**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: DAVICOM 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
- Partial: 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 Multidrop mode
- Supports hardware auto direction control

**USB Ports**
- Host Ports: 2, USB 2.0 compliant
- Host Signals: Udata+, Udata-, Ustatus+, Ustatus-, Udevice-
- Device (Client): 1, USB 2.0 compliant
- Device (Client) Signals: Udata+, Udata-, Ustatus

**I2C (Inter-IC Bus)**
- Signals: TWI, TWACK
- Supports: Driver has been built-in

**I2S (Inter-IC Sound)**
- Transmitter: TSCK, TMS, TSD
- Receiver Signals: RCK, RWS, RSD

**SPI (Serial Peripheral Interface)**
- Signals: MISO, MOSI, SCK, CS0, CS1
- SD (Secure Digital Card Interface)
  - Signals: MCD0, MCD1, MCD2, MCD3
  - SD: 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/O)**
- 32 x GPIOs can be programmed as digital input or output
- Signal Level: CMOS / 3.3V compatible

**Pre-defined Pins**
- Reset Button (CN2, pin65), input
- Buzzer (CN2, pin17), output
- 2-pin DIP: SW (CN2, pin12, #13, input
- System ready LED (CN2, pin98), output
- LAN activity LED (CN3, pin91), 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 (DO-07)
- Address Bus: 8-bit (A0-A7)
- Chip Select: x 3 (CS0, 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**
- CPU: ATMEL 400MHz AT91SAM9G20
- Memory: 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

**Features**
- ATMEAL 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
- Ultra-low power consumption, less than 2.5 Watts
- GNU C / C++ toolchain is included

**Package Management & System Administration**
- Supports ipkg install to manage the package installation, upgrade and removal
- Supports webmin (use ‘ipkg install webmin’ to install)
- Supports fwconfig (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 ATMEAL AT24C16 and its compatibles

**Pre-load USB Host Drivers (Could Be Customized)**
- Generic Flash driver
- IEEE-802.11b/g Wi-Fi adapter (Realtek RTL8187, ZYDAS zd2112)
- 10/100Mbps Fast Ethernet adapter (RTB150)
- RS-232 adapter (Proxicom PL-2303)
- ADIS, modem
- SSD modem (CDC / ACM compatible)

**S/W Specifications**

**General**
- OS: Linux, kernel 2.6.29
- Boot Loader: u-boot 1.3.4
- File Systems: UDF, VFAT, ET2X, VFAT / FAT, NFS

**Pre-installed Utilities**
- bash, busybox, sysvinit, wget, ipkg, procfs (for webmin), pmutils, lighttpd, vsftpd, lighttpd, rsyslog, ssh, wireless-tools, util-linux-mount / umount, usbutils, Artila utility

**Daemons Started by Default**
- ssh (secured shell with scp)
- syslog / klogd (system and kernel log)
- Netcat server (for easy root permission in /etc/security)
- rlogin server (rlogin)
- web server (lighttpd)
- and more (Artila broadcast search daemon)

**Package Management & System Administration**
- ipkg install 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 ATMEAL AT24C16 and its compatibles

**Pre-load USB Host Drivers (Could Be Customized)**
- Generic Flash driver
- IEEE-802.11b/g Wi-Fi adapter (Realtek RTL873usb, Realink r550usb, Realtek RTL8187, ZyDAS zd2112)
- 10/100Mbps Fast Ethernet adapter (RTB150)
- RS-232 adapter (Proxicom PL-2303)
- ADIS, modem
- SSD modem (CDC / ACM compatible)

**Ordering Information**
- **M-502**
  - ATMEAL32G02 + 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
Features
- ATMEG 400MHz AT91SAM9G20 CPU w/ MMU
- Linux kernel 2.6.29 with full system
- 64MB SDRAM and 256MB NAND Flash
- 1 x 10/100Mbps Ethernet
- 2 x USB 2.0 host supporting full speed of 12Mbps
- 1 x SD (secure digital interface)
- 4 x 921Kbps 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: ATMEG 400MHz AT91SAM9G20 w/ MMU
- Memory: 64MB SDRAM, 256MB NAND Flash
- DataFlash®: 2MB, for system backup

Network Interface
- Type: 1 x 10/100Mbps Ethernet
- PHY: DAVICOM DM941
- Protection: 1.5KV magnetic isolation

UART
- Port 0: TXD0, RXD0, RTS0, CTS0, GND
- Port 1: TXD1, RXD1, RTS1, CTS1, 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 921.8Kbps
- 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

Local Bus
- Data Bus: 8-bit (D0-D7)
- Address Bus: 8-bit (A0-A7)
- Chip Select: x 3 (CS0, CS1, CS2)
- Control Bus: RD, WR
- Signal Level: CMOS / 3.3V compatible

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

S/W Specifications
General
- OS: Linux, kernel 2.6.29
- Boot Loader: U-Boot 1.3.4
- File Systems: UBI, JFFS2, ETX2 / ETX3, VFAT / FAT, NFS

Pre-installed Utilities
- bash, busybox, sysvinit, wget, scp, props for (webmin), psncms, lighttpd, vsftpd, pigpio, ssh, wireless, tools, util-linux-mount / umount, usbsata, Artila utility

Daemons Started by Default
- ssh (secured shell with stpx)
- syslog / klogd (system and kernel log)
- netif server (stable root permission in /etc/security)
- iftp server (vftp)
- web server (lighttpd)
- amgrd (Artila broadcast search daemon)

Package Management & System Administration
- Supports pigpio 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, EEPROM, and local bus connector
- Includes one M-502 SdM 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

Pre-installed USB Host Drivers (Could Be Customized)
- Generic Flash drive
- IEEE-802.11b g WiFi adapter (Ralink r73usb, Ralink r9500usb, Realtek RTL8167, ZyDAS zd211tw)
- 10/100Mbps Fast Ethernet adapter (RTB150)
- RS-232 adapter (Proxicent PL-2303)
- ADSL modem
- ISDN modem (CDC / ACM compatible)

Ordering Information
- M-502
  ATMEG3200 + Linux 2.6.29 System on Module with 256MB NAND Flash, 64MB SDRAM
  M-502 Starter Kit
  Includes one M-502 SdM 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