Embedded Solutions

EM07 - ESM with Pentium® III / Celeron®

- **Embedded System Module with:**
- **ULP Pentium® III / 933 MHz**
- **ULV Celeron® / 400 or 650 MHz**
- **Up to 512 MB DRAM, CompactFlash**
- **Dual Fast Ethernet, COM 1 (front)**
- **Optional COM 2 (front)**
- **Graphics (rear), 2 USB 1.1 (rear), (E)IDE (rear)**
- **FPGA - programmable I/O functions (rear)**
- **Stackable with PCI-104**

The EM07 is a complete embedded single-board computer for use on any carrier board in different industrial environments. The final application consists either of a stand-alone EM07, the EM07 with an application-specific carrier card and/or with additionally plugged PCI-104 modules.
The EM07 is an ideal computing platform for embedded industrial PCs, offering the whole world of Windows® and Linux based software, e.g. for infotainment applications.
It is controlled by an Ultra-Low Power Pentium® III with 933MHz or an Ultra-Low Voltage Celeron® Processor with 400MHz or 650MHz. It provides 512KB/256KB L2 cache.
The EM07 uses the Intel® 815G chip set, including graphics, which is routed to the J2 rear I/O connector. It provides dual Fast Ethernet and one or two RS232 interfaces via RJ45 connector or 9-pin D-Sub at the front. It also has an SO-DIMM socket and a CompactFlash interface on board. Further I/O can be routed to the I/O connector of the ESM by means of an FPGA -- with the corresponding connectors available on a carrier board. The standard I/O routed to the carrier board via the J2 system connector includes two additional serial interfaces, (E)IDE, two onboard USB 1.1 interfaces, the onboard LPC bus, and a Codec connection for AC'97 audio. In the same flexible way, additional functionality such as serial interfaces, CAN bus controllers, protocol converters, touch controller etc. can also be realized in the FPGA to the needs of the individual application. Before boot-up of the system, the FPGA is being loaded from the boot Flash. Updates of the FPGA contents can be made inside the boot Flash during operation and are available after a re-boot of the system.
For a first evaluation of the functions of the EM07 it is strongly recommended to use the EK05 ESM starter kit. The kit consists of the standard CPU module, the carrier card with I/O connectors, an external PSU, and an adapter for mounting a PCI-104 module.
ESM modules are complete computers on a plug-on module. They consist of the hardware (CPU, chip set, memory, I/O) which is not fixed to any application-specific function, and an FPGA programmed in VHDL code, which provides I/O that is also still independent of a specific application. ESM modules are based on PCI. They have two system connectors: J1 has a fixed signal assignment, while J2 is variable depending on the final application-specific configuration of the ESM and the carrier board. J2 also feeds the I/O signals of the functions programmed in the FPGA to the carrier card.

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Technical Data

CPU
- Celeron® or Pentium® III
- 400MHz or 650MHz or 933MHz processor core frequency
- 256KB or 512KB L2 cache
- 100MHz or 133MHz system bus frequency
- 33MHz APIC bus frequency

Graphics
- Integrated VGA graphics controller
- Connection via rear I/O connector (J2)

Memory
- 512MB SDRAM
- One 144-pin SO-DIMM socket for synchronous DRAM modules
- 133/100MHz memory bus frequency
- CompactFlash interface
- Type I
- True IDE
- DMA is supported

Interfaces
- 10/100Base-T PCI Ethernet controller
- 82551(ER) controller
- Two RJ45 (or 9-pin D-Sub) interfaces at front panel
- Four onboard LEDs to signal LAN Link and Activity status
- Supports network boot
- Two USB 1.1 interfaces
- UHCI implementation
- Via rear I/O (J2)
- Data throughput up to 12Mbits/s
- Supplies High-Power (500mA) without external power supply
- AC'97 audio

Mass Storage
- Fast IDE ports
- One IDE hard-disk/CD-ROM port via I/O connector to carrier board
- One IDE port for local CompactFlash

Additional I/O through FPGA
- Available at I/O connector
- Depending on FPGA composition
- COM 1 and 2 at the front via RJ45 (or 9-pin D-Sub) connector

PCI Interface
- 32-bit PCI interface at PCI-104 connector J1
- Support of 4 external masters

Miscellaneous
- Real-time clock, backed up by the carrier board
- Integrated hardware monitor

Electrical Specifications
- Supply voltage/power consumption:
- +5V (4.85V..5.25V), tbd.
- +3.3V (3.2V..3.4V), tbd.
- MTBF: 100,000h @ 50°C

Mechanical Specifications
- Dimensions: conforming to ESM specification (PCB: 149mm x 71mm)
- Weight: tbd. (incl. heat sink)

Environmental Specifications
- Temperature range (operation):
- 0..+60°C
- Industrial temperature range on request
- Airflow: min. 10m³/h
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock: 15g/11ms
- Bump: 10g/16ms
- Vibration (sinusoidal): 2g/10..150Hz

Safety
- PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers

EMC
- Tested according to EN 55022 / 1999-05 (radio disturbance) and EN 55024 / 1999-05 (immunity) with regard to CE conformity

Software Support
- Award BIOS
- Windows (on request)
- Linux (on request)
- VxWorks (on request)
- QNX (on request)
- RTX (on request)

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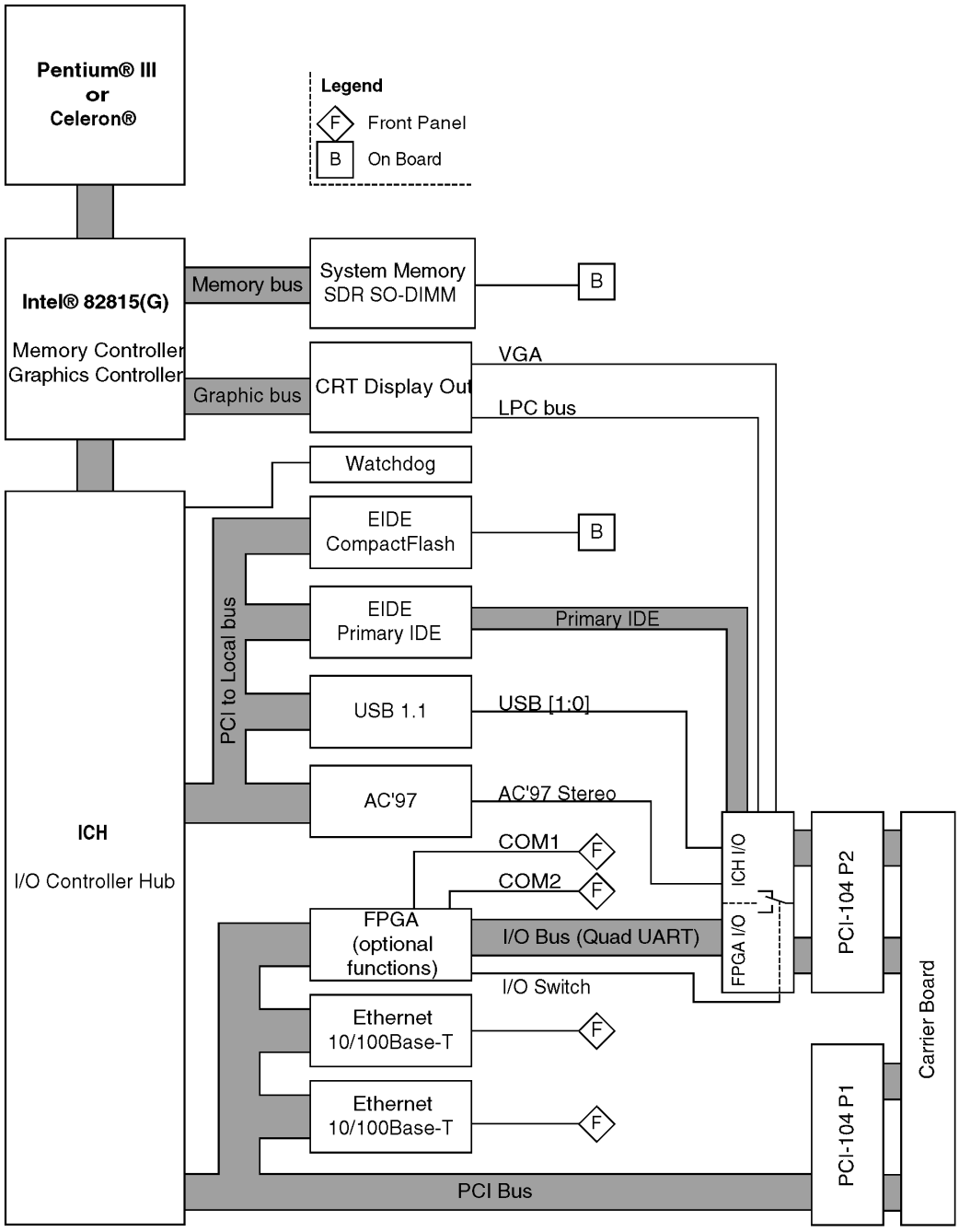
Diagram



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Related Products

Standard Hardware

02F011-00	F11, 3U 3-slot 32-bit/33MHz CompactPCI system slot SBC with ULV Pentium® III Celeron® 650MHz, 512MB SDRAM, 2MB SRAM, CompactFlash slot, 2.5" hard disk slot, dual Fast Ethernet (RJ45 front), COM 1 (D-Sub front), dual USB 1.1 (front), keyboard/mouse (front), VGA graphics controller, up to 1600 x 1200 pixels, standard FPGA content: dual UART, SRAM, GPIO; operation temperature 0..+60°C

Please refer to our ESM - Embedded System Modules compare chart for a selection of further single-board computers with different processors and on-board functionality.

FPGA IP Cores

This MEN board offers the possibility to add customized I/O functionality in FPGA. Every standard board comes with a preconfigured FPGA configuration. For additional functions already developed by MEN please refer to our FPGA IP Core overview. More IP cores that can be used in combination with MEN IP cores are available for example from www.altera.com or www.opencores.org. MEN also offers integration of existing and development ofnew (customized) IP cores. Depending on the hardware platform, SA adapters can be used to realize the physical lines - see below.

Altera offers free download of its FPGA development software: The Quartus II Web Edition software includes a complete environment for FPGA and CPLD design, including schematic- and text-based design entry, integrated VHDL and Verilog HDL synthesis and support for third-party synthesis software, SOPC Builder system generation software, place-and-route, verification, and programming. For more information and free download of the software please refer to www.altera.com/products. The Altera Tools Selector guide describes the Altera tool offerings and requirements. The online version of the document is available at www.altera.com/literature.

Accessories

For more functions realized with SA adapters, see the listing on MEN's website. You can also view our SA adapter compare chart for a quick overview of different functions. Please contact sales to make sure that these SA adapters can be used in the board configuration you are looking for.

For the most up-to-date ordering information and direct links to other data sheets and downloads, see the EM07 online data sheet under www.men.de. --> Click here!

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