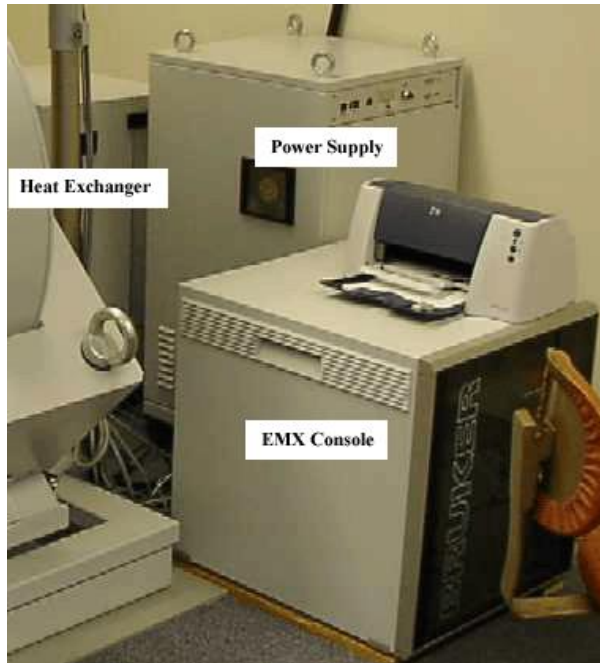


Bruker EMX basic operation

20190909 Izhu

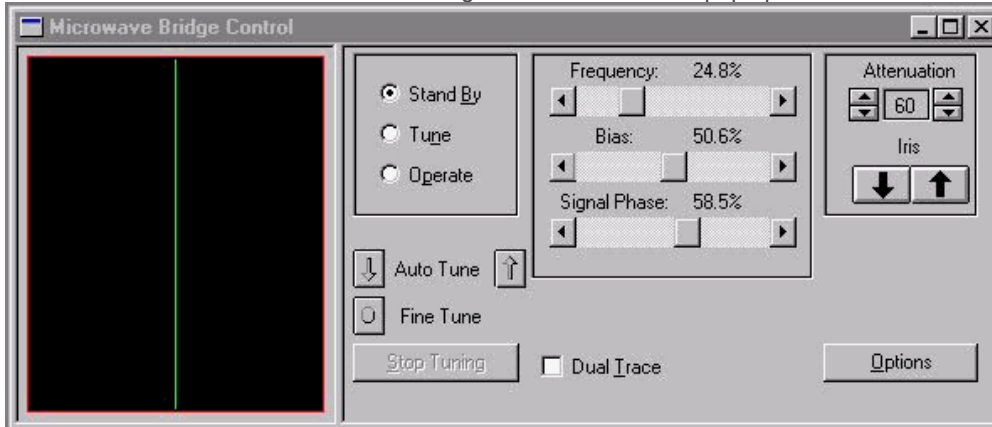


System Startup

1. Sign in in the log book.
2. Open the chilled water lines(**lower silver ones**)
3. Turn on the heat exchanger.
4. Turn on the Main power supply (Do Not Turn On The Magnet!)
5. Turn on the EMX console.
6. *If you want to use the Gauss Meter start it up by double clicking the bootp desktop icon. You will need to open it right after step 5 or you can open it before step 5. Wait for a response indicating the bootp process has completed. Stow the bootp window. The Hall field in the Bruker_EMX software is the Gauss meter; the NMR filed is the magnet field. Gauss meter is more accurate.*
7. Start the Bruker_EMX Acquisition software. The icon is on the desktop. Wait until the whole software is open
8. Turn on the Magnet power supply. Put your sample in.

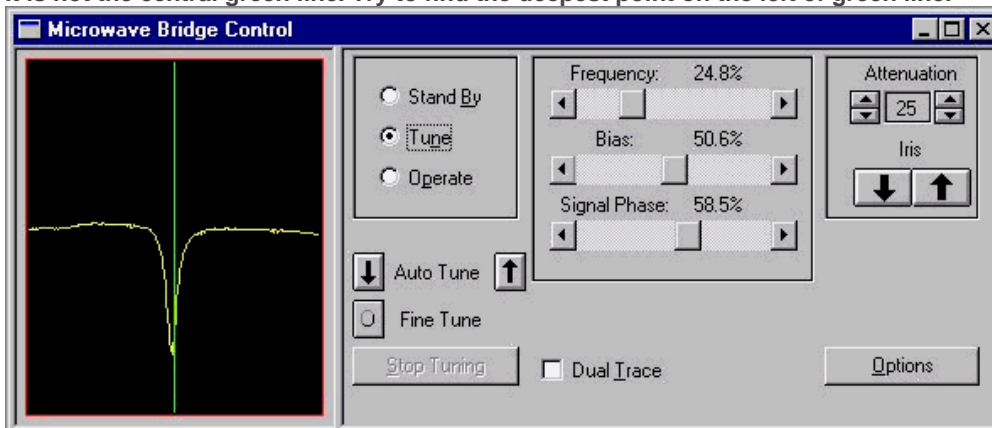
Cavity Tuning

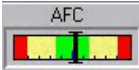
1. Click on the  icon. The Microwave Bridge Control window will pop up.

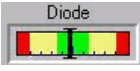


2. The bridge will be in the standby mode. Select Tune and set the microwave attenuation to 25 dB.
3. Wait a few seconds to allow the frequency to set. Adjust the frequency to locate the cavity dip and set it so that the frequency marker is at the bottom of the dip. This should be the point where the dip is the deepest.

It is not the central green line. Try to find the deepest point on the left of green line.




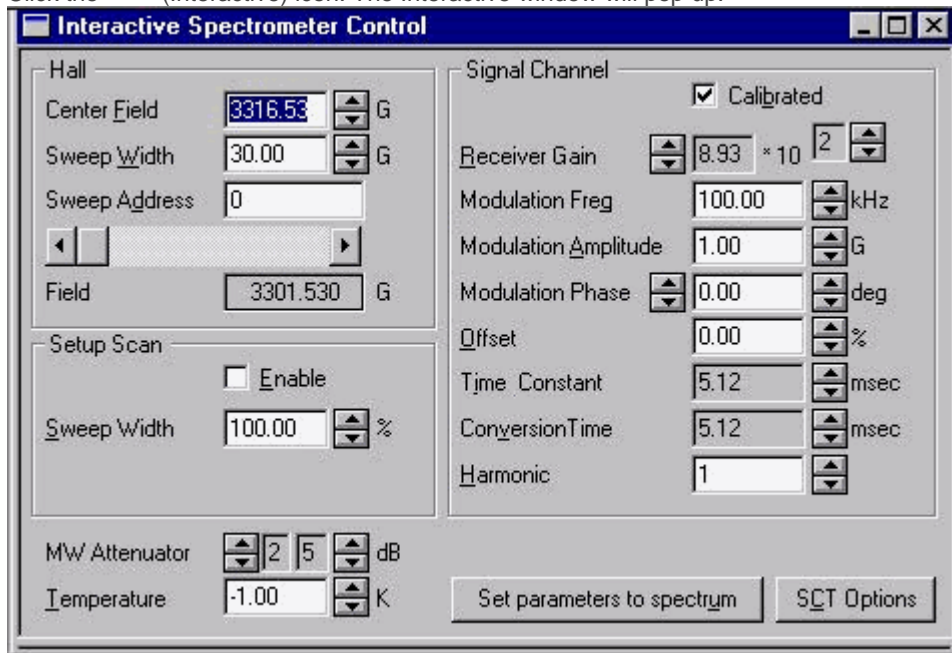
4. Select operate. Set the microwave attenuation to 40 dB. The AFC meter  should be in the green at this point. If not adjust the frequency until it is. If the frequency is close you can use the fine tune button.

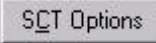
5. Adjust the diode bias so that the meter is centered in the green. . **Use the coarse adjustment.**

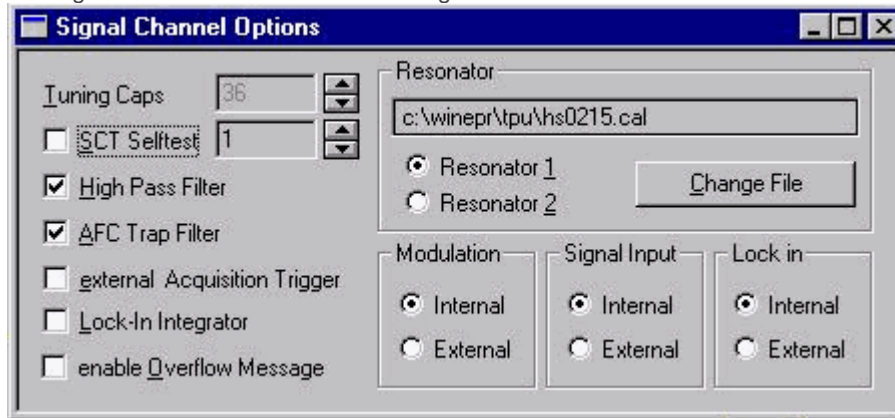
6. Lower the microwave attenuation by 10 dB. If the diode current meter deflects all the way to one side (meaning completely off scale) or the other increase the attenuation in 1 dB increments until the meter is on scale.
7. Adjust the iris up or down so that the diode current meter is centered. Make sure the AFC stays in the green throughout the process. If not adjust the frequency to bring it back. **Iris down means from right to left; iris up means left to right.**
8. Repeat steps 5 and 6 until you have reached 10 dB and the diode meter is centered.
9. Adjust the phase so as to maximize the diode current. **If it is not going to the right end, then we are good. Or it is going to right and stop, then we are good too.** Use the iris to bring the diode current back to the center if it is not centered.
10. Set the microwave attenuation back to 40 dB. Make sure the AFC is still in the green. If not, use the Frequency to make it in the center. If the diode current has moved off center repeat steps 5 - 10.
11. **When you change the sample or do anything close the cavity, please choose “Stand By” mode in the Microwave Bridge Control window**



Recording a Spectrum

1. Step 2 and 3 below are for changing the cavity. If you don't need, skip to step 4.
2. Click the  (Interactive) icon. The Interactive window will pop up.



3. If you have changed cavities make sure to change the calibration file. You can do this by clicking  then select change file.



4. Open a spectrum window by clicking the  icon.
5. Choose the spectrum window and open in the Menu bar: **Parameter -> Experiment**, change the parameters. Then click OK.
6. Alternatively you can open an existing file which will load its parameters. Then drag the spectrum into a new spectrum window. This is the recommended procedure as any changes made to the parameters in the opened file will be over written if a save is executed.
7. Click the  icon and the sweep will begin. Adjust your parameters if necessary and rescan. Parameters can be adjusted in the interactive window or in the parameters window associated with the highlighted spectrum window. Use of the parameters window is necessary if you want to do more advanced scans.

Conversion time= 4 X Time constant

Standard Parameter - Spectrum1

Experiment X: **Field Sweep** Y: **no Y-Sweep**

Hall

CF (g=2)

Center Field 3316.53 G

Sweep Width 30.00 G

Static Field 3301.530 G

Microwave Bridge

Frequency 9.298036 GHz

Attenuator dB

Power 2.01e-001 mW

Step 1 dB

Temperature Unit

Temperature K

Step 1.00 K

Goniometer

Angle deg

Step 1.000 deg

Signal Channel

Receiver Gain 8.93 * 10²

Modulation Frequency 100.00 kHz

Modulation Amplitude 1.00 G

Modulation Phase 0.00 deg

Offset 0.00 %

Time Constant 5.12 msec

Conversion Time 5.12 msec

Sweep Time 5.24 sec

Harmonic 1

Resolution in X 1024

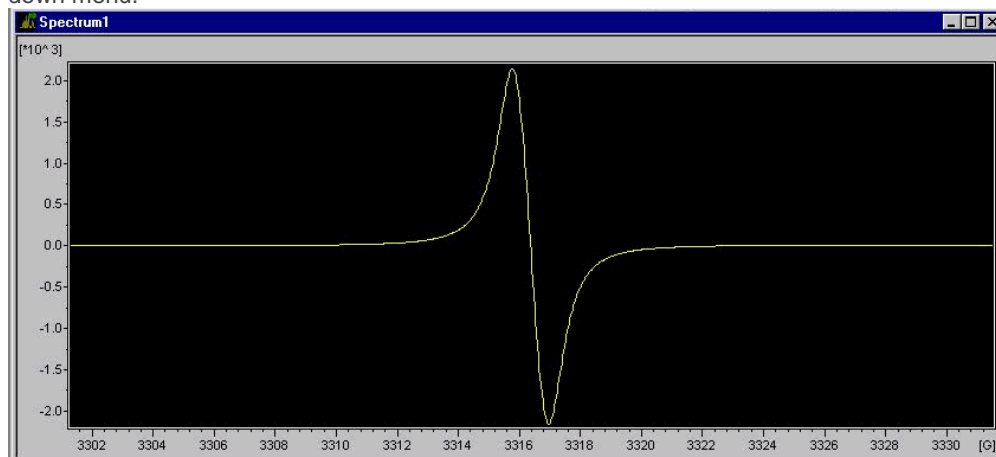
Number of X-Scans 1

Resolution in Y 1

Repetitive Mode

Save as Default **Comment** **OK** **Cancel**

8. Once you are satisfied with your spectrum you can save it to disk by selecting save as under the File pull down menu.



System Shutdown

1. Put the microwave bridge in standby mode. Remove your sample.
2. Turn off the magnet power supply.
3. Close Bruker_EMX Acquisition.
4. Close the bootp window.
5. Turn off the EMX console.
6. Turn off the main power supply.
7. Turn off the heat exchanger.
8. Close the chilled water lines(**low silver ones**)
9. Sign out in the log book.