

Sage Alerting Systems Service Bulletin #1, Audio Levels

For the Sage Digital ENDEC 3644,
with firmware versions 1.0h/79 or less.

Note: In the discussion below, level always refers to peak level.

Summary

The default settings for record level and playback level are too high if the peak audio input level into the ENDEC's monitor input is greater than 0.8V. This shows as about -7dBFS on the ENDEC's Show Input Levels web page.

Users with audio settings too high can relay alerts that appear to have another alert mixed with it, or an alert that decays into unintelligibility.

This bulletin describes how to tell if your audio settings can cause this problem, and recommends changes to your settings to solve this problem. As the type of alert relay involved also include the EAN, you should review this document and take any necessary action before the national EAN test in early November.

Description

If your input levels, or the output levels resulting from the combination of the input levels, the record levels, and the playback levels, result in excessive output from the ENDEC, then quality of alerts you put on the air can be reduced, or in some cases can be unintelligible.

If the input levels are too high, the resulting output will be clipped, no matter what the playback level. If the record/playback level is too high then the output level from the ENDEC's main audio out XLR can exceed +14dB. If the output level does exceed this level, then the output can cross couple to the input, resulting in an unintelligible alert relay.

The "output appears on the input" issue only shows up if the alert is sent in the "automatic relay" mode, meaning the ENDEC starts retransmitting the alert while it is still receiving the incoming alert (this include the EAN). In this mode, if the audio output is excessive, you will hear what appears to be a mix of two different alerts, but what you are hearing is the start of the original alert, delayed by about 20 seconds.

In cases where the input is loud enough to be clipped, and the output is >+14dB, then the output appearing on the input will also be loud and distorted, which will again appear in the output 20 seconds later, resulting in an unintelligible alert if the alert is more than 20 seconds. The first 20 seconds will have degraded audio as well, depending on how often the output is greater than +14dB, and what your downstream equipment does with such a signal.

In the case where an alert is of the “timed relay” type, the audio will also be excessively loud, but won’t result in a delayed copy of the audio appearing again on the input, because the ENDEC isn’t sending the alert while it is still being received.

Note: The above discussion refers to the levels of the “speech” portion of the alert. While it is possible to turn up the “tones” portion of the alert (data tones and the two-tone attention signal) to +14dB, you need to turn the tones far hotter than the default levels.

How to tell if you have this problem

The easiest way to tell if you have this problem is to look at the level of the relayed audio output from the ENDEC. If it is above +10dB, you need to adjust your record and playback levels to avoid the cross coupling problem. This level of audio is most likely hotter than you want anyway, and you’ll need to make adjustments as necessary. You don’t need to look at an automatic relay type of alert, any alert relay will do. You’ll need to look at an alert that has audio, a Required Weekly Test usually does not. You can also look at the input levels as shown on the ENDEC’s “show inputs levels” web page.

Looking at the input levels with Show Input Levels and a web browser

You will need to have loaded the ActiveX applet to see the meter, download the applet here:

<http://www.sagealertingsystems.com/support-pc.htm>

Download and run the VU Meter application.

Look at the horizontal light blue bar. This is the peak level of the input. If it is above the -8 dBFS level, then you will need to either:

- 1) Reduce the level on the input but turning down the receive output
- 2) Reduce the level by using a pad.
- 3) Reduce the record level
- 4) Reduce the playback level

Reducing the level into the ENDEC will be reflected in the meter display, reducing the playback and record levels will not.

Note that the record and playback levels are currently in common across all of the monitor inputs. If one of your inputs is substantially higher or lower than the others, you’ll need to make an adjustment to the input levels¹.

If any of your inputs are higher than -8 dBFS, then you will need to reduce the record levels. Here are some guidelines. The meter levels apply to firmware version 79 and lower, an upcoming firmware release will make several improvements in level settings.

¹ A future software release will permit setting input level adjustments for each channel, and will also permit a higher receiver output level without clipping.

Determining input levels from the Show Input Levels web page:

- If the input is >2.5Vp-p, you will have clipped input and will need to reduce the input level.
- 2.5V to 1.6V will show as 0dBFS on the level meter.
- 1.5V will show as just below 0dBFS on the level meter
- 1V is -3 dBFS
- 700mv is -8 dBFS

To avoid the “output appears on input problem”, you must use these settings or lower. These settings are probably hotter than you want, but won’t cross couple into the input:

- If your input peak levels are 2.5Vp-p, set your record level to 32 and your playback level to 40.
- If your input peak levels are 1.5Vp-p set your record level to 64 and your playback level to 60
- If your input levels are 0.7p-p, set your record level to 64 and your playback to 115.

To get a peak audio output of 2.6Vp-p on the main audio XLR outputs, use these settings:

- If your input peak levels are 2.5Vp-p, set your record level to 32 and your playback level to 18.
- If your input peak levels are 1.5Vp-p set your record level to 64 and your playback level to 11
- If your input levels are 0.7p-p, set your record level to 64 and your playback to 24.

Note: These settings are approximate; you should verify levels on your own equipment using the testing procedure below.

Reminder about the front panel watchdog

The ENDEC has a ten minute watchdog timer – if the ENDEC isn’t in the top level of the menu tree (the “menu week” display) once each ten minutes, it will reboot. If the ENDEC reboots while you are doing all of this testing, don’t worry, it is the software watchdog. To avoid the problem, go to the top of the menu once each 10 minutes.

From the Front Panel

You can also use the front panel **MENU.SHOW INPUT LEVELS**. The 0dBFS level is with the asterisk at 12 characters from the left of the screen (above the “p” in “Up”). The -7dBFS level is 7 characters from the left of the screen.²

Testing with a single ENDEC

You can test the level of a simulated alert by following these steps. This procedure will replace your NV audio with test audio. If you are using NV audio, you’ll need to replace it when you are done with this procedure. If you don’t know if you are using it, stop and find out. From the front panel, use the **MENU.ALERTS.PREVIEW NVAUDIO** menu. If it says “no recorded audio”, then you probably aren’t using it.

² This display issue will be corrected in a future software update.

Also, make sure none of your incoming filters have NV lead in checked, and that none of your outgoing headers or incoming filters have the NV lead in box checked, and that Lead In is set to “none” on the MHZ Sub Alert tab.

Simple procedure that shows if you have very excessive levels

- 1) Check to see if you have firmware version 74 or greater. On the web page, click the version button. Look at the board rev line, it will say board rev x/nn, where nn is the firmware version number. It must be 74 or greater. If not, download and install the firmware update from <http://www.sagealertingsystems.com/support-firmware.htm>
- 2) Record NV audio from your loudest monitor source. From the front panel, select **MENU.ALERTS.RECORD NVAUDIO**, use the next button to select the monitor source. Then click “start” to start recording, and “end” after you have several seconds of audio.
- 3) Remove the long green bar from the back of the ENDEC.
- 4) Watch the level meter from the web page while you do the next step.
- 5) Start a playback of the recorded audio from **MENU.ALERTS.PREVIEW NVAUDIO**. If the combination of input level, record level, and playback level is excessive enough to cause the output appears as input problem, you should see the peak level indicators on one or more of the audio inputs jump while you are playing back. If you do, you need to make an adjustment. Repeat the test procedure as needed (remember to reinsert the long green bar before you record, and remove it before you play back).
- 6) End with reinserting the long green bar.

Procedure to measure actual output levels on the bench

- 1) This procedure will send a live alert. You’ll want to make sure your ENDEC is not connected to your air chain, or anything that can be triggered by any of the contract closures.
- 2) Check to see if you have firmware version 74 or greater. On the web page, click the version button. Look at the board rev line, it will say board rev x/nn, where nn is the firmware version number. It must be 74 or greater. If not, download and install the firmware update from <http://www.sagealertingsystems.com/support-firmware.htm>
- 3) Record NV audio from your loudest monitor source. From the front panel, use **MENU.ALERTS.RECORD NVAUDIO**, use the next button to select the monitor source. Then click “start” to start recording, and “end” after you have several seconds of audio.
- 4) Remove the ENDEC from the air chain, and from any other alarms, sirens, flashing lights, or switching equipment you have. This procedure will result in a log entry, make a manual note in your station log that this was a test alert.
- 5) Monitor the levels from the ENDEC in any way you wish.

- 6) Send an alert.
 - a. Menu.alerts
 - b. Originate alert
 - c. (enter password)
 - d. New
 - e. Pick (for originator)
 - f. Next until you see Practice/Demo Warning (for event)
 - g. Pick
 - h. More to Change Attn to 8 seconds, then done
 - i. Next to select nv audio, then pick
 - j. New, spec, local, done (selecting areas)
 - k. For nv leadin, if shown, select no
 - l. Crawl only, if shown, select no
 - m. Done (for duration)
 - n. Proceed to send alert
- 7) Check your levels, adjust as necessary.
- 8) If you had been using NV Audio, upload it again to replace the test audio.
- 9) Put the ENDEC back in your air chain.