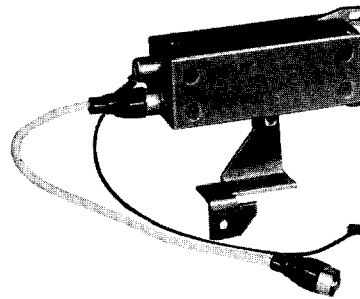


RF PREAMPLIFIER

MODELS TLE8191A AND TLE8192A

FOR UHF MICOR[®] RADIOS



FAEPS-14155-O

TECHNICAL CHARACTERISTICS

IMPEDANCE	50-ohm input, 50-ohm output
CURRENT DRAIN	7.5 mA at 13.8 V
FREQUENCY	406-450 MHz, 450-512 MHz
POWER GAIN	10 dB

RECEIVER WITH PREAMPLIFIER

SENSITIVITY	-20 dB QUIETING	0.25 uV
	EIA SINAD	0.175 uV
SELECTIVITY (EIA SINAD)		-90 dB at ± 25 kHz
INTERMODULATION (EIA SINAD)		-80 dB
SPURIOUS AND IMAGE REJECTION		-100 dB minimum
SQUELCH SENSITIVITY		Threshold 0.125 uV max. at 6 dB max. quieting
		Tight 0.6 uV max. at 14 dB min. quieting

 **MOTOROLA INC.**
Communications Division

service publications
1301 E. Algonquin Road, Schaumburg, IL 60196

1. DESCRIPTION

The rf preamplifier is an optional accessory that increases the useful operating range of the receiver. The rf preamplifier kit includes a printed circuit board, a housing, a 6-1/2 inch coaxial cable with rf phono-type connectors, and a mounting bracket with hardware. All electrical components are accessible by removing cover plates. The rf preamplifier circuit consists of two tuned-lines and a grounded gate FET amplifier. It improves the receiver sensitivity from the specified 20 dB quieting sensitivity of 0.5 microvolt to 0.25 microvolt.

2. INSTALLATION

a. Tools Required

- #1 Phillips screwdriver or,
- 7/32" Nut driver.

b. Procedure

Step 1. Disconnect the power/control cable from the radio and remove both top and bottom covers.

Step 2. Disconnect the rf input cable from the rf pre-selector.

Step 3. Position mounting bracket on the bottom side of the radio and secure it to the chassis with the mounting screw. Refer to the mounting detail illustration.

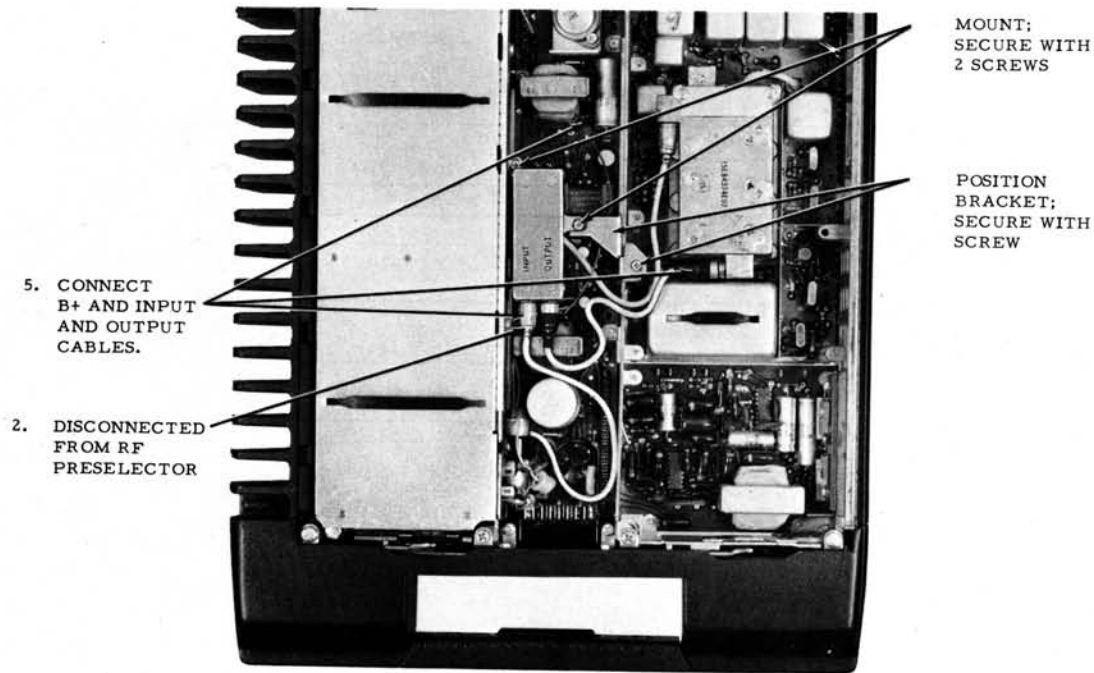
Step 4. Position the rf preamplifier as shown in the illustration and secure it to the bracket and chassis with the two mounting screws.

Step 5. Connect the B+ lead to P911 on the control board, rf input cable to the rf preamplifier input, and output cable to the pre-selector.

Step 6. Align the rf preamplifier (refer to the maintenance paragraph in this section).

3. THEORY

The signal from the antenna is coupled directly into the input tuned-line of the preamplifier through the INPUT jack. This tuned-line passes the desired signal and matches the relatively low FET input impedance to the 50-ohm input line. The signal is capacitively coupled to the source terminal of the FET where it is amplified and then capacitively coupled to the output tuned-line. The output tuned-line is a high Q tank circuit. It passes the desired signal and matches the relatively high FET output impedance to the 50-ohm output line.



FAEPS-14157-O

Installation Detail

4. MAINTENANCE

a. General

This section provides the maintenance shop type procedures for the rf preamplifier. These bench tests include measurements with a Motorola portable test set, and procedures for testing and troubleshooting.

b. Alignment

Disconnect the preamplifier input and output cables and bypass the preamplifier by connecting the receiver input cable, from the antenna switch, directly to the rf preselector input. Check and align the pre-selector according to the alignment procedure described in the receiver section of the manual. After the receiver has been aligned disconnect the receiver input cable from the pre-selector and reconnect the preamplifier input and output cables. While monitoring position 5, align the preamplifier for maximum meter indication by adjusting C1 and C2. For final tuning, repeak C1, C2, and L111 for maximum quieting.

c. Realignment

It is not necessary to bypass the preamplifier when aligning to the same frequency or to a new frequency if it is within ± 1.0 MHz of the previously tuned frequency. Align the rf pre-selector first, then adjust the preamplifier as described in the preceding paragraph.

d. Troubleshooting

With the preamplifier connected, and the test set on position 5, perform the following:

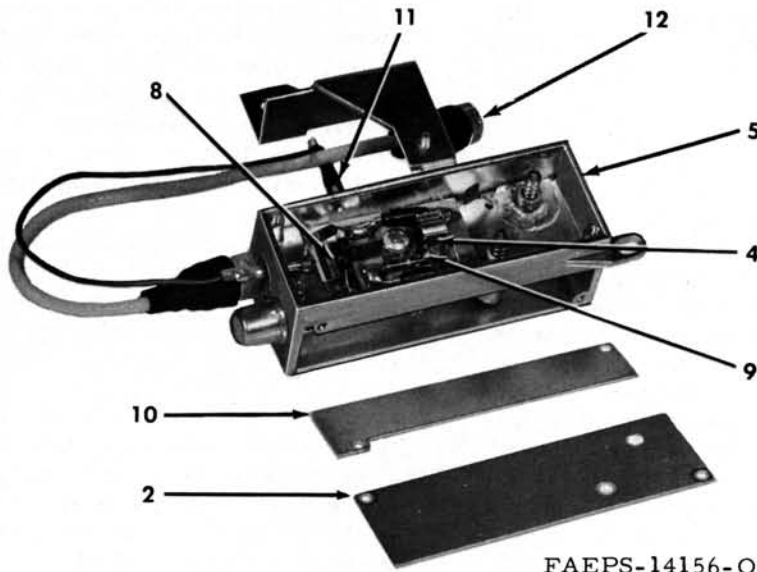
(1) Increase the signal generator output for a maximum indication on the test set meter (saturation), then decrease until a convenient reference point is reached on the test set meter (not more than 10 μ A below the saturation point). Note both the test set meter indication and the signal generator output level setting.

(2) Disconnect the preamplifier input and output cables and bypass the preamplifier by connecting the receiver input cable, from the antenna switch, directly to the rf pre-selector input.

(3) Increase the signal generator output until the same reference point is obtained on the test set meter. Note the signal generator output level setting, it should be at least 3 times greater than the previous setting for a preamplifier gain of approximately 9 to 10 dB.

(4) Reconnect the preamplifier and check the alignment if the above indications are not obtained.

(5) If there is no output or insufficient gain after the preamplifier is aligned, check for faulty components or solder connections on the printed circuit board.



FAEPS-14156-O

PREAMPLIFIER

TLE8191A Preamplifier (406-450 MHz)
 TLE8192A Preamplifier (450-512 MHz)

PL-2018-B

CODE NO.	MOTOROLA PART NO.	DESCRIPTION
1	3S490352	SCREW, machine: No. 2-56 x 5/32: cover mounting screws, 6 req'd
2	15B84322B01	COVER, top
3	7B84444E01	BRACKET, mounting
4	42B83660C01	CLIP, transistor mounting
5	15B84501G01	HOUSING, preamplifier
6	3S1234212	SCREW, tapping #4 x 5/16: "Phillips" hex nut (3 req'd)
7	3S129841	SCREW, machine: #4-40 x 1/4: "Phillips" binder head; 1 req'd
8	1V80708B85	CIRCUIT BOARD ASSEMBLY
9	4K844123	SPACER, insulator (under board)
10	15B84323B01	COVER, side: 2 req'd
11	11-10184A24	PIN
12	24C84282D01	CONNECTOR plug, male; coaxial miniature type p/o cable 1V80739B37

TLE8192A RF Preamplifier
 Mechanical Parts
 Motorola No. PEPS-11250-A
 5/20/74-UP

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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PARTS LIST

PREAMPLIFIER

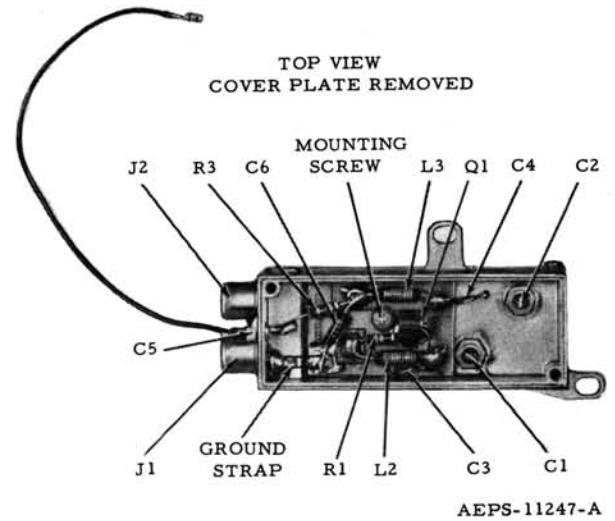
TLE8191A Preamplifier (406-450 MHz)

TLE8192A Preamplifier (450-512 MHz)

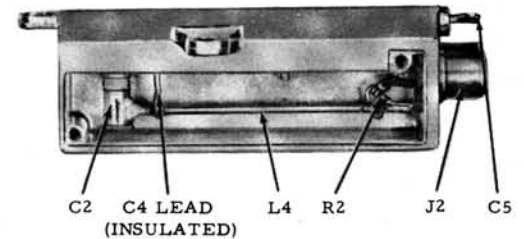
PL-2707-A

C1, 2	20-83693H03 or 20-83693H01	<u>CAPACITOR, variable:</u> (includes standard tuning "piston"); 0.9-9.0 pF (406-450 MHz) 0.8-6.0 pF (450-512 MHz) (NOTE: Also order 76-84425B01 PISTON, tuning; special; SEE NOTE II)
C3, 4 C5	21-861441 21-861219	<u>CAPACITOR, fixed:</u> 500 pF ±10%; 75 V; N4700 .001 uF +100-0%; 500 V; coded RED
C6	23-84762H04	2.2 uF ±20%; 25 V
J1, 2	9-84135B01	<u>CONNECTOR, receptacle:</u> female; coaxial; miniature type
L1 L2, 3 L4	47-84330B02 24-800484 47-84330B03	<u>COIL, RF:</u> (straight rod; 1.75" long) choke; 0.31 uH (straight rod; 2.19" long)
P2, 104	28-84282D01	<u>CONNECTOR, plug:</u> male; coaxial; miniature type
Q1	48-869533	<u>TRANSISTOR:</u> (SEE NOTE I) field-effect "N Channel"; type M9533; does not include 42-83660C01 CLIP, transistor retaining
R1 R2 R3	6-10401C25 6-185B73 6-10401C17	<u>RESISTOR, fixed:</u> 100 ±10%; 1/4 W 330 ±10%; 1/8 W 47 ±10%; 1/4 W
W1	1-80739B37	<u>LINE, RF transmission:</u> includes P2, P104 and 30-83794C01 CABLE, RF; coaxial; 6-1/2" length required

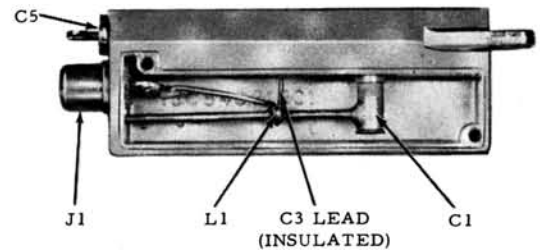
- NOTES:
- I. For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.
 - II. When replacing capacitor C1 or C2 for the 450-512 MHz range, order the two items (capacitor and special tuning "piston") shown in the parts list. Remove the standard tuning piston from the capacitor and replace it with the special piston.



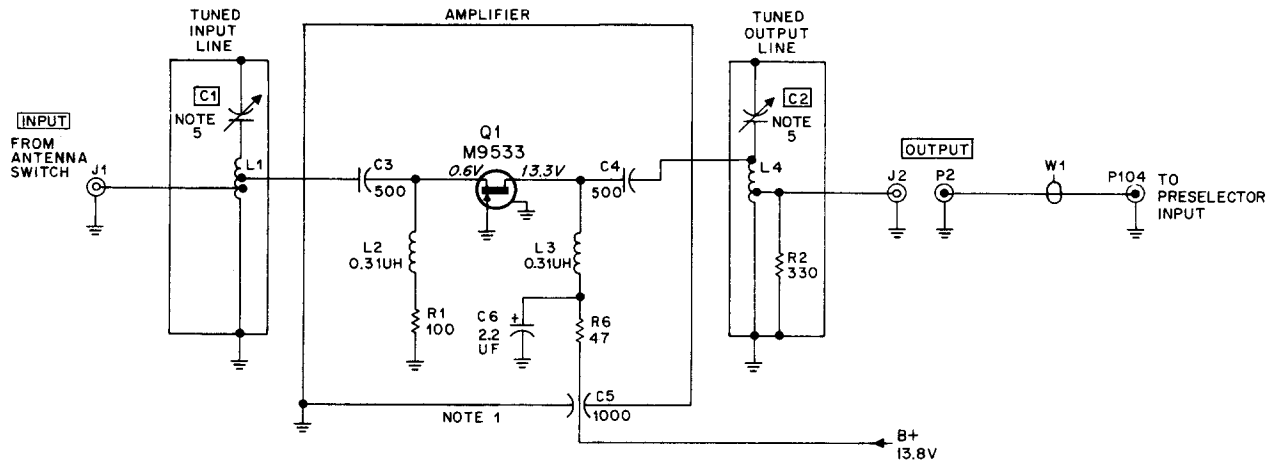
OUTPUT SIDE
(COVER PLATE REMOVED)



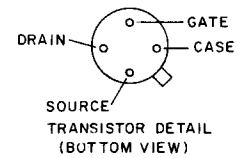
INPUT SIDE
(COVER PLATE REMOVED)



AEPS-11285-O



CEPS-11248-B



NOTES:

1. ALL COMPONENTS WITHIN THIS BOX ARE PHYSICALLY MOUNTED ON PRINTED CIRCUIT BOARD.
2. REFERENCES OUTLINED BY A RECTANGLE INDICATE MARKINGS ON CHASSIS.
3. ALL CAPACITOR VALUES ARE IN pF UNLESS OTHERWISE STATED.
4. ALL VOLTAGE READINGS MEASURED WITH A 20,000 OHM-PER-VOLT MULTIMETER.
5. SEE PARTS LIST.

EPS-11341-A

Note: Page 5 was scanned in two sections, so that all pages are 8.5 by 11 inches.

TLE8191A and TLE8192A RF Preamplifier
Schematic Diagram and Component Location
Motorola No. PEPS-11249-C
3/17/75-UP

END OF DOCUMENT