



### Features

- 4th Generation Low Power 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, Gigabit Ethernet
- 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 (optional)

### Specifications

#### Core System

|     |   |
|-----|---|
| CPU | 4th Generation Intel® Core™ Processors (Mobile) - 22nm (also know as "Haswell-ULT")<br>Core™ i7-4650U 1.7 GHz (3.3 GHz Turbo), 15W (2C/GT3)<br>Core™ i5-4300U 1.9 GHz (2.9 GHz Turbo), 15W (2C/GT2)<br>Core™ i3-4010U 1.7 GHz (no Turbo) 3MB, 15W (2C/GT2)<br>Celeron® 2980U 1.6 GHz (no Turbo) 15W (2C/GT1)<br>Supports : Intel® VT, Intel® TXT, Intel® SSE4.2, Intel® HT Technology, Intel® 64 Architecture, Execute Disable Bit, Intel® Turbo Boost Technology 2.0, Intel® AVX2, Intel® AES-NI, PCLMULQDQ Instruction, Intel® Secure Key and Intel® TSX<br>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 8MB 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<br>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<br>Use in combination with DB-40 debug module<br>Providing BIOS POST code LED, BMC access, SPI BIOS flashing, power testpoints, debug LEDs<br>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<br>Encode/transcode HD content |
| LVDS                      | Single/dual channel 18/24-bit LVDS from eDP (two lanes)  |
| Digital Display Interface | DDI1 supporting DisplayPort / HDMI / DVI<br>DDI2 supporting DisplayPort / HDMI / DVI   |

#### Audio

|             |  |
|-------------|--|
| Chipset     | Intel® HD Audio integrated in SOC                            |
| Audio Codec | Located on carrier Express-BASE6 (ALC886 standard supported) |

#### Ethernet

|                          |  |
|--------------------------|--|
| Intel® MAC/PHY Interface | i218LM (Enterprise SKU) with AMT 9.0 support<br>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 (optional)

|         |                  |
|---------|------------------|
| Chipset | Atmel AT97SC3204 |
| Type    | TPM 1.2          |

#### 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, S3, 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 2.1 Type 6   |
| Dimension             | Compact size: 95 mm x 95 mm  |
| Operating Temperature | Standard: 0°C to +60°C<br>Extreme Rugged™: -40°C to +85°C (optional)   |
| Humidity              | 5-90% RH operating, non-condensing<br>5-95% RH storage (and operating with conformal coating)                                      |
| Shock and Vibration   | IEC 60068-2-64 and IEC-60068-2-27<br>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 7/8 32/64-bit, Linux 32/64-bit |
| Extended Support (BSP) | WES7/8, Linux, VxWorks                 |

## Functional Diagram



## Ordering Information

### Modules

| Model Number                | Description/Configuration   |
|-----------------------------|---|
| <b>cExpress-HL-i7-4650U</b> | COM Express® Compact Size Type 6 Module with Intel® Core™ i7-4650U at 1.7 GHz with GT3 level graphics       |
| <b>cExpress-HL-i5-4300U</b> | COM Express® Compact Size Type 6 Module with Intel® Core™ i5-4300U at 1.9 GHz with GT2 level graphics       |
| <b>cExpress-HL-i3-4010U</b> | COM Express® Compact Size Type 6 Module with Intel® Core™ i3-4010U at 1.7 GHz with GT2 level graphics       |
| <b>cExpress-HL-2980U</b>    | COM Express® Compact Size Type 6 Module with Intel® Celeron® 2980u with 1.6GHz ULV 15W 2+1F and HD graphics |

### Accessories

| Model Number             | Description/Configuration  |
|--------------------------|--|
| <b>Heat Spreaders</b>    |  |
| 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                  |
| <b>Passive Heatsinks</b> |  |
| 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          |
| <b>Active Heatsink</b>   |  |
| THSF-cHL-B               | High profile heatsink with Fan for cExpress-HL with threaded standoffs for bottom mounting |

Note: All specifications are subject to change without further notice.