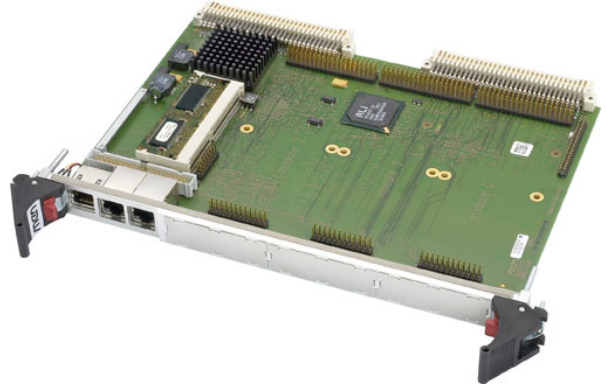# A15B – 6U VME64 MPC8245 CPU Board (M-Modules™)

- ■ **PowerPC® MPC8245 / 400 MHz**
- ■ **1-slot 64-bit VMEbus master and slave**
- ■ **256 MB DRAM, CompactFlash®**
- ■ **Dual 10/100Mbit Fast Ethernet**
- ■ **4 COMs, USB, IDE, keyboard/mouse**
- ■ **3 M-Module™ slots**
- ■ **MENMON™ BIOS for PowerPC® cards**

The A15B is a PowerPC® MPC8245 based single-board computer for embedded applications. It features full VME64 support and it can be used as a master or a slave in a VMEbus environment. The A15B provides 1 MB local dual-ported SRAM for slave access and communication between the local CPU and another VMEbus master.
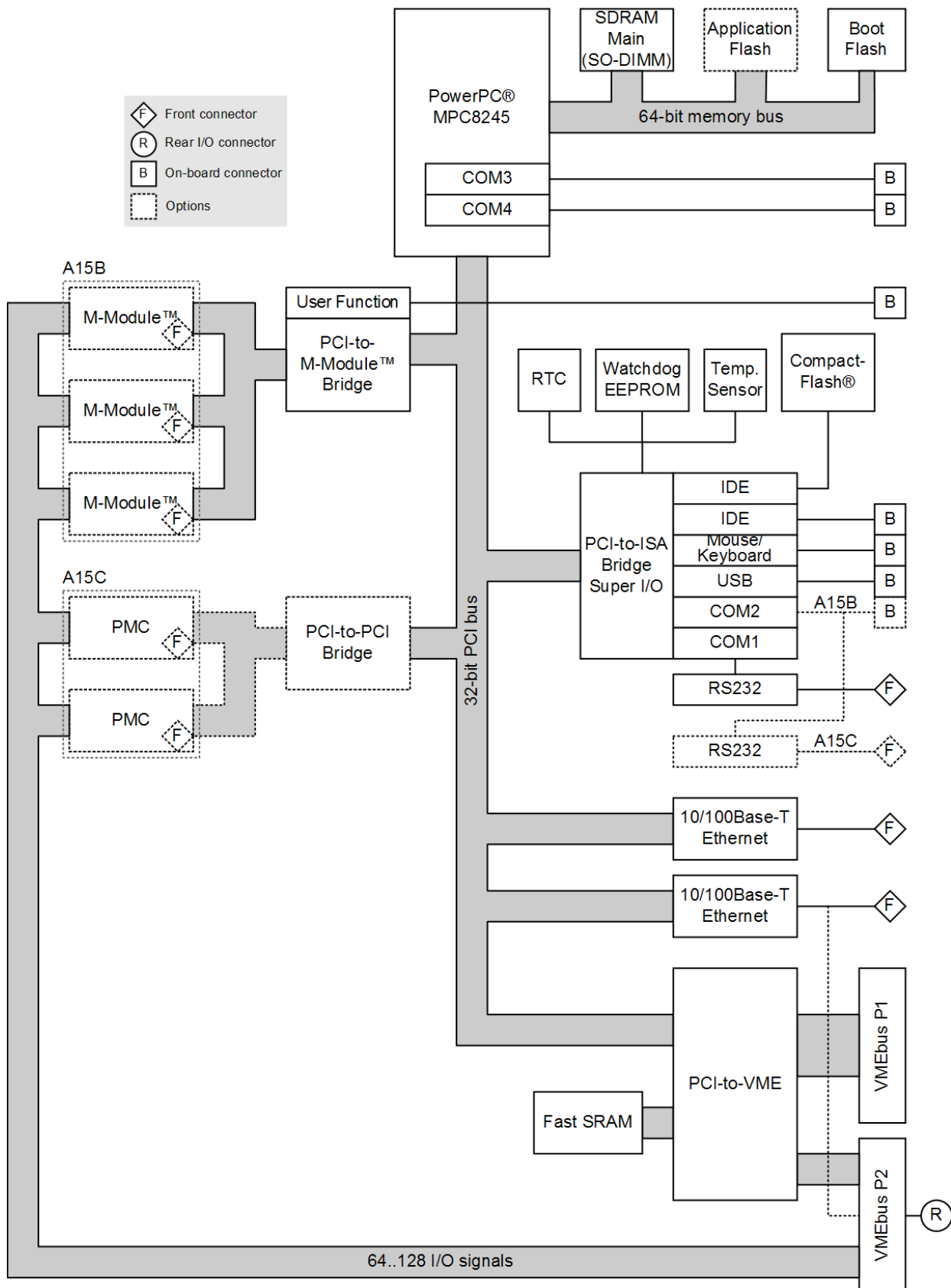
The CPU card comes with the MPC8245 PowerPC® with 400 MHz clock frequency and local 32-bit/33-MHz PCI data bus. It is a complete state-of-the-art SBC offering DRAM, Flash and CompactFlash® memory, dual Fast Ethernet, four COMs, USB, IDE and keyboard/mouse interfaces as well as an optional onboard hard 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 A15B can be equipped with M-Module™ mezzanine cards supporting both front I/O and rear I/O. 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. Depending on the kind of I/O requirements, further standard versions of A15 are availabe for other mezzanine standards.

The A15 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 A15 single-board computer is partly compatible with the MVME2100 board by Motorola.

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Diagram

Technical Data

CPU	■ PowerPC® □ MPC8245 □ 400 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 □ 133 MHz memory bus frequency ■ 2 MB Boot Flash ■ 32 MB application Flash (optional) □ 64-bit data bus ■ Serial EEPROM 4 kbits 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 □ IDE port also available for rear I/O, alternatively to onboard connector
I/O	■ USB □ One USB 1.1 port □ Accessible via I/O connector J2 □ OHCI implementation □ Data rates up to 12 Mbit/s □ External PHY ■ Ethernet □ Two 10/100Base-T Ethernet channels □ RJ45 connectors with two LEDs at front panel ■ One RS232 UART (COM1) □ RJ45 connector at front panel □ Data rates up to 115.2 kbit/s □ 16-byte transmit/receive buffer □ Handshake lines: CTS, RTS; DCD, DSR, DTR □ 16550 compliant ■ One UART (COM2) □ Accessible via I/O connector □ Physical interface at front panel or using SA-Adapter™ via 10-pin ribbon cable on I/O connector, depending on board version □ RS232..RS485, isolated or not: for free use in system (e.g., cable to front) □ Data rates up to 115.2 kbit/s □ 16-byte transmit/receive buffer □ Handshake lines: full support; lines depend on SA-Adapters™ □ 16550 compliant ■ Two UARTs (COM3/COM4) □ Accessible via I/O connector □ Data rates up to 115.2 kbit/s □ 16-byte transmit/receive buffer □ Handshake lines: none □ 16550 compliant ■ PS/2 keyboard/mouse □ Accessible via I/O connector □ Requires external PHY

Technical Data

Rear I/O	■ IDE (alternatively to onboard connector) ■ GPIO (alternatively to onboard connector) ■ M-Module™ 0, 1 and 2

Mezzanine Extensions	■ Three M-Module™ slots
	  □ Compliant with M-Module™ standard
	  □ Characteristics: A08, A24, D16, D32, INTA, INTC

Miscellaneous	■ Serial real-time clock with integrated 56-byte NVRAM ■ Serial hardware watchdog in supervisory circuit ■ Temperature sensor ■ Hex switch for user settings ■ User LEDs (integrated into COM1 connector) ■ Reset button in ejector handle ■ Abort button via I/O connector ■ JTAG/BDM connector
Local PCI Bus	■ 32-bit/33-MHz, 3.3V V(I/O) ■ Compliant with PCI Specification 2.2

VMEbus	■ Compliant with VME64 Specification
	■ Slot-1 function with auto-detection
	■ Master
	  □ D08(EO):D16:D32:D64:A16:A24:A32:ADO:BLT:RMW
	■ Slave
	  □ D08(EO):D16:D32:D64:A16:A24:A32:BLT:RMW
	■ 1 MB shared fast SRAM
	■ DMA
	■ Mailbox functionality
	■ 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
	■ Location Monitor
	■ Performance
	  □ Coupled read/write D32 non-block transfer rate 6.5 MB/s
	  □ DMA read/write D32 BLT transfer rate 12.1 MB/s
	  □ DMA read/write D64 MBLT transfer rate 25 MB/s

Electrical Specifications	■ Supply voltage/power consumption:
	  □ +5 V (-3%/+5%), 1.3 A typ.
	  □ ±12 V (-5%/+5%), only used for mezzanines, tbd.
	■ MTBF: 126 000 h @ 40°C (derived from MIL-HDBK-217F)

Mechanical Specifications	■ Dimensions: standard double Eurocard, 233.3 mm x 160 mm ■ Weight (without mezzanines and accessories): 330 g

Environmental Specifications	■ Temperature range (operation):
	  □ 0..+60°C
	  □ Industrial temperature range up to -25..+85°C on request
	  □ 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..150Hz
	■ Conformal coating on request

Technical Data

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® ■ OS-9® ■ QNX® ■ 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
01A015B00	MPC8245	400 MHz	256 MB	0 MB	2 MB	3 M-Modules	0..+60°C
01A015C02	MPC8245	400 MHz	512 MB	0 MB	2 MB	2 PMC	-25..+85°C

Options

CPU	■ MPC8245, 400 MHz
Memory	■ System RAM 　□ 128 MB, 256 MB or 512 MB ■ CompactFlash® 　□ 0 MB up to maximum available ■ Boot Flash 　□ 2 MB ■ Application Flash 　□ 32 MB, 64-bit data bus
Mezzanine Slots	■ 2 PMC ■ 3 M-Modules™
Operating Temperature	■ 0..+60°C ■ -25..+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 A15B Models	01A015B00	MPC8245, 400MHz, 256 MB SDRAM, 2MB Flash, 3 M-Module™ slots, 0..+60°C
Related Hardware	01A015C02	MPC8245, 400MHz, 512MB SDRAM, 2MB Flash, 2 PMC slots, -25..+85°C screened
	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
	0751-0053	CompactFlash® card, 2 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
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	RS232, optically isolated, 0..+60°C
	08SA03-01	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
	05A012-01	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
	08AD71-00	AD71, 2.5" hard disk adapter for A13, A14, A15, D6, D7
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 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.
	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.
	14A015-00 MENMON™ (Firmware) for A15 (object code)

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
	20A015-00 A15 User Manual
	21APPN003 Application Note: Using P1/P501 Graphics on MEN 824x/ALI boards under ELinOS
	21MENM-00 MENMON™ User Manual

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