



A **BELDEN** BRAND

Technical Note

Testing the Audio Muting Function in NV8500 Routers

Summary

Prior to NV8500 version 3.1.2, NV8500 routers emitted audio noise during a control card change-over.

As of version 3.1.2, we have fixed the audio noise problem. Hybrid output cards emit generated silence during periods of change-over.

This document describes the conditions under which hybrid output cards will switch to silence. In this document, we describe what the router will do.

We also provide a test procedure by which you can determine whether the router does what is intended regarding silence during change-over.

Theory

There are several scenarios that involve either a router with two control cards or a router with one control card.

Change-Over

- ▲ Change-over is defined for a router having two control cards. Change-over is when the active control card becomes inactive, causing the router to switch to the stand-by control card.

These scenarios are defined (and assume the presence of two control cards):

- Change-over by hard reset

This change-over occurs when you push the reset button of the active control card. Control is passed to the stand-by card. Audio mutes briefly (about 2 seconds) and then recovers (under the formerly stand-by control card).

- Change-over by removal

This change-over occurs when you remove the active control card from the frame (or simply unseat it). Control is passed to the stand-by card. Audio mutes briefly (2 seconds or less) and then recovers (under the formerly stand-by control card).

- Change-over by failure

This change-over occurs if the active control card fails. Control is passed to the stand-by card. Audio mutes briefly (2 seconds or less) and then recovers (under the formerly stand-by control card).

- Change-over by command

This change-over occurs when a command is issued from external software.

The command can be issued in MRC.

The command can be issued in the NV9000 in response to a loss of communication with the router's active control card.

The command can be issued by third-party control systems (such as VSM).

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Single Control Card

In a router having only a single control card, these scenarios are defined:

- Control card failure
- Control card removal and subsequent re-insertion
- Control card reset

This is caused either by pressing the reset button or by an external command.

In each of these cases, the audio mutes until the control returns to its active state. This can take up to 45 seconds.

Operation

The active control card provides two essential functions to the router's hybrid output cards:

- An audio clock
- TDM links

When a control card fails or is removed from service, the router's hybrid output cards detect the loss of the audio clock and the TDM links within several microseconds. When a hybrid output card detects either loss, it begins to emit silence on all its outputs.

When the clock and the links are recovered — after the stand-by control card becomes active — the hybrid output cards resume normal audio.

Embedded Output

The embedder output cards continue to insert audio packets (now containing silence) during the change-over period so that downstream equipment is not disrupted. Audio might mute for up to 3 seconds after a change-over triggering event occurs. The transitions from audio to silence and silence to audio are steps. No ramping up or down occurs.

No audible noise should be heard.

MADI Output

The MADI output cards continue to generate a 125 Mb/s data stream. The cards continue to insert control packets so that downstream equipment is not disrupted during the change-over period.

The transitions from audio to audio (or silence) and no audio (or silence) to audio are steps. (No ramping down or up occurs.) MADI audio will be missing or silent for up to 3 seconds after a change-over triggering event occurs.

No audible noise should be heard.

Testing

Summary

Embedded audio output should be tested by routing the video signal under test to a SoundPals module (or equivalent) and listening to the audio output.

MADI audio output should be tested by connecting the MADI output to an NV8900 MADI-to-AES converter (or equivalent) where the individual AES outputs can be connected to AES-to-analog-audio converters and then to speakers or headphones.

We do not recommend any particular testing equipment. We anticipate that your facility will have all the testing equipment it needs.

Method

Follow these general steps:

- 1 Verify firmware loading and that your firmware upgrade works correctly.

This document assumes working firmware as given.

- 2 Verify that the system is able to transmit video and audio for all supported video formats.

Video on all outputs should be clear and uninterrupted on a monitor.

All audio should be clear and noise free on headphones. It is sufficient to verify audio channel 1 in each video stream.

- 3 Verify audio muting on control card change-over.**

Perform control card tests as listed in the following tables.

For a router that has one control card . . .

| Step | Description | Expected Result |
|------|--|--|
| 1 | Verify removal. Remove the control card. | All audio should mute immediately and remain muted. |
| 2 | Verify reinsertion. Reinsert the control card. | All audio should remain muted until the control card becomes active (approx. 45 seconds after insertion). |
| 3 | Verify reset. Press the reset button of the control card. | All audio should mute immediately and remain muted until the control card becomes active again (approx. 45 seconds). |

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For a router that has two control cards . . .

| Step | Description | Expected Result |
|------|---|--|
| 1 | Verify 'change-over by removal'. Remove the active control card. | Audio should mute for 3 seconds or less. |
| 2 | Verify 'change-over by hard reset'. Press the reset button of one of the control cards. The other control card should take control almost immediately. Repeat for the other control card. | Audio should mute for 3 seconds or less. |
| 3 | Verify 'change-over by command, using MRC'. In MRC, go to the 'System Status' page, right-click the active control card, and click 'Reset This Control Card'. (Choose 'Reset Only'.). Repeat for the other control card. | Audio should mute for 3 seconds or less. |
| 4 | Verify 'change-over by command, using NV9000'. Pull the Ethernet cable for one of the control cards from the rear of the router. The NV9000 will detect the loss of communication and issue a command to switch to the other control card. Replace the cable and repeat for the other control card. | Audio should mute for 3 seconds or less. |
| 5 | Verify 'change-over by command, using a third-party control system (if there is one). Pull the Ethernet or serial cable, as the case may be, for one of the control cards from the rear of the router. The control system should detect the loss of communication and issue a command to switch to the other control card. If it doesn't, such a change-over cannot occur. Replace the cable and repeat for the other control card. | Audio should mute for 3 seconds or less. |