cExpress-AL

COM Express Compact Size Type 6 Module with Intel Atom® E3900 series and Pentium®/Celeron® SoC

Features

- Intel Atom® E3900 series (formerly codename: Apollo Lake) and Pentium®/Celeron® SoC, supporting full virtualization (VT-d/VT-x)
- Supports IEEE 1588 Precision Time Protocol (PTP)
- Up to 8GB dual channel non-ECC DDR3L at 1867/1600 MHz
- Two DDI channels, one LVDS (VGA/eDP by build option), supports up to 3 independent displays
- Up to Five PCIe x1 Gen2 (by PCIe bridge IC, build option)
- Two SATA 6 Gb/s, three USB 3.0/2.0, five USB 2.0 and eMMC 5.0 (build option)
- Extreme Rugged operating temperature: -40°C to +85°C (build option for E39XX SKUs)

Specifications

- Core System
  - CPU
    Intel Atom® E3900 series (formerly codename: Apollo Lake)/Pentium®/Celeron® SoC on 14nm process
    Atom® E3950 1.6/2.0GHz (Turbo), 12W (4C/1866)
    Atom® E3940 1.6/1.8GHz (Turbo), 9W (4C/1866)
    Atom® E3930 1.3/1.8GHz (Turbo), 6W (2C/1866)
    Pentium® N4200 1.1/2.5GHz (Turbo), 6W (4C/1866)
    Celeron® N3350 1.1/2.3GHz (Turbo), 6W (2C/1866)
  - Supports: Intel® VT, Intel® VT-d, 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
  - Notes: Availability of features may vary between processor SKUs. Pentium®/Celeron® supported by project basis.

- Memory
  - Dual channel 1867/1600 MHz non-ECC DDR3L memory up to 8GB in dual SODIMM socket (maximum by 2pcs 4GB or 1pcs 8GB SODIMM)

- Embedded BIOS
  - AMI EFI with CMOS backup in 16MB SPI BIOS

- Expansion Busses
  - modify as below
  - 3 PCI Express x1 Gen2 (AB): Lanes 0/1/2 by default
  - Note: 3 PCI Express x1 Gen2 (AB): Lanes 0/1/2/3/4 through PCIe bridge IC by request.
  - 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 (build option)

- Audio
  - Chipset
    Intel® HD Audio integrated in SoC
  - Audio Codec
    On carrier Express-BASE6 (ALC886 standard support)

- Ethernet
  - Intel® MAC/PHY: Intel® Ethernet Controller i210
  - Interface: 10/100/1000 GbE connection
  - support IEEE 1588 and GbE0_SDP

- Video
  - GPU Feature Support
    Intel® Gen9 LP Graphics Core, supporting 3 independent and simultaneous display combinations of DisplayPort/HDMI/LVDS or eDP/VGA 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
    DDI1/2 supporting DisplayPort/HDMI/DVI
  - VGA
    Build option support through DP-to-VGA IC (in place of DDI2)
  - LVDS
    Single/dual channel 18/24-bit LVDS from eDP-to-LVDS IC
  - eDP
    4 lanes support (build option, in place of LVDS)

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: 3x USB 3.0 (USB ports 0-2) and 5x USB 2.0 (USB ports 3-7)
  - USB OTG support on USB 2.0 port 0 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 muxed with GPIO, controlled by BIOS setting
  - Note: eMMC/SD boot device support dependent on OS.

- **Super I/O**
  - Supported on carrier if needed (standard support for WB3627DHG-P)

- **TPM (build option)**
  - Chipset: Infineon
  - Type: TPM 2.0

- **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 (Standard Temp. only)
  - Management: ACPI 5.0 compliant, Smart Battery support
  - Power States: C1-C6, S0, S3, S4, SS and S5 ECO mode (Wake on USB S3/S4, WOL S3/S4/SS)
  - ECO mode: Supports deep SS 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
    - Extreme Rugged: -45°C to +85°C (build option with E3900 series only)
  - 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, Linux 64-bit, VxWorks 64-bit
  - **Extended Support (BSP)**
    - Linux 64-bit

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Ordering Information

- **cExpress-AL-E3950**
  Compact COM Express Type6 with Intel® Apollo Lake-I Atom® E3950 (4C)

- **cExpress-AL-E3940**
  Compact COM Express Type6 with Intel® Apollo Lake-I Atom® E3940 (4C)

- **cExpress-AL-E3930**
  Compact COM Express Type6 with Intel® Apollo Lake-I Atom® E3930 (2C)

- **cExpress-AL-N4200**
  Compact COM Express Type6 with Intel® Apollo Lake Pentium® N4200 (4C)

- **cExpress-AL-N3350**
  Compact COM Express Type6 with Intel® Apollo Lake Celeron® N3350 (2C)

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Starter Kit

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

Accessories

Heat Spreaders

- **HTS-cAL-B-I**
  Heatspreader for cExpress-AL Atom® with threaded standoffs for bottom mounting

- **HTS-cAL-BT-I**
  Heatspreader for cExpress-AL Atom® with through hole standoffs for top mounting

- **HTS-cAL-B**
  Heatspreader for cExpress-AL Pentium®/Celeron® with threaded standoffs for bottom mounting

- **HTS-cAL-BT**
  Heatspreader for cExpress-AL Pentium®/Celeron® with through hole standoffs for top mounting

Passive Heatsinks

- **THS-cAL-B-I**
  Low profile heatsink for cExpress-AL Atom® with threaded standoffs for bottom mounting

- **THS-cAL-BT-I**
  Low profile heatsink for cExpress-AL Atom® with through hole standoffs for top mounting

- **THS-cAL-B**
  Low profile heatsink for cExpress-AL Pentium®/Celeron® with threaded standoffs for bottom mounting

- **THS-cAL-BT**
  Low profile heatsink for cExpress-AL Pentium®/Celeron® with through hole standoffs for top mounting

Active Heatsink

- **THSF-cAL-B-I**
  High profile heatsink with fan for cExpress-AL Atom® with threaded standoffs for bottom mounting

- **THSF-cAL-B**
  High profile heatsink with fan for cExpress-AL Pentium®/Celeron® with threaded standoffs for bottom mounting