

Aligning the 1320 transceiver.

The alignment methods in the manual are a bit jumbled up, if you want to start from scratch after completing a kit there are several places you need to look so I've tried to put them in order here.

Safety is your concern so make sure all leads are fused and a dummy load is used when required. It's also your responsibility to make sure you abide by your local regulations so watch those band edges.

Test kit required:

- RF signal source (simple 'grid dip oscillator' will do)
- HF receiver preferably with digital readout
- PC running Audio spectrum analyzer software (I use EHOCW by F8EHO)
- Dummy load
- Power meter (capable of reading 5W)
- Non-metallic core tuning instrument - a filed down knitting needle works well. A small screwdriver can be used but adjusting the BFO (L1) and L5 (IF) will be difficult as it will cause the frequency to shift when it is near.

Alignment to perform:

- 1 VFO
- 2 Sidetone frequency
- 3 Receiver alignment
- 4 RIT
- 5 TX and RX frequency alignment
- 6 Power output
- 7 Sidetone level

1 VFO (ASSEMBLY PAGE 18 & 22)

The purpose is to ensure the transceiver covers the frequencies required. The VFO frequency is set by the inductance of L3, adjusting the spacing of the turns determines the frequency coverage.

The VFO will cover approximately 60kHz so decide where in the band you want to operate. From the lowest frequency in your range (MHz), subtract 6.144, this will give the VFO frequency you will be looking for. e.g. I want 14.010 to 14.070 so the lowest is 14.010. $14.010 - 6.144 = 7.866$ MHz

- 1 Turn on the 1320
- 2 Turn the 1320's tuning knob fully counter clockwise (lowest frequency)
- 3 Tune your HF receiver until you hear the VFO carrier (adjust the 1320's tuning knob to make sure it is the correct carrier and then set it back to fully counter-clockwise)
 - If the frequency is **Higher** than what you want (in our example 7.866 MHz) **compress** the turns on L13
 - If the frequency is **Lower** than what you want (in our example 7.866 MHz) **spread-out** the turns on L13
- 4 Adjust the coils on L13 until the frequency is correct.
- 5 Use hot-melt glue or beeswax (your preference) to set the coil.

- 6 When the coils is set - repeat the above steps until you are happy the VFO is set to its lowest frequency.

2 SIDETONE FREQUENCY (ASSEMBLY PAGE 33)

The purpose is to set the sidetone (BFO) frequency to the tone you are used to. Note: this also affects the passband for the IF filter later on so a very low sidetone frequency will give a 'rumbly' audio output, setting it high will give a very 'tinny' audio output. My preference is 600 Hz.

The component adjusted is L1(bottom left of the PCB next to the volume control) which is the BFO oscillator coil

- 1 Turn on the 1320
- 2 Attach a 50 Ω Dummy Load
- 3 Attach a key
- 4 Run the PC's audio spectrum analyser program
- 5 Put the PC microphone next to the 1320's speaker
- 6 Turn L1 fully counter-clockwise (highest setting)
- 7 Key the 1320
- 8 Adjust L1 clockwise until the Spectrum Analyser shows your desired sidetone frequency (600 Hz).

3 RECEIVER ALIGNMENT

The purpose is to set the receiver for maximum sensitivity. The settings are quite easy, once you've set what you think are the peaks you will not improve it further by endless tweaking. Set L7 first.

Components adjusted are (in order of receiver chain):

- L6 - IF mixer input
- L18 - IF mixer input
- L7 - IF mixer
- L5 - BFO input

- 1 Turn on the 1320
- 2 Run the PC's audio spectrum analyser program
- 3 Put the PC microphone next to the 1320's speaker
- 4 Tune into a steady signal or use the RF signal generator to produce a signal
- 5 Adjust L7 to give the maximum output in the frequency range of your preferred Sidetone signal, you should be able to see the noise peaks shown on the Spectrum Analyser shift as you make the adjustment.
- 6 Be aware that you can make the audio quite hissy which can give the perception of maximum gain but this is at the sacrifice of the lower audio frequencies which you will be listening to.
- 7 Once L7 is set, adjust L6, L18, L5 for maximum background noise and received signal as shown on the Spectrum Analyzer and by ear.

4 RIT

Purpose to ensure the receiver is not offset when the RIT control is centred. Not the same as ensuring that the transmit frequency is the same as the receive frequency as stated in the manual but necessary to set this in step 5

Component adjusted is R46 (front panel RIT control)

3 separate methods are described but the audio method with a PC with Spectrum analyser software is described.

- 1 Turn on the 1320
- 2 Attach a 50 Ω Dummy Load
- 3 Attach a key
- 4 Set up your receiver to listen to the VFO signal
- 5 Set the PC microphone so it is near to the receiver speaker
- 6 Tune the receiver until you get a frequency displayed on the Spectrum Analyzer the same as your sidetone (600 Hz)
- 7 Key the transmitter
- 8 Adjust R46 until the audio tone is the same as listening when the 1320 is not keyed (an electronic keyer giving continuous dots is a good method) you will hear and see the notes beating together when they are the same.

5 TX AND RX FREQUENCY ALIGNMENT

Purpose to ensure the transmitted and received signals are the same. Component adjusted L14 (Transmit mixer)

Set the RIT control to its centre position (i.e. no receiver offset when transmitting - item 4 above)

- 1 Turn on the 1320
- 2 Attach a 50 Ω Dummy Load
- 3 Attach a key
- 4 Set an external RF source
- 5 Tune into the RF signal using the 1320's receiver until it gives a 600 Hz audio signal as shown on the PC
- 6 Turn the 1320 volume down
- 7 Tune into the RF signal using the receiver until it gives a 600 Hz audio signal as shown on the PC
- 8 Key the 1320 (again continuous dots help) and adjust L14 until the tone shown on the receiver is also 600 Hz

Note: If you set your PC microphone in the correct position you will be able to see the HF receiver's audio on the Spectrum Analyser and the 1320's audio, when you transmit you should see the HF receiver's audio varying from RF source to 1320's RF and the 1320's audio varying from RF Source to sidetone. When all are at 600 Hz the beating is great and everything is aligned.

Now get on the air!

73 GW6ITJ - Martyn