

CONFIGURATION GUIDE FOR THE VE-PG3 PSTN CONNECTION





FOREWORD

Introduction

This document provides a detailed explanation of each PSTN configuration parameter and tips for finding the right setting values for your telephone line. Also read the instruction manual for the VE-PG3.

Guide Revisions

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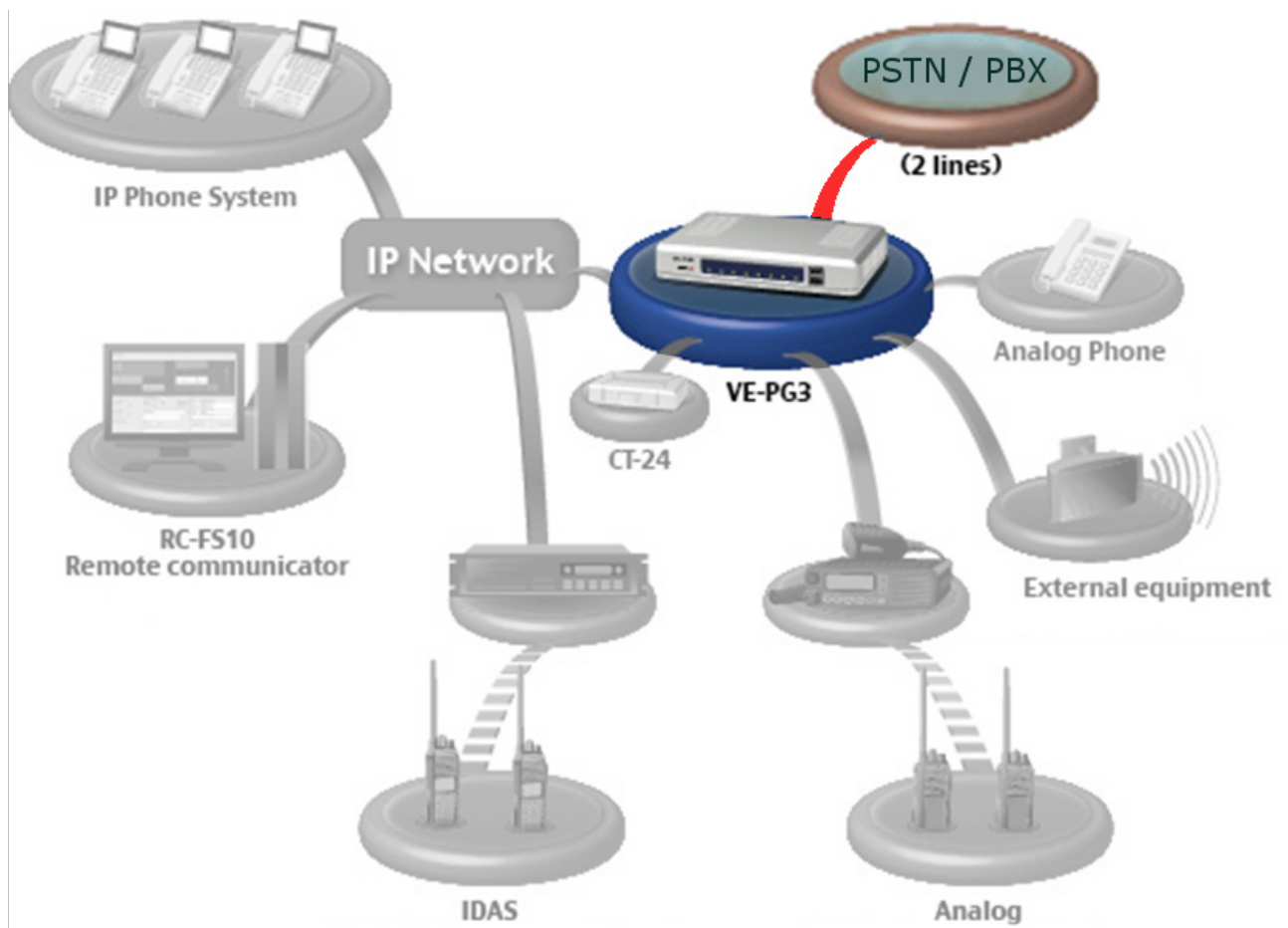
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SECTION 1 Configuration Parameters

This section explains details of each configuration parameter and helps you find the right settings to make your PSTN / PBX connection.



1-1 LINE1 and LINE2

LINE1 LINE2 PSTN

RX Volume:	0 ▼ dB
TX Volume:	0 ▼ dB
Echo Cancellor:	Enable (Manual Optimization) ▼
Optimization Status:	Not optimized
Optimization:	Start Refresh
Echo Suppression:	☐ Disable ☒ Enable
Echo Suppression Level:	-30 ▼ dB

RX Volume:

Audio level from the PSTN to the VE-PG3.

TX Volume:

Audio level from the VE-PG3 to the PSTN.

Echo Cancellor:

In most cases the default value "Enable (Booting Optimization)" should be fine. Try "Enable (Manual optimization)," if you face frequent PSTN line interaction by the unnecessary optimization processes caused by unstable PSTN line conditions. Select "Disable" only when required by the PSTN specifications, or when you need to see the effect of the Echo Cancellor by comparing Enable and Disable.

Optimization Status:

Displays the current optimization status.

Optimization:

Click "Start" to begin the Echo Cancellor optimization process and click "Refresh" to display the current status. Click "Re-optimize" when you need to restart the optimization process.

Echo Suppression:

This function suppresses the echo in addition to the Echo Cancellor by reducing the RX audio level, depending on the TX audio level. Select "Disable" only when required by the PSTN specifications, or when you need to see the effect of the Echo Suppression by comparing Enable and Disable.

Echo Suppression Level:

Higher values may cause a chopped voice during double-talk (both sides speaking at the same time.) Use the default value unless there is too much echo.

CNG Signal: ☐ Disable ☒ Enable

CNG Signal Level: dB

Contract Line Number:

CNG Signal:

The CNG Comfort Noise Generator adds synthetically generated noise to the RX audio to make any residual echo unnoticeable by the listener.

CNG Signal Level:

Use the default value unless there is too much echo.

Contract Line Number:

Enter the contract line number to be recognized by the VE-PG3 as a usable outgoing line.

1-2 LINE Settings

LINE Settings

Device

Impedance:	600 ▼
On Hook Speed:	0.5 ▼ milliseconds
Ringer Impedance:	High ▼
Ringer Threshold Select:	13.5 - 16.5 ▼ V
Current Limiting:	☒ Disable ☐ Enable
TIP/RING Voltage Adjust:	3.5 ▼ V
Min. Operational Loop Current:	10 ▼ mA

Impedance:

Set the appropriate value as shown below, or the value specified by the peer equipment. In case of an unknown PSTN LINE, find a value that gives less echo and better audio quality.

US	600
EU *	270+750 150nF
Australia	220+820 120nF
New Zealand	370+620 310nF

* UK, France, Germany, Netherlands, Sweden, Norway, Italy, Spain, Portugal, Poland, and Denmark

On Hook Speed:

Set the appropriate value as shown below, or the value specified by the peer equipment. An inappropriate setting may cause an unexpected reaction on the peer equipment. (Example: detected as a "Hook Flash").

US	0.5
EU *	3
Australia	26

* UK, France, Germany, Netherlands, Sweden, Norway, Italy, Spain, Portugal, Poland, and Denmark

Ringer Impedance:

Normally set to High, set to Synthesized in Poland, S.Africa and Slovenia.

Ringer Threshold Select:

Use the default value unless unexpected detection occurs.

Current Limiting:

Set to Enable if you need to limit loop current to a maximum of 60 mA per the TBR21. Otherwise set to Disable.

TIP/RING Voltage Adjust:

Use the default value unless something unexpected occurs.

Increasing TIP/RING voltage increases signal headroom. To comply with PTT standards, use a lower value (default) in low AC line voltage countries such as Japan.

Min. Operational Loop Current:

Use the default value unless something unexpected occurs. Increasing the minimum operational loop current above 10 mA also increases the signal headroom and prevents degradation of the signal level in low AC line voltage countries.

Ring Time Detection

Min. Active Timer:	5	[x100 milliseconds]
Max. Inactive Timer:	45	[x100 milliseconds]

Min. Active Timer:

Minimum ring burst period for the VE-PG3 to recognize it as a PSTN ring. Use the default value unless incorrect detection occurs.

Max. Inactive Timer:

Delay after the end of the ring burst before the VE-PG3 decides that PSTN ring has ceased. Use the default value unless incorrect detection occurs.

DTMF Encode

*Setting values of Active Timer and Inactive Timer are set in five milliseconds steps.

Active Timer:	80	milliseconds
Inactive Timer:	80	milliseconds
Level:	-8 ▼	dB

Active Timer:

The time period of each DTMF tone.

Inactive Timer:

The time period of the space between each DTMF tone.

Level:

Sound level of the DTMF tone.

Status Detection

Dial Tone Detect:	☐ Disable ☒ Enable
Caller Connect:	RBT Stop
Caller Disconnect:	BT
Callee Disconnect:	BT
Line Cut:	☐ Disable ☒ Enable

Dial Tone Detect: Select whether the VE-PG3 detects a “ready to dial” status by the Dial Tone.

- Disable: The VE-PG3 starts dialing after a certain waiting period after OFF-Hook, without detecting the Dial Tone.
- Enable: The VE-PG3 starts dialing as soon as the Dial Tone is detected. An appropriate setting in the "Tone Detection > Dial Tone" is needed to use this function. (See next page.)

Caller Connect: Select the method to detect the call being established.

- Disable: The VE-PG3 determines that the call is established immediately after dialing, without using any detection methods.
- RBT stop: By the ceasing of the RBT (Ring Back Tone.) An appropriate setting in the "Tone Detection > Ring Back Tone" is needed to use this method. (See next page.)
- Polarity: By the polarity reversal.
- Both: By both the “RBT stop” and “Polarity” methods.

Caller Disconnect: Select the method to detect disconnection of the call initiated by the VE-PG3.

- Disable: The VE-PG3 does not detect the “Caller Disconnect” status.
- BT: By the Disconnect Tone (same as the “BT” Busy Tone in most cases.) An appropriate setting in the "Tone Detection > Disconnect Tone" is needed to use this method. (See next page.)
- Polarity: By the polarity reversal.
- Both: By both the “BT” and “Polarity” methods.

Callee Disconnect: Select the method to detect disconnection of the call received by the VE-PG3.

- Disable: The VE-PG3 does not detect the “Callee Disconnect” status.
- BT: By the Disconnect Tone (same as the “BT” Busy Tone in most cases.) An appropriate setting in the "Tone Detection > Disconnect Tone" is needed to use this method. (See next page.)
- Polarity: By the polarity reversal.
- Both: By both the “BT” and “Polarity” methods.

Line Cut: Select whether the VE-PG3 detects PSTN disconnection by the Line Cut (open circuit of the PSTN line.)

- Disable: The VE-PG3 does not use this method.
- Enable: The VE-PG3 detects PSTN disconnection by this method.

NOTE:

In addition to the above methods, the VE-PG3 also ends a call by detecting continuous silence for the period of time in the “No Voice Release Timer” field, for each port under the “Port Settings” menu.

Tone Detection

*Setting values of Frequency1 and Frequency2 are set in four hertz steps.(except for Dial Tone)

*Setting values of Timing is set in milliseconds and in five milliseconds steps.

Dial Tone

Frequency1:	350	Hz												
Frequency2:	440	Hz												
Timing:	<table border="1"> <tr> <th>ON</th> <th>OFF</th> <th>ON</th> <th>OFF</th> <th>ON</th> <th>OFF</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	ON	OFF	ON	OFF	ON	OFF							
ON	OFF	ON	OFF	ON	OFF									

Ring Back Tone

Frequency1:	440	Hz												
Frequency2:	480	Hz												
Timing:	<table border="1"> <tr> <th>ON</th> <th>OFF</th> <th>ON</th> <th>OFF</th> <th>ON</th> <th>OFF</th> </tr> <tr> <td> 2000 </td> <td> 4000 </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	ON	OFF	ON	OFF	ON	OFF	2000	4000					
ON	OFF	ON	OFF	ON	OFF									
2000	4000													

Disconnect Tone

Frequency1:	480	Hz												
Frequency2:	620	Hz												
Timing:	<table border="1"> <tr> <th>ON</th> <th>OFF</th> <th>ON</th> <th>OFF</th> <th>ON</th> <th>OFF</th> </tr> <tr> <td> 250 </td> <td> 250 </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	ON	OFF	ON	OFF	ON	OFF	250	250					
ON	OFF	ON	OFF	ON	OFF									
250	250													

Dial Tone:

The tone advising that the PSTN line (exchange) is ready to receive call information and inviting the user to start dialing.

Ring Back Tone:

The tone advising the caller that a connection has been made and that a calling signal is being applied to a telephone number or service point.

Disconnect Tone:

The tone provided to the remaining party to a call after the remote party hangs up. In various PSTN related documents, the tone used for this status may be described as a "Congestion tone," "Re-order tone," "Busy tone" or "Fast busy tone".

NOTE: Tips for finding the pattern of call progress tone from your PSTN or PBX are in the next section. Sample setting files tested in a few regions for the application below, and described in Section 4 of the VE-PG3 instruction manual, are available here.*



*Because of the variety of PSTN characteristics, these files may not work even in their same region.

SECTION 2 Finding your PSTN Tones

The call progress tone pattern (frequency and cadence) in each country may be found on the WEB pages below.

http://www.3amsystems.com/World_Tone_Database

<http://www.itu.int/ITU-T/inr/forms/files/tones-0203.pdf>

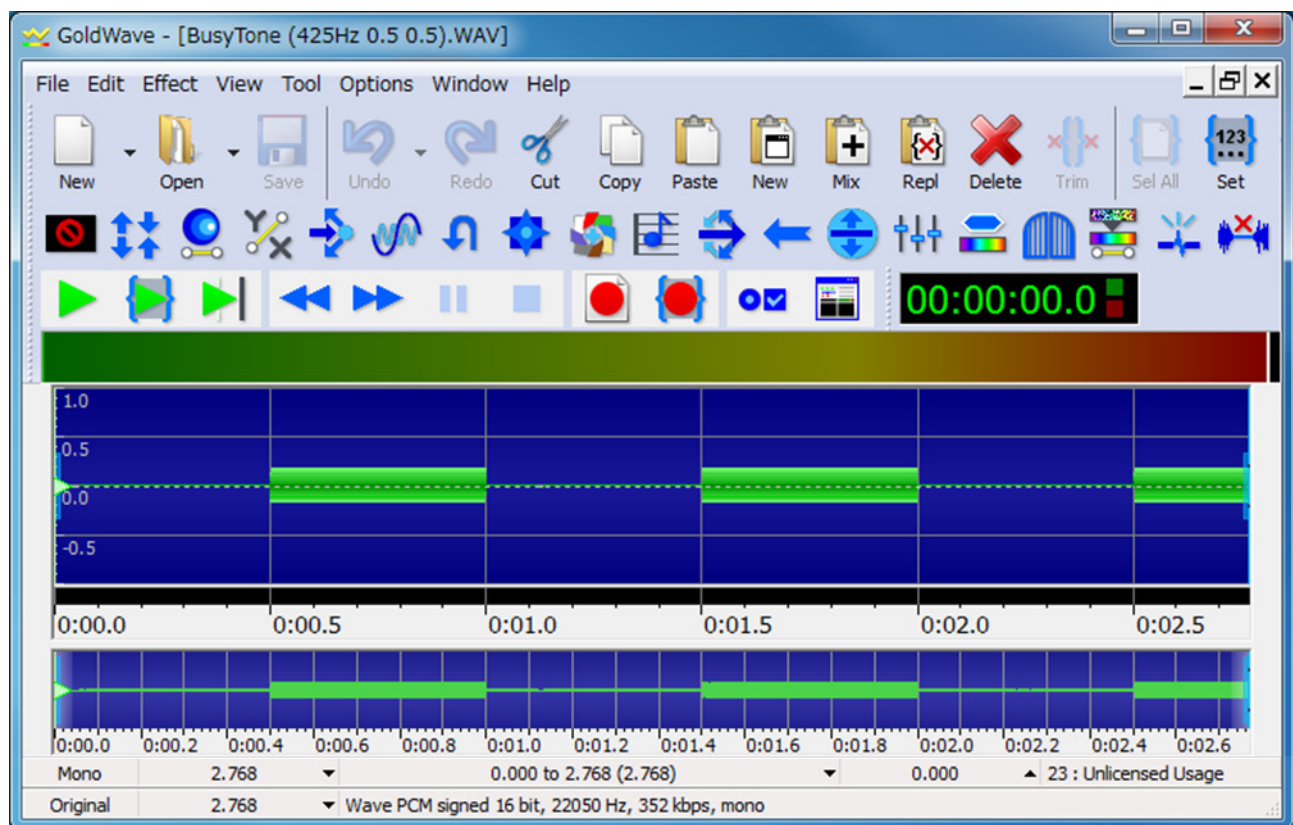
https://www.etsi.org/deliver/etsi_tr/101000_101099/10104102/01.01.01_60/tr_10104102v010101p.pdf

Or, the pattern can be found from the actual tone sound by using a PC software similar to that shown below. (Recording the sound from the speaker with a voice recorder, or even your smart phone, should be fine for this analysis.)

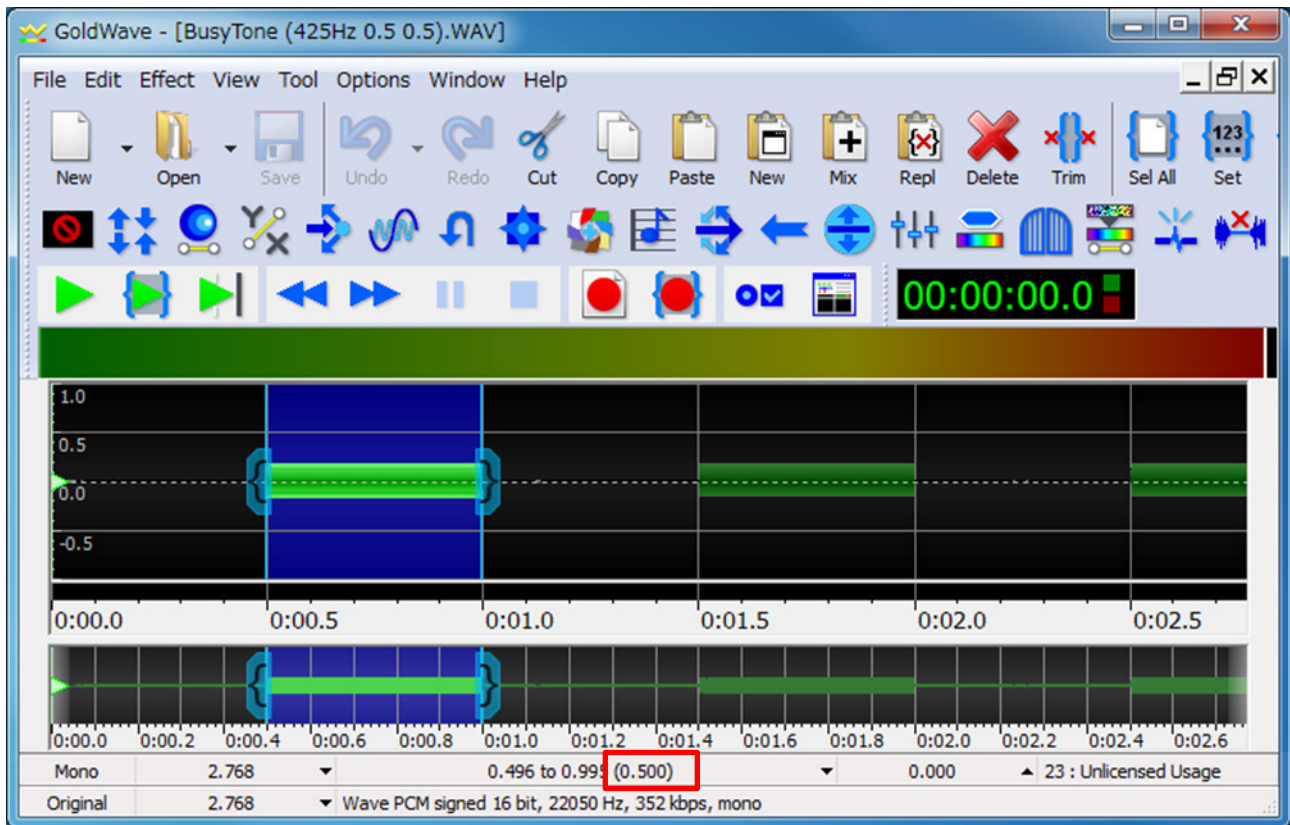
This is an example showing how to analyze the typical European Disconnect Tone (Busy Tone) 425Hz, 500 milliseconds –ON and 500 milliseconds –OFF, by using a sound file editor software like GoldWave.

(www.goldwave.com)

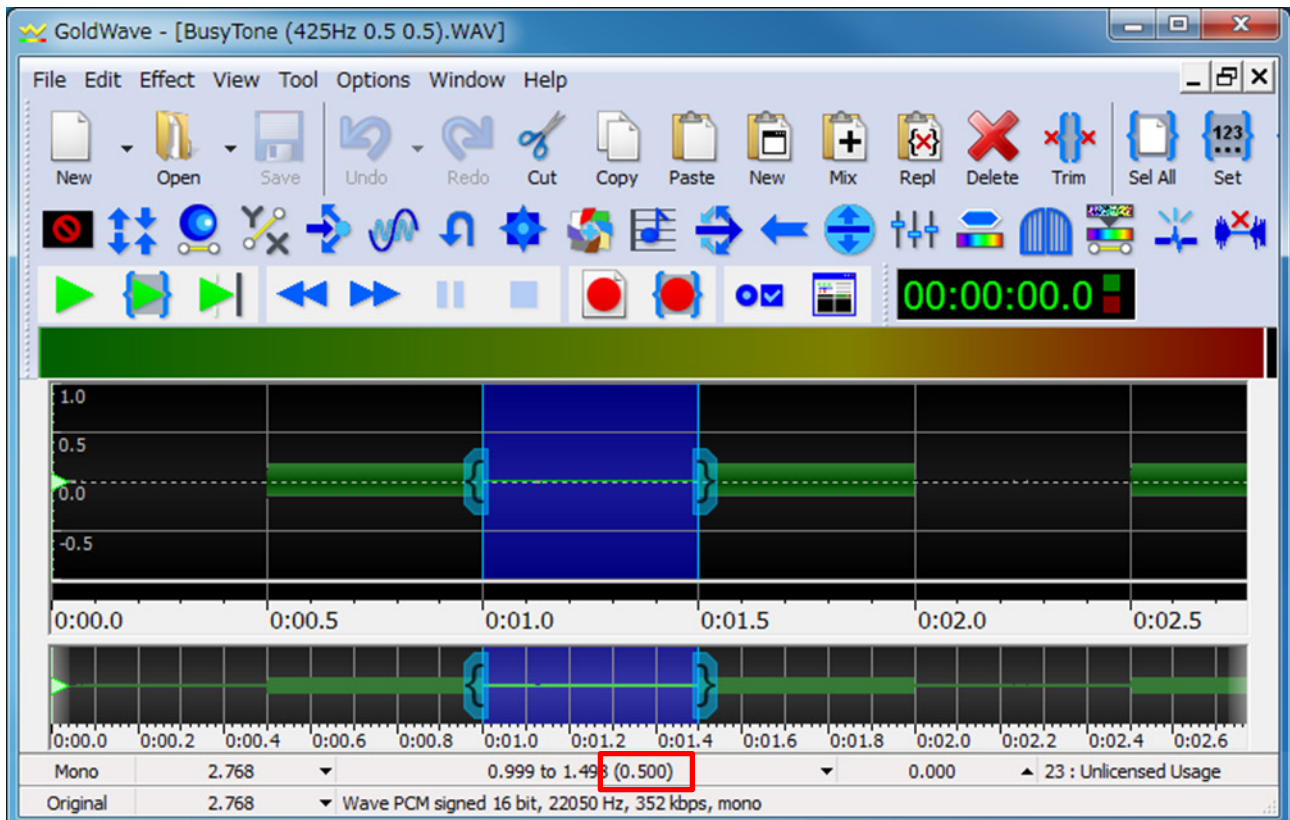
1. Open the attached Busy Tone sound file.



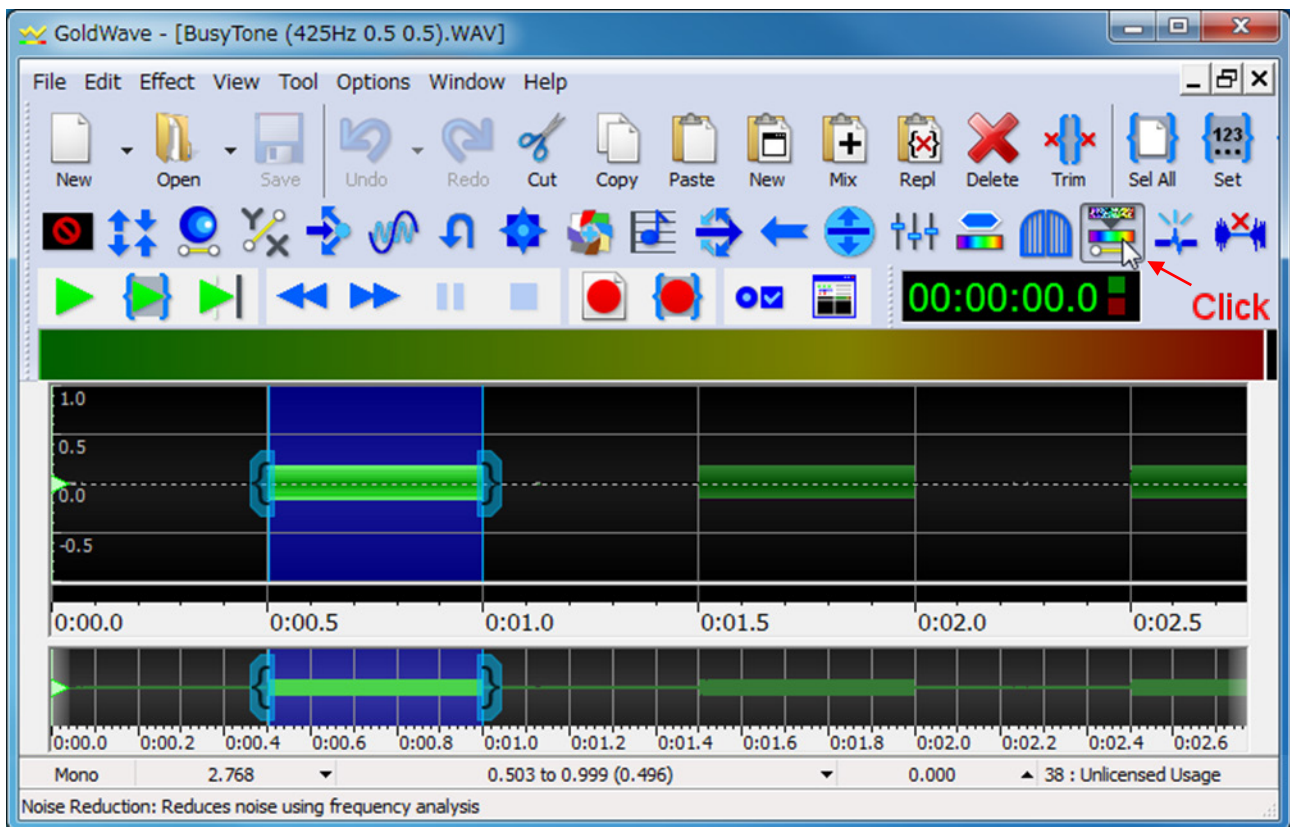
2. Select the “tone on” area as shown below by clicking-and-dragging. You can see the length of the “tone on” period is 500 milliseconds, as shown below in the red rectangle.



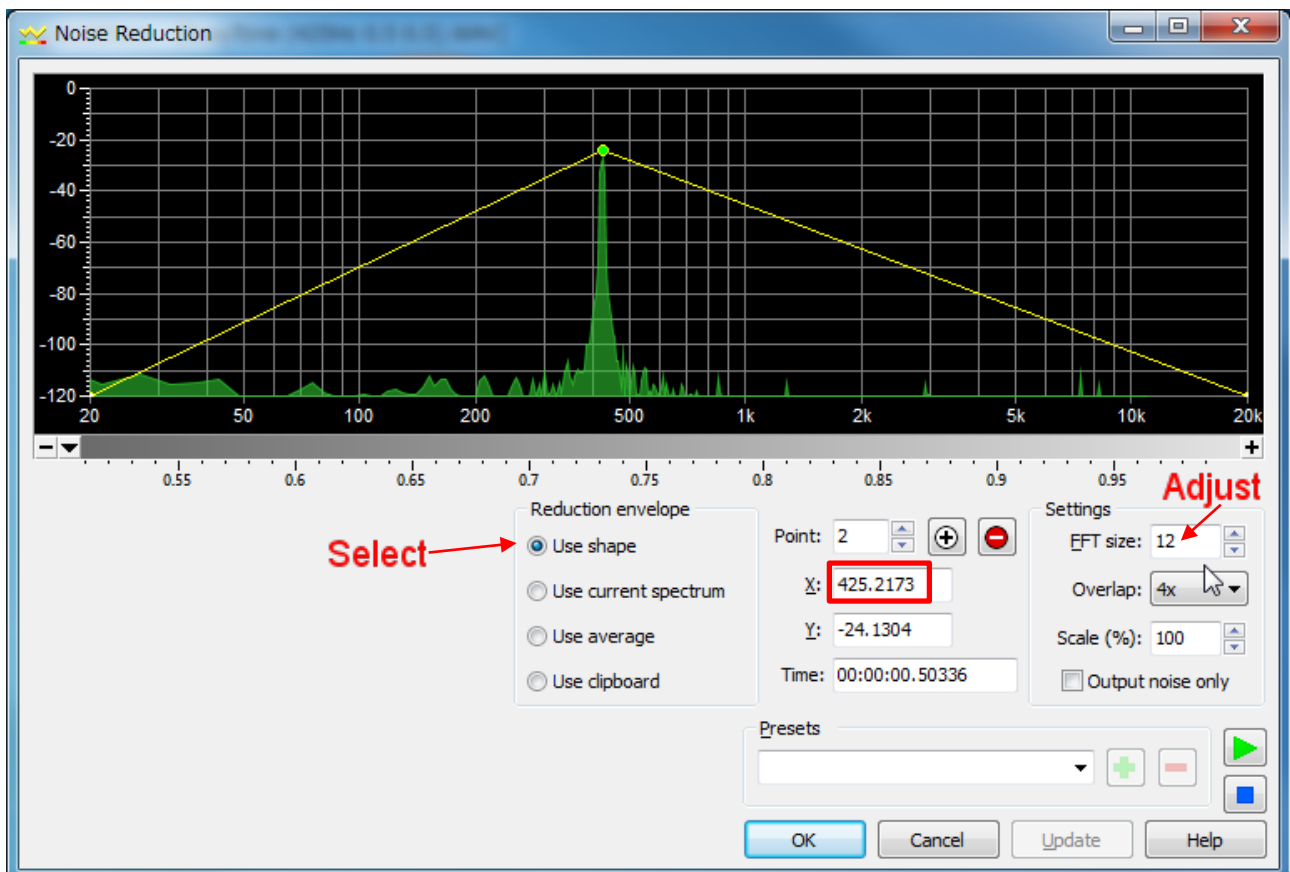
3. Do the same on the “tone off” area and see that the period is 500 milliseconds.



4. Select the “tone on” area again and click the Noise Reduction button.



5. On the Noise Reduction window, select “Use shape.” Adjust the “FFT size” for the narrower spectrum shape, and click on the top of the peak. You can see the tone frequency is about 425Hz.



6. Make settings on the VE-PG3 as shown below..

Disconnect Tone

Frequency1:	425	Hz		
Frequency2:		Hz		
Timing:	ON	OFF	ON	OFF
	500	500		

(The frequency “425” will be corrected to the closest configurable frequency “424” by clicking .)

If the VE-PG3 still cannot detect the tone, try one step higher or lower frequency.

For example if you find that the sound consists of a 480Hz/640Hz dual tone, you may need to use one of the following combinations.

476/636, 476/640, 476/644, 480/636, 480/640, 480/644, 484/636, 484/640, or 484/644

Other similar software

Wave Pad <http://www.nch.com.au/wavepad/index.html>

TwistedWave Online <https://twistedwave.com/online/>

Adobe® Audition® CC http://www.adobe.com/mena_en/products/audition.html

SECTION 3 For special cases (Telnet commands)

Unable to end the call from a transceiver through the TRX port because of continuous voice announcements from the PSTN. For example: "The number you have dialed is not in service at this time." after making a wrong call from a transceiver.

In such a case, you may try this command through Telnet.

`pager voip port sip_rx_no_speech_timer [index] [timer]`

[index]: Target port of this function

1 = TRX1, 2 = TRX2, 3 = D-TRX1, 4 = D-TRX2, 5 = DTRX3, 6 = DTRX4, 7 = EXT1, 9 = EXT2,
12 = Bridge1, 13 = Bridge2, 14 = Bridge3, 15 = Bridge4

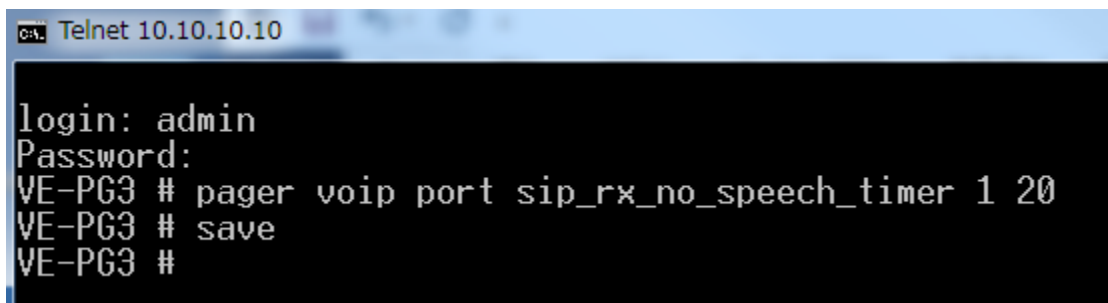
[timer]: Length of continuous silence from the target port by which VE-PG3 decides to end the connection (hang up.)

0 to 600 seconds. (initial value: 0 = OFF)

This is a timer to disconnect the call by detecting a long silence only on the TX audio (VE-PG3 to PSTN.)

NOTE: As a result of this command, the transceiver user needs to make sound at least every period of the timer to avoid unintended disconnection.

Example to set the timer to 20 seconds on the TRX1 port.



```
CAL Telnet 10.10.10.10
login: admin
Password:
VE-PG3 # pager voip port sip_rx_no_speech_timer 1 20
VE-PG3 # save
VE-PG3 #
```

The login ID and password for the Telnet is the same as for the web setting page.

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