

Matrix-516

Linux ARM9 Industry Box Computer

User Guide

Version 1.1



Table of Contents

1. Introduction	1
1.1 Packing List.....	1
1.2 Optional Accessory	1
2. Layout	2
3. Pin Assignment and Definition.....	3
3.1 Reset Button	3
3.2 Power LED	3
3.3 Ready LED.....	3
3.4 Link / Act LED	3
3.5 Serial Port LED	3
3.6 Ethernet Port	3
3.7 Serial Ports.....	3
3.8 Serial Console Port	4
3.9 Digital I/O Port (DB25 Female)	5
3.10 Factory Default Settings.....	6
3.11 Power on and System Boot up	6
3.12 Inittab and Run Levels	6
3.13 Default Started Service	7
3.14 Network Settings	7
3.15 Insert Kernel Module.....	7
3.16 File System	8
3.17 Devices List.....	8
3.18 Utility Software	9
3.19 Mounting External Storage Memory	9
3.20 Welcome Message	10
3.21 Web Page Directory.....	10
3.22 Adjust the System Time	10
3.23 SSH Console.....	11

3.24	Putty Console Software	11
3.25	ipkg Package Software Management	11
3.26	Install GNU Toolchain	12
3.27	Getting Started with the Hello Program	12
3.28	Auto Start Program on Boot.....	13
4.	Artila Utility Software	14
4.1	update	14
4.2	setuart	14
4.3	setconsole	14
4.4	version.....	15
4.5	gpioctl.....	15
5.	Loader Menu.....	16
6.	Frequently Asked Question.....	17
6.1	Forgot Password.....	17
6.2	Forgot the IP Address.....	17
6.3	System Fail to Boot.....	17
7.	System Recovery	18
7.1	Update Image.....	18
7.2	Make Filesystem	18
7.3	Recovery Env.....	18
7.4	Show Info	18
7.5	Reboot.....	18
7.6	Update Image Starts	19
7.7	Update Image Completes	19
7.8	Make Files System Starts	19
8.	Appendix.....	20
8.1	Utility Collection.....	20
8.2	ipkg Software Package Management	20
8.3	Serial Port Switch Definition.....	22

1. Introduction

Matrix-516 is an ARM9-based Linux ready industrial computer. The key features are as follow:

- ARM926EJ-S ARM Thumb Processor 400MHz w/MMU
- 32-KByte Data Cache and 32-KByte Instruction Cache
- 64MB SDRAM, 256MB NAND Flash on board
- Two 10/100 Mbps Ethernet
- Two USB 2.0 full speed (12 Mbps) Host ports, one USB device port
- Multimedia Card Interface for microSD memory card
- Eight 2500 Vrms isolated RS-485 ports
- 21 programmable Digital I/O port
- 9 to 48VDC power input
- Pre-installed Standard Linux 2.6 OS
- GNU tool chain available on Artila FTP
- Optional DIN RAIL mounting adaptor

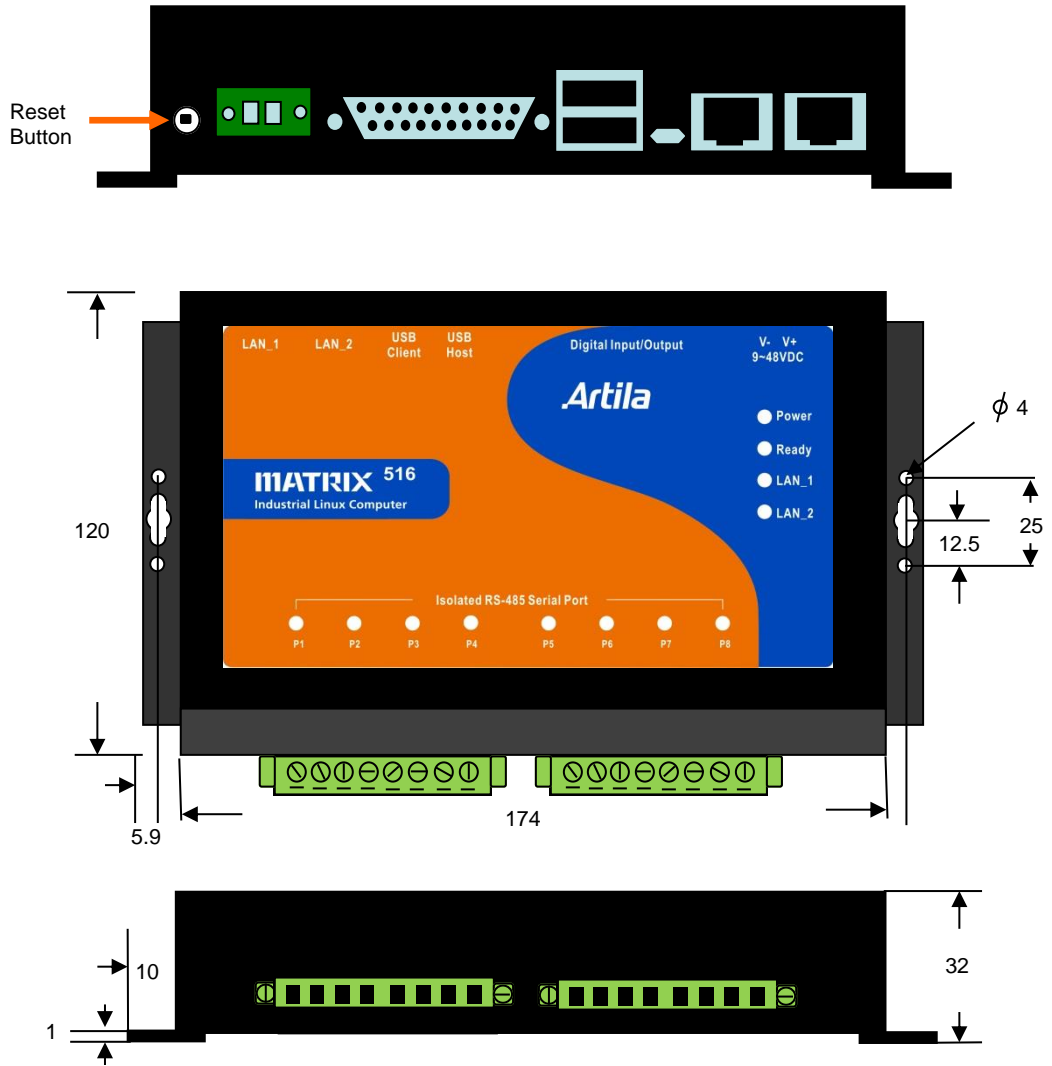
1.1 Packing List

- Matrix-516B Box Computer
- Wall mount bracket

1.2 Optional Accessory

- CBL-F10M9-20 (91-0P9M9-001): Console Cable (10Pin Header to DB9 Male, 20cm)
- DK-35A (36-DK35A-000): DIN RAIL Mounting Kit

2. Layout



3. Pin Assignment and Definition

3.1 Reset Button

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

3.2 Power LED

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

3.3 Ready LED

The Ready LED will show solid green if Matrix-516 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-516 again. If Ready LED is still off, please contact the manufacture for technical support.

3.4 Link / Act LED

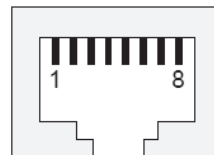
When Ethernet port are connected to the network, Link/Act will show solid green and if there is traffic is the Ethernet port, this LED will flash.

3.5 Serial Port LED

These eight 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.

3.6 Ethernet Port

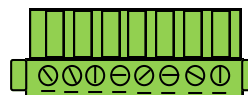
Pin No.	Signal
1	ETx+
2	ETx-
3	ERx+
6	ERx-



3.7 Serial Ports

Port 1~8: Isolated RS-485

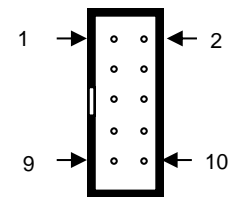
Pin No.	RS-485
1	D1+
2	D1-
3	D2+
4	D2-
5	D3+
6	D3-
7	D4+
8	D4-



3.8 Serial Console Port

Serial console port is located inside the box at CON1. You need to use console cable (91-0P9M9-001) to access it.

Serial Console RS-232			
1	N/C	2	N/C
3	RXD	4	N/C
5	TXD	6	N/C
7	N/C	8	N/C
9	GND	10	N/C



To use the serial console port, you need to open the metal case of Matrix-516 and the console connector is near the reset button and LEDs. Use any terminal software such as hyper terminal and configure the setting as follow:

Baud Rate: 115200

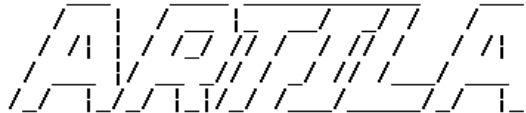
Data bits: 8

Parity: N

Stop bit: 1

Terminal type: VT100

```
Matrix518 login: root
Password:
```

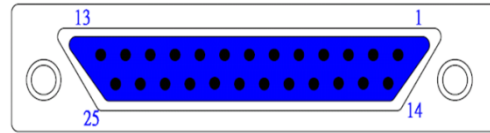


```
http://www.artila.com
```

```
root@Matrix518:~# _
```


3.9 Digital I/O Port (DB25 Female)

Pin No.	Function	Pin No.	Function
1	DIO0	14	DIO13
2	DIO1	15	DIO14
3	DIO2	16	DIO15
4	DIO3	17	DIO16
5	DIO4	18	DIO17
6	DIO5	19	DIO18
7	DIO6	20	DIO19
8	DIO7	21	DIO20
9	DIO8	22	GND
10	DIO9	23	GND
11	DIO10	24	VCC3
12	DIO11	25	VCC5
13	DIO12		



Note

1. VCC3: 3.3 VDC output
2. VCC5: 5 VDC output
3. GND: Digital Ground

Input:

Low level: -0.5V min
+0.9V max

High level: +2.3V min
+5.5V max

Output:

Low level: +0.5V min @ 8mA

High level: +1.8V min @ 8mA

3.10 Factory Default Settings

LAN 1 IP Address: 192.168.2.127

LAN 2 IP Address: 192.168.3.127

Login: root or guest (telnet guest only)

Password: root or guest (telnet guest only)

Serial Console Port:

Baud rate: 115200

Data format: 8 Bits, No Parity, 1 Stop bit (N,8,1)

Flow Control: None

Terminal type: VT100

3.11 Power on and System Boot up

Once Matrix-516 is correctly power on, it will start boot Linux kernel and mount file system. You can use Ethernet and telnet and login Matrix-516. Once kernel loaded, it will find */sbin/init* and execute it. The initialization configuration is at */etc/inittab*. Once boot up, you can use telnet to login Matrix-516.



3.12 Inittab and Run Levels

Inittab contains information of system initialization. The system initialization script */etc/rcS.d* runs first then the run level 5 */etc/rc5.d*. Matrix-516 uses run level for system setup and the default run level is number 5. Please refer to introduction to linux (<http://tille.garrels.be/training/tldp/>) for information about run level.

Following is the run levels setting:

Run level 0: halt

Run level 1 is single user (login and service are disabled)

Run level 2~5 are multiple users

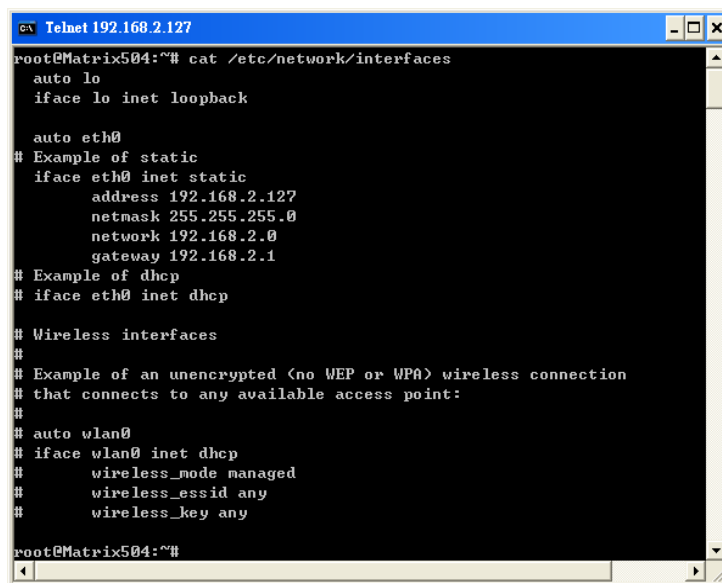
Run level 6 is reboot

Please refer to loader menu section for selection of run level.

3.13 Default Started Service

1. amgrd (Artila broadcast search daemon)
2. ssh (secured shell) with sftp
3. syslog/klogd (system and kernel log)
4. telnet server (disable root with */etc/securetty*)
5. ftp server (vsftp)
6. web server (lighttpd)
7. Ready LED (debug LED for internal use)

3.14 Network Settings



```

ex Telnet 192.168.2.127
root@Matrix504:~# cat /etc/network/interfaces
auto lo
iface lo inet loopback

auto eth0
# Example of static
iface eth0 inet static
address 192.168.2.127
netmask 255.255.255.0
network 192.168.2.0
gateway 192.168.2.1
# Example of dhcp
# iface eth0 inet dhcp

# Wireless interfaces
#
# Example of an unencrypted (no WEP or WPA) wireless connection
# that connects to any available access point:
#
# auto wlan0
# iface wlan0 inet dhcp
# wireless_mode managed
# wireless_essid any
# wireless_key any
root@Matrix504:~#

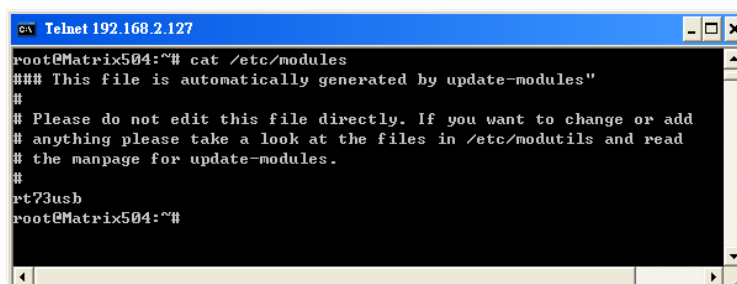
```

3.15 Insert Kernel Module

To insert kernel module while system boot up, please use *vi* to edit */etc/modules* to add module to load e.g.

rt73usb

To load the USB WLAN adaptor.



```

ex Telnet 192.168.2.127
root@Matrix504:~# cat /etc/modules
### This file is automatically generated by update-modules"
#
# Please do not edit this file directly. If you want to change or add
# anything please take a look at the files in /etc/modutils and read
# the manpage for update-modules.
#
rt73usb
root@Matrix504:~#

```

Use *vi* editing tool to edit the */etc/network/interfaces* for network setting. The default setting is static IP 192.168.2.127. Matrix-516 also supports Wireless LAN. Use

wireless_essid XXX

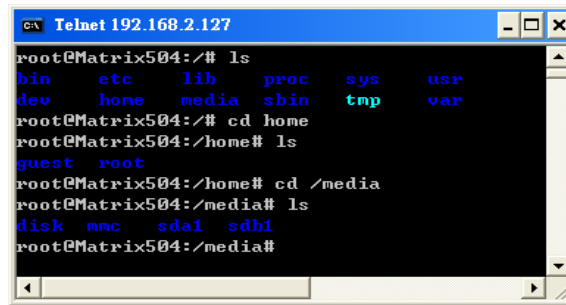
wireless_key YYY

To add SSID and WEP key if necessary. XXX is SSID and YYY is WEP Key.

Matrix-516 supports USB WLAN adaptor (Ralink RT2571). You can enable the driver module (rt73usb) by adding `rt73usb` in

`/etc/modules`

3.16 File System

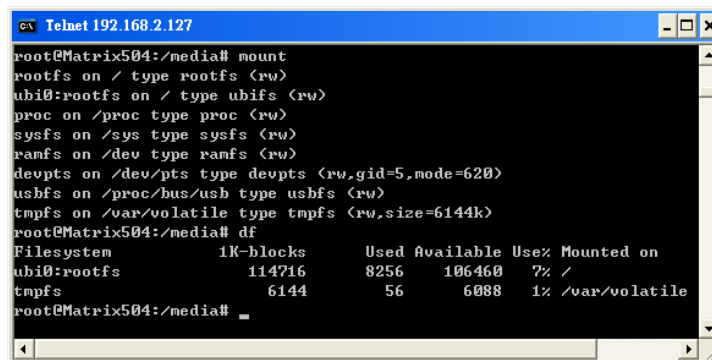


```

ca Telnet 192.168.2.127
root@Matrix504:/# ls
bin      etc      lib      proc     sys      usr
dev      home    media   /sbin    tmp      var
root@Matrix504:/# cd /home
root@Matrix504:/home# ls
guest    root
root@Matrix504:/home# cd /media
root@Matrix504:/media# ls
disk     mmc      sda1     sdb1
root@Matrix504:/media#

```

The 256MB NAND Flash memory of Matrix-516 contains Boot loader (uBoot), Linux Kernel, Root File System and user disk (/home). The file system and disk space are shown as follow:



```

ca Telnet 192.168.2.127
root@Matrix504:/media# mount
rootfs on / type rootfs (rw)
ubi0:rootfs on / type ubifs (rw)
proc on /proc type proc (rw)
sysfs on /sys type sysfs (rw)
ramfs on /dev type ramfs (rw)
devpts on /dev/pts type devpts (rw,gid=5,mode=620)
usbfs on /proc/bus/usb type usbfs (rw)
tmpfs on /var/volatile type tmpfs (rw,size=6144k)
root@Matrix504:/media# df
Filesystem            1K-blocks      Used Available Use% Mounted on
ubi0:rootfs           114716         8256   106460   7% /
tmpfs                  6144           56     6088    1% /var/volatile
root@Matrix504:/media#

```

3.17 Devices List

The supported devices are shown at /dev directory. Following list are most popular ones:

1. ttyS0: serial console port
2. ttyS1 to ttyS8: serial port 1 to port 8
3. sda to sdb: USB flash disk
4. ttyUSB0 to ttyUSB1: USB RS-232 adaptor (fdt_i2c.ko)
5. rtc: Real Time Clock
6. gpio: General Purpose digital I/O
7. ttyACM0 and ttyACM1: USB Modem (CDC compliant)
8. mmc: SD driver

3.18 Utility Software

Matrix-516 includes busybox utility collection and Artila utility software and there are placed at:

```
/sbin
/bin
/usr/bin
/use/sbin
```

Please refer to Appendix for the utility collection list.

```

Telnet 192.168.2.127
root@Matrix504:/sbin# ls
arp                init               lsush              setconsole
depmod             init.sysvinit     mkdevs            shutdown
depmod.26         insmod            mkdosfs           shutdown.sysvinit
fdisk              iwconfig          mkfs.minix        start-stop-daemon
fsck               iugetid          mkfs.vfat         sulogin
fsck.minix        iolist           mkswap            swapoff
getty              iupriv           modprobe          swapon
halt               iuspy            pivot_root        switch_root
halt.sysvinit     killall15         poweroff          sysctl
hotplug           klogd             reboot            sysctl.procps
hwclock           ldconfig          reboot.sysvinit   syslogd
ifconfig          logread           rmmod             telinit
ifdown            losetup           route             udhcpc
ifup              lsmod             runlevel

root@Matrix504:/sbin# cd /bin
root@Matrix504:/bin# ls
addgroup           dmesg             mktemp            sh
adduser           echo              more              sleep
bash              egrep             mount             stty
bashbug           false            mount.util-linux  su
busybox           fgrep            mountpoint        sync
cat               grep             mv                tar
chatrr            gunzip           netstat           touch
chgrp             gzip             pidof             true
chmod             hostname         pidof.sysvinit   umount
chown             ip               ping              unmount.util-linux
cp               kill             ps                uname
cpio              kill.procps      ps.procps         usleep
date              ln                pwd               vi
dd               login            rm                zcat
delgroup          ls               rmdir
deluser           mkdir            run-parts
df               mknod            sed

```

3.19 Mounting External Storage Memory

To find out the device name of the external memory device which plug into Matrix-516, you can use the command:

```
dmesg | grep sd
```

```
dmesg | grep mmc
```

To find out the device type (sda, sdb or mmc).

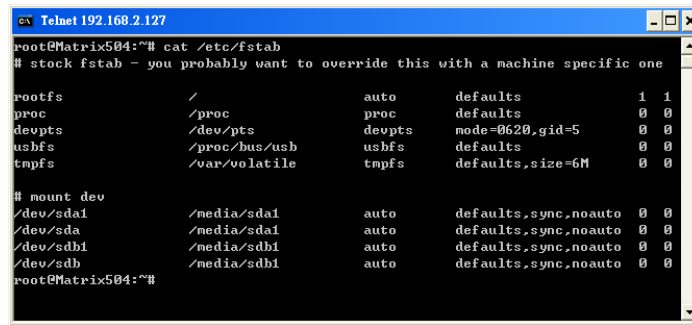
And use

```
mount /dev/sda1
```

```
mount /dev/mmc
```

to mount the USB disk or SD card and folder is local at

```
media/sda1 or /mnt/sda1
```

A screenshot of a Telnet window titled 'Telnet 192.168.2.127'. The window shows a terminal session where the user has executed the command 'cat /etc/fstab'. The output displays the contents of the /etc/fstab file, which includes entries for rootfs, proc, devpts, usbfs, tmpfs, and several mount entries for /dev/sda1, /dev/sdb1, and /dev/sdb. The entries specify file systems, mount options, and permissions.

```
root@Matrix504:~# cat /etc/fstab
# stock fstab - you probably want to override this with a machine specific one

rootfs      /          auto      defaults    1 1
proc        /proc      proc      defaults    0 0
devpts      /dev/pts   devpts    mode=0620,gid=5 0 0
usbfs       /proc/bus/usb  usbfs     defaults    0 0
tmpfs       /var/volatile  tmpfs     defaults,size=6M 0 0

# mount dev
/dev/sda1   /media/sda1  auto      defaults,sync,noauto 0 0
/dev/sda    /media/sda1  auto      defaults,sync,noauto 0 0
/dev/sdb1   /media/sdb1  auto      defaults,sync,noauto 0 0
/dev/sdb    /media/sdb1  auto      defaults,sync,noauto 0 0
root@Matrix504:~#
```

3.20 Welcome Message

To modify the welcome message, user can use text edit to modify the `/etc/motd`.

3.21 Web Page Directory

The web pages are placed at `/usr/www` and the `/etc/lighttpd.conf` contains the lighttpd web server settings. The home page name should be `index.html`.

3.22 Adjust the System Time

To adjust the RTC time, you can follow the command:

`date MMDDhhmmYYYY`

where

MM=Month (01~12)

DD=Date (01~31)

hh=Hour

mm=minutes

YYYY=Year

hwclock -w

To write the date information to RTC.

User can also use NTP client utility on Artila FTP to adjust the RTC time.

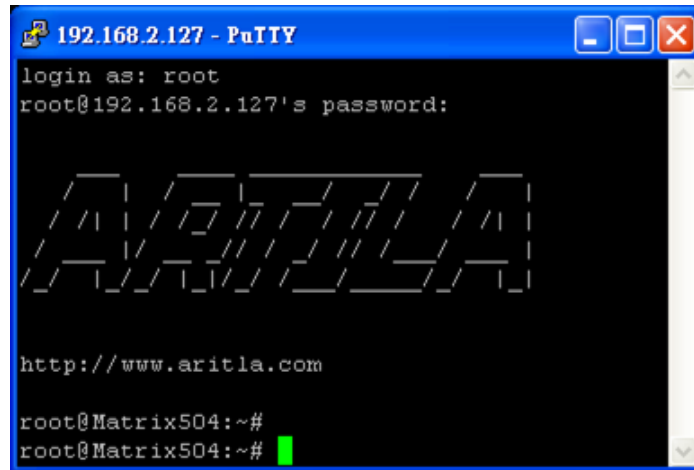
`ntpclient [time server ip]`

3.23 SSH Console

Matrix-516 supports SSH. If you use Linux computer, you can use SSH command to login Matrix-516.

The configuration of SSH and key are located at */etc/ssh*.

The key generation program is available at */usr/bin*.



3.24 Putty Console Software

For Windows user, you can download the putty software at

<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html> to use SSH to login Matrix-516.

3.25 ipkg Package Software Management

ipkg is a light software package utility. It can be used to install, upgrade and remove the software package for Matrix-516. Currently user can use ipkg to install the software package from Artila FTP.

You can find the configuration at *ipkg.conf*.

When Matrix-516 is connected to network and issue command:

ipkg update

To update the package list and use

ipkg install

To install software package and

ipkg remove

To remove software

ipkg list

To list available software

ipkg list_installed

To list software installed

Please refer to Appendix for more about *ipkg*.

3.26 Install GNU Toolchain

Find a PC with Linux OS installed as followed:

Fedora 7, ubuntu 7.04, OpenSUSE 10.2, Mandriva 2008, Debian 5.0, Centos (RedHat) 5 and above.

Login as a root user then copy the arm-linux-4.3.2.tar.gz to root directory of PC. Under root directory, type following command to install the Matrix-516 Toolchain:

```
#tar -xvfj arm-linux-4.3.3.tar.bz2
```

The toolchain file name are:

```
arm-linux-gnueabi-gcc
```

```
arm-linux-gnueabi-g++
```

```
arm-linux-gnueabi-strip
```

Version: gcc 4.3.3, glibc 2.9, binutils 2.18

For Windows user, please download the toolchain from CodeSourcery at

<http://www.codesourcery.com/sgpp/lite/arm/portal/package4547/public/arm-none-linux-gnueabi/arm-2009q1-203-arm-none-linux-gnueabi.exe>

The toolchain file name are:

```
arm-none-linux-gnueabi-gcc
```

```
arm-none-linux-gnueabi-g++
```

```
arm-none-linux-gnueabi-strip
```

Version: gcc 4.3.3, glibc 2.8, binutils 2.19

3.27 Getting Started with the Hello Program

There are many example programs on Artilla FTP. To compile the sample you can use the Make file and type:

```
make
```

To compile and link the library. Once done, use ftp command

```
ftp 192.168.2.127
```

Then login with password. Use bin command to set transfer mode to binary

```
ftp>bin
```

To transfer the execution file to Matrix-516 user disk (/home/guest) and use

```
chmod +x file.o
```

To change it to execution mode and

```
./file.o
```

to run the program.

3.28 Auto Start Program on Boot

To start a program on boot, you can use */etc/rc.local*.

For example to use *vi* to edit *rc.local*

```
hello &
```

```
exit 0
```

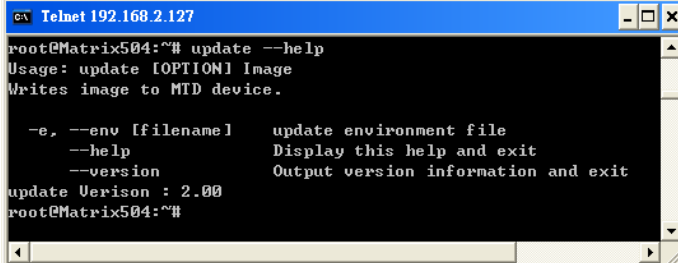
Hello will be executed after system boot up. *rc.local* has the similar function as */etc/rc* in Matrix-516.

4. Artila Utility Software

The introduction of Artila utility software as follow:

4.1 update

Update loader, environment file and kernel image. Type **update--help** to find the command usage.



```

Telnet 192.168.2.127
root@Matrix504:~# update --help
Usage: update [OPTION] Image
Writes image to MTD device.

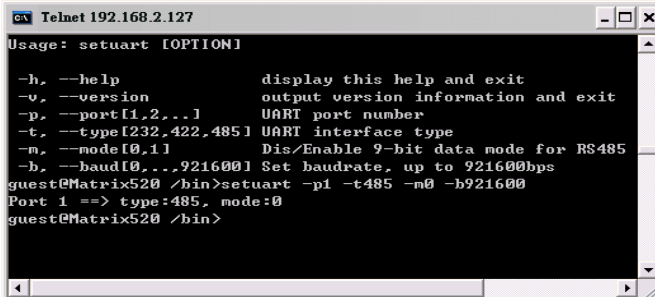
-e, --env [filename]  update environment file
--help                Display this help and exit
--version             Output version information and exit
update Verison : 2.00
root@Matrix504:~#

```

Update can only operate under supervisor mode (password: root). Please use command **su** and login as root.

4.2 setuart

Configure serial port setting. An example show as followed to configure port 1 as RS-485 interface with baud rate 921600.



```

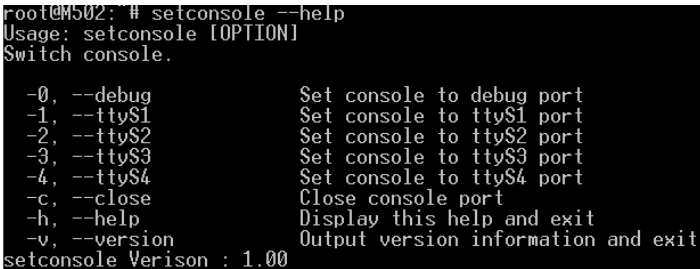
Telnet 192.168.2.127
Usage: setuart [OPTION]

-h, --help          display this help and exit
-v, --version       output version information and exit
-p, --port [1,2,..] UART port number
-t, --type [232,422,485] UART interface type
-m, --mode [0,1]    Dis/Enable 9-bit data mode for RS485
-b, --baud [0,..921600] Set baudrate, up to 921600bps
guest@Matrix520 /bin>setuart -p1 -t485 -m0 -b921600
Port 1 ==> type:485, mode:0
guest@Matrix520 /bin>

```

4.3 setconsole

Unlike Matrix-510 which shares the serial console port with the serial port 3, Matrix-516 uses dedicated pins for serial console (debug port). *setconsole* command allows user to redirect the serial console port to any one of the eight serial port of Matrix-516. Therefore user can avoid opening the metal case to access the serial console.



```

root@M502:~# setconsole --help
Usage: setconsole [OPTION]
Switch console.

-0, --debug        Set console to debug port
-1, --tty$1        Set console to tty$1 port
-2, --tty$2        Set console to tty$2 port
-3, --tty$3        Set console to tty$3 port
-4, --tty$4        Set console to tty$4 port
-c, --close        Close console port
-h, --help         Display this help and exit
-v, --version      Output version information and exit
setconsole Verison : 1.00

```


5. Loader Menu

Loader menu helps user to select the run level of system boot up. User need to use serial console to enter loader menu. Please configure the serial port of terminal as follow:

Baud Rate: 115200
Data bits: 8
Parity: N
Stop bit: 1
Flow Control: None
Terminal type: VT100

Once power up Matrix-516, please repeatedly keying "@" and you will see the loader menu appear as follow:

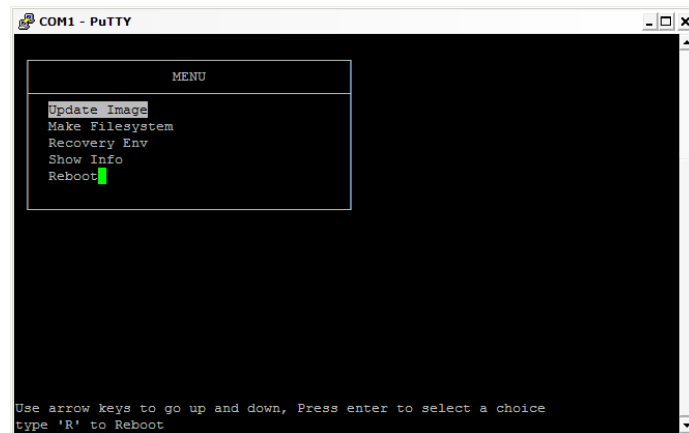
```
*****
          Artila Loader Version 3.0.1
          DRAM:128M NAND:128M
*****
G: Loader TFTP      L: Loader Serial
K: Kernel TFTP     S: Kernel Serial
F: Filesys TFTP    T: Filesys Serial
E: Env. Upgrade    M: Ethernet Setting
A: Dataflash Booting U: Runlevel
I: Boot Graphics  V: LCD Mode
R: Reset
*****
                                                                    ↵
```

If you miss the timing, please power on again the Matrix-516 and do it again. Select U will prompt the run level selection message. Run level 0 is halt, run level 1 is single user (disable login and service). Run level 2~5 are multiple users and run level 6 is reboot. To view the run level configuration, please check:

/etc/inittab

7. System Recovery

If NAND Flash file system does fail, DataFlash file system will automatically boot up and a Console Menu at console port will appear as follow:



7.1 Update Image

This option can recover the loader, kernel and file system by using an USB disk. The USB disk contains the images files with the path as follow:

Loader: ***matrix516/matrix516.alf***

Kernel: ***matrix516/MATRIX516K***

File system: ***matrix516/MATRIX516R***

The files are available on Artila FTP. Please prepare an USB disk and copy the image files to it before choosing this option.

7.2 Make Filesystem

This option is used to create customized file system. Before using this function, you need to copy the folder of ***mkimage504*** on Artila FTP to an USB disk. This function will create a new file system image for users and they can use it to duplicate the customized file system to other Matrix-516.

7.3 Recovery Env.

The option will recover the environment files as default setting. Use this function only when the NAND file system crash.

7.4 Show Info

Show the version information of Matrix-516.

7.5 Reboot

Reboot the NAND flash file system.

7.6 Update Image Starts

```

COM1 - PuTTY
Loader PATH      : matrix504/matrix504.alf      [OK]
Kernel PATH     : matrix504/MATRIX504K        [OK]
Filesystem PATH : matrix504/MATRIX504R        [OK]

Update
Refresh
Return

Use arrow keys to go up and down, Press enter to select a choice
type 'R' to Reboot

```

7.7 Update Image Completes

```

COM1 - PuTTY

Use arrow keys to go up and down, Press enter to select a choice
type 'R' to Reboot

Updating Loader 128 Kibyte @ 20000 -- 100% complete.
The update will be effective at next boot.

Updating Kernel 128 Kibyte @ 260000 -- 100% complete.
The update will be effective at next boot.

Updating Filesystem 128 Kibyte @ 7ce0000 -- 100% complete.
The update will be effective at next boot.

Done.
Type Enter to return.

Use arrow keys to go up and down, Press enter to select a choice
type 'R' to Reboot

```

7.8 Make Files System Starts

```

COM1 - PuTTY

UBI tools PATH : mkimage504/mkimage      [OK]

Make
Refresh
Return

Use arrow keys to go up and down, Press enter to select a choice
type 'R' to Reboot

```

Note

1. Use Arrow keys up and down to selection the functions.
2. Use Arrow keys left and right to go to higher or lower levels of menu screen.
3. To force system go into DataFlash booting, repeatedly keying "!" (Shift +1) right after Matrix-516 power on.

8. Appendix

8.1 Utility Collection

- busybox v1.14.2: tiny utility collection
- sysvinit v2.86: standard Linux initialization
- util-linux-mount/umount v2.12r: support long file name
- ssh v4.6p1: support sftp server
- usbutils v0.7: USB id program
- lighttpd v 1.7: web server
- wget v1.9.1: used in ipkg software
- iptables v1.3.8: IP routing
- ipkg v.0.99.163: software package management
- procps v3.2.7: support webmin process management
- vsftpd v2.0.5: ftp server
- bash v3.2: GNU shell
- wireless_tools v29: wireless LAN utility
- ppp v2.4.3: ppp dial up utility
- psmics v22.2: procps supplement
- artila utility v.1.1: handy utility added by Artila

You can find more utility on Artila FTP and use ipkg to install the utility.

8.2 ipkg Software Package Management

Matrix-516 uses **ipkg** to manage the software installation, upgrade and removal. Artila will continuously add the kernel module and utility on Artila FTP, user can install these software from Artila FTP. In addition user can also setup your FTP server to update the software you want.

How to setup ipkg via internet

enable DHCP

```
$ udhcpc eth0
```

make sure your network environment can access internet

```
$ ping www.artila.com
```

modify **/etc/ipkg.conf**

add the following two lines

```
src/gz arm http://www.artila.com/download/ipkgs/9G20/utility/
```

```
src/gz kernel http://www.artila.com/download/ipkgs/9G20/modules/
```

comment out other package source

save and quit

execute ipkg update

```
$ ipkg update
```

examples of package installation

```
$ ipkg install pythoncore
```

```
$ ipkg install pythonpyserial
```

How to setup ipkg via USB disk

You can also copy the Utility and module folder from Artilla FTP to a USB disk, then use USB disk to install the software by changing the **ipkg.conf**

```
src/gz usb_arm ftp://root:root@127.0.0.1/media/sda1/Utility
```

```
src/gz usb_kernel ftp://root:root@127.0.0.1/media/sda1/modules
```

Make sure the USB disk is correctly mounted, now use command:

```
ipkg update
```

To update the package list and use

```
ipkg install webmin
```

To install webmin. Webmin is a web-based interface to system administration.

To start webmin, go to **/etc/webmin** and type

```
start webmin
```

Then you can use browser to visit Matrix-516 port 10000.

http: //192.168.2.127 : 10000



The webmin for Matrix-516 provides following modules:

- Webmin: webmin configuration
- System: system boot, process and log management
- Server: Apache and SSH server configuration
- Network: network configuration
- Hardware: RTC setting
- Others: File manager, upload and download

Remember to use command:

depmod -a /lib/modules/2.6.29.4/modules.dep

To update the dependency list if new kernel module were added.

8.3 Serial Port Switch Definition

SW1	SW2	SW3	SW4	SW5	SW6	Description
ON	x	x	x	x	x	Terminator (120 ohm) on D+ and D-
x	ON	ON	ON	ON	x	Bias resistors (1k ohm) on D+ and D-
x	OFF	ON	OFF	ON	x	Bias resistors (150k ohm) on D+ and D-
x	x	OFF	x	OFF	x	Not bias resistors on D+ and D-

Note

1. x: Mean don't care.
2. Bias Voltage: Isolated 3.3V.

