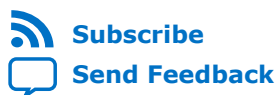


Intel[®] Quartus[®] Prime Pro Edition

Version 19.4 Software and Device Support Release Notes

Updated for Intel[®] Quartus[®] Prime Design Suite: **19.4**



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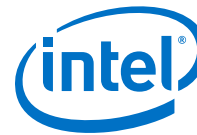
RN-01082-19.4.0 | 2020.01.10

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1. Intel® Quartus® Prime Pro Edition Version 19.4 Software and Device Support Release Notes

This document provides late-breaking information about the Intel® Quartus® Prime Pro Edition software release version 19.4.

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

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

Related Information

[Intel Quartus Prime Standard Edition Software and Device Support Release Notes](#)

1.1. New Features and Enhancements

Intel Quartus Prime Pro Edition Software Version 19.4 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. Additional security updates are planned and will be provided as they become available. You should promptly install the latest version when it is released.

Intel Quartus Prime Pro Edition Software Version 19.4 includes the following new features and enhancements:

- Intel Agilex™ device support no longer requires a separate license file.
- Starting with the Intel Agilex device family, the power estimation tool is transitioning to the new *Intel FPGA Power and Thermal Calculator*. The Power and Thermal Calculator requires a separate license.

Power estimation for earlier devices continues to be supported by the *Intel FPGA Early Power Estimator* (EPE) spreadsheet-based tool.

You can download the Power and Thermal Calculator as part of the Intel Quartus Prime Pro Edition software installation package or as a separate standalone installation package.

To run the calculator, run the following command:

```
<installation directory>/quartus/bin/ptc
```

Intel Quartus Prime Pro Edition Software Version 19.4 also includes bug fixes. Review [Software Issues Resolved](#) on page 8 and [Software Patches Included in this Release](#) on page 9 to see if this version contains fixes for or otherwise resolves any of your customer service requests.



1.2. 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.

Related Information

- [Operating System Support](#)
- [Download Center for FPGAs](#)

1.3. Memory Recommendations

A full installation of the Intel Quartus Prime Pro Edition software requires up to 75 GB of available disk space.

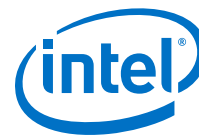
Intel recommends that your system be configured to provide virtual memory equal to the recommended physical RAM that is required to process your design.

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 Agilex	AGFA014-R0	64 GB
Intel Arria® 10	10AT115, 10AX115	48 GB
	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
	10AX016, 10AS016	18 GB
Intel Cyclone® 10 GX	10CX85, 10CX105, 10CX150, 10CX220	18 GB
Intel Stratix® 10	1SG280L, 1SX280L, 1SG280H, 1SX280H, 1ST280E 1SG250L, 1SX250L, 1SG250H, 1SX250H, 1ST250E 1SG210H, 1SX210H, 1SM21BH, 1SM21CH, 1SM21BE 1SM21CE, 1ST210E	64 GB
	1SG165H, 1SX165H, 1SM16BH, 1SM16CH, 1SM16BE, 1SM16CE, 1ST165E	48 GB
	1SG110H, 1SX110H 1SG085H, 1SX085H	32 GB



1.4. Changes in Device Support

For information about known device issues and workarounds, see the [Intel FPGA Knowledge Base](#).

1.5. Changes to Software Behavior

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

- Starting with the Intel Agilex device family, the EDA netlist writer does not support IBIS model generation. The EDA netlist writer continues to support IBIS model generation for earlier device families.

You can download IBIS models for all device families from the following web page: [IBIS Models for Intel Devices](#). This page is updated as IBIS models for devices become available.

- Intel FPGA IP cores are transitioning to a new version number scheme. Previously, IP core version numbers aligned with Intel Quartus Prime version numbers.

Under the new scheme, IP core version numbers move to a three-part version numbering scheme (X.Y.Z) that is independent of Intel Quartus Prime version numbers. Changes in the parts of an IP core version number indicate different things and might require actions on your part:

- X:** A change in X indicates a major revision of the IP. You must regenerate the IP.
- Y:** A change in Y indicates that the IP includes new features, but retains backwards compatible behavior, ports, and parameters with all X level IP cores. Regenerate the IP to include these new features.
- Z:** A change in Z indicates that the IP includes bug fixes and minor improvements, but retains backwards compatible behavior, ports, and parameters with all X level IP cores. Regenerate the IP to include the fixes and improvements.

In addition, new IP cores start their version numbering at 1.0.0. Existing IP cores adopt the new numbering scheme but increment the version number from their current version number.

Review your IP core release notes to confirm the versioning scheme for your IP core.

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.



1.6. Device Support and Pin-Out Status

Table 2. Full Device Support

Full compilation, simulation, timing analysis, and programming support is now available for the new devices listed in this table.

Device Family	Devices
Intel Agilex	AGFA014-R0, AGFB014-R0
Intel Arria 10	10AS016, 10AS022, 10AS027, 10AS032, 10AS048, 10AS057, 10AS066, 10AT090, 10AT115, 10AX016, 10AX022, 10AX027, 10AX032, 10AX048, 10AX057, 10AX066, 10AX090, 10AX115
Intel Cyclone 10 GX	10CX085, 10CX105, 10CX150, 10CX220
Intel Stratix 10	1SD110P-S1, 1SD280P, 1SD280P-S1, 1SG085H, 1SG110H, 1SG110H-S1, 1SG165H, 1SG166H, 1SG210H, 1SG211H, 1SG250H, 1SG250L, 1SG280H, 1SG280H-S1, 1SG280H-S2, 1SG280H-S3, 1SG280L, 1SG280L-S2, 1SG280L-S3, 1SM16BE, 1SM16BE-S1, 1SM16BH, 1SM16BH-S1, 1SM16CH, 1SM16CH-S1, 1SM21BE, 1SM21BE-S1, 1SM21BH, 1SM21BH-S1, 1SM21CH, 1SM21CH-S1, 1ST165E, 1ST085E, 1ST085E-AS, 1ST110E, 1ST110E-AS, 1ST210E, 1ST210E-S1, 1ST250E, 1ST280E, 1ST280E-S1, 1SX085H, 1SX110H, 1SX110H-S1, 1SX165H, 1SX210H, 1SX250H, 1SX250L, 1SX280H, 1SX280H-S1, 1SX280H-S3, 1SX280L, 1SX280L-S1, 1SX280L-S2, 1SX280L-S3

Table 3. Advance Device Support

Compilation, simulation, and timing analysis support is provided for these devices. The compiler generates pinout information for these devices in this release, but does not generate programming files.

Device Family	Devices
Intel Stratix 10	1SD21BP, 1SG040H, 1SG065H, 1ST040E, 1ST110E, 1SX040H, 1SX065H

Table 4. Initial Device Support

Compilation, simulation, and timing analysis support is provided for these devices. Programming files and pinout information are not generated for these devices in this release.

Device Family	Devices
Intel Agilex	AGFA014, AGFB014

1.7. Timing and Power Models

Table 5. Timing and Power Model Status

Device Family	Device	Timing Model Status	Power Model Status
Intel Agilex	AGFA014-R0	Preliminary	Preliminary
Intel Arria 10	10AX016, 10AS016, 10AX022, 10AS022, 10AX027, 10AS027, 10AX032, 10AS032,	Final - 16.1 ⁽¹⁾ ⁽²⁾	Final - 17.0
	10AX048, 10AS048	Final - 16.0.2 ⁽²⁾	
	10AX057, 10AS057, 10AX066, 10AS066, 10AX090	Final - 16.0.1 ⁽²⁾	Final - 16.0.1
	10AX115, 10AT115	Final - 16.0 ⁽²⁾	Final - 16.0
<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.



Device Family	Device	Timing Model Status	Power Model Status
Intel Cyclone 10 GX	10CX085, 10CX105, 10CX150, 10CX220	Final - 17.0	Final - 18.0
Intel Stratix 10	1SG280L, 1SX280L, 1SG250L, 1SX250L	Final - 18.0.1	Final - 18.1.1
	1SG280H, 1SX280H, 1SG250H, 1SX250H, 1SG210H, 1SX210H, 1SG165H, 1SX165H, 1SG110H, 1SX110H, 1SG085H, 1SX085H	Final - 18.1.1	Final - 18.1.1
	1ST280E, 1ST250E	Final - 18.1.1	Final - 19.4
	1SM21BH, 1SM21CH, 1SM16BH, 1SM16CH	Final - 19.1	Final - 19.1
	1SG166H, 1SG211H	Final - 19.1	Final - 19.3
	1ST210E, 1SM21BE, 1ST165E, 1SM16BE	Final - 19.2	Final - 19.4
	1SD110P, 1SD280P, 1SD21BP, 1SG040H, 1SG065H, 1ST040E, 1ST085E, 1ST110E, 1SX040H, 1SX065H	Preliminary	Preliminary

Related Information

[System Design with Advance FPGA Timing Models](#)

1.8. IBIS Models

Table 6. IBIS Model Status for the Intel Quartus Prime Pro Edition Software Release Version 19.4

Device families have IBIS model statuses that are either Advance, Preliminary, or Final.

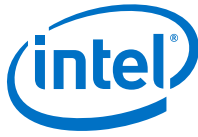
Device Family	IBIS Model Status
Intel Arria 10	Final - 16.1.2
Intel Cyclone 10 GX	Final - 17.0
Intel Stratix 10	Final - 18.1

Starting with the Intel Agilex device family, IBIS models are available only online at the following web page: [IBIS Models for Intel Devices](#). This page is updated as IBIS models for devices become available.

1.9. EDA Interface Information

Table 7. Synthesis Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 19.4

Synthesis Tools	Version
Mentor Graphics* Precision	Mentor Graphics* Precision versions that support the Intel Quartus Prime software are typically released after the release of the Intel Quartus Prime software. Contact Mentor Graphics for versions of Mentor Graphics Precision that support Intel Quartus Prime Pro Edition Software Release Version 19.4.
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 Pro Edition Software Release Version 19.4.

**Table 8. Simulation Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 19.4**

The following simulation tools support RTL and functional gate-level simulation.

Simulation Tools	Version
Aldec Active-HDL	10.5 (Windows 32-bit only)
Aldec Riviera-PRO	2019.04 (64-bit only)
Cadence Incisive Enterprise Simulator (IES)	15.20 (64-bit Linux only)
Cadence Xcelium Parallel Logic Simulation	18.03 (64-bit Linux only)
Mentor Graphics ModelSim* PE	2019.2 (Windows 32-bit only)
Mentor Graphics ModelSim SE	2019.2 (64-bit only)
Mentor Graphics ModelSim-Intel FPGA Edition	2019.2 (32-bit only)
Mentor Graphics Questa* Advanced Simulator	2019.2 (64-bit only)
Synopsys VCS and VCS MX	O-2018.09-SP2-2 (64-bit Linux only)

1.10. Antivirus Verification

The Intel Quartus Prime software release version 19.4 has been verified virus free with the following software:

Antivirus Verification Software

Windows McAfee Endpoint Security 10.5 Version : 10.5.5.5253
 Hotfix number: 190108,190514,190515
 Patch: 5
 McAfee Agent Version : 5.6.1.157
 Adaptive Threat Protection Version : 10.5.5.5160
 Threat Protection Version : 10.5.5.5245

1.11. Software Issues Resolved

The following customer service requests were fixed or otherwise resolved in Intel Quartus Prime Pro Edition Version 19.4:

Table 9. Issues Resolved in the Intel Quartus Prime Pro Edition Version 19.4

Customer Service Request Numbers							
00278095	00395371	00403480	00416225	00421601	00423089	00427752	00428814
00437262	00438878	00444704	00445579	00448434	00448582	00448996	00449290
00450492	00454036	00456864	00456931	00457323	00457655	00458390	00459864
00460361	00461226	00461459	00462856	00463815	00465570	00465810	00466933
00467382	00469277	00469666	00470766	00471935	00475343	00481451	10931816
11284834	11319086	11358636	11381328				



1.12. Software Patches Included in this Release

Intel Quartus Prime Pro Edition Version 19.4 contains the following patches for previous versions of Intel Quartus Prime Pro Edition software:

Table 10. Software Patches included in Intel Quartus Prime Pro Edition Version 19.4

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime software version 19.3	0.26	-
Intel Quartus Prime software version 19.3	0.23	-
Intel Quartus Prime software version 19.3	0.20	00475343
Intel Quartus Prime software version 19.3	0.19	00465810
Intel Quartus Prime software version 19.3	0.17	00465321
Intel Quartus Prime software version 19.3	0.16	-
Intel Quartus Prime software version 19.3	0.15	-
Intel Quartus Prime software version 19.3	0.14	00463815
Intel Quartus Prime software version 19.3	0.13	-
Intel Quartus Prime software version 19.3	0.12	-
Intel Quartus Prime software version 19.3	0.11	-
Intel Quartus Prime software version 19.3	0.09r	00469277
Intel Quartus Prime software version 19.3	0.07	-
Intel Quartus Prime software version 19.3	0.05r	-
Intel Quartus Prime software version 19.3	0.03	-
Intel Quartus Prime software version 19.3	0.02	00456931
Intel Quartus Prime software version 19.3	0.01	-
Intel Quartus Prime software version 19.2	0.15	00465810
Intel Quartus Prime software version 19.1	0.42	00465570
Intel Quartus Prime software version 19.1	0.39	00459864

1.13. Latest Known Intel Quartus Prime Software Issues

Information about known issues that affect the Intel Quartus Prime software version 19.4 is available in the Intel Programmable Solutions Knowledge Base.

Table 11. Important Known Issues Affecting Intel Quartus Prime Pro Edition Version 19.4

Description	Workaround
<p>If your LC_ALL environment variable does not match the locale settings (such as LANG), a Perl warning might be generated during IP generation:</p> <pre>perl: warning: Setting locale failed.</pre> <p>This warning also results in IP generation failure.</p>	<p>Ensure that your operating system locale is set up correctly. In particular, the locale specified with the LC_ALL environment variable must match the locale settings (such as LANG).</p>
<i>continued...</i>	



Description	Workaround
For Intel Stratix 10 devices, Intel Quartus Prime throws an error message if there is an invalid pin placement of the HPS EMIF IP PLL reference clock and RZQ pin.	For details, see the following article in the Intel Programmable Solutions Knowledge Base: Are there any placement restrictions for the Intel Stratix 10 HPS EMIF IP PLL reference clock and RZQ pin?
For Intel Stratix 10 devices, compiling existing Intel Quartus Prime projects with Intel Quartus Prime Version 19.4 might result in the following error message: Error (20834) When you enable the CvP setting, you must make sure design is CvP capable.	If you do not intend to perform CvP, remove the following QSF setting: <pre>set_global_assignment -name CVP_MODE "CORE INITIALIZATION AND UPDATE"</pre>
Logic Analyzer Interface (LAI) is not supported.	N/A
The Intel Quartus Prime Pro Edition software might fail to program the 1ST085E-AS or 1ST110E-AS security feature-enabled devices via the AVSTx8 configuration mode.	Do not program the 1ST085E-AS or 1ST110E-AS security feature-enabled devices via the AVSTx8 configuration mode.

You can find known issue information for previous versions of the Quartus Prime software on the Knowledge Base webpage.

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 webpage.

Information about issues affecting the Intel FPGA IP Library is available in the *Intel FPGA IP Release Notes*.

Related Information

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

1.14. Intel Quartus Prime Pro Edition Version 19.4 Software and Device Support Release Notes Archives

Intel Quartus Prime Pro Edition	Publication
19.3	Intel Quartus Prime Pro Edition Version 19.3 Software and Device Support Release Notes
19.2	Intel Quartus Prime Pro Edition Version 19.2 Software and Device Support Release Notes
19.1	Intel Quartus Prime Pro Edition Version 19.1 Software and Device Support Release Notes
18.1	Intel Quartus Prime Pro Edition Version 18.1 Software and Device Support Release Notes
18.0	Intel Quartus Prime Pro Edition Software and Devices Support Release Notes
17.1	Intel Quartus Prime Pro Edition Software and Devices Support Release Notes
17.0	Intel Quartus Prime Pro Edition Software and Devices Support Release Notes



1.15. Document Revision History

Table 12. The Intel Quartus Prime Pro Edition Software Release Version 19.4 Document Revision History

Document Version	Intel Quartus Prime Version	Changes
2020.01.10	19.4	<ul style="list-style-type: none"> • Updated Software Issues Resolved on page 8. Some software issues were omitted from this table when the Release Notes were initially published. The following resolved software issues were added to the table: <ul style="list-style-type: none"> – 00395371 – 00416225 – 00423089 – 00428814 – 00448434 – 00448996 – 00462856 – 00465570 – 00481451 – 11319086 Also, duplicate entries were removed from the table. • Updated Software Patches Included in this Release on page 9. Some patches were omitted from this table when the Release Notes were initially published. The following software patches were added to the table: <ul style="list-style-type: none"> – Intel Quartus Prime software version 19.3 patch 0.26 – Intel Quartus Prime software version 19.3 patch 0.17 – Intel Quartus Prime software version 19.3 patch 0.16 – Intel Quartus Prime software version 19.3 patch 0.15 – Intel Quartus Prime software version 19.3 patch 0.12 – Intel Quartus Prime software version 19.3 patch 0.07 – Intel Quartus Prime software version 19.1 patch 0.42
2019.12.16	19.4	<ul style="list-style-type: none"> • Initial release.