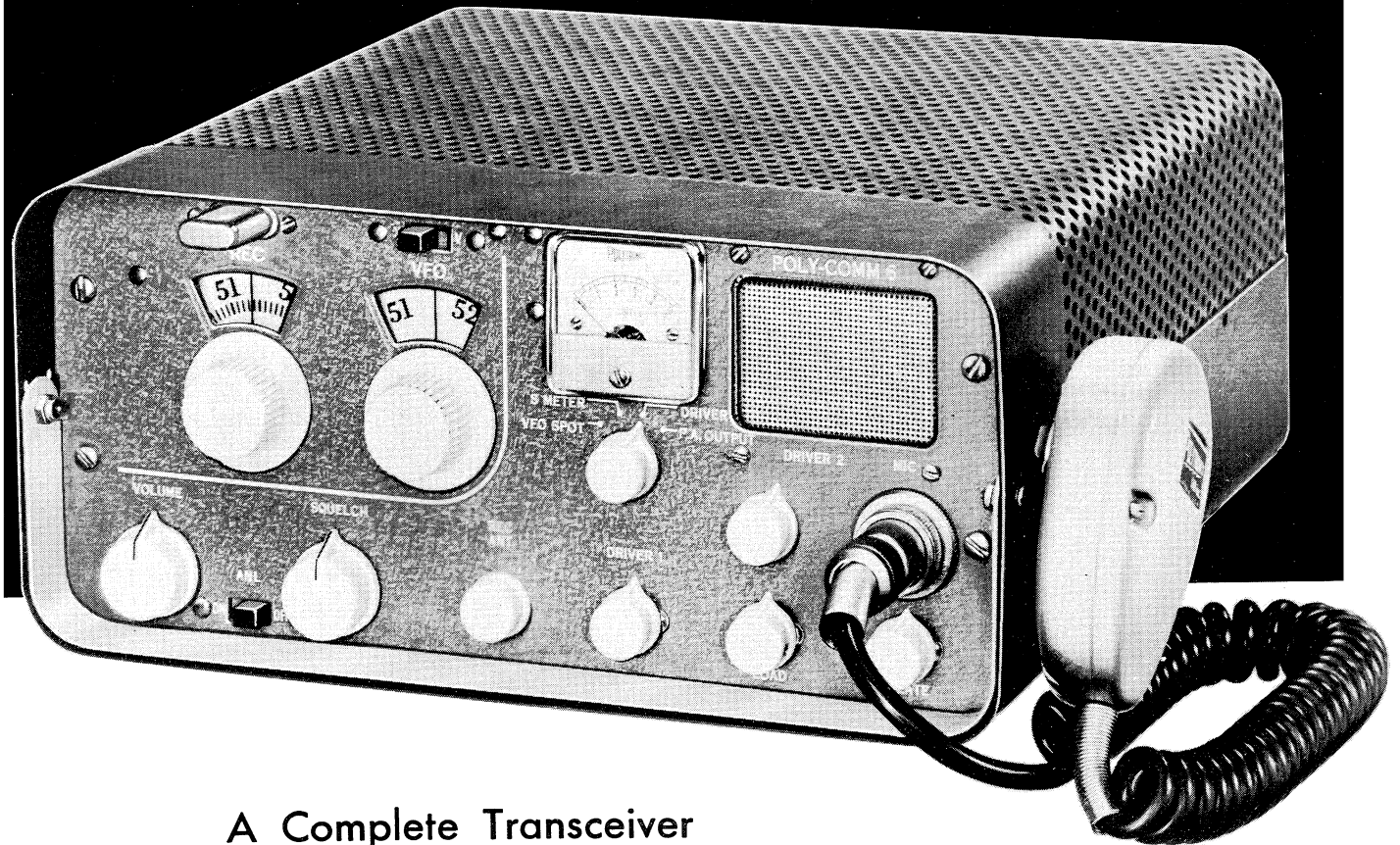


# INSTRUCTION MANUAL

## POLY-COMM "6"



A Complete Transceiver  
For The Amateur  
6 METER BAND

OPERATES FROM BOTH  
117VAC & 12.6VDC  
SOURCES

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**POLYTRONICS** LAB inc.

388 GETTY AVENUE  
CLIFTON, NEW JERSEY

Manual No. 702  
Code No. M 625371

Phone: 772-1334  
N. J. Area Code 201

## WARRANTY

The Company warrants the equipment to be free from defects in workmanship and material under normal and proper use and service for the uses and purposes for which it is designed, and agrees to repair or replace at the place of manufacture, without charge, all parts thereof showing such defects which are returned for inspection to the Company's factory, transportation prepaid, within a period of ninety (90) days from date of delivery, provided that such inspection discloses to the satisfaction of the Company that the defects are as claimed, and provided also, that the equipment has not been altered, repaired, subjected to misuse, negligence or accident, or damaged by lightning, excessive current or otherwise, or had its serial number or any part thereof altered, defaced, or removed. Tubes, vibrators, fuses and pilot lamps shall be deemed to be covered by the manufacturer's standard warranty applicable thereto, and such items shall be, and are, hereby excluded from the provisions of this warranty.

The Company warrants that all of the items of equipment that are of the Company's own manufacture will meet the technical specifications of the Standards of Good Engineering Practices, as established by the Federal Communications Commissions. As to all items of equipment that are not manufactured by the Company, it is understood that the standard warranty of the manufacturer or supplier thereof shall be the only warranty applicable to such equipment.

Except as herein specifically provided, no warranty, expressed or implied, other than that of title, shall apply to any equipment sold hereunder. In no event shall the Company be liable for damages by reason of the failure of the equipment to function properly or for any consequential damages.

## CHANGES

The Company reserves the right to modify or change the equipment, in whole or in part, at any time prior to delivery thereof, in order to include therein electric or mechanical refinements deemed appropriate by the Company, but without incurring any liability to modify or change any equipment previously delivered, or to supply new equipment in accordance with earlier specifications.

NOTE: No merchandise will be accepted for warranty service without prior written factory authorization.

## UNPACKING AND EQUIPMENT SUPPLIED

Besides this manual, the box contains:

- ( ) Poly-Comm PC6
- ( ) Microphone with coil cord and connector
- ( ) Microphone hang-up clip
  - ( ) 2 self-tapping #8 philips head screws
  - ( ) 2 6-32 x 1" MSBH
  - ( ) 2 #6 LWIT
  - ( ) 2 #6 x  $\frac{1}{4}$  nuts
- ( ) Universal mounting bracket
- ( ) 3 knurled 10 - 32 x  $\frac{1}{4}$  thumb screws
- ( ) 5 #8 3/4 hex head self-tapping screws
- ( ) AC line cord with (2) 2 amp fuses      AC cord directly
- ( ) DC line cord with (1) 30 amp fuse      connected to AC model
- ( ) Final electrical test data

Other antennas and accessories are supplied with instruction packing lists templates in their own respective cartons.

## SPECIFICATIONS

### Receiver:

Frequency Range: 49.250 MC to 54.250 MC

Calibration: 100KC graduations every 4°

Tuning Ratio: 6:1

Sensitivity: Better than .1 uv 6 db s/n @ 30% @ 1000 cps modulation

Selectivity: -6 db bandwidth 8 KC  $\pm$  2 KC

-60 db bandwidth 25 KC  $\pm$  5 KC

AGC: Audio output varies less than 3 db from 1 uv to .1 volt

Delayed AGC: Knee of AGC occurs between 3 and 10 uv

Squelch: (Adjustable): At threshold receiver will awaken for carriers of .08 uv or greater on 6M. At stop receiver will awaken for carriers of 10 uv or greater (stop limit adjustable from 3 to 30 uv).

Noise Limiter: Floating series gate type operates on all noise peaks.

Audio unaffected by modulation levels less than 85%.

Audio Output: At least 2.0 watts into 2½" PM internal speaker or at least 3.0 watts into external 4 ohm speaker. Provisions for 5W into external speaker.

Distortion: Less than 15% from 250 to 3000 cps at 1 watt output

Hum and Noise: Better than 40 db down 1 watt output

Freq. Response: Within 6 db from 250 to 3000 cps (reference 0 db at 1000 cps at 30% at 100 uv).

1st Image: Better than 60 db down

2nd Image: Better than 85 db down

Spurious Responses: Better than 50 db down everywhere except within  $\pm$  20KC of desired signal

Internally generated spurious signals greater than .1 uv: absolutely none

Cross Mod. and Desensitization: Better than 50 db down at  $\pm$  20KC

IF Frequencies: 5.405 MC

455 KC

Compliance: Meets FCC Rules Part 15 re: Incidental Radiation Device

Stability: 15KC during first 15 min

2KC/HR max. thereafter

### Tube Complement (15 Total)

#### Receiver

6DS4 1st RF AMP

6CW4 2nd RF AMP

6AW8 1st mixer, 5.4 MC IF Amp

6CB6 1st osc

12AT7 2nd mixer, 2nd osc

6AX8 IF Amp, "S" meter Amp

6CM8 IF Amp, AGC Amp, Microphone Amp

12AX7 Squelch control, 1st audio

(2) 6BQ5 Audio output/modulator

#### Trans.

6CB6 VFO

12BY7A Tripler

12BY7A Doubler

7551 Final

6BJ6 Microphone preamp

12AX7 Audio Amp

Common

- (2) 34039 Silicon diodes full wave doublers
- (3) HD6226 Silicon diodes ANL, AGC clamps, Det
- (5) NE86 Voltage reference

Transmitter (Separate osc, multipliers, and straight through final amplifier)

Plate power input to final: 18w 6M

RF power output: At least 10 watts

Mod. Cap: 85 to 100% at average speaking level via plate modulation.

Hum and noise on carrier: At least 40 db down from 30% modulation level.

Harmonic Suppression: All harmonics and spurious emissions better than 50 db down. Exceeds latest FCC requirements.

Microphone: Unit normally supplied with steel case high impedance detachable ceramic microphone with 5' retractable coil cord. Includes mounting hardware and connector.

Frequency Control: VFO or crystal

Crystal Stability:  $\pm .005\%$  - 30° C. to + 70° C.

Multiplication: 6 times

Crystal Circuit Stability:  $\pm .006\%$  -20° C. to + 60° C.

VFO Stability:  $\pm 15$ KC during 1st 15 min.  $\pm 2$ KC/hr. max thereafter

Humidity: Will perform after being subjected to 90° C. at 95% relative humidity for 8 hours.

Vibration: Will withstand 10G shake from 60 to 1800 cps. for 30 minutes in three planes.

Shock: Will withstand 15G shock in 3 planes.

Supply Voltage Variation: -20 to + 10% of rated input voltage.

AC Power Consumption: 90 watts receive, 140 trans.

DC Current: 10 Amps rec. 16 Amps trans. @ 12.6 volts

Size: 11 wide x 10 deep x 5 high

Weight: 15 lbs. total system weight

Color: Azure Blue, White knobs, white lettering, brushed aluminum grill.

Shipping Weight: 23 lbs.

Controls:

VFO - Xtal SW

Rec. tune

VFO tune

Volume off/on

Squelch (Squelch limit shaft coaxial, under knob)

Rec ant peaking

"S" Meter function selector

VFO spot

"S" meter

Driver grid current

PA output

Driver 1 tune

Driver 2 tune

PA tune and PA load

At rear

UHF type antenna connector

At bottom

"S" meter zero

"S" meter full scale

## GENERAL DESCRIPTION

The Poly-Comm PC6 is designed for general mobile, marine, or base station amateur AM operation. Poly-Comms are readily adapted to temporary field work and may also be used in 14 V. aircraft.  
(Total system weight - 16 3/4 lbs.).

### RECEIVER SECTION

The Poly-Comm PC6 receiver is designed to receive amplitude modulated signals in the 50-54 MC amateur band.

The receiver is a 10 tube dual conversion superheterodyne consisting of two high gain cathode driven nuvistor RF amplifiers working into the triode section of 6AW8 (V3A) first mixer. The tunable oscillator operates in the 47 MC range where excellent stability is obtained by rugged mechanical construction and screen regulation of the oscillator stage. The second oscillator is a conventional Pierce circuit.

A high first IF results in a first image, removed sufficiently from the desired signal so as to be attenuated at least 60 db by the tuned grid circuit and double tuned plate circuits of the R.F. amplifier.

The second image is attenuated at least 85 db by the 4 tuned circuits of the first IF amplifier.

The use of 3 double tuned 455 KC IF transformers provides adequate communication selectivity for AM use. The nose bandwidth averages 7 KC at -6 db, while the skirt band width is approximately 27 KC wide at -60 db.

A silicon diode is used as an AGC delay diode, thus providing excellent weak signal gain. Use of separate silicon diodes for the detector and ANL insure hum-free reception and permit physically placing the diodes in optimum locations.

A high-mu dual triode squelch and first audio tube produce a fast acting, highly sensitive, manually adjustable, squelch circuit. The use of a voltage regulator insures stable squelch operation with varying input voltages. A pair of 6BQ5's delivers 3 watts of audio to the built-in panel speaker or to the external speaker terminals provided at the rear of the unit. Provisions are included for increasing the external audio to 5 watts if desired.

The Poly-Comm contains a squelch circuit which mutes the receiver during the absence of a signal and thus eliminates the annoying hiss, static and atmospheric noise which would be heard when not in use. The squelch circuit is NOT a device for removing noise from the signal being received, but will silence the receiver when the frequency is clear. The squelch is NOT a selective device and will awaken the receiver during the reception of any on-frequency signal.

At the present state of the art it is practically impossible to completely eliminate ignition noise from weak signals. Very sensitive and selective receivers are prone to pick up ignition noise. The automatic noise limiter provided in the Poly-Comm is highly effective in minimizing the tick-tick-tick noise created by the firing of the spark plugs. In strong signal areas ignition noise should not be noticed, but may become more severe in weaker areas. The various filtering techniques may be unsuccessful on some model vehicles and it may be necessary to turn off the engine in weak areas in order to complete the QSO.

It is felt that the advantages of a highly sensitive receiver yielding maximum useable range with some ignition noise outweighs the disadvantages of the short range insensitive receiver that appears free from ignition noise.

The PC-6 is not designed or intended for reception or transmission of SSB or CW signals. However, a triode one section of the 6AX8 is available and leaving it to the ingenuity of the amateur. A suitable BFO could be designed for CW reception.

#### TRANSMITTER SECTION

The Poly-Comm PC6 transmitter is designed to transmit amplitude modulated signals in the 50-54.

The transmitter is either a crystal or VFO controlled unit consisting of an oscillator, two frequency multipliers, and a straight through final amplifier.

The modulator consists of a high-gain pentode microphone pre-amplifier (for use with a desk-type high impedance base station microphone) followed by a triode which drives two 6BQ5's which in turn plate modulate the 7551 final.

#### POWER SUPPLY

A unique power transformer which operates on either 117 V. AC or 12.6 V. DC furnishes the necessary power to two silicon power rectifiers arranged in a well filtered full wave doubler circuit. Another silicon rectifier supplies the necessary DC to key the two relays in the unit. The AC models use the same supply as above less the 12V DC feature.

## CONSTRUCTION

The Poly-Comm is constructed on a rectangular chassis with the larger parts such as tubes and transformers mounted on top while the smaller wired components are located underneath.

The use of the universal mounting bracket permits the mounting of the unit in any one of six positions.

## CONNECTIONS

Connections to the unit are made via two connectors located on the lower rear wall. Either 117 VAC or 12.6 VDC may be applied to the 10 pin male plug.\* A standard UHF female antenna connector is provided on the rear of the unit. The antenna connector is for a 51 ohm 6 meter antenna. \*The AC model has a permanently attached line cord.

## ALIGNMENT

All special alignment adjustments are accessible from the top, side and bottom of the chassis without removing the chassis from the case.

## MAINTENANCE

### A. Removal of Unit from Case

1. Remove the two handle screws and remove the handle.
2. Remove the two hex head screws at the rear and the single hex head screw on the bottom.
3. Tilt the case slightly and slide the unit out of the case.

## SERVICING

The Poly-Comm is supplied completely, aligned, adjusted and tested and normally requires no attention in the field. Should a failure or tampering result in the need for service, the Poly-Comm should be serviced by a competent electronic repair agency. The law requires that the transmitter section be adjusted only by a service technician who possesses a valid amateur license or a 1st or 2nd class radio-telephone operator's license.



## OPERATING THE POLY-COMM

The receiver section of the Poly-Comm can be operated immediately. No license is required.

To operate the receiver, rotate the volume control clockwise thus activating the OFF-ON switch. The dial lamps should glow softly. The red color of the bulb has been chosen so as to illuminate the dials in a dark car, or room, and not cause objectionable glare.

Set the volume control to about mid-setting and allow 30 seconds for the tubes to warm up.

Rotate the squelch control clockwise until a rushing sound is heard, use this position for tuning. For stand-by frequency monitoring back off counter-clockwise until the unit is silent.

Set the function switch to "S" meter position. Tune for desired signal. Observe the "S" meter and peak the ant rec knob.

If, during the reception of a weak signal, the characteristic tic-tic of ignition noise is heard, throw the automatic noise limiter (ANL) switch to the ON position. The actuation of the ANL normally causes a slight reduction in volume (about 2 db).

After a valid license has been posted and necessary log procured, the Poly-Comm transmitter can be operated by pressing the push-to-talk microphone button.

Pressing the microphone button places the transmitter on the air and silences the receiver. Reception is impossible while transmitting and likewise your signal cannot be heard by another station while they are transmitting. Each must take turns.

When the function switch is placed in the VFO SPOT position just the oscillator of the VFO is energized and the VFO dial can be adjusted for maximum "S" meter reading (and/or) during the reception of a S7 or stronger signal tuned for zero beat. Care should be taken that the correct (largest) peak or zero beat is chosen. A suitable 51 ohm antenna or 51 ohm dummy load should be connected to the PC6 before the transmitter is activated.

While pressing the mic button, adjust the DRIVER controls for maximum meter reading with the function switch in the DRIVER position. Adjust the PA PLATE and PA LOAD controls for maximum meter reading in the PA OUTPUT position. Maximum PA OUTPUT reading corresponds to maximum RF into the antenna. The meter will indicate the pressure of modulation in the PA OUTPUT position by exhibiting a slight downward "kick". This is the normal indication and is an indication of upward modulation.

## INSTALLATION

### A. INSTALLING IN A CRAFT OR VEHICLE

When installing the Poly-Comm in a craft or vehicle, the components listed below must be mounted in the vehicle.

- Universal mounting bracket
- DC line cord with in-line fuse
- Poly-Comm
- Antenna assembly and transmission line
- Gutter hook (optional)
- Microphone hang-up bracket
- Ignition suppressor (and generator filter if needed)
- Extra support bracket (if necessary)

Before installation is begun, the location for each part should be carefully studied, as a thorough, well-planned installation contributes considerably to the performance of the equipment and to the ease of maintenance. The installation kit contains all necessary parts for a complete installation.

The Poly-Comm is designed to operate as specified in this instruction manual. DO NOT SUBSTITUTE PARTS IN THE INSTALLATION OF THIS EQUIPMENT OR CONNECT ANY OTHER COMPONENT OR EQUIPMENT TO THE POLY-COMM WITHOUT FIRST CONSULTING WITH POLYTRONICS LABORATORIES, INC.

The components of the system should be located out of the way, yet convenient for operation and maintenance. Plan the cables so that they will not be stepped on or catch in the hand brake, gear shift or other operating controls.

#### 1. MOUNTING THE UNIT IN A VEHICLE

Examine the six ways of mounting the unit to the universal mounting bracket as shown in Fig. 2, and choose the one that will afford the best compromise between ease of operation, appearance, and serviceability. If possible, pick a location where the unit will not catch on stockings or skin knee caps. Leave enough room for detaching the rear cable connectors. The universal mounting bracket contains many punched holes which may align with holes already existing in the bottom of the dashboard. While the mounting bracket has been designed to mount in about 90% of the vehicles currently on the road, extra dashboard accessories and a desire for a custom appearing installation may require new holes to be drilled.

Avoid locations that will interfere with glove compartment, doors, ash trays, etc. For appearance sake it is usually preferred to position the bracket so the front edge of the Poly-Comm will be even with the edge or contour of the dashboard.

Using the mounting bracket as a template, locate 3 or more mounting screw positions. Drill pilot holes (#30 drill) and secure the bracket to the mounting surface with #8 self-tapping screws supplied. The slots on the sides of the bracket should face forward.

Fastening the bracket by the front-most holes will necessitate the addition of the rear support bracket which may be secured to any convenient screw or nut on the vehicle frame and bent so as to align with either of the threaded holes found on the bottom or upper rear of the case.

Ascertain that the Poly-Comm is turned off and install the DC line cord on the rear of the unit and lightly thread two knurled screws into the sides of the unit. Slide the unit into the mounting bracket. Align the rear support (if used) and install the third knurled screw. Tighten all 3 knurled screws.

Avoid lead interference and cut the unfused lead to the appropriate length and connect to the nearest good chassis ground.

Cut the fused lead to the appropriate length and connect to the ACC terminal of the ignition switch (or fuse panel). Connecting the unit directly to a continuous Hot "A" would make it possible to forget to turn off the unit before leaving the vehicle, and could result in a run-down battery. Using the ignition switch to turn the unit off and on is highly recommended since the unit is automatically placed in service whenever the vehicle is operated and prevents unauthorized operation when the keys are in the owner's possession.

#### 1. Microphone

The package containing the microphone also includes the microphone hanger and 2 mounting screws. The case of the Poly-Comm contains a cluster of holes on each side to facilitate the mounting of the microphone hanger in any of 3 positions. See Figure 1. Mounting the hanger on the case is recommended whenever the unit is to be used for temporary communications at various locations or if additional holes in the dashboard are to be avoided.

For convenience it is desirable to position the hanger somewhere on the dashboard within easy reach of the operator where the microphone may be grasped without the operator having to take his eyes off the road.

Frequently the hanger is fastened to an ashtray or some other replaceable item which can be renewed prior to trading in the vehicle.

If holes are to be added, use the hanger as a template and locate centers for 2 holes (#31 drill).

In any event, mount the hanger securely in position and place the microphone on the hanger. Remember to avoid locations where the microphone cord is likely to catch on objects. Adjust the inner spring by bending with long nose pliers for the desired microphone holding tension.

#### ALTERNATE MICROPHONE HANG UP CLIP LOCATIONS

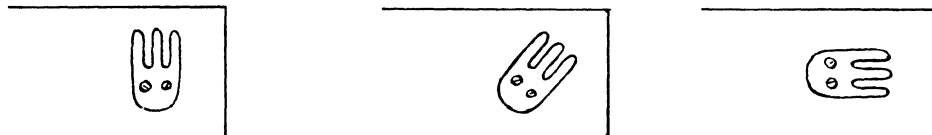


Fig. 1

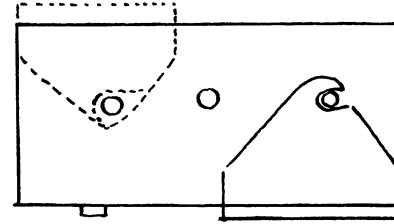
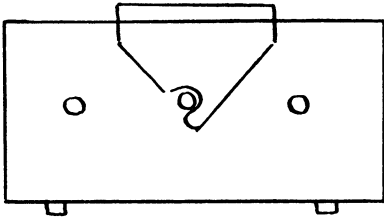
## 2. Antenna Assembly

Study the mounting details supplied with the particular type antenna to be installed. Choose a relatively flat area of the craft or vehicle body for installation. The normal location for the antenna in a typical sedan is at the left rear corner of the body. In this position the radiation pattern is somewhat more pronounced in the direction of the front right corner due to the mass of the vehicle. On boats, the  $\frac{1}{4}$  wave mobile antenna can be installed successfully in the center of the top of the cabin. A copper plate should then be installed on the underside of the boat in order to simulate a ground plane. On shallow draft or open top boats, the indoor antenna may be conveniently used or a mobile antenna may be installed on the inside of the boat as close to the unit as possible and a ground plate fastened on the outside of the craft below the water line.

In any case, the antenna should be mounted as high as possible consistent with overhead obstructions normally encountered and should not be closely parallel to vertical metal portions of the craft or vehicle.

For best coverage a 55" whip or halo antenna is recommended on 6 meters. Frequently the 6 meter whip antenna base is mounted on gas cap covers and back-up light plates in order to preserve the trade-in value of the car. Replaceable bumper guards may also be used.

## UNIVERSAL MOUNTING BRACKET POSITIONS



REMOVE FRONT FEET

### Noise Suppression

Many present day vehicles are factory equipped with resistor type spark plugs or resistance high tension leads which minimized the need for additional noise suppression components.

After the Poly-Comm has been placed in operation and tested, the installation should be analyzed for noise pickup. This check should be made while receiving a very weak signal so that the normal receiver noise is reduced to a very low value, but not quite eliminated. If any ignition noise is present, it will then be noticed as a "popping" effect against the receiver noise in the background. If noise is present and is originating in the ignition or generating system, it would disappear when the engine is turned off. If this is the case, any one or combination of the following remedies should provide a cure. Apply singly to discover which is causing the trouble, although all may be necessary in stubborn cases.

1. Remove the center high tension lead from the distributor and plug the suppressor into the distributor. Insert the high tension wire into the suppressor. (In some cases it may be necessary to install suppressors at each of the spark plugs.)
2. Frequently a severe source of interference is the generator which produces a whining and frying sound. Usually such noise will cause the receiver to awaken when the engine speed is increased and can frequently be reduced by connecting a .5 uf 50 to 200 volt generator capacitor from the generator output (armature) terminal to ground. Do not connect to generator field terminal. Such a capacitor can be obtained from any auto store or from your auto dealer.

Generator noise may make it appear that the squelch circuit is defective when actually a generator filtercoil is required. If a commercial generator filter is unavailable, such a filter can be easily made by close winding 9 turns of #14, #12 or #10 enamel wire (#10 preferred) on a 1" diameter form. Strip, tin and form each end into a closed loop. Remove all leads from the armature terminal (large bolt) on the generator and connect one end firmly to this terminal. Use a nut, bolt, 2 flat washers and a lock washer of appropriate size to fasten together all remaining loose ends plus the end of the .5 uf generator capacitor. Position the self-supporting coil in the clear and parallel to the generator.

3. Connect another capacitor to the hot side of the ammeter, the ignition switch, or the ignition coil. Further ignition noise problems may require bonding as follows:

Hood to the firewall or install grounding wipers around the hood periphery.

Tailpipe to the body (not the chassis) at the rear of the vehicle.

Some or all of the metallic cable jackets between the engine and driver's compartment. Do this at the engine side of the firewall.

Other noise sources and their remedies are as follows:

Voltage regulator noise - connect a .01 uf ceramic disc capacitor in series with a 100 ohm, 1 watt composition resistor between the field terminal and ground. Install these components inside the regulator cover if possible.

Tire static - use an inner-tube powder as recommended by the individual car manufacturer.

Electrically controlled gauge noise (gas, oil, temperature, etc.) - cut the lead as close to the actuation element as possible and install a Sprague Type 48P18 hypass capacitor. Be sure the capacitor case is well bonded to the body or engine block of the car.

## B. Installation Instructions for Operation from AC Mains

The Poly-Comm may be operated from the AC mains by connecting the fused AC line cord between the unit and any 117 V. AC convenience outlet. The Poly-Comm may be operated on a desk or shelf or out in the open using extension cords. Do not connect to a DC power main.

For additional range, a 51 ohm ground plane or coaxial sleeve antenna are recommended for base to mobile use and any array of 51 ohm horizontal beam should work out well for general hamming.

Mounting and installation instructions are included with each such antenna.

If possible, the antenna should be installed as high as possible and be as far removed from obstacles as practical.

The PC-62 is designed for use with 51 ohm coaxial transmission line only.

When speaking into the microphone best results will be obtained by holding the mic by the corner of the mouth and projecting the voice forward.

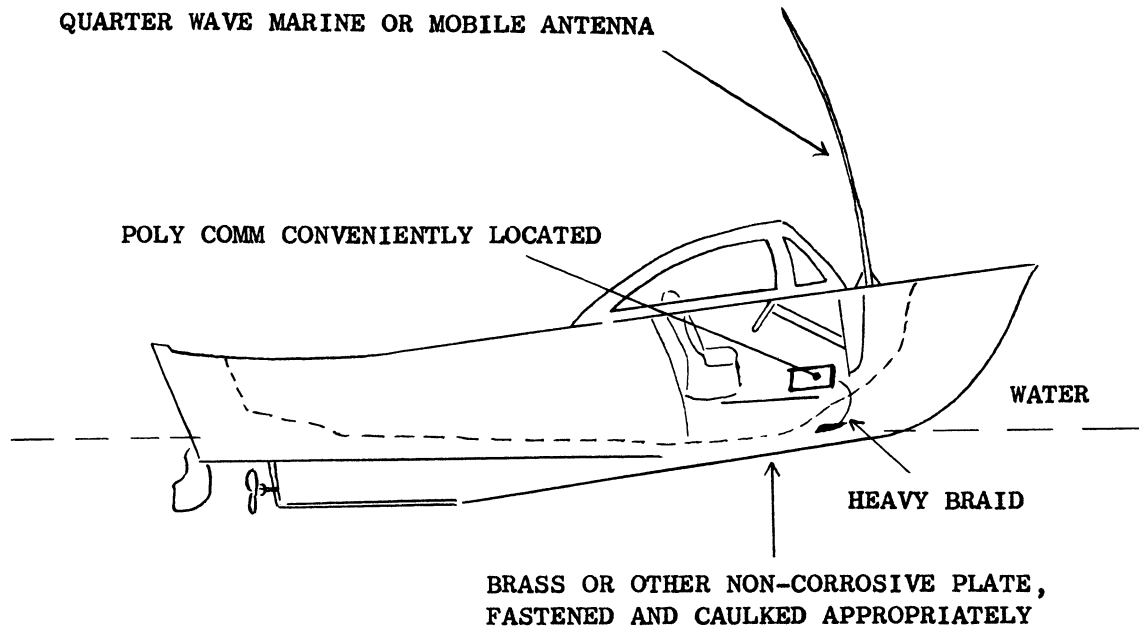
In spite of the fact that some states have laws requiring the operator of a vehicle to steer with one hand and signal with the other, the same state may also have a law prohibiting steering with one hand and holding the microphone with the other. When state law is in doubt, it is best to park while transmitting.

The Poly-Comm transmitter contains provisions for installing a high pass filter on each band which can be installed in the shielded housing provided in the event of TVI. Should the Poly-Comm be received on nearby television, radio or other electronic devices, chances are that the fault lies at the receiving end and can be cured by the addition of a high-pass filter to the unit picking up the signal. In any event a duly licensed amateur station is not required to suspend, curtail, or in any way abstain from operating a normally functioning Poly-Comm unless so ordered to do so by the FCC. In all cases of interference, courteous cooperation usually results in a happy compromise.

The sturdy metal case serves to protect the Poly-Comm as well as to dissipate the heat generated within. It is normal for the case to run quite warm and no damage will be done since the unit is designed to operate up to 140° F. Avoid placing heat sensitive objects on or near the Poly-Comm.

### 1. Antenna Matching

The Poly-Comm may be matched to any 51 ohm antenna by adjusting the PA plate capacitor and loading capacitor during transmit and the Rec. Ant. knob during receive.



Braid should be silver soldered to brass bolt passing through plate and bulkhead. Bolt should be silver soldered to plate. All screws and bolts used to secure plate must also be silver soldered to plate to prevent deterioration due to electrolysis.

#### MOUNTING THE UNIT IN A BOAT

The universal mounting bracket may be fastened to any flat surface such as an inner cabin roof, behind deck chairs, or on a bulkhead. The Poly-Comm will operate in any position, but locations where spray or rain is likely to reach the unit should be avoided. The #8 self-tapping screws supplied are pointed and will thread into wood as well as metal. Secure the bracket in the desired location using at least 4 screws. Mounting the unit with the bracket on the bottom by either the front or rear side holes will require the removal of two rubber feet. The feet can be removed by prying them out of their holes. Retain the feet for possible future desk top use. The side slots should face forward to permit quick removal of the unit.



## ALIGNMENT

The Poly-Comm is supplied aligned and normally does not require alignment in the field. Tubes and parts may be replaced (with the exception of tuned circuits) without having to align the Poly-Comm.

### MECHANICAL ALIGNMENT

1. Set the following air capacitors to full mesh.
  - (a) PA plate
  - (b) PA load
  - (c) Rec Ant
  - (d) Driver 1
  - (e) Driver 2
2. The knobs of the above should now point to the left (i. e., 9 o'clock.) If not, loosen the set screw and reposition.
3. Set both the receiver dial and the VFO dial to the calibration marks just below 50 MC.
4. Remove the two 3/16" self-tapping screws on the top side of the VFO cover and remove the cover. (Unsolder the cover wherever necessary).
5. Ascertain that the variable capacitors are in full mesh. If not, loosen the two setscrews in the vernier shaft and rotate the capacitor shaft until full mesh is reached. Re-check the dial position and tighten both set screws.

### TRANSMITTER ALIGNMENT

- A. Crystal controlled - 6 meters
  1. Temporarily disconnect the 15K 2W 7551 screen resistor at the red teflon terminal.
  2. Fire up in usual manner, except -
    - a. Keep volume control at minimum.
    - b. Keep squelch control at extreme CCW position.
    - c. Place X-V switch in X position.
    - d. Install a 8.666 MC crystal (or approx).
    - e. Set VFO dial to 52 MC or to 6X crystal frequency used.

3. Place the function switch in the DRIVER position.
4. Place the unit in TRANSMIT condition.
5. Set the DRIVER controls so their knobs are vertical.
6. Observe the 0-5MA scale of the meter and adjust L8 (the 12BY7A V13 tripler plate coil) and the 12BY7 V14 doubler plate coil L10 for maximum reading. Minimum reading 3.5 MA.
7. When the 8.666 MC crystal is removed, the drive should drop to zero.
8. Place set in receive condition and connect a clip lead from the free end of the 15K 2W resistor to the red teflon terminal.
9. Place the unit on the air and adjust the PA LOAD and PA PLATE capacitor and L12 for maximum RF power output (9 watts minimum). (Note: for maximum output the PA PLATE capacitor should be at approximately  $\frac{1}{2}$  mesh and the PA LOAD capacitor at approximately  $\frac{1}{3}$  mesh.
10. After rated power output has been obtained, when the crystal is removed, the grid drive and power output should fall to zero and remain there as the DRIVER and PA PLATE knobs are rotated. If the final oscillates adjust neutralizing capacitor until stable.
11. Check modulation percentage and quality by use of a monitoring device.

#### RECEIVER ALIGNMENT

Should receiver alignment become necessary, turn the volume control about one quarter turn clockwise from the off position. Turn the squelch control fully clockwise. Turn the IF gain control, if provided, fully clockwise. Put the function switch on "S" meter and adjust the "S" meter zero control until the meter reads zero. Connect a VTVM to the AGC buss. This is the 4th lug on the 9 lug terminal strip at the 510 uuf capacitor. Set the VTVM to read Neg. voltage and on the -1.5 volt range.

## 455 KC IF ALIGNMENT

Connect the 455 KC signal generator to pin 7 of V4 (12AT7). Make certain the output frequency of the signal generator is within 1 KC of 455 KC. Turn the output level of the 455 KC generator up until the AGC voltage starts to rise. Adjust the tuning slugs of T3, T4 and T5 for most negative AGC voltage. When the VTVM reading rises above -1.0 V. reduce the IF output attenuator and continue to adjust T3, T4 and T5 for the highest negative AGC voltage. Final tuning adjustment of these transformers must be done with the signal level adjusted to produce not more than -1.0 volts AGC. When no further increase in AGC voltage can be obtained by adjusting the slugs of T3, T4 and T5 check the frequency of the IF by slowly varying the frequency of the signal generator until the AGC voltage reaches a maximum regative reading. Disconnect the signal generator and proceed with the following step.

## 5.405 KC IF ALIGNMENT

Following the alignment of the 455 KC IF and with the VTVM still connected to the AGC test point connect the output of the Model 80 signal generator pin 2 of V3. The 6 db terminating pad must always be used with the Model 80 signal generator when making any receiver measurements. Turn the output level of the Model 80 to maximum and the modulation to 30% and tune it slowly in the vicinity of 5.4 MC until the signal is heard in the receiver. Reduce the output level until the AGC test voltage is between -0.5 and -1.0 volts and tune the generator for maximum negative AGC voltage, reducing the generator output level to keep the AGC voltage between -0.5 and -1.0 volts. When the generator frequency is adjusted for maximum negative AGC voltage, adjust the tuning slugs of T1 and T2 for maximum negative AGC voltage. Reduce the generator output level, when necessary, to keep the AGC voltage between -0.5 and -1.0 volts. Re-check the tuning of each slug several times until no further increase in AGC voltage can be obtained. Turn the generator modulation off and set the output level calibration to the calibration mark. Re-check the tuning of the generator for maximum AGC voltage. Now adjust the output attenuator until the AGC voltage is -1.0 volt. The attenuator should read less than 4 microvolts. The normal range of IF sensitivity is between 2 and 3 uv. If it is higher check the IF alignment, tubes and circuitry carefully to determine where the gain is being lost. When the IF sensitivity is better than 4 uv proceed to the following steps.

## TUNABLE OSCILLATOR ADJUSTMENT AND $52 \pm 2$ MC IF TRACKING

After the 455 KC IF and the 5.405 KC IF are aligned, set the receiver tuning dial to 52 MC and connect the output of the Model 80 signal generator via a 6 db pad to the 6M antenna connector. With the output level set about 20 uv and the modulation at 30% slowly tune the generator from approximately 45 MC to 60 MC until the

signal is heard. If more than one signal in this range, reduce the generator output until only one signal is heard in this frequency range. If the signal is above 52 MC loosen lock nut and increase the inductance of L4 (screw in) until it is approximately 52 MC. If the signal is below 52 MC reduce the inductance of L4 (screw out) until it is approximately 52 MC. Set C8 to  $\frac{1}{2}$  setting. Now adjust L2 top and bottom and Rec. Ant. for maximum AGC test voltage. At this point the measured 6M sensitivity should be at least .1 uv for 6 db s/n.

#### RECEIVER OSCILLATOR TRACKING (SEE FIGURE 5)

1. To accurately set the receiver dial it will be necessary to have a 8.333 and a 9.000 MC crystal, or crystal jig or external VFO of known calibration. Place the X-V switch in the X position.
2. Place the function switch on the "VFO SPOT" position.
3. Install an 8.333 MC crystal in the crystal socket. Set the receiver dial to 50.00 MC.
4. Position C7 so that the ceramic notch is towards the squelch.
5. Loosen the L4 locking nut slightly and slowly adjust L4 for maximum "S" meter reading. Approximately 59 + 10 db.
6. Replace the 8.333 MC crystal with a 9.000 MC crystal and tune the Rec. dial and search around 54.0 MC for a signal
  - (a) 1. If the signal is found to be below 54 MC (i.e., 53.7) then this indicates that variable "C" to fixed "C" ratio is too great. Therefore, set the dial to 50 MC, use the 8.333 MC crystal and rotate C7 clockwise towards the terminal board about 6°. Retune L4 (unscrew) for maximum "S" reading.
  2. Use the 9.000 MC crystal again and search for the signal at 54 MC. If the signal has moved closer to the 54 point repeat the above until they coincide. If the signal has overshoot the 54 MC point, repeat the above except this time rotate C7 counter-clockwise a very small amount.
  - (b) 1. If the signal is found to be above 54 MC on the dial or cannot be found at all then this indicates that the variable "C" to fixed "C" ratio is too small. Therefore, set the dial to 50.0 MC, use the 8.333 MC crystal and rotate C7 counter-clockwise away from the terminal board about 6°. Retune L4 (screw in) for maximum "S" meter reading.
  2. Use the 9 MC crystal and search for the signal at 54 MC. If the signal has moved closer to the 54 point or is now on dial repeat step (b)-1 above, until they coincide. If the signal has overshoot the 54 MC point, repeat the above except rotate C7 clockwise a very small amount.

By repeating the above several times, it will be possible to have the 50 and 54 MC points exactly aligned.

7. When tightning the L4 lock nut, be careful not to disturb its setting. It is usually best to do so while "zeroing" in on 50 MC crystal.

#### SQUELCH ADJUSTMENT

Apply a standard signal with 30% modulation to the antenna connector.

Tune in the signal and adjust the attenuator for 30 uv.

Rotate the squelch control to the extreme CCW position.

Adjust the IF gain pot, if provided, to the extreme CW position.

Adjust the inner squelch limit control unit until the unit just silences.

#### "S" METER ADJUSTMENT

With no signal applied, adjust the "S" meter zero pot to  $S = \frac{1}{2}$  of noise. Check that a signal of 50 uv yields approximately S9 and a signal of 100K uv does not block receiver and the "S" meter should read approximately S9 + 30 db.

## VFO TRACKING (See Figure 5)

1. Connect a suitable load to the lower antenna connector. An RF wattmeter is preferred, but a 10 watt bulb or 50 ohm antenna with SWR meter will work.
2. Insert a 8.333 MC crystal in the crystal socket.
3. Place the X-V switch in the X position and the bandswitch in the 6M position.
4. Press the mic button and tune the DRIVER, PA PLATE and the PA LOAD controls for maximum out put (approximately 9 - 11 watts).
5. Release mic button. Position C4 the 5-25 ceramic trimmer (see figure 5) so that the ceramic notch is towards the bandswitch. Slightly loosen L5 locking nut.
6. Press mic button, switch the X-V switch to the V position and adjust L5 for maximum output (which will be the same as on X).
7. Release mic button, place function switch in the VFO SPOT position.
8. Tune receiver to 50 MC.
9. Adjust L5 slightly (in or out) for maximum "S" meter reading (approximately 59 + 10 db).
10. Now track both Rec. and VFO knobs together up the band stopping at every MC to check calibration.  
A variation of 1 dial division in either direction is permissible. During the first check a large error will probably be encountered. If the 54 MC points are within 1 dial division, only slight retouching will be required. If widely apart, set the Rec. dial to 53.5 MC and tune the VFO for maximum "S" meter reading.

(a) If the VFO dial reading is less than 53.5 MC, this indicates that the ratio of the VFO "C" to the fixed "C" is too great. Therefore, reset both dials to 50 MC again and rotate C4 clockwise towards the terminal board (approximately  $4^{\circ}$  for each dial division error). Unscrew L5 for maximum "S" meter reading. The above adjustments must be performed carefully and slowly to avoid locking on a spurious which occurs about 1 MC away. If in doubt repeat step 6 through 10 at the new C4 setting.

(b) If the VFO dial reading is greater than the REC dial, then reset both dials to 50 MC and rotate C4 counter-clockwise away from the terminal board. (Approximately  $4^{\circ}$  for each dial division error). Adjust L5 slowly (screw in) for maximum "S" meter readings.

Repeat (a) or (b) in small steps until 50 and 54 MC are coincident. The in band tracking error should not exceed more than 1 dial division in either direction. For adjustment of differential capacitor refer to Figure 5.

## RECOMMENDATIONS

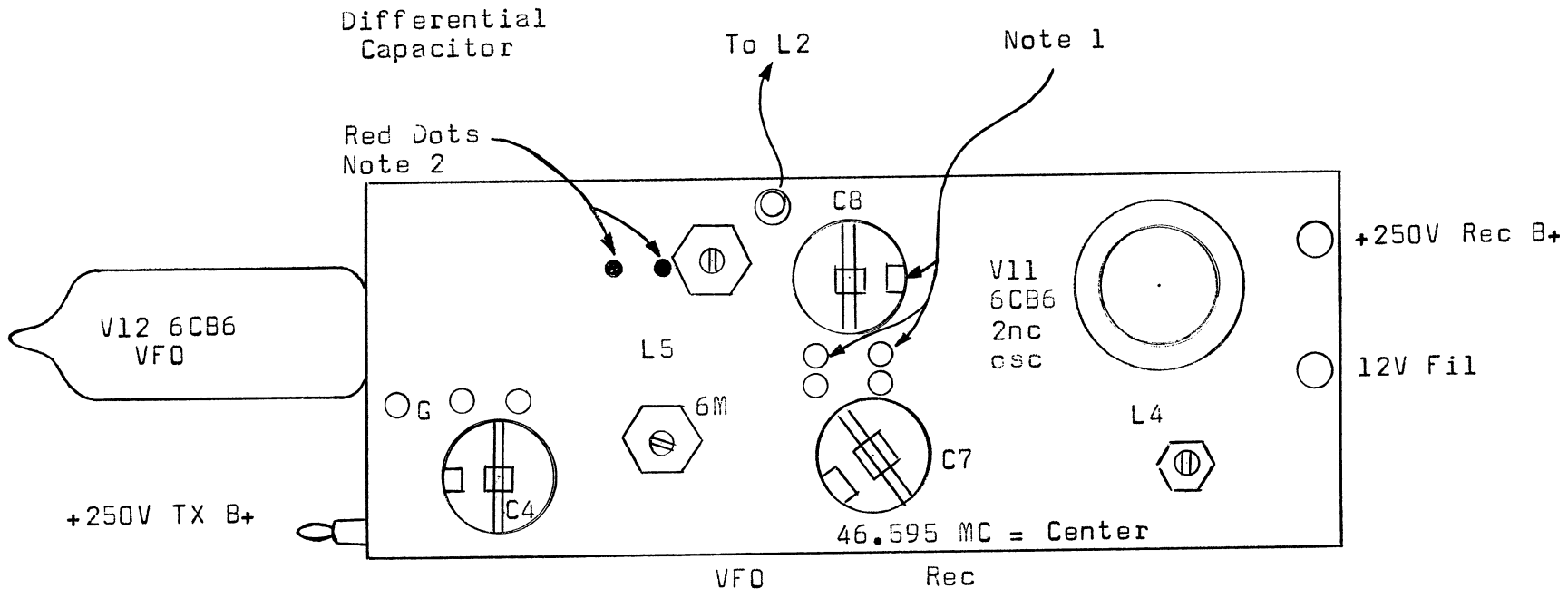
An internal 3" PM speaker has been included in the PC-62 for convenience, portability, and ease of hookup during field days or other similar outings. However, such an internal speaker has the disadvantage that it cannot handle the full power that the unit is capable of supplying and even though the REC-VFO housing is floating it may be possible for the speaker to mechanically modulate the oscillator tuning plates which can result in a howl at high volume settings. It is recommended that an external 4" PM 3.2 ohm speaker be used for maximum performances. An external speaker can be connected to the end most lugs on the rear terminal strip. Removing the jumper will disconnect the internal speaker.

The 47K 1W 6BQ5 screen resistor can be reduced to 22K 1W if 5 watts of received audio is desired. This resistor is located under the hash cover in the power supply.

If operation in a very noisy area results in an inoperative squelch control (noise present regardless of setting) the squelch limit control, which is accessible with a thin bladed screwdriver, after removing the squelch knob, can be readjusted to give an increased amount of silent area range. Care must be exercised to prevent too great an adjustment that could result in a squelch lock-out condition. Normally the squelch limit control is adjusted to just awaken the receiver at 30 uv when the squelch knob is in the extreme CCW position.

During mobile VFO operation over very bumpy roads the carrier may be frequency modulated by the severe bumps and it may be advantageous to switch to crystal controlled operation under these conditions.

# TUNER, BOTTOM VIEW PC-6



## Frequencies

Receiver oscillator tune  
Receiver RF tunes  
6M VFO tunes

44.595 to	48.595 MC
50 to	54 MC
8.333 to	9.000 MC

Figure 5

## Note:

1. Trimmer is at maximum capacity when notch is adjacent to rivets.
2. When red dots are aligned, VFO will drift up.  
When red dots are 180° apart, VFO will drift down.  
Adjust differential capacitor in small steps for minimum drift.



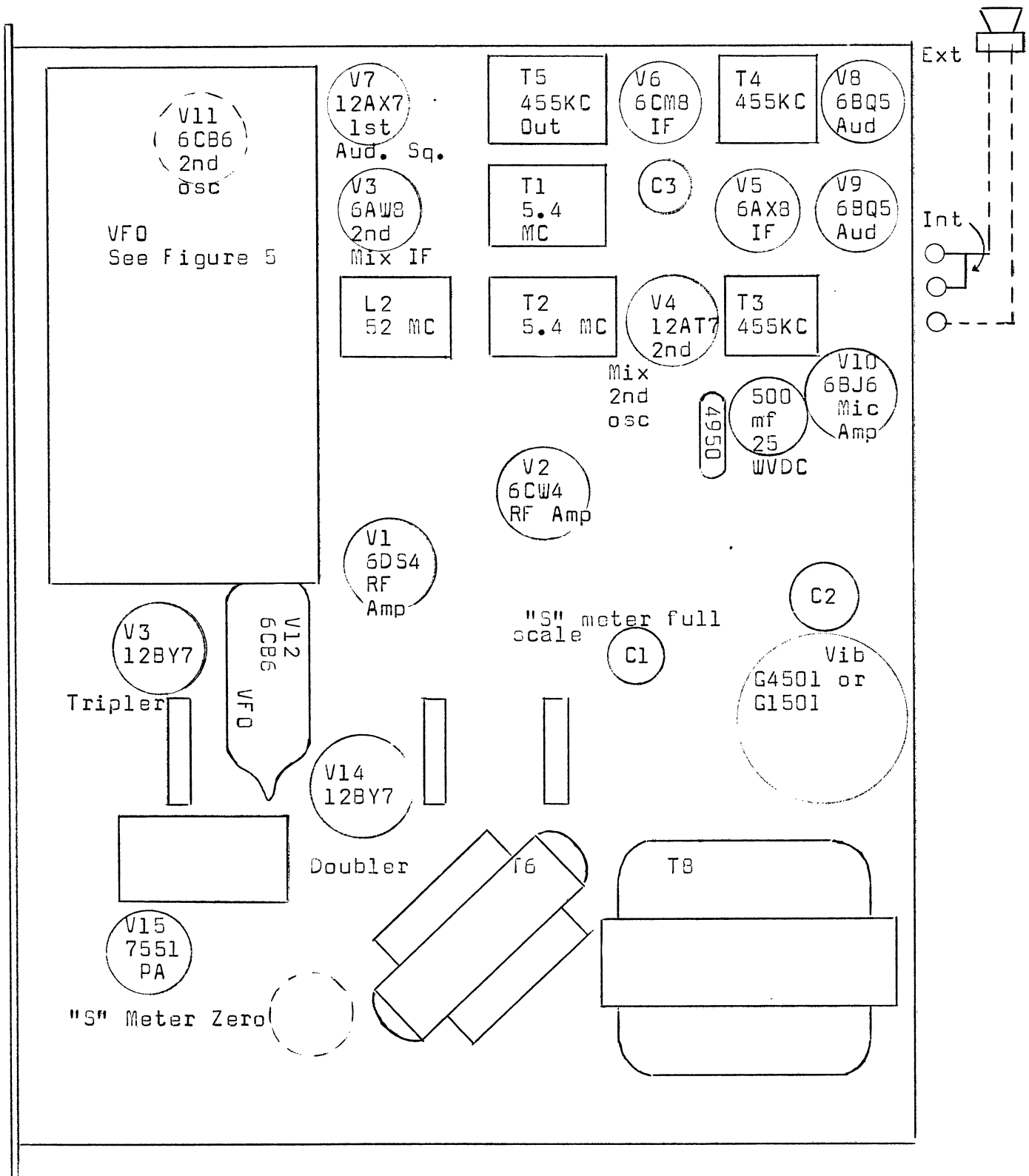


Figure 6

# CHASSIS LAYOUT- POLYCOMM "6"

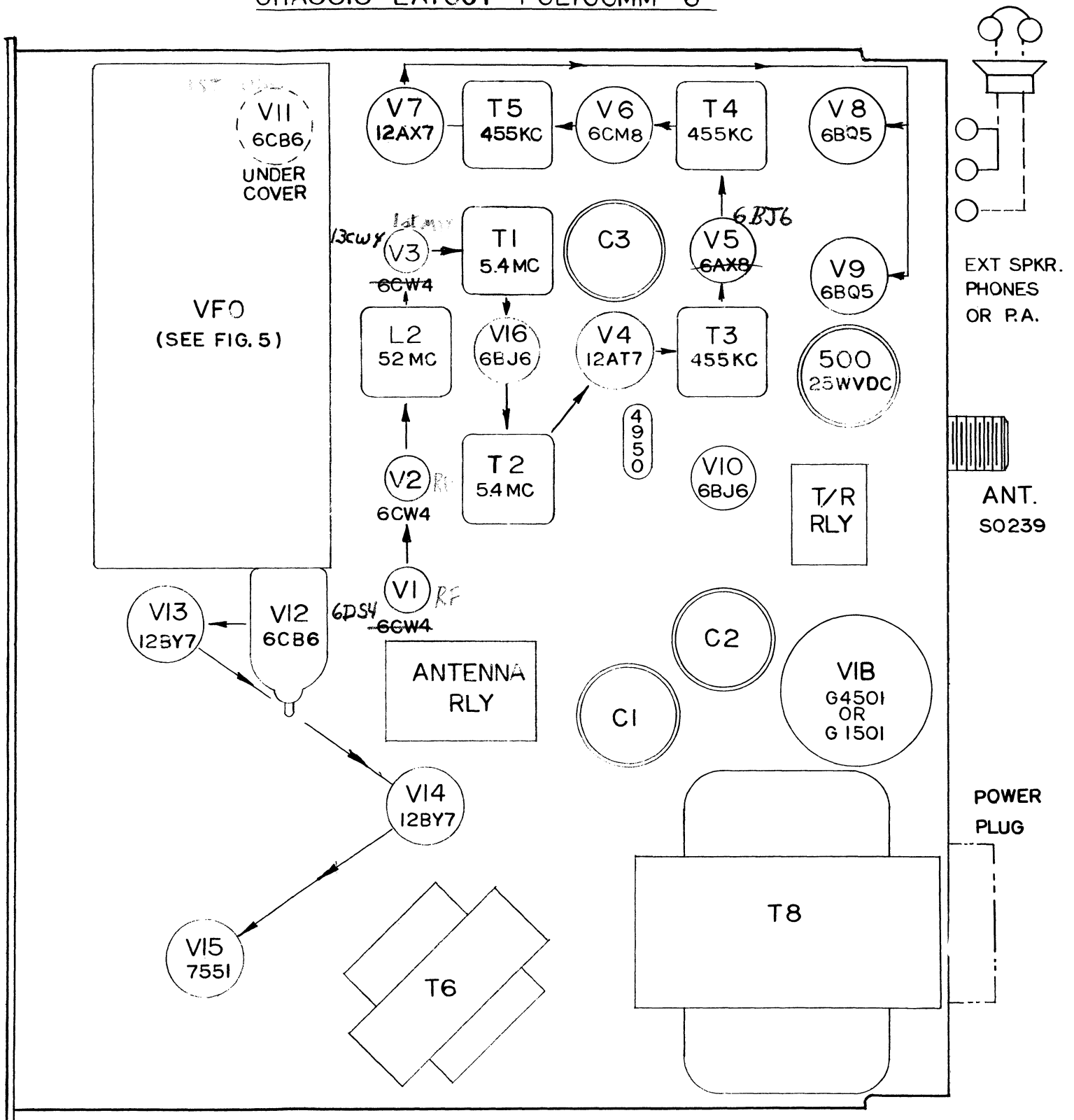


FIGURE 6

POLY-COMM MODEL PC-6C  
VOLTAGE CHARTS

**Conditions:**

1. Voltages are positive DC to ground, unless otherwise noted, measured with a VTVM of 11 megohm shunt resistance.

**Receive Conditions:**

2. Line voltage 117 VAC, ANL-OFF, volume control 1/3 up squelch threshold positioning at mid range and squelch control at threshold, antenna connected to 51 ohm load.

**Transmit Conditions:**

3. Line voltage 117 VAC, crystal controlled at 52 MC, no modulation applied, transmitter tuned and producing at least 10 watts in 51 ohm wattmeter.
4. Unregulated voltages should not vary more than  $\pm 20\%$  from those shown in chart when unit is operated from a 12.6 VDC source.

Sym- bol	Pin Type	1		2		3		4		5		6		7		8		9		10		Center	
		T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R
V1	6DS4	-	-	-1	85	-	-	-1.4	.4	-	-	-	-	-	-	0	1.	-	-	G	G	-	-
V2	6CW4	-	-	-3	100	-	-	G	0	-	-	-	-	-	-	0	1.	-	-	F	F	-	-
V3	6CW4	-	-	-1	50	-	-	0	0	-	-	-	-	-	-	0	1.	-	-	F	G	-	-
V4	12AT7	0	145	0	0	0	3.2	F	F	G	G	0	40	0	-7	G	G	NC	NC	-	-	G	G
V5	6BJ6	-1	.4	0	2.4	G	G	F	F	0	130	0	130	G	G	-	-	-	-	-	-	250	350
V6	6CM8	110	125	0	0	0	1.4	F	F	F	F	0	350	0	150	1.2	1.3	0	0	0	-	160	110
V7	12AX7	120	135	50	50	50	50	G	G	G	G	50	50	7	7	13	13.	F	F	-	-	NC	NC
V8	6BQ5	NC	NC	0	0	7.4	3	G	G	F	F	NC	NC	260	350	NC	NC	250	110	-	-	-	NC
V9	6BQ5	NC	NC	0	0	7.4	3	F	F	F	F	NC	NC	260	350	NC	NC	250	110	-	-	120	135
V10	6BJ6	0	-.3	1	.4	F	F	G	G	100	50	18	9	G	G	-	-	-	-	-	-	-	0
V11	6CB6	0	-1.4	0	.3	F	F	F	F	210	310	100	110	-	G	-	-	-	-	-	-	G	G
V12	6CB6	0	0	4	0	G	G	F	F	250	335	100	110	G	G	-	-	-	-	-	-	-	-
V13	12BY7	5.4	0	0	-.10	G	G	F	F	G	G	NC	NC	240	0	170	0	G	G	-	-	NC	NC
V14	12BY7	6	0	-6	-.1	G	G	F	F	G	G	NC	NC	250	0	160	G	G	-	-	-	G	G
V15	7551	G	G	-14	0	NC	NC	G	G	F	F	310	0	G	G	240	0	G	G	-	-	G	G
V16	6BJ6	-1	.4	0	5.4	F	F	F	F	0	140	0	140	G	G	-	-	-	-	-	-	G	G

F = filament 12.6 VAC or 6.3 VAC  
 NDV = no detectable voltage  
 G = ground  
 Tolerance:  $\pm 15\%$   
 AGC Buss: approximately  $\pm .3$  volts.

POLY-COMM MODEL PC-6C  
VOLTAGE CHARTS

itions:

Voltages are positive DC to ground, unless otherwise noted, measured with a VTVM of 11 megohm shunt resistance.

ive Conditions:

Line voltage 117 VAC, ANL-OFF, volume control 1/3 up squelch threshold positioning at mid range and squelch control at threshold, antenna connected to 51 ohm load.

smit Conditions:

Line voltage 117 VAC, crystal controlled at 52 MC, no modulation applied, transmitter tuned and producing at least 10 watts in 51 ohm wattmeter.  
Unregulated voltages should not vary more than  $\pm 20\%$  from those shown in chart when unit is operated from a 12.6 VDC source.

1	2	3	4	5	6	7	8	9	10	Center	12
R	T	R	T	R	T	R	T	R	T	R	T
-	-1	85	-	-	-1.4	.4	-	-	-	-	-
-	-3	100	-	-	G	0	-	-	-	-	-
-	-1	50	-	-	0	0	-	-	-	-	-
145	0	0	0	3.2	F	F	G	G	0	40	0
1	.4	0	2.4	G	G	F	F	0	130	0	130
0	125	0	0	0	1.4	F	F	F	F	0	350
0	135	50	50	50	50	G	G	G	G	50	50
NC	0	0	7.4	3	G	G	F	F	NC	NC	260
NC	0	0	7.4	3	F	F	F	F	NC	NC	260
-.3	1	.4	F	F	G	G	100	50	18	9	G
-1.4	0	.3	F	F	F	F	210	310	100	110	-
0	4	0	G	G	F	F	250	335	100	110	G
.4	0	0	-.10	G	G	F	F	G	G	NC	NC
0	-6	-.1	G	G	F	F	G	G	NC	NC	250
G	-14	0	NC	NC	G	G	F	F	310	0	G
.4	0	5.4	F	F	F	F	0	140	0	140	G

F = filament 12.6 VAC or 6.3 VAC  
NDV = no detectable voltage  
G = ground  
Tolerance:  $\pm 15\%$   
AGC Buss: approximately  $\pm .3$  volts.

## ADDENDUM

Poly-Comm 2 - Issue B  
Poly-Comm 6 - Issue C

The Poly-Comm 2B and the Poly-Comm 6C incorporate the following features:

### 1. Local-Distance Switch

Normally this switch will be left in the distance position. The local position may be used to prevent overload when receiving exceptionally strong signals.

### 2. Modulation Control

The transmitter will be slightly less than 100% modulated when the mod. control is at the center of the rotation and the operator speaks directly across the microphone. Adjustment of the control under varying conditions can best be made with a modulation monitor.

### 3. Phone Jack

The earphone jack is designed for use with 2000 ohm earphones. Sidetone will be present during transmitt.

### 4. TR-PA Switch

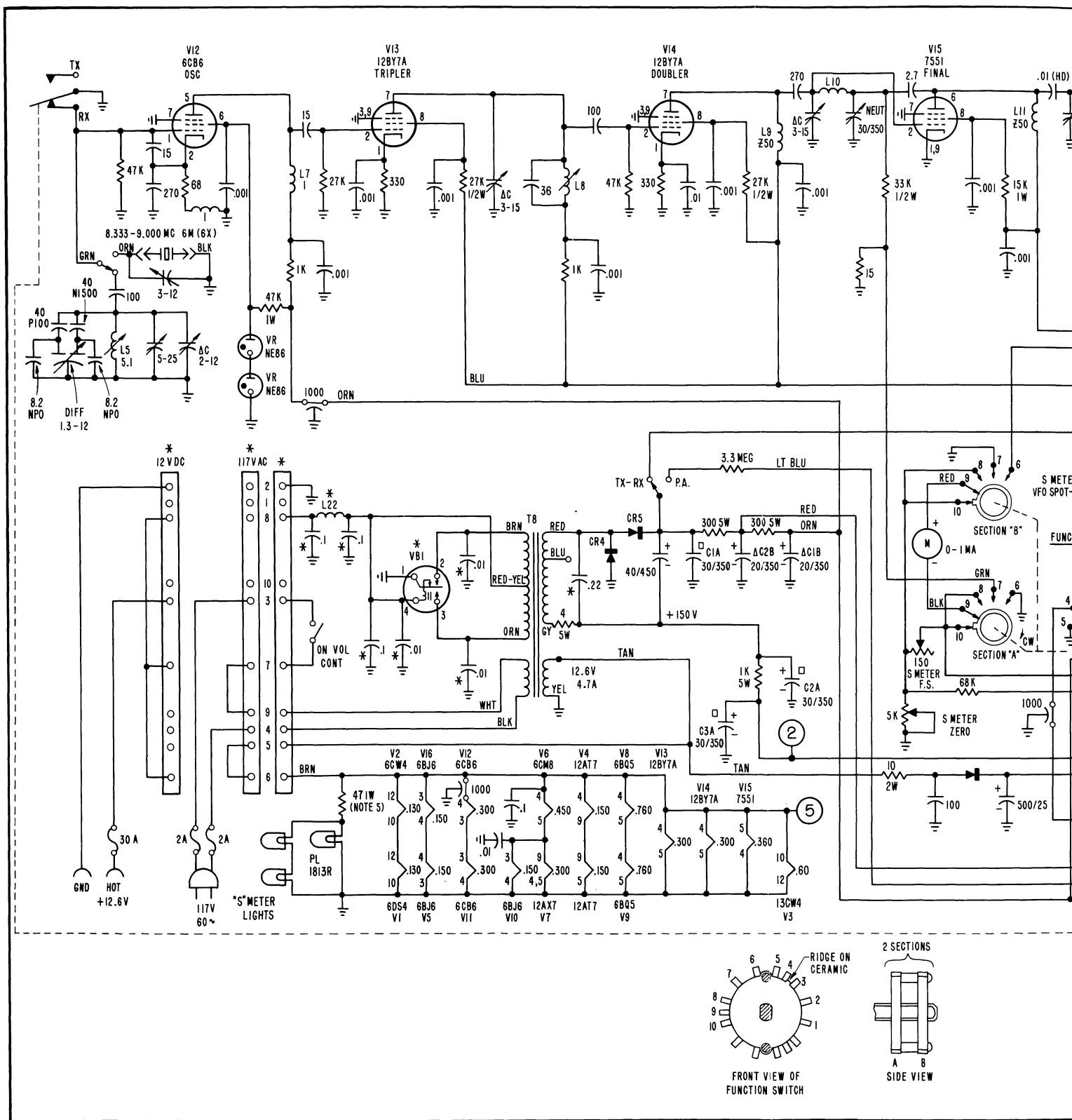
To place the unit in operation as a Public Address System proceed as follows:

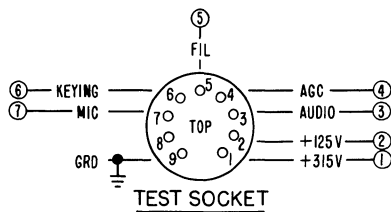
- (A) A speaker having a voice coil of 3.2 or 8 ohm and capable of at least 10 watts should be connected from speaker terminal #1 (rear apron nearest antenna connector) to ground. The ground connection may be made by installing one of the knurled mounting screws in the weld nut at the top rear of the cabinet.
- (B) If a transmitt crystal is installed in the front panel crystal socket, remove the crystal. Place PA-TR Switch in PA position.

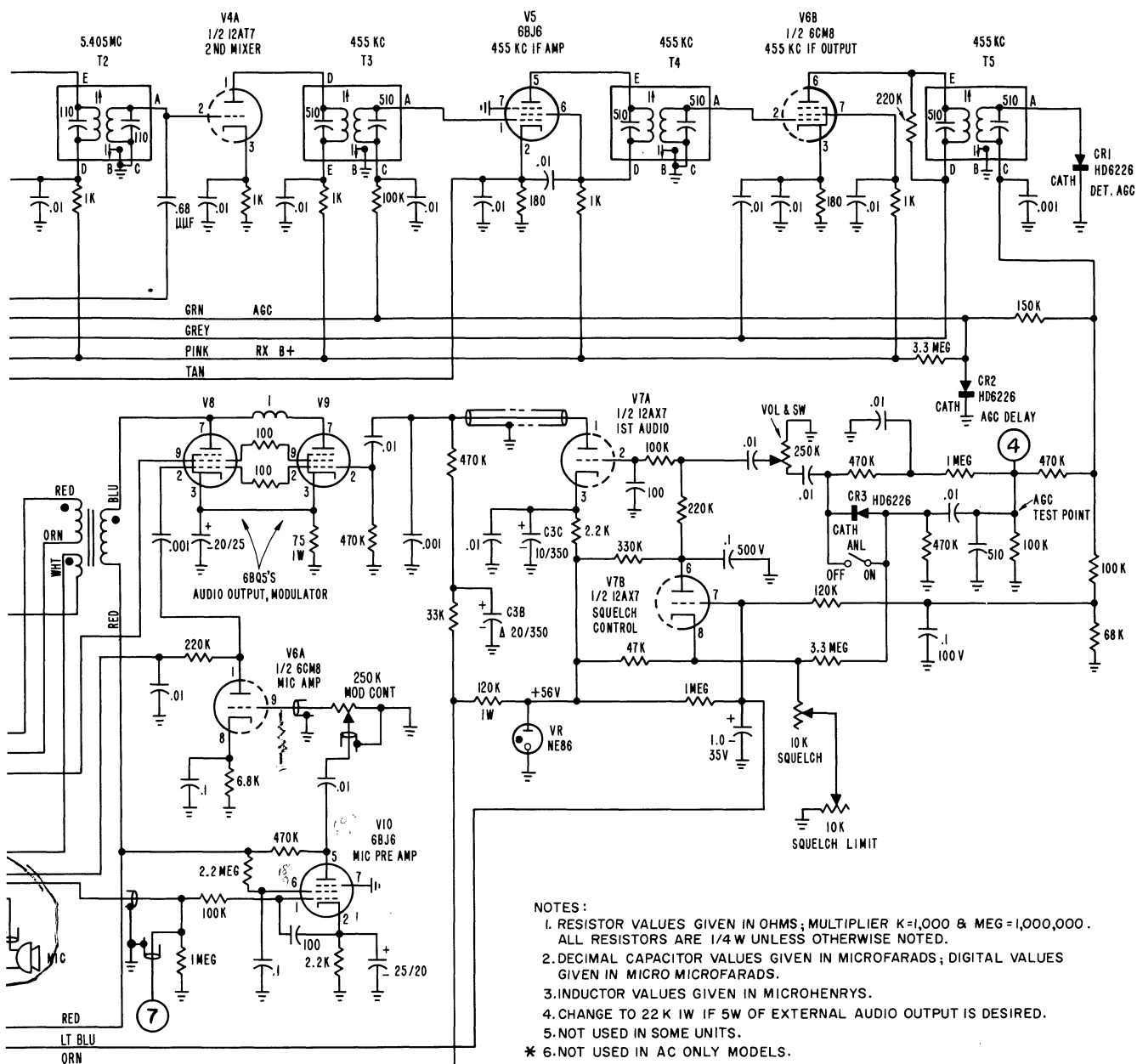
Place the VFO-Xtal switch in the xtal position.

The modulation control will serve as P.A. gain control and should be set fully ccw.

- (C) The loudspeaker should be facing away from the microphone and at sufficient distance to prevent feedback. To operate, depress the mike button and adjust the gain control for the desired volume.







SCHEMATIC: POLYCOMM MODEL PC-6 (117VAC & 12VDC)			
MANUFACTURED BY:		ENG: F. SIGGINS	WA2TDD
POLYTRONICS LABORATORIES INC.		W.V. HARGREAVES	W2SXB
88 CLINTON ROAD, WEST CALDWELL, NEW JERSEY 07007		CKD BY: H.R. LEVINE	K2JXB
Tel: (area 201) 228-2400		APP BY: J.A.D.	W2ADE
REVISIONS: "B" 10-2-62 W.V.H. & F.S.; "C" 7.3.63 W.V.H.		DWN BY: R.E. TUCKER	DWG NO. 6
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