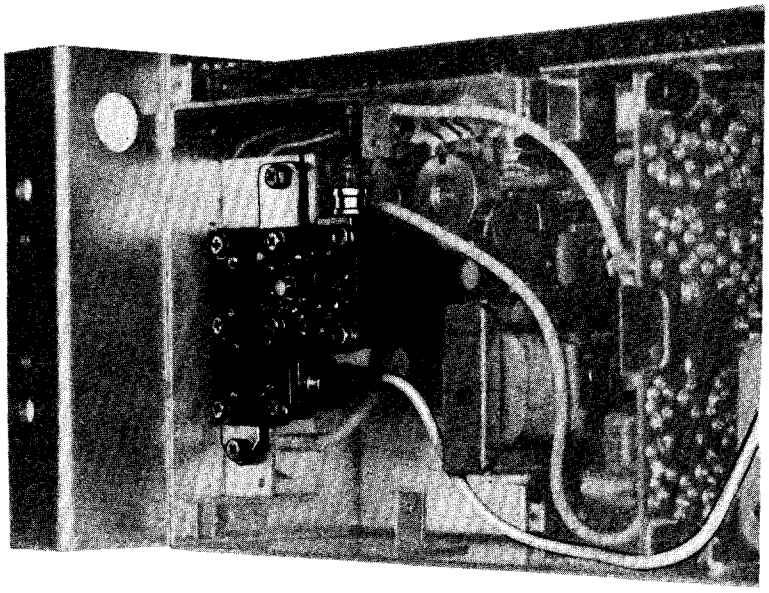
RF PREAMPLIFIER

MODELS TLD8421B AND TLD8422B

& CABLE

MODEL TKN6613A



AEPS-8824-O

MODEL	FREQUENCY
TLD8421B	132-150.8 MHz
TLD8422B	150.8-174 MHz

TECHNICAL CHARACTERISTICS

IMPEDANCE	50 ohm input, 50 ohm output
CURRENT DRAIN	20 mA at 13.8V
FREQUENCY	132-174 MHz
POWER GAIN	10 dB

RECEIVER WITH PREAMPLIFIER

SENSITIVITY	-20 DB QUIETING	0.25 uV
	EIA SINAD	0.175 uV
SELECTIVITY (EIA SINAD)		-95 dB at ±30 kHz
INTERMODULATION (EIA SINAD)		-75 dB
SPURIOUS AND IMAGE REJECTION		-95 dB minimum
SQUELCH SENSITIVITY		Threshold 0.1 uV max. at 6 dB max. quieting
		Tight 0.6 uV max. at 14 dB min. quieting

MOTOROLA INC. Communications Division

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1. DESCRIPTION

The rf preamplifier is an optional accessory item that increases the input signal level to the receiver thereby increasing its operating range. Using the rf preamplifier in two-receiver stations results in an increase greater than 3dB in input signal level to both receivers. (In stations using two receivers, the input signal level, without preamplifier, to each receiver is reduced by 3dB as compared to one-receiver stations. Two-receiver stations also require the use of the optional two-receiver coupler).

The preamplifier kit includes a printed circuit board, a housing and a coaxial cable with rf phono-type connectors. The circuit board is plated on both sides with components mounted toward the inside of the housing. The preamplifier circuit consists of two aperture-coupled helical resonators, an FET amplifier, and an output coil.

NOTE

The rf preamplifier is capable of amplifying two or more input carrier frequencies providing that the maximum center frequency separation does not exceed 1.5 MHz. If carrier frequency separation does exceed 1.5 MHz, two rf preamplifiers are required.

2. OPERATION

The incoming rf signal is applied to the preamplifier input jack J1 through the receiver input cable. The input jack is connected to a tap on coil L1. The rf signal is coupled from L1 to L2 by utilizing the cavities in the housing to form two aperture-coupled helical resonator cells. The tapped output of L2 is applied to common-gate FET amplifier Q1 through rf bypass capacitor C6. Resistor R2 develops dc bias. Output coil L3 provides loading for Q1 and is capacitively matched by capacitor C4 to output jack J2. This provides a 50-ohm termination for the input of the rf preselector.

3. 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

NOTE

If the preamplifier is normally operated with more than one carrier frequency input, determine the center of the preamplifiers operating range and, if possible, use this frequency to perform the alignment. If this is not possible, align the preamplifier using the lowest carrier frequency.

Disconnect the preamplifier input and output cables and bypass the preamplifier by connecting the receiver input cable directly to the rf preselector input. Check and align the preselector 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 preselector and reconnect the preamplifier input and output cables. While monitoring position 5, align the preamplifier for maximum meter indication by adjusting the tuning coils in the following order; L3, L2, L1. For final tuning, repeak L3, L2, and L1; then tune L2 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 preselector 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 uA 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 directly to the rf preselector input.

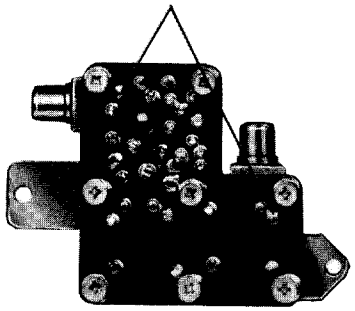
(3) Increase the signal generator output until the same reference point is obtained on the test set meter. Note the signal generator output level setting, it should be at least 3 times greater than the previous setting for a preamplifier gain of approximately 9-1/2 dB.

(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 (refer to the circuit board removal and replacement illustration).

REMOVAL PROCEDURE

1. THOROUGHLY REMOVE SOLDER FROM INPUT AND OUTPUT FEED-THRU LEADS.



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2. REMOVE 8 SCREWS AND LIFT OFF CIRCUIT BOARD.

REPLACEMENT PROCEDURE

3. REPLACE BOARD AND SECURE WITH SCREWS.
4. RESOLDER INPUT AND OUTPUT FEEDTHRU LEADS.

Preamplifier Circuit Board Removal and Replacement

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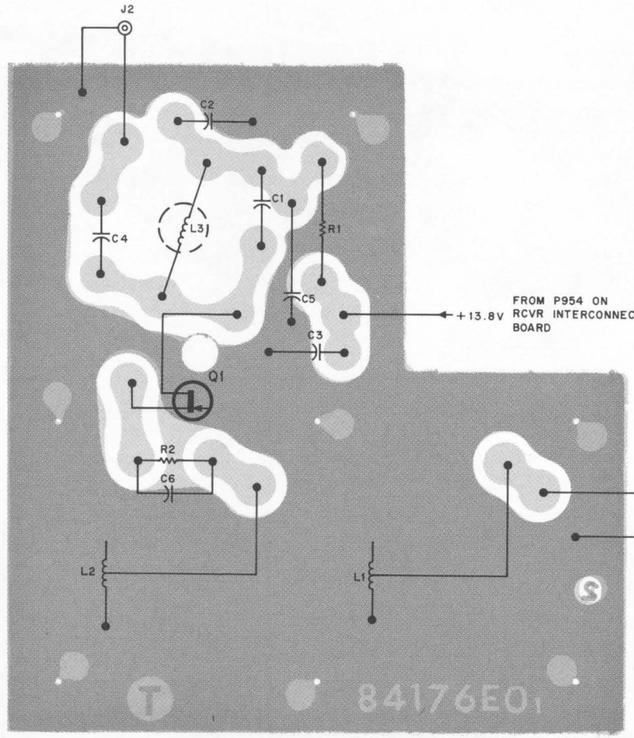

SHOWN FROM SOLDER SIDE ● COMPONENT SIDE ◍ SOLDER SIDE

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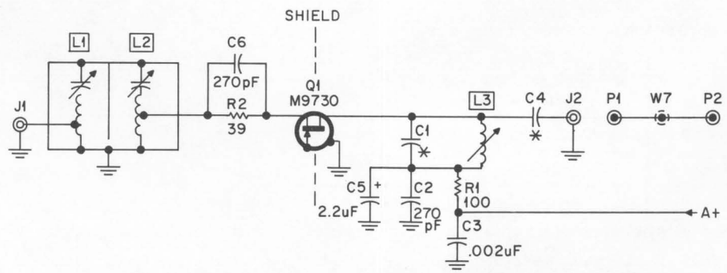
BD-BEPS-7408-0



BEPS-8825-O *=SEE PARTS LIST FOR VALUE.

PARTS LIST SHOWN ON
BACK OF THIS DIAGRAM

Receiver RF Preamplifier & Cable
Schematic Diagram & Circuit Board Detail
Motorola No. 63P81013E34-A
6/20/80-PHI

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

ELECTRICAL PARTS LIST

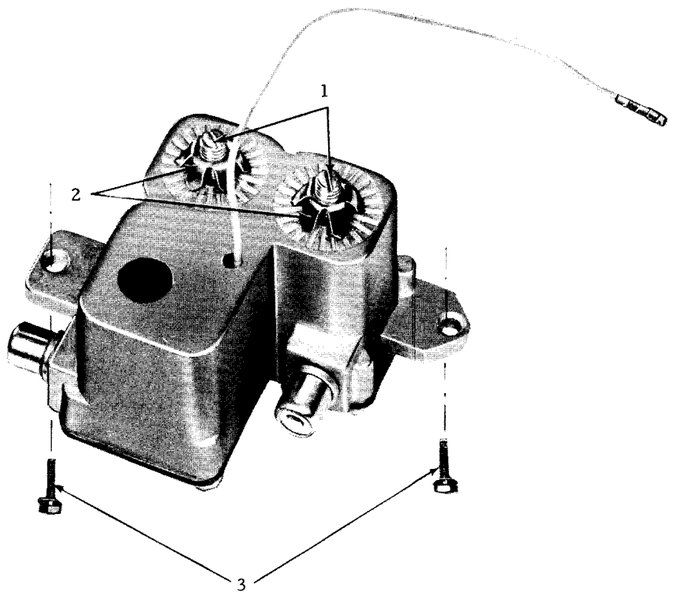
LEGEND:
L = 132-150.8 MHz
H = 150.8-174 MHz

TLD8421B RF Preamplifier (132-150.8 MHz)
TLD8422B RF Preamplifier (150.8-174 MHz) PL-1474-B

		CAPACITOR, fixed:
C1L	21-82133G40	3.9 pF ±0.25 pF; 500 V; NP0
C1H	21-83406D52	2 pF ±0.25 pF; 500 V; NP0
C2	21-82187B04	270 pF ±10%; 500 V
C3	21-83596E14	.002 uF ±10%; 200 V
C4L	21-83406D52	2 pF ±0.25 pF; 500 V; NP0
C4H	21-868487	1.5 ±0.25 pF; 500 V; NP0
C5	23-84762H04	2.2 uF ±20%; 25 V
C6	21-82187B04	270 pF ±10%; 500 V
		CONNECTOR, receptacle:
J1, 2	9-84135B02	female; coaxial; miniature type
		COIL, RF:
L1L	24-84418C01	tapped; coded BRN
L1H	24-84421B01	tapped; (not coded)
L2L	24-84418C02	tapped; coded RED
L2H	24-84421B02	tapped; coded YEL
L3	24-84422B01	(not coded)
		CONNECTOR, plug:
P1	28-82331G01	male, coaxial; miniature type
P2	28-82365D03	male, coaxial, right angle
P3	39-10184A24	female; single-contact (wire terminal)
		TRANSISTOR: (SEE NOTE)
Q1	48-869730	field-effect; N-channel; type M9730
		RESISTOR, fixed:
R1	6-129753	100 ±10%; 1/4 W
R2	6-185A15	39 ±5%; 1/8 W
		LINE, RF transmission:
W7 (Used in Mobile radio applications only)	1-80760B68	includes P1, P2 and 30-83794G01 CABLE, RF: coaxial; 4" length required

NOTE:

Replacement transistors must be ordered by Motorola part number only for optimum performance.



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MECHANICAL PARTS LIST

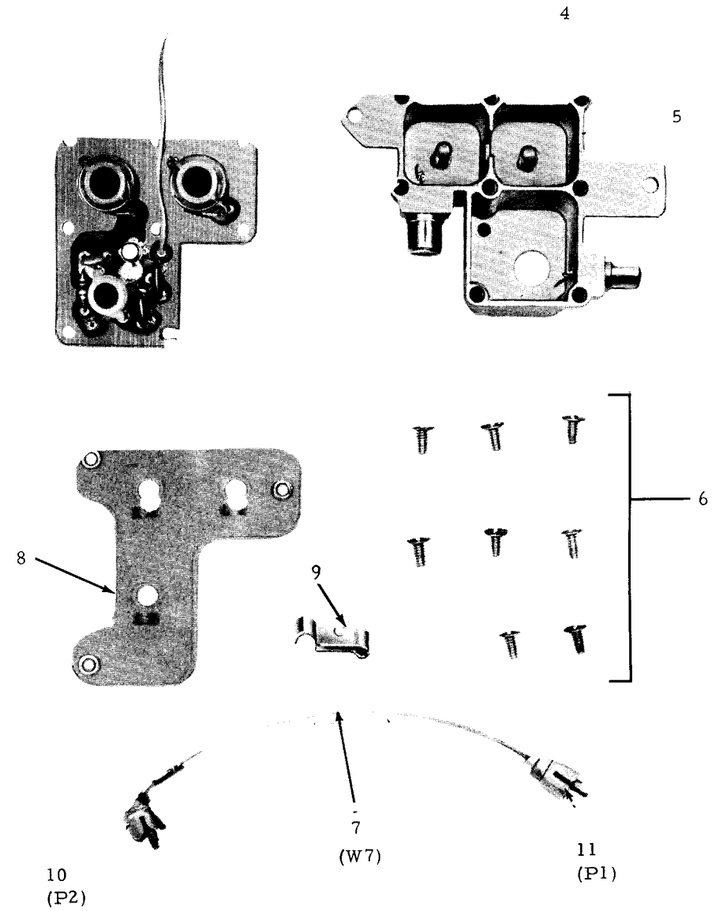
TLD8421B and TLD8422B RF Preamplifier
TLD8421A and TLD8422A RF Preamplifier PL-1035-G

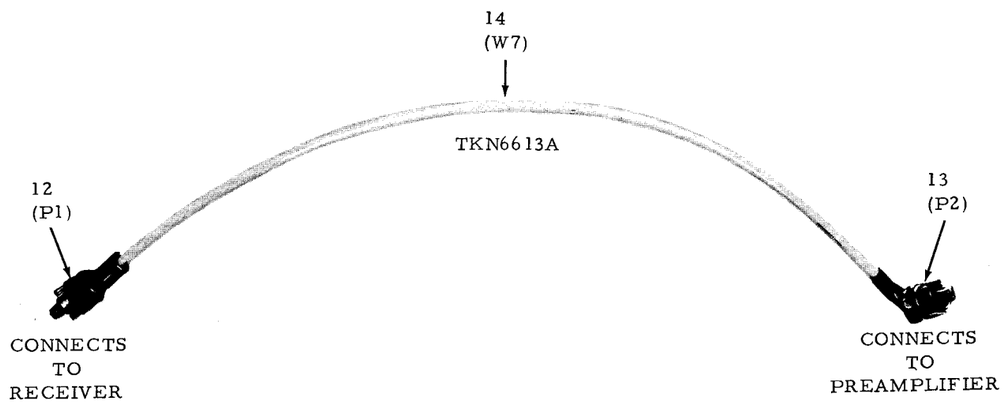
CODE	MOTOROLA PART NO.	DESCRIPTION
1	3S136923	SET SCREW, No. 10-32 x 1"; slotted head; 2 req'd
2	2B83677G01	LOCK NUT: 2 req'd
3	3S134268	LOCKSCREW, tapping: No. 4-40 x 7/16" "Phillips" hex head; 2 req'd
4	39S10184A24	CONNECTOR, receptacle: female
5	15D84416B01	HOUSING, preamplifier
6	3S136926	LOCKSCREW: No. 4-40 x 5/16" "Phillips" hex head; 8 req'd
*7	1V80760B68	CABLE ASSEMBLY
*8	14B84192C01	INSULATOR, mylar
*9	42B84816B01	CLIP, cable
*10	28-82365D03	CONNECTOR, plug; right angle
*11	28-82331G01	CONNECTOR, plug;phono type

* = Used in Mobile Radio applications only

TKN6613A Cable Kit PL-3205-O

12 (P1)	28-82331G01	CONNECTOR, plug: phono type
13 (P2)	28-82365D03	CONNECTOR, plug: right angle
14 (W7)	30-83794C01	CABLE, coaxial: 13" req'd.





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