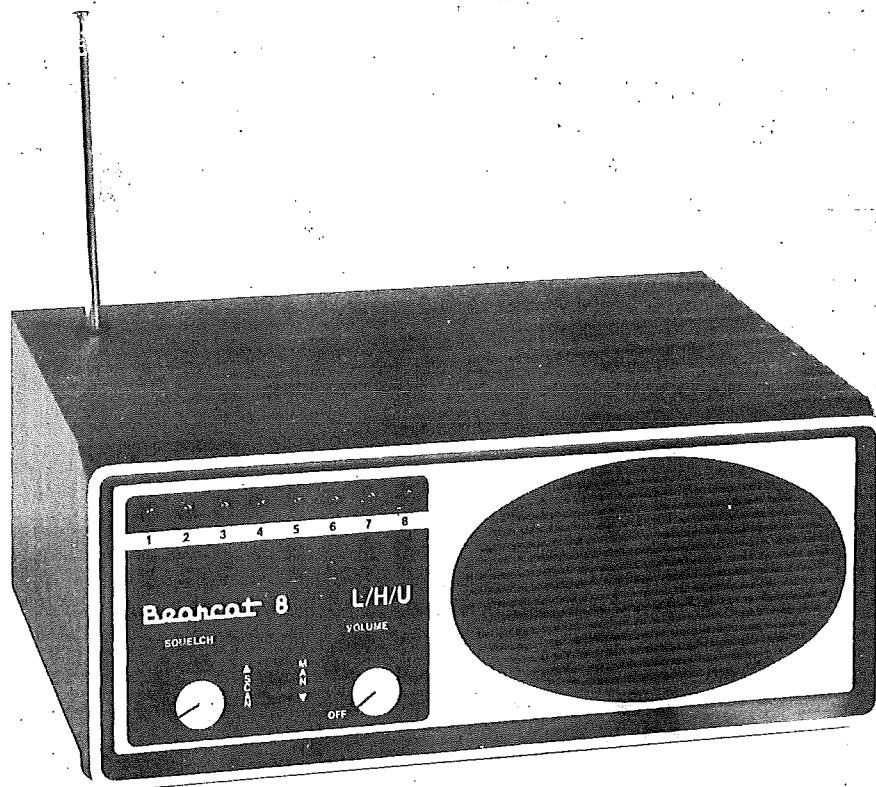


# OWNERS MANUAL



## Bearcat 8

### FOUR BAND FM SCANNING RECEIVER

LOW BAND 30-50 MHz    UHF BAND 450-470 MHz  
HI BAND 146-174 MHz    UHF (T) BAND 470-512 MHz

RECEIVES POLICE, FIRE, WEATHER,  
BUSINESS AND MUCH MORE

MADE IN CUMBERLAND, IND. U.S.A. UNDER ONE OR MORE OF THE FOLLOWING U.S. PATENTS:  
3,531,724 3,821,651 3,873,924 3,665,318 3,714,585



MFG. BY —

**Electra** COMPANY

DIVISION OF MASCO CORPORATION OF INDIANA  
CUMBERLAND, INDIANA 46229

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## RADIO SERVICES

Local Government  
Highway Maintenance  
Forestry-Conservation  
Motion Pictures  
Special Industrial  
Telephone Maintenance  
Automobile Emergency  
Public Mobile Radio  
Mobile Telephones

Special Emergency  
Hospitals  
Ambulances  
Physicians  
Disaster Relief  
School Buses  
Power  
Petroleum  
Forest Products  
Rural Radio

Police  
Fire  
Press  
Business  
Railroad  
Taxicab  
Marine  
Manufacturers  
Motor Carrier



**UNDERWRITERS  
LABORATORIES  
LISTED**

**Certified in accordance with FCC  
Rules and Regulations Part 15.63  
as of date of manufacture.**

## CAUTION

**TO PREVENT FIRE OR SHOCK  
HAZARD, DO NOT EXPOSE THIS  
APPLIANCE TO RAIN  
OR MOISTURE.**

## GENERAL DESCRIPTION

The police, firemen and other public services in your community perform a tremendously important job. Your need and right to know about these activities will be completely satisfied by your Bearcat Scanning Receiver. This high performance and reliable instrument is designed for convenient and straightforward operation, even though the solid state circuitry to provide this ease of operation is far advanced.

The Bearcat 8 is a four-band FM scanning receiver, providing automatic full band coverage of all bands in the Public Safety/Business Bands at 30-50 MHz, 146-174MHz, 450-470MHz, and 470-512MHz. Its features include: a simple bandswitching arrangement, high speed automatic or manual scanning, channel switches to omit scanning of undesired channels, solid state light emitting diode channel indicators, quieting squelch control, front-mounted 3"x5" speaker, a vinyl clad, wood material cabinet, and operation from a single telescoping or outside antenna.

The most advanced developments in solid state circuitry are incorporated in this receiver. Dual-gate MOS Field-Effect R-f and mixer transistors provide low-noise and low cross-modulation. Single conversion onto monolithic quartz crystal I-F filters reduces spurious responses, radiation and improves selectivity. Linear integrated circuits provide I-F gain, detection, audio amplification and output. TTL I.C. multi-vibrators and gates provide scanning logic.

An exclusive track-tuning system using voltage-variable capacitors provides high performance, full-band coverage.

## SPECIFICATIONS

**Size:** 9"W x 3½"H x 7½"D

**Weight:** 5 lbs.

**Cabinet:** Vinyl-clad wood material cabinet

**Power requirements:** 117V, AC, 10W

**Antenna:** Telescoping antenna electronically tuned for all bands (supplied). Connector provided for outside antenna.

**Input Impedance:** 50-70 ohms

**Sensitivity:** H and L-Bands: Readable at .3 microvolt for ±5KHz deviation, .6 microvolt for 20 db signal-to-noise ratio.

**U-Band:** 1 microvolt for 20 db signal-to-noise ratio.

**Channels:** Up to 8 crystal-controlled channels may be scanned automatically or locked out in any combination.

**Frequency Range:**

Low-Band: 30-50MHz (Aligned 33-48MHz)

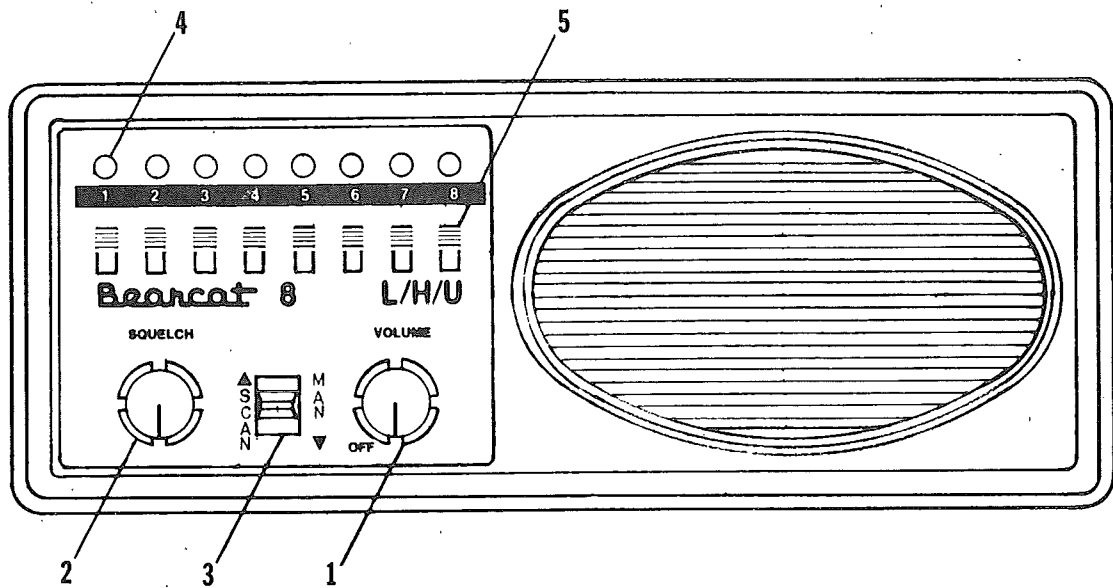
High-Band: 146-174MHz, total spread 28MHz

UHF-Band: 450-470, 470-512MHz, total spread 62MHz

**Scan Rate:** Approximately 20 channels per second

**Crystals:** Miniature plug-in type A-135 for easy user installation.

**Front Panel Features:** Squelch control/Volume On-Off Control/8 Channel Switches /8 Light-Emitting-Diode Channel Indicators/Automatic/Manual-Scan Switch/Forward-facing 3"x5" speaker.



## OPERATING CONTROLS

1. **On-Off/Volume:** Turns the receiver power on or off, and also varies the audio output level.
2. **Squelch:** Eliminates the annoying "rushing" sound that is present between transmissions when no signal is being sent. Proper setting of this control keeps the receiver "quiet" and allows scanning until a signal is received.
3. **Channel Selector-Auto/Manual:** This 3-position switch selects either the manual or automatic scan mode of operation and will manually change channels.
4. **Channel Indicator Lights:** The eight indicator lights (light emitting diodes) located on the front panel show which channel is "on" at any particular instant. During automatic scan operation these lights will flash in sequence from left to right until a signal is received on one of the channels.
5. **Channel Lock-Out Switches:** These eight switches are used to turn each individual channel on or off. When a channel lock-out switch is set to the off position, the corresponding channel is by-passed and will not light or receive signals in either the manual or automatic scan mode.

## OPERATING INSTRUCTIONS

The purpose of this section is to allow you to start receiving with your new scanner as soon as possible. Read and carefully follow these instructions.

1. Unpack the unit from the carton. Check your Bearcat 8 for shipping damage. If damage has occurred, contact your dealer immediately.

2. This radio must have the proper crystal installed for each channel you are to receive. Follow "Crystal Installation" and "Band Programming" instructions on the following pages **exactly**.

**NOTE:** If your dealer has already installed crystals, proceed to Step #3.

3. After installing crystals and band programming, insert the antenna through the hole located in the top left area of the cabinet and screw into the receptacle.

4. Plug the scanner into the power line (105 to 135Vac, 50 to 60 Hz ONLY).

5. Turn the unit ON by turning the VOLUME (1) control clockwise approximately 1/3 of its rotation.

6. Place the 8 channel switches (5) in the up (ON) position.
7. Set the "MANUAL-SCAN" switch (3) on "MANUAL" (Center Position).
8. Adjust the "SQUELCH" control (2) clockwise until you hear background noise; then turn it back counterclockwise until the noise disappears.
9. Press the MANUAL-SCAN switch (3) downward and step the indicator light through each channel. If you hear any background noise on any channel, adjust the squelch control counterclockwise again slightly until the noise disappears. The MANUAL-SCAN switch may now be used to select and monitor any desired channel.
10. To sample all channels automatically, return the MANUAL-SCAN switch up to the SCAN position. Any channel may be omitted as desired by moving the individual channel switch (5) downward (Off).

If an outside antenna is necessary for fringe reception, you may use a 450MHz or a 155MHz antenna, a 40MHz antenna or a two-band antenna depending on brands desired. External antennas should be coupled to the receiver by 50 ohm coaxial cable, such as RG-58 A/U, using the supplied automotive type connector. Suitable antennas are available at most radio dealers.

## CRYSTAL INSTALLATION

1. Disconnect the power cord from the wall outlet. Keep the set disconnected while installing the crystals.
2. To avoid breakage, remove the antenna.
3. Do not remove radio from cabinet. There are no user serviceable components inside.
4. Place the radio on its top facing away from you. Loosen the locking screw and slide the trap door open. This will reveal the crystal sockets and two bandswitching probes — red and white. These will be used for band programming. The red bandswitching probe is used in programming channels for high frequency reception; white for ultra high frequency.
5. Crystals are inserted by aligning the pins with the sockets and pushing straight down. **DO NOT BEND THE SOCKETS. THESE MINIATURE SOCKETS ARE MADE OF SPRING BRONZE AND WILL BREAK IF BENT EXCESSIVELY.**
6. Each crystal is installed in the socket corresponding to its channel. Channel #1 is nearest the left side of the radio, when positioned as in step 4.
7. **NOTE:** Do not install two crystals of the same frequency. To insure proper operation, a minimum of two crystals should be installed in the scanner.

## BAND PROGRAMMING

Your Bearcat 8 may be programmed for single band operation (Low, High, Ultra High), dual band operation (any combination of two bands) or three band operation. This is done by the proper positioning of the red and/or white bandswitching probes over an appropriate channel. Follow all instructions with the radio on its top and facing away from you.

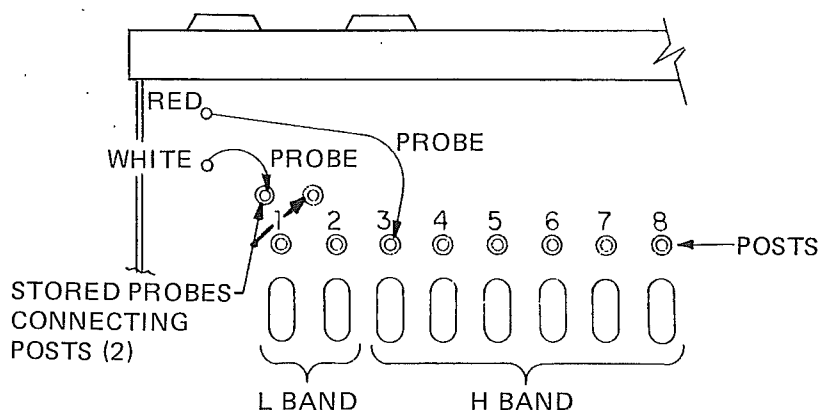
### **Single Band Operation (Low, High or Ultra-High)**

1. Low Band (30-50MHz): Leave bandswitch probes connected to their posts (Fig. 1). Then, install crystals in any order desired.
2. High Band (146-174MHz): Slide the red bandswitch probe over the

post at Channel 1. Install crystals in any order desired. White bandswitch probe is not moved from its original position (Fig. 1).

3. UHF Band (450-512MHz): Slide the white bandswitch probe over the post at Channel 1. Install crystals in any order desired. Red bandswitch probe is left connected to its post.

Figure 1



#### Low/High Band Operation - L/H: (Fig. 1)

1. Install low band crystals first, starting with Channel #1, until all low band crystals have been installed.

2. Install high band crystals in the remaining channels.

3. Slide the red bandswitch probe over the post at the first high band channel. All successive channels will automatically be high band channels.  
**Example:** You want two crystals in the low-band and six crystals in the high-band.

Insert the low-band crystals in channels one and two.

Insert the high-band crystals in the six remaining.

Place the red bandswitching probe over the post adjacent to Channel 3 (where the high-band starts). Leave white probe on its stored post.

#### High/Ultra High Band Operation

1. Slide the red bandswitch probe over the post of Channel 1.

2. Install the high band crystals beginning with Channel 1 until all high band crystals have been installed.

3. Place the white bandswitching probe over the post of the first U-Band Channel. From that point, all successive channels will automatically be U-Band channels. Insert your UHF crystals in these positions.

#### Low/Ultra High Band Operation

1. Place the white bandswitching probe over the first channel (from left to right) you wish to be UHF, All channels to the left of the white bandswitching probe will be Low band and the channels below and to the right of the white bandswitching probe will be U-Band. Install Low Band and U-Band crystals accordingly. Leave red probe on its stored post.

#### Low/High/Ultra High Band Operation

1. Install low band crystals first, starting with Channel 1.

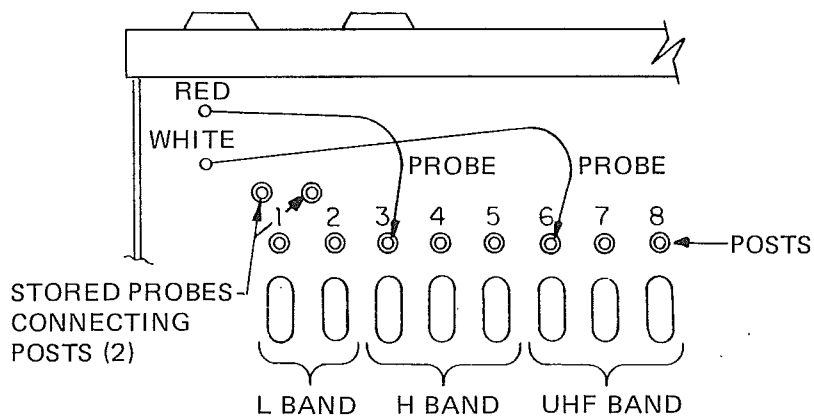
2. Slide the red bandswitching probe over the first high band channel. (Fig. 2) All successive channels will be in the high band.

3. Install the desired number of high band crystals.

4. Slide the UHF band white bandswitching probe over the post of the first channel you desire to be programmed for UHF. All successive channels will be in the UHF band. Install the desired UHF band crystals.

For example, in Figure 2, we wish to have two crystals in the low-band three crystals in the high-band, and three crystals in the UHF band. Insert the low band crystals in Channels 1 and 2. Place the red bandswitch probe on the post over Channel 3. Install the high band crystals in positions 3, 4 and 5. Place the white bandswitch probe on the post over Channel 6. Install the UHF crystals in positions 6, 7 and 8. This completes the installation of crystals for 3-band operation.

Figure 2



### Correct Crystals

Your Bearcat Receiver will operate only on crystals designed for it.

The I-F frequency of your scanning receiver is 10.8MHz, not 10.7MHz. Be sure to specify crystals for a 10.8MHz I-F when purchasing crystals for your scanner.

Rigid quality standards are applied to crystals furnished by Electra Company to assure full performance; therefore, our warranty does not include correcting poor operation caused by crystals from other sources.

The "H" alignment spread is 146MHz to 174MHz and the "L" 33MHz to 48MHz and the "U" alignment from 450 to 512 MHz. New frequencies may be added within these spreads.

### CRYSTAL FORMULAS:

"L" Received frequency + 10.80MHz = crystal frequency

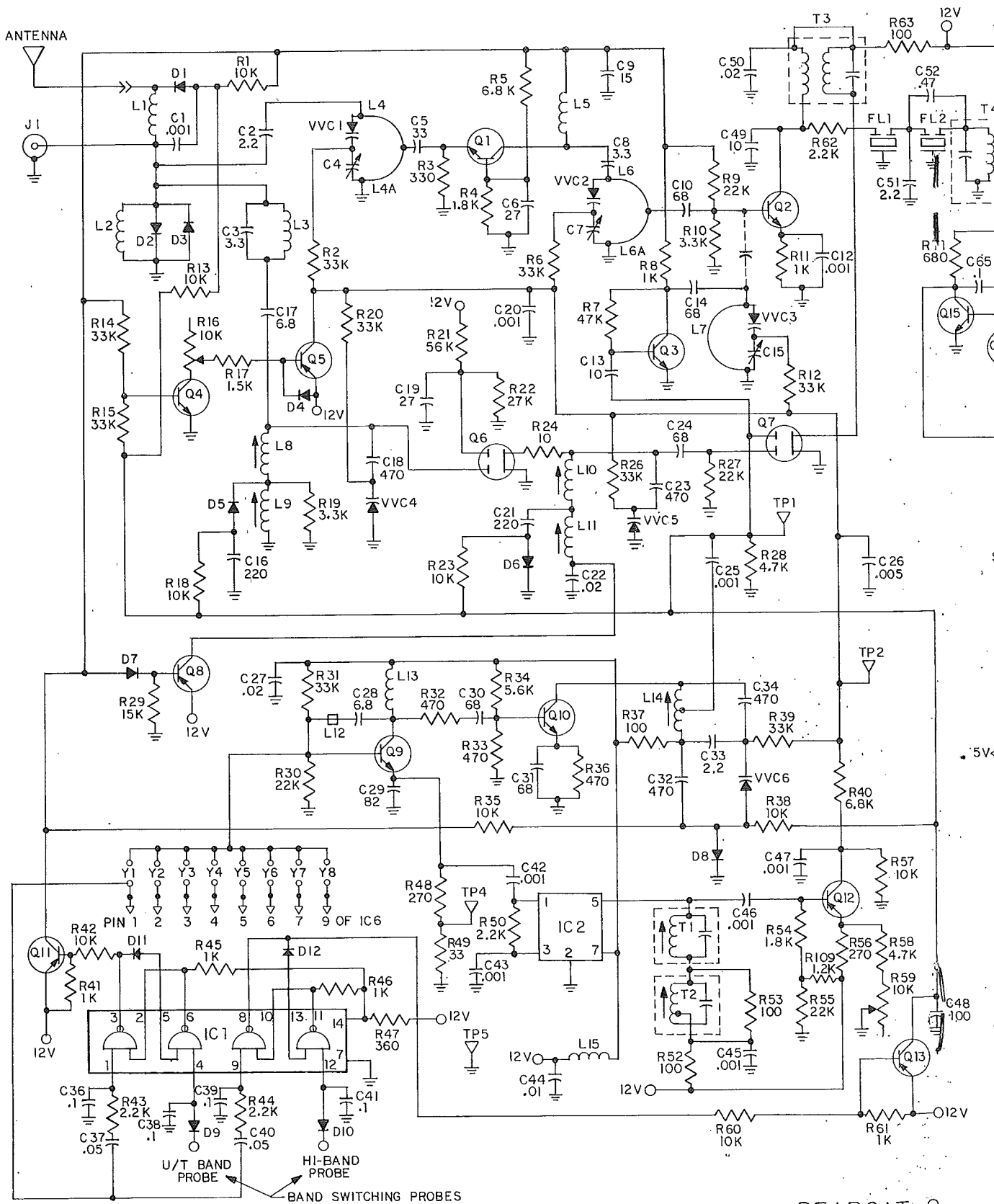
Example:  $35.80 + 10.80 = 46.60000\text{MHz}$

"H"  $\frac{\text{Received frequency} - 10.80\text{MHz}}{3} = \text{crystal frequency}$

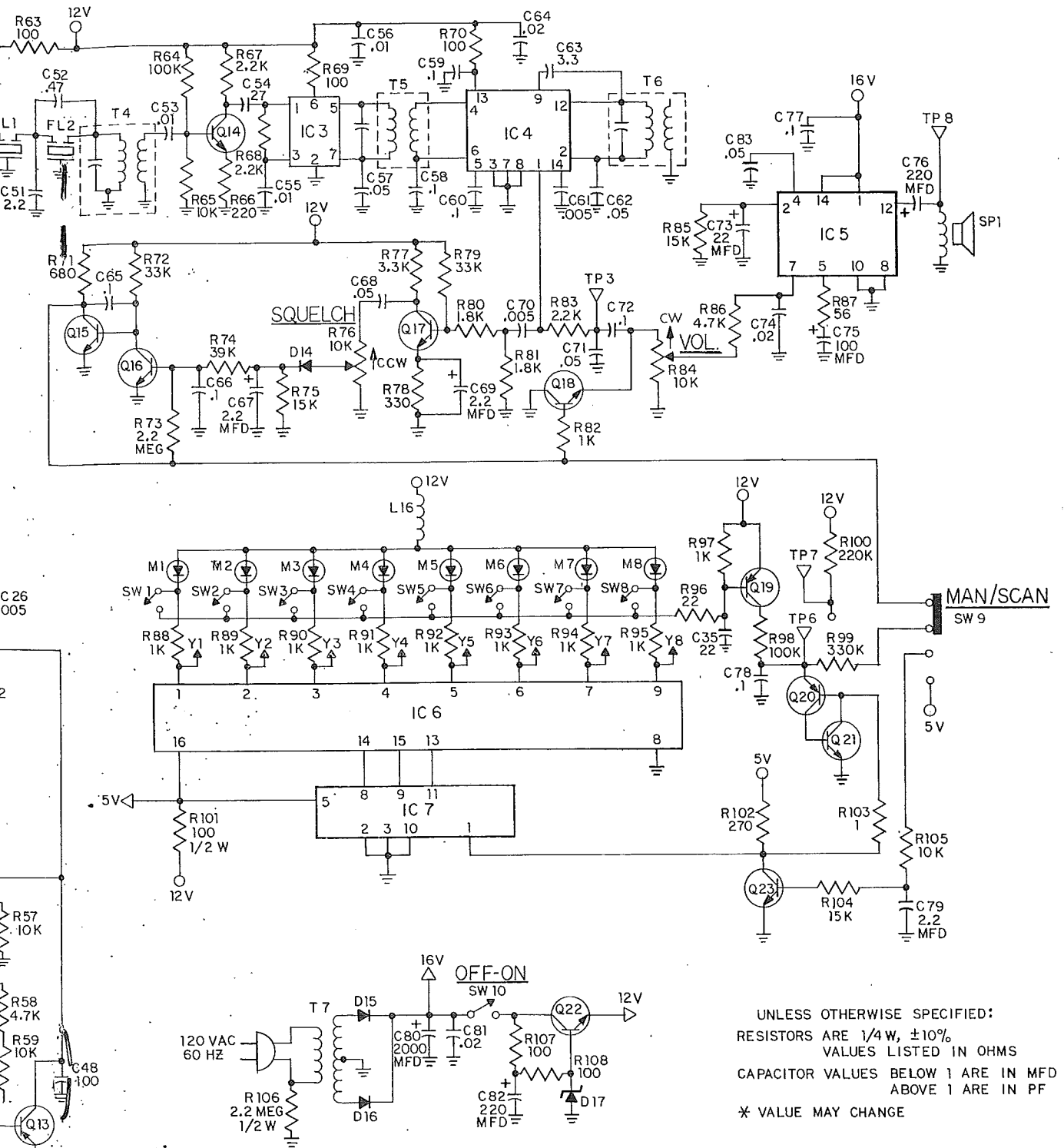
Example:  $\frac{155.01 - 10.80\text{MHz}}{3} = 48.0700\text{MHz}$

"U"  $\frac{\text{Received frequency} - 10.80}{9} = \text{crystal frequency}$

# SCHEMATIC



BEARCAT 8



UNLESS OTHERWISE SPECIFIED:  
 RESISTORS ARE 1/4W, ±10%  
 VALUES LISTED IN OHMS  
 CAPACITOR VALUES BELOW 1 ARE IN MFD  
 ABOVE 1 ARE IN PF  
 \* VALUE MAY CHANGE

AT 8 SCHEMATIC

## USER HINTS

Radio equipment usually operates in an environment of man-made electromagnetic noise which radiates from power lines, fluorescent lights, motors, appliances, ignition systems, etc. Modern radios are designed to minimize interference from such sources but operation may be affected under conditions of unusually strong noise.

Distant weak, "skip" or noise signals may be received by this receiver because of its high sensitivity. Whenever such conditions interrupt scanning or whenever a very busy channel prevents reception of other desired signals, the affected channel may be by-passed by means of its individual panel switch.

The BC-8 has high noise immunity because of the quieting squelch system. However, in cases of strong interfering noise or signals, it may be desirable to reduce the length of the antenna to reduce noise pickup below a critical level. This may be very effective in medium and strong signal areas.

Single-channel operation may be obtained as described under Operating Instruction. It may also be accomplished with "MANUAL-SCAN" switch in either position by locking out all but the desired channel. This assures that the radio will always be on that channel even when turned OFF and ON. Continuous-carrier signals such as the NOAA weather broadcasts on 162.55MHz or 162.400, which are available in many areas, may be received when desired by use of the individual channel switches.

When moving or shipping the radio, remove the telescoping antenna to avoid damage to it or to the internal circuit assemblies.

## SERVICE

### Determining Need for Service:

If your scanner doesn't seem to be functioning properly:

1. Be sure the radio is plugged into a working AC outlet.
2. Is it turned ON at Volume control?
3. Rotate squelch full clockwise and turn volume full clockwise. You should hear a loud hissing noise. If not, do not go to Step 4. Verify that another appliance will work on that AC outlet.
4. If (3) occurs, rotate squelch clockwise until noise stops.
5. Place MAN/SCAN switch into SCAN position. The 8 Channel lights should be scanning left to right. If a signal occurs on a channel it should stop scanning.
6. Place MAN/SCAN switch into MANUAL position. Press switch down momentarily several times and verify the stepping of channels as indicated by the Channel lights.
7. Check that the telescoping antenna is properly installed.
8. Check the probe/crystal locations again to verify that you have selected the proper crystals for your area.
9. Place the radio near a window (usually signals are stronger near windows). Be certain there are signals in your area.
10. Leave the radio scanning 10 to 30 minutes. If nothing is heard by that time, then something is probably wrong with the radio and you should contact Electra Customer Service.
11. When moving or shipping the radio, remove the telescoping antenna to avoid damage to it or to the internal circuit assemblies.

### TRANSISTOR VOLTAGE CHART

Q No.	Test Condition	E	B	C	Q No.	Test Condition	E	B	C	
Q1	Low	0	0	0	Q13	Low	12	11.8	0	
	High	0	0	0		High	12	11.2	12	
	U/T	.8	1.54	11.9		U	12	11.8	0	
Q2	Low	0	0	11.7	Q14	Low	.31	1	8.9	
	High	0	0	11.7		High	.31	1	8.9	
	U/T	1	1.5	11.7		U	.31	1	8.9	
Q3	Low	GND	0	0	Q15	Sq. CCW	GND	.04	6.25	
	High	GND	0	0		Sq. CW	GND	.74	.08	
	U	GND	.6	5.8		Q16	Sq. CCW	GND	.61	.04
Q4	Low	GND	0	11.7	Sq. CW		GND	.01	.74	
	High	GND	.7	.2	Q17		Sq. CCW	.51	1.14	6.9
	U	GND	.7	.2		Q18	Sq. CCW	0	.08	GND
Q5	Low	12	11.3	*			Sq. CW	0	.79	GND
	High	12	11.3	*	Q19		Man.	12	12	0.5
	U	12	11.3	*		Auto	.12	12	5.0	
Q8	Low	12	11.3	12		Q20	Man.	.5	5.3	0
	High	12	11.3	12	Auto		4.6	5.36	0.2	
	U/T	12	11.3	.2	Q21		Man.	0	0	5.3
Q9	Low	3.2	3.9	12		Auto	0	.2	5.36	
	High	3.2	3.9	12		Q22	12	12.68	16	
	U/T	3.2	3.9	12	Q23		GND	.45	5.3	
Q10	W/O Xtal	.25	.9	12						
	W/Xtal	1	.9	11.8						
Q11	Low	12	11.7	0	Q6	Low	0	3.5	0	12
	High	12	11.7	0		High	0	3.5	0	12
	U/T	12	11.7	12		U	0	3.5	0	0
Q12	Low	11.5	*	*	Q7	Low	0	0	0	12
	High	11.5	*	*		High	0	0	0	12
	U/T	11.5	*	*		U	0	0	0	12

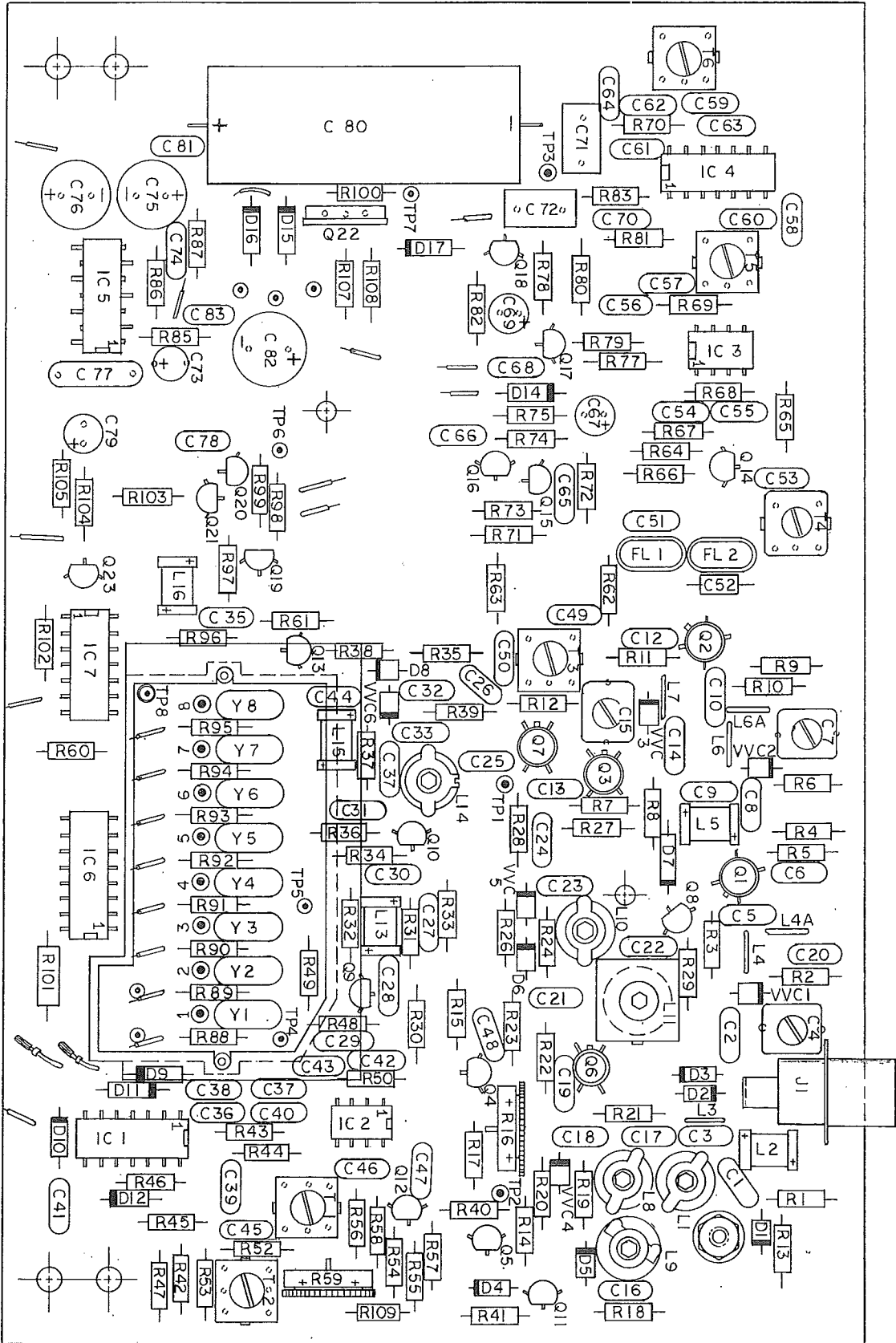
\* Changes with receive frequency

### LOGIC CHART

(Red and white probes NOT CONNECTED TO CHANNEL PINS)

PIN	IC 1	IC 6								IC 7									
		COUNT	1	2	3	4	5	6	7	8	COUNT	1	2	3	4	5	6	7	8
1	0		0	1	1	1	1	1	1	1	+VCC	1	1	1	1	1	1	1	1
2	0		1	0	1	1	1	1	1	1		0	0	0	0	0	0	0	0
3	1		1	1	0	1	1	1	1	1		0	0	0	0	0	0	0	0
4	0		1	1	1	0	1	1	1	1		0	0	0	0	0	0	0	0
5	1		1	1	1	1	0	1	1	1		1	1	1	1	1	1	1	1
6	0		1	1	1	1	1	0	1	1		0	0	0	0	0	0	0	0
7	0		1	1	1	1	1	1	0	1		0	0	0	0	0	0	0	0
8	1	GND	0	0	0	0	0	0	0	0		0	0	1	1	0	0	1	1
9	0		1	1	1	1	1	1	1	0		0	1	0	1	0	1	0	1
10	0		0	0	0	0	0	0	0	0	GND	0	0	0	0	0	0	0	0
11	0		0	0	0	0	0	0	0	0		0	0	0	0	1	1	1	1
12	1		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
13	1		0	0	0	0	1	1	1	1		0	0	0	0	0	1	0	0
14	1		0	0	1	1	0	0	1	1		1	1	1	1	0	1	1	1
15			0	1	0	1	0	1	0	1									
16		+VCC	1	1	1	1	1	1	1	1									

# PARTS PLACEMENT DIAGRAM



## ALIGNMENT I-F SECTION

Alignment of the I-F system consists of optimizing the input and output networks and balancing the detector output. The bandpass and center frequency are established by quartz crystal filters and "peaking" the coils can result in bandpass ripple or poor sensitivity. Field alignment should not be necessary but the procedure is given for general information.

### EQUIPMENT NEEDED

#### Oscilloscope

Sweep generator with 10.79, 10.80 and 10.81MHz markers

1. Connect sweep generator to TP-1 through a lpf capacitor.
2. Connect oscilloscope to TP-3.
3. Maintain output of 10.80MHz sweep generator at a low level to prevent distortion from overloading.
4. Detune T5 for maximum 1F output display. See Fig. 2.
5. Adjust T3 for maximum output, and T4 for minimum ripple.
6. Adjust T5 so that 10.80MHz is in center of discriminator curve and for best linearity. See Figure 3.



Figure 2

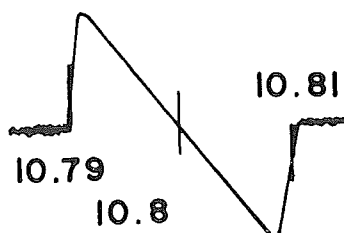


Figure 3

ALTERNATE METHOD: I-F alignment may be checked using a Measurements Model 800 Generator or equivalent tuned to an operating frequency and swept  $\pm 25$ kc. Markers are not essential since center is determined by the filter.

### R-F SECTION

DO NOT ATTEMPT ALIGNMENT  
OR "PEAKING" OF R-F SECTION

The R-F alignment points are adjusted and sealed at the factory and should not be disturbed. Factory alignment involves multi-frequency signal generation systems, add-on test modules, output indicators and training beyond the scope of normal service activities.

The unique R-F system includes electronic tracking of R-F and oscillator circuits for maximum performance over a wide range of frequencies. THIS PERFORMANCE CAN BE DESTROYED BY AN ATTEMPT TO "PEAK UP" OR "TWEAK" OR "OPTIMIZE," ETC.





## LIMITED WARRANTY

This receiver is warranted to be free from defects in material and workmanship. We agree to remedy such defect or to furnish a new part in exchange for any part which, under normal installation, use and service, discloses such defect, provided the receiver is delivered to us, intact, for our examination, with all transportation charges prepaid to our factory, within one year from the date of sale to the original purchaser, and provided such examination discloses, in our judgement, that it is thus defective.

This warranty does not apply if the receiver has been subject to misuse, neglect, accidents, incorrect wiring not our own; improper installation, destruction of serial number, or to use in violation of instructions furnished by us, nor to receivers that have been repaired or altered outside our factory.

This warranty excludes all oral or other implied warranties, and the manufacturer shall in no event be liable for damages for a breach of warranty in any amount exceeding the purchase price of the alleged defective equipment.

TO PLACE WARRANTY IN FORCE FILL OUT AND RETURN WARRANTY CARD WITHIN TEN (10) DAYS OF PURCHASE.

### ELECTRA COMPANY

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