New Features of the Quartus Software Version 2000.02

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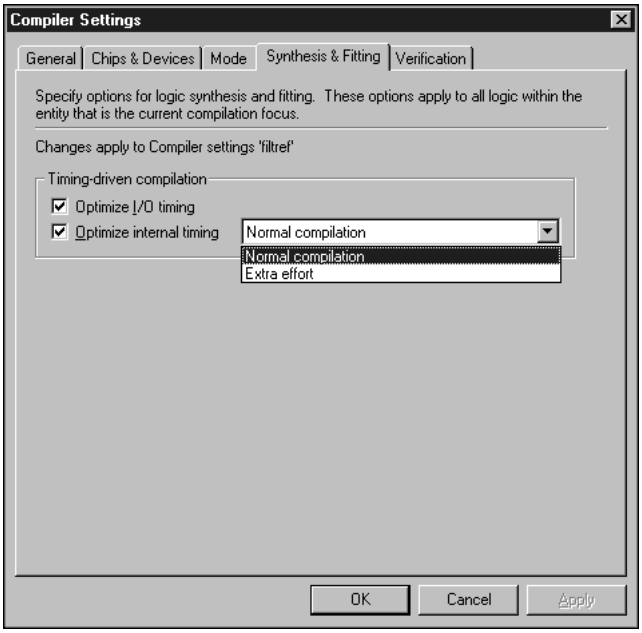
The Quartus™ software version 2000.02 is now shipping to all Altera customers with a current subscription. This latest version of the Quartus software features significant timing-driven compilation (TDC) enhancements and new device support. This technical brief details key features available in the Quartus software version 2000.02.

New TDC Algorithms Improve Performance

The optimized compilation algorithms in the Quartus software version 2000.02 improve design performance (f_{MAX}) by over 40% for designs that target high-density APEX™ devices (i.e., EP20K400E and larger devices).

The Quartus software version 2000.02 has compiler setting options that allow designers to separately assign timing constraints for both I/O settings and internal (core) logic. Figure 1 shows the Compiler dialog box for setting this option.

Figure 1. Compiler Settings Dialog Box



TDC for I/O Timing

The I/O timing optimization option allows designers to set the clock setup time (t_{SU}) and the clock-to-output delay (t_{CO}) assignments. To meet timing requirements, these assignments force the Quartus Compiler to implement input and output registers in respective I/O cells. Designers can improve on-chip and off-chip system performance by using this timing specification option.

TDC for Internal (Core) Timing

The internal timing optimization option maintains the user's timing assignments, including inverted clocks and relationships between different clocks. There are two settings for this optimization option: **Normal compilation** (default setting) and **Extra effort**.

Table 1 lists the Quartus software version 2000.02 Compiler settings and compares the results with those of the Quartus software version 1999.10.

Table 1. Performance Improvements for Each Compiler Setting in the Quartus Software Version 2000.02

Compiler Settings Enabled	Quartus Version 2000.02 Performance Results
No TDC setting	20% faster compilation time with no impact on f_{MAX}
TDC internal timing optimization, normal compilation setting	15% faster f_{MAX} with no impact on compilation time
TDC internal timing optimization, extra effort setting	Over 40% faster f_{MAX} with longer compile times (up to twice as long)
TDC I/O timing optimization setting	Compiles for optimum t_{SU} and t_{CO} without affecting compile time

Setting the TDC option to **Extra effort** forces the Compiler to work harder and provide a faster f_{MAX}; however, this setting increases the design's compilation time.

New Device Support

Table 2 shows the new APEX 20K and APEX 20KE devices that the Quartus software version 2000.02 supports.

Table 2. New Device Support for the Quartus Software Version 2000.02 *Note (1)*

Support	Device	Packages
Full Device Support (Compilation, Simulation, Pin-Out, and Programming Support)	EP20K200-X	240-pin RQFP
	EP20K400 *(2)*	652-pin BGA Industrial grade
	EP20K400E-X	672-pin FineLine BGA™
Advanced Device Support (Compilation, Simulation, and Pin-Out Support Only)	EP20K100-X	144-pin TQFP, 208-pin PQFP, 240-pin PQFP, 324-pin FineLine BGA, 356-pin BGA
	EP20K200-X	208-pin RQFP, 356-pin BGA, 484-pin FineLine BGA, 652-pin BGA, 672-pin FineLine BGA
	EP20K300E-X	652-pin BGA, 672-pin FineLine BGA
Advanced Device Support (Compilation and Simulation Support Only)	EP20K60E	144-pin TQFP, 208-pin PQFP, 240-pin PQFP, 356-pin BGA, 324-pin FineLine BGA
	EP20K60E-X	144-pin TQFP, 208-pin PQFP, 240-pin PQFP, 356-pin BGA, 324-pin FineLine BGA

Notes:
(1) APEX 20K and APEX 20KE device package types include power quad flat pack (RQFP), ball-grid array (BGA), plastic quad flat pack (PQFP), and thin quad flat pack (TQFP).
(2) For -2 speed grade devices only.

Other New Features

The Quartus software version 2000.02 includes drivers that allow you to use the ByteBlasterMV™ download cable with the Windows 98 operating system.

Conclusion

Featuring TDC enhancements that allow designers to separately specify I/O and internal timing constraints, the Quartus software version 2000.02 increases the flexibility and design performance for high-density APEX 20K designs. The optimized compilation algorithms in the Quartus software version 2000.02 can improve $\mathbf{f_{MAX}}$ in high-density APEX devices by over 40%. The Quartus software version 2000.02 also supports new APEX 20K and APEX 20KE devices.

For more information on the Quartus software version 2000.02, see the Quartus web site at **http://websupport.altera.com** or contact your local Altera sales representative.

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