



Altera Technical Solutions Seminar 2000



Schedule

- Opening
- Introduction
- FLEX[®] 10KE Devices
- APEX[™] 20K & Quartus[™] Overview
- Design Integration
- EDA Integration
- Intellectual Property
- Design Iteration
- Design Optimization
- Internet Interface
- Roadmap
- Quartus Demo



Agenda

- u APEX 20K Family
- u Quartus Software
- u Design Example

Introduction

FLEX[®] 10KE Devices

● **APEX[™] 20K &
Quartus[™] Overview**

Design Integration

EDA Integration

Intellectual Property

Design Iteration

Design Optimization

Internet Interface

Roadmap



APEX™ 20K Overview



APEX 20K Device Family





The Best of All Worlds

MAX 7000

- U Product Terms
- U Wide Fan-in
- U Fast State Machines

FLEX 10K

- U Interconnect
- U Embedded Memory
- U High Density
- U Phase-Locked Loop

FLEX 6000

- U Interleaved LABs
- U LE Structure
- U I/O Structure

APEX 20K

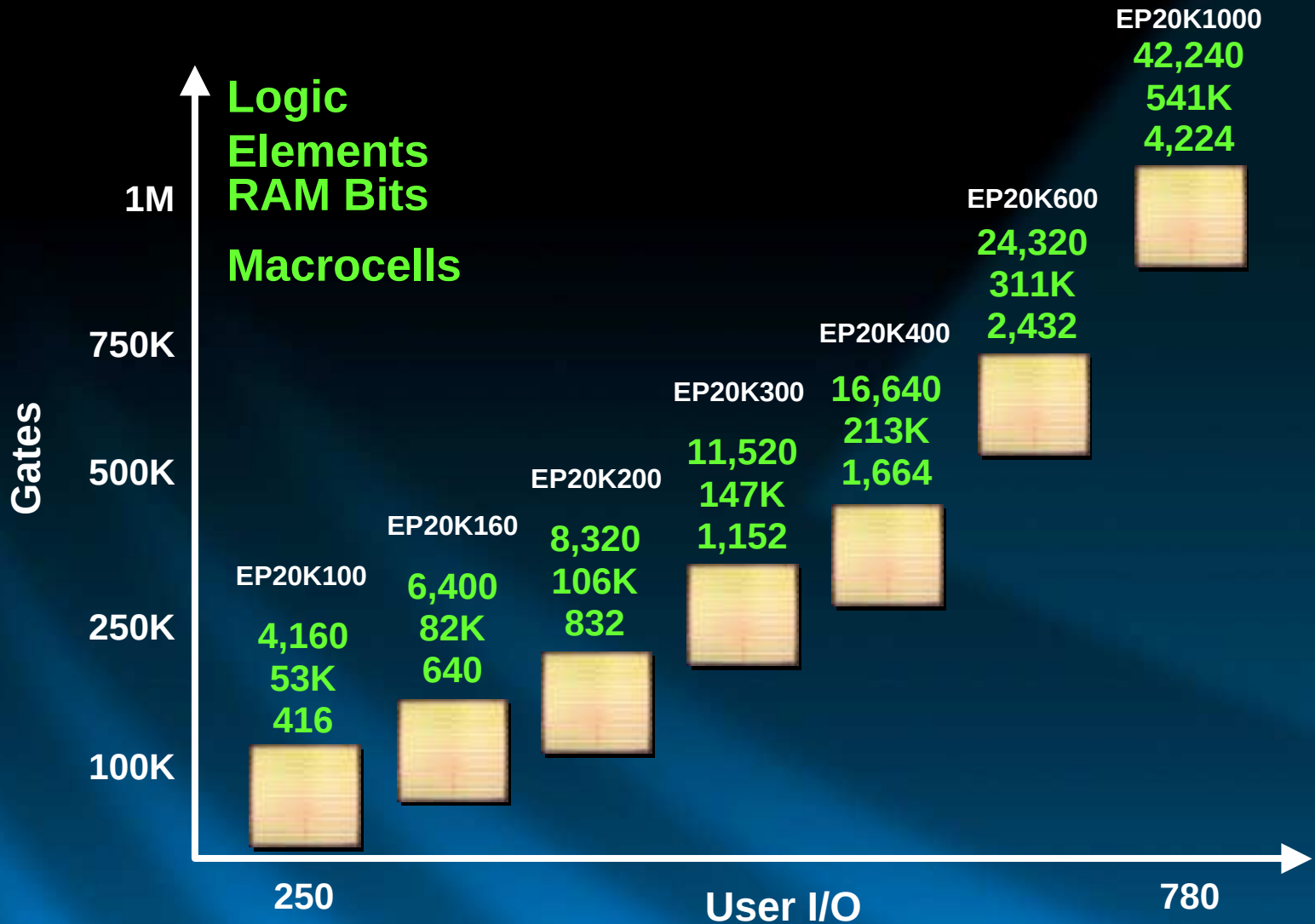


APEX 20K Features

- ◆ **125-MHz System Performance**
- ◆ **64-Bit, 66-MHz PCI Compliance**
- ◆ **4-Level Continuous FastTrack[®] Interconnect**
 - **New Level of Routing Hierarchy**
- ◆ **Enhanced Phase-Locked Loop (PLL)**
- ◆ **Advanced I/O Standard Support**
 - **Includes SSTL-3, GTL+, LVDS, and More**
- ◆ **MultiVolt[™] I/O Interface**
- ◆ **Advanced FineLine BGA Packaging**



APEX 20K Devices





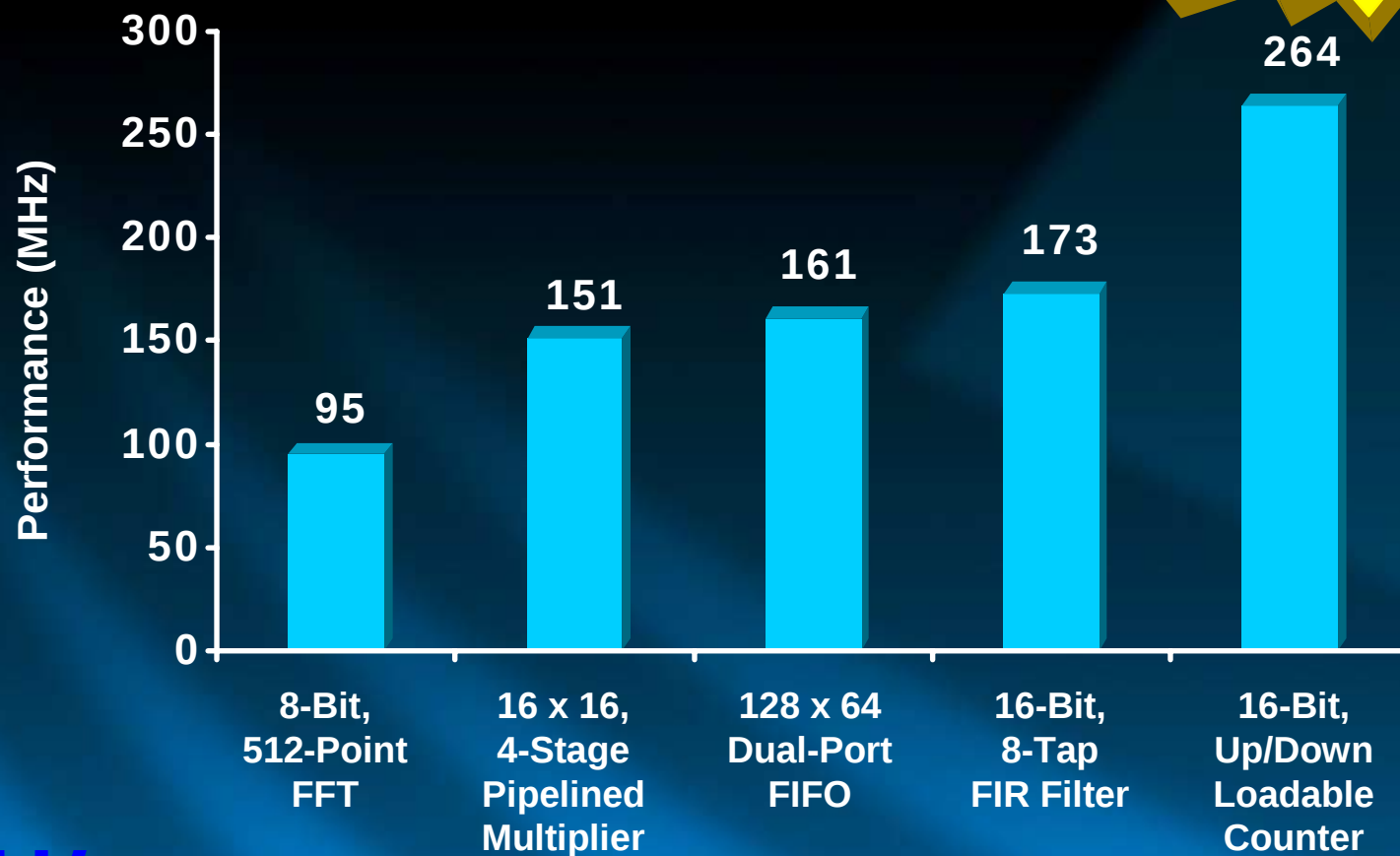
APEX 20K Technology

- ◆ SRAM Process
- ◆ 0.25 μ , 0.22 μ , 0.18 μ
- ◆ 6-Layer Metal
- ◆ 0.15- μ Devices Planned for 2001
 - Density of 2-Million Gates



APEX 20K Performance

**Density
AND
Speed**





APEX 20K Is 66-MHz PCI Compliant

- ◆ **Electrical and Timing Compliant**
- ◆ **64 Bits**
- ◆ **Outputs Have Programmable Clamps**
 - **3.3-V Compliant if Clamps Are Connected**





APEX 20K Supply Voltage

2.5 V
Core V_{CC}
0.25/0.22 ★

EP20K100

EP20K200

EP20K400

1.8 V
Core V_{CC}
0.18 ★

EP20K100E

EP20K160E

EP20K200E

EP20K300E

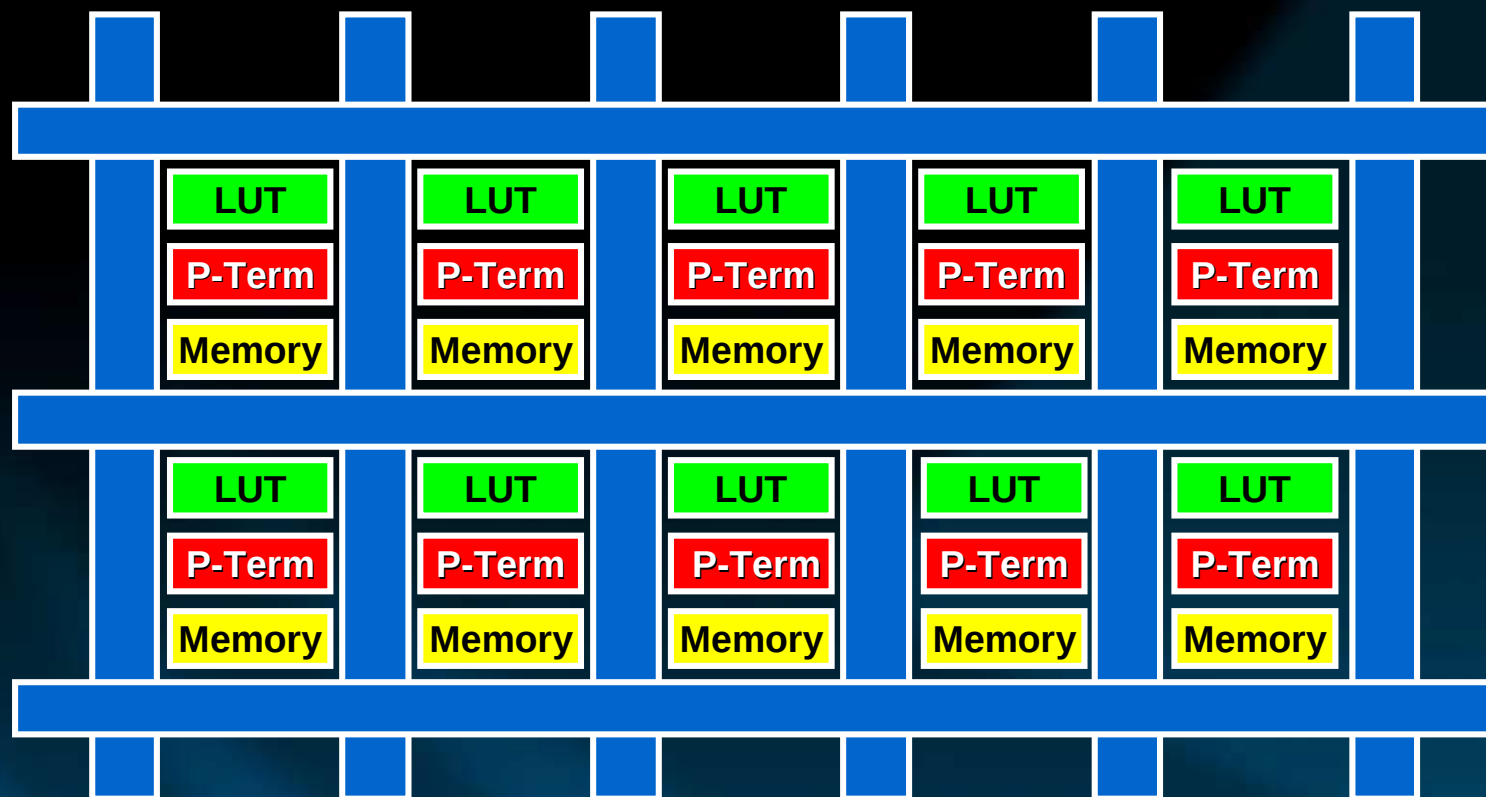
EP20K400E

EP20K600E

EP20K1000E



MultiCore™ Architecture



FLEX 6000 Model

MAX 7000 Model

FLEX 10KE Model



Quartus Development System



QUARTUS™

**Altera's
Fourth-Generation
Development Tool**





Streamlined Design Flow

- ◆ Workgroup Computing
- ◆ NativeLink™ Integration with EDA Tools
- ◆ Scripting
- ◆ Incremental Compilation
- ◆ Easy Floorplanning Linked to Design
- ◆ Intellectual Property



Additional Quartus Features

◆ Verification

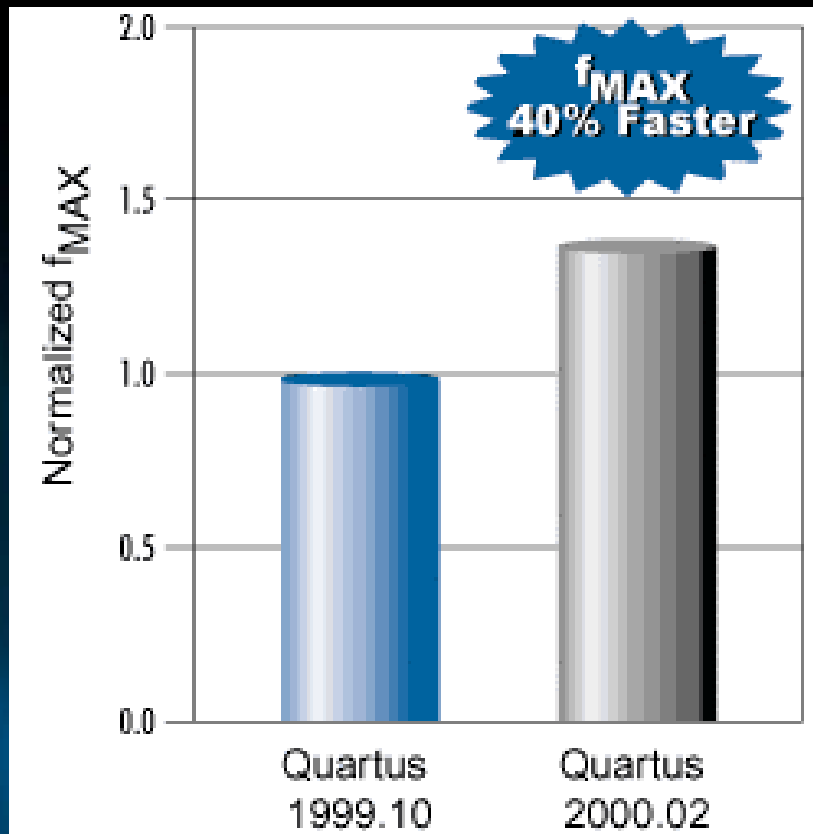
- Native HDL Simulator / Timing Analyzer
- SignalTap™: Hardware Verification at Speed

◆ Internet-Based Support

- Device Support Updates
- Patch Notification
- Quick Solutions
- Enhancement Requests
- Software Problem Reporting/Tracking



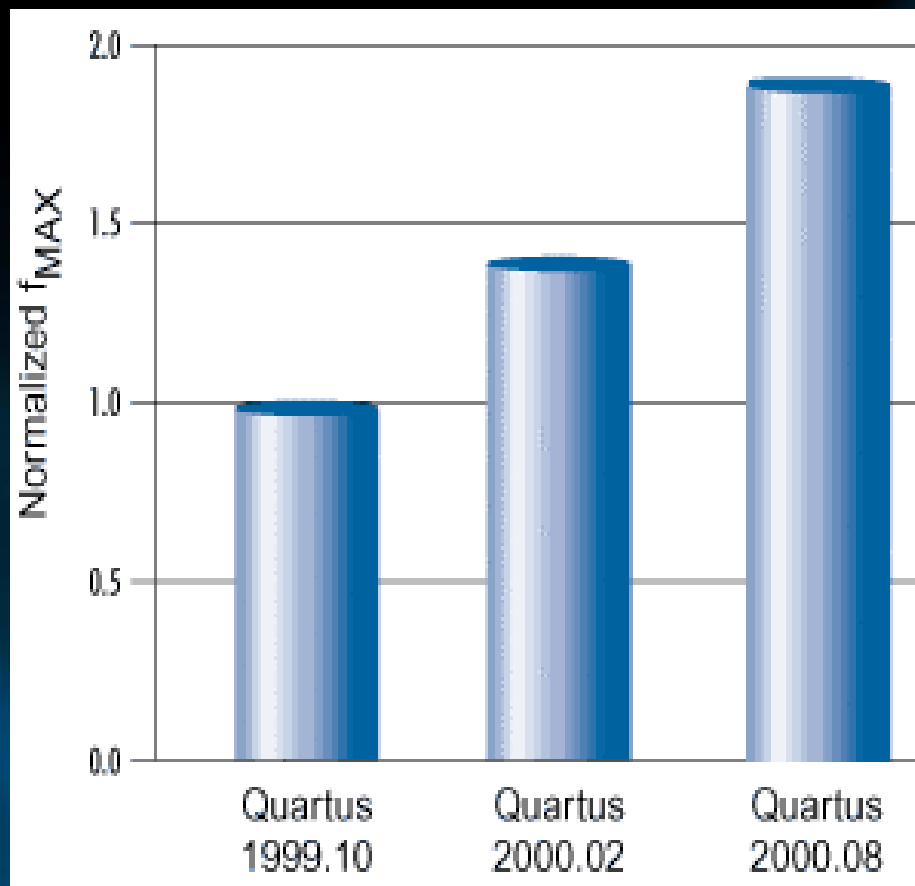
Performance Comparison of Quartus software



Over **40% Increase** in
Design Performance with
Quartus Software Version
2000.02



Design Performance Roadmap for the Year 2000





APEX 20K & Quartus Summary

- ◆ **Revolutionary Architecture for Integration**
- ◆ **Quartus Speeds Complex Designs to Market**
- ◆ **1-Gbit Ethernet Switch Illustrates Capabilities**