ZEBRA MOBILE PRINTERS
Wireless Configuration Guide

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Information Needed for Network Configuration

Before you start to configure your printer for use on a Local Area Network (LAN), you will need some basic information which will enable you to establish the network configuration for your printer.

Use Table 1 opposite as a guide to obtain information on important networking settings. If you don't know this information, you should obtain it from the network administrator.

Table 1: Network Information Needed For Printer Set-up

1. What is your wireless LAN's ESSID (Extended Service Set Identifier)?: _____

2. Does the network supports DHCP (Dynamic Host Configuration Protocol)?

   • YES _____ (If "yes", proceed to question 3)

   • NO_____ (If "no", fill out information below)

   1. IP address____:_____:_____:____

   2. Subnet Mask:__:_____:____:____

   3. Gateway:____:_____:_____:_____

3. If the Wireless network has WEP (Wired Equivalent Privacy) enabled then you need to know if it uses 40 bit or 128 bit WEP encryption and the encryption keys:

   • 40 bit key: _____ _____

   • 128 bit key:

   _____ _____ _____

   • Which encryption key index is your network using (circle one): 1, 2, 3, 4

4. Authentication Information (not available with Frequency Hopping [FHSS] radios)

   If you are using Cisco's LEAP authentication scheme you will need:

   • User Name: _____ Password: _____

   If you are using the Kerberos authentication scheme you will need:

   • User Name: _____ Realm: _____

   • Password: _____ KDC: _____

5. Zebra Mobile Network Printers support POP3 (Post Office Protocol 3) The information you will need to set up POP3 is:

   • The IP address of the POP3 server: ____:____:____:_____

   • The user name of the POP3 account: _____

   •. The password of the POP3 account: _____

   • You will also need to decide how frequently you want the printer to check for new e-mail. This is called the poll frequency.

   Poll Frequency: _____

Using Label Vista to Configure Your Wireless Printer

INTRODUCTION TO LABEL VISTA

Label Vista™ is a program that allows users with little or no programming background to design labels which can be printed on the full range of Zebra Technologies Corporation's mobile printers. It combines an intuitive graphically based user environment along with powerful, but easily mastered, editing tools.

In addition, Label Vista provides utilities making it easy to configure your printer for a variety of purposes, including setting them up for wireless communications either on a Local Area Network (LAN) or using the international Bluetooth™ communications standard.

Label Vista utilizes a subset of Zebra's Portable Printer Control Language (CPCL). Label files created in Label Vista are fully compatible with other labels created using the complete set of CPCL commands.

SYSTEM REQUIREMENTS FOR LABEL VISTA

1) An IBM-compatible PC with a CD-ROM drive and the minimum configuration to run Windows 95/98/NT/2000/XP will have sufficient memory to run Label Vista. You will need a serial (RS232-C) data port and approximately 10 MB of disk space for the full Label Vista installation.

2) Serial communications cable (Zebra P/N BL11757-000) to connect your Zebra Mobile Printer to the 9 pin serial port of your PC.

You may need to supply adapter cables between the serial communications cable and your computer if (1) your serial port has 25 pins or (2) the connector gender of your computer does not agree with the communications cable. Zebra's standard communication cable has a 9-pin female connector.

3) Label Vista™ Label Creation Utility Software, Revision 2.17 or higher. Label Vista can be installed from the Accessories CD which was packaged with your printer or can be downloaded directly from Zebra's Web site at:

http://www.zebra.com/SD/demos.htm

continued

LABEL VISTA INSTALLATION

Important: Please close all applications including Microsoft™ Office and Microsoft Outlook before proceeding.

Place the Label Vista CD-ROM in your CD drive, and double click on the "Setup.exe" icon to start the installation. You will be prompted for the location of the Label Vista installation.

Note: the Label Vista installation procedure will automatically load TrueType™ fonts included in the software package. You should insure that these fonts will not conflict with any of your system's existing fonts, and that this installation will not exceed your system's maximum number of installed fonts.

RUNNING LABEL VISTA

After Label Vista has been installed, the program can be started by navigating through the Start button on the bottom of the screen to the Programs section, and selecting Label Vista.

CONTEXTUAL HELP

Label Vista has extensive contextual help support. To use the help utility, select the [icon] icon and click on a feature of Label Vista you need information about (a menu item, an icon ,etc.).

CONNECTING YOUR PRINTER

Label Vista installs drivers to allow you to communicate with Zebra portable printers.

Connect the printer's communication cable from your computer's COM1 or COM2 (Serial I/O) connector to the mobile printer's i/o connector as shown opposite. (Refer to the section of this manual on the Printer menu for more information on setting up communications parameters from your computer to your printer.) Refer to the Appendix for more information regarding interface cables.

Communication ports

Communication Cable

Adapter Cables (as needed)

Mobile Printer (QL220 shown)
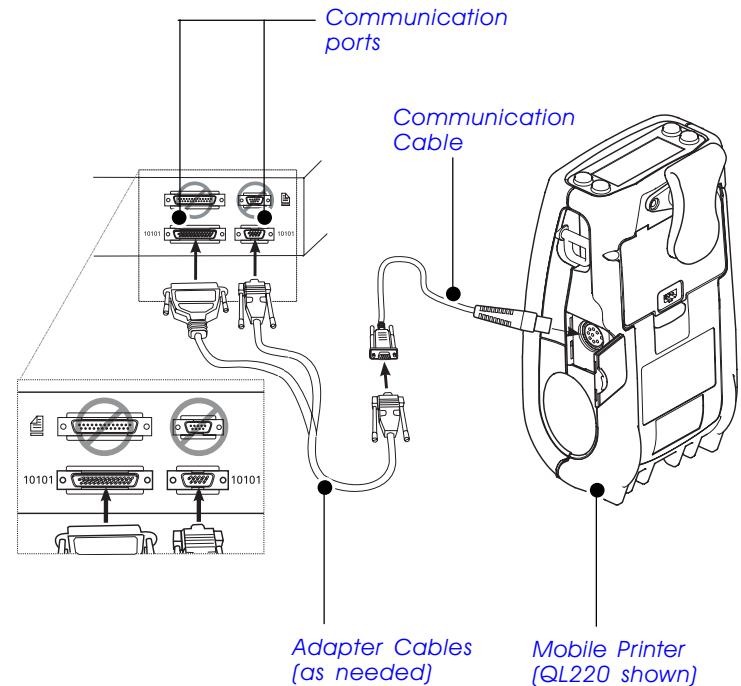
Once you have Label Vista running, and your printer connected to your P.C., click on the Printer selection on the menu bar, then the Com Port Setup selection.

Communications Port sets up the communications port via the ComPort dialog box. The mobile printer user may select the communications port and the rate at which data is transferred.. The **Com1** or **Com2** selections allow bi-directional serial communications with the printer; the other options do not apply.

Two network protocols are available to communicate to Zebra mobile printers equipped with network capabilities: **NETWORK TCPIP** and **NETWORK LPD**. In order to communicate with the printer, choose the protocol that the printer is configured for. If you are unsure as to which protocol the printer is using, turn the printer off and while holding the feed key down turn the printer back on. This will print the printer's 2-key report. The protocol that the printer is configured to use is listed under the RF-LAN section. If the printer is using a Symbol MOM card choose the **NETWORK SYMBOL MOM CARD** option. This is a TCP protocol that does not close the network connection.

In order to talk to a network printer the IP address and port must also be entered. The printer's current IP address and port are also listed on the 2-key report. Configuring **Baudrate** allows selection of the rate at which data is sent over either COM port. Baud rates range from 2400 to 115200 b.p.s.

Checking the **Set Printer Baud Rate** box allows Label Vista to automatically set the Baud rate for the program and the printer.
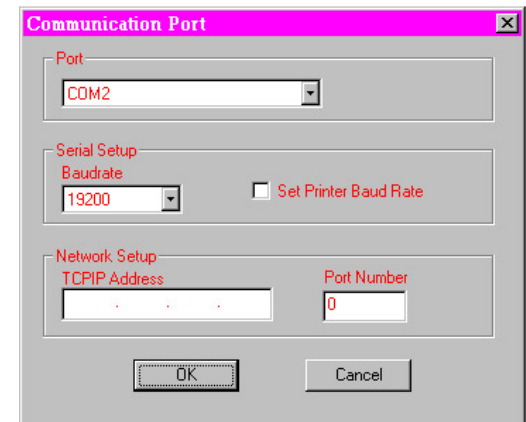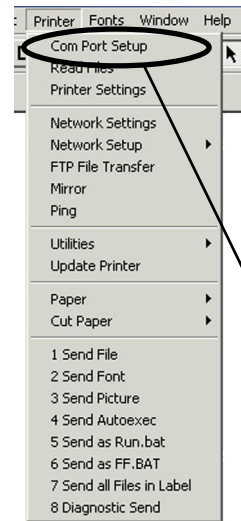
Wireless Network Printer Setup
With WLAN 802.11b Radio

You will need information for the Network to which you will be connecting. It will be useful if you get this information before you start the setup procedure. Refer to the information you compiled in Table 1 when completing the set-up process.

NETWORK SETUP USING LABEL VISTA

Label Vista has Network setup wizards to help the user to configure his/her wireless network printer quickly and easily.

The three types of setup are:
 • Quick Network Setup (no Encryption)
 • Network Setup with Encryption
 • POP3 Setup

Label Vista will also allow you to set the Authentication settings.

QUICK NETWORK SETUP

Use this option if you do not need to use data encryption on your wireless network.

Once your printer is connected via cable to your PC, open Label Vista. Ensure that communications to the printer is set per the preceding section. To verify communication between your PC and the printer click on Printer/ Read files. If there is communication, a window showing the files in the printer memory will be displayed after a few seconds.

 • Open Label Vista and select "Printer" on the top bar menu. On the drop down menu, go to Network Setup. Then select: Quick Network Setup.

 • Follow the prompts provided by the set up Wizard, using the information filled in on Table 1.

 • At the end of the setup process you will be prompted to click on "Test Settings" to make sure the connection and settings have been established. After selecting "Test Settings" you will see actual communication between the printer and Access Point taking place.
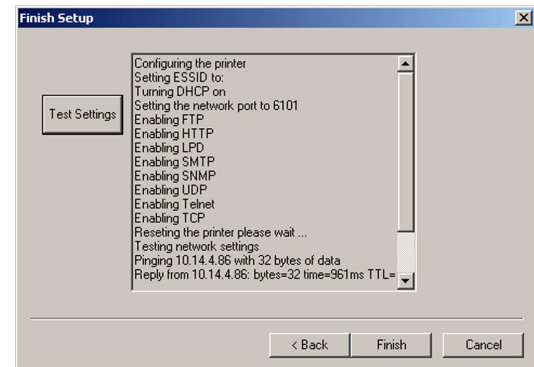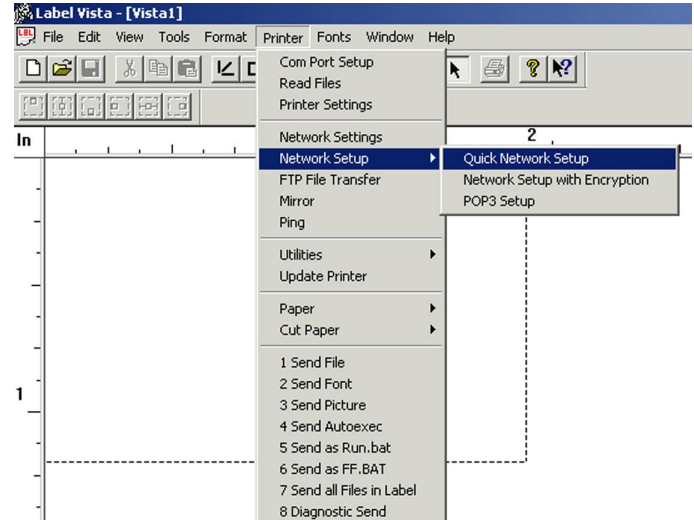
You may then exit the wizard by clicking on the "Finish" button.

If your printer is equipped with a display, you can verify that the printer has established communication with the Access Point. The antenna symbol on the upper left hand side corner of the LCD will be shown.

You can scroll the screens of the printer LCD until you get to the WLAN TCP-IP screen. The IP address and the ESSID of the Access Point will be shown. If the printer is not associated with a network radio access point, the antenna icon will be missing and the ESSID field will be blank.

If your printer does not have an LCD the "Power" LED will blink if the printer is not associated with an access point.

A blinking power LED indicates that the printer is not linked to an access point on the network, or the printer's battery needs re-charging

A rapidly blinking indicator means radio communications with a host is taking place

Power Button

Feed Button

FTN

QL Series Keypad

Feed Button

Antenna Icon

Scroll Button

```
QL320 WLANTCP
IP: 10.14.86
ESSID: ZEBRA_MKTG
PORT: 6101 MORE BACK
```

QL Series Keypad with LCD

Power Button

Select Button

If your printer does not have an LCD you can print a Configuration Label (2-key report) and verify the network settings in the printer.

To print out a Configuration Label follow these steps:

1. Turn the printer off. Load the media compartment with journal media (media with no black bars printed on the back)

2. Press and hold the Feed Button.

3. Press and release the Power button and keep the Feed button pressed. When printing starts, release the Feed button.

The printer will generate a configuration label as shown opposite.

```
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Zebra QL 320 V79.30 01/18/02
CHK: FFFF  XXVQ03-01-0457
HTQ37930    /18
Testing Memory...
Memory tested and OK
Baud Rate: 19200 BPS
In-activity Timeout: 1200 Secs
Low battery Shut-down: 168

End of report.



Zebra QL 320 V79/42 11/21/02
Serial Number:

||||||||||||||||||||||||||||

XXVQ03-01-0457
Name: XXVQ03-01-0457
Program:
  Firmware:HTQ37930    /18
    Chksum:93D5
  Software:HTNK42a
    Chksum:E49C
  Ver:L4.R79.30.U168.B19.T19.A42
Cable Communications:
  19200 BPS, N,8,1
  Handshake:hardware
  DSR: 0
  Bridge mode: off
Wireless Communications:
  Bluetooth:
    .version      1.2.0
    .date         08/01/02
    .baud         9600
    .device       printer
    .mode         slave
    .local_name   ?
    .authentication off
    .discoverable off
    .encryption   off
    .address      ?

  ZebraTCP: Sep 5 2002 14:58:23
  IP Address: 10.14.4.86
  Netmask: 255.255.255.0
  Gateway: 10.14.4.1
  MTU: 1522
  TCP/UDP Port: 6101
  Remote Server: 0.0.0.0
  TCP: ON
  UDP: ON
  LPD: ON
  DHCP: ON
  FTP: ON
  HTTP: ON
  SMTP: ON
  POP3: OFF
  SNMP: ON
  TELNET: ON

  PCMCIA/CF Adapter 1.0
  Build Date: Jul 10 2002
  Build Time: 14:36:53

  Drivers Installed for
  Symbol 802.11b PC LAN Radio
  Symbol 802.11b CF LAN Radio
  Cisco 802.11b PC LAN Radio
  Symbol 802.11 FH PC LAN Radio

  Card Detected.

  Cisco 802.11b
  MAC Address: 00:0b:46:bd:67:15
  Operating Mode: infrastructure
  Preamble Length: long
  Power Save: PSP
  Encryption: off
  Authentication: open system
  LEAP: off
  Stored ESSID: ZEBRA_MKTG
  Associated ESSID: ZEBRA_MKTG
```

A "? " value for the Bluetooth .local_name and .address parameters indicates no Bluetooth radio is installed.

The IP Address was automatically assigned by DHCP

This printer has a Cisco 802.11b radio

ESSID setup was successful and this printer is associated to the Access Point

NETWORK SETUP WITH ENCRYPTION

• As was described in Quick Network Setup, open Label Vista and click on "Printer" on the top menu. From the drop down menu go to Network Setup and select Network Setup with Encryption. Follow the wizard steps by clicking Next and by entering the information from Table 1 as it was done in the Quick Network Setup.

If you don't know some of the requested information, contact your network administrator.

• Continue the setup by following the wizard windows. Just as in the Quick Network Setup you must:

• Enter the network port

• Enable the applicable network protocols. Consult with your network administrator to find out which protocols you want to enable. Note that if your printer has a Frequency Hopping (FHSS) radio installed you can only use 40 bit encryption.

• Test the settings and click "Finish" to end the wizard and finish the setup procedure.
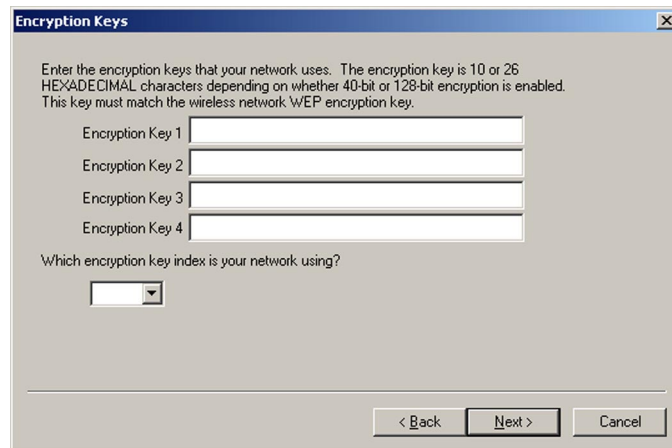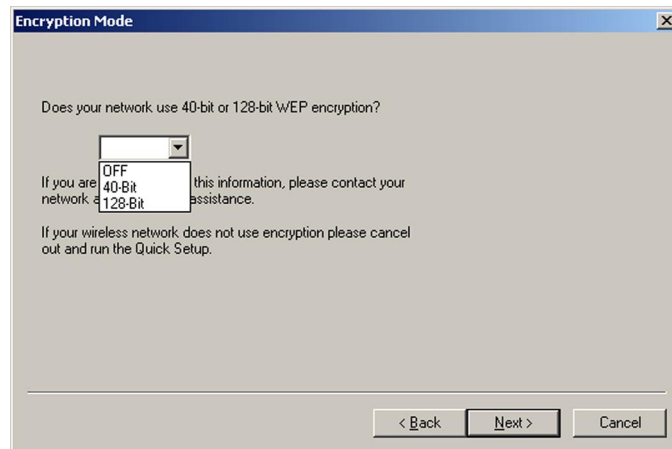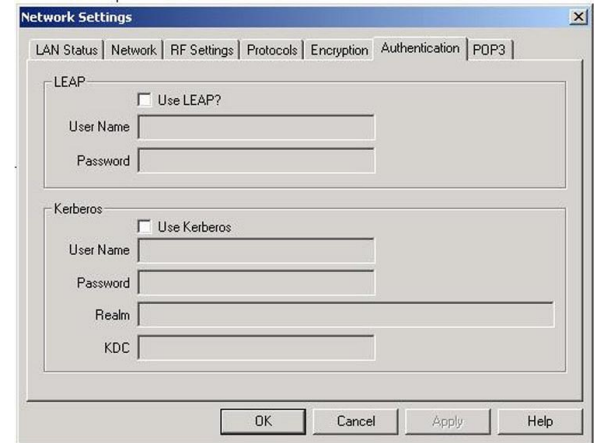
AUTHENTICATION SETTINGS

If you have a printer with a Cisco 802.11b/Symbol 802.11b radio and your network supports either the LEAP or Kerberos security, you can set authentication by doing the following:

In Label Vista's top menu click on Printer and select Network Settings from the drop down menu. Click on the "Authentication" tab and then check the box next to either LEAP or Kerberos depending on your authentication system. Enter the appropriate authentication information you recorded in Table 1. (See picture opposite). Contact your network administrator if you don't know the required authentication information.

NOTE: If you have an 802.11 FH (Frequency Hopping) radio installed, LEAP and Kerberos authentication are not available.

POP 3 (POST OFFICE PROTOCOL 3) SETUP

POP 3 (Post Office Protocol 3) is usually used to retrieve e-mail from a mail server, but it can also be used for sending print jobs to a wireless mobile network printer. The printer should already be configured for wireless operation and associated with an access point before running the POP3 setup wizard. (See the previous two sections).
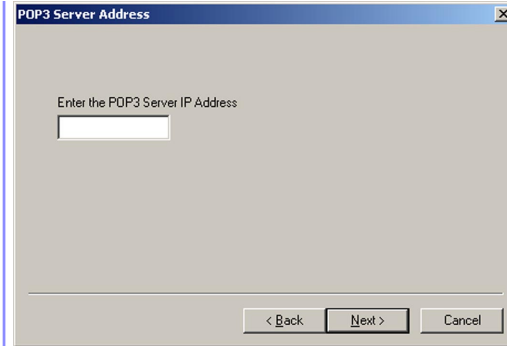
• Open Label Vista. In the top menu bar select Printer / Network Setup / POP3 Setup.

• The POP3 window will come up, and present a list of information you will need to continue. Remember that the printer should already be associated with an access point in order to proceed.

Contact your network administrator if you don't know the information requested.

• Enter the POP3 Server IP address and click "next". (Contact your network administrator to obtain this address).

• Next, you will need to enter the User Name and Password for the e-mail account being used. Click "Next".

• You must now enter the frequency (in seconds) the printer will check the POP3 account for new mail.

Note that the recommended frequency should be set to greater than thirty seconds to avoid printer unresponsiveness. Click on "Next".

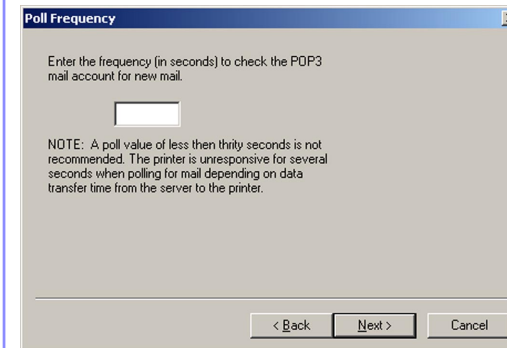*Select POP3 networking option & enter the POP3 Server IP address*

Enter the POP3 User name and password

Enter how often the printer will query the POP3 server.

• Select the POP3 desired options as shown in the last window.

If the "Print Body of E-Mails" option is selected, the printer will print messages as they are received. E-mail messages sent to the printer should be in ASCII text.

If you send an e-mail message to the printer that can be interpreted as a CPCL command, the printer will attempt to execute that command.

If you select the "Save E-Mail attachments to Printer" option, e-mail attachments will be saved in the printer's flash memory. The size of the attachments that can be saved is limited to the memory remaining. Attachment file names will be truncated to 11 characters (8 character file name and a three character extension.)

Click "Finish" when you have finished selecting the POP3 optoins.

Once you have finished setting up your printer it will become recognized as a unique device on your network with its own IP address.
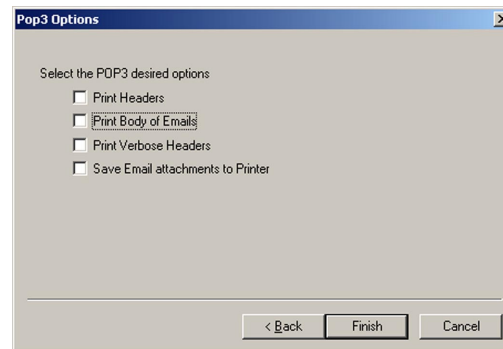
Select the options for displaying your POP3 messages.

FTP MIRROR

Zebra QL series printers support a file mirroring process that allows the printer to synchronize files with those stored on an FTP server. Since the process relies solely on the FTP standard, no other special utilities are required. The files on the FTP server can be printer firmware files, fonts, or lists of printer configuration commands (such as commands to change the printer's WEP key). In order for this file synchronization process to work properly, it is only required that the FTP server support "Unix style" directory listings and that the modification time stamps of the files stored on the FTP server are accurate.

Setting Up Mirror In Label Vista

The Mirror dialog box is a selection under the Printer menu in Label Vista. You must fill out the FTP server information and your user name and password as requested. Clicking on the "Auto" check box will instruct the printer to synchronize its files per the number of minutes you enter in the Frequency box.

Setting Up Mirror With Parameter Commands

The following set/get variables are available to enable FTP mirroring:

ip.mirror.auto: on/off

getvar example: !U1 getvar "ip.mirror.auto"
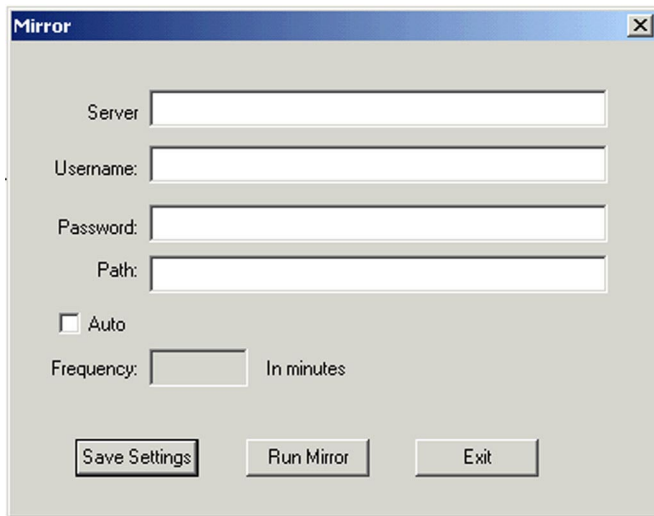*setvar example:* ! U1 setvar "ip.mirror.auto" "on"

If "on", the printer will automatically synchronize files upon power-up, and then per the frequency setting. (see **ip.mirror.freq**, below)

ip.mirror.username: 20 bytes (string)

getvar example: !U1 getvar "ip.mirror.username"
setvar example: ! U1 setvar "ip.mirror.username" "test"

Username to use for FTP login

ip.mirror.password: 20 bytes (string)

getvar example: !U1 getvar "ip.mirror.password"
setvar example: ! U1 setvar "ip.mirror.password" "secret"

Password for FTP account

ip.mirror.server: 40 bytes (string)

getvar example: !U1 getvar "ip.mirror.server"
setvar example: ! U1 setvar "ip.mirror.server" "192.168.1.1"

Server ip address or name (if DNS server information is provided via DHCP).

ip.mirror.path: 50 bytes (string)

getvar example: !U1 getvar "ip.mirror.path"
setvar example: ! U1 setvar "ip.mirror.path" "/zebra/ql"

Path on the FTP server where the mirror directory is located. Defaults to "companyname/model".

NOTE: this must be an absolute path (i.e. it must start with / or ~)

ip.mirror.freq: 0-99 minutes

getvar example: !U1 getvar "ip.mirror.freq"
setvar example: ! U1 setvar "ip.mirror.freq" "25"

Number of minutes to wait before performing another file synchronization. If this value is "0", the mirror process will be performed only once when the printer powers-up. Setting a low value will cause the printer to spend most of its time performing the mirror process. This parameter only applies if **ip.mirror.auto** is "on".

ip.mirror.fetch

do example: ! U1 do "ip.mirror.fetch" "yes"

Forces the mirror process to be run immediately. The printer will immediately contact the FTP server defined by "**ip.mirror.server**", log on with the defined username and password and look for mirror file updates.

Refer to Section 14 of the CPCL Programming Manual for more information on configuring FTP mirror with parameter commands.

Bluetooth™ Setup

Bluetooth settings that are configurable by Label Vista:
- Authentication
- Discoverable Mode
- Friendly Name
- PIN

By default, a Zebra Bluetooth printer comes with Authentication turned OFF, Discoverable turned ON, and the "Friendly Name" of the printer set as the printer's serial number.

The printer will always be a "slave device" in Bluetooth parlance. It will not look for other Bluetooth devices to connect to, and will never initiate the communication link itself.

In order to change the Bluetooth settings the printer needs to be connected to a PC through a serial cable as detailed in the first section.

- To change the Bluetooth parameters in the printer, open Label Vista from the top main menu and select Printer / Utilities / Bluetooth settings.
- Once in the Bluetooth window (see opposite) you can change any parameters that are not grayed out.

AUTHENTICATION

Authentication offers three choices: OFF, SET PIN and GENERATED.

OFF: Authentication and encryption are turned off in the printer.

SETPIN: When setting a PIN value, authentication will be enabled and the PIN will be the value set by the user in the PIN field.

Select this option and enter your selected PIN in the box (see picture). When authentication is enabled and a master device attempts to communicate with the printer, the printer will require this PIN before it accepts the connection.

GENERATED: Selecting this option will also enable authentication. This option is available for backwards compatibility only and may not be supported in future editions of the Bluetooth library.

To enable authentication make sure you are using Bluetooth library version 1.2.3 or higher and select the SETPIN option.

PIN

Enter your desired PIN in this box. You can use between 4 and 10 characters and any combination of letters and numbers (ASCII characters) is allowed. (See SETPIN option above.) NOTE: This feature is available only when application software is at revision "44u" or higher.

DISCOVERABLE

Discoverable is set ON or OFF. If Discoverable is turned OFF, the printer will not be discovered by any other device but can still can be connected if the application developer knows the printer's Bluetooth address. The printer's Bluetooth address can be found by printing a Configuration Label (2-key report), or by scrolling through the LCD if available. (Refer to pg. 9 of this manual or the printer's User's Guide for instructions on printing a Configuration Label.)

FRIENDLY NAME

The "Friendly Name" is the name that a master device will see when the printer is discovered. By default, the friendly name is the printer's serial number. It can be changed to whatever name the end user desires.

The picture opposite shows a Configuration Label (2-key report) with the Bluetooth configurable settings highlighted.

Printer serial number. Used as Bluetooth default "friendly name".

Last 3 digits of the Software number are its revision

Bluetooth version:

Discoverable and Authentication parameters can be turned "off."

Encryption is turned on when Authentication parameter is "On."

Bluetooth Address. Barcode representing the address is printed above. The Bluetooth address cannot be changed.

```
Zebra QL 420 V79/45 06/20/03
Serial Number:

XXVT03-03-0077
Name: XXVT03-03-0077
Program:
  Firmware:HTQ47931    /18
   Chksum:5B1E
  PLD: 4 Rev. EE
  Software:HTNKP45g
   Chksum:2782
  Ver:L4.R79.31.U188.B19.T19.A45#1
Cable Communications:
  19200 BPS, N,8,1
  Handshake:hardware
  DSR: 0
  Bridge mode: off
Wireless Communications:
Bluetooth:
  .version      1.2.0
  .date         08/01/02
  .baud         57600
  .device       printer
  .mode         slave
  .local_name   ?
  .authentication off
  .discoverable  on
  .encryption    off
  .address  00:80:37:17:AA:8C

00803717AA8C

Peripherals:
  MCR 2.00
Power Management:
  In-activity Timeout:1200 Secs
  Low-battery Timeout:60 Secs
  Remote(DTR) pwr-off:Enabled
  Voltage      :7.53(193)
  Low-bat Warning :7.06(181)
  Low-bat Shut-down:6.59(169)
Memory:
  Flash :1048575 Bytes
  RAM   : 262143 Bytes
Label:
  Width :576 dots, 72 mm
  Height:1027 dots, 128 mm
Sensors:(Fixed)
  Bar [DAC: 0,Thr: 97,Cur: 9]
  Temperature :176
  Voltage     :7.49(192)
Resident Fonts:
  Font    Sizes Chars
  ------- ----- -----
    0     0- 6  20-FF
    1     0     20-80
    2     0- 1  20-59
    4     0- 7  20-FF
    5     0- 3  20-FF
    6     0     20-44
    7     0- 1  20-FF
File Directory:
  File       Size
  ---------- ----------
  660000 Bytes Free
Command Language:
  CCL Key '!'[21]

End of report.

Press FEED key to
enter DUMP mode.


Dump mode not entered.
```

Using Parameter Commands to Configure a Network Printer

QL series printers use a series of parameter commands to set and retrieve network configurations. This set of commands is referred to as the "set/get/do" commands., and is available in the printer applications version 40 and above. The software version can be ascertained by performing a two-key reset. The number in the "Software:" listing on the second report must end in 40 or above (e.g. "Software: HTLK**40**d")

These commands follow a standard format as described below.

Note: All commands must be terminated with a CR/LF (0x0D, 0x0A). Actions and parameter names must be specified in lowercase. Parameter values should be specified in lowercase unless the parameter value itself is case sensitive, such as a printer's WLAN eSSID.

Refer to the Mobile Printer Programming Manual for a more detailed description of the "set/get/do" commands and examples of their use. The Manual is available on the Internet at:

http://www.zebra.com/SS/manuals.htm

PARAMETER COMMAND FORMAT

Three commands are available: **setvar**, **getvar**, and **do**.

• "**setvar**" commands are used to configure printer operating parameters to specified values.

• "**getvar**" commands are used to query the printer for its parameter values.

• "**do**" commands are used to instruct the printer to perform various functions.

The formats of these commands are as follows:

getvar Command

The **getvar** command is used to get the current value of printer parameters. This command must be terminated by a CR/LF (0x0D, 0x0A). The printer will respond with the parameter value of "?" if the parameter does not exist (usually due to incorrect spelling of the parameter name) or it has not been configured yet. The parameter name should be specified in lower case.

Format:

`getvar "{parameter name}"`

{parameter name} = The name of the parameter to be retrieved. Please refer to the parameter list for valid parameter names.

setvar Command

The **setvar** command is used to set parameter values in the printer. This command must be terminated by a CR/LF (0x0D, 0x0A). The parameter name and values must be in lower case unless the parameter value itself is case sensitive, such as a printer's WLAN eSSID.

Format:

`setvar "{parameter name}" "{value}"`

{parameter name} = The name of the parameter to be set. Please refer to the parameter list for valid parameter names.

{value}= The new value to assign to the specified parameter above.

do Command

The **do** command can be used to instruct the printer to perform predefined actions. Some do commands require one or more parameters. These parameters should be enclosed in double quotes. This command must be terminated by a CR/LF (0x0D, 0x0A). The printer will perform the specified function immediately after receiving the command.

Format:

`do "{action name}" "{parameter}"`

{action name} = The action to perform. Please refer to the parameter list for valid action names.

{parameter} = some actions require one or more parameters. The parameters should be specified as required by the corresponding action, enclosed within double quotes. For actions that do not require a parameter an empty parameter list should be specified, i.e. "".

Configuration Parameters

The following is a list of parameters which can be used to configure a printer for network use. This is not intended to be a complete guide to using these parameters, only a brief synopsis of the commands available. Always refer to the Mobile Printer Programming Manual for more details and examples of their use and syntax.

NETWORKING PARAMETERS

The following parameters can be used only with the network application versions 40 and above. Any changes made using the **setvar** command will not take effect until the printer's power has been cycled or the device.reset command is issued.

These parameters determine the internet protocol settings of a printer . Their use and definitions exceed the scope of this document, but more detailed exposition of the full set of .ip parameters may be found in the CPCL Mobile Printer Programming Manual.

card.mac_addr

type: getvar
Example: ! U1 getvar "card.mac_addr"
This parameter will report the MAC address of the network card installed in the printer.

ip.addr

type: getvar; setvar
setvar choices : Any valid IP address
getvar example: ! U1 getvar "ip.addr"
setvar example: ! U1 setvar "ip.addr" "10.14.4.235"
This parameter refers to the IP address of the printer. The DHCP

setting ("ip.dhcp.enable" parameter) must be "off" to change the printer's IP address.

ip.bootp.enable

type: getvar; setvar
setvar choices: "on" – Printer will use BOOTP to get its IP information on startup.
"off" – Printer will not use BOOTP.
Default:"off"
getvar example: ! U1 "getvar" "ip.bootp enable"
setvar example: ! U1 setvar "ip.bootp.enable" "on"
This parameter will turn BOOTP on or off. BOOTP is a method for acquiring an IP address, netmask, and gateway automatically on printer power-up. It requires a BOOTP server on the local network.

If you are using static ip addressing, BOOTP must be "off".

NOTE: It is not recommended that BOOTP and DHCP both be enabled at the same time since this may increase the printer power-up initialization time. You should contact your network administrator to determine whether your network supports either BOOTP or DHCP and enable only the proper parameter on the printer.

ip.dhcp.enable

type: getvar; setvar
setvar choices: on", "off"
Default "on"
getvar example: ! U1 getvar "ip.dhcp.enable"
setvar example: ! U1 setvar "ip.dhcp.enable" "off"
This parameter refers to DHCP setting. DHCP must be set to "off" before setting a static IP address.

NOTE: It is not recommended that BOOTP and DHCP both be enabled at the same time since this may increase the printer power-up initialization time. You should contact your network administrator to determine whether your network supports either BOOTP or DHCP and enable only the proper parameter on the printer.

ip.dhcp.cid_prefix

type: getvar; setvar
setvar choices: Any text string up to 10 characters in length
Default   ""
This parameter defines the prefix to be pre-pended to the DHCP client identifier (option 61) when DHCP is enabled and "ip.dhcp.cid_type" is set to "0".

NOTE: This parameter is only applicable if "ip.dhcp.enable" is set to "on".

ip.dhcp.cid_type

type: getvar; setvar
setvar choices: • "0": synthetic string
                          • "1": use printer's MAC address
                          Default: "1"
getvar example: ! U1 getvar "ip.dhcp.cid_prefix"
setvar example: ! U1 setvar "ip.dhcp.cid_prefix" "ZEB"
This parameter defines the type of Client Identifier (option 61) that will be sent if DHCP is enabled. A value of "1" means the type is "Ethernet" and the printer's MAC address will be used. A value of "0" means the type is "synthetic" and the client identifier sent will be "ip.dhcp.cid_prefix" concatenated with "ip.dhcp.cid_value".

NOTE: This parameter is only applicable if "ip.dhcp.enable" is set to "on".

ip.dhcp.cid_value

type: getvar; setvar
setvar choices: Any text string up to 20 characters in length
Default : If "ip.dhcp.cid_type" is "0" - the default is
the printer's friendly name (see parameter
"device.friendly_name")
If "ip.dhcp.cid_type" is "1" - the default is the printer's MAC address
getvar example: ! U1 getvar "ip.dhcp.cid_value"
setvar example: ! U1 setvar "ip.dhcp.cid_value" "PRT001"

This parameter defines the unique value to be used as the client identifier (option 61) if DHCP is enabled and "ip.dhcp.cid_type" is "1".

NOTE: This parameter is only applicable if "ip.dhcp.enable" is set to "on".

ip.ftp.enable

type: getvar; setvar
setvar choices : "on", "off"
Default   "on"
getvar example: ! U1 getvar "ip.ftp.enable"
setvar example: ! U1 setvar "ip.ftp.enable" "off"
This parameter refers to the FTP protocol setting.

ip.gateway

type: getvar; setvar
setvar choices: Any valid gateway address.
Default: "0.0.0.0"
getvar example: ! U1 getvar "ip.gateway"
setvar example: ! U1 setvar "ip.gateway" "38.10.4.1"
This parameter refers to the gateway address. This value is ignored if DHCP is enabled.

ip.http.enable

type: getvar; setvar
setvar choices: "on", "off"
Default: "on"
getvar example: ! U1 getvar "ip.http.enable"
setvar example: ! U1 setvar "ip.http.enable" "on"
This parameter refers to the HTTP protocol / web sever setting.

ip.lpd.enable

type: getvar; setvar
setvar choices:: "on", "off"
Default: "on"
getvar example: ! U1 getvar "ip.lpd.enable"
setvar example: ! U1 setvar "ip.lpd.enable" "on"

continued

This parameter refers to the LPD protocol setting. LPD communications from the host should be directed to port 515.

ip.netmask

type: getvar; setvar
setvar choices : Any valid netmask.
Default : "255.255.255.0"
getvar example: ! U1 getvar "ip.netmask"
setvar example: ! U1 setvar "ip.netmask" "255.255.0.0"
This parameter refers to the subnet mask address. This value is ignored if DHCP is enabled.

ip.ping_remote

type: do
do parameters: ip address; number of times to ping
do example: ! U1 do "ip.ping_remote "10"
This parameter directs the printer to ping a specified address "x" number of times. The address to be pinged is set by setvar **ip.remote**.

wlan.international

type: getvar ,setvar
setvar choices: "on", "off"
default: "on" for 802.11 FH radios; "off" for 802.11b radios
getvar example: ! U1 getvar "wlan.international_mode"
sevar example: ! U1 setvar "wlan.international_mode" "on"
Setting this parameter "on" allows a printer to operate in wireless networks with settings different from standard US/Canada wireless network settings. Setting this parameter "off" instructs the printer to operate according to US/Canada wireless network standards. Two radio cards are currently supported: Symbol Spectrum24 802.11b and Symbol Spectrum24 802.11 Frequency Hopping (FH).

NOTE: This parameter must be set according to the wireless network infrastructure used. Setting this parameter to "on" for an 802.11b card in a network without active wireless access points with non US/Canada settings stops the printer from communicat-

ing via its 802.11b card. Setting this parameter to "on" for 802.11 FH radios causes the printer to take an additional 4 seconds to initiate the 802.11 FH card.

A Virtual **P**rivate **N**etwork (VPN) allows users in remote locations to "log in" securely onto a network and use it as though they were logged-in locally. The use of VPN ensures privacy, integrity and authentication of the customer's wireless local area network and wireless wide area communications.

The QL series of Zebra Mobile printers support VPN . Currently the printers support Symbol's **AirBEAMSafe** VPN and VPN based on IPSEC standards .

VPN SETTINGS USING LABEL VISTA

You can enable VPN in Zebra Mobile printers with the Label Vista application as follows:

Connect your printer via serial cable BL11757-000 or BL16555-1 to your PC. Open the "Label Vista" application and go to "Printer" on the top bar menu. Then click on the VPN tab and you will find the list of parameters that need to be configured in the printer for use on the VPN .
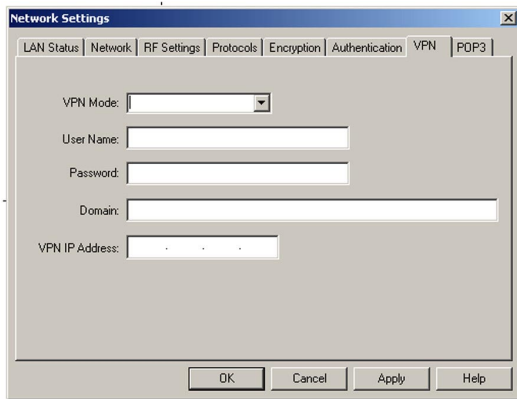
VPN MODE.

This parameter activates the VPN function and allows you to select the type of VPN server you are connecting to. At present the only type of VPN server supported is "AirBEAM safe" from Symbol.

USER NAME:

Obtains or changes the username that allows access to the VPN server.

PASSWORD:

Obtains or changes the password required to log-on to the VPN server.

DOMAIN:

Obtain or change the domain name of the VPN server you are connecting to.

VPN IP ADDRESS:

This is the virtual IP address of the printer that is assigned by the VPN server.

If you don't know the value of the above parameters, you should contact the Systems Administrator of your company to obtain the value of the parameters needed.

CPCL VPN Commands

You can also configure your printer for VPN using "get, set, do" parameters in the CPCL programming language:

ip.vpn.mode

type: getvar; setvar

getvar example: ! U1 getvar "ip.vpn.mode"

setvar example: ! U1 setvar "ip.vpn.mode" "AIRBEAM SAFE"

This parameter activates the VPN function allowing you to select the VPN server type At present the only VPN server type supported is "AirBEAM safe".

ip.vpn.username

type: getvar; setvar

getvar example: ! U1 getvar "ip.vpn.username"

setvar example: ! U1 setvar "ip.vpn.username" "Zebrauser"

Obtains or changes the username that allows access to the VPN server

ip.vpn.password

type; getvar; setvar

getvar example: ! U1 getvar "ip.vpn.password"

setvar example: ! U1 setvar "ip.vpn.password" "secret"

Obtains or changes the password required to log-on to the VPN server.

ip.vpn.domain

Type: getvar; setvar

getvar example: ! U1 getvar "ip.vpn.domain"

setvar example: ! U1 setvar "ip.vpn.domain" "domain2"

Obtains or changes the domain name of the VPN server you are connecting to.

ip.vpn.addr

type: getvar

getvar example: ! U1 getvar "ip.vpn.addr"

Obtains the virtual IP address of the printer that is assigned by the VPN server.

Using CPCL to Configure a Network Printer

Encore and Cameo series Zebra Mobile Printers with MOM radios are programmed by commands in the CPCL language. Label Vista acts as an interface between the user and the actual CPCL command structure, but it creates files using a sub-set of this language.. Users desiring more precise control of the printer's network configuration can use CPCL commands directly to set and read may network settings.

Cameo and Encore Network Printers

Cameo and Encore network printers utilize the LAN command to configure a printer for a wireless network. This command is structured as below:

Note: More detailed information on the CPCL language and the LAN command may be found in the Mobile Printer Programming Manual available on-line at Zebra's Web site:

(http://www.zebra.com/SS/manuals.htm)

LAN COMMAND

Syntax:

! U1 LAN *{ Operation } { Options }...{ Operation } { Options }*

The LAN command can be used to interrogate and configure the Wireless LAN (WLAN) card in a Zebra Cameo3 or Encore 3 Network Printer. The entire LAN command must be terminated by a CRLF pair (0x0D0x0A).

{Operation} is a required element. *{ Options }* is a variable element associated with the preceding Operation. Options can either set or retrieve information.

An error will be returned if an invalid operation is specified (see 'LAN Command Response' for error codes). Any desired number of Operations can be entered after the initial !U1 LAN command.

The possible Operations are:

IPADDR – This operation allows manual specification of the printer's TCP/IP address. (See the DHCP operation below) for a description of automatic address assignment.) The option accompanying this operation must be a valid TCP/IP address in the typical notation of a set of four decimal numbers between 0 and 255 separated by dots. (E.g., 100.150.200.150 is a valid address.) This value will most likely need to be assigned by the administrator of the network the printer will operate on. If an invalid address is specified, this operation has no effect other than to print an error message.

GATEWAY-IPADDR- This operation can be used to set the gateway IP address of the printer. The option accompanying this operation must be a valid TCP/IP address in the typical notation of a set of four decimal numbers between 0 and 255 separated by dots.

REMOTE-IPADDR- This operation can be used to set the remote IP address of the printer. (Available in printer application versions 30A and higher.)

The option accompanying this operation must be a valid TCP/IP address in the typical notation of a set of four decimal numbers between 0 and 255 separated by dots.

SUBMASK- This operation can be used to set the subset mask of the printer. (Available in printer application versions 30A and higher.)

The option accompanying this operation must be a valid TCP/IP address in the typical notation of a set of four decimal numbers between 0 and 255 separated by dots.

SSID- This operation allows the assignment of an RF SSID (Radio Frequency System Set ID). This ID allows several RF networks to operate independently in the same area without interference. The printer must have the same SSID as the RF Access Point to which it is supposed to link. The option for this operation may be any string up to 32 characters long.

MODE – This operation sets the operating mode of the printer. The two options are LPD and TCP.

• LPD is the standard printer protocol used by Unix and available for Windows NT.

• TCP affords the ability to allow bare sends using only the TCP protocol.

GET-STATUS – This operation causes the printer to report its current WLAN status. The two options are PRINT and REPLY. If PRINT is used, the status dump is printed. If REPLY is used, the status dump is sent out over the CABLE. The status report is of the following form:

```
LAN Status report:
ipAdr = nnn.nnn.nnn.nnn - a typical TCP/IP address.
userName = {the user name} - a descriptive username set in
```
the radio.
```
fwVersion = {LAN firmware version} - a descriptive firmware
```
version set in the radio.
```
swVersion = {LAN software version} - a descriptive software
```
version set in the radio.
```
MAC addr = hh:hh:hh:hh:hh:hh
associated = {link state} - YES (linked) or NO (not linked)
```

GET-CONFIG – This operation causes the printer to report its current WLAN configuration. The two options are PRINT and REPLY

• If PRINT is used, the configuration is printed.

• If REPLY is used, the configuration is sent out over the CABLE. The configuration report is of the following form, similar to the GET-STATUS report above:

```
LAN Config report:
ipAdr = nnn.nnn.nnn.nnn – a typical TCP/IP address.
powerMode = {power mode state} - SAVE or FULL
```
quiet = {quiet state} - YES or NO. YES means the radio only transmits normal data, NO means the radio transmits link status information on power up and status change.
```
protocol = {protocol selected}
essID = {SSID string}
DHCP = {DHCP state}
DHCP_SAVE = {DHCP_SAVE state}
```

SOFT_RESET – This operation resets the WLAN card. The SOFT_RESET operation should be tried first if re-setting the LAN card is desired, before using the RESET operation.

RESET – This operation performs a "hard" reset of the WLAN card.

DHCP – This operation allows for control over setting of the WLAN card's IP address. The options for this operation are enabled (ON) or disabled (OFF). If DHCP is enabled, the WLAN card will attempt to obtain an IP address from a DHCP server. If DHCP is disabled, the WLAN card will use the IP address programmed into its non-volatile storage.

Syntax: DHCP *{option}*

        Where *{option}* = ON or OFF

Example: ! U1 LAN DHCP ON

DHCP-SAVE – This operation controls the storage of addresses obtained by DHCP. If ON, a new address obtained from DHCP will be stored. If OFF, the new address will be used for this session only, leaving the previously stored address unchanged.

Syntax: DHCP-SAVE *{option}*

Where *{option} =* ON or OFF

Example: `! U1 LAN DHCP-SAVE ON`

DHCP-TIMEOUT – This operation allows for control of number of times the DHCP client will attempt to obtain an address from the DHCP server. The argument is the number of times the client will make a request before giving up. The client can be told to never give up by making the argument 0.

Syntax: DHCP-TIMEOUT {0 – 15}

Example: `! U1 LAN DHCP-TIMEOUT 5`

PORT – This operation allows for setting of the TCP port that the printer will listen on while in TCP mode.

LAN COMMAND: SETTING THE IP ADDRESS FOR NETWORK PRINTERS

1. Create the following document in a text editor such as Notepad, replacing "192.0.11.195" with your Network Printer's address, and "ZebraNet" with the SSID of your RF Access Point. It may be necessary to obtain this information from your network administrator:

```
! UTILITIES
LAN IPADDR 192.0.11.195 SSID ZebraNet MODE LPD
PRINT
```

Insure each line, including the last, is terminated with <CRLF>. Save the file in a convenient location.

2. Connect the printer to the serial port of a PC loaded with the Label Vista™ program as detailed in the section on installing and running Label Vista. Open Label Vista and select the "Diagnostic Send" utility under the Printer menu.

3. Use the "Browse" button to navigate to the file you created in step 1 and click on the "Send" button. The file will be sent to the printer, and the dialog box will indicate the download progress.
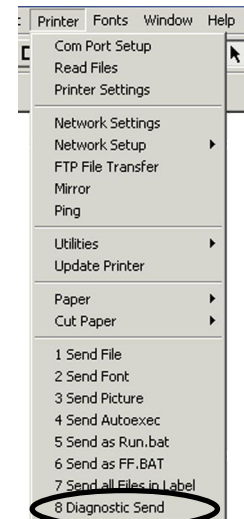
Once the IP address has been downloaded successfully, it will stay resident in the printer's memory until a new IP address is sent. The IP address can be verified by performing a "2 key reset" on the printer as detailed on page 8 of this manual

The printer will produce a line of interlocking "x" characters to insure all elements of the print head are working, and then print out a status report.

The resulting printout should include a Wireless Communications section. You should verify that the following

lines are included, with your IP address and SSID:

```
ipAdr = (your IP address)
associated = YES
protocol = LPD
essID = (Your SSID)
DHCP = OFF
```

If there is no Wireless Communications section or the parameter values do not match what is expected, please refer to the **Network Printer Troubleshooting** discussion following this section.

Details of this method of setting the IP address are covered earlier in this section in the discussions of the IPADDR, SSID and MODE operations.

LAN Command Response:

If an operation unsupported by the LAN command is given, the printer will generate the following message:

```
***Invalid LAN option {operation}
```

where {operation} is the invalid operation

If an operation with an option unsupported by the LAN command is given, the printer will print the following message:

```
Illegal{operation}option {option}
```

where {option} is the invalid option.

NETWORK PRINTER TROUBLESHOOTING

If the printer does not behave as described in this section, please take the following diagnostic steps:

1. Perform a 2 key reset on the printer. Refer opposite for an annotated sample of a status report.

2. Under the status report's Program heading, the software should have a label similar to HTLANxxx. If not, the LAN application is not loaded on this printer and LAN operation is not supported. Call Zebra tech support.

3. Under the RF LAN INFORMATION section, if you see: "Could not get WLAN status" or "Could not get WLAN config" the internal radio is not responding. If you repeat step 1 with the same result, call Zebra tech support.

```
Zebra Encore3 V79/00 11/29/00
Serial Number:

XXEC00-10-0042 ●                          Unit Serial
Program:                                  Number
  Firmware:HTE27915    /18
     Chksum:116B                          Application:
  Software:HTLAN28M ●                     Network
     Chksum:A7EB                          Printers will
  Ver:L4.R79.15.U126.B15.T19.A00          have "HTLAN
Cable Communications:                     "prefix.
  19200 BPS, N,8,1
  Handshake:Xon-Xoff/hardware
Wireless Communications:

RF LAN INFORMATION:
  Release: 3.23
  Date:    11/21/2000
  ipAdr = 10.14.2.204 ●                   I.P Address
  fwVersion = S4.40 000720                Radio Software
  swVersion = Version 4.40 ●              Version
  MAC addr = 00:a0:f8:8e:35:05
  associated = YES ●                      Unit is associ-
  Device ID = XXEC00-10-0042              ated with LAN :
  subnet = 255.255.255.0                  Yes/No
  protocol = LPD
  powermode = SAVE
  essID = ZebraNet ●                      SSID Address
  DHCP = OFF
  DHCP_SAVE = OFF


  10.14.2.204 ●                           I.P Address
```

4. Under the RF LAN INFORMATION section, verify that the SSID and IP address are set to the values you expect as described in the Printer Setup section above. If not, repeat the printer setup. If the information is still not correct, call Zebra tech support.

5. Verify that the printer is associating with the RF Access Point. Bring the printer as close as you can to the RF Access Point you are using and do a 2 key reset. Check that the value for the associated parameter under RF LAN INFORMATION is YES. If not, call Zebra tech support .

6. If you do not get a label when you try printing, verify that the printer is on.

Once a printer is part of a network, it can be configured using "**http**" or **"Telnet"** protocols. The printer must have the appropriate files installed to allow use of http and it must have a "web page" file in its memory. This html file can be created using html protocol and formatting with any text editor and downloaded to the printer. Zebra also supplies a sample printer web page (*sample.html*) shown opposite, which can be used as a template.

Setting Configuration Protocols With Label Vista

Label Vista has the capability of selecting either http or Telnet protocols in the /Printer/Network settings window. Click on the "Protocols" tab and select the "HTTP" check box to set your printer for that protocol.

In a similar manner, select the "TELNET" check box to configure the printer via telnet. Note that there is no need for an .html "Web page" file to be present in the printer to allow use of the Telnet protocol.

Configuring With A Web Browser Via http

If your printer is on a network and has a web page loaded into memory, you can view and change its configuration using a web browser such as Netscape™ or Internet Explorer™. Type in the printer's IP address to view its web page. Changes to the printer's configuration can be made via the menus that have been built into the printer's web page.

The web page can utilize the full set of "get, set, do" commands that are detailed in Section 14 of the CPCL Programmers Manual, so a completely customized web page can be constructed, allowing you to view and configure virtually any of the printer's operating parameters. The example to the right is how the default web page appears on a browser.

Zebra Sample Web Page

This is an example of querying and setting the printer's values via a web page. For further information, please refer to the programmer's manual.

The baud rate is: 38400

The ESSID is: ZEBRA_MKTG

(Undo Change:) (Save Changes)

Default web page: sample.html

The Default Web Page

The html file that follows (sample.html) defines the default web page supplied by Zebra which is shown above. It can be used as a template to create more elaborate web pages. Note that "get, set, do" parameters described in the CPCL Programmer's Manual, Section 14 are utilized within the .html code to allow configuration of specific parameters.

```
<!– ** THIS FILE DOES CONTAINS REALTIME DATA ** –>
<HTML>
<HEAD>
<TITLE>Zebra</TITLE>
</HEAD>
<BODY>

<center><h1>Zebra Sample Web Page</h1><br>
</center>

This is an example of querying and setting the
printer's values via a web page.<BR>
```

For further information, please refer to the programmer's manual.<P>

```html
<FORM ACTION="setvars.cgi" METHOD="POST">

The baud rate is: <INPUT SIZE=6 MAXLENGTH=6
NAME="comm.baud" VALUE="<!--#exec cgi="/getvar.cgi
comm.baud"-->"><br>
The ESSID is: <INPUT SIZE=20 MAXLENGTH=20
NAME="wlan.essid" VALUE="<!--#exec cgi="/getvar.cgi
wlan.essid"-->"><br>
<BR>
<INPUT TYPE="reset" VALUE="Undo Changes"><INPUT
TYPE="submit" VALUE="Save Changes"> <P>
</FORM>

</BODY>
</HTML>
```