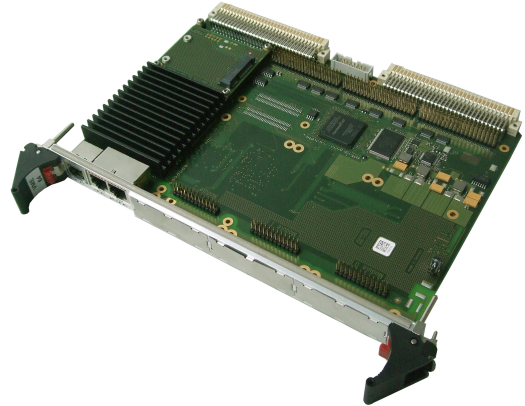


# A21B

## Embedded Single Board Computer, QorIQ P1xxx, M-Modules 6U VME64

- » *NXP PowerPC QorIQ P1013, 800 MHz*
- » *Up to dual-core P1022, 1.067 GHz*
- » *64-bit VMEbus master and slave*
- » *Up to 2 GB DDR3 DRAM soldered, ECC*
- » *Up to 64 MB Flash and 128 KB FRAM*
- » *microSD card and mSATA slot*
- » *2 Gb Ethernet, 1 COM, additional I/O options*
- » *3 M-Module slots*
- » *U-Boot Universal Boot Loader*
- » *-40°C to +85°C (screened)*



The A21B is an NXP (formerly Freescale) QorIQ based single-board computer for embedded industrial applications. The SBC features full VME64 support and can be used as a master or a slave in a VMEbus environment. The A21B provides 1 MB local dual-ported SRAM for slave access and communication between the local CPU and another VMEbus master.

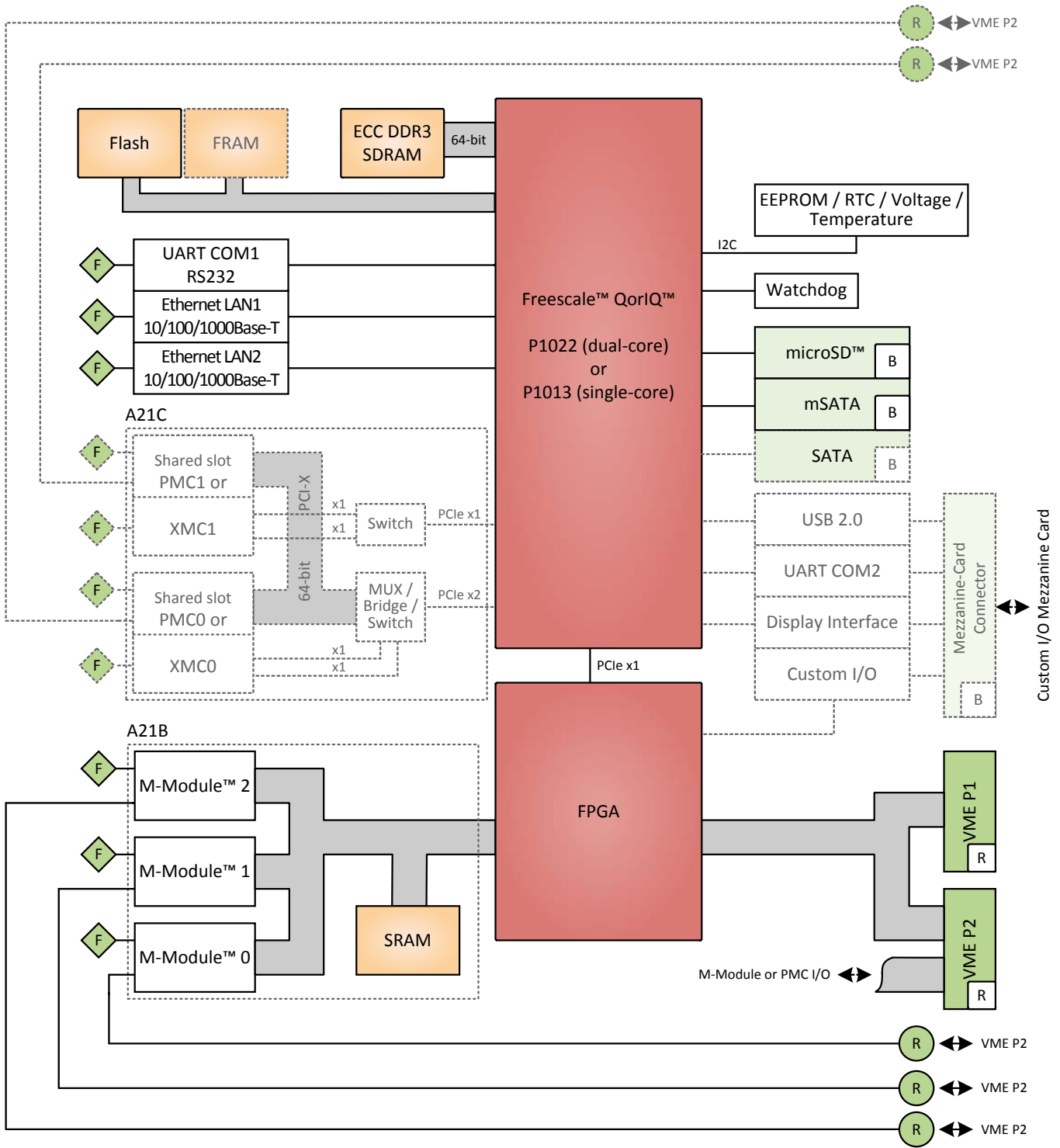
The CPU card comes with a single-core P1013 or dual-core P1022 QorIQ processor with up to 1.067 GHz clock frequency and a serial communication architecture. With two Gigabit Ethernetports and one RS232 COM at the front, and DDR3 SDRAM with ECC, Flash and FRAM, the board offers the crucial basics of an industrial computer. To satisfy your needs for mass storage, you can use microSD cards and mSATA plug-in modules.

In addition, the A21B can be equipped with up to three M-Module mezzanine cards supporting both front I/O and rear I/O. M-Modules are ideal for real-world I/O like analog/binary process and instrumentation input/output. 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.

Its sister card, the A21C, offers two PMC/XMC slots instead of M-Modules, for different I/O requirements. Where there's a need for even more or other I/O, the A21B also includes a custom I/O mezzanine card option that reduces the board by one M-Module but provides interfaces like USB 2.0, COM or even custom I/O controlled by the onboard FPGA. The mezzanine card is always an entirely customized adapter PCB, including front I/O, and makes the A21B a semi-custom solution.

The A21B supports operation in a -40°C to +85°C temperature range, and the board withstands shock and vibration.

The CPU board is supported by the U-Boot Universal Boot Loader, which can be used for bootstrapping operating systems, for hardware testing, or for debugging applications without running any operating system.



F Front  
 R Rear  
 B Onboard  
   Options

## CPU

- The following CPU types are supported:
  - NXP QorIQ P1022, dual core, 600 MHz
  - NXP QorIQ P1022, dual core, 800 MHz
  - NXP QorIQ P1022, dual core, 1.067 GHz
  - NXP QorIQ P1013, single core, 600 MHz
  - NXP QorIQ P1013, single core, 800 MHz
  - NXP QorIQ P1013, single core, 1.067 GHz

## Memory

- System Memory
  - Soldered DDR3 with ECC support
  - 1 GB or 2 GB
- Boot/Program Flash
  - 32 MB or 64 MB
- FRAM, non-volatile
  - 0 KB or 128 KB

## Mass Storage

- The following mass storage devices can be assembled:
  - One microSD card
  - One mSATA disk
  - Option: One in-system SATA hard-disk drive

## Front Interfaces

- Ethernet
  - Two RJ45 connectors, 1000BASE-T (1 Gbit/s)
  - Two link and activity LEDs per channel
- UART (COM1)
  - One RJ45 connector, RS232 interface, up to 230.4 kbit/s
- Reset button
- Status LEDs
- M-Module front I/O if populated

## Onboard Interfaces

- M-Modules
  - Three slots compliant with M-Module standard
  - Characteristics: A08, A24, D16, D32, INTA, INTC, TRIGI, TRIGO
- SATA
  - Option: One channel, SATA Revision 2.x (3 Gbit/s)
- Various I/O possible using onboard mezzanine card
  - Partly fixed set of interfaces, plus 16 pins for custom I/O
  - One USB 2.0 port, EHCI implementation
  - Additional UART COM interface
  - Display interface
  - Custom I/O functions can be implemented as FPGA IP cores (16 pins usable)
  - Occupies the space of M-Module slot 3
  - Please note that the custom I/O mezzanine card is always completely customized, including front I/O, no standard cards are available.

## Rear Interfaces

- M-Module
  - Signals from M-Modules 0, 1 and 2

## Supervision and Control

- Real-time clock
  - Buffered by a supercapacitor, or
  - Buffered by a battery using an onboard battery holder (may be in mechanical conflict with M-Module slot 0)
- Watchdog
- Voltage monitor and temperature sensor

**Backplane Standard**

- VMEbus, compliant with VME64 Specification
- Slot-1 function with auto-detection
- Master
  - D08(E0):D16:D32:D64:A16:A24:A32:ADO:BLT:RMW
- Slave
  - D08(E0):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

**Electrical Specifications**

- Supply voltages
  - +5 V (-3%/+5%)
  - +3.3 V (-3%/+5%)
  - ±12 V (-5%/+5%), only provided for mezzanines that need 12 V
- Power consumption
  - +5 V: 1.3 A typ.
  - +3.3 V: 1 A typ.

**Mechanical Specifications**

- Dimensions: 6U, 4 HP
- Weight (without mezzanines): 428 g

**Environmental Specifications**

- Temperature range (operation):
  - -40..+85°C (screened)
  - Airflow: min. 1.0 m/s
- 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: 50 m/s<sup>2</sup>, 30 ms (EN 61373)
- Vibration (function): 1 m/s<sup>2</sup>, 5 Hz - 150 Hz (EN 61373)
- Vibration (lifetime): 7.9 m/s<sup>2</sup>, 5 Hz - 150 Hz (EN 61373)
- Conformal coating on request

**Reliability**

- MTBF
  - 346 417 h @ 40°C according to IEC/TR 62380 (RDF 2000) (model 01A021B00)

**Safety**

- Flammability (PCBs)
  - UL 94 V-0

**EMC**

- EN 55022 (radio disturbance)
- IEC 61000-4-2 (ESD)
- IEC 61000-4-3 (electromagnetic field immunity)
- IEC 61000-4-4 (burst)
- IEC 61000-4-5 (surge)
- IEC 61000-4-6 (conducted disturbances)

**Software Support**

- Linux
- VxWorks
- For more information on supported operating system versions and drivers see Software.

## **BIOS**

- U-Boot Universal Boot Loader

## Germany

### **MEN Mikro Elektronik GmbH**

Neuwieder Straße 3-7  
90411 Nuremberg  
Phone +49-911-99 33 5-0

sales@men.de  
[www.men.de](http://www.men.de)

## USA

### **MEN Micro Inc.**

860 Penllyn Blue Bell Pike  
Blue Bell, PA 19422  
Phone 215-542-9575

sales@menmicro.com  
[www.menmicro.com](http://www.menmicro.com)

## France

### **MEN Mikro Elektronik SAS**

18, rue René Cassin  
ZA de la Châtelaine  
74240 Gaillard  
Phone +33-450-955-312

sales@men-france.fr  
[www.men-france.fr](http://www.men-france.fr)

## China

### **MEN Mikro Elektronik (Shanghai) Co., Ltd.**

Room 808-809, Jiaxing Mansion, No. 877 Dongfang Road  
200122 Shanghai  
Phone +86-21-5058-0961

sales@men-china.cn  
[www.men-china.cn](http://www.men-china.cn)

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[www.men.de/products/a21b/](http://www.men.de/products/a21b/)

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