

# nanoX-EL

## COM Express Mini Size Type 10 Module with 6th Generation Intel Atom® x6000E Processor SoC

### Features

- Quad-core Intel Atom® Processor SoC, Burst Frequency up to 3.0GHz
- Intel® Gen11 LP GFX for AI inference based on OpenVINO
- In-band ECC, up to 16GB LPDDR4 at up to 4267 MT/s
- TCC and 2.5GbE with TSN
- Real-time I/O via ARM Cortex-M7 processor
- USB 3.2 10Gbps



### Specifications

#### • Core System

##### CPU

6th Gen Intel Atom® Processor (formerly "Elkhart Lake")

- Intel Atom® x6425E 2.0GHz (3.0GHz Burst) 12W (4C/32EU, IB ECC/non-ECC)
- Intel Atom® x6413E 1.5GHz (3.0GHz Burst) 9W (4C/16EU, IB ECC/non-ECC)
- Intel Atom® x6211E 1.3GHz (3.0GHz Burst) 6W (2C/16EU, IB ECC/non-ECC)
- Intel Atom® x6200FE 1.0GHz 4.5W (2C/No GPU, IB ECC/non-ECC)
- Intel Atom® x6425RE 1.9GHz 12W (4C/32EU, IB ECC/non-ECC)
- Intel Atom® x6414RE 1.5GHz 9W (4C/16EU, IB ECC/non-ECC)
- Intel Atom® x6212RE 1.2GHz 6W (2C/16EU, IB ECC/non-ECC)

Supports: Intel® VT, Intel® VT-d, Intel® TXT, Intel® SSE4.2, Intel® 64 Architecture, Execute Disable Bit, Intel® AES-NI, PCLMULQDQ Instruction, Intel® Secure Key

Notes: Availability of features may vary between processor SKUs.

Some of the SKUs listed above are supported by project basis only. Please contact your ADLINK representative for availability.

##### Memory

LPDDR4 soldered memory up to 4267 MT/s, IB ECC/non-ECC up to 16GB

Memory configuration: 2/4/8/16GB (8/16GB by project basis)

In-Band ECC (IB ECC), provides ECC protection without additional ECC device (dependent on SoC SKU)

##### Embedded BIOS

AMI UEFI with CMOS backup in 32 or 16MB SPI BIOS (dual BIOS by build option)

##### Cache

TBC

##### Expansion Busses

- 4 PCIe x1 Gen3: Lanes 0/1/2/3 (configurable to x1, x2, x4)
- LPC bus, SMBus (system), I<sup>2</sup>C (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 I<sup>2</sup>C, watchdog timer, fan control and failsafe BIOS (dual BIOS by build option)

##### Debug Headers

30-pin multipurpose flat cable connector for use with DB-30 x86 debug module providing BIOS POST code LED, EC access, SPI BIOS flashing, power testpoints, debug LEDs

#### • Video

##### GPU Feature Support

Intel® Gen11 LP Graphics Core Architecture, supporting multiple independent and simultaneous display combinations of DisplayPort/HDMI/LVDS or eDP outputs (max. 4K @60Hz)

- Hardware encode/transcode of HD content (including HEVC)
- DirectX 12 and Vulkan v1.1 support
- OpenGL 4.5 and ES 3.2 support
- OpenCL 1.2 support

##### Digital Display Interface

DDIO supporting DisplayPort/HDMI/DVI

##### LVDS

Single channel 18/24-bit LVDS via eDP-to-LVDS IC (max. resolution 1920x1200 @60Hz in dual mode)

##### eDP

Optional 4 lane support, in place of LVDS (max. resolution 4096x2160 @60Hz)

#### • Audio

##### Chipset

Intel® HD Audio integrated in SoC

##### Audio Codec

Located on carrier miniBASE-10R

#### • Ethernet

##### Intel® MAC and external PHY

MaxLinear GPY series PHY (GPY 211/215)

TSN support on Linux

##### Interface

2.5Gbit/s and 1000/100/10 Mbit/s Ethernet connection

GbE0\_SDP available if TSN support enabled

## Specifications

### • I/O Interfaces

USB: 2x USB 3.2/2.0/1.1 (USB 0,1,) and 6x USB 2.0/1.1 (USB 2,3,4,5,6,7)

SATA: 2x SATA 6Gb/s (SATA 0,1)

Serial: 2x UART ports with console redirection

eMMC: eMMC 5.0 (16/32/64GB by build option), functions as boot-up device (TBC)

GPIO/SD: 4x GPO and 4x GPI from EC (GPI with interrupt TBC)

SD/GPIO muxed design, SD is build option by project basis, SD functions as storage device only

Notes: USB 3.2 Gen2 support dependent on carrier design.

2x UART and 8x GPIO can be managed by ARM M7 processor or x86 processor. UART, GPIO managed by ARM M7 is for real-time usage.

CAN FD (build option by project basis, shared with UART 1) is managed by ARM M7 processor for real-time usage (TBC).

### • Super I/O

Supported on carrier if needed (standard support for W83627DHG-P, other Super I/O supported by project basis)

### • TPM (build option)

Chipset: Infineon

Type: TPM 2.0 (SPI based, build option by project basis)

### • Power

#### Standard Input

ATX: 12V±5% / 5Vsb ±5%; or AT: 12V±5%

#### Wide Input

ATX: 4.75-20 V / 5Vsb ±5%; or AT: 4.75-20V

#### Management

ACPI 5.0 compliant, Smart Battery support

#### Power States

S0, S3, S4, S5, 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 3.0 Type 10

Dimension: Mini size: 84 mm x 55 mm

#### Operating Temperature

Standard: 0°C to 60°C (storage: -20°C to 80°C)

Extreme Rugged: -40°C to 85°C

(optional, selected SKUs; storage: -40°C to 85°C)

#### 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 IOT Enterprise 64-bit, Windows 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit (TBC), Ubuntu (TBC)

#### Extended Support (BSP)

Yocto project based Linux 64-bit

## Functional Diagram

