

# **Vertex** Caller ID for VoIP

## **Vertex VoIP Caller ID**

(Version 2.1 - 01/27/2020)

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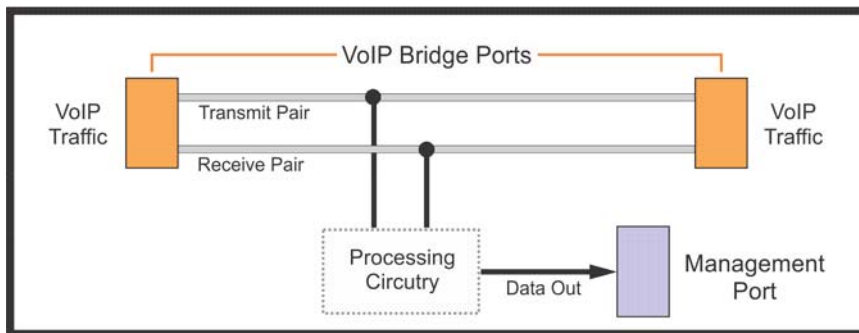
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## Overview

The Vertex unit is designed to capture Caller ID and other telephony signaling on VoIP phone calls and send this information to computers. Depending on the software running on the computer, applications such as Caller ID popup screens for delivery, dispatch, phone billing, and logging calls are available.

### Critical Information

1. The Vertex is designed to capture only standard non-encrypted SIP (Session Initiation Protocol). SIP transmitted via TLS (Transport Layer Security) and SRTP (Secure Real-time Transport Protocol), or other types of encoding are not supported. Refer to [Appendix B - Known Incompatible VoIP Providers](#).
2. There are 3 network ports on the Vertex. The 2 VoIP Bridge Ports provide a pass-through link between two network endpoints and processing circuitry connected in parallel. This approach allows passive packet "sniffing" thus eliminating any network point-of-failure. The Management Port is the only port that presents itself as an endpoint on the network.



3. A single network connection carrying all VoIP traffic of interest must pass through the Vertex VoIP Bridge Ports to capture the incoming and outgoing telephone call signaling. Your network topography will determine where the Vertex bridge ports will connect all VoIP traffic.
4. The unit will pass a maximum of 100BaseT speed through its VoIP bridge ports. At least one Gigabit endpoint on either side of the bridge port may need to be re-booted to auto-configure to 100BaseT. Passive packet "sniffing" is technically impossible on a Gigabit connection.
5. The 100BaseT Vertex throughput speed will not adversely affect VoIP phones connected through VoIP bridge ports. Only computers connected to switches or phones linked through the Bridge Ports may be affected.
  - If possible, we suggest that VoIP phones are connected on a different leg of the network than computers and the Vertex VoIP Bridge Ports link only the VoIP leg.
  - If the link to the internet passes through the Vertex VoIP Bridge Ports, only the internet speeds above 100mbs would be affected. A Gigabit LAN speed will not be affected.

## Types of VoIP

There are basically two types of VoIP service, Hosted VoIP and Managed VoIP.

Hosted VoIP is defined by the service provider performing all voice switching, routing, messages on hold, call queuing, and other functions. In most cases, the end user needs only to connect VoIP phones to their network. Any significant programming and configuration is done by the service provider. At the time of this writing, popular companies offering Hosted VoIP are Nextiva, Vonage, 8x8, and Jive.

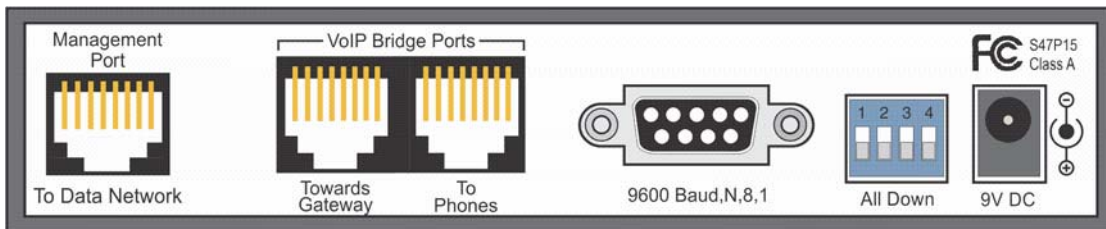
Note that Hosted VoIP service providers can also provide multi-line VoIP to analog conversion devices. If you are not using VoIP phones and still using analog or digital phones, then our analog devices may fit your needs better than the Vertex.

Managed VoIP involves additional equipment on site that handles most of the VoIP switching, routing, and call processing. Various terms and acronyms apply to Managed VoIP including SIP trunking, Asterisk PBX, ISDN PRI, and T1 feeds. There are many types of architectures available using particular combinations of these and other items. If you have a Managed VoIP system, your IT person and/or telephone switch provider should know the details.

## Installation

### Basics

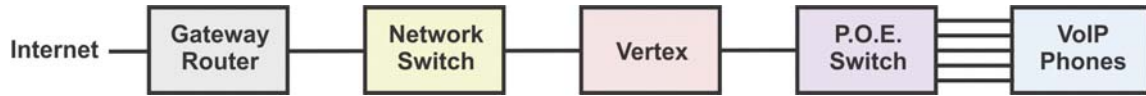
1. The Vertex Management Port is the only Vertex *Endpoint* on the network and used to configure the device. It connects to the same subnet as the PC running the Vertex Configuration Tool. Caller ID data is also sent out this port to software applications that have integrated Ethernet connected Caller ID devices.



2. The two “VoIP Bridge Ports” are pass-through, monitoring ports that connect two endpoints (I.E. network switches, routers, etc.). **A single network connection that carries all VoIP traffic of interest must pass through the Vertex VoIP Bridge Ports.**
3. To capture Caller ID and other telephony data from VoIP phone calls, call paths must travel through the VoIP Bridge Ports on the Vertex. In the simple block diagram below, the connection from the Router to the Network switch is made through the Vertex VoIP Bridge Ports. This allows monitoring of all VoIP traffic in and out of the premise.



When existing network architecture allows, it is recommended that Bridge Port connections be made nearest to the VoIP telephones as possible, while still in-line with all VoIP phones of interest. The following configuration shows the Vertex between the network switch and a P.O.E. switch powering the phones.



## Installation Instructions

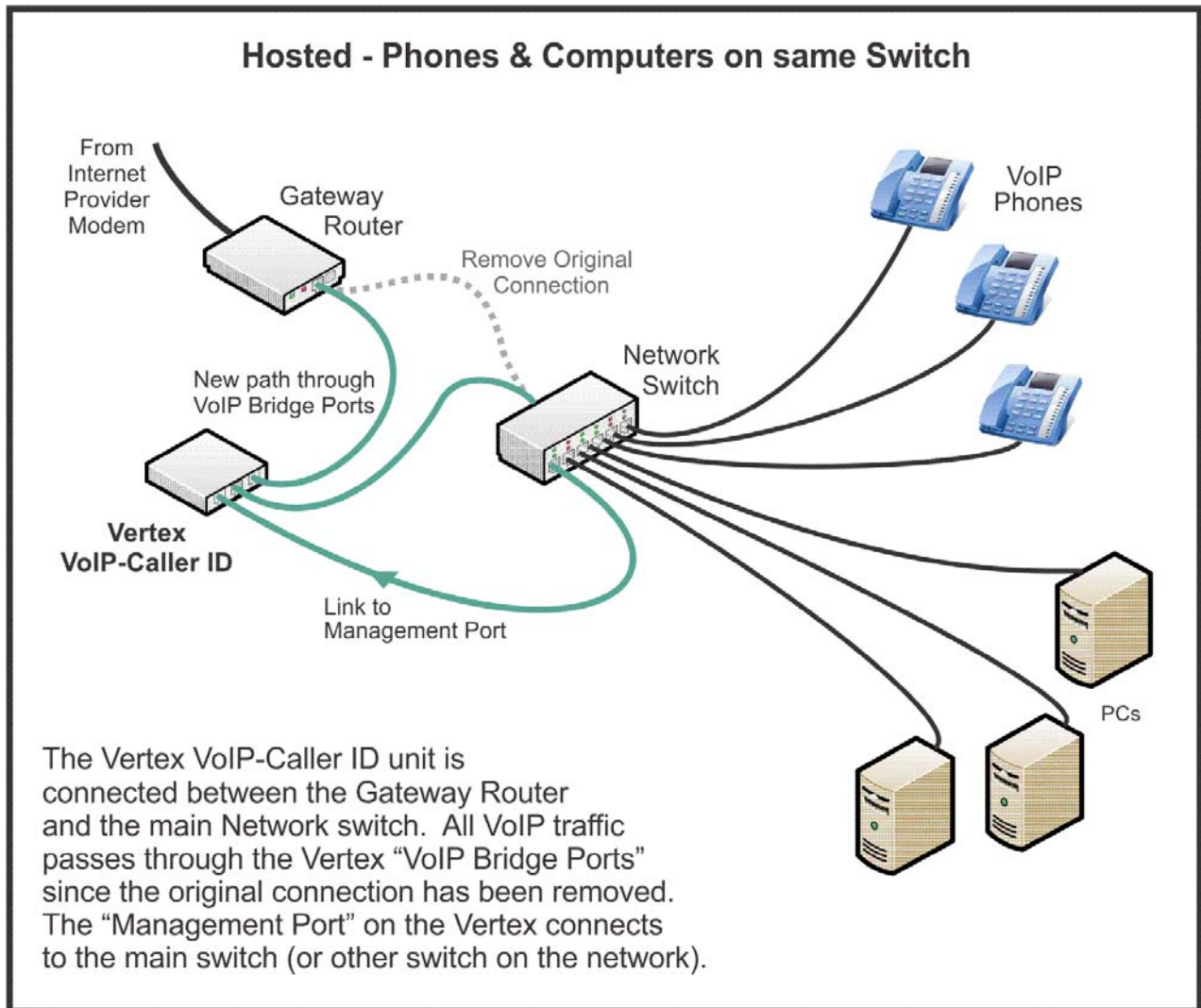
1. Refer to Figs. 1-4 to decide which connection diagram best matches your VoIP Network architecture. Chances are, none of the diagrams will match your Network topography exactly. Therefore, connecting the Vertex in an appropriate location on the network requires a basic understanding of the device operation. Review the [Critical Information](#) and [Basics](#) sections above.
2. Make Vertex connections when no VoIP calls are in progress and internet traffic is at a minimum. **Note that the Vertex will not pass a Gigabit connection.**
  - If the Vertex is placed between 2 Gigabit network endpoints (I.E Router, Switch), reboot at least one device to allow automatic negotiation to 100BaseT.
  - If rebooting does not establish a link between the two network endpoints, one endpoint will need to be hard set from automatic negotiation to 100BaseT. You will only need to change this speed parameter on the specific port that connects to the Vertex Bridge Port.
3. Power-up the Vertex and wait until power light remains steady on. The unit will attempt to negotiate DHCP in an effort to automatically obtain an IP address.
4. Check the other lights on the front panel. Amber lights on all three channels should be steady on, indicating a network connection. If any amber light is not on steady, refer to the [troubleshooting section on Amber lights](#). The green lights on each channel should flash, indicating data packets detected.
5. Close any software application on this computer that is meant to interface with the Vertex. For example, if you are running a Caller ID enabled POS or Taxi Dispatch application on this computer, close it now. Close any Caller ID services associated; they may bind to ports needed for setup.
6. Download and install the Vertex Configuration Tool (VCT) at [www.VCT.CallerID.com](http://www.VCT.CallerID.com).
7. Launch VCT. Upon startup, VCT must detect the Vertex hardware. If not, turn off any third-party Firewalls or virus checking programs, re-check Ethernet connections, and try again. [Refer to troubleshooting: VCT detection of Vertex](#).
8. Once the hardware is detected, select "Yes" to load parameters from the Vertex.
9. VCT will prompt you to run the Setup Wizard. **Run the Wizard and follow all steps carefully.** When completed, exit VCT.
10. Set the appropriate parameters within your software application to enable Caller ID pop-up screens.

## Hosted VoIP Connection Diagrams (3 Figures)

Hosted VoIP is defined by the service provider performing all voice switching, routing, messages on hold, call queuing, and other functions. In most cases, the end user needs only to connect VoIP phones to their network. Any significant programming and configuration is done by the service provider. If you are not sure whether you have Hosted VoIP service simply contact your service provider.

**Figure 1 - Phones and Computers on the same Switch**

A typical Hosted VoIP network architecture is shown below with a Vertex unit connected. If a separate gateway router and network switch is not present, you will need to install a network switch. The original connection is removed and the Gateway Router is connected to the Network Switch through the VoIP Bridge ports on the Vertex. This allows all VoIP traffic to flow through the Vertex. The "Management Port" on the Vertex is connected to the Network Switch. Green lines below indicate new connections.

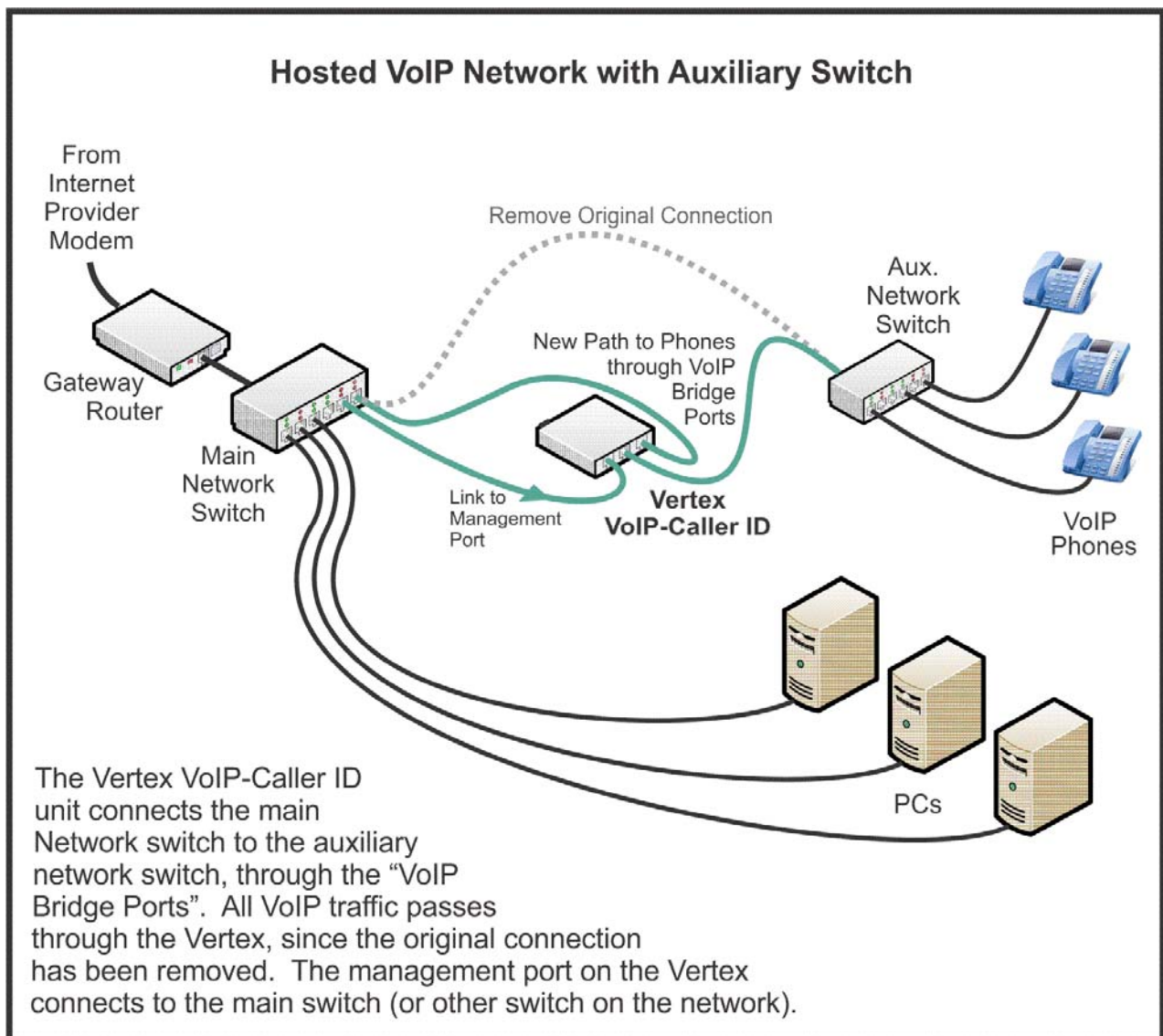




## Figure 2 - VoIP Phones connected to Auxiliary Switch

For architectures employing an auxiliary network switch to connect the phones, we recommend installing the Vertex between the auxiliary switch and the main switch. The original connection is removed and the Gateway Router is connected to the Network Switch through the VoIP Bridge ports on the Vertex. Removal of the original connection allows all VoIP traffic to flow through the Vertex "VoIP Bridge Ports". The Vertex "Management Port" can be connected to any switch on the network. Green lines indicate new connections below.

Depending on your application software, the data output will be delivered via the Management Port connection or the serial port.

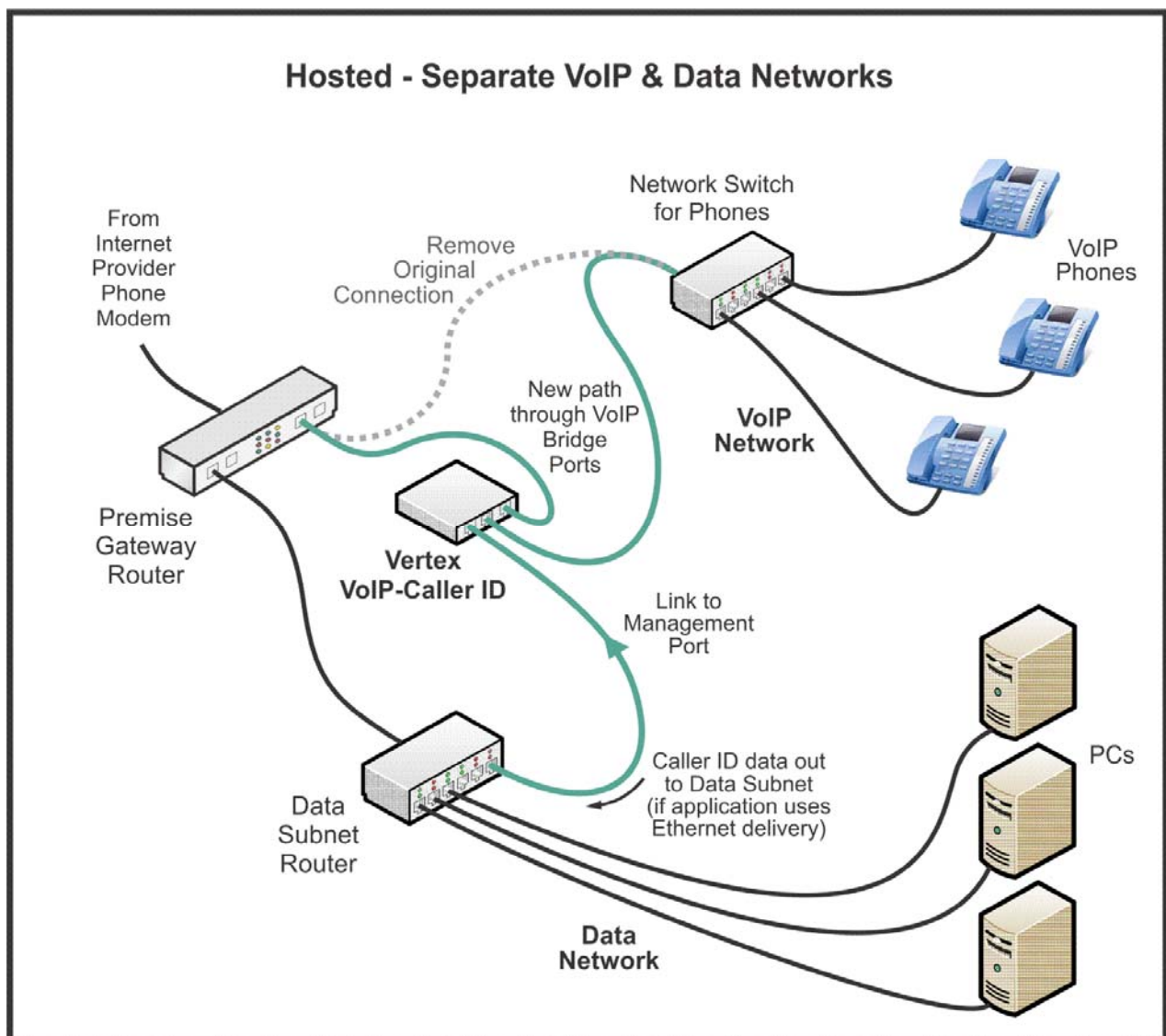


### Figure 3 - Separate VoIP and Data Networks

This network architecture is seen with controlled POS systems that supply a separate router enabling all their equipment to reside within its own subnet. Remove the original VoIP connection (dotted line below) and route the connection carrying all VoIP traffic through the two Vertex “VoIP Bridge Ports”.

If the POS application collects Caller ID via Ethernet, connect the Vertex “Management Port” and your PC running the Vertex Configuration Tool (VCT) to the Data Subnet Router, as shown in the diagram below. Conversely, if the POS obtains Caller ID data through a Serial Port, connect the Management Port and your PC running VCT to the VoIP network.

If DHCP is enabled, the Data Gateway MAC is obtained automatically upon Vertex re-boot. If not, it will need to be entered manually. If the Management Port is connected to the Subnet Router, use that MAC as the Data Gateway



## Managed VoIP Connection Diagram

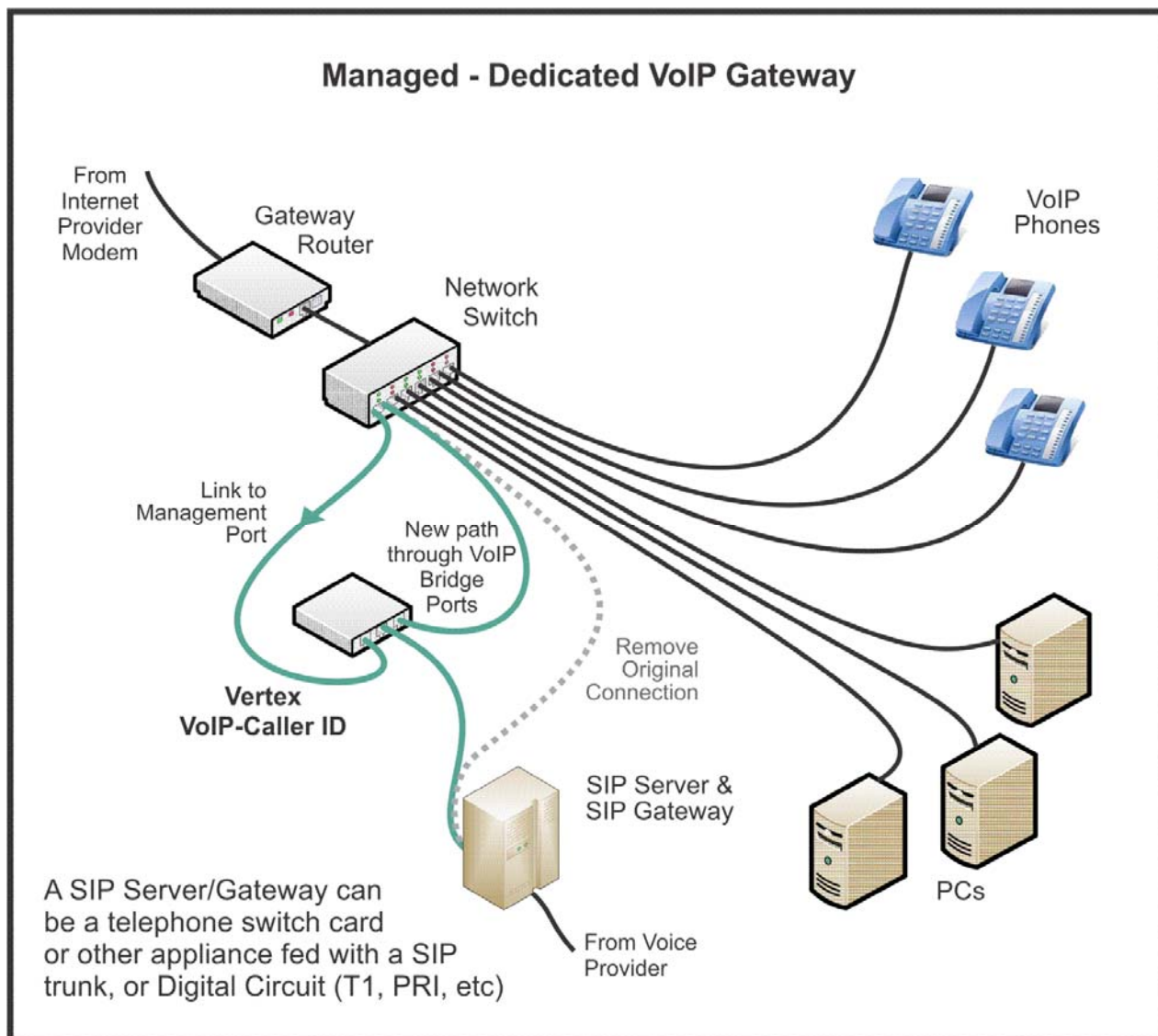
Managed VoIP involves additional equipment on site that handles most of the VoIP switching, routing, and call processing. Various terms and acronyms apply to Managed VoIP including SIP trunking, Asterisk PBX, ISDN PRI, and T1 feeds. There are many types of architectures available using particular combinations of these and other items. One sample diagram is below. If you have a Managed VoIP system, your IT person and/or telephone switch provider should know the details.

*Note: Although an Asterisk PBX is considered managed VoIP, if the VoIP gateway is the same as the Data Gateway refer to the Hosted diagrams above.*

### Figure 4 - Dedicated VoIP Gateway

Refer to this diagram when your managed VoIP service employs a SIP appliance connecting a dedicated VoIP Gateway. The SIP server/Gateway can be an Asterisk device or Telephone switch card fed with a SIP Trunk or ISDN PRI circuit.

Remove the original connection (dotted Line). Re-route the connection carrying all VoIP traffic through the two Vertex "VoIP Bridge Ports". Connect the Management Port to the Network Switch.



## Installation Checks

- Computers are working and have internet connectivity.  
*No - Reboot endpoints connected to VoIP Bridge Ports to auto-configure to 100BaseT. If still no connection is present, log into one endpoint and manually set speed to 100BaseT.*
- VoIP phones have registered and are working properly.  
*No - Reboot endpoints connected to VoIP Bridge Ports to auto-configure to 100BaseT. If still no connection is present, log into one endpoint and manually set speed to 100BaseT.*
- Vertex has steady power light.  
*No - Make sure correct power supply is used. Reboot using power cord on back of Vertex.*
- Vertex shows all 3 amber link-lights steady on.  
*No - Refer to Amber Lights blinking or not steady on in [Appendix A - Troubleshooting](#).*

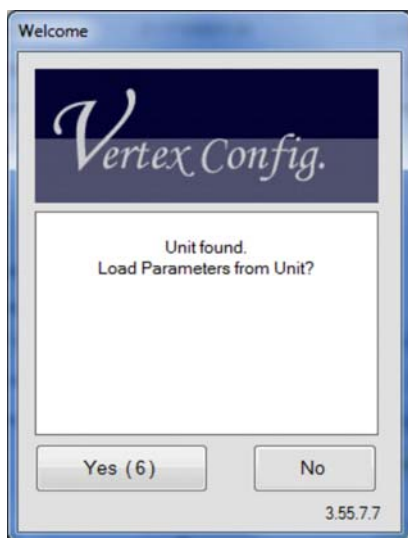
## Vertex Configuration Tool (VCT)

After hardware installation, use the Vertex Configuration Tool (VCT) to set the necessary parameters specific to your network.

*Note: Turn off any 3rd party firewalls before VCT installation.*

Depending on your Internet Brower, download and install the latest version from:  
[www.VCT CallerID.com](http://www.VCT CallerID.com) or <https://secure.callerid.com/vct/>

1. Make sure that the PC you are running VCT on is connected to the same subnet as the Vertex. Upon launching, VCT will send a UDP broadcast command on the Network in an attempt to communicate with the Vertex.
2. If VCT finds the Vertex, load the parameters from the unit.

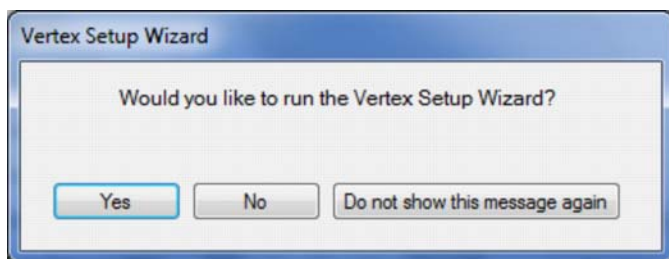


*If the unit is not found, try these troubleshooting tips:*

- Turn off any 3rd party firewalls running in the background and run VCT again. Or, set an exception within the firewall for the application name, **VertexConfig.exe**, and/or **UDP Port**

**3520** for both inbound or outbound traffic. Note that the installer will allow the exceptions based on the application name within Windows firewall.

- The Vertex default IP address is 192.168.1.90 and is set for DHCP. If your network IP scheme is not similar and the Vertex did not obtain DHCP, the router may not recognize the hardware. Try pinging 192.168.1.90 in an attempt to locate the unit on the network.
  - Reboot the Vertex. Perhaps the hardware did not obtain an IP from the DHCP server (Router or Windows server DHCP). Run VCT again once the Power Light remains steady on.
  - Check the devices listed that obtained DHCP by logging into your router or other DHCP server. The connected device list should include *Vertex-nnnn* (where *nnnn* is a unique numeric identifier for that particular unit).
3. When prompted, we strongly suggest running the *Vertex Setup Wizard*. This application is designed to walk you through each step of the Vertex configuration.



*Note: Advanced users can elect not to run the Vertex Setup Wizard and manually set up the device using the main VCT tool.*

4. The Vertex Setup Wizard should be self-guiding. Help on setting up the Vertex manually using the main VCT tool follows.

### Vertex Configuration Key Parameters

Whether you use the step-by-step Vertex Setup Wizard, or configure manually, there are three key parameters that the Vertex needs to operate properly.

Key parameters in setting up a Vertex:

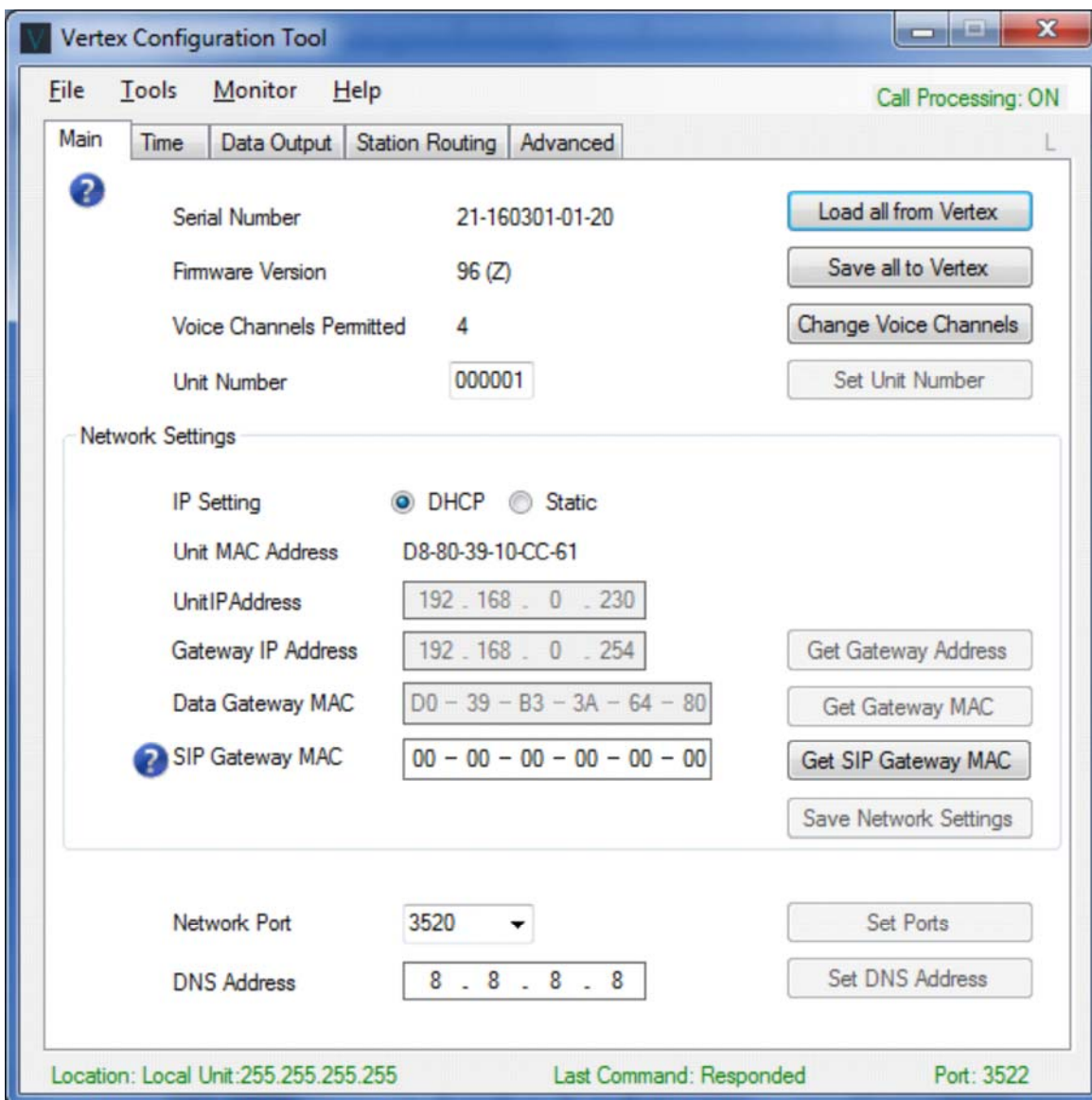
1. The Data Gateway MAC must be correct to assure that the time and date are correct on call records. The Vertex contacts a National Time Server to set its internal time clock.
  - If the Vertex IP address is negotiated via DHCP by the Gateway Router, then the Data Gateway MAC will be automatically obtained.
  - If no DHCP is negotiated or DHCP is negotiated from other than a Gateway Router, then the Data Gateway MAC address will need to be specified.
2. The SIP Gateway MAC must be correct to capture Caller ID or any other call records. If VoIP traffic passes through the same Gateway as the Data, then a separate SIP Gateway MAC is not required. When the SIP Gateway MAC is set to 00-00-00-00-00-00, the Vertex uses the Data Gateway MAC.
3. The data output format must match the requirements of the application accepting Caller ID data. Use the "Known Formats" button in the *Data Output* tab for the intended application.

## VCT Main Tab

**Serial Number.** Decoding of the serial number is as follows. In this example, the serial number is 21-171009-01-24

- 21 - Type of unit - Vertex
- 17 - Year Built - 2017
- 10 - Month Built - October
- 09 - Day Built - 9th
- 01 - Unit number built that day
- 24 - Hardware revision

**Firmware Version.** This shows 97(x). Each numeric firmware edition has a compiled version for letters (o, n, z, x) which indicates compatibility with your particular hardware revision. When upgrading, the version letter will remain the same. For example, 94(z) upgrades to 97(z). Only consider upgrading after you have performed other troubleshooting steps and read the version notes on-line. Save your configuration settings before uploading new firmware. Uploading new firmware returns all operational parameters to their defaults.



**Voice Channels Permitted.** Vertex hardware is licensed for the number of simultaneous voice channels that can be processed by the Vertex. For a 2 channel license, complete Caller ID information will be sent for 2 callers at once. If a third call arrives, the last 2 digits of the Caller ID number will be "xx" and the Caller ID name field will show "Channels Exceeded". Outbound calls in progress occupy voice channels and count towards the license limit. Voice Channel licenses can be upgraded with a code from CallerID.com. Normally, there is a cost associated.

**Unit Number.** This can be used when multiple Vertex units are placed in the same location.

**IP Setting.** If IP addresses can be obtained automatically from your Data Gateway Router via DHCP, use this setting. Even when your computers are assigned a static IP, use DHCP if the router's DHCP server is enabled. This allows the Vertex to automatically capture the MAC address of the Data Gateway. If the Data Gateway MAC is FF-FF-FF-FF-FF-FF, DHCP was not negotiated.

If your DHCP server is not the Gateway Router (I.E. Windows Server), or no DHCP server is enabled, set this to Static and fill in the appropriate parameters.

**Unit IP Address.** The default IP address of a Vertex is 192.168.1.90. If this does not change when the unit boots up, then either no DHCP server is enabled on the subnet that the Vertex is connected, or the hardware was unable to negotiate DHCP.

**Gateway IP Address.** This is the address associated with the Gateway Router responsible for communication to IP addresses outside of the subnet. If the IP Setting is *Static*, the "Get Gateway Address" button is enabled. In Administrator mode, this button invokes a background "IPConfig" command and displays any gateways found.

**Data Gateway MAC.** This must be specified to assure that the time and date are correct on call records. The Vertex contacts a National Time Server to set its internal time clock. If the IP Setting is *Static*, the "Get Gateway MAC" button is enabled. In Administrator mode, this button invokes a background "ARP -a" command on the Gateway IP address entered to find the Gateway MAC.

**SIP Gateway MAC.** This must be correct to capture Caller ID or any other call records. If VoIP traffic passes through the same Gateway as the Data, then a separate SIP Gateway MAC is not required. When the SIP Gateway MAC is set to 00-00-00-00-00-00, the Vertex uses the Data Gateway MAC.

**Get SIP Gateway MAC Button.** This starts a Vertex raw data dump in the background. The program searches for the SIP Invite produced when the user dials the specific phone number indicated. The destination MAC address of this Invite is the SIP Gateway MAC. The user has 2 minutes to make the outbound call. The instruction popup screen will close when VCT captures the Gateway MAC.

**Save Network Setting Button.** Changes made within the VCT program are not automatically written to the Vertex. Any changes within the VCT causes corresponding "Save" buttons to turn yellow. You must select these to write changes to the Vertex Hardware.

**Network Port.** This is the port number on which the Vertex sends and receives. Do not change this port number from 3520 unless your application is written to accept data on a different port. This setting is password protected. The *Vertex Setup Wizard* only supports approved ports. At the time of writing, the approved ports are 3520 and 6699.

**DNS Address.** The default is 8.8.8.8 which is the main DNS server of Google. The Vertex uses DNS to obtain the IP addresses for the websites of the National Time Service. Do not change this setting unless directed by an advanced IT professional. This setting is password protected.

## VCT Time Tab

**Last Date/Time from Unit.** The ideal method of setting the Vertex's internal time clock is retrieving it from National Time Servers (NITS). This can only occur if the Data Gateway MAC address is correct and a valid DNS server is listed.

If the NITS transaction does not occur, the Vertex will obtain the current time and date from the VoIP SIP packets, if this information is present. Setting the Vertex time and date from the PC is the last resort. This can be done from the **Tools** menu when the VCT is in an **Unlocked Mode**. If the Vertex power is removed, the time and date is lost.

**Time Offset.** The National Time Servers issue GMT time; set your time zone offset appropriately.

**Daylight Saving Time.** The defaults for DST are *Enabled* with the USA dates. Complete flexibility for DST is provided for international users.

**Time Servers.** These are the defaults for the National Time Servers. These may be changed to a direct IP address if a DNS server is unavailable.

Vertex Configuration Tool

File Tools Monitor Help Call Processing: ON

Main Time Data Output Station Routing Advanced

**NTP** Last Date/Time from Unit **October 17, 2017 1:22 PM** Read Time from Vertex

**Time Offset**

Select (GMT -5:00) Eastern Time (US & Canada), Bogota, Lima

Select Time Zone above or manually enter offset below. Set Time Offset

Enter -5 : 00 Enter in non Daylight Saving Time

**Daylight Saving Time**

Enabled

DST Start 2nd Sunday of Mar

DST End 1st Sunday of Nov Set DST

**Time Servers**

Server #1 : time.nist.gov

Server #2 : time-nw.nist.gov

Server #3 : time-a.nist.gov

Server #4 : time-b.nist.gov

Unlock

Set Time Servers

Location: Local Unit:255.255.255.255 Last Command: Responded Port: 3522



## VCT Data Output Tab

Selections for the data output Destination and Format will be specific to the software being used for Caller ID popup screens or your intended application needs. The format options available match the options of CallerID.com analog devices. This enables the Vertex to be compatible with existing software written for our analog products.

The "[Known Formats](#)" button is available to automatically set the correct parameters for most of our software partners

### Destination (area)

**Broadcast** mode is used when your software application accepts Caller ID delivery via Ethernet. For small businesses, broadcasting data to all computers (Destination IP = 255.255.255.255) is recommended. Also allowed is a multicast IP to a range of computers or a unicast to a specific IP.

*TIP: Even if your application uses Serial Port output, we recommend using the Broadcast mode to initially verify correct capture call data in VCT. Use Broadcast in conjunction with Menu Selection: Monitor/Call Data.*

Vertex Configuration Tool

File Tools Monitor Help Call Processing: ON

Main Time **Data Output** Station Routing Advanced

**Destination**

- Broadcast  
IP address: 255 . 255 . 255 . 255
- Station Routing  
Static computer IP addresses are matched to VoIP phones in Station Routing Tab.
- Serial Port  
Baud Rate:
  - 1200
  - 9600 Most applications designed for CallerID.com serial devices use 9600 Baud.
  - 38400
- Call Accounting  
IP address: 0 . 0 . 0 . 0
- Do not report Ext. to Ext. calls  
Length of extensions: 5 digit(s)

**Format**

- Limited Format  
(Only available via Serial Port)
- Comprehensive Options**
  - Data Stream Delivery
    - Send at Start of Call
    - Send at End of Call
    - Send at Both Start and End
  - Send Outgoing Call Info.
  - Send Detailed Data
  - "S" Mode  
("S" placed before data and phone number will not have dashes)
  - Extra SIP Fields

Write Changes to Vertex      Known Formats

Location: Local Unit:255.255.255.255      Last Command: Responded      Port: 3522

**Station Routing** sends individual Caller ID records to each computer. The phone line number displayed for the call will match the line appearance button on the VoIP phone. It is designed for operations using specific software designed to take advantage of this feature. Computers with static IPs are required. An IT professional will need to configure Station Routing.

**Serial Port** output is for applications accepting Caller ID via a serial port. Normally, the Broadcast mode is used initially to verify correct capture call data in VCT (in conjunction with Menu Selection:: Monitor/Call Data). Then, select Serial Port output and appropriate baud rate used by your application.

**Call Accounting** delivers all aspects of every call to a separate software package designed to capture and analyze phone call metrics. The "MultiLine" software package from Identafone Software is recommended for Call Accounting.

**Do not Report Ext. to Ext. Calls** is normally selected to ignore internal calls from one extension to another. Enter the number of digits your system uses when dialing an internal extension.

**Format (area)**

**Limited Format** is used by some software packages that accept serial Caller ID. The Limited format is not available with Ethernet delivery.

**Comprehensive Options** The comprehensive format is used by most Caller ID software applications. Many options are available, but each software application will need a specific set of parameters selected. We recommended using the "[Known Formats](#)" button whenever possible.

**Extra SIP Fields** deliver additional data on each phone call allowing specific applications designed to control delivery of Caller ID information to each workstation. With the standard output format, when an inbound call rings multiple phones, a single call record is created for the call. The Extra SIP field format creates a call record for each phone that rings and sends the additional fields shown below.

02 I S 0000 G 00 09/26 11:28 AM 770-263-7111 CallerID.com										>À"...">...Q7,>0beddfe361													
Standard Caller ID Format										Extra SIP Fields													
ACSII:	>	À	"	.	.	>	.	.	.	Q	7	,	>	0	B	E	D	D	F	E	3	6	1
HEX:	3E	C0	A8	00	15	3E	00	0B	82	51	37	B8	3E	30	62	65	64	64	66	65	33	36	31
	Phone IP					Phone MAC							Call-ID										

**Known Formats (Button).** This is a list of software applications and software companies that have integrated to CallerID.com products. Use the search text box to search for either software or company name. Applying your selection will set the VCT to the appropriate output format and apply changes to the Vertex Hardware. If you do not locate the software you are using, please contact CallerID.com.

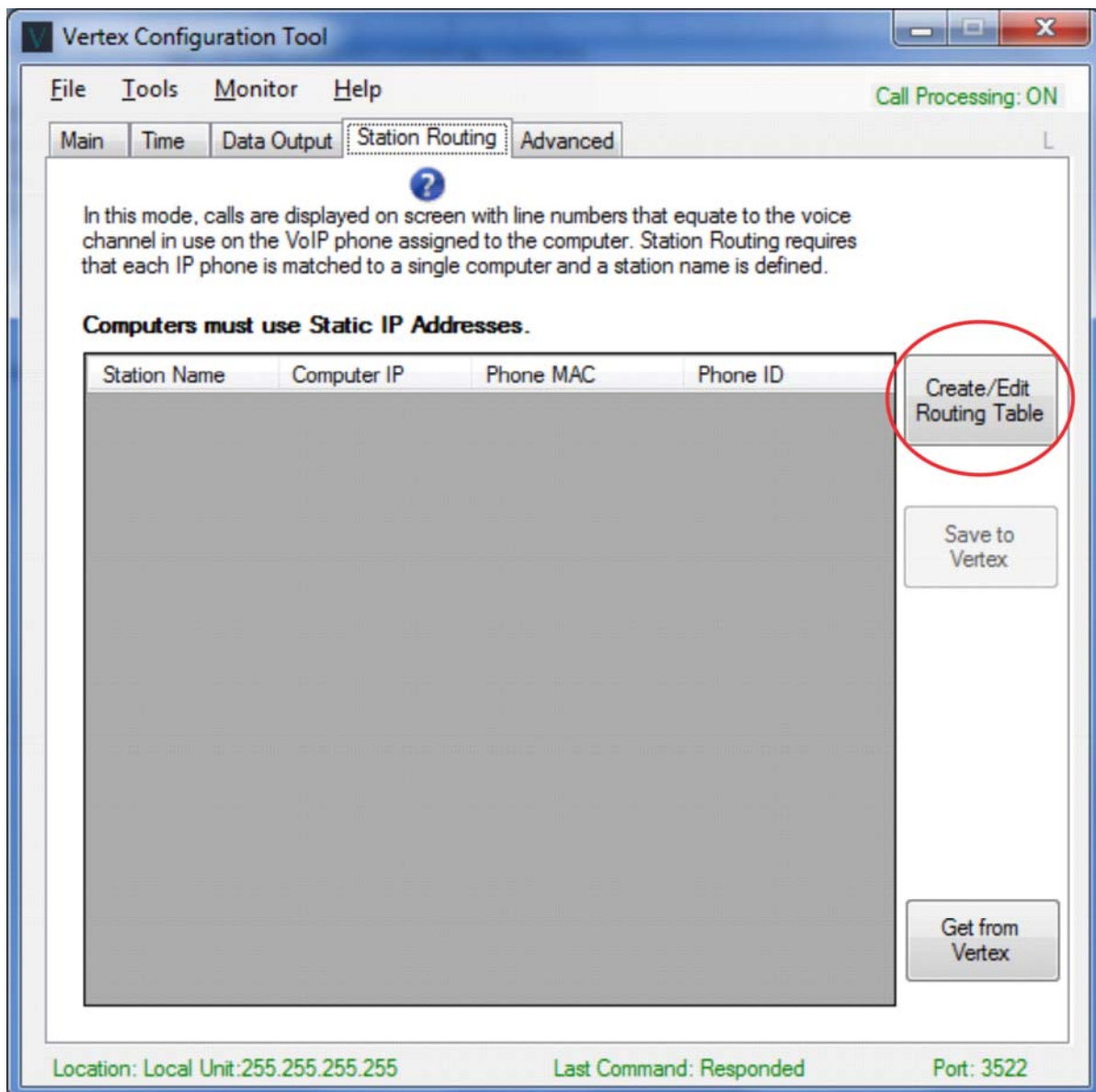
## VCT Station Routing Tab

The Station Routing method of data delivery is designed for locations having many VoIP phones and multiple voice channels available on each phone. Your software application must be written in a particular manor to take advantage of the Station Routing method.

Station Routing sends individual Caller ID records to each computer. The phone line number displayed on the computer for each call, will match the line appearance button on the VoIP phone. For example, if Station A is on a call and Station B is idle, a new call will show as Line 2 on Station A and Line 1 on Station B.

*Note: The Station Routing Mode will operate properly only if your computers have static IP addresses assigned to them.*

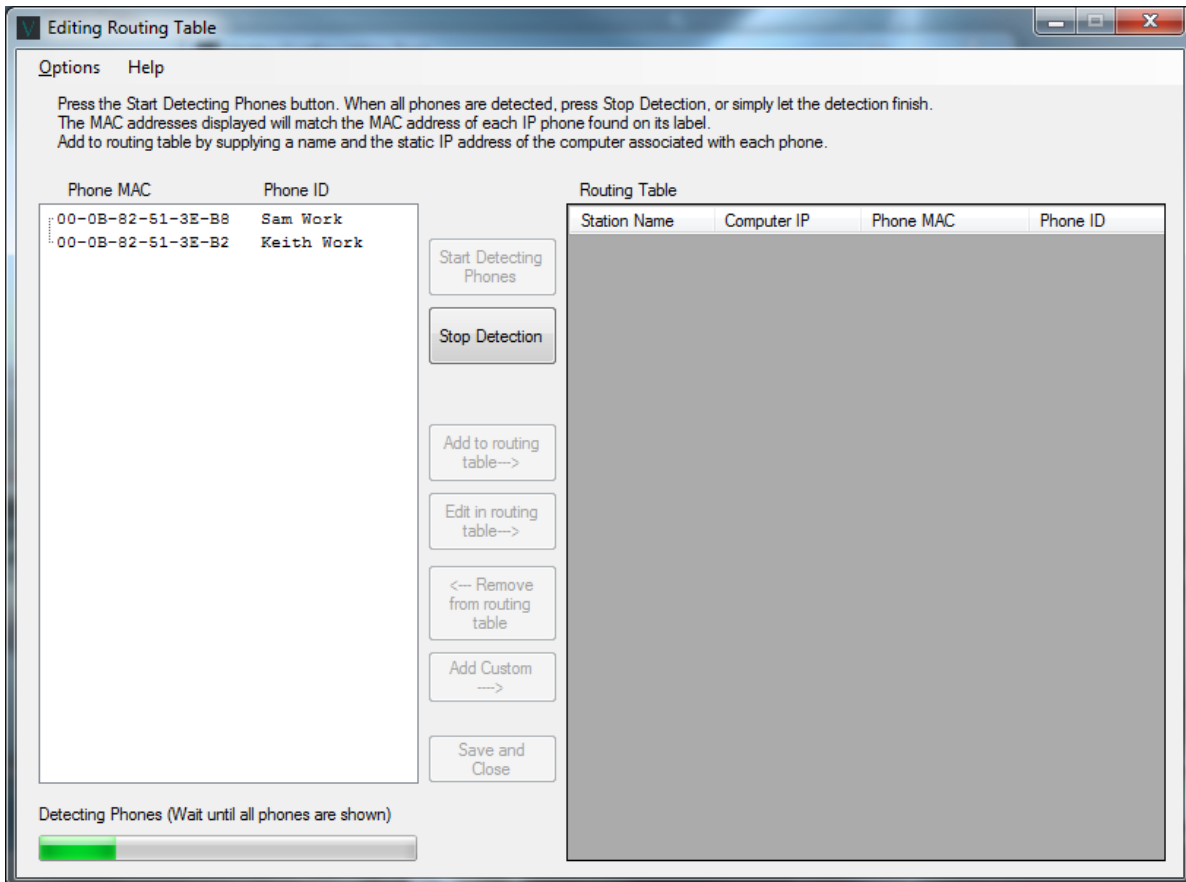
Initially, the Vertex will have no entries. Select the "Create/Edit Routing Table" button to add entries.



## Edit Routing Table

The Edit Routing Table allows you to detect phones and assign them to individual computers based on the computers static IP address. A workstation name will be assigned to each phone/computer combination.

Select the "Start Detecting Phones" button.



Wait until all your phones are detected and select **Stop Detection**, or you can simply let the 2 minute process time out. If all your phones are not detected, check whether the undetected phones are operating normally and start the detection process again.

This example shows 2 IP phones detected. The MAC address and the Phone ID are shown. Match each MAC address that the program detects, with your IP phone's MAC address printed on the manufactures label underneath each phone.

Select an entry on the left and press the Add to Routing Table button. Enter a workstation name and the IP address on the computer associated with that phone.

Input Station Name: Station 1  
Input Computer IP: 192 . 168 . 0 . 30  
Phone MAC: 00 - 0B - 82 - 51 - 3E - B8  
Phone ID: Sam Work

Add Cancel

Add the remaining detected phone entries to the Routing Table. Select the "Save and Close" button to save entries to the Vertex.

Options Help

Press the Start Detecting Phones button. When all phones are detected, press Stop Detection, or simply let the detection finish.  
The MAC addresses displayed will match the MAC address of each IP phone found on its label.  
Add to routing table by supplying a name and the static IP address of the computer associated with each phone.

Phone MAC	Phone ID	Station Name	Computer IP	Phone MAC	Phone ID
		Station 1	192.168.0.30	00-0B-82-51-3E-B8	Sam Work
		Station 2	192.168.0.31	00-0B-82-51-3E-B2	Keith Work

Start Detecting Phones  
Stop Detection  
Add to routing table-->  
Edit in routing table-->  
<-- Remove from routing table  
Add Custom --->  
Save and Close

Finished.

The main Station Routing tab will display your entries.

Vertex Configuration Tool

File Tools Monitor Help Call Processing: ON

Main Time Data Output Station Routing Advanced L

?

In this mode, calls are displayed on screen with line numbers that equate to the voice channel in use on the VoIP phone assigned to the computer. Station Routing requires that each IP phone is matched to a single computer and a station name is defined.

**Computers must use Static IP Addresses.**

Station Name	Computer IP	Phone MAC	Phone ID
Station 1	192.168.0.30	00-0B-82-51-3E-B8	Sam Work
Station 2	192.168.0.31	00-0B-82-51-3E-B2	Keith Work

Create/Edit Routing Table

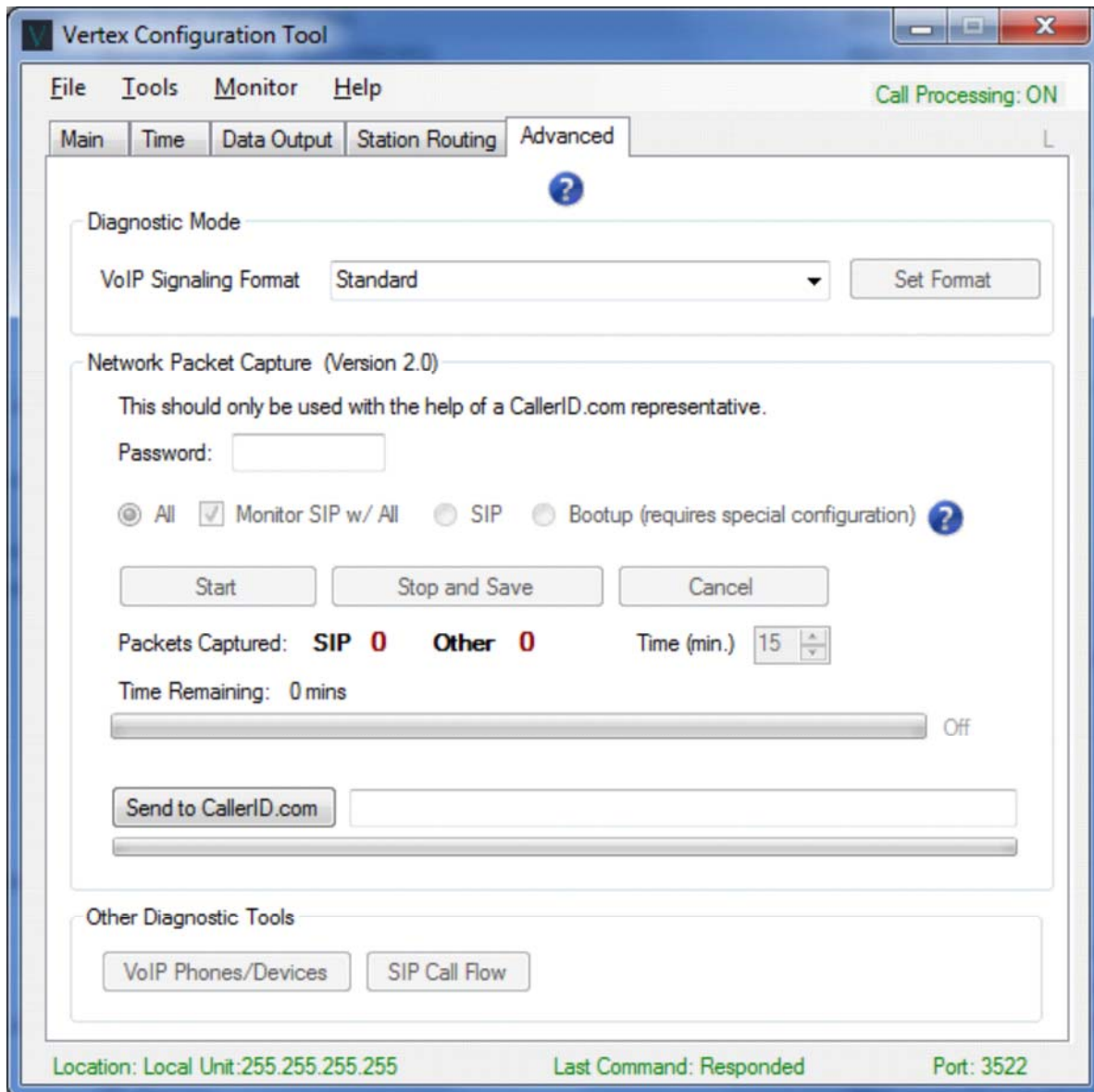
Save to Vertex

Get from Vertex

## VCT Advanced Tab

This section is used for diagnostic purposes to instruct the Vertex is set to dump raw network packets to the program. The VCT can analyze SIP packets to show the call flow and other detailed data that may be used to configure the Vertex. It also saves these packets into a file that can be read by Wireshark, a packet analyzer application.

During the raw packet dump, the normal processing of Caller ID records is automatically turned off. Consequently, VCT and other applications will not show standard call records.



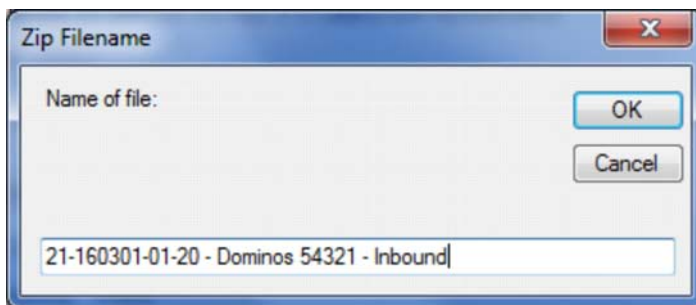
**VoIP Signaling Format.** Normally, the SIP Invite header includes the Session Description Protocol (SDP). The Vertex requires information from the SDP to process call records. A few VoIP providers do not transmit SDP on inbound calls until a phone is answered (SIP 200 OK header). The "Slow-Start SDP & Frag.TCP" format option is available for these providers. This same option should be used when fragmented TCP SIP headers are delivered by the provider. Analyzing a packet capture with Wireshark will determine whether this optional signaling format is required.

## Network Packet Capture

Once the Password is entered, advanced options can be used. The password is **callerid**.

*Tip: Just under the "Call Processing ON" label is the grey letter **L**, (Locked, password required). Instead of typing in a password, simply right-mouse-click the **L** to unlock.*

1. Normally, select **All** and **Monitor SIP w/ All**. If heavy network traffic causes VCT to lock up or crash, try deselecting **Monitor SIP w/ All**. Or use just **SIP**.
2. Select **Start**. Call processing will be turned off. The number of SIP and Other network packets will be shown. You must see SIP packets when performing a capture for the Vertex. If no SIP packets are captured, the Vertex is either not connected correctly or your VoIP provider is not sending standard, unencrypted SIP packets.
3. Make an Inbound test call to your VoIP phone number. Answer the call for a few seconds and hang up. You have 2 minutes to make the call before the network capture times out.
4. Select **Stop and Save**. Rename the file. Adding your company name to the serial number that the file name defaults to.



5. You can send the file to CallerID.com. You will need to follow up with an Email stating the problem you are having and when the file was uploaded.

## Bootup (Radio Button)

This helps troubleshoot DHCP, DNS and NTP protocol issues. A particular Vertex network connection is required that allows the VoIP Bridge Ports to monitor all packets sent and received from the Management Port upon boot up. Also, a DIP switch setting must be made. Refer to Appendix A / Advanced Troubleshooting / [DHCP, DNS, and NTP issues](#) for more information.

## Other Diagnostic Tools

### VoIP Phones/Devices.

Select "Start" and make either an inbound or outbound call. Details are shown for any phone that rang during the call. An outbound call shows the phone that made the call. Registration packets and other communication between the phones and VoIP may also produce results.

### SIP Call Flow

The VCT can analyze raw SIP VoIP packets captured to determine a number of items. For example, on an inbound test call:

- The IP address of device Invites coming from and going to.
- How which phones are receiving SIP signaling.
- Which phones ring, which ones do not, and the reason shown by the SIP header
- Reason why the Vertex is not reporting the "correct" Caller ID name or number.
- The SIP Gateway MAC.



## Default View

The capture below is from an inbound call to 3 phones within a ring group. A SIP **Invite** triggers a call flow for each of the 2 phones that ring. One phone was set to "Do not Disturb", so no Invite was sent from the VoIP provider and does not show here.

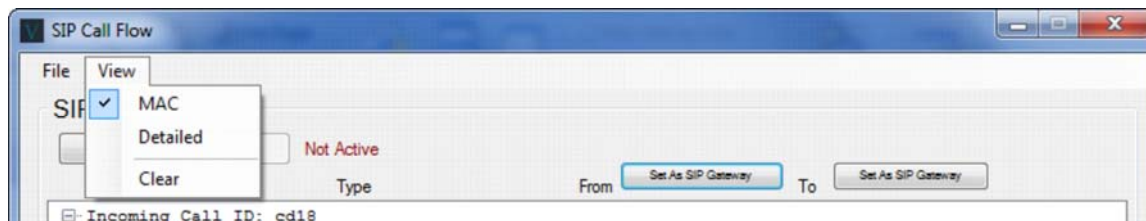
*Note: If the Vertex is monitoring all phones in the ring group and one or more phones do not display here, the Vertex is not seeing a SIP Invite to that phone. We have encountered locations where some phones are communicating via unencrypted SIP, while other phones in the same ring group are using alternative signaling. Further analysis would verify whether this is the case and your VoIP provider would need to remedy.*

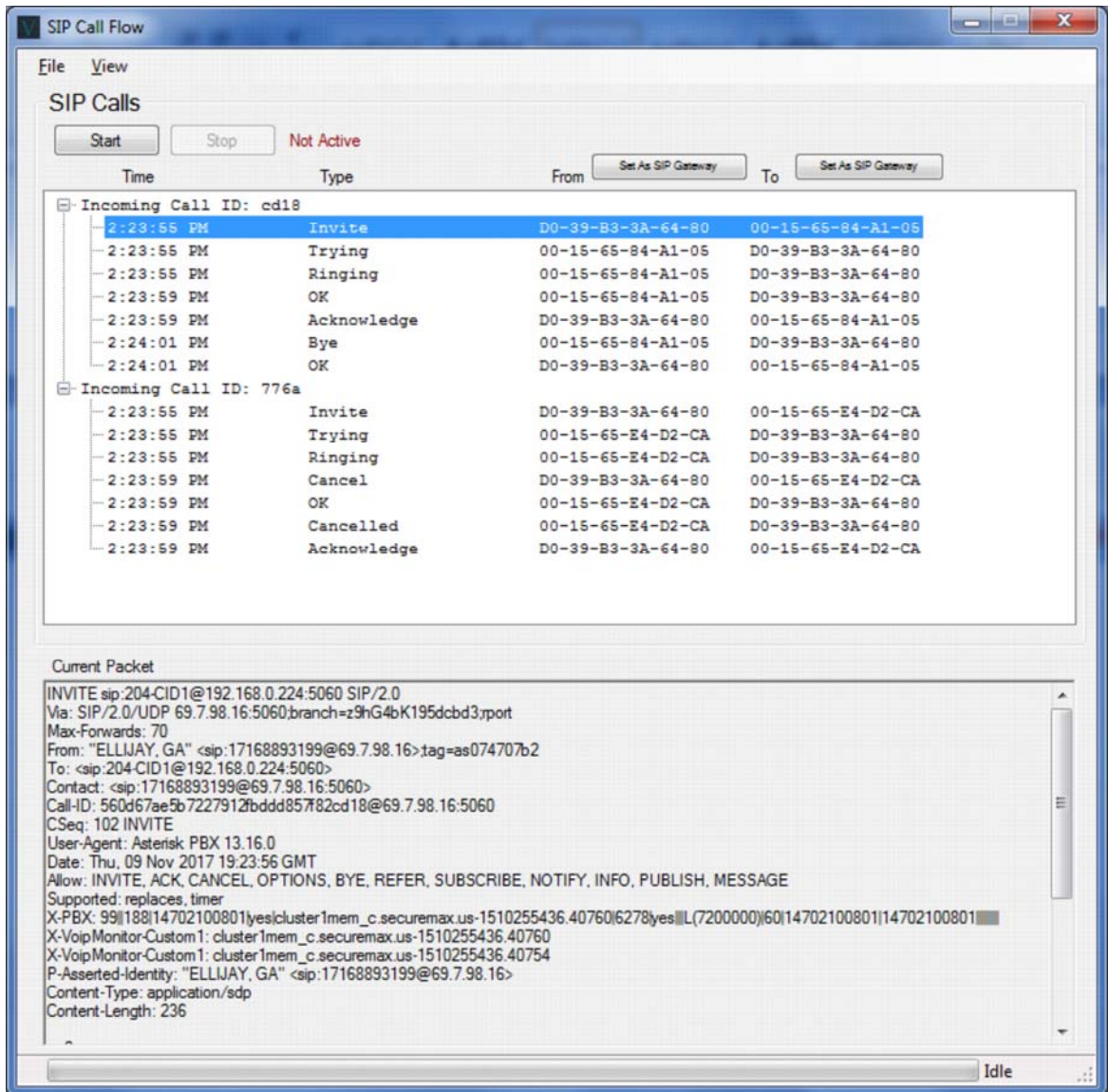
Time	Type	From	To
Incoming Call ID: cd18			
2:23:55 PM	Invite	ELLIJAY, GA	204-CID1
2:23:55 PM	Trying	204-CID1	ELLIJAY, GA
2:23:55 PM	Ringing	204-CID1	ELLIJAY, GA
2:23:59 PM	OK	204-CID1	ELLIJAY, GA
2:23:59 PM	Acknowledge	ELLIJAY, GA	204-CID1
2:24:01 PM	Bye	204-CID1	ELLIJAY, GA
2:24:01 PM	OK	ELLIJAY, GA	204-CID1
Incoming Call ID: 776a			
2:23:55 PM	Invite	ELLIJAY, GA	205-CID1
2:23:55 PM	Trying	205-CID1	ELLIJAY, GA
2:23:55 PM	Ringing	205-CID1	ELLIJAY, GA
2:23:59 PM	Cancel	ELLIJAY, GA	205-CID1
2:23:59 PM	OK	205-CID1	ELLIJAY, GA
2:23:59 PM	Cancelled	205-CID1	ELLIJAY, GA
2:23:59 PM	Acknowledge	ELLIJAY, GA	205-CID1

This shows that extension 204-CID1 answered the phone call since the **OK** was sent by the phone after ringing. Extension 205-CID1 received a **Cancel** from the VoIP server at the same time the other extension answered.

## MAC View

In the Example on the next page, we used the Menu selection: **View / MAC**.





## Caller ID Name and Number Reporting

The Caller ID name and number is captured from a header in the SIP INVITE (see *Current Packet* above). The *From* header is always present, but depending on the VoIP provider, 2 additional headers that include the name and number could be present. The Vertex uses the first header found, searching in the following order:

**P-Asserted-Identity → Remote Party ID → From**

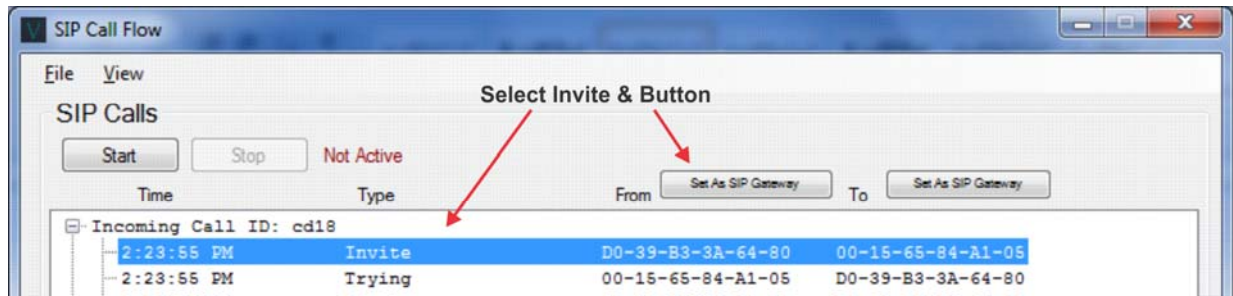
In the example above, the *P-Asserted-Identity* header is used.

The name is extracted from the header by locating the first quote ( " ) and then storing the next 15 characters. In this Example, the Name will be displayed as ELLIJAY, GA. If the text is less than 15 characters, the trailing quote terminates the capture. The Vertex uses spaces to pad short names to 15 characters when outputting.

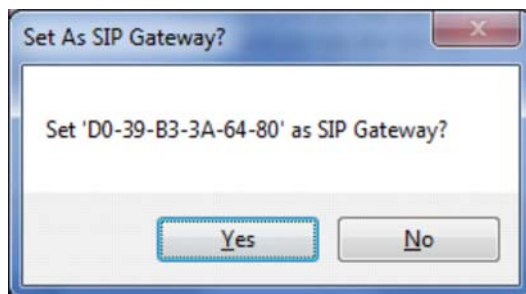
The Caller ID number appears after the string **<sip: as 17168893199**. The Vertex algorithm ignores a leading plus sign (+) or a 1. It collects up to 14 digits or until terminated by the @ sign. If the number of digits collected exceeds the number set when [ignoring extension to extension dialing](#), then the Caller ID number will be sent to the application.

## SIP Gateway MAC Determination

Inbound calls will invoke SIP Invites from the SIP Gateway. In the example on the previous page, an Invite is coming from the SIP Gateway to each of the 2 phones ringing. If the Gateway MAC is needed, select the **Invite** record and use the "Set to SIP Gateway" button next to **From** heading.



If an outbound call is captured instead, the phone invokes the Invite, sending it to the SIP Gateway. In this case, select the Invite record and "Set to SIP Gateway" next to the **To** heading.



## Menu Selections

### File / Setup Wizard

The Setup Wizard walks the user through all the necessary parameters used for proper Vertex operation. All settings can be performed manually using the VCT tabs explained above.

*Note: If running the Setup Wizard using a VPN connection, or in any other case where a UDP broadcast connection is not available, follow [instructions for VPN connections](#).*

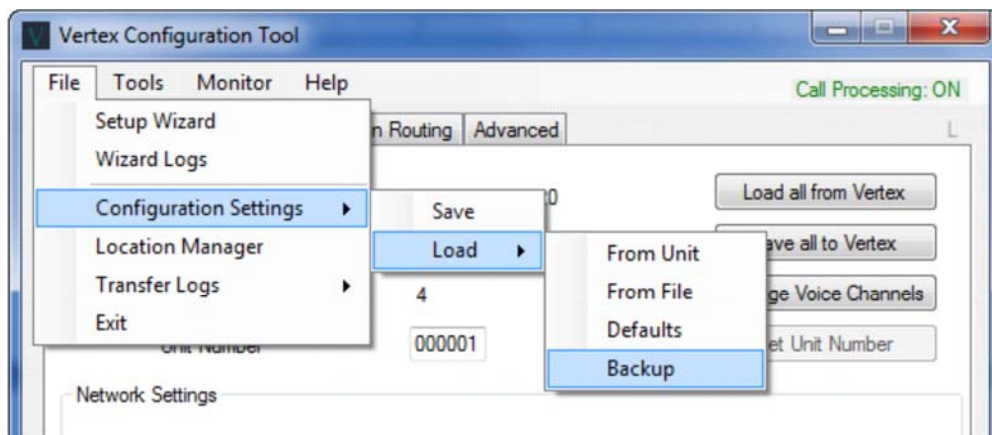
### File / Wizard Logs

These files show the detailed results of each Setup Wizard run.

### File / Configuration Settings

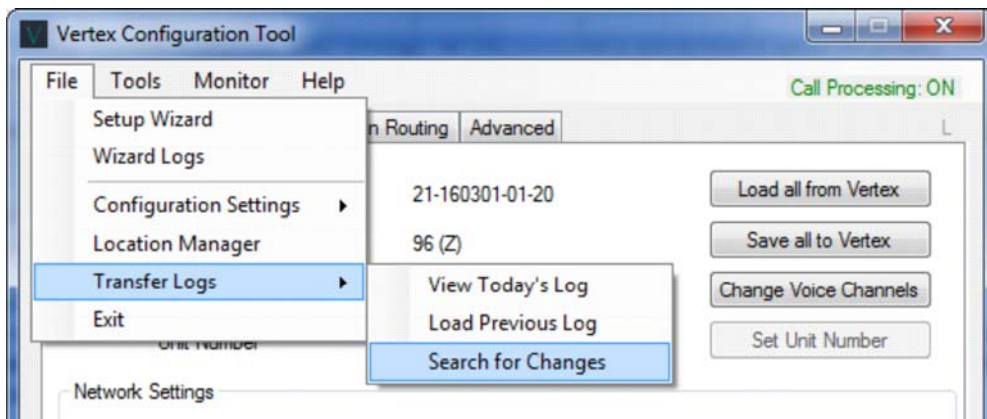
The Vertex hardware saves all settings within non-volatile memory. We recommend saving these parameters in a file on the PC. If the Vertex needs to be replaced or repaired, the settings can be loaded from the VCT back to the hardware.

Although, a backup file of the settings is saved when exiting the VCT, it is advised to also manually save them to a file. Loading defaults should only be used if you need to clear the hardware of all parameters previously set.



### File / Transfer Logs

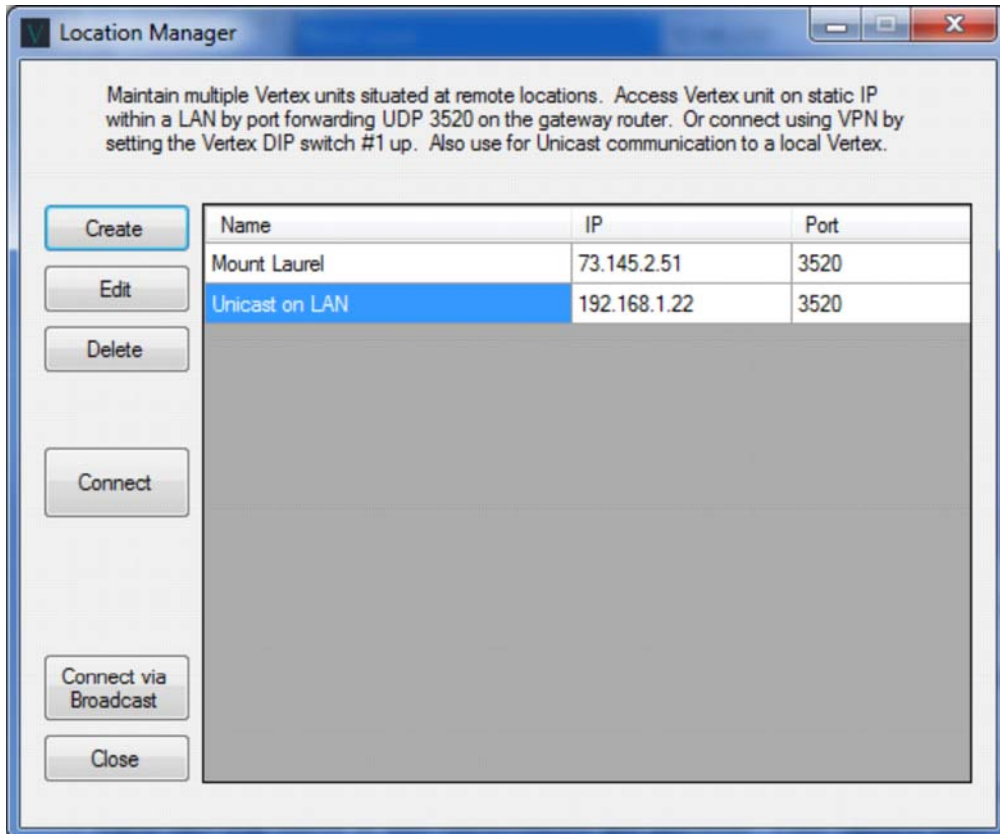
These files show all parameter changes sent to the Vertex hardware from the VCT. "Search for Changes" may help to determine whether any recent parameter changes may have adversely affected the Vertex operation.



## File / Location Manager

The Location Manager is normally used for the maintenance of units situated at multiple remote locations. To access a Vertex unit from outside a Local Area Network, set Port Forwarding on the gateway router to direct port 3520 (Vertex default port) to the IP address of the Vertex. We recommended assigning a static IP on the Vertex hardware to prevent DHCP from changing the IP address.

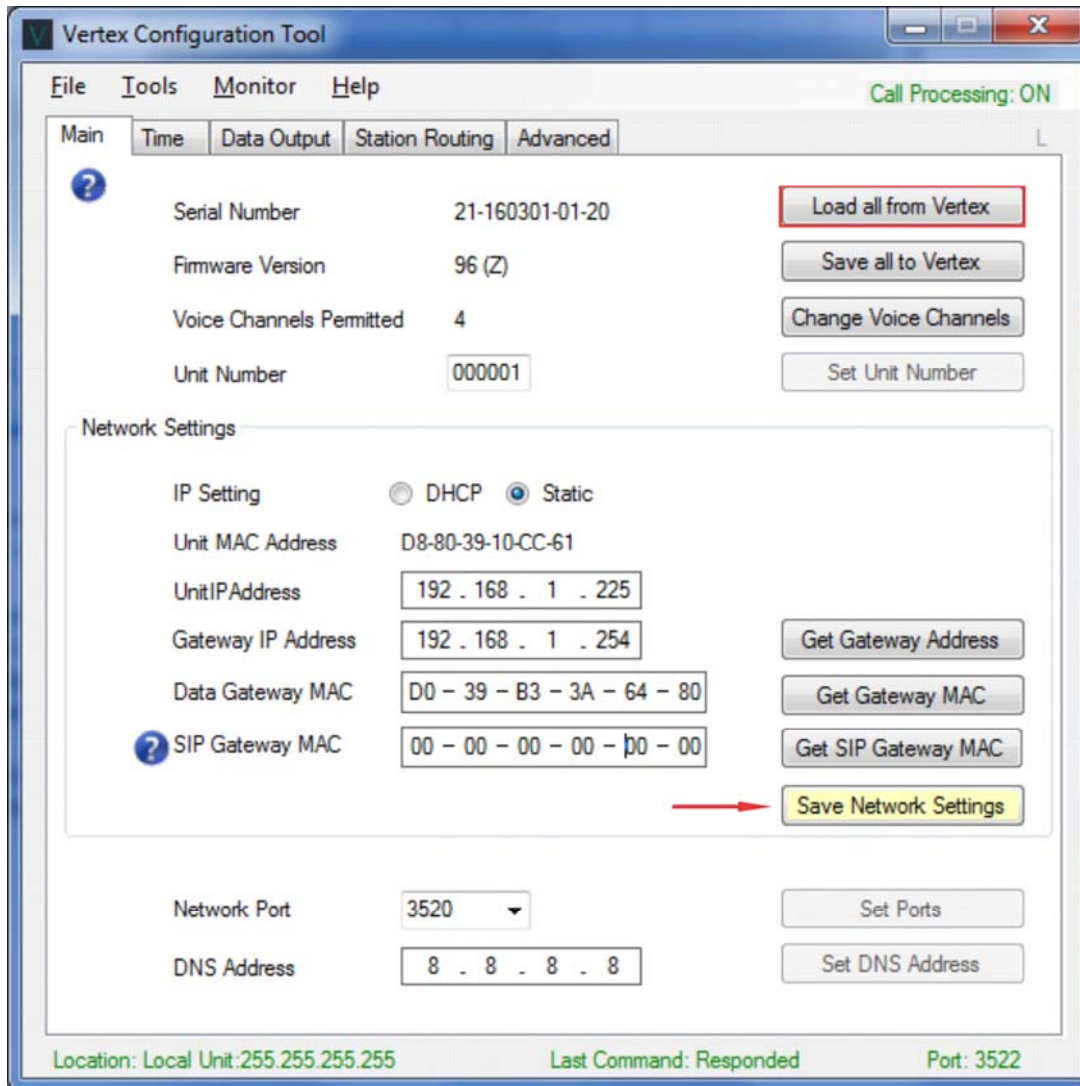
The Location Manager can also be used to connect to the hardware via Unicast, in case the router or some other device on the network is blocking the Broadcast packets sent by the VCT.



When performing administration on multiple sites, the location Manager allows you to change from one location to another, without closing out of the VCT.

When the VCT connects to the Vertex at a new location, the parameters of the new unit will load in the background. The parameters from the last location will be shown in the foreground. The highlighted buttons on each tab will show if any differences are present. This allows easy comparison of two units.

In order to show parameters in VCT from the newly connected unit, use “Load all from Vertex” button on the main tab.



## **Tools / My Computer IP**

Displays your computer IPv4 address.

## **Tools / PING**

This tool allows you to check for most basic response from the Vertex by sending a PING. The default is 192.168.1.90. If the no response is returned, then Ping IP address is not recognized by the router. If the Vertex has obtained an IP address via DHCP, then the IP address will be listed in the router, under devices connected.

If you set a static IP address prior and need to reset the unit to defaults, use the DIP switches on the back of the hardware. Set all 4 DIP switches to the up position and re-power the unit. Remember to set all switches back down after reboot, or any changes will be lost when the hardware is subsequently rebooted.

## **Tools / Reboot Unit**

If using this command, make sure DIP Switches on the back of the unit are set correctly. For instance, you may have set all 4 DIP switches Up to reset the hardware to defaults after boot up. If so, remember to set them back down before subsequent reboot in order to save any changes made.

## **Tools / Reset Hardware to Defaults**

This option is password protected ( password = **callerid** ).

Defaults are as follows:

### Main Tab

DHCP ( IP = 192.168.1.90 if no DHCP is negotiated)

SIP Gateway MAC = 00-00-00-00-00-00 (Use Data Gateway MAC)

Network Port = 3520

DNS Address = 8.8.8.8

### Time Tab

Time Offset = (GMT - 5) Eastern Time

Daylight Savings Time = Enabled with USA defaults

Time Servers

#1 = time.nist.gov

#2 = time-nw.nist.gov

#3 = time-a.nist.gov

#4 = time-b.nist.gov

### Data Output Tab

Destination = Broadcast

Do not report Ext. to Ext. calls = Selected with 5 digit extensions

Comprehensive Options = Send at Both Start and End

### Station Routing Tab

All routing table entries cleared.

## **Tools / Broadcast Connection**

This invokes the exact search routine performed when launching VCT. It uses the default Broadcast method of finding the Vertex by sending a **^^VxX** to IP 255.255.255.255 and awaits the appropriate response 3 times. For a Unicast connection, use [File / Location Manager](#).

### Tools / Call Processing

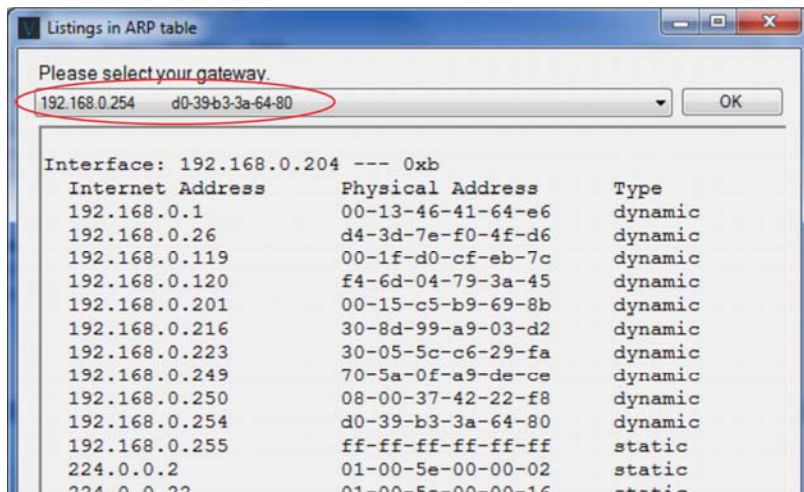
Processing call records should be on when Vertex is in normal operation. Call records are not processed during procedures involving Network Packet Captures.

### Tools / Find Vertex Port

This tool searches for the Vertex on approved ports at the time of writing (3520 and 6699). If it receives the response from the hardware, it loads the Vertex parameters into the VCT using that port.

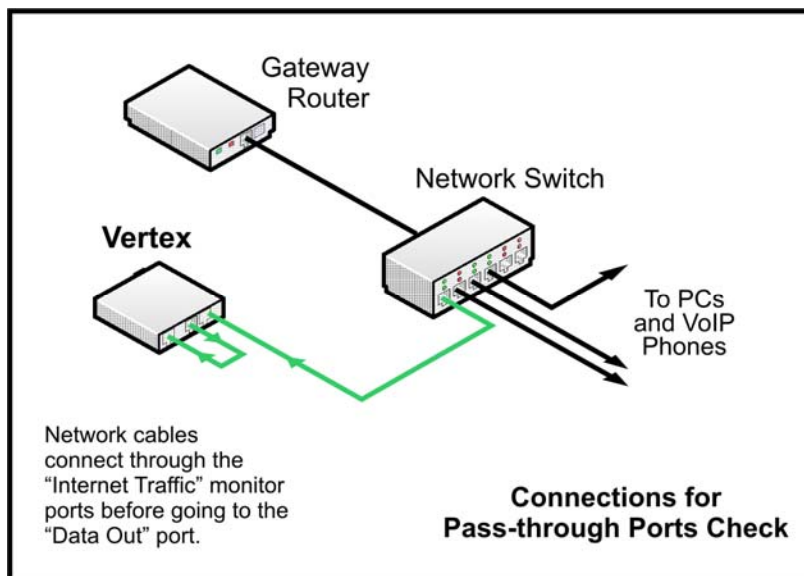
### Tools / ARP Table

Results show when user has administrator rights. If the Vertex is set for Static IP, you can set the Data Gateway MAC within the VCT by choosing your Data Gateway IP address and selecting "OK".



### Tools / Port Test

This tests the functionality of all 3 ports on the Vertex. You must re-configure the Ethernet connections as shown below to perform the Port Test.



Port 1 is the Management Port.

Port 2 is the VoIP Bridge Port marked "Towards Gateway".

Port 3 is the VoIP Bridge Port marked "To Phones".



## Tools / Set Vertex to PC Time (Unlocked Mode)

The internal time clock of the Vertex is normally set by accessing the National Time Servers. Time and Date may also be obtained from the VoIP packets (refer to the [VCT Time Tab](#)). Setting the Date and Time from the PC is the last resort and is only permitted when VCT is in the [Unlocked Mode](#). When the Vertex power is removed, the time and date is lost.

## Monitor / Call Records

This screen will display UDP call records sent from the Vertex. This is the same information that is sent to your Caller ID program. This is useful when diagnosing issues with a Caller ID popup module within your application.

The column header definitions are as follows:

**Serial Number** - Provided to distinguish multiple CallerID.com units on the network. Perhaps, you may have a Vertex and an Ethernet Link analog unit or 2 Vertex units.

**Ln** - Line number of phone call

**I/O** - Inbound or Outbound call indicators. If Outbound monitoring is turned on, Outbound call records will be shown in Blue. If "Send Detailed Data" is selected in the [Data Output Tab](#), Ring (R), Off-Hook(F), and On-Hook (N) events will be shown in this column.

**S/E** - Start of Call or End of Call record. "End of Call" records must be enabled on the [Data Output Tab](#) to display here.

**Dur** - Duration of phone call in seconds. Shown only on "End of Call" records.

**CS** - Checksum indicator. Not valid with VoIP signaling. Always "G" from Vertex. Used as a placeholder for consistency with CallerID.com format.

**Ring** - Type and number of Rings before answer. Not valid with VoIP signaling. Always "A1" on inbound and "A0" on outbound calls from Vertex. Used as a placeholder for consistency with CallerID.com format.

**Date** - Obtained from National Time Servers, VoIP packets, or set from a PC. Refer to the [Time Tab](#) section for more information.

**Time** - Obtained from National Time Servers, offset by the time zone selected, and Daylight Savings Time parameters. If unavailable, time can be obtained from the VoIP packets, if present.

**Number** - Caller ID number acquired by the Vertex from Invite packet sent by the service provider. For more information, refer to [SIP Call Flow](#) under the Advanced Tab section.

**Name** - Caller ID name acquired by the Vertex from Invite packet sent by the service provider. Many VoIP providers do not send Caller ID name (---no name---). For more information, refer to [SIP Call Flow](#) under the Advanced Tab section.



The screenshot shows a window titled "Call Records" with a table of call data. The table has columns for Serial Number, Ln, I/O, S/E, Dur, CS, Ring, Date, Time, Number, and Name. The data is as follows:

Serial Number	Ln	I/O	S/E	Dur	CS	Ring	Date	Time	Number	Name
17-001704-10-03	02	R					11/02	10:03:52		
17-001704-10-03	02	I	S	0000	G	A0	11/02	10:03 AM	716-889-3199	WIRELESS CALLER
17-001704-10-03	02	F					11/02	10:04:00		
17-001704-10-03	02	N					11/02	10:04:10		
17-001704-10-03	02	I	E	0011	G	A1	11/02	10:03 AM	716-889-3199	WIRELESS CALLER

At the bottom of the window, there is a status bar with the following text: "Current Serial: All Filters: Incoming Outgoing Detailed Call Accounting".

## Call Records - Filters

If you do not see the expected Call Records, make sure that the appropriate type record filters are checked. Filters listed in Green below the call records will show. Red listings types are not shown.

The hardware must be set appropriately to deliver the expected records. Use the [Data Output Tab](#) to change the hardware output. Your Caller ID application is designed for specific call record types. Any additional data sent by the Vertex may prevent your application from functioning properly.

### Filters / Show Incoming

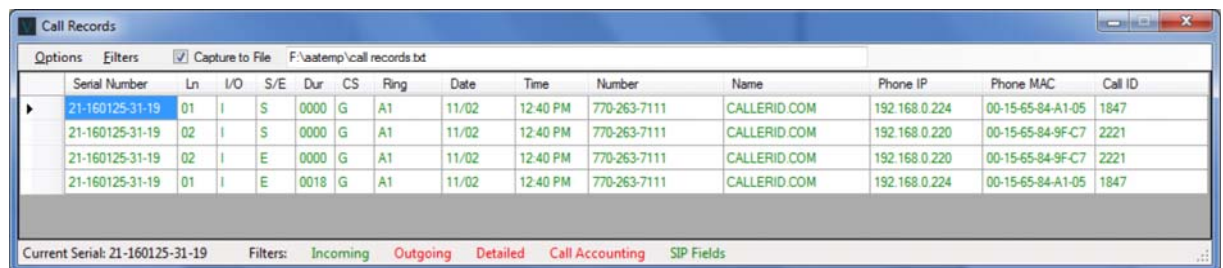
When network parameters are configured correctly, the Vertex will always show Incoming records. Be advised that the hardware can be set to only send Incoming Caller ID records at the "Start of Call" only, the "End of the Call" only, or both the start and end of call.

### Filters / Show Outgoing, Detailed, Call Accounting

The Vertex hardware must be set to send Outgoing, Detailed, and Call Accounting records for this additional data to be shown in the Call Records screen.

### Filters / Show SIP Fields

The Vertex hardware must be set to send SIP Fields for this option to be available. With the standard output format, when an inbound call rings multiple phones, a single start and end record is created for the call. The Extra SIP field format creates a start and end of call record for each phone and sends additional fields appended to the records. In the example below, one inbound call rang 2 phones. The phone with IP 192.168.0.224 answered for 18 seconds. One Start and one End of call record was sent for each phone.



Serial Number	Ln	I/O	S/E	Dur	CS	Ring	Date	Time	Number	Name	Phone IP	Phone MAC	Call ID
21-160125-31-19	01	I	S	0000	G	A1	11/02	12:40 PM	770-263-7111	CALLERID.COM	192.168.0.224	00-15-65-84-A1-05	1847
21-160125-31-19	02	I	S	0000	G	A1	11/02	12:40 PM	770-263-7111	CALLERID.COM	192.168.0.220	00-15-65-84-9F-C7	2221
21-160125-31-19	02	I	E	0000	G	A1	11/02	12:40 PM	770-263-7111	CALLERID.COM	192.168.0.220	00-15-65-84-9F-C7	2221
21-160125-31-19	01	I	E	0018	G	A1	11/02	12:40 PM	770-263-7111	CALLERID.COM	192.168.0.224	00-15-65-84-A1-05	1847

### Filters / By Serial #

This may be used if more than one Vertex was installed at the same location or both a Vertex and a Whozz Calling? analog unit were both reporting data over the network.

### Capture to File (option)

This saves call records to a text file as they arrive into the VCT. This will not log any calls that previously arrived before the option is selected. Use Menu Selection: **Options / Save** to save call records already listed on the screen.

### Options / Capture to File Options

Select whether you want to capture "Start of Call" records, "End of Call" records or both.

## Monitor / Serial Data

This option is available when the Vertex Data Output is selected for Serial Port. If the Vertex is connected to the computer running VCT with a serial cable, this option may be used to view the call records sent. It is required that a working serial port is available not used by any other software. Close any application that may be accessing the chosen serial port. If unclear which serial port is connected to the Vertex, use **Tools / Port Scan**.

### Tools / Port Scan

VCT will scan all Com Ports seen on the PC in an attempt to locate the Vertex device. If found, "CallerID.com Unit Detected" will indicate the COM port to which the Vertex is connected. Other scan results are explained on the screen.

### Tools / Port Scan - Loopback Test Button

This tests the transmit and receive functionality of the PC's serial port. Follow on-screen instructions to check whether your serial port is working properly.

### Tools / Device Manager

This is a quick link to your PC's Device Manager allowing you to see the status of your COM Ports. If using a USB-to-Serial adaptor cable and you see an exclamation sign next to the listing, your USB-to-Serial drivers need to be installed properly.

### Tools / Upload

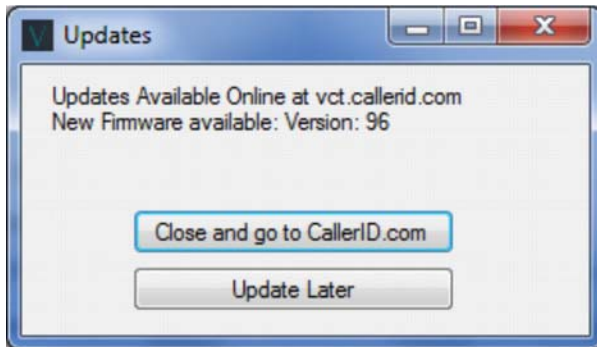
You can upload your resulting call records to CallerID.com for analysis. If so, please follow up with an Email stating your issue and include the Serial Number of the Vertex.

### Monitor / Raw Data

Used for diagnostic purposes, the viewed data can be saved to a file or directly uploaded to CallerID.com for analysis. If uploaded, please follow up with an Email stating your issue and include the Serial Number of the Vertex.

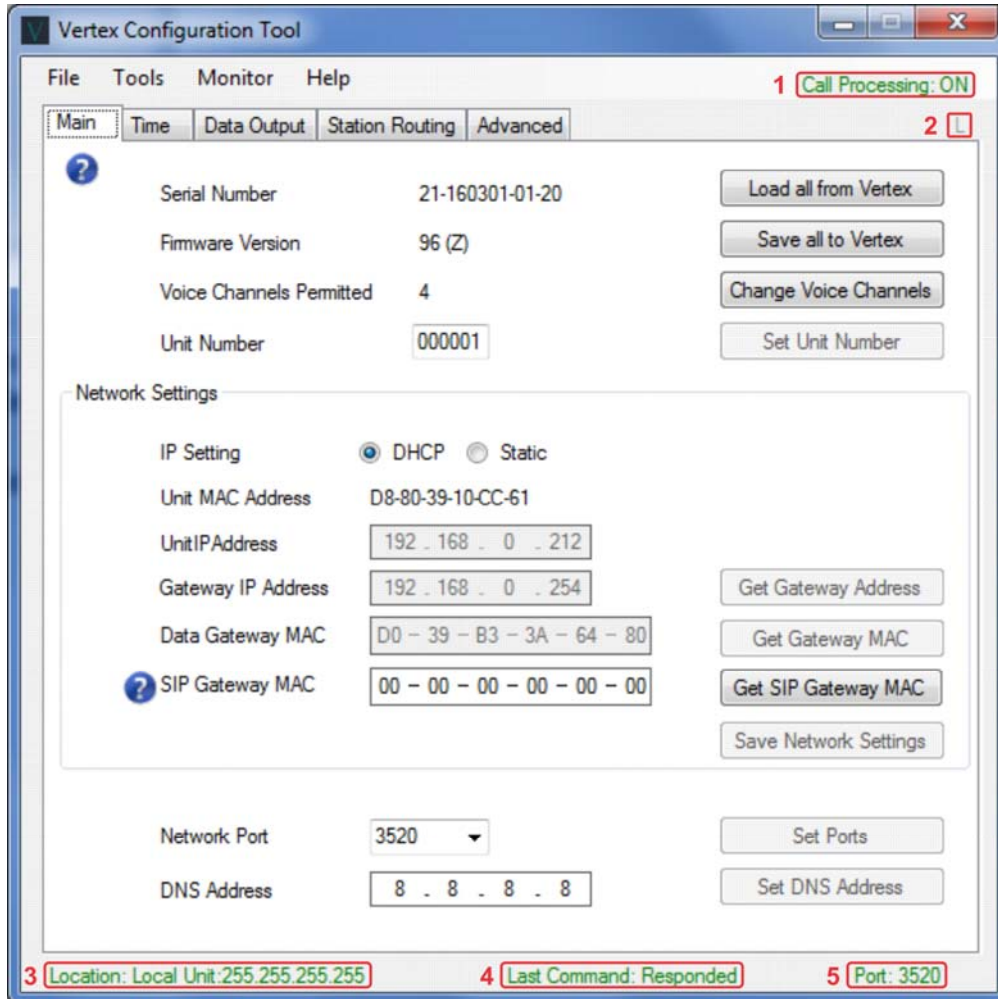
### Help / Check For Updates

This checks for both VCT and Vertex firmware updates. If your Vertex is working properly, do not perform a firmware update. When troubleshooting, updating to the newest Vertex Configuration Tool is recommended.



Updating firmware is recommended only after most common [troubleshooting](#) efforts have been performed. Before updating firmware, make sure you save the existing Vertex parameters on your PC using Menu: **File / Configuration Settings / Save**.

## VCT Window Form - Labels / Buttons



### 1. Call Processing label

When Call Processing is on, the Vertex processes VoIP call data and outputs in the format specified. Call Processing is turned off by the VCT when performing Network Packet Captures as done using the [Advanced Tab](#) and the "Get SIP Gateway MAC" button. When a Packet Capture is complete, the VCT automatically turns Call Processing back on.

### 2. Lock Label / Button

The "L" designates that password protected options are locked. Once the password, **callerid** is entered in any password protected option, the VCT is unlocked denoted by "U".

*Tip: A right-mouse-click on the "L" will unlock password protected options.*

### 3 & 4. Location: & Last Command Label / Button

Location shows the method of UDP communication with the Vertex. The default is a Broadcast connection (255.255.255.255). If you connect using the Location Manager, your defined location name and Vertex IP address is show. If the Location label is Green, the last communication between the VCT and the Vertex Hardware was successful. If Red, the most recent Command sent by the VCT was not returned by the Vertex.

*Tip: A mouse-click on the "Location" label / button will send a simple connection command. If the last command was not returned and the label is Red, this may re-establish a connection .*

## 5. Port Label

This shows which Port number the VCT is sending commands (default is 3520). The Vertex hardware communication port number can be changed on the Main tab. Unless your application uses a different port number, there is no reason to change it from the default.

## Specifications

### Physical

**Actual Unit Size** - 6.0"W x 7.1"L x 1.4"H

**Actual Unit Weight** - 0.81 lbs.

**Size of Entire Product Box** - 12" x 10" x 6"

**Weight of Entire Product w/ Peripherals** - 2.2 lbs

**Shipping Weight** - 3 lbs

**Dimensional Shipping Weight** - 7 lbs

### Electrical

**Supply Voltage** - 9V DC, 2.1mm Center Negative Connection

**Current Draw** - ~500mA

### Management Ethernet Port

**Speed** - 10/100 mbs Half and Full Duplex

**Polarity** - MDI/MDI-X auto crossover

### Pass-through VoIP Bridge Ethernet Ports

**Connection** - Parallel tap, no retransmission of packets (packet sniffing only)

**Pass-through Speed** - 10/100 mbs, (will not pass 1000 mbs)

## Manufacture's Information

CallerID.com  
5680 Oakbrook Parkway, #150  
Norcross, GA 30093

Sales 800.240.4637  
Service 770.263.7111  
Email [Info@CallerID.com](mailto:Info@CallerID.com)  
Web Site [www.CallerID.com](http://www.CallerID.com)

## Warranty Information

1. Any product manufactured by CallerID.com is covered under a 1 year, limited warranty.
2. This warranty is extended to the original purchaser of the equipment direct from CallerID.com as well as customers of dealers and distributors for CallerID.com products. This warranty is not transferable to any other parties.
3. The 1 year, limited warranty covers all parts and labor required to repair equipment manufactured by CallerID.com.
4. Purchase date will be determined by purchase receipt, other proof of purchase date, or serial number.
5. A return material authorization (RMA) number is required before returning equipment for repair. All repairs are covered under a 90 day limited warranty. Please contact CallerID.com to obtain a RMA number.
6. The warranty covers failures in materials or components occurring during normal use. It does not cover damage which occurs in shipment; failures which result from water damage, fire damage, accident, misuse, abuse, neglect, mishandling, misapplication, alteration, modification or unintended use of product; or service by anyone other than an authorized CallerID.com repair facility.
7. The warranty does not cover equipment struck by lightning or catastrophic power surges on either AC power line or network connections. Such events are identified when 2 or more components on the circuit board have suffered damage and/or electrical traces have been burned or vaporized.

## Appendix A - Troubleshooting

The Vertex requires five items in order to monitor and report call records on VoIP network packets.

1. The VoIP signaling must be unencrypted, SIP signaling.  
*The Vertex has no means to decode encrypted messaging.*
2. The VoIP traffic of interest must flow through the Vertex VoIP Bridge Ports.  
*The Vertex is a passive packet monitoring device that sees only the VoIP traffic flowing through it.*
3. The two Ethernet Controllers on the VoIP Bridge Ports must detect they are attached to the network connection passing through these ports. Both Amber lights must remain steady on.  
*Since the Vertex Ethernet controllers are in parallel with the network connection, there must be a carrier wave present for detection. If the two endpoints connected to each side of the Bridge Ports send continuous Fast Link Pulses, the carrier wave is not present, and detection is not possible.*
4. The Gateway Data MAC must be correct to obtain the current time for the call records sent.  
*The Vertex accesses the National Time Servers using the Data Gateway MAC. If DHCP is negotiated with the Gateway router, the Data Gateway MAC is known. If the IP address is set statically, the MAC must be determined.*
5. The SIP Gateway MAC entered determines whether calls will be detected as Inbound or Outbound.  
*The Vertex monitors for SIP Invite packets which indicate that a new call setup is in progress. If the Invite is sent from the SIP Gateway MAC, the call is detected as inbound. If the Invite is sent from a MAC other than the SIP Gateway MAC, it reports the call as outbound.*

### Setup Troubleshooting

► **Vertex Configuration Tool (VCT) will not detect the Vertex hardware.**

Solutions

- a. Check the Vertex Management Port lights. The amber light must be on and the green light flashing.
- b. Make sure the PC is connected within the same subnet as the Vertex. For example, if there is a secondary router upstream from the primary router, both the PC and Vertex have to be connected to the LAN side of the primary router or both connected to the LAN side of the secondary router.
- c. Turn off any 3rd party Firewalls on the PC (i.e. Norton, McAfee, Trend Micro, etc.).
- d. If DHCP on the router is enabled, re-boot the Vertex hardware in an attempt to negotiate DHCP.
- e. If the Vertex is still not detected, try running the VCT on another PC on the network with 3rd party firewalls turned off. If unsuccessful, go to next step.
- f. Check the router's DHCP table to determine whether the Vertex is listed. If shown, something is blocking UDP broadcasts. Ping the address listed. If the Ping is successful, go to step "h".
- g. If DHCP on the router is disabled, try to Ping the Vertex at the default IP address of 192.168.1.90.
- h. If Pinging the device is successful, you may have to use **File/Location Manager** in VCT to communicate. If so, the VCT Wizard will only be usable if the DHCP server uses automatic allocation, keeping a table of the last IP address the Vertex used. In other words, if the Vertex IP is assigned a new IP address upon successive reboots, then manual setup will be required.

## ► Amber Light(s) not Coming On or Flashing

### Background

The Vertex is a network packet monitoring device that inspects all traffic flowing through its VoIP bridge ports which connect two endpoints, such as a router and a network switch. Packet "sniffing" is achieved by Ethernet controllers connected in parallel to both the transmit and receive pairs of a 10/100BaseT connection. The controllers duplicate all VoIP packets seen on the wire for internal inspection and processing.

Being in parallel, these two Ethernet controllers can only detect a connection to the wire by sensing the carrier sine wave. When a controller sees the carrier wave, the corresponding Amber light remains steady and packet sniffing commences.

### Problem

Network appliances such as routers and switches send Fast Link Pulses (FLP) for auto-configuration of common network parameters such as speed, duplex, and flow control. These FLPs are usually sent only when the device boots up. But, some devices continuously send FLPs whenever the wire is idle (i.e. between network packets). When this is the case, the carrier wave is not present for the Vertex controllers to sense.

Both Amber lights on the Vertex VoIP bridge ports must remain steady on for proper operation. If one Amber light is off, then chances are, only one endpoint (router or switch) on either side of the Vertex is problematic. If both amber lights are off on the VoIP bridge ports, then most likely both network appliances are incompatible. Three options are available to help correct this issue.

## **Solutions**

### Option 1:

Many higher end routers and managed switches allow the flexibility to configure individual ports to static settings. If possible, set the port of the router or managed switch connected to the Vertex to the following:

- **100BaseT, Half Duplex**

Instead of constant FLPs, a normal carrier wave will be present for the VoIP bridge controller to sense a connection.

### Option 2:

Connect a particular type of network switch between the Vertex and the offending device. We have found that the TP Link switches listed below, work in many cases. Try one of these switches on one side of the Vertex. If unsuccessful getting the amber light steady on, try placing the switch on the other side of the Vertex.

- TL-SG105 (Metal enclosure, 10/100 switch)
- TL-SG108 (Metal enclosure, 10/100/1000 switch, will run at 100)
- TL-SF1005D (Plastic enclosure, 10/100 switch)
- TL-SG1005D (Plastic enclosure, 10/100/1000 switch, will run at 100)

### Option 3:

Use our alternative Vertex 2P device. This is a viable solution, but it does have drawbacks; whereas a standard Vertex is a passive packet sniffer, this is a 2-port switch. Therefore, it presents another point of failure, as would any network switch. The Vertex 2P reduces the throughput speed of the Ethernet connection. VoIP phones will not be affected, but we do not recommend computers be daisy-chained off the phones.



## ► Restoring to Factory Defaults

If you are able to connect with the Vertex and want to reset to defaults, use the software reset option. If you are having problems connecting with the Vertex Hardware using VCT, a hardware reset to factory defaults is an option.

### Software Reset

1. In VCT use Menu Selection: **Tools / Reset hardware to Defaults.**
2. Enter the Password: **callerid**

### Hardware Reset

1. Move all 4 switches on the back of the Vertex up (ON)
2. Unplug the unit for 10 seconds and plug it back in.
3. Wait for the power light to remain steady on. This could take up to 30 seconds.
4. Move all the switches back to the down position (OFF).
5. Vertex is now set to factory defaults.

## ► Reboot Causes Unit to Lose Parameters Previously Set

Check the 4 DIP switches on the rear of the unit. They should all be in the down position (OFF) for normal operation. When all switches are set to the up position (ON), the unit will return to factory defaults upon reboot.

If the MAC address of the unit, shown is the main tab of VCT, is 00-00-00-00-00-00, chances are all DIP switches are in the up position.

## ► Restoring Vertex to Previous Working Settings

The VCT saves a automatic backup of parameter files each time you exit the application. If you are using the VCT program from the same PC that configured the Vertex to a working condition, then a backup file of parameters will be available. To restore these parameters follow the steps below.

1. Select Menu: **File / Configuration Settings / Load / From Backup**
2. Select the appropriate file based on the date of automatic backup.
3. Select the button "Save all to Vertex"

## Operational Troubleshooting

### ► Call Parking and Vertex Operation

Call Parking can be accomplished by two basic scenarios. The first, is to send the caller to a general parking lot, where the exact *parking space* is determined by the provider. For purposes of identification, we will call this "Public Parking". The second type, is to transfer the call to an exact parking space, which we call "Private Parking". Most VoIP providers offer either one type or the other. Flexible buttons on the handset are usually programmed to accomplish the codes needed to place a call on park and retrieve parked calls.

When a caller is parked in the cloud, the call path is terminated from the caller to the on-site location. The Vertex unit sees a **Bye** SIP Packet and sends the termination call record. When the call is retrieved from park, the Vertex must see an **Invite** from the cloud server in order to recognize that a new call path has been re-established.

## Public Parking

When a caller is parked in a public lot, the cloud server simply puts the parked call in a parking queue. Although an extension is assigned by the server, it may not be readily apparent. When multiple calls are parked, retrieval of a particular caller may be difficult. Only the next call in queue would be easy to retrieve.

When a parked call is retrieved from a Public Parking queue, the cloud server does not send a SIP **Invite** packet. Therefore, the Vertex will not recognize that the call has been re-established and will not send a Caller ID record.

## Private Parking

Transferring the caller to a specific extension (parking space) allows easy retrieval of a particular parked caller. Flexible buttons (FB) can be programmed to transfer callers to exact parking extensions. These same buttons can be used to retrieve the caller.

For example, FB1 parks a call at x501, FB2 parks a call at x502, etc. Retrieval for a particular caller is as simple as selecting the FB used to park the caller. Flexible button lamps can be used to identify parked callers. Once a call is parked, the FB used to park the call lights up. Upon retrieval, the light goes off.

When a parked call is retrieved from a Private Parking space, the cloud server sends a SIP **Invite** packet. This allows the Vertex to report the Caller ID information of the retrieved call.

### ► **"Channels Exceeded" message showing on Caller ID**

If you see 'Channels Exceeded' as your Caller ID name, you do not have enough voice channels available on your Vertex to support the number of calls being processed at that moment. To eliminate this error, contact CallerID.com and purchase more voice channels. You will be given a code to instantly allow your unit to process more simultaneous calls.

### ► **Caller ID Name does not show correctly**

The Caller ID name is captured from a header in the SIP **Invite** sent by the VoIP service provider. The name is extracted from the first 15 characters of the name field in that header. If your provider is not sending the correct Caller ID name in the first 15 characters, you will need to contact them to remedy to situation.

In order to view the name information that your provider is sending, refer to:

Advanced Tab → SIP Call Flow → [Caller ID Name and Number Reporting](#)

## Advanced Troubleshooting

### ► Firmware Upgrade Procedure

1. Download and install the most recent [Vertex Configuration Tool suite](#).
2. Run the Vertex Configuration Tool (VCT). Note the **Version Number and Letter** on the Main Screen.
3. Exit VCT and run the **Vertex Firmware Uploader**.
4. Select **Vertex Firmware Website** button. At the website firmware page, enter Passcode: **ca11erid** (1's instead of L's).
5. Select your present firmware and save new suggested file. (**Do not unzip or run file**).
6. In the Firmware Uploader, select **Find File** button. Then **Upload** button.
7. When the upload is complete and the Vertex reboots, the program will indicate it is complete.
8. Run **VCT**. Use Menu selection: **File ► Load ► Backup** (Select the most recent file).
9. Select **Save all to Vertex** button.

### ► Using VCT via a VPN Connection

The VCT application can be run on a PC local to the network or on a remote computer accessing the site using a Virtual Private Network (VPN). When running VCT locally, by default, the Vertex responds to any commands and sends processed call records to a broadcast IP address (255.255.255.255). Any local computer running VCT should see the broadcast packets. Computers accessing the network via VPN will not see broadcast messages.

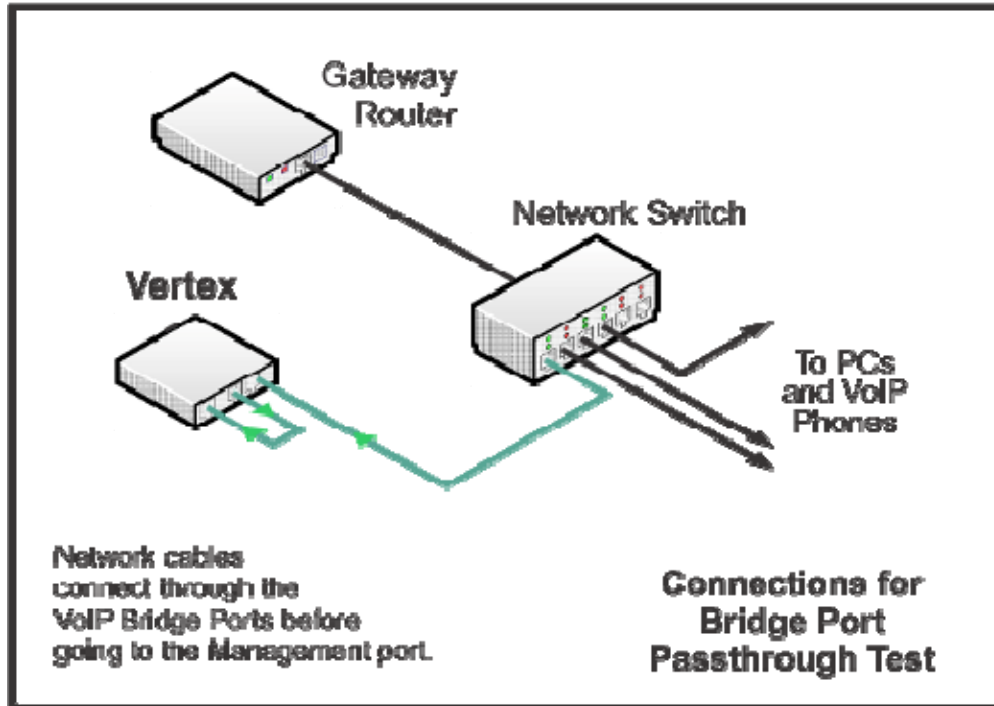
When running VCT on a computer using a VPN connection, the Vertex must respond via Unicast. If DIP switch #1 is up (ON), the Vertex will send back all command responses and processed call records via Unicast, to the IP address of the requesting computer. Upon reboot, the Vertex sends out all data using a broadcast IP, until the VCT connects again.

### Running VCT via VPN

1. Determine IP address on Vertex. If the Vertex obtained an IP address via DHCP, login to your router's connected devices to find the DHCP assignment of the label "Vertex-nnnn"  
*Note:* With VPN, we recommend setting the Vertex to a static IP address and reserving the address within the router's table.
2. Set only DIP #1 up on Vertex. All others should be down. Reboot unit.
3. Run VCT. It will not be able to connect to the Vertex on startup. Defaults will be loaded.
4. In VCT, Select **File / Location Manager**.
5. Select the **Create** button. Add location and use IP address found in step #1.
6. Select the **Create** button.
7. Select **File / Setup Wizard**. Continue until complete. Or, manually configure with VCT.
8. If your intended Caller ID application accepts Ethernet delivered Caller ID records, you must reboot the unit before use. Use Menu selection: **Tools / Reboot Unit**.
9. The Vertex will return to the Broadcast mode to send call records to the application.
10. If you need to access the unit again, simply use the Location Manager and connect. Remember to Reboot the unit after you are finished with the configuration.

► **Port Test to check "Bridge Ports" Functionality**

1. Make sure any VoIP phone traffic or critical internet traffic is not in progress.
2. Disconnect all Network Cables from the Vertex unit.
3. Reconnect the Router cable to the Switch, to re-establish VoIP calls and internet traffic.
4. Connect the "Data Out" network cable to one of the "Internet" ports. Refer to Diagram below.



5. In VCT, use Menu selection **Tools \ Port Test**.
6. Select the **Test Now** button.

The results will show the functionality of all 3 ports on the Vertex.

- Port 1 is the Management Port.
- Port 2 is the VoIP Bridge Port marked "Towards Gateway".
- Port 3 is the VoIP Bridge Port marked "To Phones".

► **LED Boot up sequence for Firmware Versions 92 and above**

Vertex is set for Static IP

- 2 Seconds ON
- Slow flash until ready
- Steady ON

Vertex is set for DHCP

- 2 Seconds ON
- Fast Flash for 4 seconds
- LED goes OFF while negotiating DHCP
  - **If DHCP is acquired** - LED immediately goes steady ON.
  - **If DHCP fails** - LED flashes fast for 4 seconds, then goes steady ON.

## ► DIP Switch Controls

DIP switch combinations set the unit for different items that may be needed for diagnostics or to access the unit via VCT. Below are the DIP settings for each mode ( "D" indicates switch in the down position, "U" is up ).

1 2 3 4	Mode
DDDD	Broadcast Mode (default)
UDDD	Unicast Mode
UDUD	Sends a standard response to a "X" command from the VCT, every second.
UUUD	Resets Vertex to Static IP address of 192.168.1.90 upon reboot.
UUDD	Sends IP address via Serial Port at 9600 Baud every second.
DUUU	Sends DHCP, DNS, and NTP packets via Network Packet Capture.
UUUU	Sets Vertex to default parameters upon reboot.

**DDDD** This default mode responds to commands and sends call records via UDP broadcast (255.255.255.255). All parameters will remain as set by the VCT.

**UDDD** Used when the VCT cannot communicate with the Vertex via UDP broadcast, as with a VPN connection. Unicast connection mode sends back commands to the requesting IP address. It also sends call records via unicast, once it receives a command from the VCT. A reboot allows call records to be sent via Broadcast until VCT connects again.

**UDUD** When launched, the VCT sends a broadcast "X" command. If seen, the Vertex responds back with all its parameters. This option instructs the hardware to simply send its parameters every second, regardless of the VCT command.

**UUUD** The Vertex default address is 192.158.1.90, but is set for DHCP. If VCT cannot detect the hardware, use this mode and reboot to set a static Vertex IP address of 192.168.1.90. If Pinging this address is unsuccessful, the PC may be on different subnet . If successful, try using the "Unicast Mode" along with the [Location Manager](#).

**UUDD** Sends the Vertex IP and whether it is set to Static or DHCP. Useful if VCT cannot detect hardware and a serial port is available. If Pinging this address is unsuccessful, the PC may be on different subnet. If successful, try using the "Unicast Mode" along with the [Location Manager](#) to configure the Vertex.

**DUUU** Diagnostic mode to troubleshoot DHCP, DNS, and NTP protocols. Used in conjunction with the Network Packet Capture on the [Advanced Tab](#). A particular Vertex network connection is required that allows the VoIP Bridge Ports to monitor all packets sent and received from the Management Port upon boot up. Refer to [DHCP, DNS, and NTP issues](#) below.

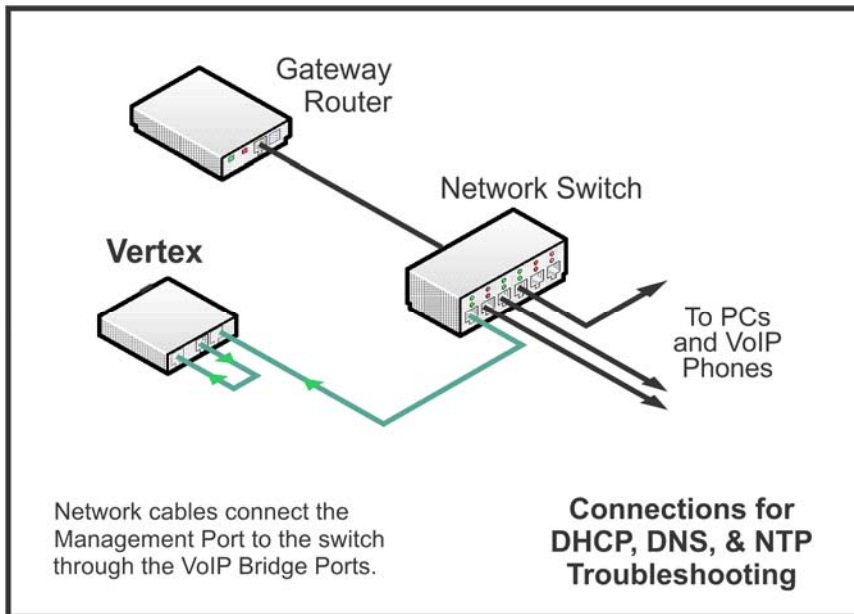
**UUUU** Sets the Vertex to the default parameters. If connecting with VCT is possible, we recommend setting the default parameters using [Tools / Reset Hardware to Defaults](#). Remember to set these DIP switches down immediately after boot up.

## ► DHCP, DNS, and NTP issues

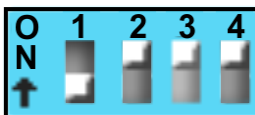
Dynamic Host Configuration Protocol (DHCP) allows network connected devices to automatically obtain a unique IP address from the network router or other DHCP server. Domain Name System (DNS) translates domain names to their numerical IP addresses. The Vertex requires DNS to obtain the IP addresses for the National Time servers to get the National Time Protocol (NTP).

In order to troubleshoot problems with DHCP, DNS, and NTP the Vertex must be connected as shown in the diagram below, so that it can monitor the Network Packets sent and received from the Management Port. A particular DIP switch setting is used along with the Network Packet Capture feature in the Advanced Tab. Analyzing the network packets requires an application such as Wireshark.

1. Make sure any VoIP phone traffic or critical internet traffic is not in progress.
2. Disconnect all Network Cables from the Vertex unit.
3. Reconnect the Router cable to the Switch to re-establish VoIP calls and internet traffic.
4. Connect the Management Port network cable to one of the VoIP Bridge ports.
5. Connect the other VoIP Bridge Port to a network switch or router.



6. Set Dip switches on back of Vertex to:



7. In the VCT, select the Advanced Tab, unlock using password **callerid**.
8. Under Network Packet Capture, select: **Bootup** and then **Start**.
9. Reboot Vertex using the Power Plug on the back of the unit.
10. Wait until finished, name the file, and select OK.
11. You can access the file by selecting **Upload to CallerID.com**.
12. Use Wireshark or similar program to analyze.

## **Appendix B - Known Incompatible VoIP Providers**

The Vertex is incompatible with the following VoIP providers since they do not communicate using standard, unencrypted SIP signaling.

List as of Jan 1, 2018

**RingCentral** - Belmont, CA

**Shoretel, Inc.** - Sunnyvale, CA (acquired by Mitel in 2017)

**Mitel Networks** - Ottawa, Canada