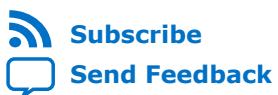




Intel[®] Quartus[®] Prime Pro Edition Software and Device Support Release Notes



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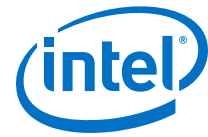
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1. Intel® Quartus® Prime Pro Edition Software and Device Support Release Notes Version 18.0

This document provides late-breaking information about the Intel® Quartus® Prime Pro Edition software release version 18.0.

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

The Intel Quartus Prime Pro Edition software release version 18.0 includes the following new features and enhancements:

- Expanded supported for Intel Stratix® 10 devices:
 - Added support for Intel Stratix 10 SX, MX, and TX family variants.
 - Added support for Intel Stratix 10 1SG/SX085 and 1SG/SX110 device families.
 - Added support for Intel Stratix 10 E-Tile devices.
 - Enabled configuration of multiple Intel Stratix 10 devices in the same JTAG chain.
- Simplified partial reconfiguration and block-based hierarchical design compilation flows for Intel Arria® 10 and Intel Stratix 10 device families.
- Enhanced Intel Quartus Prime UI:
 - Added concurrent analysis for Timing Analyzer and Netlist Viewers
 - Added support for hierarchical partial reconfiguration flows.
 - Improved high-resolution display support.
 - Improved integration of Interface Planner.
- Enhanced Platform Designer (formerly Qsys):
 - Improved Intel Quartus Prime IP upgrade regeneration times
 - Added automatic system information synchronization
 - Added ability to use Verilog syntax to connect ports
 - Added support for IP that uses System Verilog interfaces



- Enhanced debug features:
 - Heatmap is now provided as default for Eye Viewer.
 - Improved register renaming during retiming.
 - Added Intel Stratix 10 device support to Signal Probe.
 - Added Signal Tap support for Intel Stratix 10 rapid recompile.
- Enhanced compiler settings:
 - Added new **Performance (High effort)** and **Performance (Aggressive)** compiler optimization modes.
 - Added new **Register optimizations** options to allow RAM retiming and DSP retiming.
 - Added new **Compile Time** optimization mode to allow a tradeoff between design performance and compilation time.
- Enabled bitstream encryption for Intel Cyclone® 10 GX devices.
- Enhanced Intel Advanced Link Analyzer (formerly JNEye):
 - Enhanced Channel Viewer.
 - Enhanced Data Viewer.
 - Added link to online user guide.

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](#)

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 Arria 10	10AT115, 10AX115	48 GB
	10AX090	44 GB
	10AS066, 10AX066	32 GB
<i>continued...</i>		



Family	Device	Recommended Physical RAM
	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.

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.

Change in DSP and RAM Register Packing Optimizations

In Intel Quartus Prime Pro Edition software version 18.0, there is a change in DSP and RAM register packing optimizations. Registers that are identified as metastability synchronization registers cannot be placed into the internal register banks within the DSP and RAM blocks. This restriction ensures that synchronization register placement can be optimized in ALM register locations to improve MTBF (mean time between failure).



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	10AX115E3, 10AX016, 10AS016, 10AX022, 10AS022, 10AX027, 10AS027, 10AX032, 10AS032, 10AX048, 10AS048, 10AX057, 10AS057, 10AX066, 10AS066, 10AX090, 10AX115, 10AT115, 10AX016, 10AS016, 10AX022, 10AS022, 10AX027, 10AS027, 10AX032, 10AS032
Intel Cyclone 10 GX	10CX085, 10CX105 10CX150, 10CX220
Intel Stratix 10	1SG280L, 1SG280L-S2, 1SG280L-S3, 1SG280H-S1, 1SG280H-S2, 1SG280H-S3, 1SX280L-S1, 1SX280L-S2, 1ST280E-S1, 1SG250L, 1SG210H-S1, 1SG210H-S3, 1SM21BH-S1, 1SM21CH-S1, 1SM21KH-S1, 1SM21LH-S1, 1ST210E-S1, 1SM16BH-S1, 1SM16CH-S1, 1SM16KH-S1, 1SM16LH-S1

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	1SG280, 1SX280, 1ST280-F55, 1SG250, 1SX250, 1ST250-F55, 1SG210, 1SX210, 1ST210, 1SM21, 1SG165, 1SX165, 1ST165, 1SM16, 1SG110, 1SX110, 1SG085, 1SX085

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	1ST280-F50, 1ST250-F50, 1SM21xE-F55, 1SM16xE-F55

1.7. Timing and Power Models

Table 5. Timing and Power Model Status

Device Family	Device	Timing Model Status	Power Model Status
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⁾	

continued...

(1) -1 devices were finalized in Intel Quartus Prime software version 17.0

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



Device Family	Device	Timing Model Status	Power Model Status
	10AX057, 10AS057, 10AX066, 10AS066, 10AX090	Final – 16.0.1 ⁽²⁾	Final – 16.0.1
	10AX115, 10AT115	Final – 16.0 ⁽²⁾	Final – 16.0
Intel Cyclone 10 GX	10CX085, 10CX105, 10CX150, 10CX220	Final – 17.0	Final – 18.0
Intel Stratix 10	1SG280, 1SX280, 1ST280, 1SG250, 1SX250, 1ST250, 1SG210, 1SX210, 1ST210, 1SM21, 1SG165, 1SX165, 1ST165, 1SM16, 1SG110, 1SX110, 1SG085, 1SX085	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 18.0

Beginning in the Intel Quartus Prime Pro Edition software version 18.0, device families will 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	Preliminary – 17.1.1

1.9. EDA Interface Information

Table 7. Synthesis Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 17.1

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 18.0.
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 18.0.

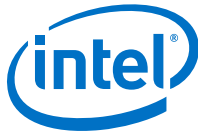


Table 8. Simulation Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 18.0

Simulation Tools	Version	Gate-Level Simulation Support
Aldec Active-HDL	10.4a (Windows 32-bit only)	Yes
Aldec Riviera-PRO	2017.10.67.6735 (64-bit only)	Yes
Cadence Incisive Enterprise Simulator (IES)	15.20 (64-bit Linux only)	Yes
Cadence Xcelium Parallel Logic Simulation	17.04 (64-bit Linux only)	Yes
Mentor Graphics ModelSim* PE	10.6c (Windows 32-bit only)	Yes
Mentor Graphics ModelSim SE	10.6c (64-bit only)	Yes
Mentor Graphics ModelSim-Intel FPGA Edition	10.6c (32-bit only)	Yes
Mentor Graphics Questa*	10.6c (64-bit only)	Yes
Synopsys VCS and VCS MX	2017.03-SP2-1 (64-bit Linux only)	Yes

1.10. Antivirus Verification

The Intel Quartus Prime software release version 18.0 has been verified virus free with the following software:

Antivirus Verification Software for Windows

Windows McAfee Agent
 McAfee VirusScan Enterprise + Antispyware Enterprise 8.8
 Scan engine version (32-bit): 5900.7806
 Scan engine version (64-bit): 5900.7806
 DAT version: 8843.0000
 DAT created on: 03/25/2018

Antivirus Verification Calm Software for Linux

ClamAV 0.99.2/24187

1.11. Software Issues Resolved

Table 9. Issues Resolved in the Intel Quartus Prime Pro Edition Version 18.0

Customer Service Request Numbers							
10865227	11016905	11028772	11034336	11082400	11100820	11109565	11111866
11113456	11115615	11125452	11150268	11150329	11162636	11170029	11173684
11177119	11183445	11190553	11196156	11196564	11198401	11204916	11207617
11211852	11214040	11214957	11217611	11219186	11224582	11227429	11227688
11228773	11231470	11236412	11237317	11238301	11239778	11241253	11241893
11244571	11245355	11245681	11246141	11250736	11252070	11253199	11255835
11257503	11258276	11259345	11259782	11260299	11263035	11263666	11264919
11265630	11266461	11268604	11268614	11270366	11271197	11271464	11272539
<i>continued...</i>							



Customer Service Request Numbers							
11275704	11275705	11276968	11277607	11278568	11279651	11279832	11280445
11281344	11281344	11282762	11284193	11284725	11285495	11288610	11289200
11291457	11291837	11292287	11292325	11295205	11295999	11296657	11296891
11297292	11297721	11298029	11298596	11299453	11299942	11300447	11302819
11304078	11304675	11304754	11305007	11305029	11305880	11306464	11306924
11307518	11307683	11307817	11309292	11309645	11310541	11310607	11311027
11311519	11312288	11312292	11312373	11312939	11313257	11313513	11313547
11313771	11313995	11314037	11314052	11315925	11316019	11316195	11316892
11317065	11317550	11319023	11319053	11319103	11319336	11319905	11320198
11320238	11320621	11320813	11321299	11321442	11322147	11322514	11323330
11323534	11323573	11323600	11323899	11323999	11324486	11324886	11325148
11325285	11325412	11325944	11326422	11326582	11326751	11326863	11326863
11326878	11326891	11327626	11327778	11328318	11328330	11328490	11328639
11328644	11329895	11329930	11329972	11330494	11330515	11330711	11330711
11330730	11330797	11331179	11331461	11332060	11332269	11332313	11332398
11332793	11332806	11332845	11332893	11332910	11332932	11332956	11333008
11333050	11333061	11333144	11333177	11333389	11333390	11333411	11333919
11334150	11334156	11334180	11334411	11334554	11334698	11334793	11334980
11334987	11335123	11335186	11335362	11335565	11335819	11335823	11336071
11336649	11336796	11337032	11337476	11337582	11337694	11337838	11338051
11338452	11338699	11338857	11338887	11339259	11339633	11339734	11340161
11340348	11340552	11340773	11341204	11341230	11341233	11341301	11341358
11341406	11341622	11341829	11341869	11342067	11342115	11342384	11342650
11342864	11342876	11342900	11342988	11343382	11343463	11343490	11343591
11343743	11343791	11343873	11344478	11344802	11345050	11345128	11345375
11345375	11345385	11345402	11345451	11345558	11345643	11345737	11345976
11345991	11346074	11346160	11346208	11346353	11346532	11347014	11347028
11347043	11347068	11347148	11347350	11347350	11347586	11347798	11348031
11348085	11348111	11348221	11348375	11348390	11348390	11348390	11348390
11348455	11348455	11348700	11348700	11348730	11348742	11348952	11349255
11349464	11349532	11349705	11349705	11349794	11350017	11350039	11350039
11350092	11350144	11350264	11350355	11350570	11350965	11350988	11351213
11351550	11351654	11352024	11352147	11352368	11352423	11352812	11352887
11353001	11353129	11353214	11353248	11353433	11353457	11353818	11353885
11353892	11354228	11354276	11354289	11354327	11354598	11354614	11354889
11354926	11355194	11355333	11355352	11355392	11355567	11355969	11356246
<i>continued...</i>							



Customer Service Request Numbers							
11356274	11356317	11356355	11356355	11356603	11356712	11356738	11357366
11357381	11357517	11357596	11357886	11358182	11358352	11358479	11358737
11358769	11358796	11358832	11358869	11358902	11359178	11359191	11359259
11359294	11359382	11359695	11359698	11359713	11359919	11360006	11360026
11360267	11360381	11360433	11360437	11360463	11360478	11360482	11360516
11360727	11360768	11361107	11361116	11361324	11361386	11361412	11361846
11362193	11362292	11362493	11362559	11362613	11362811	11362820	11362887
11363341	11363533	11363769	11364143	11364286	11364368	11364532	11364874
11365141	11365200	11365264	11365609	11365659	11365824	11366313	11366454
11366529	11366546	11366688	11366794	11366884	11366915	11367034	11367193
11367228	11367389	11367393	11367396	11367444	11367596	11367908	11368131
11368180	11368510	11368530	11368551	11368608	11368794	11368895	11368975
11369024	11369075	11369084	11369092	11369173	11369976	11370021	11370059
11370464	11370720	11371047	11371049	11371186	11371424	11371425	11371513
11371518	11371648	11371787	11371887	11371937	11372036	11372065	11372273
11372588	11372891	11373163	11373246	11373299	11373365	11373421	11373525
11373574	11373775	11373863	11373921	11374075	11374276	11374485	11374649
11374951	11375168	11375174	11375377	11375506	11375804	11376027	11376027
11376109	11376139	11376247	11376247	11376262	11376502	11376655	11376802
11376837	11377043	11377045	11377218	11377444	11377462	11377555	11377673
11377673	11377759	11377885	11378181	11378686	11378687	11378999	11379179
11379771	11379955	11379955	11380441	11380564	11380589	11380599	11380650
11380796	11380948	11381201	11381276	11381437	11381543	11381592	11381732
11381858	11382796	11382846	11382867	11383005	11383035	11383271	11383307
11383322	11383386	11383503	11383529	11383840	11383866	11384086	11384114
11384238	11384343	11384362	11384502	11384603	11384666	11384766	11384990
11385246	11385390	11385576	11385593	11385652	11386205	11386448	11386675
11386706	11387586	11387931	11387991	11389063	11390202	11390263	11391379
11391531	11392051	11394528	11396540				



1.12. Software Patches Included in this Release

Table 10. Software Patches included in Intel Quartus Prime Pro Edition Version 18.0

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime software version 17.1.2	2.18	—
Intel Quartus Prime software version 17.1.2	2.14	11376247
Intel Quartus Prime software version 17.1.2	2.12	—
Intel Quartus Prime software version 17.1.2	2.11	11378999
Intel Quartus Prime software version 17.1.2	2.09	11384343
Intel Quartus Prime software version 17.1.2	2.06	11367268
Intel Quartus Prime software version 17.1.2	2.05	—
Intel Quartus Prime software version 17.1.2	2.04	11334095
Intel Quartus Prime software version 17.1.2	2.02	11370478
Intel Quartus Prime software version 17.1.1	1.26	—
Intel Quartus Prime software version 17.1.1	1.25	—
Intel Quartus Prime software version 17.1.1	1.21	11373921
Intel Quartus Prime software version 17.1.1	1.20	11370478
Intel Quartus Prime software version 17.1.1	1.19	11376633
Intel Quartus Prime software version 17.1.1	1.12	11360463
Intel Quartus Prime software version 17.1.1	1.10	—
Intel Quartus Prime software version 17.1	0.26	11373849
Intel Quartus Prime software version 17.1	0.25	—
Intel Quartus Prime software version 17.1	0.23	11368423
Intel Quartus Prime software version 17.1	0.22	11371186
Intel Quartus Prime software version 17.1	0.20	11361324
Intel Quartus Prime software version 17.1	0.14	11357366
<i>continued...</i>		



Software Version	Patch	Customer Service Request Number
Intel Quartus Prime software version 17.1	0.10	11341233
Intel Quartus Prime software version 17.1	0.09	11341837, 11346139
Intel Quartus Prime software version 17.0.1	1.07	—
Intel Quartus Prime software version 17.0	0.16	11334180
Intel Quartus Prime software version 16.1.2	2.29	11341837
Intel Quartus Prime software version 16.1	0.29	11349659
Intel Quartus Prime software version 16.0.2	2.38	11354514
Intel Quartus Prime software version 16.0.2	2.36	11334180

1.13. Latest Known Intel Quartus Prime Software Issues

Information about known issues that affect the Intel Quartus Prime software version 18.0 is available in the Knowledge Base:

[Known Software Issues Affecting the Quartus Prime Software Version 18.0](#)

Table 11. Important Known Issues Affecting the Intel Quartus Prime Pro Edition Version 18.0

Description	Workaround
When Signal Tap is used in a Partial Reconfiguration region, the first acquisition from an instance after partial reconfiguration might return incorrect data. Subsequent acquisitions from that instance return correct data. If segmented acquisition is enabled then all acquisitions might be incorrect, regardless of the number of attempts.	Run another acquisition after the first to guarantee correct data if segmented acquisition is disabled. There is no workaround for segmented acquisition.

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

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



1.14. Document Revision History

Table 12. The Intel Quartus Prime Pro Edition Software Release Version 18.0 Document Revision History

Document Version	Intel Quartus Prime Version	Changes
2018.05.07	18.0	Initial release.