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™ i3-4010U 1.7 GHz (no Turbo) 3MB, 15W (2C/GT2) Celeron® 2980U 1.6 GHz (no Turbo) 15W (2C/GT1)
	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
	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
	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

Intel® MAC/PHY	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

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

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 part numbers for SKUs with "build options" will need to be created and may cause production lead times.

Specifications

Mechanical and Environmental
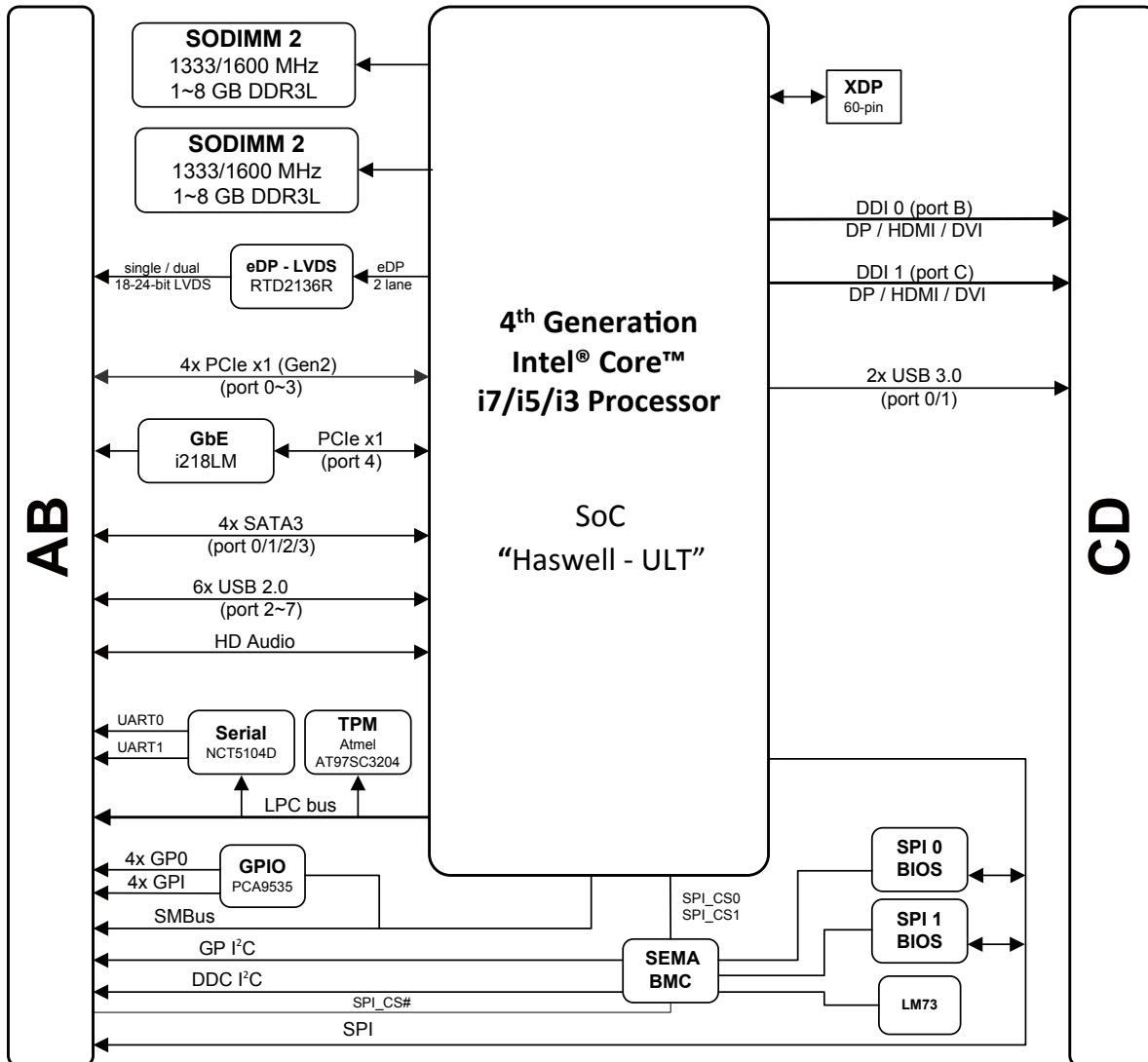
Form Factor	PICMG COM.0: Rev 2.1 Type 6
Dimension	Compact size: 95 mm x 95 mm
Operating Temperature	Standard: 0°C to +60°C
	Extreme Rugged™: -40°C to +85°C (build option)
Humidity	5-90% RH operating, non-condensing
	5-95% RH storage (and operating with conformal coating)
Shock and Vibration	IEC 60068-2-64 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

Operating Systems

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

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Functional Diagram

Ordering Information

Modules

Model Number	Description/Configuration
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

Starter Kit

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

Accessories

Model Number	Description/Configuration
Heat Spreaders	
HTS-cHL-B	Heatspreader for cExpress-HL with threaded stand-offs 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