

Probe tuning with the protune modules

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Before any acquisition, the probes in our new Varian spectrometers must be tuned to the appropriate nucleus. To let vnmrj tune the probe, select **Tools > Probe Tuning > Auto Tune Setup...**; or click the [Tune] button in the **Start, Standard** parameter panel. This automated process usually works for most common nuclei. However, with less common nuclei, the automated tuning process frequently fails. Failure during automatic tuning is recognized by a long time turning the motors in the protune module or by the display of error messages. If this happens, you will have to manually tune the probe. After trying the automated tuning, from the main menu select **Tools > Probe Tuning > Manually Tune Probe...** Then, on the **Process, Probe tune** parameter panel that appears (shown below) select the **Tune RF channel** (1 for H1 and F19; 2 for anything else) and enter a nucleus in the **Center Frequency** field (letters first, isotope last: e.g. Hg199). Click on [Start Probe Tune]. The display will show a “spectrum” similar to the one below. If you can't see anything, click on [Autoscale]. The spectrum should have a V-shaped dip; if you can't see it don't worry and keep reading. When the probe is properly tuned, the dip should be centered on the vertical blue line and its tip should be as low and close to the scale as possible. To tune the probe, you need to turn two knobs on the protune module (the white box on the floor attached with cables to the probe). The *tuning* knob moves the dip left or right, and the *matching* knob moves the dip's tip up or down. For proton and fluorine, the tuning and matching knobs are labeled HT and HM respectively; and for any other nucleus they are labeled XT2 and XM. First move the appropriate *tuning* knob in any direction until the dip is centered. If you don't see the dip and reached the end of the knob's travel (indicated by an increased resistance to be turned) **don't force it past its end** (you can break it!) but turn the knob the other direction. Note that some nuclei may show a shape more like a U than a V; the depth of the dip may not be pronounced; or the “baseline” may be heavily undulated. Next, turn the appropriate *matching* knob to lower the position of the dip's tip. Repeat the procedure alternating tuning and matching knobs until the dip is centered in the blue line and the dip's tip is as low as possible. To finish click the [Stop Probe Tune] and [Quit] buttons.

