Intel® Atom™ Processor E6x5C Series Introduction

FOR 2012 INTEL CUP ESDC
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Intelligence is Moving to the Edge....

The World is Becoming More Connected....

Intel® Architecture is Playing a Bigger Role...
What More Can We Do To Help Enable Embedded Customers To...

- Support Multiple I/O skus with One Footprint
- Integrate Proprietary Features into Processor Package
- Change Platform Details Later in the Design Cycle

Creating Simpler Options for Embedded Customers....
Introducing the Intel® Atom™ Processor E6x5C

A Configurable Intel Processor

Flexibility

- **Configurable** with application-specific or proprietary I/O and algorithms
- **Single Design** supports multiple product derivatives
- **Multiple functions** combine into a single package for smaller form factor needs

Simplicity

- **Single Package** reduces footprint and helps lower costs
- **Ease of Design** with few chips and simplified inventory
- **Power of One** with one supplier, one package, and one support call
Exceptional Flexibility

**Intel® Atom™ Processor E600 Series**
- Integrated PCIe*
- Integrated Memory Controller
- Integrated Graphics Engine
- Integrated Hi-Def Video and Intel® HD Audio
- Support of embedded Intel® architecture ecosystem

**User programmable Altera FPGA**
- 6 High-speed transceivers
- 350 I/O pins
- Dedicated DSP blocks
- Greater than sixty thousand logic elements.
- Programmable with standard Altera Quartus II* Subscription Edition tools

† PCIe* Soft IP licensed from 3rd party vendors
Rethink Flexibility with E6x5C Processor
A Customizable System-on-Chip based on Intel® Atom™ Processor E6xx Series and an FPGA

Flexible solutions to help deliver product to market faster

E6x5C is Designed to...
Ideal for designs that require
- Integrated I/O (general purpose or customer specific)
  - >350 customizable I/O pins
  - 6 high speed customizable SERDES
- DSP functions or proprietary workloads
  - 39 customizable DSP blocks on chip
  - 312 18bit x 18bit multipliers on chip
- Small form factor, low power, and performance matched to the application

Stellarton opens up opportunities for architectural conversions, replacing both a non-Intel® CPU and a programmable logic device

<table>
<thead>
<tr>
<th>Medical</th>
<th>Portable ultrasounds, Patient monitoring, devices requiring higher image processing capability on chip</th>
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<tbody>
<tr>
<td>Military</td>
<td>Portable information systems (self-aware), Missile systems</td>
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<tr>
<td>Industrial</td>
<td>Embedded PCs, Transportation monitoring, Machine vision, devices requiring processing, or proprietary or configurable interfaces</td>
</tr>
<tr>
<td>Communication</td>
<td>Signal processing, Integrated security engines, High speed I/O</td>
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Step to Customizable E6x5C Processor
Single chip enables customizable, vendor differentiating I/O and workload acceleration along with Intel® Atom™ processor performance to meet customer’s specific needs

Start with Intel® Atom™ Processor E6xx Series + IOH(s)
Highly integrated, low power processor paired with a general purpose embedded IOH supports broad embedded applications

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<tr>
<td>0.6 GHz</td>
<td>1.0 GHz</td>
<td>1.3 GHz</td>
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Highly integrated, low power processor paired with a general purpose embedded IOH supports broad embedded applications
Helping Provide More Tightly Integrated Solutions

Consolidate more functions into one chip

- CPU
- IOH
- FPGA
- DSP
- ASIC

- Military
- Portable Medical Equipment
- Machine Vision
- Robotics
- Sensors
- Security
- Transportation
- Aerospace
- Industrial Automation
Parallel Development Paths

Independent development flows
Altera* FPGA will be programmed through Quartus* II development tool
Customer can take advantage of FPGA IP ecosystem
Altera* FPGA requires Quartus* II Subscription Edition

Intel® Embedded Ecosystem approach
3rd Party vendors build BIOS, SW drivers, BSP, reference designs around multiple platforms
## Altera* FPGA Detailed Features

<table>
<thead>
<tr>
<th>Description</th>
<th>Altera* FPGA</th>
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<tbody>
<tr>
<td>Adaptive Logic Modules (ALMs)</td>
<td>25,300</td>
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<tr>
<td>Logic Elements</td>
<td>63,215 equivalent logic elements</td>
</tr>
<tr>
<td>Total Memory (M9K + MLAB)</td>
<td>5.3 Mbits</td>
</tr>
<tr>
<td>18-Bit x 18-Bit Embedded Multipliers</td>
<td>312 multipliers; 39 DSP blocks</td>
</tr>
<tr>
<td>Transceivers</td>
<td>6 available on Stellarton</td>
</tr>
<tr>
<td>PLLs</td>
<td>4</td>
</tr>
<tr>
<td>Modular I/O banks</td>
<td>6 modular I/O banks, 2 banks with DPA feature</td>
</tr>
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More information:
Intel® Atom™ Processor E6x5C Series Usage Models

- Intel® Atom™ Processor E6x5C Series is a good processor choice for;
  - designs where the customer might have some unique I/O needs (special video interface; proprietary bus; SRIO, etc.)
  - application acceleration on the chip (graphic processing; lower layer communication protocol; etc), and these features are currently implemented on an FPGA, ASIC or other logic chips

- We have seen Intel® Atom™ processor E6x5C series be considered as a replacement for:
  - Mid-higher end ARM* processor + mid-high performance FPGA
  - DSPs (With OMAP core + purpose build DSP chip)
  - Legacy AMD* chip or/and Freescale SOC + ASIC/FPGA

* Other names and brands may be claimed as the property of others.
**Intel® Atom™ Processor E6x5C Series Use Example**

**Voice Conferencing**

Mix of Voice Encoders + IO

- Key DSP technology can be integrated into FPGA which improves capability of overall platform.
- For this use example, FPGA utilization is ~45%.

*Other names and brands may be claimed as the property of others.*

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**Intel® Atom™ Processor E6x5C Series**

- DDR2
- DDR2 (800)
- HW Encode 720p
- SPI, SMBus
- Video
- GPIO (x14)
- 2D/3D Graphic
- HD Audio
- PCIe* Gen1 (2x1)
- PCIe Multi-function
- Voice Codecs: G.711/G.726
- Speech energy Calculations Conference Mixing

**External IOH Or Discrete**

- PCIe*
- SDHC
- GigE

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*Functionality implemented in the FPGA*
Intel® Atom™ Processor E6x5C Series Use Example

Traffic Flow Control
Camera interfaces and video processing

-Traffic light flow control -Monitors traffic and adjusts lights for optimal traffic patterns

* Other names and brands may be claimed as the property of others.
Intel® Atom™ Processor E6x5C Series Use Example

IP Camera

Two Encoder 720 & 1080p + IO

- SD for boot interface
- Video in using BT1120 for HD video
- H.264 for video compression

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Intel® Atom™ Processor E6x5C Series Use Example
Medical Application
Portable Ultrasound Device

- Portable Ultrasound application
- SD for boot interface
- Beamformer for Signal Processing

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Functionality implemented in the FPGA