JetBox 9500 Series

User Manual

Linux

www.korenix.com

0.0.1

1-1-1 Copyright Notice

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1-1-2 Acknowledgments

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Chapter 2 Overview

The advantage of adopting Korenix JetBox series is ready-to-use. Korenix is devoted to improve the usability of embedded computer in industrial domain. Besides operating system, Korenix provides device drivers, protocol stacks, system utilities, supporting services and daemons to make system integration simple. Further, Korenix provides application development toolkits for users to build up their own applications easily.

The stylish JetBox 9500 series is an industrial layer-3 router with power-over-Ethernet technology and Linux computing. It is a gateway to connect different network groups (Ethernet, fieldbus, serial or IO control) in a complex networking architecture and manage peripherals at the front-end site through its Linux programs or Java applications. It is reliable (network redundancy, system recovery) and robust (passive cooling, protected against the dusts and spills, shock & vibration resistance) to adopt in severe industrial vertical markets, such as transportation, substation, or hazardous environment.

Chapter 3 Software Specification

Item	Protocol	Notes	JetBox 9500
Boot Loader			Red-boot
Kernel			Linux 2.6.20
	ARP		x
	PPP		x
	CHAP		x
	IPv4		x
	IPv6		x
	PAP		x
	ICMP		x
	TCP		x
	UDP		x
	NFS		x
File System			
JFFS2			x
NFS			x
Ext2			x
Ext3			x
VFAT			x
FAT			x
Base SW package			
Shell		OS shell command	GNU ash
Busybox		Linux normal command utility	1.11.1
telnetd	Telnet	telnet server daemon	x
inetd		TCP server manager program	x
udhcp	DHCP	DHCP client/server	x
syslogd			x
e2fsprogs		Ext2/Ext3 file system utilities	1.39
i2c-tools	I2C	I2C tools for Linux	3.0.1
ltp-testsuite		Linux Test Project	20070228
microcom		Serial port terminal	1.02
mtd		MTD/JFFS2 utilities	1.1.0
pciutils	PCI	PCI utilities	2.2.10

Item	Protocol	Notes	JetBox 9500
setserial		RS-232 serial port setting tool	2.17
usbmount	USB	automatically mounts USB mass storage devices	0.0.14.1
usbutils	USB	USB utilities	0.72
Network related SW package			
bridge-utils		Ethernet bridge utility	1.0.6
ethtool		Ethernet configure tool	6
iptables		NAT setting tool	1.3.8
net-snmp	SNMP v1/v2c/v3	SNMP support package	5.1.2
ntp	NTP	NTP utility	4.2.4p2
openssh	SSH1.0/2.0	SSH support package	4.6p1
openssl	SSL	SSL support package	0.9.7m
openvpn	OpenVPN	VPN tool	2.0.9
openswan	IPsec	Ipsec for Linux	2.4.9
pppd	PPP	PPP protocol for Linux	2.4.4
rp-pppoe	PPPoE	PPPOE support package	3.8
pptp-linux	PPTP	PPTP protocol for Linux	1.7.0
proftpd	FTP	FTP daemon	1.3.1
samba		SMB (Windows network) support package	3.0.28a
goahead	HTTP	Web server	2.1.8
smtpclient		email client	1.0
bind	DNS	DNS server	9.3.2
l2tp	L2TP	L2TP protocol for Linux	0.70
mrouted	DVMRP	DVMRP multicast routing protocol	3.9b3
quagga	OSPFv1.0/2.0, RIPv1.0/2.0/ng, BGP4, ISIS	unicast routing protocol	0.99.9
wireless-tools	802.11	Tools of WLAN card	29
Graphic and Multimedia			
jamvm		JAVA Virtual Machine	1.5.0
Linux tool chain			
Gcc		C/C++ PC Cross Compiler	4.2.4
uClibc		POSIX standard C library	0.9.29
Performance			
BogoMIPS			665.19

Chapter 4 Software Feature

4-1 System login

Users can enter the JetBox Linux environment via the user name: root and no password is required.

login : root
password : (none)

4-2 Busybox v1.8.2

busybox(V1.8.2): Linux command collection

File Manager	
cp	copy file
ls	list file
ln	make symbolic link file
mount	mount and check file system
rm	delete file
chmod	change file owner & group & user
chown	change file owner
chgrp	change file group
sync	Sync file system, let system file buffer be saved to hardware
mv	move file
pwd	display now file directly
df	list now file system space
mkdir	make new directory
rmdir	delete directory

Editor	
vi	text editor
cat	dump file context
zcat	compress or expand files
grep	search string on file
cut	get string on file
find	find file where are there
more	dump file by one page
test	test file exist or not
sleep	sleep(seconds)
echo	Echo string
awk	Pattern scanning and processing language.
diff	compare two files or directories
sed	perform text transformations on a file or input from a pipeline.
xargs	execute a specified command on every item from standard input.

Archival Utilities	
bzip2/bunzip2	Compress/Uncompress bzip FILE
cpio	Extract or list files from a cpio archive
gzip/gunzip	Compress/Uncompress FILE with maximum compression.
tar	Create, extract, or list files from a tar file
unzip	Extract files from ZIP archives

System logging	
syslogd	Utility used to record logs of all the significant events
klogd	Utility which intercepts and logs all messages from the Linux kernel and sends to the 'syslogd'
logger	Utility to send arbitrary text messages to the system log

Network	
ping	ping to test network
arp	Manipulate the system ARP cache
arping	Ping host by ARP packets
ftpget	Retrieve a remote file via FTP
ftpput	Store a remote file via FTP
nslookup	Tool to query Internet name servers
pscan	Simple network port scanner
traceroute	Utility to trace the route of IP packets
wget	Utility for non-interactive download of files from HTTP, HTTPS, and FTP servers.
udhcpc	DHCP client
route	routing table manager
netstat	display network status
Ifconfig	set ip address and configure network interfaces
tracerout	trace route
tftp	Trivial File Transfer Protocol client
telnet	Telnet client
ftp	FTP client

Others	
dmesg	dump kernel log message
stty	stty is used to change and print terminal line settings
zcat	dump .gz file context
mknod	make device node
free	display system memory usage
date	print or set the system date and time
env	run a program in a modified environment
clear	clear the terminal screen
reboot	reboot / power off/on the server
halt	halt the server
du	estimate file space usage
hostname	show system's host name
aplay	aplay is a command-line audio file player for the ALSA sound card driver.
amixer	Command-line audio mixer for the ALSA sound card driver.
kill/killall	Send specified signal to the specified process or process group

For complete command usage and explanation, please refer to following website:
http://www.busybox.net/downloads/BusyBox.html

4-3 Zebra Daemon

Service name	zebra
Description	Zebra is an advanced routing software package that provides TCP/IP based routing protocols.
Config files	/etc/zebra.conf
Start file	/etc/init.d/zebra
Start at system boot up	No
Start command	/etc/init.d/zebra start
Stop command	/etc/init.d/zebra stop

There are four routing daemons in use, and there is one manager daemon.

- ospfd, ripd, bgpd*, isisd* (* for optional)
- Zebra

Configuration options:

1. Each of the daemons has its own config file. For example, zebra's default config file name is:
   - /etc/zebra.conf
2. The daemon name plus .conf is the default config file name. You can specify other config file using the -f options when starting the daemon.

3. Check the help menu of the routing daemons. (For example, type ospfd --help for further details)

4. Check the log files for proper operation. For example, you can type less -f /var/log/zebra.log to check the zebra log. Keep in mind that you have to add the log-file location to the respective daemon configuration file.

The administrator has two options to modify runtime configurations via the command-line interface (CLI):

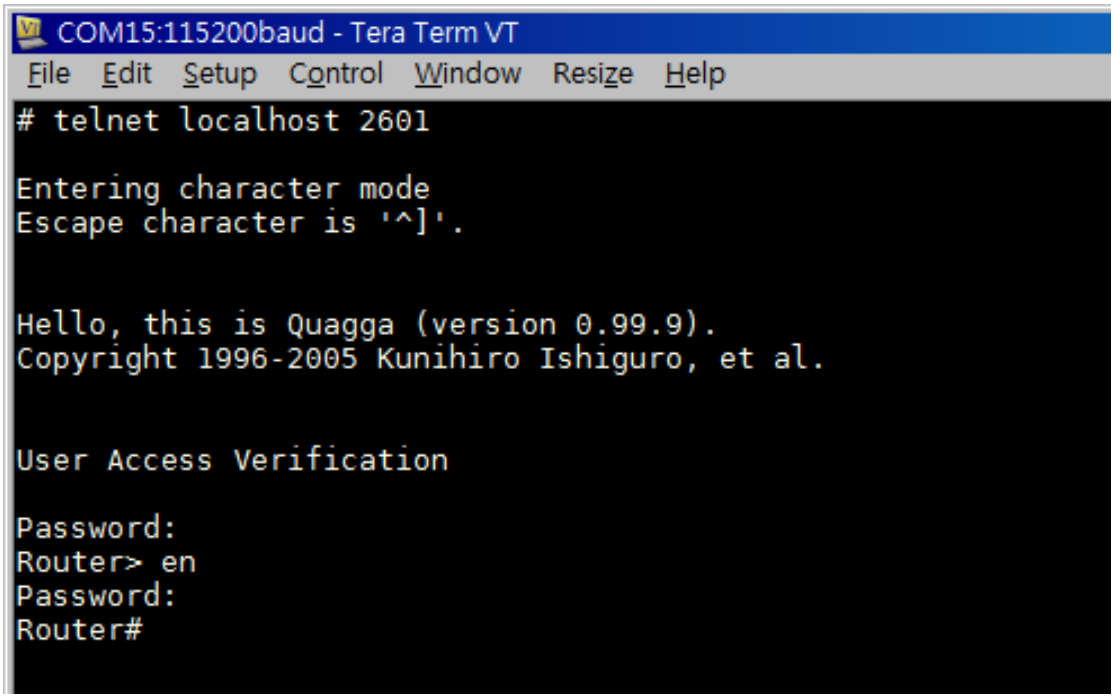
- **Telnet localhost <port> ,e.g. port 2601** connects to the ospfd. Zebra uses ports from 2600 to 2607 for daemon connections.

Service	Port
zebra	2601
ripd	2602
ospfd	2604
bgpd	2605
isisd	2607

- Use the integrated Zebra shell vtysh by typing vtysh. vtysh expects its configuration to reside in /etc/vtysh.conf.

Example:

1. Start zebra: /etc/init.d/zebra start
2. connect to zebra: telnet localhost 2601



Login zebra with password set in /etc/zebra.conf. The default value is **zebra**. The default password for enable mode is **zebra**.

3. Query for supported command: Router# **?**

```
Password:
Router#
  clear      Reset functions
  configure  Configuration from vty interface
  copy       Copy configuration
  debug      Debugging functions (see also 'undebug')
  disable    Turn off privileged mode command
  echo       Echo a message back to the vty
  end        End current mode and change to enable mode.
  exit       Exit current mode and down to previous mode
  help       Description of the interactive help system
  list       Print command list
  logmsg     Send a message to enabled logging destinations
  no         Negate a command or set its defaults
  quit       Exit current mode and down to previous mode
  show       Show running system information
  terminal   Set terminal line parameters
  who        Display who is on vty
  write      Write running configuration to memory, network,
Router#
```

4. Display the current running config: **sh run**

```
Router# sh run

Current configuration:
!
hostname Router
password zebra
enable password zebra
!
interface dummy0
 ipv6 nd suppress-ra
!
interface gre0
 ipv6 nd suppress-ra
!
```

5. Enter config mode:

Router# **config terminal**

6. Change hostname to KorenixRouter:

Router(confg) # **hostname KorenixRouter**

```
Router# config terminal
Router(config)# hostname KorenixRouter
KorenixRouter(config)# quit
KorenixRouter#
```

4-4 Korenix command

4-4-1 Ethertool

Linux ethernet device configuration tool

Usage:

```
ethtool DEVNAME       (get port status)
ethtool -a DEVNAME          (get flow control)
ethtool -A DEVNAME          (set flow control)
   [ rx on|off ]
ethtool -q DEVNAME    (get QoS)
ethtool -Q DEVNAME    (set QoS)
   [ type 0|1 ] (0: weighted, 1: Strict)
   [ trust 0-4 ] (0:Port Based, 1:CoS Only, 2:DSCP Only, 3:CoS First, 4:DSCP First)
   [ pri 0-7 ] (Port default frame priority)
   [ cos QUEUE_ID COS_ID ]
   [ dscp QUEUE_ID DSCP_ID ]
ethtool -p DEVNAME          (get vlan pvid)
ethtool -P DEVNAME          (set vlan pvid)
   [ pvid N ]
ethtool -t DEVNAME          (reset statistic)
ethtool -s DEVNAME          (set port status)\
   [ speed 10|100 ]\
   [ duplex half|full ]
   [ port on|off ] - Enable or Disable this port\
   [ autoneg on|off ] \
ethtool -S DEVNAME          (get statistic)
```

Example：

a. Get port status

```
ethtool lan:3

Port Status:
        Speed: 100Mb/s
        Duplex: Full
        Flow Control: off
Port Setting:
        Port: on
        Auto-negotiation: on
        Link detected: Up
```

b. Set port status

ethtool -s lan:3 speed 100
ethtool -s lan:3 port off
ethtool -s lan:3 autoneg off
ethtool -s lan:3 duplex half

c. Set vlan pvid

ethtool -P lan:3 pvid 2

4-4-2 Vconfig

Create and remove virtual ethernet devices

Options:

add	[interface-name] [vlan_id] tag [port_id] untag [port_id]
	[example : vconfig add lan 2 tag 1,2,3 untag 4]
rem	[vlan-name]
show	[Display Vlan Table]
set_flag	[interface-name] [flag-num] [0	1]
set_egress_map	[vlan-name] [skb_priority] [vlan_qos]
set_ingress_map	[vlan-name] [skb_priority] [vlan_qos]
set_name_type	[name-type]

Example：

a. Add a vlan interface

vconfig add lan 2 untag 1,2,3,4

****

Note：when you add a vlan interface, you can see it by typing “ifconfig -a”. It will display with “lan.2”. Remember to enable it by typing “ifconfig lan.2 up”.

```
lan       Link encap:Ethernet  HWaddr 00:12:77:FF:80:47
          inet addr:192.168.13.10  Bcast:192.168.13.255  Mask:255.255.255.0
          inet6 addr: fe80::212:77ff:feff:8047/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:512
          RX bytes:0 (0.0 B)  TX bytes:652 (652.0 B)

lan.2     Link encap:Ethernet  HWaddr 00:12:77:FF:80:47
          inet6 addr: fe80::212:77ff:feff:8047/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:176 (176.0 B)
```

****

b. Delete a vlan interface

vconfig rem lan.2

c. Show all vlan interface

vconfig show

```
//---------------------------------------//
VLAN ID          : 1
Tag Port         :
Un-Tag Port      :  1, 2, 3, 4,
//---------------------------------------//
VLAN ID          :  2
Tag Port         :
Un-Tag Port      : 1, 2, 3, 4,
```

4-4-3 Diocfg

Get/Set DIO Configuration

Usage:

```
diocfg -g PORT_NUM - get DIO status
diocfg -s PORT_NUM [0|1] - set DO [OFF|ON]
diocfg -T PORT_NUM [0|1] - set DIO Type [Output|Input]
diocfg -S Save Config
diocfg -r Read Config
diocfg -c Clean Config
```

Example：

a. diocfg -g 7

Get data of DI7 to High

****

Note：The DIO number range is 0~7. Default all DIO type are set with DI.

****

b. diocfg -T 7 0

Set Port 7 to Ouput

c. diocfg -s 7

Set data of DO7 to High

4-4-4 Poecfg

Get/Set POE Device Configuration

Usage:

poecfg -g PORT_NUM - get PoE status
poecfg -s PORT_NUM [0|1] - set PoE [OFF|ON]
poecfg -S Save Config
poecfg -r Read Config
poecfg -c Clean Config

Example：

a. poecfg -g 1 (without PD on port 1)

PoE Port 1
control status is On
power delivery status is Off

b. poecfg -g 1 (with PD on port 1, and power is 48 voltage)

PoE Port 1
control status is On
power delivery status is On
Voltage 46.3V
Current 27mA
Power 1.25W

c. poecfg -s 1 0

PoE Port 1
control status is Off
power delivery status is Off

Chapter 5 Appendix

5-1 Customer Service

Korenix Technology Co., Ltd.
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