

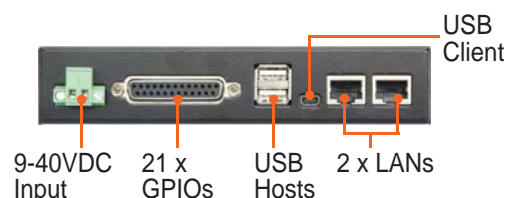
Matrix-522

Linux-ready, 400MHz ARM9-based Box Computer
with 2 x CAN interface, 2 x Ethernet and 2 x RS-232/422/485 Ports



- ▶ ATMEL 400MHz ARM9 processor (AT91SAM9G20)
- ▶ Linux kernel 2.6.29 with file system
- ▶ 64MB SDRAM, 128MB NAND Flash, 2MB Data Flash
- ▶ MicroSD socket inside the box
- ▶ 2 x CAN bus ports support SocketCAN/CANOpen
- ▶ 2 x 10/100M Ethernet ports
- ▶ 2 x RS-232/422/485 serial ports
- ▶ 2 x USB hosts and 21 x GPIOs
- ▶ Less than 3W power consumption

Back View



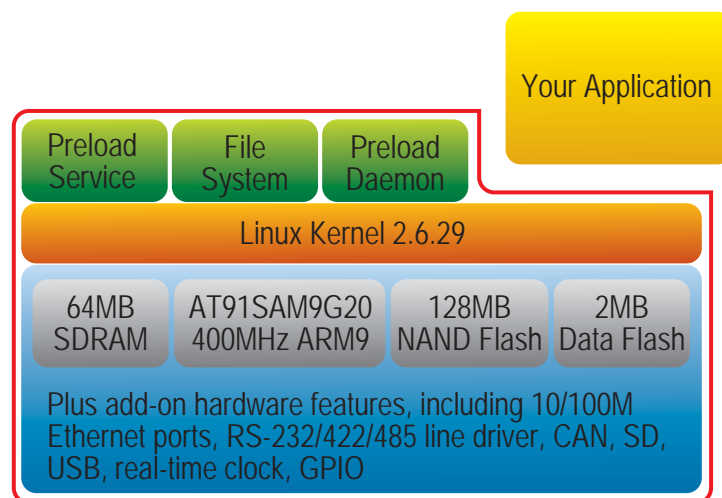
Overview

Artila's Matrix-522 industrial box computer is a small form-factor, low power consumption, and Linux-ready computing platform. With a 400MHz ARM9 CPU, 64MB SDRAM, 128MB NAND Flash, and 2MB Data Flash inside, Matrix-522 ensures system high performance. Matrix-522 is equipped with multiple I/O interfaces, including 2 LANs, 2 x RS-232/422/485 serial ports, 2 x CAN bus ports, 2 x USB hosts, and 21 x GPIOs. It is easy to develop pure C/C++ programs or Web-based applications (ex: SQLite+ PHP) to run on top of the Matrix-522.

The CAN bus (Control Area Network) is one of the dominating communication interface for embedded control systems both in automobile industry and factory automation industry. The Matrix-522 comes with two isolated CAN bus 2.0 compliant ports, supporting CANSocket and CANOpen APIs.

Matrix-522 also provides a useful fail-proof design for system backup and recovery. Normally, Matrix-522 boots up from its NAND Flash. However, the Data Flash in Matrix-522 includes a backup Linux file system as well, which will automatically boot up Matrix-522 in case the primary NAND Flash fails. If the Matrix-522 boots up from the Data Flash, a menu-driven program will appear to help users restore NAND Flash images from a USB pen drive or an SD card. Also, this program can help users make a custom image of the current file system to a USB pen drive or an SD card, so that users can easily recover the file system, or duplicate it to other Matrix-522s. Please refer to the user guide for more detailed information.

System Architecture



With pre-installed Linux OS, users can easily operate Matrix-522 via Telnet, or transfer files using FTP.

Matrix-522 comes with a free GNU tool chain for users to develop C/C++ programs. Comprehensive examples are also available in Matrix-522 product CD to demonstrate how to access I/O interface and hardware features.

Matrix-522's Linux environment is highly scalable and configurable. A variety of driver modules and software utilities are included in the product CD. Advanced customization service is also available upon request.

Hardware Specifications

CPU/Memory

CPU: ATMEL 400MHz AT91SAM9G20 w/MMU
Memory: 64MB SDRAM, 128MB NAND Flash
DataFlash®: 2MB, for system backup

Network Interface

Type: 2 x 10/100BaseT, RJ-45 connector
Protection: 1.5KV magnetic isolation

TTY(Serial) Ports

2 x RS-232/422/485
Connector: DB9 male connector

TTY(Serial) Port Parameters

Baud Rate: up to 921.6Kbps
Parity: None, Even, Odd, Mark, Space
Data Bits: 5, 6, 7, 8
Stop Bit: 1, 1.5, 2
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

Digital I/Os (GPIO)

No. of Pins: 21 Pins
Signal Level: CMOS/TTL compatible
Each pin can be programmed as input or output.

CAN Bus Ports

Type: 2 x CAN bus 2.0A/B compliant ports
Speed: up to 1Mbps
Isolation: 2500Vrms
Connector: DB9 male connector

General

WatchDog Timer: Yes
Real Time Clock: Yes
Buzzer: Yes
Power Input: 9 to 40VDC
Power Consumption: 190mA@12VDC
Dimensions: 160 x 104 x 32mm

Ordering Information

Matrix-522	Industrial Linux-ready ARM9 CAN Bus Box Computer
CB-RJ45F9-150	RJ45 to DB9 Female Connection Cable, 150cm
CBL-F10M9-20	Serial Console Cable, 20cm
DK-35A	DIN RAIL Mounting Kit

Software Specifications

General

OS: Linux, Kernel 2.6.29
Boot Loader: U-Boot 1.1.2
File Systems: UBI, JFFS2, ETX2/ETX3, VFAT/FAT, NFS

Pre-installed Utilities

bash, busybox, sysvinit, wget, ipkg, procps (for webmin), psmics, lighttpd, vsftpd, iptable, ppp, ssh, wireless_tools, util-linux-mount/umount, usbutils, Artila utility, and more

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 (lighttpd)
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 (rt2500/rtl8187/rt73/zd1211 chips)

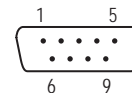
Pin Assignments

DB9 Male RS-232/422/485

PIN	RS-232	RS-422	RS-485
1	DCD	Rx-	---
2	Rx	Rx+	---
3	Tx	Tx-	Data-
4	DTR	---	---
5	GND	GND	GND
6	DSR	---	---
7	RTS	Tx+	Data+
8	CTS	---	---
9	---	---	---

DB9 Male CAN Bus

PIN	CAN
1	---
2	CAN_Lo
3	---
4	---
5	---
6	GND-ISO
7	CAN-Hi
8	---
9	---



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