**cExpress-HL**

**COM Express® Compact Size Type 6 Module with Intel® Core™ i7/i5/i3 Processor**

**Features**

- 4th Generation Intel® Core™ i7/i5/i3 Processor SoC
- Up to 16 GB DDR3L SDRAM at 1600MHz
- Two DDI channels, one LVDS supporting 3 independent displays
- Four PCIe x1 or 1 PCIe x4
- GbE, four SATA 6 Gb/s, two USB 3.0, six USB 2.0
- Supports Smart Embedded Management Agent (SEMA®) functions
- Extreme Rugged operating temperature: -40°C to +85°C (build option)

**Specifications**

**Core System**

- **CPU**
  - 4th Generation Intel® Core™ Processors (Mobile) - 22nm (formerly codename "Haswell-ULT")
  - Core™ i7-4650U 1.7 GHz (3.3 GHz Turbo), 15W (2C/GT3)
  - Core™ i5-4300U 1.9 GHz (2.9 GHz Turbo), 15W (2C/GT2)
  - Core™ i3-4100U 1.7 GHz (no Turbo) 3MB, 15W (2C/GT2)
  - Celeron® 2980U 1.6 GHz (no Turbo) 15W (2C/GT1)
  - Note: Availability of the features may vary between processor SKUs.

- **Memory**
  - Dual channel non-ECC 1600/1333 MHz DDR3L memory up to 16GB in dual SODIMM socket

- **Embedded BIOS**
  - AMI EFI with CMOS backup in BMB SPI BIOS with Intel® AMT 9.0 support

- **L3 Cache**
  - 4MB for i7-4650U, 3MB for i5-4300U and i3-4010U; 2MB for 2980U

**Expansion Busses**

- 4 PCI Express x1: lanes 0/1/2/3
- 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
- Use in combination with DB-40 debug module
- Providing BIOS POST code LED, BMC access, SPI BIOS flashing, power testpoints, debug LEDs
- 60-pin XDP header for ICE debug of CPU/Chipset

**Video**

- **GPU Feature Support**
  - Generation 7.5 graphics core architecture, supporting
  - 3 independent and simultaneous display combinations of DisplayPort/ HDMI/ LVDS monitors
  - Encode/transcode HD content
  - LVDS
  - Single/dual channel 18/24-bit LVDS from eDP (two lanes)

- **Digital Display Interface**
  - DDI1 supporting DisplayPort / HDMI / DVI
  - DDI2 supporting DisplayPort / HDMI / DVI

**Audio**

- **Chipset**
  - Intel® HD Audio integrated in SoC

- **Audio Codec**
  - Located on carrier Express-BASE6 (ALC886 standard supported)

**Ethernet**

- **Chipset**
  - Intel® MACPHY: i218LM (Enterprise SKU) with AMT 9.0 support
  - Interface: 10/100/1000 GbE connection

**I/O Interfaces**

- **USB**
  - 2x USB 3.0 (USB 0,1) and 6x USB 2.0 (USB2,3,4,5,6,7)

- **SATA**
  - Four ports SATA 6Gb/s (SATA0, SATA1, SATA2, SATA3)

- **Serial**
  - 2 UART ports COM1/2 with console redirection

- **GPIO**
  - 4 GPO and 4 GPI with interrupt

- **Super I/O**
  - On carrier if needed (standard support for W83627DHG-P)

- **TPM**
  - Chipset: Atmel AT97SC3204
  - Type: TPM 1.2

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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

● **Power**
  - Standard Input: ATX = 12V±5% / 5Vsb ±5% or AT = 12V±5%
  - Wide Input: ATX = 5~20 V / 5Vsb ±5% or AT = 5~20V
  - Management: ACPI 4.0 compliant, Smart Battery support
  - Power States: C1-C6, S0, S1, S4, S5, SS, SS ECO mode (Wake on USB S3/S4, WOL S3/S4/SS)
  - ECO mode: Supports deep S5 mode for power saving

● **Operating Systems**
  - Standard Support
    - Windows 7/8 32/64-bit, Linux 32/64-bit
  - Extended Support (BSP)
    - WES7/8, Linux, VxWorks

● **Mechanical and Environmental**
  - Form Factor: PICMG COM.0: Rev 2.1 Type 6
  - Dimension: Compact size: 95 mm x 95 mm
  - **Operating Temperature**
    - Standard: 0°C to +60°C
    - Extreme Rugged™: -40°C to +85°C (build option)
  - **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

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Ordering Information

- **cExpress-HL-i7-4650U**
  COM Express® Compact Size Type 6 Module with Intel® Core™ i7-4650U at 1.7 GHz with GT3 level graphics

- **cExpress-HL-i5-4300U**
  COM Express® Compact Size Type 6 Module with Intel® Core™ i5-4300U at 1.9 GHz with GT2 level graphics

- **cExpress-HL-i3-4010U**
  COM Express® Compact Size Type 6 Module with Intel® Core™ i3-4010U at 1.7 GHz with GT2 level graphics

- **cExpress-HL-2980U**
  COM Express® Compact Size Type 6 Module with Intel® Celeron® 2980u with 1.6GHz ULV 15W 2+1F and HD graphics

Accessories

- **Heat Spreaders**
  - **HTS-cHL-B**
    Heatspreader for cExpress-HL with threaded standoffs for bottom mounting
  - **HTS-cHL-BT**
    Heatspreader for cExpress-HL with through hole standoffs for top mounting

- **Passive Heatsinks**
  - **THS-cHL-B**
    Low profile heatsink for cExpress-HL with threaded standoffs for bottom mounting
  - **THS-cHL-BT**
    Low profile heatsink for cExpress-HL with through hole standoffs for top mounting
  - **THSH-cHL-B**
    High profile heatsink for cExpress-HL with threaded standoffs for bottom mounting

- **Active Heatsink**
  - **THSF-cHL-B**
    High profile heatsink with Fan for cExpress-HL with threaded standoffs for bottom mounting

Starter Kit

- **COM Express Type 6 Starter Kit Plus**
  COM Express formfactor starter kit with Express-BASE6 board, power supply, and accessory kit