

VocalTec Communications Ltd.

VocalTec Gateway 8

Installation and Administration Guide

release 1.5

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VGW Installation and Administration Guide, 2nd Edition — September 2001.

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Publication number: VTMN790115F2

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Preface

This section describes the organization of the VocalTec Gateway 8 Installation and Administration Guide and indicates where to find information contained in other related documentation of the VocalTec architecture.

Organization of this Manual

This manual is divided into the following chapters:

Chapter	Title	Description
Chapter 1	System Description	Provides an overview of the VocalTec Gateway 8, features and applications.
Chapter 2	Installation	Describes in detail the process of installing and setting up the VocalTec Gateway software components.
Chapter 3	Troubleshooting	Provides solutions to common problems.
Appendix 1	IVR System	Describes the Interactive Voice Response (IVR) system.
Appendix 2	Configuring Analog Tones	Describes how to edit Analog tone configurations and analyze call progress tones.
Appendix 3	Configuring Gateway Registry Parameters	Describes how to configure the gateway pqparams.reg file, via Telnet.
	Glossary	Explains key concepts, acronyms and abbreviations used in the manual.
	Index	List of key words for finding important topics.

VocalTec Architecture Related Documentation

Name	Description
VocalTec Architecture System Guide	Contains an introduction to the VocalTec architecture system and components, a network planning chapter on how to prepare your network for IP telephony, an installation chapter and a general troubleshooting chapter.
VocalTec Network Manager (VNM) Administrator's Guide	Provides a full description of the VNM workstation, used for remote monitoring and control of the VocalTec architecture elements.
VocalTec Gatekeeper (VGK) Administrator's Guide	Provides a full description of the VGK server, used for addressing and routing of gateways and system security, collection of statistics and CDR generation and as the interface to third party billing systems.
VocalTec Provisioning Utility Guide	Provides a full description of the VocalTec Provisioning Utility used for batch mode operations that add multiple subscribers, gateway and dialing plan entries to the gatekeeper database.

Chapter 1

System Description

This chapter provides an overview of the VocalTec Gateway 8 features and system specifications.

Product Overview

VocalTec Gateway 8 (VGW 8) provides a bridge between packet networks (Internet/Intranet) and the Public Switched Telephone Network. VGW 8 provides up to 8 analog telephony interfaces for connection to either an enterprise PBX or to telephones and fax machines. VGW 8 has a 10 Base-T Ethernet port for connection to the IP Network, and provides excellent voice quality and optimized packet voice streaming over IP networks.

The VGW 8 enables users to make local or international telephone and FAX calls, using existing telephony devices. These calls are routed by the VGW 8 Analog gateway between the company's branch offices over existing corporate IP data networks. The VGW 8 offers a wide range of compression levels, enabling low bandwidth consumption and first-grade voice quality.

The gateway is one of the critical components of the VocalTec architecture, an open, standards-based software platform that forms the foundation for IP communications solutions from VocalTec.

VGW 8 provides commercial phone-to-phone, fax-to-fax and PC-to-phone services. Global carriers and residential service providers can use VGW 8 to provide an extremely cost-competitive long distance service.

VGW 8 has advanced audio capabilities to enable high quality, full-duplex voice over the IP network in real-time. State-of-the-art technologies implemented by VocalTec Gateway, including G.711, G.723 and G.729 high quality codecs, G.165 echo cancellation and lost packets reconstruction, make the IP network an efficient medium for long-distance voice communications. Improved latency techniques provide voice conversation in real-time.

LED's on the front and back panels provide line activity information and network status.

The product is fully compliant with the ITU-T H.323 V2 standard. It implements version 2 of RAS, the protocol within H.323 for end-point to gatekeeper communications.

Key Features

- Flexible capacity - up to 4 or 8 analog ports
- H.323-based
- Compact, rugged, 1U height
- Embedded IVR features
- Interoperable with all VocalTec Gateways

Gateway Configurations

The gateway can be ordered in one of the following configurations:

- **Line Number** - 4 or 8 Analog lines
- **FXO** - Foreign Exchange Office interface. Allows a connection to be directed at the PSTN's Central Office, or to a standard PBX interface
- **FXS** - Foreign Exchange Station interface. Allows connection for basic telephone equipment, keysets and external PBX lines (supplies ring back tone, dial tone, disconnect tone and voltage for analog phone operation)
- **AC** - External power supply

Physical Description

Front Panel LED Indicators

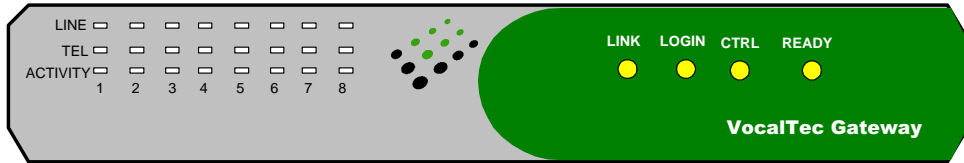


Figure 1-1. Front Panel LED Indicators

Label	Type	Color	State	Description
LINK	Ethernet Link	Green	ON	Gateway is connected to the Ethernet
LOGIN	Gatekeeper Link Status	Green	ON	Valid connection to Gatekeeper
		Red	OFF	No connection to Gatekeeper
CTRL	Service Control Link	Green	ON	Gateway is in service
		Red	OFF	Gateway is out of service
READY	Device Status	Green	ON	Device powered and OK
		Orange	ON	Software loading/initializing
		Red	ON	Failure
8 Channels (Numbered 1 to 8)				
Line	Line Status	Yellow	ON	Operational FXO port
Tel	Tel Status	Yellow	ON	Operational FXS port
Activity	Tel Port	Green	ON	Off-hook/ringing for phone port
	Line Port	Green	ON	Line-seize/ringing state for line port

Main Features

The following sections outline the gateway's main features.

Multiple Services

VGW 8 supports multiple services, including:

- **International and long distance calling** – supports phone-to-phone and fax-to-fax calling over single or multiple domains (interdomain)
- **Voice VPN** – enables seamless and transparent office-to-office calling over an IP-based Voice VPN (Virtual Private Network)
- **Calling card** – supports a subscriber-based calling card service for small POPs
- **Voice over PC** – supports PC-to-phone and Web-to-phone calling

The gateway processes real-time voice and fax traffic and delivers it (using the VocalTec architecture) to the points of presence established in key service areas.

Real-time Audio Communications

The following are some of the features that enable VocalTec Gateway to provide high quality voice conversations.

- Echo cancellation (G.165)
- Silence detection (on G.723.1)
- Local comfort noise generation on silence (on G723.1)
- Dynamic audio delay handling at less than 200ms over LAN
- Lost packets reconstruction
- High quality coders - G723 and G.729
- Support for high bandwidth G.711 coder
- DTMF erasing and reconstructing (both inband and outband)

Fax Capabilities

Customers can route both voice and fax over the IP network without having to purchase separate voice and fax interfaces. Existing phone lines can be used as universal ports for both voice and fax traffic, to allow optimal utilization of phone resources.

The VGW 8 supports Group 3 fax relay at 14,400 bps with auto-fallback.

Advanced DSP Technology

VGW 8 provides advanced codec voice compression, a technique that ensures toll quality voice on voice channels.

ITU-T Standards Compliance

VGW 8 is fully compliant with ITU-T H.323 V2 standard, providing a flexible, standards-based platform that can interoperate with other H.323 system components.

Management

Network administrators can manage and monitor IP communications network elements, including the gateways in the network through VocalTec Network Manager (VNM).

Centralized collection of event/alert logs on VNM provides a means of monitoring the network. The interval and size of log files generated and the saving location can be configured.

For more information refer to the *VocalTec Network Manager Administrator's Guide*.

NOTE The VNM workstation can be installed either at your site or at the Service Provider site. Check with your service provider for details.

Stability

The VocalTec Gateway software provides various features to ensure stability of operation. This includes a software module, capable of automatically detecting faults in system operation.

IVR System

The gateway comes with a front-end Interactive Voice Response (IVR) system. Callers are greeted with voice prompts, making the calling process via the gateway network easy and user-friendly. IVR features include:

- **Multiple voice files** – supports up multiple voice files for IVR scenarios. You can play multiple voice files for any given IVR response.
- **Request account balance** – users can request playback of their current account balance before commencing the call. Playback is according to the language choice of the caller.
- **Remaining call time** - the system plays real-time messages on current call time remaining in numbers/hours.
- **Account about to expire** - the system plays a warning just before the account is about to expire, for prepaid calling card users.
- **Change password** – users have the ability to change their password, using the IVR prompts.
- **Multiple language support** – the IVR system provides support for real-time IVR prompts in alternative languages, including balance announcements and call duration. Only two languages can be concurrently installed on the gateway.

For more information on IVR modes, refer to the *Appendix 1, IVR System*.

Separate Authorization

During call setup, call authorization can be broken into two stages:

1. The gateway first sends the user credentials to the gatekeeper for authorization.
2. The gateway waits for authorization from the gatekeeper before sending the destination phone number to the gatekeeper for resolving the call.

NOTE You can configure the system to work using a single authorization stage for both the user credentials and phone number.

Multiple Language Support

A full range of languages is supported. This may be one of two levels:

- **Basic support** – includes the ability to play files without the ability to play dynamic numbers.
- **Advanced support** – includes basic support plus the ability to play dynamic numbers such as duration and currency in the target language.

VocalTec's advanced language support includes English, Chinese, French, Korean, Japanese, German, Russian, Portuguese and other languages.

NOTE Up to two languages can be pre-installed on the gateway.

Billing

All Call Detail Records (CDRs) are collected by VocalTec Gatekeeper, which provides a centralized point for accounting and call management.

Standards Support and Interoperability

H.323 V2 Support

VGW 4/8 supports H.323 - H.225 V2.

FastStart Support

Fast connect as defined in H.323 - H.225 V2 is supported. H.323 with Fast connect is the default selection.

Interoperability

VGW 8 is fully interoperable with VocalTec Gateways 120, 480 and 2000.

Gatekeeper IP

When the gateway succeeds in logging in to the gatekeeper, it sends the Gatekeeper IP to VNM. VNM can also query the Gatekeeper IP. This information is displayed next to the gatekeeper.

System Specifications

Item	Description
Standards Compliance	H.323 V2 T.38 (1)
Hardware	CPU: 66Mhz, MPC860 Memory: 16 MB RAM 4 MB Flash NIC: 10 Base-T
Dimensions	220 x 44 x 280 mm (WxHxD) 9 x 1.75 x 11 inch (WxHxD)
Power	90-260VAC / 47-63Hz External DC Power supply 5v \pm 12v / 30W
Operating Environment	Operational: 5 to 40°C Storage: -10 to 70°C Humidity: 10 to 90% non-condensing
Interfaces	Telephone interface: 2, 4 or 8 telephone or line RJ11 ports Network interface: 10 Base-T, RJ45 Terminal port: RS 232 DB9 DCE 9600 Baud Rate
Indicators	LINK - Ethernet connection: on/off LOGIN - Gatekeeper login: on/off CTRL - Control status - in service/ out of service READY - Gateway status: ready/loading/failure Channel Status and Activity LED's
Voice, Fax.	Voice over IP: H.323 (RTP, RTCP, H.225, H.235, H.245) Voice compression: G.711 , G.723.1, G.729A Silence suppression: G.723 Annex A; G.729 Annex B Echo canceller: G.165, 25 ms Fax over IP: Group 3 fax relay up to 14.4 kbps with auto-fallback; T.38 compliant (1), tolerant to network delay up to 10 seconds (round trip) Gain control: Programmable

Item	Description
Signaling and Control	Signaling: FXS, FXO In-Band Signaling: DTMF (TIA 464A); user-defined tones and call progress tones
Regulatory Compliance	Telecommunication standards: FCC part 68 CE (CTR 21)
Certifications	Europe EMC: EN55022 1994 - Radiated and conducted emission EN55082-1998 - Generic Immunity standard SAFETY: EN60950 - Safety for ITE USA & Canada EMC: FCC part 15 - Radiated and conducted emission ICES-003 - Radiated and conducted emission SAFETY: UL1950 - Safety for ITE Australia EMC: AS/NZ3548 - Radiated and conducted emission SAFETY: TS-001 - Safety for ITE
Software	Embedded VocalTec Gateway software Embedded operating system

Ordering Information

- Line number: 4/8
- FXO - Foreign Exchange Office interface
- FXS - Foreign Exchange Station interface
- AC - for 100-220 VAC
- DC - for -48 VCD ⁽¹⁾

(1) Supported in future versions.

VocalTec Architecture Overview

The VocalTec architecture is a third generation architecture capable of sustaining large-scale deployment of IP communications in the enterprise and carrier-class environments. Figure 1-2 illustrates the basic components of the VocalTec architecture.

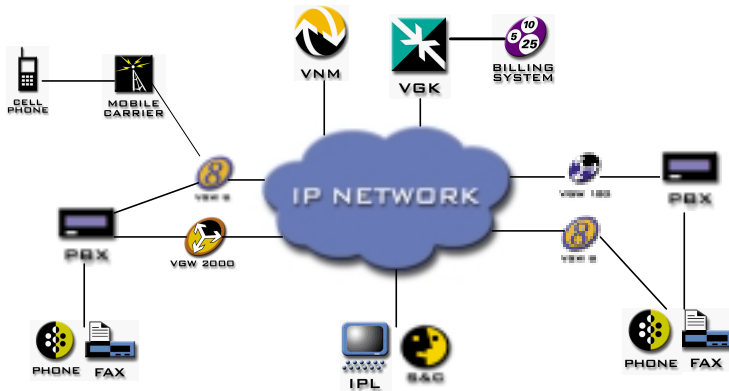


Figure 1-2. Basic VocalTec Architecture

The VocalTec architecture is a scalable and modular platform. It can support millions of subscribers and an unlimited number of endpoints. Its inherent flexibility supports configurations for a wide range of applications.

It is a highly reliable system, with no single point of failure. Security features include authentication, authorization and token-based access to services. Fail-over mechanism and information backup provide further security enhancement.

VocalTec Gatekeeper (VGK) provides flexible, rule-based dialing plan management to ensure full control over the routing of calls to all VocalTec gateways. Routing of calls to gateways can be configured according to parameters such as permissions, restrictions and hours of service.

The open architecture is capable of running on industry-standard hardware and software. It interfaces with third party systems (e.g., billing systems) using a variety of APIs. Centralized management of network elements can be implemented using VocalTec Network Manager (VNM).

The VocalTec architecture was designed with compatible implementation of the latest industry standards. This includes H.323 V2, conformance to the Voice over IP Implementation Agreement 1.0 and the emerging ETSI-TIPHON specification.

Voice Virtual Private Networks

Voice Over IP (VOIP) Virtual Private Network (VPN) is a service that provides subscribers with a "virtual" private VOIP network that exists on the public infrastructure (the PSTN). All subscribers who share the same VPN can call each other seamlessly (either while on the private network or from off the network) as though they were talking on a totally private network.

VPN call modes include the following:

- **VPN on-to-on** - calls originated within the VPN and terminated within the VPN (extension to PBX).
- **VPN on-to-off** - calls originated within the VPN and terminated through the PSTN (extension to prefix).
- **VPN off-to-on** - calls originated from the PSTN and terminated through the PSTN; however the service provider routes the call through the VPN.
- **VPN off-to-off** - calls originated from the PSTN and terminated through the PSTN

Figure 1-4 illustrates three separate company VPNs, connected to a single carrier Network Operation Center (NOC). The VocalTec Gatekeeper supports multiple

VPN dialing plan configurations.

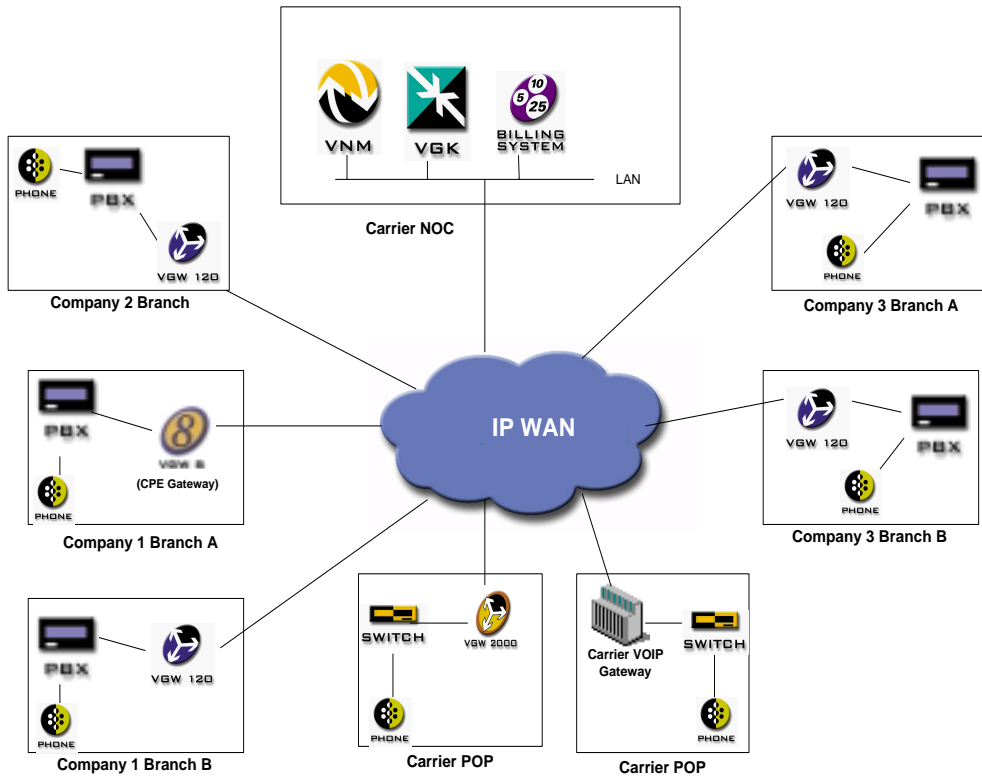


Figure 1-4. Voice Virtual Private Network Configuration

Chapter 2

Installation and Configuration

This chapter guides you through the process of installing and configuring the VocalTec Gateway 8.

Installation

VGW 8 can be equipped with up to 8 channels (VGW 4 has up to 4 channels). The type of connection per gateway box can be either FXO or FXS.

The number of installed channels and their type can be determined by viewing the Line and Telephone LEDs on the VGW 8 front panel.

Gateway Configurations

The following diagram illustrates the possible gateway connections.

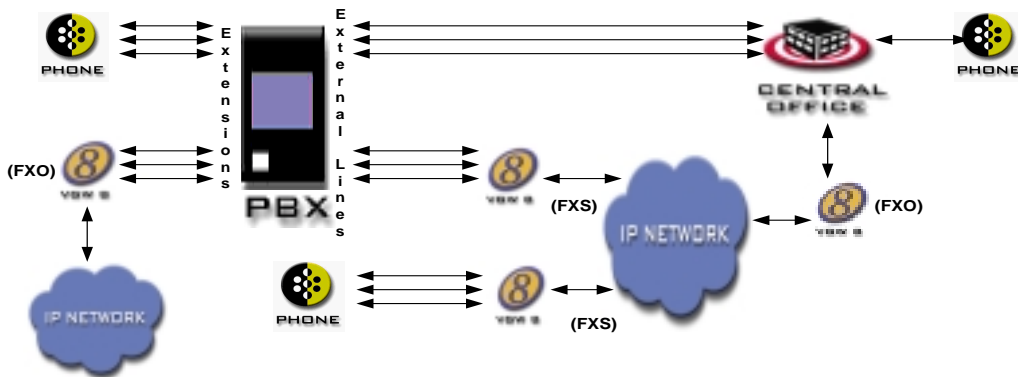


Figure 2-1. Gateway 8 Connection Options

Required Tools and Utilities

- Serial RS232 Cable (9-pin D-type connector)
- HyperTerminal
- FTP Server
- VocalTec software version 1.5F.2 CD-ROM
- SNTP Server

System Installation Steps

In a typical configuration, the gateway is installed as a component of the VocalTec architecture. The gateway installation must therefore be made in the correct sequence. The installation sequence is described in the *VocalTec Architecture System Guide*.

When setting up the network to work with VGW 8, follow these additional installation steps:

1. Install the SNTP Server.
2. Install and configure the FTP Server.
3. On each VGW 8:
 - Connect the gateway to the power supply and network.
 - Start the gateway and configure the gateway's IP (using the serial port connection).
 - Configure and download PQParams.
 - Configure and download the IVR (optional).

Installing the SNTP Server

To ensure optimum synchronization between the gateway and gatekeeper, it is recommended to install the SNTP server on the same machine as VocalTec Gatekeeper. The SNTP server setup files are located on the VocalTec System Installation CD.

Installing and Configuring the FTP Server

The FTP server is used to download configuration files to the gateway. VocalTec recommends that you download and use the Server-U FTP server (available at: <http://www.cat-soft.com>). We recommend that you install the server on the same machine that VocalTec Network Manager is installed on. This will enable you to conduct all gateway management from a single platform.

To install the FTP server:

1. Download the **serverUsetup.exe** file.
2. Double-click on the setup file. The installation wizard appears. Follow the online installation instructions.

To configure the FTP server:

1. Open the FTP server (from the System Tray, right-click the FTP server icon and select **Show Window**).
2. From the **Setup** menu, select **Users**.
3. In the *User name* and *Password* fields, enter the value *vx*.
4. In the *Home directory* field, click **Browse** and enter the path to C:\gw8
5. Click **Add**. In the Path Name box Path field, write c:\gw8
6. Mark all the required check boxes to apply directory and file access rules and click **OK**.

Connecting the Gateway Cables

This section contains a description of the steps that need to be taken to connect the VGW 8.

Refer to Figure 2-2 below.

Power Supply Connection

1. Connect the power supply unit to an available power supply socket.
2. Connect the external power supply unit to the power socket, marked POWER on the gateway and observe the front panel LEDs.

Ethernet Cable Connection

1. Attach the 10Base-T cable to the ETH RJ-45 connector, marked ETH on the gateway.
2. Connect the 10Base-T cable to your LAN.

Line Connection

1. Connect the RJ-11 connectors to the available lines on the gateway (1-4 for VGW 4 or 1-8 for VGW 8).
 2. For FXO gateways, connect the other end of the AWG line cord directly to the PBX extensions or Central Office (CO).
For FXS gateways, connect the other end of the AWG line cord directly to a telephone or external PBX lines.
- Up to 200m (660 feet) of 24 AWG line cord can be used to connect telephones or PBX extensions.

DIP-switches

NOTE Do not change the current dip-switch positions (leave them down).

Serial Port Connection

1. Connect the serial cable to the RS-232 on the gateway. See *Serial Port Pin Layout*, on page 21.
2. Connect the other end of the serial cable to the computer you are going to use to configure the gateway.

Gateway Back Panel Connections

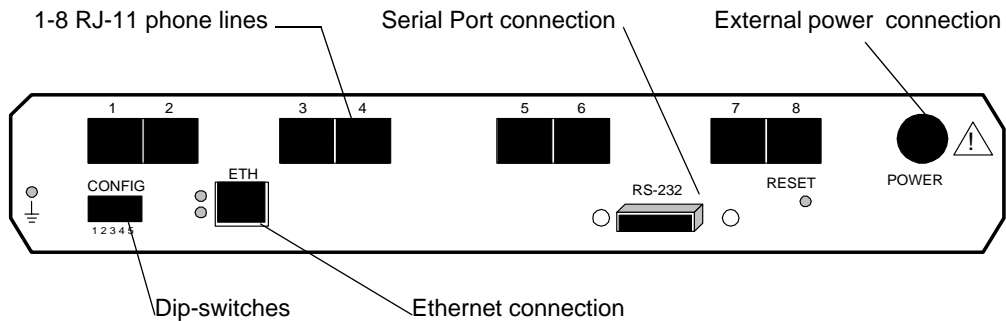


Figure 2-2. Gateway Back Panel

Notes

- The Reset button is not in use.
- Do not change the default dip-switch settings.
- Connect the power socket directly to the external power supply unit.
- Ethernet LEDs: *Red* indicates no Ethernet connection. *Green* indicates an Ethernet connection.

Serial Cable Pin Layout

PIN	Abbreviation	Function
1	DCD	Data Carrier Detect
2	RD	Receive Data
3	TD	Transmit Data
4	DTR	Data Terminal Ready
5	SG	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	Ring	Ring Indicator

Only 3 wires are actually in use: pins 2, 3 and 5.

9-pin D-type male to 9-pin D-type female straight serial RS-232 cable.

LED Display

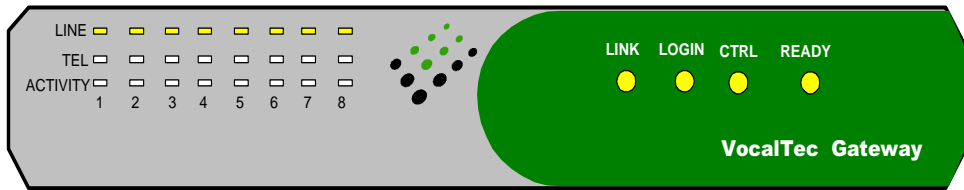


Figure 2-3. Active LED Indicators

In the above example, the "Tel" LEDs of channels 1-8 are ON, indicating that your Gateway is equipped with 8 telephone (FXS) channels.

The functionality of the Activity LEDs on the VGW 8 front panel is as follows:

- For telephone channels, the LED indicates that the telephone connected to the VGW 8 rear RJ-11 connector is either ringing or is in the Off Hook position.
- For Line channels, the LED indicates that a ringing signal has been received or the VGW 8 has seized the line, answering the incoming call or initiating an outgoing call.

First-time Gateway Configuration

1. To view the boot process on a PC monitor, connect a serial cable to the gateway and open the serial port (COM1/2), with an application such as Hyperterminal. Select the following values: Bits per second: **9600** ; Data bits: **8** ; Parity: **None** ; Stop bits: **1** ; Flow control: **None**.
2. Connect the gateway to the power supply and turn on the gateway. The gateway files are uploaded from the existing flash memory and you can view the parameters on the Hyperterminal screen:

```

VxWorks System Boot
Copyright 1984-1996 Wind River Systems, Inc.

CPU: VGW8 BSP
Version: 5.3.1
BSP version: 1.1/0
Creation date: Jan  8 2001, 16:39:50
Press any key to stop auto-boot...
7
[VxWorks Boot]:
```

3. To stop the automatic flash memory upload, press any key on the keyboard before the countdown is completed. The VxWorks prompt appears:

[VxWorks Boot]:

4. The following commands are available:

Command	Action
@	To continue loading the software from the FTP directory e.g, [VxWorks Boot] @
b	To load the software from the flash memory. e.g, [VxWorks Boot] b

Command	Action
p	To print to the screen (read-only view). e.g., [VxWorks Boot] p
C	To change any of the default boot parameters. See <i>First-time Gateway Configuration</i> below. e.g., [VxWorks Boot] c
.	To clear a field (when in configuration mode).
-	To go to the previous field
CTL + D	To quit the configuration mode.

5. Enter the “C” command at the VxWorks prompt. Change the default configuration parameters. During first-time configuration, the most important parameters that need to be configured are the gateway IP (**inet on ethernet**), the default gateway IP (**gateway inet**) and the submask. These parameters enable the gateway to connect to the network.

The following table lists the boot parameters that can be changed from the default settings:

Parameter	Description
boot device	Type of Ethernet device. Do not change the default value (cpm).
processor number	CPU number. Zero (0) is the default. Do not change the default value.
host name	Do not change the default value (host).
file name	Path and name of the file on the FTP server that is loaded onto the gateway (e.g., VGW8\vxworks). Change this value if the path on the FTP server is different.

Parameter	Description
inet on ethernet (e)	IP address of the gateway unit. If required you can add the subnet mask after the colon in hexadecimal format. For example: 172.16.2.2:ffff0000.
inet on backplane (b)	N/A
host inet (h)	IP address of the FTP server. Preferably, the FTP server should be installed on the same computer as VocalTec Network Manager.
gateway inet (g)	IP address of the default gateway on the LAN (note: do not confuse this with the IP address of the VGW 8, defined in the <i>inet on ethernet</i> (e) field).
user (u)	User name used to access the FTP server (use the default “VX”).
ftp password (pw)	FTP password required by the gateway to access the FTP server (use the default “VX”).
flags (f)	Do not change the default value (0x0).
target name (tn)	Do not change the default value (VGW 8).
startup script (s)	N/A
other (o)	N/A

NOTE To change any of the parameters, you do not need to delete the current information - just add the updated information on the same line and on the next reboot the new information will be updated.

6. Disconnect the serial port connection.

Example

Displayed below is an example of the VxWorks operating system configuration:

```
VxWorks System Boot
Copyright 1984-1996 Wind River Systems, Inc.

CPU: VGW8 BSP
Version: 5.3.1
BSP version: 1.1/0
Creation date: Jan 8 2001, 16:39:50
Press any key to stop auto-boot...

[VxWorks Boot]: c
'.' = clear field; '-' = go to previous field; ^D
= quit

boot device           : cpm
processor number      : 0
host name             : host
file name             : \vgw8\vxworks
inet on ethernet (e) : 172.16.2.19:ffff0000
inet on backplane (b):
host inet (h)         : 194.90.71.38
gateway inet (g)      : 172.16.0.1
user (u)              : vx
ftp password (pw) (blank = use rsh): vx
flags (f)             : 0x0
target name (tn)      : vgw8
startup script (s)    :
other (o)             :
```

Configuring the pqparams.reg File

For first-time gateway configuration, some parameters can only be configured using the pqparams registry file.

NOTE Most of the parameters contained in this registry file can be configured afterwards using VocalTec Network Manager. For more information, refer to the *VocalTec Network Manager Administrator's Guide*.

To edit the pqparams file:

1. In the *c:* directory, right-click the *pqparams.reg* file and open it with Notepad or any text editor.
2. Make the required changes and save the *pqparams.reg* file.

For a description of the gateway parameters in the *pqparams.reg* file, refer to *Appendix 3, Configuring Gateway Registry Parameters*.

Configuring Parameters for Connecting to VocalTec Gatekeeper

For the gateway to be able to connect to the gatekeeper, the correct gatekeeper alias or IP address of the gateway must be defined and the clock time of the gateway and gatekeeper must be synchronized.

To configure the connection to the gatekeeper:

1. Open the file *PQParams* (located on the FTP server) and change the following parameters (in the section *[Parameters\VNMGK]*):

Parameter	Description
Alias	The name of the gatekeeper, used by the DNS server to connect to the gatekeeper.
GK IP	The IP address of the gatekeeper, used to connect directly to the gatekeeper if no DNS server is available.

Parameter	Description
DNS IP	IP address of the DNS server used to connect to the gatekeeper.
OverrideGKDiscovery	Method used to connect the gatekeeper: 0 = false - connect to gatekeeper via DNS server 1 = true - connect to gatekeeper via IP address
ID	Name of the gateway, as it should appear on the VocalTec Network Manager (VNM).
Password	Gateway Administration security password, as it appears on VNM.
Domain ID	Name of the Gatekeeper's domain.
RCAM Password	Password of VNM.

2. Change the following parameters in the section *Parameters\vtg*:

Parameter	Description
SNTPServerIP	The IP address of the SNTP server.
GMTOffset	The time difference from General Mean Time (GMT) in hexadecimals (for times behind GMT, calculate the difference from the previous 24 hours. For example: 4 hours behind GMT equals 20 hours time difference (24-2=22)).

3. After saving changes to the file, download the new file to the gateway, as described in the next section.

Downloading pqparams to the Gateway

After configuring the pqparams registry file, you can download it to the gateway, as follows:

1. Telnet the Gateway using port 24.
2. Run the command: *lpqparams,<IP address of the FTP server>,c:\gw48*

Downloading Software Version Modules

VGW 8 includes a 4MB on-board flash memory already programmed with application software. The first time that the VGW 8 is powered on, the software is loaded to the flash memory. The Flash memory contains the following files:

- *VXWorks.zip* - the Operating System and gateway files
- *PQParams.reg* - the gateway registry parameters file
- *IVRMode1-17.reg* - the gateway IVR mode configuration files
- *IVRFiles.reg* - the gateway IVR file flags and their sizes
- *IVRFiles.723* - the voice files used for the IVR
- *Ring723.txt*, *Ring729.txt*, *Ring711.txt* - includes the Ring packets for the codec
- *Logger.reg* - includes an INI file that indicates the log level (for debug only)

If you need to change the gateway version or any of the files on the gateway, you can download them to the gateway, as described in the next section.

Downloading Gateway Files

From the installation CD-ROM, copy the following files to the FTP server's *c:* directory:

New software versions can be downloaded to VGW 8 via TELNET.

To download a software module:

1. Once the gateway software has started loading, connect via TELNET to the IP address of the Gateway unit, on Port 24.
2. At the prompt, enter one of the following commands, followed by the IP address of the FTP server from which the software is loaded:
 - *loadall* - loads all the files listed below in a single command:
 - *Lpqparams* - loads the gateway parameters
 - *Livrmode* - loads the IVR mode parameters
 - *Lver* - loads the VXWorks Operating System and gateway files

- *Livr* - loads the IVR files and IVR modes
- *Livrfiles* - loads the IVR files

For example:

`Lpccparams, <IP of FTP>, <path>`

3. The path parameter at the end of the command line is optional (default is C:\), and indicates the directory on the FTP server from which to download the files, if this is different from the default FTP server directory. All files should be in the directory specified.

For example: *lvr, 194.98.78, d:*

NOTE If FTP security exists, you need to define the user name and password. The default user name is “\X” and the default password is “\X”.

Connecting to a Firewall

When the Internet connection to the local gateway is via a Firewall, you must enable access in the Firewall to allow communication with the gateway. The ports are the standard H.323 ports. Perform the following configuration settings at the Firewall.

Open all Firewall TCP and UDP ports over 1024 for both input and output, for all IP addresses of remote gateways that are authorized to communicate with the local gateway.

In addition, perform the following operations.

H.323 Ports

Open the following Firewall ports for both input and output.

TCP	UDP
1720	1717, 1718, 1719

RTP Ports

Open the following Firewall ports for both input and output.

TCP	UDP
9123	4000-5000

Chapter 3

Troubleshooting

This chapter provides answers to gateway installation problems.

Solutions to Gateway Problems

For additional support information contact VocalTec Technical Support.

Startup Problems

Problem	Unable to load the vxworks file from its Flash memory (the message “Loading... starting at 0x10000...” appears)
Possible Causes	<ul style="list-style-type: none"> • The flash memory version is corrupt. • The flash memory version is old.
Solution	<p>Using the serial port, configure the VGW 8 as follows:</p> <ol style="list-style-type: none"> 1. Reboot the VGW 8. To stop the booting process, press any key when prompted. 2. Configure the <i>Host Inet</i>: add the IP of the FTP server you are using. 3. In the <i>File Name</i> field, enter “<i>vxworks</i>”. <p>On the FTP server:</p> <ol style="list-style-type: none"> 1. Go to path on the CD where vxworks is located and copy vxworks to your FTP home directory. 2. Use the “@” key to boot the device; this will indicate to the VGW 8 that it needs to load the vxworks from the FTP and not from its flash memory. <p>After rebooting is complete you should be able to start working by entering the “<i>loadall</i>” command (for loading a new version) at the telnet command prompt.</p>

Network Problems

Problem	There is no network connection (The LINK LED is off)
Possible Causes	Hardware problems: <ul style="list-style-type: none">• The cable connection is faulty.• The router is not working.• The hub is not working properly.
Solution	Check the hub connection.

Connection and Login Problems

Problem	The gateway cannot be accessed by VNM
Possible Causes	The connection information is incorrect or the Administration security password is invalid.
Solution	<ol style="list-style-type: none">1. Start the gateway.2. Verify the following gateway connection information:<ul style="list-style-type: none">• IP address• Admin port• Gateway administration security password

Problem	The gateway does not log in to the gatekeeper (LOGIN LED is orange)
Possible Causes	<ol style="list-style-type: none"> 1. The gatekeeper is not running. 2. There is a network problem between the gateway and gatekeeper. 3. One of the following may not be correctly defined: <ul style="list-style-type: none"> • Gateway name (ID) on the gatekeeper • Gatekeeper domain (alias) on the gateway • Gateway administrative password 4. There is a timing problem between the gateway and the gatekeeper.
Solution	<ol style="list-style-type: none"> 1. Check the following definitions are correct (in PQparams.reg): <ul style="list-style-type: none"> • Gateway Device ID • VGK Alias • Gateway's Administration Security Password • Gateway's DNS 2. PING the gatekeeper. Check the network connection. 3. Check the DNS configuration: ping by alias. 4. Check that the SNTP server is installed on the gatekeeper and that the IP address is correct (check that the serial ports timing is correct). If not, you can use the <i>settime</i> command with telnet: Command syntax: <i>settime,seconds,minutes,24hours,day,month,year</i> Month is calculated 0=jan, 1=feb, 2=march,,,,11=dec. Year is calculated from 1900 so you would have to type 101 for the year 2001.

NOTE It is strongly recommended to use the serial connection when you encounter log on problems. This allows you to check that the VGW 8 is configured correctly when it boots, that it receives the correct time from the SNTP and connects the VGK.

Problem	The client's attempts to send DTMF are not succeeding
Possible Causes	The client telephone works only with pulse and does not send tones.
Solution	<ul style="list-style-type: none">• Check that the user has dialed the digits correctly.• Change the telephone to one that supports tones.• Provide a mechanism to support transfer from pulse to tones.

Problem	Call setup fails after entering DTMF
Possible Causes	The line may be disabled.
Solution	Use VNM to disable any gateway lines that are not currently connected.

Problem	The line does not disconnect after the call ends (FXO)
Possible Causes	This occurs when the Analog tones have not been set correctly.
Solution	<ol style="list-style-type: none"> 1. Record the tone with a sound card and analyze it using Cool Edit (see <i>Appendix 2, Configuring Analog Tones</i>). 2. Open the Gateway Protocol page on VNM and enter the correct values in the <i>Disconnect 1</i> and <i>Disconnect 2</i> fields (see <i>Chapter 6</i> in the <i>VocalTec Network Manager Administrator's Guide</i>). 3. Reboot the gateway, from VNM.

Audio Problems

Problem	Poor audio quality
Possible Causes	The IP network line is overloaded.
Solution	Check the network for delay and packet loss (using a PING).

Appendix 1

IVR System

This appendix provides a brief description of the Interactive Voice Response (IVR) system provided by VocalTec Gateway 8.

The IVR System

VGW 8 provides a customized IVR system that guides callers through the dialing process. The system administrator can configure each gateway line to support one of 16 available dialing modes. The dialing modes can be a one- or two-step dialing process, depending on the user privileges to access the gateway. The section below provides information on the various IVR modes.

The IVR Modes

Using VocalTec Network Manager, the system administrator can remotely configure each line of the gateway to support one of the following IVR modes:

IVR Option	Description
<i>01-(p)Phone * (p)UserID#pw*</i>	The IVR prompts for the phone number and then prompts for the user's ID and password.
<i>02-(p)UserID#PW* (p)Phone*</i>	The IVR prompts for the user's ID and password and then prompts for the phone number.
<i>03-(p)Phone*UserID#pw*</i>	The IVR prompts for the phone number, user's ID and password.
<i>04-(p)Phone*- UserID, PW=guest</i>	The IVR prompts only for the phone number.
<i>05-DNIS=Phone,UserID, PW=guest</i>	Directly dial the number using the DNIS or one-step dialing option (Phone Number From DNIS, UserID and PW as guest).
<i>06-DNIS=Phone, ANI=UserID,PW</i>	Directly dial the number using the DNIS, ANI requests user ID (i.e., phone number of the caller) for billing purposes (Phone Number From DNIS, UserID from ANI and PW is null).
<i>07-(P2D) DNIS=Phone, UserID, PW=guest</i>	Phone to Desktop. The gateway directly dials the number using the DNIS or one-step dialing option. No PIN is required.

IVR Option	Description
08-(P2D) DNIS=Phone,ANI=UserID, PW	Phone to Desktop. The gateway directly dials the number using the DNIS. The PIN is taken from the ANI (i.e., phone number of the caller) for billing purposes.
09-(p)Phone* - UserID=ANI,	The IVR requests the desired phone number and uses the caller's number (ANI) as the user ID.
10-(p)userID# PW*Phone Number From DNIS	The IVR system requests the user ID and password and takes the phone number from the DNIS.
11- (p)Language(M -CH, ENG) (p)PhoneNumber# - UserID from ANI and PW NULL	The IVR system prompts for the language (menu options in parenthesis), and then prompts for the phone number. The user ID is taken from the ANI. No password is required.
12-(p)language(M-CH,ENG), (p)userID#(p)PW#(SA) (p)PhoneNumber#(#M- PN,BL,PW)(D)	The IVR system prompts for the language (menu options in parenthesis), and prompts for user ID and password. The system waits until the user ID and password are verified before requesting the phone number. Users can request to make a call, to hear the current account balance, and to change their password. For debit users, the remaining call time available is provided before the call starts.
13-(p)UserID#PW*(SA) (p)PhoneNumber*	The IVR system prompts for user ID and password. The system waits until the user ID and password are verified before requesting the phone number.
14-(p)UserID#PW*(SA) (p)PhoneNumber*(M -PN,BL)	The IVR system prompts for user ID and password. The system waits until the user ID and password are verified before requesting the phone number. The user can request to make a call and to hear the current account balance.

IVR Option	Description
<p>15-(p)UserID#PW*(SA) (p)PhoneNumber*(M - PN,BL)(D)</p>	<p>The IVR system prompts for user ID and password. The system waits until the user ID and password are verified before requesting the phone number. The user can request to make a call and to hear current account balance. For debit users, the remaining call time available is provided before the call starts.</p>
<p>16-UserID from ANI, (p) Phonenumber* - if wrong(p)UserID#password*</p>	<p>The gatekeeper authenticates the user, based on the user's ANI and prompts for the user's phone number, followed by an asterisk (*). If the user's ANI is not authorized, the IVR prompts for the user's ID and password.</p>

(p) refers to the IVR prompt, followed by the type of request, e.g., for password (PW) or User ID. * or # indicates the termination of the user response to the IVR prompt. (SA) indicates a separate authorization is made to the gatekeeper. (M) is the advanced menu option, providing users with the following information: PN - Phone Number, BL - current account Balance. (D) the remaining call time left (duration) is given to the user.

Please refer to the section *Line Configuration Options* in the *VocalTec Network Manager Administrator's Guide* for more detailed configuration instructions.

For information on how to customize some common IVR options, refer to the *IVR Customizing supplementary document*.

The illustrations below provide examples of the call flow for one-step and two-step

dialing.

Two-Step Dialing

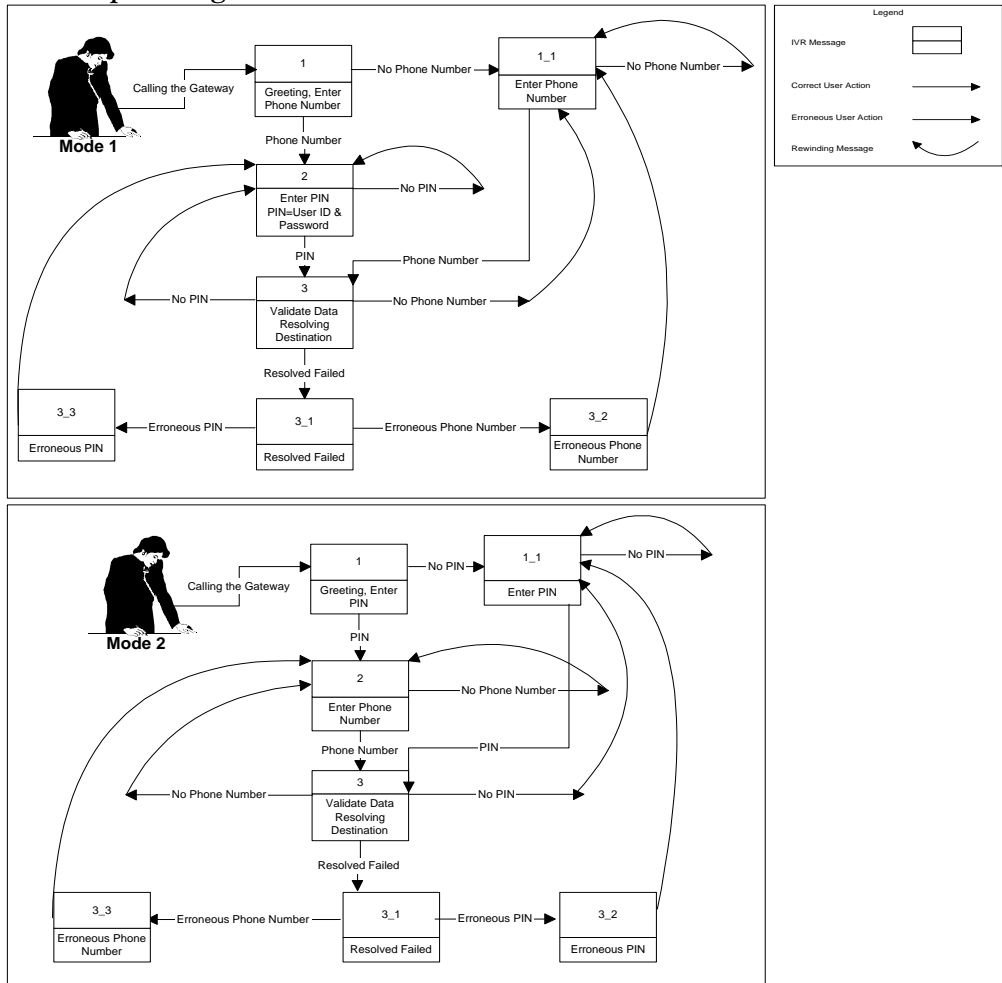
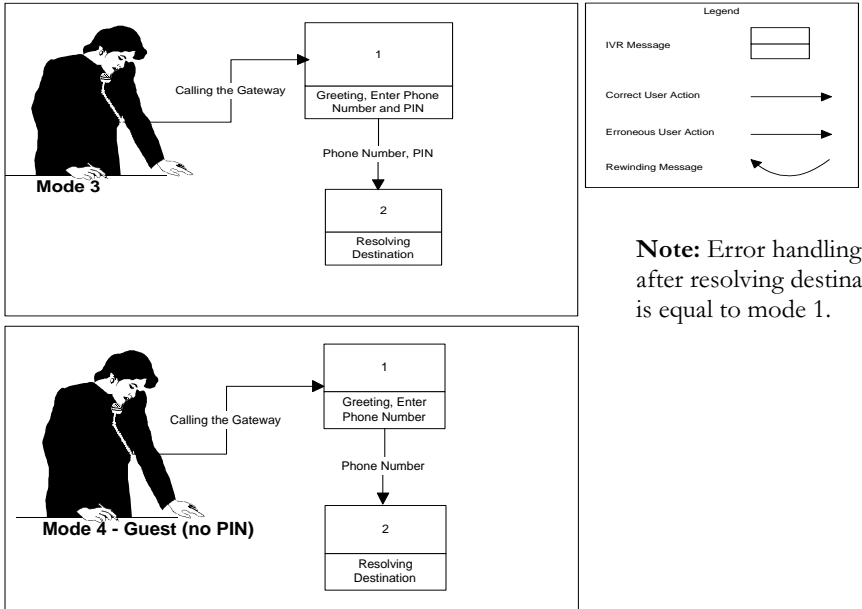


Figure A1-1. Two-Step Dialing - IVR Modes 1-2

Two Step Dialing (cont.)



One Step Dialing

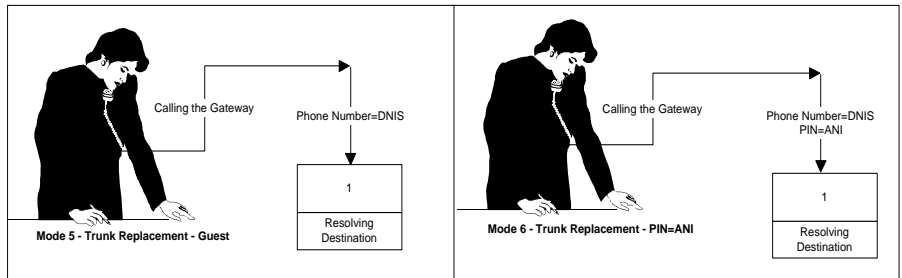


Figure A1-2. Two Step Dialing (cont.) 3-4, One Step Dialing 5-6 IVR Modes

Appendix 2

Configuring Analog Tones

This chapter describes how to edit analog tone configurations and analyze call progress tones.

Configuring Analog Tones

For the gateway to make call progress analysis correctly and detect disconnections properly, the frequency and cadence pattern of the tone must be correctly defined.

If the PBX is connected to the PSTN, you will need to configure the tones for both the PSTN and the PBX.

Analog Protocol Tone configurations can be edited in the Gateway Protocol page on VocalTec Network Manager. For more information refer to the *VocalTec Network Manager Administrator's Guide*.

You can use several methods to analyze a tone's frequency and cadence pattern:

- The manufacturer of the PBX and/or the PSTN carrier should be able to supply the frequency and cadence patterns of a tone.
- *Cool Edit* can be used to analyze tones. This options is described further below.

NOTE Recording Analog tones should be done only on FXO models.

Steps in Configuring Analog Tones

The following steps are recommended for recording and analyzing analog tones, and configuring the tone parameters on the gateway:

1. Install Cool Edit (the recording utility).
2. Record the analog tones.
3. Analyze the analog tones.
4. Modify the pq.params file.

Installing Cool Edit

The Cool Edit version supplied on the VocalTec system installation CD (under the *Utilities* directory) is an unlicensed share ware by Syntrillium Software. After you install the share ware, please visit Syntrillium Software Web site at <http://www.syntrillium.com> for registration.

To install Cool Edit:

1. From VocalTec Installation CD2, select the *Utilities* folder.
2. Click on the **c96setup** file and follow the online installation instructions.
3. Select **YES** to enable creating peak (*.pk) files.
4. Select a primary and secondary destination directory for temp file storage.
5. Click **Add** to add Cool Edit to the **Start** menu.

Recording Analog Tones

Before Recording

Read the following section prior to recording the tones:

- The recording should be made on port 1 only. It is recommended to disable all other ports except port 1, to make sure that the call goes through port 1.
- The recording should be made using codec *G711 alaw* (after changing the codec, shut down the gateway from VNM).
- The name of the recording file is *Record.dat*.
- The sample rate is *8K Mono 8 Bit* sampling.

Recording Tones using Telnet Commands

Complete the following steps when recording an analog tone:

1. Connect to the gateway through Telnet, using the IP address of the gateway (Port 24).
2. Use the following command: **rec,ip,dir**

where:

IP = the IP address of the FTP server

Dir = the path on the FTP server where the recorded file (record.dat) is saved.

The recording starts the moment when the command is submitted.

Recording a Ring back Tone

1. Make a call to port 1 on the terminating FXO gateway.
2. Do not pick up the phone.
3. Use the record command to record the ring back tone on the terminating side.

Disconnect Tone

1. Make a call to port 1 on the terminating FXO gateway.
2. Pick up the phone.
3. Disconnect the phone.
4. Use the record command to record the disconnect tone on the terminating side.

Recording a Busy Tone

1. Pick up the phone on the terminating gateway side.
2. Make a call to port 1 on the terminating FXO gateway.
3. Use the record command to record the busy tone on the terminating side.

Analyzing Analog Tones

The following parameters should be analyzed for each *record.dat* file that you have recorded:

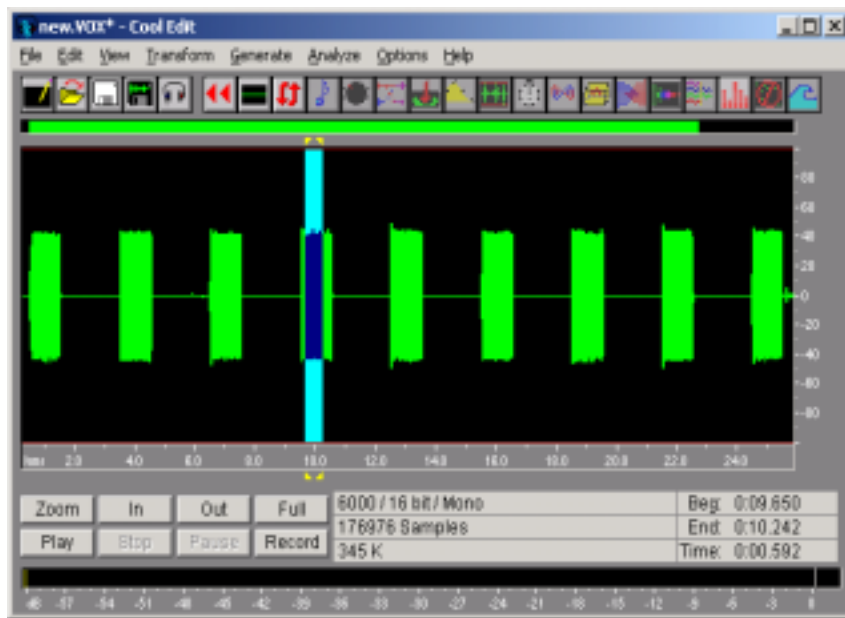
- Tone frequency
- Tone decibels
- Tone duration

Analyzing Tone Frequency

Use the following procedure for analyzing tone frequency.

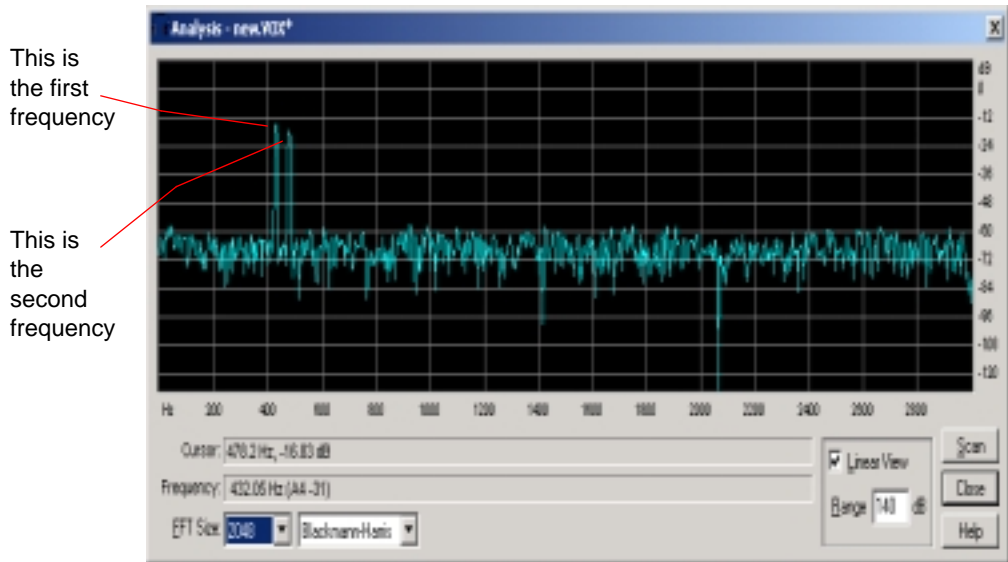
To analyze tone frequency:

1. Open the VOX file you recorded using Cool Edit.
2. In the sample rate window, select **8000** and click **OK**. The Raw Data window appears.
3. Select *Alaw* and click **OK**. The following window appears:



4. Using the mouse, drag over the tone area you want to analyze.
5. From the Cool Edit menu, select **Analyze/Frequency Analysis**. The

Analysis window appears.



6. Click **Scan** (optional).
7. Write down the low and high frequencies (for example, in the above picture, 432.05 Hz is the low frequency and 478.2 Hz is the high frequency).
8. To view the decibel level (DB) for the tone, put your cursor on the peaks of the tone. The decibel level appears in the *Cursor* field.

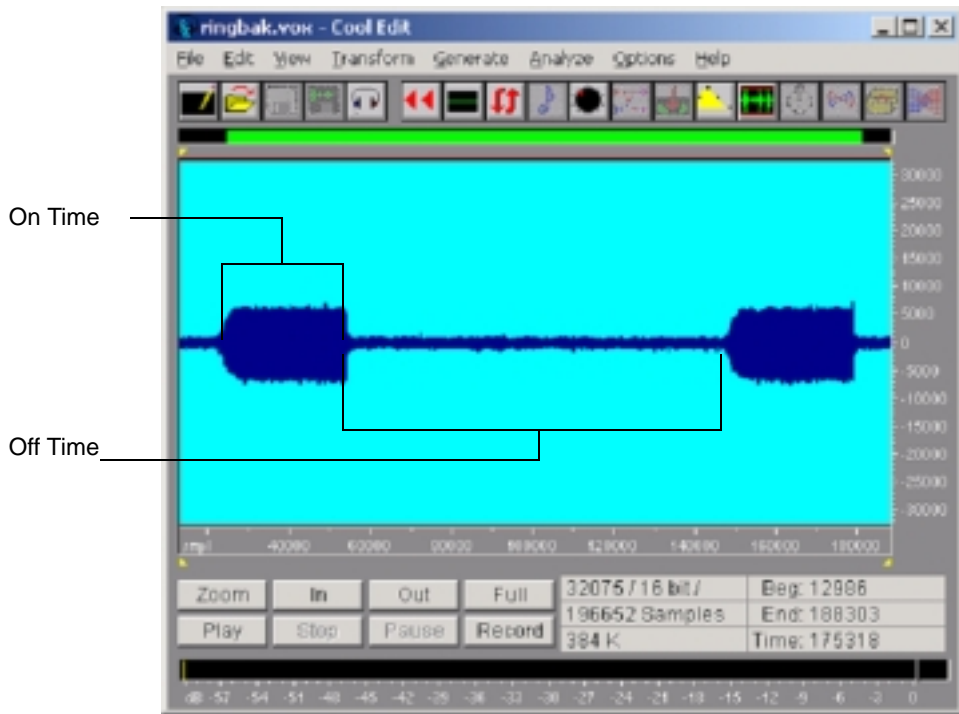
Analyzing Duration

The following procedure is used to analyze the on and off periods of the tone. There are two types of tones:

- **Asymmetric** - the tone has two on/off periods
- **Symmetric** - the tone has a single on/off period

To analyze duration:

1. Using the mouse, drag over the tone area you want to analyze.
2. To make it easier to view the on/off periods, use the **Zoom** option.



3. From the **view** menu, select **display time format/decimal**.
4. Measure the On time and Off time intervals.

5. Repeat this procedure for all on and off periods and for the different types of tones (e.g., connect, ring back, busy, disconnect etc.).

IMPORTANT After analyzing the PBX tone frequencies, amplitude and duration, it is important to add this information to the gateway, to enable the gateway to identify the correct tone sent by the PBX. This can be done through the gateway's Protocol page on VocalTec Network Manager.

Converting the Data to a Tone Definition

Refer to the *VocalTec Network Manager Administrator's Guide* for further details on how to define the custom tones in the Gateway Protocol page.

The tone definition format is as follows: Low Frequency, High Frequency, Low Delta, High Delta, 1st Duration On, 1st Duration Off, 2nd Duration On, 2nd Duration Off.

For quicker identification of the tone, if you only have a single frequency, it is preferable that this will be at the 2nd Duration On period. For example:

T1=480 , 620 , 30 , 40 , 0 , 0 , 25 , 25

There must always be 8 cells in the string.

Modifying the pparams File

After analyzing and recording the tone definitions, you need to configure these values in the pparams registry file and download it to the gateway. For more information, refer to *Appendix 3, Configuring Gateway Registry Parameters*.

Appendix 3

Configuring Gateway Registry Parameters

This chapter describes how to configure VGW 8, using the PQParams.reg file.

Telnet Commands

After configuring the VGW 8 device with hyperterminal, open Telnet port 23 to view logs, and open telnet port 24 for the VGW 8 command prompt.

Important Commands

Command	Description
<i>Startlogger</i>	Starts VGW 8 logger serial and telnet port 23.
<i>Help</i>	Enables view of all telnet VGW 8 commands in serial (hyper terminal) after the startlogger command was typed.
<i>Stoplogger</i>	Stops logs.
<i>ChangeReleaseLevel</i>	Changes log level for release.
<i>Settime</i>	Sets the system time (sec, min, hours, date, month, year) for example the time and date of 31/5/2001 17:03:00 will be set with <i>settime,0,3,17,31,4,101</i> .
<i>Gettime</i>	Prints the system time.
<i>Lver</i>	Loads the OS software version (VxWorks.zip) <i>Lver,10.10.20.50,c:\vgw8\</i>
<i>Livrmode</i>	Loads the IVR mode files <i>Livrmode,10.10.20.50,c:\vgw8\</i>
<i>Livr</i>	Loads IVR files <i>Livr,10.10.20.50,c:\vgw8\</i>
<i>Llogger</i>	Loads the Logger.reg file <i>Llogger,10.10.20.50,c:\vgw8\</i>
<i>Lpqparams</i>	Loads the PQParams.reg file <i>Lpqparams,10.10.20.50,c:\vgw8\</i>

Command	Description
<i>Dpqparams</i>	Downloads the PQParams file from the VGW 8 to the host computer this command is very useful for checking VGW 8 parameters <i>Lpqparams,10.10.20.50,c:\vgw8\</i> The downloaded file is located in c:\vgw8 file name: PQParams.txt
<i>Loadall</i>	Loads all VGW 8 files (VxWorks.zip, Pqparams.reg, IVRmodes.reg, IVRfiles, ring.txt, logger.reg) <i>loadall,10.10.20.50,c:\vgw8\</i>
<i>PrintVersion</i>	Prints the current software version.
<i>LogUnblock</i>	Enable the logging job.
<i>LogBlock</i>	Stops putting logs in the buffer.
<i>PrintHookStats</i>	Shows RTP channel statistic.
<i>Lring</i>	Loads ring back tone files ring*.txt (without this files the FXS will crash) <i>lring,10.10.20.50,c:\vgw8\</i>
<i>WDEnable</i>	Enables the watchdog operation.
<i>WDDisable</i>	Disables the watchdog operation.

Configuring PQParams.reg

All VGW 8 parameters can be configured with the PQParams.reg file. This file can be edited with notepad or any other text editor. Parameters have to be changed carefully without deleting essential data.

Only the important parameters are listed below. All other parameters should be configured using VNM (e.g., codecs and ports).

NOTE You are recommended to use VocalTec Network Manager for configuring the gateway parameters. For more information, refer to the *VocalTec Network Manager Administrator's Guide*.

Parameters\VTG

Parameter	Value	Description
"VoiceLinesNumber"	dword:4	Number of telephony ports that will be used on the gateway.
"IgnoreCheckTime"	dword:1	If this key is set to 1, the call will be made even though the gateway time is not synchronized.
"GMTOffset"	dword:2	The Greenwich Mean Time offset between the Gateway and the Gatekeeper. Use 0.
"SNTPServerIP"	172.16.2.50	The SNTP Server IP address.

Parameters\VNMMVGK

Parameter	Value	Description
"RCAMPort"	dword:23a3	Hexa 9123.
"RCAMPassword"	"test"	Password used by VNM to access the Gateway.
"ID"	"CPE100"	Gateway device ID (Name).
"Alias"	"qa_gk18.sunrise.com"	Gatekeeper alias as defined in the DNS server.
"Password"	"gatekeeper"	Password used by the Gateway to login to the Gatekeeper.
"DomainID"	"sunrize"	Domain ID.

Parameters\vnmvgk\RASClient

Parameter	Value	Description
"RasPort"	dword:6b7	Hexa 1719.
"GkIP"	""172.16.2.50	IP address of the Gatekeeper. This needs to be entered when the DNS is not in use.
"GkPort"	dword: 6b7	The gatekeeper port.
"DNSIP"	""172.16.2.50	DNS server IP address.
"OverrideGKDiscovery"	dword:1	If this value is set to 1 the gateway will override the DNS resolve with the VGK IP entered above.

Parameter	Value	Description
"RasEngineTimeoutHigh"	dword:00002710	Changes to these values will affect the time it takes VGW 8 to switch from master to snapshot and vice verse.
"RasEngineTimeoutLow"	dword:00002710	
"RasEngineRetriesHigh"	dword:00000003	
"RasEngineRetriesLow"	dword:00000003	

Parameters\Audio

Parameter	Value	Description
"PriorityCodecList"	"3"	Values that are set in this key enable different codecs and priorities. The number 3 indicates the Coder MIB G723. If other codecs are needed, the Coder MIB number should be added as follows (the first number represents the priority): "PriorityCodecList""3 2 4"

Parameters\Ports\00 to 08

Parameter	Value	Description
"PortEnable"	dword:1	Enables/disables the specified port.
"BoundDirection"	dword:3	Bound direction: inbound, outbound or both.
"IVRMode"	dword:5	IVR mode 1-16.
"RepeatIVR"	dword:0	Repeats the IVR if the call fails.

Parameters\TelephonyProtocols\Analog

Parameter	Value	Description
"NoAnswerTimeoutPBX"	dword:20	No answer timeout.
"RingBackTimeOutPBX"	dword:6	Time to wait for ringback on FXO before autoconnect (in seconds).
"DSPDelay"	dword:0	Leave the default value.
"PBXDialDelay"	dword:23	Time between sending offhook and dialing on FXO.
"InterDigitTime"	dword:46	Time between digits.
"DigitOnTime"	dword:46	Period of active digits.
"Busy1TonePBX"	"400,0,13,0,0,0,55,45"	First PBX busy tone.
"Busy2TonePBX"	"400,0,13,0,0,0,55,45"	Second PBX busy tone.
"Busy1TonePSTN"	"400,0,13,0,0,0,55,45"	First PSTN busy tone.
"Busy2TonePSTN"	"400,0,13,0,0,0,55,45"	Second PSTN busy tone.
"Ringback1TonePBX"	"420,0,19,19,50,25,50,280"	First PBX ringback tone.
"Ringback2TonePBX"	"420,0,19,19,50,25,50,280"	Second PBX ringback tone.
"Ringback1TonePSTN"	"420,0,19,19,50,25,50,280"	First PSTN ringback tone.
"Ringback2TonePSTN"	"420,0,19,19,50,25,50,280"	Second PSTN ringback tone.
"DialTonePBX"	"350,440,13,13,300,0,0,0"	PBX dial tone

Parameter	Value	Description
"DialTonePSTN"	"350,440,13,13,300,0,0,0"	PSTN dial tone.
"Disconnect1Tone"	"400,0,13,0,0,0,28,24"	First disconnect tone.
"Disconnect2Tone"	"395,0,40,0,0,0,28,24"	Second disconnect tone.
"TelNumOfDigits"	dword:10	Indicates the maximum number of digits that can be dialed. Use * at the end of the dialed number if it is smaller than 10 digits.
"NumOfLineDigits"	dword:2	Number of end DNIS digits used to find the appropriate FXS line for call termination.
"Line1"	dword:a	When configuring an FXS, use hexa decimal numbers to represent the telephone line number (a10, b11, etc.) The line number value will receive ffffffff when configuring an FXO.
"Line2"	dword:b	
"Line3"	dword:c	
"Line4"	dword:d	
"Line5"	dword:fffffff	
"Line6"	dword:fffffff	
"Line7"	dword:fffffff	
"Line8"	dword:fffffff	
"FXOFixedANI"	"7932"	This number will be sent to the gatekeeper as an ANI when calling from FXO.

PBX Tones and Timeouts

The PBX/PSTN tones are essential for normal functioning of analog gateways. The following table lists standard analog tones and timeouts. This section includes an example of the ringback tone configured in the *PQParams.reg* file, when working with an analog PBX whose tones are not standard.

Standard PBX Tones

Tone	Frequency	Timeout		
		Tone	Silence	Total
Dial tone	400			1 minute
Ring back tone	400	1 second	2 seconds	2 minutes
Busy tone	400	0.5 second	0.5 second	20 seconds
Disconnect tone (congestion tone)	400	0.25 seconds	0.25 seconds	10 seconds
NU tone	1800, 1400, 1000	0.33 seconds	0.33 seconds	0.33 seconds
ROH tone	2452, 2452, 2060, 1400	0.12 seconds	0.08 seconds	1 minute
Call waiting tone	400	0.3	10	
Caller waiting tone	400	0.1-0.1x2- 0.6		

Tone Configuration Example

"Ringback1TonePBX"="420, 0, 19, 19, 50, 25, 50, 280"

Tone Sequence	Example
First tone (hertz)	420
Second tone, silence (hertz)	0
First tone decibel (db)	19
Second tone decibel (db)	19
First tone length x/100 seconds	50
Seconds tone length x/100 seconds	25
First tone second length x/100 seconds	50
Seconds tone second length x/100 seconds	280

Glossary

The following section provides you with definitions of commonly used terms in this documentation.

ANI

Arriving Number Identification. Information received from the telephone exchange giving the calling party's telephone number. Sometimes referred to as CLI (Calling Line Identity).

DTMF

Dual Tone Multi Frequency. The technical term for the tones generated by a touch-tone telephone. So called because each button on the telephone is represented by two simultaneous tones, one of a high frequency and one of a low frequency. There are four different high tones and four low tones giving 16 unique combinations in total. Usually only 12 of these are used (0 to 9, * and #), but 4 additional codes, named A, B, C and D, are also available.

FXO

Foreign Exchange Office interface. Allows a connection to be directed at the PSTN's Central Office, or to a standard PBX interface.

FXS

Foreign Exchange Station interface. Allows connection for basic telephone equipment, keysets and PBXs (supplies ring back tone, dial tone and voltage)

IVR

Interactive Voice Response. The IVR system interacts with callers through digitized voice, providing human speech prompts.

MF

Multi-Frequency. A signaling system used to communicate between telephone exchanges and across digital lines to certain customer premises equipment (such as R2 digital systems). Note that this is not the same as DTMF or touch tone.

PBX or PABX

Private Branch Exchange (switchboard). Also referred to as Key System.

PSTN

Public Switched Telephone Network, acronym for the traditional telephone system.

Trunk Replacement Mode

The gateway can be configured as a trunk replacement interfaced to the CO equipment. In this mode, the gateway replaces traditional telephone trunks to interconnect the equipment over the IP network.

TCP/IP

Transport Control Protocol/Internet Protocol. A data protocol for transmitting information between computer systems (usually UNIX based) and across the Internet.

Voice Virtual Private Network

Voice Over IP (VOIP) Virtual Private Network (VPN) is a service that provides subscribers with a "virtual" private VOIP network that exists on the public infrastructure (the PSTN).

VGK

VocalTec Gatekeeper (VGK) for Windows NT is a standards-based, advanced IP Telephony services and control server. VGK adds intelligence to complex IP Telephony networks by providing centralized addressing, security and accounting for IP Telephony networks.

VNM

VocalTec Network Manager (VNM) is an Operations, Administration, Management, and Provisioning utility for VocalTec gateways, gatekeepers and SIP servers.

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