HYPACK
a xylem brand

Sounding Better!

Analog Side Scan and Sub-Bottom Ghosting

By Daniel Tobin

In an analog system, you may notice cross-talk or “ghosting” when polling data from multiple channels. It can be particularly noticeable when polling data from the trigger input and the data input. The signal trigger might appear on the data input or the data input could have a fixed offset that isn’t visible when reading from just the data input and not the trigger input.

This is not a problem with your sonar or the software. It’s a design quirk in most National Instruments DAQ systems.

The issue stems from the way the NI boxes read data from multiple inputs. There is a single multiplexer that feeds the voltage into a single capacitor. This capacitor doesn’t have time to discharge between readings. This article by National Instruments goes into detail about why this happens:

https://knowledge.ni.com/KnowledgeArticleDetails?id=kA00Z0000019KzzSAE

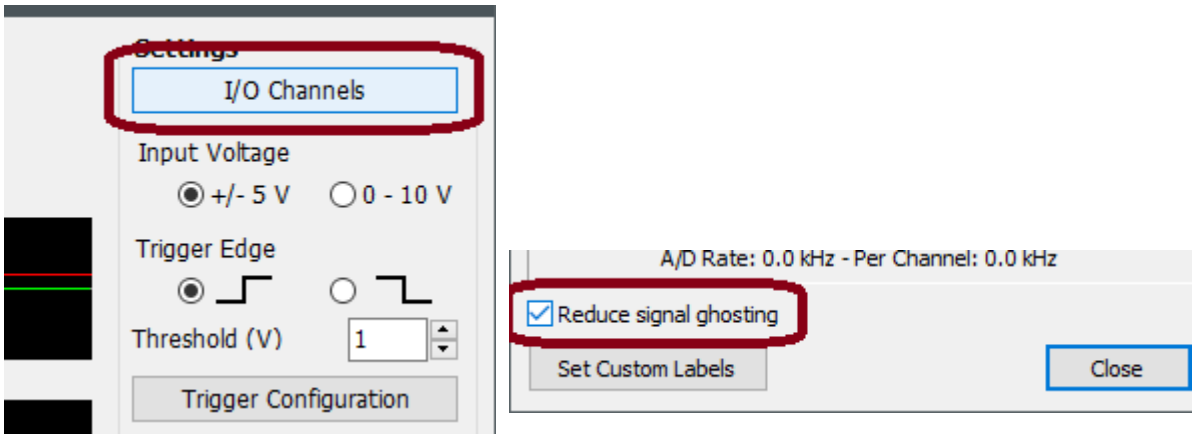
You can mitigate this with both hardware and software adjustments. These are noted in the National Instruments article:

- Select a transducer with lower source impedance.
- Implement a voltage follower or buffer circuit to decrease source impedance to less than 1 kOhm.
- Arrange signals to minimize voltage swings between channels.
- Choose the high-impedance channel as the first channel in the scan list.

In a coming update for the HYPACK Sub-bottom driver (which will be available on the HYPACK website), a few options will be added to help mitigate ghosting.

- **You can increase the channel delay**, which allows more time for the capacitor to discharge: click “I/O Channels”, check “Reduce signal ghosting”, close the window, and click “Apply”.

FIGURE 1. *Increasing the Channel Delay*



- **If you are still seeing issues with your signal, specifically a fixed voltage offset, you can try pressing the "Detect Shift" button in the Analog Monitor.** This looks at the next ping and uses its average voltage as the offset. This is best done when the hydrophone isn't receiving any sound (e.g. on the deck of the boat).

FIGURE 2. *Detect Shift*