

K1 CW Filter Alignment Procedures Using *Spectrogram*¹

ver. 1

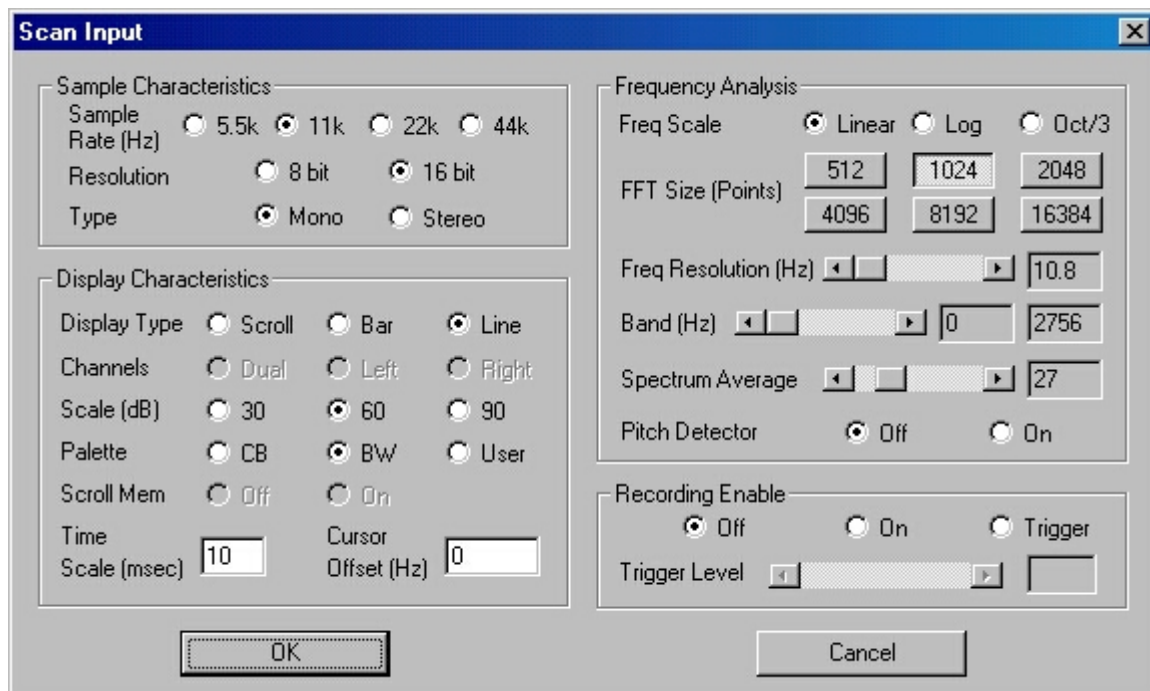
12/12/2001

From here on, it is assumed that you have already performed the RX alignment procedures in the K1 manual, that you have already selected the CW filter bandwidth (BW) for all filters you wish to use for CW reception.

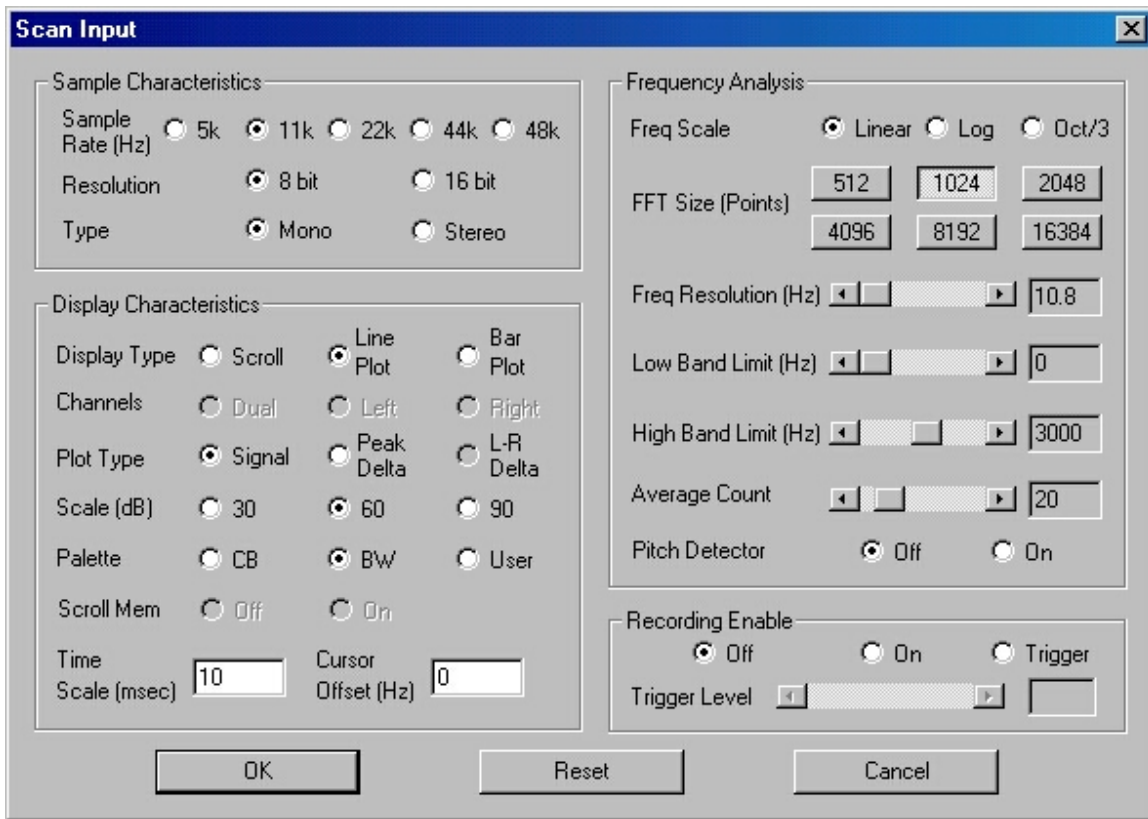
READ THIS ENTIRE DOCUMENT COMPLETELY one time, then return to step 1 and proceed with the alignment.

Here's how to proceed:

- 1) Download *Spectrogram*¹ from: <http://www.monumental.com/rshorne/gramdl.html>
- 2) Install *Spectrogram* onto your Hard drive, in its own subdirectory ('folder' for the Windows-challenged). I named my subdir C:*Spectrogram*, but of course, you may use whatever name you wish.
- 3) Prepare and attach a jumper cable from either the K1 speaker or headphone (for phones, **must** be a 3-cond. plug) output to your sound card input. The MIC input may work better than LINE input, but try each and use the one that gives the best drive to the sound card.
- 4) Start *Spectrogram* running. If you have not created an icon on your desktop through which to start *Spectrogram*, you can always start it via the **RUN** command on your **Start Bar**.
- 5) Press [**F3**] to start a spectral scan ([**Esc**]ape to STOP a scan). The first screen presented to you is the *Spectrogram* Scan Input (setup) screen (see the examples below and on next page).



Example 1: *Spectrogram* (v5.x) Scan Input (setup) Screen



Example 2: Spectrogram (v6.x) Scan Input (setup) Screen

- 6) Set the following parameters: (other parameters will work as well, these will help you get started). Note that Spectrogram v6.x offers a few more settings than does v5.x. If you are using Spectrogram v5.x, don't worry about the settings specific to v6.x.

Sample Characteristics

Sample Rate: **11kHz**
 Resolution: **8 bit**
 Type: **MONO**

Display Characteristics

Display Type: **LINE or LINE PLOT** (v6.x)
 Channels: **N/A**
 Scale: **60dB**
 Palette: **BW** (for black lines on white background)
 CB (for white lines on black background)
 Scroll Memory: **N/A**
 Time Scale: **10mS**
 Cursor Offset: **0 Hz** (N/A in v6.x)

Frequency Analysis

Freq Scale: **Linear**
 FFT Size: **1024**
 Freq Resolution: **10.8Hz**
 Band: **0 - 2756 Hz** (N/A in v.6x)
 Low Band Limit: **0** (v6.x only)
 High Band Limit: **3000** (v6.x only)

Frequency Analysis (settings cont'd.)

Spectrum Average: **20** (Start with this value. If you find that the display is too 'noisy' (too active), you may increase it to over 100. Increasing the value will also cause the display to take a bit longer to 'build', but otherwise everything will be the same).

Pitch Detector: **OFF**

Recording Enable: **OFF**

- 7) Press [**Enter**] to start the *Spectrogram* software running and displaying the spectrum of the audio input.

Note that there is a scroll bar along the right edge of the display, if it is not all the way at the top of the window, click-hold on it and drag it to the top of the display window.

- 8) At this point, click on the **Pointers** menu option and select **WHITE POINTER**
- 9) Again, click on the **Pointers** menu option. Select **FREQ MARK** and for **Freq 1** enter the CW sidetone frequency which **MATCHES** the **SIDETONE** frequency you have selected for your K2 (the sidetone you wish to hear when you are receiving CW. I used 600Hz, but everyone's ears are a little different).

Press **Enter** to return to *Spectrogram*.

- 10) If you have a broadband noise source:

Connect the noise source to the ANT jack on the K1, set the K1 to 40M and turn the noise source on and proceed to step 11 below.

If you do not have a broadband noise source:

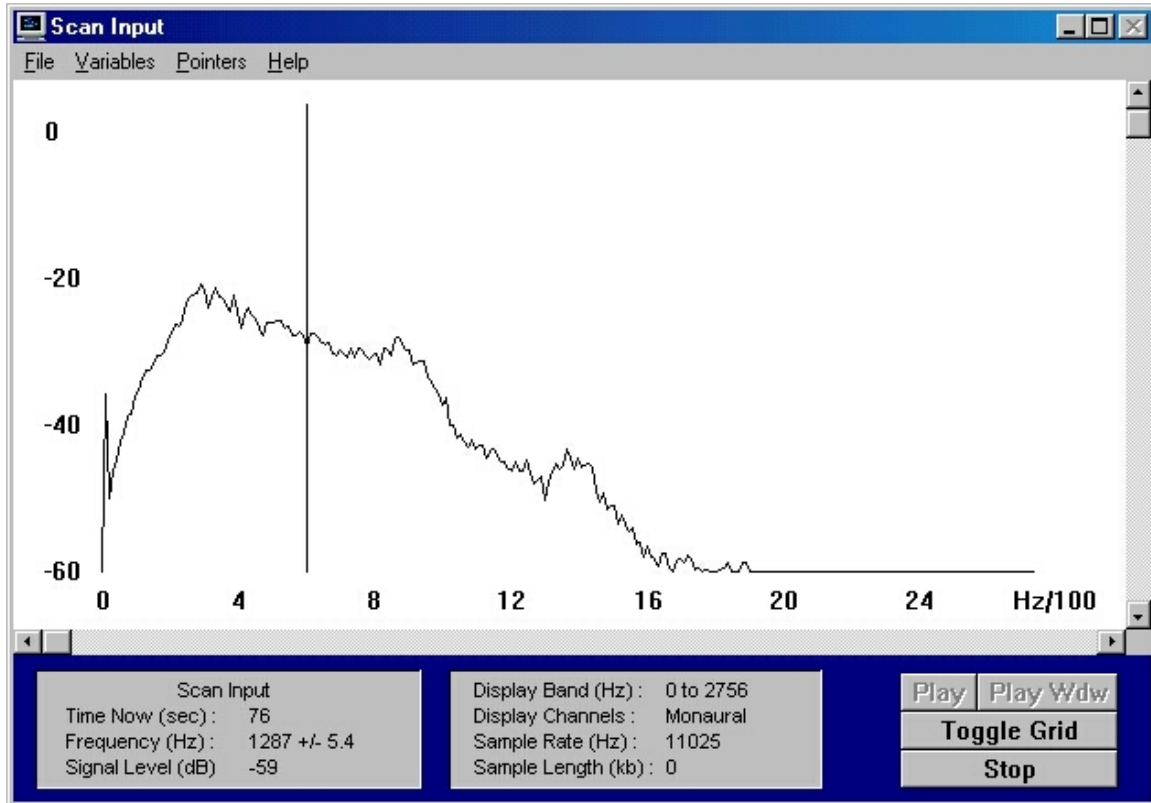
Connect an outdoor antenna to the ANY jack of the K1.

Select a band with some background noise, but **NO SIGNALS**. You want a band where there's light-to-moderate atmospheric noise, but no significant pops or crashes. 20M may be a decent choice, try 40M if 20M is dead.

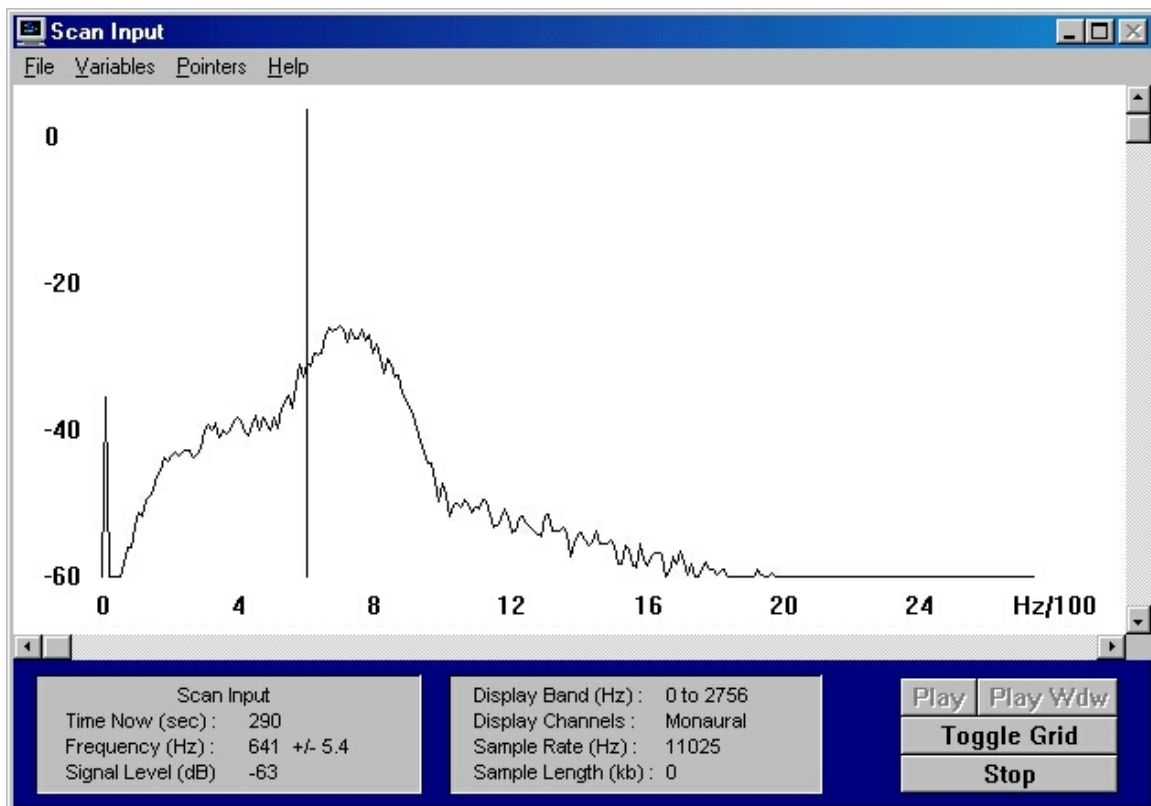
Note that 20M band noise was used for the illustrations in these instructions.

- 11) Adjust the K1 AF GAIN control to produce at least a 20dB (off the baseline) signal deflection on Spectrogram. If you're using the standard 0 to -60dB scale, try to obtain something at least around -20 to -30dB, but even a -50dB display will be usable. Note that excessive AF GAIN can cause unwanted spurious 'blips' (other than a couple which may show up at or very near the 0 Hz indicator, far left edge of display) to begin to show up on the Spectrogram display. If this occurs, reduce the AF GAIN level until none (or only the blips at the far left edge) are now visible.
- 12) BFO Alignment - The K1 three crystal filter bandwidths are selected by holding the XFIL switch. Hold XFIL until you see FL3 on the LCD. Note: FL1, 2, and 3 are pre-set to bandwidths of about 800, 400, and 250 Hz. They can be set up differently using FLx (page 53 of the K1 manual.). Personally, I set my filters to 850, 400, and 250 Hz.

- 13) At this point, you will probably see a Spectrogram display which looks similar to one of the two following examples.



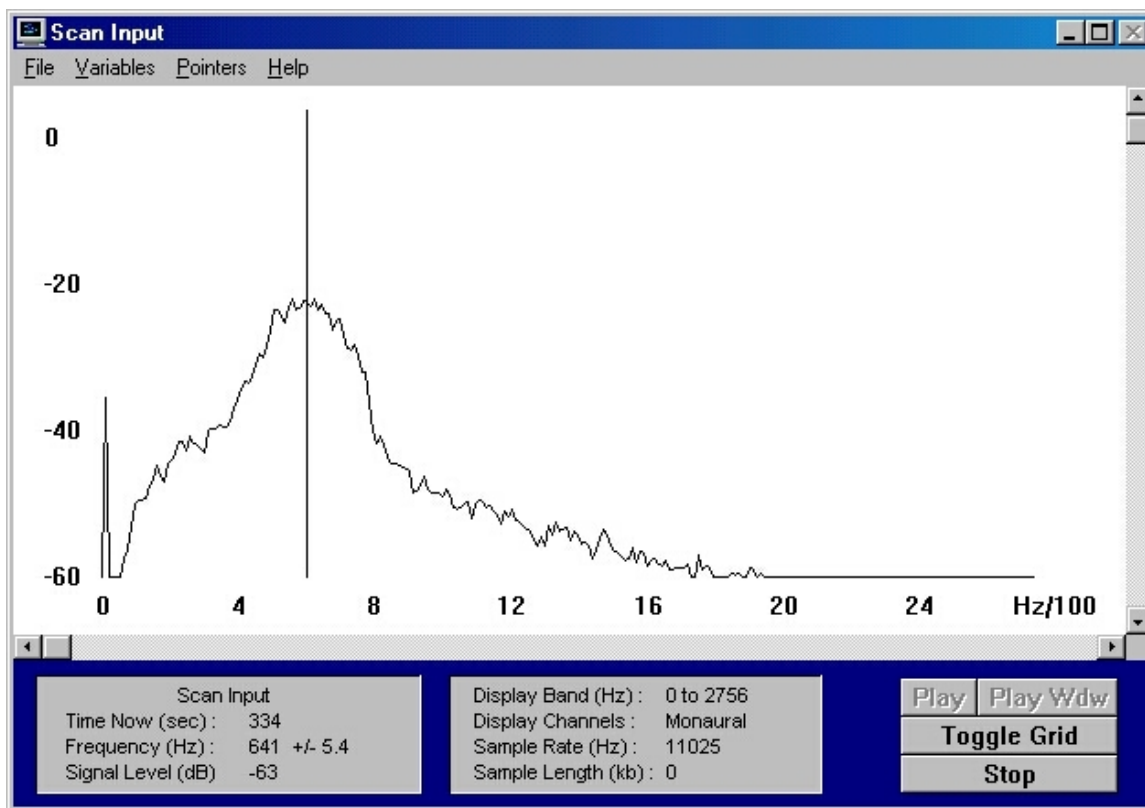
BFO set to place the received signal below the sidetone, 250Hz B/W.



BFO set to place the received signal below the sidetone, 250Hz B/W.

- 13) Select the **narrowest** of the available filter bandwidths.

- 14) Locate the BFO trimmer, C20, near the front (center) edge of the RF board.
- 15) Refer to the example below and adjust C20 to bring the peak of the displayed noise so it is centered on the sidetone marker you have selected.



BFO set to center the peak of the passband on the sidetone, 250Hz B/W.

This completes the alignment.

- 16) Press [Esc]ape to stop Spectrogram scanning.

Enjoy.

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Notes:

- ¹ *Spectrogram* (for PC compatibles only) is available from:

<http://www.monumental.com/rshorne/gramdl.html>

however, the most recent release (v6.x) of this software is **no longer freeware** and is available for a \$25 fee, a small price to pay for such a helpful alignment tool. **However**, a "limited-use" version of *Spectrogram* is also available from the author. This full-featured version allows you to use the software for ten (10) minutes at a time, thus requiring you to close the program and re-start it if you must use it longer than ten minutes. In actual use, once you become familiar with the software, ten (10) minutes is MORE than ample time to adjust the K1's BFO, as the entire process can usually be completed in about 5-6 minutes time, max.