ECX-APL
EXTENDED / EXTREME TEMPERATURE SUPPORT

3.5" ECX SINGLE BOARD COMPUTER WITH INTEL® APOLLO LAKE SOC PROCESSORS

- 1x LVDS, 1x HDMI, 1x DP for display output
- 2x GbE LAN for Ethernet
- 4x USB 3.0, 2x USB 2.0, 2x RS232/422/485, 4x RS232, 1x 8-bit DIO for peripherals
- 1x SATA 3.0, 1x Micro-SD Cage for storage
- 1x mPCIe, 1x M.2 Key B for expansion

POSSIBILITIES START HERE
ECX-APL

**3.5” ECX SINGLE BOARD COMPUTER WITH INTEL® APOLLO LAKE SOC PROCESSORS**

ECX-APL is a 3.5” ECX (Embedded Compact eXtended) form factor SBC (Single Board Computer) equipped with Intel Apollo Lake SoC Processors, providing up to 30% increase in processing / graphics performance and 15% increase in power efficiency over models powered by previous-generation processors. In addition, ECX-APL supports a highly-integrated M.2 expansion socket and thus allows developers to build more compact or thinner embedded devices. Extended and extreme temperature models are available for integration into the systems used under extreme high, low or radically fluctuating temperatures.

**PRODUCT HIGHLIGHTS**

- Intel® Apollo Lake SoC Processors
- 2x DDR3L SO-DIMM
- 1x LVDS, 1x HDMI, 1x DP for display output
- Triple display support
- 2x GbE LAN for Ethernet
- 4x USB 3.0, 2x USB 2.0, 6x COM, 1x 8-bit DIO for peripherals
- 1x SATA 3.0, 1x Micro-SD Cage for storage
- 1x mPCIe, 1x M.2 Key B for expansion
- Extended / extreme temperature model available

**BLOCK DIAGRAM**
<table>
<thead>
<tr>
<th>TECHNICAL INFORMATION</th>
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<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>PROCESSOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intel® Atom™ x7-E3950 (Quad Core, 2M Cache, up to 2.00 GHz, FCBGA1296, 12 W TDP)</td>
</tr>
<tr>
<td></td>
<td>Intel® Atom™ x5-E3940 (Quad Core, 2M Cache, up to 1.80 GHz, FCBGA1296, 9.5 W TDP)</td>
</tr>
<tr>
<td></td>
<td>Intel® Atom™ x5-E3930 (Dual Core, 2M Cache, up to 1.80 GHz, FCBGA1296, 6.5 W TDP)</td>
</tr>
<tr>
<td></td>
<td>Intel® Pentium® N4200 (Quad Core, 2M Cache, up to 2.50 GHz, FCBGA1296, 6 W TDP)</td>
</tr>
<tr>
<td></td>
<td>Intel® Celeron® N3350 (Dual Core, 2M Cache, up to 2.40 GHz, FCBGA1296, 6 W TDP)</td>
</tr>
<tr>
<td></td>
<td>2x DDR3L 1867 1.35 V SO-DIMM</td>
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<table>
<thead>
<tr>
<th>MEMORY</th>
<th></th>
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<table>
<thead>
<tr>
<th>VIDEO</th>
<th>GRAPHICS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intel® HD Graphics 505 (for models w/ x7-E3950, N4200)</td>
</tr>
<tr>
<td></td>
<td>Intel® HD Graphics 500 (for models w/ x5-E3940, x5-E3930, N3350)</td>
</tr>
<tr>
<td></td>
<td>1x LVDS (18/24-bit, 1/2-ch)</td>
</tr>
<tr>
<td></td>
<td>1x HDMI 1.4 (3840 x 2160 @ 30 Hz, on rear)</td>
</tr>
<tr>
<td></td>
<td>1x DP 1.2 (4096 x 2160 @ 60 Hz, on rear)</td>
</tr>
<tr>
<td></td>
<td>Triple Display</td>
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<table>
<thead>
<tr>
<th>AUDIO</th>
<th>AUDIO CODEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Realtek ALC662</td>
</tr>
<tr>
<td></td>
<td>2x Speaker-out (3 W)</td>
</tr>
<tr>
<td></td>
<td>1x Line-in (by header, extreme temperature model excluded)</td>
</tr>
<tr>
<td></td>
<td>1x Line-out (by header, extreme temperature model excluded)</td>
</tr>
<tr>
<td></td>
<td>1x Mic-in (by header, extreme temperature model excluded)</td>
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<table>
<thead>
<tr>
<th>NETWORK CONNECTION</th>
<th>ETHERNET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2x GbE LAN (RJ45 on rear, Intel® I210-AT)</td>
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<table>
<thead>
<tr>
<th>PERIPHERAL CONNECTION</th>
<th>USB</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>4x USB 3.0 (Type A on rear)</td>
</tr>
<tr>
<td></td>
<td>2x USB 2.0 (by header)</td>
</tr>
<tr>
<td>SERIAL PORT</td>
<td>2x RS232/422/485 (by wafer, auto flow control function for RS485)</td>
</tr>
<tr>
<td>OTHER I/Os</td>
<td>4x RS232 (by wafer)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STORAGE &amp; EXPANSION</th>
<th>CONNECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1x SATA 3.0</td>
</tr>
<tr>
<td></td>
<td>1x Micro SD Cage (on front)</td>
</tr>
<tr>
<td></td>
<td>1x mPCIe (full size)</td>
</tr>
<tr>
<td></td>
<td>1x M.2 Key B (mixed w/ USB 2.0 / SATA type 22×42)</td>
</tr>
<tr>
<td></td>
<td>1x SIM Card Cage (by wafer, switchable between mPCIe and M.2)</td>
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<table>
<thead>
<tr>
<th>POWER</th>
<th>INPUT VOLTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1x4-pin Wafer (Straight &amp; Right Angle dual-footprint)</td>
</tr>
<tr>
<td></td>
<td>DC 12 V</td>
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<table>
<thead>
<tr>
<th>FIRMWARE</th>
<th>BIOS</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>AMI uEFI BIOS w/ 128 Mb SPI Flash</td>
</tr>
<tr>
<td></td>
<td>Programmable WDT to generate system reset event</td>
</tr>
<tr>
<td></td>
<td>Voltages, Temperatures</td>
</tr>
<tr>
<td></td>
<td>Processor integrated RTC</td>
</tr>
<tr>
<td></td>
<td>Optional (Infineon SLB 9665 TPM 2.0)</td>
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<table>
<thead>
<tr>
<th>SYSTEM CONTROL &amp; MONITORING</th>
<th>FP HEADER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1x Header Reset button, HDD LED &amp; External Speaker</td>
</tr>
<tr>
<td></td>
<td>1x Header for Power button, Power LED &amp; SM bus</td>
</tr>
<tr>
<td></td>
<td>1x Header for mPCIe activity LED</td>
</tr>
<tr>
<td></td>
<td>1x Header for M.2 activity LED</td>
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</table>

<table>
<thead>
<tr>
<th>COOLING</th>
<th>FAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1x Wafer for System Smart Fan</td>
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<table>
<thead>
<tr>
<th>SOFTWARE</th>
<th>OS SUPPORT</th>
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<tbody>
<tr>
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<td>Windows 10, Linux</td>
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<thead>
<tr>
<th>MECHANICAL</th>
<th>DIMENSION (L x W)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>ECX (146 mm x 105 mm / 5.75” x 4.13”)</td>
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<table>
<thead>
<tr>
<th>ENVIRONMENTAL</th>
<th>OPERATION TEMPERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 °C – 60 °C / 32 °F – 140 °F (Standard)</td>
</tr>
<tr>
<td></td>
<td>-20 °C – 70 °C / -4 °F – 158 °F (Extended)</td>
</tr>
<tr>
<td></td>
<td>-40 °C – 85 °C / -40 °F – 185 °F (Extreme)</td>
</tr>
<tr>
<td></td>
<td>-20 °C – 80 °C / -4 °F – 176 °F (Standard)</td>
</tr>
<tr>
<td></td>
<td>-40 °C – 85 °C / -40 °F – 185 °F (Extended)</td>
</tr>
<tr>
<td></td>
<td>-55 °C – 85 °C / -67 °F – 185 °F (Extreme)</td>
</tr>
<tr>
<td></td>
<td>0 % – 95 %</td>
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</table>

<table>
<thead>
<tr>
<th>CERTIFICATION</th>
<th>EMC &amp; SAFETY</th>
</tr>
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<tr>
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<td>CE, FCC Class A</td>
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www.kontron.com
## ORDERING INFORMATION

<table>
<thead>
<tr>
<th>ARTICLE</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>ECX-APL-E3950</td>
<td>Intel® Atom™ x7-E3950, w/ audio, w/o TPM, Operating temperature: 0 °C - 60 °C</td>
</tr>
<tr>
<td>ECX-APL-E3950</td>
<td>Intel® Atom™ x7-E3950, w/ audio, w/ TPM, Operating temperature: 0 °C - 60 °C</td>
</tr>
<tr>
<td>ECX-APL-E3940</td>
<td>Intel® Atom™ x5-E3940, w/ audio, w/o TPM, Operating temperature: 0 °C - 60 °C</td>
</tr>
<tr>
<td>ECX-APL-E3930</td>
<td>Intel® Atom™ x5-E3930, w/ audio, w/o TPM, Operating temperature: 0 °C - 60 °C</td>
</tr>
<tr>
<td>ECX-APL-E3930</td>
<td>Intel® Atom™ x5-E3930, w/ audio, w/ TPM, Operating temperature: 0 °C - 60 °C</td>
</tr>
<tr>
<td>ECX-APL-N4200</td>
<td>Intel® Pentium® N4200, w/ audio, w/o TPM, Operating temperature: 0 °C - 60 °C</td>
</tr>
<tr>
<td>ECX-APL-N3350</td>
<td>Intel® Celeron® N3350, w/ audio, w/o TPM, Operating temperature: 0 °C - 60 °C</td>
</tr>
<tr>
<td>ECX-APL-E3950-XT</td>
<td>Intel® Atom™ x7-E3950, w/o audio, w/o TPM, Operating temperature: -40 °C - 85 °C</td>
</tr>
<tr>
<td>ECX-APL-E3940-XT</td>
<td>Intel® Atom™ x5-E3940, w/o audio, w/o TPM, Operating temperature: -40 °C - 85 °C</td>
</tr>
<tr>
<td>ECX-APL-E3930-XT</td>
<td>Intel® Atom™ x5-E3930, w/o audio, w/o TPM, Operating temperature: -40 °C - 85 °C</td>
</tr>
</tbody>
</table>

### OPTIONAL ACCESSORIES - CABLES

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM PORT CABLE</td>
<td>10-pin pitch = 1.25 mm to DB-9 connector, L = 350 mm</td>
</tr>
<tr>
<td>DIG CABLE</td>
<td>MXS1021-10P 1x10P 1.25 pitch to D-SUB-9P (Female), L = 200 mm</td>
</tr>
<tr>
<td>USB CABLE (2 PORT)</td>
<td>OP-2.54 2x5P pitch: 2.54 mm to 2x USB Female, L = 340 mm</td>
</tr>
<tr>
<td>SATA POWER CABLE</td>
<td>SATA 1x15P pitch:1.27 mm to PH 2.0 HSG 1x4P 2.0 pitch, L = 460 mm</td>
</tr>
<tr>
<td>SATA CABLE</td>
<td>SATA 1x7P pitch: 1.27 mm with lock, L = 460 mm</td>
</tr>
<tr>
<td>AUDIO CABLE</td>
<td>WL6008H 2x6P 2.54 pitch to EAR phone jack x3 pitch: 3.5 mm, L = 350 mm</td>
</tr>
<tr>
<td>DC IN CABLE</td>
<td>2.5 DC Jack w/ 2 mm nut, 0.5 mm washer to H-300F-XX 1x4P 3.0 pitch, L = 300 mm</td>
</tr>
<tr>
<td>MINI SIM CARD HOLDER KIT</td>
<td>1x Mini SIM card holder, 1x Cable (UC5020000001300L)</td>
</tr>
<tr>
<td>HEATSINK (FOR N-SERIES 6 W)</td>
<td>148 x 105 x 15.8 mm metal AL6063 T5 RoHS, K5 pad, 40 x 25 x 0.5 mm, w/ 4x M3XS screw</td>
</tr>
<tr>
<td>HEATSINK (FOR E-SERIES 12 W)</td>
<td>148 x 105 x 15.8 mm metal AL6063 T5 RoHS, T725 pad, 31 x 24 x 0.13 mm, w/ 4x M3XS screw</td>
</tr>
</tbody>
</table>