TIDA-00152
Automotive Acoustic Knock Sensor Interface - Test Data

This document shares the tests results of the TPIC8101-Q1 EVM. A function generator with amplitude modulation functionality was used to simulate a knock signal input. The higher amplitudes in the modulated signal simulate engine knock.

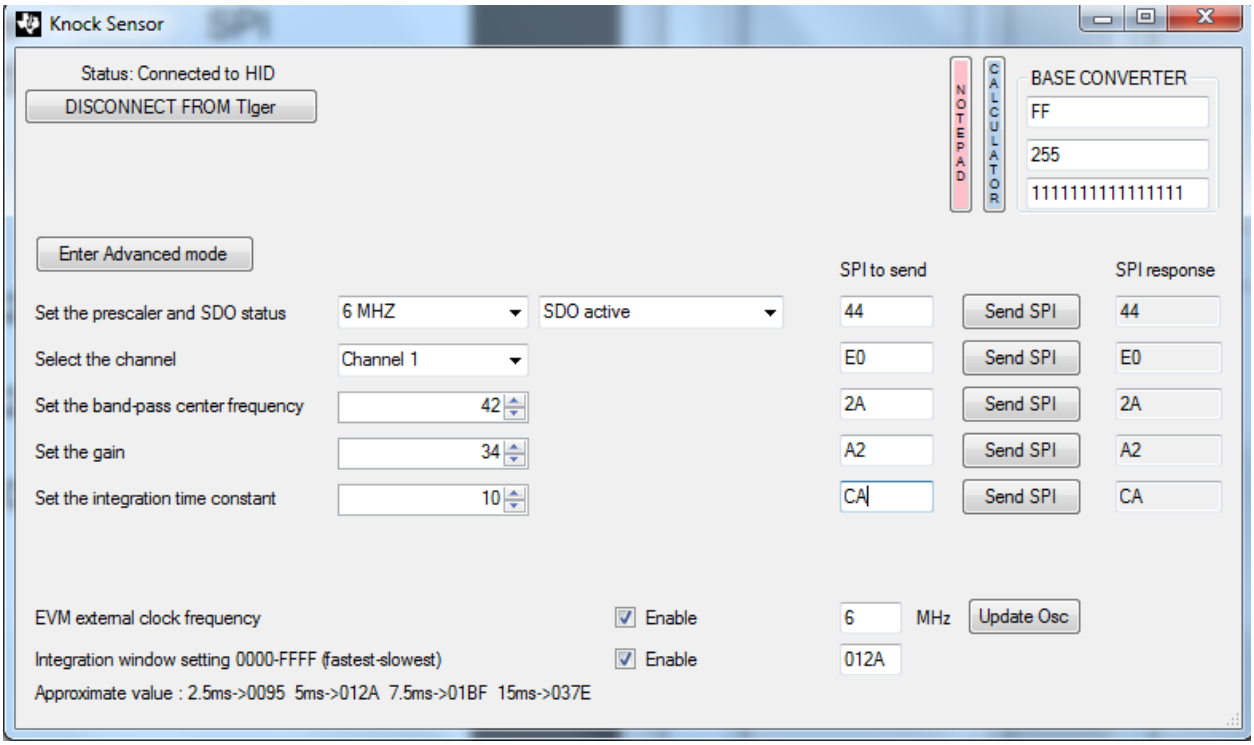
The data is structured into three main categories:

1. Output with unmodulated input
2. Output with varying degrees of modulation

Equipment used to create this data:

1. Function generator with amplitude modulation functionality
2. TPIC8101-Q1 EVM + microcontroller board
3. PC with the TPIC8101-Q1 EVM GUI installed
4. 5V power supply

To re-create the data, open up the EVM GUI and enter the following settings: (Theory behind settings can be found in the TPIC8101-Q1 EVM user's guide, Application Example, and Quick Start Guide.)



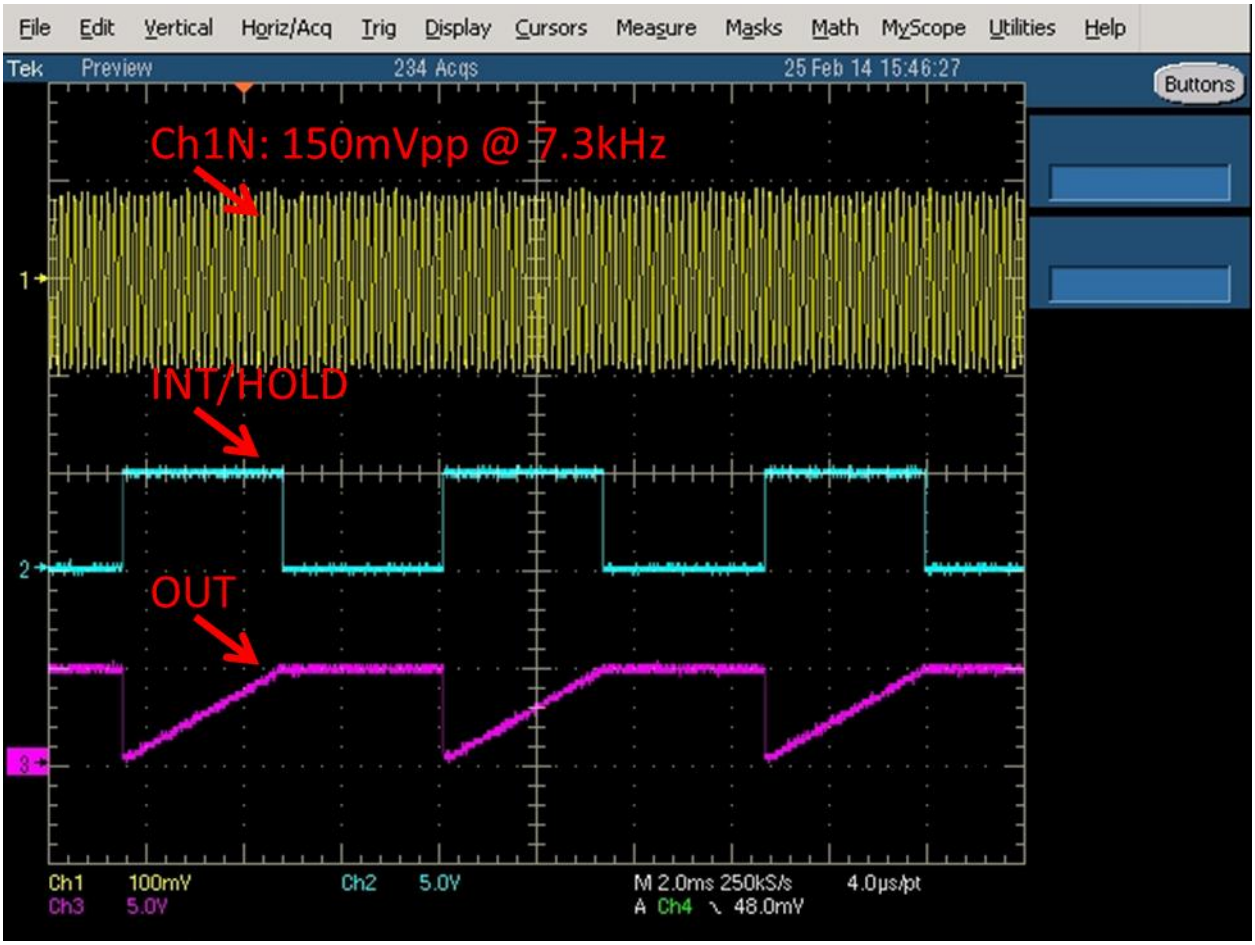
Section 1:

Ch1N on TPIC8101-Q1 EVM is connected to function generator. Function generator settings are: 150mVpp @ 7.3kHz sine wave; no amplitude modulation.

INT/HOLD is the integration window and is set for 3ms (through the GUI).

OUT is the integration of the input signal's amplitude. OUT is integrated while INT/HOLD is high. OUT is then held while INT/HOLD is low and is reset when INT/HOLD goes high again.

In the figure below, the OUT signal is periodic because the amplitude of the input is constant.



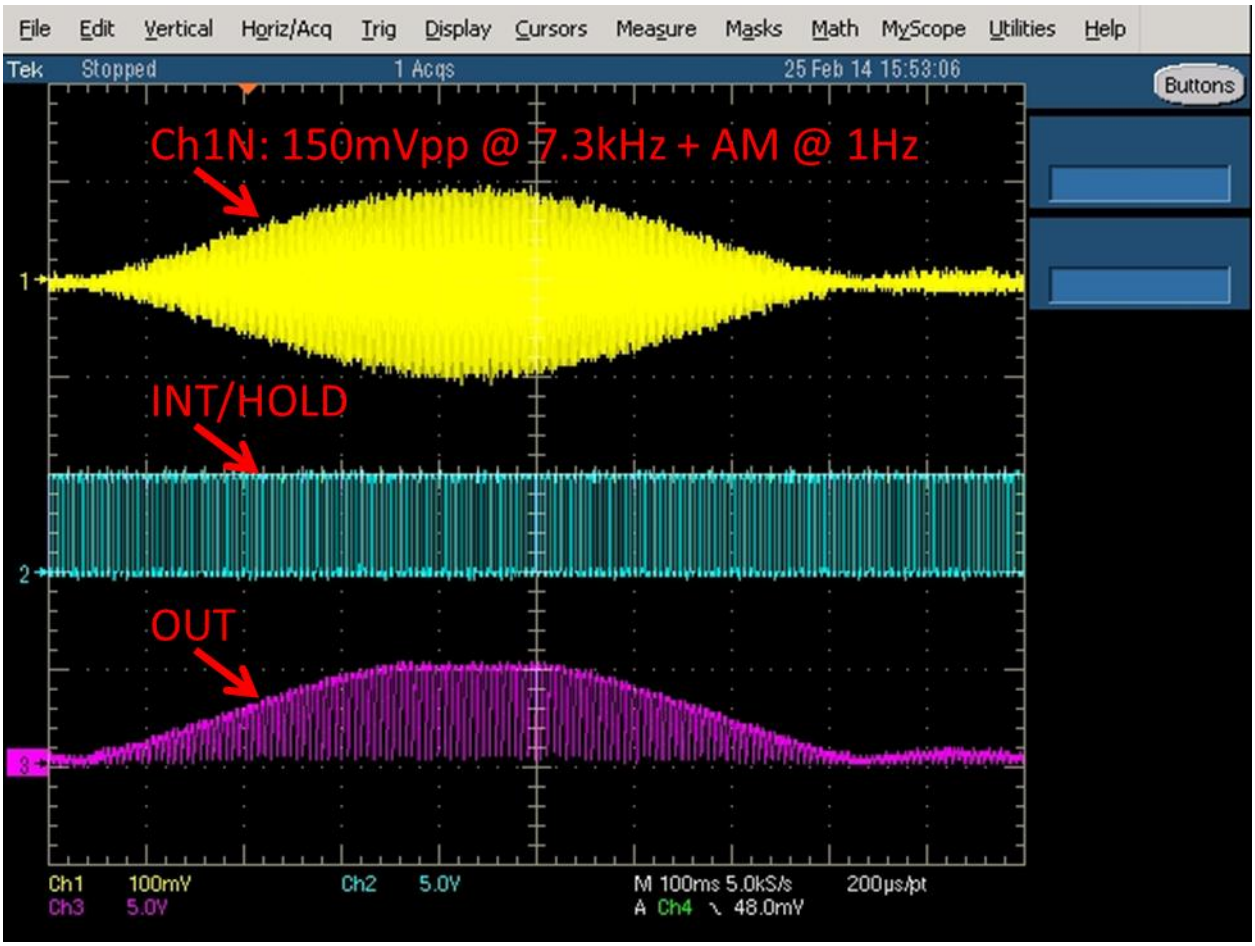
Section 2:

Ch1N on TPIC8101-Q1 EVM is connected to function generator. Function generator settings are: 150mVpp @ 7.3kHz sine wave; amplitude modulation @ 1Hz.

INT/HOLD is the integration window and is set for 3ms (through the GUI).

OUT is the integration of the input signal's amplitude. OUT is integrated while INT/HOLD is high. OUT is then held while INT/HOLD is low and is reset when INT/HOLD goes high again.

In the figure below, the input amplitude is not constant because the signal is amplitude modulated. As a result, the OUT signal's amplitude also varies. Note: The scope shot is zoomed out relative to the scope shot in Section 1.

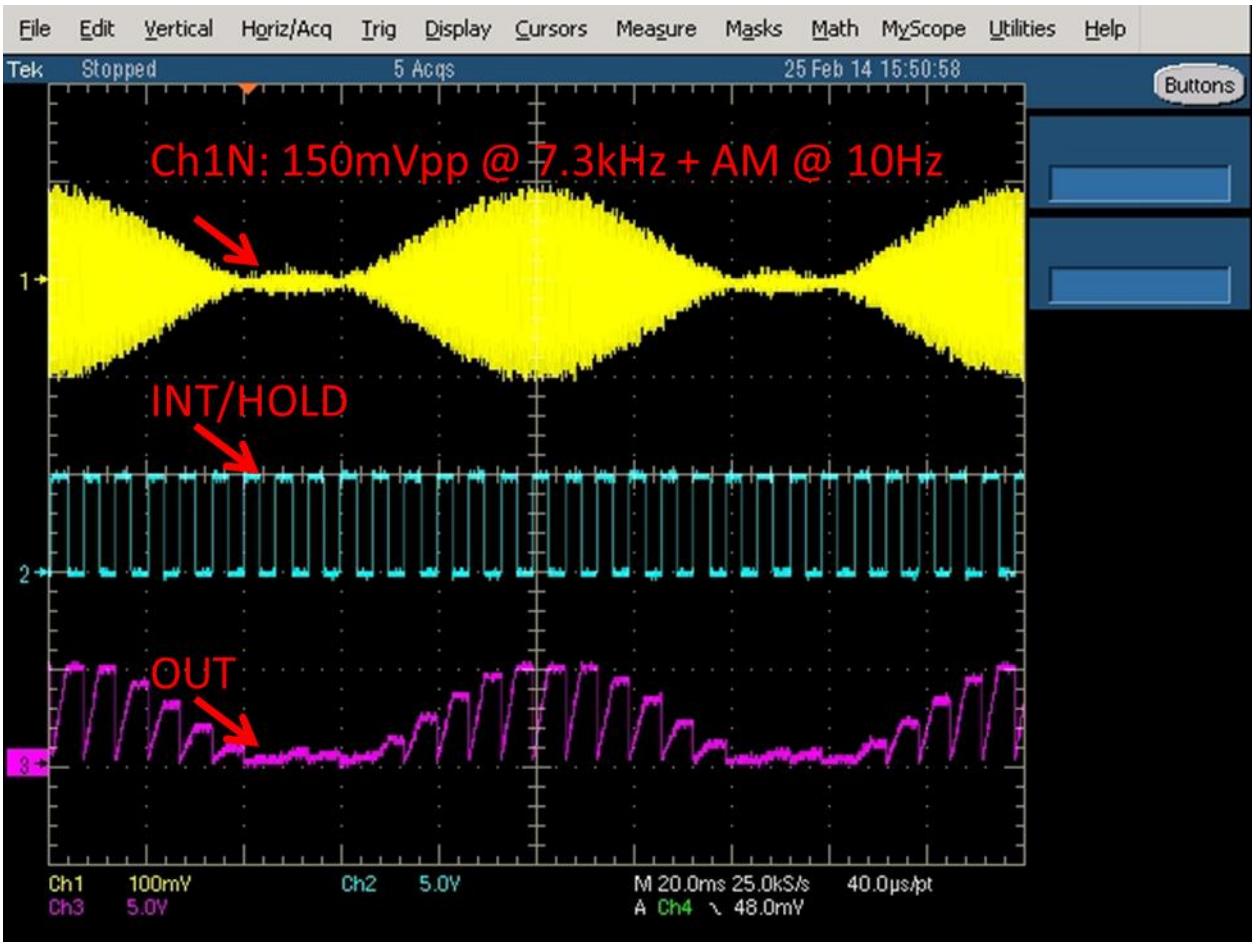


Ch1N on TPIC8101-Q1 EVM is connected to function generator. Function generator settings are: 150mVpp @ 7.3kHz sine wave; amplitude modulation @ 10 Hz.

INT/HOLD is the integration window and is set for 3ms (through the GUI).

OUT is the integration of the input signal's amplitude. OUT is integrated while INT/HOLD is high. OUT is then held while INT/HOLD is low and is reset when INT/HOLD goes high again.

In the figure below, the input amplitude is not constant because the signal is amplitude modulated. As a result, the OUT signal's amplitude also varies. Note: The scope shot is zoomed out relative to the scope shot in Section 1.

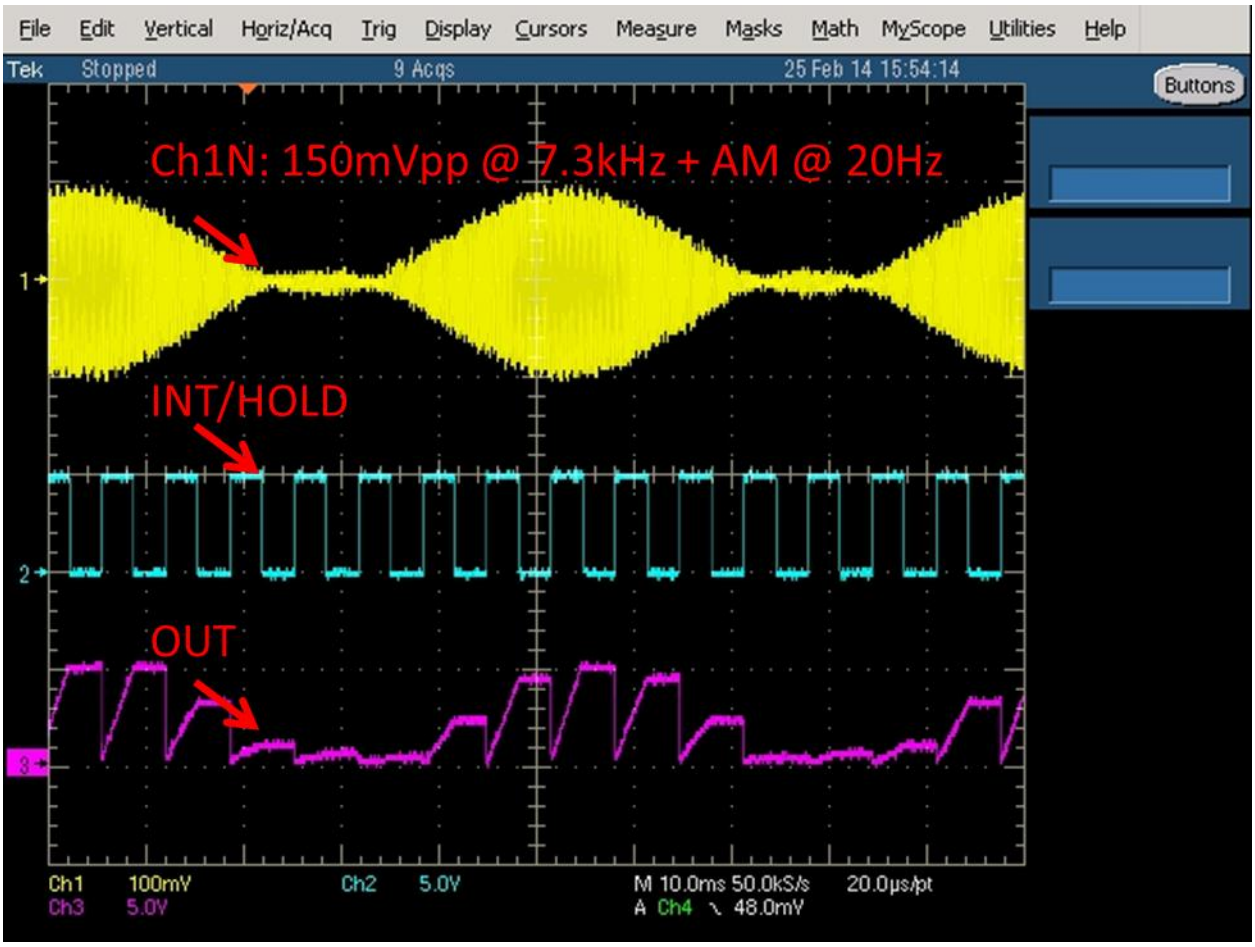


Ch1N on TPIC8101-Q1 EVM is connected to function generator. Function generator settings are: 150mVpp @ 7.3kHz sine wave; amplitude modulation @ 20 Hz.

INT/HOLD is the integration window and is set for 3ms (through the GUI).

OUT is the integration of the input signal's amplitude. OUT is integrated while INT/HOLD is high. OUT is then held while INT/HOLD is low and is reset when INT/HOLD goes high again.

In the figure below, the input amplitude is not constant because the signal is amplitude modulated. As a result, the OUT signal's amplitude also varies. Note: The scope shot is zoomed out relative to the scope shot in Section 1.



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