

Complete Alignment Procedures for BOTH units (Identical)...FACTORY.....

Equipment needed for complete alignment: Oscilloscope; Dummy Load; D.C. Power Supply; VTVM; Sig. Gen. (capable of 27MHz oper. - 1KHz, 30% AM Mod., 1KHz-1.5KHz Dev. FM Mod.); Frequency Counter. (Power Supply at 13.8VDC) RF Watt Meter.

### PLL CIRCUIT

1. Check Pin 12 of PLL chip for 10.24000MHz; + 100Hz.
2. Set channel selectors for Channel 80 (27.855MHz); in transmit mode: check/align if necessary the following: CAUTION, on 50 ohm load!
  - A. Connect VTVM between TP-1 and D.C. Ground, adjust L-203 for +5.5VDC if necessary! ..Leave meter in place at this time...
3. Set channel selectors for Channel 1 (26.515MHz); in receive mode: check for voltage reading between 0.3-2.8VDC..  
(If the DC level stays between 5.5VDC at Transmit (27.855MHz); and 0.3-2.8VDC at Receive (26.515MHz); the VCO is properly aligned).  
NOTE: Voltage swing determined by C-211 at factory, optimum value-100pf.

### TRANSMITTER CIRCUITS

RF Driver Alignment: CAUTION: on 50 ohm load!

1. Set channel selectors for Channel 19 (27.185MHz). AM..
2. Connect O-scope to base of Q-301.
3. Adjust L-204, L-301, L-302 for maximum amplitude on display.
4. Connect O-scope to collector of Q-302.
5. Adjust L-303 for maximum amplitude on display.

RF Power Amplifier Alignment: CAUTION: in-line RF Watt Meter, on 50 ohm load!

1. Channel selector should still be at 27.185MHz - AM..
2. Adjust L-304, L-305, and L-306 for maximum RF power output.
3. "Touch-up Tune" the following for peak power: L-303, L-302, and L-301.
4. When all above are peaked, RF Meter should read above 4.0W.  
Turn L-306; counterclockwise until the power reading of 4.0W is obtained.  
(Note: Step 4, may be omitted - ED.)

Transmit Frequency Check: CAUTION: in-line RF Watt Meter, on 50 ohm load!

1. Connect Frequency Counter to load, or tab on RF Watt Meter.
2. Transmit mode, no modulation; check each channel's center frequency for tolerance: should be  $\pm$  800Hz. (Check against Owner's Manual F<sub>o</sub> Tables!)

Modulation Sensitivity Alignment: CAUTION: on 50 ohm load!

1. Apply 20mV, 1KHz signal to microphone input circuit.
2. AM mode - Transmit, and adjust RV-201 for 85% modulation.
3. Decrease signal level to 6mV, modulation level should stay above 60%.
4. Leave signal level at 6mV, 1KHz; go to FM mode - TX; adjust RV-501 for 1.7KHz deviation.

RF Meter Alignment: CAUTION: in-line RF Watt Meter, on 50 ohm load!

1. Adjust RV-202 so that meter pointer indicates the same as RF Watt Meter.  
(Note: Have found it better to adjust half scale in AM TX, and leave it!)

\*If you are going to change the RF Final to 2SC1307, do it before alignment!

RECEIVER CIRCUITS

Sensitivity Alignment:

1. Channel selectors to Channel 19 (27.185MHz), AM mode, Squelch Minimum.
2. Set Sig. Gen. at 27.185MHz; 1KHz, 30% modulation - insert signal at antenna connector. (Note: 3mV signal, do not overdrive the radio AGC circuits - just enough for accurate alignment)
3. Adj.: L-204, L-101, L-102, L-103, L-104, L-105, L-106, and L-107 for maximum audio output across an 8 ohm dummy load resistor. (If you don't have one-use radio's speaker in a pinch!)
4. Set Sig. Gen. for 27.185MHz; 1KHz with 1.7KHz deviation (Note: Step 2), Unit to FM mode.
5. Adjust L-501, T-501 for maximum audio output across 8 ohm dummy load.

Squelch Alignment:

1. Sig. Gen. to 27.185MHz; 1KHz 30% modulation - 54db output.
2. Squelch control fully clockwise, radio back to AM mode.
3. Temporarily adjust RV-101 for max audio out, note the level!  
Re-adjust RV-101 for level decrease of 6DB..

S-Meter adjust:

1. Reset Sig. Gen. for 40db output signal, make no other changes.
2. Adjust RV-103 for meter indication of "s-9".

END OF ALIGNMENT...

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uPD861 PLL - AM CHASSIS (UPDATE)

O.K.; questions are popping up all the time on this one; regarding Freq. going up instead of down. Here it is - 2 different chassis: 2-Crystal with Pins 7 and 8 at Logic-0; 3-Crystal with Pins 7 and 8 at Logic-1.

I only know of two 3-crystal chassis myself, both Realistics: Mils. TRC-424/431 (if anyone knows of more-pass on info.). These units go UP in frequency when modified 155KHz, DOWN to 25.045MHz. But keeping the power up across more than 1.2MHz bandwidth is another story.

The 2-crystal chassis doesn't go down; but UP -(way up)- 29.5MHz; (That figure is theory-wise!). Haven't worked on any, but VCO circuitry is less cluttered up and should have a wider bandwidth also.

One identical feature in both chassis is: Semi-potted VCO module, and that is where the VCO Varactor is! By removing it and replacing with a "Super Diode" should widen bandwidth - but is not an easy job. Don't recommend doing this unless you just have to have those extra Fo's..

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ERRORS - NOT IN SCBI

1. SAMS #189, Page 85; Down Oscillator  $F_o$  Output of Q-805 is marked: (11.965MHz) above CT801. Wrong, change to 11.596MHz.
2. PLL DATA BOOK (Pub. by CB City) Pg. 26 - Re: '858' PLL drawing  
Correct Pin 22 to P9, not Vss.  
Pg. 27 - Re: '861' PLL specs.  
'Internal Code Converter'; delete ROM.