Factory Default Settings

LAN 1 IP Address: 192.168.2.127
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

Power on and System boot up

Once M-506 is correctly power on, it will start boot Linux kernel and mount file system. You can use Ethernet and telnet and login M-506. 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 M-506.

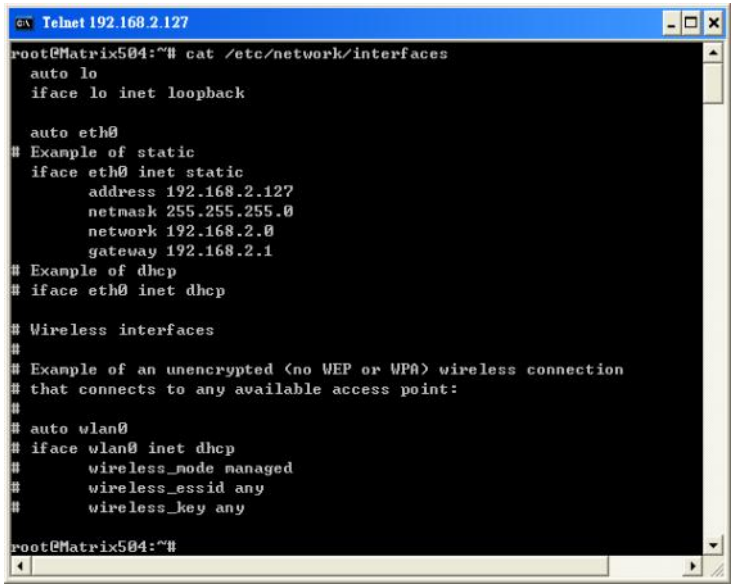
Inittab and Run levels:

Inittab contains information of system initialization. The system initialization script ***/etc/rcS.d*** runs first then the run level 5 ***/etc/rc5.d*** M-506 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

Default started service

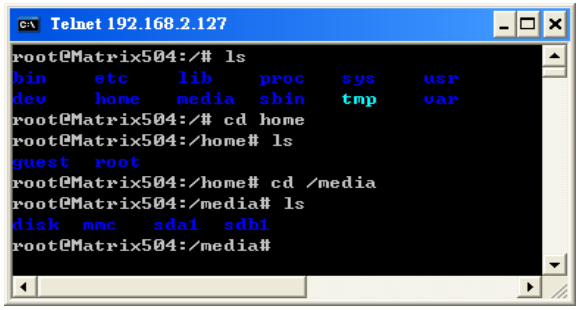
1. amgrd (Artila broadcast search daemon)
2. ssh (secured shell) with sftp
3. syslog/klogd (system and kernel log)
4. telnet server (disable root with ***/etc/securetty***)
5. ftp server (vsftp)
6. web server (lighttpd)
7. Ready LED (debug LED for internal use)
8. Auto start GTK+ demo
9. Xserver GUI

Network Settings

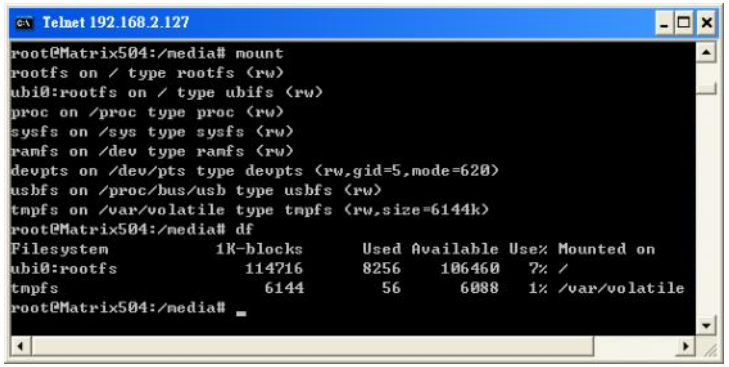


Use ***vi*** editing tool to edit the ***/etc/network/interfaces*** for network setting. The default setting is static IP 192.168.2.127. M-506 also supports Wireless LAN. Use
wireless_essid XXX
wireless_key YYY
To add SSID and WEP key if necessary. XXX is SSID and YYY is WEP Key
M-506 supports USB WLAN adaptor (Ralink RT2571). You can enable the driver module (rt73usb) by adding *rt73usb* in ***/etc/modules***

File System



The 128MB NAND Flash memory of M-506 contains Boot loader (uBoot), Linux Kernel, Root File System and user disk (\home). The file system and disk space are shown as follow



Devices list

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

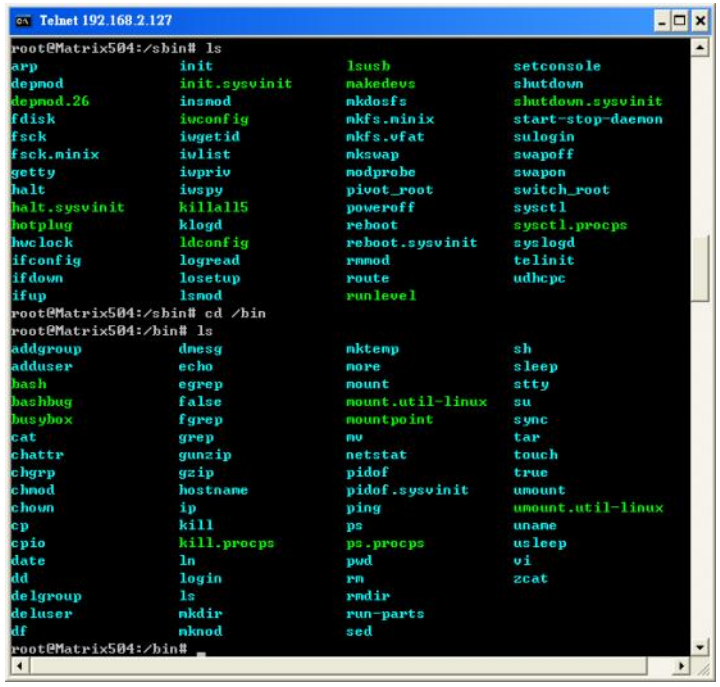
1. ttyS0: serial console port
2. ttyS1 to ttyS4: serial port 1 to port 4
3. sda to sdb: USB flash disk
4. ttyUSB0 to ttyUSB1: USB RS-232 adaptor (usbserial.ko)
5. gpio: General Purpose digital I/O
6. ttyACM0 and ttyACM1: USB Modem (CDC compliant)
7. spi0, spi1: SPI bus controller
8. mmc : SD driver
9. rtc0: m41t81 real time clock device (default)
10. rtc1: rs5c372a real time clock device (M-501 compatible)

Utility Software:

M-506 includes busybox utility collection and Artila utility software and there are placed at :

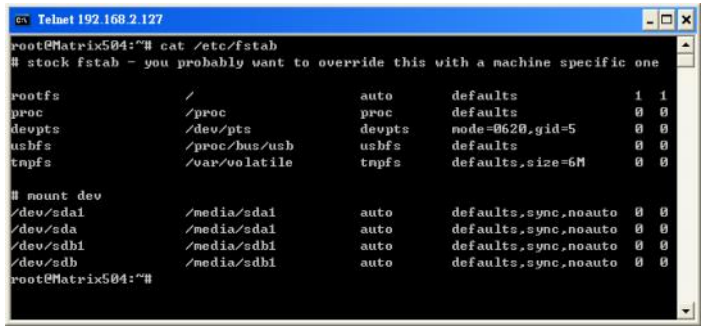
/sbin
/bin
/usr/bin
/use/sbin

Please refer to Appendix for the utility collection list



Mounting USB device by udev

M-506 supports udev which can automatically load the device driver when plugging your USB device.



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***

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 in Artila CD to adjust the RTC time.

ntpclient [time server ip]

SSH Console

M-506 supports SSH. If you use Linux computer, you can use SSH command to login M-506. The configuration of SSH and key are located at

/etc/ssh

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

Welcome Message

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

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 M-506

ipkg package software management

ipkg is a light software package utility. It can be used to install, upgrade and remove the software package for M-506. Currently user can use ipkg to install the software packge from Artila FTP. You can find the configuration at *ipkg.conf*

When M-506 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***

Install GNU Tool Chain

Find a PC with Linux OS installed as followed:
Fedore 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 M-506 Tool Chain
#tar -xvfj arm-linux-4.3.3.tar.bz2
The tool chain 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 tool chain 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

Getting started with the Hello program

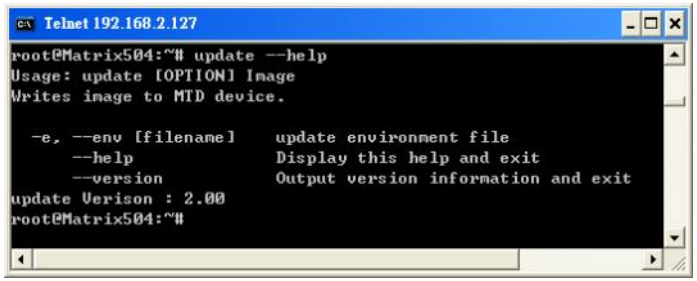
There are many example programs in Artila CD. To compile the sample you can use the Make file and type
make
To compile and link the library. Once done, use ftp command
ftp 192.168.2.127
Then login with password. Use bin command to set transfer mode to binary
ftp>bin
to transfer the execution file to M-506 user disk (/home/guest) and use
chmod +x file.o
To change it to execution mode and
./file.o
to run the program

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 M-506

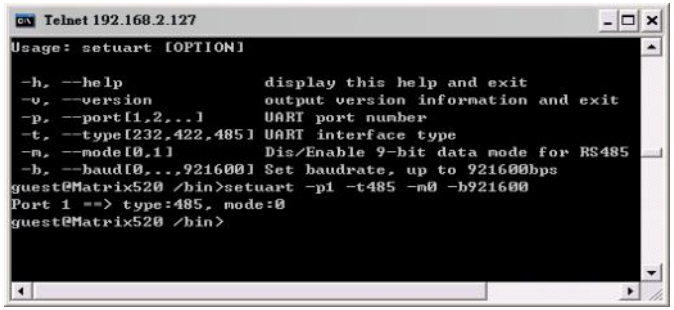
Artila Utility Software:

The introduction of Artila utility software as follow:
1. ***update*** : update loader, environment file and kernel image. Type *update—help* to find the command usage

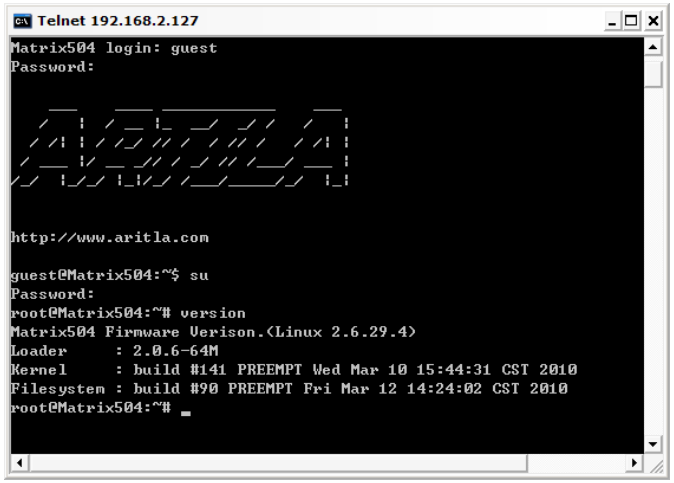


Update can only operated under supervisor mode (password : root). Please use command ***su*** and login as root

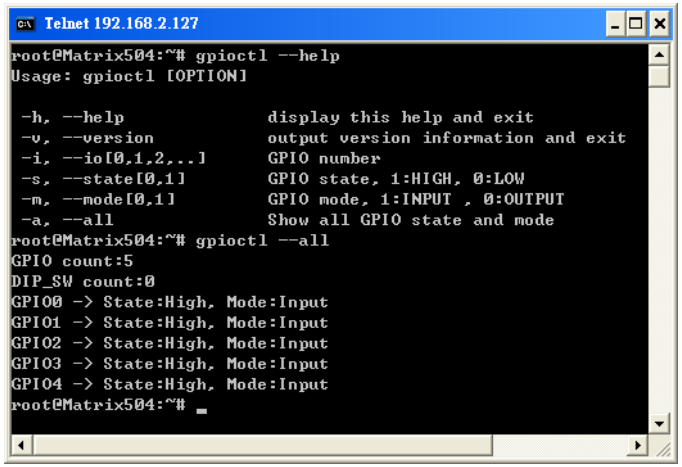
2. ***setuart****:* configure serial port setting. An example show as followed to configure port 1 as RS-485 interface with baud rate 921600.



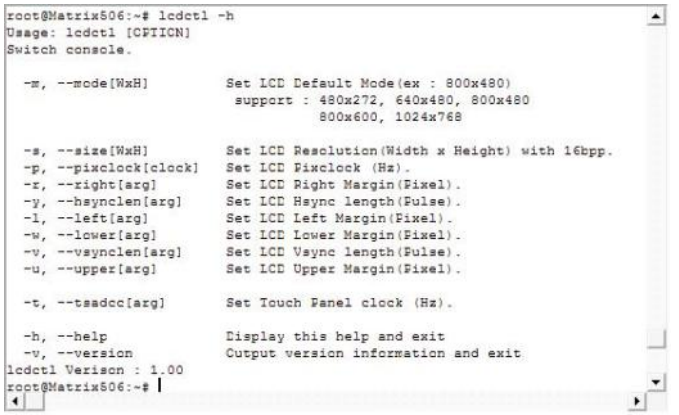
3. ***version****:* find out the version of OS.



4. ***gpioctl****:* The gpio can be configured by ***gpioctl*** and the usage is as shown followed.



4. ***lcdctl****:* The lcdctl is used to configure LCD setting and the usage is as shown followed.

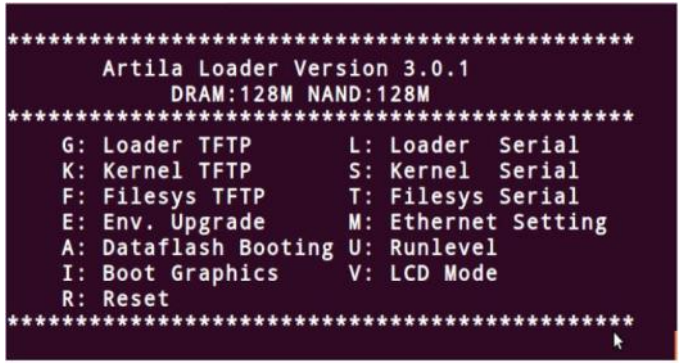


Loader Menu

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 M-506, please repeatedly keying "@" and you will see the loader menu appear as follow:



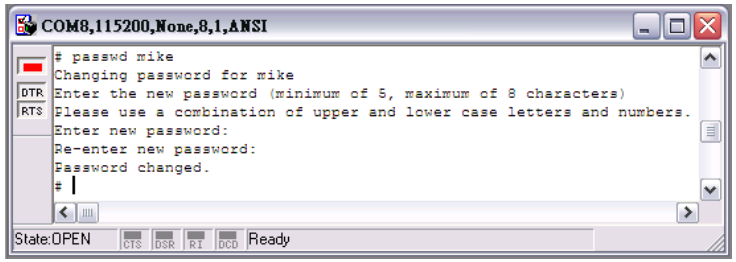
If you miss the timing, please power on again the M-506 and do it again. Select U will prompt the run level selection message. Run level 0 is halt, run level 1 is single user (disable login and service). Run level 2~5 are multiple users and run level 6 is reboot. To view the run level configuration, please check

/etc/inittab

Frequently Asked Question

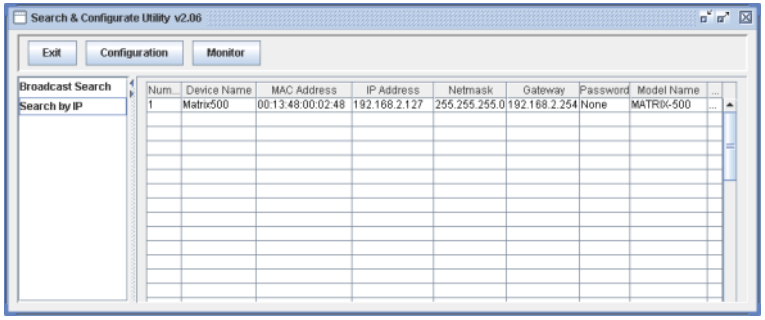
1. *Forgot password*:

If you forgot the password for login, please use serial console and use run level 1 to boot system. Use passwd to change the password setting.



2. *Forgot the IP address*

If you forgot the M-506 IP address, you can use the Java Manager available in Artila CD to search the IP address of M-506
Or use serial console port to find out the IP address by
#ifconfig

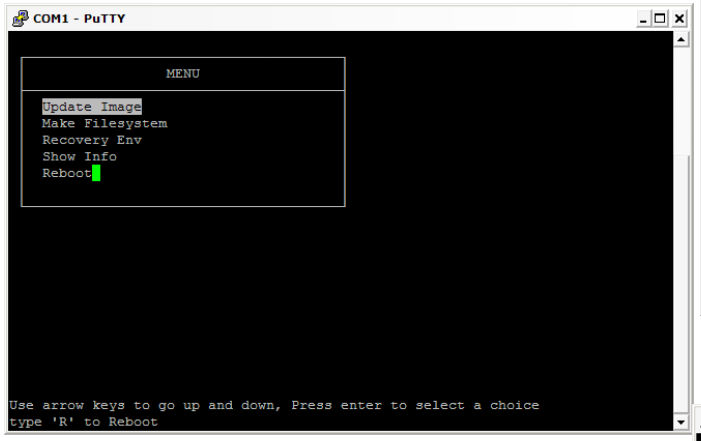


3. *System fail to boot*

If you mess up the root file system and make the system fail to boot, M-506 will automatically switch to boot from Dataflash file system and a console menu will show up at console port to help user perform system recovery. ***System Recovery Section*** will tell you how to recover the system.

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:



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: ***Matrix506/matrix506.alf***
    Kernel: ***Matrix506/matrix506K***
    File system: ***Matrix506/matrix506R***

The files are available in Artila CD. Please prepare an USB disk and copy the image files to it before choosng this option.

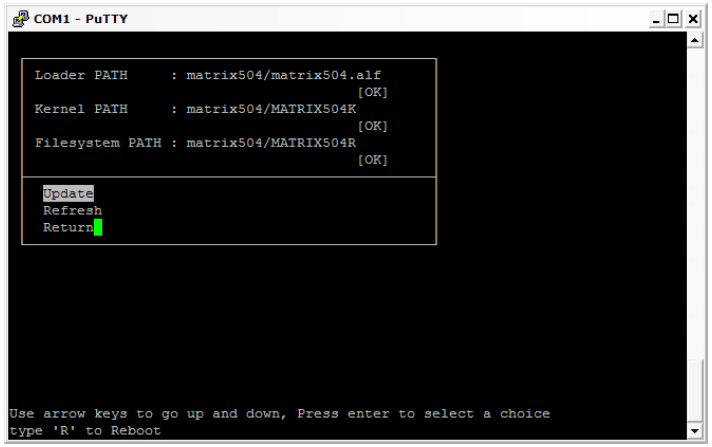
2. Make Filesystem: this option is used to create customized file system. Before using this function, you need to copy the folder of ***mkimage*** in the Artila CD to an USB disk. This function will create a new file system image for users and they can use it to duplicate the customized file system to other M-506.

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

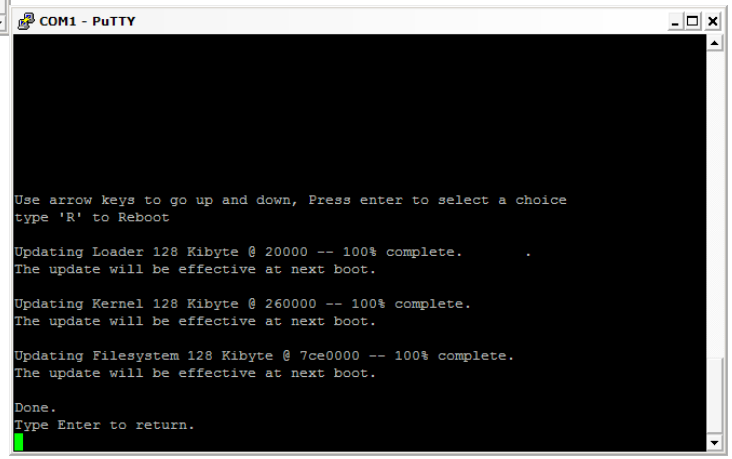
4. Show Info: Show the version information of M-506

5. Reboot: Reboot the NAND flash file system.

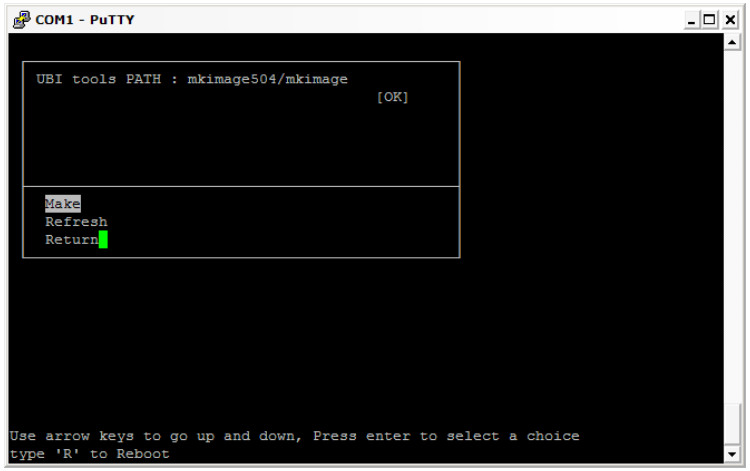
Update Image Starts



Update Image Completes



Make Files System Starts



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 M-506 power on.

Appendix

Utility Collection

1. Busybox:-tiny utility collection
2. Sysvinit: -standard Linux initialization
3. util-linux-mount/umount :-support long file name
4. ssh :– support sftp server
5. Usbutils:– USB id program
6. Lighttpd:-web server
7. Wget:– used in ipkg software
8. Iptables:– IP routing
9. Ipkg:– software package management
10. Procps:– support webmin process management
11. Vsftpd:– ftp server
12. Bash:-GNU shell
13. wireless_tools :– wireless LAN utility
14. Ppp:-ppp dial up utility
15. Psmics:– procps supplement
16. artila utility:– handy utility added by Artila

You can find more utility at Artila M-506 CD and use ipkg to install the utility.

ipkg software package management

M-506 uses ***ipkg*** to manage the software installation, upgrade and removal. Artila will continuously add the kernel module and utility at our ftp server, user can install these software from Artila's ftp server. In addition user can also setup your ftp server to update the software you want. To install the utility from Artila ftp, please use ***vi*** to edit the ***/etc/ipkg.conf***

src/gz arm ftp://ftp:ftp@ftp.artila.com/AT9G45/Artila-CD/Linux/Utility
src/gz kernel ftp://ftp:ftp@ftp.artila.com/AT9G45/Artila-CD/Linux/modules

You can also copy the Utility and module folder from Artila CD 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 M-506 port 10000

The webmin for M-506 provides following modules:

1. Webmin: webmin configuration
2. System: system boot, process and log management
3. Server: Apache and SSH server configuration
4. Network: network configuration
5. Hardware: RTC setting
6. Others: File manager, upload and download

Remember to use command

depmod –a /lib/modules/2.6.38.7/modules.dep

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