# cExpress-EL

*COM Express Compact Size Type 6 Module with 6th Generation Intel Atom® Processor SoC*

## Features



- Quad-core Intel Atom® Processor SoC, boost up to 3.0GHz
- Gen11 LP GFX, max. 3x 4K60 (DDI/eDP), opt. legacy VGA
- In-band ECC, up to 32GB DDR4 at 3200 MT/s
- Intel® TCC, up to 2.5GbE with TSN
- Real-time I/O via ARM Cortex-M7 processor
- Six PCIe Gen3 lanes
- USB 3.2 10Gbps

## Specifications

### Core System

#### CPU

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

Intel Atom® x6425E, 2.0(3.0) GHz, 12W, 4C/32EU
Intel Atom® x6413E, 1.5(3.0) GHz, 9W, 4C/16EU
Intel Atom® x6211E, 1.3(3.0) GHz, 6W, 2C/16EU
Intel Atom® x6425RE, 1.9 GHz, 12W, 4C/32EU
Intel Atom® x6414RE, 1.5 GHz, 9W, 4C/16EU
Intel Atom® x6212RE, 1.2 GHz, 6W, 2C/16EU
Intel Atom® x6200FE, 1.0 GHz, 4.5W, 2C,no GPU
Intel® Pentium® J6426, 2.0(3.0) GHz, 10W, 4C/32EU
Intel® Celeron® J6413, 1.8(3.0) GHz, 10W, 4C/16EU
Intel® Pentium® N6415, 1.2(3.0) GHz, 6.5W, 4C/16EU
Intel® Celeron® N6211, 1.2(3.0) GHz, 6.5W, 2C/16EU
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.
Intel Atom® x6200FE, x6425RE, x6414RE, x6412RE support Intel® TCC

#### Memory

Dual channel DDR4 memory up to 3200 MT/s IBECC/non-ECC, max. 32GB in two SODIMM sockets (2x 16GB)

Intel In-Band ECC (IBECC), provides ECC protection with normal type SO-DIMM memory (on Intel Atom® SKUs only, BIOS configurable)

#### Embedded BIOS

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

#### Cache

1.5MB

#### Expansion Busses

6 PCIe x1 Gen3 (AB): Lanes 0/1/2/3

(configurable to 4 x1, 2 x2, 1 x4, 2 x1+1 x2, 1 x2+2 x1),
Lanes 4/5 (only 2 x1 on Lane 4/5)

LPC bus (via ESPI-to-LPC bridge IC), SMBus (system) , I2C (user)

Note: I²C can be managed by ARM M7 processor or x86 processor by BIOS setting. I²C managed by ARM M7 core is for real-time usage. (TBC)
Requires HW build option, by project basis.

#### 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, watchdog timer, fan control and failsafe BIOS (dual BIOS by build option)

#### Debug Header

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 3 independent and simultaneous display combinations of DisplayPort/HDMI/LVDS, eDP or VGA outputs (3x 4K60)

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

#### Digital Display Interface

DDI1/2 supporting DisplayPort/HDMI/DVI

#### VGA

Support by build option via DP-to-VGA IC (in place of DDI2) max. resolution is 1920x1200@60Hz

#### LVDS

Single/dual 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 is 4096x2160@60Hz)

### Audio

#### Chipset

Intel® HD Audio integrated in SoC

#### Audio Codec

On Express-BASE6 carrier (ALC886 standard support)

### Ethernet

MAC: onboard Intel SoC
PHY: MaxLinear GPY series
(TSN support on Yocto Linux with selected GPY and CPU SKUs)

#### Interface

1000/100/10 Mbit/s or 2.5Gbit/s Ethernet connection
GbE0_SDP available if TSN support enabled

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# Specifications

## I/O Interfaces

USB: 2x USB 3.2/2.0/1.1 (USB 0,1: max. 10Gbps) and 6x USB 2.0/1.1 (USB 2-7)

USB Hub supported by project basis provides 4x USB 3.2/2.0/1.1 (USB 0-3) and 4x USB 2.0/1.1 (USB 4-7)

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 on Windows 10 Enterprise and Yocto Linux

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

SD/GPIO muxed design, switched by BIOS setting, SD functions as storage device only on Windows (support on Yocto Linux is TBC)

Note: 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 (TBC).
Requires HW build option, by project basis.

## Super I/O

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

## TPM (build option)

Chipset: Infineon

Type: TPM 2.0 (SPI based)

## Power

Standard Input: ATX: 12V±5% / 5Vsb ±5%; or AT: 12V±5%

Wide Input: ATX: 8.5-20 V / 5Vsb ±5%; or AT: 8.5-20V

Management: ACPI 5.0 compliant, Smart Battery support

Power States: C1-C6, S0, S1, S3, S4, S5 , S5 ECO mode (Wake on USB S3/S4, WOL S3/S4/S5)

ECO mode: support deep S5 mode for power saving

## Mechanical and Environmental

Form Factor: PICMG COM.0 Rev 3.0 Type 6

Dimension: Compact size: 95 mm x 95 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: -45°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

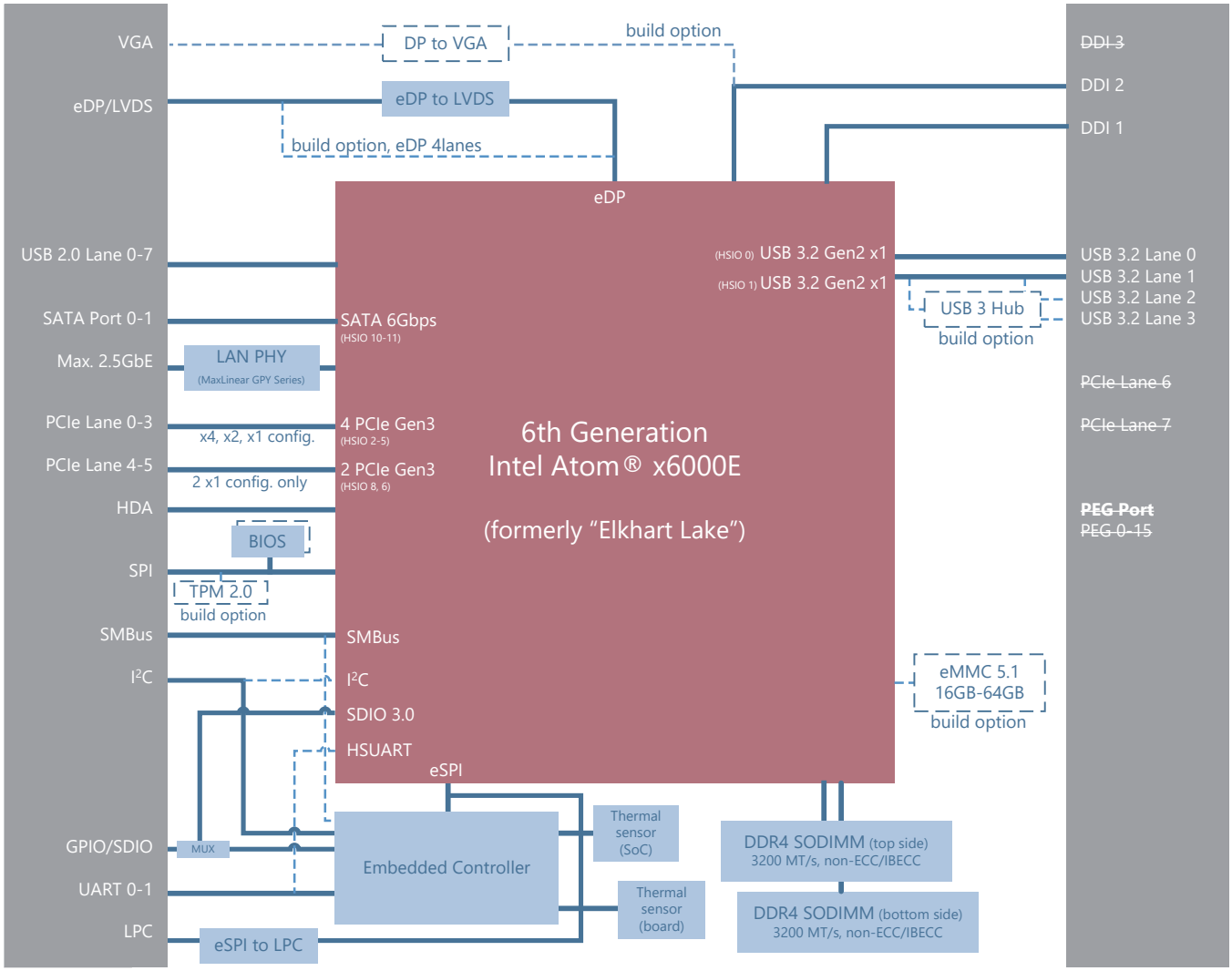
### Standard Support

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

Ubuntun (TBC)

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## Functional Diagram



# cExpress-EL

## Ordering Information

- **cExpress-EL-x6425E**
  Compact COM Express Type 6 with Intel Atom® x6425E (4C)
- **cExpress-EL-x6413E**
  Compact COM Express Type 6 with Intel Atom® x6413E (4C)
- **cExpress-EL-x6211E**
  Compact COM Express Type 6 with Intel Atom® x6211E (2C)
- **cExpress-EL-x6200FE**
  Compact COM Express Type 6 with Intel Atom® x6200FE (2C, no GPU)
- **t1cExpress-EL-x6425RE**
  Compact COM Express Type 6 with Intel Atom® x6425RE (4C), -40°C to +85°C

*For processor SKUs not listed, please contact your ADLINK representative for availability.

## Accessories

### Heat Spreaders

- **HTS-cEL-B-I**
  Heatspreader for cExpress-EL with threaded standoffs for bottom mounting
- **HTS-cEL-BT-I**
  Heatspreader for cExpress-EL with through hole standoffs for top mounting

### Passive Heatsinks

- **THS-cEL-B-I**
  Low profile heatsink for cExpress-EL with threaded standoffs for bottom mounting
- **THS-cEL-BT-I**
  Low profile heatsink for cExpress-EL with through hole standoffs for top mounting
- **THSH-cEL-B-I**
  High profile heatsink for cExpress-EL with threaded standoffs for bottom mounting

### Active Heatsink

- **THSF-cEL-B**
  High profile heatsink with Fan for cExpress-EL with threaded standoffs for bottom mounting

Note: Above solutions are for Intel Atom® SKUs. Thermal solutions for Pentium®/ Celeron® are supported by project basis.

## Starter Kit

- **COM Express Type 6 Starter Kit Plus**
  Starter kit for COM Express Type 6

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