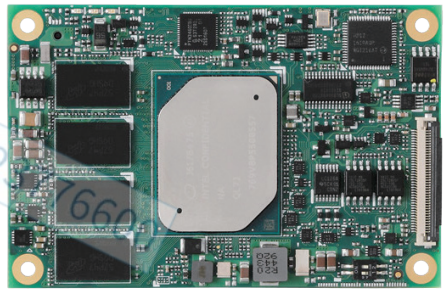
# nanoX-AL

*COM Express Mini Size Type 10 Module with Intel Atom® E3900 series SoC and Pentium®/Celeron® SoC*

## Features

- Intel Atom® E3900 series (formerly Apollo Lake) and Pentium®/Celeron® SoC, supporting full virtualization (VT-d/VT-x)
- Up to 8GB Dual Channel soldered non-ECC DDR3L at 1867/1600MHz
- Newest Intel® Gen9 Low Power graphics, up to 4k resolution and H.265 codec
- Multiple PCIe x1 Gen2 (configurable to x2, x4), GbE
- Two SATA 6 Gb/s, two USB 3.0 and six USB 2.0, eMMC 5.0 (build option)
- Supports Smart Embedded Management Agent (SEMA) functions
- Extreme Rugged operating temperature: -40°C to +85°C (build option for E3900 series SKUs)



## Specifications

### Core System

#### CPU

Intel Atom® E3900 series (formerly Apollo Lake) and Pentium®/Celeron® SoC
Intel Atom® E3950 1.6/2.0GHz (Turbo), 12W (4C/1866)
Intel Atom® E3940 1.6/1.8GHz (Turbo), 9W (4C/1866)
Intel Atom® E3930 1.3/1.8GHz (Turbo), 6W (2C/1866)
Intel® Pentium® N4200 1.1/2.5GHz (Turbo), 6W (4C/1866) (by project basis)
Intel® Celeron® N3350 1.1/2.3GHz (Turbo), 6W (2C/1866) (by project basis)
Supports: Intel® TXT, Intel® SSE4.2, Intel® 64 Architecture, IA 32-bit, Intel® AES-NI, dual or quad Out-of-Order Execution (OOE) processor cores, PCLMULQDQ Instruction DRNG
Note: Availability of features may vary between processor SKUs.

#### Memory

Up to 8 GB Dual channel DDR3L at 1867/1600 MHz non-ECC
2GB is single channel
4/8GB is dual channel

#### Embedded BIOS

AMI EFI with CMOS backup in 16MB SPI BIOS (dual BIOS by build option)

#### Cache

2MB for all SKUs

#### Expansion Busses

Multiple PCI Express x1 Gen2: Lanes 0/1/2/3 (configurable to 3x1, 1x4, 1x2+2x1)
LPC bus, SMBus (system) , I²C (user)

#### SEMA® Board Controller

Supports : Voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, flat panel control, general purpose I2C, failsafe BIOS (dual BIOS), watchdog timer and fan control

#### Debug Headers

40-pin multipurpose flat cable connector for use with DB-40 debug module providing BIOS POST code LED, BMC access, SPI BIOS flashing, power testpoints, debug LEDs
MIPI60 header for ICE debug of CPU/chipset on break out board (build option)

### Video

#### GPU Feature Support

Intel® Generation 9 LP Graphics Core Architecture, supporting 2 independent and simultaneous display combinations of DisplayPort, HDMI, LVDS or eDP outputs
Hardware encode/transcode (including HEVC)
DirectX 12, DirectX 11.3, DirectX 10, DirectX 9.3 support
OpenGL 4.3 and ES 3.0 support
OpenCL 2.0 support

#### Digital Display Interface

DDI0 supportts DisplayPort/HDMI/DVI

#### LVDS

Single channel 18/24-bit LVDS from eDP-to-LVDS IC

#### eDP

4 lane support (build option, in place of LVDS)

### Audio

#### Chipset

Intel® HD Audio integrated in SoC

#### Audio Codec

On carrier miniBASE-10R

### Ethernet

Intel® Ethernet Controller I210 (Extreme Rugged operating temperature range)
Intel® Ethernet Controller I211 (standard operating temperature range)
Supports IEEE 1588 and GbE0_SDP (I210 only)

Note: "build option" indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product. Be aware that these "build option" part numbers will need to be newly created and this will result in production lead times.

# Specifications

## I/O Interfaces

USB: 2x USB 1.1/2.0/3.0 (USB 0,1) and 6x USB 1.1/2.0 (USB 2,3,4,5,6,7)
USB OTG support on USB 2.0 port 7 with Yocto Linux
SATA: Two ports SATA 6Gb/s (SATA0,1)
Serial: 2 UART ports
eMMC: eMMC 5.0 (8/16/32GB, build option)
GPIO/SD: 4 GPO and 4 GPI
SD signal is a build option supported by project basis
Note: eMMC/SD boot device support depends on OS

## Super I/O

Supported on carrier if needed (standard support for W83627DHG-P)

## TPM (build option)

Chipset: Infineon
Type: TPM 2.0

## Power

Standard Input: ATX: 12V±5%, 5Vsb ±5%; AT: 12V±5%
Wide Input: ATX: 4.75-20 V, 5Vsb ±5%; AT: 4.75-20V (Standard Temp. only)
Management: ACPI 5.0 compliant, Smart Battery support
Power States: C1-C6, S0, S3, S4, S5 and S5 ECO mode (Wake on USB S3/S4, WOL S3/S4/S5)
ECO mode: Supports deep S5 mode for power saving

## Mechanical and Environmental

Form Factor: PICMG COM.0 Rev 2.1, Type 10
Dimension: Compact size: 84 mm x 55 mm

### Operating Temperature

Standard: 0°C to 60°C
Extreme Rugged: -45°C to +85°C (build option with E39XX SoC SKUs)

### Humidity

5-90% RH operating, non-condensing
5-95% RH storage (and operating with conformal coating)

### Shock and Vibration

IEC 60068-2-64 and IEC-60068-2-27
MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D

### HALT

Thermal Stress, Vibration Stress, Thermal Shock and Combined Test

## Operating Systems

### Standard Support

Windows 10 64-bit, Yocto project based Linux 64-bit, VxWorks 64-bit

### Extended Support (BSP)

VxWorks 64-bit

Note: "build option" indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product.
Be aware that these "build option" part numbers will need to be newly created and this will result in production lead times.

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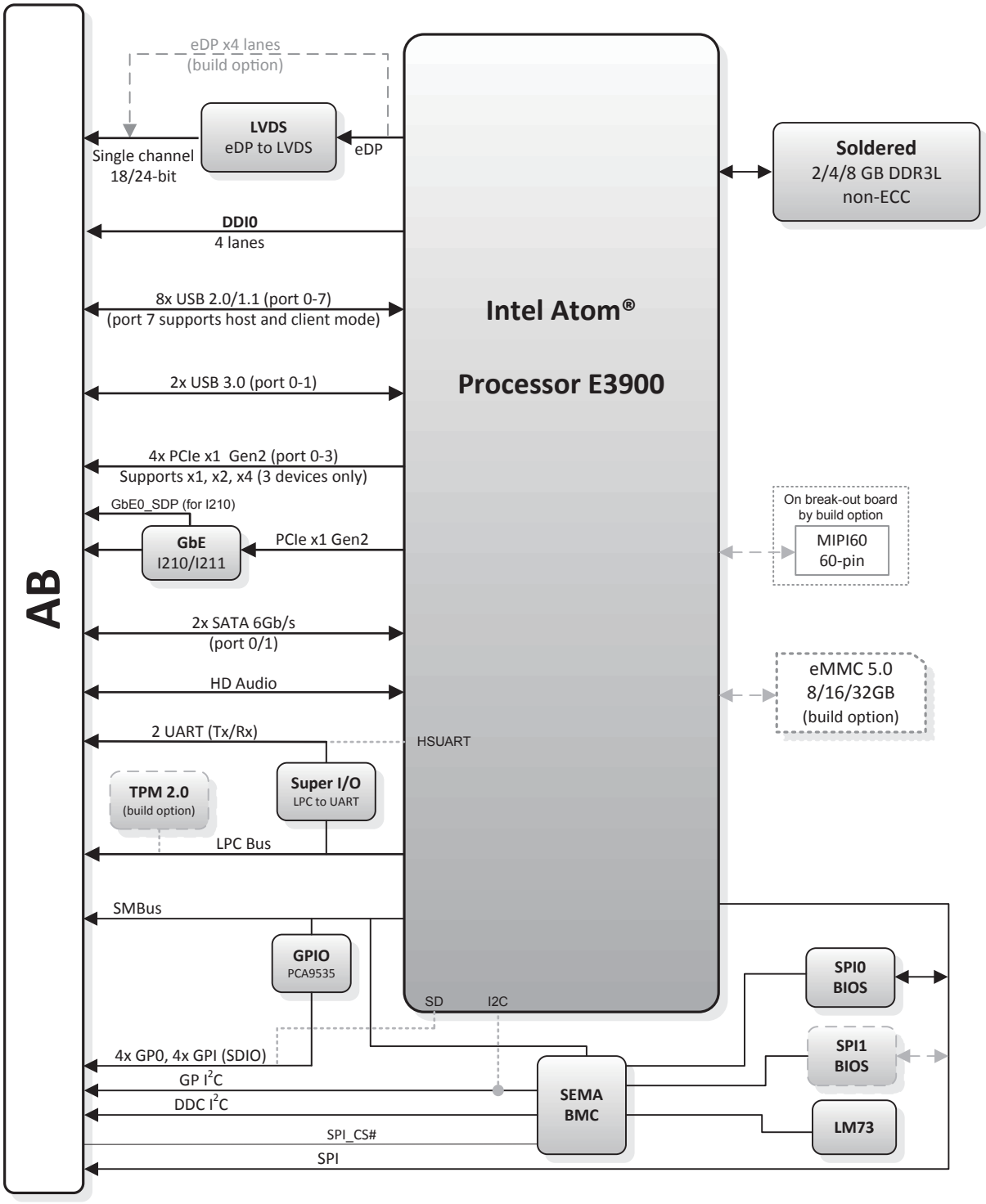
# Functional Diagram



## Ordering Information

- **nanoX-AL-E3950-2G**
  Mini COM Express Type10 with Intel Atom® E3950 (4C), 2G memory
- **nanoX-AL-E3940-2G**
  Mini COM Express Type10 with Intel Atom® E3940 (4C), 2G memory
- **nanoX-AL-E3930-2G**
  Mini COM Express Type10 with Intel Atom® E3930 (2C), 2G memory
- **nanoX-AL-N4200-2G**
  Mini COM Express Type10 with Intel Pentium® N4200 (4C)
- **nanoX-AL-N3350-2G**
  Mini COM Express Type10 with Intel Celeron® N3350 (2C)

Notes:

1. Notes: the combination not listed above might be supported by project basis
2. N4200/N3350 is supported by project basis

## Starter Kit

- **COM Express Type 10 Starter Kit Plus**
  Starter Kit Plus Starter kit for COM Express Type 10

## Accessories

### Heat Spreaders

- **HTS-nXAL-B-I**
  Heatspreader for nanoX-AL Intel Atom® with threaded standoffs for bottom mounting
- **HTS-nXAL-BT-I**
  Heatspreader for nanoX-AL Intel Atom® with through hole standoffs for top mounting
- **HTS-nXAL-B**
  Heatspreader for nanoX-AL Intel® Pentium®/Celeron® with threaded standoffs for bottom mounting
- **HTS-nXAL-BT**
  Heatspreader for nanoX-AL Intel® Pentium®/Celeron® with through hole standoffs for top mounting

### Passive Heatsinks

- **THS-nXAL-B-I**
  Low profile heatsink for nanoX-AL Intel Atom® with threaded standoffs for bottom mounting
- **THS-nXAL-BT-I**
  Low profile heatsink for nanoX-AL Intel Atom® with through hole standoffs for top mounting
- **THS-nXAL-B**
  Low profile heatsink for nanoX-AL Intel® Pentium®/Celeron® with threaded standoffs for bottom mounting
- **THS-nXAL-BT**
  Low profile heatsink for nanoX-AL Intel® Pentium®/Celeron® with through hole standoffs for top mounting
- **THSH-nXAL-B-I**
  High profile heatsink for nanoX-AL Intel Atom® with threaded standoffs for bottom mounting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