



## H/W Specifications

### CPU / Memory

- CPU: ATMEL 180MHz AT91RM9200 w/ MMU
- Memory: 64MB SDRAM, 16MB NOR Flash

### 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-

### 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: MCCA0, MCCK, MCDA0~MCDA3
- Compatible with SD memory card specification 1.0

### Watchdog Timer

- CPU built-in internal watchdog timer, used by Linux kernel

## Features

- ATMEL 180MHz AT91RM9200 CPU w/ MMU
- Linux kernel 2.6.14 with file system
- 64MB SDRAM and 16MB NOR 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
- External bus (A0~A7, D0~D7, RD, WR), with 4 x chip select
- Ultra-low power consumption, less than 2.5 Watts
- GNU C / C++ toolchain is included

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

- 32 x GPIOs can be programmed as digital input or output
- Supports interrupt function when GPIOs are set as digital input
- 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

### Undefined Digital I/O Pins (Reserved)

- CN1: pin#23, #24, #25, #26
- CN3: pin#23, #24

### Debug Ports

- Console Port: Tx / Rx serial console (share RTS2, CTS2)

### Local Bus

- Data Bus: 8-bit (D0~D7)
- Address Bus: 8-bit (A0~A7)
- Chip Select: x 4 (CS3, CS4, CS5, CS6)
- Control Bus: RD, WR
- Signal Level: CMOS / 3.3V compatible

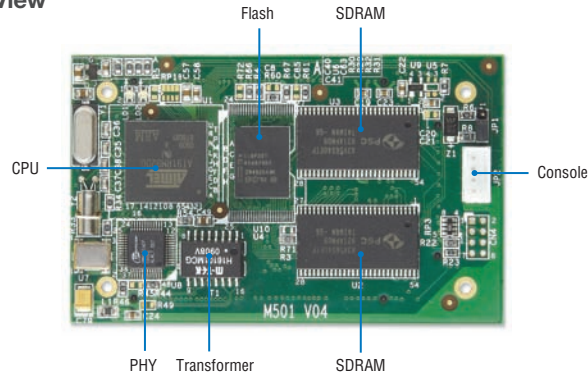
### Power Consumption

- Input Range: 3~3.6VDC (3.3V nominal)
- Consumption: 2W

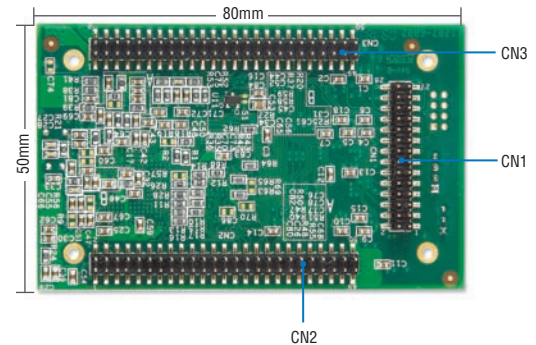
### General

- Board Dimensions (W x H): 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:
  - M-501: 0~70°C (32~158°F)
  - M-501T: -20~80°C (-4~176°F)

Front View



Rear View



## S/W Specifications

### General

- OS: Linux, kernel 2.6.14
- Boot Loader: U-Boot 1.1.2
- File Systems: JFFS2, ETX2, VFAT / FAT, NFS

### Pre-installed Utilities

- bash, busybox, wget, boa, iptables, ppp, ssh, wireless\_tools, Artila utility

### Daemons Started by Default

- ssh (secured shell)
- 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)

### Toolchain for Linux

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

### Standard Device Drivers

- SD / MMC, UART, Ethernet, GPIO, Buzzer
- Real Time Clock: Supports Ricoh RS5C372
- EEPROM: Supports ATMEL AT24C16 and its compatibles

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

- Generic Flash drive
- IEEE-802.11b/g WiFi adapter (Ralink rt73usb)
- 10/100Mbps Fast Ethernet adapter (RT8150)
- RS-232 adapter (Prolific PL-2303)
- ADSL modem
- ISDN modem (CDC / ACM compatible)

## Ordering Information

- **M-501**  
AT91RM9200 + Linux 2.6.14 System on Module with 64MB SDRAM, 16MB NOR Flash
- **M-501T**  
AT91RM9200 + Linux 2.6.14 System on Module with 64MB SDRAM, 16MB NOR Flash, Wide-temp. Version
- **M-501 Starter Kit**  
Includes one M-501 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

