PAC-4000

Programmable Automation Controller

User Guide

Version 1.1



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Table of Contents

1.	Intro	duction	1
	1.1	Features	1
	1.2	Packing List	1
	1.3	Optional Accessory	1
2.	Layo	out	2
3.	Pin /	Assignment and Definition	3
	3.1	Power Input Connector	3
	3.2	Reset Button	3
	3.3	Power LED	3
	3.4	Ready LED	3
	3.5	Link / Act LED	3
	3.6	Serial Port LED	3
	3.7	Ethernet Port	3
	3.8	Serial Port	3
	3.9	Serial Console Port	4
	3.10	Factory Default Settings	5
	3.11	Power on and System Boot up	5
	3.12	Inittab and Run Levels	5
	3.13	Default Started Service	6
	3.14	Network Settings	6
	3.15	Insert Kernel Module	6
	3.16	File System	7
	3.17	Devices List	7
	3.18	Utility Software	7
	3.19	Mounting External Storage Memory	8
	3.20	Welcome Message	9
	3.21	Web Page Directory	9
	3.22	Adjust the System Time	9

	3.23	SSH Console	. 9
	3.24	Putty Console Software	. 9
	3.25	ipkg Package Software Management	10
	3.26	Install GNU Toolchain	10
	3.27	Getting Started with the Hello Program	11
	3.28	Auto Start Program on Boot	11
4.	Artila	a Utility Software	12
	4.1	update	12
	4.2	setuart	12
	4.3	setconsole	12
	4.4	version	13
	4.5	gpioctl	13
5.	Load	ler Menu	14
6.	Freq	uently Asked Question	15
	6.1	Forgot Password	15
	6.2	Forgot the IP Address	15
	6.3	System Fail to Boot	15
7.	Syste	em Recovery	16
	7.1	Update Image	16
	7.2	Make Filesystem	16
	7.3	Recovery Env	16
	7.4	Show Info	16
	7.5	Reboot	16
	7.6	Update Image Starts	17
	7.7	Update Image Completes	17
	7.8	Make Files System Starts	17
8.	Арре	endix	18
	8.1	Utility Collection	18
	8.2	ipkg Software Package Management	18

1. Introduction

PAC-4000 is an ARM9-based Linux ready industrial controller.

1.1 Features

- 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 10/100Mbps Ethernet
- Two USB 2.0 full speed (12 Mbps) Host Ports, one USB device port
- Multimedia Card Interface for microSD memory card
- Four serial ports: RS-232 x 2 and RS-232 x 2 or Isolated RS-485 x 2
- 9 to 40VDC power input
- Pre-installed Standard Linux 2.6 OS
- GNU toolchain available on Artila FTP
- DIN RAIL mounting

1.2 Packing List

- PAC-4000 Programmable Automation Controller
- DIN Rail bracket

1.3 Optional Accessory

- CB-RJ45F9-150 (91-R45F9-150): Serial Cable (RJ45 to DB9 Female, 150cm)
- CB-PHDF9-050 (91-PHDF9-050): Console Cable (Wafer Box to DB9 Female, 50cm)
- PWR-12V-1A (31-62100-000): 110~240VAC to 12VDC 1A Power Adaptor

2. Layout



Top of PAC-4000



Bottom of PAC-4000



Back of PAC-4000



3. Pin Assignment and Definition

3.1 Power Input Connector

PAC-4000 uses +9VDC to 40VDC power and input from three ports plug-in screw terminal connector. Auto-polarity and surge protection are included in power input circuitry of PAC-4000 to provide power protection. Shielding ground provides better EMI protection. Please wire the shielding ground to an appropriate grounded metal surface.

3.2 Reset Button

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

3.3 Power LED

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

3.4 Ready LED

The Ready LED will show solid green if PAC-4000 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 PAC-4000 again. If Ready LED is still off, please contact the manufacture for technical support.

3.5 Link / Act LED

When Ethernet port are connected to the network, Link LED will show solid green. If there is traffic is the Ethernet line, the yellow Act LED will flash.

3.6 Serial Port LED

When RXD line is high then Yellow light is ON and when TXD line is high, Green light is ON.

3.7 Ethernet Port

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



3.8 Serial Port

- Port 1~2: Software selectable RS-232 or isolated RS-485. If RS-485 is chosen, please use terminal block connector for RS-485.
- Port 3~4: RS-232 port with hardware flow control.

Note

Only Port 2 support RS-232 full modem control DSR, DCD and DTR.

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



3.9 Serial Console Port

Serial console port is located inside the box at JP4 of M-502. You need a special console cable (91-PHDF9-050) to access it.



TxD: RS-232 transmit RxD: RS-232 receive VCC3: 3.3 VCC Output GND: Signal ground

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

Jor Note

We provide a utility software, **setconsole** to redirect the console port to any one of the serial port. Therefore user do not need to open the case to access the physical console port. Please refer to **setconsole** command in the Artila utility section.

Finished to configure packages. INIT: Entering runlevel: 5
Starting system message bus: dbus. Starting ssh server: done.
Starting amgrd: done Starting syslogd/klogd: done
Starting Telnet Server: done
Starting Lighttpd Web Server: lighttpd.
PHC-4000 login: guest Password:
http://www.artila.com
guest@PAC-4000:~\$

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 PAC-4000 is correctly power on, it will start boot Linux kernel and mount file system. You can use Ethernet and telnet and login PAC-4000. 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 PAC-4000.

ex Telnet 192.168.2.127	- 🗆 🗙
Matrix504 login: guest Password:	
http://www.aritla.com	
	• •

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*. PAC-4000 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 (apache2)
- 7. Ready LED (debug LED for internal use)

3.14 Network Settings

Telnet 192.168.2.127	- 🗆 :
oot@Matrix504:~# cat /etc/network/interfaces	
auto lo	
iface lo inet loopback	
auto ethØ	
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 wlanØ inet dhcp	
wireless_mode managed	
wireless_essid any	
wireless_key any	
ooteMatrix504:~#	
	•

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.

E Telnet 192.168.2.127	- 🗆 ×
root@Matrix504:~# cat /etc/modules ### This file is automatically generated by update # # Please do not edit this file directly. If you wa # anything please take a look at the files in /etc # the manpage for update-modules. #	-modules" nt to change or add ∕modutils and read
rt73us) 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. PAC-4000 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.

PAC-4000 supports USB WLAN adaptor (Ralink RT2571). You can enable the driver module (rt73usb) by adding *rt73usb* in

/etc/modules

3.16 File System

CN Te	lnet 192.1	58.2.127			- 🗆 🗙
roote	Matrix5	04:/# 1	s		^
bin					
dev				tmp	
root@	Matrix5	Ø4:∕# c	d home		
root@	Matrix5	04:/hom	e# ls		
guest					
root@	Matrix5	04:/hom	e# cd /	media	
roote	Matrix5	04:∕med	ia# ls		
disk					
roote	Matrix5	04:/med	ia#		
cx Tehet 192.168.2.127 _ root@Matrix504:/# 1s _ bin etc lib proc sys usr _ dev home media sbin tmp var _ root@Matrix504:/# cd home _ root@Matrix504:/home# 1s _ guest root _ root@Matrix504:/home# cd /media _ root@Matrix504:/home# cd /media _ root@Matrix504:/media# 1s _ disk mmc sda1 sdb1 _ root@Matrix504:/media# _					
Cx Telnet 192.168.2.127 _ _ × root@Matrix504:/# 1s _ _ _ _ bin etc lib proc sys usr dev home media sbin tmp var root@Matrix504:/t cd home root@Matrix504:/hone# ls guest root root@Matrix504:/hone# cd /media root@Matrix504:/media# ls disk mc root@Matrix504:/media# ls disk root@Matrix504:/media#					

The 256MB NAND Flash memory of PAC-4000 contains Boot loader (uBoot), Linux Kernel, Root File System and user disk (\home). The file system and disk space are shown as follow.

CN Telnet 192.168.2.127					- 🗆	×
root@Matrix504:/me	dia# mount					-
rootfs on ∕ type r	ootfs (rw)					
ubi0:rootfs on / t	ype 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 deupts (ru	,gid=5	, mode=620>			
usbfs on /proc/bus	/usb type usbfs	(rw)				
tmpfs on /var/vola	tile type tmpfs	(rw,sia	ze=6144k)			
root@Matrix504:/me	dia# df					
Filesystem	1K-blocks	Used	Available	Use%	Mounted on	
ubi0:rootfs	114716	8256	106460	7%		
tmpfs	6144	56	6088	1%	/var/volatile	
root@Matrix504:/me	dia#					
						-
•					•	11.

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 ttyS4: serial port 1 to port 4
- 3. sda to sdb: USB flash disk
- 4. ttyUSB0 to ttyUSB1: USB RS-232 adaptor (fdti_sio.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

PAC-4000 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	lsusb	setconsole
depmod	init.sysvinit	makedevs	shutdown
depmod.26	insmod	mkdosfs	shutdown.sysvinit
fdisk	iwconfig	mkfs.mini×	start-stop-daemon
fsck	iwgetid	mkfs.vfat	sulogin
fsck.minix	iwlist	mkswap	swapoff
getty	iwpriv	modprobe	swapon
halt	iwspy	pivot_root	switch_root
halt.sysvinit	killall5	poweroff	sysctl
hotplug	klogd	reboot	sysctl.procps
hwclock	ldconfig	reboot.sysvinit	s ys logd
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	mγ	tar
chattr	gunzip	netstat	touch
chgrp	gzip	pidof	true
chmod	hostname	pidof.sysvinit	umount
chown	ip	ping	umount.util-linux
сp	kill	ps	uname
cpio	kill.procps	ps.procps	usleep
date	ln	pwd	vi
dd	login	rm	zcat
delgroup	1s	rmdir	
deluser	mkdir	run-parts	
df	mknod	sed	
root@Matrix504:/	/bin#		
4			•

3.19 Mounting External Storage Memory

To find out the device name of the external memory device which plug into PAC-4000, 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

EX Telnet 192.168.2.127				-	. 🗆	>
root@Matrix504:~# c	at /etc/fstab					P
# stock fstab - you	ı probably want to	override this	with a machine specific	on	e	F
rootfs		auto	defaults	1	1	
proc	/proc	proc	defaults	Ø	Ø	
devpts	/dev/pts	devpts	mode=0620,gid=5	Ø	Ø	
usbfs	/proc/bus/usb	usbfs	defaults	Ø	Ø	
tmpfs	/var/volatile	tmpfs	defaults,size=6M	Ø	Ø	
# mount dev						
/dev/sda1	/media/sda1	auto	defaults,sync,noauto	Ø	Ø	
/dev/sda	/media/sda1	auto	defaults,sync,noauto	Ø	Ø	
/dev/sdb1	/media/sdb1	auto	defaults,sync,noauto	Ø	Ø	
/dev/sdb	/media/sdb1	auto	defaults,sync,noauto	Ø	Ø	
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

PAC-4000 supports SSH. If you use Linux computer, you can use SSH command to login PAC-4000. The configuration of SSH and key are located at */etc/ssh*.

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

₿ 192.168.2.127 - PuTTY	
login as: root root@192.168.2.127's password:	<
http://www.aritla.com	
root@Matrix504:~#	
root@Matr1x5U4:~#	\sim

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 PAC-4000.

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 PAC-4000. Currently user can use ipkg to install the software package from Artila FTP. You can find the configuration at *ipkg.conf.*

When PAC-4000 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: 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 PAC-4000 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-2 009q1-203-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 Artila 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 PAC-4000 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 PAC-4000.

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.



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

4.3 setconsole

PAC-4000 is designed to use M-502 SoM as its CPU module. The console port is located at JP4 of M-502 module. User can use **setconsole** command to redirect the serial console port to any one of the four serial port of PAC-4000. Therefore user can avoid opening the metal case to access the serial console.

root@M502:"# setconsole Usage: setconsole [OPTION Switch console.	-help]
-0,debug -1,tty\$1 -2,tty\$2 -3,tty\$3 -4,tty\$4	Set console to debug port Set console to ttyS1 port Set console to ttyS2 port Set console to ttyS3 port Set console to ttyS4 port
-c,close	Close console port
-v,version	Output version information and exit
setconsole Verison : 1.00	

4.4 version

Find out the version of OS.

Telnet 192.168.2.127	- 🗆 X
Matrix504 login: guest Password:	^
,,,,,,,,	
http://www.aritla.com	
guestCMatrix504:~\$ su	
Password:	
root@Matrix504:~# version	
Matrix504 Firmware Verison.(Linux 2.6.29.4)	
Loader : 2.0.6-64M	
Kernel : build #141 PREEMPT Wed Mar 10 15:44:31 CST	2010
Filesystem : build #90 PREEMPT Fri Mar 12 14:24:02 CST 2	.010
rooteMatrix504:"#	

4.5 gpioctl

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

🐼 Telnet 192.168.2.127	_ _ ×
root@Matrix504:~# gpioct] Usage: gpioctl [OPTION]	l −−help
-h,help -v,version -i,io[0,1,2,] -s,state[0,1] -m,mode[0,1] -aall	display this help and exit output version information and exit GPIO number GPIO state, 1:HIGH, 0:LOW GPIO mode, 1:INPUT, 0:OUTPUT Show all GPIO state and mode
root@Matrix504:~# gpioct: GPIO count:5 DIP_SW count:0 GPIO0 -> State:High, Mode GPIO1 -> State:High, Mode GPIO2 -> State:High, Mode GPIO3 -> State:High, Mode cPIO4 -> State:High, Mode root@Matrix504:~# _	Lall ::Input ::Input ::Input ::Input ::Input
•	

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 PAC-4000, please repeatedly keying "@" and you will see the loader menu appear as follow:

Starting M502..... Artila Loader Version 2.0.9 DRAM:64M 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 C: Switch Console R: Reset

If you miss the timing, please power on again the PAC-4000 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

6. Frequently Asked Question

6.1 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.

COM8,115200,None,8,1,ANSI	_ 🗆 🛛
# passwd mike Changing password for mike OTR Enter the new password (minimum of 5, maximum of 8 characters) Please use a combination of upper and lower case letters and n Enter new password: Re-enter new password: Password changed.	umbers.
Tate:OPEN CTS DOR RI DCD Ready	>

6.2 Forgot the IP Address

If you forgot the PAC-4000 IP address, you can use the Java Manager available on Artila FTP to search the IP address of PAC-4000.

Or use serial console port to find out the IP address by #ifconfig.

Search & Configurate	e Utility v	/2.06						ſ	a" I	7 [
Exit Configu	iration	Monitor								
Broadcast Search	Num	Device Name	MAC Address	IP Address	Netmask	Gateway	Password	Model Name		
Search by IP	1	Matrix600	00:13:48:00:02:48	192.168.2.127	265.265.255.0	192.168.2.254	None	MATRIX-500		-
	_									
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									+	
									-	
·									-	11

6.3 System Fail to Boot

If you mess up the root file system and make the system fail to boot, PAC-4000 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.

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:

Putty	_ 🗆 🗙
MENU	
Update Image Make Filesystem Recovery Env	
Show Info Reboot	
Use arrow keys to go up and down, Press type 'R' to Reboot	enter to select a choice

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: *pac4000/pac4000.alf* Kernel: *pac4000/pac4000K* File system: *pac4000/pac4000R*

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 PAC-4000.

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 PAC-4000.

7.5 Reboot

Reboot the NAND flash file system.

7.6 Update Image Starts

B COM1 - PUTTY	_ 🗆 🗙
Loader PATH : matrix504/matrix504.alf	
[OK] Kernel PATH : matrix504/MATRIX504K	
[OK]	
[OK]	
Update	
Refresh Return	
-	
Use arrow keys to go up and down, Press enter to s	elect a choice
type .k. to Reboot	¥

7.7 Update Image Completes



7.8 Make Files System Starts

B COM1 - PUTTY			_ 🗆 ×
UBI tools PATH : mkimage504/mkimage	[OK]		
Make Refresh Return			
]	
Use arrow keys to go up and down, Press type 'R' to Reboot	s enter to se	elect a choice	•

Note

- Use Arrow keys up and down to selection the functions.
- Use Arrow keys left and right to go to higher or lower levels of menu screen.
- To force system go into DataFlash booting, repeatedly keying "!" (Shift +1) right after PAC-4000 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 1.4.28: 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: pp 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

PAC-4000 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 <u>www.artila.com</u>

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 Artila 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 PAC-4000 port 10000.

http://192.168.2.127:10000



The webmin for PAC-4000 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.