

Reducing the Echo on the PSTN line of SPA3102

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Introduction

This article is one in a series to assist in the setup, troubleshooting, and maintenance of Cisco Small Business products (formerly Linksys Business Series).

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Q. How can I reduce the PSTN echo on SPA3102?

A. Experiencing echoes in the PSTN line is a common problem. This is because the SPA3102 passes calls from the PSTN to LINE1 by converting it to VoIP internally then converts it back to analog. This process does not produce any echo, however, it can add about 30ms of latency to the call which later produces the echo.

Reducing the Echo on the PSTN Line

1. Make sure you are running the latest firmware. Everything should be set to factory defaults, or at least undo all the previous tweaking.
2. Disable all the echo cancellation functions of your SPA3102. These settings can be found on line 1 and PSTN line tabs of your SPA3102.

```
Echo Canc Enable = No  
Echo Canc Adaptive Enable = No  
Echo Supp Enable = No
```

3. Remove devices connected to your phone line except the SPA3000. This includes all the extension cables and splitters. These can cause impedance problems which lead to echoes.
4. Set the FXO port Impedance on the PSTN tab to 220+820||120nF, and set FXS Port Impedance to 220+820||115nF as a starting point.
5. Look for **Network Jitter Level** on the PSTN Line tab and set it to **low**. Then, look for **Jitter Buffer Adjustment** and set it to **disable**. This reduces the delay across your SPA3000.

Note: If you are using a poor quality VoIP service, go to the Line 1 tab and look for **Network Jitter Level**. Set it to **low** and set the **Jitter Buffer Adjustment** from **up** to **down**. However, if you are using a poor quality PSTN, set the **Network Jitter Level** to **medium**.

6. Go to the PSTN Line under Audio Configuration. Look for **Preferred Codec** and set it to your preferred settings, then lock it in by setting the **Use Pref Codec Only** to **yes**. Adjust these settings if you are accessing your PSTN line via VoIP from a remote network. Then, go to Line 1 and set **Preferred Codec** with the same settings

you set with PSTN Line. Under **Preferred Codec Only** set it to **no**. These settings reduce your latency and can make the echo less obvious or easier to catch with the echo canceller.

7. Power cycle the SPA3000 by powering down the device. This sometimes fixes the problem especially after changing the physical phone wiring.
8. Make some test calls and observe if you can hear an echo. If yes, the problem might be that you are sending too much power down the line and it gets reflected back somewhere as an echo. Even if you have good wiring but you are too close to the mouthpiece, you will still hear an echo. To resolve this, you need to increase the level of Gain by going to **PSTN** and look for **SPA To PSTN Gain**, then slowly adjust the level until you can clearly hear the person on the other line.

Note: If you enable **Echo Supp Enable**, you will negate these parameters. The echo suppression is just an automatic gain control. It is recommended to keep it disabled.

9. Make a test call to someone with a phone that works via the SPA's PSTN line, or call in to the PSTN line. If the remote party is hearing an echo, your phone might be loud and is experiencing feedback in the microphone. Lower the PSTN to SPA Gain until you are comfortable hearing the person on the other line. If the remote user can still hear an echo, try using a different phone plugged into the SPA. If this solves the problem, your phone might not be working properly, or there is an impedance mismatch between your phone and the SPA. Try changing the FXS Port Impedance to 600 on the **Regional** tab and change the **FXO port impedance** to **600** or **global**. If this does not help, change it back. The impedance will only affect what the remote party hears and will not help remove the echo you are hearing.
10. After lowering the echo to a tolerable level, go back to the **PSTN** tab and enable **Echo Can Enable** by selecting **Yes, OK**. Check if the echo has improved. If the echo is tolerable at this level, leave the adaptive echo canceller off. You should have the echo level down to a level that can be filtered by the echo canceller. If you are using a sip device to talk through your PSTN line, you should probably do all the echo cancellation at that device and leave it switched off in the SPA.

Related Information

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