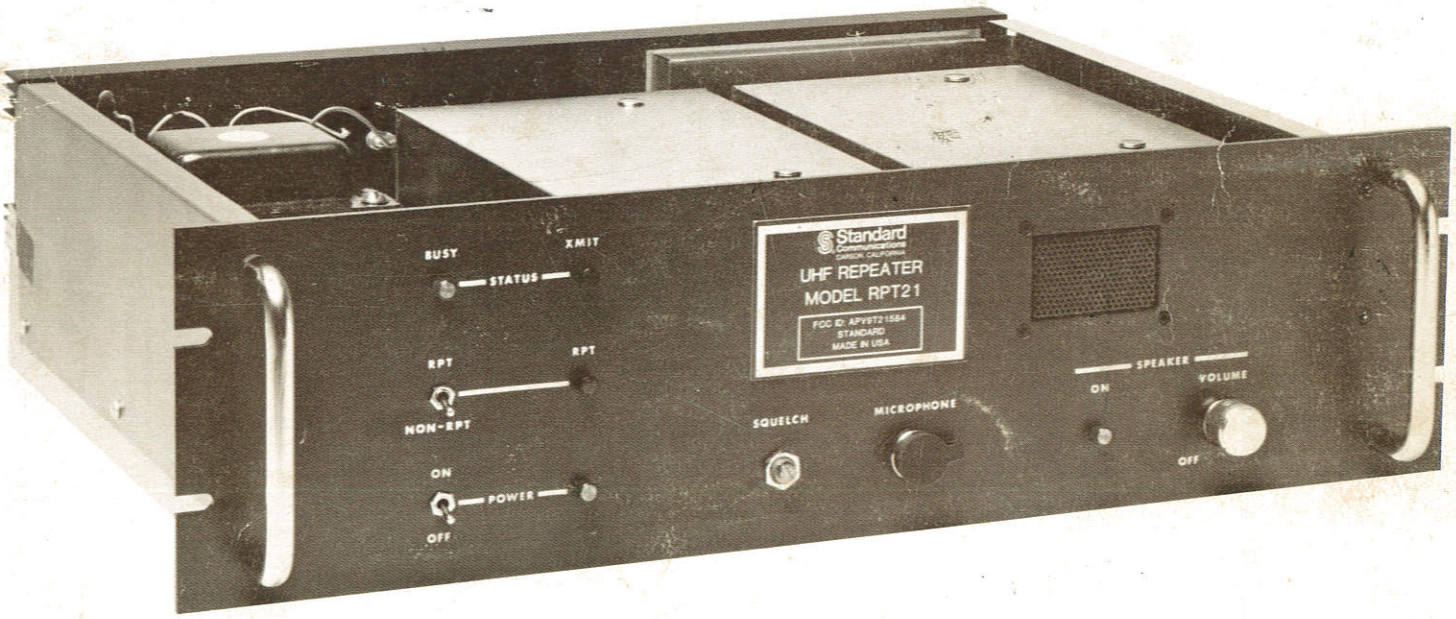
RPT 21

UHF/FM Repeater

Contains:

- ☐ Specifications
- ☐ FCC Information
- ☐ Operation
- ☐ Installation
- ☐ Theory of Operation
- ☐ Performance Tests
- ☐ Alignment Procedure
- ☐ Complete Drawings
- ☐ Parts Lists

Service Manual



Standard Communications

RPT21
UHF/FM REPEATER

This manual is intended for use by qualified technicians and includes all necessary information pertaining to RPT21 operation, installation, circuit design, and Maintenance. Changes which occur after the printed date will be incorporated in supplemental service publications.

5/85

Contents

Specifications 1

Performance specifications are nominal, unless otherwise indicated, and are subject to change without notice.

1.1 General

Frequency
Range ..... 406-420 MHz, 440-512 MHz*
Number of Channels 1
Input Voltage ..... 120 VAC, 50-60 Hz (RPT21);
230 VAC, 50-60 Hz (RPT21/22);
Optional 13.8 VDC Input
Current Drain (Standby) ..... 0.145 A
(Transmit) ..... 3.2 A
Dimensions ..... 19" W x 5 1/4" H x 13" D
Weight ..... 23 lbs.
Compliance ..... FCC Parts 21, 22, 90, and 95, DOC
FCC Type Acceptance Number APV9T21584
DOC Approval 363192450C

1.2 Receiver

Measurements are made in accordance with EIA Standard RS-204-B.

Sensitivity (12 dB SINAD) ..... 0.5 uV
(20 dB Quieting) ..... 0.6 uV
Squelch Sensitivity (Threshold) ..... 0.3 uV
Modulation Acceptance
Bandwidth ..... ±7.5 kHz min.
Selectivity ..... 80 dB min.
Spurious and Image Rejection ..... 68 dB min.
Intermodulation Rejection ..... 58 dB min.
Audio Power Output at less than
10% Distortion ..... 3.5 W min.
Frequency Stability
(-30°C to +60°C) ..... ±5 ppm

1.3 Transmitter

Measurements are made in accordance with EIA Standard RS-152-B.

RF Power Output ..... 5 W min.
Spurious and Harmonic Emissions ..... 60 dB
FM Hum and Noise .....40 dB below 1 kHz tone at 60% Modulation
Modulation 16F3
Audio Distortion ..... Less than 10% at 3 kHz deviation (1 kHz tone)
Frequency Stability
(-30°C to +60°C) ..... ±2.5 ppm
*F1 = 406-420 MHz
F3 = 440-470 MHz
F4 = 470-490 MHz
F5 = 490-512 MHz

General Information 2

The Standard Communications Corp. (SCC) Model RPT21 Series UHF/FM Repeater provides automatic repeating or local duplex operation on a single pair of channels in the 440 to 512 MHz range. It is completely solid-state, requires a 120 VAC, 50-60 Hz power source (120 VAC, 50/60 Hz for RPT21; 230 VAC, 50/60 Hz for RPT21/22) and has an RF output of 5 watts (minimum).

Features of the repeater include a carrier operated relay (C.O.R.), carrier delay, and time out timer - all integral and fully adjustable. Provisions are included for control of squelch threshold, repeat level, and instantaneous deviation control (I.D.C.). The transmitter and receiver sections are individually enclosed in steel covers for signal isolation, and the front panel is designed for standard 19-inch rack mounting.

FCC Information 3

The RPT21 has been designed to comply with the Federal Communications Commission requirements necessary to operate it in the Business Radio Service and other services within the designated frequency range. The user must be cognizant of, and comply with, all parts of the FCC Rules and Regulations which apply to the service used. Rules applicable to each service may be ordered from:

SUPERINTENDENT OF DOCUMENTS
Government Printing Office
Washington, D.C. 20402

A valid station license and call sign are required before operation of the RPT21 is permissible. This is obtained by submitting a properly and fully completed application to the FCC. It is the user's responsibility to apply for and obtain a radio license from the FCC. The following data for the RPT21 may be helpful when filling out the application.

Type Accepted ..... FCC Parts 21, 22, 90, and 95
Output Power ..... 5 Watts
Emission 16F3
Frequency Range .... 450-512 MHz
Type Accepted APV9T21584

Controls & Connections 4

Prior to operation of the repeater, the user should become familiar with all the controls and connections. Refer to the following list and Figure 1 for a description of each.

1. RPT/NON-RPT SWITCH - Selects automatic re-transmit mode (RPT) or manual transmit mode (NON-RPT). Red (RPT) lamp illuminates when the switch is in the repeat mode.

2. LED STATUS INDICATORS - Green (BUSY) lamp illuminates when the repeater channel frequency is busy. Red (XMIT) lamp illuminates when the repeater is transmitting.

3. POWER SWITCH - On/off switch applies power to the repeater. Green (POWER) lamp illuminates when the switch is placed in the "ON" position.

4. SQUELCH CONTROL - Adjusts the squelch threshold sensitivity for both repeat and non-repeat modes.

5. MICROPHONE CONNECTOR - Receptacle for connection of 5-pin microphone, used only in the locally controlled duplex mode (NON-RPT).

6. SPEAKER VOLUME - Adjusts the local internal speaker volume only. Green (SPEAKER) lamp illuminates when the control is in the "ON" position.

7. TRANSMITTER ANTENNA RECEPTACLE - Provides for connection of TX antenna.

8. MULTI TONE RECEPTACLE - Provides for interconnection of a multiple tone panel.

9. RECEIVER ANTENNA RECEPTACLE - Provides for connection of RX antenna.

10. CONTROL RECEPTACLE - Provides for connection of remote control facility.

11. RESET SWITCH - Resets the circuit breaker to restore repeater operation.

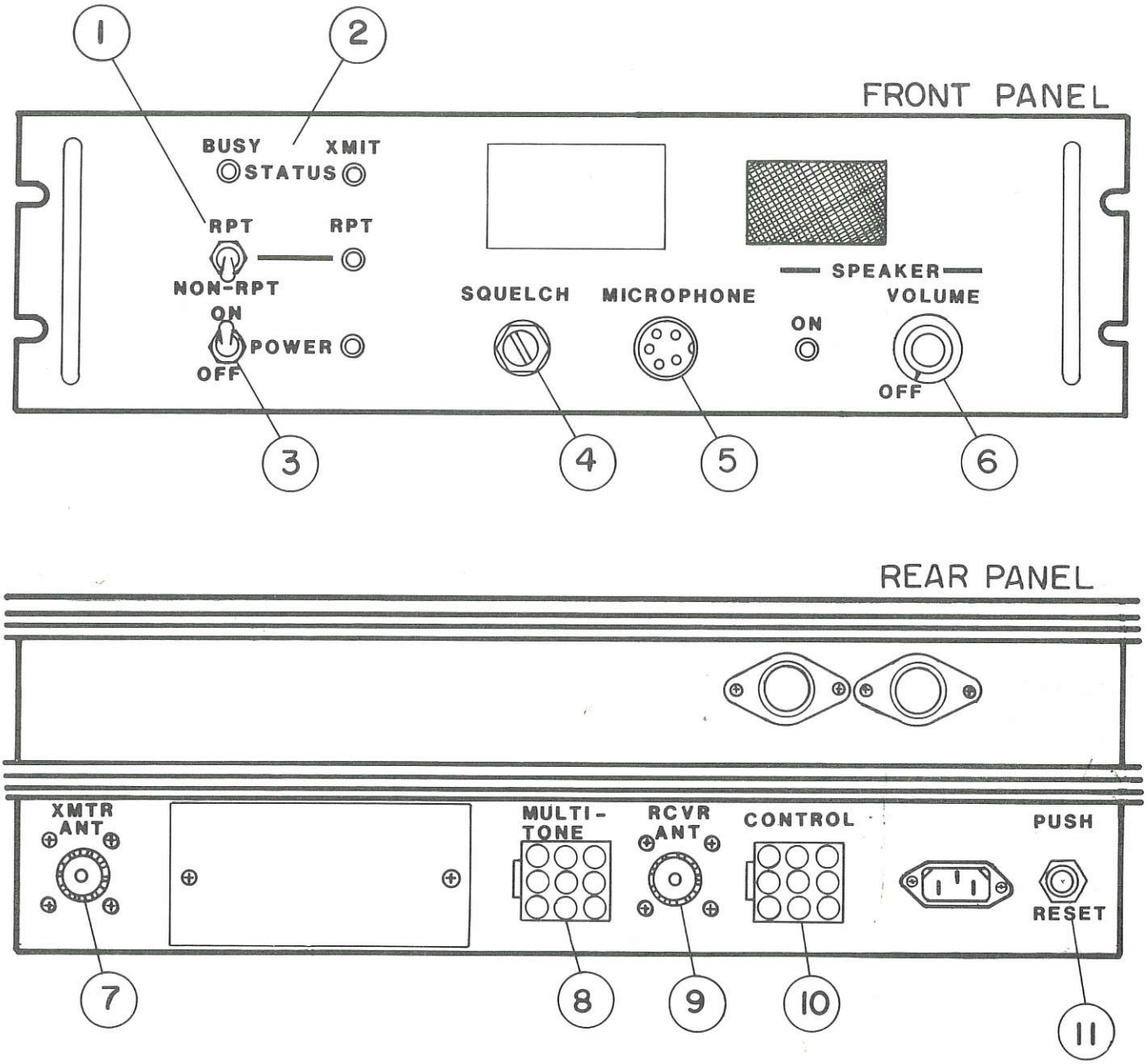


Figure 1. RPT21 Controls and Connections

Installation 5

5.1 Pre-Installation

Prior to installation of the repeater, its performance should be checked to insure optimum operation. In addition, FCC regulations require that the deviation and frequency of the radio be checked before the unit is placed in operation and at least annually thereafter. Refer to the Performance Test portion of the Maintenance section or complete performance check instructions. If the repeater does not meet the performance check requirements, proceed with the alignment and troubleshooting procedures located in the Maintenance section.

5.2 Mechanical

Normal installation includes mounting in a standard 19" rack, but the RPT21 can be mounted on any suitable surface. While selecting the location for the repeater, keep the following considerations in mind:

- The controls must be visible and accessible.
- The cables and power source must be connected to the repeater.
- Adequate ventilation must be provided. This is especially true for the rear heat sink.

5.3 Electrical

The repeater should be connected to the proper transmit and receive antennas and should be supplied with the proper power source (120 VAC 50-60 Hz for RPT21, 230 VAC, 50-60 Hz for RPT21/22) before operation. If operational equipment is used with the repeater, refer to the Repeater System Manual for interconnection to the repeater.

5.4 Adjustments

The repeater includes several variable adjustments. In general, these are the only adjustments that will be needed for normal operation.

1. Carrier Delay - Factory preset to 1.5 seconds, adjustable over the range of 0.1 to 5 seconds. If adjustment is desired, adjust R910, located on the C.O.R. circuit board.

2. Time Out Timer - Factory preset to 1.5 minutes, adjustable over the range of 0.1 to 5 minutes. If adjustment is desired, adjust R928, located on the C.O.R. circuit board.

3. Repeat Level - Factory preset to linearly repeat up to the maximum level set by the I.D.C circuit. If adjustment is desired, adjust R924, located on the C.O.R. circuit board.

Operation 6

The repeater is shipped for operation with factory installed crystals for the transmitter and receiver frequencies of your choice. For automatic repeat operation, it is necessary only to connect the unit to the recommended power source and the appropriate RX/TX antenna(s).

For initial operation, the procedure is as follows:

1. Turn the power switch to the "ON" position.

2. Turn the speaker volume on and adjust it for a normal listening level. This speaker is used only for servicing or for duplex base operation. It does not effect the repeat mode.

3. Adjust the squelch control as follows:

   a. If a multiple tone panel is installed, unplug the tone panel.

   b. Set the mode switch to NON-RPT position.

   c. Wait until the channel is clear, then slowly rotate the squelch control clockwise until the background noise just disappears. At this point the receiver is fully silenced; however, it will operate when a weak transmission is received.

   d. To stop undesired weak transmissions from operating the repeater, turn the control slightly further clockwise. This adjustment should be done carefully to avoid desensitizing the receiver more than necessary.

   e. It will be necessary to test the repeater with desirable transmissions to assure optimum squelch adjustment. (For optimum performance, the squelch control should be set to 10 dB QS).

   f. If a multiple tone panel is installed, plug the tone panel back in.

4. If using the repeater in the manual duplex mode, the mode switch should be set to the NON-RPT position and a suitable microphone should be connected to the microphone receptacle. Operation is the same as for a normal duplex radiotelephone.

5. If using the repeater in the automatic duplex mode, the mode switch should be set to the RPT position.

6. If the repeater is to be operated with a remote control, the jumper between 14E and 15E on the Communications Bus must be clipped.

Theory of Operation 7

Refer to the repeater block diagram (Figure 2) and the schematic diagrams at the rear of the manual for the following description.

7.1 Transmitter

7.1.1 Microphone Amplifier

The audio signal picked up through the microphone, or from the receiver in repeat mode, undergoes level adjustment at R364. It is applied to Q323 and then to Q322 (1/2, 2/2), and is amplified and limited. These amplifiers also give the audio a 6 dB/octave pre-emphasis and then pass it through a level control (R344). Finally, the audio is applied to the 10.7 MHz offset oscillator.

7.1.2 FM Modulated Signal

The 10.7 MHz offset oscillator is modulated by the microphone amplifier to obtain an FM modulated signal. This FM modulated signal is amplified by Q316, and is then applied to the double balanced mixer.

7.1.3 Double Balanced Mixer and TX Frequency

The transmit oscillator originates at Q401 and Q402, passes through buffer amplifier Q403, is multiplied 18 times by Q404 through Q407, and is amplified by Q324. The signal is then applied to the double balanced mixer. The transmit oscillator frequency is determined by the following equation:

$$\frac{\text{Transmit Frequency} - 21.4\text{Mhz}}{36}$$

The transmit oscillator and the 10.7 MHz offset oscillator are mixed in the double balanced mixer Q309 - Q312 and converted into one half the transmit frequency. This signal is doubled by Q304, amplified by Q303 - Q301, and applied to a transmit booster.

7.2 Receiver

The receiver is designed for the UHF range of 406 to 512 MHz. See "Specifications" for the "F" ranges.

7.2.1 RF Stage

A signal from the antenna is fed into a two-stage bandpass filter (L101, L102). It is then applied to the source of the RF amplifier (Q103) where it is amplified. The signal is then once again filtered through a high Q bandpass filter (L103, L104).

7.2.2 First Mixer and First Local Oscillator Injection

The signal which passed through the bandpass filter is sent to the gate of the first mixer (Q105).

The first local oscillator originates at Q133 and is multiplied 36 times by Q130 through Q120. It is then applied to the source of the first mixer (Q105).

The receiver crystal frequency is determined in the same way as the transmit crystal frequency.

7.2.3 First and Second IF

The heterodyning action of the first mixer produces a 21.4 MHz intermediate frequency (first IF), which is applied to a two stage crystal filter (F101 and F102), then amplified by Q106, and applied to the base of the second mixer (Q107). The 21.855 MHz second L. O. signal from Q119 is also applied to the base of Q107.

These two signals are then mixed by Q107, and a 455 kHz frequency is produced. This converted signal is filtered through two bandpass filters (F103 and F104), and applied to the second IF amplifier (Q108). The amplified signal passes through L110 and is applied to Q110 and Q111.

7.2.4 Discriminator

L110, Q110, and Q111 form an FM discriminator. The IF signal is converted into an audio signal in the FM discriminator. If a multiple tone panel is used, this audio signal is fed through L111 and R127 to the multiple tone panel. This audio signal is also fed through R128 to PRE AMP Q112 for repeat audio or for amplification by Q114. Q114 supplies the necessary power to drive the local speaker.

7.2.5 Noise Squelch

L112, L113, L114, and C130 form a high pass filter to feed noise to the squelch circuit. This noise is amplified through Q115 and converted to a DC signal by Q117 and Q116. The DC signal controls DC switch Q118 which turns off PRE AMP Q112 when no signal is present.

7.3 C.O.R./Timer

The C.O.R./Timer provides the following four basic functions in repeater operations:

1. To key the transmitter push-to-talk relay, K1, when a proper signal appears in the discriminator output to Q901.

2. To provide a delay to keep the transmitter on for a predetermined period of time after the received signal "drops out".

3. To remove the inhibit at the input of Q112, permitting local monitoring (when the switch is actuated).

4. To turn the transmitter off after a predetermined period of time, limiting the length of individual transmissions through the repeater.

C.O.R. Operation

Transistors Q902 and Q903 form a regenerative DC switch, or Schmitt trigger. When a carrier quiets the 455 kHz IF, the squelch detector output falls relatively slowly; however, the Schmitt trigger will change state instantaneously, permitting the charging drivers, Q904 through Q906, to rapidly charge the timing capacitor, C902, to the supply voltage. This initiates the following actions.

1. Transistor Q911 turns on, removing the inhibit from Q118 on the receiver board.

2. Transistor Q912 turns off, removing an inhibit at the input of Q913 and applying the demodulated audio to the first speech amplifier, Q323, in the transmitter through the RPT/NON-RPT switch. A de-emphasis network is provided at the input to Q913, and R924 permits the audio level of the repeated signal to be adjusted.

3. Relay drivers Q907, Q908, Q909, Q910, and Q916 energize relay K1, initiating the time-out timer function.

Upon loss of signal input the squelch detector output goes positive and the Schmitt trigger again changes state. This causes the following actions.

1. Charging drivers Q904 through Q906 go to the off state.

2. Transistor Q911 turns off, permitting Q118 to inhibit the input to Q112 and mute the receiver audio.

3. Transistor Q912 turns on, inhibiting Q913 and removing the FM detector output from the transmitter input to prevent repeating "noise".

4. The charge on timing capacitor C902 decays through R910. Adjustment of R910 permits the delay to be set to a predetermined period between 0.1 and 5 seconds. When the charge drops to a low level, relay drivers Q907, Q908, Q909, Q910, and Q916 turn off, de-energizing K1 to produce the following actions.

   a. The transmitter is turned off.

   b. The time out timer resets.

7.4 Time Out Timer

When K1 is energized, it applies +13.8 VDC to Q914 and Q915 to initiate the time-out function. The time constant at the input to Q914 is adjustable by R928, permitting the time-out delay to be set to a predetermined period of time between 0.1 and 5 minutes. At the end of the time-out period Q917 energizes. This opens the ground return to K1, turning the transmitter off. When the C.O.R. relay (Q910 and Q916) de-energizes after the delay at loss of signal, the timer will recycle almost instantaneously as C905 discharges to ground through R930, D903, and Q917.

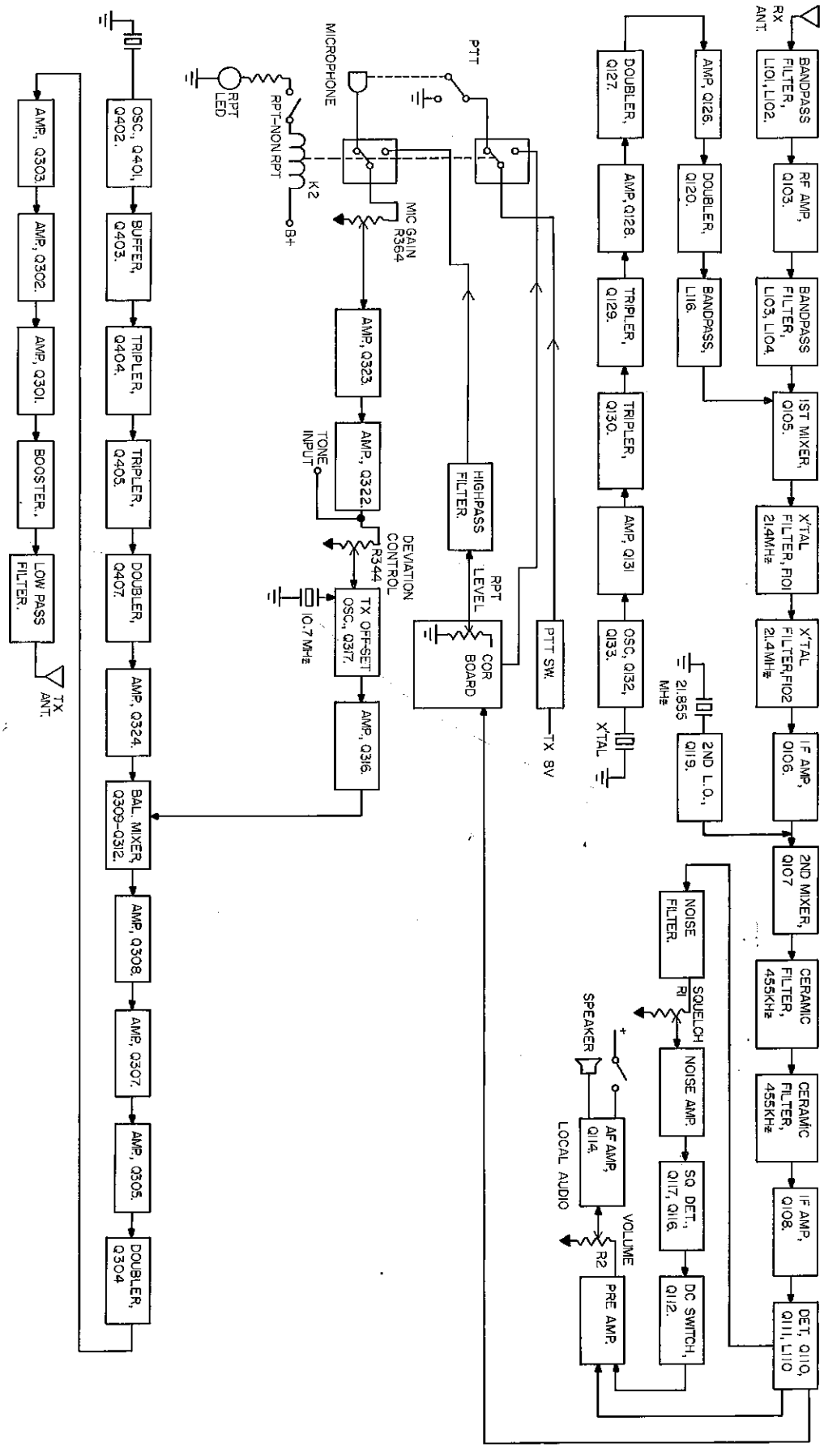


Figure 2. Block Diagram

Maintenance 8

8.1 FCC Requirements

8.2 Precautions

The inherent quality of the solid-state components used in the repeater will provide many years of continuous use without failure, assuming the unit is treated with care. The following precautions should always be observed to prevent damage to the repeater.

1. Never turn on the repeater or key the transmitter unless an antenna or suitable dummy load is connected to the transmitter antenna receptacle of the repeater.

2. Avoid excessive or insufficient line voltage. The voltage should not exceed the limits of 120 VAC ±10% (RPT21), 230 VAC ±10% (RPT21/22), or 13.8 VDC ±10% (optional RPT21).

8.3 Test Applications

Maintenance on the repeater should be performed in the following sequence.

1. Performance Test - Conducted to check the overall performance of the repeater. Should be performed prior to the sale/installation of the repeater and prior to any corrective maintenance.

2. Alignment/Adjustment - Conducted if the repeater fails the Performance Test and/or a critical electrical component has been replaced in the repeater. In addition, SCC recommends that the repeater be retuned whenever it requires maintenance.

3. Troubleshooting - Isolates a fault in the repeater.

Remove the covers from the repeater to obtain access to the test and adjustment points. Connect it to the recommended power source. Test equipment hookups are illustrated in Figures 3 and 5. Alignment reference point locations are illustrated in Figures 4 and 6.

8.4 Test Equipment

The following maintenance procedure is supplied assuming that repair technician has access to the following test equipment, or its equivalent.

EQUIPMENT	MODEL
FM Communications Monitor	Cushman CE-6A
RF Wattmeter w/50 Ohm Load	Bird 6154
Two-Tone Generator	Cushman CE-11
Voltmeter	HP 427A
RF Probe	HP 1109B
Frequency Counter	HP 5314A
Oscilloscope	HP 1220A
Power Supply	Ratelco 2046B
Sinadder	Helper Instruments
Zero Center Meter	25 uA - 0 - 25 uA
RF Spectrum Analyzer	HP 8559B w/Display

8.5 Alignment

For this procedure, ensure the following:

- The power cord is connected to an appropriate power supply.
- A crystal is installed.
- R194 on the RX board has been clipped.

CAUTION

Exercise extreme care in adjusting the slug-tuned inductors as the cores are extremely brittle. Use an SCC P/N A00416402, SCC P/N A00416422, or SCC P/N A582001001 adjustment tool, as appropriate.

8.5.1 TX Oscillator

Connect the test equipment as illustrated in Figure 3.

1. Rotate the Output Power Control (R383) fully clockwise.

2. Ensure that the repeater is in transmission mode.

3. Connect a voltmeter to TP1.

4. Adjust L401, L402, and L403 for maximum voltage.

   NOTE: If the peak of L403 cannot be determined, move L402 slightly and again attempt to determine the peak.

5. Move the voltmeter to TP2.

6. Adjust L404 and L405 for maximum voltage.

7. Move the voltmeter to TP3.

8. Adjust L407, L408, L330, and L331 for maximum voltage.

9. Repeat Steps 3 to 8 several times.

8.5.2 TX Offset, Output Power, and Frequency

Connect the test equipment as illustrated in Figure 3.

1. Ensure that the repeater is in transmission mode and has been operating for at least 5 minutes. This allows the ovens to warm up.

2. Move the voltmeter to TP4.

3. Adjust L326 and L325 for maximum voltage.

4. Disconnect the voltmeter, and connect a frequency counter to the top of diode Q315. Also, remove the crystal board.

5. Adjust L327 to a frequency of 10.70000 MHz, ±.00002.

   NOTE: Reinstall the crystal board, and disconnect the frequency counter.

6. Connect a voltmeter to TP6.

7. Adjust L316 through L320 for maximum voltage. Then disconnect the voltmeter.

8. Adjust C316, C399, C310, C306, and C302 for maximum output power.

9. Repeat Steps 9 and 10 several times.

10. Adjust R383 to obtain an output power of 1 watt.

11. Use a coupler to connect the frequency counter to the booster input.

12. Adjust CX03 to obtain the desired frequency.

8.5.3 TX Deviation

Connect the test equipment as illustrated in Figure 3.

1. Ensure that the repeater is in the transmission and NON-RPT modes.

2. Set an audio generator to an audio signal of 1000 Hz, and an output level of 50 mV.

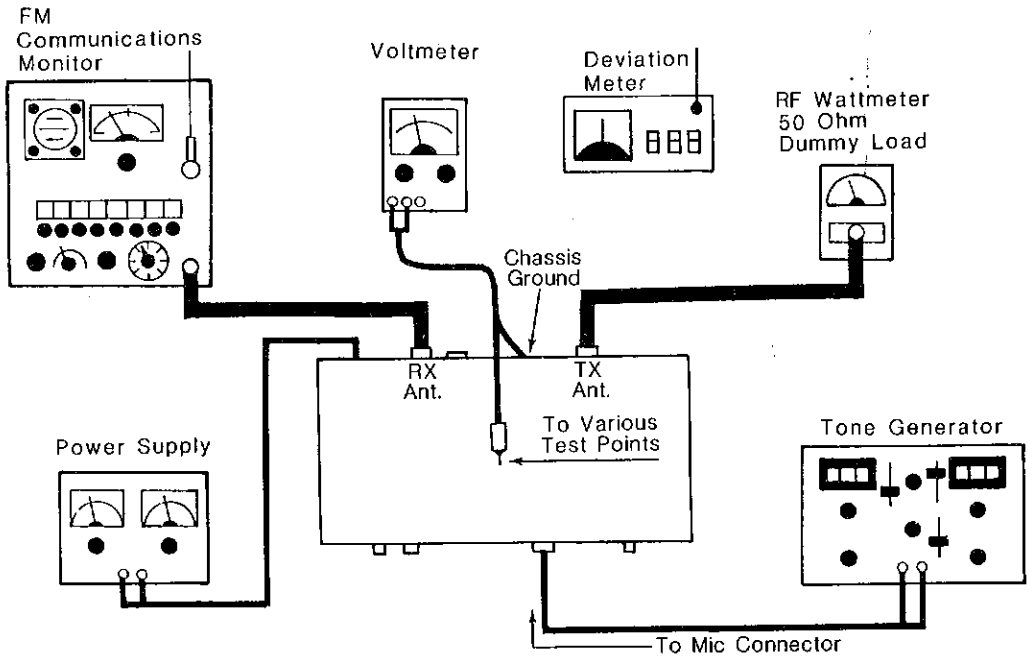


Figure 3. TX Test Setup

3. Connect the audio generator to pins 1 - 4 in the MIC connector as follows:

   - The high, through a .1 uF capacitor, is connected to pin 1.
   - The low or shield is connected to pin 4.

4. Adjust R344 for a deviation of ±4.5 kHz.

5. Lower the level of the audio generator to 5 mV.

6. Adjust R364 for a deviation of ±3 kHz.

7. Raise the level of the audio generator to 50 mV.

8. Adjust R344 for a deviation of ±4.5 kHz.

9. Repeat Steps 5 through 8 several times until a +3 kHz deviation is obtained for a 5 mV audio generator input, and a +4.5 kHz deviation is obtained for a 50 mV audio generator input.

10. Adjust L328 if the deviation is ±4.5 kHz and the frequency counter indicates a difference of 200 Hz or more in the CW mode.

11. Readjust the frequency and deviation.

8.5.4 RX Oscillator

Connect the test equipment as illustrated in Figure 5.

1. Switch the repeater to NON-RPT mode.
2. Connect a voltmeter to TP1 (R175).
3. Adjust L128, L127, and L126 for maximum voltage.
4. Connect a voltmeter to TP2 (R170).
5. Adjust L125 and L124 for maximum voltage.
6. Connect a voltmeter to TP3 (R165).
7. Adjust L123 for maximum voltage.
8. Connect a voltmeter to TP4 (R161).
9. Adjust L121 and L120 for maximum voltage.

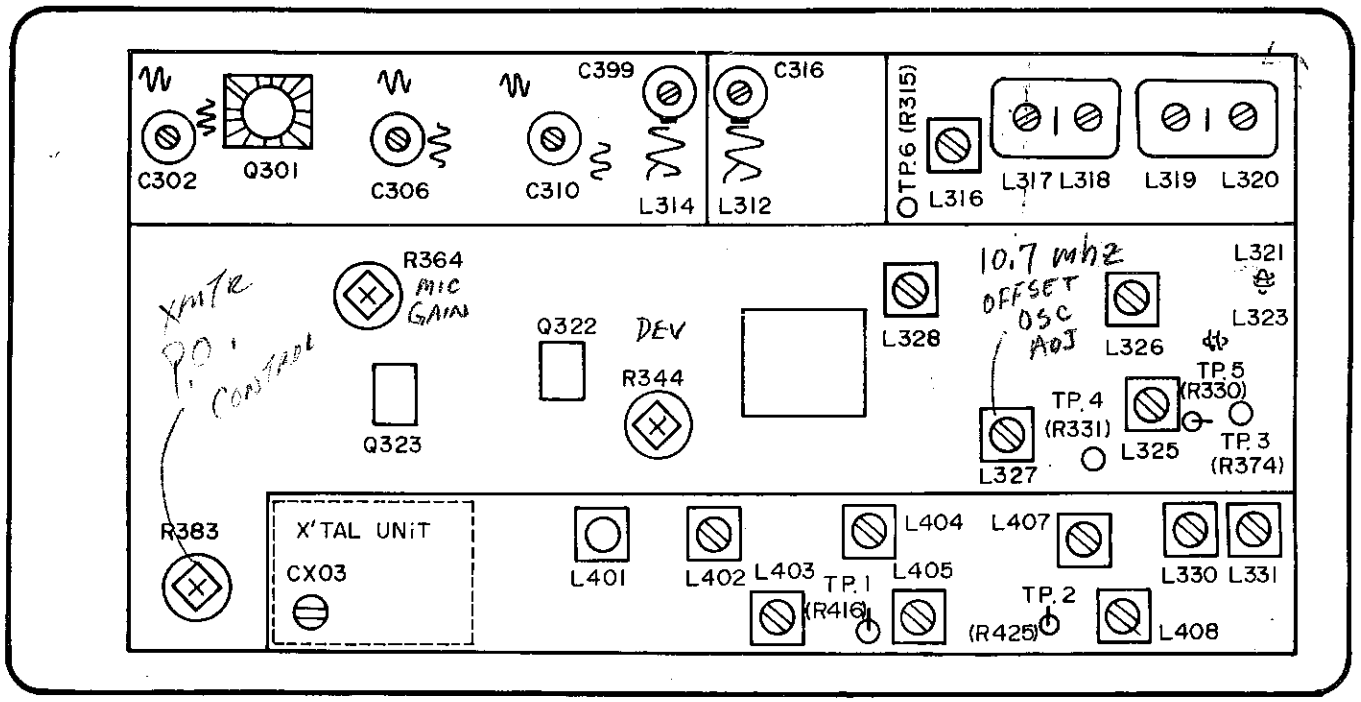


Figure 4. TX Alignment Points

10. Connect a voltmeter to TP5 (R158).

11. Adjust L119 and L118 for maximum voltage.

12. Fine tune, in order, L128 through L123, and L121 through L118 to obtain the maximum voltage of each coil.

8.5.5 Discriminator and IF

Connect the test equipment as illustrated in Figure 5.

1. Ensure that the squelch is off.

2. Adjust L111 for maximum noise.

3. Set the signal generator modulation to a deviation of ±3.0 kHz with a 1 kHz tone.

4. Connect a zero center meter to pin 6 of J102, and air couple the signal generator output (455 kHz at about 20 dB QS) to the second IF.

5. Adjust L110 until the needle of the center meter is deflected to the zero position. Ensure that the needle will deflect to the left and the right when L110 is adjusted.

6. Connect the signal generator to the receiver antenna jack, and adjust it for approximately 12 db SINAD on the desired receive frequency.

7. Adjust, in order, L101 through L104, C168, C171, L107, L106, L108, and L109 for maximum SINAD. Repeat several times.

   NOTE: Reduce the output of the signal generator as needed to maintain approximately 12 dB on the SINAD meter.

8.5.6 IF and RF

Connect the test equipment as illustrated in Figure 5.

1. Set the signal generator modulation to ±3.0 kHz deviation with a 1 kHz tone.

2. Ensure that the squelch is off.

3. Connect a voltmeter to TP7 (R118).

4. Adjust the signal generator output until the deflection of the meter is approximately 0.1 V.

5. Adjust, in order, C171, C168, L107, L106, L108, and L109 for the maximum voltage at TP7 (R118). Repeat several times. Adjust the signal generator output to maintain a voltmeter reading of 0.1 V.

   NOTE: Adjust C171 and C168 alternately for the point of maximum voltage.

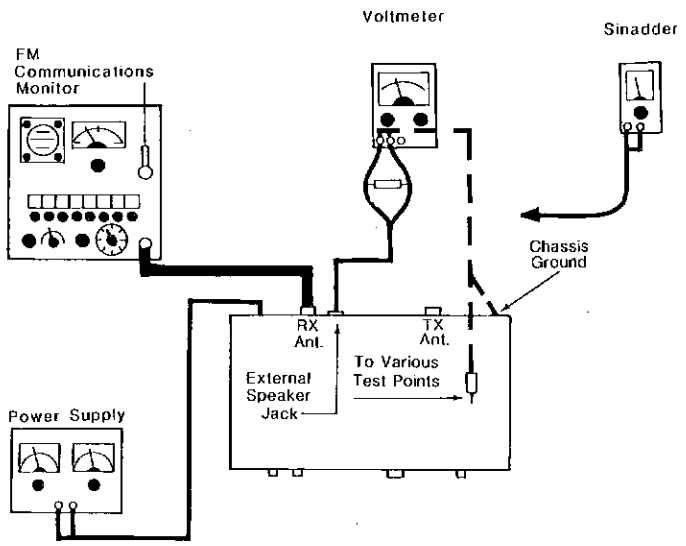
6. Adjust, in order, L101 through L104 for maximum voltage at TP7 (R118). Repeat several times. Adjust the signal generator output to maintain a voltmeter reading of 0.1 V.

7. Remove the voltmeter from TP7 (R118), and set the signal generator to CW.

8. Adjust L101 through L104 several times for maximum 20 dB QS reading (minimum noise).

   NOTE: The alignment of L101 through L104 is especially narrow.

9. Repeat Steps 4 and 5 several times.



Figu1 **RX Test Setup**

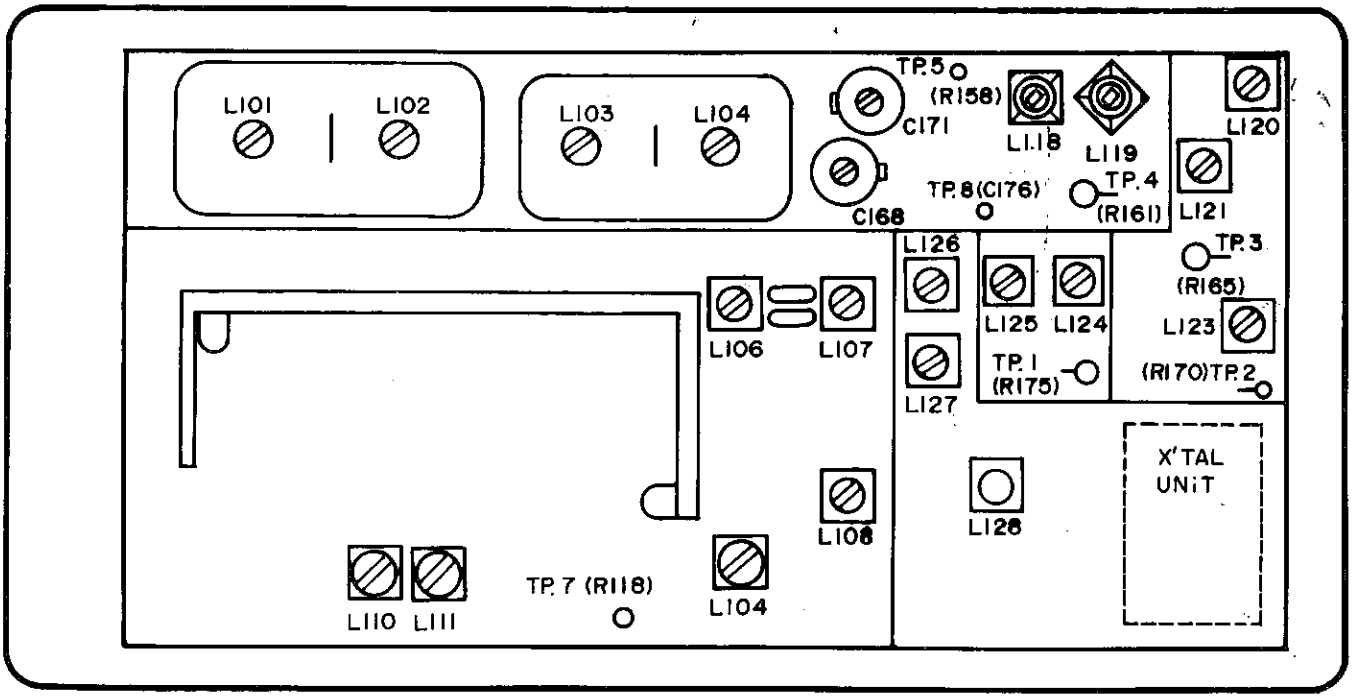


Figure 6. RX Alignment Points

8.6 Performance Test

8.6.1 Transmitter

1. Connect a wattmeter with a 50 ohm load to the TX antenna receptacle.
2. Set the RPT/NON-RPT switch to the NON-RPT position.
3. Key the transmitter by pressing the microphone PTT switch.
4. Confirm that the power output is at least 6 watts.
5. Set an FM communications monitor to measure the exact transmitter frequency of the unit.
6. Key the transmitter, and confirm that the FM monitor indicates the exact transmitter frequency ±500 Hz.
7. Set the FM communications monitor to the transmitter deviation.
8 Key the transmitter, and speak into the microphone. Deviation must not exceed ±5.0 kHz.

8.6.2 Receiver

1. Connect an FM signal generator to the RX antenna receptacle.
2. Connect an AC voltmeter to the speaker.
3. Turn the squelch control counterclockwise for maximum noise.
4. Adjust the volume control for a voltmeter reading of 2.0 VAC.
5. With the signal generator set at the receive frequency (no modulation), slowly increase the signal level until the voltmeter reading is reduced to 0.2 VAC (20 dB decrease). Verify that the signal generator output does not exceed 0.5 uV.
6. Set the signal generator modulation to ±3 kHz with 1 kHz tone.
7. Turn the squelch control fully clockwise (maximum quieting).
8. Increase the signal generator output until the audio is recovered at the speaker again. Confirm that the signal level of the signal generator is below 5 uV.
9. Reduce the signal generator output to zero.
10. Adjust the squelch control to the point where the speaker noise just cuts out (threshold).
11. Ensure that speaker noise returns with a signal generator input of less than .35 uV.

8.6.3 Repeater

1. Connect a wattmeter with a 50 ohm load to the TX antenna receptacle.
2. Set the RPT/NON-RPT switch to the RPT position, and select a tone if applicable.
3. Connect the signal generator to the RX antenna receptacle.
4. Inject a signal at the repeater receive frequency with ±600 Hz of the appropriate tone deviation. Confirm that the repeater keys up.
5. Disconnect the injected signal, and confirm that the repeater stays keyed-up for the designated hang time.

Drawings 9

The drawings in the section show the electrical and mechanical parts locations and interconnections of the RPT21. The values of most electrical parts are indicated on the schematic diagrams.

Figure 7. Interconnect Schematic Diagram

Figure 8. TX Schematic Diagram

Figure 9. TX P.C. Board Layout

Figure 10. RX Schematic Diagram

Figure 11. RX P.C. Board Layout

Figure 12. C.O.R. Schematic Diagram

Figure 13. C.O.R. P.C. Board Layout

Figure 14. TX/RX Crystal P.C. Board Layout

Figure 15. Power Amplifier Schematic Diagram

Figure 16. Power Amplifier P.C. Board Layout

Figure 17. High Pass Filter Schematic Diagram

Figure 18. High Pass Filter P.C. Board Layout

Figure 19. Communications Bus P.C. Board Layout

Figure 20. RPT21 Exploded Parts View

Figure 21. RX Exploded Parts View

Figure 22. TX Exploded Parts View

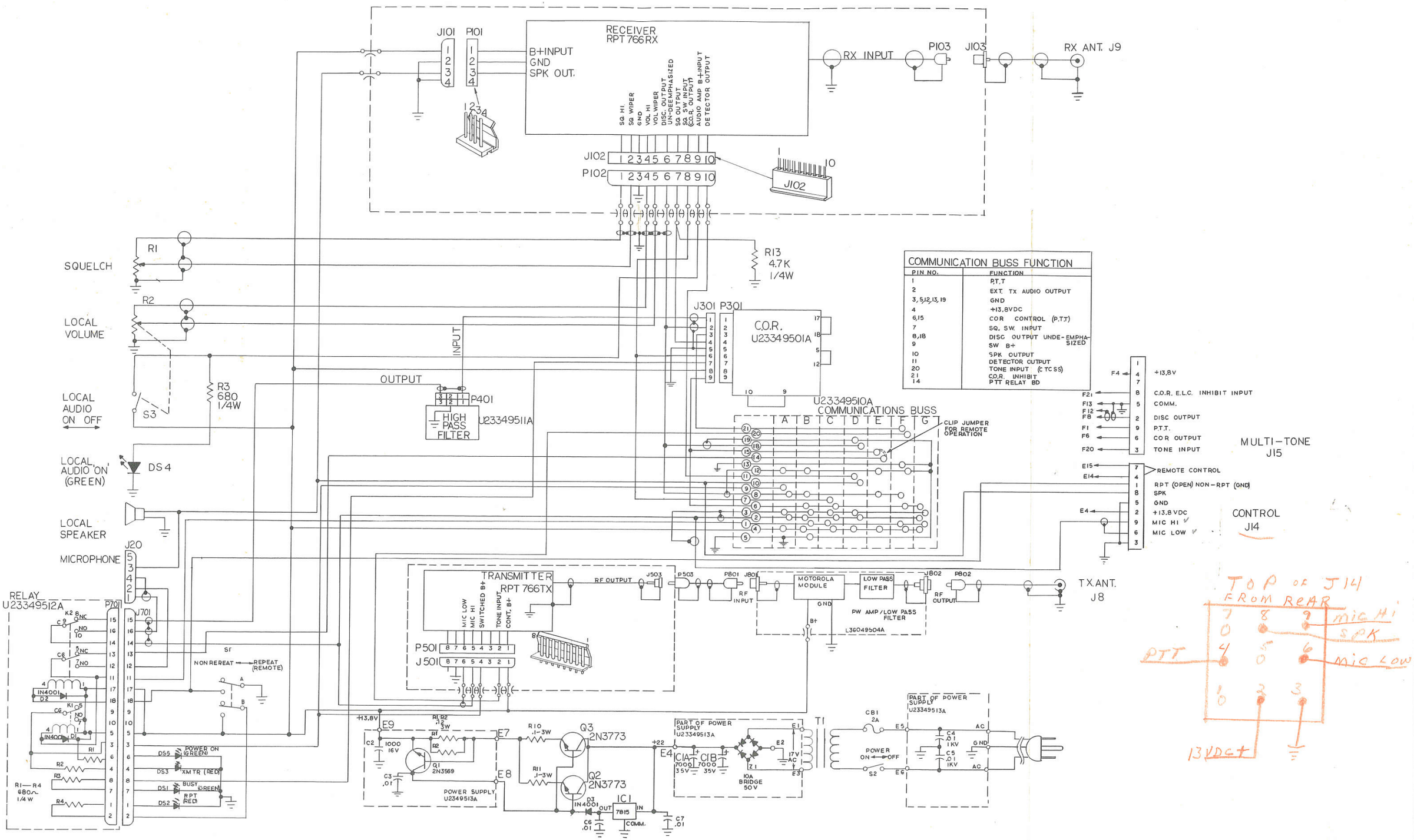
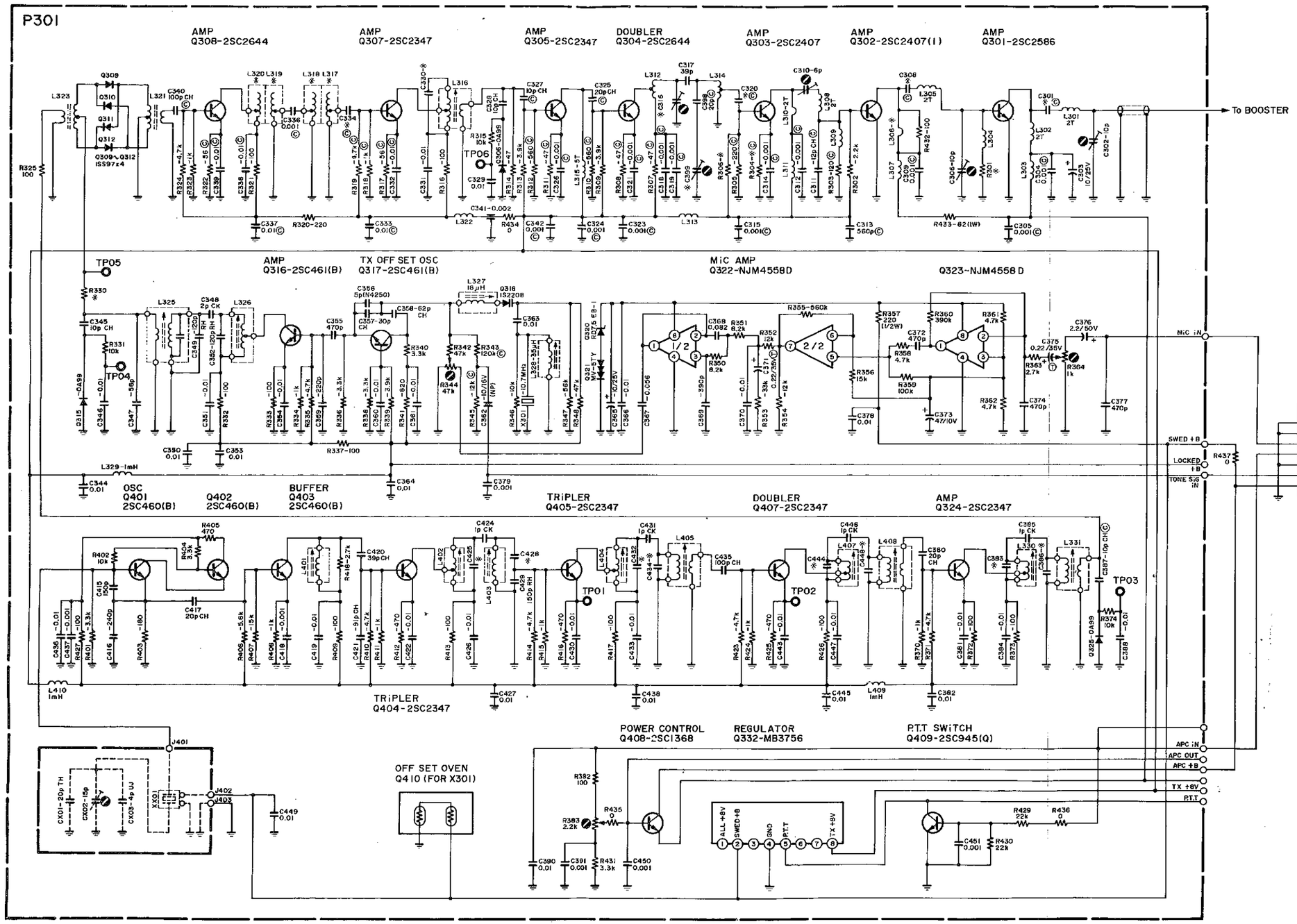


Figure 7. Interconnect Schematic Diagram

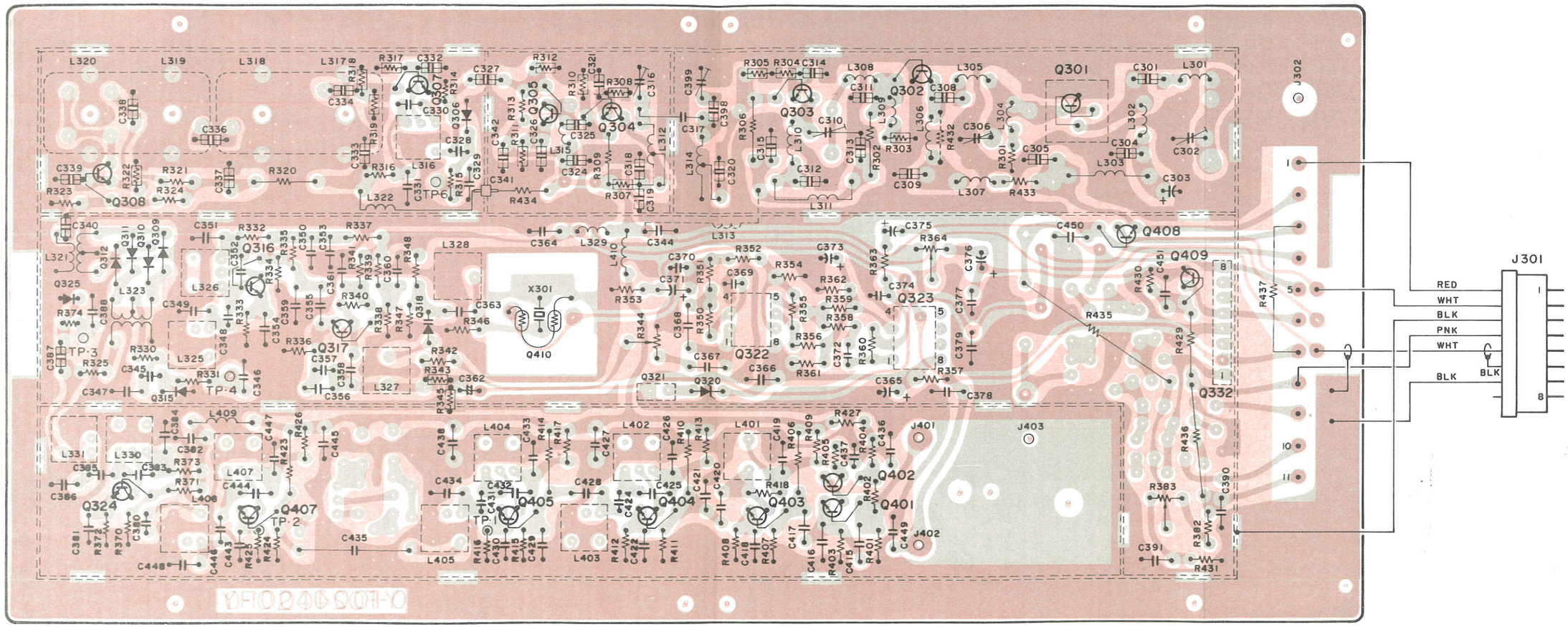


※-F CHART

	C301	C308	C316	C320	C330	C334	C383	C386	C399	C425	C428	C432	C434	C444	C448	L306	L317	L318	L319	L320	R301	R304	R306	R330
F3	12p CH	6p CH	6p TRIM	1p CK	7p RH	20p CH	6p RH	7p RH	6p TRIM	39p RH	47p RH	13p RH	15p RH	5p RH	7p RH	LCI5000110	LCI5010102	LCI5010112	LCI5010112	LCI5010102	22	22	1k	10

Figure 8. TX Schematic Diagram

P301



COMPONENTS SIDE

SOLDER SIDE

Figure 9. TX P.C. Board Layout

RF AMP Q103 2SK125(3)

1st MIXER Q105 2N5668

1st IF AMP Q106 2SC460(B)

2nd MIXER Q107 2SC460(B)

2nd IF AMP/DET Q108-H8D1216

DOUBLER Q120-2SC2644

SWITCH Q121-2SC945(Q)

2nd LOCAL Q119-2SC945(Q)

PRE AMP Q112-2SC945(R)

REGULATOR Q124-MB3756

NOISE AMP Q115-TA7063P

DC SWITCH Q118-2SC945(Q)

AF AMP Q114-HA1366W

AMP Q126-2SC2347

DOUBLER Q127-2SC2347

AMP Q128-2SC2347

TRIPLER Q129-2SC2347

TRIPLER Q130 2SC2347

AMP Q131 2SC460(B)

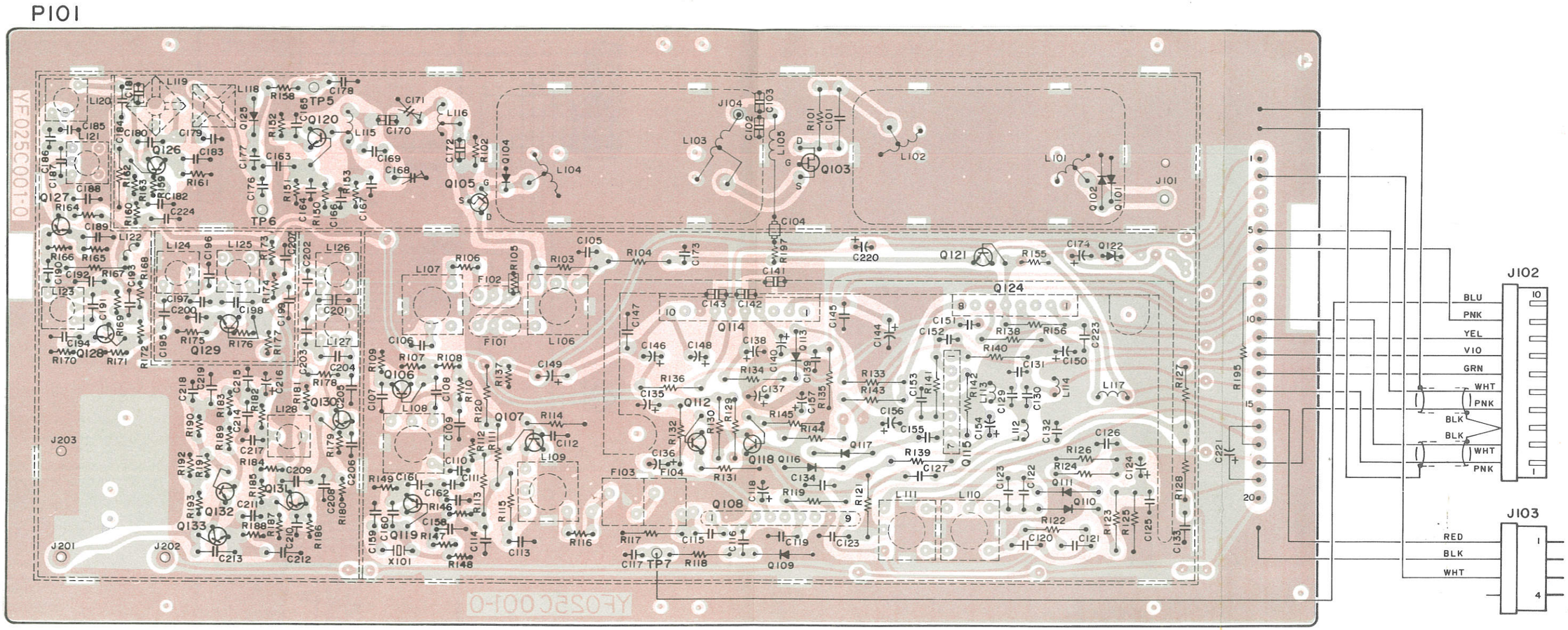
Q132 2SC460(B)

Q133 2SC460(B)

※-F CHART

	C179	C180	C185	C187	C191	C196	C198	C201	C204	L101	L102	L103	L104	L115	L116
F3	5p RH	6p RH	7p RH	6p RH	16p RH	15p RH	15p RH	43p RH	43p RH	LCI1210082	LCI1210052	LCI1210250	LCI1210072	LCI7000102	LCI7000130

Figure 10. RX Schematic Diagram



COMPONENTS SIDE

SOLDER SIDE

Figure 11. RX P.C. Board Layout

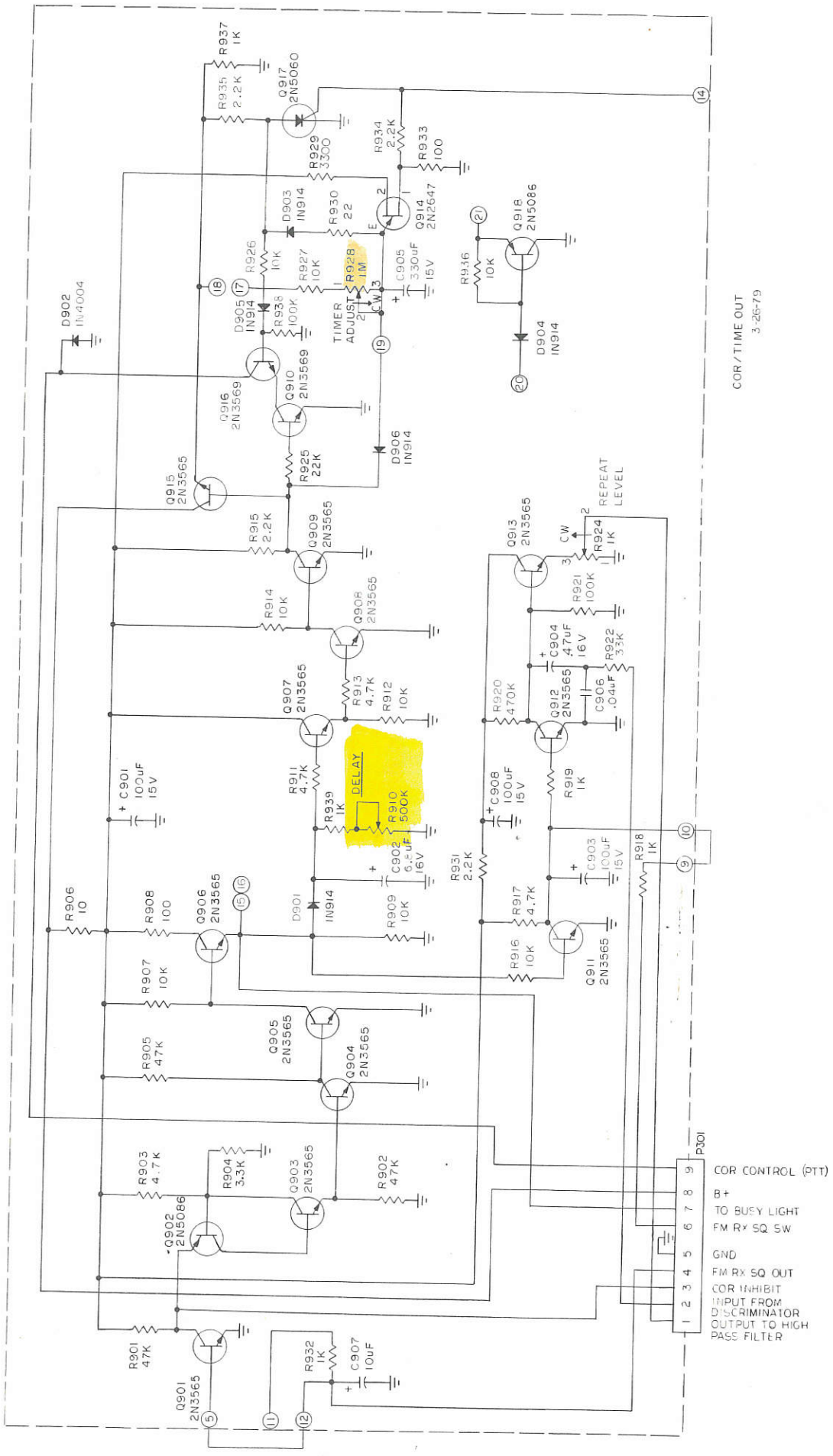


Figure 12. C.O.R. Schematic Diagram

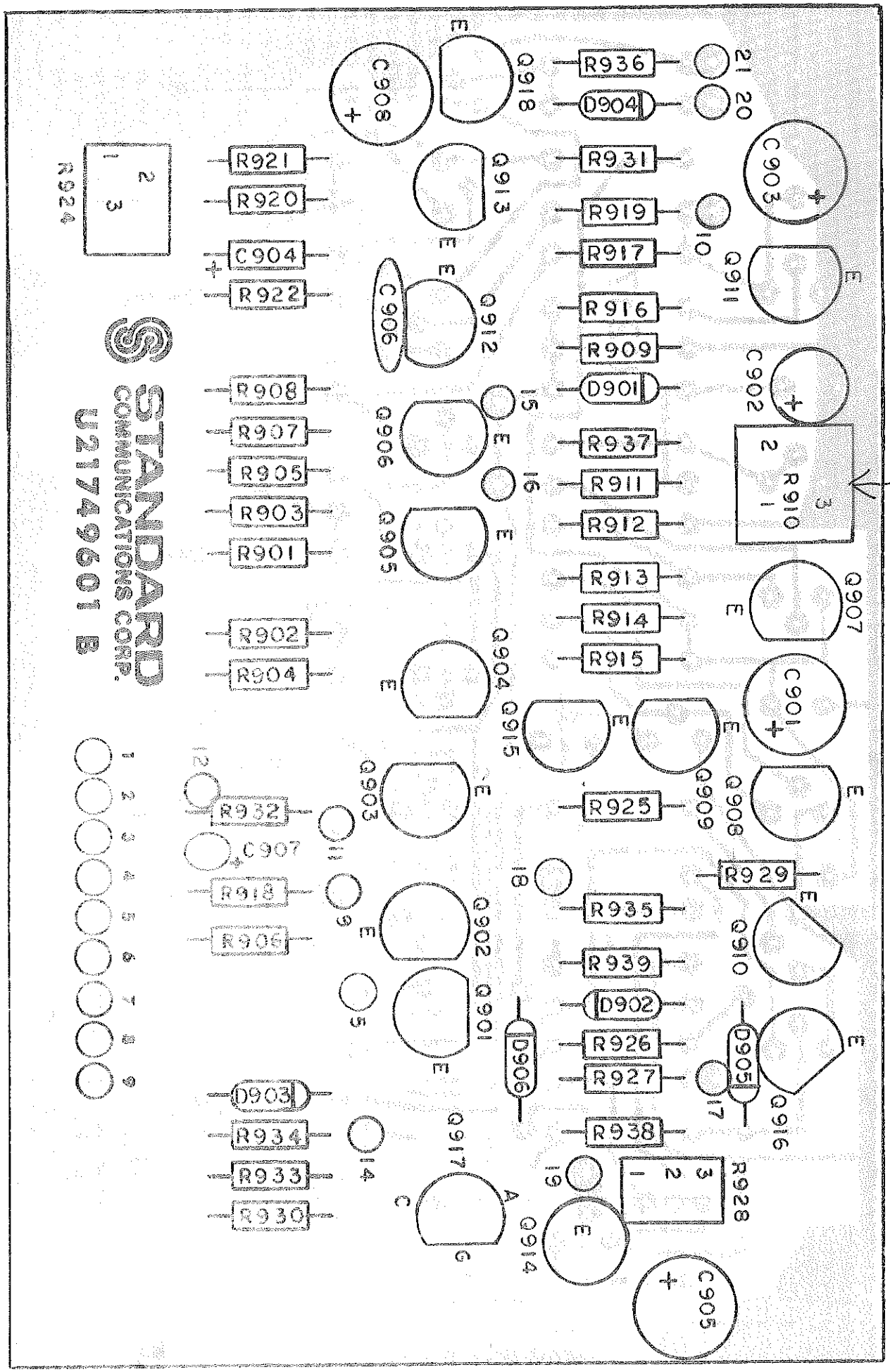


Figure 13. C.O.R. P.C. Board Layout

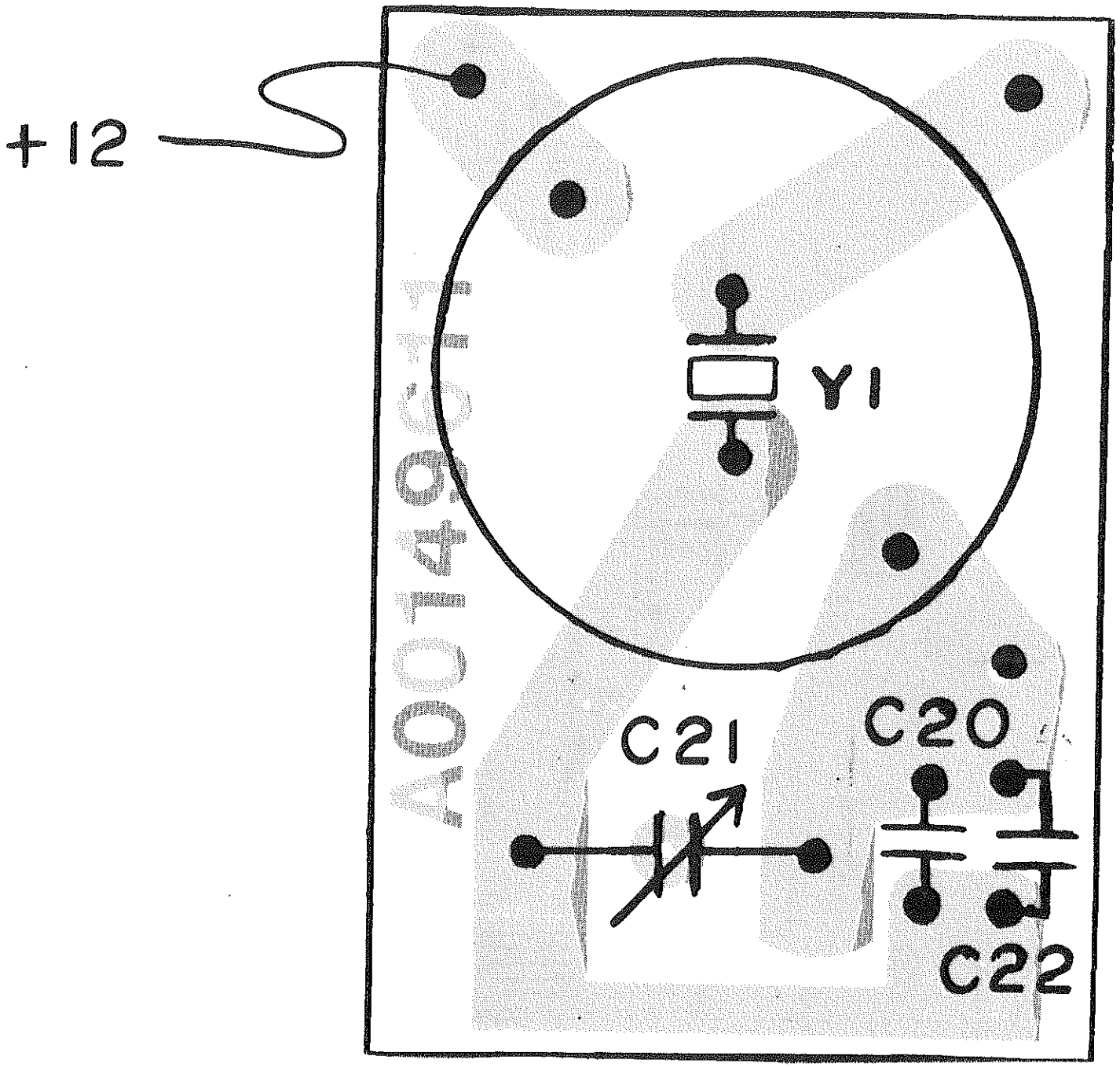


Figure 14. TX/RX Oscillator P.C. Board Layout (Crystal)

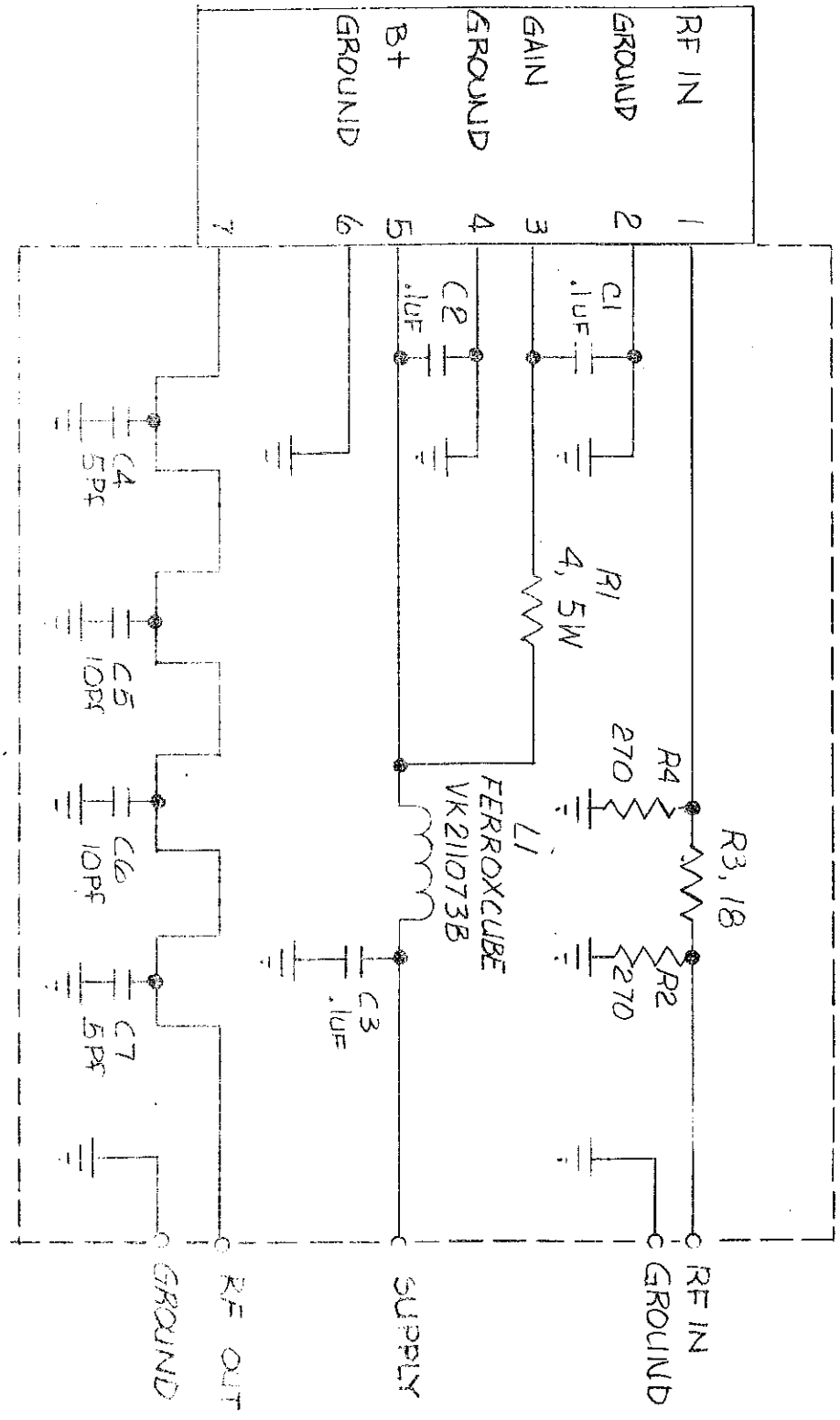


Figure 15. Power Amplifier Schematic Diagram

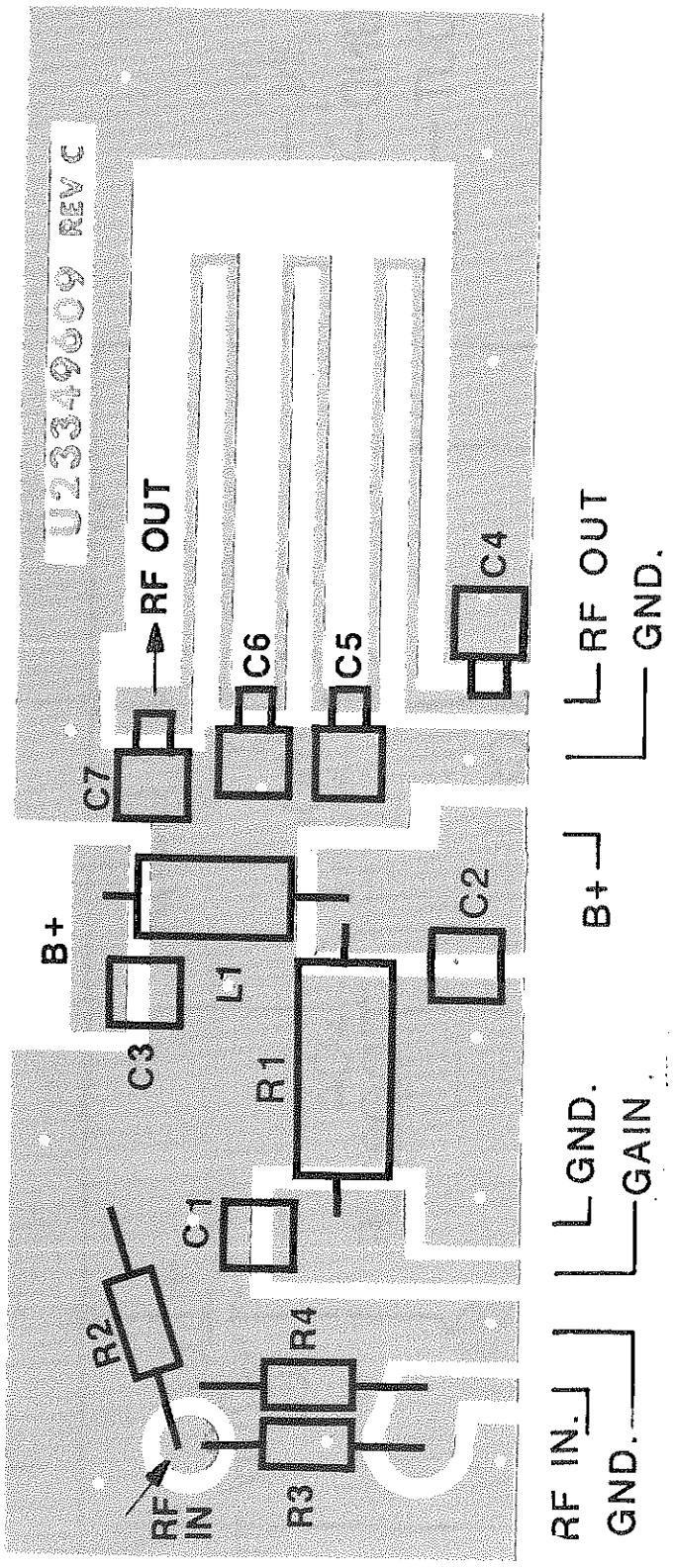


Figure 16. Power Amplifier P.C. Board Layout

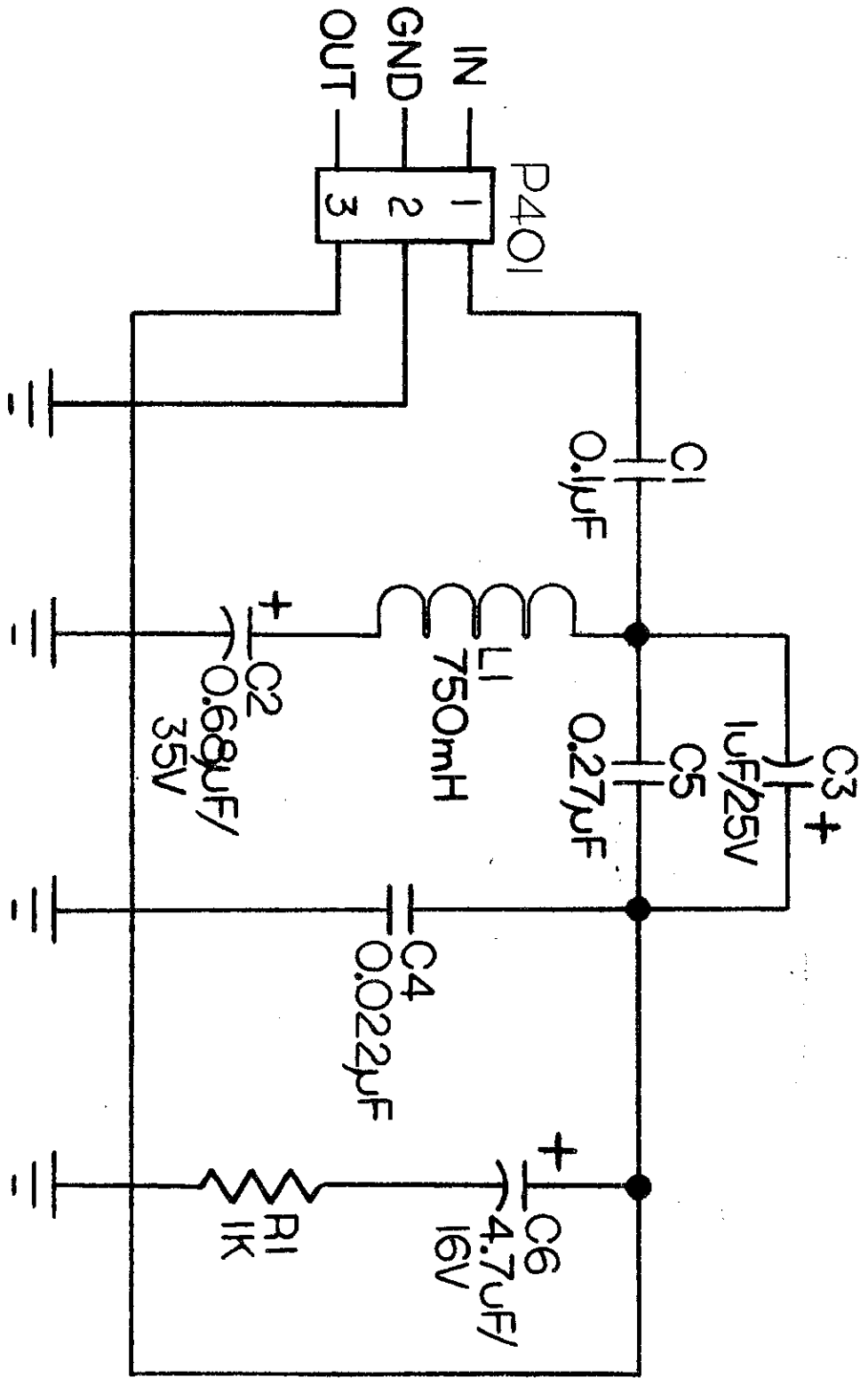


Figure 17. High Pass Filter Schematic Diagram

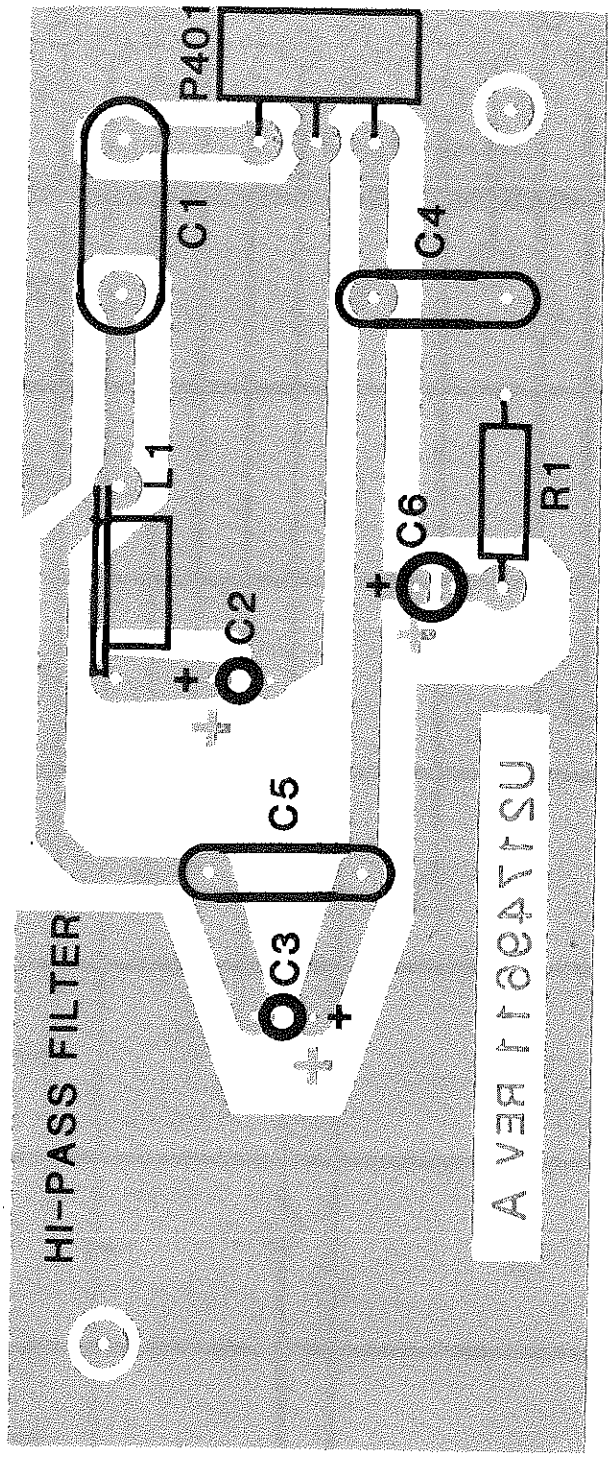


Figure 18. High Pass Filter P.C. Board Layout

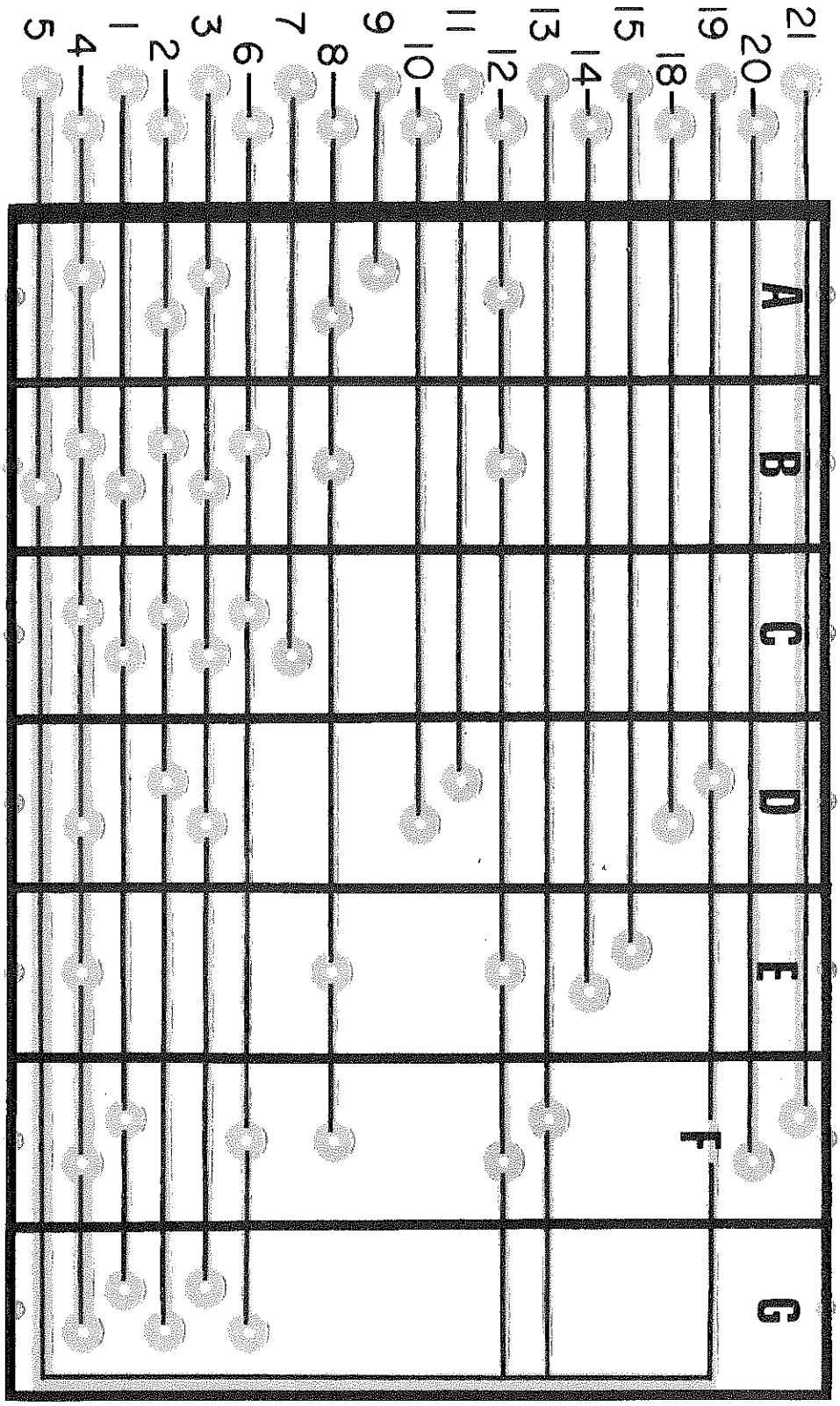


Figure 19. Communications Bus P.C. Board Layout

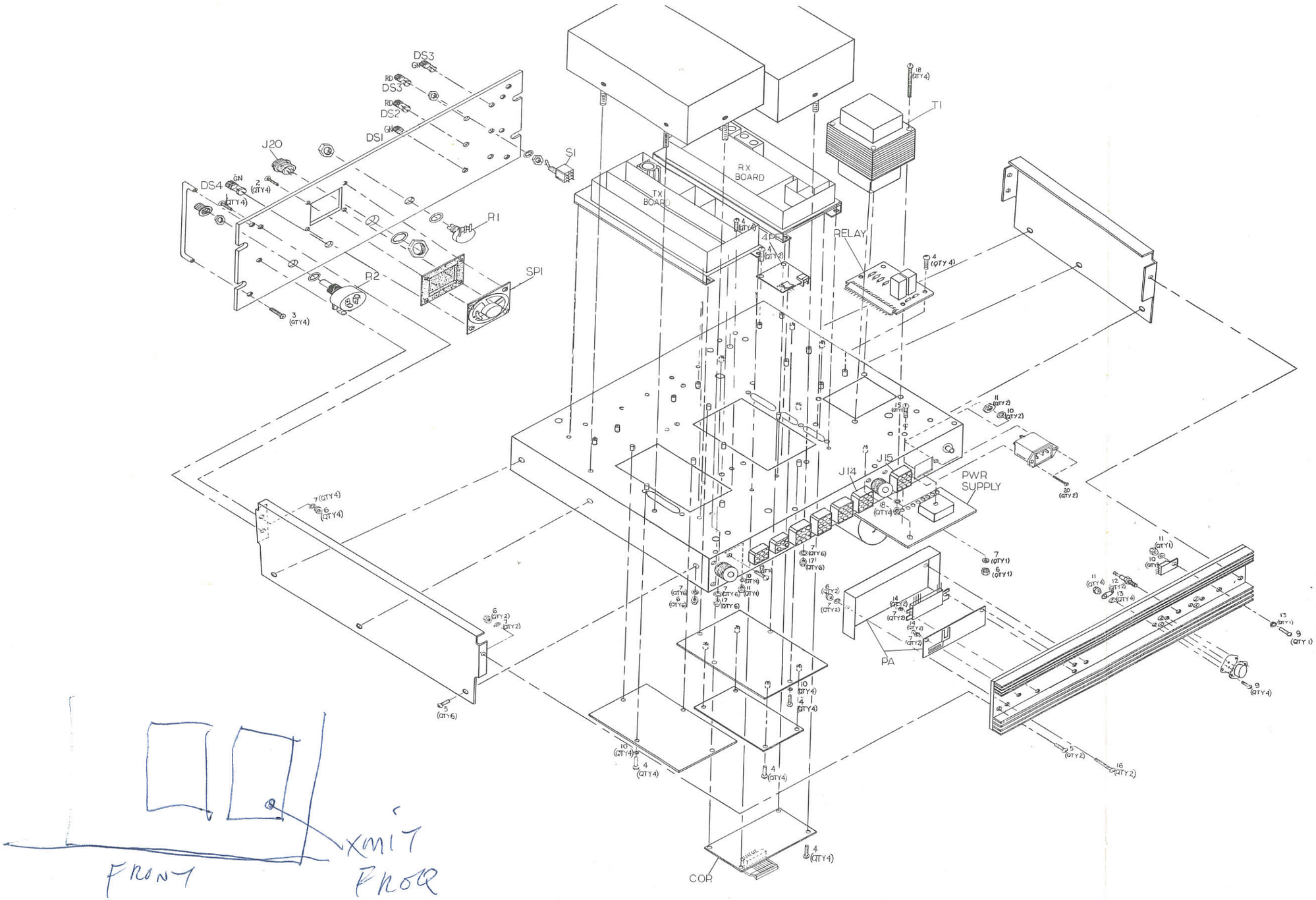


Figure 20. RTP 21 Exploded Parts View

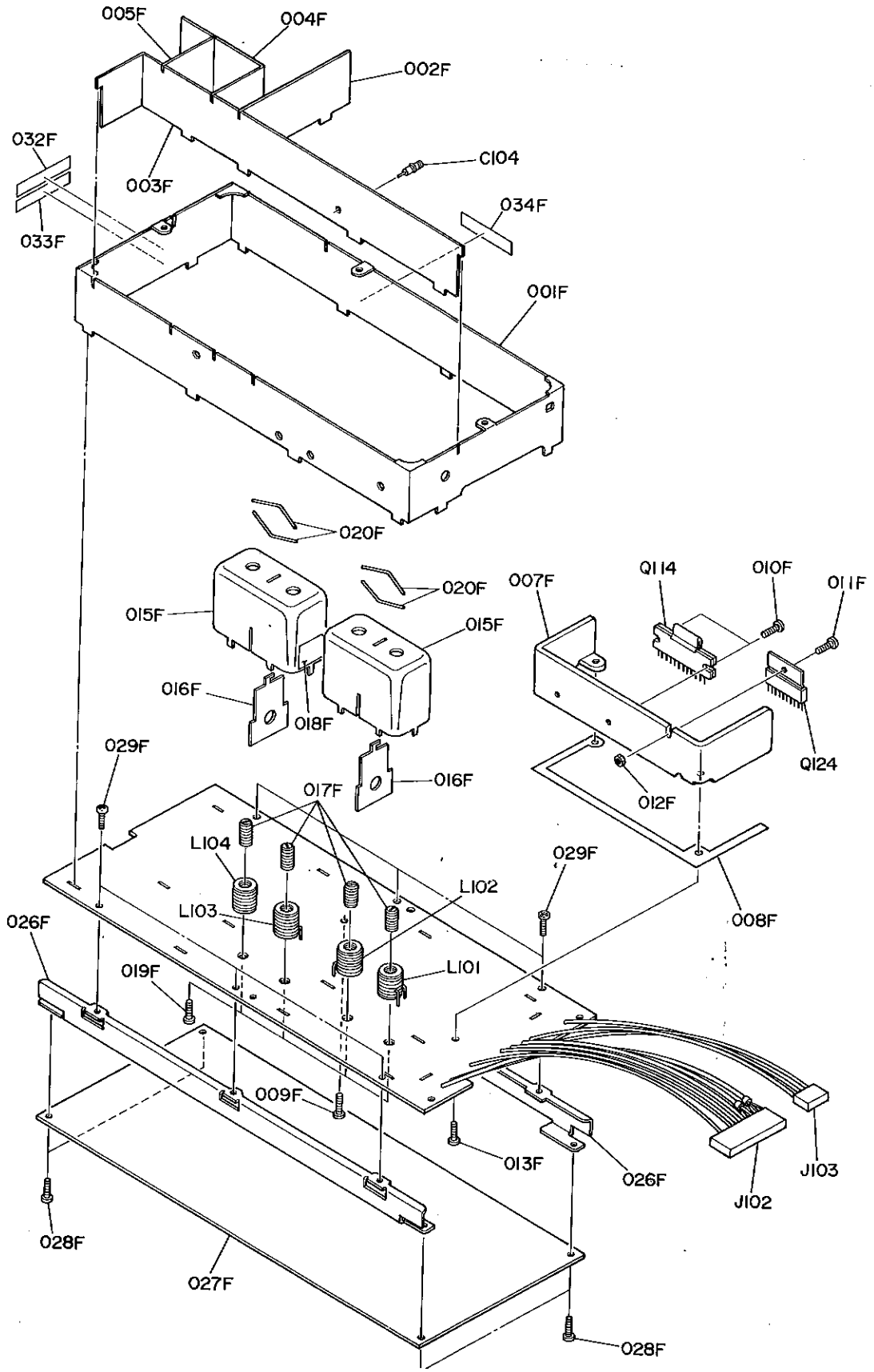


Figure 21. RX Exploded Parts View

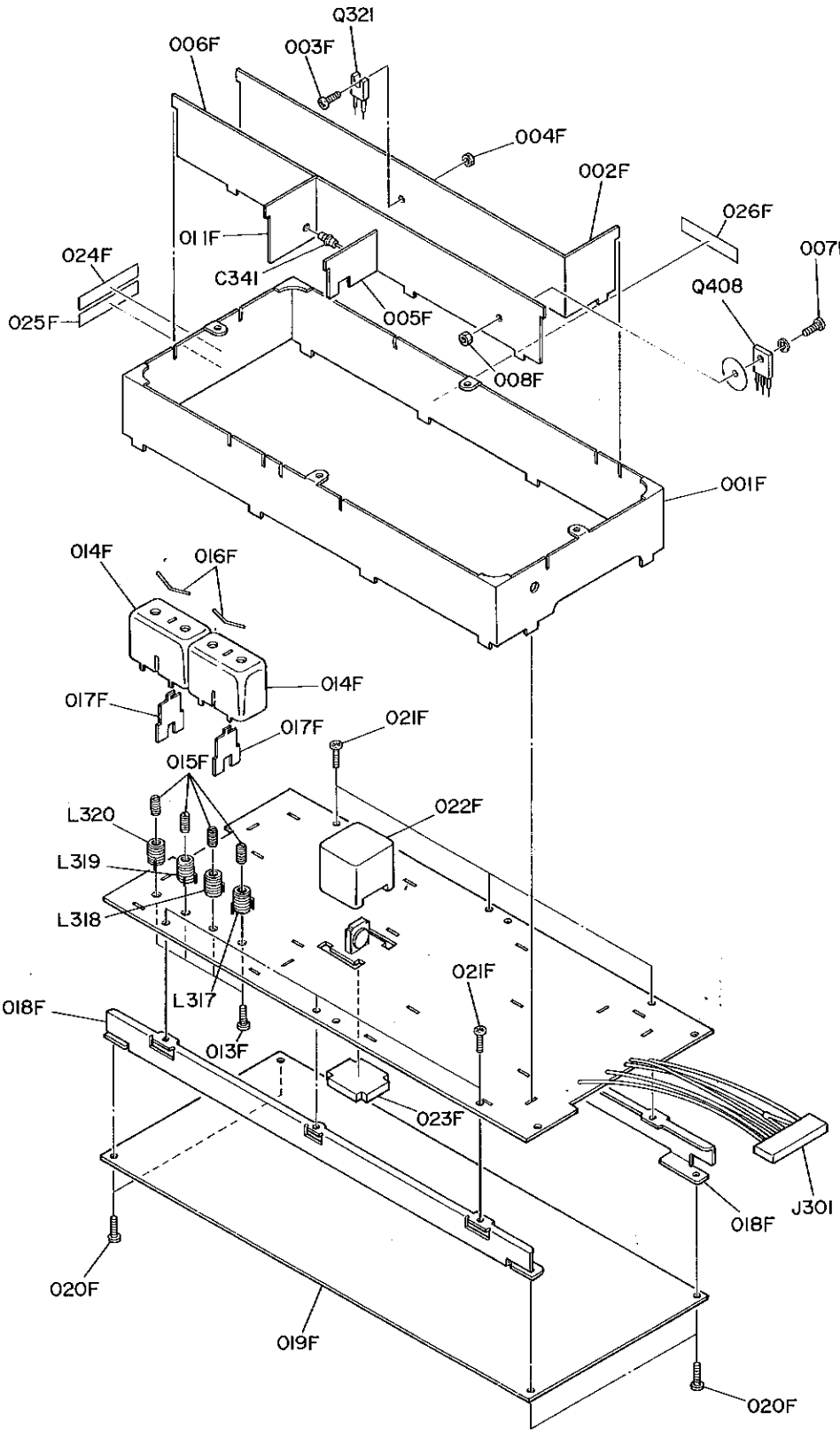


Figure 22. TX Exploded Parts View

Parts List 10

10.1 GENERAL

Information on most electrical and mechanical parts is included in the parts list. The parts are listed by reference designators in alpha-numeric order.

10.2 Ordering Replacement Parts

Crystal orders should be referred to the Frequency Management Department at (213) 532-5300 ext. 251, or write:

Standard Communications Corp.
Frequency Management Department
P. O. Box 92151
Los Angeles, CA 90009-2151

All other parts orders should be referred to the Parts Department at (213) 532-5300 ext. 248, or write:

Standard Communications Corp.
Parts Department
P. O. Box 92151
Los Angeles, CA 90009-2151

Please note that SCC may not be able to fill replacement parts orders without such identifying information as:

- reference designator
- value
- description
- part number
- unit model number

Unless otherwise noted, all chip resistors in this parts list are valued at 1/10 W, ±5%. All resistance values are in ohms. Resistors not listed in this parts list are composed of carbon film and valued at 1/4 W, ±5%. The resistance values of those resistors not listed are on the schematic diagram.

Reference Designator	Description	SCC Part Number
COR P. C. BOARD ASSY		
Capacitors		
C901, C903, C908	Elect, 100 uF, 25 V	EA1070250A
C902	Tant, 6.8 uF, 16 V	EW6850160A
C904	Tant, .47 uF, 16 V	EW4740161A
C905	Elect, 330 uF, 25 V.	EA3370250A
C906	Mylar, .047 uF, 16 V	DF1747300A
C907	Tant, 10 uF, 16 V	EW1060160A
Semiconductors		
Q901, Q903, Q909, Q911	Transistor, 2N3565	HT2N35651A
Q902, Q918	Transistor, 2N5086	HT2N50861A
Q910, Q916	Transistor, PN3643-5	HT7PN3643A
Q913, Q915	Transistor, 2N3565	HT2N35651A
Q914	Transistor, 2N2647	HT72N2647A
Q917	Transistor, 2N5060	HT72N5060A

Reference Designator	Description	SCC Part Number
Resistors		
R910	Variable, 500 kΩ	RA1504000A
R924	Variable, 1 kΩ	RA1102000A
R928	Variable	RA1105031A
Miscellaneous		
D901, D903, D904, D905	Diode, Silicon 75 V	HD21N9141A
D902	Diode, Silicon, 200 V	HD21N4004A
D906	Diode, Silicon 75 V	HD21N9141A
J1	Connector, 9-pin	YP0026012A

CRYSTAL P.C. BOARD ASSEMBLY

Capacitors		
C20	Ceramic, 50 V	*
C21	Variable, 2-15 pF	CT1150001A
C22	Ceramic, 50 V	*
--	Crystal Oven	L36049002A
Miscellaneous		
Y1	Crystal	*

* Value determined by frequency order from Frequency Dept.

FINAL AMP P.C. BOARD ASSEMBLY

Capacitors		
C1, 2, 3	Chip, .1 uF, 12 V	DD4610401A
C4, 7	Uncased Mica, 200 V, 5 pF	DF3505025A
C5, 6	Uncased Mica, 200 V, 10 pF	DF3510025A
Inductors		
L1	Choke	LW0002002A
Resistors		
R1	Wire Wound, 4Ω, 5 W	RC0504005A
Miscellaneous		
-	Hybrid Amplifier	HC1000117A
P25, P26	Plug, RCA Phone Special	YP0004001A

Reference Designator	Description	SCC Part Number
HIGH PASS FILTER ASSY		
Capacitors		
C1	Mica, 0.1 uF, 100 V	DF3610400A
C2	Tant, 0.68 uF, 35 V	EV6840350A
C3	Tant 1.0 uF, 35 V	EV1050350A
C4	Mica, 0.0f22 uF, 100 V	DF3622200A
C5	Tant, 0.27 uF, 75 V	EV2730750A
C6	Alum Elect, 4.7 uF, 16 V	EM4750161A
Inductors		
L1	Choke, 750 MH	LC1754001A
Resistors		
R1	FXD, 1 kΩ, 1/4 W	RC0510214A
Miscellaneous		
P19	Connector, 3-pin	YP0022012A
POWER SUPPLY P.C. BOARD ASSEMBLY		
Capacitors		
C1	Alum, Elect, 6800 uF, 35 V	EA6880350A
C2	Elect, 1000 uF, 16 V	ED1070160A
C3	Ceramic, .01 uF, 50 V	DD1710301A
C4, C5	FXD, .01, 600 V	DD1610301A
Semiconductors		
Q1	Transistor, PN3643-5	HT7364350A
Resistors		
R1, R2	0.12Ω, 3 W	RC1012003A
Miscellaneous		
Z1	Diode, 10 amp, 1.2 V, 10 uF	HD12A10V0A

Reference Designator	Description	SCC Part Number
RELAY P.C. BOARD ASSEMBLY		
Miscellaneous		
D1, D2	Diode, Silicon	HD21N4001A
K1, K2	Relay, PC Term Contacts, 5 AMP...	LY0006000A
P24	Connector, Plug, 18-pins	YP0025012A
REPEATER ASSEMBLY		
Capacitors		
C6, C7	Ceramic, 0.1 uF, 12 V,	DD17104120
C1 - C19	Ceramic, 1000 pF, 500 V	DC1710251A
Semiconductors		
Q2, Q3	Transistor, 2N3773	HT2N37731A
Resistors		
R1	Variable, 5 kΩ	RA1502002A
R2	Variable, 10 kΩ	RA0103027A
R10, R11	CBFM, 0.1Ω	RC0101030A
Miscellaneous		
-	LED 1 5/4, Red	HW1MV5050A
-	Grill, Speaker, Brown	U21705313A
-	Knob, Aluminum	154002006A
-	Chassis, Back Plate	U21705312A
-	Cord	YC0010001A
-	Stand Off	T28002001A
-	Hood	YJ0004007A
-	Heat Sink	U21726701A
-	Feed Thru Strip Assy	A00149701A
-	Cover	U21705310A
-	Plug, Butch 1/4"	YP0004003A
-	Cover, Power AMP	U21705302A
-	Cover, Bottom, RX	U2170530BA
-	Cover, Bottom, TX	U21705309A
-	Assembly, RX PC Board	RPT766RX
-	Assembly, TX PC Board	RPT766TX
-	Power Supply, PC Board Assy	U23349513A
-	COR, PC Board Assy	U23349501A
-	Final AMP-UHF PC Board Assy	U36049501A
-	Relay PC Board Assy	U23349512A
-	Crystal, PC Board Assy	L36049502A
-	Plug	YP0004001A
-	Terminal	YT0004011A
-	Terminal	XJ0010013A

Reference Designator	Description	SCC Part Number
-	Plug	YP0009012A
-	LED, T 1 3/4, Green	HW2MV5253A
-	Jumper, Repeater	U21749002A
-	Jack, 18 pin	YJ0015013A
-	Terminal	YT0003011A
CB-1	Breaker, 2 amps, 250 V	SC0001015A
DS1, 4, 5	Lens, Green 1/4" dia	355002001A
DS2	Lens, Red, 1/4" dia	355001001A
D3	Diode, Silicon, 50 V	HD21N4001A
FL-1	Filter, Power Line 250 V	FG0002004A
FL-1	Filter, 500 V, .001 uF	PC1710250A
IC1	Regulator Assy	HTA7815U0A
J1	Jack, 4-pins	YP0005013A
J2	Plug, 10-pin	YP0018012A
J4	Jack, 8-pins	YP0023013A
J8, J9	Jack, RF	YJ0002007A
J19	Jack, 3-pin	YP0019012A
J20	Jack, Mic, 5-pin	UJ1000080A
P18	Plug, 8-pin	YP0020012A
P20	Jack, 9-pin	YJ0022013A
SP1	Speaker, 1 Watt	QK0003001A
S1	Switch, 125 V	SC0006002A
S2	Switch, 125 V	SC0007002A
T1	Transformer, 115 V	U21726901A
Z3	Filter, PC Board Assy	U23349511A

RX P.C. Board Assembly

Capacitors

C101	Ceramic, 470 pF	DA16471010
C102, C103	Ceramic, 0.001 uF,CIP	DK46102300
C104	Feedthru, 0.001 uF	DC18102030
C105	Ceramic, 0.001 uF	DK16102300
C106	Ceramic, 470 pF, B	DK16471300
C107, C109	Ceramic, 0.01 uF	DK18103310
C108	Ceramic, 2 pF, CK	DD10020300
C110	Ceramic, 470 pF, B	DK16471300
C111	Ceramic, 3 pF, CJ	DD10030300
C112, C113, C114	Semicon, 0.068 uF	DS17683010
C115,	Ceramic, 220 pF	DD15221370
C116	Ceramic, 220 pF	DK16221300
C117	Ceramic, 0.001 uF	DK16102300
C118	Elect, 1 uF 50 V	EA10505010
C119	Semicon, 0.033 uF	DS17333010
C120	Ceramic, 200 pF, UJ	DD15201360
C121	Ceramic, 10 pF, ZL	DD11100420
C122	Ceramic, 200 pF, N1000	DD15201010
C123	Ceramic, 330 p, N1000	DD15331010
C124	Elect, 10 uF 25 V	EA10602510
C125, C126	Semicon, 0.0047 uF, B	DS17472010
C127	Semicon, 0.022 uF, B	DS17223020
C128, C129, C130, C131	Semicon, 0.01 uF, B	DS17103010
C132	Semicon, 0.0047 uF, B	DS17472010
C133, C134	Semicon, 0.068 uF, B	DS17683010
C135	Elect, 22 uF 10 V	EV22601060
C136	Elect, 0.1 uF 35 V	EV10403560
C137	Elect, 6.8 uF 10 V	EV68501060

Reference Designator	Description	SCC Part Number
C138	Elect, 10 uF 25 V	EA10602510
C139	Ceramic, 470 pF	DK16471300
C140	Elect, 0.1 uF 35 V	EV10403560
C141	Ceramic, 0.001 uF, CIP	DK46102300
C142, C143	Ceramic, 470 pF	DK46471300
C144	Elect, 470 uF 25 V	EA47702510
C145	Ceramic, 0.01 uF	DK18103310
C146	Elect, 1 uF 50 V, NP	EQ10505030
C147	Semicon, 0.1 uF, B	DS17104010
C148	Elect, 100 uF 10 V	EA10701010
C149	Elect, 470 uF 25V	EA47702510
C150	Elect, 10 uF 25 V	EA10602510
C151	Semicon, 0.01 uF	DS17103010
C152	Ceramic, 100 pF, SL	DD15101370
C153	Semicon, 0.047 uF, B	DS17473010
C154	Elect, 4.7 uF 50 V	EA47505010
C155	Semicon, 0.01 uF, B	DS17103010
C156	Elect, 1 uF 35 V	EV10503560
C157	Elect, 22 uF 10 V	EV22601060
C158	Ceramic, 0.01 uF	DK18103310
C159, C160, C161, C162,	Ceramic, 51 pF, CH	DD15510300
C163,	Ceramic, 51 pF, CH	DD15510300
C164	Ceramic, 15 pF, CH	DD15150300
C165, C166, C167,	Ceramic, 470 pF	DK16471300
C168	Trimming, 10 pF	CT11000130
C169	Ceramic, 5 pF, CJ	DD10050300
C170	Ceramic, 2 pF, CK CIP	DD40020300
C171	Trimming, 6 pF	CT10600100
C172	Ceramic, 470 pF, CIP	DD45471370
C173	Ceramic, 470 pF	DK16471300
C174	Elect, 4.7 uF 16 V	EV47501660
C176, C177	Ceramic 10 pF, CH	DD11100300
C178	Ceramic, 0.01 uF	DK18103310
C179	Ceramic, 5 pF, RH	DD10050330
C180	Ceramic, 6 pF, RH	DD11060330
C181	Ceramic, 0.01 uF	DK46103300
C182, C183	Ceramic, 0.01 uF	DK18103310
C184	Ceramic, 20 pF, CH	DD15200300
C185	Ceramic, 7 pF, RH	DD11070330
C186	Ceramic, 1 pF, CK	DD10010300
C187	Ceramic, 6 pF, RH	DD11060330
C188, C189,	Ceramic, 0.01 uF	DK18103310
C190	Ceramic, 62 pF, CH	DD15620300
C191	Ceramic, 16 pF, RH	DD15160330
C192, C193, C194	Ceramic, 0.01 uF	DK18103310
C195	Ceramic, 100 pF, CH	DD15101300
C196, C198	Ceramic, 15 pF, RH	DD15150330
C197	Ceramic, 1 pF, CK	DD10010300
C199, C200	Ceramic, 0.01 uF	DK18103310
C201	Ceramic, 43 pF, RH	DD15430330
C202	Ceramic, 33 pF, CH	DD15330300
C203	Ceramic, 1 pF, CK	DD10010300
C204	Ceramic, 43 pF, RH	DD15430330
C205, C206, C207	Ceramic, 0.01 uF	DK18103310
C208	Ceramic, 91 pF, CH	DD15910300
C209	Ceramic, 100 pF, CH	DD15101300
C210	Ceramic, 0.001 uF	DK16102300
C211	Ceramic, 20 pF, CH	DD15200300
C212	Film, 240 pF, Mica	DF88241500

Reference Designator	Description	SCC Part Number
C213	Film, 150 pF, Mica	DF88151500
C214	Ceramic, 0.001 uF	DK16102300
C215	Ceramic, 0.01 uF	DK18103310
C216	Elect, 4.7 uF, 25 V	EA47502550
C217	Ceramic, 0.01 uF	DK18103310
C218	Ceramic, 0.001 uF	DK16102300
C219	Ceramic, 0.01 uF	DK18103310
C220	Elect, 0.1 uF, 35 V	EV10403560
C221	Elect, 6.8 uF, 35 V	EV68403560
C223	Ceramic, 0.01 uF	DK18103310
C224	Ceramic, 1000 pF	DK18103310
C225	Elect, 0.1 uF, 35 V	EV10403560

Inductors

L101, L102	Coil, Choke, 3 5/8 T	LC11210052
L103	Coil, Choke, 3 1/2 T	LC11210250
L104	Coil, Choke, 3 1/2 T	LC11210072
L105	Coil, Choke	LC12010012
L106, L107, L108	Coil, Doublar, 21.4 MHz	LW10187010
L109	I.F.T. 455 KHz	LI10016360
L110, L111	I.F.T. Detect. Coil (Blu)	LI10010460
L112	Coil, Choke, 820 UH	LC18240020
L113, L114	Coil, Choke, 390 UH	LC13940010
L115	Coil, Choke, 3T	LC17000102
L116	Coil, Choke, 3T	LC17000130
L117	Coil, Choke, 1 MH	LC21060030
L118, L119	Coil, Ant, RF Coil	LA70340010
L120, L121	Coil, Ant, Doub Coil	LA70196130
L122	Coil, Choke, 390 UH	LC13940010
L123	Coil, Ant, Buff Coil	LA70196120
L124, L125	Coil, Ant, Trip. Coil	LA70196120
L126, L127	Coil, Ant, Trip. Coil	LA70238040
L128	Coil, Choke, 8 UH	LC18020020

Semiconductors

Q101, Q102, Q104	Diode, 1S1555	HD20011050
Q103	F.E.T. 2SK125 (3)	HF201251A0
Q105	F.E.T. 2N5668	HF70006000
Q106, Q107	Transistor, 2SC460 (B)	HT304601B0
Q108	IC, H8D1216	HC10002230
Q109, Q110, Q111	Diode, OA99	HD10005020
Q112	Transistor, 2SC945 (R)	HT309451R0
Q113	Diode, 1S155	HD20011050
Q114	IC, HA1366W	HC10031010
Q115	IC, TA7063P	HC10037050
Q116, Q117	Diode, OA99	HD10005020
Q118, Q119	Transistor, 2SC945 (Q)	HT30945100
Q120	Transistor, 2SC2644	HT32644000
Q121	Transistor, 2SC945 (Q)	HT30945100
Q122	Zener, WZ-115	HD30048060
Q124	IC, MB3756	HC10003180
Q125	Diode, OA99	HD10005020
Q126, Q127, Q128, Q129	Transistor, 2SC2347	HT32347100
Q130	Transistor, 2SC2347	HT32347100
Q131, Q132, Q133	Transistor, 2SC460B	HT304601B0

Reference Designator	Description	SCC Part Number

Resistors

Unless otherwise noted, all chip resistors in this parts list are valued at 1/10 W, +5%. All resistance values are in ohms. Resistors not listed in this parts list are composed of carbon film and valued at 1/4 W, +5%. The resistance values of those resistors not listed are on the schematic diagram.

R105	Chip, 3.3 k, J 1/8 W	RI05332180
R155	820	GJ05821010

Mechanical, Chassis Electrical

F101, F102	Crystal, 21.4 MHz (N)	XU421400N5
F103	Ceramic Filter, CFU455D	FG455304D0
F104	Ceramic Filter, CFU455E	FG455304E2
J102	Connective Cord, 10/Pin	YB00201300
J103	Connective Cord, 4/Pin	YB00200990
J104	Pin, Tap for L103	3592254010
J201, J202, J203	Jack, for OSC B/D	YJ03000040
X101	Crystal, 21.855 MHz	XB101001G0
001F	Shield, Frame	027C109034
002F	Shield	025C109010
003F	Shield, Main	025C109022
004F	Shield, Tripler	025C109030
005F	Shield, RF	025C109040
007F	Heatsink, Main	101C267120
008F	Insulator, For Heatsink	025C120010
009F	B.H. Tap Screw for Heatsink	51282606B0
010F	B.H.M. Screw, For AF IC	51100308E9
011F	B.H.M. Screw, For Regulator IC	51100306E9
012F	Hexagon Nut, For Regulator IC	53110303E9
013F	B.H. Tap Screw, For Heat Sink	51280306B0
015F	Shield, Cavity Case	101C109112
016F	Shield, Cavity (L)	101C109120
017F	Ferric Core, For Cavity	101C161010
018F	Insulator, For Cavity Case	412C120060
019F	Screw, Bobbin & PWB	5006030889
020F	Spring, For RX Cavity	101C115110
021F	Ferric Core, For Cavity	101C161020
022F	Ferric Core, For Cavity	101C161030
023F	Ferric Core, For Cavity	101C161040
026F	Bracket, For PWB	026C160040
027F	Chassis	026C105010
028F	B.H.M. Screw,	51100305A9
029F	B.H. Tap Screw, for PWB	51280306B0
032F	Label	025C861010
033F	Indicator	2112265110
034F	Label	101C861040

Reference Designator	Description	SCC Part Number

TX P.C. Board Assembly

Capacitors

C301	Ceramic, 12pF CH	DD45120300
C302	Trimming, 10pF	CT11000130
C303	Elect, 10uF 25V	EA10602510
C304	Ceramic, 0.001uF W5R	DK46102300
C306	Trimming, 10pF Philips	CT11000130
C308	Ceramic, 6pF CH	DD41060300
C309	Ceramic, 0.001uF W5R	DK46102300
C310	Trimming, 6pF Philips	CT10600100
C311	Ceramic, 12pF CH	DD45120300
C312	Ceramic, 0.001 uF W5R	DK46102300
C313	Ceramic, 560pF W5R	DK46561300
C314	Ceramic, 0.001uF W5R	DK46102300
C315	Ceramic, 0.001uF W5R	DK46102300
C316	Trimming, 6pF	CT10600100
C317	Minic, 0.39pF	DM15339510
C318	Ceramic, 0.001uF W5R	DK46102300
C319	Ceramic, 0.001uF W5R	DK46102300
C320	Ceramic, 1pF CK	DD40010300
C321	Ceramic, 0.001uF W5R	DK46102300
C324	Ceramic, 0.001uF W5R	DK46102300
C325	Ceramic, 20pF CK	DD45200300
C326	Ceramic, 0.001uF W5R	DK46102300
C327	Ceramic, 100pF CK	DD45101300
C328	Ceramic, 10pF CK	DD11100300
C329	Ceramic, 0.01uF W5R	DK18103310
C330	Ceramic, 7pF RH	DD11070330
C331	Ceramic, 0.01uF F	DK18103310
C332	Ceramic, 0.001uF W5R	DK46103300
C333	Ceramic, 0.001uF W5R	DK46103300
C334	Ceramic, 20 pF CH	DD45200300
C336	Ceramic, 0.001uF Chip	DK46102300
C337	Ceramic, 0.01uF W5R	DK46103300
C338	Ceramic, 0.01uF W5R	DK46103300
C339	Ceramic, 0.01uF W5R	DK46103300
C340	Ceramic, 100 pF CH	DD45101300
C341	Feedthru, 2000pF	DC18202020
C342	Ceramic, 0.001uF W5R	DK46102300
C344	Ceramic, 0.01uF F	DK18103310
C345	Ceramic, 10 pF CH	DD11100300
C346	Ceramic, 0.01uF F	DK18103310
C347	Ceramic, 56 pF	DD15560370
C348	Ceramic, 2 pF CJ	DD10020300
C349	Ceramic, 120 pF RH	DD15121330
C350	Ceramic, 0.01uF F	DK18103310
C351	Ceramic, 0.01uF F	DK18103310
C352	Ceramic, 120 pF RH	DD15121330
C353	Ceramic, 0.01uF F	DK18103310
C354	Ceramic, 0.01uF F	DK18103310
C355	Film, 470pF Mica	DF88471500
C356	Ceramic, 5pF N4250	DD12050050
C357	Ceramic, 30 pF CH	DD15300300
C358	Ceramic, 62 pF CH	DD15620300
C359	Film, 220pF Mica	DF88221500
C360	Ceramic, 0.01uF F	DK18103310

Reference Designator	Description	SCC Part Number
C361	Ceramic, 0.01uF F	DK18103310
C362	Elect, 10uF 16V NP	EQ10601620
C363	Ceramic, 0.01uF F	DK18103310
C364	Ceramic, 0.01uF F	DK18103310
C365	Elect, 10uF 25V	EA10602510
C366	Ceramic, 0.01uF F	DK18103310
C367	Film, 0.056uF	DF15563310
C368	Film, 0.08uF	DF15823310
C369	Ceramic, 390pF B	DK16391300
C370	Semicon, 0.01uF B	DS17103010
C371	Elect, 0.22uF 35V Tantal	EV22403560
C372	Ceramic, 470pF B	DK16471300
C373	Elect, 47uF 10V	EA47601010
C374	Ceramic, 470pF B	DK16471300
C375	Elect, 0.22uF 35V Tantal	EV22403560
C376	Elect, 2.2uF 50V	EA22505010
C377	Ceramic, 470pF B	DK16471300
C378	Ceramic, 0.01uF F	DK18103310
C379	Ceramic, 0.001uF B	DK16102300
C380	Ceramic, 20 pF CH	DD15200300
C381	Ceramic, 0.01uF F	DK18103310
C382	Ceramic, 0.01uF F	DK18103310
C383	Ceramic, 6 pF RH	DD11060330
C384	Ceramic, 0.01uF F	DK18103310
C385	Ceramic, 1 pF CK	DD10010300
C386	Ceramic, 7pF RH	DD11070330
C387	Ceramic, 10 pF CH	DD41100300
C388	Ceramic, 0.01uF F	DK18103310
C390	Ceramic, 0.001uF B	DK16102300
C391	Ceramic, 0.001uF B	DK16102300
C398	Ceramic, 20 pF CH	DD45200300
C399	Trimming, 6pF	CT10600100
C415	Film, 150pF Mica	DF88151500
C416	Film, 240pF Mica	DF88241500
C417	Ceramic, 20 pF CH	DD15200300
C418	Ceramic, 0.01uF B	DK16102300
C419	Ceramic, 0.01uF F	DK18103310
C420	Ceramic, 39 pF RH	DD15390300
C421	Ceramic, 91 pF CH	DD15910300
C422	Ceramic, 0.01uF F	DK18103310
C424	Ceramic, 1 pF CK	DD10010300
C425	Ceramic, 39 pF RH	DD15390330
C426	Ceramic, 0.01uF F	DK18103310
C427	Ceramic, 0.01uF F	DK18103310
C428	Ceramic, 47 pF RH	DD15470300
C429	Ceramic, 150 pF RH	DD15161330
C430	Ceramic, 0.01uF F	DK18103310
C431	Ceramic, 1 pF CH	DD10010300
C432	Ceramic, 13 pF RH	DD15130330
C433	Ceramic, 0.01uF F	DK18103310
C434	Ceramic, 15 pF RH	DD15150330
C435	Ceramic, 100 pF CH	DD15101300
C436	Ceramic, 0.01uF F	DK18103310
C437	Ceramic, 0.001uF B	DK16102300
C438	Ceramic, 0.01uF F	DK18103310
C443	Ceramic, 0.01uF F	DK18103310
C444	Ceramic, 5 pF RH	DD10050330
C445	Ceramic, 0.01uF F	DK18103310
C446	Ceramic, 1 pF CK	DD10010300

Reference Designator	Description	SCC Part Number
C447	Ceramic, 0.01uF F	DK18103310
C448	Ceramic, 7 pF RH	DD10070330
C449	Ceramic, 0.01uF F	DK18103310
C450	Ceramic, 0.001uF B	DK16102300
C451	Ceramic, 0.001uF B	DK16102300

Inductors

L301	Coil,Choke, 2T	LC15000110
L302	Coil,Choke, 2T	LC15000110
L303	Coil,Choke, 8T	LC12010012
L304	Coil,Choke, 8T	LC12010012
L305	Coil,Choke, 2T	LC15000110
L306	Coil,Choke, 2T	LC15000110
L307	Coil,Choke, 8T	LC12010012
L308	Coil,Choke, 2T	LC15000110
L309	Coil,Choke, 8T	LC12010012
L310	Coil,Choke, 2T	LC15000110
L311	Coil,Choke, 8T	LC12010012
L312	Coil,Choke, 2T	LC12500060
L313	Coil,Choke, 8T	LC12010012
L314	Coil,Choke, 2T	LC12500060
L315	Coil,Choke, 5T	LL635005A0
L316	Coil,Ant, PLL TX Out	LA70196130
L317	Coil,Choke, Cavity Coil for F5	LC15010102
L318	Coil,Choke, Cavity Coil for F5	LC15010112
L319	Coil,Choke, Cavity Coil for F5	LC15010112
L320	Coil,Choke, Cavity Coil for F5	LC15010102
L321	Coil,Ant, DBM-Coil	LF50080050
L322	Coil,Choke, 1 MH	LC11050040
L323	Coil,Ant, DBM-Coil	LF50080050
L325	Coil,Ant, Off Set Coil	LA70280060.
L326	Coil,Ant, Off Set Coil	LA70280060
L327	Coil,Choke, 18 UH	LC11830050
L328	Coil,Choke, 35 UH	LC13530010
L329	Coil,Choke, 1 MH	LC11050040
L330	Coil,Ant, for Buffer Coil	LA70196130
L331	Coil,Ant, for Buffer Coil	LA70196130
L401	Coil,Choke, for OSC Buffer Coil	LC18020020
L402	Coil,Ant, for 1st Tripler Coil	LA70238040
L403	Coil,Ant, for 1st Tripler Coil	LA70238040
L404	Coil,Ant, for 2nd Tripler Coil	LA70196120
L405	Coil,Ant, for 2nd Tripler Coil	LA70196120
L407	Coil,Ant, for Double Coil	LA70196130
L408	Coil,Ant, for Double Coil	LA70196130
L409	Coil,Choke, 1 MH	LC11050040
L410	Coil,Choke, 1 MH	LC11050040

Semiconductors

Q301	Transistor, 2SC2586	HT32586100
Q302	Transistor, 2SC2407 (1)	HT32407120
Q303	Transistor, 2SC2407	HT32407100
Q304	Transistor, 2SC2466	HT32644000
Q305	Transistor, 2SC2347	HT32347100
Q306	Diode, OA-99	HD10005020
Q307	Transistor, 2SC2347	HT32347100

Reference Designator	Description	SCC Part Number
Q308	Transistor, 2SC2644	HT32644000
Q309	Diode, 1SS97	HD20012060
Q310	Diode, 1SS97	HD20012060
Q311	Diode, 1SS97	HD20012060
Q312	Diode, 1SS97	HD20012060
Q315	Diode, OA-99	HD10005020
Q316	Transistor, 2SC461B	HT30461180
Q317	Transistor, 2SC461B	HT30461180
Q318	Vericap, 1S2208	HD40002060
Q320	Zener, RD7.5EB-1	HD30019060
Q321	Varistor, MV-5TY	HV00012120
Q322	IC, NJM4558D	HC10003090
Q323	IC, NJM4558D	HC10003090
Q324	Transistor, 2SC2347	HT32347100
Q325	Diode, OA-99	HD10005020
Q332	IC, MB3756	HC10003180
Q401	Transistor, 2SC460B	HT304601B0
Q402	Transistor, 2SC460B	HT304601B0
Q403	Transistor, 2SC460B	HT304601B0
Q404	Transistor, 2SC2347	HT32347100
Q405	Transistor, 2SC2347	HT32347100
Q407	Transistor, 2SC2347	HT32347100
Q408	Transistor, 2SC1368	HT31368180
Q409	Transistor, 2SC945Q	HT309451Q0
Q410	Varistor, Posistor for TX Offset Oven	HP00007240

Resistors

Unless otherwise noted, all chip resistors in this parts list are valued at 1/10 W, ±5%. All resistance values are in ohms. Resistors not listed in this parts list are composed of carbon film and valued at 1/4 W, ±5%. The resistance values of those resistors not listed are on the schematic diagram.

R303	Chip, 120	R105121180
R304	Chip, 22,J 1/8W	R105220180
R305	Chip, 220	R105221180
R307	Chip, 47Ω	R105470180
R308	Chip, 47Ω	R105470180
R310	Chip, 560Ω	R105561180
R311	Chip, 470Ω	R105471180
R312	Chip, 560Ω	R105561180
R317	Chip, 56Ω	R105560180
R318	Chip, 1 kΩ	R105102180
R319	Chip, 4.7 kΩ	R105472180
R322	Chip, 56	R105560180
R343	Chip, 120 kΩ	R105124180
R344	Trimming, 47 kΩ	RA05030110
R345	Chip, 12 kΩ	R105123180
R410	4.7 kΩ	GD05472140
R357	220, 1W	GJ05221010
R364	Trimming, 1 kΩ	RA01020150
R383	Trimming, 2.2 kΩ	RA02220100
R433	82Ω, 1W	GJ05820010

Reference Designator	Description	SCC Part Number
Miscellaneous		
J301	Connective Cord, Molex 8P Pulug	YB00201400
J401	Jack, Pin for OSC B/D	YJ03000040
J402	Jack, Pin for OSC B/D	YJ03000040
J403	Jack, Pin for OSC B/D	YJ03000040
X301	Crystal, 10.7 MHz Off Set	XB888003F0
020F	Chassis & Bracket, B.H.M. Screw	51100305A9
021F	B.H. Tap. Screw for PWB	51280306B0
022F	For Crystal, Buffer	101C056010
023F	For Crystal Case, Buffer	101C056020
024F	Model Name, Label	024C861010
025F	Serial No. Card, Indicator	2112265110
026F	Label	101C861040
001S	For Mount, Mass Carton	026C805020
002S	For Mount, Partitioner	026C803010
003S	For Mount, Reinforcing	026C807010
001F	Shield Frame, Shield	027C109034
002F	TX Younger Shield, Shield	024C109010
003F	For TR, B.H.M. Screw	51100308E9
004F	For TR, Hexagon Nut	53110303E9
005F	Younger Centor Shield, Shield	024C109040
006F	DBM Shield, Shield	024C109020
007F	For TR, B.H.M. Screw	51100306E9
008F	For TR, Hexagon Nut	53110303E9
011F	TX Filter Shield, Shield	024C109030
012F	For TR, Heatsink	024C267010
013F	B.H. Tap. Screw for Cavity Coil	5128260680
014F	UHF Cavity Case, Shield	4724109120
015F	For Cavity, Ferric Core	4724161020
016F	UHF Cavity Spring, Spring	4724115010
017F	For Cavity Case, Shield	4724109160
018F	For PWB, Bracket	026C160040

Standard Communications

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E039 287 .5C VF

NOTES

R 428 MIC GAIN, XMTR
R 438 IDC LIMIT

R - 306 RPT AUDIO

R - 445 PL DEV

R - 248 LOCAL MIC GAIN

3/27/92 WHEN SETTING UP RPTR WITH REMOTE/LOCAL CONTROL CAPABILITY, SMALL NEW POT ADDED BY SB-216 R-236 (NEAR R-428) IS ADJUSTED FOR PROPER REPEAT PL DEV AFTER SETTING DEV OF PL BRD POT FOR CORRECT LOCAL/REMOTE XMIT DEV