

TROUBLESHOOTING CLARIFIER PROBLEMS ON THE 858 CHASSIS

COMMON PROBLEMS:

- A. Distorted Output
- B. Warble
- C. Drift
- D. Sounds like mike is under water
- E. Weird FM effects

COMMON CAUSE:

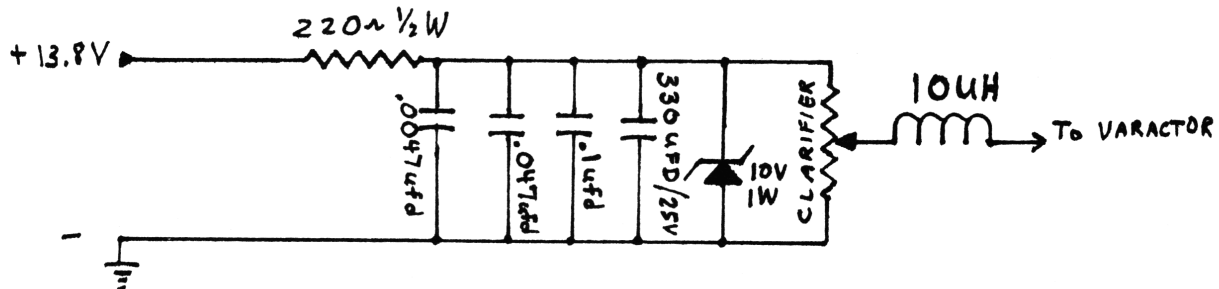
Main power supply, Zener/IC Regulators, Voltage feed circuits, primarily those concerned with the VCO and PLL sections.

Power supply regulation problems are often caused by leaky or dried out electrolytic filter capacitors. I always change the original filter cap. (commonly a 1000-3300uf/25V) to a 5600uf/50V.

Another possible cause is in the design of the power supply. Common practice is to design the unit with the minimum adequate power supply (current) to hold costs down. Then you have problems after you tune it up. The only answer is to redesign the power supply.

Also, the more slide that you have installed, the more critical the voltage regulation becomes. A 4 to 1 ratio over the original range is about the maximum usable slide before modifications to the reference voltage becomes necessary.

An improved type of regulator would be to disconnect the existing voltage line connected to the clarifier pot and insert the circuit shown:



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This circuit effectively isolates the reference voltage from all other circuits that could cause voltage fluctuation to the VCO.

Difficulty with the clarifier control usually stems from the VCO circuit itself. The following symptoms are related to each other and adversely affect the clarifier control.

1. Clarifier does not linearly track frequency.
2. Center clarifier position rarely matches center frequency.
3. When using an inductor to tune the crystals to match center clarifier position to center frequency, slide range is lessened.
4. Transmit and receive are not together.

To cure these problems, use the directions below. The purpose of this technique is to figure out the ratio between crystal frequency and output frequency and then calculate the new crystal frequencies you will need.

NOTE: Use tunable coils and be sure you are satisfied with the slide range before beginning. Changing amount of slide could cause the RATIO to change, nullifying your efforts. Let's Begin.

- STEP 1. Remove covers. Connect a frequency counter and a dummy load. Set clarifier to center position on channel 40.
2. Key Radio and write down the output frequency. (Ours read 27,400,900.) _____.
 3. Remove X3 (11.2858)Xtal. Plug X6 (11.2850) Xtal in its place. Read frequency and write down. (Ours read 27,398,700) _____.
 4. Remove X6. Plug X4 (11.2842) Xtal into X3 position. Read frequency and write down. (Ours read 27,396,700) _____.
 5. Replace crystals to original positions.
 6. Subtract reading obtained in STEP 2 from center frequency. (Here is how ours looked: $27,405,000 - 27,400,900 = 4,100$.) Write your answer here: _____

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7. Subtract X6 from X3: $11,285,800 - 11,285,000 = 800$.
Subtract X4 from X3: $11,285,800 - 11,284,200 = 1,600$.
Subtract Step 3 from Step 2. ($27,400,900 - 27,398,700 = 2,200$.) It can clearly be seen that an 800 hertz change in crystal frequency moves the transmit approximately 2,000 hertz in my example. Yours will vary; however the RATIO will be the same.
8. Subtract Step 4 from Step 2. ($27,400,900 - 27,396,700 = 4,200$) So a 1,600 hertz change in crystal frequency moved the transmit frequency down 4,200 cycles. To shift the frequency up, simply add 1,600 hertz to the X3 crystal frequency. $11,285,800 + 1,600 = 11,287,400$. This is how you figure your new X3 frequency.
9. Calculate X4 and X6 Xtal frequencies you want to order:
 $X4 = 11,284,200 + 1,600 = 11,285,800$
 $X6 = 11,285,000 + 1,600 = 11,286,600$
10. Place new crystals in their appropriate sockets. To compensate for any remaining errors, set clarifier to center position and adjust the inductor for each particular crystal.

MODE	REC.	XMIT	FREQ. REC.	FREQ. XMIT
AM	X6	X3	11.2850	11.2858
USB	X3	X3	11.2858	11.2858
LSB	X4	X4	11.2842	11.2842

This technique works well and solves alot of headaches!