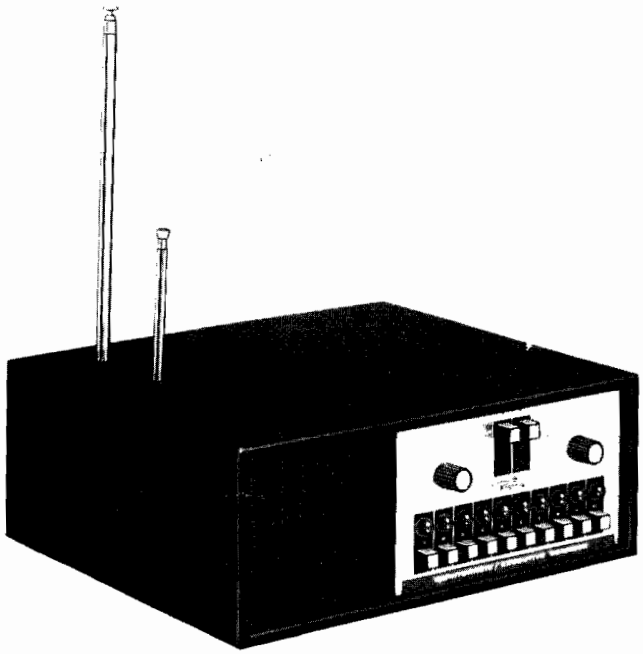
Ted Moriarty

Regency® ELECTRONICS INC.

SERVICE MANUAL



MODEL ACT-E10H/L/U
MONITORADIO RECEIVER

7707 RECORDS STREET
INDIANAPOLIS, INDIANA 46226

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7-75

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ACT-E10 H/L/U SERVICE MANUAL

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SECTION 1 SPECIFICATIONS AND CIRCUIT DESCRIPTION

1-1 SPECIFICATIONS (Subject To Change Without Notice)

RECEIVER - MODEL ACT-E 10 H/L/U

Frequency Range
- VHF Band (Low) ..... 30-50 MHz
- VHF Band (High) ..... 148-174 MHz
- UHF Band (Factory Tuned) ..... 450-470 MHz
- UHF Band (Retuned) ..... 470-500 MHz

Frequency Separation
- VHF Band (Low) ..... 6 DB Bandwidth; 33-47 MHz
  10 DB Bandwidth; 30-50 MHz
- VHF Band (High) ..... 8 MHz (maximum sensitivity)
  12 MHz (usable sensitivity)
- UHF Band ..... 8 MHz (maximum sensitivity)
  12 MHz (usable sensitivity)

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) ..... 0.3 Microvolt
- VHF Band (High) ..... 0.5 Microvolt
- UHF Band ..... 0.5 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. 10 KHz (±5 KHz)

I.F. Frequencies ..... 1st I.F.: 10.7 MHz
2nd I.F.: 455 KHz (ceramic filter)

Squelch System ..... "Noise Operated"

Audio Output (8 Ω Speaker) ..... 1 Watt @ 5%, or less, Distortion; 2 Watts, maximum

FCC Certified ..... Part 15, Subpart C

SCANNER

Scan Rate ..... Approx. 15 Channels per sec.

Scan Delay ..... Approx. 1/2 sec.

POWER

Voltage Requirement ..... 105-130 VAC, 60 Hz @ 13 Watts maximum
11-15 VDC @ 9 Watts maximum

Current Requirements	@ 13.8 VDC
Receiver (Squelched)	180 MA.
Receiver (Max. Audio Output)	600 MA.
Fuse Size	1.5 Amp., 3AG

SEMICONDUCTORS

Integrated Circuits	5
Silicon Transistors (Total)	25
Field Effect Transistor	1
Diodes (Total)	30
Signal Diodes	24
Zener Diodes	2
Rectifier Diodes	3
Varactor Diode	1

GENERAL

Front Panel Size	6 1/2" x 2 5/8"
Depth (including Knobs and Rear Panel Connectors)	9 3/4"
Antenna Connectors	Motorola Type
Speaker Size	2" x 6", 8 Ohm

ACCESSORIES

DC Power Cord	MA-17
Cigarette Lighter Plug DC Power Cord	MA-18
8 Ω, 4" Remote Speaker	MA-34
70 DB Ceramic Filter (455 KHz)	MA-46

1-2 CRYSTAL SPECIFICATIONS

Miniature plug-in crystals are utilized in the receiver. Because of the high accuracy (close tolerance) required, Shepherd Industries' crystals are recommended. If the crystals are ordered from Regency, it is only necessary to specify Part No. 2302-0000-000 for High Band crystals and the desired receive frequency, or Part No. 2303-0000-000 for Low Band crystals and the desired receive frequency, or Part No. 2304-0000-000 for UHF (450-470 MHz) crystals and the desired receive frequency, or Part No. 2320-0000-000 for UHF (470-500 MHz) crystals and the desired receive frequency.

If desired, the crystals may be purchased from other manufacturers. The following specifications must be included in the order:

High Band Crystal: (148-174 MHz)

a. Crystal frequency, determined as follows:

$$\text{Crystal frequency} = \frac{\text{Channel frequency} - 10.7\ \text{MHz}}{3}$$

EXAMPLE:

Crystal frequency =

$$\frac{155.55 \text{ MHz} - 10.7 \text{ MHz}}{3} = \frac{144.85 \text{ MHz}}{3} = 48.28333 \text{ MHz}$$

b. Frequency Tolerance of .001%
c. 3rd Overtone
d. Series resonance minus 450 Hz
e. Maximum equivalent series resistance of 35 Ohms
f. Drive Level of 2 MW
g. Holder: HC-25/U

Low Band Crystal: (30-50 MHz)

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

EXAMPLE:

Crystal frequency = 39.50 MHz +10.7 MHz = 50.20 MHz

b. Frequency Tolerance of .001%
c. 3rd Overtone
d. Series resonance minus 450 Hz
e. Maximum equivalent series resistance of 35 Ohms
f. Drive Level of 2 MW
g. Holder: HC-25/U

UHF Band Crystal (450-470 MHz)

a. Crystal frequency = $\frac{\text{Receive frequency} - 10.7 \text{ MHz}}{9}$

EXAMPLE:

Crystal frequency = $\frac{458.00 \text{ MHz} - 10.700 \text{ MHz}}{9}$

Crystal frequency = 49.70000 MHz

b. Frequency Tolerance of .001%
c. 3rd Overtone
d. Parallel resonance - 18 PF load capacitance
e. Maximum equivalent series resistance of 35 Ohms
f. Drive Level of 2 MW
g. Holder: HC-25/U

UHF Band Crystal (470-500 MHz)

a. Crystal frequency = $\frac{\text{Receive frequency -10.7 MHz}}{10}$

EXAMPLE:
Crystal frequency = $\frac{485.10 \text{ MHz } -10.7 \text{ MHz}}{10}$

Crystal frequency = 47.44000 MHz

b. Frequency Tolerance of .001%
c. 3rd Overtone
d. Parallel resonance - 18 PF load capacitance
e. Maximum equivalent series resistance of 35 Ohms
f. Drive Level of 2 MW
g. Holder: HC-25/U

1-3 CRYSTAL INSTALLATION AND BAND PROGRAMMING

Crystal Installation:

Due to the numerous frequencies involved, the crystal is not normally installed by the factory, but by the seller or owner of the unit. Miniature, plug-in crystals are installed by inserting them in receptacles mounted on the printed circuit board.

Prior to installing a crystal, the receiver's Crystal Access Door will have to be removed. Turn the unit over and then rotate the two Access Door fasteners so that the door may be lifted out. It is recommended that the power cord (AC or DC) be disconnected before removing the Access Door. Also, remove the two telescopic antennas.

Carefully install the crystal in the proper pair of socket pins as indicated in the Crystal Location Drawing 3-7. The crystal MUST be installed in the proper row for correct operation. The numbers located between two of the rows of pins indicate which group of pins correspond to the channel number on the front panel.

NOTE: Later production units have a Crystal Installation Diagram label affixed to the inside surface of the Access Door.

If the crystal is for the UHF band (450 to 500 MHz), it should be installed with one lead in a center row pin (labeled COMMON) and its other lead in the corresponding pin in the row labeled UHF (row on the right, as viewed from the front of the unit). If the crystal is for one of the VHF bands (either High or Low), it should be installed with one lead in a center row pin and its other lead in the corresponding pin in the row labeled VHF (on the left as viewed from the front of the unit). Thus, one of the crystal's leads must always be inserted in a cen-

ter row socket pin while its other lead is inserted in the proper corresponding outer row socket pin.

Band Programming:

As shipped from the factory, the first three channels are programmed for Low Band VHF, the next four (Channels 4 through 7) are programmed for High Band VHF and the last three (Channels 8 through 10) are programmed for the UHF Band. If desired, this arrangement can be changed to any other combination of High, Low or UHF Band channels. Remove the Crystal Access Door, as described above, and follow the detailed instructions in the next three paragraphs.

If a channel is to be re-programmed (change bands), remove the proper color-coded wire and socket from its present pin and place it onto the corresponding pin in the desired band row. Each row is labeled (see Crystal Location Diagram 3-7) for its respective band (Hi, Lo or UHF). The outer row of pins on the left side (as viewed from the front) is for the Low VHF Band; the center row is for the Hi VHF Band and the other outer row (on the right side, as viewed from the front) is for the UHF Band.

Be sure that each channel has its color-coded wire programmed properly with respect to the crystal installed and to the channel number. Reading from rear to front (Channel 1 through 10), the color-coded wires should be in this order; brown, red, orange, yellow, green, blue, purple (or violet), pink, white and black.

NOTE: If a particular channel is not used (in other words, there is no crystal installed for that channel), the band selection wire must still be connected to either a High Band, a Low Band or to a UHF Band pin. Thus, for proper scanner operation, all of the band selection wires MUST be connected, even though not all channels are used.

After the crystals are installed and any necessary band programming changes are completed, reinstall the Crystal Access Door. Place the door in its opening and rotate the two fasteners so that they are firmly holding the door in place. Turn the unit over; plug the power cord back in and reinstall the two telescopic antennas.

1-4 MAIN BOARD – CIRCUIT DESCRIPTION

Q101 is a Low VHF Band RF amplifier with broad-band tuned circuits in its input and output circuitry. The output of the RF amplifier is coupled to the input of the Low VHF Band mixer, Q102.

Q103 is a High VHF Band RF amplifier with broad-band circuits in its input and output circuitry. The output of the RF amplifier is coupled to the input of the High VHF Band mixer, Q104.

Q105 is the UHF Band Field Effect RF transistor used in the common gate configuration. Q105 has broad-band tuned circuits in its input and output circuitry. The output from the RF amplifier is coupled to the input of the UHF Band mixer, Q106.

The first L.O. (local oscillator), Q125, uses third overtone crystals and operates on all VHF channels, whether High or Low Band. For Low VHF Band signals, the fundamental frequency of the crystal is taken off the Emitter of Q125 for injection. For High VHF Band signals, the third harmonic of the crystal is coupled off the collector of Q125 for oscillator injection. For UHF Band signals, the third harmonic of the crystal is coupled off the collector circuitry of Q107 (the first L.O. for UHF) and is coupled to the base of Q108. Q108 is a tripler which multiplies the 3rd harmonic of the UHF oscillator (Q107) by three for use as the ultimate injection frequency.

The radio is switched between Low VHF Band, High VHF Band and UHF Band by transistors Q113, Q114 and Q115. When Q113 is conducting, operating bias is applied to the Low VHF Band RF amplifier and mixer. When Q114 conducts, operating bias is applied to the High VHF Band RF amplifier and mixer. When Q115 conducts, operating bias is applied to the UHF Band mixer. Conduction of Q113, Q114 or Q115 is determined by the Band Programming pins. A wire socket for each particular channel is connected to either a Low, High or UHF programming pin. When that particular channel is scanned, the Low, High or UHF section is also turned on, depending upon the band programming.

There are three row of crystal socket pins. The middle or center row is common to the diode switching circuitry (CR101-110, R125-134, L109-118), thus one pin or lead of the crystal is always inserted in the center row. The other crystal lead is inserted in the associated socket in one of the two outer rows, depending upon whether it is a VHF or UHF crystal.

A crystal is electrically connected to one of the oscillator circuits when its associated diode is forward biased. Until the scanner reaches that particular channel, the diode is back biased and prevents the oscillator from operating on the crystal's frequency. When the respective channel is reached, the scanner's output line provides a low resistance path to ground, which turns the diode on (forward biases it) and effectively connects the crystal into the oscillator circuit.

The automatic frequency control circuit (AFC), UHF Band only, consists of Q109, Q110, Q111 and CR111. Q110 and Q111 form a differential amplifier. The voltage at pin 1 of IC102 is determined by the amount the signal is off frequency; this is called an error voltage. The error voltage is first fed to the differential amplifier pair (Q110 and Q111) and then amplified by Q109 and applied to CR111. CR111 is a voltage variable capacitor, or varactor, in the UHF oscillator (Q107) circuit. When the voltage applied to CR111 changes, the frequency of the oscillator is changed.

The second L.O. frequency is normally 10.245 MHz. In cases where interference is encountered from a signal approximately 910 KHz BELOW the desired frequency, the second L.O. may be changed to 11.155 MHz. If the second L.O. is 10.245 MHz, the error voltage is taken from the collector of Q111. If the second L.O. has been changed to 11.155 MHz, the error voltage is taken from the collector of Q110. The correct combination can be determined by checking the frequency stamped on the second L.O. crystal, (Y111).

The output frequency from the first mixers is 10.7 MHz, the first IF frequency. It is filtered by L122, L123 and L124 before it is fed to an Integrated Circuit IC101, which contains the second mixer circuitry and L.O. circuitry.

The 455 KHz output of IC101 (terminal 5) is coupled through a tuned circuit to the input of the ceramic filter, CF101. CF101 is a narrow-band filter centered at 455 KHz. The excellent bandpass characteristics of CF101 provide for very good adjacent channel rejection. The output of CF101 is amplified by Q116 and coupled through another tuned circuit to the input of Integrated Circuit IC102. IC102 is a series of amplifiers providing approximately 60 DB gain at 455 KHz. Also included in IC102 is the limiting circuitry and a Quadrature Detector circuit. L128, connected between terminals 2 and 12 of IC102, is the adjustable Quadrature coil.

The audio output from IC102 (terminal 1) is coupled to the input of the audio amplifier circuit and to the input of the noise-operated squelch circuit.

Transistor Q117 is an amplifier whose frequency response extends from approximately 5 KHz to 25 KHz. Q117 amplifies the "noise" occuring in this frequency range. The noise is coupled to the base of Q118. Q118 is used as a detector which rectifies the amplified noise and produces a DC voltage at its collector. When the DC voltage at the collector of Q118 is positive and of sufficient value to provide base bias for Q119, Q119 turns off and removes forward bias from diode, CR113 and leaves it back biased. This action prevents audio from reaching the speaker and the receiver is squelched (muted). When a signal (carrier) arrives, the output from the detector Q118 is reduced to the point where the DC voltage at the base of Q119 is no longer sufficient to cause Q119 to conduct.

At this time, CR113 is forward biased and is allowed to conduct normally and the audio output of the unit is heard. Audio is applied through the volume control to IC103. IC103 is an Integrated Circuit containing a power audio amplifier; gain is internally fixed at 34 DB or 50 times and the output is short-circuit proof with internal thermal limiting. The output of IC103 is connected to an 8 ohm internally mounted speaker. An external speaker can be connected to the unit; no less than a 8 ohm speaker is recommended for optimum performance.

The squelch tail circuit consists of R184, R185, CR112, and C170. This circuit is used to keep the squelch circuit open for a short time after the station signal goes off. The purpose of the squelch tail circuit is to prevent the squelch circuits

from chopping very weak signals, especially mobile signals. The timing of the squelch tail can be changed by changing the value of C170. Removing C170 from the circuit will remove the squelch tail completely.

Five basic functional circuits make up the Scanner system. They are; a 4-bit binary counter, a binary coded decimal to one of ten decoder/driver, a lamp detector, a three-speed clock and a clock inhibitor.

The 4-bit binary counter (IC104) has four output (pins 8, 9, 11 and 12) and two inputs. One of the inputs (pin 1) accepts clock pulses and the other one (pin 14) accepts pulses from pin 11 of the counter. The counter counts the clock pulses (up to 16) and provides a binary-coded decimal (BCD) output for each input pulse. This is basically accomplished by having four divide-by-two sections (Flip-Flops) interconnected in a series circuit.

There is a specific combination, in a binary form, of these counter outputs for each channel. The Decoder/Driver (IC105) converts the BCD information into decimal configuration (0 through 9) and provides the "Low" output necessary to turn on the channel lamp and diode switch for the crystal. Only one Decoder/Driver output is low at any one time; all other outputs are "High" or near the supply voltage.

The duration for the lamp to be on is dependent upon the position of the channel switch and the Scan/Manual Switch. If the channel switch is set to the "OUT" position, the lamp does not light at all and the Lamp Detector (Q120) remains cut off (no collector current). The clock runs at its FAST speed (approximately 1200 Hz) and the receiver's oscillator and squelch circuits can not react quickly enough to stop on the channel even if a RF signal were present.

If the channel switch is in the "IN" position, the channel lamp lights and the Lamp Detector (Q120) conducts, forcing the clock to run at its NORMAL (approximately 15 Hz) scan speed. Thus, the lamp is on long enough to reach normal illumination and the receiver's oscillator and squelch circuits can react quickly enough during this relatively long period of time to an incoming RF signal. It should be noted that the Clock runs at its FAST speed except when scanning through an active channel. In other words, until the Lamp Detector (Q120) determines that a channel lamp is drawing current, the Clock is operating in its FAST mode and it does not slow down to its NORMAL scan speed until it actually is partly into an active (lamp lit) channel.

When an RF signal is present, squelch is "broken" and a positive voltage is fed to the Clock Inhibitor (Q121) which then stops the clock from running. Thus, as long as an RF signal (carrier) is present, the clock is stopped and the Counter is not operative. After the RF signal is gone, a delay to the Clock starting again is provided by capacitor C179. This delay permits a short interval of a "stopped" clock so that another RF signal responding to the first signal (for example a mobile replying to the base station) can come on channel without the scanner going through all of the other channels first.

The Clock (pulse generator) circuitry is primarily a unijunction oscillator. Its basic speed (frequency or period) is determined by R197 and C181, which is the FAST speed. Its NORMAL speed is determined by R197, C180 and C181. When Q122 is turned on (Q121 turned off, Q120 turned on), C180 is effectively added to the timing circuit of the clock, forcing it to run much slower (approximately 15 Hz).

The Clock Inhibitor, Q121, stops the Clock when it is conducting and its collector goes low (near ground). This provides a low voltage path to ground for the Emitter of the unijunction (Q123). When the Emitter of Q123 is below a certain value, the unijunction ceases to oscillate. It can be considered a solid-state version of the relaxation type oscillator.

For normal scanning operating, the Scan/Manual switch connects the carrier delay capacitor (C179) to the Clock Inhibitor's collector circuit. For manual operation, C179 is connected in parallel with C180. Also, fixed voltage is applied to the base of Q121 which is turned on (conducting), thus stopping the Clock. Then, when the Step switch is pushed in, it removes this fixed voltage from Q121's base, permitting the Clock to run. However, with C180 and C179 in parallel, the Clock will now run at approximately 2 Hz, which is the SLOW or manual stepping scan rate. Upon release of the Step Switch, the Clock Inhibitor (Q121) is again forced to stop the Clock. Pushing in the Scan/Manual switch will automatically let the Clock run again at its proper scan rate.

1-5 470-500 MEGAHERTZ OPERATION

This unit can be retuned to cover an eight Megahertz segment of the 470-500 MHz band. The major difference is that the crystal frequency is determined by taking the channel frequency minus 10.7 MHz and dividing by TEN (Refer to Section 1-2, CRYSTAL SPECIFICATIONS). This allows for L119, the drive coil for the UHF tripler, (Q108), not to be retuned. However, C139, the UHF Band injection tuning capacitor, is retuned to 10th harmonic of the crystal. Tuning procedure for 470 to 500 MHz operation is the same as in the UHF Section alignment, see Section 2-4 for proper RF Alignment.

SECTION 2 ALIGNMENT AND TUNING PROCEDURE

2-1 EQUIPMENT REQUIRED

2-1-1 FM Signal Generator
2-1-2 Oscilloscope
2-1-3 AC VTVM

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

All receiver RF sections, (Low, High and UHF) should be aligned to the channel nearest the center of the frequency range in the band over which they will operate.

2-2 QUADRATURE DETECTOR

2-2-1 Connect the FM Signal Generator to the H/L antenna input jack. Accurately set the frequency to the center of the channel being used for alignment. Modulate Signal Generator Generator with 1000 Hz, 3 KHz deviation.

2-2-2 Connect the oscilloscope to Junction of C162, C163 and R172.

2-2-3 Adjust Signal Generator's output until all of the noise in the scope pattern just disappears.

2-2-4 Adjust L128 for maximum peak to peak amplitude, while maintaining symmetry of the detected signal. When L128 is properly aligned, signal at above Junction should be approximately 0.2 volts RMS with test signal input as noted in 2-2-1.

2-3 IF ALIGNMENT

2-3-1 Pre-Set the cores of L122, L123 and L124 9 turns in from the outer end of the coil form. This step is usually necessary only if the IF appears to be badly misaligned.

2-3-2 Connect AC voltmeter to the Junction of R167 and the collector of Q116.

2-3-3 Set AC voltmeter to the 300 millivolts (or 1 volt) scale.

2-3-4 With generator accurately set to the frequency of the center of the channel being used for alignment, increase Signal Generator's output until AC voltmeter reading is mid-range.

2-3-5 Adjust L122, L123 and L124 (in that order) for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading approximately in the mid-range. Repeat adjustment until no further improvement can be made.

2-4 RF ALIGNMENT

LOW BAND SECTION

2-4-1 Pre-Set the cores of L102 and L103 one turn from the outer ends of the coil form. (NOTE: Due to the broadness of the Low Band Section, presetting the above cores will give you optimum performance over the entire band).

HIGH BAND SECTION

2-4-2 Connect AC voltmeter to the Junction of R167 and the collector of Q116.

2-4-3 Set AC voltmeter to the 300 millivolts scale.

2-4-4 Activate High Band channel nearest to center of High Band frequencies being used.

2-4-5 With Signal Generator accurately set to the frequency of the center of the channel being used for alignment and connected to H/L antenna input jack, increase Signal Generator's output until AC voltmeter reading is mid-range.

2-4-6 Adjust L129, L104, L105 and L106 (in that order) for maximum AC voltmeter reading. Readjust Signal Generator's output to maintain voltmeter reading approximately in the mid-range. Repeat adjustment until no further improvements can be made.

UHF BAND SECTION

2-4-7 Connect AC voltmeter across the speaker terminals; connect Signal Generator to the UHF antenna input jack.

2-4-8 With Signal Generator output reduced to zero, adjust the volume control until AC voltmeter reads 1.0 volt of noise.

2-4-9 Activate UHF channel nearest to center of UHF frequencies being used.

2-4-10 Set Signal Generator accurately to the channel being used and adjust output of Signal Generator until AC voltmeter reads approximately 0.2 volts.

2-4-11 Pre-Set trimmer capacitor C139 for minimum capacitance. The movable half-moon section (gold color) should be turned toward the front of the unit.

2-4-12 Adjust trimmer capacitors C121 and C122 (in that order) for maximum quieting (lowest meter reading). Adjust Signal Generator's output to maintain a voltmeter reading between 0.1 and 0.2 volts. Repeat adjustments until no further improvement can be made.

NOTE: Use a non-metallic tool for all trimmer capacitor adjustments. Peaks are very sharp, so tune with care.

2-4-13 Adjust the core of L119 for maximum quieting (lowest meter reading). Adjust Signal Generator's output to maintain a reading between 0.1 and 0.2 volts.

2-4-14 Adjust trimmer capacitor C139 for maximum quieting (lowest meter reading). Adjust Signal Generator's output to maintain a reading between 0.1 and 0.2 volts.

2-4-15 Readjust trimmer capacitors C121, C122 and C139 (in that order) for maximum quieting (lowest meter reading). Adjust Signal Generator's output to maintain a voltmeter reading between 0.1 and 0.2 volts. Repeat these adjustments until no further improvement can be made.

2-5 AFC ALIGNMENT

NOTE: This adjustment requires an accurate 10.7 MHz ±1 KHz oscillator or 455 KHz ±500 Hz oscillator to be used as a reference signal. If none are available, proceed to Step 2-5-4.

2-5-1 With a coupling loop, inject "Reference" signal (either 10.7 MHz or 455 KHz) to produce good quieting (more than 30 DB quieting). Adjust R147 for reading of 3.8 to 4.0 volts at the collector of Q109.

2-5-2 Remove the "Reference" signal and have the unit squelched and receiving no signal. The voltage on the collector of Q109 shall be between 3.2 and 4.6 volts. If not, note voltage and proceed to Step 2-5-3. If voltage is between 3.2 and 4.6 volts, AFC alignment is complete.

NOTE: Any further adjustment made to L128 and R147 will require AFC to be re-adjusted.

2-5-3 Inject "Reference" signal and monitor voltage on collector of Q109. Adjust L128 for same voltage as noted in Step 3. Readjust R147 for a voltmeter reading of 3.8 to 4.0 volts. Repeat Step 2-5-2.

NOTE: Do not adjust L128 more than 1/4 turn at a time.

2-5-4 If an accurate I.F. signal source is not available, an approximate AFC alignment can be made by adjusting L128 on a High Band or Low Band crystal as specified in Quadrature Detector Alignment (Section 2-2), and with the unit squelched and receiving no signal, adjust R147 for voltmeter reading of 3.2 to 4.6 on the collector of Q109.

NOTE: Units equipped with a 10.245 MHz crystal have the jumper in the AFC circuit connected between the base of Q109 and collector of Q111. When a 11.155 MHz crystal is used, the jumper is connected between the base of Q109 and the collector of Q110. If the crystal is changed from one frequency to the other, the jumper MUST be also changed. If the UHF, first L.O. crystals are made for high side injection (to eliminate a primary image problem in certain areas of the country), the jumper must be changed.

SECTION 3 DIAGRAMS, VOLTAGE DATA AND SCHEMATIC

3-1 MAIN BOARD PARTS PLACEMENT DIAGRAM

3-2 MAIN BOARD BOTTOM VIEW

3-3 MAIN BOARD JUMPER PLACEMENT (BOTTOM VIEW) DIAGRAM

3-4 LIGHT BOARD PARTS PLACEMENT DIAGRAM

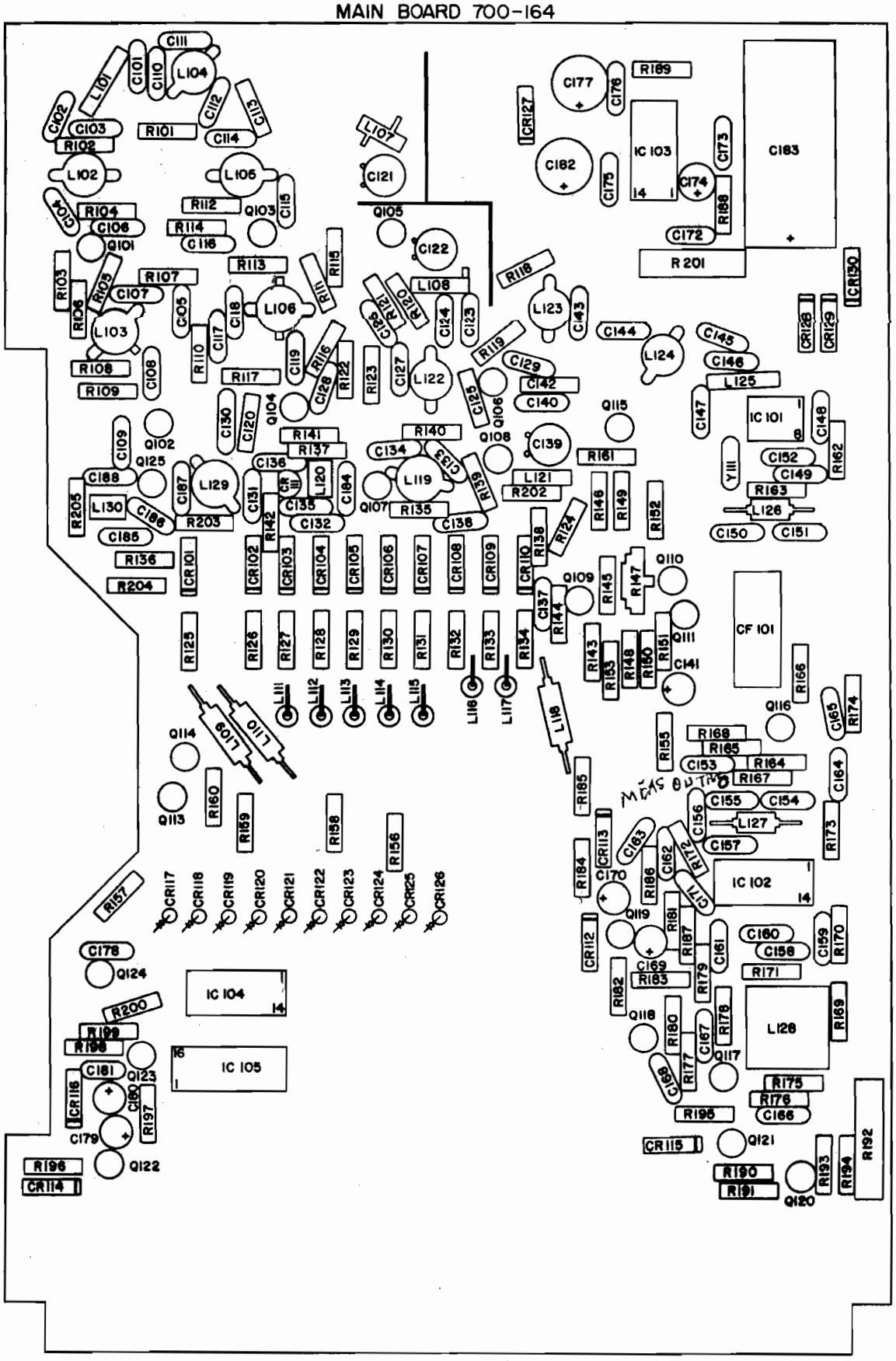
3-5 LIGHT BOARD BOTTOM VIEW

3-6 VOLTAGE DATA

3-7 CRYSTAL LOCATION DIAGRAM

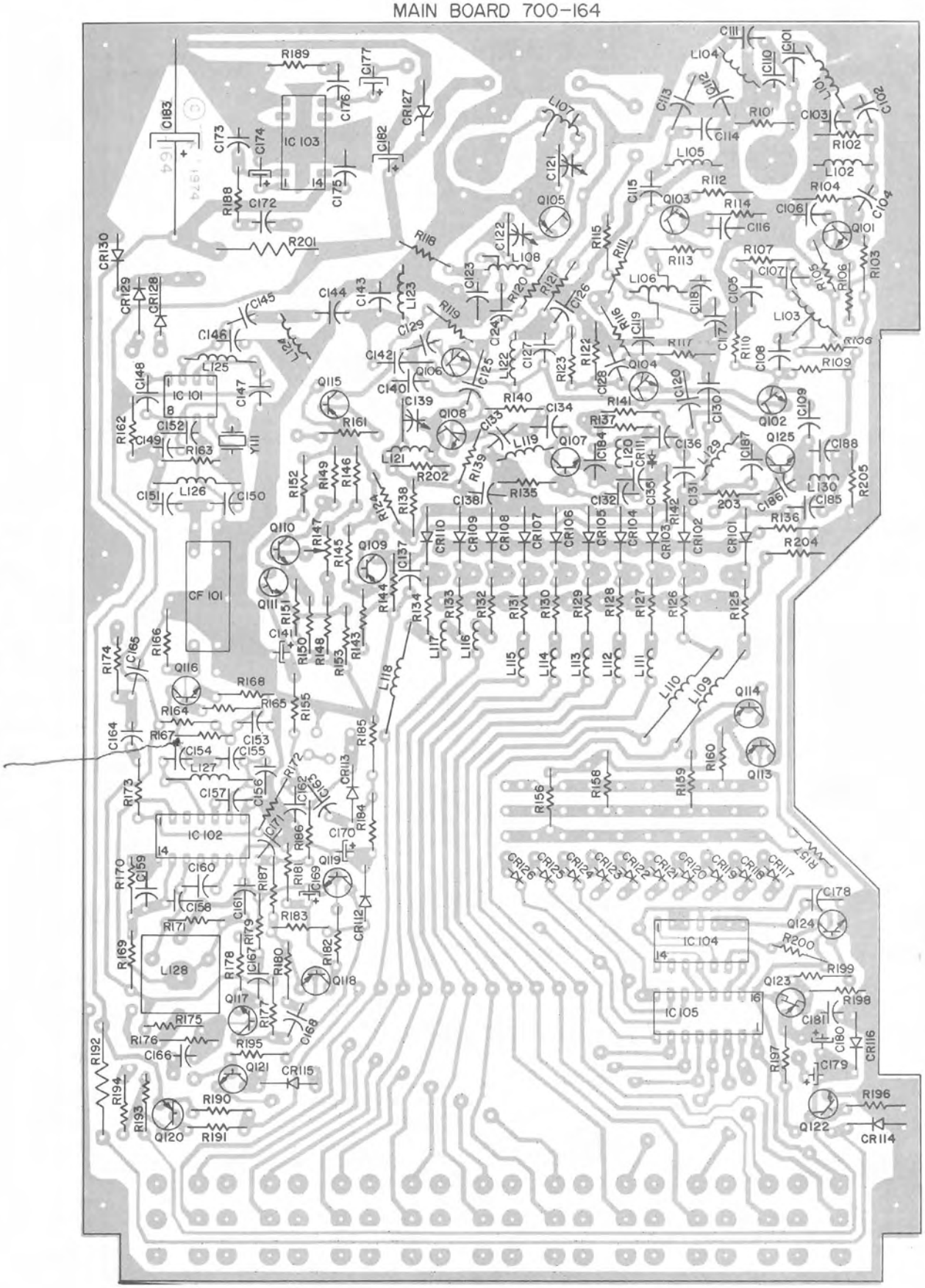
3-8 SCHEMATIC

MAIN BOARD 700-164



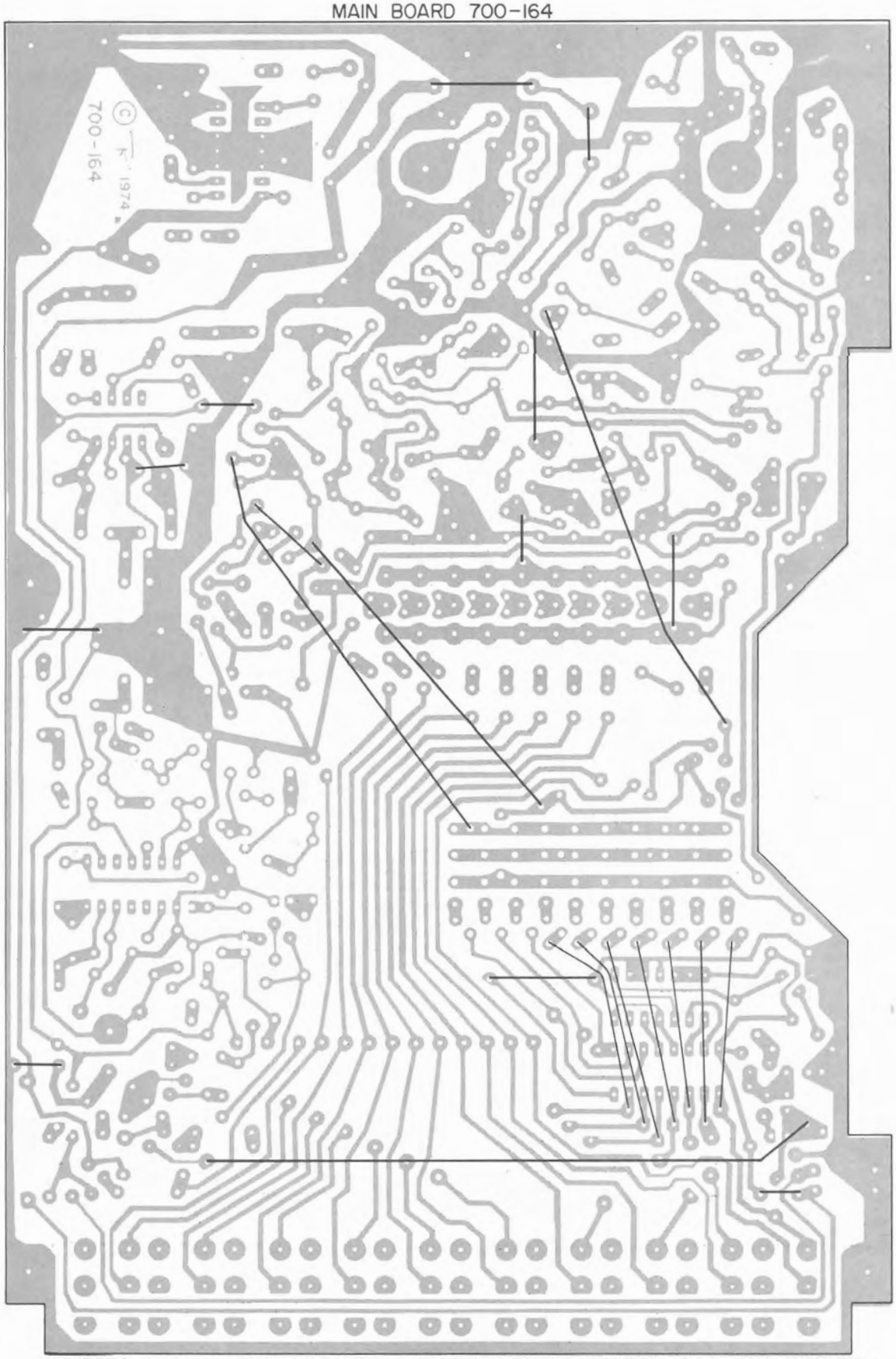
3-1 MAIN BOARD PARTS PLACEMENT DIAGRAM

MAIN BOARD 700-164



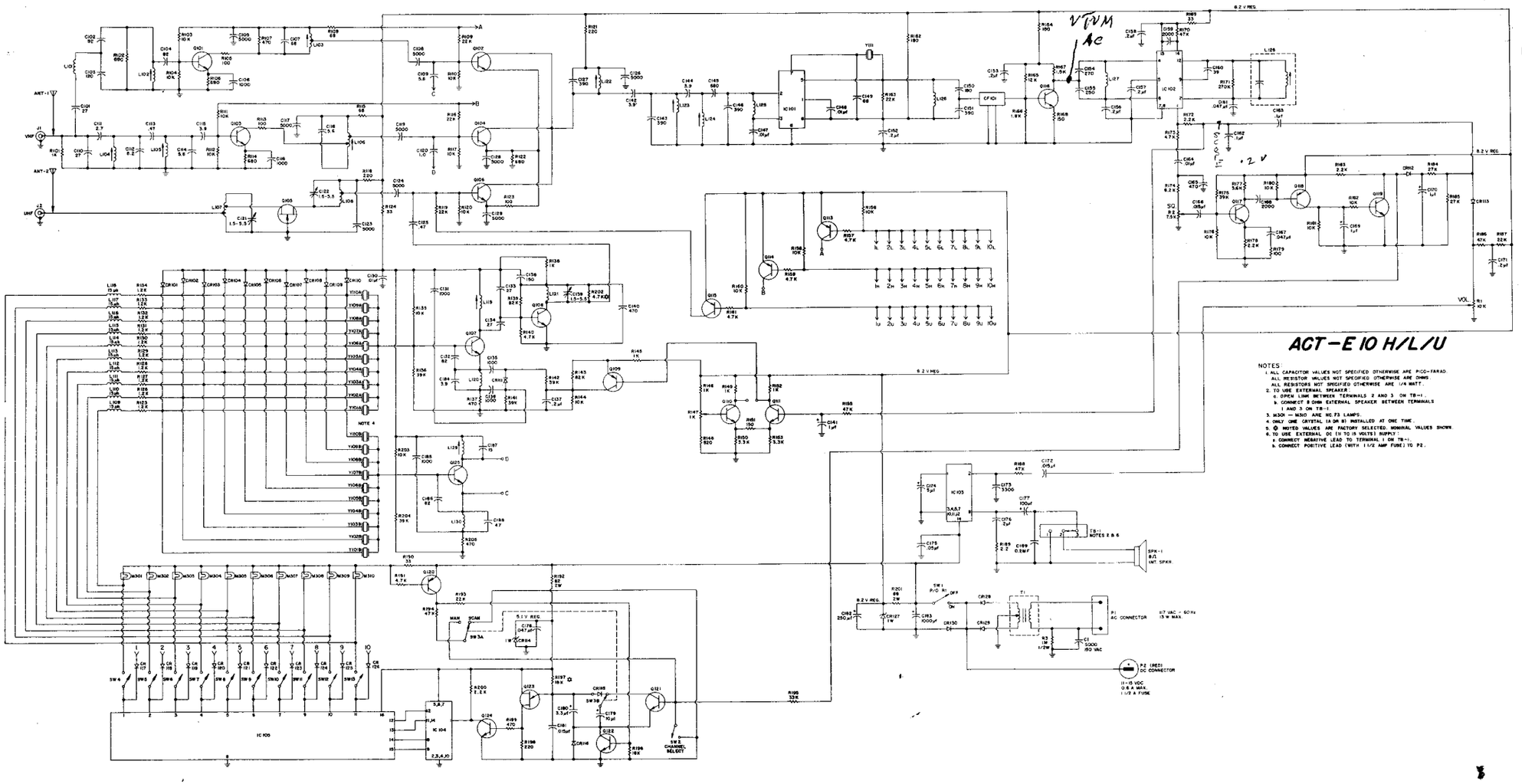
3-2 MAIN BOARD BOTTOM VIEW

MAIN BOARD 700-164

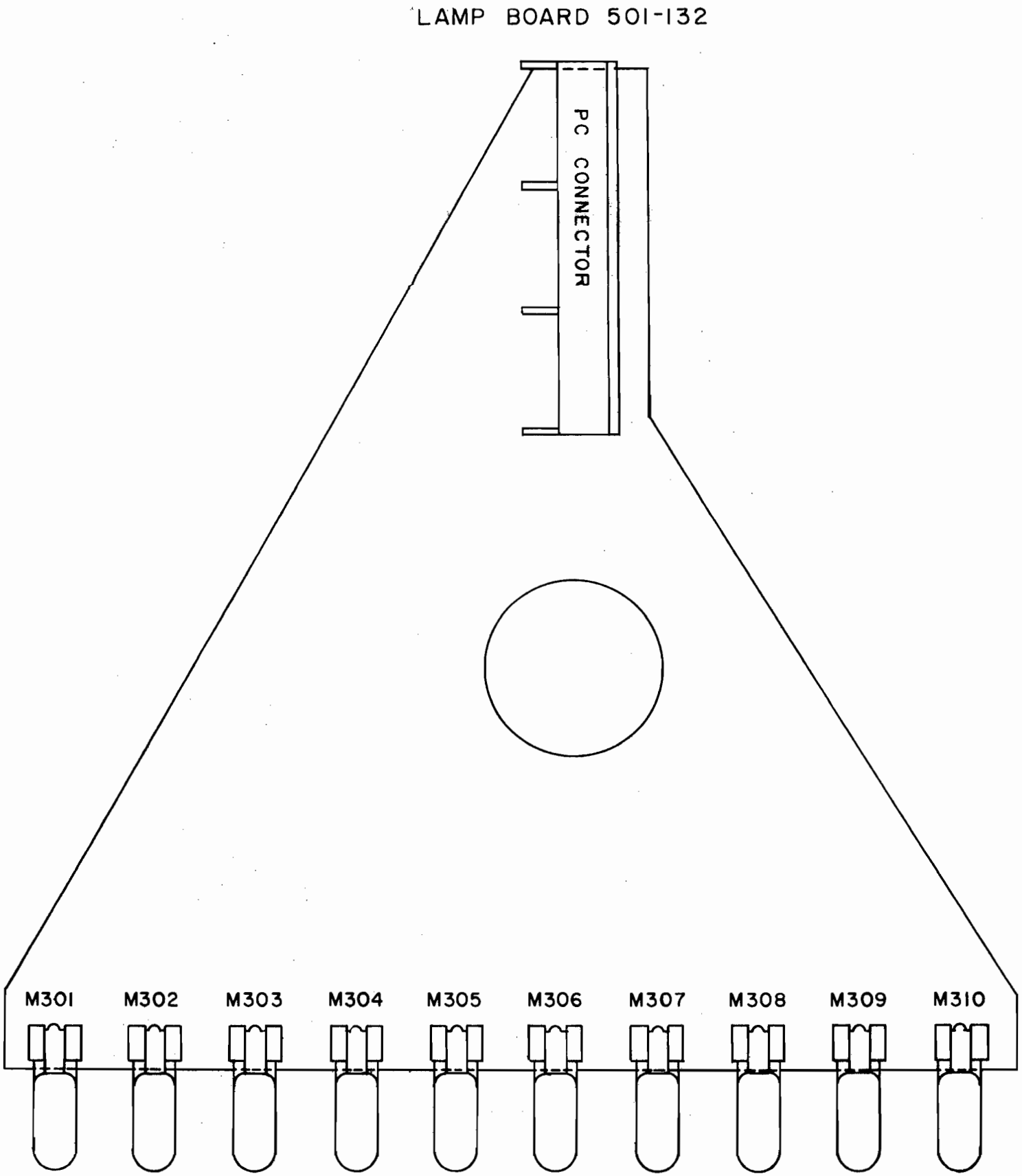


JUMPERS ARE LOCATED TOP SIDE. DIAGRAM SHOWS COPPER SIDE FOR PROPER CONNECTIONS.

3-3 MAIN BOARD JUMPER PLACEMENT (BOTTOM VIEW) DIAGRAM

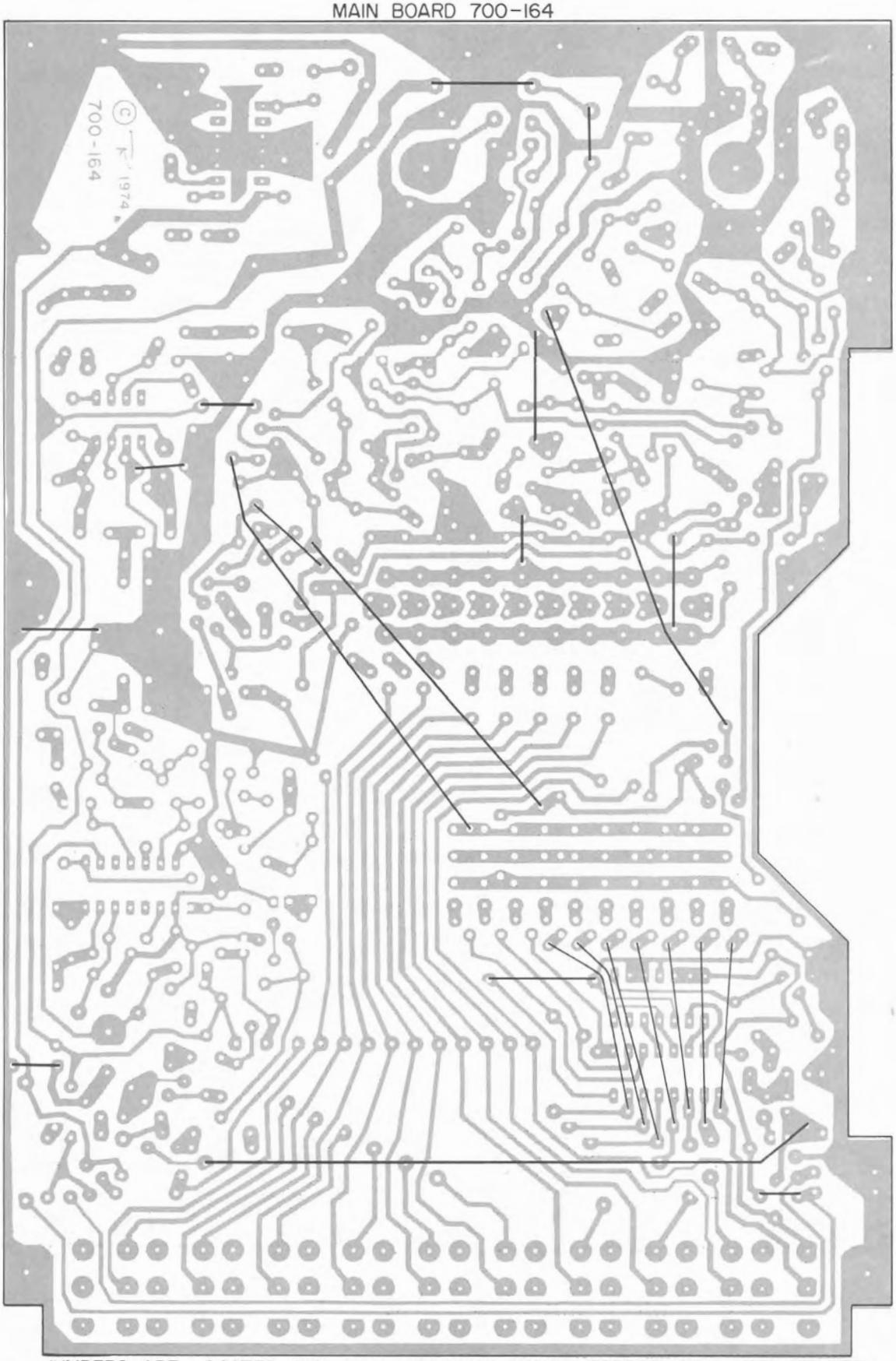


3-8 SCHEMATIC



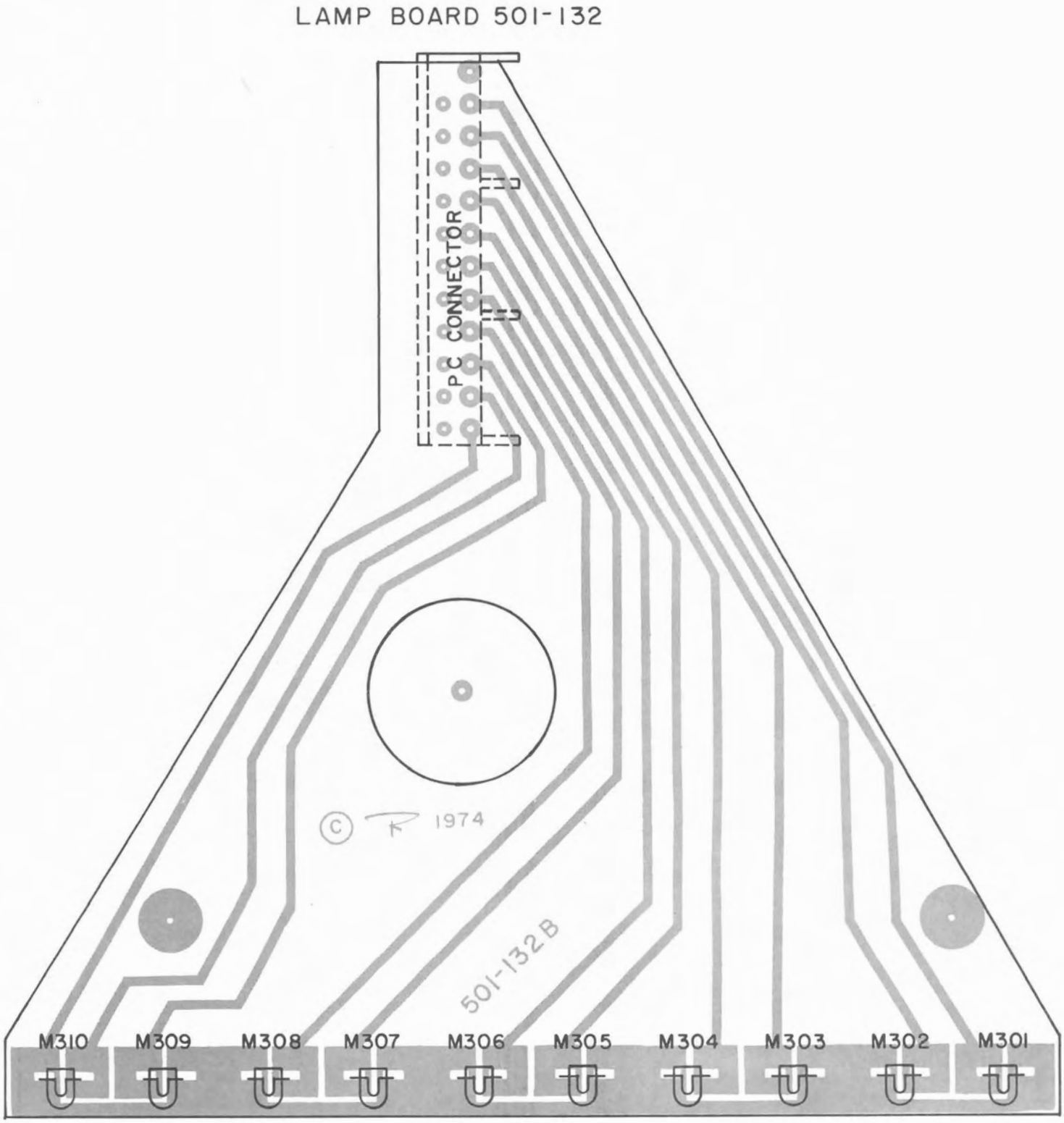
3-4 LIGHT BOARD PARTS PLACEMENT DIAGRAM

MAIN BOARD 700-164



JUMPERS ARE LOCATED TOP SIDE. DIAGRAM SHOWS COPPER SIDE FOR PROPER CONNECTIONS.

3-3 MAIN BOARD JUMPER PLACEMENT (BOTTOM VIEW) DIAGRAM



3-5 LIGHT BOARD BOTTOM VIEW

3-6 VOLTAGE DATA

NOTE: All voltages are nominal and are measured with a VTVM. SCAN indicates the unit is scanning. MAN indicates the unit is not scanning and is stopped at channel 1. A "P" beside a voltage indicates that the meter reading is pulsating (fluctuating) because the scanner section of the unit is operating.

VOLTAGE DATA – SEMICONDUCTORS:

TRANSISTOR	EMITTER (Source)	BASE (Gate)	COLLECTOR (Drain)	
Q101	3.1	3.8	7.0	Low Band Activated
	0	0	0	High Band Activated
	0	0	0	UHF Band Activated
Q102	1.6	2.3	7.7	Low Band Activated
	1.6	0	7.7	High Band Activated
	1.4	0	7.7	UHF Band Activated
Q103	0	0	8.2	Low Band Activated
	3.1	3.8	7.9	High Band Activated
	0	0	8.2	UHF Band Activated
Q104	1.6	0	7.7	Low Band Activated
	1.6	2.3	7.7	High Band Activated
	1.4	0	7.7	UHF Band Activated
Q105 (FET)	0	0	6.0	
Q106	1.6	0	7.7	Low Band Activated
	1.6	0	7.7	High Band Activated
	1.6	2.3	7.7	UHF Band Activated
Q107	3.7	4.4	7.3	No Crystal
	3.4	4.0	7.3	With Crystal
Q108	0	.4	7.3	UHF Band (No Crystal)
	0	.1	4.0	UHF Band (With Crystal)
Q109 (PNP)	7.9	7.2	3-5	
Q110	2.9	3.6	7.2	
Q111	2.9	3.6	7.4	
Q113 (PNP)	8.2	7.5	8.1	Low Band Activated
	8.2	8.2	0	High Band Activated
	8.2	8.2	0	UHF Band Activated
Q114 (PNP)	8.2	8.2	0	Low Band Activated
	8.2	7.5	8.1	High Band Activated
	8.2	8.2	0	UHF Band Activated
Q115 (PNP)	8.2	8.2	0	Low Band Activated
	8.2	8.2	0	High Band Activated
	8.2	7.5	8.1	UHF Band Activated

VOLTAGE DATA (CONTINUED)

TRANSISTOR	EMITTER (Source)	BASE (Gate)	COLLECTOR (Drain)	
Q116	0.4	1.1	4.5	
Q117	1.0	1.7	5.0	
Q118	8.2	8.2	0	(Unsquelched)
	8.2	8.2	1.0	(Squelched)
	8.2	8.2	1.5	Min. (Tight Squelched)
Q119	0	0	7.2	(Unsquelched)
	0	0.8	0.2	(Squelched)
	0	0.8	0.1	(Tight Squelched)
Q120	13.8	13.1	13.6	(SCAN)
	13.8	13.1	13.6	(MAN)
	13.8	13.8	0	(No Lights)
Q121	0	0	4.0	(SCAN)
	0	0.8	0.1	(MAN)
Q122	0	0.8	0.1	
Q124	0	.2	4.9	(SCAN)
	0	.2	5.1	(MAN)
Q125	3.7	4.4	7.3	No Crystal
	3.4	4.0	7.3	With Crystal

	BASE 1	EMITTER	BASE 2	
Q123	0.2	3.8	5.1	(SCAN)
(Unijunction)	0.2	0.5	5.1	(MAN)

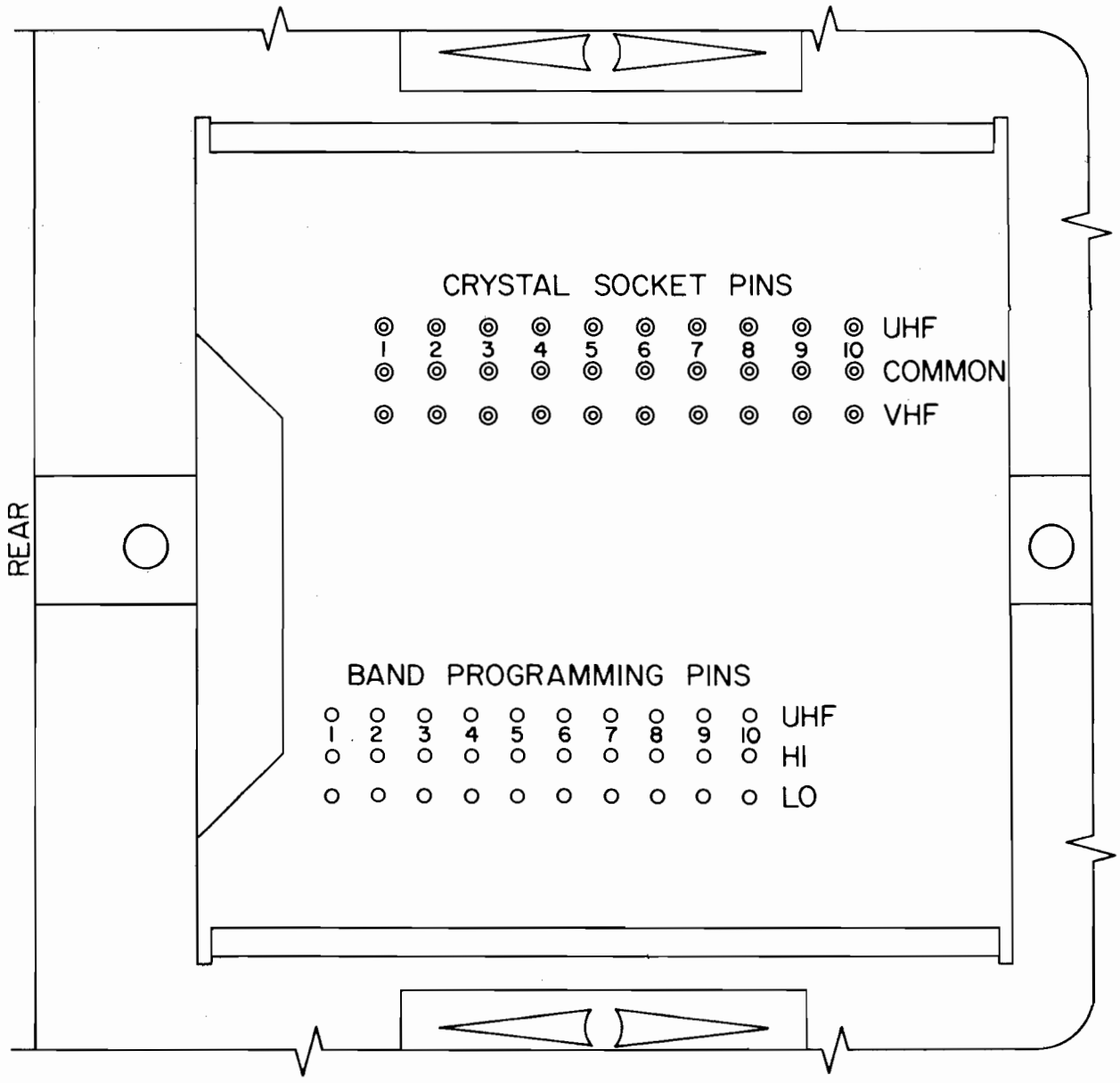
	CATHODE	ANODE	
CR113	1.8	2.4	(Unsquelched)
	1.0	0	(Squelched)

VOLTAGE DATA (CONTINUED)

INTEGRATED CIRCUITS

NOTE: A "P" beside a voltage indicates that the meter reading is pulsating (fluctuating) because the scanner section of the unit is operating. MAN indicates the unit is not scanning and is at channel 1 (M301 is lighted).

IC No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
IC101	4.2	0.7	0.7	4.2	7.8	0	4.2	7.8	–	–	–	–	–	–	–	–	
IC102	4.0	3.5	0	1.3	1.3	1.3	0	0	0.2	1.4	2.9	3.5	7.6	5.0	–	–	
IC103	7.1	.01	0	0	0	.01	0	6.9	0	0	0	0	0	13.8	–	–	
IC104	5.1	0	0	0	5.1	5.1	5.1	.1	.1	0	.1	.1	0	.1	–	–	Manual
	4.9	0	0	0	5.1	5.1	5.1	1P	2P	0	2P	1P	0	2P	–	–	SCAN
IC105	.5	11.2	11.2	11.2	11.2	11.2	11.2	0	11.2	11.2	11.2	.1	.1	.1	.1	5.1	Manual
	9P	9P	9P	9P	9P	9P	9P	0	9P	9P	9P	1P	2P	1P	2P	5.1	SCAN



3-7 CRYSTAL LOCATION DIAGRAM

SECTION 4 PARTS LIST

NOTE: When ordering parts, please include the following information:

a. Model Number (ACT-E 10 H/L/U)
b. Item Number
c. Description
d. Part Number

4-1 MAIN BOARD 700-164

Item No.	Description	Part No.
	RESISTORS	
R101	1K, 10%, ¼W	4701-0102-042
R102	680 ohm, 10%, ¼W	4701-0681-042
R103	10K, 10%, ¼W	4701-0103-042
R104	10K, 10%, ¼W	4701-0103-042
R105	100 ohm, 10%, ¼W	4701-0101-042
R106	680 ohm, 10% ¼W	4701-0681-042
R107	470 ohm, 10%, ¼W	4701-0471-042
R108	68 ohm, 10%, ¼W	4701-0680-042
R109	22K, 10%, ¼W	4701-0223-042
R110	10K, 10%, ¼W	4701-0103-042
R111	10K, 10%, ¼W	4701-0103-042
R112	10K, 10%, ¼W	4701-0103-042
R113	100 ohm, 10%, ¼W	4701-0101-042
R114	680 ohm, 10%, ¼W	4701-0681-042
R115	68 ohm, 10%, ¼W	4701-0680-042
R116	22K, 10%, ¼W	4701-0223-042
R117	10K, 10%, ¼W	4701-0103-042
R118	220 ohm, 10%, ¼W	4701-0221-042
R119	22K, 10%, ¼W	4701-0223-042
R120	10K, 10%, ¼W	4701-0103-042
R121	220 ohm, 10%, ¼W	4701-0221-042
R122	680 ohm, 10%, ¼W	4701-0681-042
R123	100 ohm, 10%, ¼W	4701-0101-042
R124	33 ohm, 10%, ¼W	4701-0330-042
R125	1.2K, 10%, ¼W	4701-0122-042
R126	1.2K, 10%. ¼W	4701-0122-042
R127	1.2K, 10%, ¼W	4701-0122-042
R128	1.2K, 10%, ¼W	4701-0122-042
R129	1.2K, 10%, ¼W	4701-0122-042
R130	1.2K, 10%, ¼W	4701-0122-042
R131	1.2K, 10%, ¼W	4701-0122-042
R132	1.2K, 10%, ¼W	4701-0122-042
R133	1.2K, 10%, ¼W	4701-0122-042
R134	1.2K, 10%, ¼W	4701-0122-042
R135	10K, 10%, ¼W	4701-0103-042
R136	39K, 10%, ¼W	4701-0393-042
R137	470 ohm, 10%, ¼W	4701-0471-042
R138	1K, 10%, ¼W	4701-0102-042
R139	82K, 10%, ¼W	4701-0823-042
R140	4.7K, 10%, ¼W	4701-0472-042
R141	39K, 10%, ¼W	4701-0393-042
R142	39K, 10%, ¼W	4701-0393-042
R143	82K, 10%, ¼W	4701-0823-042
R144	10K, 10%, ¼W	4701-0103-042
R145	1K, 10%, ¼W	4701-0102-042
R146	1K, 10%, ¼W	4701-0102-042
R147	1K, Trimmer (Vert.)	4751-0102-005
R148	820 ohm, 10%, ¼W	4701-0821-042
R149	1K, 10%, ¼W	4701-0102-042
R150	3.3K, 10%, ¼W	4701-0332-042
R151	150 ohm, 10%, ¼W	4701-0151-042
R152	1K, 10%, ¼W	4701-0102-042
R153	3.3K, 10%, ¼W	4701-0332-042
R155	47K, 10%, ¼W	4701-0473-042
R156	10K, 10%, ¼W	4701-0103-042
R157	4.7K, 10%, ¼W	4701-0472-042
R158	10K, 10%, ¼W	4701-0103-042
R159	4.7K, 10%, ¼W	4701-0472-042
R160	10K, 10%, ¼W	4701-0103-042
R161	4.7K, 10%, ¼W	4701-0472-042
R162	180 ohm, 10%, ¼W	4701-0181-042
T163	22K, 10%, ¼W	4701-0223-042
R164	180 ohm, 10%, ¼W	4701-0181-042
R165	12K, 10%, ¼W	4701-0123-042
R166	1.8K, 10%, ¼W	4701-0182-042
R167	1.5K, 10%, ¼W	4701-0152-042
R168	150 ohm, 10%, ¼W	4701-0151-042
R169	33 ohm, 10%, ¼W	4701-0330-042
R170	47K, 10%, ¼W	4701-0473-042
R171	270K, 10%, ¼W	4701-0274-042
R172	2.2K, 10%, ¼W	4701-0222-042
R173	4.7K, 10%, ¼W	4701-0472-042
R174	8.2K, 10%, ¼W	4701-0822-042
R175	39K, 10%, ¼W	4701-0393-042
R176	10K, 10%, ¼W	4701-0103-042
R177	5.6K, 10%, ¼W	4701-0562-042
R178	2.2K, 10%, ¼W	4701-0222-042
R179	100 ohm, 10%, ¼W	4701-0101-042
R180	10K, 10%, ¼W	4701-0103-042
R181	10K, 10%, ¼W	4701-0103-042
R182	10K, 10%, ¼W	4701-0103-042
R183	2.2K, 10%, ¼W	4701-0222-042
R184	27K, 10%, ¼W	4701-0273-042
R185	27K, 10%, ¼W	4701-0273-042
R186	47K, 10%, ¼W	4701-0473-042
R187	22K, 10%, ¼W	4701-0223-042
R188	47K, 10%, ¼W	4701-0473-042
R189	2.2 ohm, 10%, ¼W	4701-0229-042
R190	33 ohm, 10%, ¼W	4701-0330-042
R191	4.7K, 10%, ¼W	4701-0472-042
R192	82 ohm, 5%, 2W	4710- 0820-031
R193	22K, 10%, ¼W	4701-0223-042
R194	47K, 10%, ¼W	4701-0473-042
R195	33K ,10%, ¼W	4701-0333-042
R196	18K, 10%, ¼W	4701-0183-042
R197	18K, 10%, ¼W	4701-0183-042
R198	220 ohm, 10%, ¼W	4701-0221-042
R199	470 ohm, 10%, ¼W	4701-0471-042
R200	2.2K, 10%, ¼W	4701-0222-042
R201	68 ohm, 5%, 2W	4710-0680-031
R202	4.7K, 10%, ¼W	4701-0472-042
R203	10K, 10%, ¼W	4701-0103-042
R204	39K, 10%, ¼W	4701-0393-042
R205	470 ohm, 10%, ¼W	4701-0471-042
	CAPACITORS	
C101	27 pf, 10%, NPO, 50V (Disc.)	1500-0270-650
C102	82 pf, 5%, NPO, 50V (Disc.)	1524-0820-002
C103	120 pf, 5%, 50V (Mica)	1506-0121-550
C104	82 pf, 5%, NPO, 50V (Disc.)	1524-0820-002

Item No.	Description	Part No.
	CAPACITORS (Cont'd.)	
C105	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C106	.001 mfd, +80-20%, 500V (Disc.)	1503-0102-001
C107	68 pf, 5%, NPO, 50V (Disc.)	1524-0680-002
C108	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C109	5.6 pf, 10%, NPO, 500V (Disc.)	1500-0569-905
C110	27 pf, 10%, NPO, 50V (Disc.)	1500-0270-650
C111	2.7 pf, +.25 pf, NPO, 500V (Disc.)	1500-0279-205
C112	8.2 pf, 10%, NPO, 500V (Disc.)	1500-0829-905
C113	.47 pf, 10%, (Composition)	1510-0478-900
C114	5.6 pf, 10%, NPO, 500V (Disc.)	1500-0569-905
C115	3.9 pf, 10%, NPO, 500V (Disc.)	1500-0399-905
C116	.001 mfd, +80-20%, 500V (Disc.)	1503-0102-001
C117	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C118	5.6 pf, 10%, NPO, 500V (Disc.)	1500-0569-905
C119	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C120	1 pf, 10%, (Composition)	1510-0010-900
C121	1.5-5.5 pf, Trimmer	1517-0000-011
C122	1.5-5.5 pf, Trimmer	1517-0000-011
C123	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C124	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C125	.47 pf, 10%, (Composition)	1510-0478-900
C126	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C127	390 pf, 5%, 50V (Mica)	1506-0391-550
C128	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C129	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C130	.01 mfd, +80-20%, 500V (Disc.)	1502-0103-001
C131	.001 mfd, +80-20%, 500V (Disc.)	1503-0102-001
C132	82 pf, 5%, NPO, 50V (Disc.)	1524-0820-002
C133	27 pf, 10%, NPO, 50V (Disc.)	1500-0270-650
C134	27 pf, 10%, NPO, 50V (Disc.)	1500-0270-650
C135	.001 mfd, +80-20%, 500V (Disc.)	1503-0102-001
C136	.001 mfd, +80-20%, 500V (Disc.)	1503-0102-001
C137	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C138	150 pf, 20%, 50V (Disc.)	1523-0151-002
C139	1.5-5.5 pf, Trimmer	1517-0000-011
C140	470 pf, 20%, 50V (Disc.)	1523-0471-002
C141	1 mfd, 16V, 85°C (Electrolytic)	1513-0010-002
C142	3.9 pf, 10% (Composition)	1510-0399-900
C143	390 pf, 5%, 50V (Mica)	1506-0391-550
C144	3.9 pf, 10%, NPO, 500V (Disc.)	1500-0399-905
C145	680 pf, 5%, 50V (Mica)	1506-0681-550
C146	390 pf, 5%, 50V (Mica)	1506-0391-550
C147	.005 mfd, +80-20%, 500V (Disc.)	1503-0502-002
C148	.01 mfd, +80-20%, 25V (Disc.)	1502-0103-004
C149	68 pf, 5%, NPO, 50V (Disc.)	1524-0680-002
C150	180 pf, 5%, 50V (Mica)	1506-0181-550
C151	390 pf, 5%, 50V (Mica)	1506-0391-550
C152	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C153	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C154	270 pf, 5%, 50V (Mica)	1506-0271-550
C155	250 pf, 5%, 50V (Mica)	1506-0251-550
C156	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C157	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C158	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C159	.002 mfd, 20%, 50V (Disc.)	1523-0202-002
C160	39 pf, 10%, NPO, 50V (Disc.)	1500-0390-650
C161	.047 mfd, 10%, 100V (Mylar Film)	1508-0473-610
C162	.1 mfd, 20%, 12V (Disc.)	1502-0104-005
C163	.1 mfd, 20%, 12V (Disc.)	1502-0104-005
C164	.01 mfd, 10%, 100V (Mylar Film)	1508-0103-610
C165	470 pf, 20%, 50V (Disc.)	1523-0471-002
C166	.015 mfd, 10%, 100V (Mular Film)	1508-0153-610
C167	.047 mfd, 10%, 100V (Mylar Film)	1508-0473-610
C168	.002 mfd, 20%, 50V (Disc.)	1523-0202-002
C169	1 mfd, 16V, 85°C (Electrolytic)	1513-0010-002
C170	1 mfd, 16V, 85°C (Electrolytic)	1513-0010-002
C171	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C172	.015 mfd, 10%, 100V (Mylar Film)	1508-0153-610
C173	.0033 mfd, 10%, 100V (Mylar Film)	1508-0332-610
C174	5 mfd, 10V, 85°C (Electrolytic)	1513-0050-001
C175	.05 mfd, +80-20%, 25V (Disc.)	1502-0503-004
C176	.2 mfd, +80-20%, 12V (Disc.)	1502-0204-006
C177	100 mfd, 16V, 85°C (Electrolytic)	1513-0101-002
C178	.047 mfd, 10%, 100V (Mylar Film)	1508-0473-610
C179	10 mfd, 10V, 85°C (Electrolytic)	1513-0100-001
C180	3.3 mfd, 20%, 10V, 85°C (Elect.)	1513-0339-005
C181	.015 mfd, 10%, 100V (Mylar Film)	1508-0153-610
C182	250 mfd, 10V, 85°C (Electrolytic)	1513-0251-001
C183	1000 mfd, 16V 85°C (Electrolytic)	1513-0102-002
C184	3.9 pf, 10%, NPO, 500V (Disc.)	1500-0399-905
C185	.001 mfd, +80-20%, 500V (Disc.)	1503-0102-001
C186	82 pf, 5%, NPO, 50V (Disc.)	1524-0820-002
C187	15 pf, 10%, NPO, 50V (Disc.)	1500-0150-650
C188	47pf, 5%, NPO, 50V (Disc.)	1524-0470-002
C189	0.2 mfd, +80 -20%, 12V (Disc.)	1502-0204-006
	COILS	
L101	Choke, .68 uhy	1802-0688-003
L102	Input, RF AMP (Green)	1800-3152-005
L103	Output, RF AMP (Yellow)	1800-3152-004
L104	Input, RF AMP (Red)	1800-3152-002
L105	Input, RF AMP (Red)	1800-3152-002
L106	Output, RF AMP (Orange)	1800-3152-003
L107	Input, RF AMP (UHF)	1800-3160-001
L108	Output, RF AMP (UHF)	1800-3160-002
L109	Choke, 15 uhy	1802-0152-004
L110	Choke, 15 uhy	1802-0152-004
L111	Choke, 15 uhy	1802-0152-004
L112	Choke, 15 uhy	1802-0152-004
L113	Choke, 15 uhy	1802-0152-004
L114	Choke, 15 uhy	1802-0152-004
L115	Choke, 15 uhy	1802-0152-004
L116	Choke, 15 uhy	1802-0152-004
L117	Choke, 15 uhy	1802-0152-004
L118	Choke, 15 uhy	1802-0152-004
L119	Oscillator, Collector (White)	1800-3152-009
L120	Oscillator, Emitter	1801-1236-900
L121	Tripler, Collector	1800-3160-003
L122	10.7 MHz IF (White)	1800-3191-401
L123	10.7 MHz IF (White)	1800-3191-401
L124	10.7 MHz IF (Yellow)	1800-3191-402
L125	Choke, 6.8 uhy, 10%	1802-0689-003
L126	Choke, 820 uhy	1802-0000-002
L127	Choke, 820 uhy	1802-0000-002
L128	Quadrature Detector	1800-3151-700
L129	Oscillator, Collector (White)	1800-3152-009

Item No.	Description	Part No.
	DIODES	
CR101	Germanium--junction, signal	4807-1233-900
CR102	Germanium—junction, signal	4807-1233-900
CR103	Germanium—junction, signal	4807-1233-900
CR104	Germanium—junction, signal	4807-1233-900
CR105	Germanium—junction, signal	4807-1233-900
CR106	Germanium—junction, signal	4807-1233-900
CR107	Germanium—junction, signal	4807-1233-900
CR108	Germanium—junction, signal	4807-1233-900
CR109	Germanium—junction, signal	4807-1233-900
CR110	Germanium—junction, signal	4807-1233-900
CR111	Varactor, SMV 1172	4809-0000-001
CR112	Silicon, signal	4805-1241-200
CR113	Silicon, signal	4805-1241-200
CR114	Zener, 5.1V, 5%, 1W	4808-0000-007
CR115	Silicon, signal	4805-1241-200
CR116	Silicon, signal	4805-1241-200
CR117	Silicon, signal	4805-1241-200
CR118	Silicon, signal	4805-1241-200
CR119	Silicon, signal	4805-1241-200
CR120	Silicon, signal	4805-1241-200
CR121	Silicon, signal	4805-1241-200
CR122	Silicon, signal	4805-1241-200
CR123	Silicon, signal	4805-1241-200
CR124	Silicon, signal	4805-1241-200
CR125	Silicon, signal	4805-1241-200
CR126	Silicon, signal	4805-1241-200
CR127	Zener, 8.2V, 5%, 1W	4808-0000-009
CR128	Silicon, rectifier	4806-0000-004
CR129	Silicon, rectifier	4806-0000-004
CR130	Silicon, rectifier	4806-0000-004
	TRANSISTORS	
Q101	Silicon, NPN (Red top)	4801-0000-035
Q102	Silicon, NPN (Red top)	4801-0000-035
Q103	Silicon, NPN (Red top)	4801-0000-035
Q104	Silicon, NPN (Red top)	4801-0000-035
Q105	Field effect, junction	4811-0000-015
Q106	Silicon, NPN (Red top)	4801-0000-035
Q107	Silicon, NPN	4801-0000-100
Q108	Silicon, NPN (Red top)	4801-0000-035
Q109	Silicon, PNP (White top)	4801-0000-060
Q110	Silicon, NPN	4801-0000-010
Q111	Silicon, NPN	4801-0000-010
Q113	Silicon, PNP (White top)	4801-0000-060
Q114	Silicon, PNP (White top)	4801-0000-060
Q115	Silicon, PNP (White top)	4801-0000-060
Q116	Silicon, NPN	4801-0000-010
Q117	Silicon, NPN	4801-0000-010
Q118	Silicon, PNP (White top)	4801-0000-060
Q119	Silicon, NPN	4801-0000-010
Q120	Silicon, PNP (White top)	4801-0000-060
Q121	Silicon, NPN	4801-0000-010
Q122	Silicon, NPN	4801-0000-010
Q123	Silicon, PN, unijunction	4813-0000-001
Q124	Silicon, NPN	4801-0000-010

Item No.	Description	Part No.
Q125	Silicon NPN	4801-0000-100
	INTEGRATED CIRCUITS	
IC101	IF Amplifier	3130-3167-901
IC102	Limiter/Quadrature detector	3130-3157-603
IC103	Audio amplifier	3130-3157-614
IC104	Counter	3130-3157-608
IC105	Decoder/Driver	3130-3193-501
	CRYSTAL	
Y111	10.245 MHz (Standard)	2301-3151-601
Y111	11.155 MHz (Special)	2301-3151-602
	FILTER	
CF101	Ceramic, 455 KHz	2700-0000-007
	MISCELLANEOUS	
	Socket Pin, Crystal Mounting	2830-3216-400
	Terminal, Female (PC Mount)	2106-0000-002
	Terminal, Male (PC Mount)	2107-0000-003
	Terminal, Female (Wire Mount)	2107-0000-001
	Connector, 11-pin, PC Mount	2105-0000-014
	Shield (Straight section)	2508-1256-300
	Shield (L-shaped section)	2508-1256-400

4-2 LAMP BOARD 501-132

Item No.	Description	Part No.
	LAMPS	
M301	Incandescent, 14.4V, 80 MA.	3901-0000-007
M302	Incandescent, 14.4V, 80 MA.	3901-0000-007
M303	Incandescent, 14.4V, 80 MA.	3901-0000-007
M304	Incandescent, 14.4V, 80 MA.	3901-0000-007
M305	Incandescent, 14.4V, 80 MA.	3901-0000-007
M306	Incandescent, 14.4V, 80 MA.	3901-0000-007
M307	Incandescent, 14.4V, 80 MA.	3901-0000-007
M308	Incandescent, 14.4V, 80 MA.	3901-0000-007
M309	Incandescent, 14.4V, 80 MA.	3901-0000-007
M310	Incandescent, 14.4V, 80 MA.	3901-0000-007
	MISCELLANEOUS	
	Clip, Lamp Mounting (2 required per lamp)	2830-5106-600
	Connector, 12-pin, PC Mount	2105-0000-016
	Connector (10-pin) and wire assembly	7011-1069-000

4-3 CHASSIS ASSEMBLY

Item No.	Description	Part No.
	ELECTRICAL COMPONENTS	
R1	10K, Volume control/SW-1	4750-3212-101
R2	7.5K, Squelch control	4750-3212-102
R3	1 Meg, 10%, ½W	4701-0105-044
C1	.005 Mfd, +80-20%, 1400 V (Disc.)	1500-0502-002
J1	Connector, Antenna	2105-0000-005
J2	Connector, Antenna	2105-0000-005
P1	Connector, AC	2105-1279-100
P2	Connector, DC (Red)	2105-1277-900
T1	Transformer, Power	5604-5100-600
Y100	Crystal, Receive, 30-50 MHz	2303-0000-000
Y100	Crystal, Receive, 148-174 MHz	2302-0000-000
Y100	Crystal, Receive, 450-470 MHz	2304-0000-000
Y100	Crystal, Receive, 470-500 MHz (Specify frequency on all crystals)	2320-0000-000
ANT-1	Antenna, Telescopic, H1/LO VHF	1201-5108-802
ANT-2	Antenna, Telescopic, UHF	1201-5108-803
SPK-1	Speaker, 8 ohm, 3½-inch, square	1301-3236-000
SW2-3	Switch, 2-station, push button	5112-6035-820
SW4-13	Switch, 10-station, push button	5112-6038-401
TB-1	Terminal Board, 3-lug (rear panel)	2103-3007-907
TS-1	Terminal strip, 3-lug	2103-3008-006
	Power Cord, AC (MA-16)	6041-3215-900
	Power Cord, DC (MA-17)	7011-1047-800
	MECHANICAL COMPONENTS	
	Shield, AC connector	2508-3236-200
	Speednut, speaker mounting	2853-0000-007
	Screw, #6-32, Black	2804-0312-010
	Mask, subpanel (speaker)	2514-3237-900
	Panel, front	1405-6040-300
	Lens, 10-station	3900-5100-801
	Shield, light (tubular)	2508-1286-601
	Knob, volume and squelch	2402-1276-202
	Cabinet (wrap) assembly	1408-7017-400
	Panel, rear	1405-3167-503
	Door, crystal access	1413-1293-900

Item No.	Description	Part No.
	Label, Crystal Access Door	2507-5117-800
	Latch, rotary (access door)	2402-1293-800
	Bushing, antenna (UHF)	2501-0000-006
	Bushing, antenna (VHF)	2501-0000-007
	Foot, Rubber	1401-0000-001
	Label, frequency/service	2507-1278-100
	Manual, Owner's Instruction	7001-1059-600
	Manual, Service ($5.00 prepaid)	SM-10-596