

Modular ARM 9 SBC

for industrial applications

Axotec
Hightech made applicable

μ X-PRO™



ARM 9 Single Board Computer

Axotec
Hightech made applicable

Sudetenstraße 88
D-82538 Geretsried
fon +49 (0)8171 92192-0
fax +49 (0)8171 92192-40
info@axotec.de
<http://www.axotec.com>

μX-PRO is an ARM9 (200 MIPS) based All-In-One Single Board Computer according to state of the art technologies. Ultra Low Power technology, a rich set of interfaces and flexible expandability characterize this modern single board computer. Industrial applications in harsh environments benefit from the full industrial temperature range of **μX-PRO**. The Linux operating system opens the whole world of software tools, servers / clients and software development tools for this powerful single board computer.

HIGH CONNECTIVITY – POWERFUL – FLEXIBLE

μX-PRO supports following onboard interfaces: 10/100Base Ethernet, 5 x RS232, RS422/485, USB Host 2.0 full speed und USB Client 2.0 full speed (12MBit/s each). All this interfaces are available at industry standard connector types. Further onboard available is a 12 Bit 8 channel A/D convertor with 3,8 uS conversion time. A SPI interface, three synchronous serial interfaces and a TWI/I2C interface are available at the expansion bus connector. The modular concept makes the **μX-PRO** flexible expandable and thus easy customizable.

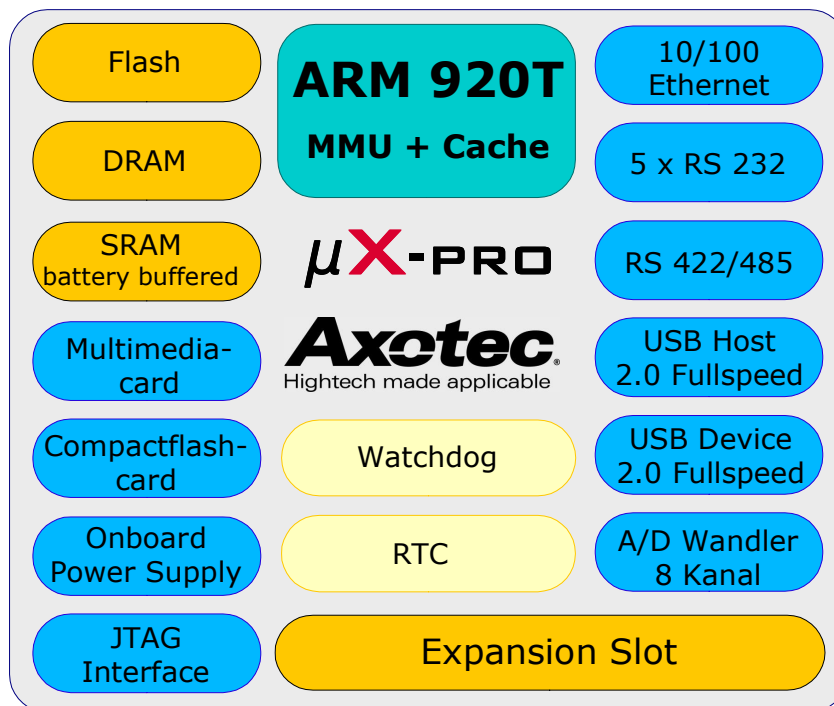


Fig.1 **μX-PRO** system block diagram

MODULAR EXPANDABLE

μX-PRO supports two high density expansion module connectors. By means of this expansion feature, specific interfaces can easily be added to **μX-PRO**. The module expansion supports the full processor bus as well as further system interfaces. The expansion modules are mechanical attached to the processor board by four screws. Besides standard off the shelf expansion modules, customer specific modules can be designed and manufactured at low prices. Design of expansion modules is simplified through a clear structured and simple bus interface.

MEMORY

μX-PRO supports a DRAM capacity of up to 128 MB. Nonvolatile programmable Flash memory can be up to 16 MB. In addition it is provided a battery buffered SRAM with up to 512 kB. It can be used e.g. for fast nonvolatile parameter and data storage. At least **μX-PRO** provides a serial EEPROM with up to 128 kB capacity. **μX-PRO** accepts standard Compact Flash as well as Multimedia mass storage cards. Both card types are industry standard, robust and low priced.

SECURITY

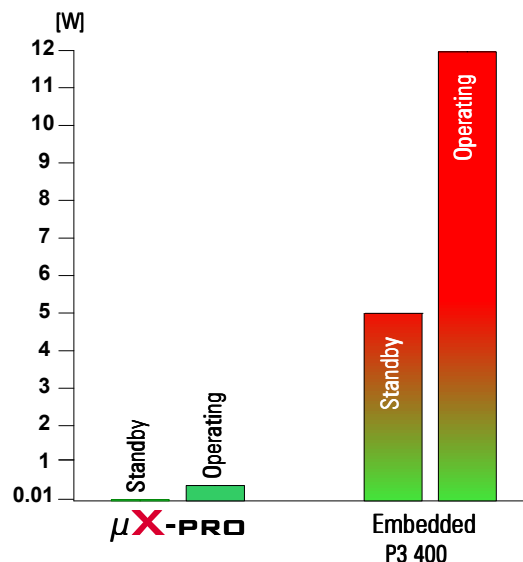
An integrated and programmable watchdog circuit guarantees reliable operation of μ X-PRO. Besides the watchdog functionality the supply voltage is supervised. The onboard temperature can be measured by software at any time thanks to the onboard temperature sensor. The sensor is software programmable and can issue alarms at programmable temperature values.

POWER SUPPLY

μ X-PRO has an integrated DC-DC convertor with wide range input. DC input voltage can be supplied in the range of 9..40 volts. The DC-DC convertor operates with high efficiency and has enough power reserve to drive also expansion modules as well as external powered devices. An additional input for battery backed operation is also available. The battery input is decoupled from the DC-DC input with uninterruptable operation functionality. Charging of the battery is done by an onboard trickle charger.

LOWEST POWER CONSUMPTION

μ X-PRO works with an industry standard 32 Bit ARM processor in RISC technology. All components of the system are designed towards lowest power requirement. The graphics on the right side displays the power consumption of μ X-PRO compared to standard embedded computer technology. The advantages are obvious. No heating components, fanless operation, no wearing parts, no temperature problems, no cooling slots and no dust. The power supply unit can be small and cheap. In case of battery operated applications battery runtimes can be considerably extended.



POWERFUL LINUX OPERATING SYSTEM

The Linux operating system, supplied by Axotec, is based on actual kernel versions and is a high reliable, powerful and fully open operating system. The system works with full MMU support. The complete source code of the Linux operating system is available. The Linux system is modular designed and can easily be adapted to specific requirements. The footprint of the Linux system is minimized without functional restrictions. The Linux operating system is free of licence costs.

Other operating systems, namely real time operating systems can also be used with μ X-PRO.

APPLICATION PROGRAMMING

μ X-PRO SBC's are offering an open hard- as well as an open software design. The application software development for μ X-PRO benefits from the mighty Linux environment. The software can use powerful highlevel protocols, rich libraries and even powerful client/server systems. Examples therefore are ppp, sms, smsd, http, httpd, ftp, ftpd, ntp to name only a few. Software can be written in C/C++ or Java or even other common programming languages. The powerful and comfortable development system supports several debugging technologies. The application program can be source code debugged on the host development computer with all features of modern programming environments. Full JTAG debugging support is available as a matter of course.

APPLICATIONS

The μ X-PRO SBC's are designed for use in demanding industrial applications. Thanks to the availability of the industrial temperature range of -40°..85°C μ X-PRO can be used even in harsh environments. Typical applications can be found in industrial control, interface convertors, data storage, mobile computing, fleet management, navigation computing and serial server applications to name only a few.

TECHNICAL DATA

OVERVIEW

- extreme low power consumption
- modular expandable
- integrated wide range DC power supply
- full Linux support
- extended temperature range -40° .. + 85° available

PROCESSOR

- ARM 920 T with MMU, AT91RM9200
- 200 MIPS
- low power modis

MEMORY ON BOARD

- Flash up to 16 MB
- DRAM up to 128 MB
- SRAM batterybuffered up to 512k
- Serial EEPROM 1024kBit

MMI-CARD

- Socket for Standard Multimediacard

COMPACTFLASH

- Socket for Standard Compact Flash Cards
- Type I und Type II

ETHERNET

- 10/100 Base T Ethernet with RJ45 jack

SERIAL INTERFACES

- five serial asynchronous interfaces
one with full control line set, three with RTS/CTS
one with Rx/Tx
- one asynchronous interface optional RS 422/485
- three synchronous serial interfaces available at the expansion connector
- further serial interfaces available by means of expansion board

USB INTERFACES

- USB Host 2.0 full speed (12 MBit)
- USB Device 2.0 full speed (12MBit)

TWO-WIRE INTERFACE

- TWI interface with master mode support

SPI INTERFACE

- Serial Peripheral Interface
- Master/Slave capable
- 8/16 Bit datalength

WATCHDOG + TEMP. SENSOR

- Watchdog with hard-software enable/disable
- Temperatursensor onboard

A/D WANDLER

- Onboard 12 Bit AD-convervor with 8 channels and 3,8 uS conversion time

JTAG

- Onboard JTAG interface for debugging purposes

POWER SUPPLY

- DC-Input 9..40 volts
- Accu-Input and onboard trickle charger
- 3,3 V and 5V generation onboard

MOUNTING OPTIONS

- Universal mounting points
- 19" compatible dimensions and mounting points for standard 19" mechanics

DIMENSIONS

- ca. 100 x 160 mm

EXPANSION MODULES

The **uX-PRO** SBC supports pluggable expansion modules. There is a growing number of standard modules available. Customerspecific modules can even be developed and manufactured by Axotec Technologies.

- CAN / RS 485 Module
two optoisolated CAN interfaces
- quad serial RS232/422/485, full +-12V signal level incl. CTS,RTS,DSR,DTR,RI
- Videocontroller module
VGA output + LCD output for steering of flat panel displays
- Digital I/O opto coupled
- Customerspecific modules according to customer requirements