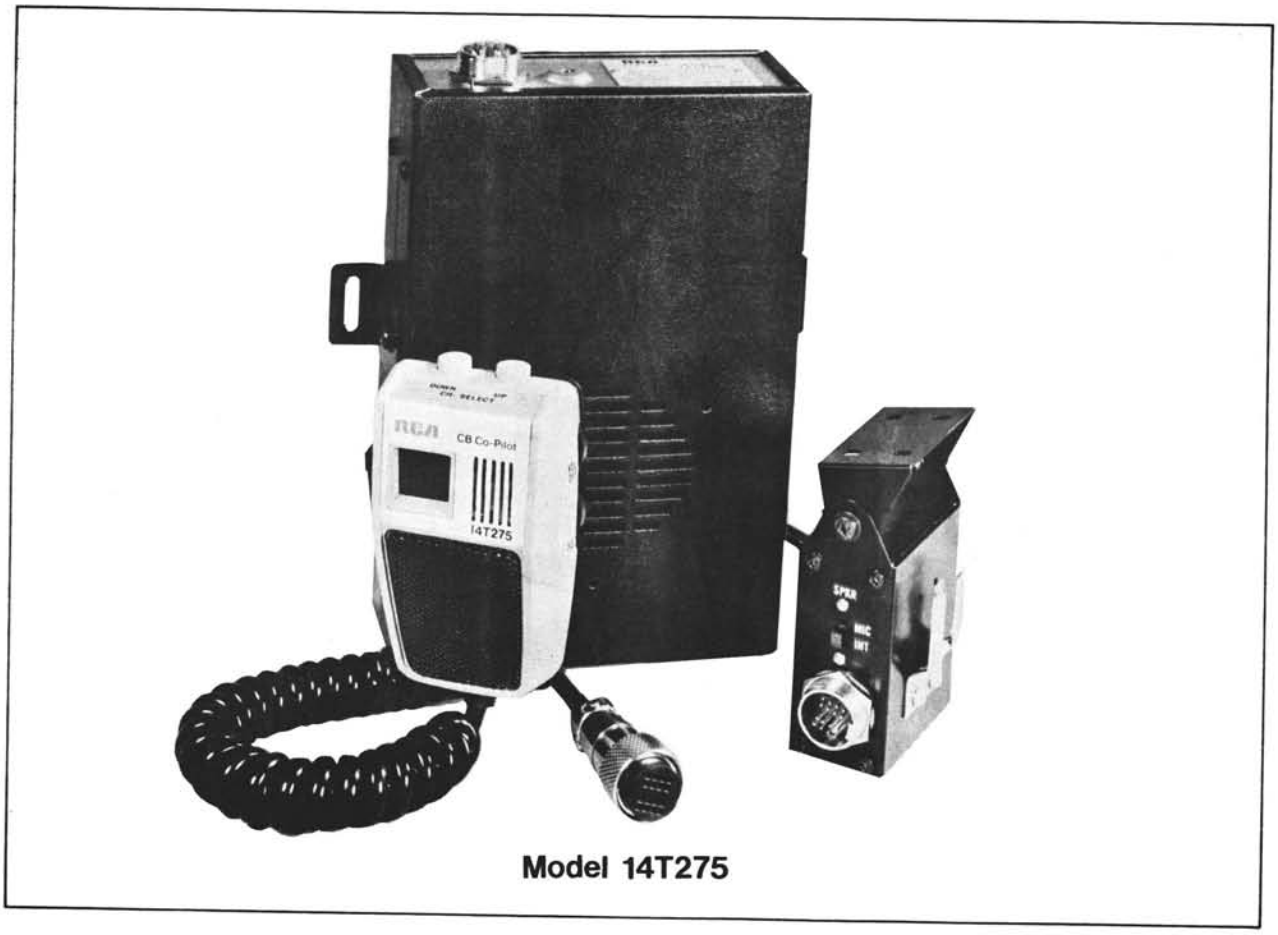
RCA

Service Manual

RCA Model 14T275
Concealed Chassis CB



Model 14T275

40-Channel
Concealed Chassis
Citizens Band Transceiver

RCA CB Co-Pilot

RCA Model 14T275 Concealed Chassis CB

Typical Specifications

GENERAL

Operating Frequency Range ..... 26.965 to 27.405 MHz
Channel Coverage ..... Ch. 1 to Ch. 40 incl.
Frequency Control ..... Crystal-controlled phase-lock loop
Operating Temperature Range .... −30 to 50°C. (−22 to 112°F)
Power Requirements (Automotive-type electrical system):
Voltage ..... 10-15 Vdc
Current (Typical Average)..... 0.7A (Rec); 1.2A (Xmtr)

TRANSMITTER SECTION

Emission Classification (FCC) 6A3
Power Output 4W
Maximum Modulation (FCC Limit) 100%
Harmonic & Spurious Suppression ..... 60 dB min.
Output Impedance (Antenna Load) ..... 50 Ohms

RECEIVER SECTION

Sensitivity (10 dB s/n) ..... 0.7 μV
Adjacent Channel Rejection ..... 40 dB min.
Image Rejection (First IF frequency) ..... 60 dB min.
Spurious Rejection ..... 40 dB min.
Intermediate Frequencies ..... 10.695 MHz; 455 kHz
Squelch Sensitivity (Adjustable) ..... 1.5 μV to 100 μV
Audio Power Output (Less than 10% THD) ..... 3W min.

NOTE: The Model 14T275 meets all applicable requirements for Class D Citizens Band Radio under Part 95 of the Federal Communications Commission Rules and Regulations in effect as of the date of unit manufacture.

Important Notice

Under law, the transmitter portion of the transceiver described in this manual may be serviced by (or only under the direct-supervision of) a technician having a First Class or a Second Class FCC Radiotelephone License.

Servicing includes internal adjustments or replacement of crystals, transistors and any other components which affect transmitter performance.

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Description

GENERAL

The model 14T275 is a solid-state, precision-engineered CB transceiver for two-way radio communication on all 40 channels of the Class D Citizens Band. It uses a special, detachable, hand-held unit that contains all operating controls, a dynamic microphone and speaker.

The Model 14T275 operates in any vehicle equipped with an automotive-type 12-volt, positive- or negative-ground electrical system. There are three major assemblies: the mic./speaker/control unit, a switch box that doubles as a mic. bracket and the main chassis. A 6.5 foot (2m) cable (included) interconnects the switch box with the main chassis.

The chassis is packaged for mounting in a concealed location such as beneath the instrument panel on the cowl or under the front seat in automobiles, trucks, recreational vehicles and the like. Equipped with an optional extension cable (Model 14T818, 13 ft. or 3.9m length), the chassis unit can be mounted in the trunk or under the rear seat of most automobiles. The out-of-sight chassis mount and the easily concealed, detachable mic./speaker/control unit minimizes theft risk and allows installation in vehicles with insufficient space for an underdash CB set.

CAUTION: Closed car-trunk temperatures in some regions of the country exceed maximum operating temperatures for the chassis. In such cases, we recommend that the chassis be located beneath the front seat instead of in the trunk.

The transceiver uses electronic channel selection, digital channel indication and separate elements for microphone and speakers. A chassis-mounted speaker, activated with a switch on the mic. bracket, provides improved sound quality in some situations. The chassis includes a jack for connection of an external speaker.

CIRCUIT DESCRIPTION

Phase-Lock Loop Circuitry

The Model 14T275 uses a phase-lock loop (PLL) system of frequency synthesis to generate highly precise carrier and local-oscillator signals for the transmitter and receiver sections of the transceiver.

The PLL employs a free-running, voltage-controlled oscillator (VCO, part of IC-2, Location 5B in Fig. 1), a phase detector, a crystal-controlled reference oscillator (Loc. 8D in Fig. 1) and a programmable frequency divider IC1. (Loc. 2-6D Fig. 1)

The VCO operates at a frequency of 17.18 to 17.62 MHz, depending on channel selector setting, and produces two outputs: one at 37.66 to 38.1 MHz and another at 2.86 to 3.3 MHz. The crystal controlled reference oscillator (Loc. 8D in Fig. 1) operates at 10.24 MHz and feeds a bandpass filter/doubler (BPF/DBLR Loc. 7C in Fig. 1). The 20.48 MHz output of the BPF/DBLR beats with the 17.18-17.62 MHz VCO signal to produce a 37.66-38.1 MHz result. This signal feeds two loads: the receiver first mixer and the transmitter oscillator/mixer/buffer stage (IC3, Loc. 7B in Fig. 1). The second mixer output signal, at 2.86-3.3 MHz, feeds the programmable divider in IC1, (Loc. 3D in Fig. 1).

Simultaneously, the 10.24 MHz output of the reference oscillator through a buffer amplifier (Loc. 7D in Fig. 1) goes to the 1/1024 divider in IC1. This produces a highly precise 10 kHz signal for VCO control via the phase detector (Loc. 4D in Fig. 1). The programmable divider (Loc. 3D, Fig. 1) divides the 2.86 to 3.3 MHz signal in 10 kHz steps, according to the program developed in the channel selector circuit to arrive at a signal in the 10 kHz region, harmonically related to the VCO frequency.

The phase detector develops a d-c voltage in proportion to the phase difference between the two 10 kHz signals. This alters the frequency of the VCO until the divided down signal matches the divided down reference oscillator signal. Once the VCO arrives at the proper frequency, it locks to the reference oscillator. Thus, at Ch. 20, the VCO operates at 17.42 MHz (17.42 + 20.48 – 10.695 MHz) for a carrier frequency of 27.205 MHz. See chart of Fig. 2 for the VCO, carrier and receiver local oscillator frequency for all 40 channels.

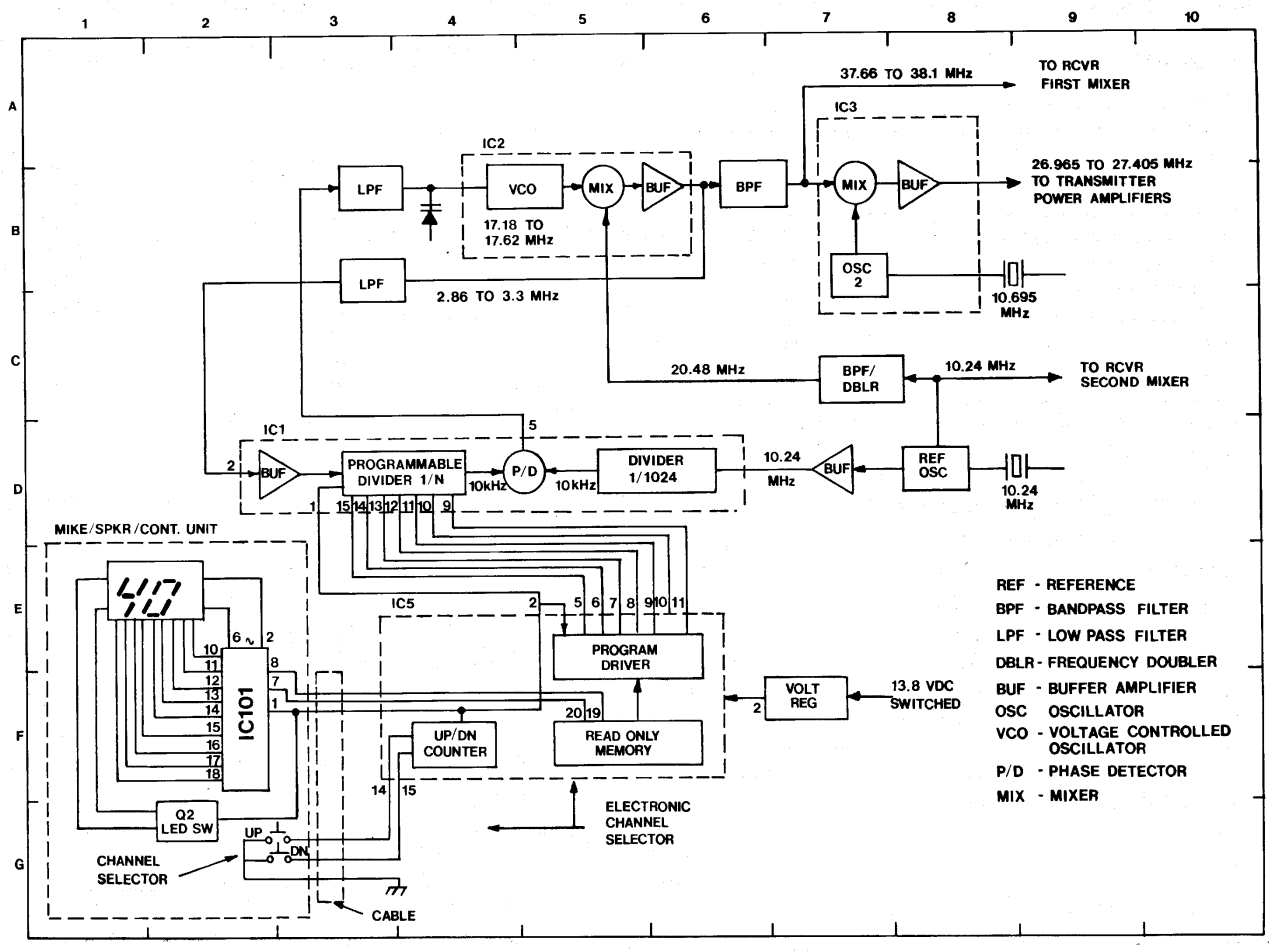


Figure 1. Block Diagram, Phase Locked Loop (PLL) and Electronic Channel Selector

ELECTRONIC CHANNEL SELECTOR

Since the operating controls are in the mic./speaker unit, the 14T275 uses a system of pushbutton electronic channel selection instead of the familiar rotary channel selection switch. Referring to Fig. 1, actual channel selection is the function of chip IC5 (Loc. 4 & 5E, Fig. 1). This chip includes three sub-functions: one, a read-only memory (ROM); two, a program driver, and three, an up/down counter. A driver for the LED channel number indicator is part of the hand-held control unit (IC101 in the control unit).

The ROM is programmed with the digital "N" codes (see chart of Fig. 2). When either the "UP" or "DN" pushbutton switches are closed, the UP/DN counter shifts operating channel at a one-per-second rate. If the pushbutton switch (either "UP" or "DOWN") is still closed after the one channel shift, the rate increases to about six channels per second. As the channel change takes place, the LED driver switches the sections of the display accordingly. When the pushbutton switch opens, the counter operation ceases. At this point, the proper "N" code goes to the programmable divider in IC1. The PLL then goes to work in adjusting VCO frequency to the needs of the system.

While a channel change takes place, both the receiver and the transmitter become inoperative. In the receiver, the bias in the 455 kHz IF amplifier (Q11, Q12) is lifted; removing the bias from the DC switch (Q22) renders the transmitter temporarily inoperative.

TRANSMITTER RF SYSTEM

Carrier frequency generation starts with a crystal controlled oscillator (in IC3, see Fig. 3) operating at 10.695 MHz. This signal, beat against the PLL generated 37 MHz signal in the mixer section of IC3, generates a 27 MHz carrier. This carrier signal goes through a buffer stage in the chip before going on to the first carrier amplifier (Q3) in the transmitter amplifier chain. This amplifier increases the power level slightly and isolates the modulated amplifiers that follow from the mixer stage. Through a shift in bias, this stage also serves as the on/off control of the transmitter. Transistors Q4 and Q5 are modulated amplifiers that raise carrier to the 4-watt output level. A low pass filter, in the output circuit attenuates out-of-band signals and matches antenna impedance to that of the final amplifier.

AUDIO AND MODULATOR SYSTEM

A preamplifier, built into the mic./speaker unit, raises the level of mike audio to offset the attenuation of the cable to the main chassis. In the main chassis, IC4 prepares the audio for modulating the collector power of the two modulated amplifiers in the RF chain (Q4 and Q5). An ALC circuit (Q14, 15) controls audio gain to prevent overmodulation.

RECEIVER SYSTEM

The receiver is a double conversion system with a grounded base RF amplifier and a two-stage 455 kHz IF amplifier. The first mixer (Q9) beats incoming RF against the 37 MHz signal generated in the PLL. This produces a 10.695 MHz result which feeds the second mixer (Q10). The second mixer beats the 10.695 MHz signal against that of the reference oscillator (Q1) operating at 10.24 MHz. This results in a 455 kHz intermediate frequency. Cascaded, grounded emitter amplifiers (Q11, Q12) amplify the 455 kHz signal for the detector circuit. A three-pole ceramic filter (CF1), in the input circuit of the first 455 Khz IF amplifier (Q11) achieves amplifier selectivity.

A 1N60 diode (D9), demodulates the IF signal. The resulting audio goes through the volume control to the audio amplifier chip (IC4) and then to either the speaker in the mike/speaker unit or the chassis-mounted speaker, as determined by the position of a slide switch in the mike connector box.

Audio amplifier squelch voltage is developed in the Q13 circuit. At low or no signal RF levels, Q13 conducts heavily which, in turn, blocks the audio amplifier (IC4). As incoming RF level increases, Q13 unsaturates and opens the audio amplifier. The adjustment of the squelch control determines the signal level required to open the audio amplifier.

The receiver includes no Noise Blanker, PA or Delta-Tune features.

CH. NO.	CHAN. FREQ. MHz	"N" CODE	VCO FREQ.	SELECTOR SWITCH OUTPUT A	B	C	D	A	B	C	RECR. LOC. OSC.
1	26.965	330	17.18	0	1	0	1	0	0	1	37.66
2	26.975	329	17.19	1	0	0	1	0	0	1	37.67
3	26.985	328	17.20	0	0	0	1	0	0	1	37.68
4	27.005	326	17.22	0	1	1	0	0	0	1	37.70
5	27.015	325	17.23	1	0	1	0	0	0	1	37.71
6	27.025	324	17.24	0	0	1	0	0	0	1	37.72
7	27.035	323	17.25	1	1	0	0	0	0	1	37.73
8	27.055	321	17.27	1	0	0	0	0	0	1	37.75
9	27.065	320	17.28	0	0	0	0	0	0	1	37.76
10	27.075	319	17.29	1	1	1	1	1	1	0	37.77
11	27.085	318	17.30	0	1	1	1	1	1	0	37.78
12	27.105	316	17.32	0	0	1	1	1	1	0	37.80
13	27.115	315	17.33	1	1	0	1	1	1	0	37.81
14	27.125	314	17.34	0	1	0	1	1	1	0	37.82
15	27.135	313	17.35	1	0	0	1	1	1	0	37.83
16	27.155	311	17.37	1	1	1	0	1	1	0	37.85
17	27.165	310	17.38	0	1	1	0	1	1	0	37.86
18	27.175	309	17.39	1	0	1	0	1	1	0	37.87
19	27.185	308	17.40	0	0	1	0	1	1	0	37.88
20	27.205	306	17.42	0	1	0	0	1	1	0	37.90
21	27.215	305	17.43	1	0	0	0	1	1	0	37.91
22	27.225	304	17.44	0	0	0	0	1	1	0	37.92
23	27.255	301	17.47	1	0	1	1	0	1	0	37.95
24	27.235	303	17.45	1	1	1	1	0	1	0	37.93
25	27.245	302	17.46	0	1	1	1	0	1	0	37.94
26	27.265	300	17.48	0	0	1	1	0	1	0	37.96
27	27.275	299	17.49	1	1	0	1	0	1	0	37.97
28	27.285	298	17.50	0	1	0	1	0	1	0	37.98
29	27.295	297	17.51	1	0	0	1	0	1	0	37.99
30	27.305	296	17.52	0	0	0	1	0	1	0	38.00
31	27.315	295	17.53	1	1	1	0	0	1	0	38.01
32	27.325	294	17.54	0	1	1	0	0	1	0	38.02
33	27.335	293	17.55	1	0	1	0	0	1	0	38.03
34	27.345	292	17.56	0	0	1	0	0	1	0	38.04
35	27.355	291	17.57	1	1	0	0	0	1	0	38.05
36	27.365	290	17.58	0	1	0	0	0	1	0	38.06
37	27.375	289	17.59	1	0	0	0	0	1	0	38.07
38	27.385	288	17.60	0	0	0	0	0	1	0	38.08
39	27.395	287	17.61	1	1	1	1	1	0	0	38.09
40	27.405	286	17.62	0	1	1	1	1	0	0	38.10

Figure 2. Channel Number vs. Frequency, "N" Code, VCO and Receiver Local Oscillator Frequency

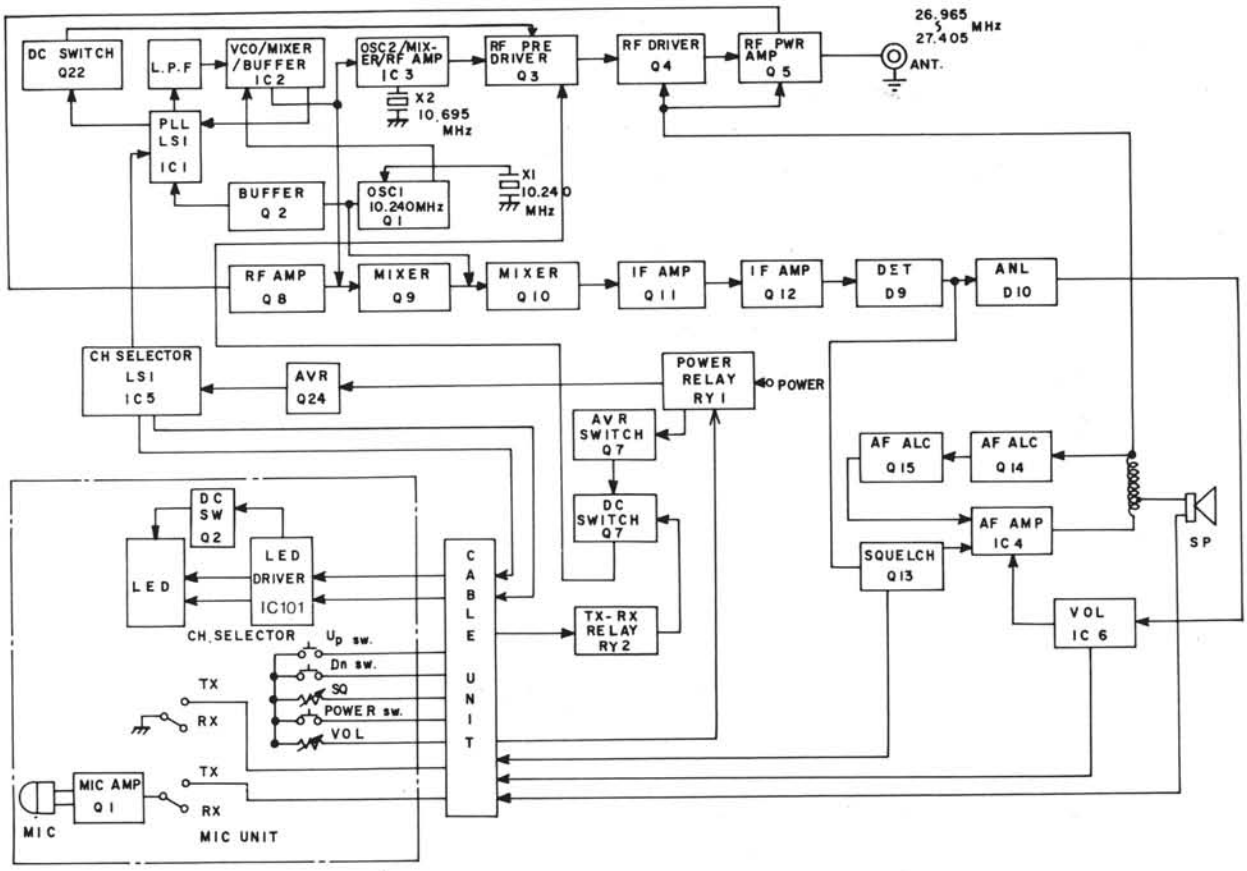


Figure 3. Overall Block Diagram, 14T275 CB Transceiver

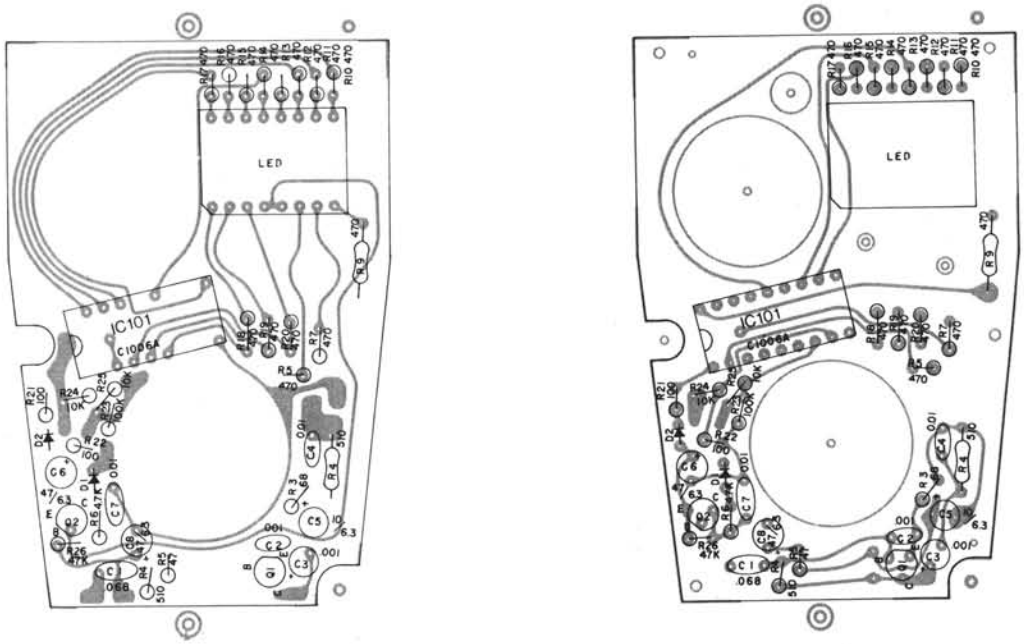


Figure 4. Mic/Speaker/Control Board (Foil on Both Sides)

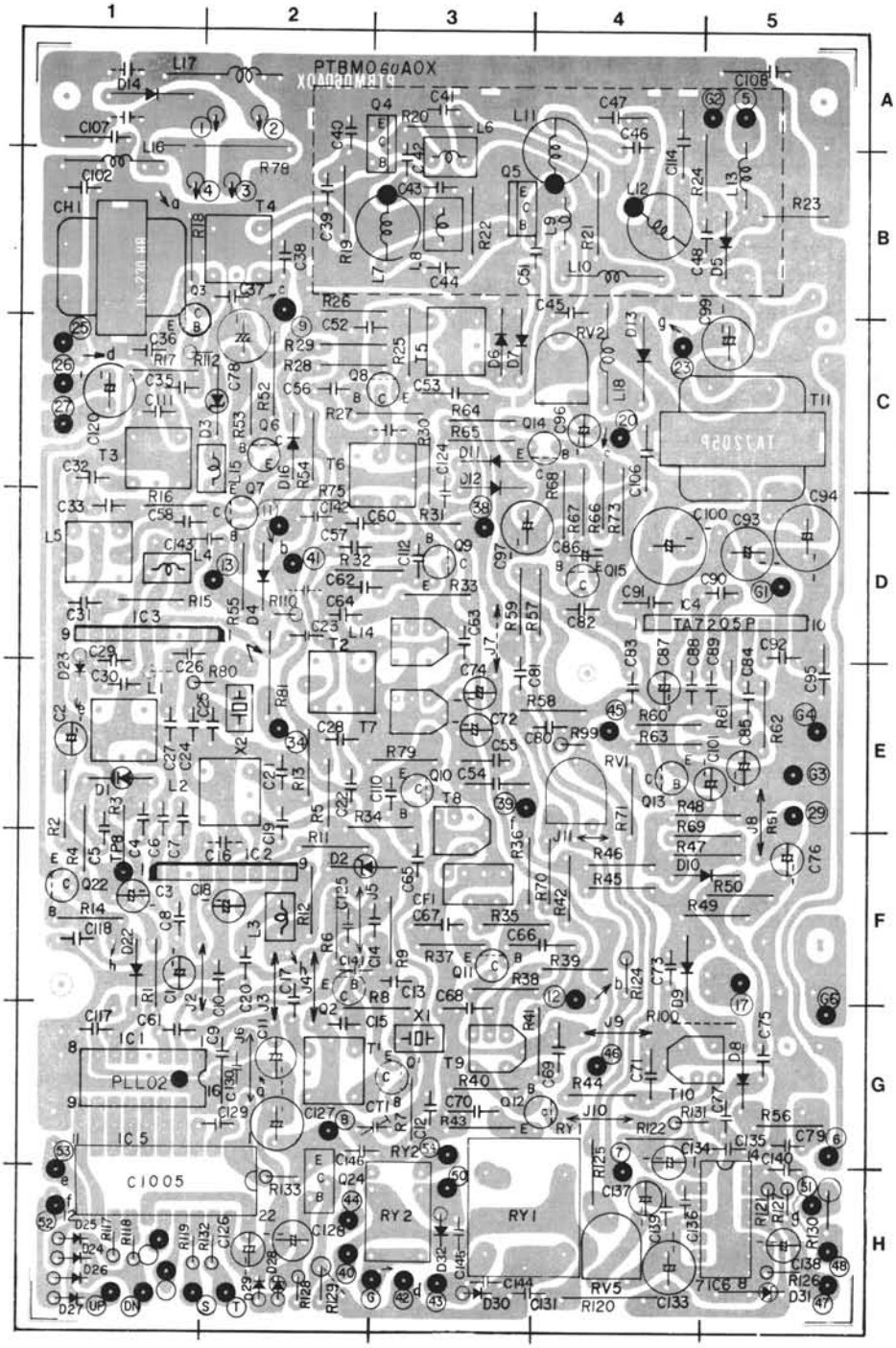


Figure 5. Main Board, Component Side

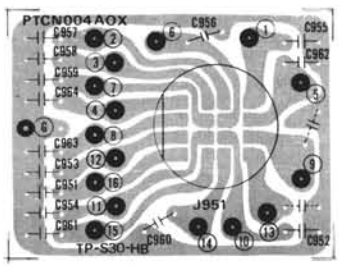


Figure 6. Connector Board, Component Side

MAIN BOARD
COMPONENT LOCATIONS

C

C1	1F
C2	1E
C3	1F
C4	1F
C5	1F
C6	1F
C7	1F
C8	1F
C9	2G
C10	2F
C11	2G
C12	3G
C13	3F
C14	3F
C15	2G
C16	2F
C17	2F
C18	2F
C19	2F
C20	2F
C21	2E
C22	2E
C23	2D
C24	1E
C25	2E
C26	1E
C27	1E
C28	2E
C29	1E
C30	1E
C31	1D
C32	1C
C33	1D
C35	1C
C36	1C
C37	2B
C38	2B
C39	2B
C40	2A
C41	3A
C42	3B
C43	3B
C44	3B
C45	4B
C46	4A
C47	4A
C48	5B
C49	5B
C50	5B
C51	3B
C52	2C
C53	3C
C54	3E
C55	3E
C56	2C
C57	2D
C58	1D
C60	2D
C61	1G
C62	2D
C63	3D
C64	2D
C65	3F
C66	4F
C67	3F
C68	3G
C69	4G
C70	3G
C71	4G
C72	3E
C73	4F
C74	3E
C75	5G
C76	5F
C77	5G
C78	2C
C79	5G
C80	4E
C81	3E
C82	4D
C83	4E
C84	5E
C85	5E
C86	4E
C87	4E
C88	4E
C89	5E
C90	5D
C91	4D
C92	5D
C93	5D
C94	5D
C95	5E
C96	4C
C97	3D
C99	5C
C100	4D
C101	5E
C102	1B
C106	4C
C107	5A
C108	5A
C110	3E
C111	1C
C112	3D
C114	4B
C117	1G
C118	1F
C120	1C
C124	3C
C125	2F
C126	2H
C127	2G
C128	2H
C129	2G
C131	4H
C133	4H
C134	4G
C135	5G
C136	4H
C137	4H
C138	5H
C139	4H
C140	5G
C141	2F
C142	2D
C143	1D
C144	4H
C145	3H
C146	2G

R

R1	1F
R2	1E
R3	1E
R4	1F
R5	2E
R6	2F
R7	3G
R8	3G
R9	3F
R11	2F
R12	2F
R13	2E
R14	1F
R15	1D
R16	1D
R17	1C
R18	1B
R19	2B
R20	3A
R21	4B
R22	3B
R23	5B
R24	5B
R25	3C
R26	2B
R27	2C
R28	2C
R29	2C
R30	3C
R31	3D
R32	2D
R33	3D
R34	3E
R35	3F
R36	3F
R37	3F
R38	3F
R39	4F
R40	3G
R41	4G
R42	4F
R43	3G
R44	4G
R45	4F
R46	4F
R47	4F
R48	4E
R49	4F
R50	5F
R51	5E
R52	2C
R53	2C
R54	2C
R55	2D
R56	5G
R58	4E
R59	3D
R60	4E
R61	5E
R62	5E
R63	4E
R64	3C
R65	3C
R66	4D
R67	4D
R68	4C
R69	4E
R70	4F
R71	4E
R73	4D
R75	2D
R78	2B
R79	3E
R80	1E
R81	2E
R99	4E
R100	4G
R110	2D
R112	1C
R117	1H
R118	1H
R119	1H
R120	4H
R121	5H
R122	4G
R124	4F
R125	4G
R126	5H
R127	5H
R128	2H
R129	2H
R130	5H
R131	4G
R132	2H
R133	2H

D

D1	1E
D2	2F
D3	2C
D4	2D
D5	5B
D6	3C
D7	3C
D8	5G
D9	4F
D10	4F
D11	3C
D12	3C
D13	4C
D14	1A
D16	2C
D22	1F
D23	1E
D24	1H
D25	1H
D26	1H
D27	1H
D28	2H
D29	2H
D30	4H
D31	5H
D32	3H

T

T1	2G
T2	2D
T3	1C
T4	2B
T5	3C
T6	2C
T7	3E
T8	3E
T9	3G
T10	4G
T11	5C

Q

Q1	2G
Q2	2G
Q3	1C
Q4	3A
Q5	3B
Q6	2C
Q7	2D
Q8	2C
Q9	3D
Q10	3E
Q11	3F
Q12	4G
Q13	4E
Q14	4C
Q15	4D
Q22	1F
Q24	2H

IC

IC1	1G
IC2	2F
IC3	1D
IC4	5D
IC5	1G
IC6	5H

J

J1	5A
J2	1A
J3	1A

L

L1	1E
L2	1E
L3	2F
L4	1D
L5	1D
L6	3A
L7	3B
L8	3B
L9	4B
L10	4B
L11	4A
L12	4B
L13	5B
L14	2D
L15	2C
L16	1B
L17	1A
L18	4C

RV

RV1	4E
RV2	4C
RV3	5G
RV4	5B
RV5	4H

RY

RY1	4H
RY2	3H

X

X1	3G
X2	2E

CH

CH1	1B

CF

CF1	3F

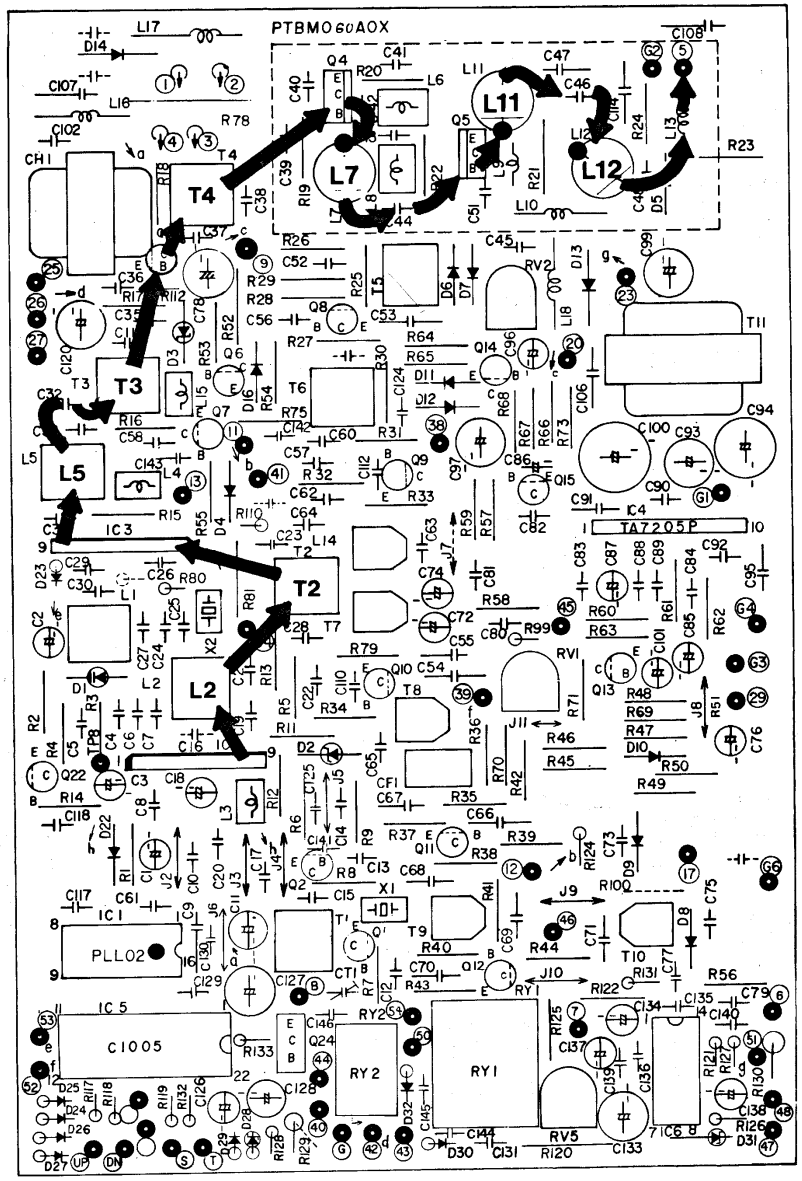


Figure 7. Transmitter Signal Path, Main Board

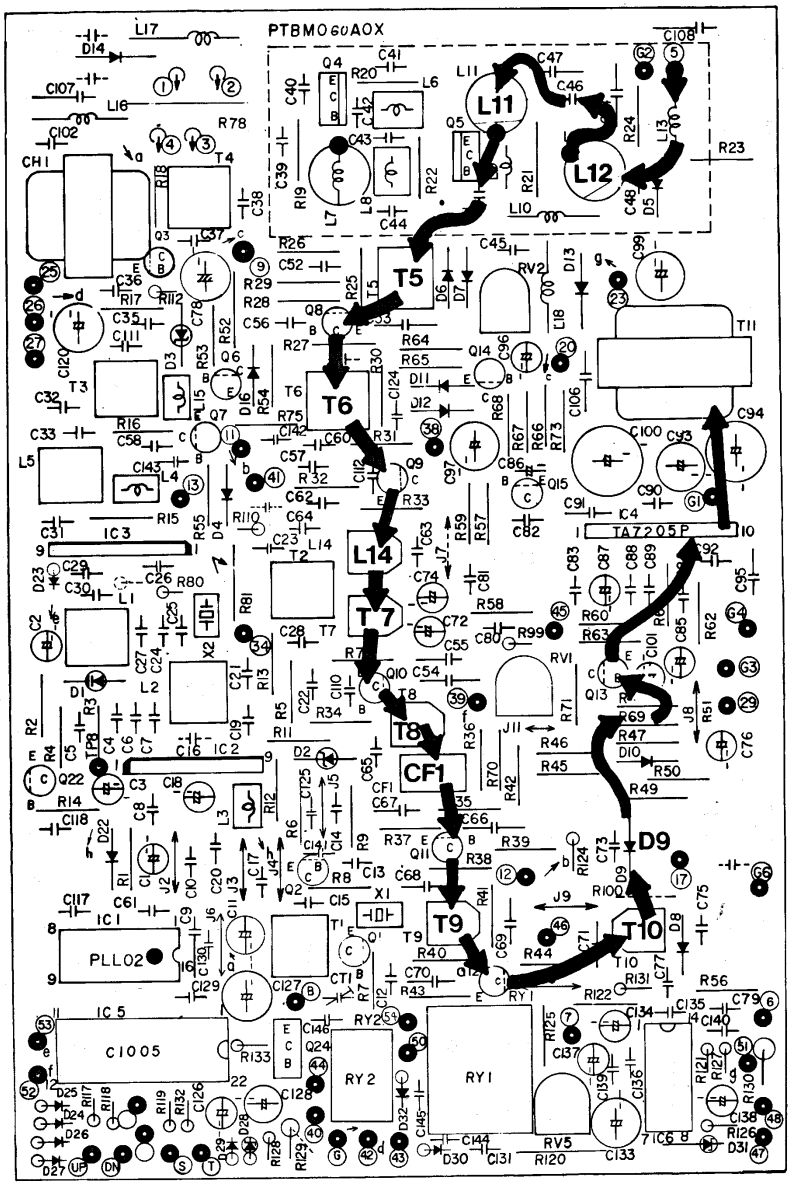
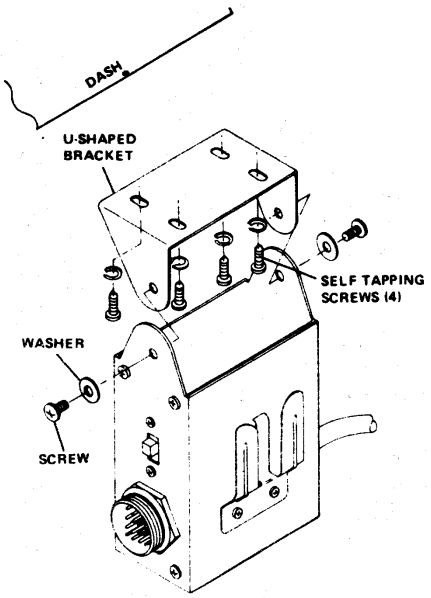
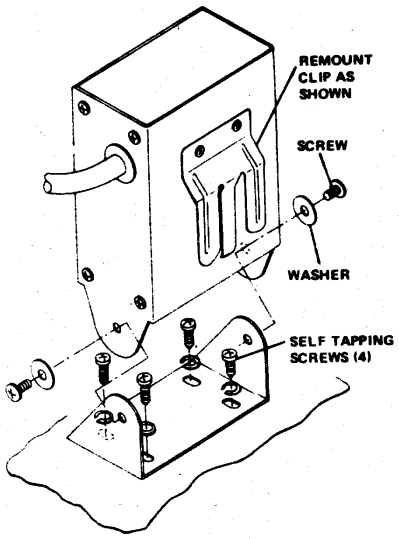


Figure 8. Receiver Signal Path, Main Board

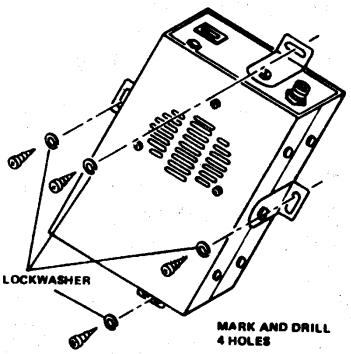
Installation



Installing Bracket Under Dash



Installing Bracket On Console



Installing Chassis

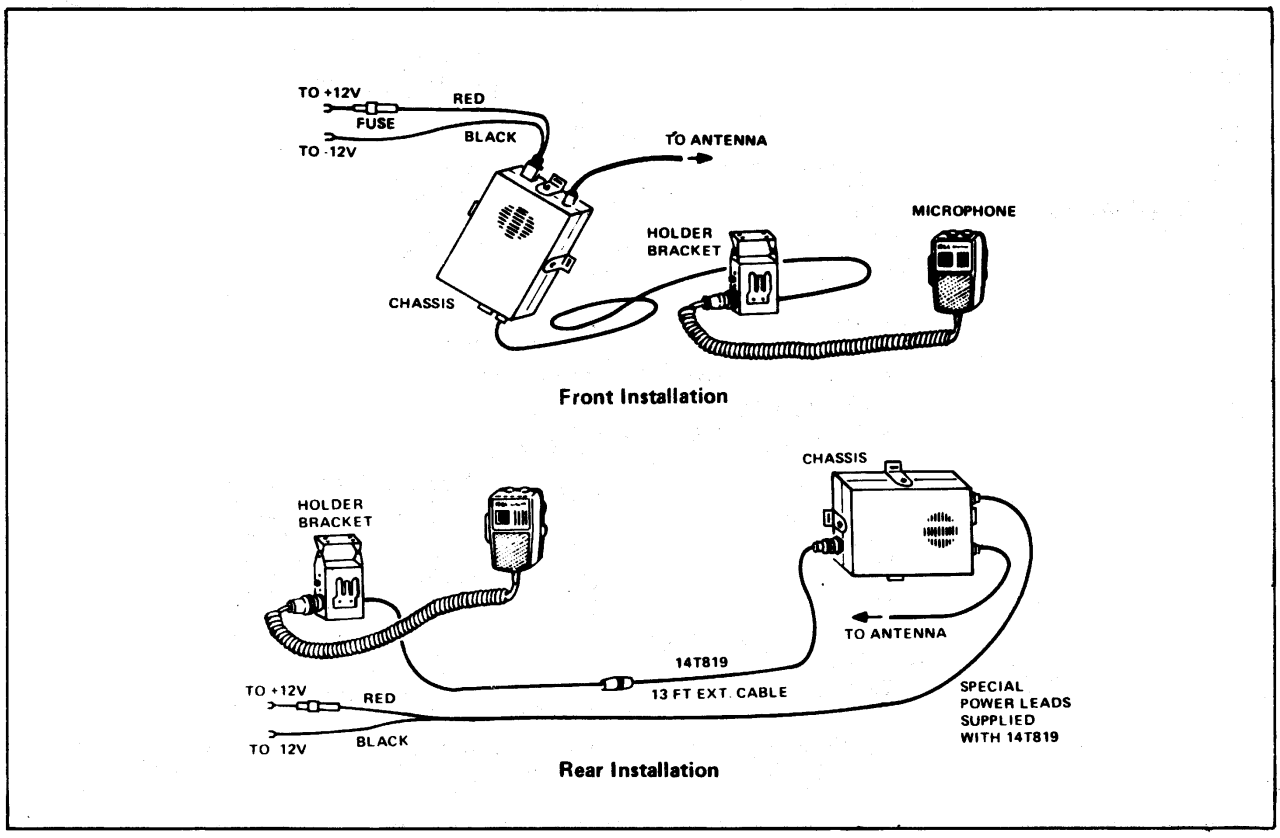


Figure 9. 14T275 Cable Interconnections

Service Notes

REPAIR OF UNIT

RCA Co-Pilot CB Transceivers are designed for high performance. This performance is strongly dependent on the high quality of the components used in fabrication. When you repair or otherwise service these transceivers, the way you perform the repair and the quality of the replacement part or parts you select has a definite bearing on transceiver performance. Consequently, you should use components of superior quality. The parts included in the lists printed at the rear of this manual are superior replacements.

RETUNING AND REALIGNMENT

The transceiver is carefully aligned during manufacture. Before readjusting the unit, visually recheck all external connections for looseness or broken wires. A check of operating voltages (see schematic and Fig. 11) often isolates a malfunction. If realignment is in order, use procedure starting on page 11.

CRYSTALS SOLDERED IN PLACE

Frequency crystals are *not* plug-in units. What appears to be a crystal socket is a thermal isolator; crystals are soldered into the circuit.

EQUIPMENT REMOVAL

When removing unit from vehicle, it is unnecessary to remove either the dash unit or the extension cable connecting a trunk mounted unit to the dash unit. The mic. connector connects directly to the chassis receptacle for operation out-of-car. However, this arrangement disables the speaker in the hand-held mic. unit. (The slide switch in the connector box controls the speakers).

Caution

Since the operating controls are in the hand-held mic./speaker unit, operation of the transceiver with the hand-held unit disconnected is impossible. As a result, a dummy mic. connector cannot be used. This presents a serious danger to test equipment used in troubleshooting receiver circuitry in that inadvertent keying of the transmitter could damage the test gear. *As a result, we recommend that you disable the push-to-talk switch while troubleshooting and/or aligning receiver circuits.* The easiest way is to remove, temporarily, the push-to-talk lever from the hand-held unit. See Fig. 21 (page 18) for assembly drawing of hand-held unit.

Recommended Test Equipment

1. *Antenna Dummy Load* – Power rating of at least 5 watts. Bird Model 8053 Coaxial Load Resistor or equivalent.
2. *RF Wattmeter* – Bird Model 43 "Thru-Line" Wattmeter with Bird Model 5A Element or equivalent.
3. *Frequency Counter* – Hewlett-Packard Model HP-5283A or equivalent (requires attennator for connection to antenna output).
4. *High-Frequency Signal Generator* – Hewlett-Packard Model HP-606B, Wavetek Model 3000 or equivalent with a frequency range of 50 kHz to 65 MHz and accurate to within 1 percent.
5. *Oscilloscope* – Suitable instrument with vertical axis response to 30 MHz or higher for monitoring modulation envelope.
6. *Electronic Voltmeter* – RCA Model WV-500B or equivalent with high input impedance.
7. *Speaker Dummy Load* – Five watt, 8-ohm resistive load.
8. *Audio Signal Generator* – Range 10 Hz to 20 kHz with output level calibration.
9. *RF Voltmeter* – High input impedance with response to 30 MHz or higher (RCA WV-500B above plus WG-301A RF Probe or equivalent).
10. *Power Supply* – Regulated, 0-20 Vdc, 2A current capability.
11. *Ammeter* – 2A full scale.
12. *Multimeter* – 20,000 ohms/volt or greater sensitivity.

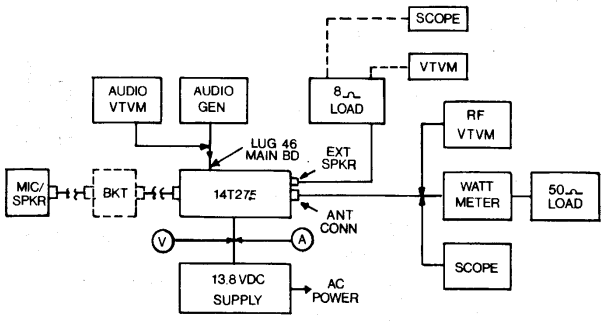
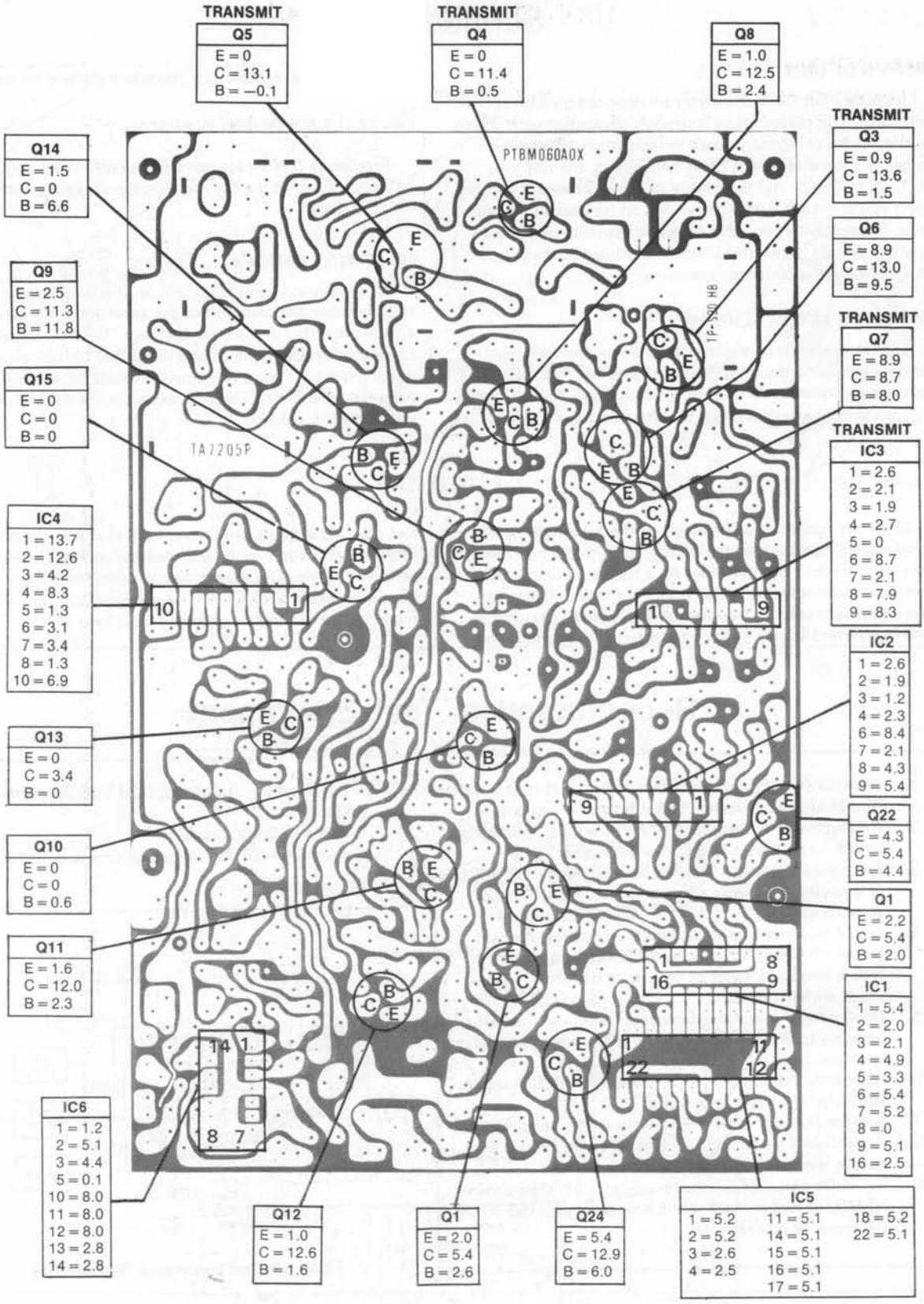


Figure 10. Test Equipment Relationships



All voltages measured from PC Board Ground with DC VTVM, No Signal, Unit Tuned to Ch. 9, 13.8V Power Supply. Voltages within ±20% are considered normal.

Figure 11

14T275

Tuning and Alignment

TRANSMITTER ALIGNMENT

The equipment setup is shown in Fig. 12. Since the 14T275 control center is part of the mic./speaker unit, operating the transceiver with a dummy mic. connector is impractical. As a result, precautions must be taken to prevent inadvertent transmitter keying while servicing. See Caution, page 9.

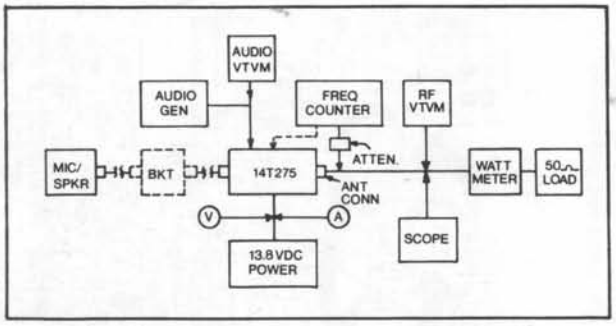


Figure 12. Equipment Setup, Transmitter Alignment

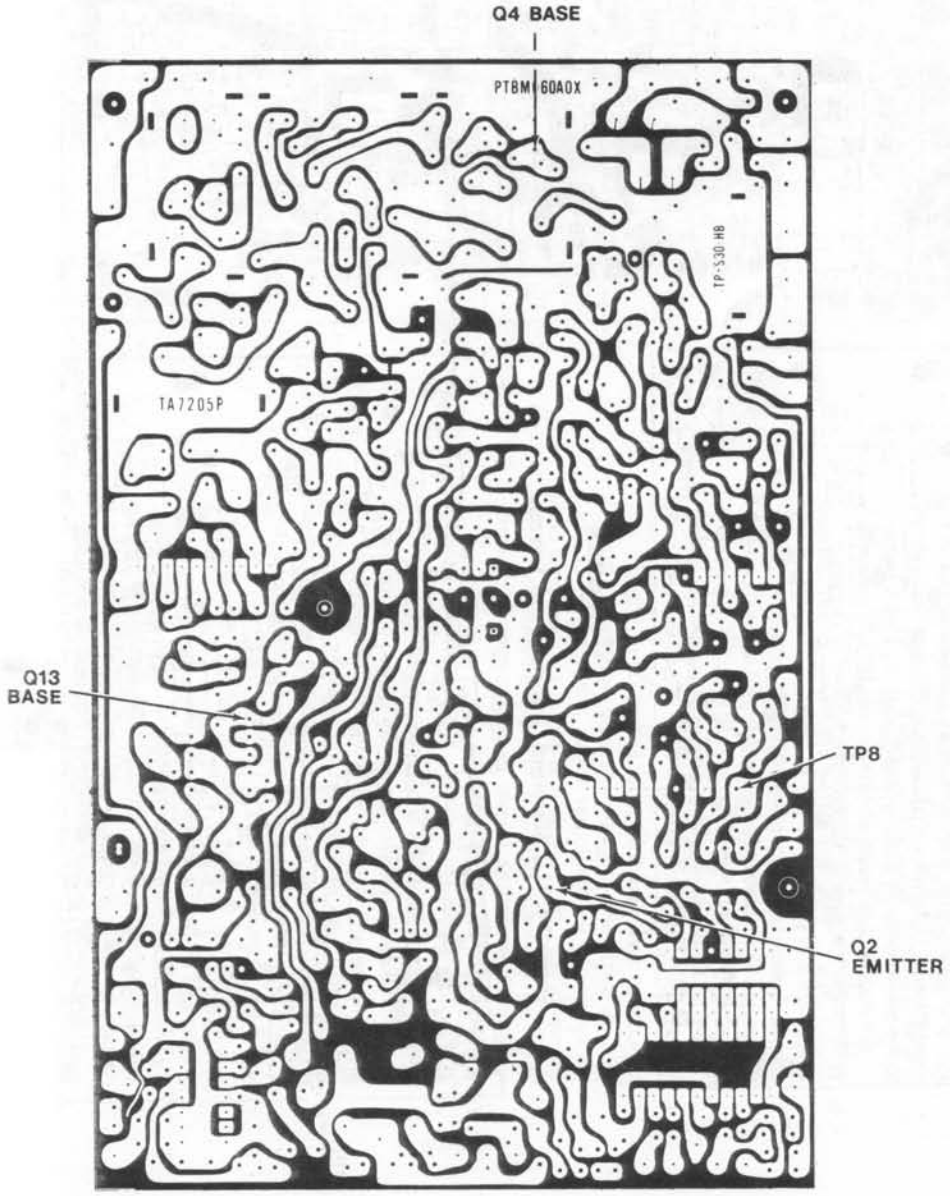


Figure 13. Transmitter Alignment Test Points, Foil Side

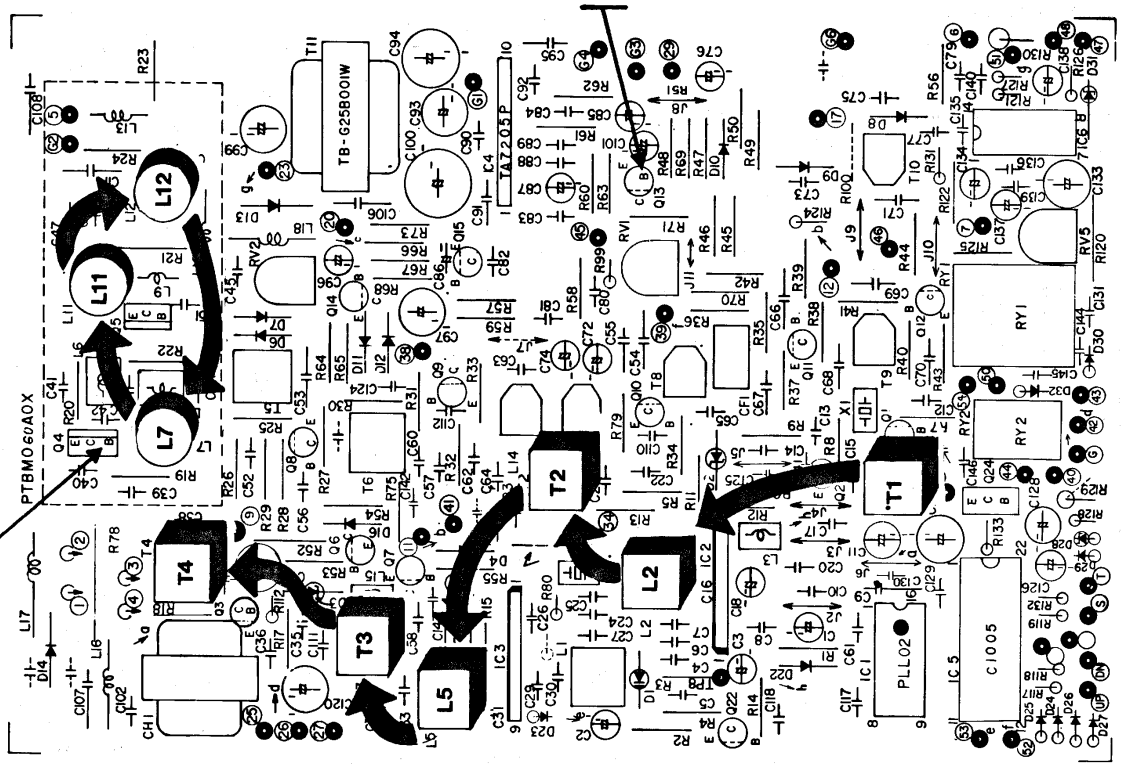


Figure 16. RF Driver and Power Amplifier Alignment

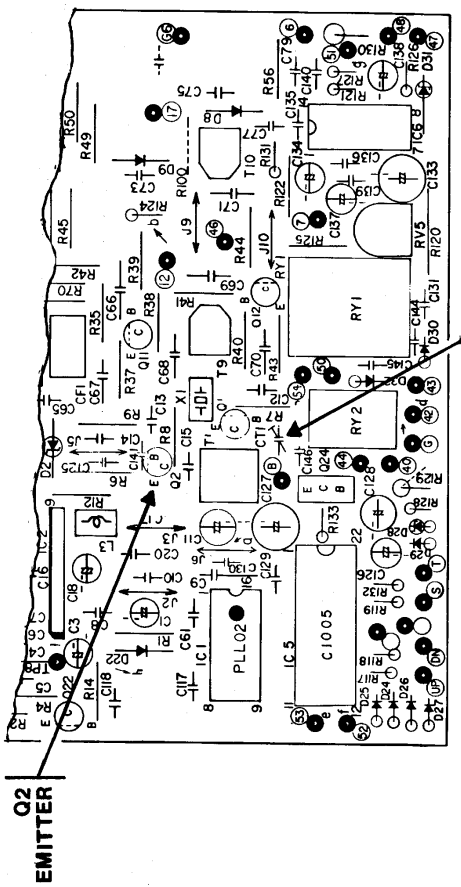


Figure 14. PLL Alignment, Test-Point and Trimmer

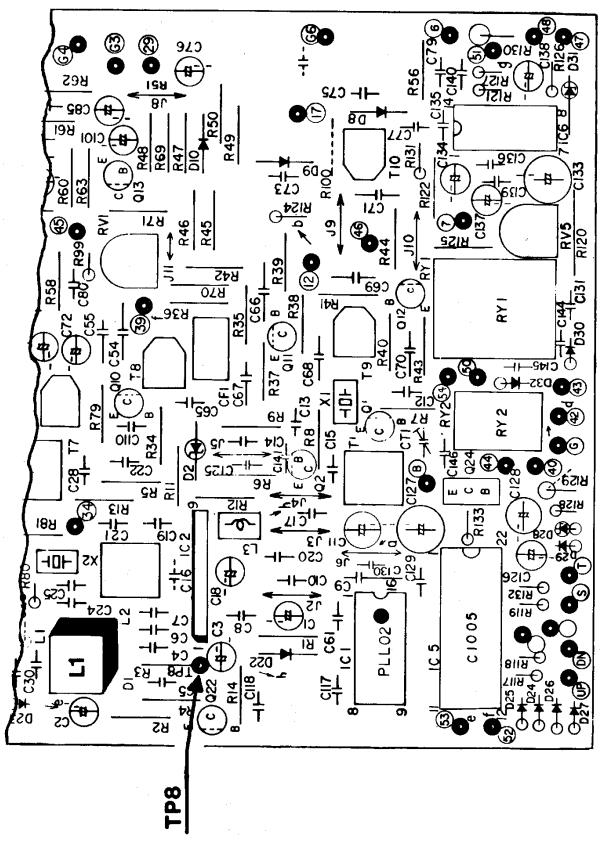


Figure 15. VCO Circuit Alignment, Test-Point and Adjustment

14T275

A. *Phase-Lock Loop Alignment*

Connect the frequency counter probe (100 pf capacitor in series) to the emitter of Q2 (near T1, see Fig. 14 for location). Adjust trimmer CT1 (between T1 and RY2, see Fig. 14) for a frequency readout of 10.24 MHz ± 50 Hz. Other frequencies in the PLL are included in Fig. 2.

B. *VCO Circuit Alignment*

Turn Channel Selector to Ch. 1. Connect an accurate 20,000 ohm/volt VOM or VTVM (5 Vdc range) to TP8 (see Fig. 15) and ground. Adjust L1 core for 3.6 ± 0.1 Vdc on meter with core on top side of travel. Switch Channel Selector to Ch. 40. Meter reading should fall between 1.4 and 2.3V.

C. *RF Driver Stage Alignment*

Switch Channel Selector to Ch. 19. Connect scope to Q13 base and ground. Key transmitter and adjust T1, L2, T2, L5 and T3 for maximum amplitude of 27.185 MHz on scope. See Fig. 16. Reduce power supply voltage to 7V. Connect scope to base of Q4. Adjust T3 and T4 for maximum amplitude on scope with transmitter keyed. See Fig. 16.

D. *RF Power Amplifier Alignment*

Reset power supply voltage to 13.8V; Channel Selector at Ch. 19. Connect wattmeter to antenna connector. Adjust L7, L11 and L12 (in that order) for maximum power. Touch up L11 for maximum power. Adjust L7 core *clockwise* for wattmeter indication of 4.4W. Adjust L7 core *counterclockwise* for wattmeter indication of 3.8W.

E. *Transmitter Frequency Check*

Connect dummy load to antenna connector. Connect frequency meter to antenna connector through suitable attenuator. Key transmitter and read frequency of each channel. Each channel frequency should be within ±800 Hz of listing in Fig. 2.

F. *Modulation Sensitivity Adjustment*

Connect dummy load to antenna connector. Connect scope across dummy load. Apply 20 mV of 1 kHz sinusoidal tone to Terminal 46 (lavender color wire, see Fig. 17). Key transmitter and adjust RV2 (near modulation transformer) for 85% modulation as indicated on the scope.

Decrease 1 KHz amplitude to 6mV. Modulation percentage, as observed on the scope, should exceed 60%. This completes transmitter alignment.

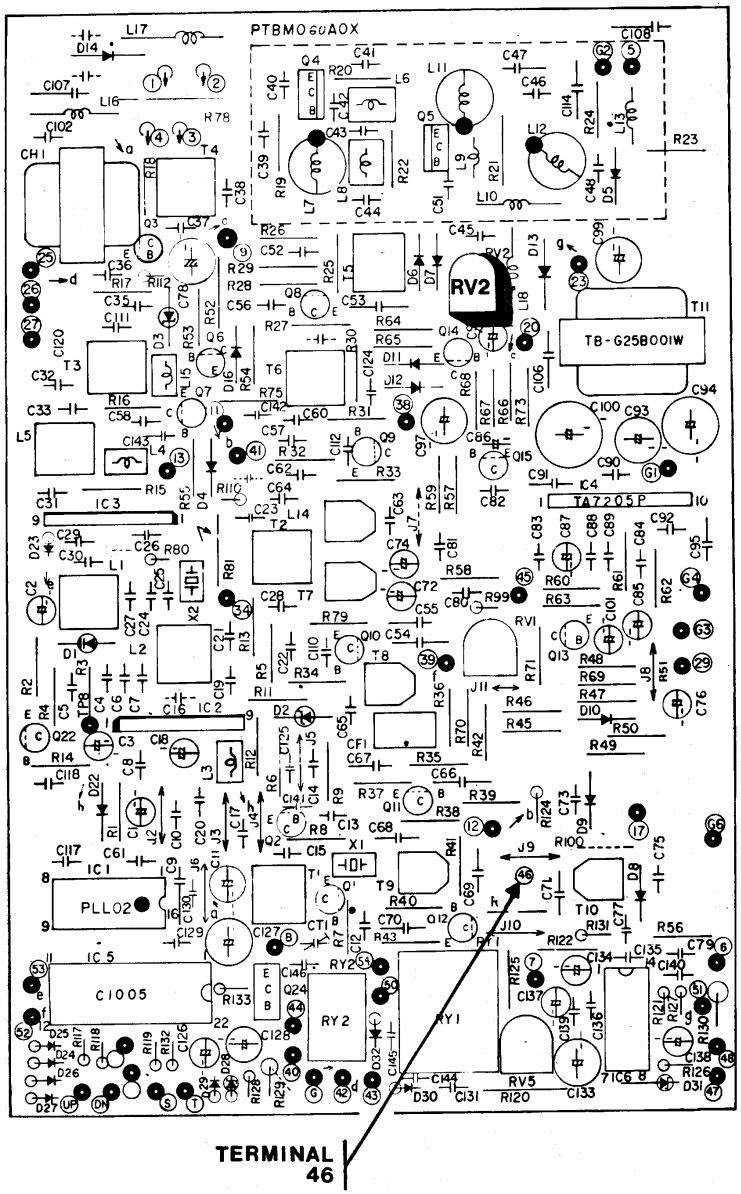


Figure 17. Modulation Sensitivity Test Point and Adjustment

RECEIVER ALIGNMENT

A. *Sensitivity Alignment*

See equipment setup in Fig. 18. Set signal generator at 27.185 MHz with 30% AM at 1 kHz. Set transceiver on Ch. 19 with volume control fully clockwise. Keep generator output just high enough to get scope indication and minimize AGC action. Adjust T1, L2, T2, T5, T6, L14, T7, T8, T9 and T10 (in that order) for maximum audio output. See Fig. 19 for locations. Reduce generator output level as required to avoid AGC action. Readjust T5 core one turn clockwise.

B. *Squelch Circuit Alignment*

Set signal generator at 27.185 MHz with 30% AM at 1 kHz. Adjust generator output level to 100 uV. Set transceiver on Ch. 19. Rotate Squelch and Volume controls fully clockwise. Adjust RV1 (see Fig. 19 for location) for maximum audio output across 8-ohm load resistor. Take note of output level. Readjust RV1 to reduce audio output by 6dB.

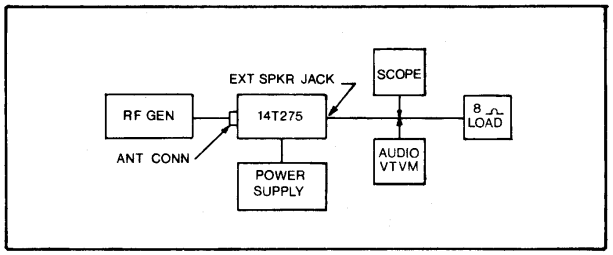


Figure 18. Equipment Setup, Sensitivity and Squelch Adjustment

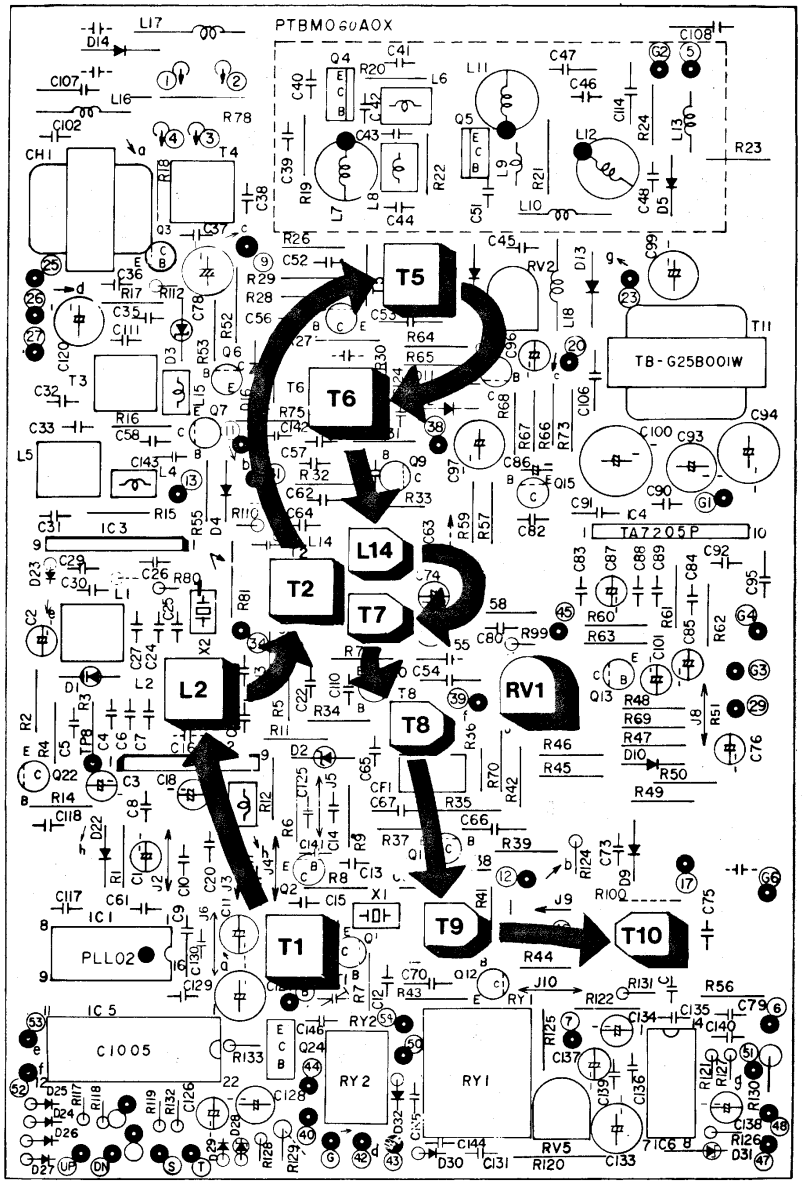


Figure 19. Receiver Sensitivity Alignment and Squelch Adjustment (RV1)

Replacement Parts

Symbol	Stock No.	Description
		MAIN CHASSIS ELECTRICAL PARTS
C1	122522	.1 UF 10V ELECT
C2	742072	10UF 16V ELYT
C3	742553	0.22UF 10V AROX
C4	741788	68PF 10% 50V CERAMIC
C5	742070	.01 UF 50V CER
C6	741807	22PF 10% 50V CERAMIC
C7	423555	330 PF 50V CER
C8	437385	150 PF 50V CER
C9	741779	47000PF 10% 50V CER
C10	742524	47PF 50V CER
C11	742077	47UF 10V ELYT
C12	741807	22PF 10% 50V CERAMIC
C13	741754	.001 UF 10% 50V FILM MYLAR
C14	741788	68PF 10% 50V CERAMIC
C15	742070	.01 UF 50V CER
C17	245245	47 PF 50V CER
C18	742076	1UF 50V ELYT
C19	741754	.001 UF 10% 50V FILM MYLAR
C20	741754	.001 UF 10% 50V FILM MYLAR
C21	741754	.001 UF 10% 50V FILM MYLAR
C22	423295	2 PF 5% 50V CER DISC
C23	742527	7PF 50V CER
C24	741781	33PF 10% 50V CERAMIC
C25	742528	4PF 50V CER
C26	423555	330 PF 50V CER
C27	742530	390PF 50V CER
C28	742070	.01 UF 50V CER
C29	423291	68 PF 50V CER
C30	742531	56PF 50V CER
C31	742070	.01 UF 50V CER
C32	423295	2 PF 5% 50V CER DISC
C33	742070	.01 UF 50V CER
C35	423291	68 PF 50V CER
C36	742070	.01 UF 50V CER
C37	741763	100 PF 50V CER
C38	742070	.01 UF 50V CER
C39	741755	.01 UF 10% 50V FILM MYLAR
C40	426384	470 PF 50V CER
C41	742070	.01 UF 50V CER
C42	426475	120 PF 50V CER
C43	437367	220 PF 50V CER
C44	426475	120 PF 50V CER
C45	742070	.01 UF 50V CER
C46	426475	120 PF 50V CER
C47	742926	270 PF 500V CER
C51	437390	27PF 5% 50V CERAMIC
C52	742070	.01 UF 50V CER
C53	741779	47000PF 10% 50V CER
C54	741779	47000PF 10% 50V CER
C55	741780	.047UF 10% 50V FILM MYLAR
C56	742070	.01 UF 50V CER
C57	742069	10PF 50V CER
C58	742070	.01 UF 50V CER
C59	742070	.01 UF 50V CER
C60	742070	.01 UF 50V CER
C61	742070	.01 UF 50V CER
C62	742070	.01 UF 50V CER
C63	423295	2 PF 5% 50V CER DISC
C64	742070	.01 UF 50V CER
C65	742525	18PF 50V CER
C66	741782	2.2PF 10% 500V CERAMIC
C67	741780	.047UF 10% 50V FILM MYLAR
C68	741780	.047UF 10% 50V FILM MYLAR
C69	741780	.047UF 10% 50V FILM MYLAR
C70	741780	.047UF 10% 50V FILM MYLAR
C71	741780	.047UF 10% 50V FILM MYLAR
C72	742068	10UF 16V ELYT
C73	742534	6800PF 50V FILM MYLAR
C74	742074	3.3 UF 25V ELYT
C75	741669	4700 PF 50V FILM (MYLAR)
C76	742076	1UF 50V ELYT
C77	741787	100 PF 50V CER
C78	742079	47UF 16V ELYT
C80	742078	.0022UF 50V CER
C81	741789	.022 UF 10% 50V FILM MYLAR
C82	437367	220 PF 50V CER
C83	741755	.01 UF 10% 50V FILM MYLAR
C84	742078	.0022UF 50V CER
C85	741793	3.9 UF 25V TANTALUM
C86	742535	.47UF 10V AROX
C87	741794	33 UF 6.3V ELYT
C88	423291	68 PF 50V CER
C89	423291	68 PF 50V CER
C90	741787	100 PF 50V CER
C91	741795	.068 UF 10% 50V FILM MYLAR
C92	741787	100 PF 50V CER
C93	742079	47UF 16V ELYT
C94	741797	220 UF 16V ELYT
C95	741795	.068 UF 10% 50V FILM MYLAR

Symbol	Stock No.	Description
C96	742074	3.3 UF 25V ELYT
C97	742077	47UF 10V ELYT
C99	742081	47UF 25V ELYT
C100	742080	1000UF 16V ELYT
C101	741794	33 UF 6.3V ELYT
C102	742070	.01 UF 50V CER
C106	741779	47000PF 10% 50V CER
C107	741779	47000PF 10% 50V CER
C108	741779	47000PF 10% 50V CER
C110	742570	18PF 50V CER
C114	742927	390 PF 500V CER
C117	432515	4700 PF 50V CER
C118	742536	.022UF 50V CER
C124	742070	.01 UF 50V CER
C125	742070	.01 UF 50V CER
C126	742535	.47UF 10V AROX
C127	742928	100 UF 6.3V ELYT
C128	742077	47UF 10V ELYT
C129	742592	1200 PF 50V FILM (MYLAR)
C131	742070	.01 UF 50V CER
C133	742529	100 UF 10V ELYT
C134	742076	1UF 50V ELYT
C135	423274	1000 PF 50V CER
C136	742070	.01 UF 50V CER
C137	742076	1UF 50V ELYT
C138	742082	4.7 UF 25V ELYT
C139	742070	.01 UF 50V CER
C140	742070	.01 UF 50V CER
C141	741787	100 PF 50V CER
C142	432515	4700 PF 50V CER
C143	432515	4700 PF 50V CER
C146	742070	.01 UF 50V CER
C201	422318	150 PF 10% 500V CER DISC
C202	742087	.01UF 50V CER
C203	742087	.01UF 50V CER
C204	742087	.01UF 50V CER
C205	742087	.01UF 50V CER
C206	742569	.047 UF 50V CER
C207	742910	.0047 UF 50V CER
C208	742910	.0047 UF 50V CER
C951	742084	.0047UF 50V CER
C952	742084	.0047UF 50V CER
C953	742084	.0047UF 50V CER
C954	742084	.0047UF 50V CER
C955	742084	.0047UF 50V CER
C956	742084	.0047UF 50V CER
C957	742084	.0047UF 50V CER
C958	742084	.0047UF 50V CER
C959	742084	.0047UF 50V CER
C960	423274	.001 UF 50V CER
C961	742084	.0047 UF 50V CER
C962	423274	.001 UF 50V CER
C963	742532	330PF 50V CER
C964	742084	.0047 UF 50V CER
CF1	741812	FILTER, CER.
CH1	742611	COIL-CHOKE
CT1	741721	CAPACITOR TRIMMER
D1	741689	DIODE - TYPE ITT410
D2	741738	DIODE - TYPE ZMZ205
D3	741739	DIODE - TYPE RD9.1E
D4	741741	DIODE - TYPE 1S1555
D6	741741	DIODE - TYPE 1S1555
D7	741741	DIODE - TYPE 1S1555
D9	226344	DIODE - TYPE 1N60
D10	741741	DIODE - TYPE 1S1555
D11	741741	DIODE - TYPE 1S1555
D12	741741	DIODE - TYPE 1S1555
D13	166593	DIODE - TYPE V06C
D14	741740	DIODE - TYPE 1S1885
D16	741741	DIODE - TYPE 1S1555
D22	741741	DIODE - TYPE 1S1555
D23	741741	DIODE - TYPE 1S1555
D24	741741	DIODE - TYPE 1S1555
D25	741741	DIODE - TYPE 1S1555
D26	741741	DIODE - TYPE 1S1555
D27	741741	DIODE - TYPE 1S1555
D28	741738	DIODE - TYPE ZMZ205
D29	741741	DIODE - TYPE 1S1555
D30	741740	DIODE - TYPE 1S1885
D31	742922	DIODE - TYPE RD8.2F
D32	741741	DIODE - TYPE 1S1555
IC1	741686	I.C. - TYPE PLL02A
IC2	742510	IC - TYPE TA7310P
IC3	742510	IC - TYPE TA7310P
IC4	741687	I.C. - TYPE TA7205P
IC5	742920	IC - TYPE C1005A
IC6	742921	IC - TYPE AN8295

PA 289

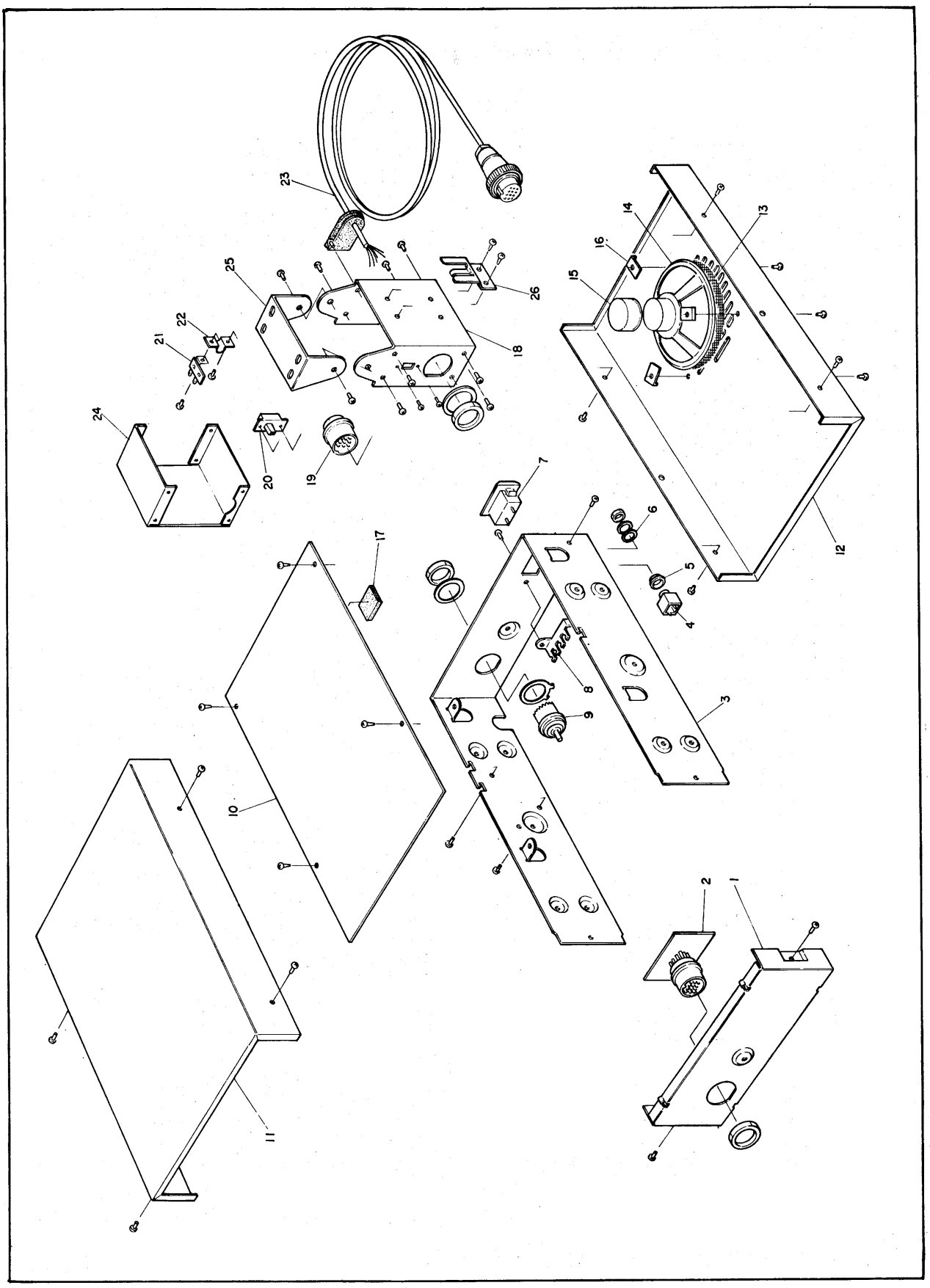


Figure 20. Assembly, Main Chassis and Mic Connector Box

Replacement Parts (Continued)

Symbol	Stock No.	Description
J1	742497	CONNECTOR - JACK - ANT
J2	741816	CONNECTOR-JACK P.A.
J3	741819	CONNECTOR - JACK - DC
J951	742918	CONNECTOR - JACK - MIKE (16P)
L1	742514	COIL - RF
L2	741720	COIL - RF
L3	741697	COIL - R. F.
L4	742934	COIL - RF (1UH)
L5	742516	COIL - RF-27 MHZ
L6	741695	COIL - R. F.
L7	741696	COIL - R. F.
L8	741697	COIL - R. F.
L9	741703	COIL - R. F.
L10	741698	COIL - R. F.
L11	741699	COIL - R. F.
L12	741700	COIL - R. F.
L13	742517	COIL - RF (.40UH)
L14	742925	COIL - RF (10.7MHZ)
L15	741697	COIL - R. F.
L16	741702	COIL - R. F.
L17	741702	COIL - R. F.
L18	741702	COIL - R. F.
Q1	742544	TRANSISTOR - TYPE 2SC710DE
Q2	742544	TRANSISTOR - TYPE 2SC710DE
Q3	741731	TRANSISTOR - TYPE 2SC1687
Q4	742545	TRANSISTOR - TYPE 2SC1846QRS
Q5	741732	TRANSISTOR - TYPE 2SC1306
Q6	741856	TRANSISTOR - TYPE 2SC1318
Q7	742546	TRANSISTOR - TYPE 2SA719PQR
Q8	742547	TRANSISTOR - TYPE 2SA1047BC
Q9	742548	TRANSISTOR - TYPE 2SC1359BC
Q10	741726	TRANSISTOR - TYPE 2SC710D
Q11	741726	TRANSISTOR - TYPE 2SC710D
Q12	742549	TRANSISTOR - TYPE 2SC829BC
Q13	741737	TRANSISTOR - TYPE 2SC828P
Q14	741729	TRANSISTOR - TYPE 2SA719Q
Q15	742512	TRANSISTOR - TYPE 2SC945(L)PD
Q22	742513	TRANSISTOR - TYPE 2SC900U
Q24	742623	TRANSISTOR - TYPE 2SC1096-3SL
R1	107972	3300 OHM 5% 1/4W COMP
R2	108864	470 OHM 5%, 1/4W., COMP.
R3	426112	22000 OHM 5% 1/4W COMP
R4	108871	47000 OHM 5% 1/4W COMP
R5	426216	68 OHM 5%, 1/4W., COMP.
R6	426215	680 OHMS 5% 1/4W COMP
R7	108869	15000 OHM 5% 1/4W COMP
R8	108869	15000 OHM 5% 1/4W COMP
R9	219459	1500 OHM 5% 1/4W COMP
R11	227959	82 OHM 5%, 1/4W., COMP.
R12	108866	2200 OHM 5% 1/4W COMP
R13	227744	150 OHM 5%, 1/4W., COMP.
R14	218762	1000000 OHM 5% 1/4W COMP
R15	108860	47 OHM 5%, 1/4W., COMP.
R16	108861	100 OHM 5% 1/4W COMP
R17	239460	5600 OHM 5% 1/4W FILM
R18	426216	68 OHM 5%, 1/4W., COMP.
R19	108861	100 OHM 5% 1/4W COMP
R20	218758	220 OHM 5% 1/4W COMP
R21	426743	10 OHM 2% 1/2W FILM
R22	426216	68 OHM 5%, 1/4W., COMP.
R23	108871	47000 OHM 5% 1/4W COMP
R25	219458	330 OHM 5% 1/4W COMP
R26	108865	1000 OHM 5% 1/4W COMP
R27	426215	680 OHMS 5% 1/4W COMP
R28	108871	47000 OHM 5% 1/4W COMP
R29	107972	3300 OHM 5% 1/4W COMP
R30	108861	100 OHM 5% 1/4W COMP
R31	219460	1800 OHM 5% 1/4W COMP
R32	227741	560 OHM 5%, 1/4W., COMP.
R33	108864	470 OHM 5%, 1/4W., COMP.
R34	232389	470000 OHM 5% 1/4W COMP
R35	108865	1000 OHM 5% 1/4W COMP
R36	426213	4700 OHM 5% 1/4W COMP
R37	108864	470 OHM 5%, 1/4W., COMP.
R38	108871	47000 OHM 5% 1/4W COMP
R39	218758	220 OHM 5% 1/4W COMP
R40	427563	3900 OHM 5% 1/4W COMP
R41	108869	15000 OHM 5% 1/4W COMP
R42	426219	33000 OHM 5% 1/4W COMP
R43	218758	220 OHM 5% 1/4W COMP
R44	108860	47 OHM 5%, 1/4W., COMP.
R45	426112	22000 OHM 5% 1/4W COMP
R46	232687	270000 OHM 5% 1/4W COMP
R47	108871	47000 OHM 5% 1/4W COMP
R48	427566	68000 OHM 5% 1/4W COMP
R49	426219	33000 OHM 5% 1/4W COMP
R50	108871	47000 OHM 5% 1/4W COMP
R52	426743	10 OHM 2% 1/2W FILM
R53	108865	1000 OHM 5% 1/4W COMP

Symbol	Stock No.	Description
R54	433018	390 OHMS 5% 1/4W COMP
R55	218499	10000 OHM 5% 1/4W COMP
R59	107972	3300 OHM 5% 1/4W COMP
R60	108866	2200 OHM 5% 1/4W COMP
R61	426234	820 OHM 10% 1/4W COMP.
R62	108860	47 OHM 5%, 1/4W., COMP.
R63	218499	10000 OHM 5% 1/4W COMP
R64	108860	47 OHM 5%, 1/4W., COMP.
R65	108865	1000 OHM 5% 1/4W COMP
R66	426213	4700 OHM 5% 1/4W COMP
R67	108870	18000 OHM 5% 1/4W COMP
R68	108865	1000 OHM 5% 1/4W COMP
R69	426112	22000 OHM 5% 1/4W COMP
R70	426112	22000 OHM 5% 1/4W COMP
R71	219460	1800 OHM 5% 1/4W COMP
R73	426213	4700 OHM 5% 1/4W COMP
R75	426213	4700 OHM 5% 1/4W COMP
R78	742552	15 OHM 2W METAL OXIDE
R80	108867	6800 OHM 5% 1/4W COMP
R99	218499	10000 OHM 5% 1/4W COMP
R100	239460	5600 OHM 5% 1/4W FILM
R110	107972	3300 OHM 5% 1/4W COMP
R112	426213	4700 OHM 5% 1/4W COMP
R117	108865	1000 OHM 5% 1/4W COMP
R118	108865	1000 OHM 5% 1/4W COMP
R119	108861	100 OHM 5% 1/4W COMP
R120	742626	150 OHM 1W FILM
R121	426199	56000 OHM 5% 1/4W COMP.
R122	219467	27000 OHM 5% 1/4W COMP
R124	227741	560 OHM 5%, 1/4W., COMP.
R125	427563	3900 OHM 5% 1/4W COMP
R126	218499	10000 OHM 5% 1/4W COMP
R127	427563	3900 OHM 5% 1/4W COMP
R128	426234	820 OHM 10% 1/4W COMP.
R129	742930	22 OHM 1W FILM
R130	742931	56 OHM 2W FILM
R131	108871	47000 OHM 5% 1/4W COMP
R132	108861	100 OHM 5% 1/4W COMP
R133	108860	47 OHM 5%, 1/4W., COMP.
		MAIN CHASSIS MECHANICAL PARTS
RV1	741707	10,000 OHM VAR
RV2	742508	5000 OHM VAR, LINEAR
RV5	741708	2000 OHM VAR
RY1	742923	RELAY - 12V 30MA 3A
RY2	742924	RELAY - 12V 40MA 1A
T1	742518	TRANSFORMER - RF
T2	742519	TRANSFORMER - RF
T3	741712	TRANSFORMER RF
T4	741713	COIL - R. F.
T5	741714	TRANSFORMER RF
T6	742520	TRANSFORMER - RF
T7	742925	TRANSFORMER - RF (10.7MHZ)
T8	741717	I F T 455 KHZ
T9	741718	I F T 455 KHZ
T10	741719	I F T 455 KHZ
T11	741690	TRANSFORMER - A F OUTPUT
X1	742506	CRYSTAL-10.24000 MHZ
X2	742507	CRYSTAL-10.69500 MHZ
4	741816	CONNECTOR-JACK P.A.
7	741819	CONNECTOR - JACK - DC
8	742505	TERMINAL-DC
9	742497	CONNECTOR - JACK - ANT
13	742908	NET SHEET - SPEAKER
14	741845	SPEAKER
15	742933	CAP - SPEAKER
16	742013	BRACKET - SPEAKER MTG
17	742909	SPONGE - COIL
		MICROPHONE CONTROL UNIT
19	742912	CONNECTOR MIKE (16P)
20	742913	SWITCH - SLIDE
21	742914	TERMINAL
22	742915	HOLDER - MIKE CORD
23	742916	CORD ASSEM - MIKE CONNECTION
25	742917	BRACKET - MIKE CONT MTG
26	741825	HOLDER - MICROPHONE
C-	742087	.01UF 50V CER
		MAIN CHASSIS MISCELLANEOUS
BRK	742911	BRACKET - CHASSIS MTG
CRD	741827	CORD - PWR D C
FUS	426968	FUSE - 2 AMP 250 V
INS	741745	INSULATOR (MYLAR SHEET)
MIC	742932	MICROPHONE
SPC	741813	SPACER (CRYSTAL)
SPK	741845	SPEAKER

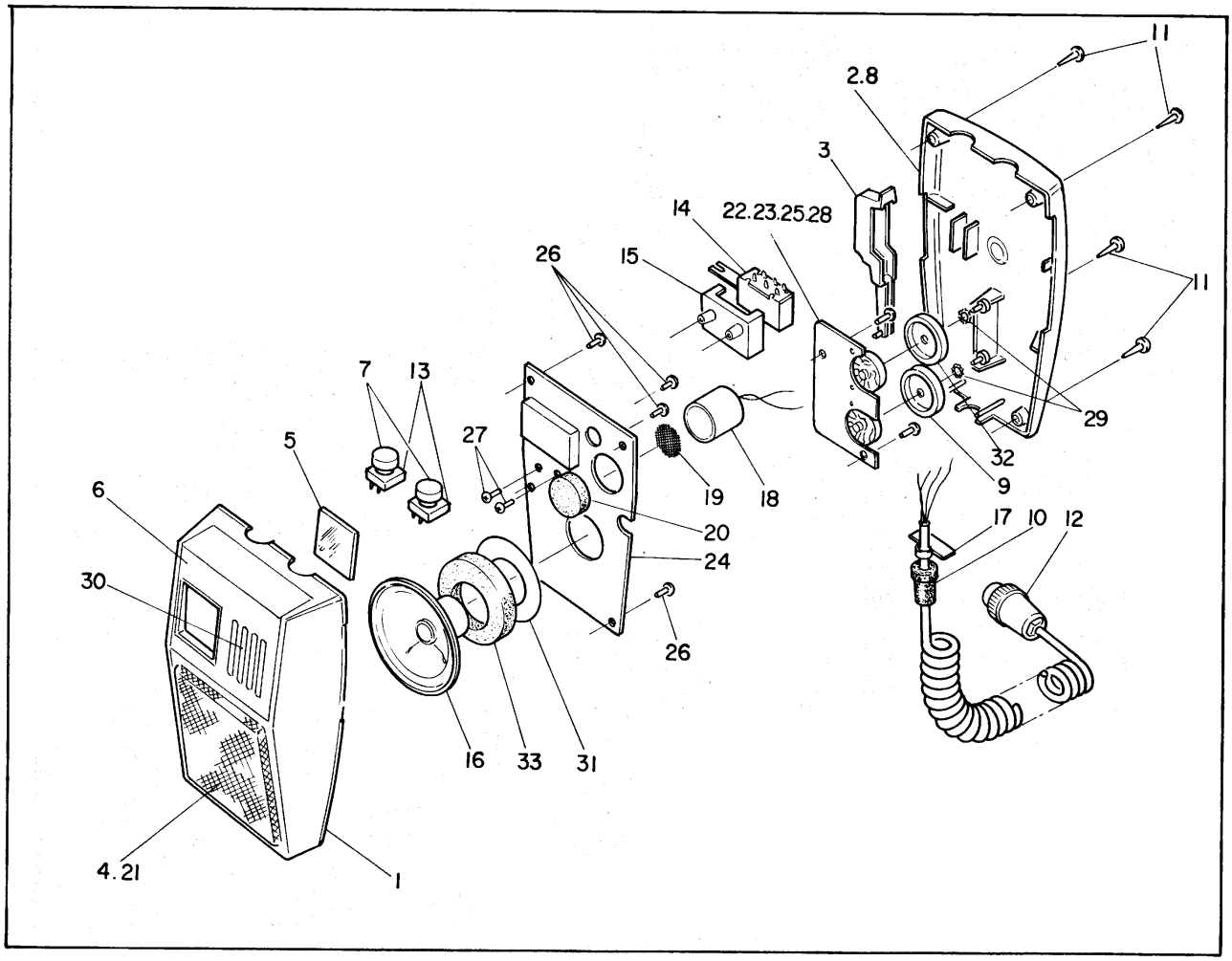


Figure 21. Assembly, Mic/Speaker/Control Unit

Replacement Parts (Continued)

Symbol	Stock No.	Description
		MICROPHONE ASSEMBLY
		ELECTRICAL PARTS
C1	741795	.068 UF 10% 50V CER
C2	423274	.001 UF 50V CER
C3	741467	10 UF 16V ELYT
C4	742087	.01 UF 50V CER
C5	741467	10 UF 16V ELYT
C6	740840	47 UF 10V ELYT
C7	742087	.01 UF 50V CER
C8	740840	47 UF 10V ELYT
D1	741051	DIODE - TYPE 1S1588
D2	741051	DIODE - TYPE 1S1588
IC1	742986	IC - TYPE C1006A
LED	742989	LED - TYPE TLR321
R1	420319	180 OHM 5% 1/4W FILM
R2	239457	2700 OHM 5% 1/4W FILM
R3	428106	68 OHM 5% 1/4W FILM
R4	239452	510 OHM 5% 1/4W FILM
R5	240580	470 OHM 5% 1/4W FILM
R6	243078	4700 OHM 5% 1/4W FILM
R7 THRU R20	240580	470 OHM 5% 1/4W FILM
R21	249553	100 OHM 1% 1/4W FILM
R22	241593	100000 OHM 5% 1/4W FILM
R23	241593	100000 OHM 5% 1/4W FILM
R24	435515	10000 OHM 5% 1/4W FILM
R25	435515	10000 OHM 5% 1/4W FILM

Symbol	Stock No.	Description
R26	239465	47000 OHM 5% 1/4W FILM
RES	742987	3300 OHM 5% 1/4W COMP
TR1	742991	TRANSISTOR - TYPE 2SC536F
TR2	742990	TRANSISTOR - TYPE 2SA562-O
		MICROPHONE CONTROL UNIT
		MECHANICAL PARTS
F-CASE	742972	CASE ASSEMBLY (FRONT)CONSISTS OF:
1		CASE-FRONT
4		NET COVER (FRONT CASE)
6		NAME PLATE
21		SHADE-MIKE ELEMENT
30		SHADE
R-CASE	742973	CASE ASSEMBLY (REAR)CONSISTS OF:
2		CASE-REAR
8		STUD-MIKE HANGER
3	742974	KNOB-ON/OFF
7	742975	BUTTON-CH
9	742976	KNOB-SQ
10	742977	BUSHING-CONNECTION CORD
12	742979	CORD ASSEM-CONNECTION
13	742980	SWITCH-CH
14	742981	SWITCH-ON/OFF
16	742982	SPEAKER
18	742983	ELEMENT-MIKE(300 OHM)
22	742984	100000 OHM LINEAR VAR W/SWITCH
23	742985	100000 OHM LINEAR VAR
32	742988	KNOB-VR

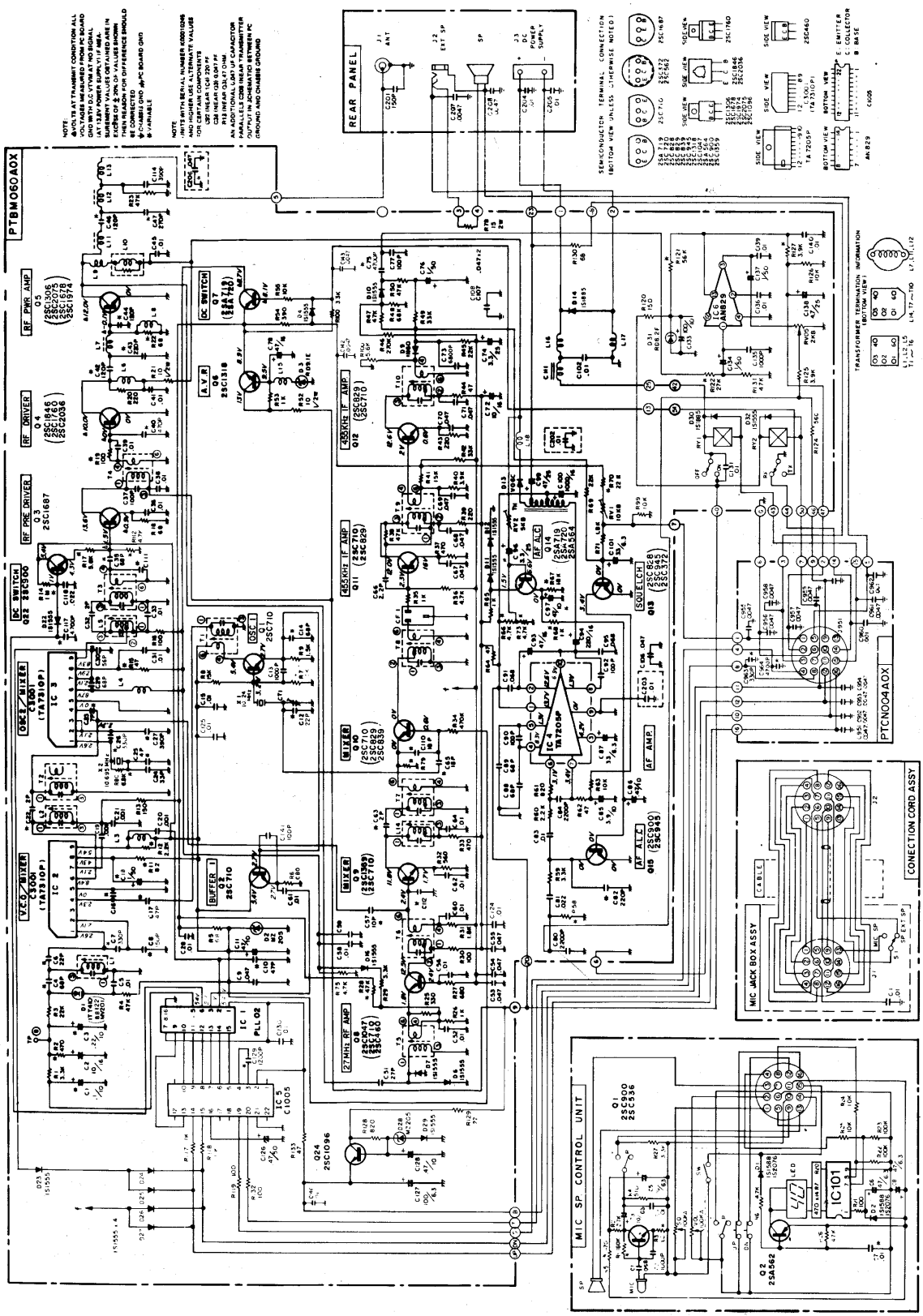


Figure 22. Overall Schematic, Model 14T275