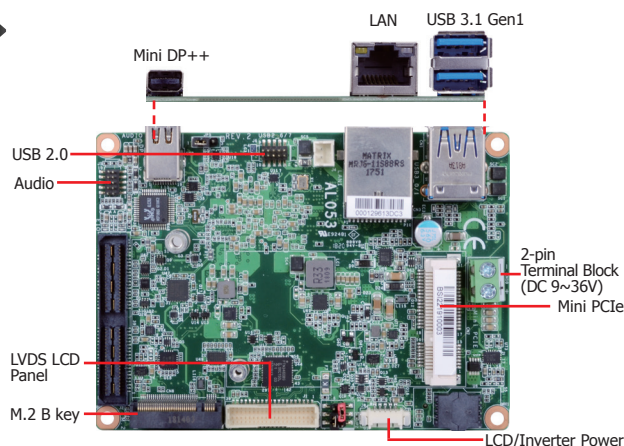
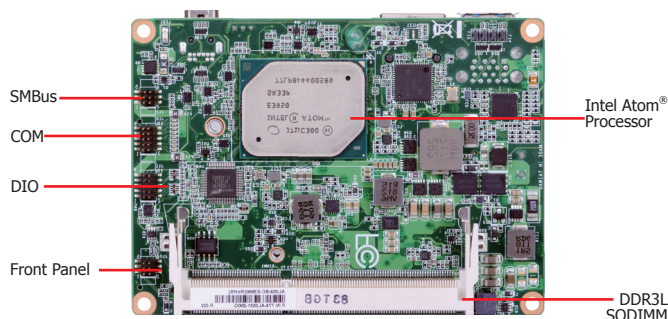


## AL053

Atom



Top View



Bottom View

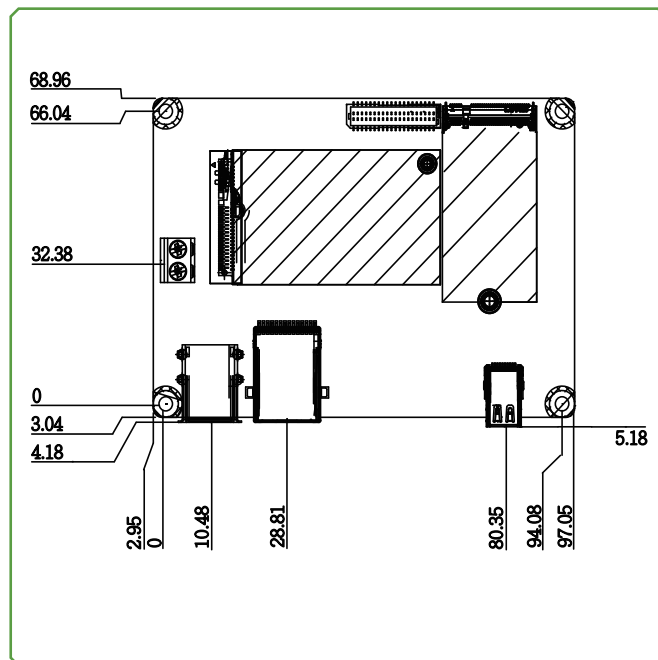
### Features

- Small form factor 2.5" Pico-ITX for space-limited applications
- 1 DDR3L SODIMM up to 8GB
- Two independent displays: LVDS + Mini DP++
- Expansion and Storage: 1 Mini PCIe, 1 M.2, 1 SMBus
- Rich I/O: 1 Intel GbE, 1 COM, 2 USB 3.1 Gen1, 2 USB 2.0

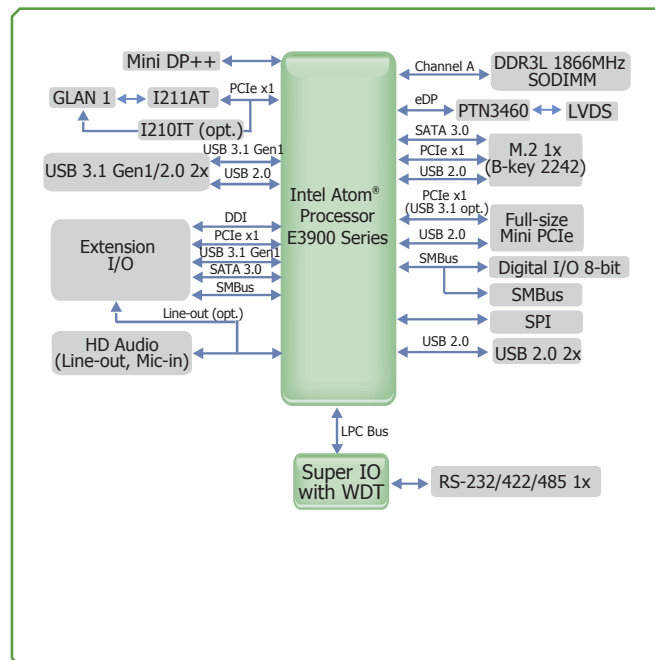
\* Populated by default



### Mechanical Drawing



### Block Diagram



## Specifications

|                               |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SYSTEM</b>                 | <b>Processor</b>             | Intel Atom® Processor E3900 Series, BGA 1296<br>Intel Atom® x7-E3950 Processor, Quad Core, 2M Cache, 1.6GHz (2.0GHz), 12W<br>Intel Atom® x5-E3940 Processor, Quad Core, 2M Cache, 1.6GHz (1.8GHz), 9.5W<br>Intel Atom® x5-E3930 Processor, Dual Core, 2M Cache, 1.3GHz (1.8GHz), 6.5W<br>Intel® Pentium® Processor N4200, Quad Core, 2M Cache, 1.1GHz (2.5GHz), 6W<br>Intel® Celeron® Processor N3350, Dual Core, 2M Cache, 1.1GHz (2.4GHz), 6W |
|                               | <b>Memory</b>                | One 204-pin SODIMM up to 8GB<br>Single Channel DDR3L 1866MHz                                                                                                                                                                                                                                                                                                                                                                                    |
|                               | <b>BIOS</b>                  | Insyde SPI 128Mbit (supports UEFI boot only)                                                                                                                                                                                                                                                                                                                                                                                                    |
|                               | <b>Controller</b>            | Intel® HD Graphics                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>GRAPHICS</b>               | <b>Feature</b>               | OpenGL 4.2, Direct X 11.1, OpenCL 1.2, OGL ES 3.0<br>HW Decode: H.264, MPEG2, VC1, VP8, H.265, MPEG4<br>HW Encode: H.264, MPEG2, MPEG4                                                                                                                                                                                                                                                                                                          |
|                               | <b>Display</b>               | 1 x Mini DP++<br>1 x LVDS<br>Mini DP++: resolution up to 4096x2160 @ 60Hz<br>LVDS: dual channel 18/24-bit, resolution up to 1920x1200 @ 60Hz                                                                                                                                                                                                                                                                                                    |
|                               | <b>Dual Displays</b>         | LVDS + Mini DP++                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                               | <b>Interface</b>             | 1 x Full-size Mini PCIe (PCIe/USB 2.0, optional USB 3.1 Gen1/USB 2.0)                                                                                                                                                                                                                                                                                                                                                                           |
| <b>EXPANSION</b>              | <b>Storage</b>               | 1 x M.2 B key 2242 (PCIe/USB 2.0/SATA 3.0)                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Storage</b>                | <b>Audio Codec</b>           | Realtek ALC262-VC2-GR                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>AUDIO</b>                  | <b>Controller</b>            | 1 x Intel® I211AT PCIe (10/100/1000Mbps)<br>1 x Intel® I210IT PCIe (10/100/1000Mbps) (available upon request)                                                                                                                                                                                                                                                                                                                                   |
| <b>ETHERNET</b>               | <b>Ethernet</b>              | 1 x GbE (RJ-45)                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>REAR I/O</b>               | <b>USB</b>                   | 2 x USB 3.1 Gen1                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                               | <b>Display</b>               | 1 x Mini DP++                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                               | <b>Serial</b>                | 1 x RS-232/422/485 (1.27mm pitch)                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>INTERNAL I/O</b>           | <b>USB</b>                   | 2 x USB 2.0 (1.27mm pitch)                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                               | <b>Display</b>               | 1 x LVDS LCD Panel Connector<br>1 x LCD/Inverter Power                                                                                                                                                                                                                                                                                                                                                                                          |
|                               | <b>Audio</b>                 | 1 x Audio (Line-out/Mic-in)                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                               | <b>DIO</b>                   | 1 x 8-bit DIO                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                               | <b>SMBus</b>                 | 1 x SMBus                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                               | <b>Output &amp; Interval</b> | System Reset, Programmable via Software from 1 to 255 Seconds                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>WATCHDOG TIMER</b>         | <b>TPM</b>                   | fTPM 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>SECURITY</b>               | <b>Type</b>                  | 9~36V DC                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>POWER</b>                  | <b>Connector</b>             | 2-pin Terminal Block                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                               | <b>RTC Battery</b>           | CR2032 Coin Cell                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                               | <b>Consumption</b>           | Typical: E3950:12V @ 0.35A (4.20Watt)<br>Max.: E3950:12V @ 1.90A (22.8Watt)                                                                                                                                                                                                                                                                                                                                                                     |
|                               | <b>Microsoft/Linux</b>       | Windows 10 IoT Enterprise (64-bit)<br>Ubuntu 16.04                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>OS SUPPORT (UEFI Only)</b> | <b>Temperature</b>           | Operating: 0 to 60°C, -20 to 70°C, -40 to 85°C<br>Storage: -40 to 85°C                                                                                                                                                                                                                                                                                                                                                                          |
| <b>ENVIRONMENT</b>            | <b>Humidity</b>              | Operating: 5 to 90% RH<br>Storage: 5 to 90% RH                                                                                                                                                                                                                                                                                                                                                                                                  |
|                               | <b>MTBF</b>                  | 715,458 hrs @ 25°C; 482,964 hrs @ 45°C ; 335,469 hrs @ 60°C                                                                                                                                                                                                                                                                                                                                                                                     |
|                               | <b>Dimensions</b>            | 2.5" Pico-ITX Form Factor<br>100mm (3.94") x 72mm (2.83")                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>MECHANICAL</b>             | <b>Height</b>                | PCB: 1.6mm<br>Top Side: 15mm, Bottom Side: 8mm                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Certification</b>          |                              | CE, FCC, RoHS                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Ordering Information

| Model Name            | P/N             | Processor | Memory   | Display          | GbE | RS-232/422/485 | USB 3.1 Gen1 | USB 2.0 | Power    | Thermal | Temp.       |
|-----------------------|-----------------|-----------|----------|------------------|-----|----------------|--------------|---------|----------|---------|-------------|
| <b>AL053-BC-E3930</b> | 770-AL0531-000G | X5-E3930  | 1 SODIMM | LVDS + Mini DP++ | 1   | 1              | 2            | 2       | 9~36V DC | Fanless | 0 to 60°C   |
| <b>AL053-BC-E3940</b> | 770-AL0531-100G | X5-E3940  | 1 SODIMM | LVDS + Mini DP++ | 1   | 1              | 2            | 2       | 9~36V DC | Fanless | 0 to 60°C   |
| <b>AL053-BC-E3950</b> | 770-AL0531-200G | X7-E3950  | 1 SODIMM | LVDS + Mini DP++ | 1   | 1              | 2            | 2       | 9~36V DC | Fanless | 0 to 60°C   |
| <b>AL053-BC-N3350</b> | 770-AL0531-300G | N3350     | 1 SODIMM | LVDS + Mini DP++ | 1   | 1              | 2            | 2       | 9~36V DC | Fanless | 0 to 60°C   |
| <b>AL053-EC-E3930</b> | 770-AL0531-400G | X5-E3930  | 1 SODIMM | LVDS + Mini DP++ | 1   | 1              | 2            | 2       | 9~36V DC | Fanless | -20 to 70°C |
| <b>AL053-TC-E3930</b> | 770-AL0531-500G | X5-E3930  | 1 SODIMM | LVDS + Mini DP++ | 1   | 1              | 2            | 2       | 9~36V DC | Fanless | -40 to 85°C |
| <b>AL053-TC-E3950</b> | 770-AL0531-900G | X7-E3950  | 1 SODIMM | LVDS + Mini DP++ | 1   | 1              | 2            | 2       | 9~36V DC | Fanless | -40 to 85°C |

Note: N4200 is supported upon request with MOQ requirement.

## Packing List

|                                  |                                                                      |
|----------------------------------|----------------------------------------------------------------------|
| • 1 AL053 board                  | E Series CPU:<br>A71-808308-000G<br>N Series CPU:<br>A71-808309-000G |
| • 1 Heat spreader (Height: 11mm) |                                                                      |

## Optional Items

|                                                                   |                 |
|-------------------------------------------------------------------|-----------------|
| • USB port cable (Length: 200mm)                                  | A81-001061-016G |
| • 1 COM port cable (Length: 300mm)                                | A81-015038-016G |
| • Power adapter (60W, 12V, DC Jack)                               | 671-106012-000G |
| • 2 pole terminal to DC Jack cable                                | A81-004013-000G |
| • 1 Audio cable (Length: 160mm)                                   | A81-022013-016G |
| • Heat sink for E series CPU 0 to 60°C/wide temp (Height: 22.6mm) | A71-008111-010G |
| • Heat sink for N series CPU 0 to 60°C (Height: 19mm)             | A71-008108-010G |