

EK6N – ESM™ Starter Kit with EM1N / MPC5200B COM

- **EM1N with MPC5200B / 384 MHz**
- **256 MB DDR SDRAM, 1 GB NAND Flash**
- **2 MB SRAM, 16 MB graphics memory**
- **2 Fast Ethernet, COM, USB, 2 CAN bus**

- **FPGA with additional I/O:**
- **Graphics, SPI, 4 UARTs, IDE**

- **ATX-compatible carrier card:**
- **1 ESM™ slot, 3 PCI slots**
- **Graphics, touch, 1 USB 2.0, IDE, 2 COMs**

- **Accessories:**
- **External PSU, PCI-104 adapter**
- **VGA cable, RJ45 to D-Sub cable**



Embedded System Modules are complete computers on a module. A final application consists either of a stand-alone ESM™, an ESM™ with an application-specific carrier card and/or an ESM™ with additionally plugged PCI-104 modules.

The EK6N is a starter kit that allows evaluation of the functions of the EM1N ESM™. The kit consists of the CPU module, an FPGA with additional I/O functions, the carrier card, memory, PSU, various cables, and an adapter for mounting a PCI-104 module. The EK6N provides versatile mounting options and can also be installed in a standard PC.

After evaluation, the design overhead for each application is limited to I/O. Depending on the application and quantity it may be necessary to develop a simple carrier card, choose PCI-based standard components, load additional I/O functions into the FPGA, write software drivers for those additional functions, or design a housing.

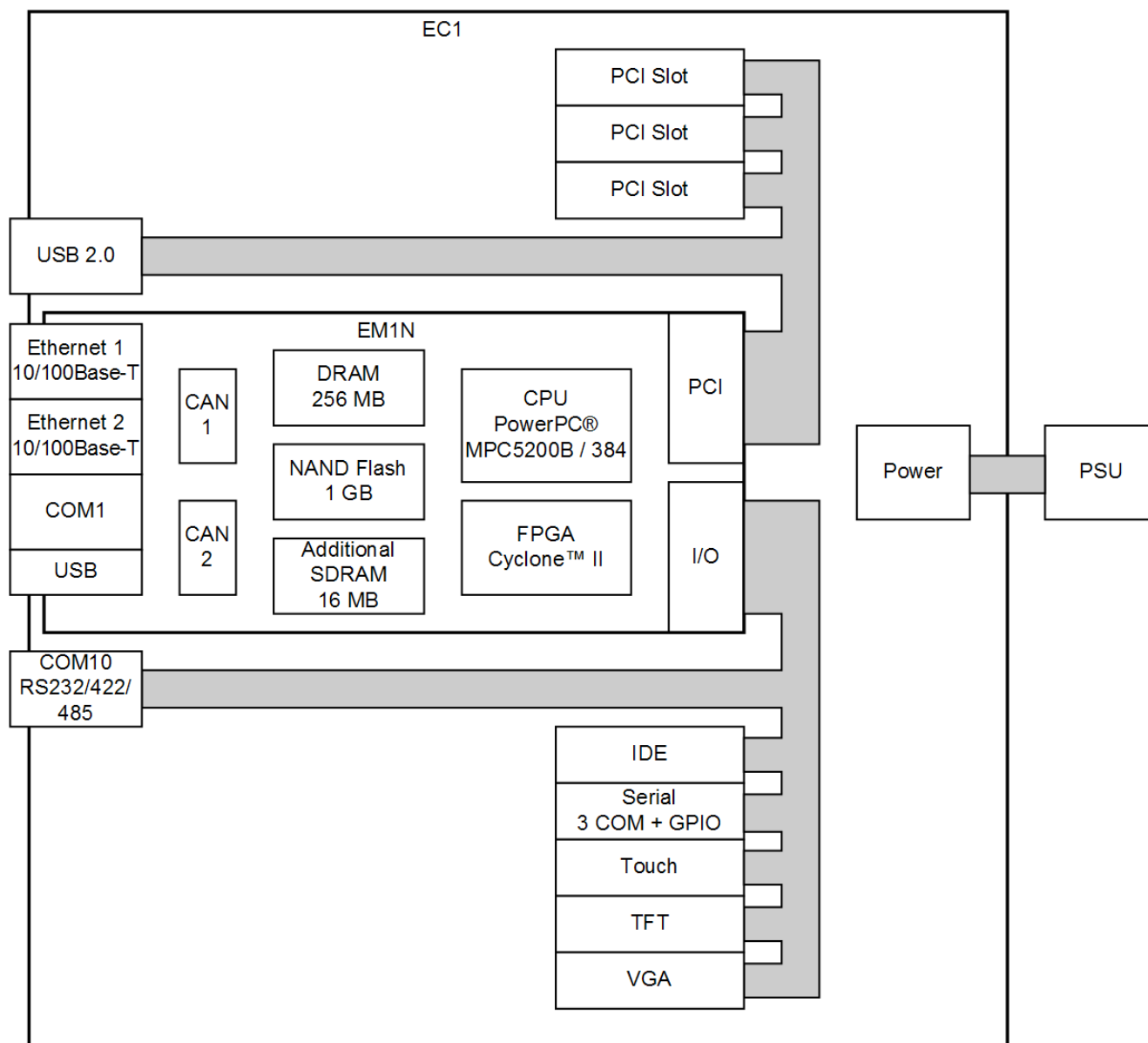
The EM1N is controlled by the MPC5200B PowerPC® processor that was especially developed for automotive

applications. It is equipped with soldered DDR SDRAM, on-chip NAND Flash, graphics memory, boot Flash and battery-backed SRAM. The EM1N provides two Fast Ethernet interfaces, one serial line and USB 1.1 at its front panel. Two CAN controllers with V2.0A/B CAN protocol are included in the MPC5200B. The physical CAN interfaces are accessible via SA-Adapters™ on the EM1N itself. Further serial interfaces controlled by the FPGA can be accessed using SA-Adapters™ via the carrier board.

Additional I/O functionality is implemented in the onboard FPGA, comprising graphics and touch, IDE and additional UARTs. The physical interfaces are accessible on the carrier board which is included in the kit. Separate SA-Adapters™ are needed for some of the UARTs provided in the FPGA. The functionality of the FPGA is dynamically loaded by the application software.

The ATX-compatible carrier board provides the mechanical platform, the power supply, a USB 2.0 interface and the I/O access for the FPGA functions. It comes with one ESM™ slot and three PCI slots, which allow the use of standard extension cards in the PC.

Diagram



Technical Data

ESM™ Carrier Card

- One ESM™ slot
- J1 and J2 assembled
- I/O connectors
 - USB 2.0
 - RS232/422/485 COM10 interface
 - Quad serial I/O interface (3 COM, GPIO)
 - IDE connector
 - TFT connector
 - Touch panel connector
 - VGA connector
- PCI interface
 - Three PCI slots
 - 32-bit/32-MHz, 5V V(I/O)
 - Compliant with PCI Specification 2.2
- Reset button and power LED

ESM™ Module EM1N

- CPU
 - PowerPC® MPC5200B
 - 384MHz
- Memory
 - 256MB DDR SDRAM, soldered
 - 1GB soldered NAND Flash, FPGA-controlled
 - 2MB boot Flash
 - 2MB battery-backed SRAM
 - 16MB SDRAM (graphics/NAND firmware)
- Mass storage
 - Fast IDE port for IDE devices (40-pin, via ESM™ carrier)
 - PIO mode 0 support
 - 1GB soldered ATA NAND Flash, FPGA-controlled
- Graphics: TFT/VGA and touch panel, connectors on carrier card
- I/O at front panel
 - One USB 1.1, on Series A connector
 - Two 10/100Base-T Ethernet channels, on RJ45 connectors
 - One RS232 UART (COM1), on RJ45 connector
- I/O via onboard connectors
 - Two CAN bus interfaces, via SA-Adapters™
- I/O via carrier card
 - Accessible on ESM™ carrier
 - One UART interface (COM10), on D-Sub connector
 - Three UART interfaces (COM11..COM13), via SA-Adapters™
 - 5 GPIO lines, on 40-pin serial I/O connector
- Functions in FPGA
 - Main bus interface
 - 16Z070_IDEDISK - IDE controller for NAND Flash
 - 16Z043_SDRAM - Additional SDRAM controller (16MB)
 - 16Z023_IDENHS - IDE controller (PIO mode 0; non-hot-swap)
 - 16Z044_DISP - Display controller (800 x 600, 60Hz/70Hz, 6-bit RGB)
 - 16Z031_SPI - SPI touch panel controller
 - 16Z087_ETH - Ethernet controller (10/100Base-T)
 - 16Z025_UART - UART controller (controls COM10..COM13)
 - 16Z034_GPIO - GPIO controller (5 lines)
 - The FPGA offers the possibility to add customized I/O functionality. See FPGA.
- PCI interface
 - 32-bit/32-MHz PCI interface at PCI-104 connector J1
 - Compliant with PCI Specification 2.2
 - Supports four external masters

Technical Data

Accessories	■ External PSU ■ VGA cable ■ RJ45 to D-Sub cable ■ Adapter for mounting of one PCI-104 module ■ SA-Adapter™ ribbon cable for 40-pin connector with four 10-pin connectors (not included in standard delivery)
Electrical Specifications	■ Supply voltage/power consumption: □ +24V (-35%/+50%), 0.3A ■ MTBF: 179,474h @ 40°C according to IEC/TR 62380 (RDF 2000)
Mechanical Specifications	■ Dimensions: □ Carrier: conforming to Mini-ATX standard (PCB: 170mm x 150mm) □ ESM™: conforming to ESM™ specification (PCB: 149mm x 71mm), Type I-S ■ Weight: □ Carrier: 200g □ ESM™: 90g (w/o heat sink)
Environmental Specifications	■ Temperature range (operation): □ 0..+60°C □ Airflow: natural convection ■ 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
BIOS	■ MENMON™
Software Support	■ VxWorks® ■ Linux (ELinOS) ■ QNX® ■ PikeOS (partitionable RTOS) certified platform ■ MSCAN/Layer2 support: MEN Driver Interface System (MDIS™ for all supported operating systems) ■ For more information on supported operating system versions and drivers see Downloads.

FPGA

This product offers the possibility to add customized I/O functionality in FPGA.

Flexible Configuration	■ Customized I/O functions can be added to the FPGA. ■ It depends on the board type, pin counts and number of logic elements which IP cores make sense and/or can be implemented. Please contact MEN for information on feasibility. ■ You can find more information on our web page "User I/O in FPGA"
FPGA Capabilities	■ FPGA Altera® Cyclone® II EP2C20 □ 18,752 logic elements □ 239,616 total RAM bits ■ Connection □ Functions available via onboard connectors □ SA-Adapters™ can be used to realize the physical lines of some interfaces. ■ MEN offers an FPGA Development Package for implementation of customized IP cores.
MEN IP Cores	■ MEN offers a large number of standard IP cores. ■ Examples: □ IDE (e.g. PIO mode 0, UDMA mode 5) □ UARTs □ CAN bus □ Display control □ Fast Ethernet (10/100Base-T) □ ... ■ For IP cores developed by MEN please refer to our IP core overview. □ IP Core compare chart (PDF) ■ MEN also offers development of new (customized) IP cores.
Third-Party IP Cores	■ Third-party IP cores can also be used in combination with MEN IP cores. ■ Examples: □ www.altera.com □ www.opencores.org
FPGA Design Environment	■ Altera® offers free download of Quartus® II Web Edition □ Complete environment for FPGA and CPLD design □ Includes 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 ■ Altera® Quartus® II Web Edition FPGA design tool

Ordering Information

Standard EK6N Models	08EK06N00	ESM™ evaluation kit for EM1N: Mini ATX carrier board, EM1N with PowerPC® MPC5200B / 384 MHz, 256 MB DDR SDRAM, 1 GB NAND Flash, 2 MB SRAM, 16 MB graphics memory, 2 MB boot Flash, 2 Fast Ethernet, 1 UART, 1 USB 1.1, graphics, IDE, RJ45 to D-Sub cable, VGA cable, external PSU and adapter for mounting of one PCI-104 module, 0..+60°C
SA-Adapters™	08SA01-00	RS232, not optically isolated, 0..+60°C
	08SA02-00	RS422/485, half duplex, optically isolated, 0..+60°C
	08SA02-01	RS422/485, full duplex, optically isolated, 0..+60°C
	08SA03-00	RS232, optically isolated, 0..+60°C
	08SA08-00	CAN ISO high-speed, optically isolated, 0..+60°C
	08SA22-00	IBIS master SA-Adapter™, -40..+85°C screened
	08SA22-01	IBIS slave SA-Adapter™, -40..+85°C screened
	08SA25-00	GPS receiver, isolated, -40..+85°C screened
	08SA26-00	RS422 with 15-pin D-Sub connector, with handshake signals (RTS, CTS, DCD, DTR), coated, -40..+85°C screened
Software: FPGA	16EK06N00	EK6N FPGA development package (MEN), including net lists of all IP cores being part of the EK6N standard factory configuration, top file, and Altera® Quartus® project (license not included in EK6N starter kit)
Software: Linux	This product is designed to work under Linux. See below for potentially available separate software packages from MEN.	
	10EM01-90	Linux BSP (MEN) for EM1, EM1A, EM1N, EK6, EK6N, F12, F12N and PP1 under ELinOS 5.0 (rpm for direct installation in ELinOS)
	This product is designed to work under ELinOS Embedded Linux by Sysgo. For more information and product support please contact www.sysgo.com .	
	13Z015-06	MDIS5™ low-level driver sources (MEN) for 16Z029_CAN (MSCAN/Layer2)
Software: VxWorks®	13Z077-90	Linux native driver (MEN) for 16Z077_ETH and 16Z087_ETH
	This product is designed to work under VxWorks®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	10EM01-60	VxWorks® BSP (MEN) for EM1, EM1A, EM1N, EK6, EK6N, F12N and F12
	13Z015-06	MDIS5™ low-level driver sources (MEN) for 16Z029_CAN (MSCAN/Layer2)

Ordering Information

Software: QNX®

This product is designed to work under QNX®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.

10EM01-40	QNX® 6.3 SP3 BSP (MEN) for EM1, EM1A, EM1N, EK6, EK6N, F12 and F12N
10EM01-41	QNX® 6.4.1 BSP (MEN) for EM1, EM1A, EM1N, EK6, EK6N, F12 and F12N
10EM01-42	QNX® 6.5.0 BSP (MEN) for EM1, EM1A, EM1N, EK6, EK6N, F12 and F12N
13Z015-06	MDIS5™ low-level driver sources (MEN) for 16Z029_CAN (MSCAN/Layer2)
13Z025-40	QNX® 6.3 native driver (MEN) for 16Z025_UART and 16Z125_UART
13Z025-41	QNX® 6.4 native driver (MEN) for 16Z025_UART and 16Z125_UART
13Z025-42	QNX® 6.5 native driver (MEN) for 16Z025_UART and 16Z125_UART
13Z087-40	QNX® native driver (MEN) for 16Z087_ETH

Software: PikeOS

This product is designed to work under PikeOS by Sysgo. PikeOS is a real-time operating system for use in safety and mission-critical systems. For more information and product support please contact www.sysgo.com.

Software: Firmware/BIOS

MENMON™ is MEN's firmware/BIOS for PowerPC® platforms.

14EM01-00	MENMON™ (Firmware) for EM1, EM1A, EM1N, F12 and F12N (object code)
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For operating systems not mentioned here [contact MEN sales](#).

Documentation

20EK06N00	EK6N User Manual
20EM00-00	ESM™ Specification
22Z025-ER	16Z025_UART Errata

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