HDIce Status Report

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Detector Support Group

Contents

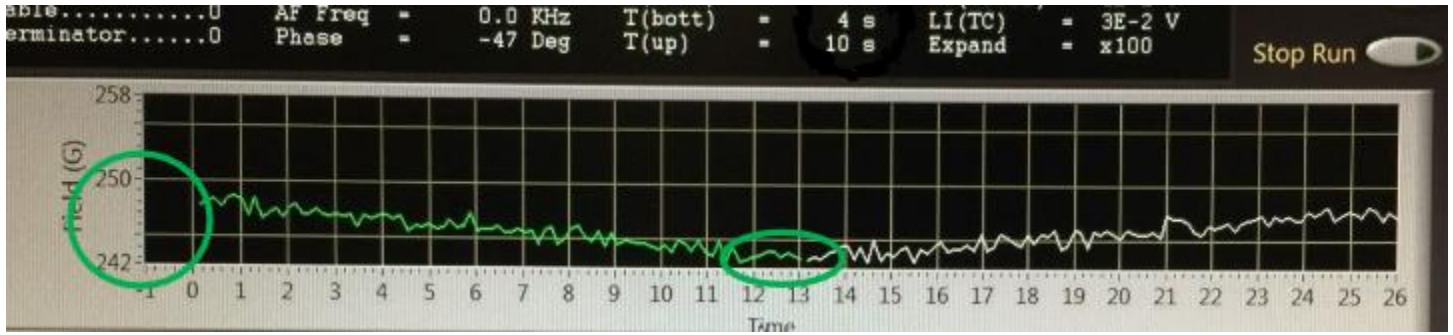
- NMR program problems.
- CT-Box noise test.
- CT-Box and lock-in amplifier synchronization.
- Current work status.

Program Problems

- Status Report from HDIce sent 1/26/17.
- Outlined 3 problems:
  1. CT-Box noise issue of 2 Gauss.
  2. CT-Box enabled and disabled features not working.
  3. Triggering every lock-in data read with separate trigger unnecessary.
     - Single trigger was suggested.

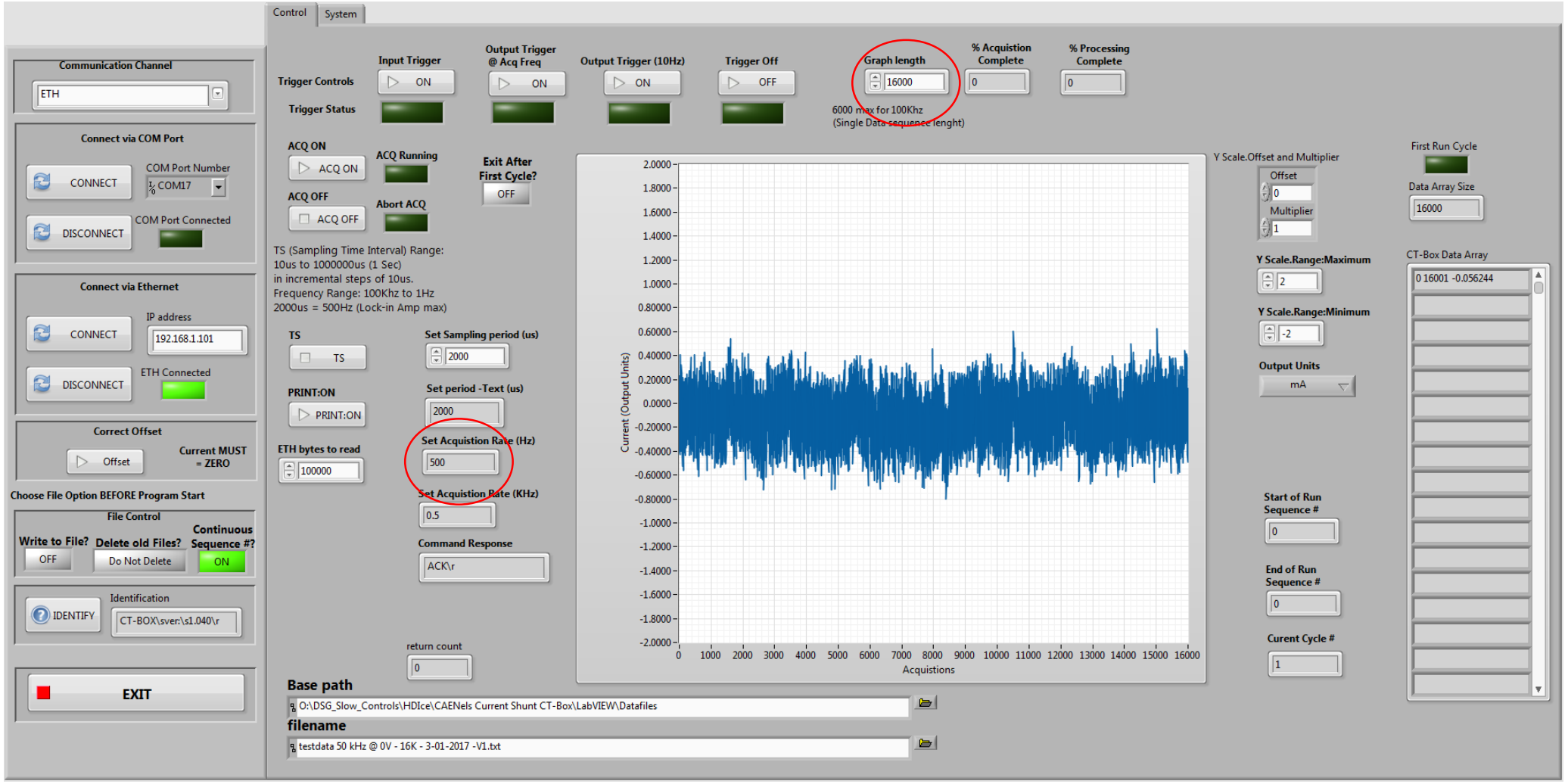
CT-Box Noise

- Report statement: HDIce report stated field signal noise in CT-Box enabled condition appears way too high, on order of 2 gauss.



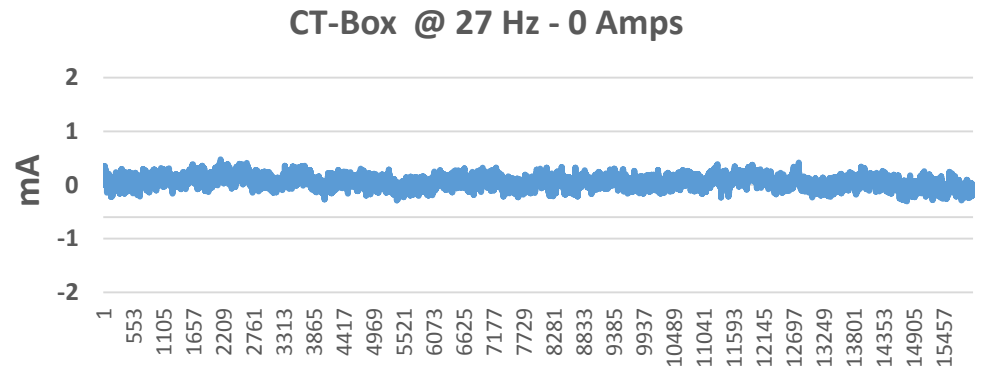
- DSG response: CT-Box noise test conducted in control room does not show 2 gauss noise.

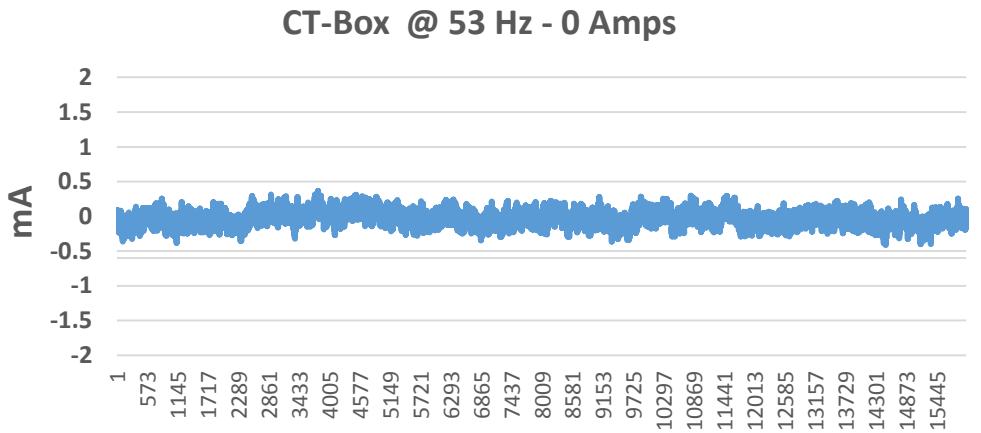
CT-Box Data Acquisition Program

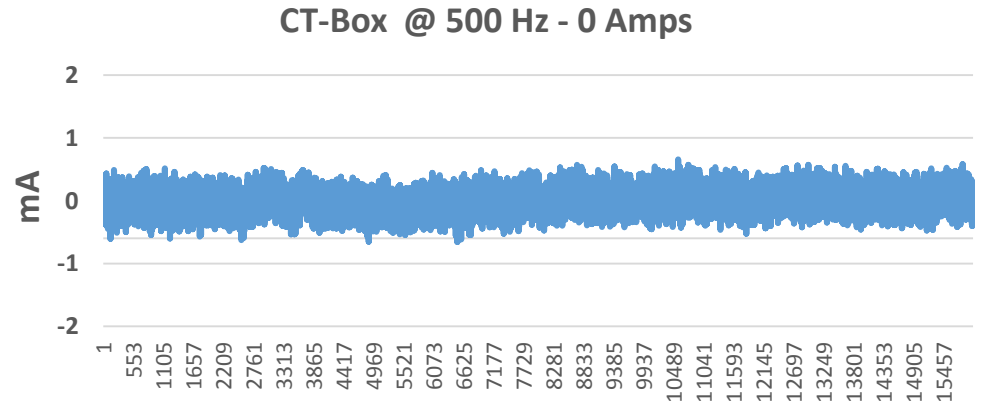


Noise Test for Varying Frequency

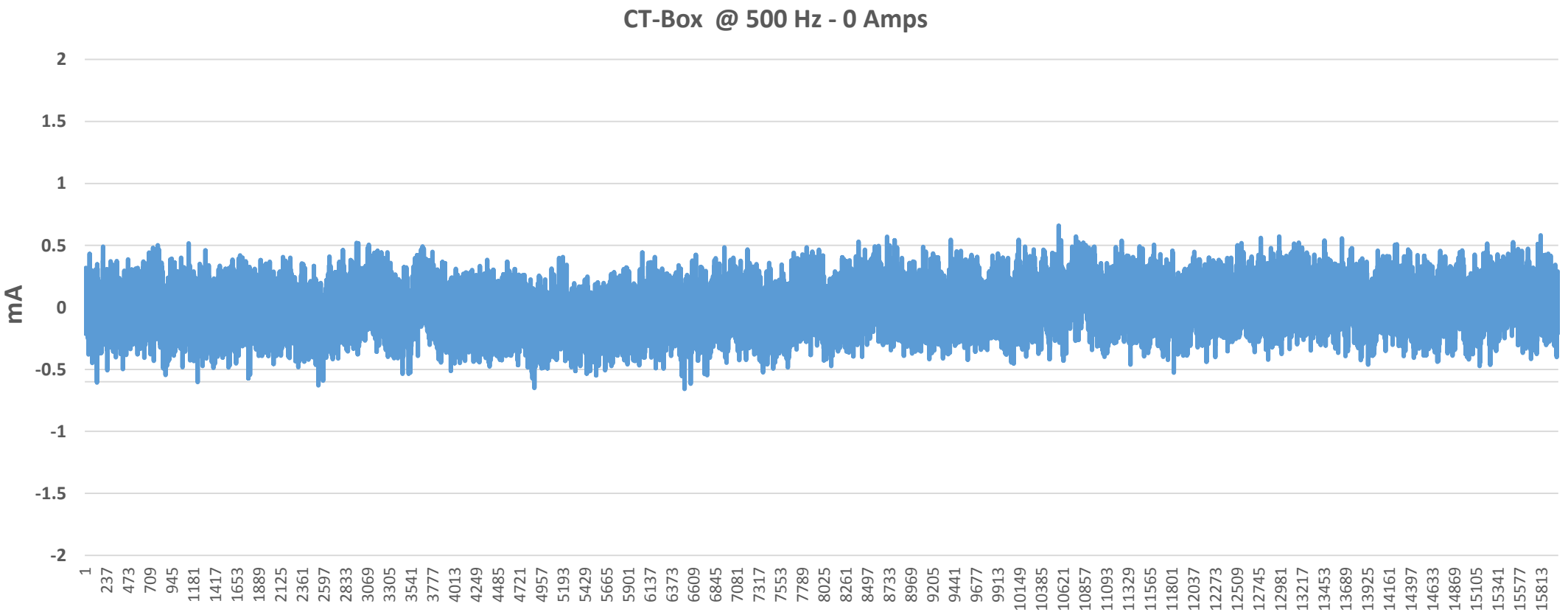
- Tested at 27 Hz, 53 Hz, and 500 Hz.
  - Frequency chosen due to min and max scan times.
- Signal shown to center 0 mA and not exceed 1 mA.







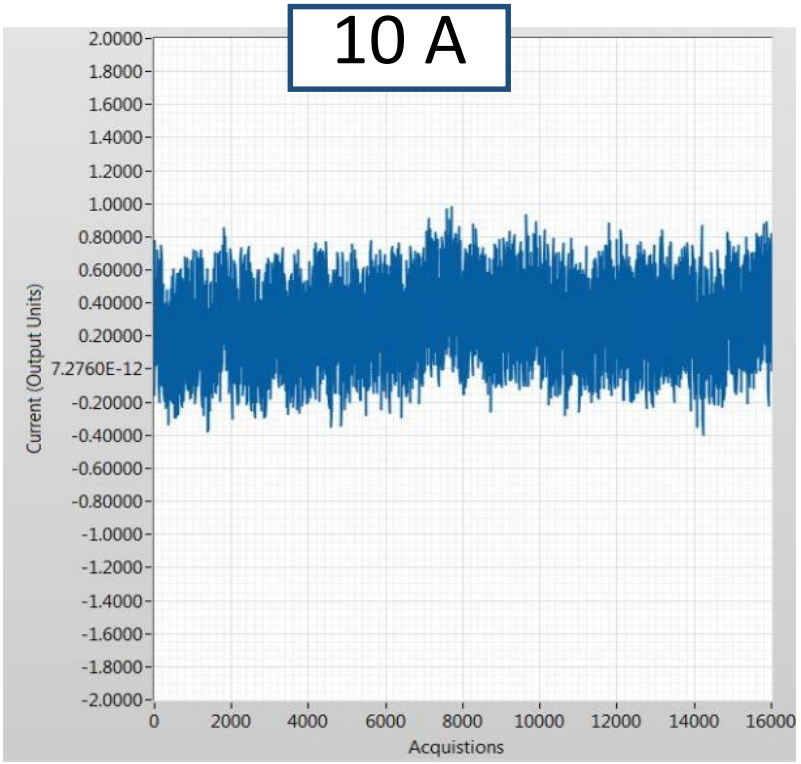
Noise Test at 0A, 500 Hz

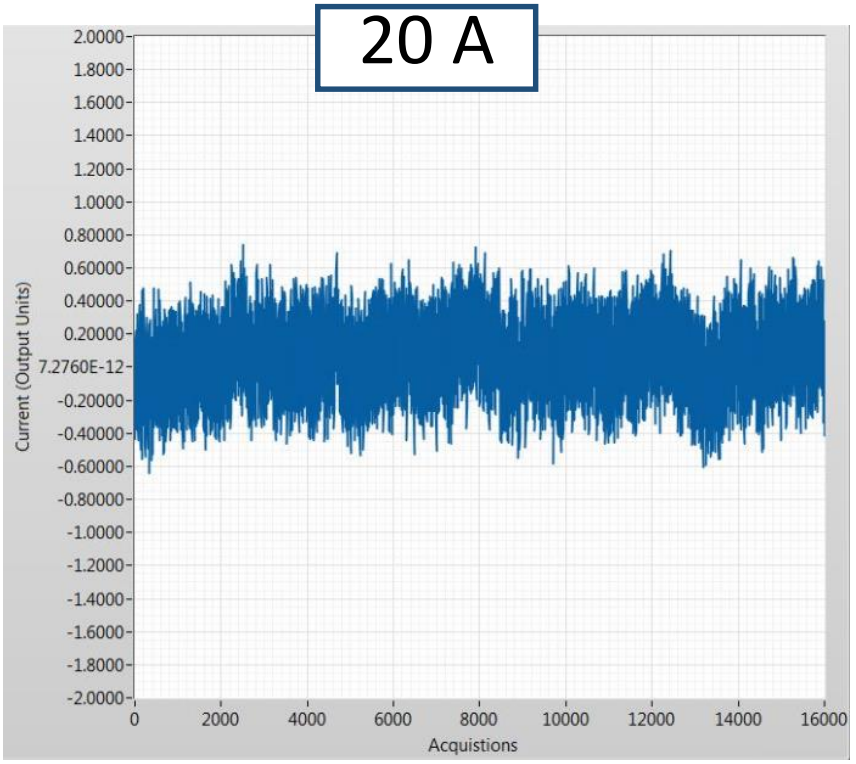


1 gauss is 1.994mA for PDI and 1.937mA for PDII

Noise Test for Varying Current

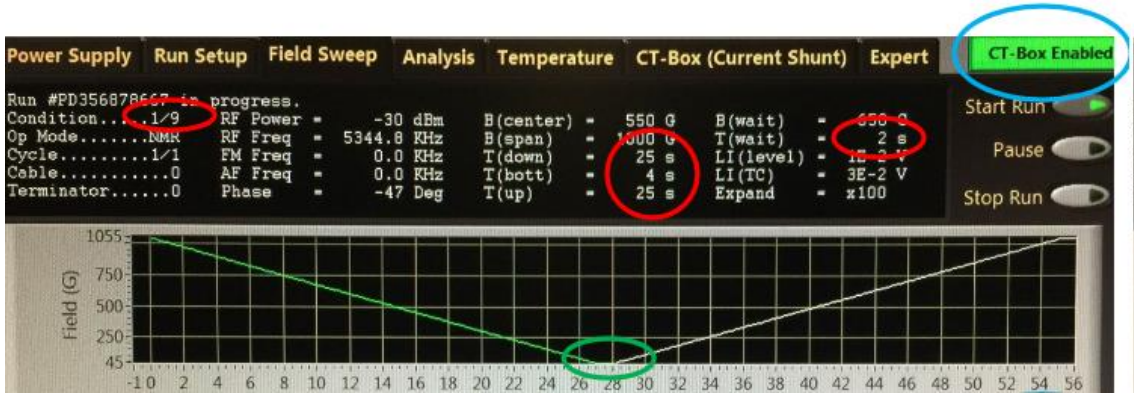
- Signals for 10A and 20A at 500 Hz (in mA).
  - Signals are offset to 0A for comparison.

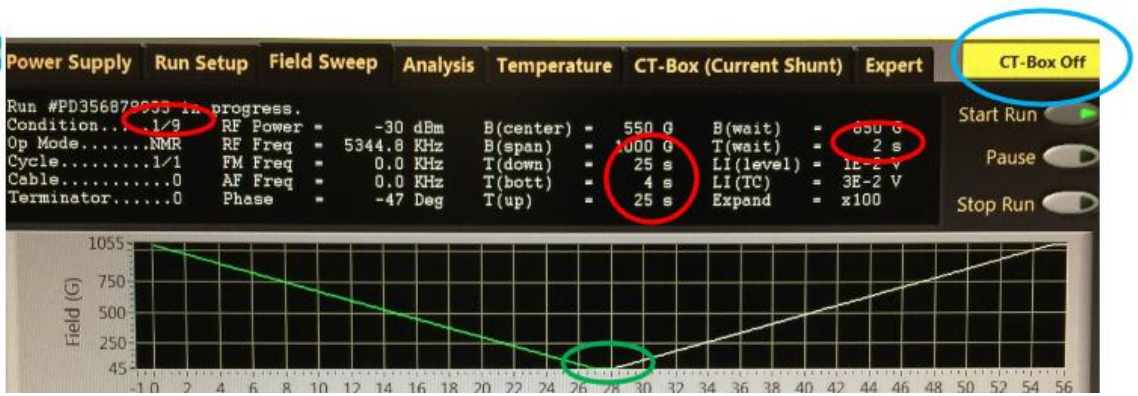




CT-Box Enable/Disable

- Report statement: No difference in graphs with CT-Box enabled vs disabled.





- DSG response: CT-Box Enable and Disable features must be selected before running VI.

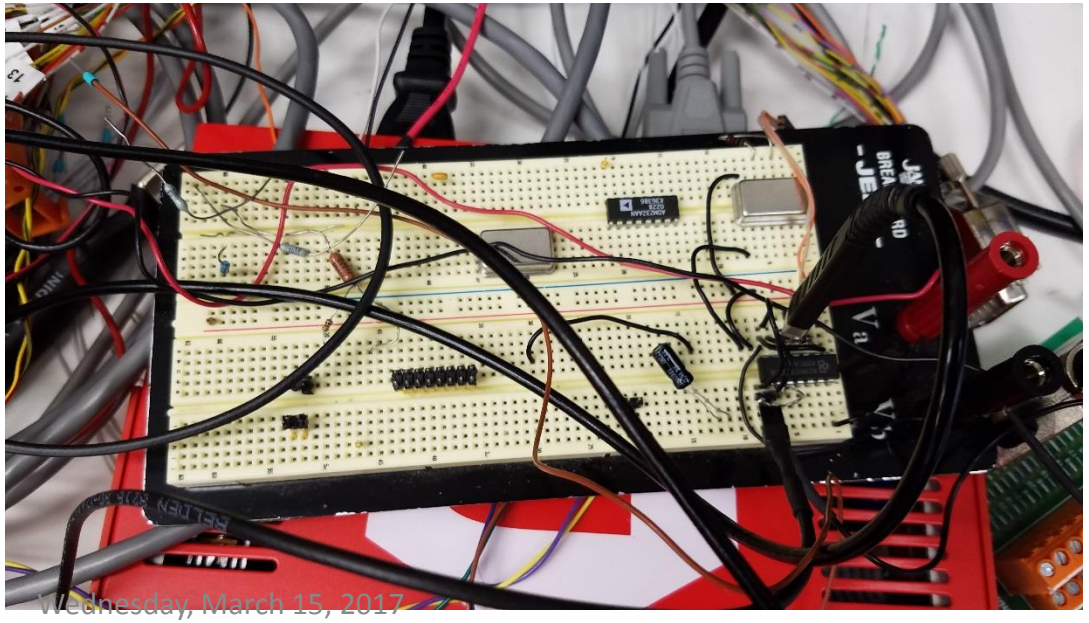
Synchronization

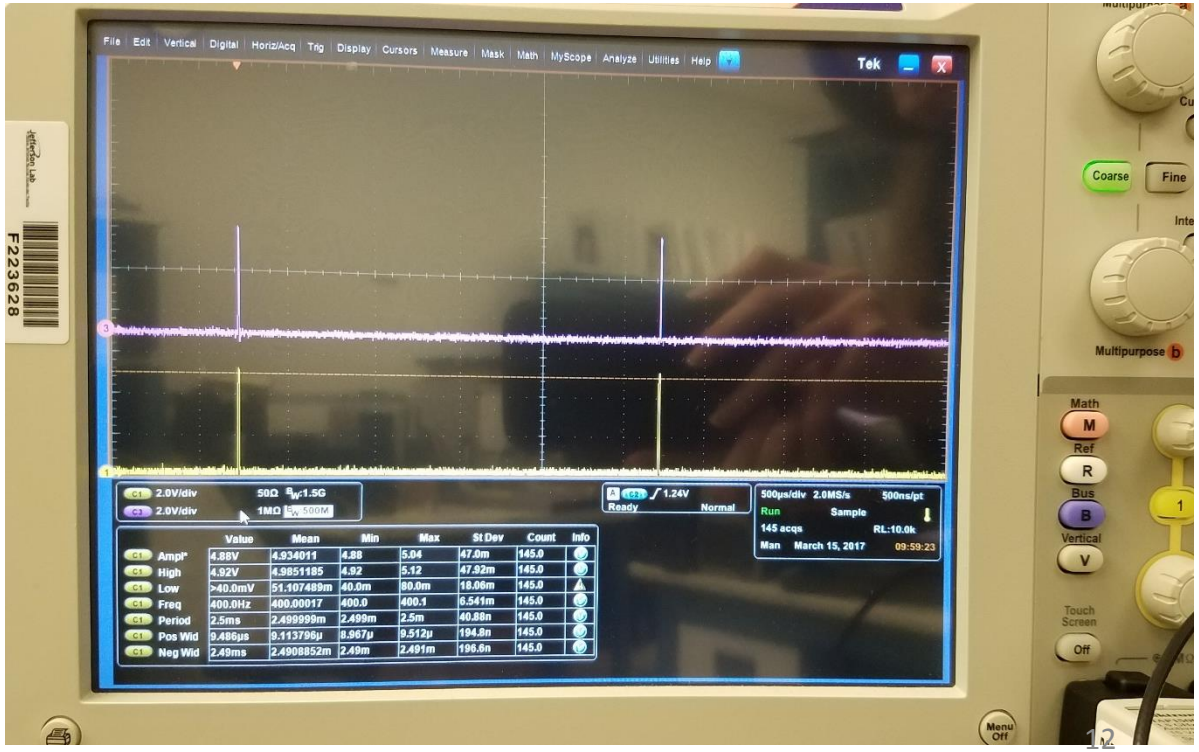
- Report statement: Trigger lock-in scan and field sweep when CT-Box current crossed threshold, once for every IPS sweep.

- DSG response: CT-Box has to send trigger signal to Lock-In Amplifier for every data point required.
  - Single trigger will not work.
    - Requires instruments to use own acquisition clocks and run asynchronously.
    - Both instruments required to have same or integral multiple of the other's frequency.
      - The lock-in amplifier fixed sample rate intervals of 64 Hz, 128 Hz, 256 Hz, and 512 Hz.
      - The CT-Box's acquisition frequency is programmable from 1 Hz to 100 KHz in 10 µs steps.
    - Misalignment between CT-Box and lock-in amplifier measurements will occur.

Triggering Progress

- Signal from CT-Box too weak to drive trigger input of Lock-In Amp.
- Driver chip was used to buffer signal.
- Scope signals: CT-Box output (pink) and Lock-In input (yellow) at 400 Hz.





Current Work

- FRS and NMR programs updated to LabVIEW 2016.
- Creating flow charts for FRS, NMR, and RTP programs.
- Working on synchronization.
  - Test program being written to read data from both CT-Box and Lock-In Amp.
  - Single data array.
- Waiting for testing and verification of NMR program by HDIce group.

Thank You