



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

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## Version 19.3 Software and Device Support Release Notes

Updated for Intel<sup>®</sup> Quartus<sup>®</sup> Prime Design Suite: **19.3**



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# 1. Intel® Quartus® Prime Pro Edition Version 19.3 Software and Device Support Release Notes

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This document provides late-breaking information about the Intel® Quartus® Prime Pro Edition software release version 19.3.

For information about operating system support, refer to the `readme.txt` file in your `intelFPGA_pro/<version number>/quartus` directory.

## 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 19.3 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 19.3 includes the following new features and enhancements:

- On Microsoft Windows\* systems, Intel Quartus Prime Pro Edition software transitioned from using Cygwin to using Ubuntu 18.04 LTS on Windows Subsystem for Linux (WSL).

This transition improves the performance, robustness, and security of Intel Quartus Prime Pro Edition software.

For instructions on installing WSL, see [Installing Windows Subsystem for Linux\\* \(WSL\) on Windows](#) in *Intel FPGA Software Installation and Licensing*.

- Changed the System Console to include a unified debugging environment and now includes functions available from the Transceiver Toolkit.
- Improved user interface including support for 4K monitors.
- Enhanced Design Assistant including finer grained control of rule violations and rule author control over violation display.



- Added Intel Agilex™ device support for the following Intel Quartus Prime features:
  - Chip Planner
  - Design Assistant
  - Design Reuse
  - EDA Netlist Writer
  - Incremental block-based compilation flows
  - Interface Planner
  - Logic Lock regions
  - Netlist Viewers
  - Partitions flows (PRESERVE assignment, QDB\_FILE\_PARTITION assignment)
  - Periphery reuse
  - Pin Planner
  - Platform Designer
  - Power Analyzer
  - Power and Thermal Calculator
  - Rapid recompile flows
  - Signal Probe (Beta-level support)
  - Signal Tap Logic Analyzer

For more details about Intel Agilex device support in Intel Quartus Prime software, contact your Intel representative.

- For Intel Stratix® 10 advanced security enabled devices, added the following security features:
  - Security policy enforcement through eFuses, including disabling JTAG
  - HPS debug certificates
  - Physical eFuse bitstream encryption key storage
  - Side channel mitigation
  - Additional user authorization key for bitstream authentication
- Added Fast Preservation feature to reduce compile time for designs that use Partial Reconfiguration or Root Partition Reuse Flow. Use the following command to enable this feature:

```
set_global_assignment-name FAST_PRESERVE AUTO|OFF
```

- Added RSU retry mechanism.
- Added new Timing Analyzer report commands to help with timing closure:
  - report\_design\_metrics
  - report\_logic\_depth
  - report\_neighbor\_paths
- Enabled back annotation of RAMs, DSPs, and clocks for the --back\_annotate option of the quartus\_cdb command:

```
quartus_cdb --back_annotate [--dsp] [--ram] [--clock] design_name
```



- Starting with Intel Agilex devices, the power estimation tool is transitioning to the new *Intel FPGA Power and Thermal Calculator* in Quartus Prime software.  
Power estimation for earlier devices continues to be supported by the *Intel FPGA Early Power Estimator (EPE)* spreadsheet-based tool.
- Added Intel Enpirion® devices to the list of power management devices that can be used with devices that support the SmartVID controller.
- Enhanced Advanced Link Analyzer with the following new features:
  - Added support for Intel Agilex devices.
  - Added support for proposed IEEE 802.3 106Gbps Ethernet and 112Gbps OIF CEI standards.
  - Added embedded COM analysis.
  - Added Intel Device Model Importer wizard.
  - Added XML simulation report.

## 1.2. Operating System Support

Information about OS 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	Contact your Intel representative for information about Intel Agilex devices support.	64 GB
Intel Arria® 10	10AT115, 10AX115	48 GB
	10AX090	44 GB
	10AS066, 10AX066	32 GB
	10AS057, 10AX057	30 GB
	10AS048, 10AX048	28 GB

*continued...*



Family	Device	Recommended Physical RAM
	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.

- 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.



- The University Vector Waveform Editor tool has been removed from Intel Quartus Prime Pro Edition software.
- In Platform Designer (formerly QSys), **Merlin Components** have been removed from the Platform Designer component library.
- Changed hierarchy name for VHDL to remove the "\" escaping of generated hierarchies. If you use VHDL generations, you must update your QSF and SDC assignments.
- Logic Analyzer Interface (LAI) is not supported

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 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	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 Agilex	Contact your Intel representative for information about Intel Agilex device support.
Intel Stratix 10	1SD110P, 1SD21BP, 1SD280P, 1SG065H, 1ST085E, 1ST110E, 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 Stratix 10	1ST040E



## 1.7. Timing and Power Models

**Table 5. Timing and Power Model Status**

Device Family	Device	Timing Model Status	Power Model Status
Intel Agilex	Contact your Intel representative for information about Intel Agilex device support.	Preliminary	N/A
Intel Arria 10	10AX016, 10AS016, 10AX022, 10AS022, 10AX027, 10AS027, 10AX032, 10AS032,	Final – 16.1 <sup>(1)</sup> <sup>(2)</sup>	Final – 17.0
	10AX048, 10AS048	Final – 16.0.2 <sup>(2)</sup>	
	10AX057, 10AS057, 10AX066, 10AS066, 10AX090	Final – 16.0.1 <sup>(2)</sup>	Final – 16.0.1
	10AX115, 10AT115	Final – 16.0 <sup>(2)</sup>	Final – 16.0
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	Preliminary
	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	Preliminary
	1SD110P, 1SD21BP, 1SG065H, 1SX065H, 1ST085E, 1ST110E, 1SD280P	Preliminary	Preliminary
	1ST040E	Advance	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 19.3**

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

Device Family	IBIS Model Status
Intel Agilex	N/A
Intel Arria 10	Final – 16.1.2
Intel Cyclone 10 GX	Final – 17.0
Intel Stratix 10	Final – 18.1

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

(2) All automotive and military grade devices are preliminary.





## 1.9. EDA Interface Information

**Table 7. Synthesis Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 19.3**

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 19.3.
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 19.3.

**Table 8. Simulation Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 19.3**

Simulation Tools	Version	Gate-Level Simulation Support
Aldec Active-HDL	10.5 (Windows 32-bit only)	Yes
Aldec Riviera-PRO	2019.04 (64-bit only)	Yes
Cadence Incisive Enterprise Simulator (IES)	15.20 (64-bit Linux only)	Yes
Cadence Xcelium Parallel Logic Simulation	18.03 (64-bit Linux only)	Yes
Mentor Graphics ModelSim* PE	2019.2 (Windows 32-bit only)	Yes
Mentor Graphics ModelSim SE	2019.2 (64-bit only)	Yes
Mentor Graphics ModelSim-Intel FPGA Edition	2019.2 (32-bit only)	Yes
Mentor Graphics Questa* Advanced Simulator	2019.2 (64-bit only)	Yes
Synopsys VCS and VCS MX	0-2018.09-SP2-2 (64-bit Linux only)	Yes

## 1.10. Antivirus Verification

The Intel Quartus Prime software release version 19.3 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

**Table 9. Issues Resolved in the Intel Quartus Prime Pro Edition Version 19.3**

Customer Service Request Numbers							
00278095	00279317	00288605	00289865	00325352	00342920	00351172	00368658
00379732	00386832	00387783	00388550	00388661	00388680	00389949	00390911
00391150	00391782	00397680	00399261	00399997	00400001	00400360	00400618
00400687	00401178	00402606	00404576	00406576	00407275	00407594	00407861
00408144	00408154	00409872	00410533	00412763	00413092	00415408	00416168
00416940	00420779	00421221	00421510	00421932	00422062	00422100	00422384
00422693	00422918	00423959	00425453	00426370	00426370	00427361	00429367
00430330	00432192	00432977	00434239	00434427	00434486	00434618	00434721
00434759	00434821	00434986	00435057	00436665	00437259	00437322	00439195
00439229	00439488	00440344	00440384	00440797	00441398	00441956	00442461
00442475	00443318	00444704	00444721	00445521	00447236	00448218	00448913
00449824	00449849	00450147	00450556	00450776	00451006	00451626	00452515
00453749	00458390	00459850	00511887	00545732	11234863	11294627	11296478
11301506	11309118	11341523	11346435	11348777	11353214	11355477	11358187
11358636	11358966	11364044	11373997	11385870	11386675	11387236	11387326
11392216	11394821	11403468	11408867	11409593	11409979	11410529	11411912

## 1.12. Software Patches Included in this Release

**Table 10. Software Patches included in Intel Quartus Prime Pro Edition Version 19.3**

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime software version 19.2	0.13	00408144
Intel Quartus Prime software version 19.2	0.11	00443666
Intel Quartus Prime software version 19.2	0.10	00449849
Intel Quartus Prime software version 19.2	0.08	00447236
Intel Quartus Prime software version 19.2	0.06	00440892
Intel Quartus Prime software version 19.2	0.04	00440797
Intel Quartus Prime software version 19.2	0.03	-
Intel Quartus Prime software version 19.2	0.02	-

*continued...*



Software Version	Patch	Customer Service Request Number
Intel Quartus Prime software version 19.2	0.01	-
Intel Quartus Prime software version 19.1	0.33	00459850
Intel Quartus Prime software version 19.1	0.32	00435057
Intel Quartus Prime software version 19.1	0.30	-
Intel Quartus Prime software version 19.1	0.29fw	00408144
Intel Quartus Prime software version 19.1	0.28	00445521
Intel Quartus Prime software version 19.1	0.27	-
Intel Quartus Prime software version 19.1	0.24	00442475
Intel Quartus Prime software version 19.1	0.23	00442461
Intel Quartus Prime software version 19.1	0.22	00434618
Intel Quartus Prime software version 19.1	0.21	00437259
Intel Quartus Prime software version 19.1	0.19	00429419
Intel Quartus Prime software version 19.1	0.17	-
Intel Quartus Prime software version 19.1	0.15	-
Intel Quartus Prime software version 19.1	0.14fwp	00416168
Intel Quartus Prime software version 19.1	0.14fw	00416168
Intel Quartus Prime software version 19.1	0.11	-
Intel Quartus Prime software version 19.1	0.10	-
Intel Quartus Prime software version 19.1	0.09p	00412250
Intel Quartus Prime software version 19.1	0.09	00412250
Intel Quartus Prime software version 19.1	0.05	00368431
Intel Quartus Prime software version 19.1	0.03p	-
Intel Quartus Prime software version 19.1	0.03	-

*continued...*



Software Version	Patch	Customer Service Request Number
Intel Quartus Prime software version 19.1	0.01p	-
Intel Quartus Prime software version 18.1.2	2.06p	-
Intel Quartus Prime software version 18.1.2	2.06	-
Intel Quartus Prime software version 18.1.2	2.02	-
Intel Quartus Prime software version 18.1.1	1.22	-
Intel Quartus Prime software version 18.1.1	1.21p	00416168
Intel Quartus Prime software version 18.1.1	1.21	00416168
Intel Quartus Prime software version 18.1.1	1.20	00412250
Intel Quartus Prime software version 18.1.1	1.18	00368431
Intel Quartus Prime software version 18.1.1	1.04	00389361
Intel Quartus Prime software version 18.1	0.40	00389853
Intel Quartus Prime software version 18.1	0.29	-
Intel Quartus Prime software version 18.1	0.25	-
Intel Quartus Prime software version 18.0.1	1.57	00443318
Intel Quartus Prime software version 18.0.1	1.56	00442461
Intel Quartus Prime software version 18.0.1	1.54	00434618
Intel Quartus Prime software version 18.0.1	1.53	-
Intel Quartus Prime software version 18.0.1	1.51	00407594
Intel Quartus Prime software version 16.1	0.32	00434664

### 1.13. Latest Known Intel Quartus Prime Software Issues

Information about known issues that affect the Intel Quartus Prime software version 19.3 is available in the Intel Programmable Solutions Knowledge Base.



**Table 11. Important Known Issues Affecting Intel Quartus Prime Pro Edition Version 19.3**

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>
<p>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.</p>	<p>For details, see the following article in the Intel Programmable Solutions Knowledge Base: <a href="#">Are there any placement restrictions for the Intel Stratix 10 HPS EMIF IP PLL reference clock and RZQ pin?</a></p>
<p>For Intel Stratix 10 devices, some existing Intel Quartus Prime projects might give the following error message when the project is compiled with Intel Quartus Prime Version 19.3:</p> <pre>Error (20834) When you enable the CvP setting, you must make sure design is CvP capable.</pre>	<p>If you do not intend to perform CvP, remove the following QSF setting:</p> <pre>set_global_assignment -name CVP_MODE "CORE INITIALIZATION AND UPDATE"</pre>
<p>Logic Analyzer Interface (LAI) is not supported.</p>	<p>N/A</p>
<p>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.</p>	<p>Do not program the 1ST085E-AS or 1ST110E-AS security feature-enabled devices via the AVSTx8 configuration mode.</p>

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 19.3 Software and Device Support Release Notes Archives

Intel Quartus Prime Pro Edition	User Guide
19.2	<a href="#">Intel Quartus Prime Pro Edition Version 19.2 Software and Device Support Release Notes</a>
19.1	<a href="#">Intel Quartus Prime Pro Edition Version 19.1 Software and Device Support Release Notes</a>
18.1	<a href="#">Intel Quartus Prime Pro Edition Version 18.1 Software and Device Support Release Notes</a>
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Intel Quartus Prime Pro Edition	User Guide
18.0	<a href="#">Intel Quartus Prime Pro Edition Software and Devices Support Release Notes</a>
17.1	<a href="#">Intel Quartus Prime Pro Edition Software and Devices Support Release Notes</a>
17.0	<a href="#">Intel Quartus Prime Pro Edition Software and Devices Support Release Notes</a>

## 1.15. Document Revision History

**Table 12. The Intel Quartus Prime Pro Edition Software Release Version 19.3 Document Revision History**

Document Version	Intel Quartus Prime Version	Changes
2019.09.30	19.3	Initial release.