IP Office : Echo on IP Sets with Analog Lines Using ATMv2

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Details

Echo on IP Sets when using Analog Lines, affects all software releases of IP Office, but these steps were written based on 9.0 Software.

Problem Clarification

Echo on incoming and outgoing calls using the Analog Lines. No echo heard on internal calls.

Echo and Static (white noise) on the lines and echo on outgoing calls

On all outside calls (incoming and outgoing)

Can only be heard internally

Cause

Issue is with echo on the analog lines, but most instances can be compensated with Line Tuning and echo cancellation on the IP Office.

NOTE: It is normal for there to be a brief echo at the begriming of the call, for up to 5-10 seconds, but is usually just one or two syllables. This is part of the system echo canceller normal behavior. Issues to report are echo that last longer or that show up in the middle of the call.

Also, most calls to mobile phones will get echo introduced from the Cellular network, and should not be used in examples of echo on the system. Test calls should be made between physical lines.

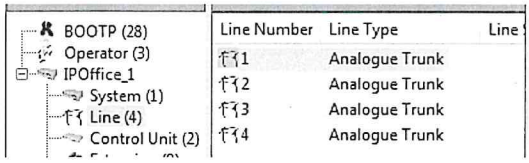
Examples of causes:

- Case 1: One customer issue was Analog Lines not per specs. See solution for more info.
- Case 2: One customer issue was caused by Auto Gain Control settings. See solution for more info.
- Case 3: Another instance was caused by IP Office Echo features. See solution for more info.
- Case 4. The IP Phone firmware on the phones is for a version of Communication Manager use, not IP Office.
- Case 5 Static, Echo with audio fade in and out caused by cold start followed by extended period of time without reboot.

Solution

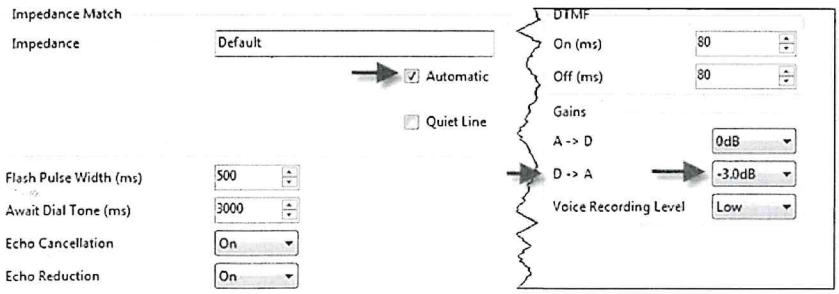
1) Confirm that the ground wire is securely connected to the Ground Terminal on the back of the IP Office 500v2 Chassis.

2) Connect to the System using IP Office Manager and select Line. Review each Analogue Line on the system for the following

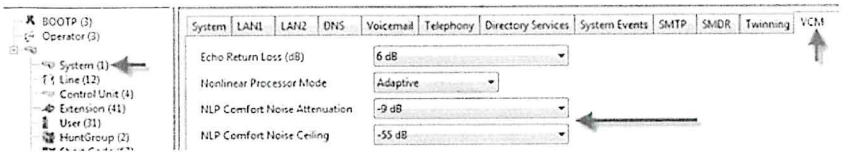


a. Impedance Match is set to Automatic:

b. Confirm D->A gains on all Analog Lines are set to -3 dB, if not set it. A->D should be 0.



3) Confirm the VCM tab settings under System are set Echo Return Loss = 6 dB, Nonlinear Processor Mode = Adaptive, NLP Comfort Noise Attenuation = -9 dB and NLP comfort Notice Ceiling = -55 dB



4) Under the analog options for each line ensure the Echo Reduction setting is "Off"

5) Shutdown the system using IP Office manager:

   a. Using IP Office Manager, select File | Advanced | System Shutdown.

   b. Using the Select IP Office menu to select the system and enter the administrator name and password. IP Office Manager displays the System Shutdown Mode menu.

   c. Select Indefinite and click OK.

   NOTE: The shutdown process takes up to a minute to complete. When shutting down a system with a Unified Communications Module installed, the shutdown can take up **to 3 minutes** while the card safely closes all open files and closes down its operating system. During this period, the module's LED 1 remains green.

6) Do not remove power from the system until the system LEDs are in the following states:

   a. LED 1 on each installed base card flashes fast red-amber. For those base cards with a trunk daughter card installed, LED 9 also flashes fast red-amber.

   b. The CPU LED on the rear of the system flashes fast red-amber.

   c. The System SD and Optional SD memory card LEDs on the rear of the system are off.

7) Once the LED conditions in step 4 are met, remove the power cord from the back of the IP Office.

8) Count to 30 and then reconnect the power cable to the back of the IP Office Chassis.

9) Once the Phones return to service, please disable the AGC (Automatic Gain Control) option on the phones.

   a. Press the key menu MENU/HOME button and select Settings.

   b. Use the up arrow up and down arrow keys to highlight Advanced Options. Press Select.

   c. Use the up arrow and down arrow keys to highlight Automatic Gain Control. Press Select.

   d. Use the up arrow and down arrow keys to switch between Handset, Headset, or Speaker settings for AGC.

   e. To change the highlighted setting, press Change, and select Off

   f. When completed, press Save.

   g. Press Back / Exit to exit the menus.

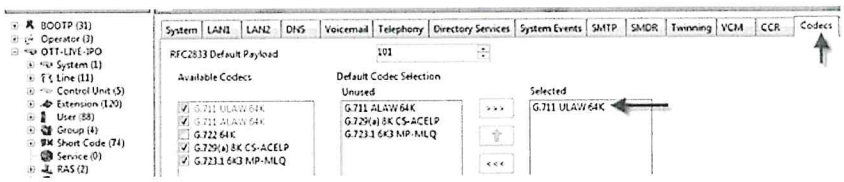
   h. Wait 5 minutes, then call into each line on the IP Office and record the outcome of each call and any noticed differences between the lines tested.

10) If there is echo detected on one or two of the lines on the system, re-check the Impedance Match setting that was detected and set by the system on boot. If the lines that are still having echo are set different than the rest of the lines on the system that are clean. Then uncheck the Automatic setting for the lines still showing echo, and manually set the Impedance Match value to match the other clean lines. The system will require a reboot to save the changes, no power cycle, just standard system reboot.

11) Retest all lines again, and confirm if the echo has cleared.

For Sites with Returning Echo We can test the following changes:

1) Set the Codec selection to G.711 only:



2) Manually set the Impedance on the lines to 600 by disabling Automatic and selecting it from the drop down. 600 ohm is the North American Default Line Impedance.

Note: The automatic matching does work with the Analog 16 trunk module and only works with the ATM combo card. Take the analog line out of the ATM 16 and test using the card. Once the impedance has been run on the line, place the line back in the ATM 16 and manually set the Impedance.

Check all LAN cable to make sure they are Cat 5.

Case 1: Turing automatic gain control On or Off

- Problem: Internal user hear echo on analog line for both outgoing and incoming calls.
- Solution: The automatic gain control (AGC) automatically adjusts the audio output level to achieve a constant and better quality audio. However, on some environment (example, small or noisy room), turning off that option is preferable.

Procedure:

1. Press Home
2. Select Options & Settings
3. Press Select or OK

4. Select Advanced Options
5. Press Select or OK
6. Select Automatic Gain Control
7. Press Select or OK
8. To change the AGC status setting, scroll through the options for handset, headset, or speaker and press Change or OK
9. Press Save

Case 2: Analog lines not per specs by Provider

- Problem: Internal user hear echo on analog line for both outgoing and incoming calls.
- SOLUTION: contact provider to verify analog line specs

Echo with Analog Trunks
The ability to eliminate echo with analog trunks relies on the trunks being within specifications. If the trunks are not within specification, the IP Office will not be able to tune the trunk port(s) correctly and echo may result. If echo persists after properly configuring the IP Office, the trunks should be measured using special tools or by the service provider.

- The objective for all trunks should be an NMSa Reading (dBrnc) of less than 20 dBrnc, with a gain of -3.5 db within +/- 1dB.
- It is recommended that for all new installations, or where the IP Office is replacing an existing system, the customer should be advised to ask their service provider to check the line noise and gain levels on their Analog trunks in order to confirm that the lines are within the requirements.

Analog Line Test
Analog should meet requirements.

Line Current / Signal Strength / Noise:

REM	Loop Current (off-hook)	Circuit Loss	Metallic Noise	Power Influence
Unit of measure	mA (milliamp)	dBrn	dBrnc	dBrnc
Acceptable	23 - 25	-8.5	<20	<80
YOURS				

Line Voltages:

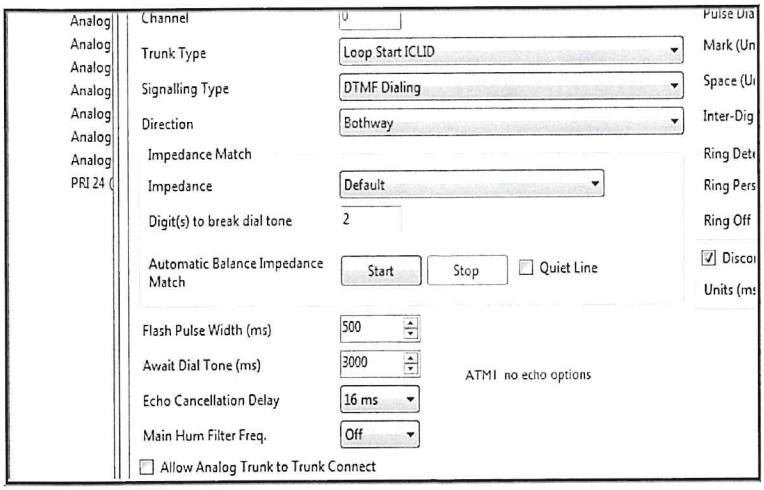
	On-Hook	Off-Hook	Ringing
Unit of measure	Voltage	Voltage	Voltage (RMS)
Acceptable	-48 to -56	-8 to -12 (steady)	90
YOURS			

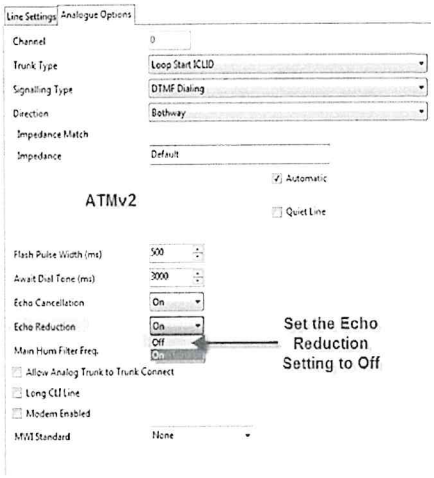
For trunks that fall outside of these standards, a number of issues may occur, including echo. It is recommended that for all new installations, the customer should be advised to ask their service provider to check the line noise and gain levels on their Analog trunks in order to confirm that the lines are within these requirements.

Case 3: Adjust Echo Reduction settings for analog lines.

- Problem: Internal user hear echo on analog line for both outgoing and incoming calls.
- SOLUTION: adjust echo and canceller settings

Note: As shown below, the older ATMv1 does not have the echo settings





IP Office Echo Canceller:

Use of both the System VCM EC (Nonlinear processor mode), and the Lines ATM's EC (up to 128 ms) can help provide satisfactory performance. You may want to try different echo cancellation settings for testing. Note that some analog trunks may need a different values.

- Note that echo of more than 128ms cannot be cancelled by the IP Office echo canceller.
- Also, if the echo disappears after only 2 to 3 seconds from the beginning of the message, it cannot be cancelled by IP office.

Case 4: use IP Office supported firmware. Using Avaya Aura firmware is not supported.

- The IP Phone firmware on the phones is for a version of Communication Manager use, not IP Office.
- Verify the firmware version being used is supported on the current load of IP Office. This can be found in the latest Technical Bulletin for the release.
- Follow this link for a list of all IP Office Tech Bulletins:
  http://marketingtools.avaya.com/knowledgebase/ipoffice/general/rss2html.php?XMLFILE=techbulls.xml&TEMPLATE=feed_bulletins_table.html
  (http://marketingtools.avaya.com/knowledgebase/ipoffice/general/rss2html.php?XMLFILE=techbulls.xml&TEMPLATE=feed_bulletins_table.html)

Case 5:

Reboot IP Office

Before reporting an issue, please make sure you have rebooted the IP Office.

OTHER INFORMATION :

CODEC used.

Voice quality can be affected by the type of speech CODEC utilized in the telephone network. A low-rate coder such as a G.729 codec reduces speech to a low transmission rate (8000 bits-persecond) but sacrifices voice quality in the process. In contrast, the G.711 codec has a higher transmission rate of 64,000 bits-per-second that uses more bandwidth, but allows it to better represent the talker's voice (less impairments). Example for IP Office systems:

If the issue cannot be resolved from the above information, and you may want to open a Service Request with Avaya **after you collect the following info:**

1. Config file
2. Line Changes related to echo (impedance, echo cancel delay, gain from and to co)
3. What Type of analog Card (Combo, ATM4)?
4. PCS of the IP Office.
5. Recording of the call with the echo.
6. SSA Continuous trace
7. Monitor traces
8. Wireshark trace
9. Monitor trace of the Impedance Match tool
