.24	-
Intel Quartus Prime Version 14.1	0.44	-
Intel Quartus Prime Version 14.0	0.5	-
Intel Quartus Prime Version 13.1.4	4.71	-
Intel Quartus Prime Version 13.1	0.13	-
Intel Quartus Prime Version 13.0sp	1.86	-
All versions	0.02stdp	00616912

## 1.12. Latest Known Intel Quartus Prime Software Issues

Information about known issues that affect Intel Quartus Prime Standard Edition Version 21.1 is available in the Intel FPGA Knowledge Base.

You can find known issue information for previous versions of the Quartus Prime software on the [Intel FPGA Knowledge Base](#) web page.

Information about known software issues that affect previous versions of the Quartus II software is available on the [Intel Quartus Prime and Quartus II Software Support](#) web page.

Information about issues affecting the Intel FPGA IP Library is available in the release notes for each IP. You can find the IP release notes on the [Intel FPGAs and Programmable Devices Release Notes](#) web page.

### Related Information

- [Intel FPGA Knowledge Base](#)
- [Intel Quartus Prime and Quartus II Software Support](#)
- [Intel FPGAs and Programmable Devices Release Notes](#)

## 1.13. Intel Quartus Prime Standard Edition Version 21.1 Software and Device Support Release Notes Archives

Intel Quartus Prime Standard Edition	Publication
21.1	Intel Quartus Prime Standard Edition Version 21.1 Software and Device Support Release Notes
20.1.1	Intel Quartus Prime Standard Edition Version 20.1.1 Software and Device Support Release Notes
20.1	Intel Quartus Prime Standard Edition Version 20.1 Software and Device Support Release Notes
19.1	Intel Quartus Prime Standard Edition Version 19.1 Software and Device Support Release Notes
18.1	Intel Quartus Prime Standard Edition Version 18.1 Software and Device Support Release Notes
18.0	Intel Quartus Prime Standard Edition Software and Devices Support Release Notes
17.1	Intel Quartus Prime Standard Edition Software and Devices Support Release Notes
17.0	Intel Quartus Prime Standard Edition Software and Devices Support Release Notes

## 1.14. Document Revision History

**Table 10. The Intel Quartus Prime Standard Edition Software Release Version 21.1 Document Revision History**

Document Version	Intel Quartus Prime Version	Changes
2021.11.03	21.1	<ul style="list-style-type: none"> <li>Initial release.</li> </ul>