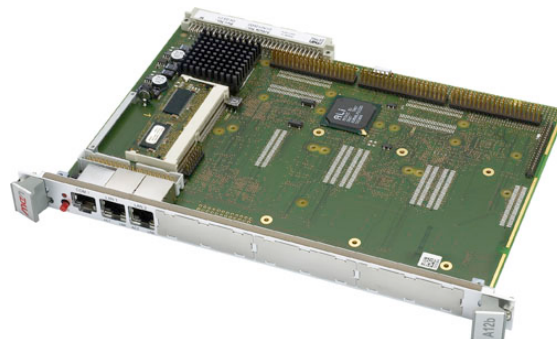# A12B – 6U VMEbus MPC8245 CPU Board (M-Modules™)

- **PowerPC® MPC8245 / 300 MHz**
- **VMEbus master and slave**
- **256 MB DRAM, CompactFlash®**
- **Dual 10/100-Mbit Fast Ethernet**
- **4 COMs, USB, IDE, keyboard/mouse**
- **3 M-Module™ slots**
- **MENMON™ BIOS for PowerPC® cards**

The A12B is a single-board computer for embedded applications based on the PowerPC® MPC 8245. It can be used as a master or slave in a VMEbus environment or as a stand-alone card. The A12 provides up to 1MB local dual-ported SRAM for slave access and communication between the local CPU and another VMEbus master.

The CPU card comes with the MPC8245 PowerPC® with 300MHz clock frequency and a local 32-bit/33-MHz PCI data bus. It is a complete state-of-the-art SBC offering DRAM, Flash and CompactFlash® memory, dual Fast Ethernet, 4 COMs, USB, IDE and keyboard/mouse interfaces as well as an optional onboard hard disk. A software-loadable FPGA is available for
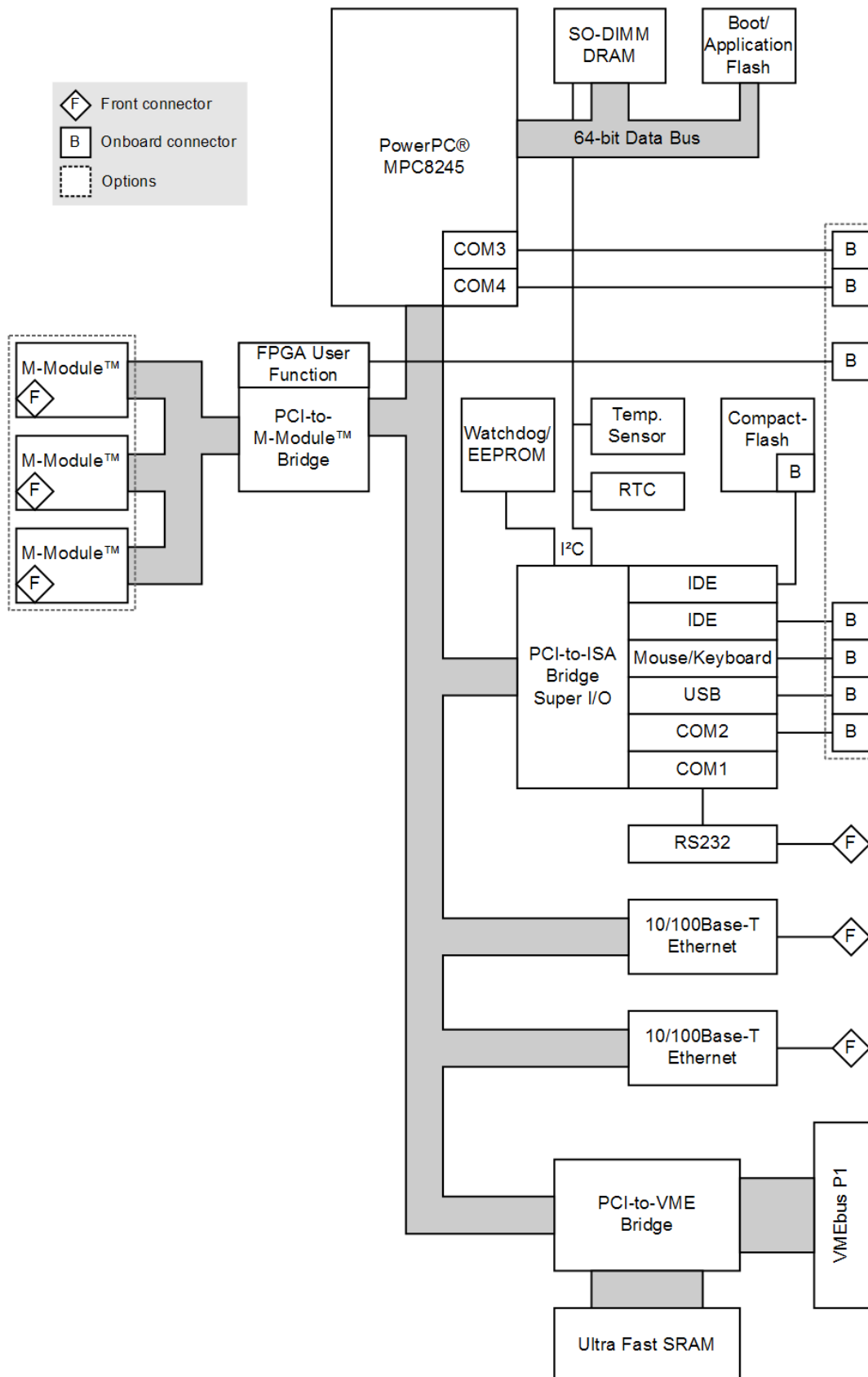
individual user-defined functions such as additional UARTs, a CAN bus interface, DSP functions etc.

In addition, the A12B CPU board can be equipped with M-Module™ mezzanine cards. M-Modules™ are recommended for real-world I/O like analog/binary process I/O and instrumentation I/O. The modular combination of I/O functionality on a single-board computer allows to build up tailored control systems which appear as customized solutions based on standard components.

The A12 comes with MENMON™ support. This firmware/BIOS can be used for bootstrapping operating systems (from disk, flash or network), for hardware testing, or for debugging applications without running any operating system.

The A12 single-board computer is partly compatible with the MVME2100 board by Motorola.

Diagram

Legend:
- F — Front connector
- B — Onboard connector
- Options

Diagram elements: PowerPC® MPC8245, SO-DIMM DRAM, Boot/Application Flash, 64-bit Data Bus, COM3 (B), COM4 (B), FPGA User Function (B), PCI-to-M-Module™ Bridge, M-Module™ (F) ×3, Watchdog/EEPROM, Temp. Sensor, RTC, Compact-Flash (B), I²C, PCI-to-ISA Bridge Super I/O with IDE, IDE (B), Mouse/Keyboard (B), USB (B), COM2 (B), COM1, RS232 (F), 10/100Base-T Ethernet (F) ×2, PCI-to-VME Bridge, VMEbus P1, Ultra Fast SRAM

Technical Data

CPU	■ PowerPC® □ MPC8245 □ 300 MHz □ Double precision FPU
Memory	■ L1 Cache integrated in MPC8245 ■ Up to 512 MB SDRAM system memory □ One 144-pin SO-DIMM slot for SDRAM modules □ 100 MHz memory bus frequency ■ 2 MB Flash ■ Serial EEPROM 2 KB for factory settings ■ CompactFlash® card interface □ Via onboard IDE □ Type I □ True IDE
Mass Storage	■ Parallel IDE (PATA) □ One port for local CompactFlash® □ One port for local hard-disk drive □ Drive can be connected via ribbon cable or mounted directly on the CPU board using MEN adapter kit □ Only one VMEbus slot needed even with hard disk
I/O	■ USB □ One USB 1.1 port □ Available via I/O connector □ External PHY □ Data rates up to 12 Mbit/s ■ Ethernet □ Two 10/100Base-T Ethernet channels □ RJ45 connector at front panel with two LEDs ■ One RS232 UART (COM1) □ RJ45 connector at front panel □ 16-byte transmit/receive buffer □ Handshake lines: CTS, RTS; DCD, DSR, DTR ■ One UART (COM2) □ Accessible via I/O connector □ Physical interface using SA-Adapter™ via 10-pin ribbon cable on I/O connector □ RS232..RS485, isolated or not: for free use in system (e.g., cable to front) □ 16-byte transmit/receive buffer □ Handshake lines: CTS, RTS; DCD, DSR, DTR; RI ■ Two UARTs (COM3/COM4) □ Accessible via I/O connector □ Physical interface using SA-Adapter™ via 10-pin ribbon cable on I/O connector □ RS232..RS485, isolated or not: for free use in system (e.g., cable to front) □ Handshake lines: none ■ PS/2 keyboard/mouse □ Accessible via I/O connector □ Requires external PHY
Mezzanine Slots	■ Three M-Module™ slots □ Compliant with M-Module™ standard □ Characteristics: D16, D32, A08, A24, INTA, INTC
Miscellaneous	■ Serial real-time clock with integrated 56-byte NVRAM ■ Serial hardware watchdog in supervisory circuit ■ Temperature sensor ■ User LEDs (external) ■ Hex switch for user settings

Technical Data

Local PCI Bus	■ 32-bit/33-MHz, 3.3V V(I/O) ■ Compliant with PCI Specification 2.2

VMEbus	■ Slot-1 function with auto-detection
	■ Master
	  □ D08(EO):D16:A24:A16
	  □ Transfer rate max. 7 MB/s
	■ Slave
	  □ D08(EO):D16:A24:BLT
	  □ Transfer rate max. 15 MB/s
	■ Up to 1 MB shared fast SRAM
	■ Interrupter D08(O):I(7-1):ROAK
	■ Interrupt handler D08(O):IH(7-1)
	■ Single level 3 fair requester
	■ Single level 3 arbiter
	■ Bus timer

Electrical Specifications	■ Supply voltage/power consumption:
	  □ +5 V (-3%/+5%), 1.65 A typ.
	  □ ±12 V (-5%/+5%), only used for mezzanines, tbd.
	■ MTBF: 63 000 h @ 50°C (derived from MIL-HDBK-217F)

Mechanical Specifications	■ Dimensions: standard double Eurocard, 233.3 mm x 160 mm ■ Weight (without mezzanines and accessories): 273 g

Environmental Specifications	■ Temperature range (operation):
	  □ 0..+60°C or -40..+85°C (screened)
	  □ Airflow: min. 10 m³/h
	■ Temperature range (storage): -40..+85°C
	■ Relative humidity (operation): max. 95% non-condensing
	■ Relative humidity (storage): max. 95% non-condensing
	■ Altitude: -300 m to +3000 m
	■ Shock: 15 g, 11 ms
	■ Bump: 10 g, 16 ms
	■ Vibration (sinusoidal): 2 g, 10..150 Hz
	■ Conformal coating on request

Safety	■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	■ Tested according to EN 55022 (radio disturbance), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst)
BIOS	■ MENMON™
Software Support	■ Linux ■ VxWorks® ■ QNX® ■ OS-9® ■ For more information on supported operating system versions and drivers see Downloads.

Configuration & Options

Standard Configurations

Article No.	CPU Type	Clock	System RAM	CFlash	Boot Flash	Mezzanine Slots	Operating Temperature
01A012B00	MPC8245	300 MHz	256 MB	0 MB	2 MB	3 M-Modules	0..+60°C

Options

CPU	■ MPC8245, 300 MHz
Memory	■ System RAM 　□ 64 MB, 128 MB, 256 MB or 512 MB ■ CompactFlash® 　□ 0 MB up to maximum available ■ Boot Flash 　□ 2 MB
SA-Adapters™	■ Up to three SA-Adapters™ for UART functions (COM2..COM4) ■ RS232, RS422, RS485
Operating Temperature	■ 0..+60°C ■ -40..+85°C

Please note that some of these options may only be available for large volumes. Please ask our sales staff for more information.

Ordering Information

Standard A12B Models	**01A012B00**	MPC8245, 300MHz, 256 MB SDRAM, 2MB Flash, 3 M-Module™ slots, 0..+60°C
Related Hardware	**01A021B00**	A21B, Freescale™ QorIQ™ single-core P1013, 800 MHz, 1 GB DDR3 ECC SDRAM, 32 MB Flash, 3 M-Module™ slots, -40 to +85°C screened
Memory	**0751-0042**	CompactFlash® card, 4 GB, Type I, fixed bit set, -40..+85°C
	0751-0055	CompactFlash® card, 8 GB, Type I, fixed bit set, -40..+85°C
	0751-0058	CompactFlash® card, 16 GB, Type I, fixed bit set, -40..+85°C
	0751-0061	CompactFlash® card, 2 GB, Type I, fixed bit set, -40 to +85°C
SA-Adapters™		You can find a more detailed overview of possible carrier board/SA-Adapter™ combinations along with software support in our option matrix (PDF).
	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
	08SA02-07	RS422/485, full duplex, optically isolated, -40..+85°C screened
	08SA03-00	1 RS232, optically isolated, 0..+60°C
	08SA03-01	1 RS232, optically isolated, -40..+85°C screened
Systems & Card Cages		MEN delivers turn-key systems completely installed (hardware, operating system, accessories), wired and tested. Different rack sizes, power supplies and backplanes on request. For details please contact your local sales representative.
Miscellaneous Accessories	**05AD67-00**	IDE mounting kit 44-pin to 44-pin; 50.8 mm; installation kit for Kahlua Box or A12, A15, D3 with AD67, temperature range: -40..+85°C
	05A012-00	Mounting kit for 2.5" hard disk (9.5mm adapter) for A12, D3, SC13
	05A012-01	Mounting kit for 2 SA adapters for A12/A15/D3, incl. 6U 1-slot VME or CompactPCI® front panel incl. ribbon cable, without SA adapters
	05F006-00	RS232 interface cable RJ45 to 9-pin D-Sub (1 COM to 1 COM), 2m
	05M000-17	25 mounting screw sets to fix M-Modules™ on carrier boards
	0710-0037	PATA hard disk drive 2.5", 24/7, 80GB, 4200rpm, -15..+70°C
	08AD67-01	I/O extension 19" 6U 4HP incl. 1 USB connector, 1 keyboard connector, 1 mouse connector; prepared for 3 SA adapters, prepared for HDD 2.5", reset, abort, 0..+60°C
Software: Linux		This product is designed to work under Linux. See below for potentially available separate software packages from MEN.
		This product is designed to work under ELinOS Embedded Linux by SYSGO. For more information and product support please contact www.sysgo.com.
	13Z014-90	Linux device driver (MEN) for PCI-to-VME bridge on A12, A13, A14, A15, A17, A19, A20, A21B/A21C and B11
Software: VxWorks®		This product is designed to work under VxWorks®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.
	10F001N60	VxWorks® BSP (MEN) for A15, F1N, B11, A12, D3, SC13 and Kahlua Box

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.
	10F001N40 QNX® BSP (MEN) for F1N, B11, A12, A15, D3, SC13 and Kahlua Box
Software: OS-9®	This product is designed to work under OS-9®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.
	10F001N01 OS-9®(000) V.2.2/3.x BSP (object code, MEN) for F1N, B11, A12, D3, SC13 and Kahlua Box
	10F001N02 OS-9®(000) V4.2 BSP (object code, MEN) for F1N, B11, A12, A15, D3, SC13 and Kahlua Box
Software: Firmware/BIOS	MENMON™ is MEN's firmware/BIOS for PowerPC® platforms.
	14A012-00 MENMON™ (Firmware) for A12, D3 and SC13 (object code)
Software: Miscellaneous	XiBase9, a graphical user interface for Linux and OS-9® from XiSys, is running on the MEN graphics controller PC-MIP® and PMC modules P1, P17 and P517 in combination with the PowerPC®-based single-board computers A11, A12, D3, F1N, B11 and SC13 (further SBCs on request). For more information, purchase and support please go to www.xisys.de.

For operating systems not mentioned here contact MEN sales.

Documentation	Compare Chart 6U VMEbus CPU and I/O cards » Download
	20AD67-00 AD67 User Manual
	20A012-00 A12 User Manual
	21MENM-00 MENMON™ User Manual

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