

Matrix-520 Linux-ready ARM9 Embedded Computer

- ✓ 100% Linux 2.6.x compatible computing platform
- ✓ 32MB SDRAM and 16MB Flash
- ✓ 18x2 high-brightness LCM display
- ✓ Two 10/100Mbps Ethernet port
- ✓ Eight 921.6Kbps high speed TTY (serial) ports
- ✓ Two USB 2.0 host ports for add-on functionality expansion
- ✓ One SD memory card slot inside for storage expansion
- ✓ Twenty-one TTL-level digital I/Os (GPIO)
- ✓ One audio out supporting mp3 and wav format
- ✓ GNU C/C++ tool chain for Linux/Windows environment



Introduction

The Matrix-520 is a mini-mighty Linux-ready ARM9-based computing platform for embedded headless run-only application. It comes equipped with two Ethernet, eight TTY (serial) ports, two USB host and one USB client ports, plus one internal SD memory card slot and twenty-one TTL-level GPIOs in an incredible small package measuring only 160x104x38.5 mm.

☒ 100% Linux Compatible , Hassle Free

The Matrix-520 is a true Linux computing platform and it supports versatile file systems. Users can operate the Matrix-520 the same way as they do on a normal Linux desktop.

☒ Support Wire and Wireless Networking

The Matrix-520 comes with two standard 10/100Mbps Ethernet ports for wired networking. In addition, it is easy to add IEEE-802.11b/g WiFi support by simply plugging an USB WiFi dongle into the Matrix-520.

☒ Eight High Speed TTYs (Serial Interface)

Also, the Matrix-520 provides eight 921.6Kbps high-speed TTY ports. Port 1,5,6,7 and 8 can be configured as RS-232, RS-422 or RS-485. Port 2 features full RS-232 supporting for modem connection. Port 3 and Port 4 support standard RS-232s.



☒ 18x2 High-brightness LCM Display

The Matrix-520 features a high-brightness 18x2 LCM display. User application can easily display run-time messages through Artila's utility, which is pre-installed in the Matrix-520.



☒ Twenty-one TTL-level GPIOs

The Matrix-520 comes with twenty-one TTL-level digital I/Os. Each pin can be individually programmed as input or output.

☒ Optional 4GB SD Card for Data Storage

Users can install one standard SD Flash memory card, up to 4GB now, into the Matrix-520 as an additional hard drive.

☒ GNU Tool Chain for Application Development

Open-source GNU Tool Chain, including C/C++ cross-compiler and POSIX standard C/C++ library, is bundled with the Matrix-520 for free.



H/W Specifications

CPU/Memory

- ▶ CPU: ATMEL AT91RM9200 (ARM9-core)
- ▶ Clock: 180MHz
- ▶ SDRAM: 32MB
- ▶ Flash: 16MB
- ▶ EEPROM: 2KB

LCM Display

- ▶ Type: 144x32 dot-matrix, w/ built-in English font
- ▶ Text mode: can display 18x2 characters

Network Interface

- ▶ No. of ports: two
- ▶ Type: 10/100BaseT, RJ-45 connector
- ▶ Protection: 1.5KV magnetic isolation

TTY (Serial) Ports

- ▶ Port 1,5,6,7,8: can be set as RS-232, RS-422, or RS-485
- ▶ Port 2,3,4: RS-232
- ▶ Port 2,5,6,7,8: supports full modem signals
- ▶ Connector: RJ45 connector

TTY (Serial) Port Parameters

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

USB Host Ports

- ▶ No. of ports: two
- ▶ Speed: USB 2.0 compliant, supports low-speed (1.5Mbps) and full-speed (12Mbps) data rate

Digital I/Os (GPIO)

- ▶ No. of pins: twenty one pins
- ▶ Signal level: TTL compatible
- ▶ Each pin can be programmed as input or output

Mass Storage

- ▶ One SD 1.0 compliant socket inside

Audio output

- ▶ support mp3 and wav format

General

- ▶ WatchDog Timer: yes, for kernel use
- ▶ Real Time Clock: yes
- ▶ Buzzer: yes
- ▶ Power input: 9~40VDC
- ▶ Power consumption: 300mA@12VDC
- ▶ Dimension: 160 x 104 x 38.5mm
- ▶ Operation Temperature: 0 to 70C(32 to 158F)
- ▶ Regulation: CE Class A, FCC Class A

TTY Pin Assignment

PIN	RS-232	RS-422	RS-485
1	DSR	-	-
2	RTS	Tx+	Data+
3	GND	GND	GND
4	Tx	Tx-	Data-
5	Rx	Rx+	-
6	DCD	Rx-	-
7	CTS	-	-
8	DTR	-	-



S/W Specifications

General

- ▶ OS: Linux, kernel 2.6.x
- ▶ Boot Loader: U-Boot 1.1.2
- ▶ File Systems: JFFS2, ETX2/ETX3, VFAT/FAT, NFS

Protocol stacks

- ▶ IPv4, ICMP, ARP, DHCP, NTP, TCP, UDP, FTP, Telnet, HTTP, PPP, PPPoE, CHAP, PAP, SMTP, SNMP V1/V2, SSL, SSH 1.0/2.0

Utilities

- ▶ bash: shell command
- ▶ tinylogin: login and user manager utility
- ▶ telnet: Telnet client program
- ▶ busybox: Linux utility collection
- ▶ ftp: FTP client program
- ▶ lcdctl: Matrix LCM control utility, can turn On/Off LCM and display user messages

Daemon

- ▶ pppd: Dial In/out over serial port and PPPoE
- ▶ snmpd: SNMP agent program
- ▶ telnetd: Telnet server program
- ▶ inetd: TCP server program
- ▶ ftpd: FTP server program
- ▶ boa: Web server program
- ▶ sshd: secured shell server
- ▶ iptables: Firewall service manager
- ▶ armd: Artila manager daemon

Tool Chain for Linux

- ▶ GCC: C/C++ PC cross compiler for Linux, CygWin
- ▶ GLIBC: POSIX Library

Device Drivers

- ▶ LCM, SD/MMC, UART, Real Time Clock, Buzzer, Digital I/O, Ethernet, Watchdog Timer

USB Host Drivers (could be customized)

- ▶ Flash disk
- ▶ WiFi (IEEE-802.11b/g)
- ▶ RS-232 adaptors

Ordering Information

☒ Matrix-520

ARM9-based Linux Computer with 16MB on-board Flash, including one CD-ROM which contains GNU tool chain and user guide