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5. MODULATION OBSERVATION

A. Turn the transceiver POWER to OFF and disconnect the frequency counter from the 50 db attenuator. Connect a modulation monitor or an oscilloscope to the attenuator. Connect an audio generator to the high side of the Volume Control (side nearest the circuit board) through a .01 capacitor. Connect a millivoltmeter to the same point on the Volume Control.

B. Adjust the audio generator to 1 KHz and set the output to obtain 5 millivolts on the RMS millivoltmeter.

C. Turn the transceiver POWER to ON and press the transmit switch on the microphone. Observe approximately 3.5 to 4 watts on the wattmeter and a 95 to 100% modulation pattern as shown in Figure 4.

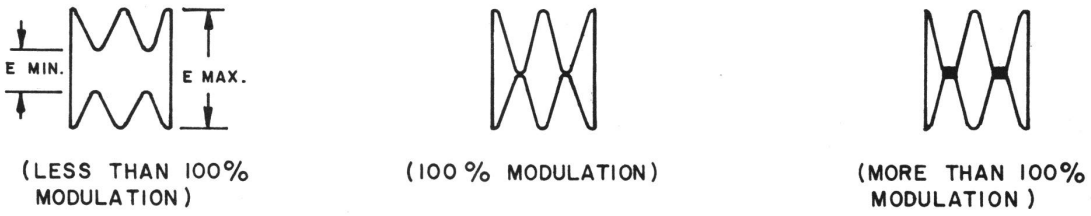



**FIGURE 4, MODULATION PERCENTAGE WAVEFORMS**

6. HARMONICS TRAP ADJUSTMENT

A. Connect the spectrum analyzer to the 50 db attenuator output as shown in Figure 3.

B. Press the TRANSMIT switch and observe on the spectrum analyzer the fundamental and harmonic frequency patterns. Adjust the TVI Trap (See Figure 1) on the rear of the chassis to reduce ALL HARMONICS to at least -50 db below the fundamental as shown in Figure 5.

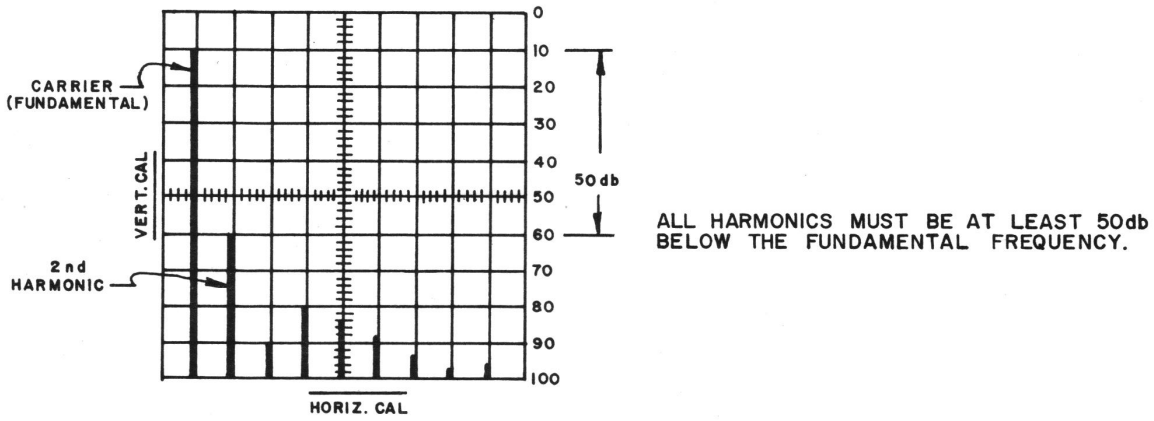



**FIGURE 5, HARMONICS FREQUENCY PATTERNS**

# SECTION II
# VHF/FM MONITOR ALIGNMENT

GENERAL INFORMATION

The manual tuning range of the monitor is from 150 MHz through 175 MHz, also three different fixed crystal controlled frequencies may be used. The crystals which may be installed in any particular unit (See Figure 6) will be unknown by the service personnel. Therefore, for the sensitivity and quieting tests, 159.09 MHz will be used. For this frequency a 48.46333 MHz crystal would be required as determined by the following formula:

$$\frac{\text{Desired Frequency (Station Frequency) minus 10.7 MHz}}{\text{Divided by 3}} = \text{Crystal Frequency}$$

Crystals operate on their 3rd overtone, therefore, the station frequency minus the 1st IF frequency divided by 3 equals the crystal frequency.

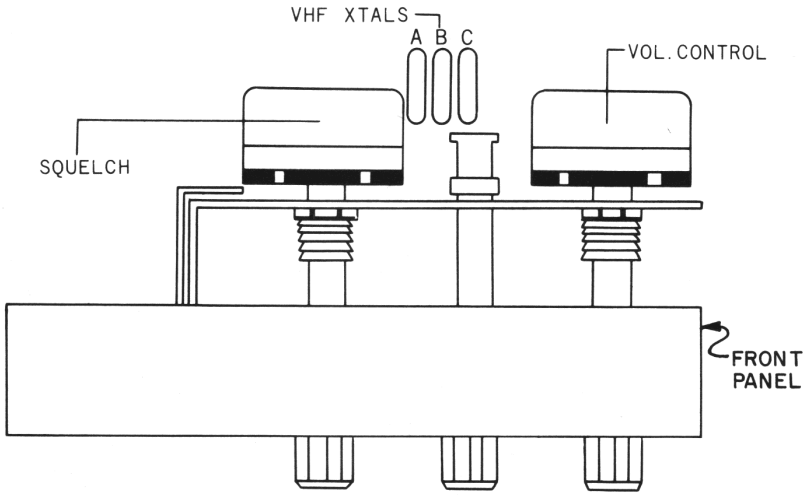



FIGURE 6, VHF/FM MONITOR CRYSTAL LOCATION DIAGRAM

1. Receiver Alignment

   A. Connect the transceiver to the test equipment as shown in Figure 7.

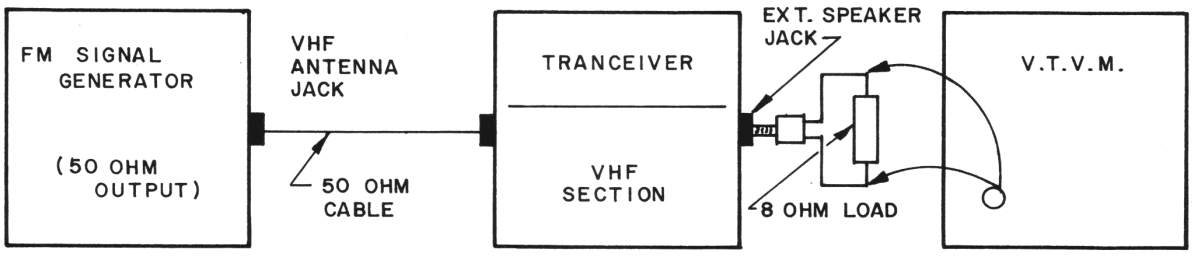



FIGURE 7, TEST SETUP FOR VHF/FM MONITOR

B. Set the transceiver front panel controls as follows:

| | | |
|---|---|---|
| VHF CHANNEL SELECTOR | to | VHF TUNE |
| VHF/CB SELECTOR | to | VHF |
| VOLUME CONTROL | to | Full CW Position |
| SQUELCH CONTROL | to | Full CW Position |
| POWER SWITCH | to | ON |

C. Adjust the FM/RF Signal Generator to 156.00 MHz and modulate ±5 KHz with a 1 KHz audio signal. Set the output attenuator to obtain 0.25 microvolts (-6 db).

D. Connect the RMS VTVM across the 8 ohm load connected to the EXT SPK jack and adjust the scale to read 3 volts full scale.

E. Observe a reading of approximately 2.0 volts (nominal) on the VTVM when 0.25 microvolts or less is applied to the VHF antenna connector. If more than 0.25 microvolts (-6 db) is required the RF section may require alignment as outlined in the following procedure.

F. Local Oscillator Tripler Adjustment:

1) Turn the transceiver POWER to OFF.

2) Connect a DC VTVM to the emitter of Q6, adjust the meter to read 1 volt negative voltage at approximately center scale. Connect the ground lead to the chassis.

3) Insert a 150 to 175 MHz crystal in each socket A and B; set the channel selector to the A position and the dial pointer near the crystal frequency.

4) Turn the POWER to ON. Set tuning dial to crystal channel frequency.

5) Observe a negative voltage reading on the VTVM and adjust L4 for maximum reading.

6) Turn the POWER to OFF, and connect the VTVM to the emitter of Q5 and adjust L3 for maximum reading on the meter.

G. IF Alignment

1) Adjust the channel selector to crystal position, and insert a 156.00 MHz crystal.

2) Set the RF signal generator to 156 MHz. Modulate ±5 KHz with a 1 KHz audio signal.

3) Connect an 8 ohm non-inductive load (two 15 ohm 2 watt carbon resistors in parallel) across a miniature phone plug (Herman H. Smith part No. 480 or equivalent) and plug it into the EXT SPK jack; then connect a RMS DB/Voltmeter set to the 3 volts scale across the 8 ohm load.

4) Turn the POWER to ON. Adjust L1, L2, T1, and T2 for the maximum reading on the VTVM. Repeat the adjustments several times to assure maximum sensitivity. Set manual tuning dial to 156 MHz.

5) Remove the 1 KHz modulation from the signal generator and disconnect the generator from the antenna connector.

G. IF Alignment (continued)

6) Set the transceiver VOLUME and SQUELCH controls full CW position and the ANL switch to OFF.

7) Read and record the noise level in db, as indicated on the wattmeter.

8) Connect the signal generator to the antenna connector and adjust the output attenuator to obtain 20 db quieting as indicated on the wattmeter. Do not modulate the signal generator.

9) Adjust T2 and T3 to obtain the maximum quieting. Signal generator attenuator should read 0 to 9 db (0.5 to 5 microvolts).

H. Squelch Sensitivity

1) Disconnect the signal generator from the antenna connector and the wattmeter from the EXT SPK jack (remove plug).

2) Adjust the SQUELCH control to the point where the noise disappears from the speaker.

3) Connect the signal generator to the antenna connector. Modulate the signal ±5 KHz with a 1 KHz audio signal.

4) Adjust the signal generator attenuator to the point where the 1 KHz tone is heard in the transceiver loud speaker.

5) The signal generator attenuator should read 0.1 to 0.5 microvolts (-14 to 0 db).

6) Turn the SQUELCH control full CCW position. Adjust the signal generator output attenuator to the point where the 1 KHz tone is heard in the loud speaker.

7) The signal generator attenuator reading should read 16 to 26 db (3.0 to 10 microvolts).

After all repairs and adjustments have been completed, be sure to seal all the coils that were adjusted with coil wax and carefully reassemble the transceiver in its case and repeat the Harmonics Trap Adjustment Test as described on page 16, paragraph 6.

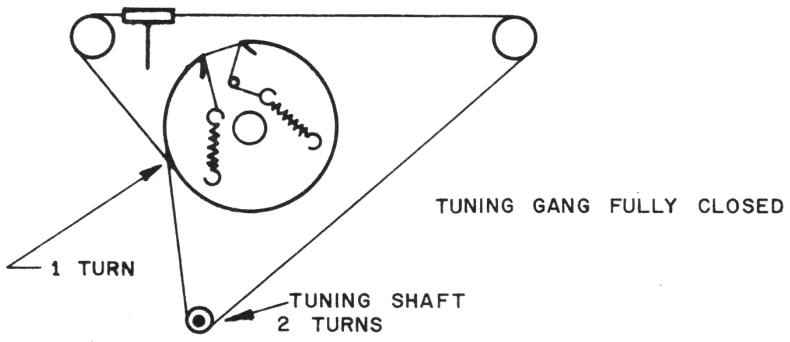



FIGURE 8, DIAL CORD STRINGING DIAGRAM, FRONT VIEW

## VOLTAGE MEASUREMENTS

The voltages shown on the chart were measured in one production unit and therefore indicate only the general range of values to be expected. Some measured voltages may, in fact, depart from these values by as much as 25 percent without causing difficulty.

## VOLTAGE MEASUREMENT CONDITIONS

A. Input voltage 13.8VDC
B. Volume Control CCW position (minimum)
C. Squelch Control CW position (maximum)
D. DC voltage measurements were made with a VTVM, and with the negative lead connected to the PC board (common ground)
E. CB/VHF switch in CB position
F. Voltage measurements taken with no signal input to receiver
G. Letter "T" voltage readings, indicate transmit mode.
H. CB/VHF switch in VHF position for FM monitor voltage measurements

TRANSCEIVER

| TRANS. | B | E | C |
|---|---|---|---|
| Q101 | 2.6V | 1.9V | 8.5V |
| Q102 | 2.7 | 2.0 | 8.8 |
| Q103 | 3.1 | 2.4 | 7.5 |
| Q104 | 1.5 | 1.0 | 9.0 |
| Q105 | 3.2 | 2.7 | 9.0 |
| Q106 | T4.0 | 3.6 | 9.0 |
| Q107 | T.34 | .3 | 9.0 |
| Q201 | 2.3 | 1.6 | 4.3 |
| Q202 | 1.8 | 1.2 | 7.2 |

TRANSCEIVER

| TRANS. | B | E | C |
|---|---|---|---|
| Q203 | 0 | 0 | 1.06 |
| Q204 | 1.06 | .3 | .35 |
| Q205 | 2.0 | 1.4 | 5.2 |
| Q206 | .8 | .2 | 10.4 |
| Q207 | T 0 | 1.15 | 13.2 |
| Q208 | T 0 | .1 | 13.2 |
| Q209 | T-.3 | +.1 | +.1 |
| Q301 | T.62 | .05 | 12.8 |
| Q302 | T.62 | .05 | 12.8 |

VHF-FM-MONITOR

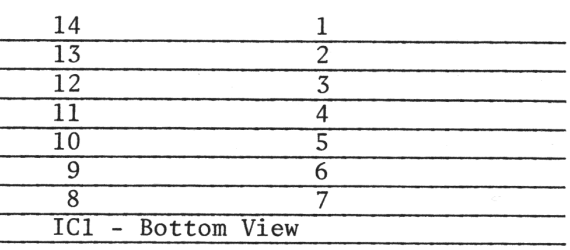
| TRANS. | B | E | C |
|---|---|---|---|
| Q1 | 1.16V | .45V | 3.7V |
| Q2 | 1.2 | .45 | 3.7 |
| Q3 | 1.2 | .5 | 4.6 |
| Q4 | 1.4 | .7 | 5.5 |
| Q5 | 0 | 0 | 6.0 |

VHF-FM-MONITOR

| TRANS. | B | E | C |
|---|---|---|---|
| Q6 | 0 | .22 | 6.0 |
| Q7 | 1.2 | 1.1 | 5.4 |
| Q8 | .8 | .15 | 5.5 |
| Q9 | 1.4 | .7 | 9.8 |
| Q10 | 1.4 | .8 | 2.9 |

IC1

| PIN NO. | VOLT | PIN NO. | VOLT |
|---|---|---|---|
| 1 | 4.75 | 8 | 2.1 |
| 2 | 3.3 | 9 | 3.5 |
| 3 | 5.4 | 10 | 5.4 |
| 4 | 4.2 | 11 | 4.8 |
| 5 | 1.2 | 12 | 4.8 |
| 6 | 1.2 | 13 | 4.8 |
| 7 | GND | 14 | GND |



IC1 - Bottom View

IC2

| PIN NO. | VOLTAGE |
|---|---|
| 1 | 0.2 |
| 2 | 0.1 |
| 3 | 0.01 |
| 4 | 7.0 |
| 5 | 6.0 |

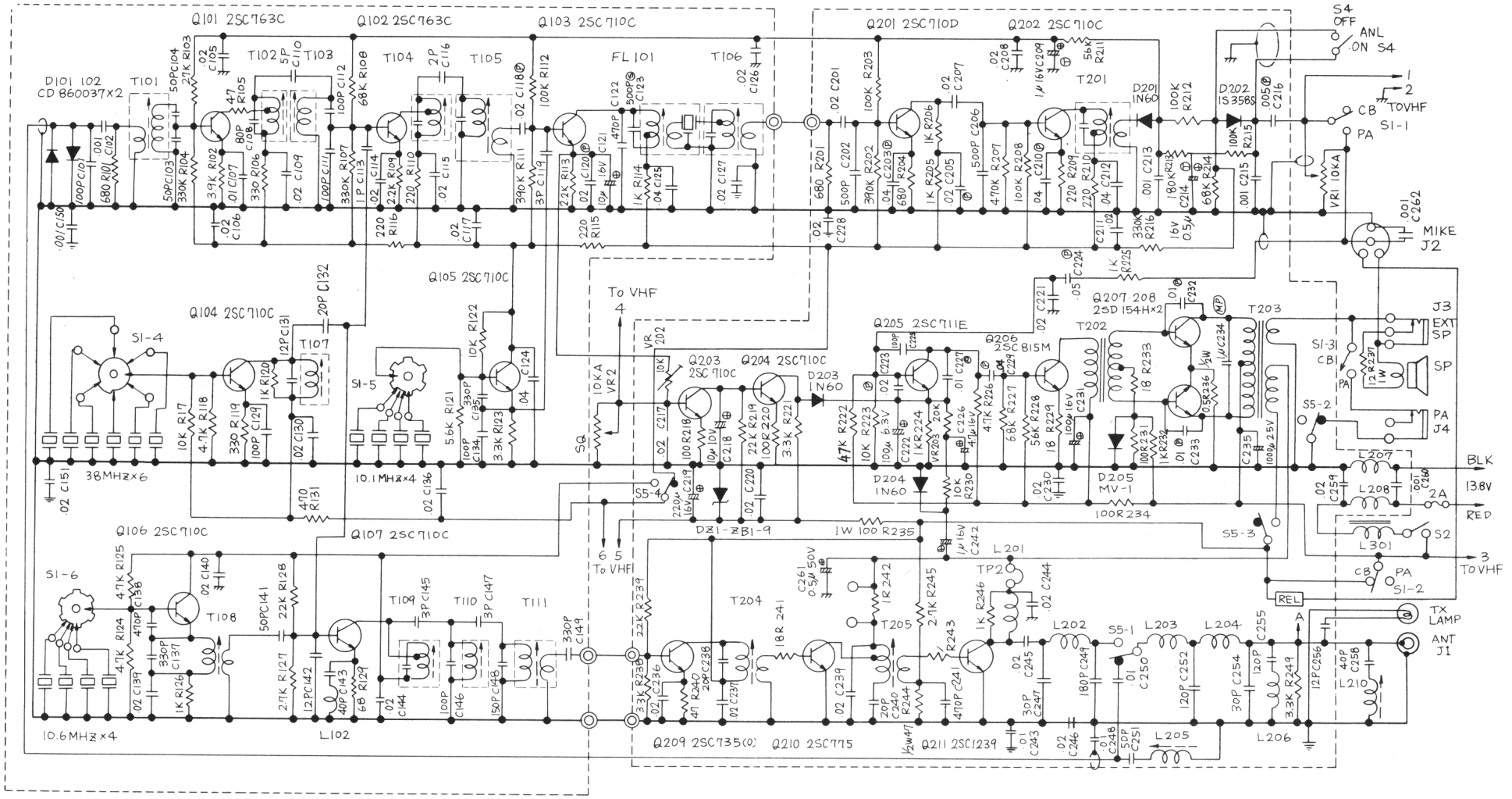




FIGURE 9, SCHEMATIC DIAGRAM, CB TRANSCEIVER, ISSUE D

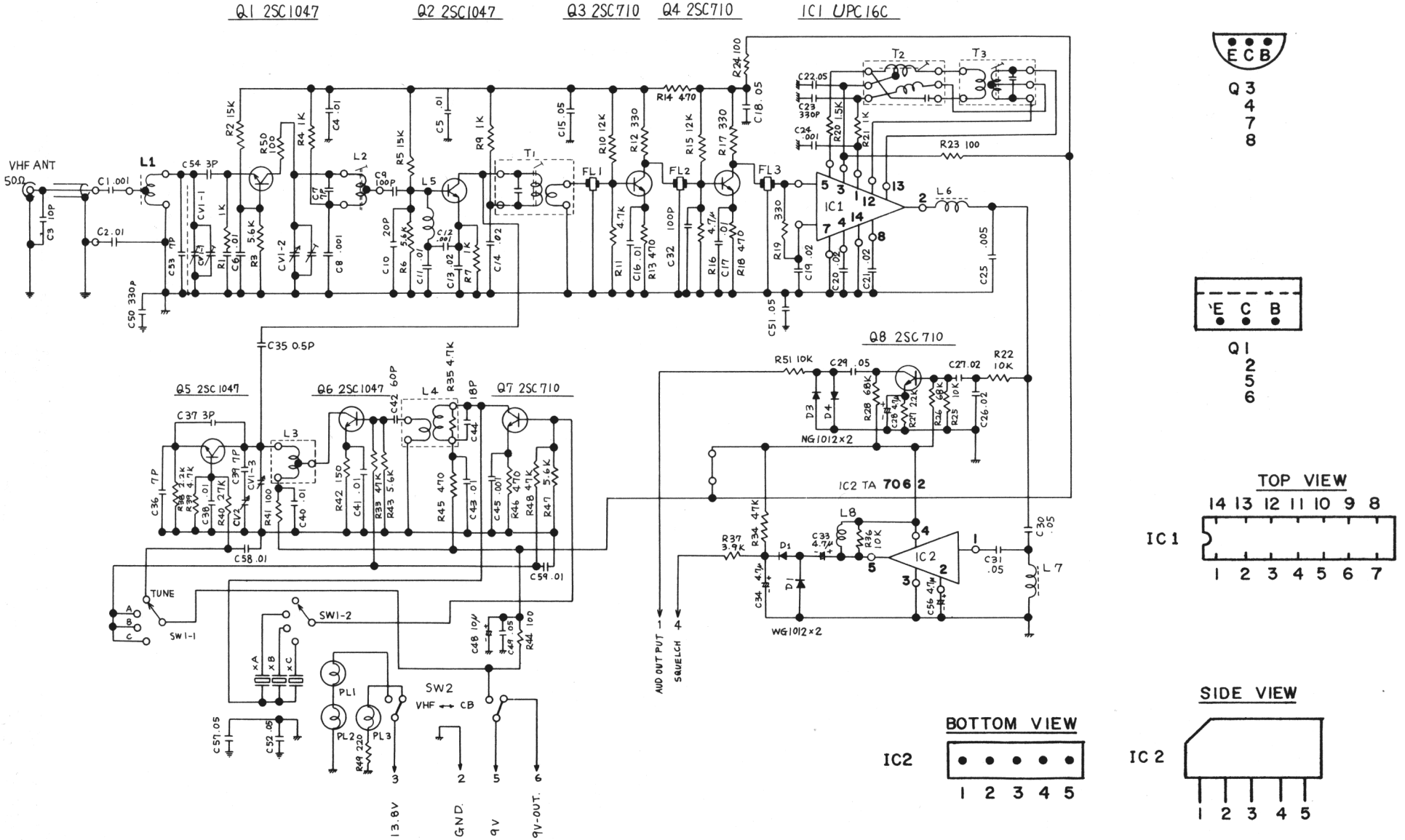



FIGURE 10, SCHEMATIC DIAGRAM, VHF/FM MONITOR, ISSUE D

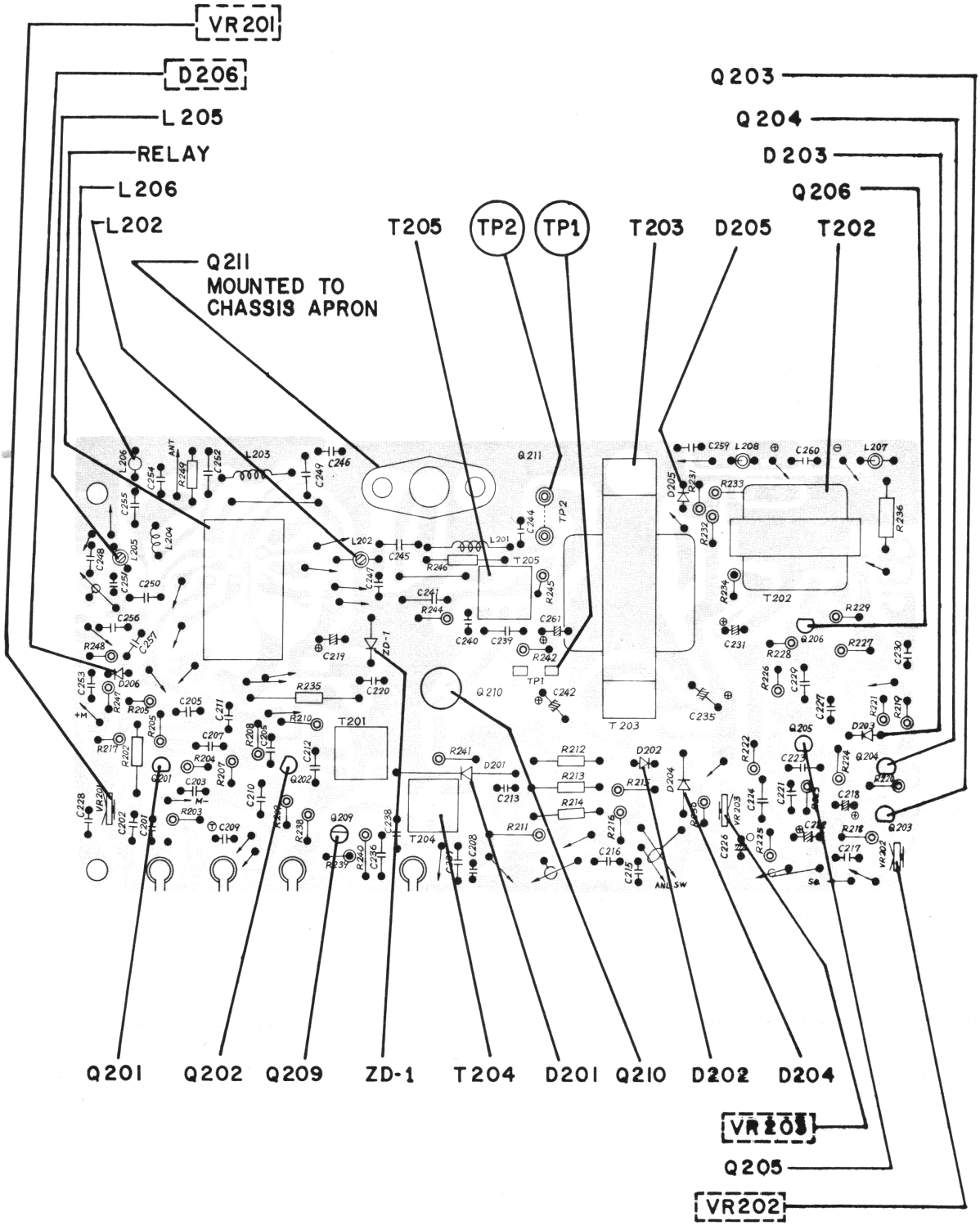



FIGURE 11, COMPONENT LOCATION DIAGRAM, CB TRANSMITTER MODULATION CIRCUIT BOARD, ISSUE D

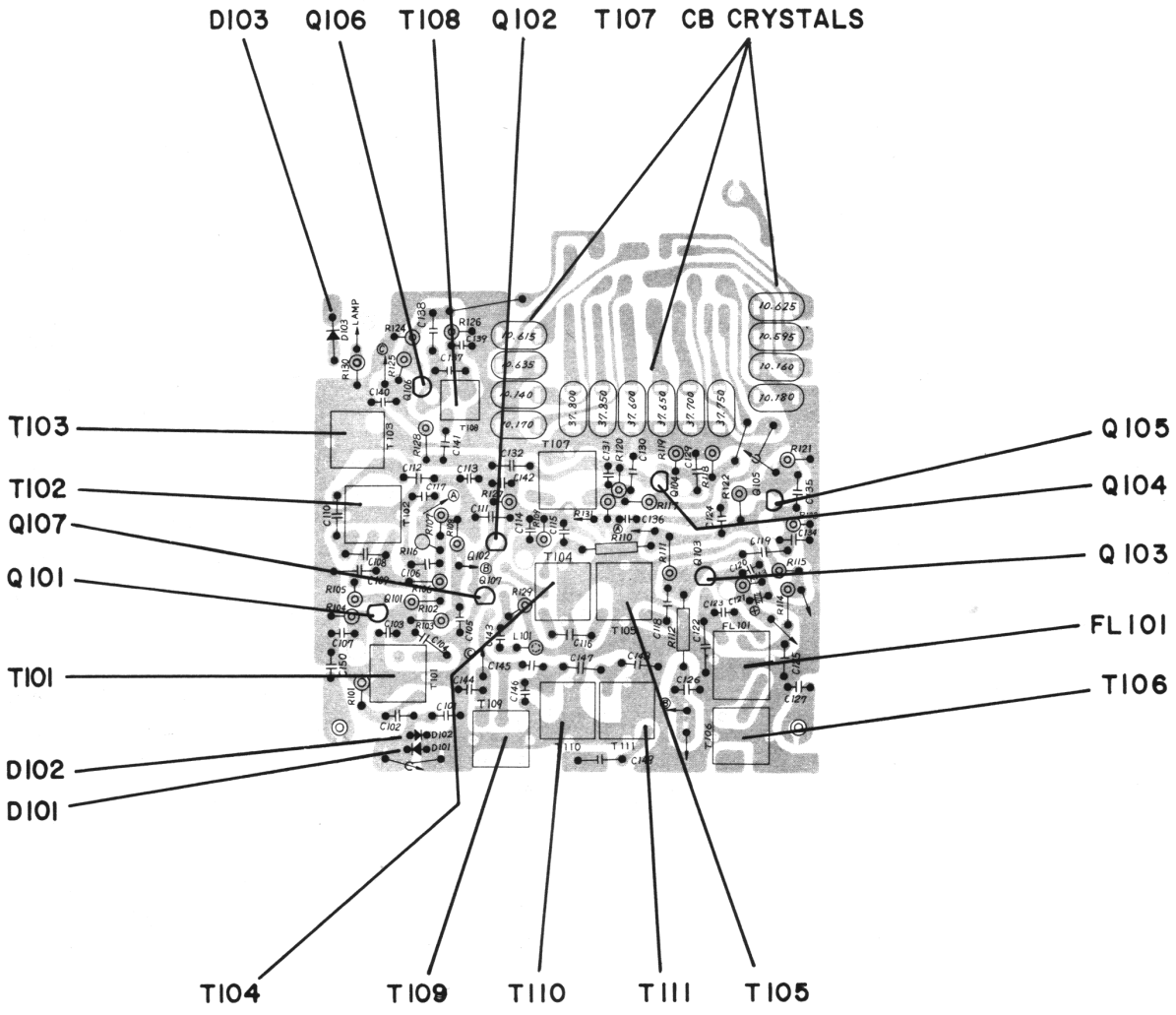



FIGURE 12, COMPONENT LOCATION DIAGRAM CB RECEIVER, ISSUE D

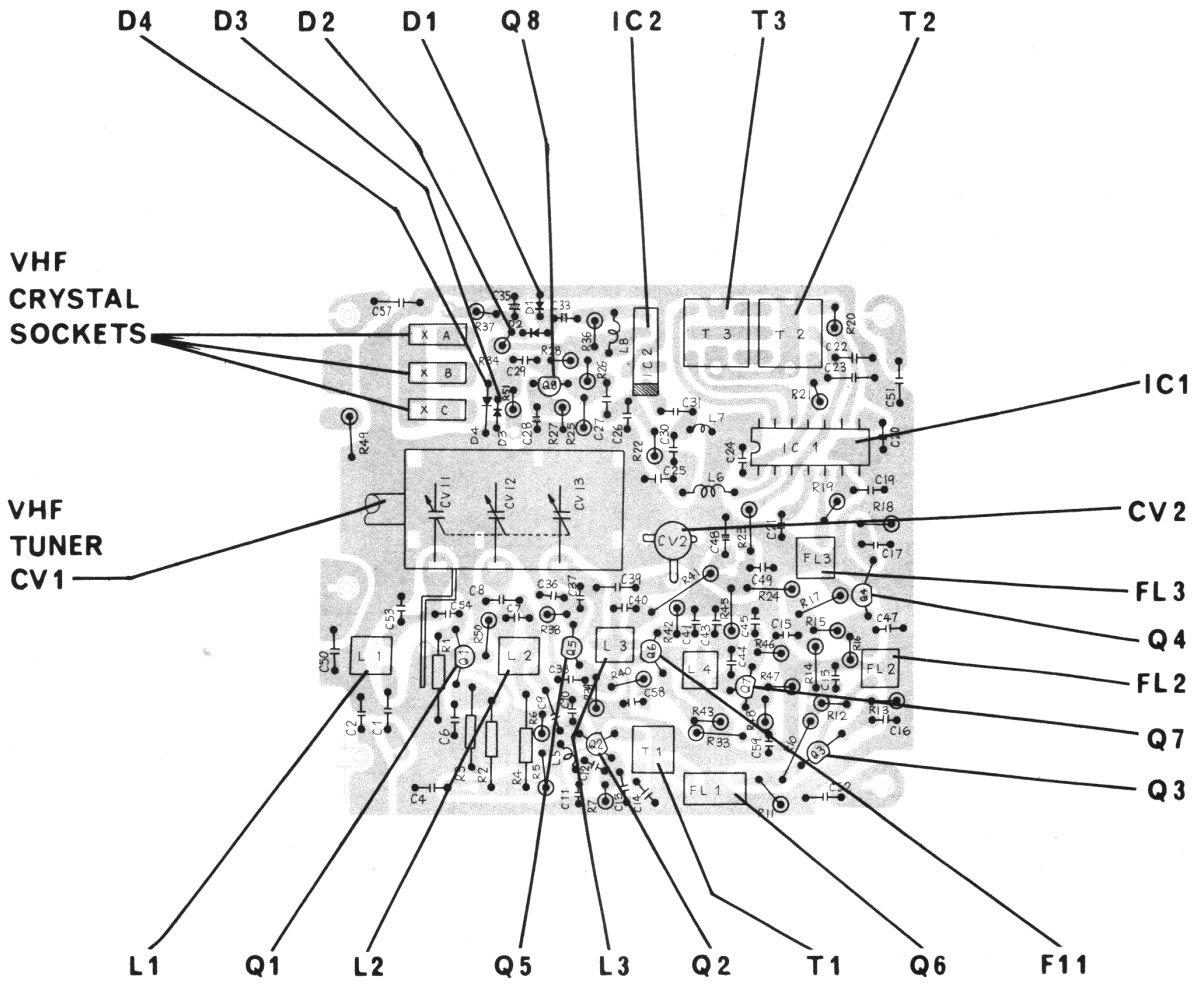



FIGURE 13, COMPONENT LOCATION DIAGRAM VHF/FM MONITOR CIRCUIT BOARD, ISSUE D

# REPLACEMENT PARTS LIST

| PART NUMBER | DESCRIPTION | SYMBOL |
|---|---|---|
| | **TRANSISTORS** | |
| 1076-01 | 2SC763(C) | Q101,102 |
| 1042-07 | 2SC710(C) | Q103-107,202-204 |
| 1043-163 | 2SC710(D) | Q201 |
| 1014-44 | 2SC711(E) | Q205 |
| 1044-03 | 2SC915(M) | Q206 |
| 1080-07 | 2SC735(O) | Q209 |
| 296-81-9 | 2SC775 | Q210 |
| 296-78-9 | 2SC1239 | Q211 |
| 1043-139 | 2SD154(H) | Q207,208 |
| 1003-103 | 2SC1047(C) | Q1,2,5,6 |
| 1042-07 | 2SC710(C) | Q3,4,7,8 |
| | **DIODES** | |
| 1076-70 | CD860037 | D101,102 |
| 1001-10 | IN60 | D201,203,204 |
| 1001-11 | IS358S | D202 |
| 1001-12 | Zener 9.1V BZ-090 | DZ-1 |
| 1001-13 | Thermister MV-1 | D205 |
| 1045-08 | WG-1012 | D1,2,3,4 |
| | **RF COILS and TRANSFORMERS** | |
| 1076-03 | TKXN-22353AQ, Antenna Coil | T101 |
| 1076-04 | " 22352Y, RF Coil | T102 |
| 1076-05 | " 1364 OHM " | T103 |
| 1043-16 | KAC-6184A, Mix Coil | T104,105 |
| 1003-35 | YXE-10857H, 455 KHz IF | T106 |
| 1043-20 | YLC-20400N " | T201 |
| 1076-06 | TKXN-13639, 38 MHz OSC Coil | T107 |
| 1076-07 | TKXC-2244DF, Tx Mix Coil | T109 |
| 1043-22 | KXN-13638HM " | T110 |
| 1043-23 | KXN-13636BM " | T111 |
| 1076-08 | UN-45 " | T204 |
| 1076-09 | UN-46, Tx Mix Coil | T205 |
| 1076-10 | UN-44, 10 MHz OSC Coil | T108 |
| 1076-11 | NCW-04, Filter Coil | L202,205 |
| 1076-12 | NS-1448 " | L203 |
| 1043-26 | NS-1344 " | L204 |
| 1003-07 | S-070-027, TVI Trap | L210 |
| 1003-08 | S-070-010 sp-401, Choke Coil | L102 |
| 1003-36 | S-070-020 " " | L201,207,208 |
| 1003-37 | IR8K Microinductor | L206 |
| 1043-17 | MFH-51T, Mechanical Filter | FL101 |
| 1003-106 | Antenna Coil, S-070-016 | L1 |
| 1003-107 | RF Coil, S-070-017 | L2 |
| 1003-108 | Oscillator (VFO) S-070-031 | L3 |
| 1003-109 | Oscillator (Xtal) S-070-032 | L4 |
| 1003-110 | IFT 119AC-10224A | T1 |
| 1003-111 | IFT TKAC-22028PPF | T2 |
| 1003-112 | IFT TKAC-22029SZ | T3 |

# REPLACEMENT PARTS LIST

| PART NUMBER | DESCRIPTION | SYMBOL |
|---|---|---|
| | **RF COILS and TRANSFORMERS, continued** | |
| 1003-113 | S-070-015, 0.15uH | L5 |
| 1003-114 | S-070-014, 1mH | L6,7 |
| 1003-115 | S-070-021, 33mH | L8 |
| 1003-36 | DC Line Filter Choke | L201,L207,L208 |
| | **AUDIO TRANSFORMERS** | |
| 1001-42 | N24-7434A 111M, Input Transformer | T202 |
| 1001-43 | N35-71637BM 11R, Output Transformer | T203 |
| 1076-18 | N35-7433H 111L, Choke Transformer | L301 |
| | **CRYSTALS** | |
| 1043-118 | 37.600 MHz | |
| 1043-119 | 37.650 MHz | |
| 1043-120 | 37.700 MHz | |
| 1043-121 | 37.750 MHz | |
| 1043-122 | 37.800 MHz | |
| 1043-123 | 37.850 MHz | |
| 1043-124 | 10.595 MHz | |
| 1043-129 | 10.615 MHz | |
| 1043-130 | 10.625 MHz | |
| 1043-131 | 10.635 MHz | |
| 1043-124 | 10.140 MHz | |
| 1043-125 | 10.160 MHz | |
| 1043-126 | 10.170 MHz | |
| 1043-127 | 10.180 MHz | |
| | **VARIABLE CONTROLS** | |
| 1003-19 | AF Volume, 10K ohm, and ON/OFF Power Sw | VR1/S2 |
| 1003-20 | Squelch, 10K ohm | VR2 |
| 1003-118 | 10K ohm B | VR202,VR203 |
| | **CAPACITORS** | |
| 1042-155 | 50V 1P, Silvered Mica | C113 |
| 1042-154 | " 2P, " | C116 |
| 1043-70 | " 3P, " | C119,145,147 |
| 1042-151 | " 5P, " | C110 |
| 1043-67 | " 12P, " | C131,142,256 |
| 1042-148 | " 20P, " | C132,238,240 |
| 1042-146 | " 30P, " | C247 |
| 1042-145 | " 40P, " | C143,258 |
| 1076-33 | " 50P, " | C103,104,141 |
| 1042-143 | " 80P, " | C108 |
| 1042-142 | " 100P, " | C101,111,112,129,134,146 |
| 1042-141 | " 120P, " | C252,255 |
| 1042-140 | " 150P, " | C148 |
| 1076-34 | " 180P, " | C249 |
| 1076-35 | " 330P, " | C135,137,149 |

# REPLACEMENT PARTS LIST

| PART NUMBER | DESCRIPTION | SYMBOL |
|---|---|---|
| | **CAPACITORS** | |
| 1076-36 | 50V 470P, Silvered Mica | C122,138,241 |
| 1003-119 | 50V 100P, Ceramic | C225 |
| 1003-120 | 50V 500P, " | C202,206 |
| 1003-212 | " 0.001uF " | C102,150,213,215,260,262 |
| 1042-157 | " 0.01uF " | C107,243,248,250 |
| 1042-159 | " 0.02uF " | C105,106,109,114,115,117 126,127,130,136,139,140, 144,151,201 |
| 1003-56 | " 0.04uF " | C124,215,212 |
| 1042-167 | " 0.005uF " | C216 |
| 1042-166 | " 0.01uF " | C227,232,233 |
| 1043-50 | " 0.02uF " | C118,120,205,223 |
| 1042-163 | " 0.04uF " | C203,210,229 |
| 1076-39 | " 0.05uF " | C224 |
| 1003-122 | 125V 500P, Styrol | C123 |
| 1076-40 | 200V 1uF, Polyester film | C234 |
| 1003-57 | 16V 5uF, Tantalum | C214 |
| 1003-58 | " 1U " | C109 |
| 1076-42 | 50V 0.5uF, Electrolytic | C261 |
| 1001-66 | 16V 1uF, " | C242 |
| 1001-70 | " 4.7uF " | C226 |
| 1042-129 | " 10uF " | C121,218 |
| 1042-127 | " 100uF " | C231 |
| 1042-125 | " 220uF " | C219 |
| 1001-72 | 25V 1000uF " | C235 |
| 1003-59 | " 7P, Ceramic | C7,36,39,53 |
| 1003-60 | " 18P, " | C44 |
| 1042-167 | 50V 0.005uF, Mylar | C25 |
| 1043-50 | " 0.02uF " | C26,27 |
| 1076-39 | " 0.05uF " | C29,30,31 |
| 1003-61 | " 10P, Silvered Mica | C3 |
| 1042-148 | " 20P " | C10 |
| 1003-62 | " 60P " | C42 |
| 1042-142 | " 100P " | C9,32 |
| 1076-35 | " 330P " | C23,50 |
| 1003-63 | ECG-N5 50K, Minic | C35 |
| 1003-64 | 6.3V 4.7uF, Electrolytic | C28,33,24 |
| 1042-129 | 16V 10uF " | C48 |
| 1003-99 | 25V .001uF, Ceramic | C1,8,12,24,45 |
| 1042-157 | 50V 0.01uF " | C2,4,6,11,16,17,38,40 41,43,58,59 |
| 1042-159 | " 0.02uF " | C13,14,19,20,21 |
| 1003-100 | " 0.05uF " | C15,18,22,49,51,52,57 |
| 1003-101 | 25V 3P " | C37,54 |
| 1003-102 | 6.3V 100uF Electrolytic | C222 |
| | **MISCELLANEOUS** | |
| 1001-56 | Heat Sink | |
| 1003-24 | Front Panel | |
| 1001-78 | Top Cabinet | |

# REPLACEMENT PARTS LIST

| PART NUMBER | DESCRIPTION | SYMBOL |
|---|---|---|
| | **MISCELLANEOUS, continued** | |
| 1001-79 | Bottom Cabinet | |
| 1003-70 | Small Knob | |
| 1003-72 | Knob Spring | |
| 1003-75 | Dial Pointer | |
| 1003-76 | Tuner Window | |
| 1003-78 | Front Plate | |
| 1003-79 | Pilot Lamp Holder | |
| 1003-80 | Mounting Screw | |
| 1001-62 | Channel Select Knob Assembly | |
| 1001-49 | Speaker, 12D40SA | |
| 1001-47 | Microphone | |
| 1043-133 | Fuse Holder | |
| 1042-104 | Fuse, 2 Amp | |
| 1003-13 | Variable Capacitor, 3 Gang | CV1 |
| 1003-14 | Variable Capacitor | CV2 |
| | **SWITCHES** | |
| 1001-52 | Rotary Switch, Channel Selector | S1-1 to 1-6 |
| 1003-82 | LPS1-2-4 VHF Selector | S3-1,3-2 |
| 1001-73 | Toggle Switch, Noise Limiter | S4 |
| | **CONNECTORS and JACKS** | |
| 1001-46 | Antenna Connector | J1 |
| 1003-18 | " for VHF | J5 |
| 1001-44 | Microphone Connector (Chassis) | J2 |
| 1001-45 | EXT SPK jack | J3,4 |
| 1076-55 | Heat Sink | |
| 1001-53 | Crystal Socket | Crystal Socket |
| 1003-34 | Relay | S5-1 thru 4 |
| 1076-54 | Relay Socket PM-16-0 | |
| 1001-55 | Pilot Lamp 6V/30mA | |
| 1001-80 | Mic. Connector (Male) | |
| | **INTEGRATED CIRCUITS** | |
| 1003-104 | UPC16C | I.C.1 |
| 1003-105 | TA-7062 | I.C.2 |
| | **CERAMIC FILTERS** | |
| 1003-12 | Ceramic Filter SFC-10.7mA | FL1,2,3 |

# REPLACEMENT PARTS LIST

| SYMBOL | DESCRIPTION | PART NUMBER |
|---|---|---|
| | **RESISTORS** | |
| R242 | Carbon Resistor 1 ohm 1/4W | 1076-21 |
| R229,233,241 | " " 18 " " | 1076-22 |
| R105,240 | " " 47 " " | 1076-71 |
| R129 | " " 68 " " | 1079-23 |
| R218,220,231,234,23, 24,41,44,50 | " " 100 " " | 1042-199 |
| R115,116,209,210,49 | " " 220 " " | 1042-197 |
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## STANDARD WARRANTY

Adopted and Recommended by Electronic Industries Association

FANON/COURIER CORPORATION warrants each new electronic product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part (at the Company's option) in exchange for any part of any unit of its manufacture which under normal installation, use and service disclosed such defect; provided the unit is delivered by the owner to us or to our authorized distributor from whom purchased, or authorized service station, intact, for our examination, with all transportation charges prepaid to our factory, within 90 days from the date of sale to original purchaser and provided that such examination discloses, in our judgment, that it is thus defective.

Written authorization must be obtained before any merchandise is returned to the factory.

This warranty does not extend to any of our electronic products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, unauthorized modifications, or to use in violation of instructions furnished by us, nor units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

This warranty is in lieu of all warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our electronic products.

**FANON/COURIER CORPORATION**

FANON
Courier

990 SOUTH FAIR OAKS AVENUE
PASADENA, CALIFORNIA 91105
SUBSIDIARY OF
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