Manuals+ — User Manuals Simplified.

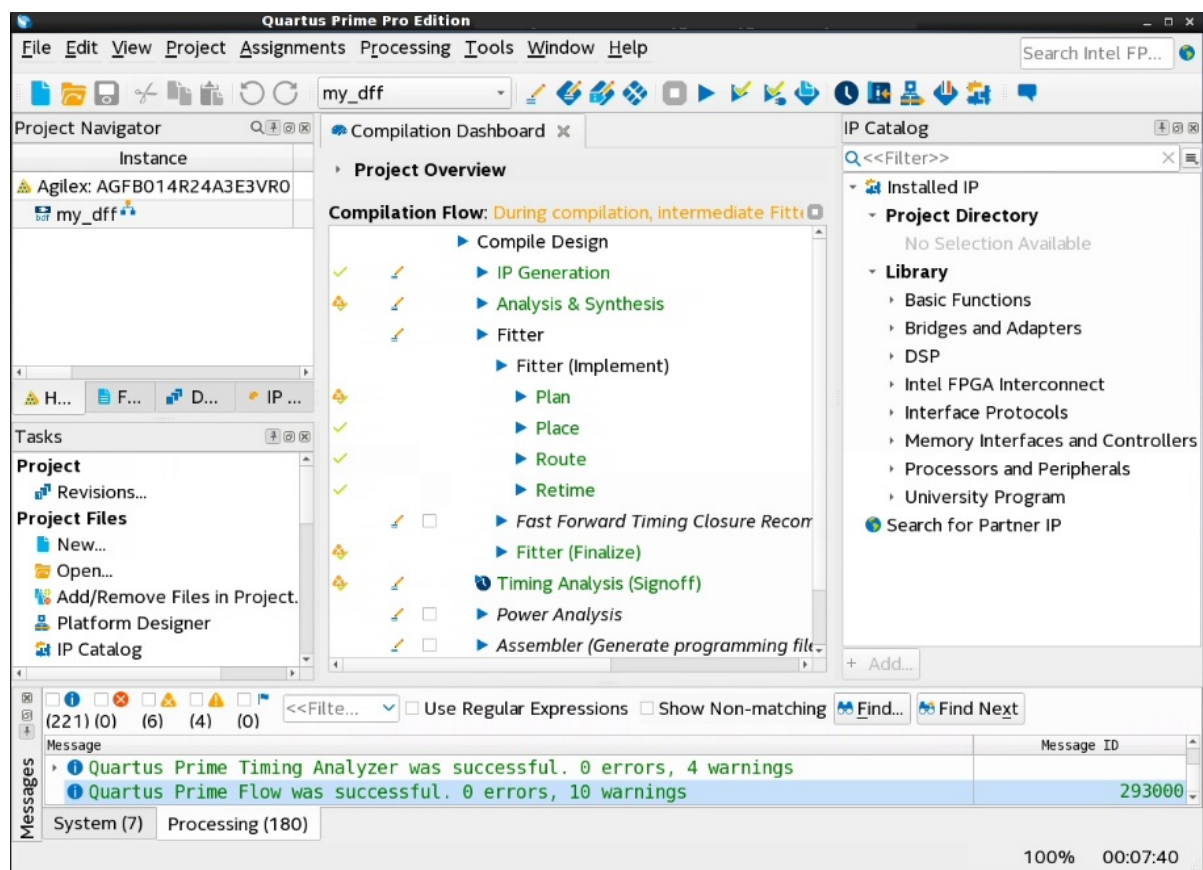# intel 22.4 Quartus Prime Pro Edition Software User Guide

Contents

intel 22.4 Quartus Prime Pro Edition Software

Product Information

The text extract is from the user manual of Intel Quartus Prime Pro Edition Software Version 22.4. The software release notes provide information about new features, bug fixes, changes to software behavior, and deprecated features and functions. The software version includes functional and security updates, and it is recommended to keep the software up-to-date to improve the security of the installation.

Product Usage Instructions

To install and use Intel Quartus Prime Pro Edition Software Version 22.4, follow these steps:

1. Refer to the Intel Quartus Prime Pro Edition README file in the following location: /quartus/readme.txt for additional information about the software release.
2. Refer to the following web page for information about operating system support: Intel FPGA Operating System Support.
3. Download and install the software.
4. To view the default assignment settings for the latest version of the Intel Quartus Prime software, refer to the Intel Quartus Prime Default Settings File (.qdf), located at /quartus/bin/assignment_defaults.qdf.
5. If you have customer service requests, review the Software Issues Resolved on page 17 and Software Patches Included in this Release on page 18 to see if this version contains fixes for or otherwise resolves any of your requests.
6. If you have OpenCL FPGA designs, migrate them to SYCL* by reviewing Migrating OpenCL FPGA Designs to SYCL* guide that demonstrates important differences between OpenCL and SYCL for FPGA and provides steps to migrate your OpenCL designs. The Intel oneAPI Base Toolkit is an alternative to the discontinued Intel FPGA SDK for OpenCL software product.

Intel® Quartus® Prime Pro Edition Version 22.4 Software and Device Support Release Notes

- This document provides late-breaking information about Intel® Quartus® Prime Pro Edition Version 22.4.
- For additional information about this software release, refer to the Intel Quartus Prime Pro 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 Standard Edition Software and Device Support Release Notes
- Intel Quartus Prime Pro Edition Design Software for Linux
- Intel Quartus Prime Pro Edition Design Software for Windows
- Intel FPGA Software Installation and Licensing

New Features and Enhancements

Intel Quartus Prime Pro Edition Software Version 22.4 includes functional and security updates. Keep your software up-to-date and follow the technical recommendations that help to improve the security of your Intel Quartus Prime installation.
Intel Quartus Prime Pro Edition Software Version 22.4 includes the following new features and enhancements:

- Added support for new Intel Agilex™ devices. For details, refer to Changes in Device Support on page 12.
- Added new design example discovery feature that provides a single point of entry into FPGA design examples within Intel Quartus Prime and Platform Designer. The design examples come from various offline and online sources, including examples provided as part of your Intel Quartus Prime Pro Edition installation and examples available in the FPGA Design Store.
- Added new board awareness feature in Platform Designer that enables faster design creation when targeting Intel and third-party FPGA boards. The board awareness feature provides preconfigured IP and board settings to help get your design started quickly.

- Enhanced the RTL Analyzer as follows:
  - Added filtering options so that you can filter your netlist and view only a specified logic path.
  - Added Expand Connections option so you can expand a selected pin and reveal the next connected node.
  - Added capability to save and restore your last view when you relaunch RTL Analyzer. Changing your RTL and recompiling the project invalidates your saved view.
- Enhanced the Power and Thermal Calculator (PTC) as follows:

- Added beta support for IP Wizard to help populate the PTC with resource used by an IP. This wizard replaces the I/O-IP Page of the PTC.
  - Added support for importing design hierarchies from Quartus Power Analyzer.
- Enhanced Nios V support as follows:
  - Updated Ashling* RiscFree* IDE for Intel FPGA to 2022 Q4 release.
  - Enhanced the Nios V example design flow by migrating example designs to the Intel FPGA Design Store.
  - Enabled Zephyr RTOS for Nios V/m.
- For F-tile−based IP, added simulation support for Aldec* Active-HDL* and Aldec Riviera-PRO* simulation tools.
- Enhanced System Console GUI with the ability to customize the workspace layout and save your customizations.
- Added Tile Assignment Editor for user-defined Dynamic Reconfiguration (DR) Group specification for F-tile designs.

Bug Fixes

Intel Quartus Prime Pro Edition Software Version 22.4 also includes bug fixes. Review Software Issues Resolved on page 17 and Software Patches Included in this Release on page 18 to see if this version contains fixes for or otherwise resolves any of your customer service requests.

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 Quartus Prime Pro Edition has the following changes:

- Updated the timing model for some Intel Agilex F-Series with a -4F speed grade.

  The updated timing model corrects for a discrepancy discovered when these devices run at 0° C.

  The following Intel Agilex F-Series devices are affected by this updated timing model:
  - AGFA014R24, AGFA019R25, AGFA022R25, AGFA023R25, AGFA027R25
  - AGFB014R24, AFGB019R25, AGFB022R25, AGFB023R25, AGFB027R25
  - AGFC019R25, AGFC023R25
  - AGFD019R25, AGFD023R25

For more information about this timing model update, refer to "Why are there functional failures when using Intel Agilex F-Series -4F devices in the Intel Quartus Prime Pro Edition Software version 22.3 and earlier?" in the Intel FPGA Knowledge Base.
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.

Deprecated Features and Functions

The functions and features listed in this section have been deprecated but not removed from Intel Quartus Prime Pro Edition Version 22.4 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 Pro Edition Version 22.4 No Intel Quartus Prime features or functions have been deprecated in Intel Quartus Prime Pro Edition Version 22.4. Features and Functions Deprecated as of Intel Quartus Prime Pro Edition Version 22.3 The Intel FPGA SDK for OpenCL™ software product is deprecated. Intel is discontinuing the Intel FPGA SDK for OpenCL software product. Refer to the Product Discontinuation Notice PDN2219.
As an alternative, use the Intel oneAPI Base Toolkit, which provides core tools and libraries for developing high-performance, data-centric applications across diverse architectures. It features an industry-leading C++ compiler that implements SYCL*, an evolution of C++ for heterogeneous computing. For more information, refer to the Intel

oneAPI Base Toolkit web page. To migrate your OpenCL FPGA designs to SYCL*, review Migrating OpenCL FPGA Designs to SYCL* guide that demonstrates important differences between OpenCL and SYCL for FPGA and provides steps to migrate your OpenCL designs.

- Features and Functions Deprecated as of Intel Quartus Prime Pro Edition Version 22.2
- No Intel Quartus Prime features or functions have been deprecated in Intel Quartus Prime Pro Edition Version 22.2.
- Features and Functions Deprecated as of Intel Quartus Prime Pro Edition Version 22.1
- No Intel Quartus Prime features or functions have been deprecated in Intel Quartus Prime Pro Edition Version 22.1.

Removed Features and Functions

- The functions and features listed in this section have been removed from Intel Quartus Prime Pro Edition Version 22.4 or earlier.
- Features and Functions Removed from Intel Quartus Prime Pro Edition Version 22.4
- No Intel Quartus Prime features or functions have been removed from Intel Quartus Prime Pro Edition Version 22.4.
- Features and Functions Removed from Intel Quartus Prime Pro Edition Version 22.3
- No Intel Quartus Prime features or functions have been removed from Intel Quartus Prime Pro Edition Version 22.3.
- Features and Functions Removed from Intel Quartus Prime Pro Edition Version 22.2
- No Intel Quartus Prime features or functions have been removed from Intel Quartus Prime Pro Edition Version 22.2.
- Features and Functions Removed from Intel Quartus Prime Pro Edition Version 22.1

Removed support for the following operating systems:

- CentOS* 7.5
- Red Hat* Enterprise Linux* 7
- Windows Server* 2012
- Removed support for Siemens* EDA ModelSim* SE.
  Use Siemens EDA Questa* Advanced Simulator instead.

Intel FPGA IP Regeneration
The following Intel FPGA IPs have major version updates and must be regenerated in Intel Quartus Prime Pro Edition Version 22.4:

- E-Tile Hard IP for Ethernet Intel FPGA IP
- E-Tile Ethernet IP for Intel Agilex FPGA
- Low Latency Ethernet 10G MAC Intel FPGA IP
- 1G/2.5G/5G/10G Multirate Ethernet PHY Intel FPGA IP
- Interlaken (2nd Generation) Intel FPGA IP
- E-Tile CPRI PHY Intel FPGA IP
- P-Tile Avalon Streaming Intel FPGA IP for PCI Express

- F-Tile Auto-Negotiation and Link Training for Ethernet Intel FPGA IP

- F-Tile Ethernet Intel FPGA Hard IP

- R-Tile Avalon Streaming Intel FPGA IP for PCI Express

- F-Tile Avalon Streaming Intel FPGA IP for PCI Express

- F-Tile Serial Lite IV Intel FPGA IP

- F-Tile Interlaken Intel FPGA IP

- F-Tile Ethernet Multirate Intel FPGA IP

- 5G LDPC-V Intel FPGA IP

- F-Tile Multichannel DMA Intel FPGA IP for PCI Express

- P-Tile Multichannel DMA Intel FPGA IP for PCI Express

- Serial Lite IV Intel FPGA IP

- External Memory Interfaces (EMIF) IP

- JESD204C Intel FPGA IP

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.

Microsoft* Windows* Requirements

For some Microsoft* Windows* operating systems, Intel Quartus Prime Design Suite requires a specific level of operating system or other settings as follows:

Table 1. Microsoft Windows Requirements

Operating System	Required Version Level or Other Requirements
Windows 10	Windows 10 Version 1607 or later. Windows 10 Version 1809 or later is recommended.
Windows 11	N/A
Windows Server* 2016	N/A
Windows Server 2019	N/A

Operating System Support Changes in Intel Quartus Prime Pro Edition Version 22.4
There are no operating system support changes in Intel Quartus Prime Pro Edition Version 22.4.
Operating System Support Changes in Intel Quartus Prime Pro Edition Version 22.3
Support for the following operating systems is added as of Intel Quartus Prime Pro Edition Version 22.3:

- Red Hat Enterprise Linux* 8.4

- Red Hat Enterprise Linux 8.6

- Ubuntu* Linux 22.04 LTS

- Windows 11

Support for the following operating systems is deprecated as of Intel Quartus Prime Pro Edition Version 22.3:

- Windows Server 2016
- Windows 10 Version 1607

Later version of Windows 10 remain supported. Migrate your Windows 10 installation to Windows 10 Version 1809 or later.
Support for these operating systems might be removed in a future release.
Support for the following operating systems is removed as of Intel Quartus Prime Pro Edition Version 22.3:

- CentOS Linux 8.2
- Red Hat Enterprise Linux 8.2

Operating System Support Changes in Intel Quartus Prime Pro Edition Version 22.2
There are no operating system support changes in Intel Quartus Prime Pro Edition Version 22.2.
Operating System Support Changes in Intel Quartus Prime Pro Edition Version 22.1
Support for the following operating systems is removed as of Intel Quartus Prime Pro Edition Version 22.1:

- CentOS Linux 7.5
- CentOS Linux 8.0(1)
- CentOS Linux 8.1(1)
- Red Hat Enterprise Linux 7
- Red Hat Enterprise Linux 8.0(2)
- Red Hat Enterprise Linux 8.1(2)
- Windows Server 2012

1. CentOS Linux 8.2 remains supported by Intel Quartus Prime Pro Edition Version 22.1
2. Red Hat* Enterprise Linux 8.2 remains supported by Intel Quartus Prime Pro Edition Version 22.1

Related Information
Operating System Support

Disk Space and Memory Recommendations

A full installation of the Intel Quartus Prime Pro Edition software requires up to 140 GB of available disk space. Configure your system to provide additional virtual memory equal to the recommended physical RAM that is required to process your design. This additional virtual memory effectively doubles the total effective memory available 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 2. Memory Requirements for Processing Intel Agilex Designs

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

Family	Device	Recommended Physical RAM
Intel Agilex	AGFA022, AGFA023, AGFA027	64 GB
	AGFB022, AGFB023, AGFB027	
	AGFC023	
	AGFD023	
	AGIA023, AGIA035, AIGA040	
	AGIB022, AGIB023, AGIB027, AGIB041	
	AGIC023, AGIC035, AGIC040	
	AGID023, AGID041	
	AGFA019, AGFB019, AGFC019, AGFD019, AGIB019, AGID019	48 GB
	AGFA006, AGFA008, AGFA012, AGFA014	32 GB
	AGFB006, AGFB008, AGFB012, AGFB014	

Table 3. Memory Requirements for Processing Intel Arria® 10 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
	10AS032, 10AX032	24 GB
	10AS027, 10AX027	22 GB
	10AS022, 10AX022	20 GB
	10AS016, 10AX016	18 GB

Table 4. Memory Requirements for Processing Intel Cyclone® 10 GX Designs
These requirements are the same for both Windows and Linux installations.

Family	Device	Recommended Physical RAM
Intel Cyclone® 10 GX	10CX85, 10CX105, 10CX150, 10CX220	18 GB

Table 5. Memory Requirements for Processing Intel Stratix® 10 Designs

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

Family	Device	Recommended Physical RAM
Intel Stratix® 10	1SD21BP, 1SD280P, 1SG10MH, 1SG210H, 1SG211H, 1SG250H, 1SG250L, 1SG280H, 1SG280L, 1SM21BE, 1SM21BH, 1SM21CH, 1ST210E, 1ST250E, 1ST280E, 1SX210H, 1SX250H, 1SX250L, 1SX280H, 1SX280L	64 GB
	1SG165H, 1SG166H, 1SM16BE, 1SM16BH, 1SM16CH, 1ST165E, 1SX165H	48 GB
	1SD110P, 1SG040H, 1SG065H, 1SG085H, 1SG110H, 1ST040E, 1ST085E, 1ST110E, 1SX065H, 1SX085H,1SX110H, 1SX040H	32 GB

Intel Quartus Prime Licensing Information
If you use a floating license with Intel Quartus Prime Version 22.4, ensure that you use the most recent version of the FlexLM license daemon.
For more information about Intel Quartus Prime licensing, refer to Intel FPGA Software Installation and Licensing.

Related Information

- Intel FPGA Software Installation and Licensing
- FlexLM License Daemons for Intel FPGA Software

Device Support and Pin-Out Status

Table 6. Final Device Support
Final compilation, simulation, timing analysis, and programming support are available for the devices listed in this table. These devices have finalized device models, bitstream, and firmware.

Device Family	Devices
Intel Agilex	AGFA012R24B, AGFA014R24B, AGFA019R25A, AGFA022R25A, AGFA023R25A, AGFA027R25A AGFB012R24B, AGFB014R24B, AGFB019R25A, AGFB022R25A, AGFB023R25A, AGFB027R25A AGFC019R25A, AGFC023R25A AGFD019R25A, AGFD023R25A
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, 1SD21BP, 1SD280P 1SG040H, 1SG065H, 1SG085H, 1SG10MH, 1SG110H, 1SG165H, 1SG166H, 1SG210H, 1SG211H, 1SG250H, 1SG250L, 1SG280H, 1SG280L 1SM16BE, 1SM16BH, 1SM16CH, 1SM21BE, 1SM21BH, 1SM21CH, 1ST040E, 1ST085E, 1ST110E, 1ST165E, 1ST210E, 1ST250E, 1ST280E 1SX040H, 1SX065H, 1SX085H, 1SX110H, 1SX165H, 1SX210H, 1SX250H, 1SX250L, 1SX280H, 1SX280L

Table 7. Preliminary Device Support
Full compilation, simulation, timing analysis, and programming support are available for the devices listed in this table.

Device Family	Devices
Intel Agilex	AGFA012R24A, AGFA012R24C-AA, AGFA014R24A, AGFA014R24A-R0, AGFA014R24C-AA,
	AGFA022R24C, AGFA022R31C, AGFA022R31C-AA, AGFA023R25A-R0, AGFA027R24C,
	AGFA027R24C-R0, AGFA027R24C-R2, AGFA027R25A-R0, AGFA027R31C,
	AGFA027R31C-AA, AGFA027R31C-R0
	AGFB012R24A, AGFB012R24C-AA, AGFB014R24A, AGFB014R24A-R0, AGFB014R24C-AA,
	AGFB022R24C, AGFB022R31C, AGFB022R31C-AA, AGFB023R25A-R0, AGFB027R24C,
	AGFB027R24C-R0, AGFB027R24C-R2, AGFB027R25A-R0, AGFB027R31C,
	AGFB027R31C-AA, AGFB027R31C-R0
	AGFC023R25A-R0
	AGFD023R25A-R0
	AGIA023R18A-R0, AGIA040R39A-R0
	AGIB022R31B, AGIB022R31B-AA, AGIB023R18A-R0, AGIB027R29A-R0, AGIB027R29A-R1,
	AGIB027R29A-R2, AGIB027R29A-R3, AGIB027R31B, AGIB027R31B-AA, AGIB027R31B-R0
	AGIC023R18A-R0, AGIC040R39A-R0
	AGID023R18A-R0
Intel Stratix 10	1SD110P-S1
	1SG280H-S3, 1SG280L-S3
	1SX280H-S3, 1SX280L-S3

Table 8. Advance Device Support
Compilation, simulation, and timing analysis support are 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	AGFA006R16A, AGFA006R24C, AGFA008R16A, AGFA008R24C, AGFA012R24C, AGFA014R24C, AGFA019R24C, AGFA019R31C, AGFA023R24C, AGFA023R31C
	AGFB006R16A, AGFB006R24C, AGFB008R16A, AGFB008R24C, AGFB012R24C,
	AGFB014R24C, AGFB019R24C, AGFB019R31C, AGFB023R24C, AGFB023R31C
	AGFC019R24C, AGFC019R31C, AGFC023R24C, AGFC023R31C
	AGFD019R24C, AGFD019R31C, AGFD023R24C, AGFD023R31C
	AGIA035R39A, AGIA040R39A
	AGIB019R18A, AGIB019R31B, AGIB022R29A, AGIB023R18A, AGIB023R31B,
	AGIB027R29A, AGIB027R29B, AGIB041R29D-R0
	AGIC035R39A, AGIC040R39A
	AGID019R18A, AGID019R31B, AGID023R18A, AGID023R31B, AGID041R29-R0

Table 9. Initial Device Support
Compilation, simulation, and timing analysis support are provided for these devices. Programming files and pinout information are not generated for these devices in this release.

Device Family	Devices
No devices with this status in Intel Quartus Prime Pro Edition Version 22.4.	

Changes in Device Support

- Starting with Intel Quartus Prime Version 20.1, a new device support level was introduced: Preliminary device support.
- For devices with Preliminary device support, Intel Quartus Prime provides full compilation, simulation, timing analysis, and programming support but the device models, bitstreams, and firmware for the devices are not finalized.
- Devices with Final device support (previously Full) have finalized device models, bitstreams, and firmware.
- The definitions of Initial and Advance device support levels are unchanged.
- For information about known device issues and workarounds, refer to the Intel FPGA Knowledge Base.

New Device Support
Support for the following devices is added to Intel Quartus Prime Pro Edition Version 22.4 with Advance device support:

- AGIB041R29D-R0
- AGID041R29D-R0

Changed Device Support

Support for the following devices moves from Advance device support to Preliminary device support:

- AGFA022R24C, AGFA022R31C, AGFA027R24C, AGFA027R31C
- AGFB022R24C, AGFB022R31C, AGFB027R24C, AGFB027R31C
- AGIB022R31B, AGIB027R31B

F-Tile Support Changes
For Intel Agilex designs with F-Tile IPs that were developed with Intel Quartus Prime Pro Edition Version 22.1 or earlier, you must regenerate your F-Tile IP in Intel Quartus Prime Pro Edition Version 22.2 or later.
The following devices are affected:

- AGFA006R16A, AGFA008R16A, AGFA022R24C, AGFA022R31C, AGFA027R24C, AGFA027R31C
- AGFB006R16A, AGFB008R16A, AGFB022R24C, AGFB022R31C, AGFB027R24C, AGFB027R31C
- AGIB022R29A, AGIB022R31B, AGIB027R29A, AGIB027R31B

Timing Model, Power Model, and Device Status
Only devices with a timing model, power model, and device status of Final are suitable for production systems.

Table 10. Timing Model, Power Model, and Device Status for Intel Agilex Devices

Device Family	Device	Timing Model Status	Power Model Status	Device Status
Intel Agilex	AGFC023R25A-AE, AGFD023R25A-AE	Final – 22.3	Final – 22.3	Final – 22.3
	AGFA019R25A, AGFA023R25A	Final – 22.2	Final – 22.2	Final – 22.2
	AGFB019R25A, AGFB023R25A			
	AGFC019R25A, AGFC023R25A			
	AGFD019R25A, AGFD023R25A			
	AGFA012R24B, AGFA014R24B, AGFA022R25A, AGFA027R25A	Final – 21.3	Final – 21.3	Final – 21.3
	AGFB012R24B, AGFB014R24B,			
	AGFB022R25A, AGFB027R25A			
	AGFA006R16A, AGFA006R24C,	Preliminary	Preliminary	Preliminary
	AGFA008R16A, AGFA008R24C,			
	AGFA012R24C, AGFA012R24C-AA,			
	AGFA014R24C, AGFA014R24C-AA			
	AGFA019R24C, AGFA019R31C,			
	AGFA022R24C, AGFA022R31C,			
	AGFA022R31C-AA, AGFA023R24C,			
	AGFA023R31C, AGFA027R24C,			

	AGFA027R31C, AGFA027R31C-AA			
	AGFB006R16A, AGFB006R24C,			
	AGFB008R16A AGFB008R24C,			
	AGFB012R24C, AGFB012R24C-AA,			
	AGFB014R24C, AGFB014R24C-AA,			
	AGFB019R24C, AGFB019R31C,			
	AGFB022R24C, AGFB022R31C,			
	AGFB022R31C-AA, AGFB023R24C,			
	AGFB023R31C, AGFB027R24C,			
	AGFB027R31C, AGFB027R31C-AA			
	AGFC019R24C, AGFC019R31C,			
	AGFC023R24C, AGFC023R31C			
	AGFD019R24C, AGFD019R31C,			
	AGFD023R24C, AGFD023R31C			
	AGIA035R39A, AGIA040R39A			
	AGIB019R18A, AGIB019R31B,			
	AGIB022R29A, AGIB022R31B,			
	AGIB022R31B-AA, AGIB023R18A,			
	AGIB023R31B, AGIB027R29A,			
	AGIB027R29B, AGIB027R31B,			
	AGIB027R31B-AA			
	AGIC035R29A, AGIC040R39A			
	AGID019R18A, AGID019R31B,			
	AGID023R18A, AGID023R31B			
	AGFA014R24A-R0, AGFA023R25A-R0,	Preliminary	Preliminary	Preliminary
	AGFA027R24C-R0, AGFA027R24C-R2,			
	AGFA027R25A-R0, AGFA027R31C-R0			
	AGFB014R24A-R0, AGFB023R25A-R0,			
	AGFB027R24C-R0, AGFB027R24C-R2,			
	AGFB027R25A-R0, AGFA027R31C-R0			

	AFGC023R25A-R0			
	AFGD023R25A-R0			
	AGIA023R18A-R0, AGIA040R39A-R0			
	AGIB023R18A-R0, AGIB027R29A-R0,			
	AGIB027R29A-R1, AGIB027R29A-R2,			
	AGIB027R29A-R3, AGIB027R31B-R0,			
	AGIB041R29D-R0			
	AGIC023R18A-R0, AGIC040R39A-R0			
	AGID023R18A-R0, AGID041R29D-R0			

Table 11. 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 (**3**) (**4**)	Final – 17.0	Final – 17.0
	10AX048, 10AS048	Final – 16.0.2 (**4**)	Final – 17.0	Final – 17.0
	10AX057, 10AS057, 10AX066, 10AS066, 10AT090, 10AX090	Final – 16.0.1 (**4**)	Final – 16.0.1	Final – 16.0.1
	10AX115, 10AT115	Final – 16.0 (**4**)	Final – 16.0	Final – 16.0

Table 12. 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 GX	10CX085, 10CX105, 10CX150, 10CX220	Final – 17.0	Final – 18.0	Final – 18.0

Table 13. Timing Model, Power Model, and Device Status for Intel Stratix 10 Devices

Device Family	Device	Timing Model Status	Power Model Status	Device Status
Intel Stratix 10	1SG280L, 1SX280L, 1SG250L, 1SX250L	Final – 18.0.1	Final – 18.1.1	Final – 18.1.1
	1SG280H, 1SX280H, 1SG250H, 1SX250H, 1SG210H, 1SX210H, 1SG165H, 1SX165H, 1SG110H, 1SX110H, 1SG085H, 1SX085H	Final – 18.1.1	Final – 18.1.1	Final – 18.1.1
	1ST280E, 1ST250E	Final – 18.1.1	Final – 19.4	Final – 19.4
	1SM21BH, 1SM21CH, 1SM16BH, 1SM16CH	Final – 19.1	Final – 19.1	Final – 19.1
	1SG10MH, 1SG166H, 1SG211H	Final – 19.1	Final – 19.3	Final – 19.3
	1ST210E, 1SM21BE, 1ST165E, 1SM16BE	Final – 19.2	Final – 19.4	Final – 19.4
	1SD280P, 1ST040E, 1ST085E, 1ST110E	Final – 20.1	Final – 20.1	Final – 20.1
	1SD110P	Final – 20.2	Final – 20.2	Final – 20.2
	1SD21BP	Final – 20.3	Final – 20.3	Final – 20.3
	1SG040H, 1SX040H	Final – 20.3	Final – 20.3	Final – 21.1
	1SG065H, 1SX065H	Final – 21.2	Final – 21.2	Final – 21.2

- 3) Devices with a -1 speed grade were finalized in Intel Quartus Prime software version 17.0
- (4) All military grade devices were finalized in Intel Quartus Prime software version 18.0.1.

IBIS Models

Table 14. IBIS Model Status for the Intel Quartus Prime Pro Edition Software Release Version 22.4

Device Family	IBIS Model Status
Intel Agilex	Refer to **IBIS Models for Intel Devices**.
Intel Arria 10	
Intel Cyclone 10 GX	
Intel Stratix 10	

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

EDA Interface Information

Table 15. Synthesis Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 22.4

Synthesis Tools	Version
Siemens EDA Precision* FPGA Synthesis	Siemens EDA Precision FPGA Synthesis 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 FPGA Synthesis that support Intel Quartus Prime Pro Edition Software Version 22.4.
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 Version 22.4.

Table 16. Simulation Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 22.4
The following simulation tools support RTL and functional gate-level simulation. Only 64-bit simulation tools are supported.

Simulation Tools	Version
Aldec Active-HDL	13.0 (Windows only)
Aldec Riviera-PRO	2021.10
Cadence* Xcelium* Parallel Logic Simulation	21.09.003 (Linux* only)
Questa-Intel FPGA Edition	2022.1
Siemens EDA Questa Advanced Simulator	2021.4
Synopsys VCS* and VCS MX	S-2021.09-1 (Linux only)

Questa-Intel FPGA Edition requires FlexLM licensing daemon version 11.16.4.0 (or later). You can obtain the licensing daemon from the FlexLM License Daemons for Intel FPGA Software web page.
You can obtain the Intel FPGA Edition of simulation tools from the Download Center for FPGAs.

Operating System Support for Questa-Intel FPGA Edition Version 2022.2

- Red Hat Enterprise Linux 8
- SUSE* Linux Enterprise Server 12
- SUSE Linux Enterprise Server 15
- Windows 10 (64-bit)

Related Information

- Intel Quartus Prime Pro Edition Design Software for Linux
- Intel Quartus Prime Pro Edition Design Software for Windows

Antivirus Verification

The Intel Quartus Prime software release version 22.4 has been verified virus free with the following software:

Antivirus Verification Software
McAfee VirusScan Command Line for Linux64 Version: 7.0.0.477
AV Engine version: 6300.9389 for Linux64.
Dat set version: 10559 created Dec 12 2022

Software Issues Resolved

The following customer service requests were fixed or otherwise resolved in Intel Quartus Prime Pro Edition Version 22.4:

Table 17. Issues Resolved in the Intel Quartus Prime Pro Edition Version 22.4

Customer Service Request Numbers							
00387444	00553391	00634869	00644742	00661097	00669572	00673194	00692360
00694974	00698210	00698723	00702882	00702926	00703707	00704117	00706447
00708964	00710869	00712835	00714701	00716383	00726915	00729961	00731682
00733009	00733051	00733220	00733414	00733701	00736181	00736498	00736688
00737681	00737702	00737956	00738733	00739075	00740688	00741731	00742654
00743029	00743329	00745149	00745934	00746401	00748148	00748465	00748760
00749380	05355807	05640050	11340561				

Software Patches Included in this Release
Intel Quartus Prime Pro Edition Version 22.4 contains the following patches for previous versions of Intel Quartus Prime Pro Edition software:

Table 18. Software Patches included in Intel Quartus Prime Pro Edition Version 22.4

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime Version 22.3	0.27fw	–
Intel Quartus Prime Version 22.3	0.25	00745149
Intel Quartus Prime Version 22.3	0.21	00743329
Intel Quartus Prime Version 22.3	0.19	–
Intel Quartus Prime Version 22.3	0.18	00735205
Intel Quartus Prime Version 22.3	0.15	–
Intel Quartus Prime Version 22.3	0.06	–

Intel Quartus Prime Version 22.3	0.04	–
Intel Quartus Prime Version 22.3	0.01	–
Intel Quartus Prime Version 22.2	0.39fw	–
Intel Quartus Prime Version 22.2	0.38	00736498
Intel Quartus Prime Version 22.2	0.36	00735205
Intel Quartus Prime Version 22.2	0.35	00716738
Intel Quartus Prime Version 22.2	0.33	–
Intel Quartus Prime Version 22.2	0.31	00731682
Intel Quartus Prime Version 22.2	0.3	–
Intel Quartus Prime Version 22.2	0.29fw	00706447
Intel Quartus Prime Version 22.2	0.28fw	–
Intel Quartus Prime Version 22.1	0.40fw	–
Intel Quartus Prime Version 22.1	0.37	00733220
Intel Quartus Prime Version 22.1	0.34fw	–
Intel Quartus Prime Version 22.1	0.32fw	00715716
Intel Quartus Prime Version 21.4	0.80fw	00000000
Intel Quartus Prime Version 21.4	0.78	00736498
Intel Quartus Prime Version 21.4	0.77fw	00706447
Intel Quartus Prime Version 21.4	0.72	00000000
Intel Quartus Prime Version 21.4	0.69	00698723
Intel Quartus Prime Version 21.4	0.66	00731682
Intel Quartus Prime Version 21.4	0.64	–
Intel Quartus Prime Version 21.3	0.5	00735343
Intel Quartus Prime Version 21.2	0.49	00733220

continued…

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime Version 21.2	0.48	–
Intel Quartus Prime Version 21.2	0.47	00716383
Intel Quartus Prime Version 21.2	0.43	00698723
Intel Quartus Prime Version 21.1	0.63	05418969
Intel Quartus Prime Version 20.4	0.53	–

Latest Known Intel Quartus Prime Software Issues

- Information about known issues that affect Intel Quartus Prime Pro Edition Version 22.4 is available in the Intel FPGA Knowledge Base.
- For the latest information about issues that affect Intel Quartus Prime Pro Edition Version 22.4, review the Intel FPGA Knowledge Base articles that apply to Intel Quartus Prime Pro Edition Version 22.4.
- 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 FPGA Documentation Index web page.

Related Information

- Intel FPGA Knowledge Base
- Intel Quartus Prime and Quartus II Software Support
- Intel FPGAs and Programmable Devices Release Notes

Intel Quartus Prime Pro Edition Software and Device Support Release Notes Archives
For the latest and previous versions of these release notes, refer to Intel Quartus Prime Pro Edition Software and Device Support Release Notes. If a software version is not listed, the release notes for the previous software version applies.

Intel Quartus Prime Pro Edition Software Release Version

Document Revision History

Document Version	Intel Quartus Prime Version	Changes
2022.12.19	22.4	• Initial release.

Intel Quartus Prime Pro Edition: Version 22.4 Software and Device Support Release Notes

Documents / Resources

intel. Intel® Quartus® Prime Pro Edition Version 22.4 Software and Device Support Release Notes	**intel 22.4 Quartus Prime Pro Edition Software** [pdf] User Guide Version 22.4, 22.4, 22.4 Quartus Prime Pro Edition Software, Quartus Prime Pro Edition Software, Prime Pro Edition Software, Pro Edition Software, Edition Software, Software

References

- intel **cdrdv2.intel.com/v1/dl/getContent/738067?explicitVersion=true**

- ^{intel} **[Migrating OpenCL™ FPGA Designs to SYCL*](#)**
- ^{intel} **[Intel® oneAPI Base Toolkit: Essential oneAPI Tools & Libraries](#)**
- ^{intel} **[1. Answers to Top FAQs](#)**
- ^{intel} **[1. Intel® Quartus® Prime Standard Edition Version 22.1std Software...](#)**
- ^{intel} **[1. Intel® Quartus® Prime Pro Edition Version 23.1 Software and Device...](#)**
- ^{intel} **[Quartus Prime and Quartus II Software: Design Support Information](#)**
- ^{intel} **[Software Operating System (OS) Support List Information | Intel](#)**
- ^{intel} **[Intel ISO 9001:2015 Registrations](#)**
- ^{intel} **[Intel® Quartus® Prime Pro Edition Design Software Version 21.4 for Windows](#)**
- ^{intel} **[FlexIm License Daemons for Intel® FPGA Software](#)**
- ^{intel} **[FlexIm License Daemons for Intel® FPGA Software](#)**
- ^{intel} **[How can I improve the security of my Intel® Quartus® Prime...](#)**
- ^{intel} **[Why are there functional failures when using some Intel®...](#)**
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