UHF RECEIVER
MODEL TRE6160A, 70A SERIES

1. DESCRIPTION

1.1 Table 1 provides a model chart of the UHF receivers. These receivers are fully transistorized units that receive FM signals on one to four crystal-controlled frequencies. In a multi-frequency receiver, only one frequency can be received at a time.

1.2 Each receiver includes an rf preselector, mixer, local oscillator injection circuitry, high gain selective i-f stages, quadrature detector, audio preamplifier, and a low-ripple 9.5 volt regulator. The receiver develops a low noise audio signal from a frequency modulated "on-channel" rf carrier in the 450-512 MHz range.

1.3 All circuits are constructed on a single plug-in circuit board which is easily accessible for servicing. The receiver plugs into the backplane interconnect board which provides all dc, audio, and rf connections thereby eliminating all interconnecting wiring. All alignment points are accessible through the top of the rf compartment cover. Table 2 provides the UHF receiver performance specifications. Refer to the attached Receiver Functional Block Diagram for signal flow.

2. THEORY OF OPERATION

Refer to the attached Receiver Schematic Diagram and Circuit Board Detail, at the end of this section, for circuit details.

2.1 RF PRESELECTOR

Received carrier rf is connected, via P101, to the 6-pole helical resonator rf preselector filter (L1 thru L6). The steep skirted rf preselector filter has a bandwidth of 2 MHz and ultimate rejection of 100 dB. The output of the preselector (L6) is connected to the gate of an N-channel JFET mixer, Q106.

2.2 LOCAL OSCILLATOR and INJECTION

Plug in crystal oscillator modules (channel elements) provide a stable, temperature compensated frequency which is applied to injection amplifier Q101. Each receiver is capable of receiving up to four distinct frequencies. The output of Q101 (typical gain of 15 dB) is applied to the base of Q103, which triples the frequency. The output of Q103 passes through L7 and L8, a 2-pole helical bandpass filter, which attenuates harmonics of the injection frequency. A typical injection level of +10 dBm is coupled to the source of mixer Q106.

2.3 MIXER

Excellent intermodulation immunity is provided by mixer, Q106. The filtered receive input and injection signal are applied to the gate and source respectively. The output at the drain is applied to impedance matching circuitry which emphasizes the difference frequency applied to the i-f circuitry. Both the mixer and the following impedance matching circuitry are shielded.

Table 1. UHF Receiver Model Table

Model	Frequency (MHz)	Description	Application
TRE6162A	450-470	Multi-Frequency 10.7 MHz I-F	Normally used with all stations.
TRE6163A	470-512		
TRE6172A	450-470	Multi-Frequency 10.8 MHz I-F	Used with 2-Receiver Stations Where Shifted I-F is Required.
TRE6173A	470-512		

2.4 I-F CIRCUITRY

2.4.1 Several stages of filtering and amplification are employed in the i-f circuitry. Selective i-f filtering is accomplished using dual-resonator, mode coupled monolithic crystals cut to a fundamental frequency of 10.7 MHz or 10.8 MHz. Due to the inherent piezoelectric properties of the crystal material, input signals selectively produce mechanical vibrations which propagate through the device. At the output the same piezoelectric property selectively converts the mechanical vibrations into the i-f electrical signal.

2.4.2 Refer to Figure 1. The high "Q" of the crystals create steep skirts which result in excellent on-channel intelligibility and off-channel signal rejection. The i-f circuitry requires no tuning and makes extensive use of shielding.

2.4.3 The first crystal filter is a single 2-pole device, Y201. This stage is followed by a matching network, 16 dB discrete amplifier Q201, additional matching, and 4-pole filter Y202-Y203. The output of the first 4-pole filter is applied to a matching network and then to high gain (appoximately 50 dB) 2nd i-f amplifier U201. The output of U201 is applied to matching circuitry, a 2nd 4-pole filter Y204-Y205, final matching circuitry, and limiter/detector U202.

2.5 LIMITER/DETECTOR

Limiter/Detector U202 is a 16-pin monolithic integrated circuit that internally includes three stages of i-f amplification for limiting, a quadrature fm detector, audio preamplifier, and alignment metering output. The recovered audio output of approximately 80 mV is applied to discrete audio preamplifier Q202-Q203, which provides the 250 mV receiver detected audio level required by the R1 (or R2) audio board in the control package. Adjustment of the quadrature detector is provided by L201.

2.6 9.5 VOLT REGULATOR

The regulated 9.5 volts and 13.8 volts provided to the receiver from the station power supply are applied to Q104 and Q105, resulting in a highly regulated and filtered 9.5 volts. This highly regulated 9.5 volts is supplied to the receiver channel elements, quadrature detector U202, and audio preamplifier Q202 to assure good receiver hum and noise performance.

2.7 DELAYED KEYED A+

This circuit (Q102) provides for disabling of the receiver channel element while the base station is in the transmit mode and prevents audio feed back to the receiver.

3. MAINTENANCE

Malfunctions in the receiver can be localized by using the optional built-in station metering kit or connecting a Motorola portable test set to the receiver metering receptacle and making stage measurements. The meter readings may be compared to the values shown on the receiver functional diagram, but preferably, a log of readings should be maintained for reference. Each new set of readings should then be compared to previous readings. An abrupt change in a meter reading indicates a circuit failure while a gradual change in a reading may indicate an impending failure which can be corrected before operation becomes marginal. Table 3 provides a list of test equipment recommended for use while servicing UHF receivers.

Table 2. Performance Specifications

Input Impedance	50 ohms
Number of Channels	1, 2, 3, or 4
Frequency Separation	2 MHz
I-F Frequency	10.7 MHz or 10.8 MHz
EIA Modulation Acceptance	±7 kHz Minimum
Frequency Stability	±.0002% from −30°C to +60°C ambient (+25°C reference)
Channel Spacing	25 kHz
Sensitivity:	
20 dB Quieting EIA SINAD	Less Than 0.5 uV Less Than 0.35 uV
Selectivity: EIA SINAD	90 dB
Intermodulation: EIA SINAD	85 dB (minimum)
Spurious and Image Rejection*	100 dB (Minimum)

* In receivers tuned for 1 to 2 MHz widespace frequency separation, the 1/2 i-f spur degrades to 90 dB.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

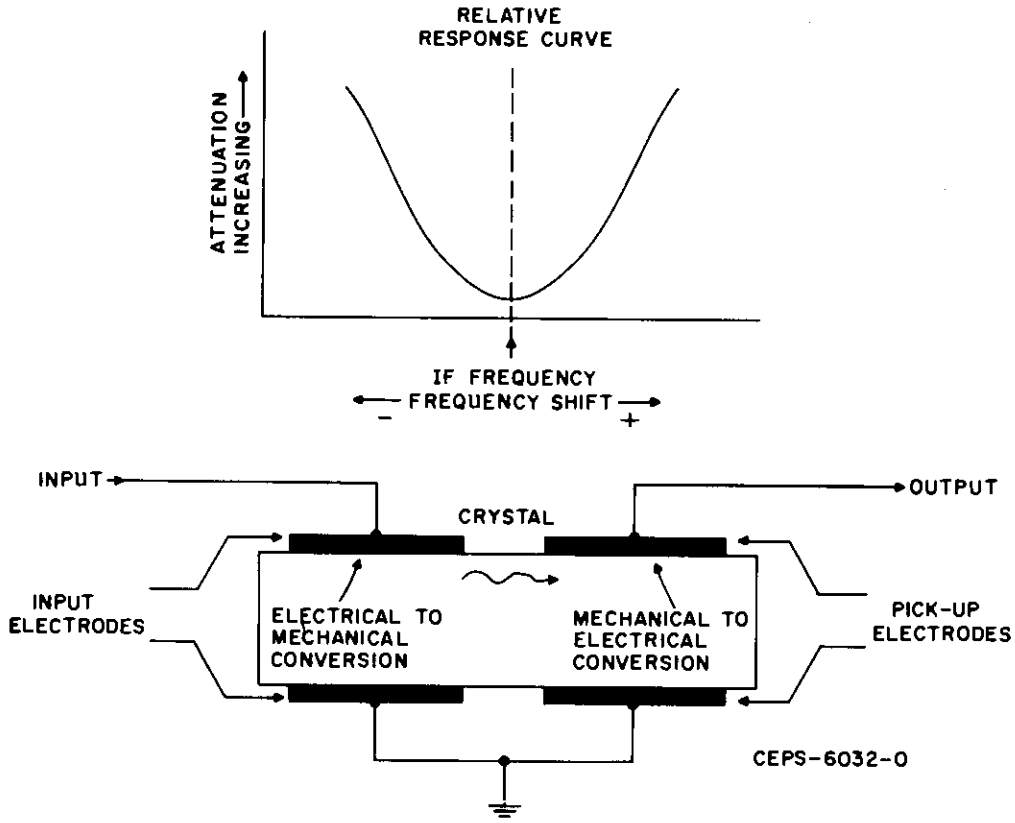


Figure 1. Simplified Piezoelectric Coupling Diagram

4. RECEIVER FUNCTIONAL TESTS

4.1 AUDIO and SQUELCH TEST

The receiver and R1 audio board should provide 1 watt of audio when the VOLUME control on the R1 audio board is set fully clockwise and a strong carrier signal is received that is modulated ±3 kHz devation with a 1000 Hz tone. When the rf input signal is reduced to minimum and the SQUELCH control on the R1 audio board is set at theshold, the speaker should be quieted. Increasing the rf input signal a small amount should again produce noise in the speaker. With coded squelch models, no audio should be heard from the speaker unless the rf input signal has the proper encoded PL or DPL signals. These circuits may be checked as follows:

Step 1. PL disable station. Connect speaker to test connector on the backplane interconnect board. Adjust the signal generator for 1000 uV input to the receiver, modulated with 1000 Hz tone at ±3 kHz deviation.

Step 2. Connect an ac voltmeter to measure the voltage between pins 1 and 2 of the CONTROL metering socket.

Step 3. Set the VOLUME control on the R1 audio board fully clockwise. The ac voltmeter should indicate at least 2.8 volts rms.

Step 4. Decrease the signal generator output to minimum. Remove modulation from signal generator.

Step 5. Set the SQUELCH control at threshold, that is, turn it clockwise until the noise just quiets.

Step 6. Increase the signal generator output slightly until the noise is again heard in the speaker. No more than 0.2 uV should be required.

Step 7. On coded squelch models, enable the PL function. No noise should be heard in the speaker.

Step 8. Modulate the rf signal with the proper PL or DPL signals, with ±500 Hz deviation. Adjust signal generator output until noise is again heard in speaker. No more than 0.2 uV should be required. (Refer to the Audio and Squelch tab of the Control and Audio Instruction manual for further squelch explanation).

4.2 20 dB QUIETING TEST

With no signal input and the receiver unsquelched, noise should be heard in the speaker or indicated on position 11 of the portable test set (function selector switch in RCVR position). When a carrier frequency signal is injected, the noise should decrease. No more than 0.5 uV should be required to decrease the noise 20 dB. This may be checked as follows:

Table 3. Recommened Test Equipment For UHF Receiver Servicing

General Type	Application	Recommended Model	Minimum Specifications
AC-DC VOM	DC voltage measurements, general	Motorola T1009	Measurement range: 0-15 V dc Sensitivity: 20,000 ohms/volt
DC Multimeter	DC voltage readings requiring a high input resistance meter	Motorola S1063	Measurement range: 0-15 V dc Input resistance: 11 megohms
AC Voltmeter	Audio voltage measurements	Motorola S1053	Measurement range: 0-10 V ac Input resistance: 10 megohms
RF Voltmeter	RF voltage measurements	Motorola S1339	Measurement range: 100 uV-3 V from 1 MHz-512 MHz Inputs: 50 ohm and high impedance
Oscilloscope	Waveform observation	Motorola R1004	Vertical sensitivity: 5 mV-10 V/division Horizontal time base: 0.2 usec. 0.5 sec/division
Frequency Meter	Receiver frequency measurement	Model R1200 Service Monitor with high stability oscillator (X suffix) option. Frequency calibration recommended every 6 months or less.	Measurement range: 450-512 MHz Frequency resolution: 10 Hz
RF Signal Generator	Receiver alignment and troubleshooting	Motorola R1200 Service Monitor with attenuator	Frequency range: 450-512 MHz Output Level: 0.1 uV-100,000 uV Must be capable of at least ±3 kHz deviation when modulated by 1 kHz tone.
Audio Signal Generator	Audio circuit troubleshooting	Motorola S1067	Frequency range: 20 Hz-20 kHz Output level: 50 mV-1 V
PL Tone Generator*	Tone-coded *Private-Line* decoder troubleshooting	Motorola S1333	Frequency range: 10 Hz-9999 Hz Output level: 0-3 V rms
DPL Test Set**	*Digital Private-Line* encoder-decoder troubleshooting	Motorola SLN6413	
Radio Test Set	Meter readings at circuit metering points for alignment and troubleshooting	Motorola S1056 Portable Test Set with a TEK-37 or TEK-37A Test Set Adapter or a Motorola TEK-5 Meter Panel with a TEK-40 (MICOR Adapter) Cable.	
DC Power Supply	DC power for shop service	Motorola R1011	1-20 V dc 0-40A

*Required for tone-coded *Private-Line* models only.
**Required for *Digital Private-Line* models only.

NOTE

All test equipment, with the exception of the DPL test set and dc power supply, may be replaced by the Motorola R2001 System Analyzer. Tuning tools Motorola Part No. 66-82977K01 and 66-83398A01 should be used for alignment purposes.

Step 1. Unsquelch receiver by turning the SQUELCH control on the R1 audio board fully counterclockwise. PL disable the receiver.

Step 2. Set the function selector switch on the portable test set to the RCVR position and the selector switch to position 11.

Step 3. Adjust VOLUME control on the R1 audio board for noise in the speaker and a reading on the test set meter. A reading of 1.5 V ac is a convenient reference value to use.

Step 4. Connect an rf signal generator (set to the receiver carrier frequency) to the antenna input connector.

Step 5. Beginning with minimum signal level, increase the signal generator output until the meter 11 reading drops to 1/10 the reference value in Step 3, that is 0.15 V ac. No more than a 0.5 uV output from the signal generator should be required to quiet the receiver.

4.3 RECEIVER GAIN MEASUREMENTS

NOTE

Before making any receiver gain measurements, make sure the case of every crystal filter has a good conductive path to ground. A continuity test should indicate less than 1 ohm between the crystal filter case and the receiver circuit board ground plating. A bad ground connection may cause errors in gain measurements.

Step 1. Proper receiver alignment is essential for proper receiver gain measurement. Perform a complete receiver alignment as provided on the attached Alignment Procedure page of this section.

Step 2. Refer to the Receiver Functional Block Diagram, schematic diagram, and circuit board detail while performing this procedure.

Step 3. Attached and adjust an rf signal generator output frequency to the receive channel frequency. Adjust the rf signal generator output to provide the required receiver input voltage for a particular test point. Then, using an rf ac voltmeter, measure the rf signal voltage between the test point and a nearby chassis ground point. At every test point, the measured voltage should be within ±6 dB of the given value.

5. TROUBLESHOOTING TECHNIQUES

5.1 VISUAL INSPECTION

The first step in the troubleshooting procedure should be a thorough visual inspection of the receiver and, in particular, the receiver board. Corrosion, burned or damaged components are usually easily seen and may be the cause or a symptom of the receiver malfunction. An improperly installed receiver shield can cause a degradation in receiver performance.

After the "obvious" problems have been corrected, repeat the receiver functional tests. If the tests still produce unsatisfactory results, refer to the receiver troubleshooting chart attached to this section. The troubleshooting chart provides a systematic procedure for isolation of a defective stage and component.

5.2 ALIGNMENT AS A TROUBLESHOOTING TECHNIQUE

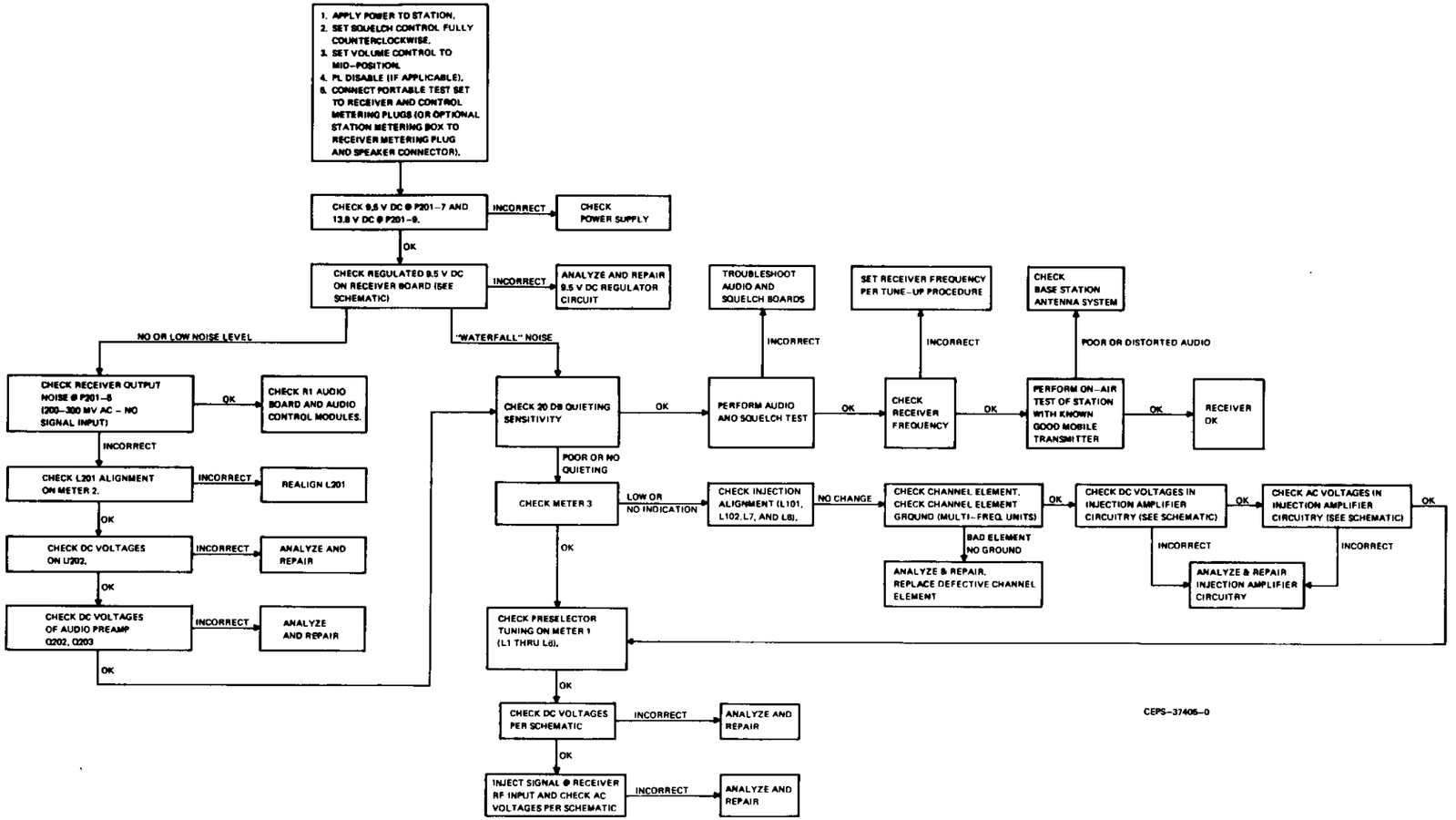
Low meter readings, and otherwise abnormal performance of the receiver are very often corrected by realignment. Therefore, alignment should be one of the first troubleshooting steps performed for these symptoms.

5.3 TROUBLESHOOTING INTEGRATED CIRCUITS

Integrated circuits (IC) are very reliable components and should not be replaced unless it is definitely indicated that the IC is the defective component. Before replacing an IC, make sure that the external components in the circuit are normal. The IC's on the receiver board may be checked by dc voltage measurements. Refer to schematic diagram for correct voltages.

5.4 TROUBLESHOOTING CRYSTALS

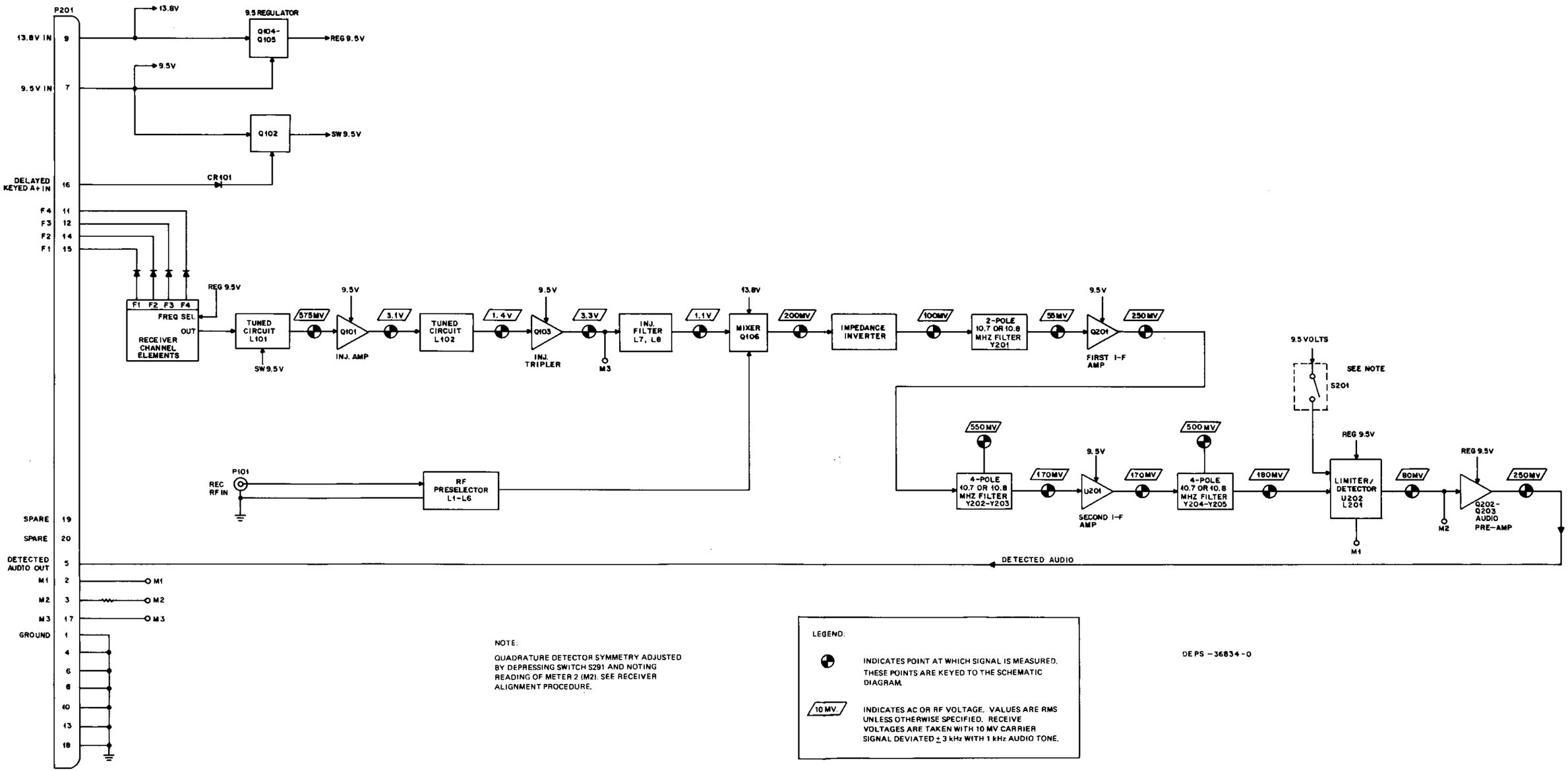
A defective filter crystal can best be found by performing an i-f gain check per the schematic diagram. A defective crystal will show an abnormally high insertion loss. If the crystal is found to be defective because of high insertion loss or an ungrounded case, it should be replaced.



Troubleshooting Chart
Motorola No. PEPS-37315-O
(Sheet 1 of 2)
8/19/83-PHI

UHF RECEIVER

MODEL TRE6160A, 70A SERIES



NOTE:

QUADRATURE DETECTOR SYMMETRY ADJUSTED BY DEPRESSING SWITCH S291 AND NOTING READING OF METER 2 (M2). SEE RECEIVER ALIGNMENT PROCEDURE.

LEGEND:

● INDICATES POINT AT WHICH SIGNAL IS MEASURED. THESE POINTS ARE KEYED TO THE SCHEMATIC DIAGRAM.

10 MV. INDICATES AC OR RF VOLTAGE. VALUES ARE RMS UNLESS OTHERWISE SPECIFIED. RECEIVE VOLTAGES ARE TAKEN WITH 10 MV CARRIER SIGNAL DEVIATED ± 3 kHz WITH 1 kHz AUDIO TONE.

DEPS-36834-O

Functional Block Diagram
Motorola No. PEPS-37315-O
(Sheet 2 of 2)
8/19/83-PHI

UHF RECEIVER ALIGNMENT

1. Receiver Frequency Calculations:
Where:

fo = Channel Element Frequency
fc = Carrier Frequency
finj = Injection Frequency

10.7 MHz Receivers	10.8 MHz Receivers
Finj = fc — 10.7 MHz	finj = fc — 10.8 MHz
fo = (fc — 10.7 MHz)/3	fo = (fc — 10.8 MHz)/3

2. For multi-channel stations:

FLO = Lowest receive channel frequency, and
FHI = Highest receive channel frequency.
For single channel stations: FLO = FHI.

3. Receiver Meter Reading:
When the receiver is properly aligned, meter deflections should fall within the following limits.

Switch Position	M1	M2	M3
Meter Reading (no signal)	12 uA (min.) 30 uA (max.)	20 uA (min.) 28 uA (max.)	10 uA (min.) —
Function Metered	Limiter/ Detector	Detector Alignment	Receiver Injection

4. The receiver alignment procedure should be performed using Model TRN5080A DC Metering Chassis, or Motorola TEK-5F (or modified TEK-5B through TEK-5E) Metering Panel, or Motorola S1056-1059 Portable Test Set (used with Motorola TEK-37A Test Set Adapter). Connect the metering cable to the receiver metering socket (J4 for RCVR1 or J6 for RCVR2) on the rear of the backplane interconnect board.

If using the dc metering chassis, put the FORWARD-REVERSE switch to the FORWARD position. If using the meter panel, put the FUNCTION switch to position C and the M1, 2 POLARITY switch to the NORMAL position. If using the portable test set, place the A/B switch in the A position and the FUNCTION SELECT switches to the RCVR and METER REVERSE positions.

NOTE

For stations with two receivers, align each receiver individually using this same procedure.

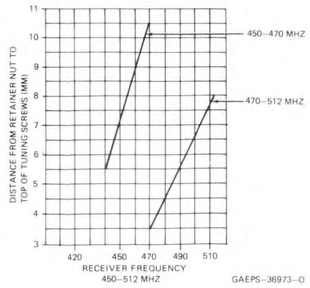


Figure 1. Preselector (L1 Thru L6) Cavity Preset Chart

Receiver Alignment Procedure

Step	Metering Cable Connection	Test Switch Position (Meter)	Freq.	Adjust	Procedure
1a	None	None	None	L1 thru L6	Set preselector tuning screws per Preselector Cavity Preset Chart (Fig. 1).
1b				L7, L8	Set injection filter tuning screws 15mm (9/16") above each retainer nut (Fig. 2).
1c				L101, L102	Set injection amplifier coil slugs flush with top of coil form. Then set each 16 turns down.
1d				L201	Set limiter-detector coil slug flush with top of coil form. Then set 3 turns down.
2	Receiver J4	M2	None	L201	Turn slug slowly clockwise (CW) for the first reading of 24 uA (no input signal required).
3	Receiver J4	M2	None	L201 & S201	Depress S201 with a non-metalic alignment tool and record M2 reading: M2 = _____. Release S201. Adjust L201 to obtain same M2 reading as recorded. Repeat Step 3 once.
4	Receiver J4	M3	FLO	L101, L102 & Channel Select	Peak L101, then Peak L102. Repeat Step 4 until no further M3 improvement (typically twice).
	If aligning 1-frequency receivers, or if channel separation is less than 1 MHz, skip to Step 9. Otherwise, continue on to Step 5.				
5	Receiver J4	M3	FLO & FHI	Channel Select and L101 & L102	Record M3 reading for FLO and FHI. FLO M3 = _____. FHI M3 = _____. Adjust either L101 or L102, or both, so as to obtain highest possible balanced M3 reading between FLO and FHI. Make low reading higher.
6	Receiver J4	M3	FHI	L7 and Channel Select	Adjust CW for Dip.
7	Receiver J4	M3	FHI	L8 and Channel Select	Adjust CW for Peak.
8	Receiver J4	M3	FHI	L8	Adjust slowly CW for a 2 uA decrease.
	Do **NOT** repeat Steps 6, or 7, or 8. Skip to Step 11.				
9	Receiver J4	M3	FHI	L7	Adjust CW for Dip.
10	Receiver J4	M3	FHI	L8	Adjust CW for Peak.
	Do **NOT** repeat Steps 9 and 10. Continue on to Step 11.				
11	Receiver J4	M1	FLO	RF Generator & L1 thru L6	Set rf generator to FLO ±100 Hz, without modulation, and adjust its output level for 35 uA. (If unable to obtain a reading between 30 and 40 uA initially, turn each tuning screw 1/2-turn CW. Repeat this adjustment until M1 Peaks between 30 and 40 uA.) Then, adjust (each) L1 thru L6 **once**, in that order, CW for Peak. While making each screw adjustment, re-adjust the rf generator output as necessary to maintain an output between 30 and 40 uA.
12a	—	—	FHI	L1 thru L6	For FHI = 400 to 460 MHz or 470 to 494 MHz; adjust L1 through L5 1/4-turn CCW, and adjust L6 1/2-turn CCW.
12b			FHI	L1 thru L6	For FHI = 460 to 470 MHz or 494 to 512 MHz; adjust L1 through L5 1/2-turn CCW, and adjust L6 1-turn CCW.
13	Receiver J4	M1	FLO	RF Generator & L1 thru L6	Set rf generator to FLO ±100 MHz, without modulation, and adjust its output level for 35 uA. Adjust (each) L1 thru L6 **once**, in that order, CW for Peak. While making each screw adjustment, re-adjust the rf generator output as necessary to maintain an output between 30 and 40 uA. Do **NOT** repeat this Step unless having FIRST repeated Steps 1a, 11, and 12.
14 Audio Zero Beat	Control J2	SPKR	ALL	RF Generator, Signal Source, & Channel Element	For each receiver frequency, set rf generator on frequency ±75 Hz, without modulation. Monitor speaker. Using a wire connected to a 1 mV, 10.7 MHz signal source (or 10.8 MHz for receivers with shifted i-f), "spray" signal near i-f circuitry (via L201 access hole). Simultaneously, warp channel element for an audio zero beat. Repeat Step 14 for all receive frequencies.
	This completes the alignment for all UHF receivers.				

UHF RECEIVER

MODEL TRE6160A, 70A SERIES

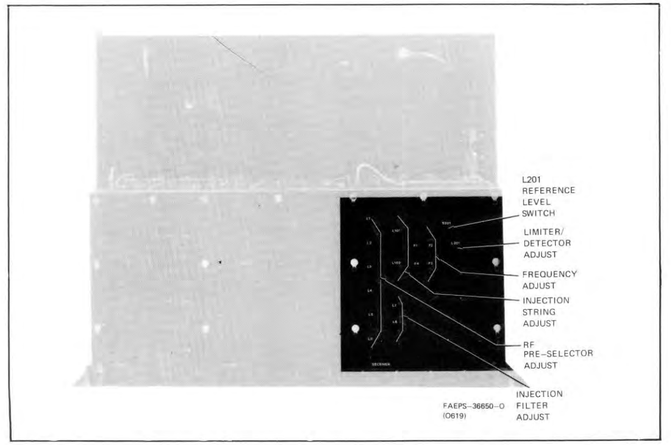


Figure 2. Receiver Alignment Adjustment Locations

UHF RECEIVER

Alignment Procedure
Motorola No. ***PEPS-37318-O***
8/19/83- PHI

UHF RECEIVER

MODEL TRE6160A, 70A SERIES

parts list

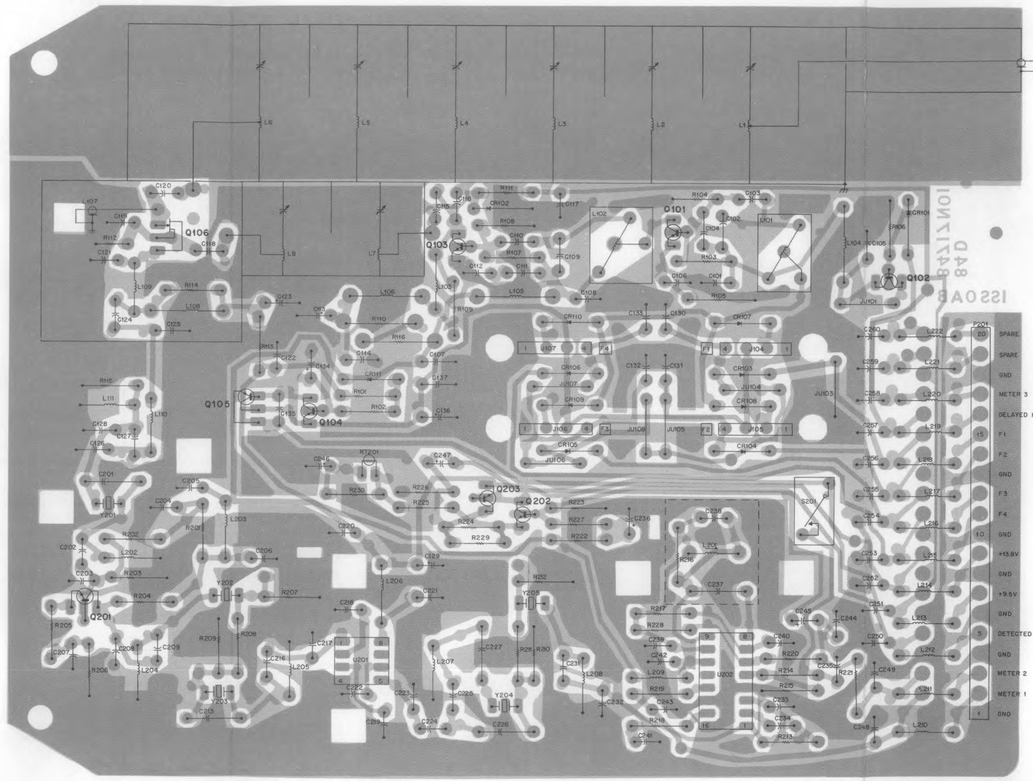
legend:
M = TRE6162A, 72A: 450-470 MHz
H = TRE6163A, 73A: 470-512 MHz

TRE6162A, 63A 10.7 MHz I-F Receiver
TRE6172A, 73A 10.8 MHz I-F, Receiver — PL-8445-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF ±5%; 50 V: unless otherwise stated
C101	21-11021H06	.033 uF + 80 – 20%
C102M	21-845014	3.9 ± 0.25; N750
C102H	21-82355B34	3.0 ± 0.25; N750
C103	21-11022G08	2 ± 0.25
C104	21-82610C23	6.8 ± 0.5
C105	21-11021H06	.033 uF + 80 – 20%
C106	21-11021E05	220 ± 10%
C107	21-11021E01	100 ± 10%
C108	21-11021E13	.001 uF ± 10%
C109M	21-82610C15	5; N750
C109H	21-845014	3.9 ± 0.25; N750
C110	21-83406D54	4 ± 0.25
C111	21-83406D65	5 ± 0.25
C112	21-11022G18	5.1 ± 0.5
C113	23-11019A16	4.7 uF ± 20%; 35 V
C114, 115	21-11021E13	.001 uF ± 10%
C116	21-82450B37	0.47 uF; 500 V
C117	21-11021E05	220 ± 10%
C118	21-11022G23	7 ± 0.5
C119	21-82372C10	.05 uF ± 20%
C120	21-11022G23	7 ± 0.5
C121	21-11022G35	16
C122	21-11022G37	20
C123	23-11019A40	47 uF ± 20%; 25 V
C124	21-11021E05	220 ± 10%
C125	21-11022G38	22
C126	21-83406D65	5 ± 0.25
C127	21-11022G27	9 ± 0.5
C128	21-11022G30	10 ± 0.5
C129	23-11019A46	100 uF ± 20%; 25 V
C130 thru 133	21-11021E05	220 ± 10%
C134	23-11019A46	100 uF ± 20%; 25 V
C135	21-11021H06	.033 uF + 80 – 20%
C136	23-11019A46	100 uF ± 20%; 25 V
C137	21-11021H06	.033 uF + 80 – 20%
C201	21-82450B07	0.39; 500 V
C202	21-11022G45	43
C203	21-11022G40	27
C204 thru 207	21-11021H06	.033 uF + 80 – 20%
C208	21-11022G44	39
C209	21-11022G41	30
C213	21-82450B44	0.82; 500 V
C216	21-11022G40	27
C217	21-11022G45	43
C218 thru 222	21-11021H06	.033 uF + 80 – 20%
C223	21-11014H42	51; 100 V
C224	21-11022G38	22
C225	21-11022G39	24
C226	21-82450B44	0.82; 500 V
C227	21-82450B17	22; 500 V
C231	21-11022G41	30
C232	21-11022G44	39
C233 thru 235	21-11021H06	.033 uF + 80 – 20%
C236	23-11019A27	22 uF ± 20%; 25 V
C237	21-82450B46	0.62; 500 V
C238	21-82358G12	100; 100 V; N080
C239, 240	21-11021H06	.033 uF + 80 – 20%
C241	21-11021E21	.0047 uF ± 10%
C242	21-11021H06	.033 uF + 80 – 20%
C243	21-11021E21	.0047 uF ± 10%
C244	21-11017B07	.0068 uF ± 10%
C245	23-11019A27	22 uF ± 20%; 25 V
C246	23-11019A46	100 uF ± 20%; 25 V
C247	23-11019A27	22 uF ± 20%; 25 V
C248 thru 260	21-11021E13	1000
		diode: (see note)
CR101	48-83654H01	silicon
CR102	48-82139G01	germanium
CR103 thru 110	48-83654H01	silicon
CR111	48-83654H02	silicon
		connector, plug:
JU104 thru 107	28-80096A01	male; 4-contact
		coil, rf:
L1 thru 8	1-80766D56	preselector, injection filters; 450-470 MHz (TRE6162A, 72A)
	or 1-80766D57	preselector, injection filters; 470-512 MHz (TRE6163A, 73A)
L101	24-80065A01	4-1/2 turns (RED)
L102	24-80065A05	4-1/2 turns (BLU)
L103	24-82723H28	choke; 0.29 uH
L104, 105	24-82549D42	choke; 10 uH
L106	24-82835G25	choke; 1.5 uH
L107	1-80775D46	1-3/4" short stub (450-470 MHz)
	or 1-80775D47	1-5/16" short stub (470-512 MHz)
L108	24-82835G41	choke; 5.6 uH
L109	24-82723H04	choke; 0.29 uH
L110	24-83397L11	choke; 30 uH
L111	24-83397L08	choke; 15 uH
L201	24-84419D04	23-1/2 turns
L202	24-83397L07	choke; 10 uH
L203	24-82723H03	choke; 23 uH
L204, 205	24-83397L07	choke; 10 uH
L206	24-82723H03	choke; 23 uH
L207	24-83397L08	choke; 15 uH
L208	24-83397L07	choke; 10 uH
L209	24-82723H03	choke; 23 uH
L210 thru 222	24-83961B01	choke; 3 turns (BRN)
		connector, receptacle:
P101	9-84135B02	female
P200, 201	9-83497F05	female; 10-contact
		transistor: (see note)
Q101	48-869932	NPN; type M9932
Q102	48-869643	PNP; type M9643
Q103	48-84411L09	NPN; type M1109
Q104	48-869642	NPN; type M9642
Q105	48-84411L10	PNP; type M1110
Q106	48-869839	FET; type M9839
Q201	48-869494	NPN; type M9494
Q202	48-869642	NPN; type M9642
Q203	48-869643	PNP; type M9643
		resistor, fixed: ±5%; 1/4 W: unless otherwise stated
R101, 102	6-11009A49	1k
R103	6-11009A57	2.2k
R104	6-11009A45	680
R105	6-11009A24	91
R106	6-11009A71	8.2k
R107	6-11009A73	10k
R108	6-11009A40	430
R109	6-11009A73	10k
R110	6-125A19	56; 1/2 W
R111	6-11009A77	15k
R112	6-11009A39	390
R113	6-11009A25	100
R114	6-11009A63	3.9k
R115	6-11009A81	22k
R116	6-125A19	56; 1/2 W
R201	6-11009A79	18k
R202	6-11009A49	1k
R203	6-11009A87	39k
R204	6-11009A37	330
R205	6-11009A11	27
R206	6-11009A54	1.6k
R207	6-11009A93	68k
R208	6-11009A35	270
R209, 210	6-11009A93	68k
R211	6-11009A35	270
R212	6-11009A93	68k
R213	6-11009A41	470
R214, 215	6-11009A89	47k
R216	6-11009A93	68k
R217	6-11009A65	4.7k
R218	6-11009A49	1k
R219	6-11009A91	56k
R220	6-11009A68	6.2k
R221	6-11009B06	220k
R222	6-11009A73	10k
R223	6-11009A91	56k
R224	6-11009A75	12k
R225	6-11009A53	1.5k
R226	6-11009A65	4.7k
R227	6-11009A71	8.2k
R228	6-11009A66	5.1k
R229	6-11009A80	20k
R230	6-11009A46	750
RT201	6-83600K02	**thermistor:** 1k @ 25° C
S201	40-82765M01	**switch:** spst
U201	51-83629M05	**integrated circuit: (see note)** second i-f amplifier
U202	51-83629M60	quad detector
Y201	48-84396K05	**crystal:** 10.7 MHz (TRE6162A, 63A)
	or 48-84396K07	10.8 MHz (TRE6172A, 73A)
Y202 thru 205	48-84396K02	10.7 MHz (TRE6162A, 63A)
	or 48-84396K06	10.8 MHz (TRE6172A, 73A)
		mechanical parts
	2-80045A02	NUT; M8 × 1.25; 6 used
	2-80045A03	NUT; M6 × 1mm; 2 used
	3-3375	SCREW, tapping; 6-20 × 5/16"; 18 used
	3-80012A03	SCREW, set
	3-80256A01	SCREW, set
	3-84256M01	SCREW, tapping
	5-10277A17	GROMMET, plastic
	5-84220B01	GROMMET, panel; 8 used
	15-84638N01	PLATE, bottom
	26-80062C01	SHIELD, IC
	26-80121A01	SHIELD, can; 5 used
	26-80144B03	SHIELD, mixer
	26-80196A01	SHIELD, coil; 2 used
	26-82871N01	SHIELD, quad
	26-83264F01	SHIELD, coil; L201
	26-84173N01	SHIELD, magnetic; L201
	26-83347N01	SHIELD, 2nd i-f
	26-84991N01	SHIELD
	45-83824N01	CARD, ejector; 2 used
	64-82174P01	PLATE, mixer cover
	75-05295B01	INSULATOR, xtal; 5 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Circuit Board Detail and Parts List
Motorola No. PEPS-37321-O
(Sheet 1 of 2)
8/19/83- PHI

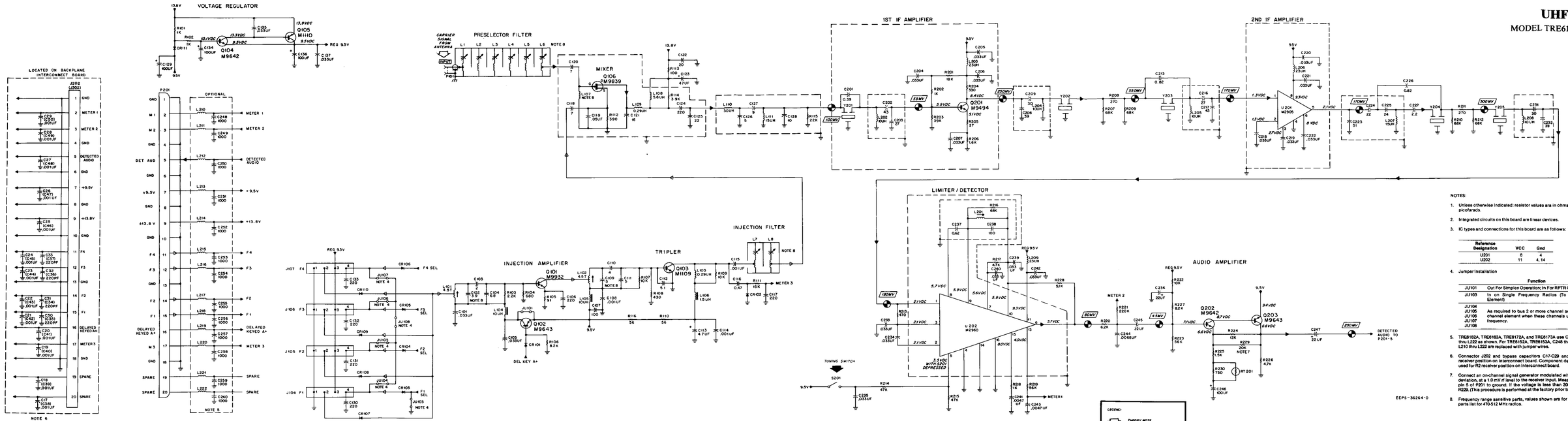


SHOWN FROM COMPONENT SIDE

SOLDER SIDE = 80-EEPS-36678-O
COMPONENT SIDE = 80-EEPS-36677-O
OL 80-EEPS-36676-O

UHF RECEIVER

MODEL TRE6160A, 70A SERIES



NOTES:

1. Unless otherwise indicated: resistor values are in ohms; capacitor values are in picofarads.
2. Integrated circuits on this board are linear devices.
3. IC types and connections for this board are as follows:

Reference Designation	VCC	Gnd
U201	8	4
U202	11	4, 14

4. Jumper Installation

	Function
JU101	Out For Simplex Operation; In For RPTR Operation
JU103	In on Single Frequency Radios (To Enable F1 Channel Element)
JU104	
JU105	As required to bus 2 or more channel select lines to a single
JU106	channel element when these channels use the same receiver
JU107	frequency.
JU108	

5. TRE8182A, TRE8163A, TRE8172A, and TRE8173A use C248 thru C260 and L210 thru L222 as shown. For TRE8152A, TRE8153A, C248 thru C260 are deleted and L210 thru L222 are replaced with jumper wires.
6. Connector J202 and bypass capacitors C17-C29 and C30-C33 used for R1 receiver position on interconnect board. Component designators shown in ( ) used for R2 receiver position on interconnect board.
7. Connect an on-channel signal generator modulated with a 1.0 kHz tone, 3 kHz deviation, at a 1.0 mV rf level to the receiver input. Measure the ac voltage from pin 5 of P201 to ground. If the voltage is less than 200 mV rms, then cut out R229. (This procedure is performed at the factory prior to shipment.)
8. Frequency range sensitive parts, values shown are for 450-470 MHz radio. See parts list for 470-512 MHz radios.

Kit	Description	Frequency Range
TRE8152A	Receiver 10.7 MHz I-F, Non-Filtered	450-470 MHz
TRE8162A	Receiver 10.7 MHz I-F, Filtered	
TRE8172A	Receiver 10.8 MHz I-F, Filtered	
TRE8153A	Receiver 10.7 MHz I-F, Non-Filtered	470-494 MHz
TRE8163A	Receiver 10.7 MHz I-F, Filtered	
TRE8173A	Receiver 10.8 MHz I-F, Filtered	
TLE5561A	Preamplifier (Optional)	450-512 MHz

Schematic Diagram
Motorola No. PEPS-37321-O
(Sheet 2 of 2)
8/19/83- PHI

UHF RECEIVER
MODEL SERIES TRE6260A, 70A

parts list

legend:
M = TRE6262A, 72A: 450-470 MHz
H = TRE6263A, 73A: 470-512 MHz
TRE6262A, 63A 10.7 MHz I-F, Receiver
TRE6272A, 73A 10.8 MHz I-F, Receiver PL-9668-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF ±5%; 50 V: unless otherwise stated
C101	21-11021H06	.033 uF +80+20%
C102M	21-845014	3.9 ±0.25; N750
C102H	21-82355B34	3.0 ±0.25; N750
C103	21-11022G08	2 ±0.25
C104	21-82610C23	6.8 ±0.5
C105	21-11021H06	.033 uF +80+20%
C106	21-11021E05	220 ±10%
C107	21-11021E01	100 ±10%
C108	21-11021E13	.001 uF ±10%
C109M	21-82610C15	5; N750
C109H	21-845014	3.9 ±0.25; N750
C110	21-83406D54	4 ±0.25
C111	21-83406D65	5 ±0.25
C112	21-11022G18	5.1 ±0.5
C113	23-11019A16	4.7 uF ±20%; 35 V
C114, 115	21-11021E13	.001 uF ±10%
C116	21-82450B37	0.47 uF; 500 V
C117	21-11021E05	220 ±10%
C118	21-11022G23	7 ±0.5
C119	21-82372C10	.05 uF ±20%
C120	21-11022G23	7 ±0.5
C121	21-11022G35	16
C122	21-11022G37	20
C123	23-11019A40	47 uF ±20%; 25 V
C124	21-11021E05	220 ±10%
C125	21-11022G38	22
C126	21-83406D65	5 ±0.25
C127	21-11022G27	9 ±0.5
C128	21-11022G30	10 ±0.5
C129	23-11019A46	100 uF ±20%; 25 V
C130 thru 133	21-11021E05	220 ±10%
C134	23-11019A46	100 uF ±20%; 25 V
C135	21-11021H06	.033 uF +80+20%
C136	23-11019A46	100 uF ±20%; 25 V
C137	21-11021H06	.033 uF +80-+20%
C201	21-82450B07	0.39; 500 V
C202	21-11022G45	43
C203	21-11022G40	27
C204 thru 207	21-11021H06	.033 uF +80+20%
C208	21-11022G44	39
C209	21-11022G41	30
C213	21-82450B44	0.82; 500 V
C216	21-11022G40	27
C217	21-11022G45	43
C218 thru 222	21-11021H06	.033 uF +80+20%
C223	21-11014H42	51; 100 V
C224	21-11022G38	22
C225	21-11022G39	24
C226	21-82450B44	0.82; 500 V
C227	21-82450B17	2.2; 500 V
C231	21-11022G41	30
C232	21-11022G44	39
C233 thru 235	21-11021H06	.033 uF +80+20%
C236	21-11022G17	4.7 uF ±0.25
C237	21-11022G25	8 uF ±0.5
C238	21-11022G31	11 uF ±5%
C239, 240	21-11021H06	.033 uF +80+20%
C241	21-11021H06	.033 uF ±5%
C242	21-11021H06	.033 uF +80+20%
C243	21-11021E21	.0047 uF ±10%
C244	8-11017A06	.0047 uF ±5%
C247	23-11019A27	22 uF ±20%; 25 V
C248 thru 260	21-11021E13	1000
		diode: (see note)
CR101	48-83654H01	silicon
CR102	48-82139G01	germanium
CR103 thru 110	48-83654H01	silicon
CR111	48-83654H02	silicon
		connector, plug:
JU104 thru 107	28-80096A01	male; 4-contact
		coil, rf:
L1 thru 8	1-80766D56	preselector, injection filters; 450-470 MHz (TRE6162A, 72A)
	or 1-80766D57	preselector, injection filters; 470-512 MHz (TRE6163A, 73A)
L101	24-80065A01	4-1/2 turns (RED)
L102	24-80065A05	4-1/2 turns (BLU)
L103	24-82723H28	choke; 0.29 uH
L104, 105	24-82549D42	choke; 10 uH
L106	24-82835G25	choke; 1.5 uH
L107	1-80775D46	1-3/4" short stub (450-470 MHz)
	or 1-80775D47	1-5/16" short stub (470-512 MHz)
L108	24-82835G41	choke; 5.6 uH
L109	24-82723H04	choke; 0.29 uH
L110	24-83397L11	choke; 30 uH
L111	24-83397L08	choke; 15 uH

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L202	24-83397L07	choke; 10 uH
L203	24-82723H03	choke; 23 uH
L204, 205	24-83397L07	choke; 10 uH
L206	24-82723H03	choke; 23 uH
L207	24-83397L08	choke; 15 uH
L208	24-83397L07	choke; 10 uH
L209	24-82723H03	choke; 23 uH
L210 thru 222	24-83961B01	choke; 3 turns (BRN)
L230	24-11047B58	choke; 24 uH
L231	24-83397L07	choke; 10 uH
		connector, receptacle:
F101	9-84135B02	female
P200, 201	9-83497F05	female; 10-contact
		transistor: (see note)
Q101	48-869932	NPN; type M9932
Q102	48-869643	PNP; type M9643
Q103	48-84411L09	NPN; type M1109
Q104	48-869642	NPN; type M9642
Q105	48-84411L10	PNP; type M1110
Q106	48-869839	FET; type M9839
Q201	48-869494	NPN; type M9494
Q202	48-869643	PNP; type M9643
		resistor, fixed: ±5%; 1/4 W: unless otherwise stated
R101, 102	6-11009A49	1k
R103	6-11009A57	2.2k
R104	6-11009A45	680
R105	6-11009A24	91
R106	6-11009A71	8.2k
R107	6-11009A73	10k
R108	6-11009A40	430
R109	6-11009A73	10k
R110	6-125A19	56; 1/2 W
R111	6-11009A77	15k
R112	6-11009A39	390
R113	6-11009A01	10
R114	6-11009A61	3.3k
R115	6-11009A81	22k
R116	6-125A19	56; 1/2 W
R201	6-11009A79	18k
R202	6-11009A49	1k
R203	6-11009A87	39k
R204	6-11009A37	330
R205	6-11009A11	27
R206	6-11009A54	1.6k
R207	6-11009A93	68k
R208	6-11009A35	270
R209, 210	6-11009A93	68k
R211	6-11009A35	270
R212	6-11009A93	68k
R213	6-11009A41	470
R214	6-11009A01	10k
R215	6-11009A61	15k
R216	6-11009A73	10k
R217	6-11009A65	4.7k
R218	6-11009A49	1k
R219	6-11009A94	75k
R220	6-11009A73	10k
R221	6-11009B02	150k
R222	6-11009A65	4.7k
		integrated circuit: (see note)
U201	51-83629M05	second i-f amplifier
U202	51-84561L84	quad detector
		crystal:
Y201	91-80011E04	10.7 MHz (TRE6262A, 63A)
	or 48-84396K07	10.8 MHz (TRE6272A, 73A)
Y202 thru 206	91-80011E05	10.7 MHz (TRE6262A, 63A)
	or 48-84396K06	10.8 MHz (TRE6272A, 73A)
		mechanical parts
	2-80045A02	NUT; M8 × 1.25; 6 used
	2-80045A03	NUT; M6 × 1mm; 2 used
	3-3375	SCREW, tapping: 6-20 × 5/16"; 18 used
	3-80012A03	SCREW, set
	3-80256A01	SCREW, set
	3-84256M01	SCREW, tapping
	5-84220B01	GROMMET, panel; 8 used
	15-84638N01	PLATE, bottom
	26-80062C01	SHIELD, IC
	26-80121A01	SHIELD, can; 5 used
	26-80144B03	SHIELD, mixer
	26-80196A01	SHIELD, coil; 2 used
	26-82871N01	SHIELD, quad
	26-83347N01	SHIELD, 2nd i-f
	26-84991N01	SHIELD
	45-83824N01	CARD, ejector; 2 used
	64-82174P01	PLATE, mixer cover
	75-05295B01	INSULATOR, xtal; 6 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Circuit Board Detail and Parts List
*Motorola No. **PEPS-41729-O***
(Sheet 1 of 2)
4/29/85-PHI

UHF RECEIVER

MODEL TRE6160A, 70A SERIES

parts list

legend:
M = TRE6162A, 72A: 450-470 MHz
H = TRE6163A, 73A: 470-512 MHz
TRE6162A, 63A 10.7 MHz I-F, Receiver
TRE6172A, 73A 10.8 MHz I-F, Receiver PL-8445-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF ±5%; 50 V: unless otherwise stated
C101	21-11021H06	.033 uF +80+20%
C102M	21-845014	3.9 ±0.25; N750
C102H	21-82355B34	3.0 ±0.25; N750
C103	21-11022G08	2 ±0.25
C104	21-82610C23	6.8 ±0.5
C105	21-11021H06	.033 uF +80+20%
C106	21-11021E05	220 ±10%
C107	21-11021E01	100 ±10%
C108	21-11021E13	.001 uF ±10%
C109M	21-82610C15	5; N750
C109H	21-845014	3.9 ±0.25; N750
C110	21-83406D54	4 ±0.25
C111	21-83406D65	5 ±0.25
C112	21-11022G18	5.1 ±0.5
C113	23-11019A16	4.7 uF ±20%; 35 V
C114, 115	21-11021E13	.001 uF ±10%
C116	21-82450B37	0.47 uF; 500 V
C117	21-11021E05	220 ±10%
C118	21-11022G23	7 ±0.5
C119	21-82372C10	.05 uF ±20%
C120	21-11022G23	7 ±0.5
C121	21-11022G35	16
C122	21-11022G37	20
C123	23-11019A40	47 uF ±20%; 25 V
C124	21-11021E05	220 ±10%
C125	21-11022G38	22
C126	21-83406D65	5 ±0.25
C127	21-11022G27	9 ±0.5
C128	21-11022G30	10 ±0.5
C129	23-11019A46	100 uF ±20%; 25 V
C130 thru 133	21-11021E05	220 ±10%
C134	23-11019A46	100 uF ±20%; 25 V
C135	21-11021H06	.033 uF +80+20%
C136	23-11019A46	100 uF ±20%; 25 V
C137	21-11021H06	.033 uF +80-+20%
C201	21-82450B07	0.39; 500 V
C202	21-11022G45	43
C203	21-11022G40	27
C204 thru 207	21-11021H06	.033 uF +80+20%
C208	21-11022G44	39
C209	21-11022G41	30
C213	21-82450B44	0.82; 500 V
C216	21-11022G40	27
C217	21-11022G45	43
C218 thru 222	21-11021H06	.033 uF +80+20%
C223	21-11014H42	51; 100 V
C224	21-11022G38	22
C225	21-11022G39	24
C226	21-82450B44	0.82; 500 V
C227	21-82450B17	22; 500 V
C231	21-11022G41	30
C232	21-11022G44	39
C233 thru 235	21-11021H06	.033 uF +80+20%
C236	23-11019A27	22 uF ±20%; 25 V
C237	21-82450B46	0.62; 500 V
C238	21-82358G12	100; 100 V; N080
C239, 240	21-11021H06	.033 uF +80+20%
C241	21-11021E21	.0047 uF ±10%
C242	21-11021H06	.033 uF +80+20%
C243	21-11021E21	.0047 uF ±10%
C244	21-11017B07	.0068 uF ±10%
C245	23-11019A27	22 uF ±20%; 25 V
C246	23-11019A46	100 uF ±20%; 25 V
C247	23-11019A27	22 uF ±20%; 25 V
C248 thru 260	21-11021E13	1000
		diode: (see note)
CR101	48-83654H01	silicon
CR102	48-82139G01	germanium
CR103 thru 110	48-83654H01	silicon
CR111	48-83654H02	silicon
		connector, plug:
J104 thru 107	28-80096A01	male; 4-contact
		coil, rf:
L1 thru 8	1-80766D56	preselector, injection filters; 450-470 MHz (TRE6162A, 72A)
	or 1-80766D57	preselector, injection filters; 470-512 MHz (TRE6163A, 73A)
L101	24-80065A01	4-1/2 turns (RED)
L102	24-80065A05	4-1/2 turns (BLU)
L103	24-82723H28	choke; 0.29 uH
L104, 105	24-82549D42	choke; 10 uH
L106	24-82835G25	choke; 1.5 uH
L107	1-80775D46	1-3/4" short stub (450-470 MHz)
	or 1-80775D47	1-5/16" short stub (470-512 MHz)
L108	24-82835G41	choke; 5.6 uH
L109	24-82723H04	choke; 0.29 uH
L110	24-83397L11	choke; 30 uH
L111	24-83397L08	choke; 15 uH
L201	24-84419D04	23-1/2 turns
L202	24-83397L07	choke; 10 uH
L203	24-82723H03	choke; 23 uH
L204, 205	24-83397L07	choke; 10 uH
L206	24-82723H03	choke; 23 uH
L207	24-83397L08	choke; 15 uH
L208	24-83397L07	choke; 10 uH
L209	24-82723H03	choke; 23 uH
L210 thru 222	24-83961B01	choke; 3 turns (BRN)
		connector, receptacle:
P101	9-84135B02	female
P200, 201	9-83497F05	female; 10-contact
		transistor: (see note)
Q101	48-869932	NPN; type M9932
Q102	48-869643	PNP; type M9643
Q103	48-84411L09	NPN; type M1109
Q104	48-869642	NPN; type M9642
Q105	48-84411L10	PNP; type M1110
Q106	48-869839	FET; type M9839
Q201	48-869494	NPN; type M9494
Q202	48-869642	NPN; type M9642
Q203	48-869643	PNP; type M9643
		resistor, fixed: ±5%; 1/4 W: unless otherwise stated
R101, 102	6-11009A49	1k
R103	6-11009A57	2.2k
R104	6-11009A45	680
R105	6-11009A24	91
R106	6-11009A71	8.2k
R107	6-11009A73	10k
R108	6-11009A40	430
R109	6-11009A73	10k
R110	6-125A19	56; 1/2 W
R111	6-11009A77	15k
R112	6-11009A39	390
R113	6-11009A25	100
R114	6-11009A63	3.9k
R115	6-11009A81	22k
R116	6-125A19	56; 1/2 W
R201	6-11009A79	18k
R202	6-11009A49	1k
R203	6-11009A87	39k
R204	6-11009A37	330
R205	6-11009A11	27
R206	6-11009A54	1.6k
R207	6-11009A93	68k
R208	6-11009A35	270
R209, 210	6-11009A93	68k
R211	6-11009A35	270
R212	6-11009A93	68k
R213	6-11009A41	470
R214, 215	6-11009A89	47k
R216	6-11009A93	68k
R217	6-11009A65	4.7k
R218	6-11009A49	1k
R219	6-11009A91	56k
	or 6-11009A94	75k (used when U202 is 51-84561L84)
R220	6-11009A68	6.2k
R221	6-11009B06	220k
R222	6-11009A73	10k
R223	6-11009A91	56k
R224	6-11009A75	12k
R225	6-11009A53	1.5k
	or 6-11009A51	1.2k (used when U202 is 51-84561L84)
R226	6-11009A65	4.7k
R227	6-11009A71	8.2k
R228	6-11009A66	5.1k (not used when U202 is 51-84561L84)
R229	6-11009A80	20k
R230	6-11009A46	750
		thermistor:
RT201	6-83600K02	1k @ 25°C
		switch:
S201	40-82765M01	spst
		integrated circuit: (see note)
U201	51-83629M05	second i-f amplifier
U202	51-83629M60	quad detector
	or 51-84561L84	
		crystal:
Y201	91-80011E04	10.7 MHz (TRE6162A, 63A)
	or 48-84396K07	10.8 MHz (TRE6172A, 73A)
Y202 thru 205	91-80011E05	10.7 MHz (TRE6162A, 63A)
	or 48-84396K06	10.8 MHz (TRE6172A, 73A)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		mechanical parts
	2-80045A02	NUT; M8 × 1.25; 6 used
	2-80045A03	NUT; M6 × 1mm; 2 used
	3-3375	SCREW, tapping: 6-20 × 5/16"; 4 used
	3-3398	SCREW, tapping: 6-20 x 3/18"; 18 used
	3-80012A03	SCREW, set
	3-80256A01	SCREW, set
	3-84256M01	SCREW, tapping
	5-10277A17	GROMMET, plastic
	5-84220B01	GROMMET, panel; 8 used
	15-84638N01	PLATE, bottom
	26-80062C01	SHIELD, IC
	26-80121A01	SHIELD, can; 5 used
	26-80144B03	SHIELD, mixer
	26-80196A01	SHIELD, coil; 2 used
	26-82871N01	SHIELD, quad
	26-83264F01	SHIELD, coil; L201
	26-84173N01	SHIELD, magnetic; L201
	26-83347N01	SHIELD, 2nd i-f
	26-84991N01	SHIELD
	45-83824N01	CARD, ejector; 2 used
	64-82174P01	PLATE, mixer cover
	75-05295B01	INSULATOR, xtal; 5 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Circuit Board Detail and Parts List
Motorola No. ***PEPS-37321-B***
(Sheet 1 of 2)
11/15/85-PHI