

HA-5 VARIABLE OSCILLATOR PRECISION ALIGNMENT

BACKGROUND

The OPERATING AND SERVICE MANUAL for the HA-5 was written in a time when frequency counters were rare in most Ham radio shacks. Using external receivers was the best way to track VFO's. The following process is much more accurate. However, it does amplify the importance of the crystal oscillator being dead on frequency. The following chart illustrates the amount of error in the final frequency for each band. *Example*: The largest error is on 2-meters. If the crystal oscillator is off frequency by 300Hz the output frequency of the 2-meter transmitter will be off by 5.4KHz.

There is very little you can do to correct frequency errors in the crystal osc. If the error is linier from Y1 to Y4 then it is possible to alter the values of C21 and C31 to bring the error within acceptable limits. Otherwise swapping out xtals, if you can find them, is your only option. These errors will not render the equipment unusable, you will have to keep in mind there will be an offset error between the dial on the HA-5 and the operating frequency.

CRYSTAL OSC	BAND	ERROR MULTIPLIER
Y1	80M	X1
Y2	40M	X1
	20M	X2
	15M	X3
	10M	X4
Y3	6M	X5
Y4	2M	X18

ALIGNMENT PROCEDURE

Remove the unit from the case.

- 1, Set band switch to 80-meters.
- 2, Remove Y1.
- 3, Connect frequency counter to pin 2 of V2.
- 4, Set the dial to 3.5 MHz on the 80-meter dial.

Power up and allow thirty minutes warm up.

- A, Ensure the dial is still set to 3.5 MHz. Adjust C2 for 5.500 MHz on the counter.
- B, Set the dial for 4.0MHz on the 80-meter dial.
- C, Adjust L1 for 5.000Mhz on the counter.

The adjustment of C2 and L1 interact. You may have to repeat steps A, B and C several times, over correcting or under correcting on one end or the other to get it to fall into place.

The final goal is detailed in the chart below.

DIAL	VARIABLE OSC FREQUENCY
3.500 MHz	5.500 MHz
3.600 MHz	5.400 MHz
3.700 MHz	5.300 MHz
3.800 MHz	5.200 MHz
3.900 MHz	5.100 MHz
4.000 MHz	5.000 MHz