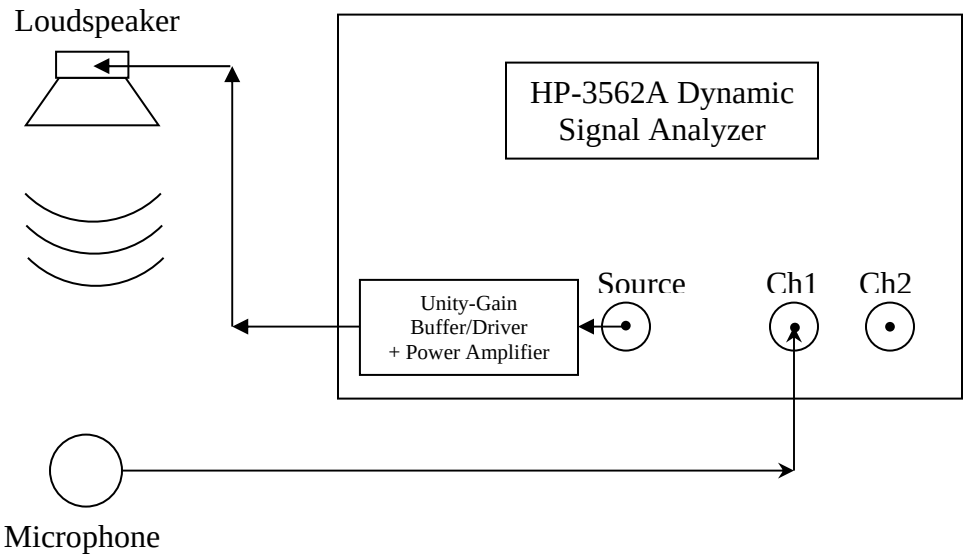
Power Spectral Density (PSD) Measurements with the HP-3562A Dynamic Signal Analyzer

Last Updated: 01/16/2014 12:45 hr {SME}



Brief/Short Step-by-Step Instructions:

1. Define Frequency Span:
a. MEASUREMENT: press **FREQ** button
b. RHS CRT Buttons: press **FREQ SPAN** button, use **ENTRY KEYPAD** enter (*e.g.*) **20**,
c. RHS CRT Buttons: press **KHz** (*e.g.* for a frequency range of **0-20 KHz**)

2. Define # of Averages:
a. MEASUREMENT: press **AVG** button
b. RHS CRT Buttons: press **NUMBER AVGS** button,
c. RHS CRT Buttons: use **ENTRY KEYPAD:** enter **1000** (*e.g.* for **1000** Avgs)
d. RHS CRT Buttons press **ENTER**
e. RHS CRT Buttons: press **STABLE (MEAN)**

3. Define Scale:
a. DISPLAY: press **SCALE** button
b. RHS CRT Buttons press **Y AUTO SCALE**

4. Enable X or Y Marker:
a. MARKERS: press **X** or **Y** button
b. MARKERS: turn knob to set marker position

5. CONTROL: press yellow-orange START button
a. Take data until have/achieve a statistically well-defined plot.
b. Then press yellow-orange PAUSE button.

* Important Note: the **red** "over range" LED above the Ch 1 input on the DSA should not be ***steadily*** lit!!!! If it is, unplug the input ***immediately*** and contact a POM TA!

The DSA Power Spectral Density (PSD) data associated can readout via GPIB into a PC using the NI LabView program **P406_LV_DAQ\NEW_HP3562A\HP3562A_DSA.vi** program. Ask the POM TA to show you how to do this. On the GUI for **HP3562A_DSA.vi**, you will need to set the proper path to write out a user-specified *.txt data file to a sub-folder in the PC's **P406_LV_DAQ\NEW_HP3562A\DATA** area.

Important Notes:

a) If the HP3562A is in the process of **calibrating** itself (notice shows up at the bottom of DSA CRT), you ***must*** wait until the calibration has completed to carry out a GPIB readout of the DSA. If this happens during a calibration, it locks up the DAQ .and. the DSA! Contact a POM TA if this happens – we will have to cold-reboot both the PC .and. the DSA!

b) You ***must*** read out the **purely real** PSD data with the toggle switch on the **HP3562A_DSA.vi** GUI in the **Auto-Correlation** position.

c) Note also that the *.txt data format for **purely real quantities** is **801** rows of **2** columns (frequency and *e.g.* magnitude-squared $\tilde{G}_{x\star x}(f) = \tilde{x}^*(f) \cdot \tilde{x}(f) = \left|\tilde{x}(f)\right|^2$) .

Offline Data Analysis:

There exist MATLAB-based *.m file scripts located in the POM Backup Server Area (Access these via use of the shortcut "New P406POM Backup" on the desktop of POM PC):

\Common\MATLAB_Analyses\HP3562A_Spectral_Analyses

Copy the relevant MATLAB *.m script files to a subfolder the Local MATLAB Work folder on the PC – e.g. in a sub-folder that *you* create on the local PC for your *own* analysis:

C:\Program Files\MATLAB\R2012a\work\HP3562A_Spectral_Analyses\My_Analysis_Subfolder

Edit/modify these MATLAB script(s) for your own individual/specific needs. Don't hesitate to ask a POM TA for help in doing this! The MATLAB *.m scripts will a.) absolutely calibrate your PSD data data and b.) make plots of your absolutely-calibrated PSD data.

You can save all of the plots (*.fig, *.pdf and *.png formats) using the corresponding Matlab *Save_Pix.m scripts – produces a Pix folder containing these plots. Rename this Pix folder to something meaningful/specific to your data analysis.

When you have completed analysis of your data on the local PC, you *must* copy the contents of your local MATLAB analysis My_Analysis_Subfolder to its corresponding location in the POM Backup Server (Note that *nothing* is backed up on any of the PC's in the POM lab!!!!):

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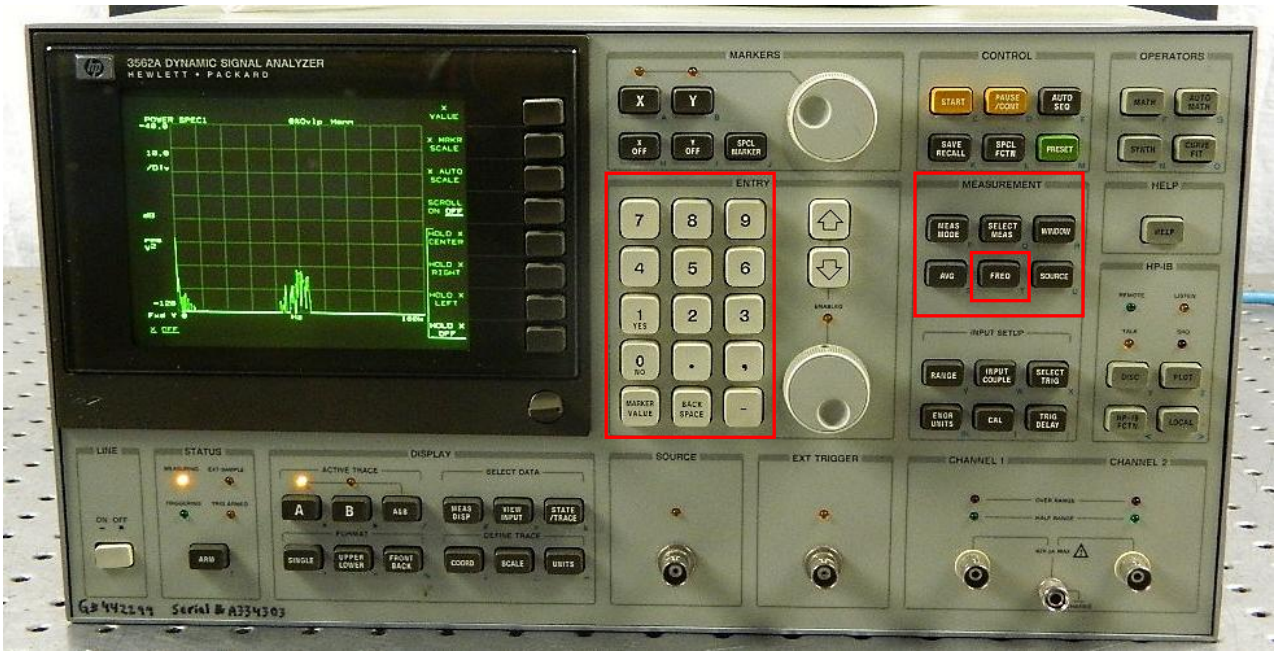
Detailed Step-by-Step Instructions:

1. Define Frequency Span:
a. MEASUREMENT: press **FREQ** button
b. RHS CRT Buttons: press **FREQ SPAN** button, use **ENTRY KEYPAD**: enter (*e.g.*) **20**,
c. RHS CRT Buttons: press **KHz** (*e.g.* for a frequency range of **0-20 KHz**)



2. Define # of Averages:

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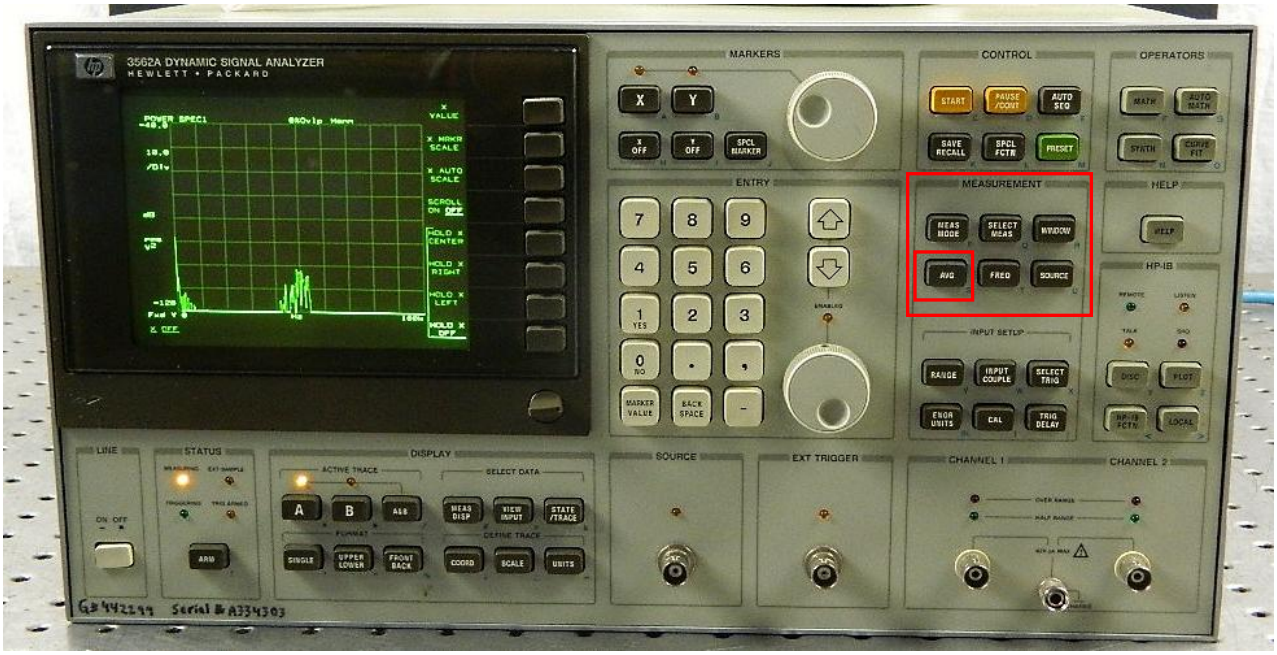
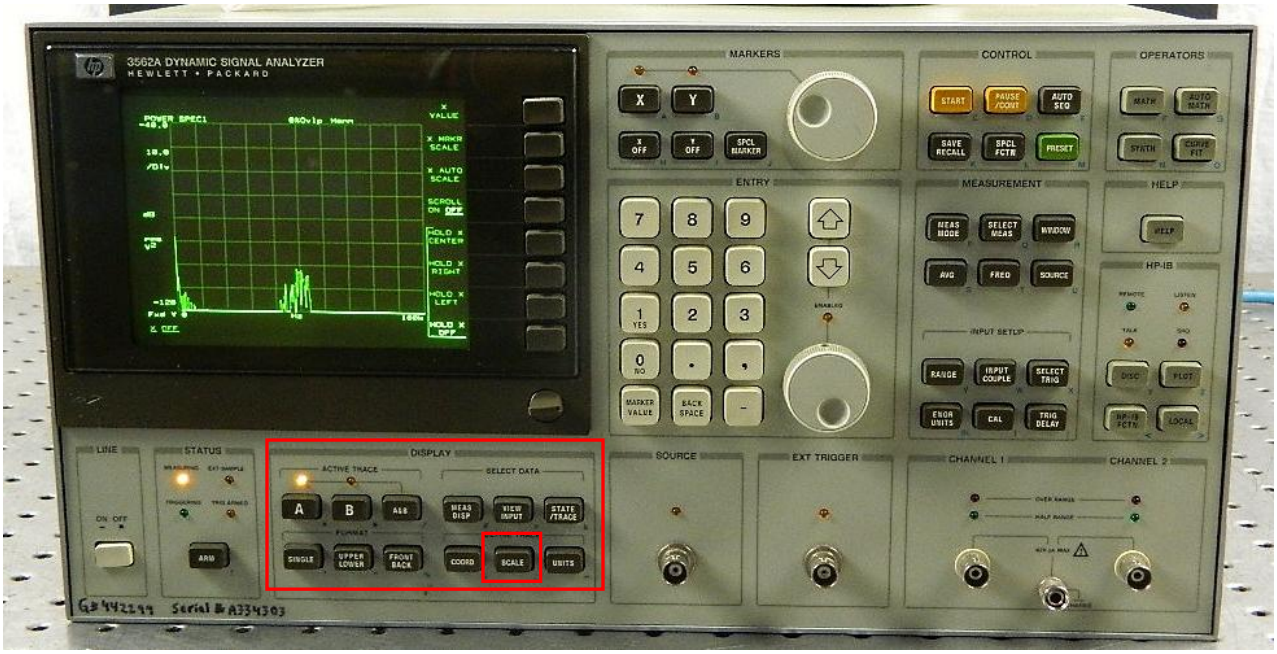
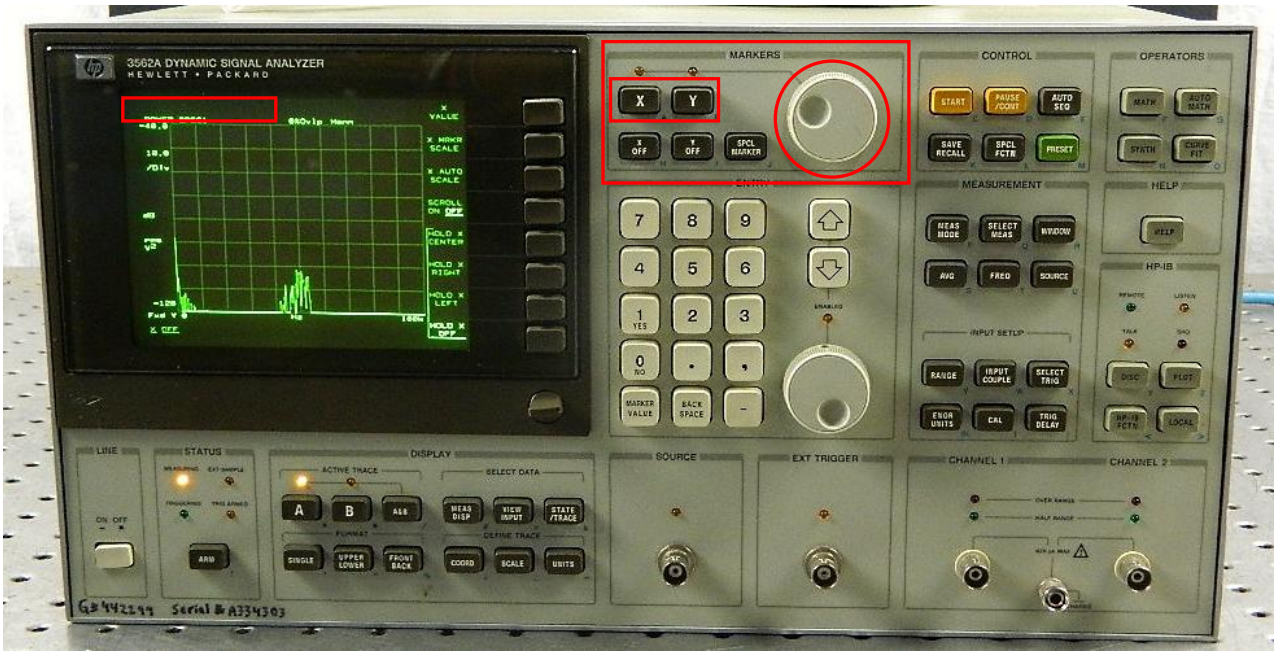


3. Define Scale:
a. DISPLAY: press **SCALE** button
b. RHS CRT Buttons: press **Y AUTO SCALE**



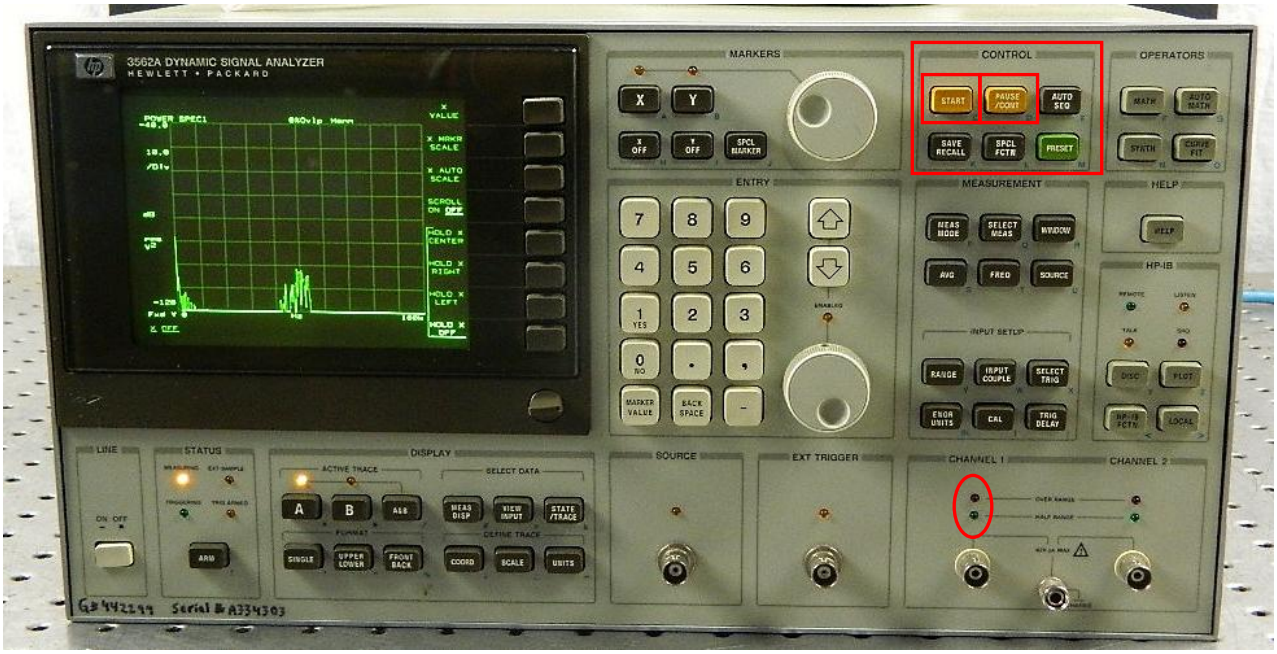
4. Enable X or Y Marker(s):
a. MARKERS: press **X** (horizontal axis) or **Y** (vertical axis) button
b. MARKERS: rotate the round knob to move marker position
c. X, Y numerical information is displayed in upper left hand corner of CRT



5. CONTROL: press the yellow-orange START button

a. Take data until have/achieve a statistically well-defined plot.

b. Then press yellow-orange PAUSE button.



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