

Matrix 500 Quick Installation Guide

Overview

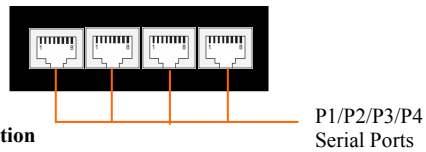
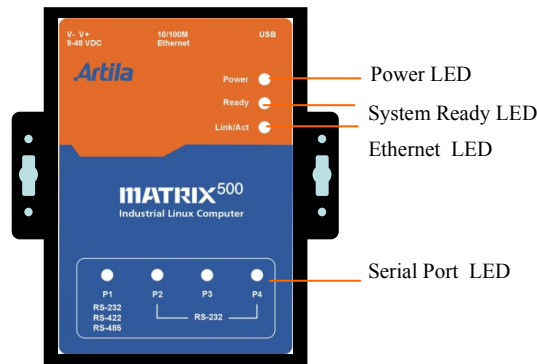
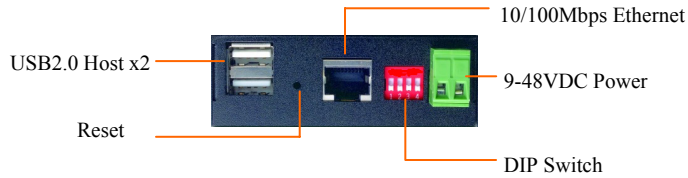
Matrix 500 features four serial ports, 10/100 Mbps Ethernet, USB port and SD socket for flash disk expansion. The pre-install Linux OS and GNU tool chain make Matrix 500 ready for your application development.

Packing List

Matrix 500 is shipped with following items

1. Matrix 500
2. Artila CD includes Tool Chain, Installation guide and example programs

Matrix 500 Panel Layout



Connector Description

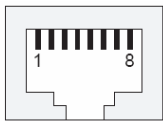
Power Connector

Connect the 9 to 48VDC power line to Matrix 500. If the power is properly supply, the power LED will show a solid green color.

Ethernet Port

The Ethernet Port use RJ45 connector

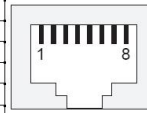
Pin	Signal
1	ETx+
2	ETx-
3	ERx+
6	ERx-



Serial Port

The four serial ports use RJ45 connector and the pin assignment are shown as following table.

Pin	RS-232	RS-422	RS-485
1	DSR	---	---
2	RTS	TXD+	Data+
3	GND	GND	GND
4	TXD	TXD-	Data-
5	RXD	RXD+	---
6	DCD	RXD-	---
7	CTS	---	---
8	DTR	---	---



USB Port

The USB 2.0 Host port now supports following devices

1. USB Storage Device
2. USB to Wireless LAN Adaptor (Ralink RT2570)
3. USB to Ethernet Adaptor (Realtek RTL8150)
4. USB to Serial Adaptor (Prolific 2303)

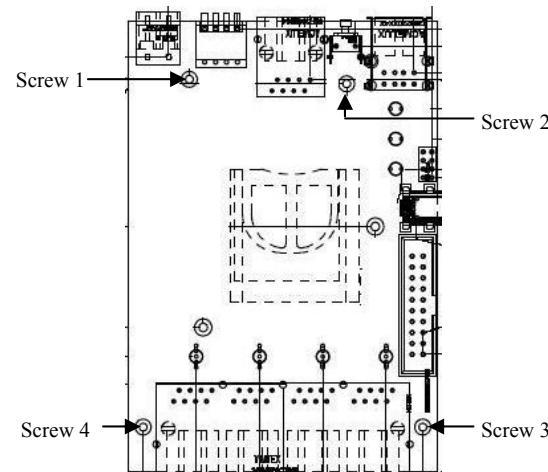
Use command `modprobe rt2570` and `modprobe rtl8150` load the device driver. USB to Serial Adaptor (ttyUSB0 and ttyUSB1) are built-in Kernel.

SD Socket

The SD socket is compatible with SD memory card specification version 1.0. The SD Socket is located in the back panel of the PCB. To install the SD memory card, please use the screw driver to open the metal case of Matrix 500 and unscrew Screw 1 to 4 as following

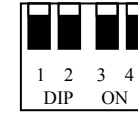


SD Socket



DIP Switch

Switch is a four keys DIP switch and Key 1 and 2 are used to configure the hardware interface mode of serial port P1 and Key3 and Key 4 are reserved for your application.



	1	2	3	4
RS-232	ON	ON	--	--
RS-422	OFF	ON	--	--
RS-485	OFF	OFF	--	--

Reset Button

Press the "Reset" button to activate the hardware reset. You should only use this function if the software does not function properly.

Power LED

The Power LED will show solid green if power is properly applied

Ready LED

The Ready LED will show solid green if Matrix 500 complete system boot up. If Ready LED is off during system boot up, please check if power input is correct. Turn off the power and restart Matrix 500 again. If Ready LED is still off, please contact the manufacture for technical support.

Link/Act

When Ethernet port are connected to the network, Link/Act will show solid green and if there is traffic is the Ethernet, this LED will flash

Serial Port LED

These four dual color LEDs indicate the data traffic at the serial ports. When RXD line is high then Green light is ON and when TXD line is high, Yellow light is ON.

Default Setting

Default IP Address:192.168.2.127

Netmask: 255.255.255.0

Login: root

Password: root

Terminal type: VT100

Network Configuration

To configure the IP address, Netmask and Gateway setting, please modify

/disk/etc/rc as following:

#Static IP

```
ifconfig eth0 192.168.2.127 netmask 255.255.255.0
```

For DHCP setting:

#DHCP

```
dhcpcd eth0 &
```

Wireless LAN Configuration

Matrix 500 supports wireless LAN by using USB WLAN adaptor which uses Ralink RT2570 controller. Please refer to the website <http://ralink.rapla.net> for the supporting list of the USB WLAN adaptor. To configure the wireless LAN setting, please use command:

```
modprobe rt2570
```

```
ifconfig wlan0 up
```

```
iwconfig wlan0 essid XXXX key YYYYYYYY mode MMMM
```

For infrastructure mode XXXX is the access point name and YYYYYYYY is the encryption key and MMMM should be *managed*

For Ad-Hoc mode mode XXXX is the Matrix 500 device name and YYYYYYYY is the encryption key MMMM should be *ad-hoc*. To configure the IP address use command

```
dhcpcd wlan0 & or ifconfig wlan0 192.168.2.127 netmask 255.255.255.0
```

USB to Ethernet Configuration

To enable the USB to Ethernet Adaptor device driver, use command

```
modprobe rtl8150
```

```
ifconfig eth1 192.168.2.128 netmask 255.255.255.0
```

Install GNU Tool Chain

Find a PC with Linux 2.6.X Kernel installed and login as a **root** user then copy the arm-linux-3.3.2.tar.gz to root directory \ of PC. Under \ directory type following command to install the Matrix 500 Tool Chain

```
#tar xzvf arm-linux-3.3.2.tar.gz
```

I/O Devices Control

Matrix 500 uses standard I/O device control to access following devices:

1. Ethernet: eth0
2. Serial Ports: ttyS1, ttyS2, ttyS3, ttyS4
3. Serial Console Port: ttyS0
4. Real time clock: rtc
5. USB Flash Disk: sda, sda1, sdb, sdb1
6. SD memory Card: mmc0
7. USB WLAN dongle: wlan0
8. USB Serial Cable: ttyUSB0, ttyUSB1

Remark: Remember to include the "matrix500.h" header file in your program. Please refer to the example program included in the Matrix 500 SDK CD to demo the RS-232/422/485 mode configuration of serial port 1 configuration.

File System

Matrix 500 uses jffs2 file system for the built-in flash memory disk. The directory are:

/disk

/home

/etc

Write data to these directories are saved to flash memory and will not be erased after power off.

Mount External Disk

To mount the USB Flash Disk and SD memory card, use following commands after the disk are installed properly. To mount USB disk **mount /mnt/sda** or **mount /mnt/sda1** or **mount /mnt/sdb** or **mount /mnt/sdb1**

To find out the device name of the USB disk, you can use

```
dmesg | grep sd
```

And to mount SD memory card

```
mount /mnt/mmc
```

Web Page Directory

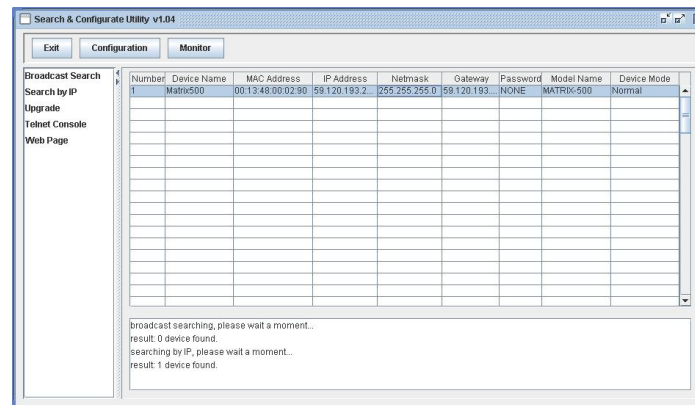
The web pages are placed at /home/httpd and the boa.conf contains the boa web server settings. The home page name should be *index.html*

Welcome Message

The welcome message "Artila" can be modified by editing the */etc/motd* file.

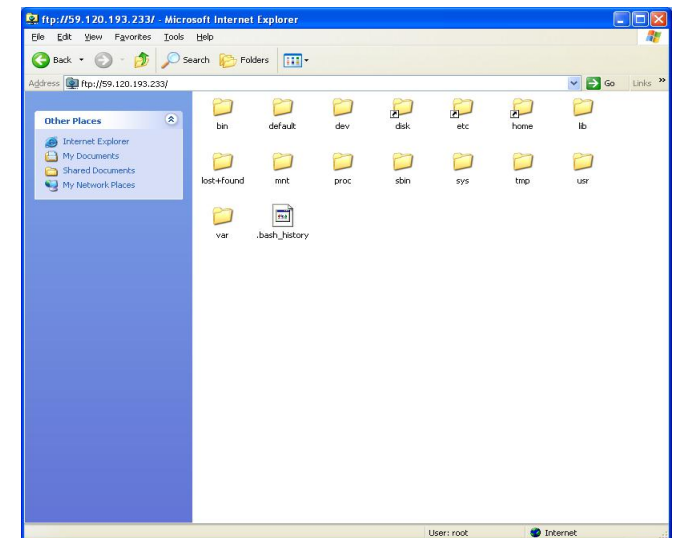
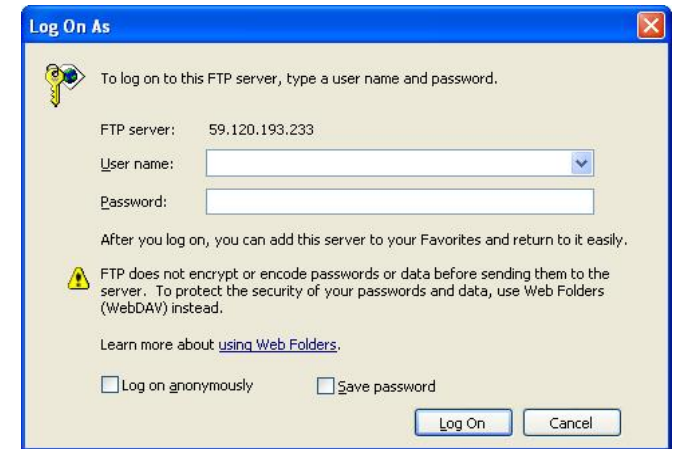
Manager Utility Software

The Manager Utility software, **manager.jar** is a java program and is used to discovered the Matrix 500 in the network if the IP address is forgotten. It can be run at any OS where java run time is available. To install the java run time platform at your computer, please visit <http://java.sun.com> and download the Java 2 Standard Edition (J2SE). Once the Matrix 500 is found, you can click the Telnet Console to configure the Matrix 500



Upload file to Matrix 500

To upload the file to Matrix 500, you can use FTP command in command line or Web Browser such as Microsoft Internet Explorer. Type **ftp://192.168.2.127** And under the file menu, click log on option to login Matrix 500. After login, you can see the files system of Matrix 500.



Compile and upload the C program

Use following command of the GNU cross compiler to compile the C program **#arm-linux-gcc -o hello hello.c**

Then upload the **hello** to Matrix 500. Remember to change the mode of the file After upload to Matrix 500 by **chmod +x hello**