



OPERATING AND SERVICE INSTRUCTIONS

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*Hallyphone*®

CITIZENS BAND  
TRANSMITTER-RECEIVER  
MODEL CB-3A  
12-VOLT MODEL

81.50 NET

## WARRANTY

"The Hallicrafters Company warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to our authorized radio dealer, wholesaler, from whom purchased, or, authorized service center, intact, for examination, with all transportation charges prepaid within ninety days from the date of sale to original purchaser and provided that such examination discloses in our judgment that it is thus defective.

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

Any part of a unit approved for remedy or exchange hereunder will be remedied or exchanged by the authorized radio dealer or wholesaler without charge to the owner.

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

*The* hallicrafters *co.*

ONE-04857

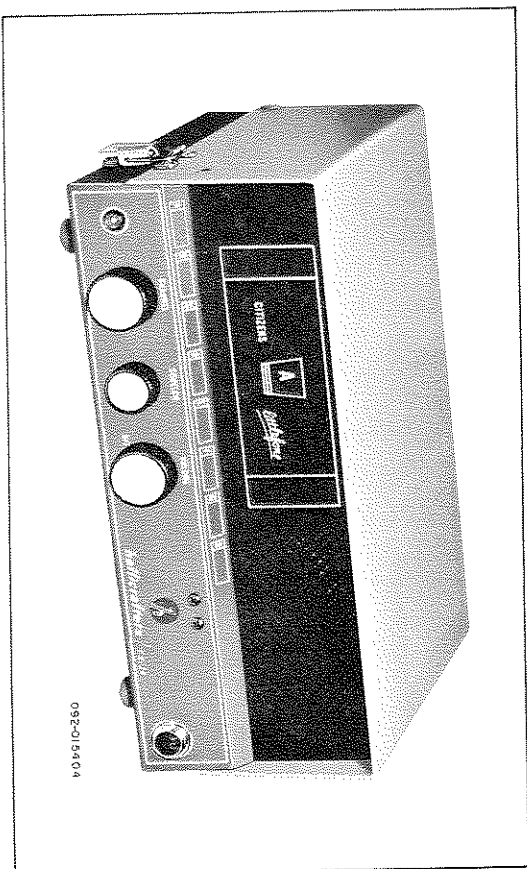


Figure 1. Hallicrafters Model CB-3A.

## GENERAL DESCRIPTION

### SECTION I

Your New Hallicrafters Model CB-3A *Autofone*<sup>®</sup> transceiver is a compact, self-contained transmitter-receiver designed for class D, 27-megacycle citizens band service.

Two of these units can provide convenient, reliable voice communication between your home and car, or between your office and truck, at distances ranging up to eight or ten miles. Communication over longer distances is possible, depending upon local conditions, antennas, and terrain.

All that is required for immediate on-the-air operation is: (1) authorization in the form of a station call sign from the Federal Communications Commission (FCC) (see license application enclosed), (2) an appropriate antenna system, and (3) a power source of 115 volts AC (house current) or a DC storage battery, as found in an automobile, truck, tractor, or boat.

The citizens band is a group of 23 channels (frequencies) assigned by the FCC for use by private individuals and provides short-range, two-way communication for business or personal use.

Channels are shared on a party-line basis; that is, licensees are not assigned individual private channels but, rather, are permitted to operate on any of the 23 channels as they choose. The Model CB-3A is supplied ready for immediate operation on channel 11 (27.085 MC). Operation on any one of eight channels is instantly possible by installing transmitting and receiving crystals for the desired additional channels in the sockets provided.

The Model CB-3A incorporates a two-stage transmitter capable of the full authorized power limit (5 watts) with 100% modulation capabilities. It has a super-heterodyne receiver with dual conversion for excellent adjacent channel rejection and a dual noise limiter to reduce automobile and other local interference. It has a push-to-talk ceramic microphone, self-contained speaker, and is housed in a cabinet with a hinged cover, permitting easy access to tubes and crystals.

## SECTION II

### SPECIFICATIONS

TRANSMITTER POWER INPUT	5 watts.
FREQUENCY RANGE	26,965 MC to 27,255 MC.
RECEIVER SENSITIVITY	Less than one microvolt for a 10-DB signal-to-noise ratio.
RECEIVER AUDIO POWER OUTPUT	2.5 watts.
TRANSMITTING CRYSTALS	Third overtone CR-23/U, $\pm 0.005\%$ tolerance.
RECEIVING CRYSTALS	As in transmitter, except 1650 KC higher in frequency.
OUTPUT CIRCUIT	50-ohm link.
TVI SUPPRESSION	Second harmonic (54 MC) series-tuned trap, 50 DB minimum.
POWER REQUIREMENTS	
AC - 115-volt, 60-cycle	48 watts.
DC - 6V or 12V (depending on model)	
6 volts	9.0 amperes.
12 volts	4.5 amperes.
OVERALL DIMENSIONS (HWD)	5-1/2 inches by 12 inches by 8 inches.
NET WEIGHT	12-1/2 pounds.
SHIPPING WEIGHT	15-1/2 pounds.

### SECTION III

### INSTALLATION

#### 3-1. UNPACKING.

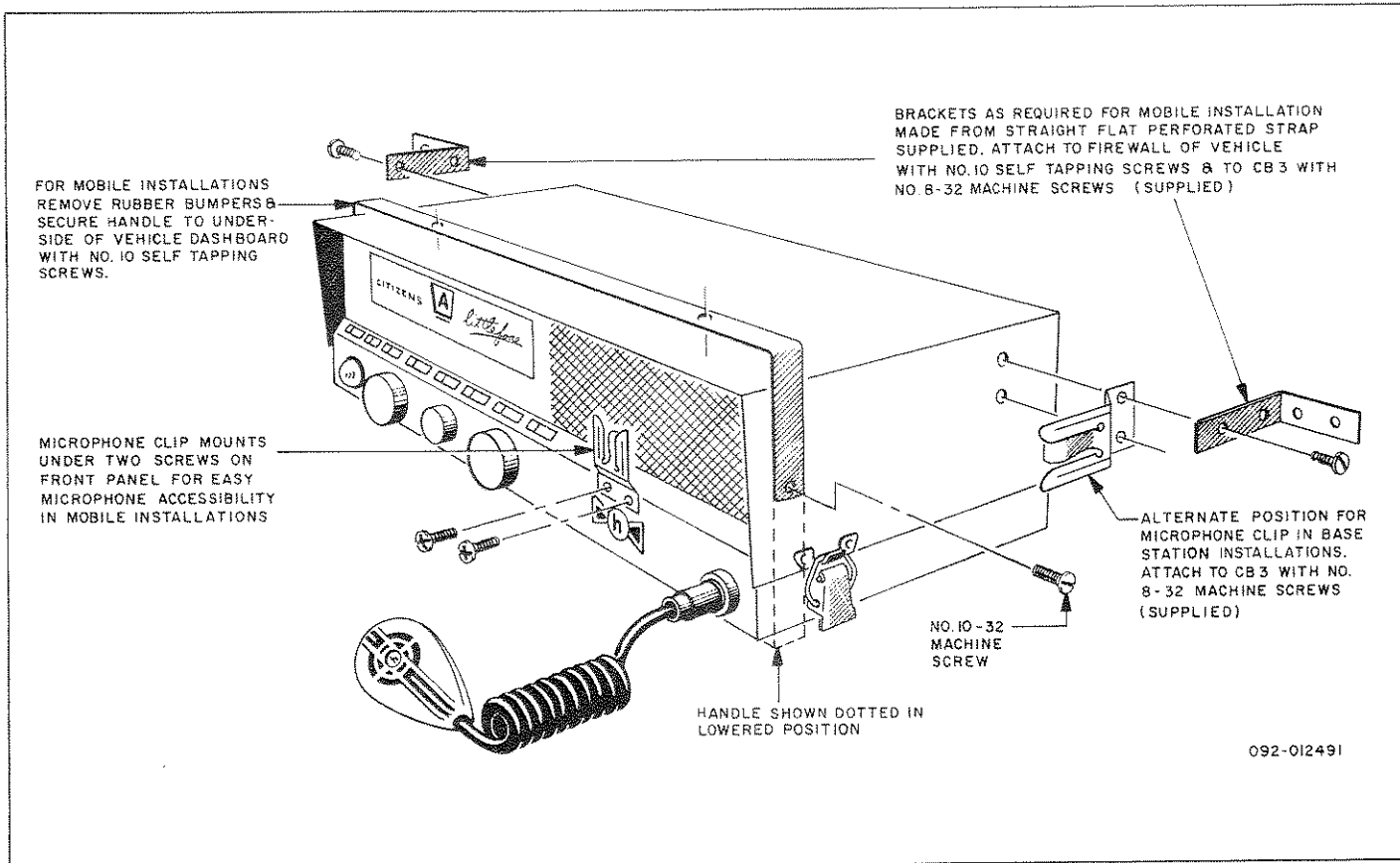
After unpacking the equipment, examine it closely for damage which may have occurred in transit. Should damage be apparent, immediately file a claim with the carrier stating the extent of the damage. Carefully check all shipping labels and tags for instructions before removing them.

#### 3-2. CONNECTION TO POWER SOURCE.

Two versions of the Model CB-3A are available. One provides operation from 115 volts AC (house current) or 12 volts DC (most modern cars, trucks, etc.) and the other from 115 volts AC or 6 volts DC (older trucks, cars, and some foreign cars). Before installation, be certain that you have the proper unit for the power source available.

In home installations, the power cord with the standard two-contact, molded plug on one end is used to connect the unit to a 115-volt, 60-cycle outlet.

In mobile installations, the power lead with the fuseholder in the line is used. It is recommended that the bare end of this wire be connected directly to the hot (ungrounded) terminal of the battery. If additional length is required, wire no smaller than No. 12 AWG should be used. Connection of this lead to other points (ammeter, etc.) may introduce ignition interference which would impair reception. Battery polarity is unimportant as the Model CB-3A is designed to operate on either positive or negative grounded systems.



092-012491

Figure 2. Installation.

An additional wire is required to be connected from the Model CB-3A chassis (thumb-screw terminal on rear) to the firewall or frame of the vehicle. This wire, No. 12 AWG or larger, completes the other side of the battery circuit.

### 3-3. ANTENNAS.

The Model CB-3A is adjusted at the factory to give optimum performance using a 50-ohm antenna. There are a number of antennas of this type available for citizens band use. For base station installations, a ground-plane or a half-wave vertical antenna is recommended for good all-around performance. For mobile use, a quarter-wave vertical whip, equipped with a bumper mount, is generally satisfactory.

The antenna should be connected to the antenna socket with RG-8/U or RG-58/U coaxial cable (RG-8/U is recommended for lengths in excess of 50 feet) and a type PL-259 VHF connector.

For limited range applications (1 or 2 miles), a short base-loaded whip antenna may be used.

Additional information concerning antennas may be obtained from your local Halliart's dealer.

## SECTION IV

### CONTROLS AND OPERATION

#### 4-1. OPERATING CONTROLS.

There are three operating controls on the front panel. Facing the unit, they are from left to right: (1) CHANNEL SELECTOR, (2) SQUELCH, and (3) VOLUME control with ON/OFF switch.

The CHANNEL SELECTOR switch has eight positions. The position that the switch is set to is indicated in the small dial window (letters A through H). The CHANNEL SELECTOR switch sets both the transmit and receive frequencies simultaneously. Operating frequencies are determined by quartz crystals installed in the unit, one for transmitting and one for receiving. The Model CB-3A is factory equipped for operation on channel 11 with crystals installed in position A.

The CHANNEL SELECTOR switch must remain in position A as no transmission or reception on other channels is possible until additional crystals are installed. The switch has a movable stop (located on the rear panel) that can be set to limit rotation, if desired, to only those consecutive alphabetical positions for which crystals have been installed.

The SQUELCH control is used to quiet background noise (static) in the absence of a signal. In the fully-clockwise position the Model CB-3A is unsquelched (i.e., no noise quieting). In the fully-counterclockwise position, the unit is fully squelched. In practice this control should be set to the point that just quiets the noise.

The VOLUME control turns the power ON and OFF and adjusts the loudness of received signals. The VOLUME and SQUELCH controls have no effect on transmission.

#### 4-2. OPERATION.

The power cable, antenna cable, and microphone should be connected prior to operation. Turn the Model CB-3A ON by rotating the VOLUME control clockwise until a click is heard. The channel dial should illuminate, indicating that power is applied.

## NOTE

IN MOBILE INSTALLATIONS, TURN THE MODEL CB-3A OFF BEFORE ENGAGING THE ENGINE STARTER SWITCH. FAILURE TO OBSERVE THIS PRECAUTION MAY MATERIALLY AFFECT THE LIFE OF THE POWER SUPPLY VIBRATOR.

Set the CHANNEL SELECTOR switch to the desired position. Set the SQUELCH control fully clockwise (unsquelched). After a warmup of approximately one minute, other citizens band stations or atmospheric noise will be heard. Adjust the VOLUME control to the desired listening level.

The SQUELCH control should be set when only noise is present (no signals heard). Adjusting the SQUELCH control when signals are present will give an erroneous indication of the proper level. Turn the SQUELCH control slowly counterclockwise to the point where the noise just disappears. In this position, the SQUELCH control is properly set so that transmitted signals will be heard but the receiver will be quiet between transmissions. Do not turn the SQUELCH control further than is required to just silence the noise; this could result in signals being missed that might otherwise be heard.

To transmit, depress the microphone button (push-to-talk switch) and speak in a normal voice one or two inches away from the microphone. To receive, release the button.

An output indicator is located on the front panel to the left of the CHANNEL SELECTOR. This indicator will light during transmissions, indicating normal transmitter operation. You may find that the indicator lights only occasionally or just when actually speaking into the microphone. This may indicate low power source voltage (example: operation in an automobile with motor not running).

#### 4-3. OPERATING PROCEDURE.

Since citizens band channels are shared on a party-line basis, standard operating procedures and courtesies should be observed so that full utility of the service can be realized by all users.

##### POINTS TO REMEMBER ARE:

1. Do not transmit if you hear other stations using the channel.
2. Limit your communication to the minimum possible time required to complete your business.
3. Announce the call sign of your station at the beginning and end of each communication (not each transmission). This is required by FCC rules and can be performed as follows:  
(When initiating a call) "This is \_\_\_\_\_ (your call sign) unit 1 (2, 3, etc.) calling unit 2 (1, 3, etc.)." and (when completing a call) "This is \_\_\_\_\_ unit 1 off and clear with unit 2."

#### 4-4. THE TEN SIGNALS.

Following is a list of the most commonly used citizens band code signals. Their use increases the efficiency and effectiveness of citizens radio communication by shortening transmission time and by helping to eliminate errors in information transmitted, by being easy to understand even under crowded or noisy conditions.

10-1 I am receiving you poorly. Not completely understandable, weak signal, or being interfered with by noise and/or other stations.

10-2 I am receiving you well. Perfectly understandable - interference slight if any.

- 10-4 OK. Acknowledge, understand, affirmative.
- 10-7 Out of service - leaving the air. Not subject to call.
- 10-8 In service, standing by. Subject to call.
- 10-9 Please repeat - I do not understand.
- 10-10 Transmission completed, standing by, subject to call.
- 10-20 What is your location? My location is \_\_\_\_\_.
- 10-23 Standby please.
- 10-41 I am changing to channel \_\_\_\_\_. Please change to channel \_\_\_\_\_.

**4-5. ADDING NEW CHANNELS.**

Two crystals are required for each channel, one for transmit and one for receive. Under no circumstances use other than standard military type CR-23/U series resonant, third overtone crystals. Crystals should be ordered in pairs from your local dealer. Hallcrafters Model CB-3A transmitting crystals are stamped with part number 19-2820 and the receiving crystals with 19-2819. When ordering crystals, be sure to indicate: (1) the desired channel, (2) model number CB-3A, and (3) the serial number found on the rear of the unit.

One crystal is stamped with the letter T followed by a number and the other crystal with the letter R followed by a number. The number indicates the channel. The T crystal is used in the transmitter circuit and should be inserted in the appropriately lettered socket at the REAR of the chassis. The R crystal (1650-KC higher than the channel frequency) is used in the receiver and should be installed in the appropriate socket at the FRONT of the chassis (near the dial).

**IMPORTANT**

No adjustments are necessary when adding crystals to the Model CB-3A. The FCC requires, however, that after the installation of new crystals, the transmitter frequency be checked by a person holding a first or second class commercial operator's license.

**4-6. ACCESSORIES.**

The Model CB-3A is provided with two removable plates on the front panel for the purpose of installing operating accessories. See your local Hallcrafters dealer for information on accessories that are available.

**SECTION V  
SERVICE DATA**

**5-1. CHASSIS REMOVAL.**

Completely remove the top cover. Remove all knobs and the six screws on the underside of the cabinet. Slide the chassis out of the bottom cover.

**5-2. DIAL CORD RESTRINGING.**

In order to restring the dial assembly, it is required that the front of the chassis be completely exposed. Also, remove the dial disc (1 screw) to expose the pulley. Refer to figure 3. Follow the arrows and letter sequence to string the dial cord.

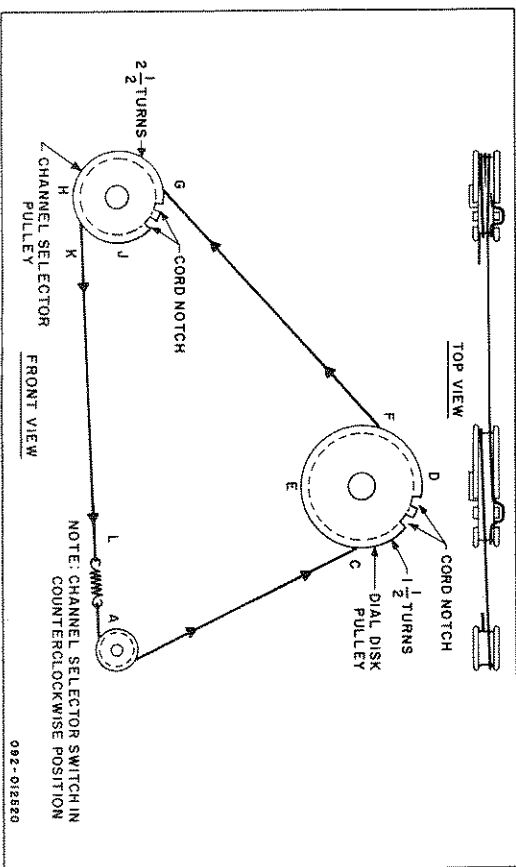


Figure 3. Dial Cord Stringing Diagram.

The dial cord spring should be expanded 1/8 inch to 1/4 inch. After stringing raise the cord with a pointed tool and place it into the pulley notches to lock the cord in the pulleys. Replace the dial disc so that the letter A aligns with the window opening in the panel. Replace all parts and hardware to their original positions.

**5-3. SERVICE AND OPERATING QUESTIONS.**

For further information regarding operation or servicing of this equipment, contact the Hallcrafters dealer from whom it was purchased. The Hallcrafters Company maintains an extensive system of Authorized Service Centers where any required service will be performed promptly and efficiently at no charge if this equipment is delivered to the service center within 90 days from date of purchase by the original buyer and the defect falls within the terms of the warranty. It is necessary to present the bill of sale in order to establish warranty status. After the expiration of the warranty, repairs will be made for a nominal charge. All Hallcrafters Authorized Service Centers display the sign shown below. For the location of the one nearest you, consult your local telephone directory.

Service shipments should not be made to the factory unless instructed to do so by letter, as The Hallcrafters Company will not accept responsibility for unauthorized shipments.

The Hallcrafters Company reserves the privilege of making revisions in current production of equipment and assumes no obligation to incorporate such revisions in earlier models.

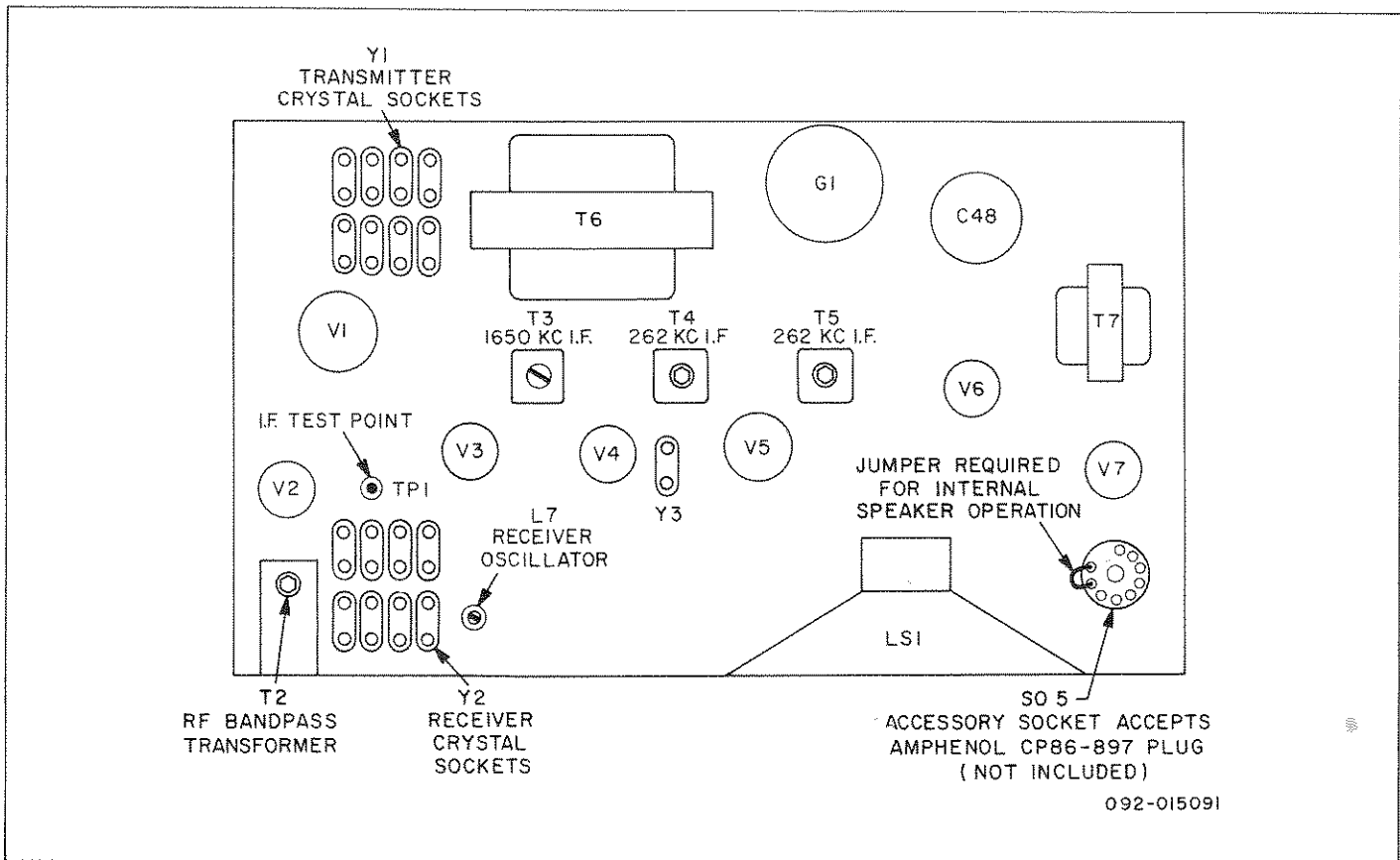
**SECTION VI  
ALIGNMENT**

**6-1. GENERAL.**

The Model CB-3A has been carefully aligned and adjusted at the factory by specially trained personnel using precision equipment. Alignment should not be attempted until all other possible causes of faulty operation have been investigated. Alignment should not be required unless the unit has been tampered with or component parts have been replaced in the RF or IF stages. Alignment should be made only by persons familiar with communications equipment and experienced in their alignment.



Figure 4. Top View of Model CB-3A Chassis.



6-2. EQUIPMENT REQUIRED.

Receiver

- \* Standard AM signal generator 1650 KC to 27.255 MC, modulated 30% with 400 CPS or 1000 CPS audio.
- \* Output meter (or AC vacuum tube voltmeter) connected across speaker terminals.
- \* 3-volt battery (two 1-1/2-volt D cells connected in series).

Transmitter

- \* 50-ohm, non-reactive dummy load (two 100-ohm, 2-watt resistors in parallel).
- \* RF power output indicator connected across load.

General

- \* Plastic screwdriver, 1/8-inch tip.
- \* Hexagonal alignment tool (GC No. 9091).

6-3. ALIGNMENT PROCEDURE.

CRYSTAL OSCILLATORS

Transmitter: The transmitter oscillator coil, L1, has been adjusted at the factory for series resonant operation of the transmitter crystals. This coil should not be tampered with as off-frequency, illegal operation may result. The FCC requires that persons making transmitter frequency adjustments be licensed commercial radio telephone operators, second class or higher, and that they have adequate frequency measuring equipment. For proper on-frequency operation of the CB-3A, use only Hallicrafters crystals. These are standard military type CR-23/V, third overtone, series resonant crystals.

Receiver (first conversion oscillator): The receiver oscillator, like the transmitter, is designed for CR-23/V series resonant operation. The oscillator can be aligned with a short-wave receiver capable of tuning to the actual receiver crystal frequency (channel 11 receiver crystal = 28.735 MC). To align the receiver oscillator, proceed as follows:

1. Zero beat (with VFO on) the short-wave receiver to the crystal frequency (channel 11). The antenna of the short-wave receiver must be close enough to the Model CB-3A receiver oscillator tube (V3) to pick up the radiated crystal signal.
2. Substitute a 39-ohm, 1/2-watt resistor for the crystal. With the resistor installed in place of the crystal, the circuit should oscillate on or near the crystal frequency. (Note: oscillation will sound quite rough in the short-wave receiver.)
3. Tune the short-wave receiver to pick up the oscillation. If the oscillation is within  $\pm 500$  KC of the crystal frequency, adjustment is adequate. If not, readjust the short-wave receiver tuning to the crystal frequency. With the resistor installed, carefully adjust the receiver oscillator coil (L7) to frequency. This adjustment is critical.
4. Replace the crystal. The adjustment performed on channel 11 provides uniform performance on all other channels. No readjustment is necessary when changing channels.

**IMPORTANT**

The alignment procedure should be closely followed in order to produce proper overall performance. Do not attempt to adjust IF transformers (T2, T3, or T4) by any method other than that described. Adjustment of these transformers for maximum output with weak on-the-air signals is not recommended and will result in a loss of selectivity.

RECEIVER RF & IF ALIGNMENT

Alignment	Connections	Generator Frequency	Channel Crystal	Adjust
1630 KC and 262 KC	3-volt battery; negative connected to IF test point (TP1); positive to chassis (GND).	1630 KC	None	Top and bottom of T3, T4, and T5. Keep peaking (the generator output to maintain the output meter below 1.2 watt (volume control fully clockwise. Caution should be exercised in adjusting the cores on T4 and T5. They must be tuned to the first peak (not necessarily the largest peak) reached from their maximum CCW position.
RF bandpass transformer	Signal generator; to antenna input connector. Alternate method: antenna connected to input.	27.085 MC	11 (27.085 MC)	Top and bottom of T2. Adjust with low level signal generator input for maximum output, alternately (with antenna), adjust for maximum noise output. Adjust to first peak from maximum CCW. When adjusted, cores should be just entering the windings from the outside ends. Under no circumstances should they be between the windings. Aligned in transmit
RF input	See transmitter adjustment.			

TRANSMITTER RF ADJUSTMENT

Adjustment	Connections	Channel Crystal	Adjust
Power Output	Dummy load to antenna socket. Power output indicator across load.	11 (27.085 MC)	T1 and L5 for maximum power output; adjustments should be made alternately, a little at a time, until maximum output is obtained. The link coil L5 should be adjusted so that it shows no tendency to spring back to an improper position.
Second harmonic trap	Normal installation set-up. Interference observed on TV set screen (set to TV channel 2).	11 (27.085 MC)	Adjustment should be made only in the advent of transmitter interference to local television receivers (i.e., wavy lines, herring bone, etc.). Adjust L6 for minimum interference.

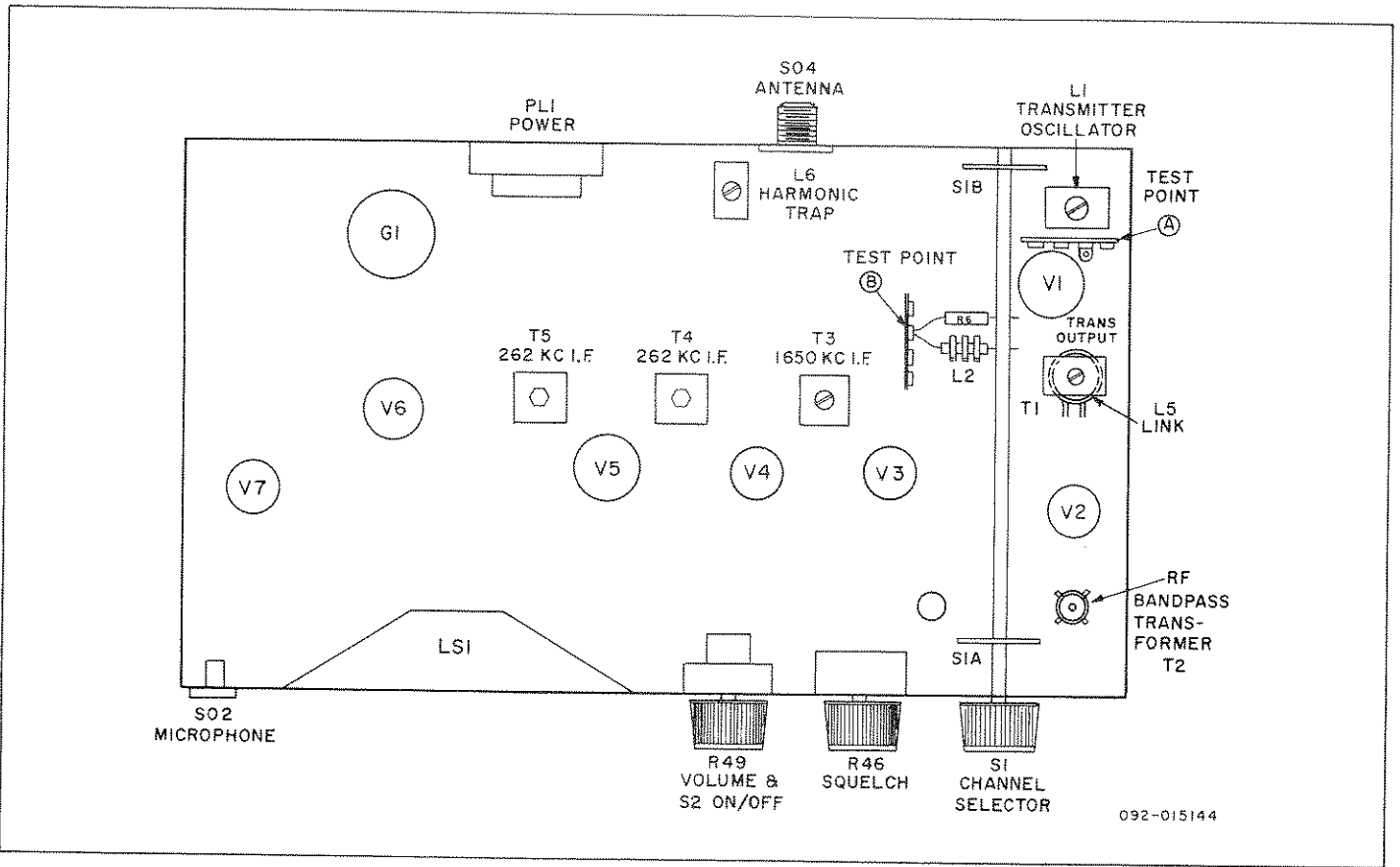
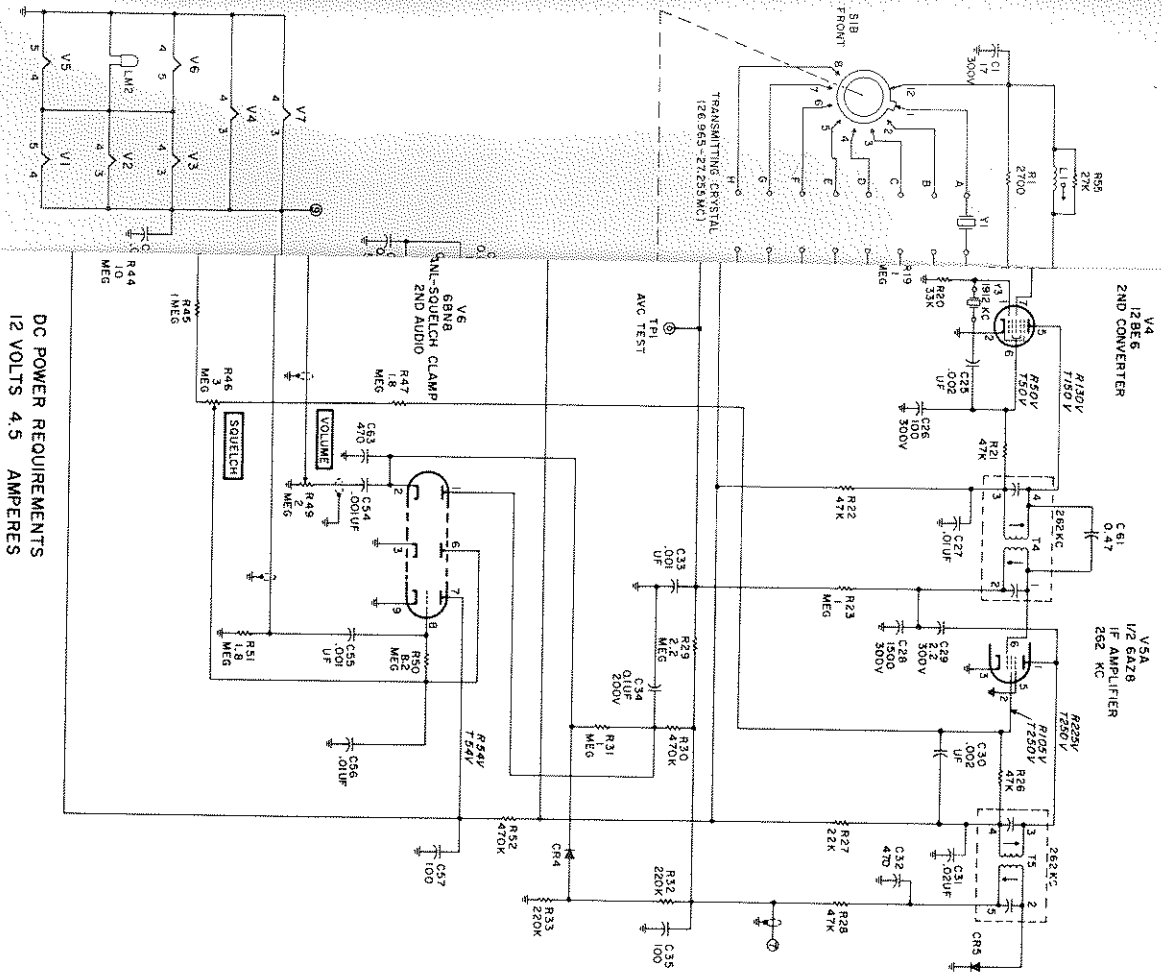


Figure 5. Bottom View of Model CB-3A Chassis.

CHANNEL ALLOCATIONS  
FOR  
U.S. CLASS D CITIZENS RADIO SERVICE  
AND  
CANADIAN GENERAL RADIO SERVICE

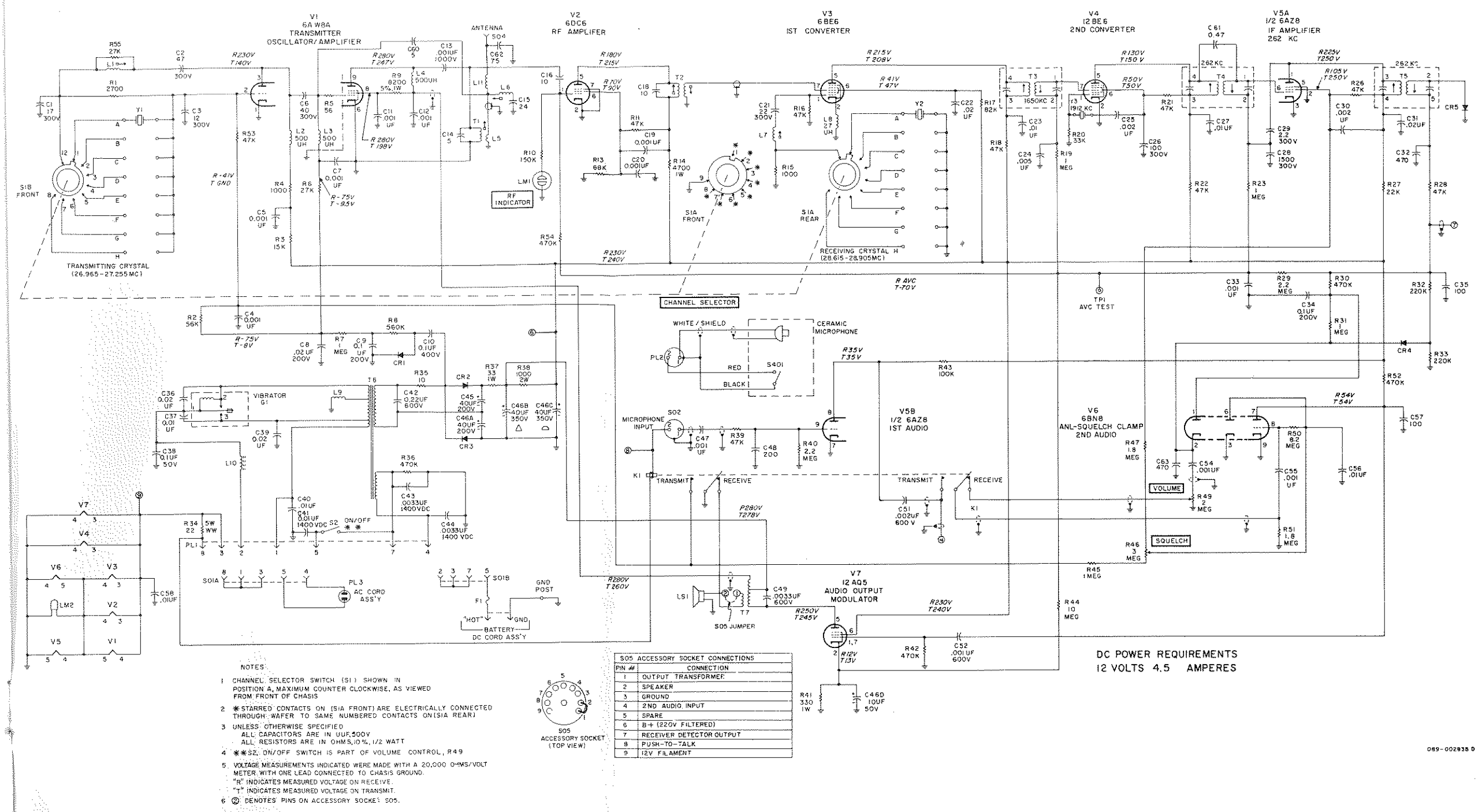
CHANNEL ALLOCATION			CRYSTAL ORDERING INFORMATION			
Frequency (MC)	U. S. Number	Canadian Number	Transmitter Crystal		Receiver Crystal	
			Frequency (MC)	Hallicrafters Part Number	Frequency (MC)	Hallicrafters Part Number
26.965	1	Do Not Use	26.965	019-002820-1	28.615	019-002819-1
26.975	2	Do Not Use	26.975	019-002820-2	28.625	019-002819-2
26.985	3	Do Not Use	26.985	019-002820-3	28.635	019-002819-3
27.005	4	4	27.005	019-002820-4	28.655	019-002819-4
27.015	5	5	27.015	019-002820-5	28.665	019-002819-5
27.025	6	6	27.025	019-002820-6	28.675	019-002819-6
27.035	7	7	27.035	019-002820-7	28.685	019-002819-7
27.055	8	8	27.055	019-002820-8	28.705	019-002819-8
27.065	9	9	27.065	019-002820-9	28.715	019-002819-9
27.075	10	10	27.075	019-002820-10	28.725	019-002819-10
27.085	11	11	27.085	019-002820-11	28.735	019-002819-11
27.105	12	12	27.105	019-002820-12	28.755	019-002819-12
27.115	13	13	27.115	019-002820-13	28.765	019-002819-13
27.125	14	14	27.125	019-002820-14	28.775	019-002819-14
27.135	15	15	27.135	019-002820-15	28.785	019-002819-15
27.155	16	16	27.155	019-002820-16	28.805	019-002819-16
27.165	17	17	27.165	019-002820-17	28.815	019-002819-17
27.175	18	18	27.175	019-002820-18	28.825	019-002819-18
27.185	19	19	27.185	019-002820-19	28.835	019-002819-19
27.205	20	20	27.205	019-002820-20	28.855	019-002819-20
27.215	21	21	27.215	019-002820-21	28.865	019-002819-21
27.225	22	22	27.225	019-002820-22	28.875	019-002819-22
27.255	23	Do Not Use	27.255	019-002820-23	28.905	019-002819-23

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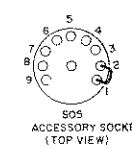




019-002819-1	26.615	019-002820-1	26.965	Do Not Use	1	26.965
019-002819-2	28.625	019-002820-2	26.975	Do Not Use	2	26.975
019-002819-3	28.635	019-002820-3	26.985	Do Not Use	3	26.985
019-002819-4	28.655	019-002820-4	27.005	Do Not Use	4	27.005
019-002819-5	28.665	019-002820-5	27.015		5	27.015
019-002819-6	28.675	019-002820-6	27.025		6	27.025
019-002819-7	28.685	019-002820-7	27.035		7	27.035
019-002819-8	28.705	019-002820-8	27.055		8	27.055
019-002819-9	28.715	019-002820-9	27.065		9	27.065
019-002819-10	28.725	019-002820-10	27.075		10	27.075
019-002819-11	28.735	019-002820-11	27.085		11	27.085
019-002819-12	28.755	019-002820-12	27.105		12	27.105
019-002819-13	28.765	019-002820-13	27.115		13	27.115
019-002819-14	28.775	019-002820-14	27.125		14	27.125
019-002819-15	28.785	019-002820-15	27.135		15	27.135
019-002819-16	28.805	019-002820-16	27.155		16	27.155
019-002819-17	28.815	019-002820-17	27.165		17	27.165
019-002819-18	28.825	019-002820-18	27.175		18	27.175
019-002819-19	28.835	019-002820-19	27.185		19	27.185
019-002819-20	28.855	019-002820-20	27.205		20	27.205
019-002819-21	28.865	019-002820-21	27.215		21	27.215
019-002819-22	28.875	019-002820-22	27.225		22	27.225
019-002819-23	28.905	019-002820-23	27.255	Do Not Use	23	27.255



- NOTES:
- CHANNEL SELECTOR SWITCH (S1) SHOWN IN POSITION A, MAXIMUM COUNTER CLOCKWISE, AS VIEWED FROM FRONT OF CHASSIS
  - \* STARRED CONTACTS ON (S1A FRONT) ARE ELECTRICALLY CONNECTED THROUGH WAFER TO SAME NUMBERED CONTACTS ON (S1A REAR)
  - UNLESS OTHERWISE SPECIFIED ALL CAPACITORS ARE IN UUF, 500V ALL RESISTORS ARE IN OHMS, 10%, 1/2 WATT
  - \* S2, ON/OFF SWITCH IS PART OF VOLUME CONTROL, R49
  - VOLTAGE MEASUREMENTS INDICATED WERE MADE WITH A 20,000 OHMS/VOLT METER WITH ONE LEAD CONNECTED TO CHASSIS GROUND. "R" INDICATES MEASURED VOLTAGE ON RECEIVE. "T" INDICATES MEASURED VOLTAGE ON TRANSMIT.
  - ⊙ DENOTES PINS ON ACCESSORY SOCKET S05.



PIN #	CONNECTION
1	OUTPUT TRANSFORMER
2	SPEAKER
3	GROUND
4	2ND AUDIO INPUT
5	SPARE
6	B+ (220V FILTERED)
7	RECEIVER DETECTOR OUTPUT
8	PUSH-TO-TALK
9	12V FILAMENT

Figure 6. Schematic Diagram of Model CB-3A.

