Tecraft Falcon Radiophone Mark V Owner's Manual

falcon radiophone

Mk V

Price $ 1.50

Tecraft SALES CORPORATION
P. O. Box 84 South Hackensack, N. J. - ATlas 8-9020

W A R N I N G

USE ONLY A.C. POWER PLUG PROVIDED -- OR AS SHOWN ON SCHEMATIC FOR POWER SUPPLY.

DO NOT ATTEMPT TO USE A.C. PLUGS FROM OTHER UNITS. 6 VOLT AND 12 VOLT CONNECTIONS REMAIN THE SAME AS ON PREVIOUS PRODUCTION RUNS.

IMPORTANT

When the Falcon radiophone is battery operated, it is extremely important to use proper wire sizes to power plug. (See power supply schematic for plug connections).
Feed lines should connect directly to battery and good ground. DO NOT USE WIRE SIZES SMALLER THAN SHOWN IN FOLLOWING TABLE:

	6 VOLT OPERATION	12 VOLT OPERATION
When each wire to plug is 3' or less use	#12 AWG	#14 AWG
When each wire is 3' to 10' use	#10 AWG	#12 AWG
When each wire is 10' to 20' use	#8 AWG	#10 AWG

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Do not attempt to use your Falcon until you have read and thoroughly understand the contents of this manual. Failure to observe the necessary procedures can result in damage to the unit, and/or unsatisfactory operation. See Page 19.

NOTE: Each Falcon is supplied with a 6 Volt vibrator as standard equipment. This allows the unit to operate universally on 6 or 12 Volts. When vibrator is replaced in units operated on 12 Volts exclusively, it should be replaced with a 12 Volt vibrator for increased vibrator life.

Since the terminal impedance of antenna feed lines varies in each installation, and with the type of aerial used, it is of paramount importance that the proper tuning procedure be followed whenever a Falcon is connected to any antenna. A set, properly tuned to one antenna must not be considered as being tuned to any other antenna, even though it be of the same type, employing the same type feed line. Each Falcon must be carefully adjusted each time it's antenna system is changed.

TRANSMITTER TUNING PROCEDURE

Use Dummy Load, (page 6) connected to antenna connector, and run thru the tuning several times to familiarize yourself with technique. Then repeat, using aerial in place of dummy load.

See Page 20. Set "load adjust" screw fully counter clockwise - slowly turn "Plate tuning" screw till meter shows least current (approx. 10ma). Advance, (clockwise) "load adjustment" till meter shows increase to about 22ma. - again turn "Plate tuning" till meter shows least current. This will be between 10 and 20 ma. - advance "load adjustment" slightly, then again "dip" "Plate tuning" adjustment. Always end the tuning cycle with the "Plate tuning" adjustment set so that lowest obtainable reading is 20 ma. Now refer to Section III - Page 4.

IMPORTANT

When the Falcon is installed in vehicles employing 12 Volt regulated systems, we highly recommend the installation of an auxiliary ballast resistor to prevent premature vibrator failure.
SEE PAGE 20

GENERAL SPECIFICATIONS
FALCON RADIOPHONE

TRANSMITTER

Emission A3 - Amplitude (AM) Modulated
Power Input - 5 Watts
Load Impedance - 50-80 ohms - Pi Net
Frequency Stability - 5 Channel Crystral Controlled to .005% -55C 90C
Modulation Frequency - 300 to 4000 cycles
Modulation Limit - Controlled by modulator gain and microphone.
Microphone - Ceramic, Press-to-Talk

RECEIVER

Double Conversion Superheterodyne.
Sensitivity - Better than 1 uV at 6DB Signal to Noise.
Tuning - See Note
Noise Limiter - See Note
Squelch - Adjustable, Series Diode Type.
Output - 2 Watts to 4" speaker or external remote speaker.
Power Supply - Universal - operates from 6V DC, 12V DC, 115V AC-60 cycles.

NOTE: There are 4 models available:

STANDARD MODELS: (include standard Series Gate Limiter and Squelch).
"A" Tuned receiver plus one crystal controlled channel.
"B" 5 crystal controlled channels transmit and receive.

T.N.S. MODELS: (include highly effective Twin Noise Squelch System).
"C" Tuned receiver plus one crystal controlled channel.
"D" 5 crystal controlled channels transmit and receive.

SECTION I

INTRODUCTION

The Falcon Radiophone two-way communication unit is designed for operation under the FCC Citizen Radio Class D service. It includes a three-way power supply capable of operating from 6 or 12 Volts DC or 115 Volts AC by merely changing the power cable assembly.

INSPECTION

Your Falcon should be unpacked and inspected as soon as it is received. If it fails to operate properly, or is damaged in any way, a claim should be filed immediately with the carrier. Each Falcon has been operated for final alignment and production testing prior to shipment. During operational checks the transmitter is operated into a 52 ohm dummy load.

A specially designed carton has been used for shipment and will insure safe arrival unless subject to extreme abuse of careless handling by the carrier. In cases of damaged equipment, a full report of the damage should be forwarded to the dealer or distributor from whom the equipment was purchased. You will then be advised as to the disposition to be made of the unit and arrangements for repair or replacement.

ACCESSORIES

Each Falcon is priced to include one (1) power plug - one (1) ceramic microphone - one (1) owners manual.

LICENSING PROCEDURE

As is the case with all radio transmitting equipment, a radio station license must be obtained from the Federal Communications Commission for the type of equipment being used. For Citizens Radio this procedure is quite simple. Fill out FCC form 505-D and forward to the address listed on the form. Complete instructions are included with each form. A copy of this form is enclosed with each Falcon. One license may be used to cover a number of operating units.

SECTION II

CONTROLS AND FUNCTIONS

The crystal controlled transmitter channels are selected by the switch on the front panel. As shipped, the unit includes one transmit ting crystal. To use this channel, the switch knob should point "A" counter-clockwise. You may install other crystals in the holders provided on the chassis, in which case the switch is set accordingly.

The receiving system includes crystal controlled (single channel) and manually tuned operation. The choice of function is determined by the slide switch found on the left side of the cabinet. Set this on "XTL" and install crystal for desired channel. Set switch to "MAN" when dial is to be used. On the 5 channel crystal controlled receiver model, this switch is eliminated.

Dial markings are approximate and should not be considered as calibration points. The logging scale will enable you to mark the tuning point for stations frequently contacted. Since a tuned receiver will drift, mark the logging scale allowing 30 minutes for receiver warm up.

The on/off switch is located on the front panel, and controls power for either battery or AC operation.

A manual R.F. control provides a means for adjusting threshold sensitivity by varying the bias voltage on the first R.F. stage.

R.F. Gain Controll will effect the "S" meter. "S" meter reading can be considered reliable only when the controll is full on.

CITIZEN BAND CHANNELS

Chan	Freq	Trans Crystals	Rec Crystals
#1	26.965 MC	13482.50 MC	34.96500 MC
#2	26.975 MC	13487.50 KC	34.97500 MC
#3	26.985 MC	13492.50 KC	34.98500 MC
#4	27.005 MC	13502.50 KC	35.00500 MC
#5	27.015 MC	13507.50 KC	35.01500 MC
#6	27.025 MC	13512.50 KC	35.02500 MC
#7	27.035 MC	13517.50 KC	35.03500 MC
#8	27.055 MC	13527.50 KC	35.05500 MC
#9	27.065 MC	13532.50 KC	35.06500 MC
#10	27.075 MC	13537.50 KC	35.07500 MC
#11	27.085 MC	13542.50 KC	35.08500 MC
#12	27.105 MC	13552.50 KC	35.10500 MC
#13	27.115 MC	13557.50 KC	35.11500 MC
#14	27.125 MC	13562.50 KC	35.12500 MC
#15	27.135 MC	13567.50 KC	35.13500 MC
#16	27.155 MC	13577.50 KC	35.15500 MC
#17	27.165 MC	13582.50 KC	35.16500 MC
#18	27.175 MC	13587.50 KC	35.17500 MC
#19	27.185 MC	13592.50 KC	35.18500 MC
#20	27.205 MC	13602.50 KC	35.20500 MC
#21	27.215 MC	13607.50 KC	35.21500 MC
#22	27.225 MC	13612.50 KC	35.22500 MC

FORMUIA FOR CAICUIATING CRYSTAL FREQUENCIES

2nd Osc 8455.000 KC
1st Rec RF Fc + 8 = Fx
Transmitter $\frac{Fc}{2}$ = Fx

CONTROLS AND FUNCTIONS (continued)

The Squelch control permits quiet operation of receiver during standby periods. It should be turned fully to the clockwise position for weak signal operation. When signal strength permits, it may be turned slowly to the left until background noise just drops out. The received signal will then trigger the circuit, allowing reception. The Squelch adjustment must be carefully made, since the receiver may fail to operate if the control is set improperly.

SQUELCH- On the Standard model, when maximum output is required, or when the receiver is operated in areas where noise is low, the squelch circuit may be cut out by throwing switch on left side of cabinet to "SQUELCH OUT".

The TNS circuit, as provided on the TNS model, utilizes the inherent noise that is present in any hetrodyne receiver. The noise is composed of thermal agitation noise generated in the I.F. strip, and random noise picked up thru the antenna. The noise is first clipped by the action of ½ of the 6AL5 dual diode so that excessive noise peaks are eliminated. With the noise peaks reduced to a useable level the noise is then amplified in ½ of the 12AX7. The amplified noise is then rectified by the other half of the 6AL5 to provide a d.c. bias which will either allow the second section of the 12AX7 to conduct or cut-off the audio, thus providing an ideal system of muting.

The 6 or 12 Volt DC or 115 Volt AC power cables plug into the rear of chassis and automatically make the power supply connections for the type of power input required.

The fuse receptacles are marked to indicate the proper fuses. DO NOT INSERT LARGER FUSES.

A 50 ohm antenna or feed line should be connected to the co-ax receptacle.

A receptacle is provided for a remote speaker. This may be from 1 to 4 ohms impedance.

Two tuning adjustments on the rear of the chassis are the Pi-Net output circuit adjustments. (See transmitter tuning).

SECTION III

INITIAL OPERATIONAL CHECK

An initial operational check should be made to determine if both transmitter and receiver are operating properly. This can be done by plugging in the proper power cable. Connect a proper antenna into the co-ax antenna fitting. Turn the Squelch control full right, turn volume control about 3/4 to the right. Turn the set on, after several minutes warm-up, background hiss or noise should be heard in the loudspeaker, indicating the receiver is operating.
NOTE: If loud squeal is heard, be sure Press-to-Talk button on microphone is not depressed. To be certain, press it firmly, but quickly, on and off, once or twice. This will throw relays which control send/receive functions.

INITIAL OPERATIONAL CHECK (continued)

Set Transmit channel selector to the left position. Use small neon bulb, (obtainable from your parts distributor) in contact with the antenna. It will glow and change brilliancy when microphone switch is depressed while speaking into microphone, or, tune signal on another Falcon or similiar receiver, or on communications receiver.

CAUTION: Do not operate the transmitter without an antenna or dummy load. If either the transmitter or receiver fail to operate refer to the maintenance section.

SECTION IV

GENERAL OPERATIONAL PROCEDURE

A. EMERGENCY OPERATION

The Falcon can be placed into operation for short range and emergency communications by operating the unit as outlined under Initial Operational Check. Operating the unit from as high a location as possible will increase the operating distance.

B. FOR MAXIMUM DISTANCE - TYPES OF INSTALLATION

One question in the mind of radiophone users is "How far can I communicate?" The answer to this question is effected by several factors.

(1) Antenna being used and antenna height at both receiving and transmitting positions.

(2) Type of terrain over which the signal must travel.

(3) Existing noise level at the location where unit is used.

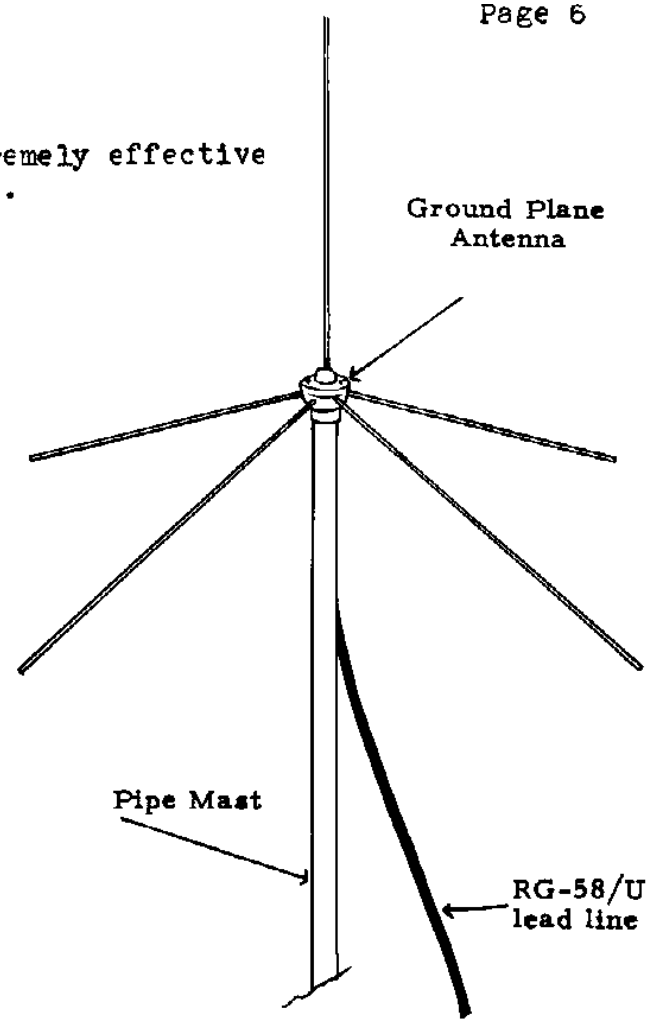
As a "Rule of Thumb", expect the following distances.

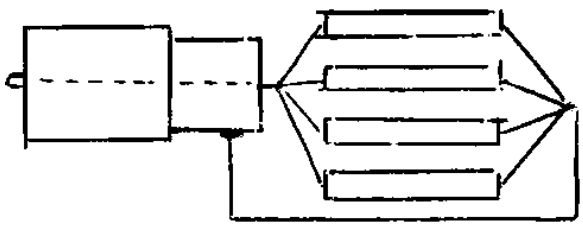
(a) Using the extended antenna on the unit and the two radiophones inside buildings the communicating distance will be 100 feet to 1 mile depending on the type of building and relative position of the two units.

(b) Using one fixed antenna of the co-ax or ground plane type mounted 20 feet above a building and one mobile antenna mounted on the outside of a vehicle - communication distance is 1 to 5 miles radius - often substantially more.

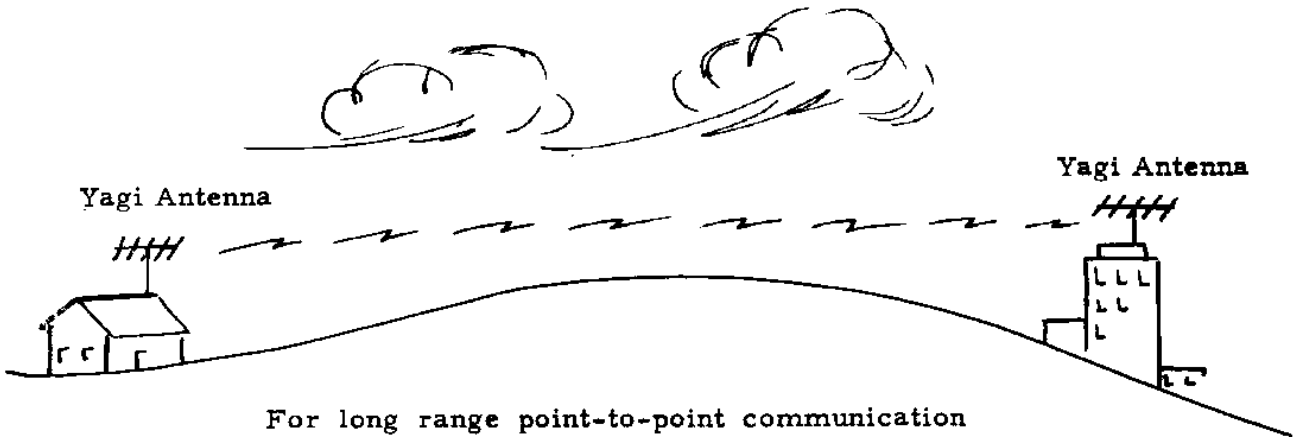
(c) Using two fixed antennas of the yagi type mounted 20 feet above a building - communication distance is 6 to 10 miles minimum. Distances of 40 miles may be obtained under certain conditions. Remember, the higher your antenna is mounted (within the FCC limits) and the more gain your antenna has, the further will be your communicating distance.

This type of antenna is extremely effective for omni-directional service.

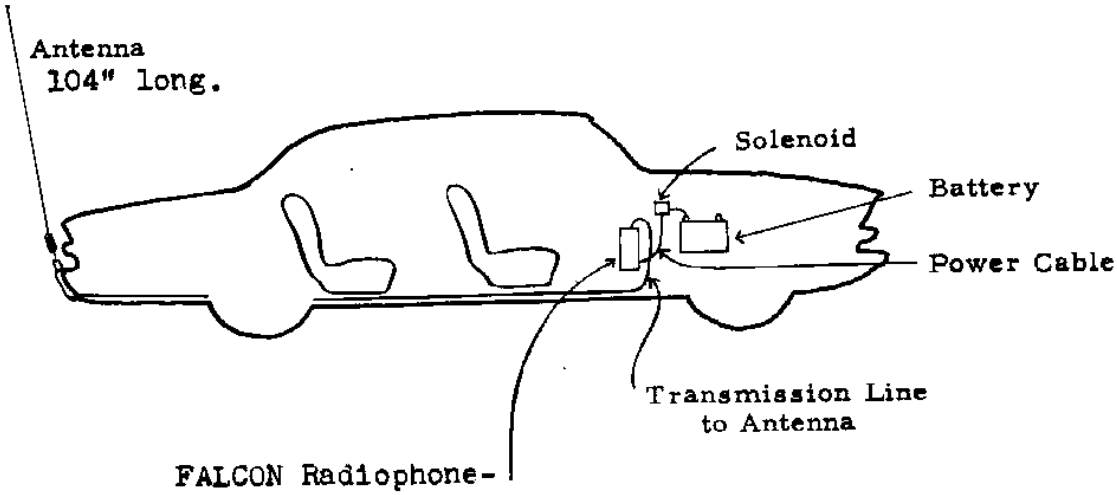




DUMMY LOAD

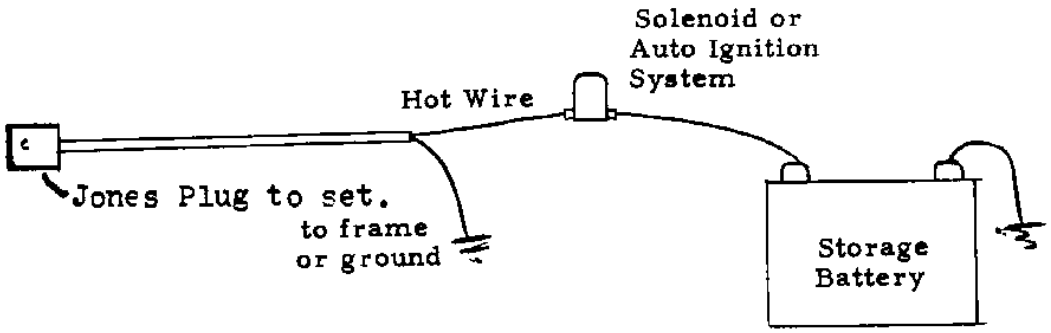


For long range point-to-point communication



It is suggested that you obtain a copy of "THE RADIO AMATEUR'S HANDBOOK", published by the American Radio Relay League, West Hartford, Connecticut.

This volume deals in detail with mobile and fixed station installations, and methods for suppressing ignition interference. Much data on antenna types and signal propogation is also included.



Typical Mobile Installation

(D) Since most operation of the Radiophone will depend upon ground wave communication, height of the antenna will determine the signal distance.

C MOBILE OPERATION

When the Falcon Radiophone is used in an automobile or other vehicle, a whip antenna should be mounted on the outside of the vehicle. The antenna lead-in cable can be dressed under the car to the front and thru the fire wall. The power cable can be connected to the battery with heavy lugs or clips. The Falcon can be easily removed for use in the house or fixed location. Normally it will fit under the dash or set on the floor for easy access by the driver.

Mobile installation of Radiophones in automobiles, or aircraft and marine units, are subject to electrical noise interference with reception which may arise from various sources. These include ignition noise, generator and voltage-regulator hash, wheel or tire static on automobiles, or propeller drive shaft noise on some marine installations. The noise limiter incorporated in the set is effective in reducing the noise level to a usable point but for reception of weak or distant signals noise suppression is necessary. In automobiles, trucks and marine installations, the use of regular automotive-type 10,000 ohm spark-plug suppressors at each plug or the use of resistor-type plugs will generally reduce the ignition noise. Bonding the hood to the car frame across the hinges with heavy copper braid is frequently effective.

Shielded spark plugs and wiring as found on most aircraft is the best solution to the problem. Generator noise can be eliminated by means of a regular generator by-pass capacitor (a metal cased low voltage capacitor .25 mfd to 1.0 mfd). Regulator noise can be eliminated by soldering a .001 to .005 mfd disc ceramic capacitor across each set of regulator contacts with the shortest possible leads. Wheel and tire static can be eliminated by installing special spring grounding clips in each hub to provide a good ground across the wheel bearing. All of these parts are available at your local radio parts store.

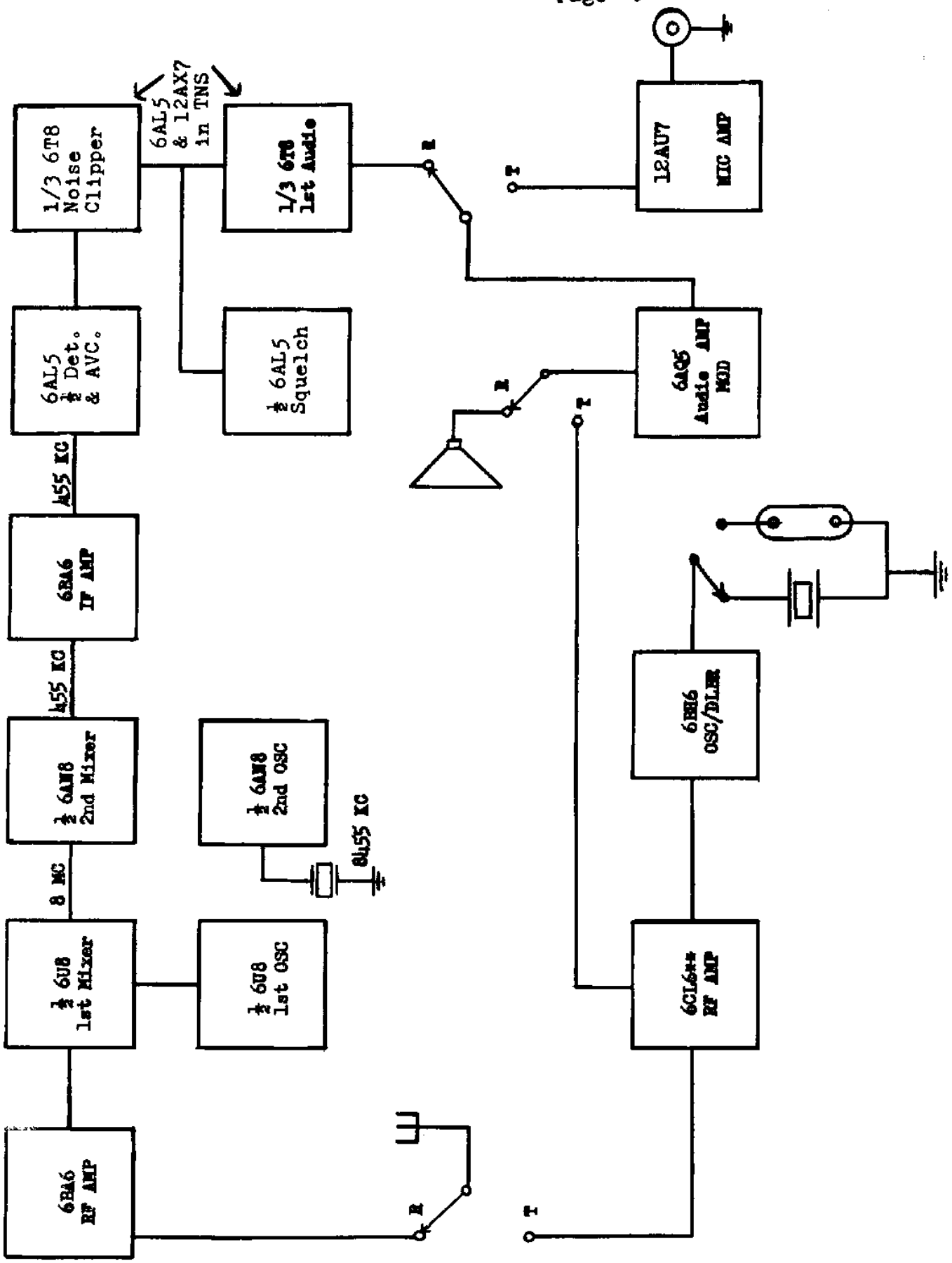
SECTION V

CIRCUIT FUNCTIONS

The Falcon makes use of a number of multi-purpose tubes in its design. In order to more clearly trace the circuit functions refer to the block diagram. This diagram together with the detailed description of the various sections of the equipment will not only aid in understanding the function of the unit but will be of considerable assistance in isolating or localizing troubles.

TRANSMITTER

The transmitter oscillator tube is a 6BH6 using a fundamental type crystal requiring a 32 mmf load. A trimmer capacitor is provided for zeroing the crystal to frequency. This trimmer is set at the factory and should not be changed unless accurate measuring


1/3 6T8 Noise Clipper
6AL5 & 12AX7 in TNS
1/3 6T8 1st Audio
12AU7 MIC AMP
6AL5 ½ Det. & AVC.
½ 6AL5 Squelch
6AQ5 Audio AMP MOD
455 KC
6BA6 IF AMP
455 KC
½ 6AU8 2nd Mixer
½ 6AU8 2nd OSC
8455 KC
6BH6 OSC/DLBR
8 MC
½ 6U8 1st Mixer
½ 6U8 1st OSC
6CL6** RF AMP
6BA6 RF AMP
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TRANSMITTER (continued)

equipment is available. The 6CL6 operates as a straight plate-modulated amplifier. Bias is developed across the grid leak by the tube grid current. The plate circuit is shunt fed thru an RF choke and coupled into the pi-network. The transmitter output is designed to operate into a low impedance unbalanced circuit 50-75 ohms. Modulation voltage is obtained from the microphone thru speech amplifier 12AT7 and modulator 6AQ5. This is also used as the audio output tube for the receiver. The 6CL6 Class "C" RF amplifier is neutralized by means of a link which feeds back out of phase RF voltage to amplifier grid coil. DO NOT ATTEMPT TO RE-ADJUST.

RECEIVER

The receiver consists of eight tubes (three dual purpose tubes) in a dual conversion superheterodyne circuit. The dual conversion eliminates image effect with 8 mc IF and yet gives selectivity thru the 455 kc IF. A 6BA6 is tuned grid-plate RF amplifier stage, capacity coupled to the pentode section of (6U8) mixer. The triode section of which is the first oscillator. This oscillator is tunable and/or crystal controlled. Both circuits are indicated on the schematic diagram. The oscillator is coupled to the mixer grid thru a capacitor. The plate circuit of 1st. mixer is tuned to 8 mc and capacity coupled to the grid of the second mixer (6AN8) pentode section. The triode section is used as the crystal controlled second oscillator and operated at 8455 kc. A 6BA6 is the 455 kc IF amplifier feeding a 6AL5 diode detector and AVC. The second diode develops squelch voltage. The triode section of 6T8 is receiver audio feeding into ½ of 12AT7 speech amplifier tube which couples to 6AQ5 audio output. One diode of 6T8 serves as noise limiter. The AVC voltage is applied to the RF - 2nd mixer and IF stages. The volume control for the receiver adjusts the audio level fed from the series clipper. The demodulated signal goes to the series diode squelch circuit.

The T.N.S. function is explained in paragraph 3 on page 4. See schematic diagram for change and tube lineup.

POWER SUPPLY

The Falcon 3-way power supply uses a special transformer and vibrator to permit instant change over. The transformer has one 115 VAC primary and two 6VAC primaries. For 115 VAC operation the two 6V primaries are not used and the power supply operates as a straight AC unit with HV secondary and 6.3 VAC filament winding. On battery input the 115 VAC primary and 6.3 VAC filament winding are not used. The input is applied from the vibrator to the two 6V winding either in parallel for 6 VDC or Series for 12 VDC. All jumper connections to change the power supply are made within the power plug. There are no internal modifications required to be made by the operator in changing from one voltage source to another. Merely changing the power plug does all the work.

SECTION VI
MAINTENANCE

GENERAL

The Falcon Radiophone has been designed for simplicity of operation and no controls or adjustments are accessible to the operator which will effect the transmitter frequency accuracy. As is the case with any type of electronic equipment, periodic checks should be made by properly qualified technical personnel to determine whether any adjustments are required for optimum performance. Many of the procedures indicated in the Trouble Localization section may be conducted with the minimum of test equipment. This will frequently serve to isolate the section of equipment which may be the cause of the trouble. The procedures outlined in the following paragraphs systematically locate the section at fault with a few relatively simple voltage measurements and requires only that the set be removed from the cabinet.

The alignment adjustments required for optimum performance are more extensive and critical and will require more elaborate test equipment in order to be executed properly.

CABINET REMOVAL

To remove the Falcon from it's "E-Z Open" cabinet, the following steps are required:

(a) Remove 3 PK screws from front panel. (1 top center, 1 ea. side).
(b) Remove 2 upper PK screws each side. Lift off top cover.
(c) Remove 2 lower PK screws each side. Drop bottom cover.

TEST EQUIPMENT REQUIRED

For simple test a 20,000 ohm-per-volt test meter will be satisfactory. For more extensive alignment a good VTVM and signal generator covering 455KC, 8MC and 27MC are required.

TROUBLE LOCALIZATION

To correct any trouble which may occur in the Radiophone, isolate the section of the set which causes the trouble. Trouble usually occurs in one section at a time, and may quickly be located by checking each section independently. When tubes are indicated as being the cause of trouble, substitute a new tube of the same type. If no improvement is noted reinstall the old tube. Where tubes are referred to as trouble possibilities, it must be remembered that circuit components directly associated with the particular tube may also be the cause of trouble.

CHECK FUSES

After removing the set from the cabinet, apply 115 VAC power and connect 50 or 70 ohm dummy load. Check the unit in the following order: REMEMBER THAT TUBES ARE EXPENDABLE - ALWAYS CHECK TUBES FIRST.

POWER SUPPLY

Inoperative on AC or DC	(a)	Defective fuse.
	(b)	Defective on/off switch.
Operates OK on AC Blows fuse on DC	(a)	Defective vibrator.
	(b)	Defective or incorrect power cable or plug.
	(c)	Defective Buffer Cap.
Low B + voltage when operating on DC	(a)	Low Battery voltage.
	(b)	Excessive power cable length.
	(c)	Defective vibrator.
	(d)	Defective buffer capacitor.
	(e)	Defective rectifier tube
Operates OK on DC but noisy	(a)	Defective Hash Choke and/or 1 mfd. capacitors
	(b)	Defective vibrator
	(c)	Defective buffer capacitor.
Low B + on AC or DC	(a)	Shorted tube or component, in B circuit.
	(b)	Defective tube, check 6AQ5.
	(c)	Defective transformer
	(d)	Defective filter capacitor.

Once the power supply has been checked, operate the set on 115 VAC for other checks.

TRANSMITTER

Inoperative; No RF output	(a)	Defective tubes.
	(b)	Defective crystal.
	(c)	Defective switch.
Operative but low output	(a)	Defective tube.
	(b)	Out of adjustment.
	(c)	Low B +.

TRANSMITTER (continued)

Output OK, Modulation Low	(a) Defective microphone.
	(b) Defective 12AT7 or 6AQ5.
	(c) Improper adjustment of grid drive to 6CL6
Output and Modulation OK, frequency out of tolerance	(a) Crystal trimmer out of adjustment.
	(b) Defective crystal.

After both power supply and transmitter sections have been checked connect antenna and check receiver.

RECEIVER

Low Volume	(a) Defective tubes.
	(b) Defective crystal.
	(c) Receiver out of adjustment. See receiver alignment below.
	(d) Low B +

RECEIVER ALIGNMENT

The receiver alignment procedure is to inject a 455 KC signal into the 2nd mixer stage and carefully align the 455 KC IF transformers for maximum AVC voltage as indicated on a VTVM. Next, 8 MC is fed into the grid of the 1st mixer and this circuit adjusted. Last, the RF section is aligned.

NOTE: If any doubt exists as to the frequency available from the signal generator, it is recommended that the IF stages be aligned as accurately as possible with the available equipment and the receiver be re-peaked with an on-the-air signal.

(A) IF alignment 455 KC.

(1) Connect the 455 KC output of signal generator to pin 8 of 6AN8 and ground. Connect a VTVM to the AVC feed point.

(2) Peak 1st IF and 2nd IF transformers for maximum indication of AVC. As the IF circuits are tuned, reduce the signal generator output to the minimum usable level in order to prevent excessive AVC action.

(B) IF alignment 8 MC.

(1) Connect the 8 MC output of the generator to pin 2 of 6U8 and ground. Leave VTVM connected as above.

(2) Peak coil in plate circuit of 6U8.

(C) RF alignment.

Connect the output of a stable HF signal generator having a load impedance of 50 to 70 ohms to the antenna jack. Set the signal to the exact frequency desired.

(1) Adjust the signal generator to 27.1 mc and set the receiver tuning knob to the same frequency on the dial scale. Tune the screw in the end of the oscillator coil until the signal generator signal is received with the dial set as indicated above. The oscillator operates 8 mc on the low side of the signal in the tunable receiver.

(2) When receiver 1st oscillator is crystal controlled, it requires no tuning. The crystal oscillator operates 8 mc above the signal and has been factory adjusted.

(3) The RF stage is tuned by peaking the antenna and plate coils for maximum AVC indication. Use the minimum usable signal from the generator.

TRANSMITTER ALIGNMENT

NOTE: Transmitter adjustments should not be attempted by anyone not fully qualified, legally and technically, or should they be attempted with make-shift equipment.

In the event of transmitter failure, the fault will seldom involve adjustments. Usually the cause of failure will be a defective tube, crystal or small component such as a resistor or capacitor, or dirty relay contacts. Simple continuity testing will isolate these difficulties.

(1) Connect 50 ohm dummy load to antenna connector.

(2) Under the chassis, in the transmitter section, locate:

Point 1. Junction of grid leak resistor and amp. grid coil (5600 ohm shunted by .01 mf capacitor) used to measure grid voltage between this point and ground. See schematic.

(3) Disconnect B+ feed to 6CL6 plate and screen.

(4) Connect VTVM as stated to Point 1 and ground, adjust osc. slug for maximum voltage at crystal frequency. Use, 10 V scale of VTVM, then back out slug 1/3 turn.

(5) Check frequency with grid dip meter. Should be same as crystal.

TRANSMITTER ALIGNMENT (continued)

(6) Reconnect B+ to screen and plate of 6CL6.

(7) Set compression trimmer of Pi-net to maximum capacity.

(8) Use press-to-talk switch to activate transmitter for short periods while 6CL6 amplifier output is tuned.

(9) Tune air condensor for lowest reading on 0-50 ma plate current meter. Should be under 20 ma.

(10) Slightly decrease capacity of compression trimmer, re-tune air condensor for lowest plate current. Repeat this process until plate current reads 20 ma. Plate voltage will be 250 volts. This current value represents 5 Watts input to transmitter.

(11) Speak into the microphone and note the plate current meter, The current should remain steady, or at the most, just barely kick meter up on modulation peaks. Incorrect adjustment of the grid coil can produce downward modulation.

NOTE: When properly adjusted and at normal line voltages, the transmitter output will be approximately 3 watts.

PROCEDURE FOR CHANGING FREQUENCY

RECEIVER

Tune dial on front of receiver, and/or change the receiver first oscillator crystal to the channel desired. Refer to the crystal chart included in this book. The crystal is a 3rd overtone type. Peak the receiver RF coils for maximum output.

TRANSMITTER

Refer to the crystal chart and select channel desired.
Install crystal in transmitter.
The frequency should be compared to a standard with at least .002% accuracy. No other oscillator tuning is required. The final plate and grid circuits should be adjusted as previously described.

TRANSMITTER

VOLTAGE AND RESISTANCE DATA

Tube Socket Pin Numbers

TUBE		1	2	3	4	5	6	7	8	9	
6AQ5 MOD.	VOLTS	0	13	6.3 AC	0	265	265	0			
	OHMS	1mg	390	0	0	∞	∞	1mg			
12AT7 SPCH. AMP.	VOLTS	50	-1	0	0	0	∞	0	3.4	6.3 AC	
	OHMS	∞	5mg	0	0	0	∞	470K	1K		
6BH6 OSC.	VOLTS	-.36	7.2	0	6.3 AC	250	220	0			
	OHMS	18K	1K	0	0	∞	∞	0			
6CL6 CL "C" AMP.	VOLTS	0	-3.5	133	0	6.3 AC	260	0	133	-3.5	
	OHMS	0	5.6K	∞	0	0	∞	0	∞	5.6K	

NOTE: Above readings are average values taken under the following conditions:

(1) Voltages measured with 115 VAC input. Variations may be as high as 20 percent.

(2) Voltages measured with VTVM between socket pins and chassis.

(3) Transmitter operation in to 50 ohm dummy load. No. modulation.

(4) Resistance measurements were taken with power off.

RECEIVER

VOLTAGE AND RESISTANCE DATA

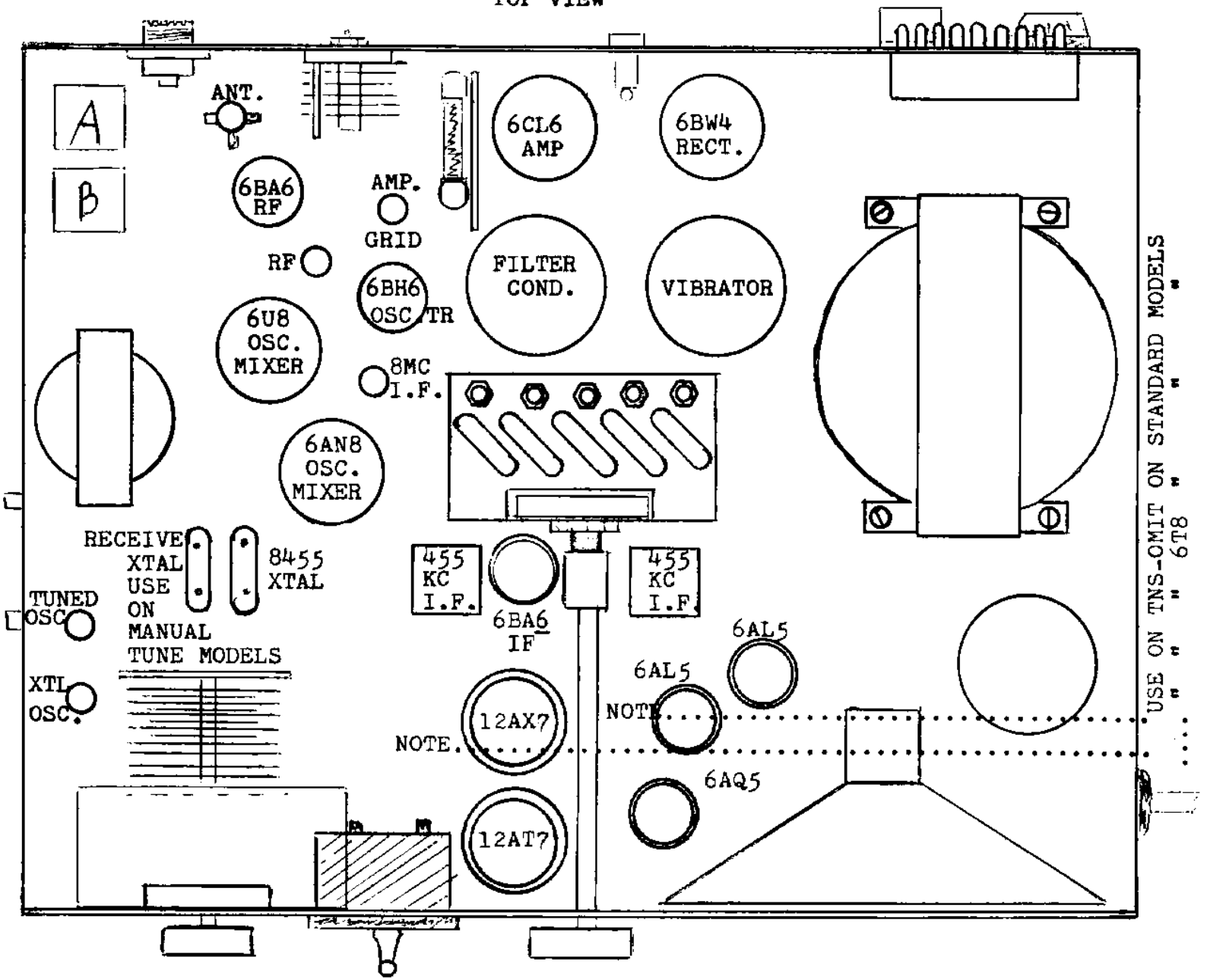
Tube Socket Pin Numbers

	TUBE		1	2	3	4	5	6	7	8	9
	6BA6 RF AMP	VOLTS	-.4	0	HTR	HTR	260	90	.8		
		OHMS	3M	0	-	-	1M	1M	82		
	6U8 OSC/ MIX	VOLTS	58	0	90	HTR	HTR	260	0	0	-3.6
		OHMS	1M	1M	1M	-	-	1M	0	0	10K
	6AN8 OSC/ MIX	VOLTS	52	-9	0	HTR	HTR	260	95	0	2.7
		OHMS	1M	47K	0	-	-	1M	1M	3M	1500
	6BA6 IF AMP	VOLTS	0	0	HTR	HTR	250	90	3.6		
		OHMS	2M	0	-	-	1M	1M	680		
	½ 12AT7 2nd AUDIO	VOLTS	0	0	0	HTR	HTR	50	0	.9	HTR
		OHMS	-	0	-	-	-	∞	470K	1K	-
	6AQ5 AUDIO OUTPUT	VOLTS	0	14.5	HTR	HTR	270	270	0	-	-
		OHMS	1M	390	-	-	∞	∞	1m		
	6T8 ANL	VOLTS	0	0	0	HTR	HTR	-.6	0	-1	60
		OHMS	0	330K	3M	-	-	480K	0	5.6M	2M
	6AL5 DET & SQUELCH	VOLTS	0	54	HTR	HTR	54	0	-.7		
		OHMS	0	2M	-	-	1.8M	0	220K		
TNS MODELS	6AL5 DET & SQUELCH	VOLTS	0	60	HTR	HTR	60	0	-.4		
		OHMS	0	1.4M	-	-	1.4M	0	500K		
	6AL5 TNS	VOLTS	40	35	HTR	HTR	35	0	35		
		OHMS	1.8M	3.5M	-	-	∞	0	∞		
	12AX7 TNS	VOLTS	65	-.6	.2	HTR	HTR	35	-.2	.3	HTR
		OHMS	1.8M	300K	1.5K	-	-	1.8M	60K	1.5K	-

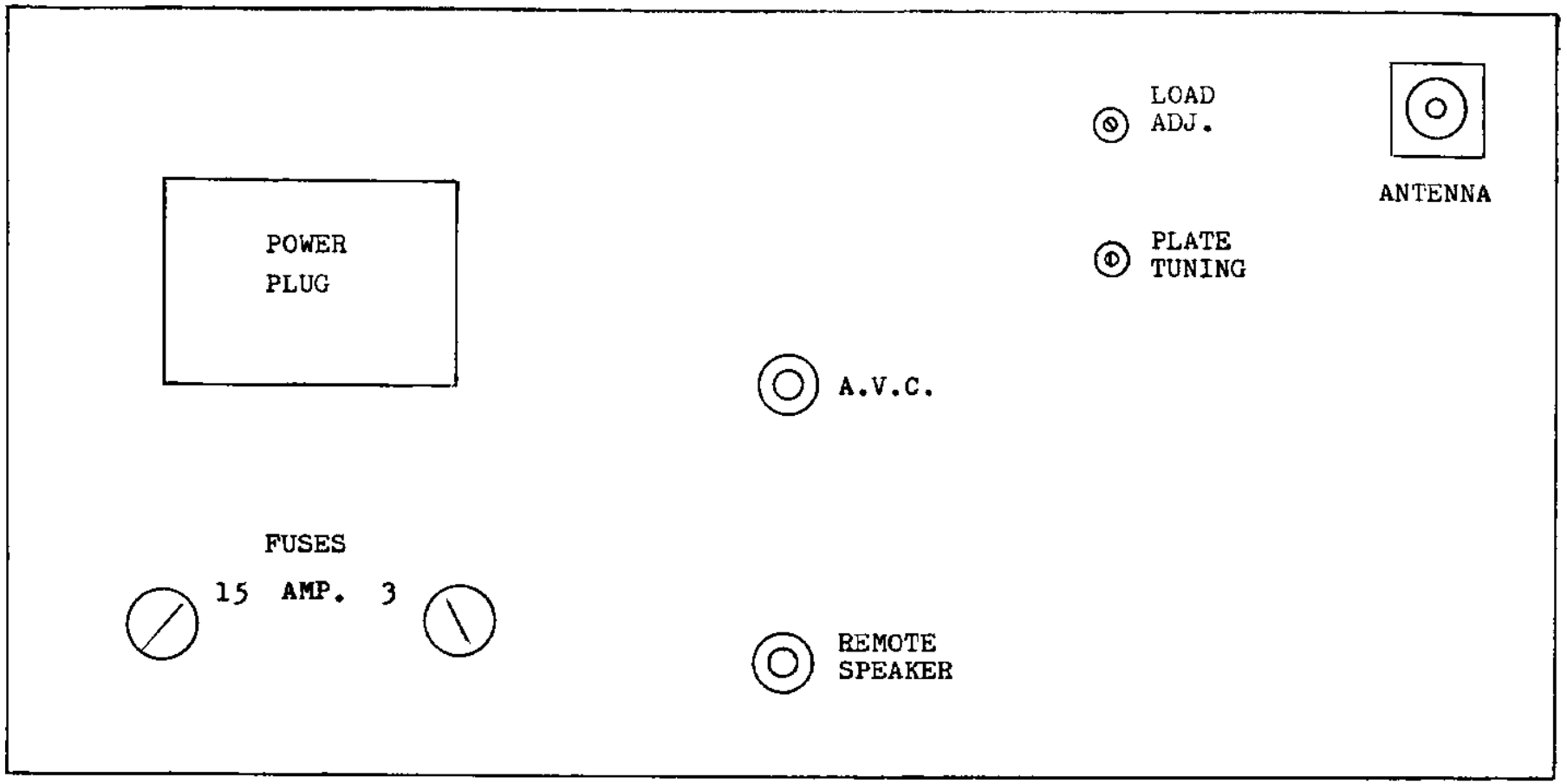
NOTE: Above readings are average values taken under the following conditions. Variations may be to 20 percent.

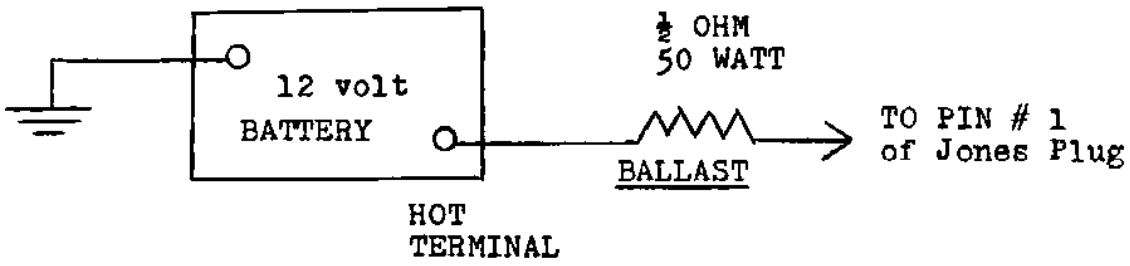
(1) AC line volts - 115 - 60 cycles.
(2) Oscillator switch on "MAN".
(3) Antenna receptacle short circuited.
(4) Volume control "OFF".
(5) Squelch switch "OUT".
(6) Voltages measured with VTVM from socket pins to chassis.
(7) Resistances measured with Jones plug disconnected from rear of chassis.

CHASSIS LAYOUT
TOP VIEW



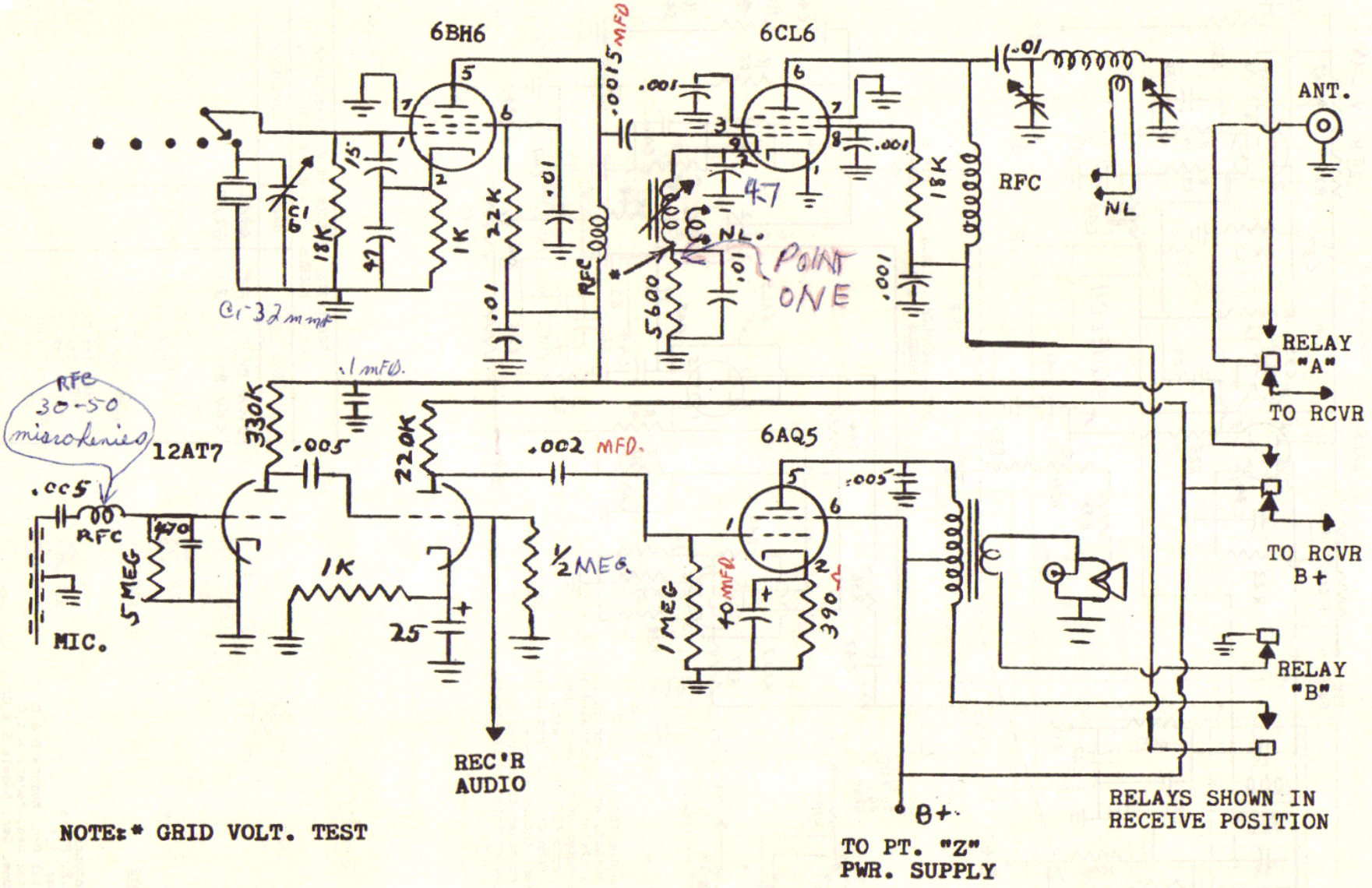
REAR PANEL


LOAD
ADJ.
ANTENNA
POWER
PLUG
PLATE
TUNING
A.V.C.
FUSES
15 AMP. 3
REMOTE
SPEAKER



THE BALLAST RESISTOR should be mounted in the engine compartment since it will become hot.

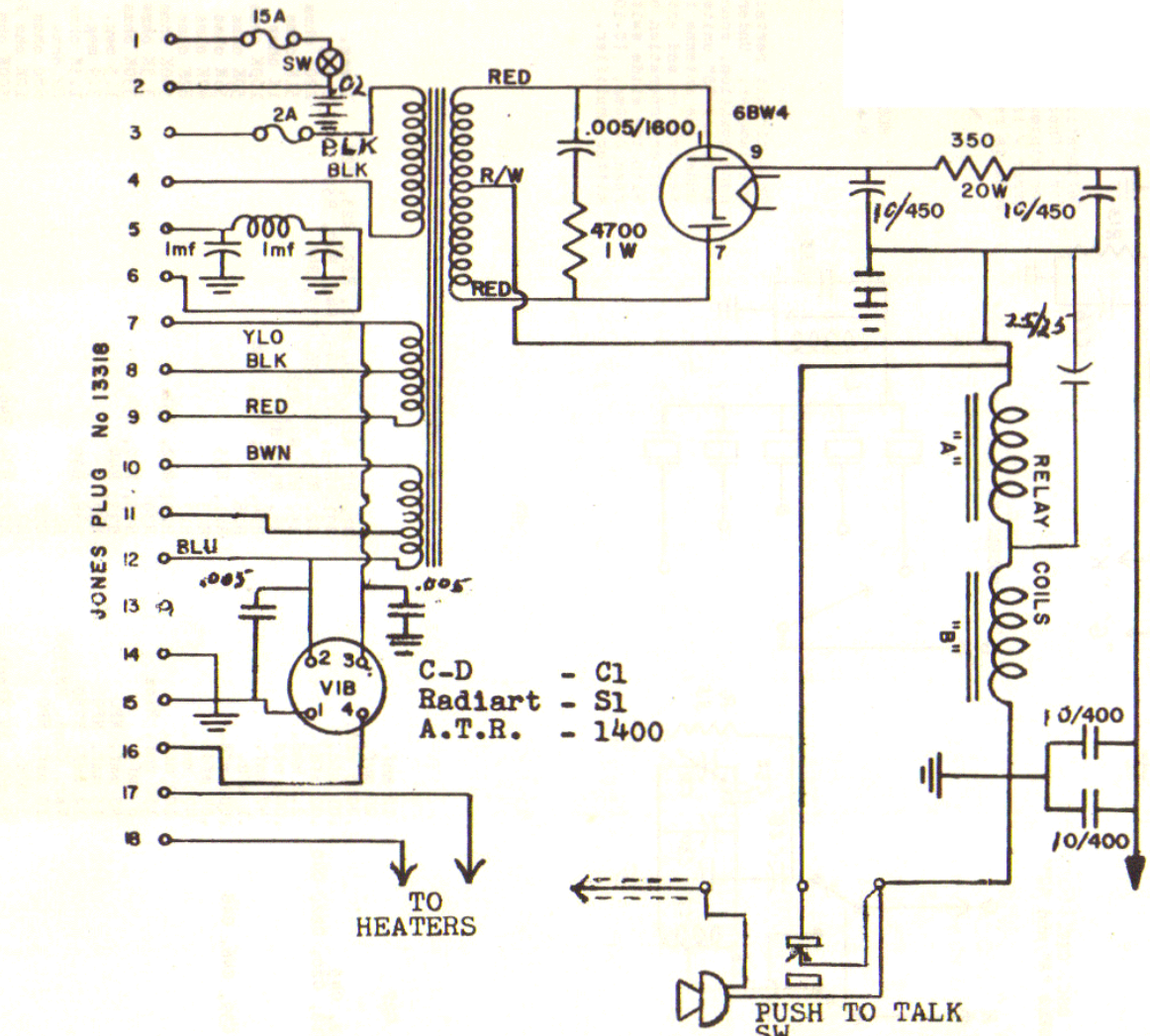
TRANSMITTER



NOTE: * GRID VOLT. TEST

POWER SUPPLY and RELAY CONTROL CIRCUITS

6V-12VDC. & 115 VAC.



POWER SUPPLY CONNECTIONS

115 VAC

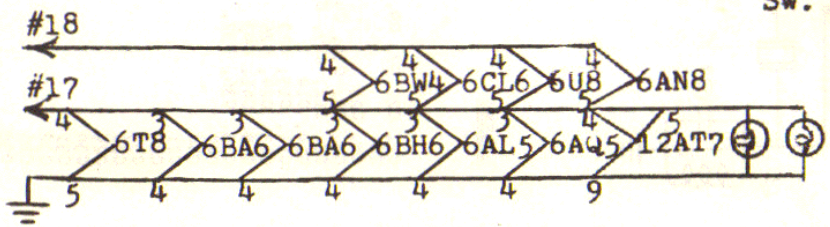
115 VAC TO PINS	1 AND 4
JUMPER PINS	2 TO 3
	10 TO 17
	15 TO 18
	12 TO 15

6 VDC

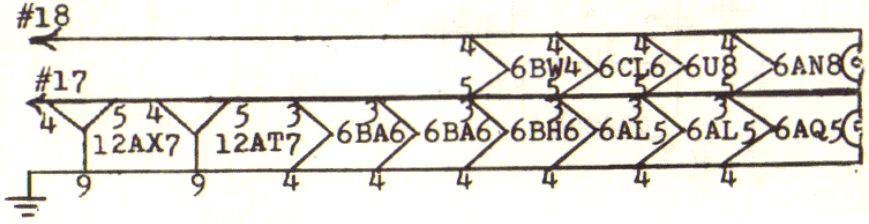
6 V HOT TO PIN	1
6 V GND TO PIN	14
JUMPER PINS	2 TO 5
	6 TO 8
	8 TO 11
	7 TO 10
	9 TO 12
	17 TO 5
	15 TO 18
	15 TO 16

12 VDC

12 V HOT TO PIN	1
12 V GND TO PIN	14
JUMPER PINS	2 TO 5
	6 TO 9
	9 TO 10
	5 TO 18



HEATERS MODELS A & B



HEATERS MODELS C & D

The performance of Falcon radiophones is related to the skill of the user, and the adequacy of installation. Proper choice of antennae, and care in establishing precise operating frequencies will play the largest part in securing satisfactory service from your system.

The purchaser must assume responsibility for proper installation, operating conditions and accessory equipment. Our responsibility is outlined by the following warranty.

OWNERS WARRANTY

The Falcon electronic equipment which you have purchased was carefully tested and inspected before leaving our factory. If properly installed, adjusted and operated in accordance with instructions furnished, it should give excellent performance and reliable operation.

Falcon equipment is guaranteed against all defects in material and workmanship for 90 days from date of sale to the original purchaser. Any part of the equipment which, with normal installation and use, becomes defective will be repaired or replaced by us provided it is returned for our examination, transportation prepaid, to our factory (or authorized service station). This warranty does not apply to equipment which has been subjected to abuse or accident or which has been altered in any way; nor does this warranty extend to tubes, vibrators, or accessories, etc. not of our own manufacture which are seperately covered by the producing manufacturer's warranty.

There is no other warranty, expressed or implied, and no agent or agency has the authority to extend, modify or in any way alter the terms and/or conditions of this warranty.

Fill out and return the enclosed registry card as soon as equipment is received, in order to validate the warranty.

Notify us if failure occurs. - We will advise with regard to handling for service.

All shipments to us or our agencies should be made via Railway Express, or Motor Freight, pre-paid.

Pack equipment in sturdy carton and provide a minimum of 2" of shock absorbing material.