

Matrix-504 Linux-ready ARM9 Embedded Computer

- ✓ 100% Linux 2.6.29 compatible computing platform
- ✓ ATMEL AT91SAM9G20 400MHz CPU
- ✓ 64MB SDRAM and 128MB NAND Flash
- ✓ System backup Data Flash: 2MB
- ✓ One 10/100Mbps Ethernet port
- ✓ Four 921.6Kbps high speed TTY (serial) ports
- ✓ Two USB 2.0 host ports, 12Mbps
- ✓ One micro-SD socket inside (Matrix-504D only)
- ✓ GNU C/C++ tool chain for Linux/Windows
- ✓ Extremely compact design, 78 x 108 x 24mm
- ✓ Ultra-low power consumption, less than 3 Watts
- ✓ Operating temperature 0 to 70°C (Matrix-504/504D)
- ✓ Operating temperature -20 to 80°C (Matrix-504T)



Introduction

The Matrix-504 is Artila's 2nd-generation ARM9- based box computer with pre-built Linux kernel and file system. It comes with a 400MHz ARM9 CPU, 128MB NAND Flash and 64MB SDRAM. Which enables the Matrix-604 perform more tasks at the same time while retaining high responsiveness.

✕ UBI File System & Failover Mechansim

The Matrix-504 uses UBI file system for its on-board NAND Flash. The UBI file system offers better write performance and more reliable bad-block handling over JFFS2.

If the NAND Flash file system does crash for any reason, the Matrix-504 will automatically boot up from its on-board 2MB Data Flash (read only). This failover mechanism allows users to rescue the Matrix-504 in a limited Linux environment.

✕ Support Wire and Wireless Networking

The Matrix-504 comes one standard 10/100Mbps Ethernet port for wired networking. Besides, it is easy to add IEEE-802.11b/g WiFi support by simply plugging an USB WiFi dongle into the Matrix-504.

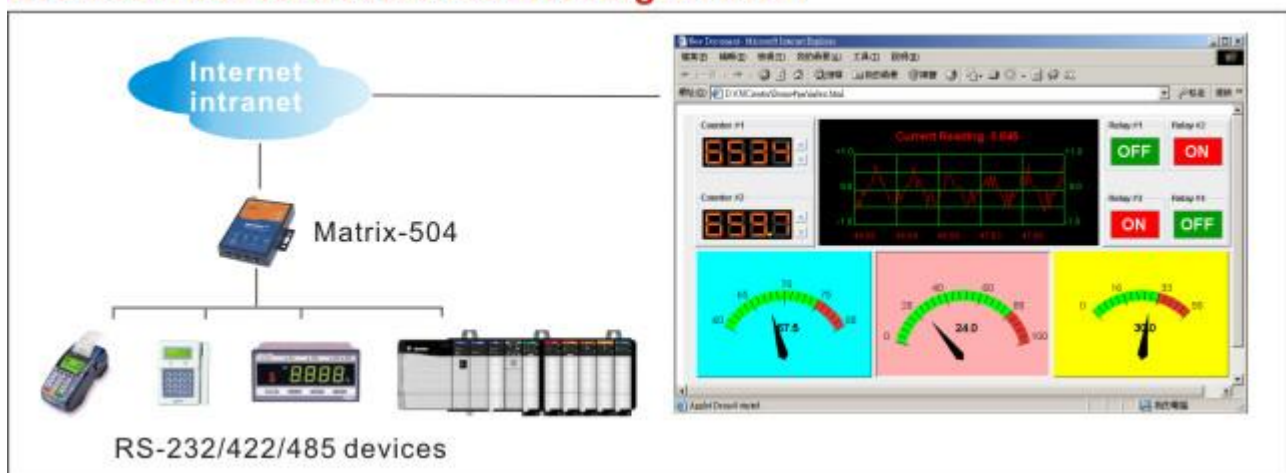
✕ Four High Speed TTYs (Serial Interface)

The Matrix-504 provides four high-speed TTY ports: Port 1 supports RS-232/422/485 and Port 2 to Port 4 support RS-232/485. The RS-485 interface features hardware direction control to ease communication programming.

✕ GNU Tool Chain for App. Development

Open-source GNU Tool Chain, including C/C++ cross-compiler and POSIX standard C/C++ library, is bundled with the Matrix-504 for free.

Browser-based device monitoring/control



H/W Specifications

CPU/Memory

- ▶ CPU: ATMEL 400MHz AT91SAM9G20 (ARM9, w/MMU)
- ▶ Memory: 64MB SDRAM, 128MB Flash (NAND)
- ▶ DataFlash@: 2MB, for system backup

Network Interface

- ▶ Type: 10/100BaseT, RJ-45 connector
- ▶ Protection: 1.5KV magnetic isolation

TTY (Serial) Ports

- ▶ Port 1: can be set as RS-232, RS-422, or RS-485
- ▶ Port 2,3,4: can be set RS-232 or RS-485
- ▶ 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
- ▶ RS-485 direction control: auto, by hardware

USB Ports

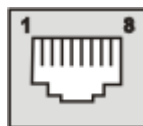
- ▶ Host ports: two
- ▶ Client port: one, reserved
- ▶ Speed: USB 2.0 compliant, supports low-speed (1.5Mbps) and full-speed (12Mbps) data rate

General

- ▶ WatchDog Timer: yes, for kernel use
- ▶ Real Time Clock: yes
- ▶ Buzzer: yes
- ▶ micro-SD socket: Matrix-504D only
- ▶ Power input: 9~48VDC
- ▶ Power consumption: 300mA@12VDC
- ▶ Dimension: 78 x 108 x 24mm
- ▶ 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 2.6.29
- ▶ Boot Loader: U-Boot 1.1.2
- ▶ File Systems: UBI, JFFS2, ETX2/ETX3, VFAT/FAT, NFS

Utilities pre-installed

- ▶ bash, busybox, sysvinit
- ▶ wget, ipkg, procps (for webmin), psmics,
- ▶ apache2, vsftpd, iptable, ppp, ssh
- ▶ wireless_tools, util-linux-mount/umount, usbutils
- ▶ artila utility
- ▶ more utilities can be found in product CD

Daemons started by default

- ▶ ssh (secured shell) with sftp
- ▶ syslog/klogd (system and kernel log)
- ▶ telnet server (disable root with /etc/securetty)
- ▶ ftp server (vsftp)
- ▶ web server (apache2)
- ▶ 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.

Tool Chain for Linux

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

USB Host Drivers

- ▶ Generic Flash drive
- ▶ RS-232 adaptors (for Prolific PL-2303 compatibles)
- ▶ WiFi dongles (for Ralink RT73 compatibles)

Ordering Information

☒ Matrix-504 (for project only)

ARM9-based Linux Computer with 128MB on-board Flash, including one CD-ROM which contains GNU tool chain and user guide

☒ Matrix-504D

Upgraded version of the Matrix-504, with micro-SD socket inside

☒ Matrix-504T

Wide-temperature (-20 to 80°C) version of the Matrix-504