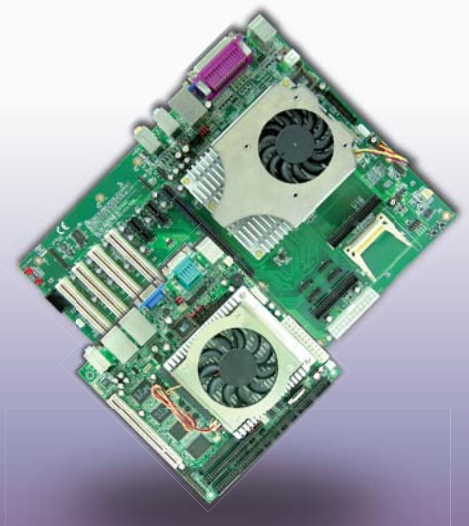
# Module Computers

## Smart Choice for Embedded Solution



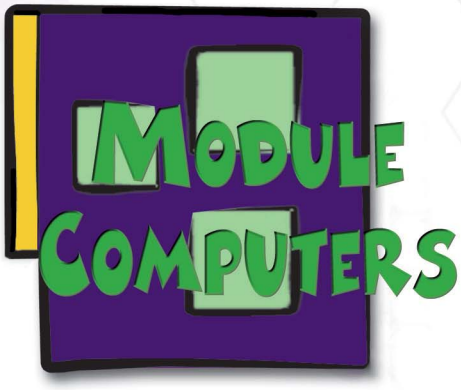
## State of The Art





Ver. 26H

# Modular Computing Solutions




## Modular computing platforms

Compact size, computing power options, reliability, ease of use, and function expansion are the key design considerations for every embedded application. Modular computing boards have been defined and developed in order to satisfy these design needs. The modular computing approach is to condense the fundamental computer functions into a compact module that includes an interface for additional function expansion.

The PC/104, PC/104+, and EBX (Embedded Board eXpandable) are some traditional form factors of modular computing boards in the market place. The ETX (Embedded Technology eXtended) form factor has been created in recent years with greater computing power, smaller size, and extended expansion capability. In 2005, the ETX was imbued with latest interface technologies such as PCI Express and SATA. Due to the simplicity of its circuit design, balanced computing power, and I/O bandwidth, the ETX stander evolved into -- one of the PICMG (PCI Industrial Computer Manufacturer Group) standards. In addition to COM Express, the ECX (Embedded Compact eXtend) form factor is defined by Intel to be a 3.5" computer board with specific placement of mounting holes and expansion connector.

### ▪ COM Express

The COM Express form factor includes a bootable host computer modular board that is connected with its carrier board through the PCI Express interconnection. The PCI Express technologies enable the data transmission from parallel to serial. The advantage of such architecture is higher I/O density and greater performance.

The module, bootable host computer "engine" is packaged as an off-the-shelf board and plugged into a "carrier board," which is implemented with I/Os and also connects to the power supply. The application-specific system functions and peripheral expansion are all built on the carrier board. By combining this configuration with a standard engine module and application-oriented carrier board, COM Express delivers the following benefits:

- Fast Time-to-Market/Fast Time-to-Revenue: For OEM engineering's focus, only the carrier board needs to be designed and implemented. The engineering efforts dedicated to processor and interface revolution can be minimized. This helps shorten the development time so the product can be delivered faster.
- Focus on core business and competence: The approach of separating the module and carrier board design enables the module board vendor and OEM engineers to dedicate their expertise and resource to the focused area.
- Upgradeable and scaleable: With the modular approach, the application can be easily upgraded or scaled up for future CPUs. This increases the flexibility of microprocessor supply now and in the future.

### ▪ ECX Overview

The ECX form factor measures a mere 105 x 146mm, making it smaller than all other SBCs in the market place. Intel defined the mechanical, electrical interfaces, and placement of major components so that hardware vendors and system integrators can build and integrate compliant components, signal devices, and systems.

The ECX's high density, computing performance, and legacy interfaces -- as well as the expandability to meet the PCI Express standards - benefit many applications in the embedded market, including car infotainment (vehicle PC). Fitting within a one DIN height vehicle enclosure standard, the system is able to operate in a fanless environment with just an Intel Ultra Low Voltage microprocessor. Wireless functions such as GPS and Ethernet can be added through the expansion region defined in the specification.

### ▪ PCM from Portwell

The PCM (Portwell Computing Module) is the module board defined by Portwell with MXM* socket and proprietary pin definition. The architecture is able to reduce the cost of high-density board-to-board connector by about 10 percent compared with ETX or COM Express. In addition to cost savings, PCM is more compact than both ETX and COM Express boards, measuring around 85 percent of the ETX board. With the requisite I/Os, the PCM can be implemented on a less-layer PCB board.

Portwell has built the first module based on Intel 852GM chipset with an Ultra Low Voltage Celeron M processor to feature the lowest power consumption and very affordable price. By separating the module and carrier board design, the development time of a system is much less than a traditional SBC development.

Cost saving, time saving, and design flexibility are key attributes of PCM, the ideal alternative solution to COM Express and ECX.

*MXM (Mobile PCI Express Module) is the protocol defined by NVIDIA and some leading notebook manufactures for mobile PCI Express graphics expansion.

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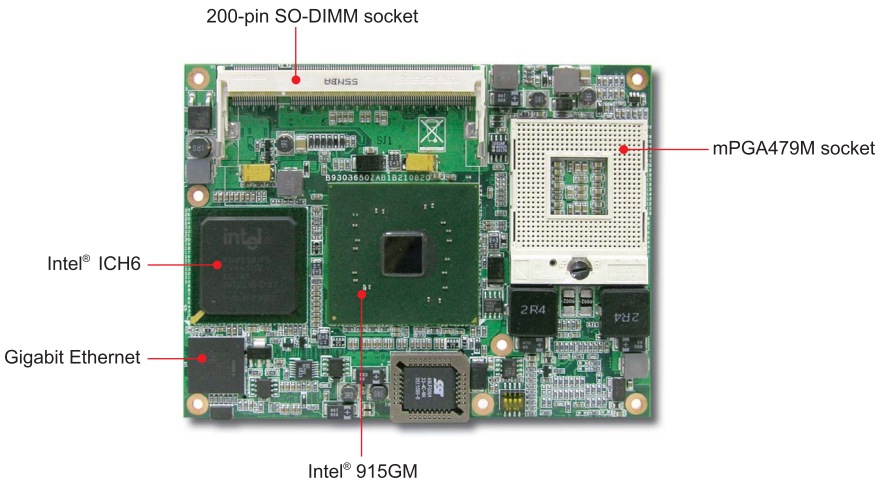
E225800

# PCOM-B210VG

**Intel® Pentium® M or Celeron® M processor based Type II COM Express module with DDR2 SDRAM, VGA, Gigabit Ethernet and USB**




## FEATURES

- COM Express module that supports extreme high bandwidth serial type I/O interfaces such as PCI Express, SDVO & SATA
- Design to comply with both socket type and BGA type Pentium® M & Celeron® M processor for intensive computing as well as fanless applications
- Architecture of module and carrier boards speeds up time-to-market of tailor-made equipment
- The popular DDR2 memory is cost-effective and easy to obtain
- Equipped with single PCI Express x1 interface based Gigabit Ethernet that could change to Fast Ethernet by project

## ORDERING GUIDE

| | |
|---|---|
| Standard | **PCOM-B210VG**<br>Intel Pentium® M or Celeron® M processor based Type II COM Express module with DDR2 SDRAM, VGA, Gigabit Ethernet and USB |

## GENERAL

| | |
|---|---|
| Processor | CPU & Package: Intel® Pentium® M or Celeron® M processor in mFCPGA package<br>FSB: 533/400MHz |
| Chipset/Core Logic | Intel® 915GV and ICH6 |
| System Memory | Up to 1GB DDR2 533/400 SDRAM on one 200-pin DIMM socket |
| BIOS | Award BIOS |
| Storage Devices | EIDE: Support one EIDE channel with Ultra DMA 100/66/33<br>SATA: Support four SATA 150 drives |
| Solid State Disk | N/A |
| Watchdog Timer | N/A |
| Expansion Interface | - One PCI Express x16, multiplexed with SDVO interface<br>- Three PCI Express x1<br>- Four PCI devices<br>- LPC interface<br>- High definition audio interface |
| Hardware Monitoring | CPU temperature |
| Power Requirement | TBA |
| Dimension | Dimension : 95(L) x 114(W) mm; 3.7"(L) x 4.5" (W)<br>PCB: 10-layer |
| Environment | Operating Temperature: 0 to 60°C<br>Storage Temperature: -20 to 80°C<br>Relative Humidity: 5% to 90%, non-condensing |
| MTBF | TBA |

## I/O

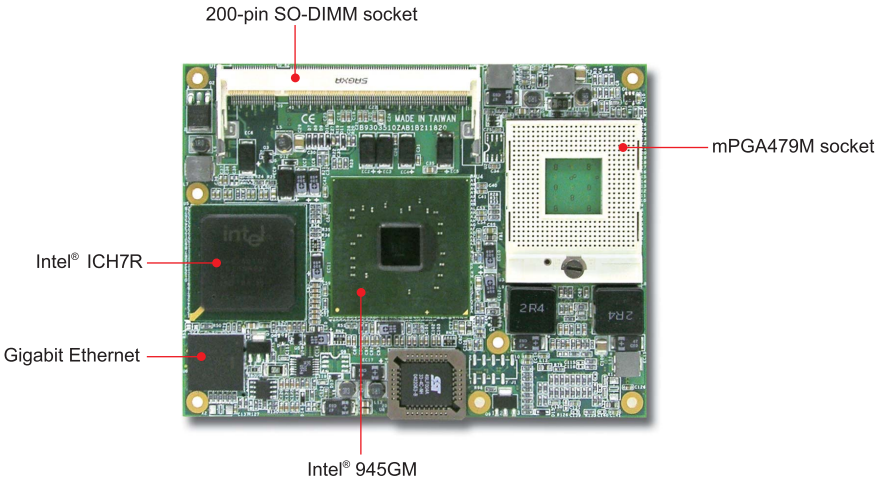
| | |
|---|---|
| MIO | N/A |
| IrDA | N/A |
| Ethernet | One Gigabit Ethernet |
| Audio | N/A |
| USB | Eight USB ports |
| Keyboard & Mouse | N/A |

## DISPLAY

| | |
|---|---|
| Graphic Controller | Intel® 915GM integrated Intel® Graphics Media Accelerator 900 (Intel® GMA 900) |
| Graphic Memory | Dynamic share system memory up to 224MB (Intel® DVMT 3.0) or static share system memory up to 128MB |
| Display Interface | - Support CRT, LVDS and TV-out display interfaces<br>- CRT display resolution up to 2048x1536 @ 85Hz refresh |

# PCOM-B211VG

**Intel® Core Duo & Solo processor based Type II COM Express module with DDR2 SDRAM, VGA, Gigabit Ethernet, SATA 300 and USB**




## FEATURES

- The Intel® Core Duo processor features dual-core technology that provides significant performance improvements in a typical Pentium® M thermal envelope
- Design to comply with both socket type and BGA type Core Duo & Core Solo processor for intensive computing as well as fanless applications
- Architecture of module and carrier boards speeds up time-to-market of tailor-made equipment
- SATA 300, high-speed storage interface supports faster transfer rate for improved data acces
- Equipped with single PCI Express x1 interface based Gigabit Ethernet that could change to Fast Ethernet by project

## ORDERING GUIDE

| | |
|---|---|
| Standard | **PCOM-B211VG**<br>Intel® Core Duo or Solo processor based Type II COM Express module with DDR2 SDRAM, VGA, Gigabit Ethernet and USB |

## GENERAL

| | |
|---|---|
| Processor | CPU & Package: Intel® Core Duo or Solo processor in mFCPGA package<br>FSB: 667/533MHz |
| Chipset/Core Logic | Intel® 945GM and ICH7R |
| System Memory | Up to 2GB DDR2 667/533/400 SDRAM on one 200-pin DIMM socket |
| BIOS | Award BIOS |
| Storage Devices | EIDE: Support one EIDE channel with Ultra DMA 100/66/33<br>SATA: Support four SATA 300 drives |
| Solid State Disk | N/A |
| Watchdog Timer | N/A |
| Expansion Interface | - One PCI Express x16, multiplexed with SDVO interface<br>- Five PCI Express x1<br>- Four PCI devices<br>- LPC interface<br>- High definition audio interface |
| Hardware Monitoring | CPU temperature |
| Power Requirement | TBA |
| Dimension | Dimension : 95(L) x 114(W) mm; 3.7"(L) x 4.5" (W)<br>PCB: 10-layer |
| Environment | Operating Temperature: 0 to60°C<br>Storage Temperature: -20 to 80°C<br>Relative Humidity: 5% to 90%, non-condensing |
| MTBF | TBA |

## I/O

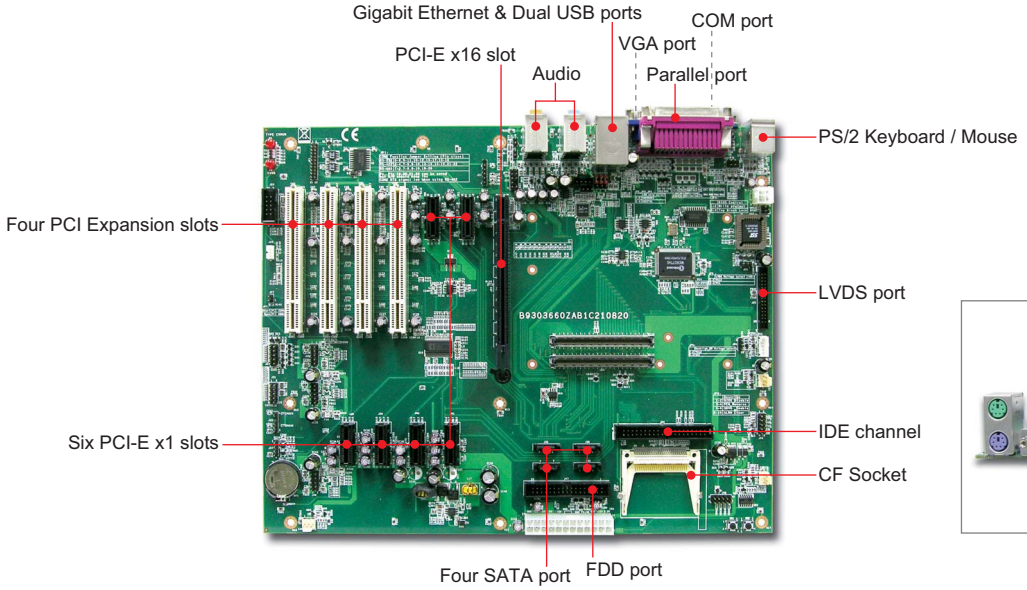
| | |
|---|---|
| MIO | N/A |
| IrDA | N/A |
| Ethernet | One Gigabit Ethernet |
| Audio | N/A |
| USB | Eight USB ports |
| Keyboard & Mouse | N/A |

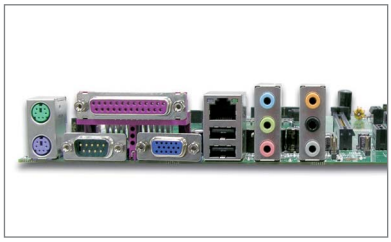
## DISPLAY

| | |
|---|---|
| Graphic Controller | Intel® 945GM integrated Intel® Graphics Media Accelerator 950 (Intel® GMA 950) |
| Graphic Memory | Dynamic share system memory up to 224MB (Intel® DVMT 3.0) or static share system memory up to 128MB |
| Display Interface | - Support CRT, LVDS and TV-out display interfaces<br>- CRT display resolution QXGA |

# PCOM-C210

**ATX Form Factor Evaluation Carrier Board For COM Express Type II Module**



**Rear I/O**

## FEATURES

- COM Express carrier board accommodates Portwell Type II COM Express module PCOM-B210 & PCOM-B211 for computing power and I/O capability evaluation
- ATX form factor is chosen because the bigger and standard board size could include more expansions and easily fix in chassis
- Power and Reset switches are mounted on-board for evaluation without chassis
- Dual BIOS design that could take place of on-module BIOS as master BIOS of the system

## ORDERING GUIDE

| | |
|---|---|
| Standard | **PCOM-C210**<br>ATX Form Factor Evaluation Board For COM Express Type II Module |

## GENERAL

| | |
|---|---|
| Com Express Module | Type II COM Express Module PCOM-B210VG or PCOM-B211VG |
| BIOS | Award BIOS (or BIOS on COM Express Module) |
| Storage Devices | EIDE: Two EIDE devices with Ultra DMA 100/66/33<br>SATA: Four SATA ports |
| Solid State Disk | One Type II CF socket |
| Watchdog Timer | Programmable via software from 0.5 sec. to 254.5 min. |
| Expansion Interface | Four PCI, six PCI Express x1 and one PCI Express x16 expansion slots (availability based on COM Express module) |
| Dimension | Dimension : 304.8(L) x 243.8(W) mm; 12"(L) x 9.6" (W)<br>PCB: 10-layer |
| Environment | Operating Temperature: 0 to 60°C<br>Storage Temperature: -20 to 80°C<br>Relative Humidity: 5% to 90%, non-condensing |

## I/O

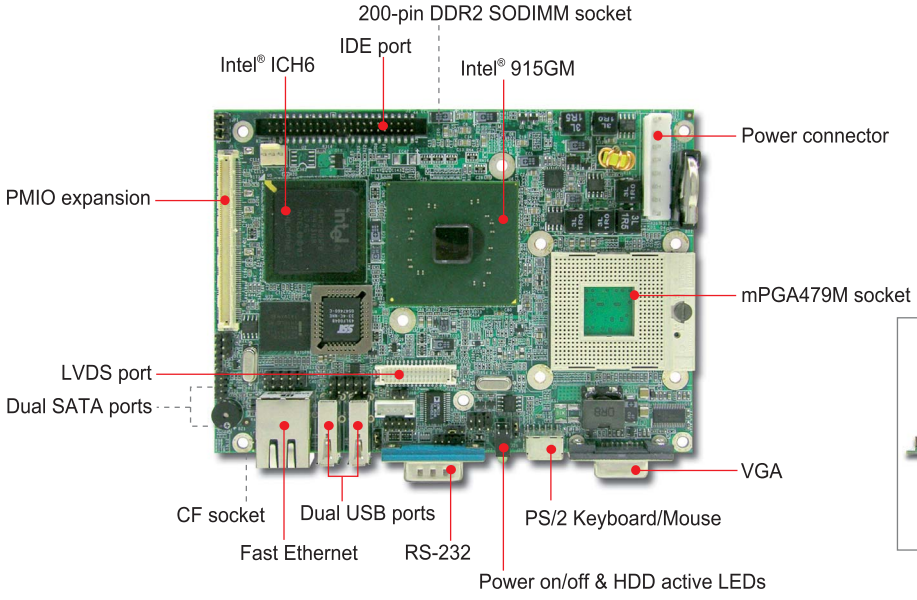
| | |
|---|---|
| MIO | One serial port, one FDD channel and one parallel port |
| IrDA | N/A |
| Ethernet | - Single 10BASE-T/100BASE-TX/1000BASE Ethernet<br>- Single RJ-45 connector with two LED indicators at rear I/O panel |
| Audio | High Definition Audio |
| USB | Six USB ports (dual ports at rear I/O panel; four ports internal) |
| Keyboard & Mouse | PS/2 keyboard & mouse |

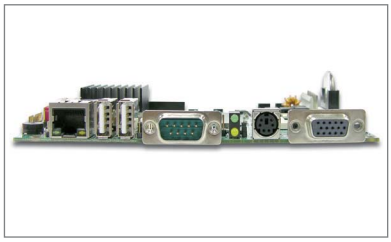
## DISPLAY

| | |
|---|---|
| Graphic Controller | Intel® 915GM integrated GMA 900 for PCOM-B210; 945GM integrated GMA 950 for PCOM-B211 |
| Graphic Memory | DVMT 3.0 share system memory up to 128MB |
| Display Interface | Support VGA, LVDS interfaces with dual display capability |

# PECX-2710VL

**Intel® Pentium® M or Celeron® M processor based Intel® ECX SBC with DDR2 SDRAM, VGA/Panel and Fast Ethernet**



**Rear I/O**

## FEATURES

- Intel® new initiative of compact 3.5" ECX form factor to fit in most wide range of system architecture
- Scalable high performance uFC-PGA socket model supports Pentium® M up to 2.0Ghz
- Dual display via CRT and LVDS interface or display interface that transformed by reserved SDVO part
- One PMIO expansion connector (with PCI, PCI Express x1, I2C, LPC, AC' 97, USB and SDVO interfaces) for versatile application

## ORDERING GUIDE

| | |
|---|---|
| Standard | **PECX-2710VL**<br>3.5" ECX base on Intel® Pentium® or Celeron M processor with DDR2 SDRAM, VGA/Panel and LAN |

## GENERAL

| | |
|---|---|
| Processor | Intel® mPGA479M to support uFC-PGA Pentium® M up to 2.0GHz with 2M L2 cache |
| Chipset/Core Logic | Intel® 915GM and ICH6 |
| System Memory | Up to 1GB DDR2 400/533 SDRAM on one SODIMM socket |
| L2 Cashe Memory | 256KB to 2MB depends on processor |
| BIOS | Award BIOS |
| SSD | Type II Compact Flash socket (Support 8~320MB) |
| Storage Devices | IDE: Two IDE devices at UMDA 33/66/100<br>SATA: Dual SATA Ports |
| Watchdog Timer | Yes |
| Expansion Interface | PMIO expansion x1 (including PCI, PCI Express x1, I2C, SDVO, LPC, AC' 97, USB) |
| Hardware Monitoring | Yes |
| Power Requirement | ATX compliant power |
| Dimension | Dimension : 146(W) x 102(L) mm; 5.75"(W) x 4.0" (L) |
| Environment | Operating Temperature: 0 to 55°C<br>Storage Temperature: -20 to 75°C<br>Relative Humidity: 5% to 95%, non-condensing |

## I/O

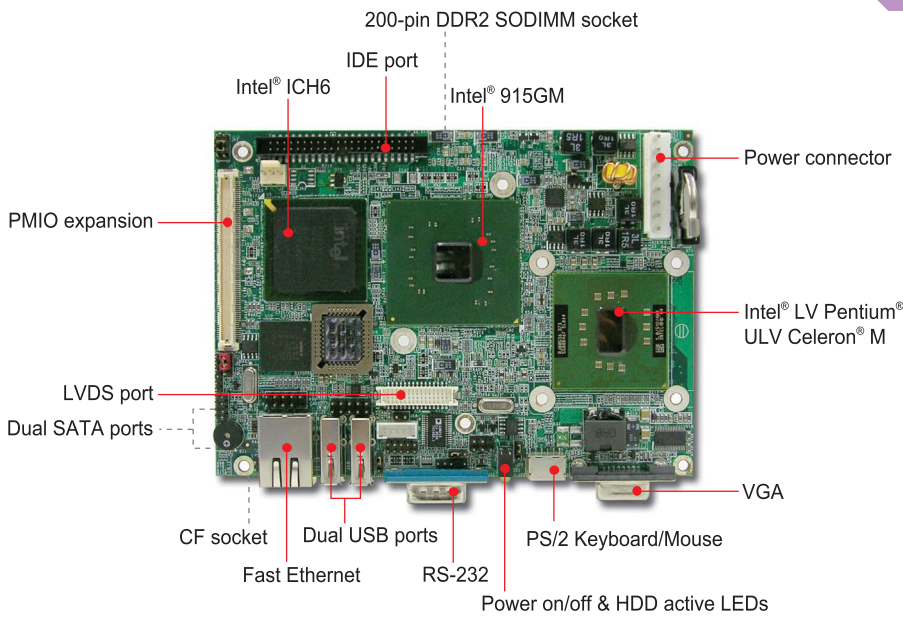
| | |
|---|---|
| MIO | RS-232 x1 |
| IrDA | Yes |
| Ethernet | One Fast Ethernet |
| Audio | AC '97 2.3 |
| USB | USB 2.0 x 4 (dual ports via pin header) |
| Keyboard & Mouse | PS/2 Keyboard/Mouse |

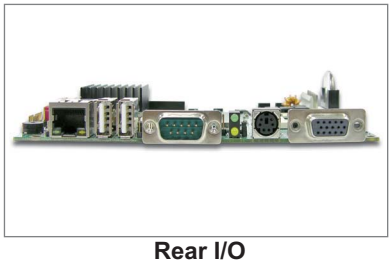
## DISPLAY

| | |
|---|---|
| Graphic Controller | Intel® 915GM integrated GMA 900 |
| Graphic Memory | DVMT 3.0 share system memory up to 128MB |
| Display Interface | - LVDS x1, CRT x1, TV-out<br>- Dual Independent Display support |

# PECX-2730VL

**Intel® LV Pentium® M or ULV Celeron® M processor based Intel® ECX SBC with DDR2 SDRAM, VGA/Panel and Fast Ethernet**



Rear I/O

## FEATURES

- Intel® new initiative of compact 3.5" ECX form factor to fit in most wide range of system architecture
- Intel® low power chipset 915GM powered by low voltage Pentium® M with frequencies of up to 1.4 GHz with 2M L2 cache; optional fan-less ultra low power model with ULV Celeron® M 1.0GHz
- Dual display via CRT and LVDS interface or display interface that transformed by reserved SDVO part
- One PMIO expansion connector (with PCI, PCI Express x1, I2C, LPC, AC' 97, USB and SDVO interfaces) for versatile application

## ORDERING GUIDE

| | |
|---|---|
| Standard | **PECX-2730VL**<br>3.5" ECX base on Intel® LV Pentium® M 1.4GHz processor with DDR2 SDRAM, VGA/ Panel and LAN<br>**PECX-2730VL-1G**<br>3.5" ECX based on Intel® ULV Celeron® M 1.0GHz processor with DDR2 SDRAM, VGA/ Panel and LAN |

## GENERAL

| | |
|---|---|
| Processor | - Intel® uFC-BGA LV Pentium M 1.4 GHz on board<br>- Intel® uFC-BGA ULV Celeron M 1.0GHz on board |
| Chipset/Core Logic | Intel® 915GM and ICH6 |
| System Memory | Up to 1GB DDR2 400/533 SDRAM on one SODIMM socket |
| L2 Cashe Memory | 256KB to 2MB depends on processor |
| BIOS | Award BIOS |
| SSD | Type II Compact Flash socket (Support 8~320MB) |
| Storage Devices | IDE: Two IDE devices at UMDA 33/66/100<br>SATA: Dual SATA Ports |
| Watchdog Timer | Yes |
| Expansion Interface | PMIO expansion x1 (including PCI, PCI Express x1, I2C, SDVO, LPC, AC' 97, USB) |
| Hardware Monitoring | Yes |
| Power Requirement | ATX compliant power |
| Dimension | Dimension : 146(W) x 102(L) mm; 5.75"(W) x 4.0" (L) |
| Environment | Operating Temperature: 0 to 55°C<br>Storage Temperature: -20 to 75°C<br>Relative Humidity: 5% to 95%, non-condensing |

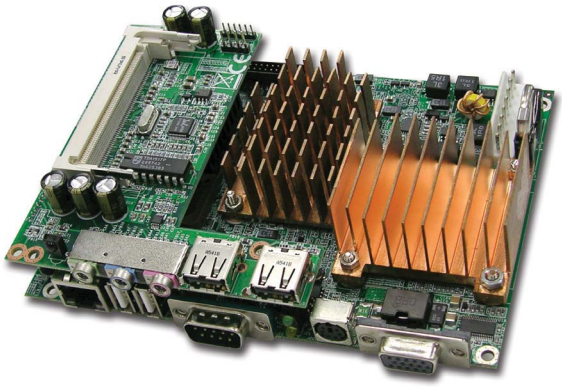
## I/O

| | |
|---|---|
| MIO | RS-232 x1 |
| IrDA | Yes |
| Ethernet | One Fast Ethernet |
| Audio | AC '97 2.3 |
| USB | USB 2.0 x 4 (dual ports via pin header) |
| Keyboard & Mouse | PS/2 Keyboard/Mouse |

## DISPLAY

| | |
|---|---|
| Graphic Controller | Intel® 915GM integrated GMA 900 |
| Graphic Memory | DVMT 3.0 share system memory up to 128MB |
| Display Interface | - LVDS x1, CRT x1, TV-out<br>- Dual independent Display support |

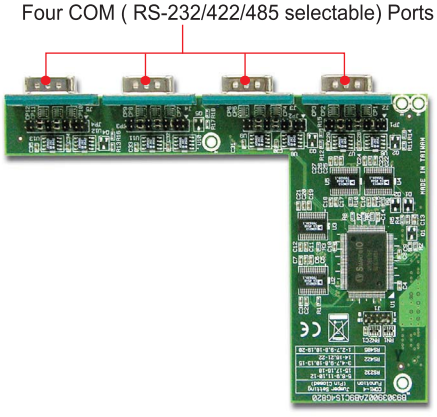
# PMIO Board

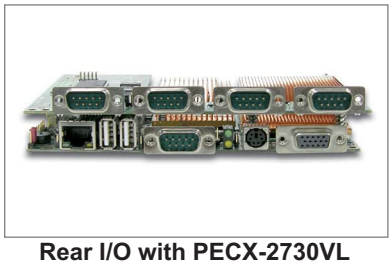


Portwell Multi I/O boards are designed dedicated to Portwell ECX board, PECX-2710VL & PECX-2730VL for expanding more functions. Functions are application oriented and could be developed based on interfaces that reserved at board-to-board connector of ECX board. For PB-C1S4G, it's solution for POS application; for PB-M1AUM, it's solution for multi-media player application. PMIO board can be created base on customer request and sample can be delivered very quickly and nicely.

## PB-C1S4G

**Multi I/O Expansion Board with Four Serial RS-232/422/485 Selectable Ports**

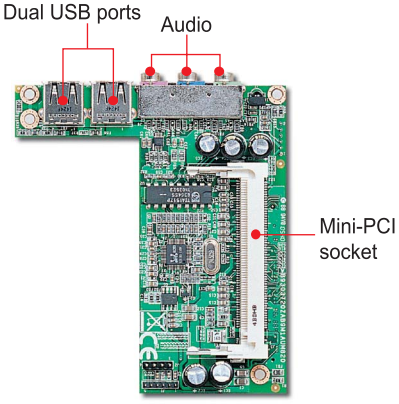


Rear I/O with PECX-2730VL

## PB-M1AUM

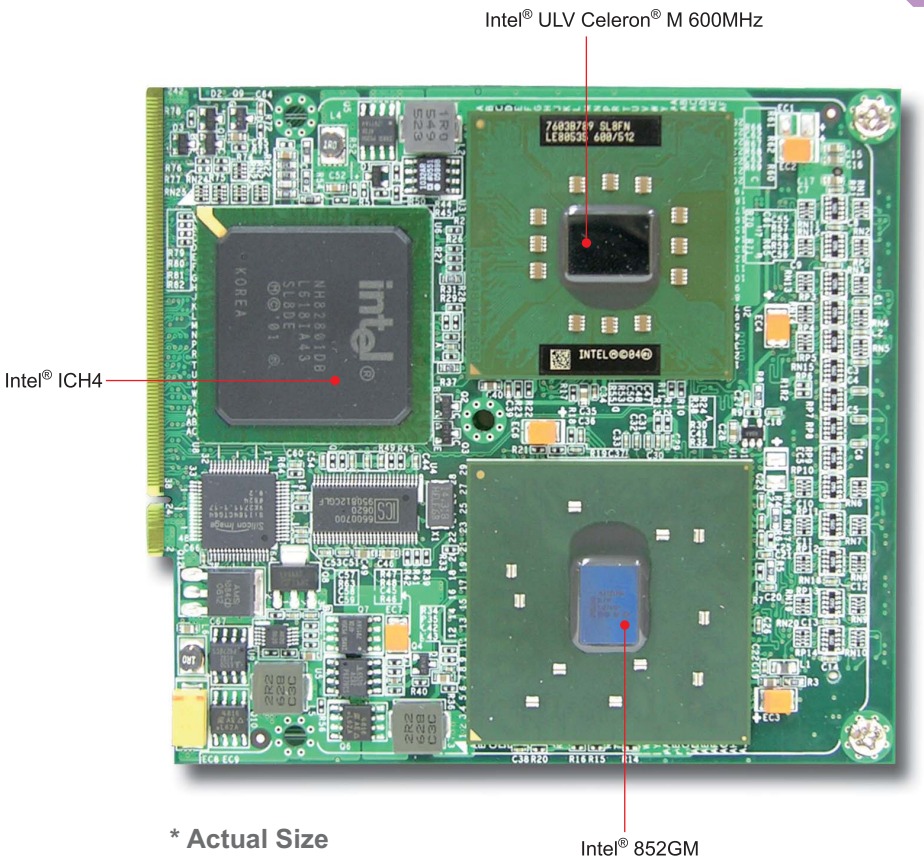
**Multi I/O Expansion Board with Mini-PCI socket, Audio and Dual USB Ports**




Rear I/O with PECX-2730VL

# POKI-1730

**Intel® ULV Celeron® M based PCM module with DDR SDRAM, Display and USB**




* Actual Size

Fan Less

Active Cooler

## FEATURES

- Portwell computing module that speeds up product time-to-market and perfect-match platform with dedicated carrier board development
- Module size is more compact than ETX that saves more space on carrier board for I/O integration
- Utilize Intel® Ultra Low Voltage Celeron® M processor and its companion chipset 852GM to provide quiet, powerful engine with competitive price
- VGA, LVDS and DVI-D display interfaces with dual display capability meet demanding of most applications
- PCI & LPC are the most flexible expansion interfaces that allow the module to pump different kinds of I/O on carrier boards

## GENERAL

| | |
|---|---|
| Processor | CPU & Package: On-board Intel® ULV Celeron® M 600MHz PS/2 KB L2 cache<br>FSB: 400MHz |
| Chipset/Core Logic | Intel® 852GM and ICH4 |
| System Memory | Up to 1GB DDR2 266 SDRAM on one 200-pin SODIMM socket |
| Expansion Interface | - Six PCI 2.2 devices<br>- Low Pin Count (LPC interface)<br>- One IDE channel<br>- AC' 97 interface<br>- Six USB 2.0 ports<br>- Power Management SMBus |
| Power Requirement | TBA |
| Dimension | Dimension : 90(L) x 100(W) mm; 3.54"(L) x 3.94" (W)<br>PCB: 8-layer |
| Environment | Operating Temperature: 0 to 60°C<br>Storage Temperature: -20 to 80°C<br>Relative Humidity: 5% to 90%, non-condensing |
| MTBF | TBA |

## ORDERING GUIDE

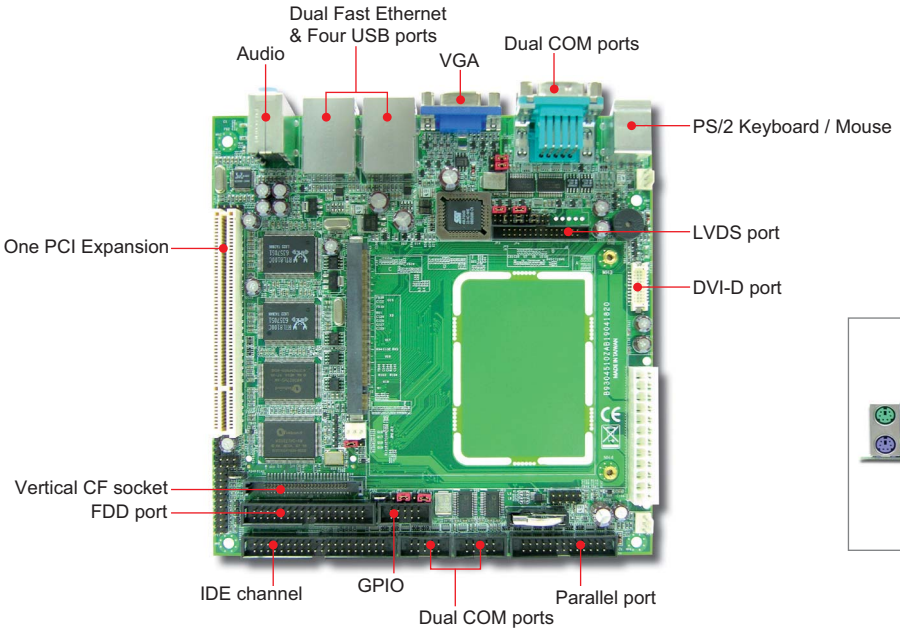
| | |
|---|---|
| Standard | **POKI-1730**<br>Intel® ULV Celeron® M processor based PCM module with DDR SDRAM, Display and USB |

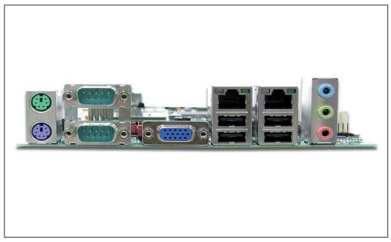
## DISPLAY

| | |
|---|---|
| Graphic Controller | Intel® 852GM integrated Extreme Graphics 2 graphics engine that support DirectX 8.0 and OpenGL 1.1 |
| Graphic Memory | Dynamic Video Memory Technology 2.0 allocates up to 64MB system memory for display |
| Display Interface | Support VGA, LVDS and DVI-D interfaces with dual display capability |

# WADE-9041

**Mini-ITX Carrier Board for Portwell Computing Module with Dual Fast Ethernet Ports, Six USB Ports and Four Serial Ports**



Rear I/O

## FEATURES

- Mini-ITX carrier board accepts Portwell Computing Module with scalable computing power, graphics engine and memory extension capability
- Four serial ports for versatile peripherals connections especially for automation and POS applications
- Dual Fast Ethernet and six USB ports equipped that are very popular and user friendly interfaces for data transmission and receiving
- VGA, LVDS and DVI-D display interfaces with dual display capability meet demanding of most applications
- One PCI expansion slot prepared for the last function that the WADE-9041 does not included yet

## ORDERING GUIDE

| | |
|---|---|
| Standard | **WADE-9041**<br>Mini-ITX Carrier Board for Portwell Computing Module with Dual Fast Ethernet Ports, Six USB Ports and Four Serial Ports |

## GENERAL

| | |
|---|---|
| PCM | POKI-1730 |
| BIOS | Award BIOS |
| Storage Devices | EIDE: Two EIDE devices with Ultra DMA 100/66/33 |
| Solid State Disk | One Type II CF socket |
| Watchdog Timer | Programmable via software from 0.5 sec. to 254.5 min. |
| Expansion Interface | One PCI add-in card |
| Dimension | Dimension : 170(L) x 170W) mm; 6.69"(L) x 6.69" (W) |
| Environment | Operating Temperature: 0 to 60°C<br>Storage Temperature: -20 to 80°C<br>Relative Humidity: 5% to 90%, non-condensing |

## I/O

| | |
|---|---|
| MIO | Four serial ports (one RS-232/422/485 selectable), one FDD channel and one parallel port |
| IrDA | N/A |
| Ethernet | - Dual 10BASE-T/100BASE-TX Ethernet<br>- PCI interface Fast Ethernet<br>- Dual RJ-45 connectors with two LED indicators at rear I/O panel |
| Audio | AC' 97 2.2 Audio |
| USB | Six USB ports (four ports at rear I/O panel; two ports internal) |
| Keyboard & Mouse | PS/2 keyboard & mouse |

## DISPLAY

| | |
|---|---|
| Graphic Controller | Intel® 852GM integrated Extreme Graphics 2 graphics engine that support DirectX 8.0 and OpenGL 1.1 on POKI-1730 |
| Graphic Memory | Dynamic Video Memory Technology 2.0 allocates up to 64MB system memory for display |
| Display Interface | Support VGA, LVDS and DVI-D interfaces with dual display capability |

# Portwell

## Together in Electric Dream!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