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A9 - 6U VMEbus Single-Board Computer

- **MC68040/25MHz + MC68360/25MHz**
- **Upward-compatible with A10**
- **1-slot VMEbus master or slave**
- **EL/LCD/CRT graphics**
- **48MB DRAM, 8MB Flash, 2MB SRAM**
- **10Mbit Ethernet**
- **4 COMs, SCSI, PCMCIA, CAN**
- **4 M-Module slots**
- **4 additional local M-Module slots with A8EXT**

The A9 CPU board combines workstation characteristics with embedded control capabilities and industrial requirements.
The A9 with its 68040 (with MMU and FPU) plus a 68360 is a mid-range industrial workstation. It is hardware and software compatible with the A10 and B9L/B10, comprising a family of boards scalable in size and performance.
Because of full compatibility between A9 and A10, a single processor family (and a single BSP) can be used many places in a system.
Major SBC components are part of the design story: the powerful 32-bit processor(s), DRAM, SRAM and Flash memory, multiple serial and mass storage interfaces, graphics and Ethernet, making the A9 a fully functional VME CPU card. The other part, the many features often required for hard industrial applications, are also provided on the card: including PC-card carrier, CAN bus interface, timers, RTC, watchdog, temperature sensors, and DRAM parity.
Four M-Modules providing flexible industrial I/O extension can be mounted on the same double Eurocard, and can be accessed without hitting the VMEbus.
The A9 single-board computer is partly compatible with the MVME162 and MVME167 boards by Motorola.

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Technical Data

CPU
- A9: 32-bit CPU MC68040/25MHz
  - 22 MIPS
- A10: 32-bit CPU MC68060/50MHz
  - Superscalar processor with two integer units
  - Over 100 MIPS

Peripheral Controller
- MC68360/25MHz I/O RISC processor

M-Module Extension
- 4 M-Module slots (requires additional VMEbus slot)
- Characteristics: A08, A24, D16, D32, INTA, INTC
- DMA16, DMA32 on slot 1

VMEbus
- 6U VMEbus form factor
- VMEbus master/slave interface
  - VIC068
  - Interrupter
  - Interrupt handler
  - A16, A24, A32, D16, D32
  - VMEbus slot-1 functionality

Memory
- Up to 2MB boot EPROM, 16-bit data bus
- Up to 32 MB DRAM
  - 1 JEDEC SIMM module
  - 32-bit data bus
  - 4-bit parity
  - Burst access
- Up to 16MB VMEbus-shared DRAM, permanently soldered
- Up to 8MB Flash
  - 32-bit data bus
  - On-board programming
- Up to 2MB SRAM, battery-backed via VMEbus
  - 4 SMD places (JEDEC)
  - 32-bit data bus (128KB/512KB/2MB steps)

Interfaces
- 2 SMC UARTs (debug)
  - RS232 interfaces
  - 9-pin D-Sub connector
- 1 SCC intelligent serial interface
  - Keyboard/mouse PC/AT compatible
  - Two 6-pin DIN connectors
- 2 SCC intelligent serial interfaces
  - 6-wire interfaces
  - Physical interface using SA adapter via 10-pin plug connector
  - RS232..RS485, isolated or not: for free use in system (cable to front or back)
- Ethernet controller
  - CPM of the MC68360
  - Local DMA
  - AUI, Twisted Pair or Cheapernet through interface adapter
- Memory card interface
  - Disk-like interface
  - JEIDA/PCMCIA
  - On-board card slot unit
- CAN bus interface
  - ISO High-Speed
  - Optically isolated via adapter on P2
- SCSI-2 interface
  - Local DMA
  - Connection via P2

Graphics Controller
- CL-GD6440 from Cirrus Logic
  - LCD/EL/CRT display
  - 32-bit data bus
  - Resolution up to 1024x768 dots with 256 colors
  - Linear memory addressing, packed pixel mode
  - 1MB frame buffer RAM
  - VGA connector at front panel
  - LCD/EL connector via P2

Miscellaneous
- Analog touch-screen interface via P2
- D/A converter for controlling the display contrast voltage (on adapter card via P2)
- Battery-backed real-time clock
- 4 general-purpose timers
- EEPROM (256x16) for setup
- Hex switch
- 16 LEDs
- Reset and abort switches
- Programmable watchdog
- Temperature measurement
- Single 5V supply

Electrical Specifications
- Power requirements (no M-Modules, no display):
  - +5V, 3A typ., 5A max.
  - +12V, 0.1A typ., 1A max.
  - -12V, 20mA typ., 0.1A max.
- Power consumption: 17W typ.
- Isolation voltage for Ethernet/CAN bus: 500V DC
- MTBF:
  - A9/A10: 35,000h @ 50°C

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- A8-EXT: 52,000h @ 50°C

Mechanical Specifications
- Dimensions: standard double Eurocard, 233.3mm x 160mm
- Weight (no M-Modules/Ethernet/SA adapter):
  - A9: 464g
  - A10: 464g
  - A8-EXT: 222g

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 range (operation): max. 95% non-condensing
- Relative humidity range (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock: 15g/0.33ms, 6g/6ms
- Vibration: 1g/5..2,000Hz

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
- MENMON
- VxWorks
- OS-9

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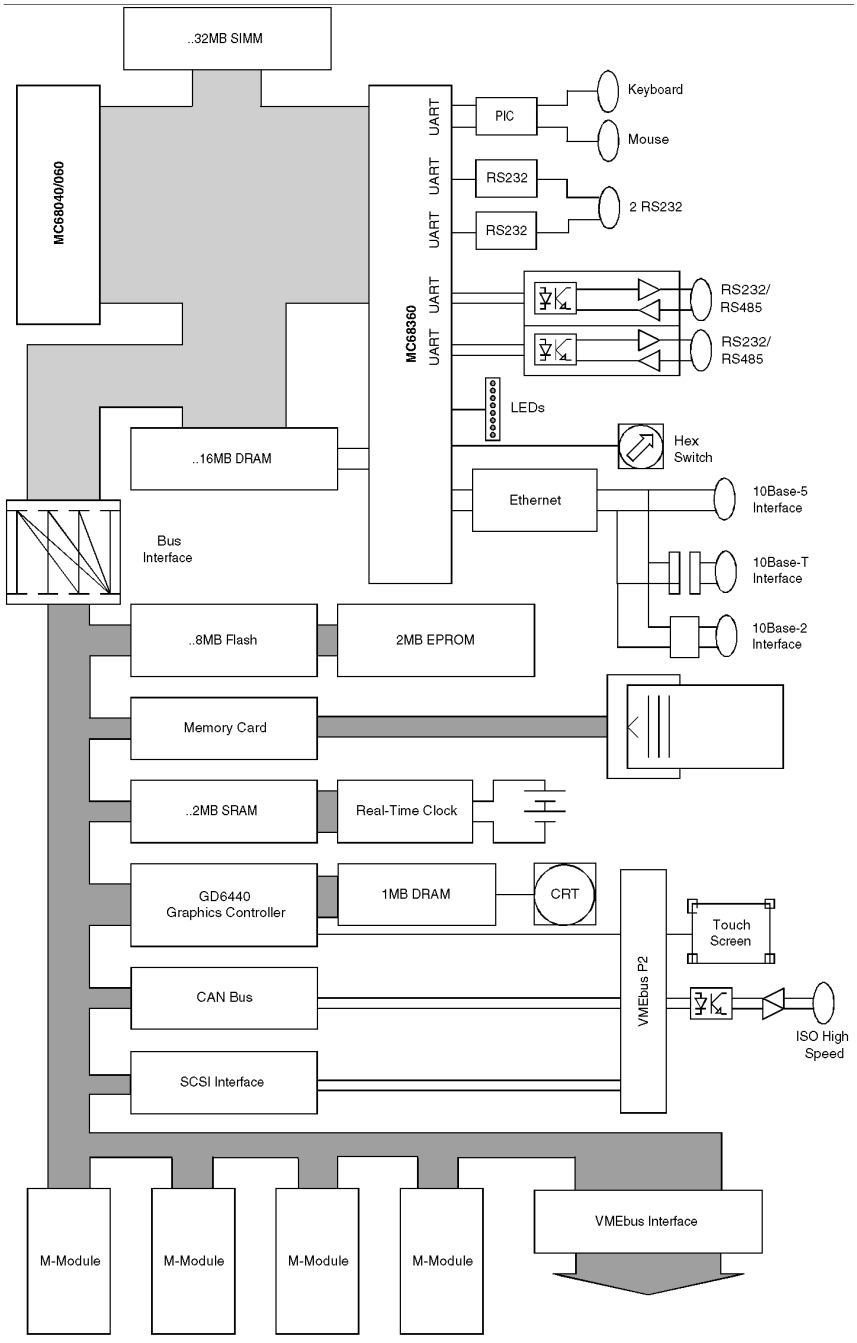
Diagram



Related Products

Standard Hardware

01A008E00	A8-EXT, VMEbus 6U, extension board for A8/A9/A10, 4 M-Module slots, with P2
01A009-00	A9, VMEbus 6U, single-board computer, CPU 68040/25MHz and CPU 68360/25 MHz, 16MB DRAM, 0.5MB SRAM, 8MB Flash, SCSI-2, Ethernet, graphics, PC card, CAN, 4 M-Module slots, 1-slot front panel
01A009-01	A9, VMEbus 6U, single-board computer, CPU 68360/25 MHz and CPU 68040/25 MHz, 16MB DRAM, 0.5MB SRAM, 8MB Flash, SCSI-2, Ethernet, PC card, 4 M-Module slots, 1-slot front panel
01A010-00	A10, VMEbus 6U, single-board computer, CPU 68060/50MHz and CPU 68360/25MHz, 16MB DRAM, 0.5MB SRAM, 8MB Flash, SCSI-2, Ethernet, graphics, PC card, CAN, 4 M-Module slots, 1-slot front panel
01A010-01	A10, VMEbus 6U, single-board computer, CPU 68060/50MHz and CPU 68360/25MHz, 16MB DRAM, 2MB SRAM, 8MB Flash, Ethernet, SCSI-2, PC card, 4 M-Module slots, 1-slot front panel

The A9 is partly compatible with the MVME162 board by Motorola. You can download the corresponding compare chart here.

The A9 is partly compatible with the MVME167 board by Motorola. You can download the corresponding compare chart here.

Systems & Card Cages

Disk drives for basic systems are delivered as requested. Different rack sizes, power supplies and backplanes on request.

0700-0006	CE-conforming housing for VMEbus 6U: closed 19" rack, 5U, 7 slots, J1+2 backplane (not VME64), power supply 230V, fan incl. power cable no. 6080-0020

Accessories

05A008-02	A9, A10 M-Module mounting kit for 4 M-Modules, 1 additional 1-slot front panel, 4 60-pin contact strips
05A008-03	Accessory A9/A10: SA adapter mounting kit on M-Module mounting kit
05A008-12	Accessory A9/A10: 1-slot front panel for 2 SA adapters
05M000-01	M-Module cable, 2m, 21-pin VG receptacle to pig tail, for connection to VMEbus P2 mating connector (05M000-02), for wiring of M-Module I/O signals via P2

Related Products

05M000-15	Front-panel cover for M-Module cut-outs at front panels, snap-in, 10 pcs
08AD19-00	Adapter A8/B8 family: Ethernet AUI
08AD20-00	Adapter A8/B8 family: Cheapernet
08AD21-00	Adapter A8 family: Twisted Pair
08AD22-00	Adapter A8 family: P2 adapter with SCSI-2
08AD23-00	Adapter A8 family: P2 adapter with SCSI-2 and CAN
08AD23-01	Adapter A8 family: P2 adapter with SCSI-2, CAN and graphics (LCD, touch screen, contrast voltage)
08AD44-00	DRAM SIMM module, 32MB, fast-page mode, 60ns
08AD44-01	DRAM SIMM module, 16MB, fast-page mode, 60ns
08SA01-00	Serial interface adapter, RS232, not optically isolated, 0..+60°C
08SA02-00	Serial interface adapter, RS422/485, half duplex, optically isolated, 0..+60°C
08SA02-01	Serial interface adapter, RS422/485, full duplex, optically isolated, 0..+60°C
08SA02-07	Serial interface adapter, RS422/485, full duplex, optically isolated, temperature range: -40..+85°C
08SA03-00	Serial interface adapter, RS232, optically isolated, 0..+60°C
08SA03-01	Serial interface adapter, RS232, optically isolated, -40..+85°C
08SA04-00	Serial interface adapter, TTY, optically isolated, 0..+60°C

For more functions realized with SA adapters, see the listing on MEN's website. Please contact sales to make sure that these SA adapters can be used in the board configuration you are looking for.

Software

10ABMX-07	OS-9 V.3.0: OS-9/68k + NET license
10A009-01	OS-9 V.3.0: BSP for A9/A9L (object code, PC disk format, MEN)
10A009-62	VxWorks V.5.4/Tornado 2.0 standard BSP for A9/A9L/A10

VxWorks software for this MEN board is available from WindRiver Systems. For VxWorks BSP and driver support provided by MEN please refer to the ordering numbers below.

For OS-9 BSP and driver support provided by MEN please refer to the ordering numbers below.

Documentation

20A008-00	A9/A10 user manual

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Related Products

20SA00-00	SA adapter user manual

For the most up-to-date ordering information and direct links to other data sheets and downloads, see the A9 online data sheet under www.men.de. --> Click here!

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