

ALIGNMENT

The high reliability of the chip components in the FT-212RH minimize the possibility that repair or realignment should be needed after leaving the factory. However, if damage occurs and some parts subsequently be replaced, realignment may be required. If a sudden problem occurs during normal operation, it is likely due to component failure; realignment should not be done until after the faulty component has been replaced.

Because of the compact circuitry of this transceiver, we recommend that servicing be performed only by authorized Yaesu service technicians who are experienced with the circuitry and fully equipped for repair and alignment. Therefore, if a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Authorized Yaesu service technicians realign all circuits and make complete performance checks to ensure compliance with factory specifications after replacing any faulty components.

Those who do undertake any of the following alignments are cautioned to proceed at their own risk. Yaesu must reserve the right to change circuits and alignment procedures in the interest of improved performance, without notifying owners.

No alignment should be attempted unless the normal function and operation of the transceiver are clearly understood, the cause of the malfunction has been clearly pinpointed and any faulty components replaced, and the need for realignment determined to be absolutely necessary.

The following test equipment (and thorough familiarity with its correct use) is necessary for complete realignment. Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy.

A 50-ohm dummy load that is non-reactive up to 150 MHz is required. Correct alignment is not possible with an antenna.

Alignment Equipment

DC voltmeter (at least 20-kilohms/volt)

150 MHz standard signal generator (SSG) with calibrated level and modulation (see note below)

AF signal generator

SINAD meter (SINADDER)

FM linear detector (deviation meter)

CM coupler (directional coupler)

RF wattmeter (50W, $\pm 5\%$ @ 150MHz)

50-ohm non-reactive (@150 MHz) dummy load

Frequency counter (100Hz resolution at 150MHz)

Oscilloscope (recommended, not required)

Note: SSG levels referred to in the alignment procedure are based on $0\text{dBu}=0.5\text{uV}$.

Alignment Precautions

Correct alignment requires that the ambient temperature be the same as that of the transceiver and test equipment, and that this temperature be held constant between 20 and 30 °C (68 to 86 °F). When the transceiver is brought into the shop it should be allowed at least 2 hours for thermal equalization before alignment.

Alignments must not be made unless the oscillator shields and circuit boards are firmly affixed in place. Also, the frequency counter must be thoroughly warmed up before beginning.

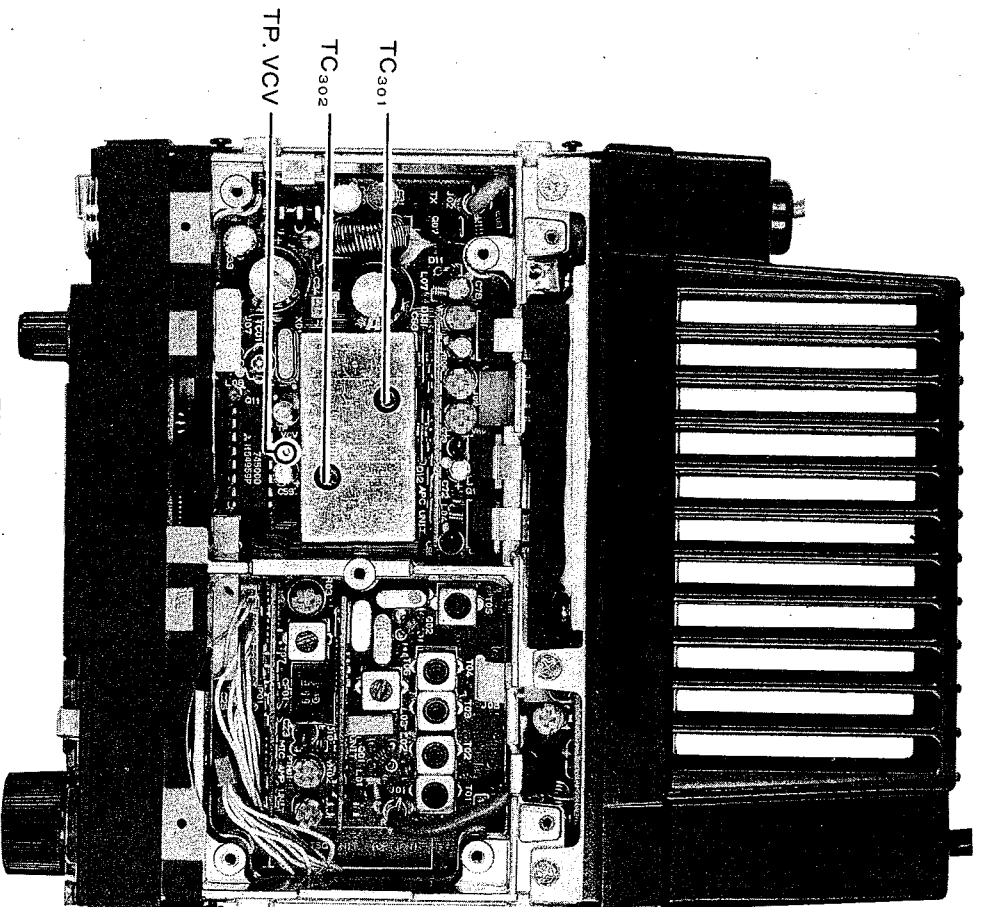
Supply voltage during alignment must be held constant at 13.8V DC. Use a well regulated, adjustable power supply capable of at least 10A continuous load.

ALIGNMENT (PLL)

A. PLL Unit

- 1) VCV (Varactor Control Voltage)
 - a) With the dummy load connected to the ANT jack, connect the DC voltmeter (3V scale) to the VCV terminal on the VCO Unit.
 - b) Tune the transceiver to the top edge of the band for the model being aligned, and while receiving, adjust TC301 on the VCO Unit for the voltage indicated below ($\pm 0.1V$) for Receive at that frequency:

	Receive	Transmit
146 MHz	1.5V	1.4V
148 MHz	1.7V	1.6V
 - c) Return the transceiver to 144 MHz and confirm at least 1.3V.
 - d) Return to the top edge of the band, close the PTT line, and adjust TC302 for the voltage indicated above for Transmit.
 - e) Again return to 144 MHz and confirm at least 1.2V on the meter while transmitting.
 - f) Repeat steps b - e several times, and then remove the voltmeter.



PLL ALIGNMENT POINTS

(Transmitter) ALIGNMENT

B. Transmitter

Set up the test equipment as shown in Figure 1. Close the PTT line when making adjustments. All adjustment points are on the Main Unit.

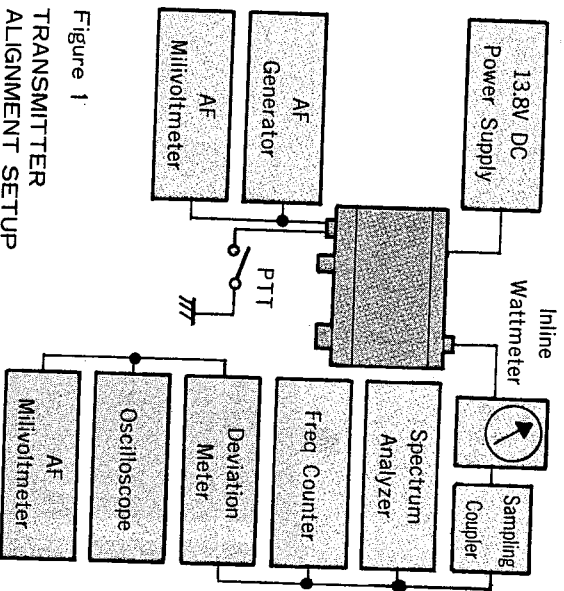
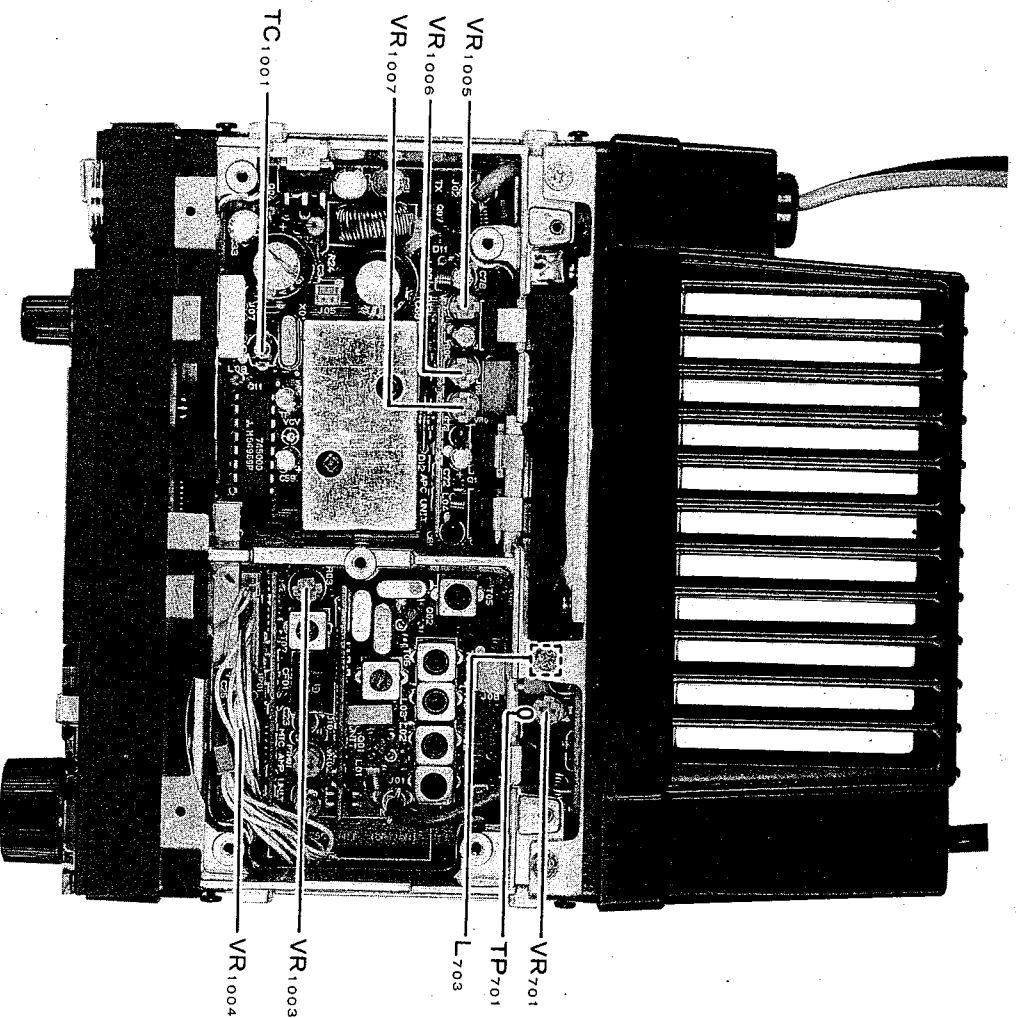


Figure 1
TRANSMITTER
ALIGNMENT SETUP

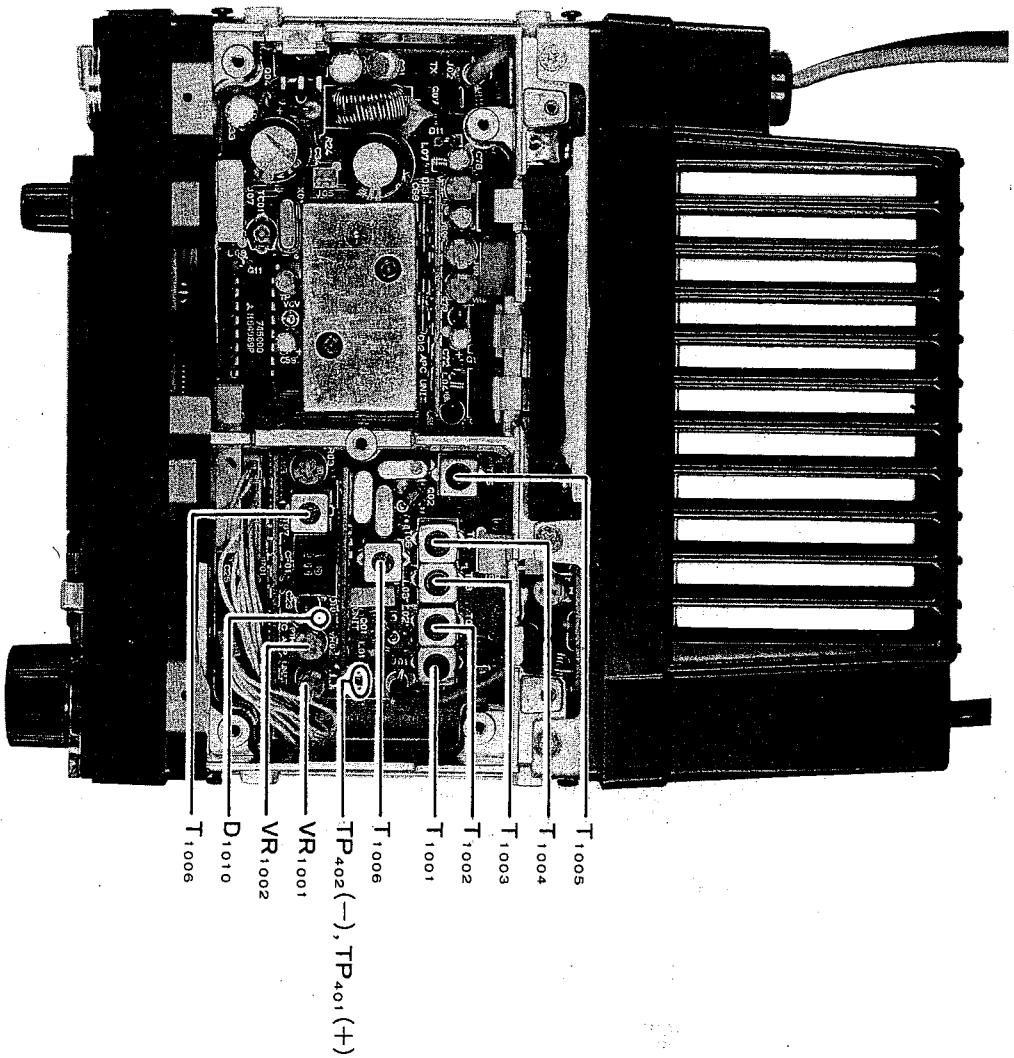
- 1) Early Stage Coupling
 - a) Tune the transceiver to the center of the band, and set the LOW button to the high power position.
 - b) Adjust L703 for maximum power output (at least 46 watts).
- 2) Power Output
 - a) With the transceiver tuned to the center of the band, set the LOW button to the high power position.
 - b) Connect the DC voltmeter to TP701 on the PA Unit.
 - c) Press the PTT switch and adjust VR701 for minimum on the voltmeter.



TRANSMITTER ALIGNMENT POINTS

ALIGNMENT (Transmitter)

- d) Adjust VR1006 for 46 watts output.
 - e) Press the LOW switch and adjust VR1005 for 5W output.
- 3) Frequency Calibration
- a) Adjust TC1001 to match the counter indication with the transceiver frequency.
 - b) Reduce the AF generator level to 5mV and adjust VR1004 for ± 3.5 kHz deviation.
- 4) Deviation
 - a) Set the AF generator for 25mV output at 1 kHz. Adjust VR1003 for ± 4.5 kHz deviation on the Deviation Meter.
 - b) Reduce the AF generator level to 5mV and adjust VR1004 for ± 3.5 kHz deviation.

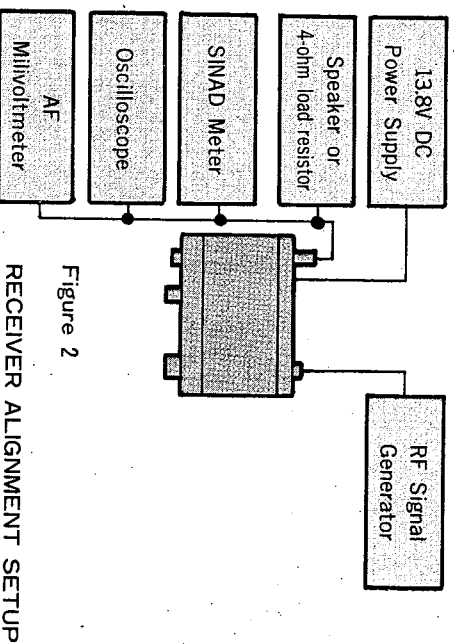


RECEIVER ALIGNMENT POINTS

(Receiver) ALIGNMENT

C. Receiver

Set up the test equipment as shown in Figure 2. All adjustment points are on the Main Unit.



1) Interstage Transformers

- Connect the DC voltmeter between the cathode of D1010 and chassis ground.
- Modulate the RF signal generator for ± 3.5 kHz deviation of a 1 kHz tone.
- Tune the transceiver and signal generator to the same frequency at the center of the band, and set the injection level to produce midrange S-meter indication.
- Adjust T1001 through T1007 for maximum S-meter indication. Reduce the injection level, if

necessary, to keep the S-meter near midrange.

- Confirm 12dB SINAD sensitivity of -7.5dBu ($0.21\mu\text{V}$) or better on the SINADDER.

2) S-Meter Calibration

- At the center of the band, set the signal generator for 30dBu ($50\mu\text{V}$) injection with ± 3.5 kHz deviation of a 1 kHz tone.
- Adjust VR1002 so that all S-meter segments are just on.

3) Scanner Center-Stop

- Connect the DC voltmeter (3V range) between TP401 (+) and TP402 (-) on the IF Unit.
- Tune the transceiver to 146.000 MHz, and set the SQL fully counter-clockwise (the BUSY lamp should be lit).
- Tune the signal generator also to 146.000 MHz, and inject 20dBu ($5\mu\text{V}$) with ± 3.5 kHz deviation of a 1 kHz tone.
- Adjust VR1001 for 0V on the voltmeter.