### 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**

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

### Network Interface
- **Type:** 1 x 10/100Mbps Ethernet
- **PHY:** DAVICOM DM9161
- **Protection:** 1.5KV magnetic isolation

### UART
- **Port 0:** TXD0, RXD0, RTS0, CTS0, GND
- **Port 1:** TXD1, RXD1, RTS1, CTS1, DCD1, DTR1, DIR1, GND
- **Port 2:** TXD2, RXD2, RTS2, CTS2, GND
- **Port 3:** TXD3, RXD3, RTS3, CTS3, GND
- **System ready LED:** CN1: pin#23, #40, #40B, #42
- **SD card slot:** CN2: pin#37, output
- **Signal Level:** CMOS / 3.3V compatible

### Port 0: TXD0, RXD0, RTS0, CTS0, GND
- **Signal Level:** CMOS / 3.3V compatible

### Pre-defined I/O Pins (Reserved)
- **CN1:** pin#23, #40, #40B, #42
- **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 (CS0, CS1, CS2, CS3)
- **Control Bus:** RD, WR
- **Signal Level:** CMOS / 3.3V compatible

### Power Consumption
- **Input Range:** 3~3.6VDC (3.3V nominal)
- **Consumption:** 1W

### General
- **Board Dimensions:** 80 x 50mm
- **Pitch:** 2.0mm Pitch Connectors
- **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)
- **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
  - **Linux-ready ARM9 System on Module**

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### 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/securetty)**
- **ftp server (viusftpd)**
- **web server (lighttpd)**

#### 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
- **EFPROM:** Supports ATMEL AT24C16 and its compatibles

#### Pre-load USB Host Drivers (Could Be Customized)
- **Generic Flash drive**
- **IEEE 802.11b/g Wi-Fi adapter (Ralink rt73usb)**
- **10/100Mbps Fast Ethernet adapter (RT8150)**
- **RS-232 adapter (Prolific PL-2303)**
- **ADSL modem**
- **SDN modem (CDC / ACM compatible)**

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### GPIO
- **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

### Common UART Parameters
- **Baud Rate:** Up to 921.6Kbps
- **Parity:** None, Even, Odd, Mark, Space
- **Stop Bits:** 1, 1.5, 2
- **Flow Control:** RTS / CTS, XON / XOFF, None

#### UART Advanced Feature (When Used as RS-485)
- **9-bit Multi-drop mode**
- **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:** MOSI, MISO, SCK, CS0, CS1, CS2
- **Supported Devices:** Driver has been built-in

### 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**

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### 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.
  - 1 x RS-232 port, 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

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### 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

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Features

- ATMEG 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 local bus (A0~A7, D0~D7, RD, WR) with 4 x chip select signals
- Ultra-low power consumption, less than 2.5 Watts
- GNU C / C++ toolchain is included

CPU / Memory

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

Network Interface

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

UART

- Port 0: TXD0, RXD0, RTS0, CTS0, GND
- Port 1: TXD1, RXD1, RTS1, CTS1, DCD1, DTR1, DS1, GND
- Port 2: TXD2, RXD2, RTS2, CTS2, GND
- Port 3: TXD3, RXD3, RTS3, CTS3, GND
- Signal Level: CMOS / 3.3V compatible

Undefined Digital I/O Pins (Reserved)

- CN1: pinx23, f104, f105
- CN2: pinx23, f24

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

Pre-installed Utilities

- bash, busybox, wget, boa, istables, ppp, ssh, wireless_tools, Artila utility

Daemons Started by Default

- ssh (secured shell)
- syslog / klogd (system and kernel log)
- inetd server (disable root permission in /etc/securetty)
- ip server (ipf)
- web server (lighttpd)
- amgrd (Artila broadcast search daemon)

Toolchain for Linux

- GCC: C / C++ PC cross compiler
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- M-501 Starter Kit
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