

# Linux-ready Arm9 System on Module M-502



## Features

- ATMEL 400MHz AT91SAM9G20 CPU w/ MMU
- Linux kernel 2.6.29 with file system
- 64MB SDRAM and 256MB NAND Flash
- 1 x 10/100Mbps Ethernet
- 2 x USB 2.0 hosts supporting full speed of 12Mbps
- 1 x SD (secure digital) interface
- 4 x 921.6Kbps UARTs w/ hardware flow control
- 32 x GPIOs, CMOS / 3.3V compatible
- Compact size, 50 x 80mm only
- Ultra-low power consumption, less than 2.5 Watts
- GNU C / C++ toolchain is included

## ■ H/W Specifications

### CPU / Memory

- CPU: ATMEL 400MHz AT91SAM9G20 w/ MMU
- Memory: 64MB SDRAM, 256MB NAND Flash
- DataFlash@: 2MB, for system backup

### Network Interface

- Type: 1 x 10/100Mbps Ethernet
- PHY: DAVIDCOM DM9161
- Protection: 1.5KV magnetic isolation

### UART

- Port 0: TXD0, RXD0, RTS0, CTS0, GND
- Port 1: TXD1, RXD1, RTS1, CTS1, DCD1, DTR1, DSR1, GND
- Port 2: TXD2, RXD2, RTS2, CTS2, GND
- Port 3: TXD3, RXD3, RTS3, CTS3, GND
- Signal Level: CMOS / 3.3V compatible

### Common UART Parameters

- Baud Rate: Up to 921.6Kbps
- Parity: None, Even, Odd, Mark, Space
- Data Bits: 5, 6, 7, 8
- Stop Bits: 1, 1.5, 2
- Flow Control: RTS / CTS, XON / XOFF, None

### UART Advanced Feature (When Used as RS-485)

- Supports 9-bit Multi-drop mode
- Supports hardware auto direction control

### USB Ports

- Host Ports: 2, USB 2.0 compliant
- Host Signals: UdataA+, UdataA-, UdataB+, UdataB-
- Device (Client): 1, USB 2.0 compliant
- Device (Client) Signals: Uddata+, Uddata-, Udio

### I2C(Inter-IC Bus)

- Signals: TWD, TWCK
- Supported Devices: Driver has been built-in

### I2S (Inter-IC Sound)

- Transmitter Signals: TSCK, TWS, TSD
- Receiver Signals: RSCK, RWS, RSD

### SPI (Serial Peripheral Interface)

- Signals: MISO, MOSI, SPCK, CS1, CS2

### SD (Secure Digital Card Interface)

- Signals: MCCDA, MCCK, MCDA0-MCDA3
- Compatible with SD memory card specification 1.0

### Watchdog Timer

- CPU built-in internal watchdog timer, used by Linux kernel
- Additional watchdog timer is available for users' applications

### GPIO (General-purpose I/Os)

- 32 x GPIOs can be programmed as digital input or output
- Signal Level: CMOS / 3.3V compatible

### Pre-defined Pins

- Reset Button (CN2, pin#35), input
- Buzzer (CN2, pin#37), output
- 2-pin DIP SW (CN2, pin#12, #13), input
- System ready LED (CN2, pin#38), output
- LAN activity LED (CN3, pin#11), output

### Real Time Clock

- Chip: ST M41T81
- Backup Battery: Lithium, 48mAh

### Debug Ports

- JTAG Port: for low level debug
- Console Port: RS-232 (Tx / Rx) serial console

### Local Bus

- Data Bus: 8-bit (D0-D7)
- Address Bus: 8-bit (A0-A7)
- Chip Select: x 3 (CS0, CS5, CS6)
- Control Bus: RD, WR
- Signal Level: CMOS / 3.3V compatible

### Power Requirement

- Power Input: +3.3VDC (Typical)
- Power Consumption: 2W

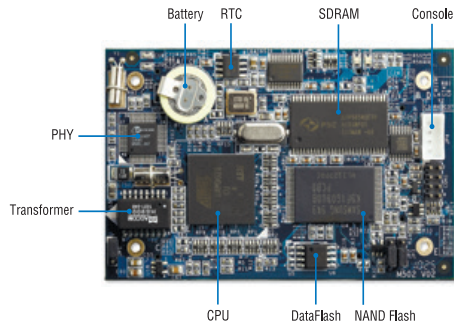
### General

- Board Dimensions (W x L): 80 x 50mm
- 2.0mm Pitch Connectors
- CN1: 28 pins; CN2: 50 pins; CN3: 50 pins
- Mounting Holes: x 4, 2.0mm (M2) in diameter
- Operating Temperature: 0-70°C (32-158°F)

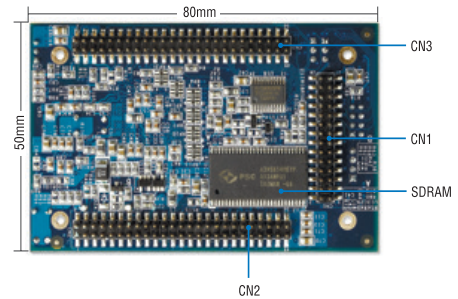
# Linux-ready Arm9 System on Module

# M-502

Front View



Rear View



## ■ S/W Specifications

### General

- OS: Linux, kernel 2.6.29
- Boot Loader: U-Boot
- File Systems: UBI, JFFS2, ETX2 / ETX3, VFAT / FAT, NFS

### Pre-installed Utilities

- bash, busybox, sysvinit, wget, ipkg, procps (for webmin), psmics, lighttpd, vsftpd, iptables, ppp, ssh, wireless\_tools, util-linux-mount / umount, usbutils, Artila utility

### Daemons Started by Default

- ssh (secured shell) with sftp
- syslog / klogd (system and kernel log)
- telnet server (disable root permission in /etc/security)
- ftp server (vsftpd)
- web server (lighttpd)
- amgrd (Artila broadcast search daemon)

### Package Management & System Administration

- Supports ipkg to manage the package installation, upgrade and removal
- Supports webmin (use 'ipkg install webmin' to install) for web-based system administration

### Toolchain for Linux

- GCC: C / C++ PC cross compiler
- GLIBC: POSIX Library

### Standard Device Drivers

- Real Time Clock, SD / MMC, UART, Ethernet, GPIO, Buzzer
- EEPROM: Supports ATMEL AT24C16 and its compatibles

### Pre-load USB Host Drivers (Could Be Customized)

- Generic Flash drive
- IEEE-802.11 WiFi adapter
- 10/100Mbps Fast Ethernet adapter
- RS-232 adapter
- ADSL modem
- ISDN modem (CDC / ACM compatible)

## ■ Ordering Information

### M-502

- ATMEL9G20 + Linux 2.6.29 System on Module with 256MB NAND Flash, 64MB SDRAM

### M-502 Starter Kit

- Includes one M-502 SoM and one carrier board with power circuitry, 3 x RS-232 ports, 1 x RS-232 / 422 / 485 port, 1 x Ethernet port, 2 x USB hosts, 1 x SD socket (at rear side), 2 x GPIO connectors, Real Time Clock, EEPROM, and local bus connector

## Assured Systems

Assured Systems is a leading technology company with over 1,500 regular clients in 80 countries, deploying over 85,000 systems to a diverse customer base in 12 years of business. We offer high-quality and innovative rugged computing, display, networking and data collection solutions to the embedded, industrial, and digital-out-of-home market sectors.

### US

[sales@assured-systems.com](mailto:sales@assured-systems.com)

Sales: +1 347 719 4508  
Support: +1 347 719 4508

1309 Coffeen Ave  
Ste 1200  
Sheridan  
WY 82801  
USA

### EMEA

[sales@assured-systems.com](mailto:sales@assured-systems.com)

Sales: +44 (0)1785 879 050  
Support: +44 (0)1785 879 050

Unit A5 Douglas Park  
Stone Business Park  
Stone  
ST15 0YJ  
United Kingdom

VAT Number: 120 9546 28  
Business Registration Number: 07699660