# Agenda

- Ampro by ADLINK™ COM form factors

- What's new about COM Express Type 6

- Product overview

- Product positioning

- Selling points (benefits to customers)

- Product features & specifications

- Express-IBR functional diagram

- Software support

- Roadmap

- Ampro by ADLINK™ COM Express

- Comparison between Express-IBR and Express-HRR

- Thermal solutions

- 3rd Gen Intel® Core™ i7 on COM Express

- Competitor comparison

- Target customers & applications

Ampro by ADLINK™ COM form factors

- **Basic size**
  - COM Express Type 2 & 6 pinout
  - 125mm x 95mm
  - Express-CBR Type 2 (1st Gen Core i7-Dual core)
  - Express-HRR Type 6 (2nd Gen Core i7-Quad/Dual core)
  - Express-IBR Type 6 (3rd Gen Core i7-Quad/Dual core)
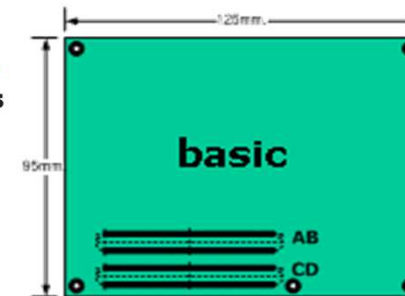
- **Compact size**
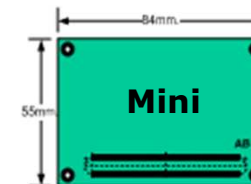 - COM Express Type 2 pinout
  - 95mm x 95mm
  - Form factor accepted by PICMG Q1, 2009
  - Express-ATR Type 2 (N270 + 945GSE)
  - Express-IBCR Type 6 (3rd Gen Core i7-Quad/Dual core) (developing)
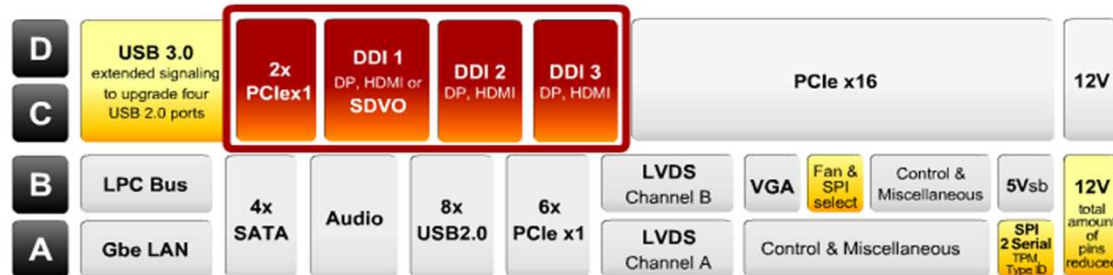 - Express-CTR Type 6 (Atom N2x00/D2x00 Dual core) (developing)
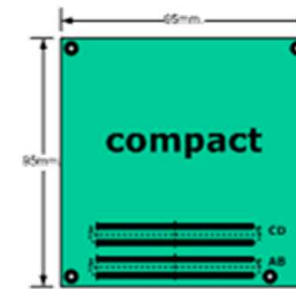
- **Mini size**
  - COM Express Type 1 & 10 pinout
  - 84mm x 55mm
  - Mini small form factor, very low power
  - nanoX-TCR (E6xxT + EG20T)

What's new about COM Express Type 6

The release of COM Express COM.0 Revision 2.0 brings Computer-on-Modules in line with current and future technology trends by providing for the latest graphics interfaces **(DisplayPort/DVI/HDMI), PCI Express Gen 2, and SuperSpeed USB 3.0.** The new Type 6 pinout is based on the popular Type 2 pinout, but with legacy functions replaced by Digital Display Interfaces (DDI), additional PCI Express lanes, and reserved pins for future technologies.

Product Overview

Express-IBR

- The Express-IBR extends Ampro by ADLINK's leadership in the Military, Aerospace and Transportation markets using rugged-by-design technology

- Based upon Ampro by ADLINK's 15 years of leadership in meeting the needs of the harsh environment marketplace

- Designed as **Extreme Rugged™**, not just screened;
    - 50% thicker PCB, $-40°C$ to $+85°C$ temperature range for harsh environments; sustained shock and vibration.
    - Shock: 50G peak-to-peak, 11ms duration, MIL-STD-202G Method 213B
    - Vibration: Operating - 11.96 Grms, 50-20,000 Hz, each axis, MIL-STD-202G Method 214A

- The Express-IBR combines a 22nm process Intel® Core™ i7 dual /quad core processor with QM77 Express chipset that supports dual channel DDR3 1600 MHz ECC memory up to 16 GB.

- Board space priority is for Extreme Rugged power supply circuitry and high-temp reliability, not extra features for non-rugged markets

- 3-year warranty with 100% ETT testing and optional Conformal Coating

Product Positioning

- **For** Military / Aerospace Contractors or Transportation OEMs such as airborne and vehicle-mounted military computers and human machine interfaces (HMI) applications

- **Who** are looking for an Extreme Rugged module with wide operating temperature range and shock / vibration resistance

- **Ampro by ADLINK™ Extreme Rugged™ modules take** advantage of standard form factors and field-proven design-for-ruggedness methodologies for the 3rd Gen Intel Core i7 processors. It's a power efficient solution for applications running in space constrained, extreme rugged environments.

- **That provide** high-performance graphics, ECC RAM support, security features, virtualization, -40°C to +85°C thermal solutions, 3-year warranty and 7+ year lifecycle

- **Unlike** lot-screened (10 out of 100) design-for-cost boards, ETT is available with 100% screening

- **Our products** are designed from the ground up to withstand 11.95G vibration, 50G shock and to operate at extreme temperature ranges. These capabilities are verified by extensive testing including HALT testing, Voltage & Temperature Margin testing and demonstrated in hundreds of Extreme Rugged deployments worldwide.

Selling Points

- Delivers higher performance per watt over previous-generation processors
  - 5% to 15% increase in CPU performance
  - 25% to 68% increase in integrated GPU performance
- Extreme Rugged™ Design Methodology
  - Screening only does NOT predict reliability
  - 50% thicker PCB for shock & vibration resistance
- ECC support on select processor SKUs to ensure data integrity
- Maximum power dissipation (TDP) configurable in BIOS
- Board space priority is for extreme rugged power supply circuitry and high-temp reliability, not extra features for non-military markets
- 3-year warranty with 100% ETT testing and optional conformal coating

Product Features and Specifications

Features

- Supports 3rd generation Intel® Core™ processor family:
  - Core i7-3615QE / 3612QE / 3555LE / 3517UE
  - Core i3-3217UE
- General Purpose PCIe configured as:
  - PCI Express x16 (Gen3) bus for discrete graphics solution or general purpose PCI Express (2 x8 or 1 x8 with 2 x4)
  - Seven PCIe x1 (Gen 2)
- Dual stacked SODIMMs up to 16GB DDR3 at 1600 MHz
- ECC Memory Support
- QM77 PCH
  - Analog VGA and single/dual channel **18/24-bit LVDS**
  - SDVO, 3 DDI supporting HDMI/DisplayPort/DVI
  - 7 x1 PCI Express Gen 2 lanes on chipset
  - 1 x16 PCI Express Gen 3 lanes on chipset
  - Integrated GbE LAN, 8 USB 2.0
  - Two SATA 3Gb/s ports
  - Two SATA 6Gb/s ports
- AMI EFI BIOS / TPM on module
- Maximum power dissipation (TDP) configurable in BIOS
- **PICMG COM Express COM.0 R2.1, Type 6 pinout**
- Operating Temperature:
  - STD: -20° to +70°C
  - ETT: -40° to +85°C

Express-IBR

Functional Diagram

General Purpose **PCIe Gen3** configured as :
- one x16 PCIe
- two x8-lane PCIe
- one x8-lane and two x4-lane PCIe

3rd Gen Intel Core i7

ECC 1600 MHz DDR3 SODIMM up to 8GB

ECC 1600 MHz DDR3 SODIMM up to 8GB

18/24-bit LVDS

FDI

DMI

DP / DVI / HDMI / **SDVO**
DP / DVI / HDMI
DP / DVI / HDMI

QM77

7 PCIe x1 Gen2

8 Hi-Speed USB 2.0 Ports

2 SATA 3 Gb/s
2 SATA 6 Gb/s

Intel PHY

Integrated GbE

SPI

LPC

BIOS   TPM

Intel® High Def Audio
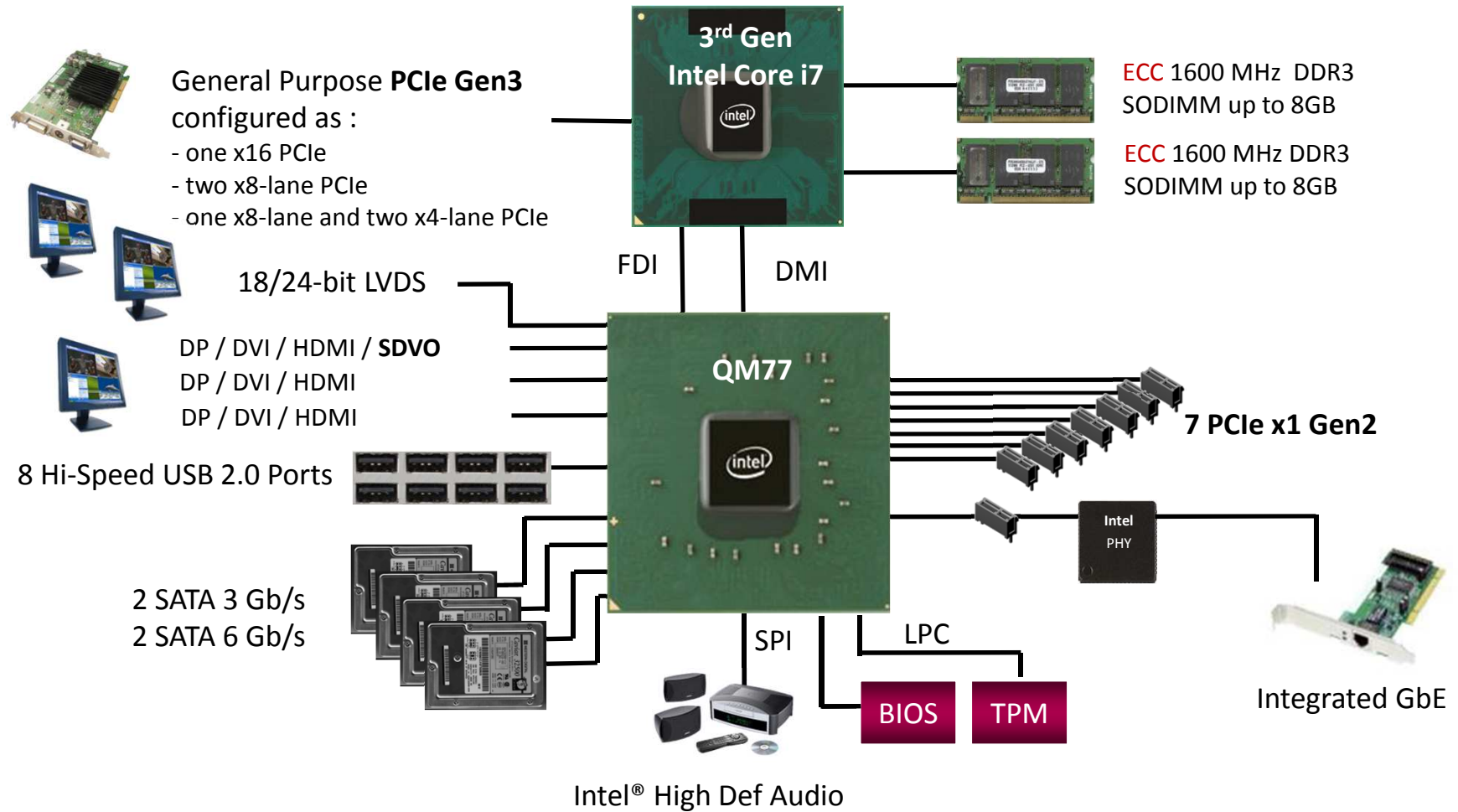
Software Support

- **BIOS – AMI with ACPI 2.0**

- **Windows Embedded Standard 7**
- **Windows Embedded Standard 2009**
- **Windows Embedded Compact 7** (developing)
- **Linux 2.6.x**
- **VxWorks 6.9 RTOS**
- **QNX 6.5**
- **AIDI Library**

Roadmap

COM Express

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Performance

Express-CBR
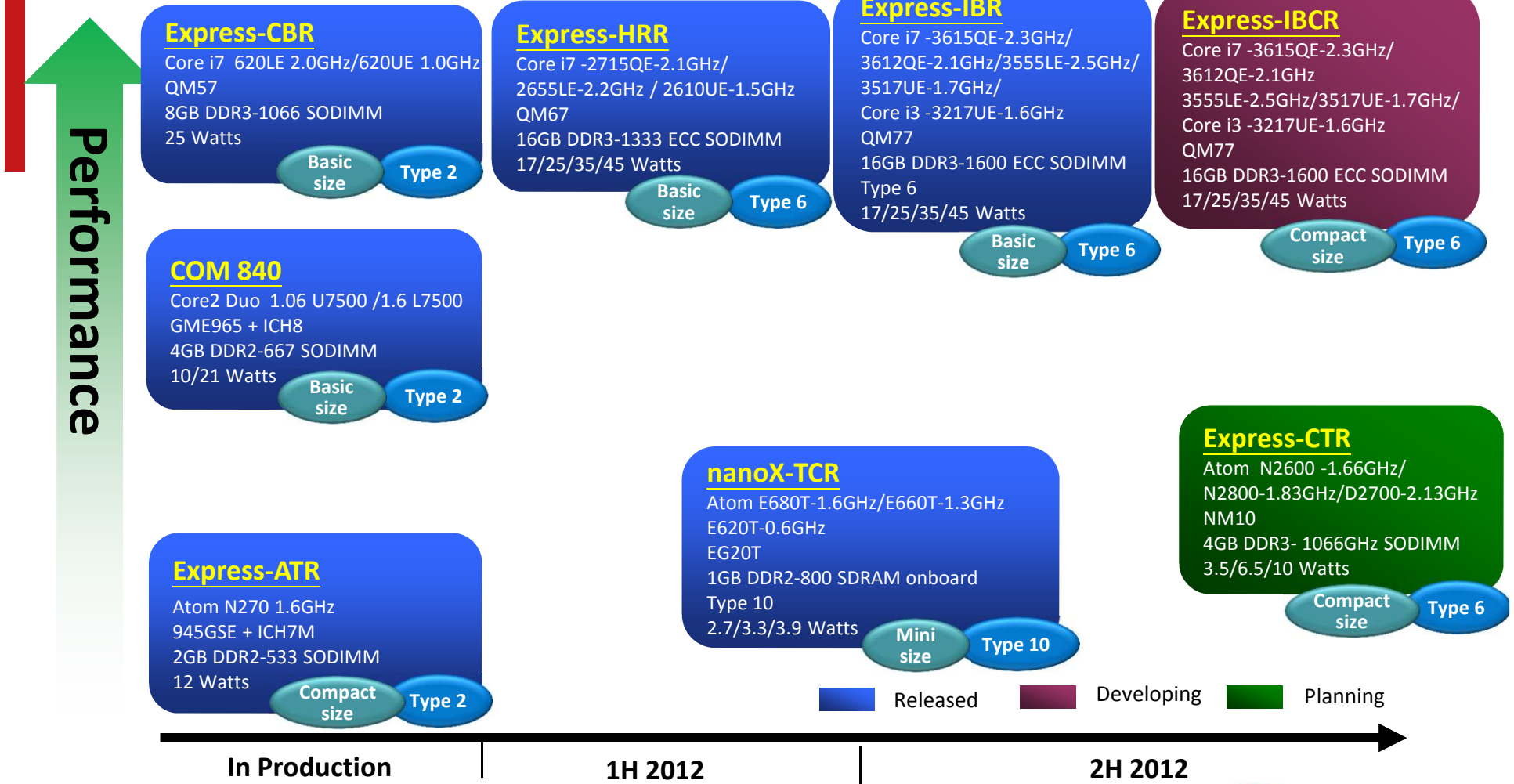Core i7 620LE 2.0GHz/620UE 1.0GHz
QM57
8GB DDR3-1066 SODIMM
25 Watts

Basic size | Type 2

Express-HRR
Core i7 -2715QE-2.1GHz/
2655LE-2.2GHz / 2610UE-1.5GHz
QM67
16GB DDR3-1333 ECC SODIMM
17/25/35/45 Watts

Basic size | Type 6

Express-IBR
Core i7 -3615QE-2.3GHz/
3612QE-2.1GHz/3555LE-2.5GHz/
3517UE-1.7GHz/
Core i3 -3217UE-1.6GHz
QM77
16GB DDR3-1600 ECC SODIMM
Type 6
17/25/35/45 Watts

Basic size | Type 6

Express-IBCR
Core i7 -3615QE-2.3GHz/
3612QE-2.1GHz
3555LE-2.5GHz/3517UE-1.7GHz/
Core i3 -3217UE-1.6GHz
QM77
16GB DDR3-1600 ECC SODIMM
17/25/35/45 Watts

Compact size | Type 6

COM 840
Core2 Duo 1.06 U7500 /1.6 L7500
GME965 + ICH8
4GB DDR2-667 SODIMM
10/21 Watts

Basic size | Type 2

nanoX-TCR
Atom E680T-1.6GHz/E660T-1.3GHz
E620T-0.6GHz
EG20T
1GB DDR2-800 SDRAM onboard
Type 10
2.7/3.3/3.9 Watts

Mini size | Type 10

Express-CTR
Atom N2600 -1.66GHz/
N2800-1.83GHz/D2700-2.13GHz
NM10
4GB DDR3- 1066GHz SODIMM
3.5/6.5/10 Watts

Compact size | Type 6

Express-ATR
Atom N270 1.6GHz
945GSE + ICH7M
2GB DDR2-533 SODIMM
12 Watts

Compact size | Type 2

Released | Developing | Planning

In Production | **1H 2012** | **2H 2012**

ADLINK TECHNOLOGY INC.

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Ampro by ADLINK™ COM Express®

	Express-CBR Type 2	Express-HRR Type 6	Express-IBR Type 6
CPU	Core i7 (Calpella) i7-620LE 2.0GHz i7-620UE 1.06GHz	Core i7 (Huron River) i7-2715QE 2.1GHz i7-2655LE 2.2GHz i7-2610UE 1.5GHz i5-R2515E 2.5GHz	Core i7 (Chief River) i7-3615QE 2.3GHz i7-3612QE 2.1GHz i7-3555LE 2.5GHz I7-3517UE 1.7GHz i3-3217UE 1.6GHz
Chipset	QM57	QM67	QM77
Memory	8GB DDR3 1066 SODIMM	16GB DDR3 1333 ECC SODIMM	16GB DDR3 1600 ECC SODIMM
Video	PCIe x8 Discrete or embedded DisplayPort Dual Channel 18/24-bit LVDS, CRT, SDVO	PCIe x16 Gen 2 Discrete or embedded DisplayPort, Dual Channel 18/24-bit LVDS, three DDI ports supporting HDMI/DVI/DisplayPort or SDVO	PCIe x16 Gen 2 Discrete or embedded DisplayPort, Dual Channel 18/24-bit LVDS, three DDI ports supporting HDMI/DVI/DisplayPort or SDVO
Size	125 x 95 mm	125 x 95 mm	125 x 95 mm
PCB thickness	2.36 mm	2.36 mm	2.36 mm
GbE	Intel 82574IT	Intel WG82579LM	Intel WG82579LM
SATA & IDE	4 SATA 3Gb/s + 1 IDE (PATA)	2 SATA 6Gb/s, 2 SATA 3Gb/s (RAID support 0,1,5,10)	2 SATA 6Gb/s, 2 SATA 3Gb/s (RAID support 0,1,5,10)
Other		Direct X 10.1, Open GL 3.0, XPDM support	DirectX 11.0, OpenGL 3.1, and OCL 1.1
USB	8	8	8
TPM	TPM (optional)	TPM 1.2	TPM 1.2
Busses	6 PCIe x1, PCI	8 PCIe x1	8 PCIe x1
Power	25 watts	45 / 35 / 25 /17 watts	45 / 35 / 25 /17 watts
Temperature	-40°C to +80°C	-40°C to 85°C (2655LE & 2610UE) -20°C to 70°C (2715QE)	-40°C to 85°C

# Comparison between Express-IBR and Express-HRR

	Express-IBR	Express-HRR
Core System	2nd Gen Intel Core i7 + QM67 (Sandy Bridge)	3nd Gen Intel Core i7 + QM77 (Ivy Bridge)
Memory	RAM support up to 1600MHz (ECC)	RAM support up to 1333MHz (ECC)
Busses	supports PCI Express Gen 3 and USB 3.0	supports PCI Express Gen 2 and USB 2.0
GPU	Intel HD Graphics 4000 at 650-1300 MHz; video support DirectX 11.0, OpenGL 3.1, and OCL 1.1	Intel HD Graphics 3000 at 650-1300 MHz; video support DirectX 10.1 and OpenGL 3.0
TDP	Maximum power dissipation configurable in BIOS	N/A

Express-IBR EXTREME RUGGED
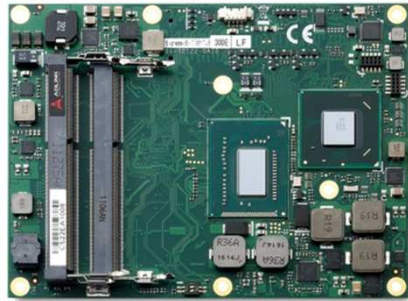
Express-HRR EXTREME RUGGED

Equipped with the **3rd generation Intel® Core™ processor**, which utilizes Intel's new 3D tri-gate transistor technology and 22nm process technology. This platform **delivers higher performance per watt over previous-generation processors.**

Thermal Solutions

- Heat spreader
  - **HTS-IBR-BTF**: heat spreader for Express-IBR with through-hole standoffs for top mounting

  - **HTS-IBR-B**: heat spreader for Express-IBR with threaded standoffs for bottom mounting (for Express-BASE6)

- Passive heatsink
  - **THSH-IBR-BTL**: heatsink for Express-IBR with through-hole standoffs for top-mounting

- Active heatsink
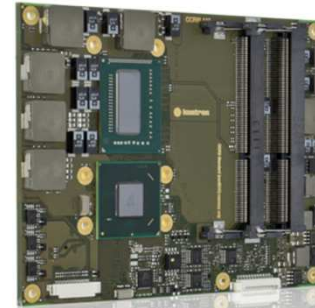 - **THSF-IBR-BTL-CU**: heatsink with FAN for Express-IBR with through-hole standoffs for top-mounting
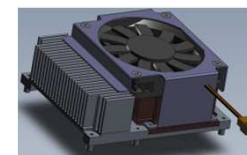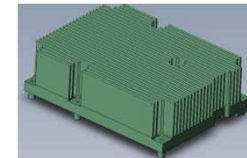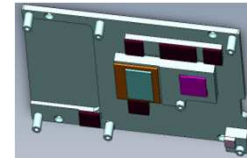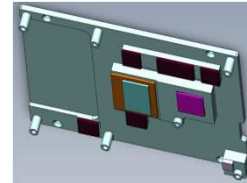
3rd Gen Intel® Core™ i7 on COM Express

ADLINK
Express-IB

Advantech
SOM-5892

Kontron
COMe-bIP6

Congatec AG
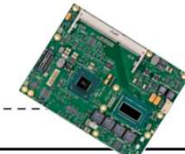Conga-TS77

Express-IBR

Ampro by ADLINK

Multiple Core i7 COM Express products are on the market today

But….

The Express-IBR is the only Core i7 module that is *Extreme Rugged* by design!

Competitor Comparison

	ADLINK	Advantech	Kontron	Congatec AG	MSC
	Express-IBR	**SOM-5892**	**COMe-bIP6**	**Conga-TS77**	**C6B-7S**
CPU	Core i7-3615QE, 3612QE, 3555LE, 3517UE, i3 - 3217UE	Core i7-3615QE, 3612QE, 3555LE, 3517UE, Core i5-3610ME, Core i3-3120ME, 3217UE	Core i7-3615QE, 3612QE	Core i7-3615QE, 3612QE, 3555LE, 3517UE, Core i5-3610ME, Core i3-3120ME, 3217UE	Core i7-3615QE, 3612QE, 3555LE, 3517UE, Core i5-3610ME, Core i3-3120ME, 3217UE, Celeron 847E, 827E
Chipset	QM77	QM77	QM77	QM77	QM77
Memory	Up to 16GB DDR3 1600 ECC SODIMM	Up to 16GB DDR3 1600 non-ECC SODIMM	Up to 16GB DDR3 1600 non-ECC SODIMM	Up to 16GB DDR3-1600 non-ECC SODIMM	Up to 16GB DDR3-1600 SODIMM non-ECC support
PCB thickness	2.3mm	1.6mm	1.6mm	1.6mm	1.6mm
	2 SATA 3 Gb/s + 2 SATA 6 Gb/s with RAID 0,1,5,10 support	2 SATA 3 Gb/s + 2 SATA 6 Gb/s	2 SATA 3 Gb/s + 2 SATA 6 Gb/s	4 SATA 6 Gb/s + 2 SATA 3 Gb/s (AHCI) with RAID 0/1/5/10 support	4 SATA 3 Gb/s
PCI Express	7 PCIe x1 & 1 PEG x16 (Gen2)	7 PCIe x1 & 1 PEG x16	7 PCIe x1	7 PCIe x1 & 1 PEG x16	7 PCIe x1 & 1 PEG x16
TPM	TPM 1.2	TPM (optional)	TPM 1.2	TPM (optional)	TPM 1.2
Network	Intel® WG82579LM Gigabit Ethernet	Intel® 82579LM Gigabit Ethernet	Intel® 82579LM Gigabit Ethernet	Intel® 82579LM Gigabit Ethernet	Intel® 82579LM Gigabit Ethernet
Power input	ATX (12 V, 5 Vsb +/- 5%) AT (12 V +/- 5%)	ATX (12 V, 5 Vsb) AT (12 V)	8.5V – 20V Wide Range Single Power Supply	+12V and +5Vsb	+12V +/-10%, 5V Stby optional
Operating temp.	-20°C to +70°C (Std.) -40°C to +85°C (ETT)	0°C to +60°C	0°C to +60°C	0°C to +60°C	0°C to +60°C

Target Customers & Applications

- Military/Homeland Security

- Transportation

- Aviation

- Industrial