

Changing EPR Cavities

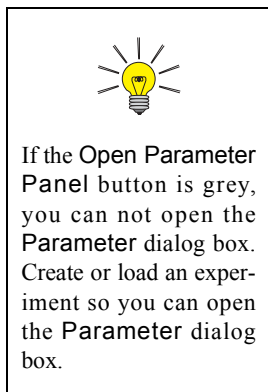
7.2

We assume that the spectrometer is turned on, connected, and an experiment loaded before performing the following operations.

1. **Click the Activate button.** If this button is not already activated, click its button in the Acquisition Control Tool section. (See Figure 7-7.) This button allows you to interactively control the spectrometer when it is activated.



Figure 7-7 The Parameter to Hardware button.



2. **Click the Parameter button.** Click this button to open the Acquisition Parameter dialog box. (See Figure 7-8.)

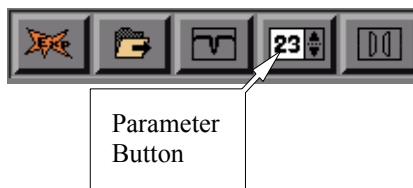


Figure 7-8 The Parameter button.

3. **Set the modulation amplitude to zero.** Click the Signal Channel tab. Enter a value of 0.00 in the Modulation Amplitude box. (See Figure 7-9.)

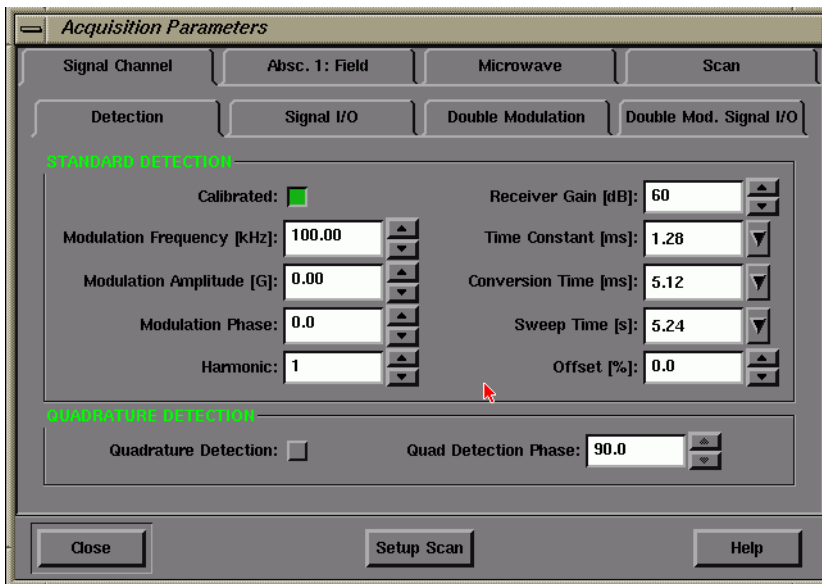


Figure 7-9 Set the Modulation Amplitude to zero.



Setting the magnetic field to the minimum value avoids the risk of magnetizing your watch when changing cavities.

4. **Set the magnetic field to the minimal value.** Click the Absc. 1:Field tab. Enter in a value of 0.00 in the Sweep Width box and then a value of 0.00 in the Center Field box.
5. **Close the Acquisition Parameter dialog box.** Click the Close button of the Acquisition Parameter dialog box. Click the **Activate** button again to exit the interactive control mode.

6. **Open the Microwave Bridge Tuning dialog box.** If this window is not already open, click its button in the monitoring panel. The button toggles the dialog box open and closed. The Microwave Bridge Tuning dialog box will then appear. (See Figure 7-10.)

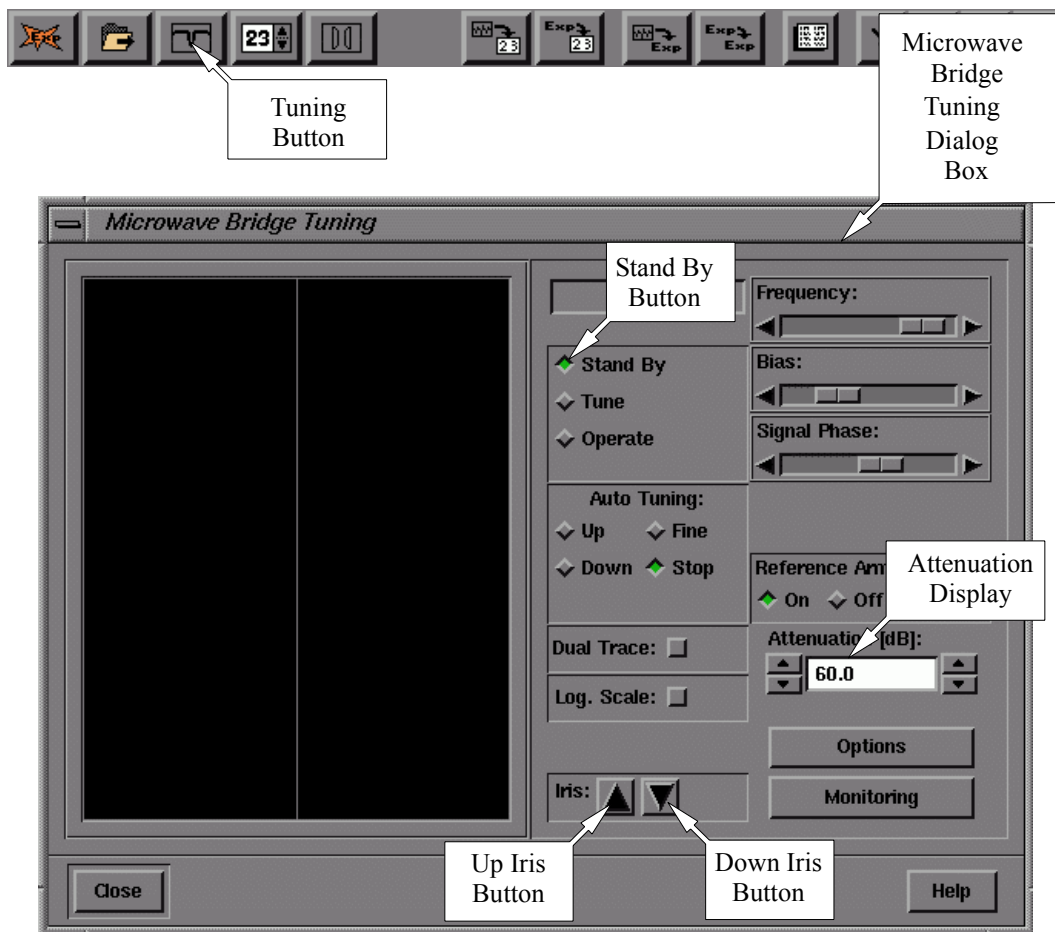


Figure 7-10 The Microwave Bridge Tuning dialog box.



Not all cavities have a rapid scan cable.

7. **Switch the microwave bridge to Stand By mode.** (See Figure 7-10.) Click the Stand By button in the dialog box to change to the Stand By mode.
8. **Disconnect any accessories.** If a variable temperature dewar assembly is installed, disconnect the coolant transfer line and the thermocouple connections from the cavity.
9. **Disconnect the modulation cable from the cavity.** This is the twin-ax cable labeled with a white connector and attached to the front of the standard cavity. To remove it, push the connector in, turn counter-clockwise and gently pull the cable away. (See Figure 7-11.)
10. **Disconnect the rapid scan cable from the cavity.** Disconnect the 50 Gauss rapid scan cable if it is connected to the cavity. This is the twin-ax cable labeled with a yellow connector and attached to the front left of the standard cavity.
11. **Disconnect the nitrogen purge line from the port on the waveguide.** The port is half way down the waveguide attached to the cavity. (See Figure 7-11.)

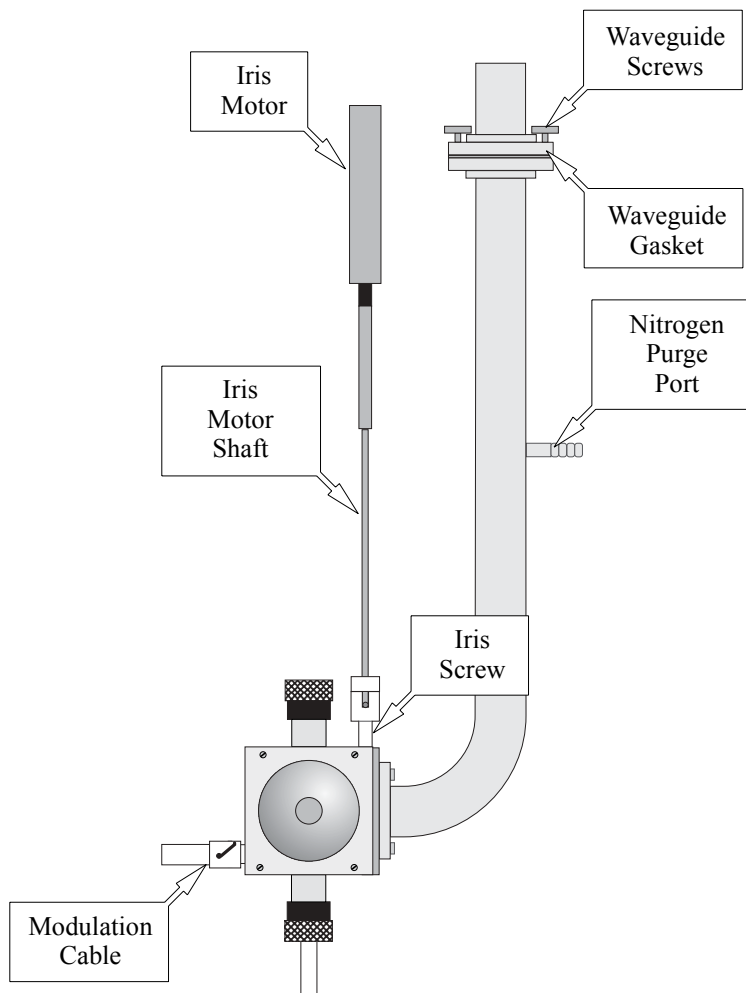


Figure 7-11 Connections on the ER 4122SHQ cavity.



Store the lock nut in a place where it will not be lost.

12. **Disconnect the iris motor shaft from the iris screw.** First unscrew the lock nut from the iris screw. Lift the shaft upwards to disconnect. Move the iris motor to the side where it is out of the way. (See Figure 7-12.)

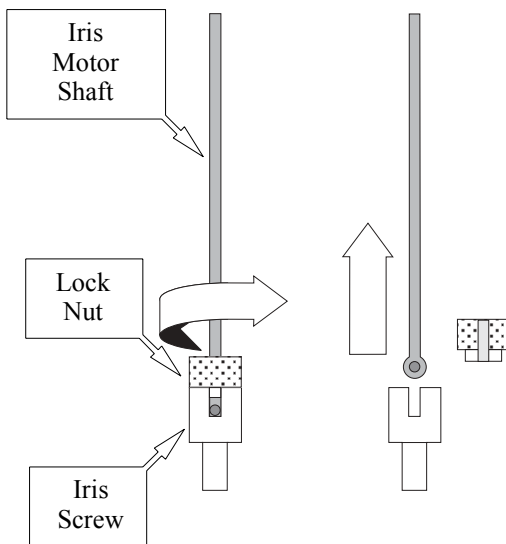


Figure 7-12 Disconnecting the iris motor shaft from the iris screw.

13. **Disconnect the cavity.** While grasping the waveguide attached to the cavity with one hand, unscrew the four waveguide screws joining the two sections of waveguide. (See Figure 7-11.) Loosen the waveguide stabilizers by rotating the screws and carefully remove the cavity from the air gap of the magnet. (See Figure 7-13.) Take care not to lose the gasket which was between the two waveguide flanges. Remove the waveguide stabilizers. (See Figure 7-14.) Seal the cavity with the solid collets and put the cavity in a safe clean place.

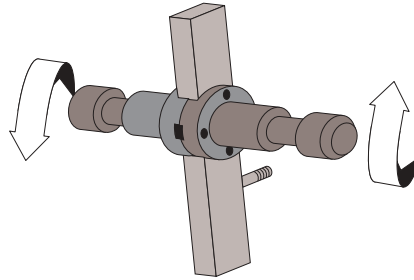


Figure 7-13 Loosening the waveguide stabilizers.

14. **Install the waveguide stabilizers on the new cavity.** (See Figure 7-14.) Visually position them just above the magnet pole caps.

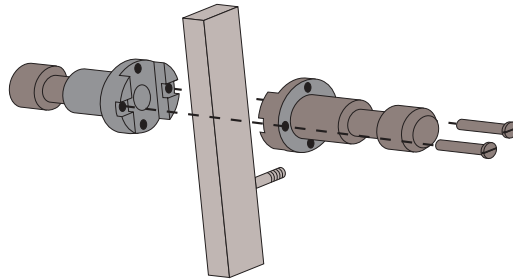


Figure 7-14 Removing/Installing the waveguide stabilizers.



Steps 16. and 21. are used to set the limit switches in the iris motor. The limit switches prevent you from screwing the iris in too far and thereby breaking the iris screw.

15. **Attach the appropriate size collet and pedestal on the cavity.**
16. **Screw in the iris.** Manually (By hand!) turn the iris screw almost all the way in. The iris screw will stop rotating. Back the screw out at least one turn after it hits the bottom. This will further decrease your chances of accidentally breaking the iris screw during the tune procedure.



Make sure you connect the modulation cable to the MOD (modulation) connector and not the R.S. (Rapid Scan) connector. Not all cavities have rapid scan coils.

17. **Connect the modulation cable to the cavity.** (See Figure 7-11.)
18. **Connect the 50 Gauss Rapid Scan cable to the cavity.** If you plan to do rapid scan experiments and there are rapid scan coils on your cavity, connect the 50 G rapid scan cable (the yellow twinax cable) to the front left connector of the cavity.
19. **Reconnect the waveguide sections and tighten the stabilizers.** Do not forget to install the waveguide flange gasket between the two flanges; make sure it is oriented correctly. (See Figure 7-15.) Position the cavity in the center of the magnet air gap by moving the bridge on the table. Carefully tighten the stabilizers. Be careful not to stress the waveguide when expanding the stabilizers. Reconnect the nitrogen purge line and adjust the flow rate for a light flow.

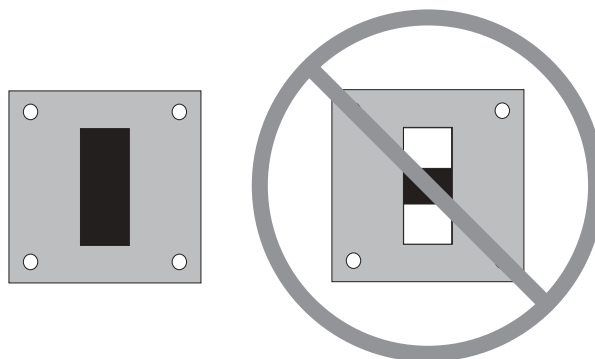


Figure 7-15 Installing the waveguide gasket properly.

20. **Reposition the iris motor.** Move the iris motor into a position such that the iris motor shaft hangs freely in the magnet. It should not be in contact with other objects.

21. **Lower the iris motor.** Open the Microwave Bridge Tuning dialog box. Click the Options button.

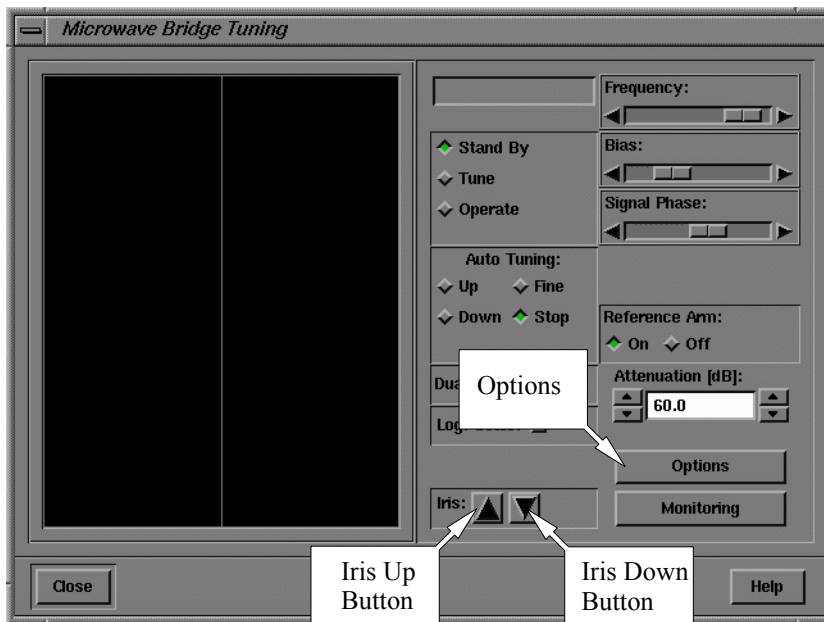


Figure 7-16 Iris controls in the Microwave Bridge Tuning dialog box.

A dialog box for lowering the iris screw appears. (See Figure 7-17.) Click the button next to Iris Run Down. A



Figure 7-17 The Iris Control dialog box.

message reminding you to disconnect the iris motor pops up. Heed the message and then click the **Yes** button to close the dialog box. (See Figure 7-18.) The iris motor will turn until it reaches the lower limit. Click **Close** on the **Iris Control** dialog box when the iris motor stops. You can also manually lower the iris motor. Click and hold the **Iris Down** button. In the **Microwave Bridge Tuning** dialog box (See Figure 7-16.), activate the **Iris Down** button until the iris motor stops; this is the lower limit of the motor.

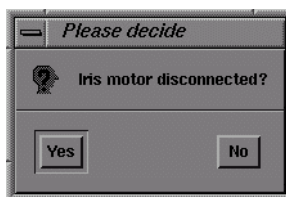


Figure 7-18 Make sure disconnecting the iris motor.



The end of the iris motor shaft should fit easily in the top of the iris screw. If it does not, rotate the iris screw until it fits easily.

22. **Reconnect the iris motor shaft to the iris screw.**
The procedure here is like Step 12, performed in reverse. Reposition the iris screw motor. Screw the lock nut on the iris screw. Click and hold the up iris button in the **Microwave Bridge Tuning** dialog box (See Figure 7-10.) until the iris screw is approximately 0.5 to 1 cm. above the top surface of the cavity body.

23. **Read in the calibration file for the cavity.** Click Acquisition in the menu bar and then click Spectrometer Configuration. (See Figure 7-19.) The Spectrometer Configuration dialog box will then appear. (See Figure 7-20.)

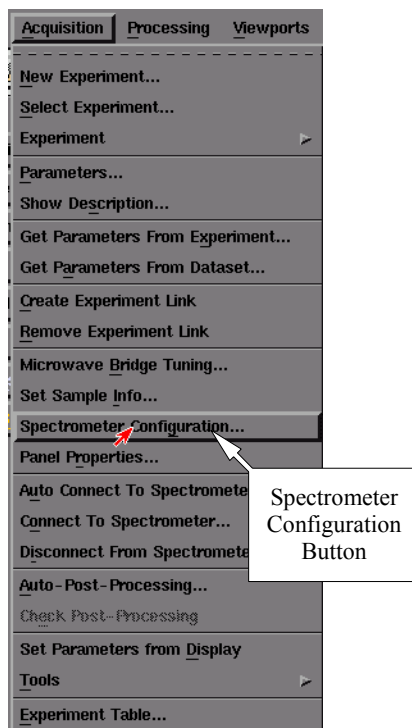


Figure 7-19 The Spectrometer Configuration button.

Click the Signal Channel tab. In the Standard Calibration folder there is a box called Calibration Data Set. Click the arrow to view the drop-down list. Select the appropriate calibration file for your cavity and click the

Apply button at the bottom of the folder. This will automatically load the calibration data you have selected.

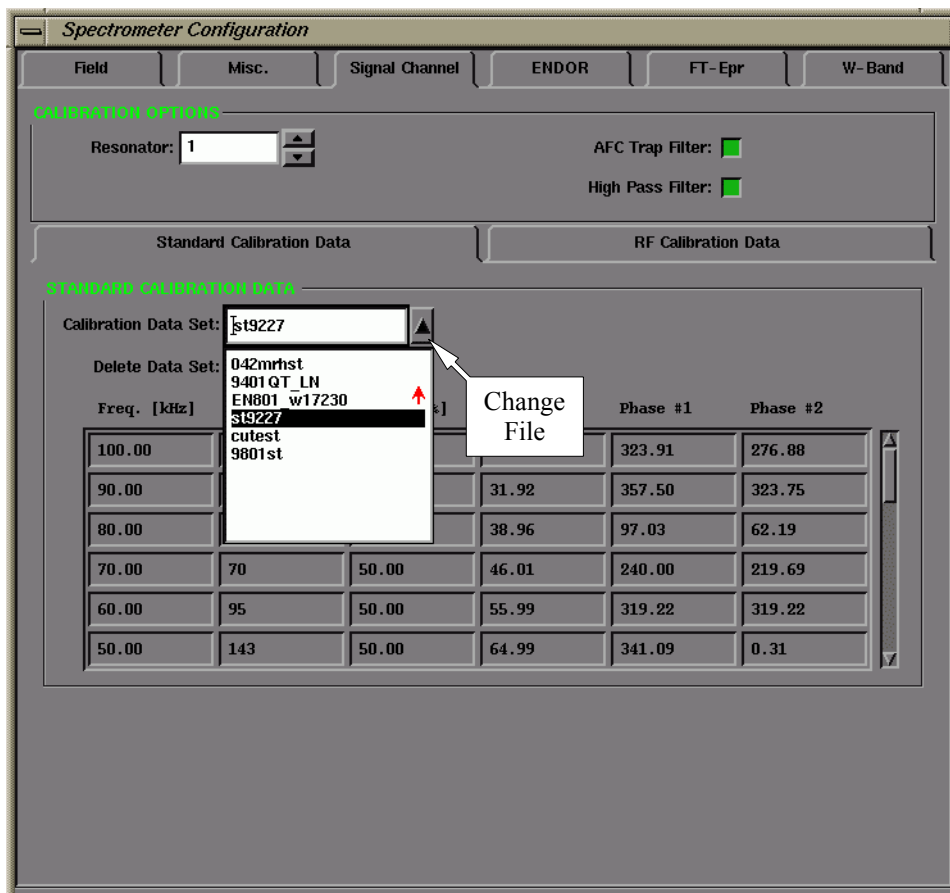


Figure 7-20 Selecting a calibration file.

Confirm that the calibration file is the correct one for the cavity. The calibration file name usually consists of two or three letters that identify the type of cavity (ST for ER 4102ST or TM for ER 4103TM) followed by the serial number of the cavity. This number is found on the back or front of the cavity. Click **Close** to exit. If you can not find the calibration file for the cavity you need to do the calibration first. Follow the instruction in Chapter 2 of the Elexsys E 500 User's Manual: Advanced Operations to create a calibration file.