

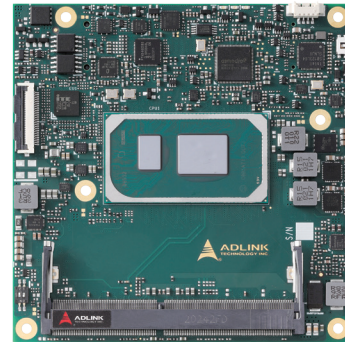
cExpress-TL

COM Express Compact Size Type 6 Module with Next Gen Intel® Core™ and Celeron® Processors

Features

- Next Gen Intel® Core™ and Celeron® Processor SoC, Gen12 GFX integration
- Up to 64GB dual channel DDR4, max. 3200MT/s, IBCEC and non-ECC
- Three DDI channels, one LVDS (opt. 4 lanes eDP), one opt. VGA, up to 4 independent displays (4x 4K60 or 2x 8K60)
- Eight PCIe lanes (by PCIe switch) max. 2.5GbE with TSN
- Two SATA 6 Gb/s, four USB 3.2 and four USB 2.0
- Supports Smart Embedded Management Agent (SEMA) functions
- Extreme Rugged operating temperature: -40°C to +85°C (optional)

Preliminary



Specifications

• Core System

CPU

Next Gen Intel® Core™ and Celeron® Processors - Mobile 10nm++ process (formerly "Tiger Lake UP3")

Core™ i7, 12MB, 28W (cTDP 15W, 4C/GT2)

Core™ i5, 8MB, 28W (cTDP 15W, 4C/GT2)

Core™ i3, 6MB, 28W (cTDP 15W, 2C/GT2)

Celeron®, 4MB, 15W (2C/GT1)

Supports: Intel® VT, Intel® VT-d, Intel® TXT, Intel® SSE4.2, Intel® HT Technology, Intel® 64 Architecture, Execute Disable Bit, Intel® Turbo Boost Technology 2.0, Intel® AVX-512, Intel® AVX2, Intel® AES-NI, PCLMULQDQ Instruction, Intel® Secure Key and Intel® TSX-NI.

Notes: Availability of features may vary between processor SKUs.

Three additional SKUs are not listed (supporting IBCEC).

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

Memory

Dual channel DDR4 memory up to 3200 MT/s IBCEC/non-ECC, max. 64GB (2x 32GB) in two SODIMM sockets

One SO-DIMM on top side, one SO-DIMM on bottom side

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

Embedded BIOS

AMI UEFI with CMOS backup in 32 or 16MB (TBC) SPI BIOS with Intel® AMT 12.x support (dual BIOS by build option)

Cache

12MB for Core™ i7, 8MB for Core™ i5, 6MB for Core™ i3, 4MB for Celeron®

Expansion Busses

5 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) and Lane 4 (x1 only)

Note: PCIe switch build option available by project basis to offer more x1 lanes (Lanes 5, 6, 7)

1 PCIe x4 Gen4 (CD): Lanes 16-19 (only x4)

LPC bus (through an ESPI-to-LPC bridge IC), 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, 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® Gen12 Graphics Core Architecture, supporting 4 independent and simultaneous display combinations of DisplayPort/HDMI/LVDS, eDP or VGA outputs (4x 4K60, 8K60 at DDI 1, 2, eDP 8K occupies two display pipelines)

Hardware encode/transcode of HD content (including HEVC)

DirectX 12 support

OpenGL 4.5, 4.4/4.3 and ES 2.0 support

OpenCL 2.1, 2.0/1.2 support

Digital Display Interface

DDI1/2/3 supporting DisplayPort/HDMI/DVI

DP from DDI 1, 2 supports up to 8K60, requires re-timer on carrier and is memory bandwidth dependent

VGA

Support by build option via DP-to-VGA IC (in place of DDI3), max. resolution 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 8K@60Hz, may require re-timer on carrier and is memory bandwidth dependent

• Audio

Chipset

Intel® HD Audio integrated in SoC

Audio Codec

On Express-BASE6 carrier (ALC886 standard support)

• Ethernet

Intel® MAC/PHY

LAN Controller, Intel® i225 series (V/LM/IT versions)

TSN supported by LM/IT versions only on Linux, by project basis

Interface

10/100/1000/2500 Mbit/s Ethernet connection

GbE0_SDP available if TSN support enabled

Specifications

• I/O Interfaces

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

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

Serial: 2x UART ports with console redirection

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

Note: USB 3.2 Gen2 support dependent on carrier design

• Super I/O

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

• TPM

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: -45°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

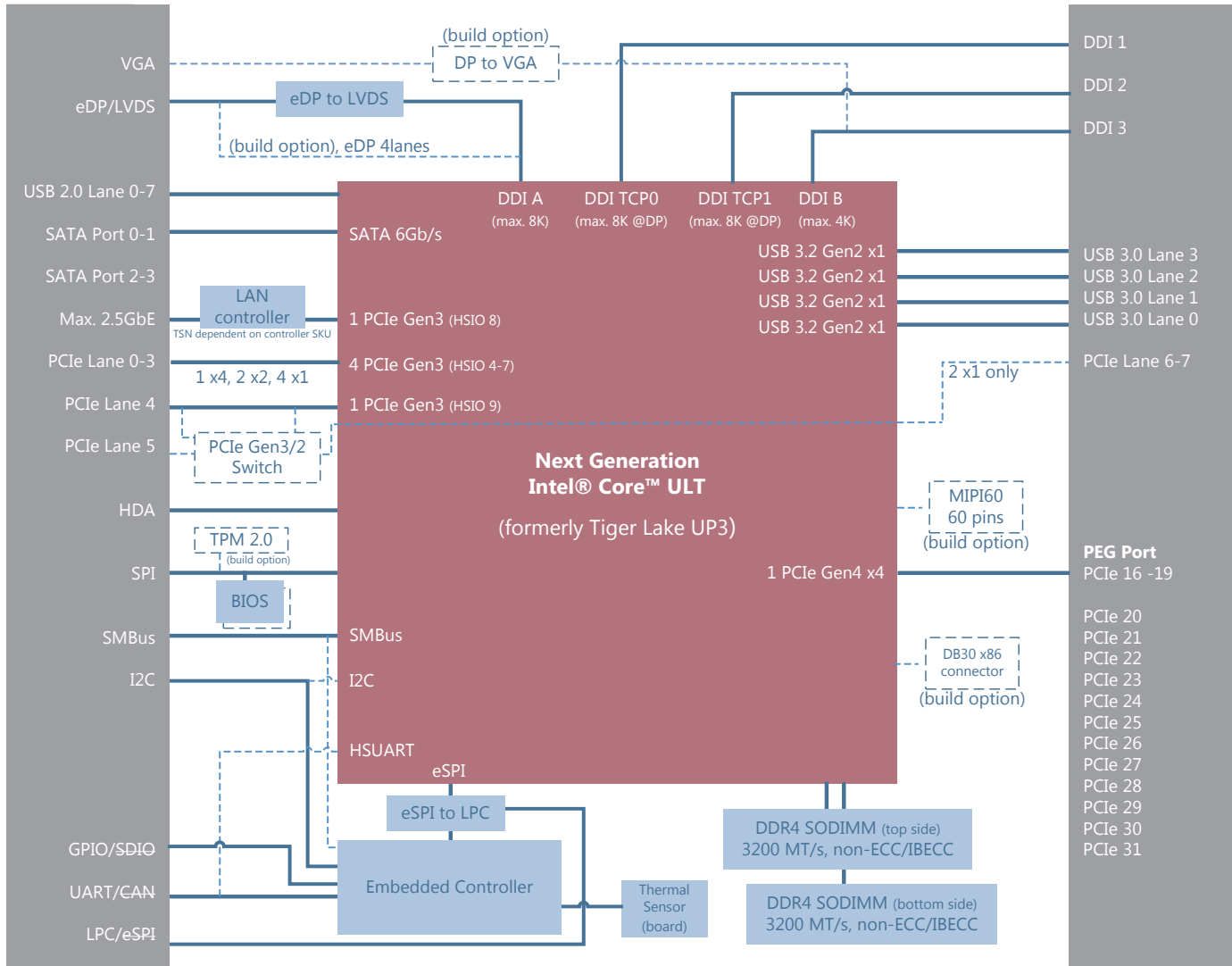
• Operating Systems

Standard Support

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

Ubuntu (TBC)

Functional Diagram



cExpress-TL

Ordering Information

- **cExpress-TL-i7**
Compact COM Express Type 6 module with Next Gen Intel® Core™ i7, quad-core with GT2 level graphics
- **cExpress-TL-i5**
Compact COM Express Type 6 module with Next Gen Intel® Core™ i5, quad-core with GT2 level graphics
- **cExpress-TL-i3**
Compact COM Express Type 6 module with Next Gen Intel® Core™ i3, dual-core with GT2 level graphics
- **cExpress-TL-Celeron**
Compact COM Express Type 6 module with Next Gen Intel® Celeron®, dual-core with GT1 level graphics

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

Accessories

Heat Spreaders

- **HTS-cTL-B**
Heatspreader for cExpress-TL with threaded standoffs for bottom mounting
- **HTS-cTL-BT**
Heatspreader for cExpress-TL with through hole standoffs for top mounting

Passive Heatsinks

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

Active Heatsink

- **THSF-cTL-B**
High profile heatsink with Fan for cExpress-TL with threaded standoffs for bottom mounting

Starter Kit

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