

20 YEARS of

ALTERA®

INNOVATION



SOPC

WORLD

2003



SOPC
WORLD
2003

Design Methodology/ SOPC Builder

Agenda

- Leadership in Programmable Logic Design Software
- System-Level Design Solutions
 - SOPC Builder
 - DSP Builder
 - Development Kits
- Software Design Tools Roadmap

20 Years of Altera Software Leadership



MAX+PLUS® II

1980s: The Tradition Begins

- First PLD Vendor Software on MS Windows
- Software Superiority Drove Altera's CPLD Leadership



QUARTUS® II

2003: The Tradition Continues

- Quartus® II: Altera's Flagship Software for CPLD, FPGA & HardCopy™ Devices
- Extends Altera's Knowledge & Leadership into High-Density Devices
- Even More Powerful & Easy-to-Use



Quartus II Software: Logic & System Design

Megafunctions



EDA Partners

SOPC Builder

- Embedded Systems
- Nios® Processor
- GNU Tools
- RTOS

Logic Design

- Integrated Synthesis
- Physical Synthesis
- SignalProbe™
- SignalTap® II

DSP Builder

- MathLab / Simulink
- FPGA Co-Processors
- Hardware Accelerators
- Custom Instructions

Cyclone™

MAX®



Quartus II Overview

Logic Design

Idea



Architecture/Spec
Development

Custom RTL
Development

Basic PLD
Development Flow

Functional
Verification

IP Core Integration
& Synthesis

Design

Place-&-Route

Timing Verification
& Debug

Compilation
& Optimization

Hardware/Software
Co-Development

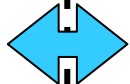
Verification

Product

IP Cores



Third-Party
Software



Quartus II Software
Serves

- Design
- Compilation
- Verification



Quartus II - Leadership in All Phases

Design

**Compilation
& Optimization**

Verification

- Design at System Level
- Block-Based Design



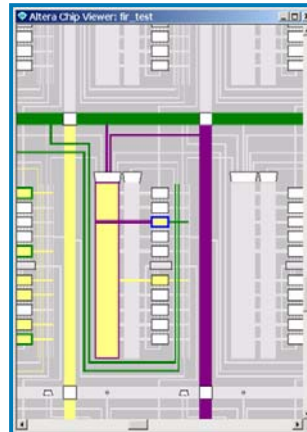
- Begin PCB Design Early

I/O Assignment Editor (partial screen)

	Source Name (From)	Destination Name (To)	Option
1	clk	clk2	Multicycle
2	clk	clk	Clock Settings
3	clk2	clk2	Clock Settings
4	yvalid	yvalid	Current Strength
5	taps:inst>Select_...		Fast Output Enable Register
6	fred2		Fast Output Register
7	ym_out		I/O Standard
8	yvalid		I/O Standard
9	d		Location
10	ym_out		Location

- Integrated Synthesis
- Physical Synthesis
- Design Changes
 - Incremental Compile
 - Chip Editor

- Faster Design Completion
- Robust Debug:
 - SignalProbe
 - SignalTap II
- PowerGauge™



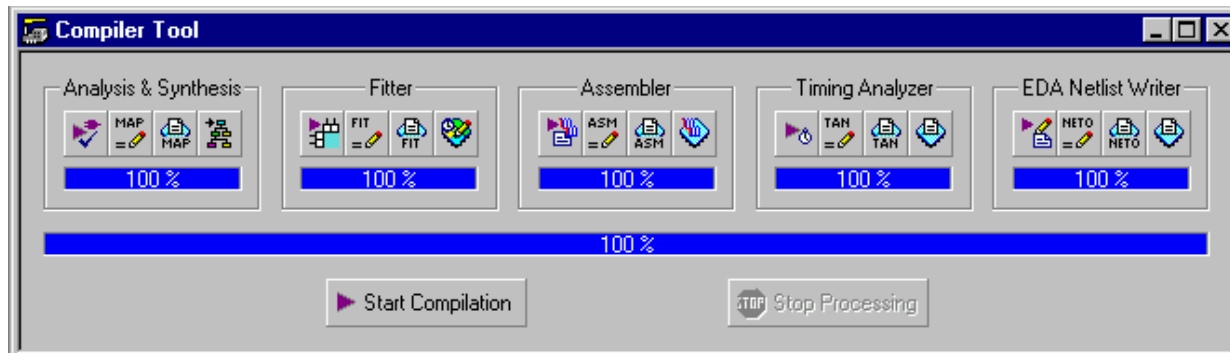
Use Quartus II Software for All New Designs

- Quartus II Advantages
 - Access to All Altera® Devices
 - Best Quality of Results
 - Superior HDL Synthesis
 - Advanced Features Support



Use Quartus II Software for ALL New Designs

- Quartus II Software Includes Popular MAX+PLUS® II Features
 - MAX+PLUS II Schematic Entry Features
 - Pin & Location Assignment Display in Schematics
 - Double-Clicking on Block or Symbol Opens Design File
 - Graphical Compiler Window



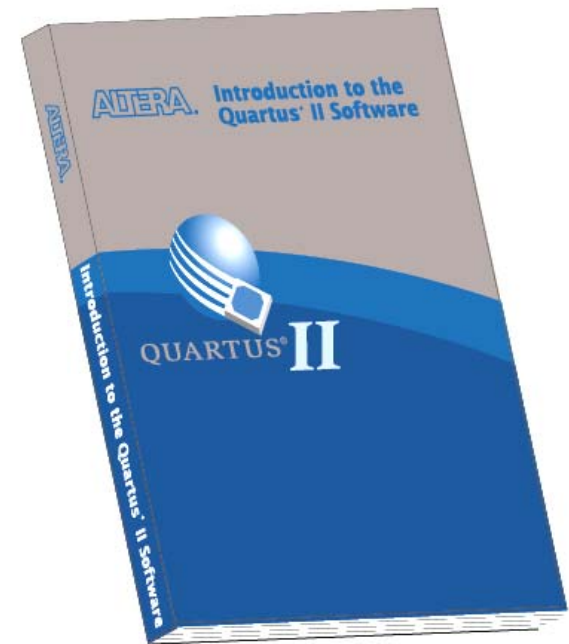
- Edit Simulator Report Files Directly
- Stand-Alone Programmer

Quartus II Software Is Easy to Learn!

- New Manual Introduces Quartus II Design Flow
- Extensive On-Line Help
- Quartus II On-Line Tutorials

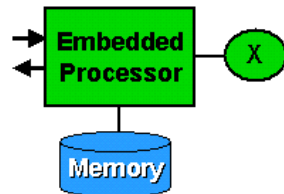
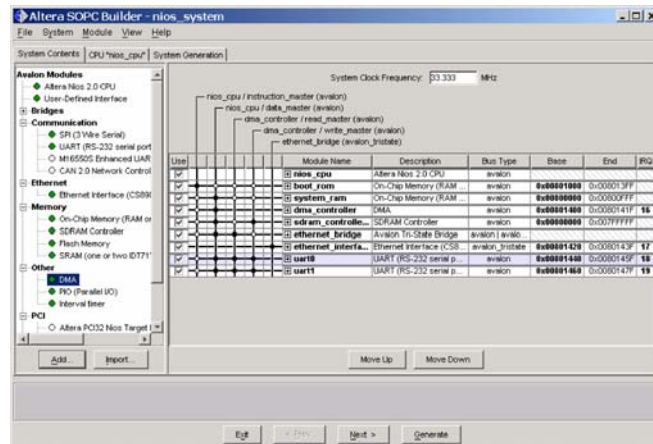


- Convert MAX+PLUS II Project Feature
- Easy-to-Use New Project Wizard



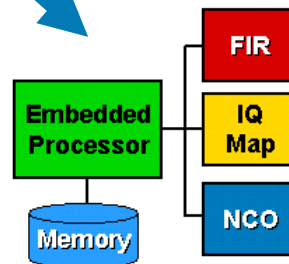
System Design Tools

SOPC Builder

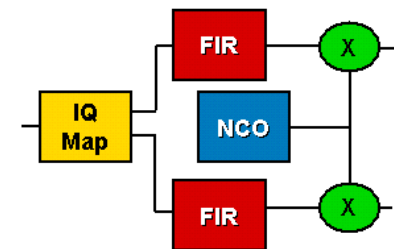
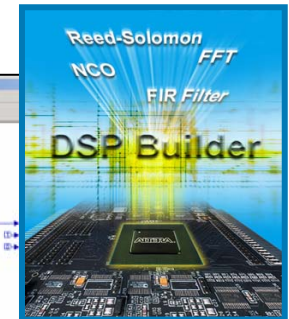
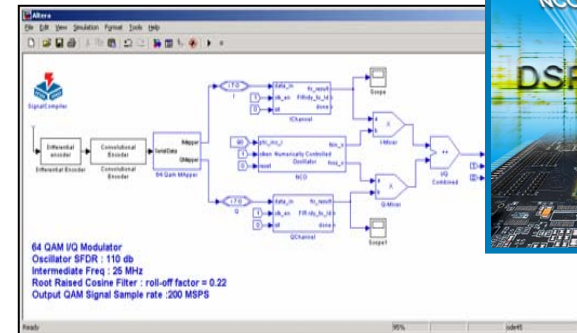


Stand-Alone Processor

Processor + FPGA Logic

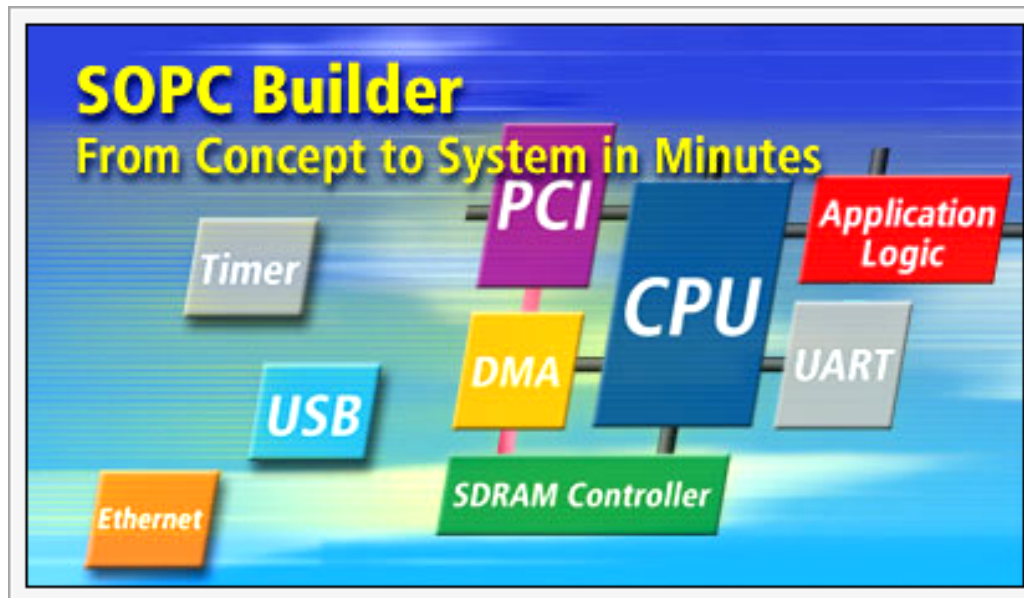


DSP Builder



Dedicated Hardware Architecture

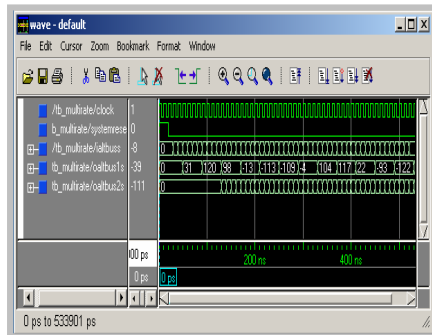
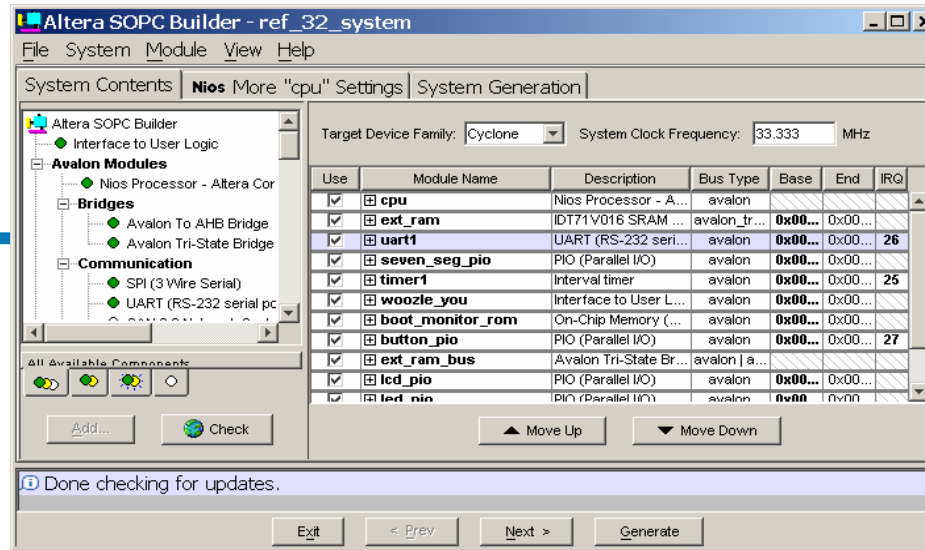
SOPC Builder Overview



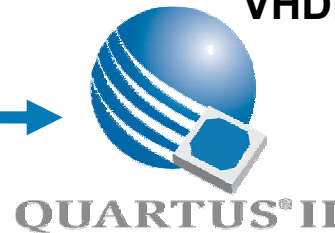
SOPC Builder Overview

**Simulation
Testbench
Generation**

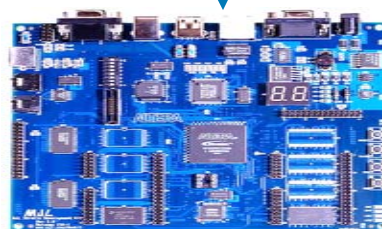
**Software
Development
Kit Generation**



**System Generation
VHDL / Verilog HDL**



- C Header files
- Custom Library
- Peripheral Drivers
- RTOS
- Middle Ware
- Software IDE
- Software Debuggers



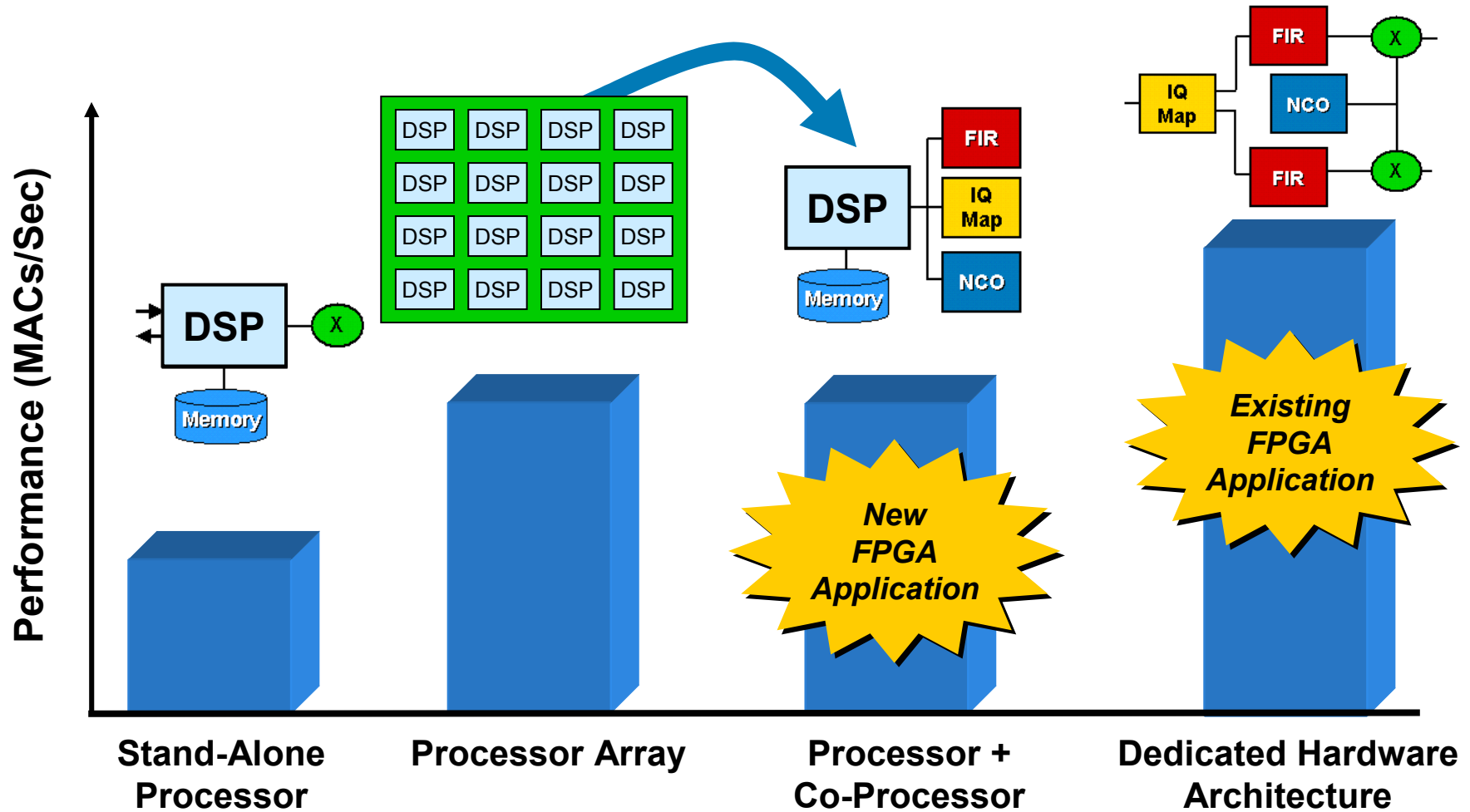
SOPC Builder Ready Components



Excalibur™ Stripe	DMA	USB 1.1	SDRAM
Nios Processor	PCI	USB 2.0	SSRAM
ARM-to-Nios Bridge ARM (AMBA AHB-to-Avalon)	GPIO	SPI	SRAM
Interface to User Logic	Timer	CAN 2.0	FLASH
10/100 Ethernet	Watchdog	16550S UART	On-Chip ROM On-Chip RAM

***More than 50+ IP Cores Now . . .
the List Keeps Growing***

DSP System Architecture Options

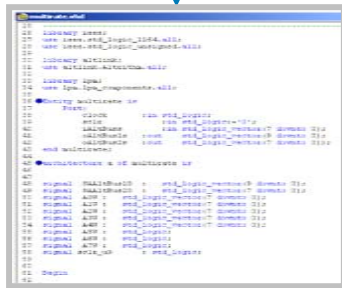


DSP Builder Overview

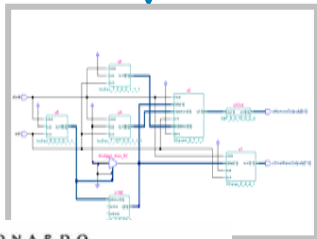
DSP Builder

MATLAB®
& SIMULINK®

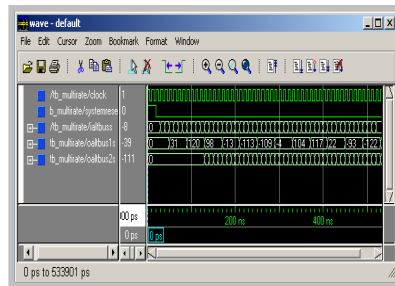
Creates
HDL Code



HDL
Synthesis



Creates
Simulation Testbench



Model Technology
A MENTOR GRAPHICS COMPANY



Creates
Processor
Plug-in



Download
Design to
Development
Board



Verify
in
Hardware



FPGA Co-Processor Applications

- Wireless
 - 2.5G EDGE Equalization
 - 3G Baseband Processing
 - HSDPA
 - 1xEVDV
 - 3G RF Linearization
- Consumer
 - Broadcast - Studio & Cable Plant
 - Digital Entertainment – MPEG2 & MPEG4
- Industrial
 - Military-Aerospace
 - Software Define Radio
 - Security
 - Medical Imaging
- Wireline Communications
 - Encryption
 - Framer
 - Traffic Management
 - TCP/IP
- Computer & Storage
 - Data Analysis & Routing Engine
 - Digital Imaging

Application Development Kits

- Jump-Start Your Application
- Complete Solutions
 - FPGA-Centered Boards
 - Development Software
 - Reference Designs
 - Download Cables
 - Accessories
- Available from Altera & Third-Party Partners
- Targeted Areas: Embedded CPUs, High-Speed I/O Designs, Memory, PCI, Ethernet & DSP
- www.altera.com/devkits

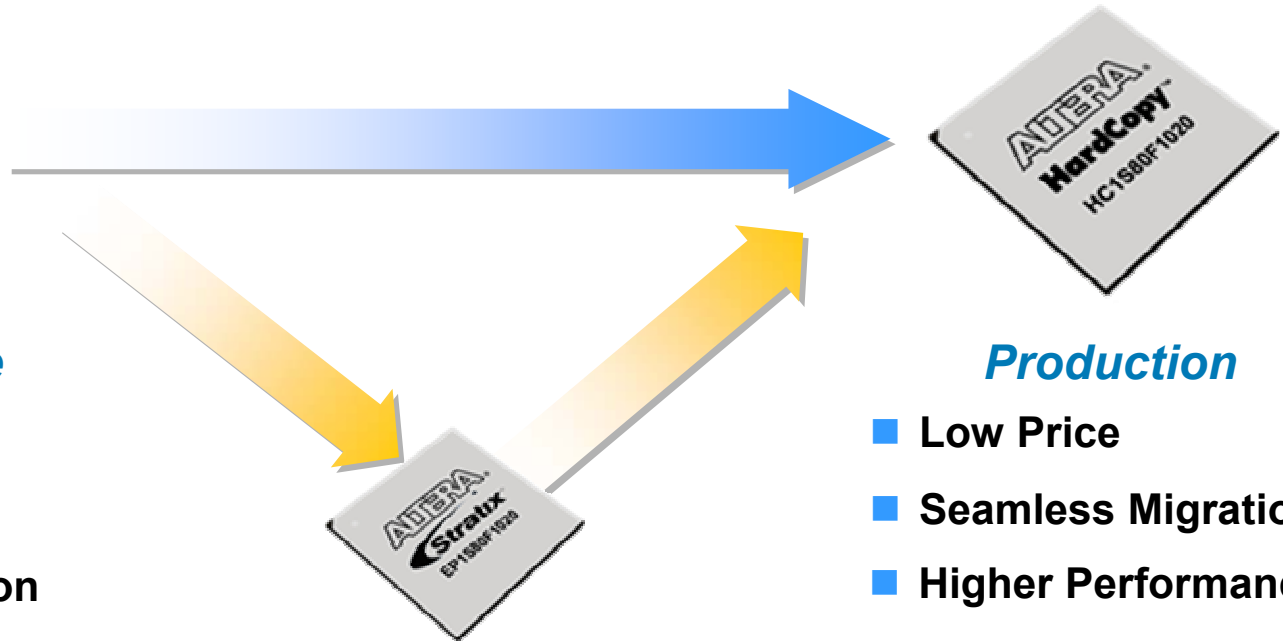


Designing for HardCopy Stratix™ Devices



Design Software

- SOPC Builder
- DSP Builder
- Timing Optimization
- Chip Editor
- Power Estimator
- Design Space Explorer



Production

- Low Price
- Seamless Migration
- Higher Performance
- Lower Power Consumption

FPGA Prototyping

- System Verification
- System Software Development
- Field Trial Production



Designing for HardCopy Stratix Devices

ASIC



Comparison	ASIC	HardCopy
EDA Tool Cost	\$200K	\$2K
NRE/Masks/Prototypes	\$700K	\$200K
Time to FPGA Prototype	Not Available	6 Months
Time to First Units	14 Months	8 Months

***How Do You Want
to Spend Your Resources?***



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Development Kit Offerings

Stratix GX Development Kit

- 3.125-Gbps Transceiver (SERDES) Solution
 - Supports Various Data Rates
 - Supports Many Protocols
 - Supports Array of Connectors
- Full Reference Design
 - Board Layout Files
 - Design Examples
 - Out of Box Support
 - Quartus II Software Tools
- Part Number
 - HS-BOARD/SX40



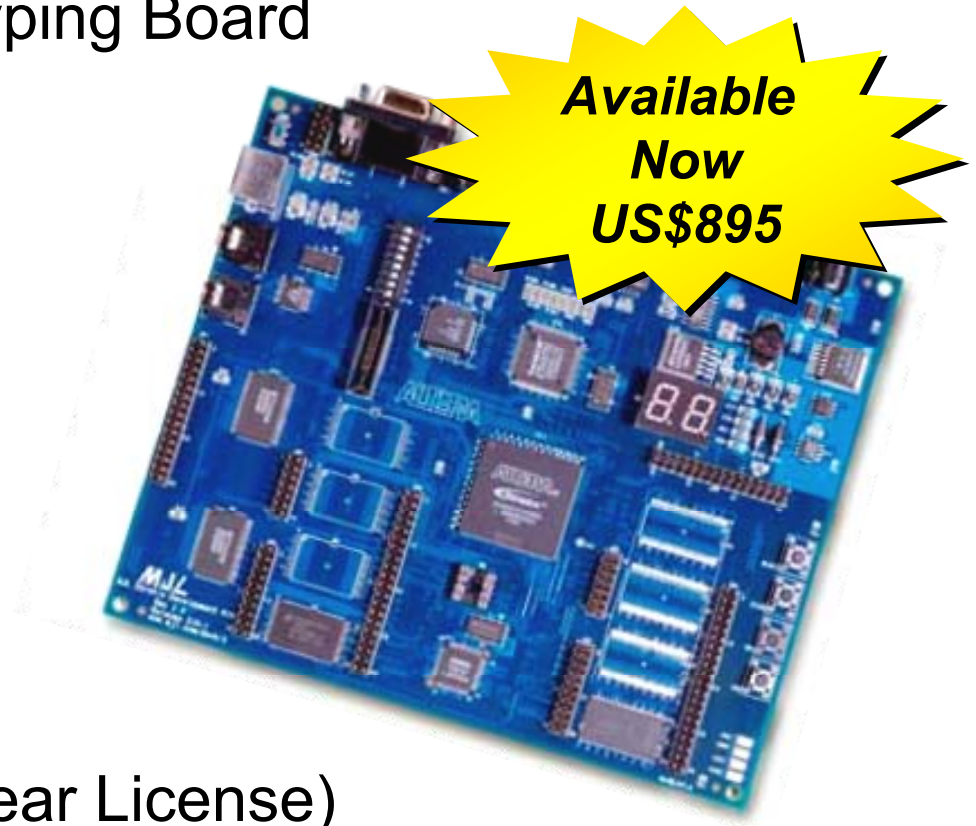
***Available
Now***

HardCopy Stratix Prototyping Kit

■ HardCopy Stratix Prototyping Board

- EP1S25F672 FPGA
- 32 Mbytes SDRAM
- 16 Mbytes Flash
- Audio A/D & D/A
- Keyboard & Mouse Port
- VGA Port
- USB 1.1
- 10baseT Ethernet
- LEDs, Switches

■ Quartus II Software (1-Year License)



***Start Your HardCopy Design
Immediately!***

Nios Development Kit

Stratix Edition

- Nios Processor Version 3.0
- Stratix EP1S10 Development Board
 - 1 MByte SRAM
 - 16 MBytes SDR SDRAM
 - 8 MBytes Flash
 - Compact Flash Connector & 16 MByte Card
 - 10/100 Ethernet MAC/PHY
 - Two Serial Ports (RS-232)
 - Two Daughter Board Expansion Headers
 - Mictor Connector (Debug & Trace)
 - 50-MHz Crystal (Socket), External Clock Input
 - Two Seven-Segment LEDs, Eight User LEDs, Four Pushbuttons
- SOPC Builder Design Tool
- Quartus II Software
- GNUPro Toolkit
- Network Protocols Software Library
- Evaluation Software
 - code|lab Developer Suite
 - Nucleus Plus LV Real-Time Operating System
 - IAR visualSTATE Graphical Software Design Tool

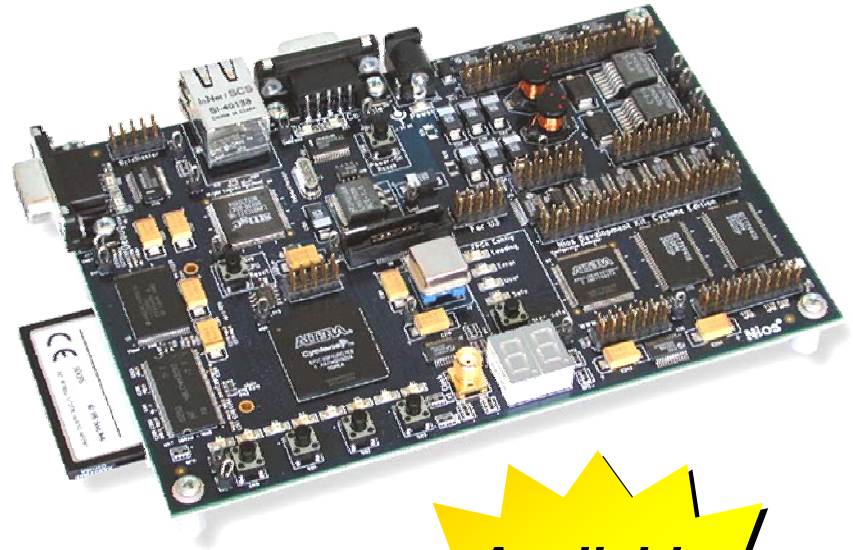


**Available
Now
US\$995**

Nios Development Kit

Cyclone Edition

- Nios Processor Version 3.0
- Cyclone EP1C20 Development Board
 - 1 MByte SRAM
 - 16 MBytes SDR SDRAM
 - 8 MBytes Flash
 - Compact Flash Connector & 16 MByte Card
 - 10/100 Ethernet MAC/PHY
 - Two Serial Ports (RS-232)
 - Two Daughter Board Expansion Headers
 - Mictor Connector (Debug & Trace)
 - 50-MHz Crystal (Socket), External Clock Input
 - Two Seven-Segment LEDs, Eight User LEDs, Four Pushbuttons
- SOPC Builder Design Tool
- Quartus II Software
- GNUPro Toolkit
- Network Protocols Software Library
- Evaluation Software
 - code|lab Developer Suite
 - Nucleus Plus LV Real-Time Operating System
 - IAR visualSTATE Graphical Software Design Tool



**Available
Now
US\$995**

Nios Development Kit

Stratix Professional Edition

- Nios Processor Version 3.0
- Stratix EP1S40 Development Board
 - 1 MByte SRAM
 - 16 MBytes SDR SDRAM
 - 8 MBytes Flash
 - Compact Flash Connector & 16 MByte Card
 - 10/100 Ethernet MAC/PHY
 - Two Serial Ports (RS-232)
 - Two Daughter Board Expansion Headers
 - Mictor Connector (Debug & Trace)
 - 50-MHz Crystal (Socket), External Clock Input
 - Two Seven-Segment LEDs, Eight User LEDs, Four Pushbuttons
- SOPC Builder Design Tool
- Quartus II Software
- GNUPro Toolkit
- Network Protocols Software Library
- Evaluation Software

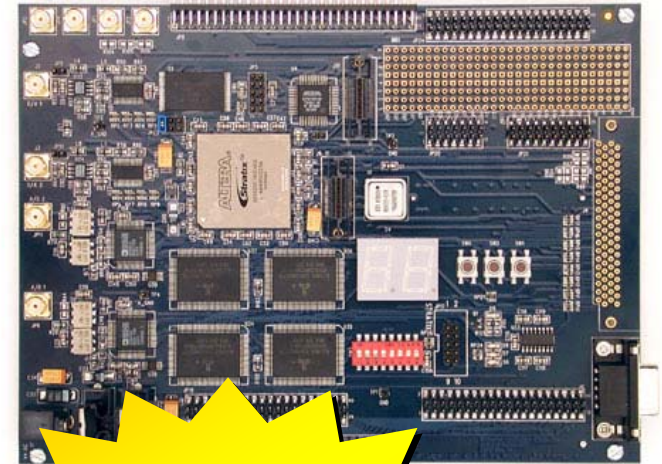


**Available
Now
US\$2,495**

DSP Development Kit

Stratix Edition

- Stratix EP1S25 Development Board
 - Analog I/O
 - Two 12-Bit, 125 MHz A/D Converters
 - Two 14-Bit, 165 MHz D/A Converters
 - Digital I/O
 - Four 40-Pin Connectors for Analog Devices A/D Converter Evaluation Boards
 - Connector for TI TMS320 Cross-Platform Daughter Card
 - 3.3-V Expansion/Prototype Headers
 - RS 232 Serial Port
 - 2 Mbytes of 7.5-ns Synchronous SRAM
- Quartus II Software
- MatLab / Simulink - 30 Day Evaluation
- DSP Builder
- Reference Designs
 - Filtering
 - DSSS Modem
 - QPSK Modem
 - DDC
- Labs
 - Digital Filtering
 - Error Correction (R-S) Network Protocols Software Library
- Ordering Code: DSP-BOARD/S25

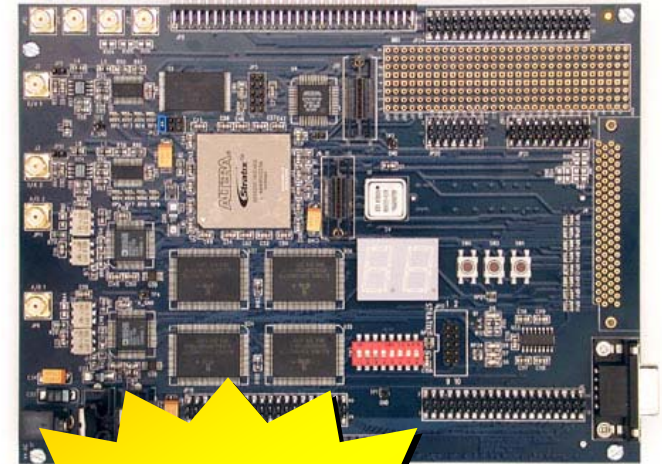


**Available
Now
US\$1,995**

DSP Development Kit

Stratix Professional Edition

- Stratix EP1S80 Development Board
 - Analog I/O
 - Two 12-Bit, 125 MHz A/D Converters
 - Two 14-Bit, 165 MHz D/A Converters
 - Digital I/O
 - Four 40-Pin Connectors for Analog Devices A/D Converter Evaluation Boards
 - Connector for TI TMS320 Cross-Platform Daughter Card
 - 3.3V Expansion/Prototype Headers
 - RS 232 Serial Port
 - 2 Mbytes of 7.5ns Synchronous SRAM
- Quartus II Software
- MatLab / Simulink – 30-Day Evaluation
- DSP Builder
- Reference Designs
 - Filtering
 - DSSS Modem
 - QPSK Modem
 - DDC
- Labs
- Ordering Code: DSP-BOARD/S80



**Available
Now
US\$4,995**

PCI Development Kit

Stratix Edition

- PCI Development Board
 - Stratix EP1S25F1020C5 Device
 - In-Chassis or Stand-Alone Operation
 - Universal PCI/PCI-X Edge Connector
 - Double-Data Rate SDRAM (DDR333)
- Supports Conventional PCI & PCI-X
 - 32-Bit & 64-Bit Conventional PCI Up to 66-MHz
 - 32-Bit & 64-Bit PCI-X Up to 133-MHz
- Plugs into Any Desktop PC
 - Universal 3.3 v & 5 v
 - Short Card Form Factor
- Standard Expansion Ports
 - RS-232
 - 10/100 Ethernet
- Quartus II Software (1-Year License)
- Reference Designs & Applications



**Available
Now
US\$1,995**

20 YEARS of

ALTERA®

INNOVATION



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2003