Timing Solutions for Intel Atom-Based Embedded Systems

Intel® Atom CPUs are used in many embedded and industrial applications such as communications equipment, industrial control, automotive In-Vehicle Infotainment (IVI), and automation. IDT has the industry’s broadest line of Atom support clocks allowing timing coverage for all applications.

**KEY BENEFITS**

- Industry's widest selection of Atom support clocks – one-stop-shop for any application
- Industrial temperature grade parts available for systems that must function in demanding environments
- Automotive AEC-Q100 level devices for use in automotive In-Vehicle Infotainment
- Integrated series resistors and voltage regulators for differential outputs
  Minimal external component count with maximum performance
- VDD_IO rail on many devices for maximum power savings
- Available 1.5V core operation minimizes power consumption
- Wide range of I/O configurations allows ‘right-sizing’ the clock to the design, resulting in the smallest footprint device for the application

**TARGET MARKETS & APPLICATIONS**

- POS terminals
- Embedded CPU cards
- Automotive IVI
- Micro-servers
- Industrial controllers
- Communication cards
- Internet kiosks
- Digital signage
- Home energy management
- Medical instrumentation

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**Typical Application Diagram**

**Industrial Computing**

- **Atom 230/330 (Diamondville)**
  - 9UMS9001 (CK540)
  - 9UMS9610 (CK610)
  - 9UMS9633 (CK633)
  - 9LPRS525 (CK505)
- **Atom D4xx, D5xx Series (Tunnel Creek)**
  - 9LPRS436 (CK505 derivative)
  - 9LPS525 (CK505)

**Embedded**

- **Atom N270/N280 (Diamondville)**
  - 9UMS9633 (CK633)
- **Atom E6xx Series (Tunnel Creek, Stellarton)**
  - 9LPRS436 (CK505 derivative)
  - 9LPS525 (CK505)

**Mobile Internet Devices**

- **Atom Z5xx, Z6xx Series (Silverthorn, Lincroft)**
  - 9UMS9001 (CK540)
  - 9UMS9610 (CK610)
- **Moorsetown**
  - HE Smartphones
  - Lindcourt SOC (45nm)
  - Langwell I/O PCH (65nm)
  - Custom PMIC/SOC
- **Medfield**
  - Custom PMIC/SOC

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**Timing for Intel Atom-Based Embedded Systems**
# Timing for Intel Atom-Based Embedded Systems

<table>
<thead>
<tr>
<th>Device</th>
<th>9UMS9001</th>
<th>9UMS9610</th>
<th>9UMS9633</th>
<th>9LPRS525</th>
<th>9LPRS436</th>
<th>9VRS4338</th>
<th>9VRS4339</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package</td>
<td>56 MLF(^2) (8x8mm Body, 0.5mm pin pitch)</td>
<td>48 MLF(^1) (6x6mm Body, 0.4mm pin pitch)</td>
<td>48 MLF(^2) (6x6mm Body, 25 mil pin pitch)</td>
<td>56 SSOP(^2) (300 mil Body, 0.5mm pin pitch)</td>
<td>48 MLF(^1) (6x6mm Body, 0.4mm pin pitch)</td>
<td>48 MLF(^2) (7x7mm Body, 0.4mm pin pitch)</td>
<td>56 MLF(^3) (7x7mm Body, 0.4mm pin pitch)</td>
</tr>
<tr>
<td>Core Voltage</td>
<td>3.3V</td>
<td>1.5V</td>
<td>3.3V</td>
<td>3.3V</td>
<td>3.3V</td>
<td>1.5V</td>
<td>1.5V</td>
</tr>
<tr>
<td>Separate VDD_IO rail for power savings</td>
<td>Yes (1.05 to 3.3 V)</td>
<td>Yes (1.5V)</td>
<td>Yes (1.5 to 3.3 V)</td>
<td>Yes (1.05 to 3.3 V)</td>
<td>No</td>
<td>Yes (1.05 to 1.5 V)</td>
<td>Yes (1.05 to 1.5 V)</td>
</tr>
<tr>
<td>Fully integrated Voltage Regulator for VDD_IO</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Integrated Series Resistors on Differential Outputs</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>C</td>
<td>C</td>
<td>C, I, W3</td>
<td>C, I</td>
<td>C, I</td>
<td>C</td>
<td>C</td>
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<tr>
<td>Typical Power Consumption</td>
<td>190mW(^4)</td>
<td>100mW(^3)</td>
<td>215mW(^4)</td>
<td>430mW(^5)</td>
<td>330mW(^6)</td>
<td>125mW(^7)</td>
<td>150mW(^7)</td>
</tr>
<tr>
<td>Target Applications</td>
<td>UMPC, Embedded, Portable Internet Devices</td>
<td>UMPC, Portable Internet Devices</td>
<td>Embedded, Industrial, Automotive</td>
<td>Embedded, Desktop, Netbook</td>
<td>Embedded, µServers</td>
<td>Ultrabook, Netbook, Desktop, Embedded, Servers</td>
<td>Ultrabook, Netbook, Desktop</td>
</tr>
<tr>
<td>PCIe Phase Noise Capability</td>
<td>Gen1</td>
<td>Gen1</td>
<td>Gen1</td>
<td>Gen2</td>
<td>Gen2</td>
<td>Gen2</td>
<td>Gen2</td>
</tr>
</tbody>
</table>

## I/O Mix

| CPU pairs | 2 | 3 | 2 | 2 | 2 | 2 |
| SRC pairs | 4 | 3 | 5 | 2 | 3 | 5 |
| ITP/SRC pair | 1 ITP | 0 | 1 | 1 | 1 | 1 |
| DOT96/SRC pair | 1 DOT96 | 1 DOT96 | 1 | 1 DOT96 | 1 | 1 |
| SATA/SRC pair | 0 | 0 | 1 | (SATA = 75 or 100 M) | 1 | 1 |
| LCD/SRC pair | 1 LCD | 1 LCD | 1 | 0 | 1 LCD | 1 LCD |
| Single-ended Outputs/SRC pair | 0 | 0 | 1 muxed | (with LCD/SCR pair) | 12.288M, 25M | 1 PCI/25M output | 1.25M, 1 PCI/27M |
| PCI outputs | 3 | 0 | 6 | 2 | 3 | 3 |
| USB48 output | 1 | 0 | 1 | 1 | 1 | 1 |
| REF output | 1 | 1 | 1 | 1 | 1 | 1 |
| CLKREQ#/ | 4 | 3 | 6 muxed | 3 | 1 muxed, 1 non-muxed | 2 muxed, 1 non-muxed |

1. HDI PCB technology required
2. HDI PCB technology NOT required
3. 48 SSOP is available in AECQ-100 Level 3 Grade for Automotive Applications
4. VDD = 3.3V, VDD\_IO = 1.05V
5. VDD = 1.5V, VDDREF = 3.3 V, VDD\_IO = 1.5V
6. VDD = 3.3V, VDDREF = 3.3 V, VDD\_IO = 1.5V
7. VDD33 = 3.3V, VDD =1.5 V, VDD\_IO = -1.05V
8. VDD = 3.3V

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8. VDD = 3.3V