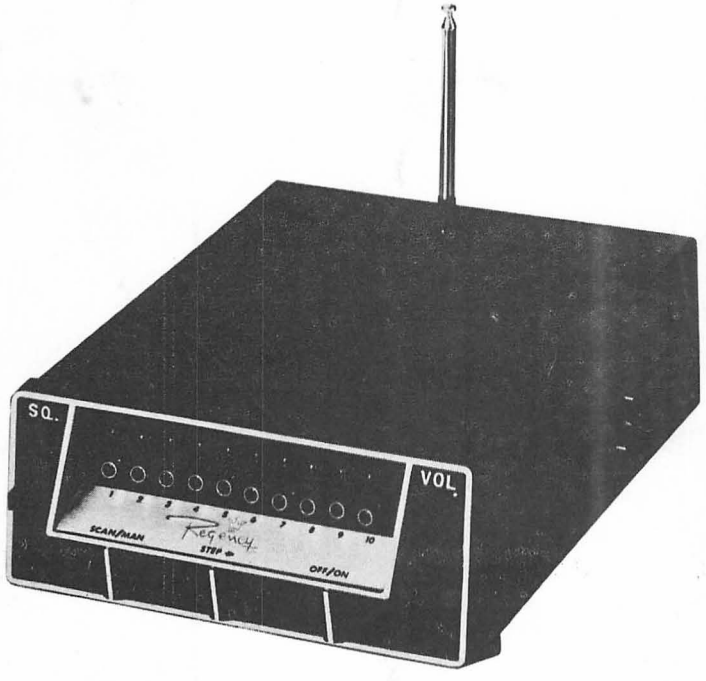
Regency® ELECTRONICS INC.

SERVICE MANUAL



MODEL ACT-R-106
MONITORADIO RECEIVER

7707 RECORDS STREET
INDIANAPOLIS, INDIANA 46226

PRINTED IN U.S.A.
2-80

0300-1174-900

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1-1 SPECIFICATIONS (Subject To Change Without Notice)

Frequency Range	VHF Band (Low)	30-50 MHz
	VHF Band (High)	146-174 MHz
	UHF Band	450-512 MHz
	UHF Band (see page)	406-420 MHz

Frequency Separation (Refer to Special Alignment)

VHF Band (Low)	LL; 6 DB Bandwidth; 30-39 MHz
	LH; 6 DB Bandwidth; 39-50 MHz
VHF Band (High)	HL; 10 DB Bandwidth; 146-160 MHz
	HH; 10 DB Bandwidth; 160-170 MHz
UHF Band	UL; 10 DB Bandwidth; 450-470 MHz
	UH; 10 DB Bandwidth; 475-500 MHz

Sensitivity (At Tune-Up)

VHF Band (Low)	0.5 microvolt for 20 DB quieting
VHF Band (High)	0.6 microvolt for 20 DB quieting
UHF Band	0.7 microvolt for 20 DB quieting

Squelch Sensitivity (Threshold)

VHF Band (Low)	0.4 Microvolt
VHF Band (High)	0.5 Microvolt
UHF Band	0.6 Microvolt

Selectivity	6 DB @ 7 KHz 50 DB @ 18 KHz
Spurious Rejection (except Primary Image)	50 DB
Modulation Acceptance	7 KHz
AFC Range (UHF Only)	Approx. 8 KHz (4 KHz)
I.F. Frequencies	1st I.F.: 10.7 MHz (crystal filter) 2nd I.F.: 455 KHz (ceramic filter)
Scanning Rate	Approx. 15 channels per sec.
Audio Output	1 Watt @ 5%, or less, distortion;
Power	105-130 VAC, 60 Hz @ 13 Watts maximum 11-15 VDC @ 9 Watts maximum
F.C.C. Certified	Part 15, Subpart C

1-2 DESCRIPTION

The ACT-R-106 is a fully programmable, 10 channel, crystal-controlled FM monitor receiver, used to receive broadcasts in three public service communications bands. Low Band (30-50 MHz), High Band (146-174 MHz), and UHF Band (450-512 MHz).

The ACT-R-106 is a double conversion, super-heterodyne type receiver.

Any combination of one to 10 channels may be scanned. A slide switch on each channel is used to turn the channel ON or OFF.

Manual selection is provided to permit continuous monitoring of any one channel.

The ACT-R-106 uses silicon transistors throughout. Integrated circuits are used for compactness and reliability.

A crystal filter in the first IF, and a ceramic filter in the second IF insures good performance in areas where the desired frequencies are closely spaced.

Automatic Frequency Control (AFC) is used on UHF to insure good operation with various crystals.

The ACT-R-106 operates on 117 V, 60 Hz AC or 12 volt battery.

1-3 CIRCUIT DESCRIPTION

Q101 is the Low Band RF amplifier. Varactor tuning is used in the input and output circuits to determine whether the circuits are tuned to the upper or lower segment of the Low Band. The RF signal from Q101 is coupled to the input of the Low Band mixer Q102.

Q103 is the High Band RF amplifier. The input circuit is double tuned. Varactor tuning is used to tune both parts of the double tuned circuits to determine whether the circuits are tuned to the upper or lower segment of the High Band. The RF output signal from Q103 is coupled to the input of the High Band mixer Q104.

Q105 is the UHF RF amplifier. Varactor tuning is used in the input and output to determine whether the circuits are tuned to the upper or lower segment of the UHF Band. The UHF portion of the receiver is normally tuned to cover 450 to 470 MHz (UL) and 475 to 500 (UH). Special alignments are available to cover 406 to 420 MHz or 500 to 512 MHz. When either band segment is retuned to these special segments, operation on the standard segment is eliminated. Either or both UHF segments may be retuned to cover any desired segment. The only requirement is that the UH section must be tuned to a higher frequency segment than the UL section.

Tuning the UH segment will change the tuning of the UL segment, the UL segment will have to be retuned. Tuning the UL segment does not effect the tuning of the UH segment.

The output signal from Q105 is coupled to the input of the UHF mixer, Q106.

The RF amplifier and mixers for each band are turned on by the scan circuit. The band that is turned on for each channel is determined by which band selector pin the program wire for that channel is connected to. In addition, the band selector pin shosen determines whether the circuits are tuned to the high frequency segment of the selected band, or the low frequency segment of that band.

Q107 is the crystal controlled local oscillator. The fundamental frequency of the crystal is taken from the emitter circuit for low band injection. The third harmonic of the crystal frequency is taken from the collector circuit for high band injection. When operating on UHF, the third harmonic of the crystal frequency at the collector of Q107 is coupled to a frequency tripler Q108 which multiplies the frequency by three for UHF injection. Q108 is turned on only for UHF operation. The fundamental frequency of the crystal is normally multiplied by nine for UHF injection. When the UHF section is tuned to 406-420 MHz, the crystal frequency is multiplied by eight. When tuned to 470-512 MHz, the crystal frequency is multiplied by ten.

Automatic Frequency Control (AFC) is used in the oscillator circuit when operating on UHF. The AFC voltage is obtained from Pin 9 of IC101. The average DC voltage at Pin 9 of IC101 is a function of how far the 455 KHz I.F. signal is off frequency. This is called an error voltage. The error voltage is applied to a varactor, CR107 in the oscillator circuit. The voltage applied to CR107 causes the oscillator frequency to change to correct the error. AFC is used only on UHF. When operating on Low Band or High Band, the voltage from Pin 9 of IC101 is shorted out by diodes CR139 or CR140.

The first IF frequency, 10.7 MHz, from any one of the mixers if fed through XF101 (a monolithic crystal filter) to the input of IC101 (Pin 16). Between Pins 16 and 3 is the second IF mixer circuit. Crystal Y111 is used to generate the second L.O. frequency (10.245 MHz) used to mix with the 10.7 MHz IF to produce the second IF frequency 455 KHz. The 455 KHz signal at Pin 3 of IC101 is fed through CF101, a narrow band ceramic filter centered at 455 KHz, to Pin 5 of IC101. Between Pins 5 and 10 of IC101, there are amplifiers, limiters, and a quadrature detector circuit. The adjustable quadrature coil is connected between Pins 8 and 4 of IC101.

The audio signal from Pin 10 of IC101 is fed through the squelch control to an amplifier between Pins 11 and 12 of IC101. The component values in this circuit have been chosen to limit the frequency response of the circuit to approximately 5 KHz to 15 KHz. The "noise" occuring in this range is amplified and applied to a detector, CR109. The positive voltage output from CR109 is applied to the input of an inverting switch between Pins 13 and 14 of IC101. When the positive voltage at Pin 13 reaches sufficient value, the voltage at Pin 14 goes low (near ground). With Pin 14 at or near ground, Q115 is not conducting and operating bias is applied to Q116. Q116 conducts and shorts out the audio input to IC102. When a signal (carrier) arrives at the receiver, the reduction in noise causes the output from CR109 to drop to the point where it is no longer sufficient to operate the inverter. The voltages at Pin 14 of IC101 goes high, (near supply). This high voltage turns on Q115. Conduction of Q115 removes the operating bias from Q116. With Q116 not conducting, the input of the audio amplifier is no longer shorted and audio is heard from the speaker.

In earlier versions, Q109 is used to turn the audio amplifier off by applying high voltage to Pin 1 of IC102. When a signal is received, Q109 is cut off and Pin 1 of IC102 goes low, (near ground) and the audio amplifier operates normally.

The audio signal from Pin 10 of IC101 is coupled through the volume control to input of IC102 (Pin 2). IC102 contains audio amplifiers and output circuits capable of supplying approximately 2 watts of audio to an 8 ohm speaker. The audio output of IC102 is connected to the internal speaker by way of the external speaker jack. When an external speaker is plugged in, the internal speaker is disconnected.

When an external speaker is used, it should have an impedance of 8 ohms.

Q112 is a unijunction transistor operating as a pulse generator. The pulses are generated at 3 different rates. When the scanner is scanning a channel that is turned off, the rate is approximately 1200 Hz. During normal scan, the rate is approximately 15 Hz. When manual scan is selected and the step switch is held to the right, the rate is approximately 2 Hz. The pulse rate for fast, or "skip scan", is determined by the values of R168 and C171.

Q111 is used as a switch. When Q111 is conducting, it connects C170 in parallel with C171. The frequency of oscillation with C170 in the circuit is approximately 15 Hz.

When the Scan/Manual Switch is switched to Manual, C169 is added to the combination of C170 and C171. The frequency of oscillation with C169 in the circuit is approximately 2 Hz.

Q110 is used to turn the clock (Q112) ON and OFF. When Q110 is conducting, the voltages at the base of Q112 is clamped at near zero and the clock is stopped. The scanning action ceases.

Q110 is turned on by the squelch circuit; each time the squelch circuit "opens", Q110 stops the scanner.

When the scanner is scanning, Q114 is used to determine if each channel is turned ON or OFF. If the channel is turned on, the current through the diode causes Q114 to conduct. When Q114 conducts, forward bias is applied to Q111. Q111 conducts and connects C170 to the oscillator circuit. The channel is scanned at a rate of 15 channels per second. When a channel is turned off, current is prevented from flowing through the diode associated with that channel. As a result, Q114 does not turn on Q111 and the channel is scanned at a rate of 1200 channels per second. This rate is too fast for the receiver to recognize a signal. That channel is "skipped".

When the Scan/Manual Switch is set to Manual, a positive voltage is applied to both Q110 and Q111 to turn them both on, provided the scanner is on a channel that has its' front panel switch turned on. With Q110 conducting, the clock is stopped. With Q111 conducting, C169 and C170 are connected to the clock circuit.

Pushing the Step Switch to the right turns off Q110, permitting the clock to run. Because C169 and C170 are in the circuit, the clock runs at approximately 2 channels per second, for as long as the switch is held to the right. When the scanner reaches a channel that has its' front panel switch in the off position (down), Q114 turns off Q111 to disconnect C169 and C170. Without these capacitors in the circuit, the channel is scanned at the "skip scan" rate.

SCAN CIRCUIT

The pulses generated by Q112 are fed to IC103 through a buffer-inverter, Q113. IC103 has four outputs that are switched high and low in the proper order to supply the switching signals required by IC104. The output signals switch once for each pulse applied to Pin 1. IC104 uses the four signals from IC103 to produce the sequential scanning action for the 10 channels. The ten outputs from IC104 are normally high (near supply). The output to each channel is switched low (near ground), as each channel is scanned in order. If the channel switch is on, this ground turns on the light for that channel. In addition, forward bias is provided to the diode associated with the crystal installed in the channel, thus connecting the crystal to the oscillator circuit. The ground for each channel is applied through an isolating diode to the proper band segment pin to turn on the proper RF amplifier and mixer circuits. The RF and mixer circuit that is turned on and the segment of the band which they are tuned is determined by how the channel is programmed by means of the program wires and pins.

1-4 CRYSTAL SPECIFICATIONS

Crystals are not normally supplied with the receiver. The crystals are usually obtained by the owner from the dealer where the receiver was purchased. When ordering crystals from the recommended supplier, Shepherd Industries, the ordering information should include the Model Number of the receiver and the Receive Frequency.

The following information should be included when ordering crystals from a manufacturer who is not familiar with the specifications for the crystals used in Regency receivers.

A. Low VHF Band Crystals

1. Crystal frequency, determined as follows:
   Crystal frequency = Channel frequency +10.7 MHz

2. Frequency tolerance of .002%

3. Series resonance - 450 Hz; 3rd Overtone

4. Maximum impedance of 35 ohms

5. Holder is an HC-25/U with pin leads (plug-in type).

B. High VHF Band Crystals

1. Crystal frequency, determined as follows:
   $$\text{Crystal frequency} = \frac{\text{Channel frequency} - 10.7 \text{ MHz}}{3}$$

2. Frequency tolerance of .001%

3. Series resonance - 450 Hz; 3rd Overtone

4. Maximum impedance of 35 ohms

5. Holder is an HC-25/U with pin leads (plug-in type).

C. UHF Band Crystals (450 to 470 MHz)

1. Crystal frequency, determined as follows:
   $$\text{Crystal frequency} = \frac{\text{Channel frequency} - 10.7 \text{ MHz}}{9}$$

2. Frequency tolerance of .001%

3. 3rd Overtone; load capacitance of 18 PF; drive level of 2 milliwatts

4. Maximum impedance of 35 ohms

5. Holder is an HC-25/U with pin leads (plug-in type)

D. UHF Band Crystals (470 to 512 MHz)

1. Crystal frequency, determined as follows:
   $$\text{Crystal frequency} = \frac{\text{Channel frequency} - 10.7\ \text{MHz}}{10}$$

2. Frequency tolerance of .001%

3. 3rd Overtone; load capacitance of 18 PF; drive level of 2 milliwatts

4. Maximum impedance of 35 ohms

5. Holder is an HC-25/U with pin leads (plug-in type)

E. UHF Band Crystals (406 to 420 MHz)

1. Crystal frequency, determined as follows:
   $$\text{Crystal frequency} = \frac{\text{Channel frequency} - 10.7\ \text{MHz}}{8}$$

2. Frequency tolerance of .001%

3. 3rd Overtone; load capacitance of 18 PF; drive level of 2 milliwatts

4. Maximum impedance of 35 ohms

5. Holder is an HC-25/U with pin leads (plug-in type)

1-5 CRYSTAL INSTALLATION AND PROGRAMMING

Prior to changing the Band Programming or installing a crystal, the receiver's cover will have to be removed. To remove the cover, first remove the telescopic antenna if it is installed. Second, unscrew the two large knurled thumb screws located at the sides of the unit. The cover may then be slipped off by sliding it toward the rear of the unit.

As shipped from the factory, the first two channels are programmed for LL (low portion of Low VHF Band 30-39 MHz). The third channel is programmed for LH (high portion of Low VHF Band 39-50 MHz). The fourth and fifth channels are programmed for HL (low portion of High VHF Band 146-160 MHz). The sixth and seventh channels are programmed for HH (high portion of High VHF Band 160-174 MHz). The eighth and ninth channels are programmed for UL (low portion of UHF Band 450-470 MHz). The tenth channel is programmed for UH (high portion of the UHF Band 470-512 MHz).

Diagram 3-5 shows the factory programming.

Programming is a process of connecting together all of the channels to be used in each band segment and then connecting the group to the proper band segment pin.

Each channel has one program WIRE and one program PIN. Refer to diagram 3-5 to locate the wires and pins. Channels of the same group are connected together by connecting the program WIRE from one channel to the program PIN of another channel. The group of channels is connected to the proper band segment PIN by connecting the program WIRE from the first channel in each group to the band segment PIN which covers the frequencies in that group.

Step 1:

Group all of the crystals to be used in each band segment together. Refer to the frequency marked on the crystals and the chart on page to determine the proper band segment for each group. There may be any number from one to ten crystals in each group. The number of groups may be any number from one to six.

Step 2:

Select the group of crystals to be installed. This may be any one of the groups and the crystals may be installed in any order within the group.

Step 3:

Install the first crystal from the selected group in the desired channel crystal sockets. See page for Crystal Location Diagram.

Step 4:

Connect the program WIRE for the channel selected in Step 3 to the proper band segment PIN. If this group has only one crystal, proceed to the next group by starting over with Step 2. If the group has more than one crystal, proceed with Step 5.

Step 5:

Install the second crystal of the group in the desired channel crystal socket. Connect the program WIRE for this channel to the program PIN of the channel selected in Step 4. This connects the two channels in this segment together. If the group has only two crystals, proceed with the next group by starting over with Step 2. If the group has more than two crystals, continue with Step 6.

Step 6:

Continue the process of installing crystals and connecting the channels together until the group programming is completed. Repeat Steps 2 through 6 for each of the remaining groups.

If there are any unused channels remaining at the completion of programming, continue with Step 7.

Step 7:

Connect all of the UNUSED channels together by connecting the program WIRE for each unused channel to the program PIN of another UNUSED channel. Upon completion of connecting all of the UNUSED channels together, connect the program wire from the last channel either to the program pin of any used channel that has been programmed, or to any unused band segment pin.

The program WIRE of any channel should NEVER be connected to the program PIN of the same channel. In other words, the program WIRE of any channel should always be connected to either another channel's program PIN or to a band segment pin.

Upon completion of programming the desired channels, Step 7 MUST be performed to insure proper scanner operation.

The channels may be programmed in any order desired, however, the programming can be simplified by starting with channel one and progressing to channel ten.

SECTION 2 ALIGNMENT AND TUNING PROCEDURE

2-1 EQUIPMENT REQUIRED

FM Signal Generator
Oscilloscope
AC VTVM capable of measuring 455 KHz

NOTE: During all steps of alignment, the squelch control should be in the UP position (minimum squelch action).

All receiver RF segments (LL, LH, HL, HH, UL and UH) should be aligned to the channel nearest the center of the frequency range in the segment over which they will operate.

2-2 QUADRATURE DETECTOR

1. Connect the FM Signal Generator to the antenna input jack. Accurately set the frequency to the center of the channel being used for alignment. Modulate Signal Generator with 1000 Hz, 3 KHz deviation.

NOTE: Use a High or Low Band crystal.

2. Connect the Oscilloscope to the Junction of R155, C155 and C156.

3. Adjust Signal Generator's output until all of the noise in the scope pattern just disappears.

4. Adjust L115 for maximum peak to peak amplitude, while maintaining symmetry of the detected signal. When L115 is properly aligned, signal at above Junction should be approximately .15 volts RMS with test signal input described in Step 2-2-1.

2-3 IF ALIGNMENT

1. Connect AC voltmeter to the Junction of Pin 5 (IC101), CF101 and R150.

2. Set AC voltmeter to the 100 millivolts scale.

3. With generator accurately set to the frequency of the center of the channel being used for alignment, adjust Signal Generator's output until AC voltmeter reading is mid-range.

4. Adjust L113 for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading near mid-range.

RF ALIGNMENT

Low Band

2-4 LL SEGMENT (30-39 MHz)

1. Connect AC voltmeter to the Junction of Pin 5 (IC101), CF101 and R150.

2. Set AC voltmeter to the 100 millivolt scale.

3. Use an RF frequency near 35 MHz. Set Signal Generator accurately to the frequency of the channel being used for alignment. Connect generator's output to antenna input jack. Adjust Signal Generator's output until AC voltmeter reading is mid-range.

4. Adjust L102 and L103 for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading near mid-range. Repeat adjustments until no further improvements can be made.

2-5 LH SEGMENT (39-50 MHz)

1. Check sensitivity near 45 MHz by comparing the amount of RF signal required to duplicate AC voltmeter reading obtained in Step 2-4-4. The signal should be approximately the same as the LL alignment at 35 MHz.

2. Due to the broadness of Low Band segments, no further adjustments should be necessary.

NOTE: Adjusting any coil to frequencies other than described in the alignment procedure will adversely effect the other Low Band segment.

High Band

2-6 HH SEGMENT (160-174 MHz)

1. Connect AC voltmeter to the Junction of Pin 5 (IC101), CF101 and R150.

2. Set AC voltmeter to the 100 millivolt scale.

3. Use an RF frequency near 165 MHz. Set the Signal Generator accurately to the frequency of the channel being used for alignment. Connect generator's output to antenna input jack. Adjust Signal Generator's output until AC voltmeter reading is mid-range.

4. Adjust L105 and L106 for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading near mid-range. Repeat adjustments until no further improvement can be made.

2-7 HL SEGMENT (146-160 MHz)

1. Use an RF frequency near 155 MHz. Set Signal Generator accurately to the frequency of the channel being used for alignment. Connect generator's output to antenna input jack. Adjust Signal Generator's output until AC voltmeter reading is mid-range.

2. Adjust L107 and L110 for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading near mid-range. Repeat adjustments until no further improvement can be made.

3. Adjust R136 for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading near mid-range.

NOTE: Tune-Up frequencies may be moved within the segment. For proper UHF operation, L110 must be tuned in the 155 to 159 MHz range.

UHF Band

2-8 UH SEGMENT (470-512 MHz)

1. Connect AC voltmeter to the Junction of Pin 5 (IC101), CF101 and R150.

2. Set AC voltmeter to the 100 millivolt scale.

3. Use an RF signal near 487.5 MHz. Set the Signal Generator accurately to the frequency of the channel being used for alignment. Connect generator's output to antenna input jack. Adjust Signal Generator's output until AC voltmeter reading is mid-range.

4. Adjust C122, C125 and C143 (in that order) for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading near mid-range. Repeat adjustments until no further improvement can be made.

NOTE: If sensitivity is poor (greater than .7) or if sensitivity varies more than 3 DB while AFC voltage is varied from 1 to 7 volts, detune L110 two turns CCW.

2-9 UL SEGMENT (450-470 MHz)

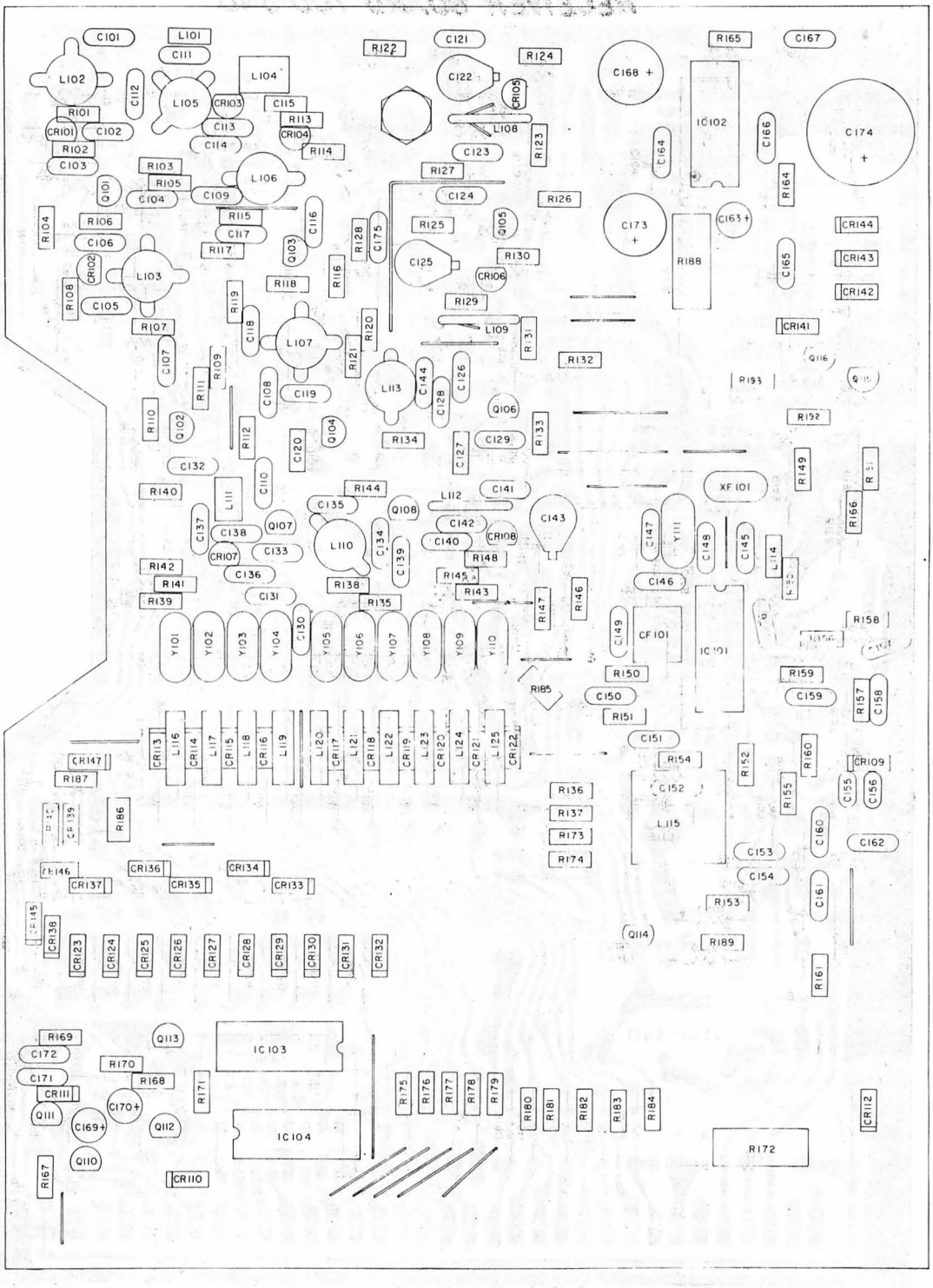
1. Use an RF signal near 460 MHz. Set the Signal Generator accurately to the frequency of the channel being used for alignment. Connect generator's output to antenna input jack. Adjust Signal Generator's output until AC voltmeter reading is mid-range. Adjust R185 for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading near mid-range. Repeat adjustments until no further improvement can be made.

NOTE: Tune-Up frequencies may be moved around within the segment. In all tuning, except Low Band, the High segment must be tuned first and its tuning will affect the Low segments. Re-check Low segment after any adjustments are made to the High segment.

2-10 AFC ALIGNMENT

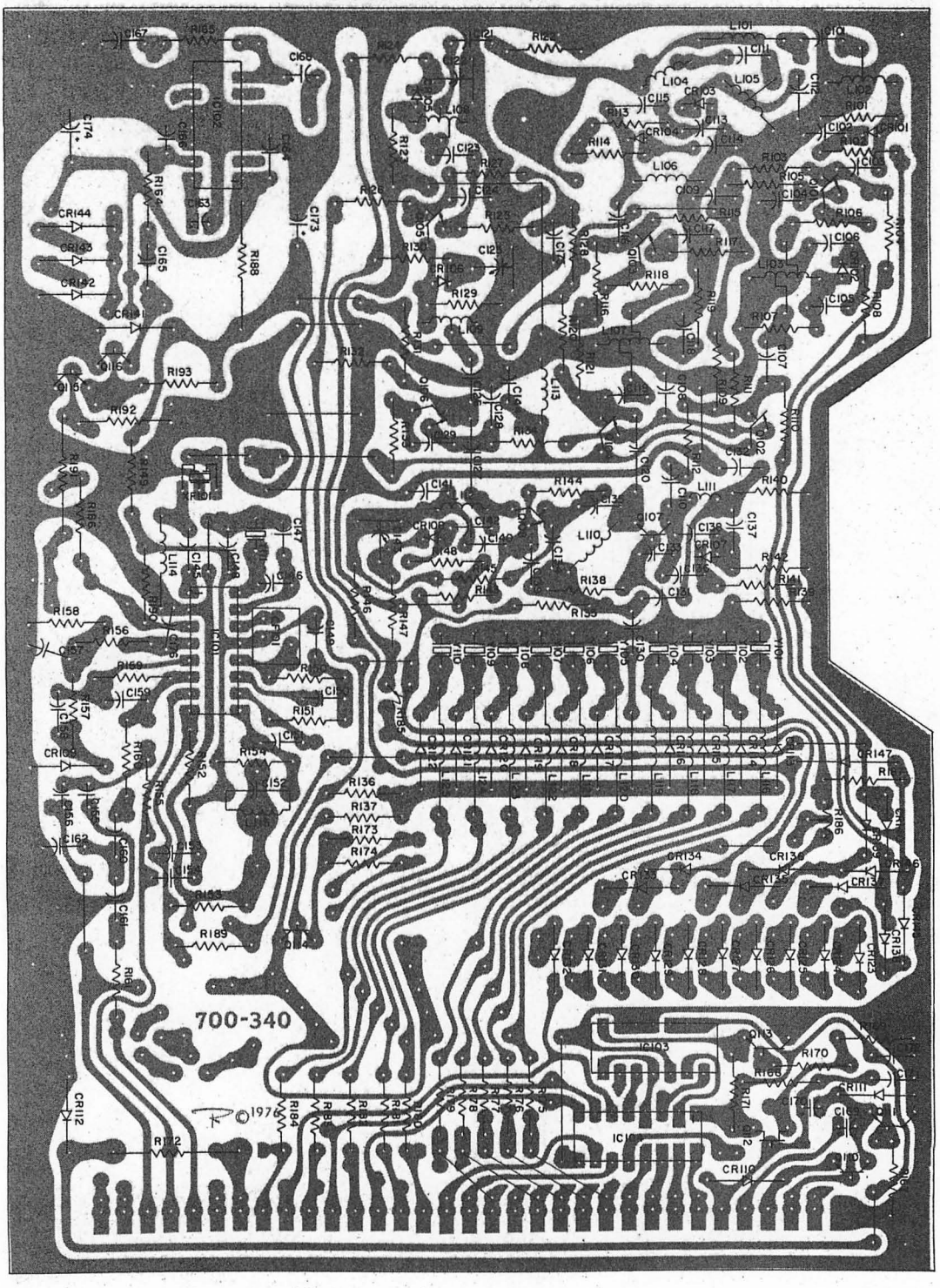
1. With the unit on a channel with a crystal, programmed for a UHF segment and receiving no signal, adjust L115 for voltmeter reading of approximately 3.8 volts at the Junction of R189 and R141. Its' setting should be within a turn of the setting in Wuadrature Alignment.

RECEIVER BOARD 700-340



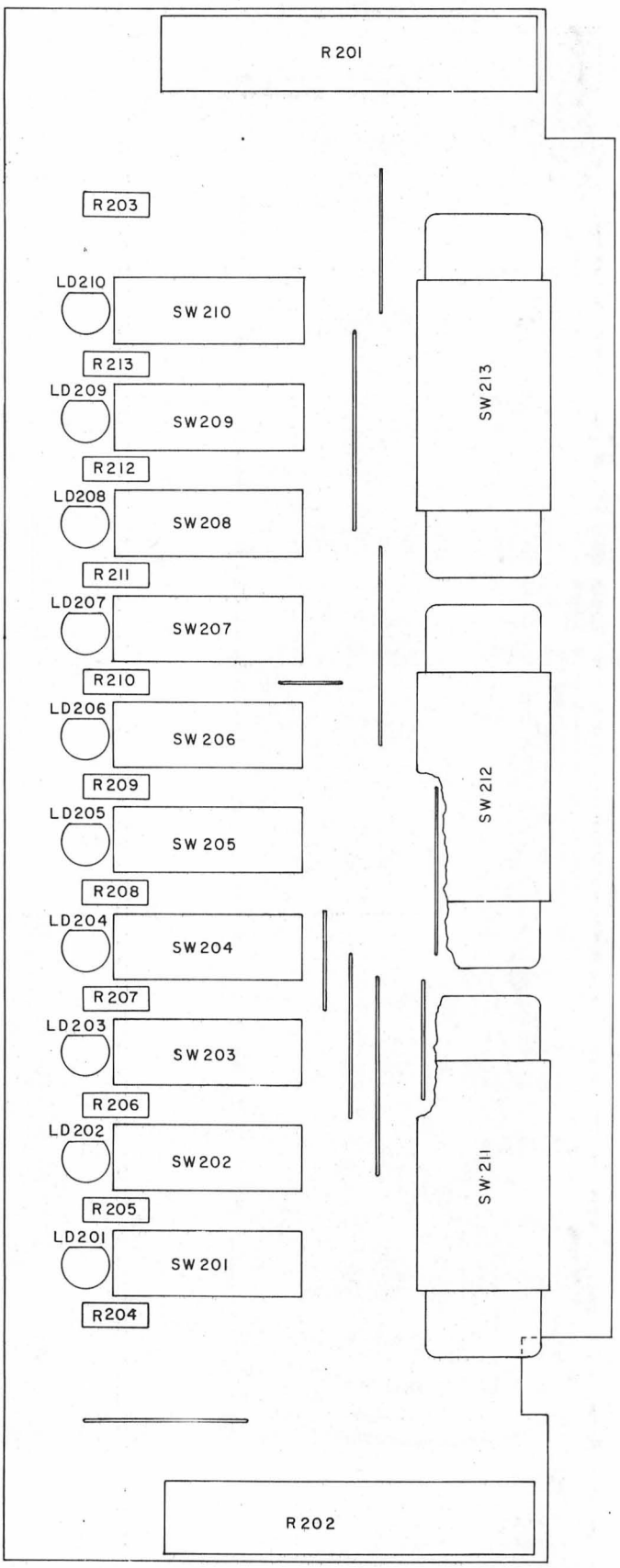
3-1 RECEIVER BOARD PARTS PLACEMENT DIAGRAM

RECEIVER BOARD 700-340

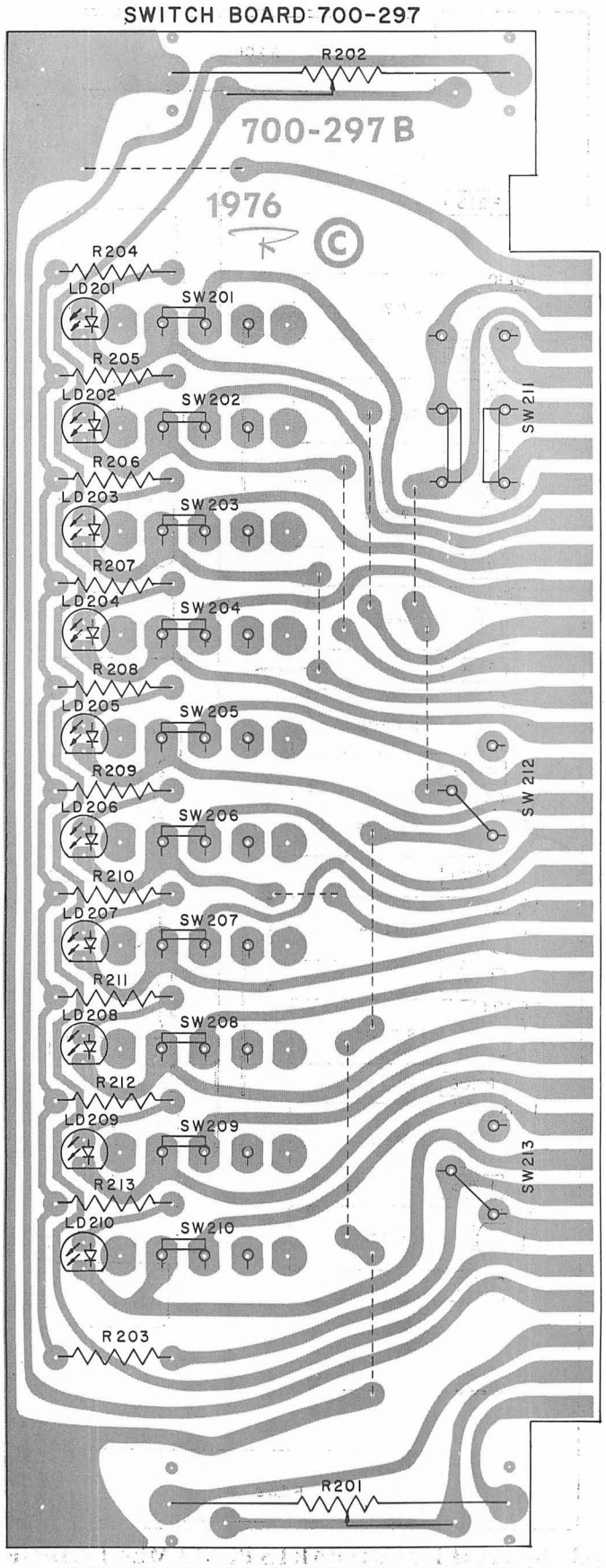


3-2 RECEIVER BOARD PARTS OVERLAY DIAGRAM

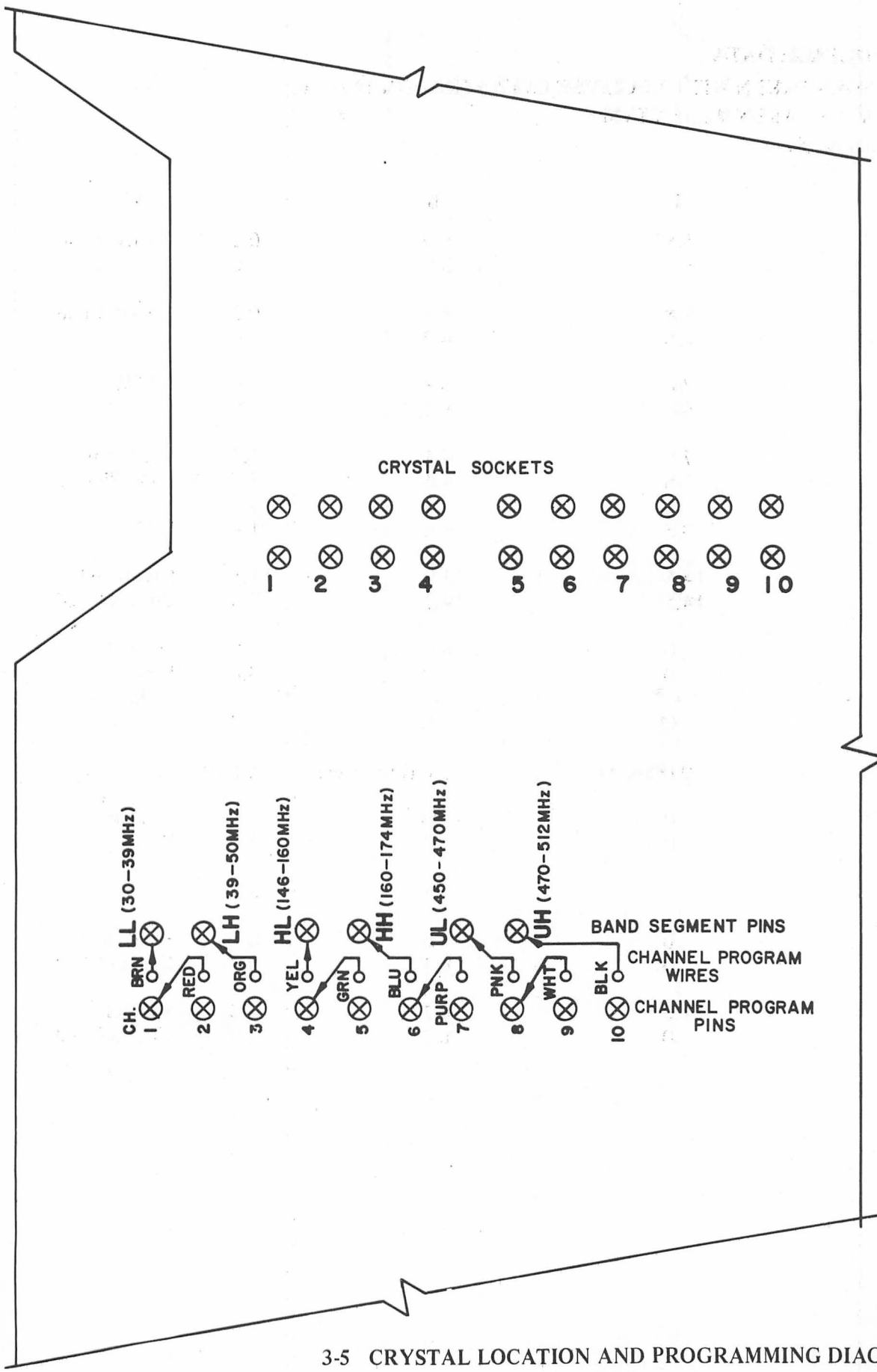
SWITCH BOARD 700-297



3-3 SWITCH BOARD PARTS PLACEMENT DIAGRAM



3-4 SWITCH BOARD PARTS OVERLAY DIAGRAM

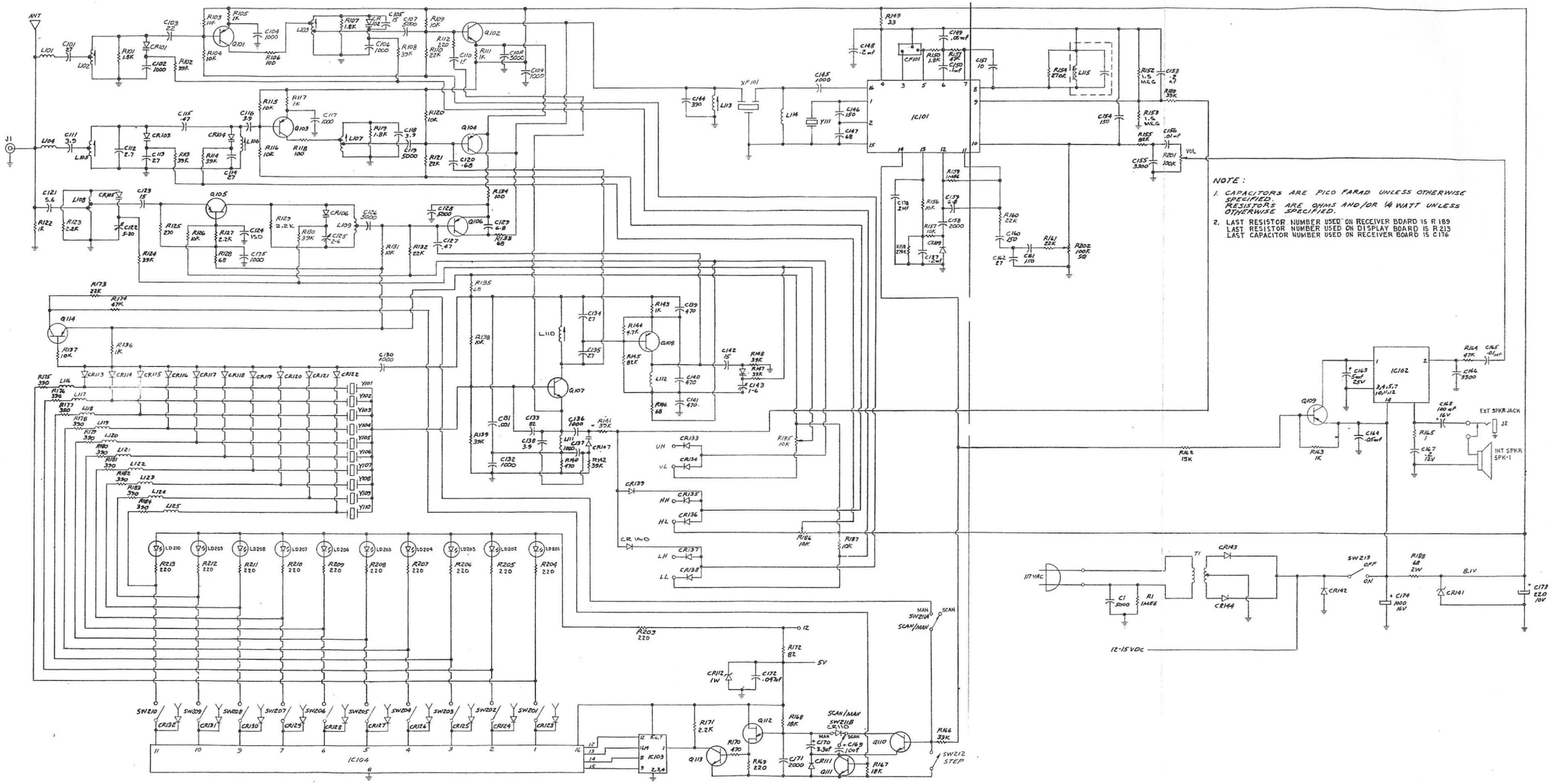


3-5 CRYSTAL LOCATION AND PROGRAMMING DIAGRAM

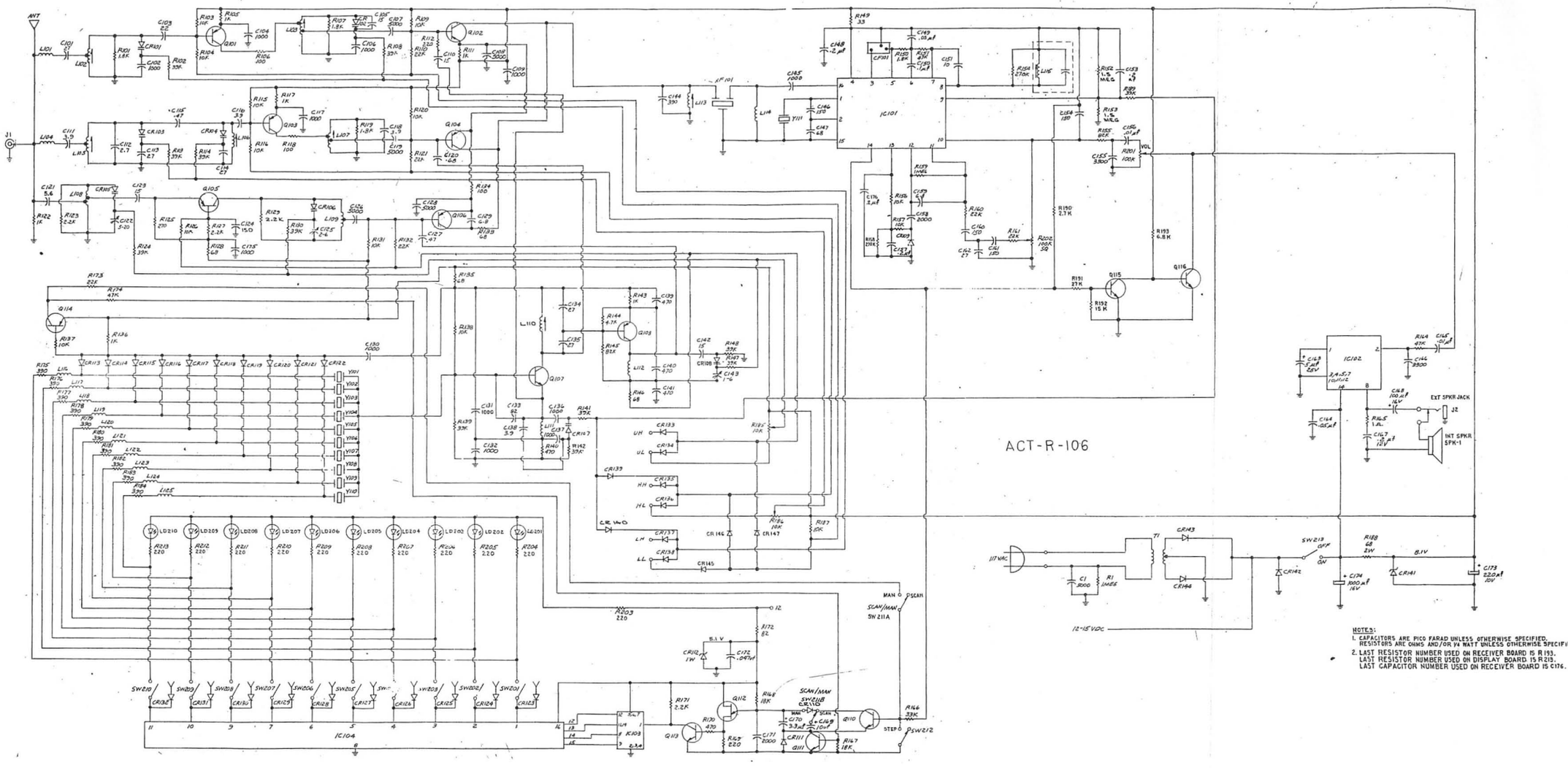
3-6 VOLTAGE DATA

VOLTAGES TAKEN WITH RECEIVER OPERATING ON 117V AC
VOLTAGES TAKEN WITH VTVM
No Signal Applied

	E	B	C	
Q101	5.8	5.0	0.2	– Low Band
Q102	6.3	5.8	0	
Q103	5.8	5.0	0.2	– High Band
Q104	6.8	6.2	0	
Q105	7.6	6.8	0	– UHF
	6.8	6.2	0	
Q107	7.8	4.1	3.7	Oscillating
	7.8	4.6	3.7	Non Oscillating
Q108	8.3	8.0	1.4	UHF
Q109	14.5	13.9	14.5	Squelched
	14.5	14.2	7.3	Unsquelched
Q110	0	0.6	0	Manual
	0	0	3.8	Scan
Q111	0	0.6	0	
Q112	0 (Base 1)	3.6 (Emmiter)	4.6 (Base 2)	
Q113	0	-0	4.6	Manual
	0	0	4.4	Scan
Q114	8.3	7.6	8.3	
Q115	0	0	0.7	Squelched
	0	0.7	0.2	Unsquelched
Q116	0	0.7	0	Squelched
	0	0.2	0	Unsquelched



3-7 SCHEMATIC (EARLY MODELS)



3-8 SCHEMATIC (CURRENT MODELS)

SECTION 4 PARTS LIST
4-1 MAIN BOARD

RESISTORS

All Resistors are ¼ Watt 10% unless otherwise indicated

Item No.	Description	Part No.
R101	1.8K	4701-0182-042
R102	39K	4701-0393-042
R102	39K	4701-0393-042
R103	10K	4701-0103-042
R104	10K	4701-0103-042
R105	1K	4701-0102-042
R106	100	4701-0101-042
R107	1.8K	4701-0182-042
R108	39K	4701-0393-042
R109	10K	4701-0103-042
R110	22K	4701-0223-042
R111	1K	4701-0102-042
R112	220	4701-0221-042
R113	39K	4701-0393-042
R114	39K	4701-0393-042
R115	10K	4701-0103-042
R116	10K	4701-0103-042
R117	1K	4701-0102-042
R118	100	4701-0101-042
R119	1.8K	4701-0182-042
R120	10K	4701-0103-042
R121	22K	4701-0223-042
R123	2.2K	4701-0222-042
R124	39K	4701-0393-042
R125	270	4701-0271-042
R126	10K	4701-0103-042
R127	2.2K	4701-0222-042
R128	68	4701-0680-042
R129	2.2K	4701-0222-042
R130	39K	4701-0393-042
R131	10K	4701-0103-042
R132	22K	4701-0223-042
R133	68	4701-0680-042
R134	100	4701-0101-042
R135	68	4701-0680-042
R136	1K	4701-0102-042
R137	10K	4701-0103-042
R138	10K	4701-0103-042
R139	39K	4701-0393-042
R140	470	4701-0471-042
R141	39K	4701-0393-042
R142	39K	4701-0393-042
R143	1K	4701-0102-042
R144	4.7K	4701-0472-042
R145	82K	4701-0823-042
R146	68	4701-0680-042
R147	39K	4701-0393-042
R148	39K	4701-0393-042
R149	33	4701-0330-042
R150	1.8K	4701-0182-042
R151	47K	4701-0473-042
R152	1.5 Meg	4701-0155-042
R153	1.5 Meg	4701-0155-042
R154	270K	4701-0274-042
R155	82K	4701-0823-042
R156	10K	4701-0103-042
R157	10K	4701-0103-042
R158	270K	4701-0274-042
R159	1 Meg	4701-0105-042
R160	22K	4701-0223-042
R161	22K	4701-0223-042
R162	15K	4701-0153-042
R163	1K	4701-0102-042
R164	47K	4701-0473-042
R165	1 Ohm	4701-0010-042
R166	33K	4701-0333-042
R167	18K	4701-0183-042
R168	18K	4701-0183-042
R169	220	4701-0221-042
R170	470	4701-0471-042
R171	2.2K	4701-0222-042
R172	82 2W	4710-0820-031
R173	22K	4701-0223-042
R174	47K	4701-0473-042
R175	390	4701-0391-042
R176	390	4701-0391-042
R177	390	4701-0391-042
R178	390	4701-0391-042
R179	390	4701-0391-042
R180	390	4701-0391-042
R181	390	4701-0391-042
R182	390	4701-0391-042
R183	390	4701-0391-042
R184	390	4701-0391-042
R185	10K Variable	4751-0103-002
R186	10K Variable	4751-0103-002
R187	10K	4701-0103-042
R188	68 2W	4710-0680-031
R189	39K	4701-0393-042
R190	2.7K	4701-0272-042
R191	27K	4701-0273-042
R192	15K	4701-0153-042
R193	6.8K	4701-0682-042
R194		

CAPACITORS

All Values are pf 10% unless otherwise indicated.

C101	27 NPO	1500-0270-650
C102	.001 mf	1503-0102-003
C102	.001 mf	1503-0102-003
C103	22	1500-0220-650
C104	.001 mf	1503-0102-003
C105	15	1500-0150-605
C106	.001 mf	1503-0102-003
C107	.005 mf	1503-0502-005
C108	.005 mf	1503-0502-005
C109	.001 mf	1503-0102-003
C110	15	1500-0150-605
C111	3.9	1500-0399-905
C112	2.7 NPO	1500-0279-205
C113	27 NPO	1500-0270-650
C114	27 NPO	1500-0270-650

Item No.	Description	Part No.
C115	.47	1510-0478-900
C116	3.9	1500-0399-905
C117	.001 mf	1503-0102-003
C118	3.9	1500-0399-905
C119	.005 mf	1503-0502-005
C120	.68	1510-0688-900
C121	5.6	1500-0569-905
C122	2.5-20 Trimmer	1517-0000-034
C123	15	1500-0150-605
C124	150	1523-0151-002
C125	2-6 Trimmer	1517-0000-035
C126	.005	1503-0502-005
C127	.47	1510-0478-900
C128	.005 mf	1503-0502-005
C129	6.8	1500-0689-905
C130	.001 mf	1503-0102-003
C131	.001 mf	1503-0102-003
C132	.001 mf	1503-0102-003
C133	82 5% NPO	1524-0820-002
C134	27 NPO	1500-0270-650
C135	27 NPO	1500-0270-650
C136	.001 mf	1503-0102-003
C137	.001 mf	1503-0102-003
C138	3.9	1500-0399-905
C139	470	1523-0471-002
C140	470	1523-0471-002
C141	470	1523-0471-002
C142	15	1500-0150-605
C143	2-6 Trimmer	1517-0000-035
C144	390 5%	1506-0391-550
C145	.001 mf	1503-0102-003
C146	150 5%	1506-0151-550
C147	68 5% NPO	1524-0680-002
C148	.2 mf	1502-0204-006
C149	.05 mf	1502-0503-004
C150	.1 mf	1502-0104-005
C151	10	1500-0100-905
C152	15	1500-0150-605
C153	.2 mf	1502-0204-006
C154	150	1523-0151-002
C155	.0033 mf	1508-0332-610
C156	.01 mf	1508-0103-610
C157	.2 mf	1502-0204-006
C158	.002 mf	1523-0202-002
C159	6.8	1500-0689-905
C160	150	1523-0151-002
C161	150	1523-0151-002
C162	27	1500-0270-650
C163	5 mf 25v	1513-0050-003
C164	.05	1502-0503-004
C165	.01 mf	1503-0103-007
C166	.0033 mf	1508-0332-610
C167	.2 mf	1502-0204-006
C168	100 mf 16v	1513-0101-002
C169	10 mf 10v	1513-0100-001
C170	3.3 mf 10v	1513-0339-005
C171	.002 mf	1523-0202-002
C172	.047 mf	1508-0473-610
C173	220 mf 10v	1513-0221-001
C174	1000 mf 16v	1513-0102-002
C175	.001 mf	1503-0102-003

Item No.	Description	Part No.
	FILTERS & CRYSTALS	
XF101	Crystal Filter 10.7 MHz	2705-3232-200
CF101	Ceramic Filter 455 KHz	2700-3209-500
Y111	Crystal, 2nd L.O., 10.245 MHz	2301-3151-601
	COILS	
L101	RF Choke, .68 μhy	1802-0688-003
L102	Low Band Ant.	1800-3152-012
L103	Low Band RF	1800-3152-013
L104	RF Choke	1803-5125-903
L105	High Band Ant. Pri.	1800-3152-001
L106	High Band Ant. Sec.	1800-3152-002
L107	High Band RF	1800-3152-014
L108	UHF Ant.	1800-3160-004
L109	UHF RF	1800-3160-006
L110	Osc. Collector	1800-3152-009
L111	Osc. Emitter	1801-1236-900
L112	UHF Multiplier	1800-3160-003
L113	10.7 MHz If	1800-3191-401
L114	RF Choke	1803-3268-201
L115	Quadrature	1800-3151-700
L116 thru L125	RF Choke, 12 μhy	1803-1313-100
	DIODES	
CR101	Varicap	4809-0000-001
CR102	Varicap	4809-0000-001
CR103	Varicap	4809-0000-004
CR104	Varicap	4809-0000-004
CR105	Varicap	4809-0000-004
CR106	Varicap	4809-0000-004
CR107	Varicap	4809-0000-001
CR108	Varicap	4809-0000-004
CR109	Silicon	4805-1241-200
CR110		
CR111	Silicon	4805-1241-200
CR112	Zener 5.1v, 5%	4808-0000-007
CR113 thru CR122	Germanium	4807-1233-900
CR123 thru CR140	Silicon	4805-1241-200
CR141	Zener, 8.2v	4808-0000-009
CR142	Silicon, Rect.	4806-0000-004
CR143	Silicon, Rect.	4806-0000-004
CR144	Silicon, Rect.	4806-0000-004

Item No.	Description	Part No.

TRANSISTORS

Q101	PNP	4801-0000-026
Q102	PNP	4801-0000-026
Q103	PNP	4801-0000-026
Q104	PNP	4801-0000-026
Q105	PNP	4801-0000-026
Q106	PNP	4801-0000-026
Q107	NPN	4801-0000-100
Q108	PNP	4801-0000-026
Q109	PNP	4801-0000-060
Q110	NPN	4801-0000-010
Q111	NPN	4801-0000-010
Q112	Unijunction	4813-0000-001
Q113	NPN	4801-0000-010
Q114	PNP	4801-0000-060
Q115	NPN	4801-0000-010
Q116	NPN	4801-0000-010

INTEGRATED CIRCUITS

IC101	3130-5127-100
IC102	3130-3157-614
IC103	3130-3157-608
IC104	3130-3193-501

4-2 CONTROL BOARD

Item No.	Description	Part No.
	RESISTORS	
	All Resistors ¼W 10% unless otherwise indicated	
R201	100K Volume, Audio Taper	4752-5135-304
R202	100K Squelch, Linear	4752-5135-303
R203 thru R213	220	4701-0221-042
	DIODES	
LD201 thru LD210	Led, Red	4810-1282-900
	SWITCHES	
SW201 thru SW210	Channel Selector	5113-5135-201
SW211	Scan-Manual	5113-3245-901
SW212	Step	5113-3231-501
SW213	On-Off	5113-3231-601

4-3 CHASSIS ASSEMBLY

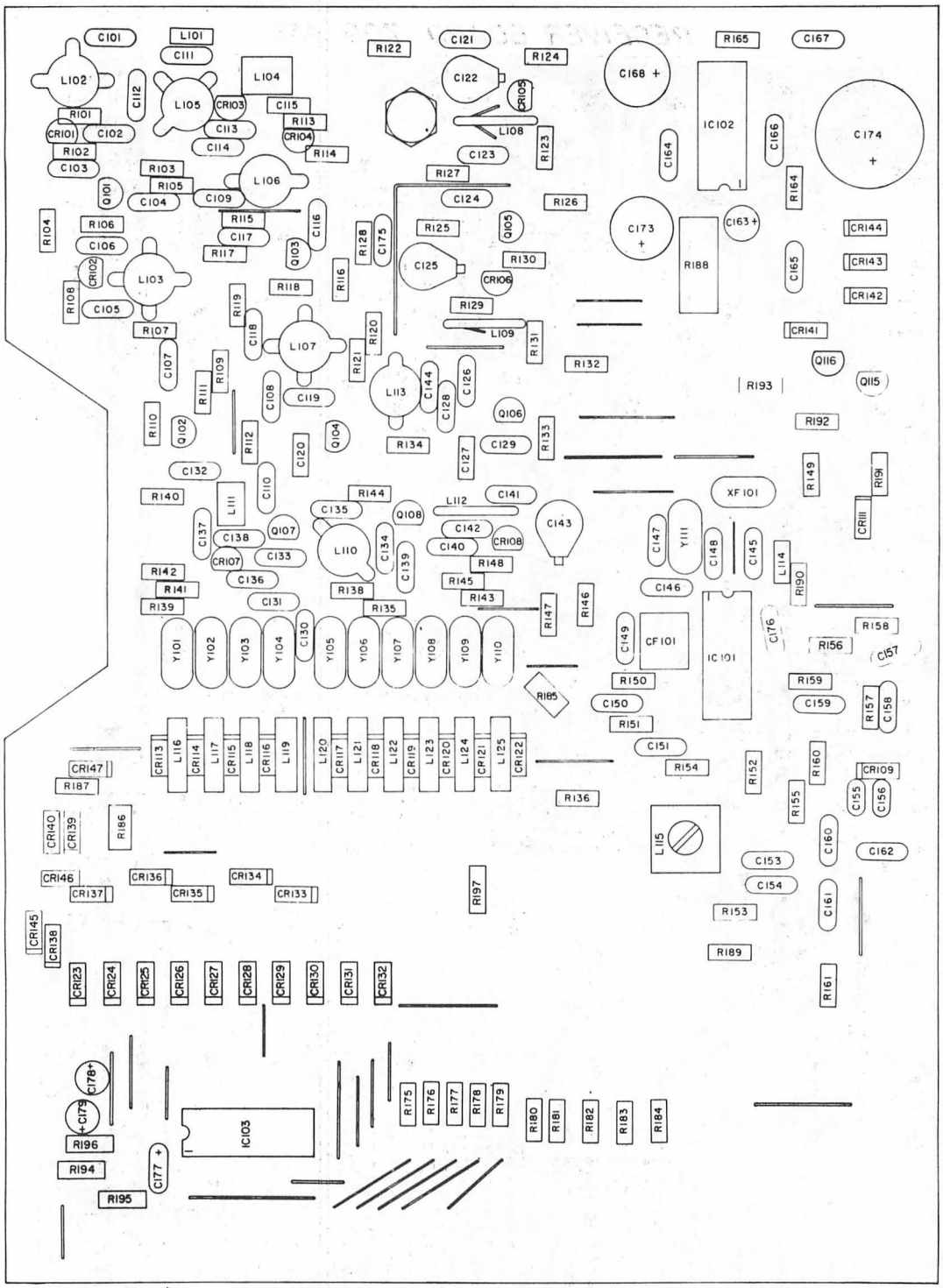
Item No.	Description	Part No.
	CHASSIS & CABINET	
R1	1 Meg ½W 10%	4701-0105-044
C1	.005 Mf 1.4Kv	1501-0502-002
T1	Power Transformer	5604-5100-600
SPK1	Speaker 2x6 8 Ohm	1301-5101-000
MA-13	Mobile Mtg. Bracket	1400-3214-200
MA-9	DC Power Cord	7011-1047-800
MA-16	AC Power Cord	6041-3215-900
	Ant., Telescoping	1201-5108-801
	Knob, Slidetrol	2402-5135-801
	Knob, Slide Sw.	2402-5127-702
	Wrap Assembly	7011-1176-100
	Escutcheon	1411-7028-900
	Inlay	2509-5136-400
	Foot, Rubber	1402-3231-902

SECTION 5

700-456 AND 700-487B BOARD

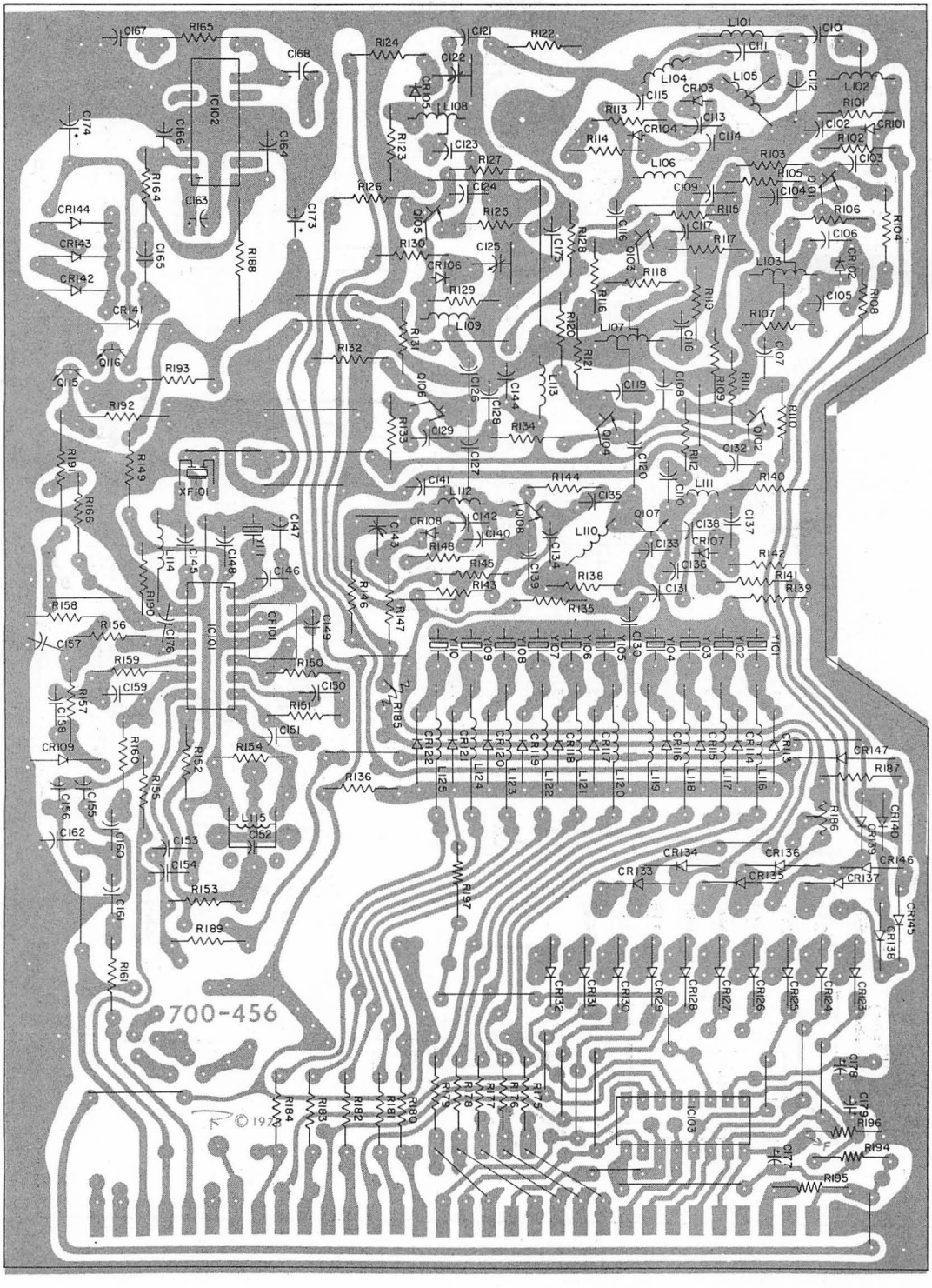
ADDENDUM

RECEIVER BOARD 700-456



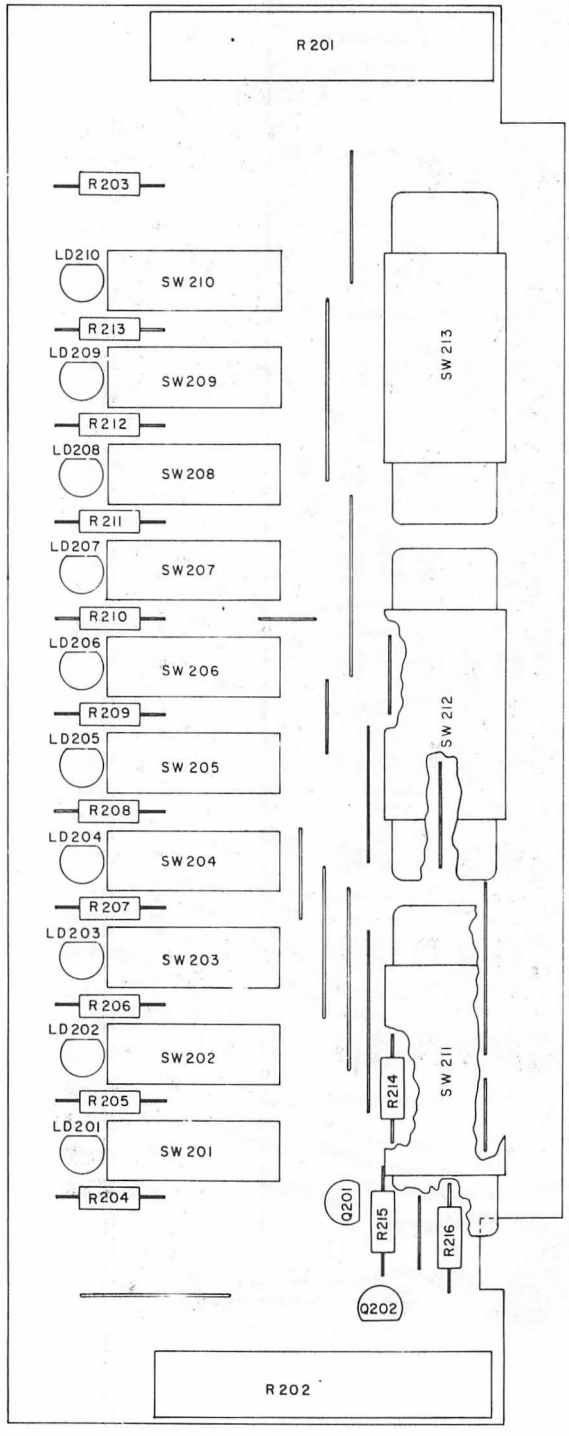
5-1 RECEIVER BOARD TOP VIEW

RECEIVER BOARD 700-456



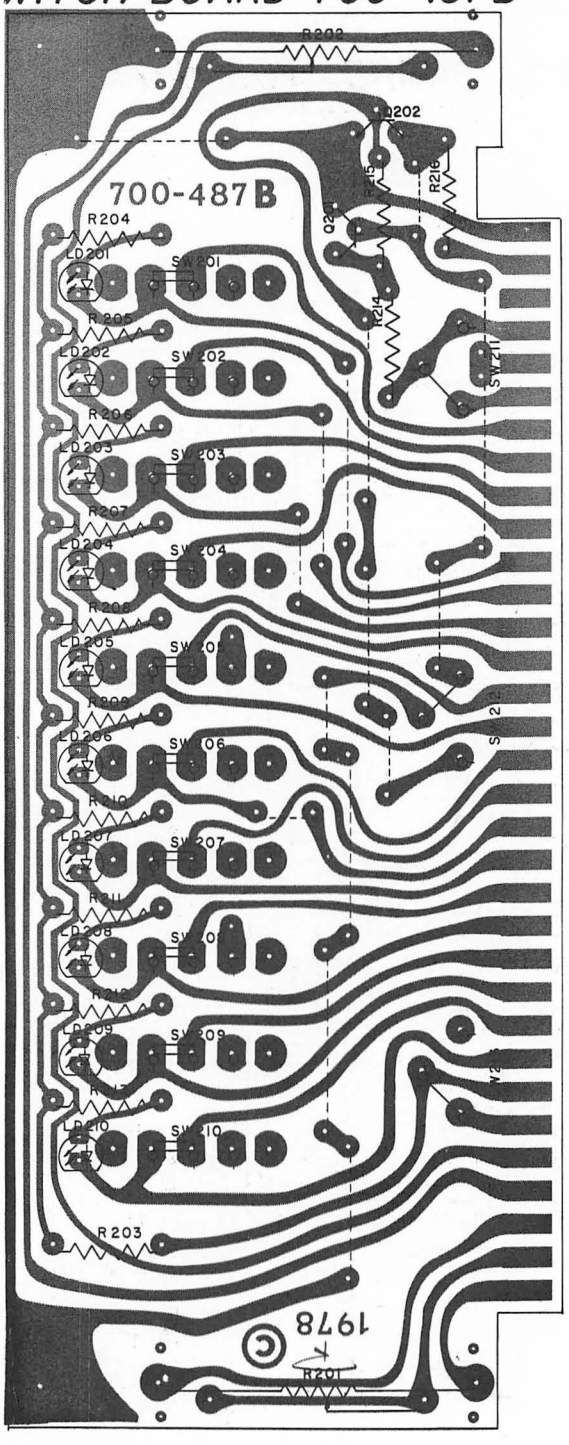
5-2 RECEIVER BOARD BOTTOM VIEW

SWITCH BOARD 700-487B

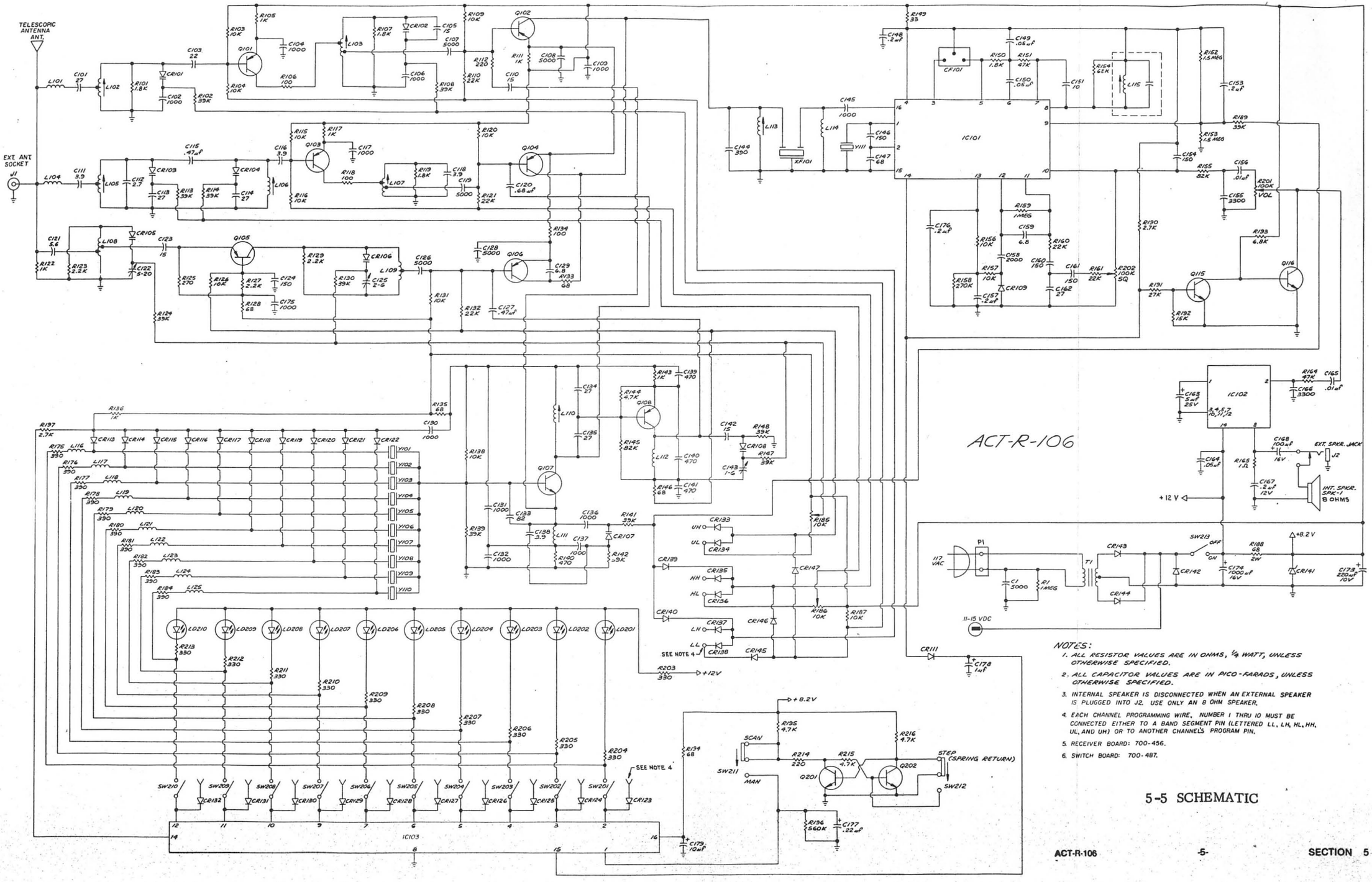


5-3 SWITCH BOARD TOP VIEW

SWITCH BOARD 700-487B



5-4 SWITCH BOARD BOTTOM VIEW



NOTES:

1. ALL RESISTOR VALUES ARE IN OHMS, 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITOR VALUES ARE IN PICO-FARADS, UNLESS OTHERWISE SPECIFIED.
3. INTERNAL SPEAKER IS DISCONNECTED WHEN AN EXTERNAL SPEAKER IS PLUGGED INTO J2. USE ONLY AN 8 OHM SPEAKER.
4. EACH CHANNEL PROGRAMMING WIRE, NUMBER 1 THRU 10 MUST BE CONNECTED EITHER TO A BAND SEGMENT PIN (LETTERED LL, LH, HL, HH, UL, AND UH) OR TO ANOTHER CHANNEL'S PROGRAM PIN.
5. RECEIVER BOARD: 700-456.
6. SWITCH BOARD: 700-487.

5-5 SCHEMATIC

5-6 CIRCUIT DESCRIPTION

Scan Circuit

The entire scan circuit is contained in IC104.

The frequency of the internal clock, and therefore the normal scan rate, is determined by the values of C177 and R196.

Pin 14 of IC104 samples the voltage drop across R136 as each channel is scanned. When a channel is turned off, there will be no current through the diode (CR113 through C122) for that channel, and therefore no voltage drop across R136 when that channel is scanned. No voltage drop across R136 results in full supply voltage being applied to Pin 14 of IC104. Full supply voltage on Pin 14 causes the scan speed to increase to "skip scan" rate. This rate is too fast for the receiver to recognize a signal and that channel will be "skipped".

The voltage on Pin 14 of IC101 goes high, (near supply), when a signal is received. This voltage is applied through CR111 to Pin 15 of IC104. The voltage also charges C178. When the signal is no longer present, Pin 14 of IC101 goes low, (near zero). CR111 prevents rapid discharge of C178. The time required for C178 to discharge and scanning to resume is the "scan delay".

Moving the SCAN-MAN Switch to MAN applies voltage to C177 through R195. C177 will charge to approximately supply voltage and remain charged. This action stops the scan clock and the scanning.

Q201 is turned off because the Step Switch has its base shorted. Moving the STEP Switch to Step removes the short and allows turn on bias to be applied to the base of Q201 through R216. When Q201 conducts, C177 is discharged through R214 and Q201. The drop in voltage on Pin 1 of IC104 causes the channel to move one position to the right. Any channel that is turned off will be "skipped". Q201 holds C177 in a discharged condition as long as the STEP Switch is held down. Releasing the switch turns Q201 off and allows C177 to charge. Q202 is used to make sure switch "bounce" does not appear to multiple signals applied to Q201.

5-7 PARTS LIST

RECEIVER BOARD 700-456

Item No.	Description	Part No.
	RESISTORS	
All resistors are 1/4 Watt, unless otherwise indicated.		
R194	68 Ohm	4701-0680-042
R195	4.7K Ohm	4701-0472-042
R196	560K Ohm	4701-0564-042
	CAPACITORS	
C177	.22 MF	1526-0224-001
C178	1.0 MF	1513-0010-004
C179	10 MF	1513-0101-002
	DIODE	
CR111	Silicon	4805-1241-200
	INTEGRATED CIRCUIT	
IC103	Scan	3130-5127-900

SWITCH BOARD 700-487

	RESISTORS	
R201	Volume, 100K	4752-5135-304
R202	Squelch, 100K	4752-5135-303
R203 Thru R213	330 Ohm	4701-0331-042
R214	220 Ohm	4701-0221-042
R215	4.7K Ohm	4701-0472-042
R216	4.7K Ohm	4701-0472-042

SWITCH BOARD 700-487 (CONTINUED)

Item No.	Description	Part No.
	DIODES	
LD201 Thru LD210	LED, Red	4810-1282-903
	TRANSISTORS	
Q201	NPN	4801-0000-010
Q202	NPN	4801-0000-010
	SWITCHES	
SW201 Thru SW210	Channel	5113-5135-203
SW211	Scan/Man	5113-3231-601
SW212	Step, Spring Return	5113-3231-501
SW213	ON/OFF	5113-3231-601