

CHAPTER 5

ALINEMENT

70. Test Equipment Required for Alinement

The following test equipment is required for alinement:

Test equipment	Common name
Signal Generator AN/URM-48.	Rf signal generator.
Electronic Multimeter TS-505/U.	Vtvm.
RF Wattmeter ME-11/U....	Rf wattmeter.

71. If. and Discriminator Alinement

If. and discriminator cans are hermetically sealed. No equipment is available at present in the field for opening and resealing these cans. Therefore, defective if. or discriminator cans are not to be repaired, but are to be returned to appropriate higher repair echelons. Directions for repair of these cans will be issued at a future date.

72. Mixer Alinement

(figs. 30 and 31)

a. Connect the vtvm to terminal 4 of J7 and ground.

b. Apply a 4.3-mc signal to terminal E19 through a .005- μ f or larger capacitor.

c. Use the alinement tool provided with the receiver-transmitter to adjust the core of T2 for maximum negative voltage on the vtvm. *Be careful not to apply excessive pressure to T2 as this transformer is fragile and can easily be broken.*

73. Receiver Oscillator Alinement

(figs. 30 and 31)

a. Center the pointer of the receiver-transmitter (fig. 3) to the middle of its extremes of travel. Turn the TUNING capacitor exactly to its fully meshed position. When this is done, a

marker line, located just below the lowest frequency mark on the dial drum, should be within one-half of a small division of the dial from the previously set pointer. If this condition is not satisfied, adjust the dial drum in accordance with instructions in paragraph 68.

b. Set the receiver-transmitter to its lowest frequency. Calibrate the signal generator to this frequency and connect it through a .005- μ f or larger capacitor to terminal E19. Connect the vtvm across terminal 4 of J7 and ground.

c. Adjust coil L21 for maximum negative voltage on the vtvm. Reduce the output voltage of the signal generator to a level just sufficient to enable a peak reading to be obtained at the vtvm. To check against unwanted signal pickup from other sources, vary the output control of the signal generator. The vtvm reading should show a corresponding variation.

d. Raise the frequency of the signal generator 8.6 mc. This signal also should cause a peak reading on the vtvm. This indicates that the receiver oscillator has been tuned correctly to a frequency 4.3 mc higher than the signal applied as directed in *b* above.

e. Set the receiver-transmitter to the highest frequency on its dial, and tune the signal generator to this frequency. Adjust C43 for maximum voltage on the vtvm.

f. Repeat procedures in *c* and *e* above until no further adjustments are necessary.

74. Rf Alinement

(figs. 30 and 31)

The first and second rf amplifiers are alined jointly first at the low frequency end of the dial and then at the high frequency end of the dial. The frequencies to be used for each of the radio sets are shown in the chart following:

Radio set	Low frequency (mc)	High frequency (mc)
N/PRC-8-----	20.6	27.4
N/PRC-9-----	27.9	38.1
N/PRC-10-----	39.2	53.8

a. Insulate coil L8 (connected to pin 1 of V3) with friction or cellophane tape, or spaghetti. (This is to prevent accidental shorting of B+ to ground while adjustments are being made to L9 and C20.)

b. Tune the signal generator and the radio set to the low frequency end of the dial shown in the chart above.

c. Connect the vtvm across terminal 4 of J7 and ground.

d. Connect the signal generator in series with a 33-ohm resistor to AUX ANT connector J3. Vary the signal generator tuning dial slightly up and down for maximum reading on the vtvm. Adjust coils L13, L11, and L9 in that order for maximum reading on the vtvm. (Reduce the output voltage of the signal generator to a level just sufficient to enable a peak reading to be obtained at the vtvm.)

e. Tune the radio set and the signal generator to the high frequency shown on the chart above. Vary the signal generator tuning dial slightly up and down for maximum reading on the vtvm. Adjust C26, C22, and C20 in that order for maximum reading on the vtvm.

f. Repeat the adjustments of L13, L11, and L9 at the low alignment frequency and C26, C22, and C20 at the high alignment frequency until no further adjustments are necessary.

g. Check the receiver alignment using the calibration oscillator test. In this test, the POWER switch is held at CAL while the TUNING control of the radio set is turned slowly from the low to the high end of the dial. With a handset connected to the AUDIO connector, a beat note should be heard at each whole number mc point. If satisfactory results are not obtained, repeat the mixer, receiver oscillator, and rf alignment procedures.

75. Afc Alignment

(figs. 30 and 31)

a. Apply a 4.3-mc signal at maximum output through a .005- μ f or larger capacitor to termi-

nal E19. (If the maximum output voltage of the signal generator is .1 volt or less, remove tube V3 from the receiver-transmitter and apply the signal to terminal E6H on the mixer box.) Be careful not to ground to chassis the lead that is connected to E19 as this point is at +65 volts.

b. Press the push-to-talk button on a handset connected to the AUDIO connector, and tape the button down in this position.

c. Connect a vtvm across terminal E1B and ground.

d. Disable receiver oscillator V8 by placing a finger on E21. (If V3 has been removed, V8 need not be disabled.)

e. Tune coil L1 for maximum reading on the vtvm. (Be careful not to exert too much pressure on L1 because this coil is very fragile.)

f. Remove the vtvm leads from across E1B and ground; connect the ground lead to the junction of R13 and R11, and the high lead to terminal 5 of J7.

g. Adjust coil L2 (being careful not to exert excessive pressure on this coil) for zero reading on the vtvm within ± 1 volt.

h. If the afc circuit is operating properly and has been adjusted properly, a rotation of L2 of approximately one full turn in one direction should give a reading of at least +2 volts, and in the other direction, a reading of at least -2 volts. Make this check and then be sure to re-adjust L2 to give zero reading.

76. Transmitter Alignment

(fig. 47)

Perform the transmitter alignment only after the alignments described in paragraphs 72 through 75 have been made.

a. Insulate coil L8 (connected to pin 1 of V3) with friction or cellophane tape, or spaghetti. This prevents accidental shorting of B+ to ground while L9 and C20 are being adjusted.

b. Turn stem of coil L3 clockwise to bottom position.

c. Turn C11 to the position where the top of the stem is flush with the bottom of the mounting plate on which the mounting brackets for the alignment tool are located. (In those units in which C11 is adjusted by the alignment tool, clockwise rotation of the stem raises it and

counterclockwise rotation lowers it. In those units in which C11 is screwdriver adjusted, clockwise rotation of the stem lowers it and counterclockwise rotation raises it.)

d. Adjust C17 to minimum capacitance by setting the arrow on this capacitor to point toward A as shown in figure 47.

e. Connect a 50-ohm rf wattmeter such as RF Wattmeter ME-11/U (Sig C stock No. 4C5611) or equivalent to AUX ANT jack J3. If a suitable wattmeter is not available, use a .25-ampere, 6- to 8-volt pilot Lamp LM-27 (Sig C stock No. 2Z5927), or a 47-ohm 2-watt resistor in series with an rf ammeter (200 ma, Sig C stock No. 3F920-30).

f. Connect the ground lead of the vtvm to the junction of R13 and R11; connect the dc probe to pin 5 of jack J7. Use zero center of vtvm if available.

g. Set the POWER switch of the radio set to ON. Tape down the push-to-talk button on the handset.

h. For alinement at the low end of the dial, tune the AN/PRC-8 to 20.6 mc, the AN/PRC-9 to 27.9 mc, and the AN/PRC-10 to 39.2 mc.

i. Adjust L3 for correct zero on the vtvm. (When correct zero is obtained, adjustment of L3 (approximately one full turn) in one direction produces a reading of at least +2 volts, and in the other direction a reading of at least -2 volts.)

j. Adjust L9 for maximum rf power output (as indicated on the wattmeter or its equivalent).

k. Readjust L3 for correct zero on the vtvm.

l. For alinement at the high end of the dial, tune the AN/PRC-8 to 27.4 mc, the AN/PRC-9 to 38.1 mc, and the AN/PRC-10 to 53.8 mc.

m. Adjust C11 for correct zero on the vtvm. (Correct zero is indicated by +2- and -2-volt readings when C11 is adjusted off zero as L3 was adjusted in i above.)

n. Adjust C20 for maximum power output.

o. Readjust C11 for correct zero on the vtvm.

p. Remove rf power indicator from AUX ANT jack J3.

q. Adjust C17 for correct zero on vtvm. If this zero cannot be obtained, obtain a reading as close as possible to zero, with C17 oriented with its arrow pointing within the range of A and B as shown on figure 47. (Adjust C17 only at the high end of the radio set TUNING dial at the frequencies indicated in l above.)

r. Connect the rf power indicator to AUX ANT jack J3. Readjust C20 for maximum power output; then readjust C11 for correct zero on the vtvm.

s. Repeat the procedure in h through r above until no further adjustment is necessary. (It usually is necessary to repeat the procedure in h through r above three or four times.)

t. The set is considered to be alined properly under the following conditions:

- (1) When the set is at the high alinement frequency and the rf power indicator is connected to AUX ANT jack J3, the voltage on the vtvm does not exceed .1 volt (without readjusting C11).

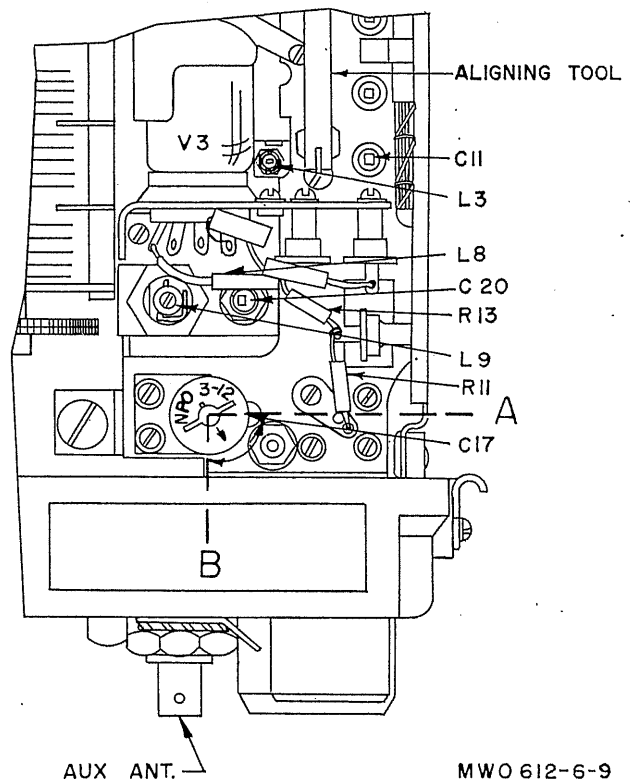


Figure 47. Location of controls used in transmitter alinement.

- (2) When the set is at the high alinement frequency and the rf power indicator *is not* connected to AUX ANT jack J3, the voltage on the vtvm does not exceed .1 volt (without readjusting C17).
- (3) When the set is at the low alinement frequency and the rf power indicator

is connected to AUX ANT jack J3, the voltage on the vtvm must not exceed .1 volt (without readjusting L3).

Note. If the frequency is monitored during alinement of the transmitter while the vtvm is connected, a distorted note may be heard as a result of pickup on the vtvm test leads.