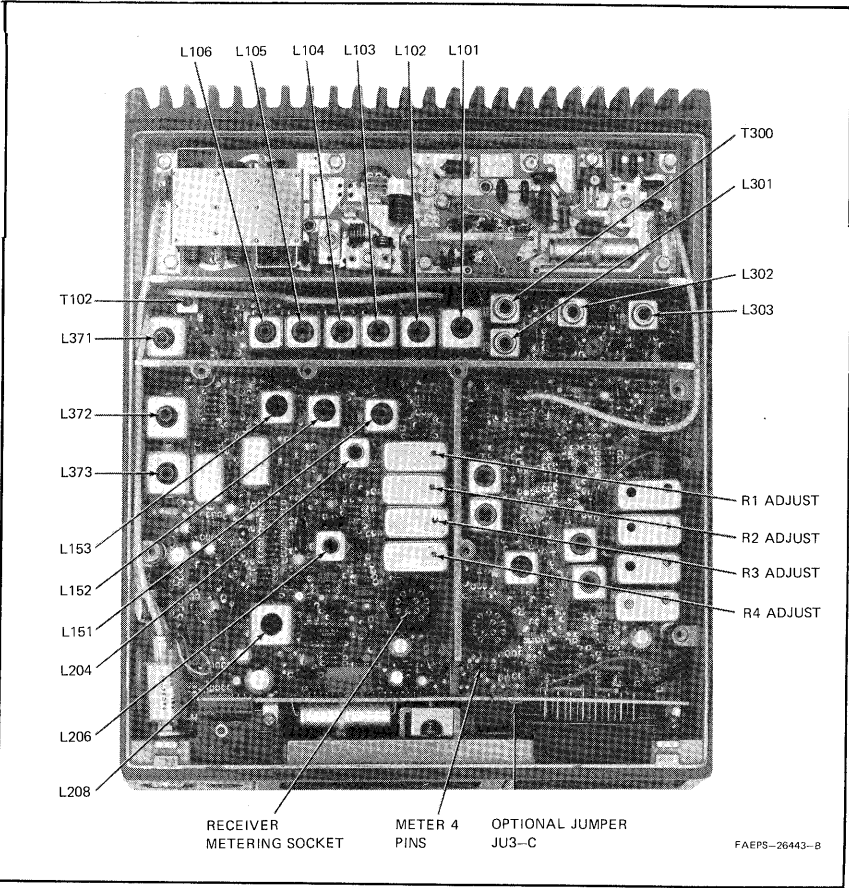


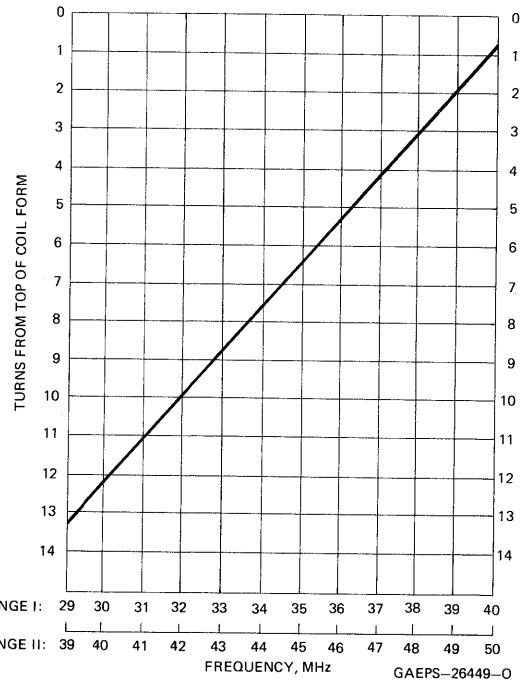
LOW BAND MITREK

RECEIVER ALIGNMENT

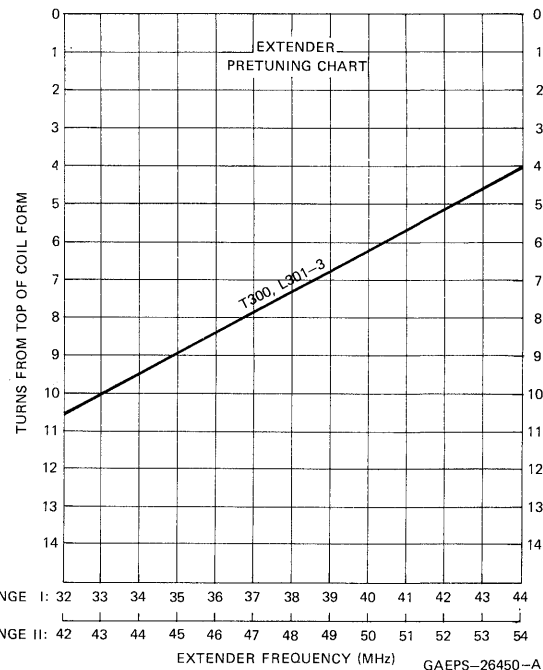


Receiver Adjustment Locations

RF Deck L101-6 and Injection Circuit L151-3 Preset Chart



Extender Preset Chart



RECEIVER PREALIGNMENT NOTES

- The alignment procedure is written for use with the Motorola portable test set. If using the TEK5-F or modified TEK5-B through TEK5-E meter panels, put the M1, 2 polarity switch in the reverse position and ignore the indicated polarity notes.
- IMPORTANT:** When using the Motorola portable test set for M4, place the FUNCTION SELECTION SWITCH to the XMTR position. Switch polarity as necessary for proper M4 operation.
- In some cases peak meter reading may occur at two points in the tuning range of a coil. Always tune to the peak where the slug is nearest the top of the coil form (away from the circuit board).
- Receive Frequency Calculations:
 $F_{osc} = F_c + 10.7 \text{ MHz}$
 F_c = carrier frequency
 F_{osc} = oscillator frequency
- F_L is the lowest receive frequency.
 F_H is the highest receive frequency.

POSITIVE GROUND SYSTEMS

CAUTION

In positive ground systems the case of the TEK5 Meter Panel and portions of the S1056B Portable Test Set are hot with respect to the vehicle chassis due to the nature of the positive ground installation. Take necessary precautions that the test equipment does not contact the vehicle chassis.

RECEIVER ADJUSTMENT PROCEDURE

STEP	TEST SET METER POSITION	ADJUST	PROCEDURE
Omit Steps 1-5 if receiver previously tuned.			
1	L101-L106 L151-L153		Preset rf deck and injection tuning slugs as shown in Preset Chart (read chart for F_L).
Omit Step 2 on non-extender radios.			
2	T300, L301, L302, L303		Determine sampling channel frequency from EXTENDER tuning table. Preset EXTENDER tuning slugs as shown in EXTENDER Preset Chart.
3	T102		Preset the mixer drain transformer, T102, to approximately 2 turns below flush with the top of the coil form.
4	L204, L206		Preset the i-f matching network coils, L204 and L206, to 8 turns below flush with the top of the coil forms.
5	2	L208	Starting with the slug at the top of the coil form, adjust the detector coil L208, for 24 uA on meter 2 (no input signal is necessary).
Omit Step 6 for non-extender radios.			
6	3	T300, L301, L302, L303	Set signal generator to extender frequency (see table) and set level to obtain a reading on meter 3. Tune in order for a peak on meter 3. Repeat until no further improvement is obtained.
Perform Step 7A for all radios. Perform Steps 7B and 7C only for wide-space radios ($F_H - F_L$ greater than 400 kHz).			
7A	6	L151, L152, L153	Set frequency switch to F_L . Adjust for peak reading on meter 6. Repeat until no further improvement is obtained.
7B	6	L151, L153	Set frequency switch to F_H . Tune L151 and L153 for a peak on meter 6. Repeat until no further improvement is obtained.
7C	6	L152	Set frequency switch to F_L . Tune L152 for a peak on meter 6. Repeat Step 7B then proceed to Step 8.
8	1 (Rev), 4	Receiver Oscillator Warp	For each frequency: Set the rf signal generator to the carrier frequency ($\pm 30 \text{ Hz}$) and adjust the output level for a meter 1 reading of 35 uA. Activate the meter 4 circuit by shorting the meter 4 enable pins. Adjust the oscillator frequency (R1-R4 ADJUST) for a zero reading on meter 4.
9A	1 (Rev)	L101-L106	Connect an rf signal generator to the antenna connector and set to F_L . Adjust the generator level for an indication between 35 and 45 uA on meter 1. During tuning readjust the signal generator level as necessary to keep meter 1 between 35 uA and 45 uA. Tune L101-L106, in order, for a peak on meter 1. Repeat until no further improvement is obtained.
Perform Step 9B only for wide-space radios ($F_H - F_L$ greater than 400 kHz).			
9B	1	L101-L106	Repeat Step 9A using F_H .
For a change of receiver frequency only, omit Steps 10 and 11.			
10	1 (Rev)	T102, L371, L372, L373, L204, L206	With any receiver frequency selected, apply standard test modulation (1 kHz modulation, $\pm 3 \text{ kHz}$ deviation) to an on-channel signal generator and adjust the signal generator level for 35 uA on meter 1. Adjust T102, L371, L372, L373, L204 and L206 for a peak on meter 1, while adjusting the signal generator level to keep meter 1 between 35 uA and 45 uA (L372 and L373 are preset only on extender radios). Repeat until no further improvement is obtained.
11	AC voltmeter across speaker	L208	With the same conditions as in Step 10, adjust L208 slowly to produce maximum audio voltage across the speaker.
12	1 (Rev, 4)	Receiver Oscillator Warp	Repeat Step 8.

FINAL METER READINGS

In a properly tuned receiver the following meter readings should be obtained. All meter readings are purely relative and do not give actual current or voltage measurements.

RECEIVER METERING TABLE

S1056B-9B SERIES SWITCH POSITION	1	2	3	6
METER READING FOR NO INPUT SIGNAL	11 uA (min) 30 uA (max)	20 uA (min) 28 uA (max)	0 uA	10 uA (min)
METER READING FOR 200 uV INPUT AT F_{EXT}	5 uA (min)			
INPUT LEVEL ON F_{REC} FOR 35 uA METER READING	7 uV (max)			
FUNCTION METERED	Signal Strength	Detector D. C. Output	Extender RF Gain	Injection Level

EXTENDER FREQUENCY TABLE

F RECEIVE (MHz)	EXTENDER FREQUENCY
29.7-38.0 39.0-46.0	Tune the extender to $F_H + 3.0 \text{ MHz}$.
38.0-38.999 46.0-50.0	Tune the extender to $F_L - 3.0 \text{ MHz}$.

NOTE

In some instances, it may be necessary to retune the extender to avoid interference. If retuning is needed, the extender should *never* be tuned *closer than 3 MHz* to any receive frequency. Also, the extender should never be tuned more than *4 MHz higher than F_H or 5 MHz lower than F_L* . The extender may be tuned within the following bands of frequencies:

RANGE I: 32.7 MHz-44.0 MHz
RANGE II: 42.0 MHz-54.0 MHz

The national paging frequencies are approximately 35.5 MHz and 43.5 MHz. If there is a paging system in your area *avoid* tuning the extender near these frequencies.

EXTENDER PERFORMANCE TESTS

To check for proper extender channel operation, noise pulses must be coupled into the receiver along with the rf carrier. These pulses will degrade receiver sensitivity when the Extender is off. However, the noise pulses will have little effect when the Extender is working. The following tests may be made to verify that the Extender channel is operating properly.

Test Setup

Couple a TEK47A pulse generator modulated with an rf signal generator, to the receiver being tested. Monitor the receiver output with an ac voltmeter across the speaker.

NOTE

If another pulse generator must be used, connect it and the rf signal generator to the receiver being tested using a 3-way pad.

Continuous Pulse Blanking Effectiveness Test

This test applies high amplitude pulses to the Extender channel to verify proper noise attenuation during severe noise conditions.

Step 1. Disable the Extender by removing the option clip, (JU3), from the interconnect board.

Step 2. Apply a signal on the carrier frequency and adjust its amplitude to produce 25 dB quieting. The pulse generator should be off at this time.

Step 3. Increase the signal generator 50 dB above the 25 dB quieting level.

Step 4. Turn the pulse generator on, set it to the 10 kHz position, and increase its output level until 25 dBq is again obtained. This setting is known as a 50 dB max. pulse.

EXAMPLE

Normal 25 dB quieting -115 dBm (0.4 uV)
25 dB quieting degraded 50 dB -65 dBm (125 uV)

These are voltages into the radio; if the TEK47A is used, the voltages at the signal generator are typically 4 dB higher.

Step 5. Turn the pulse generator off, and enable the Extender by replacing the option clip, (JU3), at position C.

Step 6. Reset 25 dB quieting.

Step 7. When the pulse generator is turned back on, radio quieting should not be less than 20 dB.

Blanking Pulse Threshold Sensitivity Test

This test determines the amount of tolerable degradation to receiver sensitivity before blanking begins.

Step 1. Apply a signal on the carrier frequency and adjust its amplitude to produce 25 dB quieting. The pulse generator should be off at this time.

Step 2. Turn the pulse generator on, and set it to its lowest possible amplitude (at 10 kHz). Make sure that the option clip is in place (position C) so that the Extender is on.

Step 3. Increase the pulse amplitude slowly until quieting no longer degrades, but begins to get better. Receiver performance should never be worse than 5 dB quieting during this test.

Level Shut-Off

This test checks for proper operation of the Extender level shut-off. It is used to disable the Extender under high level receive signal conditions.

Step 1. Perform Steps 1-6 in the Blanking Effectiveness Test above to set 50 dB maximum pulse.

Step 2. After turning the pulse generator on, increase the rf signal generator slowly until a sharp increase in noise is heard in the speaker. At this point, the Extender circuitry is turned off. This should occur between 50 uV and 150 uV into the radio (80 uV and 240 uV on the generator when using the TEK47A).