

66'er

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INSTRUCTION MANUAL

Clegg

66'er

I. INTRODUCTION

UNPACKING

The 66'er has been packed with adequate internal carton bracing and cushioning to withstand normal handling in shipment on common carriers. Examine the carton exterior for signs of severe damage (crushing, piercing, etc.) In the event of obvious serious damage, examine the equipment carefully to determine the extent of internal damage, save packing material and make claim against transportation company.

Check all front panel controls for freedom of action and observe that all tubes and crystals are firmly seated in their sockets. Complete and mail the equipment registration card, to insure validation of warranty.

Many customers have found that saving the shipping carton and the internal cushioning is a great convenience in the event of subsequent need for reshipment or prolonged storage.

GENERAL

The Clegg 66'er has been specifically designed to provide consistent communication on the 6 meter band. This band includes frequencies used by the radio amateur as well as by Military Affiliate Radio Systems, Civilian Defense, and Civil Air Patrol. The 66'er transceiver contains a stable and sensitive receiver and a dependable 22 watt transmitter in one package.

CIVIL DEFENSE Accessories

In addition to the characteristics which make the 66'er outstanding for Civil Defense the following accessories are available for use under all Civil Defense requirements:

Crystal Receive Adapter: Available separately as #800-047, provides crystal receive operation on an assigned C.D. frequency and assures constant on frequency operation.

Special C.D. Case: Utilizes a heavy duty carrying handle, trap door for the crystal rec. adapter and heavy duty feet. #800-805

Transmit Crystal Modification: Allows for exact frequency control of the crystal by the use of a padder capacitor precisely set with your crystals.

Tuning Controls: Transmitter controls and shafts can be quickly removed after turning to eliminate accidental mistuning by unauthorized personnel.

In order to familiarize yourself with the 66'er and its many features it is suggested that you read the instruction book completely before attempting to operate your new transceiver.

SPECIFICATIONS

RECEIVER:

1. Dual Conversion with 10.7 mhz 1st IF and 456 khz Second IF
2. Sensitivity better than ~~4~~ ⁶ uv. for 10 db $\frac{S + N}{N}$
3. Selectivity is 8 khz.
4. Frequency coverage 49.9 to 52.1 mhz.
Expanded tuning range available on special order.
5. Typical drift is less than 10 khz during warm up and less than 3 khz per hour after 20 minute warmup.
6. Rejection of spurious responses down more than 60 db.
7. AGC provides more than 10 db compression for 40 db signal increase.

SPECIFICATIONS (Cont'd)

8. Squelch threshold adjustable from less than .5 μ v. to more than 500 μ v.
9. Switchable ANL provides more than 20 db suppression of typical impulse noise.
10. Audio output greater than 2 watts.

TRANSMITTER

1. High Efficiency, 22 watts input, 10 watts or more output into 52 ohm load.
2. HIGH TALK POWER performance gives high level modulation to 100% with typical -56 db mike.
3. Harmonic outputs down more than 50 db.
4. Spurious outputs excluding harmonics down more than 66 db.
5. Exciter stages are broadband and multituned for quick QSY and low, low spurious (TVI) outputs.
6. Built-in Push-To-Talk and provisions to automatically switch the Apollo Linear and/or an external VFO.
7. Audio response 300 to 3000 hz. \pm 3 db.
8. Operates with 8.3, 12.5, or 25 mhz. crystals or external VFO.
9. Built-in solid state power supply for both 115 volt AC and 12 volt DC operation.

TUBE COMPLIMENT

6EH7	RF Amplifier	6KE8/2	Crystal Oscillator multiplier to 25 mhz.
6DJ8	First Mixer		
6KE8	Oscillator/Buffer	6KE8/2	Doubler to 50 mhz.
6BA6	10.7 mhz. IF Amplifier	12BY7	Driver (50 mhz.)
6BA6	Second Mixer	2E26	Power Amplifier, Class C
6BA6	456 khz. Amplifier	6AN8	Two stage Audio Amplifier
12AL5	Diode Detector/ANL	2-6AQ5	Receive Audio/Modulator
	3 semi-conductors		

POWER SUPPLY

1. Built-in 117 v. \pm 5 50-60 cy. supply utilizes power transformer, solid state bridge rectifier and heavy filtering circuits.
2. Built-in 13.8 V.D.C. supply with a DC to AC solid state convertor.
3. Separate fusing and power connectors for AC and DC operation.
Power ratings are 50 w. receive and 85 w. transmit nominally.

SIZE AND WEIGHT

12" W. x 12" D. x 6-1/2" H. 19 lbs.

ACCESSORIES

66'er Push-to-talk Ceramic Microphone	#551-001
66'er Mobile Mount, Adjustable	#800-802
66'er Crystal Receive Adapter (less crystal)	#800-047
66'er C. D. Cabinet (Special Order)	#800-805

II. INSTALLATION

A. PRELIMINARY

It is recommended that initial operation of the 66'er be with 117 VAC until the user may familiarize himself with the tune-up and other operating procedures.

The 66'er is supplied with a pre-wired power plug for 117 VAC operation. A Jones plug is supplied for DC operation but this must be wired by you for either positive or negative ground systems. (See Fig. 2, page 5)

B. CRYSTAL INFORMATION

Transmitting crystals are available from your local electronic distributor or by special order from Squires-Sanders, Inc. The following information will be helpful for purchasing your crystals:

Type:	Fundamental Cut HC ¹⁷ U ² Holder
	Except for 25 mc. crystals which are 3 rd overtone cut.
Frequency:	8,333 khz. to 8,667 khz.
	12,500 khz. to 13,000 khz. $\pm .005\%$
	25,000 khz. to 26,000 khz.
Capacitance:	32 pf. parallel resonant.

C. OPERATION (117 VAC)

117 VAC installations are straightforward. The appropriate power plug is inserted at the rear receptacle and a suitable antenna with less than 2:1 VSWR is connected to the UHF coax connector. Either the internal speaker or an external 3-8 ohm speaker may be used. In the former case make certain that the short patch cable with phono connectors is in place between the 4 ohm chassis output jack on the rear of the cabinet. (See Fig. 1.)

D. OPERATION (13.8 VDC)

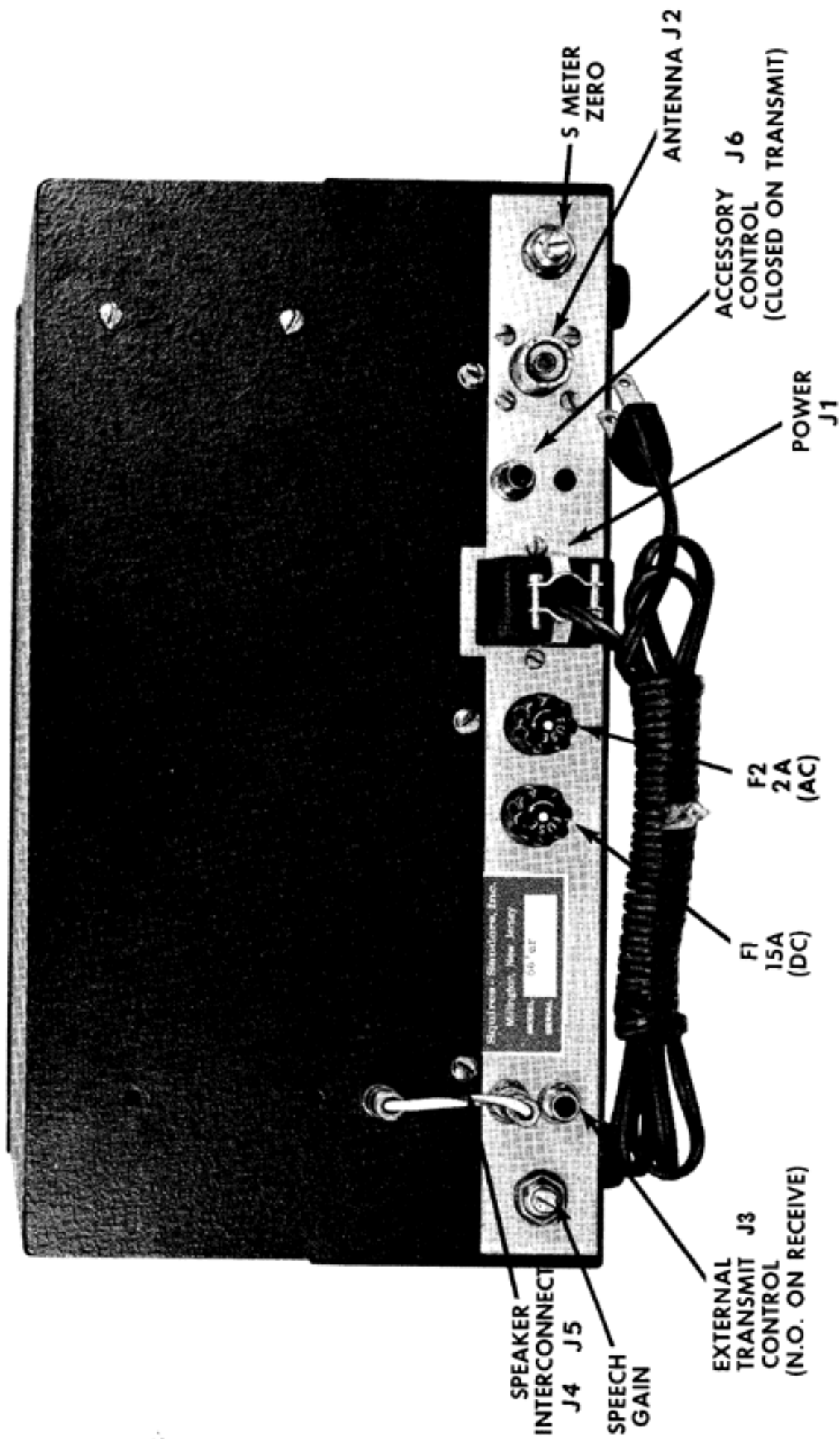
1. Wire the 12 volt cord for either negative or positive ground system according to the diagram. (See Fig. 2)
2. With either polarity the user must also supply the two primary leads for 13.8 VDC operation. They should be connected to pins 3 and 6. Where the length of the leads between the 66'er and the 13.8 volt source is less than 4 feet, #14 wire can be employed. Should the length exceed 4 feet a heavier gauge wire is recommended.
3. Remove the AC fuse.
4. Operate your 66'er according to the operation procedures in Section III., P. 7.

E. EXTERNAL V.F.O. INSTALLATION

To operate the 66'er with an external V.F.O., be sure the V.F.O. has an output of 1 to 3 v. rms. at 8.3, 12.5 or 25 mhz. Connect the V.F.O. output to the 66'er crystal socket. The upper socket pin as viewed from the front is the grounded terminal. Keying of the V.F.O. may be accomplished for example, by connecting the keying circuit to ~~32~~ ⁵⁶ of the 66'er, which will ground the circuit on transmit position.

F. EXTERNAL LINEAR AMPLIFIER INSTALLATION

To operate the 66'er with an external linear amplifier simply connect the antenna output of the 66'er to the linear antenna input. Antenna switching must provide bypassing the linear in receive mode. (This is normally provided within the linear.) The 66'er provides approximately 10 watts at 50 ohms output for linear operation. Amplifier switching may be done by utilizing J6 of the 66'er which completes your linear switching circuit to ground.



66'er SIX METER TRANSCEIVER - REAR VIEW

Fig #1

[illegible]

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Fig. #3 66'er FRONT VIEW

L13 and C92 comprise a selective impedance match into the grid of V13 (2E26), which operates as a Class C power amplifier with plate and screen modulation provided through transformer T4. The leakage reactance of T4 and capacitor C102 combine to form an effective low pass splatter filter.

The microphone output is amplified in V7B (6AN8) and further amplified in V7A. On transmit both V8 and V9 are in parallel to furnish the necessary audio power for modulation of the 2E26 stage. Operating levels of the 6AQ5's are such that grid clipping and plate bottoming occur at approximately 10 watts audio level and over modulation is prevented. As noted earlier potential high frequency splatter components are filtered by the design constants of the modulation coupling components.

All transmit-receive switching functions are performed by the four poles of the 12V DC relay, K1. These functions are:

K1A	Antenna Transfer
B	Modulated B+
C	250 volts
D	Speaker

In the transmit mode the "D" pole of K1 is employed (in addition to disabling the speaker) to ground auxiliary jack, J6 for control of external devices such as VFO, linear amplifier, external receiver muting, etc.

K1 is normally controlled by the push-to-talk action of a microphone. External and/or remote control of K1 is provided by J3.

C. POWER SUPPLY

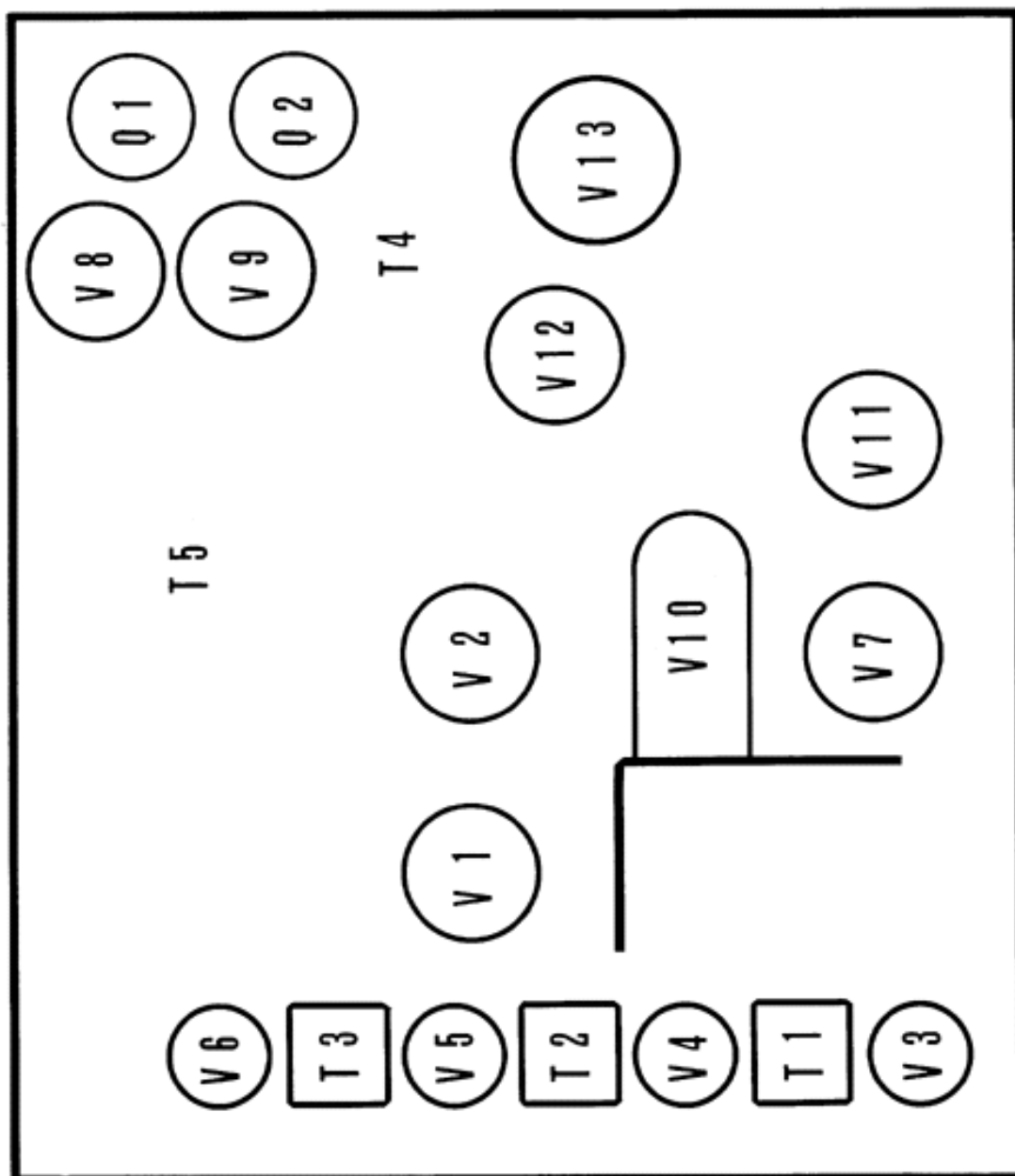
The combination power supply furnished with the 66'er operates from 117 ± 5 volt 60 ± 5 cps. or $13.8 \text{ V} \pm .5 \text{ VDC}$.

The unit has a built-in 12 volt DC supply which may be converted to either positive or negative ground systems by properly wiring the DC plug.

A full wave bridge rectifier and filter is employed on both DC and AC operation. Selection of AC or DC is performed automatically by selection of the appropriate plug, PlA, B, or C. DC to DC (12 to 300 volts) voltage inversion is performed by Q1 and Q2 and related circuitry.

Q1 and Q2 are operated at approximately 150 cps. in the common emitter mode to yield a highly efficient inverter.

TUBE TYPES 66'er



Q1	TRANSISTOR	2N2869
Q2	TRANSISTOR	2N2869
V1	TUBE ELECTRON	6EH7
V2	TUBE ELECTRON	6DJ8
V3	TUBE ELECTRON	6BA6
V4	TUBE ELECTRON	6BE6
V5	TUBE ELECTRON	6BA6
V6	TUBE ELECTRON	12AL5
V7	TUBE ELECTRON	6AN8
V8	TUBE ELECTRON	6AQ5
V9	TUBE ELECTRON	6AQ5
V10	TUBE ELECTRON	6KE8
V11	TUBE ELECTRON	6KE8
V12	TUBE ELECTRON	12BY7
V13	TUBE ELECTRON	2E26

III. OPERATION

A. RECEIVER SECTION

1. Plug in proper Power Connector as shown in Section II and connect 50 ohm 6 meter antenna system to the antenna connector. See p. 4 for locations.
2. Advance the RECEIVER AUDIO control from the AC OFF position and allow 1 - 2 minutes for warm up time.
3. Turn the SQUELCH control toward full clockwise position.
4. Set SPOT-NORMAL-ANL to NORMAL. Proceed with tuning of signals.
5. After 5-10 minute operation, the S-Meter ZERO ADJUST may be set by adjusting this control on the rear of your 66'er. See p. 4 for location.*
6. Insert suitable crystal into the panel crystal holder. See p. 3. Crystal Information: These may be purchased at your local distributor or mail order house. Turn the SPOT-NORMAL-ANL switch to SPOT. The 6 meter frequency of the crystal may now be tuned in on the receiver. To determine the exact frequency multiply the crystal fundamental by 6 (if 8.3 mhz type). For example: $8360 \times 6 = 50,160$ khz.
7. Where ignition or other impulse noise becomes objectionable, such noise may be reduced appreciably by placing the SPOT-NORMAL-ANL switch to the ANL position.
8. The 66'er has a sensitive, stable squelch system. Threshold sensitivity can be varied from less than .5 uv. to several hundred uv. by means of the panel SQUELCH control. Where squelch operation is not desired, this control should be set fully clockwise. Where only strong signals are to operate the squelch system, the SQUELCH control should be set near the lower portion of the range.

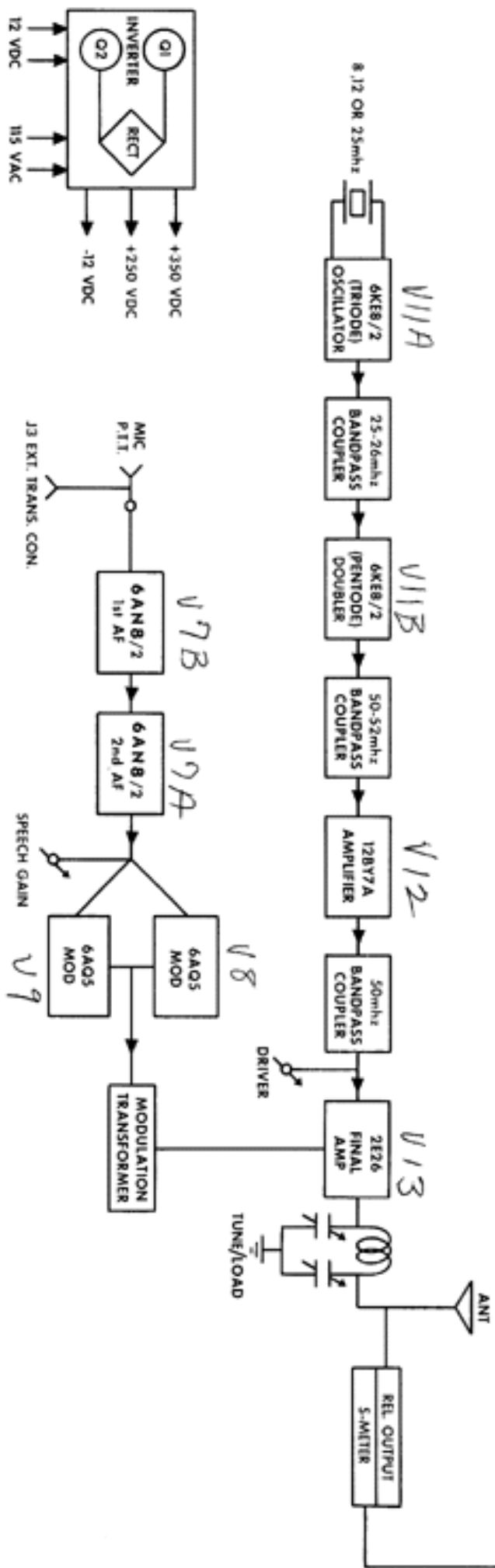
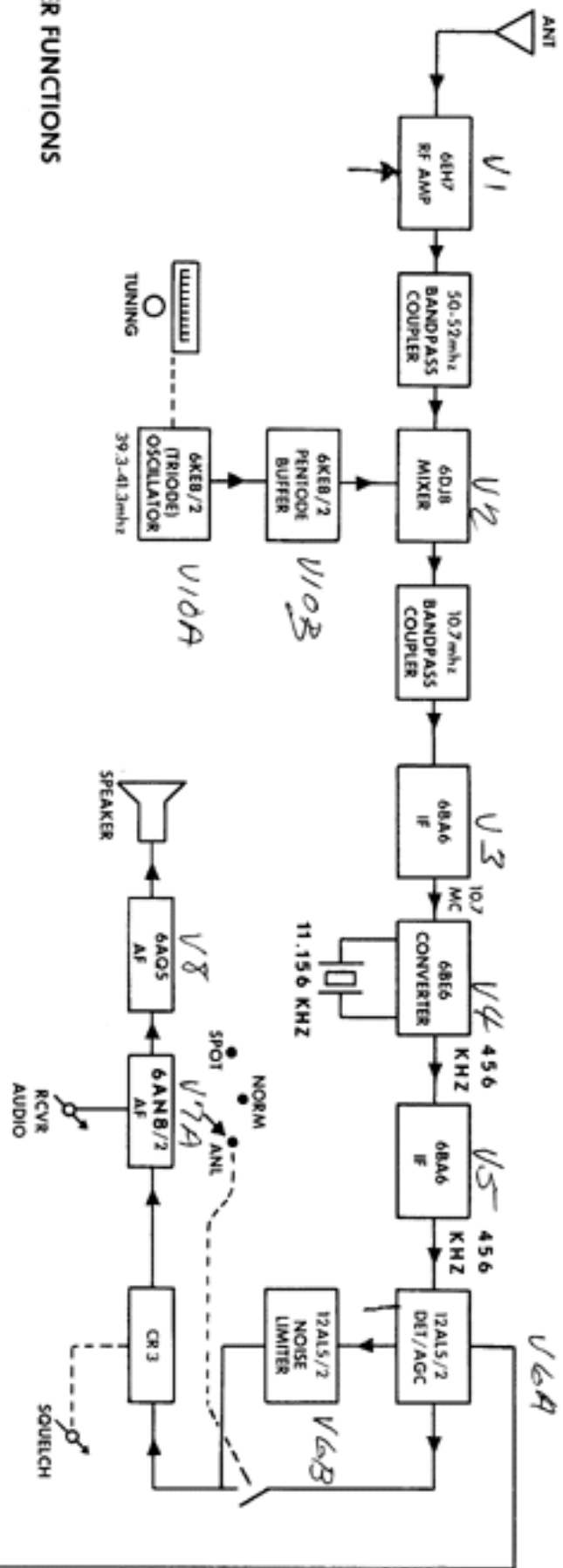
The squelch circuit is intentionally of the "leaky" type in which some receiver audio output can always be heard. When a station is received at sufficient strength to activate the squelch, output will increase from a low level to a suitable comfortable level approximately 20 db louder.

B. TRANSMITTER SECTION

1. Install a suitable crystal into the panel crystal socket. Be sure the crystal meets the specifications shown above in Step 6, Receiver Section and Section B. of page 3.
2. Connect a high impedance push-to-talk microphone with a properly wired plug into the MIC jack. See the diagram on page 5 for connections. The Squires-Sanders #551-001 microphone is recommended and is available from your local electronics distributor.
3. Set the SPEECH GAIN control on rear of chassis to mid range position. See page 4 for location.
4. Depress the push-to-talk button on the microphone and adjust the DRIVER, TUNE, and LOAD controls for maximum reading on the S-Meter. The S-Meter will read near midscale with 13 watts or more output if the antenna VSWR is near unity.
5. Speak into the microphone and advance the SPEECH GAIN control until a slight flicker of the S-Meter is observed. This completes the transmitter tuneup and operation.

* Temporarily remove the antenna for this adjustment.

66'er FUNCTIONAL BLOCK DIAGRAMS



IV. THOERY OF OPERATION

A. RECEIVER

V1 (6EH7) is a high gm pentode operated as ^a low noise RF amplifier with band pass coupling (50 - 52 mhz.) into V2 (6DJ8). V2 is a low-noise first conversion stage to 10.7 mhz. first IF.

Injection at the signal frequency minus 10.7 mhz. is provided by V10 (6KE8) where the triode section is utilized as a stable 39.3 to 41.3 mhz. tunable oscillator and the pentode stage performs as a buffer amplifier.

10.7 mhz. output from V2 is amplified in V3 (6BA6) and converted to 455 KHz. in V4 (6BE6). Self excitation of this conversion is used with the injection frequency at 11,156 KHz. established by the crystal, Y1.

V5 (6BA6) provides amplification at the 455 KHz. second IF frequency.

V6A (1/2 12AL5) functions as a conventional diode AM detector. AGC voltage is generated by this same stage and applied to V3, V4, and V5 directly. ~~AGC is applied to V1 through Zener diode CR1 (1884). This technique delays application of AGC to V1 until comparatively large input signals exist.~~

V6B (1/2 12AL5) serves as a series gate impulse noise limiter.

Diode CR 3 functions as a series squelch diode and is arranged to open the audio circuit between the detector output and the first audio stage whenever its cathode is more positive than its anode voltage. Anode voltage is varied automatically by the screen voltage of V5, which inherently follows the AGC level. Cathode voltage (of CR3) is preset to the desired threshold level by means of SQUELCH control, R 41.

Receiver audio gain is controlled by R 44. To prevent the setting of R 44 from influencing audio gain when the 66'er is in the transmit mode, CR 4 is utilized as a diode switch closed in the receive mode only by application of suitable bias via R 45 and R 46.

V7A functions as a conventional audio stage as does V8 (6AQ5) in the receive mode. (R 56, the Transmitter Speech Gain Control is deactivated in the receive mode by diode CR 5 in a manner similiar to that described for CR 4 above.)

B. TRANSMITTER

V11A (6KE8 triode section) functions as a Colpitts crystal oscillator. Output at crystal harmonics (25 to 26 mhz.) is band pass coupled to V11B (6KE8 pentode section.) V11B is a frequency doubler to 50 - 52 mhz. and is also band pass coupled to V12 (12BY7), the driver stage. Considerable reduction in spurious output is achieved by using straight through operation in the driver stage.

PARTS LIST

ITEM	DESCRIPTION	PART NUMBER
C1	CAPACITOR, DISC CERAMIC, 5.6 PF, $\pm 5\%$, NPO, 1 KV	101-109
C2	CAPACITOR, VARIABLE TRIMMER, .5-5 PF	116-001
C3	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C4	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C5	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C6	CAPACITOR, DISC CERAMIC, 6.8 PF, $\pm 5\%$, NPO, 1 KV	100-110
C7	CAPACITOR, DISC CERAMIC, 6.8 PF, $\pm 5\%$, NPO, 1 KV	100-110
C8	CAPACITOR, DISC CERAMIC, .01 PF, $\pm 5\%$, NPO, 1 KV	100-120
C9	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C10	CAPACITOR, DISC CERAMIC, .01 MFD, +80-20%, 500 V	102-069
C11	CAPACITOR, DISC CERAMIC, 55 PF	101-121
C12	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C13	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C14	CAPACITOR, DISC CERAMIC, 47 PF, $\pm 5\%$, NPO, 1 KV	100-120
C15	CAPACITOR, VARIABLE TRIMMER, .5-5 PF	116-001
C16	CAPACITOR, DISC CERAMIC, .01 MFD, +80-20%, 500V	102-069
C17	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C18	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C19	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C20	NOT USED	
C21	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C22	CAPACITOR, DISC CERAMIC, 27 PF, $\pm 5\%$, NPO, 1 KV	100-117
C23	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C24	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C25	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C26	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C27	CAPACITOR, DISC CERAMIC, 1 PF, ± 25 PF, NPO, 1 KV	100-100
C28	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C29	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C30	NOT USED	
C31	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C32	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C33	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C34	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C35	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C36	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C37	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C38	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C39	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C40	NOT USED	
C41	CAPACITOR, MYLAR, .1 MFD, $\pm 10\%$, 400 V	105-304
C42	CAPACITOR, DISC CERAMIC, .05 MFD, $\pm 10\%$, 1 KV	102-059
C43	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C44	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C45	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C46	CAPACITOR, DISC CERAMIC, 22 PF, $\pm 5\%$, NPO, 1 KV	100-116
C47	CAPACITOR, DISC CERAMIC, .05 MFD, $\pm 10\%$, 1 KV	102-059
C48	CAPACITOR, DISC CERAMIC, .01 MFD, +80-20%, 500 V	102-069
C49	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C50	NOT USED	
C51	CAPACITOR, DISC CERAMIC, 5.6 MFD @ 5.6 V	107-025
C52	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C53	CAPACITOR, DISC CERAMIC, .05 MFD, $\pm 10\%$, 1 KV	102-059
C54	CAPACITOR, ELECTROLYTIC, 10 MFD @ 25 V	107-019
C55	CAPACITOR, DISC CERAMIC, .01 MFD, +80-20%, 500 V	102-069
C56	CAPACITOR, ELECTROLYTIC, 10 MFD, @ 25 V	107-019
C57	CAPACITOR, ELECTROLYTIC, 10 MFD @ 25 V	107-019
C58	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C59	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C60	NOT USED	
C61	CAPACITOR, AIR-VARIABLE, 6.8-20 PF	110-026
C62	CAPACITOR, SILVER MICA, 110 PF, $\pm 5\%$	103-117
C63	CAPACITOR, SILVER MICA, 39 PF, $\pm 5\%$	103-102
C64	CAPACITOR, TUBULAR CERAMIC, 10 PF, $\pm 5\%$, N750	105-030
C65	CAPACITOR, SILVER MICA, 240 PF, $\pm 2\%$	103-138
C66	CAPACITOR, SILVER MICA, 110 PF, $\pm 5\%$	103-117
C67	CAPACITOR, DISC CERAMIC, 27 PF, $\pm 5\%$, NPO, 1 KV	100-117
C68	NOT USED	
C69	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C70	NOT USED	
C71	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C72	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C73	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C74	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V	102-056
C75	CAPACITOR, DIPPED MICA, 18 PF, $\pm 5\%$, 500 V	104-103
C76	CAPACITOR, DISC CERAMIC, 10 PF, $\pm 5\%$, NPO, 1 KV	100-112
C77	CAPACITOR, DISC CERAMIC, 27 PF, $\pm 5\%$, NPO, 1 KV	100-117
C78	CAPACITOR, DISC CERAMIC, 68 PF, $\pm 5\%$, NPO, 1 KV	100-122
C79	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C80	NOT USED	
C81	CAPACITOR GIMMICK	
C82	CAPACITOR, DISC CERAMIC, 6.8 PF, $\pm .25\%$, NPO, 1 KV	100-110
C83	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C84	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C85	CAPACITOR, DISC CERAMIC, 10 PF, $\pm 5\%$, NPO, 1 KV	100-112
C86	CAPACITOR, DISC CERAMIC, .0022, +80-20%, 1 KV	102-043
C87	CAPACITOR, DISC CERAMIC, 6.8 PF, $\pm .25$ PF, NPO, 1 KV	100-110
C88	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C89	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C90	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C91	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C92	CAPACITOR, AIR VARIABLE, 2-7 PF	110-024
C93	CAPACITOR, DISC CERAMIC, 68 PF, $\pm 5\%$, NPO, 1 KV	100-122
C94	CAPACITOR, DISC CERAMIC, 2.2 PF, $\pm .25$ PF, NPO, 1 KV	100-104
C95	CAPACITOR GIMMICK	
C96	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C97	CAPACITOR, DISC CERAMIC, 470 PF, $\pm 10\%$, 1 KV	101-003
C98	CAPACITOR, SILVER MICA, 300 PF, 22, 1500 V	103-129
C99	CAPACITOR, AIR VARIABLE, 3-10 PF	110-025
C100	CAPACITOR, DISC CERAMIC, .02 MFD, $\pm 80-20\%$, 500 V	102-056
C101	CAPACITOR, VARIABLE, 6.2 to 142 PF	110-030
C102	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 500 V	102-070
C103	CAPACITOR, ELECTROLYTIC, 50 MFD, 25 V	107-022

ITEM	DESCRIPTION	PART NUMBER
C104	CAPACITOR, ELECTROLYTIC, 50 MFD, 25 V	107-022
C105	CAPACITOR, DISC CERAMIC, .005 MFD, +80-20%, 150 VAC	102-077
C106	CAPACITOR, ELECTROLYTIC, 250 MFD, 25 V	107-011
C107	CAPACITOR, ELECTROLYTIC, 50 MFD, 25 V	107-022
C108	CAPACITOR, ELECTROLYTIC, 50 MFD, 25 V	107-022
C109	CAPACITOR, ELECTROLYTIC, 100, 40 MFD @ 450 V, 20 @ 350 V	108-208
C110	NOT USED	
C111	CAPACITOR, ELECTROLYTIC, 40 MFD, 350 V	107-022
C112	CAPACITOR, DISC CERAMIC, .01 MFD, +80-20%, 500 V	102-069
C113	CAPACITOR, DISC CERAMIC, .0022 MFD, +80-20%, 1 KV	102-043
C114		
C116		
CR1	DIODE, SILICON, TYPE T156	142-001
CR2	DIODE, GERMANIUM, TYPE IN34	141-001
CR3	DIODE, SILICON, TYPE T156	142-001
CR4	DIODE, SILICON, TYPE T156	142-001
CR5	DIODE, SILICON, TYPE T156	142-001
CR6	DIODE, SILICON, TYPE SD4	142-004
CR7	DIODE, SILICON, TYPE SD4	142-004
CR8	DIODE, SILICON, TYPE SD4	142-004
CR9	DIODE, SILICON, TYPE SD4	142-004
CR10	DIODE, SILICON, TYPE ED3001	142-002
CR11	DIODE, SILICON, TYPE ED3001	142-002
CR12	DIODE, SILICON, TYPE SD4	142-004
F1	FUSE, 3AG, 15 AMP, 32 VOLTS	160-025
F2	FUSE, 3AG, 2 AMP, SLO-BLO, 125 V	165-020
I1	LAMP, INCANDESCENT, FROSTED, #1847	150-101
I2	LAMP, INCANDESCENT, FROSTED, #1847	150-101
J1	PLUG, 12 PIN CHASSIS MOUNT	292-020
J2	CONNECTOR, UHF	291-101
J3	PHONE JACK, 1 PIN	293-003
J4	PHONE JACK, 1 PIN	293-003
J5	PHONE JACK, 1 PIN	293-003
J6	PHONE JACK, 1 PIN	293-003
J7	PHONE JACK, MIC	293-006
K1	RELAY, 4 PDT, 12 VDC	174-002
L1	COIL, SLUG TUNED 0.5 - 1.0 μ h	182-007
L2	COIL, SLUG TUNED 0.5 - 1.0 μ h	182-007
L3	COIL, SLUG TUNED 0.5 - 1.0 μ h	182-007
L4	COIL, SLUG TUNED 7-18 μ h / 10-1/2 T SEC.	182-034
L5	COIL, SLUG TUNED 2.57 - 6.3 μ h	182-074
L6	COIL, CHOKE, RF, 120 μ h	190-008
L7	COIL, CHOKE, 20 T, #26 WOUND ON 6.8K, 1 W, RESISTOR	190-016
L8	COIL, SLUG TUNED, 0.43 - 0.70 μ h	182-030
L9	COIL, SLUG TUNED, 1.7 - 4 μ h	182-015
L10	COIL, SLUG TUNED, 1.7 - 4 μ h	182-015
L11	COIL, SLUG TUNED, .36 - .72 μ h/1-1/2 T SEC.	182-020
L12	COIL, SLUG TUNED, .36 - .72 μ h/1-1/2 T SEC.	182-020
L13	COIL, CHOKE, RF, 7 μ h	190-002
L14	COIL, 11 TURNS, 16TPI, 5/8" DIA.	191-010
L15	COIL, CHOKE, RF, 7 μ h INSULATED	190-004
L16	COIL, 4 TURNS, 8 TPI, 1-1/4 DIA.	191-055
M1	METER "S" SCALE, 0-1 MA	409-004
Q1	TRANSISTOR, POWER, 2N2869 RCA	200-019
Q2	TRANSISTOR, POWER, 2N2869 RCA	200-019
R1	RESISTOR, COMP., 330 K, \pm 10%, 1/2 W.	223-334
R2	RESISTOR, COMP., 270 OHMS, \pm 10%, 1/2 W.	223-271
R3	RESISTOR, COMP., 33 K, \pm 10%, 1 W.	223-333
R4	RESISTOR, COMP., 1.2 K, \pm 10%, 1/2 W.	223-122
R5	RESISTOR, COMP., 220 K, \pm 10%, 1/2 W.	223-224
R6	RESISTOR, COMP., 680 OHMS, \pm 10%, 1/2 W.	223-681
R7	RESISTOR, COMP., 10 K, \pm 10%, 1/2 W.	223-103
R8	RESISTOR, COMP., 27 OHMS, \pm 10%, 1/2 W.	223-270
R9	RESISTOR, COMP., 2.2 K, \pm 10%, 1/2 W.	223-222
R10	RESISTOR, COMP., 33 K, \pm 10%, 1 W.	223-333
R11	RESISTOR, COMP., 18 K, \pm 10%, 1 W.	227-183
R12	RESISTOR, COMP., 220 K, \pm 10%, 1/2 W.	223-224
R13	RESISTOR, COMP., 150 OHMS, \pm 10%, 1/2 W.	223-151
R14	RESISTOR, COMP., 33 K, \pm 10%, 1/2 W.	223-333
R15	RESISTOR, COMP., 1.8 K, \pm 10%, 1/2 W.	223-182
R16	RESISTOR, COMP., 220 K, \pm 10%, 1/2 W.	223-224
R17	RESISTOR, COMP., 560 OHMS, \pm 10%, 1/2 W.	223-561
R18	RESISTOR, COMP., 47 K, \pm 10%, 1/2 W.	223-473
R19	RESISTOR, COMP., 12 K, \pm 10%, 1 W.	225-123
R20	RESISTOR, COMP., 47 OHMS, \pm 10%, 1/2 W.	223-470
R21	RESISTOR, COMP., 1.8 K, \pm 10%, 1/2 W.	223-182
R22	RESISTOR, COMP., 220 K, \pm 10%, 1/2 W.	223-224
R23	RESISTOR, COMP., 1 K, \pm 10%, 1/2 W.	223-102
R24	RESISTOR, VARIABLE W/SWITCH 5 K	241-005
R25	RESISTOR, COMP., 3.3 K, \pm 10%, 1 W.	223-332
R26	RESISTOR, COMP., 6.8 K, \pm 10%, 1/2 W.	223-682
R27	RESISTOR, COMP., 680 K, \pm 10%, 1/2 W.	223-68

PARTS LIST (Cont'd.)

ITEM	DESCRIPTION	PART NUMBER
R30	RESISTOR, COMP., 100 K, $\pm 10\%$, 1/2 W	223-104
R31	RESISTOR, COMP., 1 MEG, $\pm 10\%$, 1/2 W	223-105
R32	RESISTOR, COMP., 33 K, $\pm 10\%$, 1/2 W	223-333
R33	RESISTOR, COMP., 47 K, $\pm 10\%$, 1/2 W	223-473
R34	RESISTOR, COMP., 220 K, $\pm 10\%$, 1/2 W	223-224
R35	RESISTOR, COMP., 4.7 K, $\pm 10\%$, 1/2 W	223-472
R36	RESISTOR, COMP., 220 K, $\pm 10\%$, 1/2 W	223-224
R37	RESISTOR, COMP., 1.2 MEG, $\pm 10\%$, 1/2 W	223-125
R38	RESISTOR, COMP., 1.2 MEG, $\pm 10\%$, 1/2 W	223-125
R39	RESISTOR, COMP., 1 MEG, $\pm 10\%$, 1/2 W	223-105
R40	RESISTOR, COMP., 470 K, $\pm 10\%$, 1/2 W	223-474
R41	RESISTOR, VARIABLE W/SWITCH 100 K	240-007
R42	RESISTOR, COMP., 68 K, $\pm 10\%$, 1/2 W	223-683
R43	RESISTOR, COMP., 120 K, $\pm 10\%$, 1/2 W	223-124
R44	RESISTOR, VARIABLE W/SWITCH, 1 MEG	245-005
R45	RESISTOR, COMP., 1.2 MEG, $\pm 10\%$, 1/2 W	223-125
R46	RESISTOR, COMP., 1.2 MEG, $\pm 10\%$, 1/2 W	223-125
R47	RESISTOR, COMP., 220 K, $\pm 10\%$, 1/2 W	223-224
R48	RESISTOR, COMP., 2.2 MEG, $\pm 10\%$, 1/2 W	223-225
R49	RESISTOR, COMP., 1 MEG, $\pm 10\%$, 1/2 W	223-105
R50	RESISTOR, COMP., 680 K, $\pm 10\%$, 1/2 W	223-684
R51	RESISTOR, COMP., 220 K, $\pm 10\%$, 1/2 W	223-224
R52	RESISTOR, COMP., 680 OHMS, $\pm 10\%$, 1/2 W	223-581
R53	RESISTOR, COMP., 4.7 K, $\pm 10\%$, 1/2 W	223-472
R54	RESISTOR, COMP., 3.3 MEG, $\pm 10\%$, 1/2 W	223-335
R55	RESISTOR, COMP., 2.7 K, $\pm 10\%$, 1/2 W	223-272
R56	RESISTOR, VARIABLE W/SWITCH, 100 K	240-007
R57	RESISTOR, COMP., 470 K, $\pm 10\%$, 1/2 W	223-474
R58	RESISTOR, COMP., 470 K, $\pm 10\%$, 1/2 W	223-474
R59	RESISTOR, COMP., 82 K, $\pm 10\%$, 1/2 W	223-823
R60	RESISTOR, COMP., 33 OHMS, $\pm 10\%$, 1/2 W	223-330
R61	RESISTOR, COMP., 220 K, $\pm 10\%$, 1/2 W	223-224
R62	RESISTOR, COMP., 470 OHMS, $\pm 10\%$, 1 W	225-471
R63	RESISTOR, COMP., 470 K, $\pm 10\%$, 1/2 W	223-474
R64	RESISTOR, COMP., 10 K, $\pm 10\%$, 1/2 W	223-103
R65	RESISTOR, COMP., 470 OHMS, $\pm 10\%$, 1 W	225-471
R66	RESISTOR, COMP., 100 K, $\pm 10\%$, 2 W	227-104
R67	RESISTOR, COMP., 39 K, $\pm 10\%$, 1/2 W	223-393
R68	RESISTOR, COMP., 39 K, $\pm 10\%$, 1/2 W	223-393
R69	RESISTOR, COMP., 150 OHMS, $\pm 10\%$, 1/2 W	223-151
R70	RESISTOR, COMP., 1.2 MEG, $\pm 10\%$, 1/2 W	223-125
R71	RESISTOR, COMP., 10 K, $\pm 10\%$, 1 W	225-103
R72	RESISTOR, COMP., 6.8 K, $\pm 10\%$, 1 W	225-682
R73	RESISTOR, COMP., 39 K, $\pm 10\%$, 1/2 W	223-393
R74	RESISTOR, COMP., 22 K, $\pm 10\%$, 2 W	227-223
R75	RESISTOR, COMP., 10 K, $\pm 10\%$, 1/2 W	223-103
R76	RESISTOR, COMP., 1.2 K, $\pm 10\%$, 1/2 W	223-122
R77	RESISTOR, COMP., 56 K, $\pm 10\%$, 1/2 W	223-563
R78	RESISTOR, COMP., 39 K, $\pm 10\%$, 1/2 W	223-393
R79	RESISTOR, COMP., 1.2 K, $\pm 10\%$, 1/2 W	223-122
R80	NOT USED	
R81	RESISTOR, COMP., 68K $\pm 10\%$, 1/2 W	223-683
R82	RESISTOR, COMP., 180 K, $\pm 10\%$, 1/2 W	223-184
R83	RESISTOR, COMP., 22 OHMS, $\pm 10\%$, 1/2 W	223-220
R84	RESISTOR, COMP., 18 K, $\pm 10\%$, 2 W	227-183
R85	RESISTOR, COMP., 82 OHMS, $\pm 10\%$, 1/2 W	223-820
R86	RESISTOR, COMP., 120 K, $\pm 10\%$, 1/2 W	223-124
R87	RESISTOR, COMP., 12 K, $\pm 10\%$, 1/2 W	223-123
R88	RESISTOR, COMP., 27 K, $\pm 10\%$, 1 W	225-273
R89	RESISTOR, COMP., 8.2 K, $\pm 10\%$, 1/2 W	223-822
R90	NOT USED	
R91	RESISTOR, COMP., 8.2 OHMS, $\pm 5\%$, 1/2 W	222-082
R92	RESISTOR, W.W., 150 OHMS, 5 W	232-006
R93	RESISTOR, W.W., 150 OHMS, 5 W	232-006
R94	RESISTOR, COMP., 8.2 OHMS, $\pm 5\%$	222-082
R95	RESISTOR, COMP., 22 OHMS, $\pm 10\%$, 1/2 W	223-220
R96	RESISTOR, W.W., 75 OHMS, 5 W	232-009
R97	RESISTOR, W.W., 2 K, $\pm 10\%$, 10 W	233-007
R98	RESISTOR, COMP., 1.2 K, $\pm 10\%$, 1/2 W	223-122
R99	RESISTOR, COMP., 100 OHMS, $\pm 10\%$, 1/2 W	223-101
R100	NOT USED	
R101	NOT USED	
R102	RESISTOR, COMP., 120 OHMS, $\pm 10\%$, 1/2 W	223-121
R103	NOT USED	
R104	RESISTOR, COMP., 100 OHMS, $\pm 10\%$, 1/2 W	223-101
R105	RESISTOR, COMP., 47 OHMS, $\pm 10\%$, 1 W	225-470
S1	PART OF R44	
S2	ROTARY, 2 POLE, 3 POS, NON-SHORTING	272-007
T1	TRANSFORMER, I. F. 10.7 MC	602-002
T2	TRANSFORMER, I.F. 456 KC	602-001
T3	TRANSFORMER, I.F. 456 KC	602-001
T4	TRANSFORMER, MODULATION & AUDIO OUTPUT	604-004
T5	TRANSFORMER, POWER #3019	601-011
V1	TUBE, ELECTRON, TYPE 6EH7	216-023
V2	TUBE, ELECTRON, TYPE 6DJ8	216-021
V3	TUBE, ELECTRON, TYPE 6BA6	216-009
V4	TUBE, ELECTRON, TYPE 6BE6	216-010
V5	TUBE, ELECTRON, TYPE 6BA6	216-009
V6	TUBE, ELECTRON, TYPE 12AL5	211-001
V7	TUBE, ELECTRON, TYPE 12AX7	211-003
V8	TUBE, ELECTRON, TYPE 6AQ5	216-006
V9	TUBE, ELECTRON, TYPE 6AQ5	216-006
V10	TUBE, ELECTRON, TYPE 6KE8	216-036
V11	TUBE, ELECTRON, TYPE 6KE8	216-036
V12	TUBE, ELECTRON, TYPE 12BY7	211-011
V13	TUBE, ELECTRON, TYPE 2E26	212-001

ITEM	DESCRIPTION	PART NUMBER
	CHASSIS	341-014
	CHASSIS, LOW PASS FILTER	341-017
	DIAL PLATE, PLASTIC	339-020 (66'er)
	DUST COVER	342-026
	FRONT PANEL	340-009 (66'er)
	SPEAKER	550-001
	BALL DRIVE	328-039M
	BUMPER, SMALL	332-019
	BUMPER, LARGE	332-016
	CAP, PLATE	320-502
	CABLE, JUMPER ASSEMBLY (SHIELDED CABLE 6" & PLUGS)	510-017
	CORD, DIAL-NYLON	338-007
	COUPLER, SHAFT	328-058
	FUSE HOLDER	300-001
	GROMMET, 1/4 I.D.	332-003
	KNOB, CONTROL, LARGE	330-323
	KNOB, TUNING, SMALL	330-333
	LAMPHOLDER, DIAL	301-107
	CABLE ASSEMBLY, A.C. POWER	510-016
	POINTER, DIAL	328-036
THE FOLLOWING CHANGES AND ADDITIONS SHOULD BE READ INTO THE ABOVE PARTS LIST.		
CHANGES		
C30	CAPACITOR, DISC CERAMIC, .01 MFD, +80-20%, 500 V.	102-069
C55	CAPACITOR, DISC CERAMIC, .02 MFD, +80-20%, 500 V.	102-056
C68	CAPACITOR, DISC CERAMIC, 3.3 PF, $\pm 5\%$	100-106
CR1	DIODE, SILICON, TYPE T156	142-001
R31	RESISTOR, COMP., 470 K, $\pm 10\%$, 1/2 W	223-474
R35	RESISTOR, COMP., 1 K, $\pm 10\%$, 1/2 W.	223-102
R43	RESISTOR, COMP., 100 K, $\pm 10\%$, 1/2 W.	223-104
R106	RESISTOR, COMP., 470 K, $\pm 10\%$, 1/2 W.	223-474
V7	TUBE, ELECTRON, TYPE 6AN8	216-005
Y1	CRYSTAL, 11.156 mhz.	251-006

66'ER ALIGNMENT PROCEDURE

I Front End & I. F. Alignment:

A. Front End Alignment

Equipment: Sweep generator Jerrold #601 or equivalent, production scope - or equivalent, signal generator, H.P. 608 or equivalent.

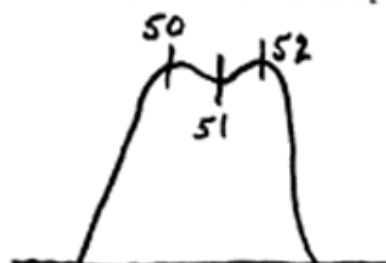
1. Connect Jerrold Sweeper (via coax.) to 66'er antenna connector and set Jerrold to:

Freq. - 15-65 MC.
Sweep Width - 3
Center Freq. - 5-9
ALC - 50%
Attenuator - 20 db in

2. Connect HP 608 (via coax.) to antenna connector through a 1PF capacitor. This is being used as a marker.
3. Disconnect VLO B+ (at load end R-74 22K 2W)
4. Connect AC coupled scope (via coax.) to pin 3 of V-2 and set scope to:

External Sync.
Vertical Att. to 2V. (Full Scale)
Sync. in via coax. from Jerrold

5. Turn on 66'er. Using 608 as a marker adjust Jerrold center freq. to center scope display at 51 mc. Increase 608 output as necessary to provide visible marker.
6. a) Adjust L2 and L3 to center response on 51MC marker.



- b) Check response width with marker at 50 & 52 mc. Response should be as shown.

- c) If too wide, cut off "gimmick" on L3 a little at a time, readjusting L2 & L3 as necessary to obtain response shown.
50 & 52 must be down less than 1 db.

B. I.F. Alignment

Equipment: Signal generator H.P. #608 or equivalent, **VIVM** RCA #WV77E or equivalent, short clip lead (3").

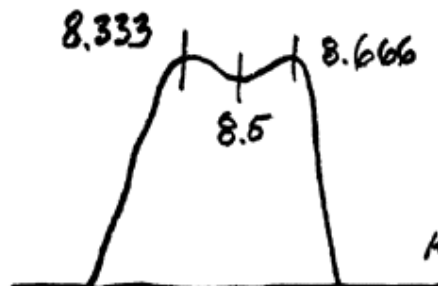
1. Connect HP 608 to antenna connector (via coax.) and set freq. to 10.7 ~~mc~~ ~~unmodu~~lated
2. Connect **VIVM** (-5v scale) to junction R-33, C 35 (AGC Buss).
3. Short ~~antenna~~ connector to pin 2 V2 via clip lead.
4. a) Increase 608 output until AGC voltage reaches -lv.
b) Adjust L4, L5, T1, T2 and T3 for maximum AGC voltage.
c) Reduce 608 output as necessary to maintain - lv.
d) Repeat step b until there is no change.

II Transmitter Alignment & VLO Tracking

A. Transmitter Alignment

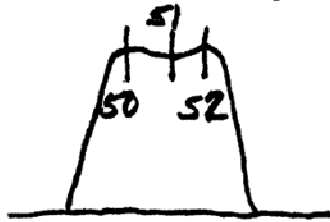
Equipment: Monitor scope
8 mc sweep generator (with 8.333, 8.5 and 8.666 xtal markers)
Dummy Load/watt meter
13 V.D.C. Supply
Production scope
Shorting mic. plug

1. Remove B+ from final amp. v13 (2E26).
2. Connect sweep output to xtal socket of 66'er.
3. Connect scope vert to junction R77, C83 (cold side of L-10).
4. Insert shorting plug in mic socket.
5. Adjust L9, C81 and L10 for response shown.



KEEP C81 AS SHORT AND
TIGHTLY TWISTED AS
POSSIBLE.

6. Move scope probe to junction ~~R~~82, C88.
7. Connect A jumper across C92.
8. Set L11 & L 12 for response shown.



11. Remove probe and sweep connections.

B. Neutralization & Power output

Remove B+ from V13

1. Connect RF detector to antenna connector.
2. Insert 8.666 mc. xtal and tune xmtr for max. R.F. output indication.
3. Neutralize by clipping "CN" until indication is at minimum.
4. Disconnect RF meter and connect Dummy load/wattmeter.
5. Replace B+ connection to V13.
6. With 8.66 mc. xtal. tune for max, and record on test data sheet.
7. Insert 8.33 mc xtal and tune for max. output - 10 watts.
8. Insert 8.500 mc xtal and tune for max. output - 10 watts.
9. Plug in mic and check modulation on wattmeter & monitor.
10. Replace AC cord with DC cord connected to 13 vdc supply.
11. Repeat step 6 above. Min - 8 watts.

III Final Test

A. Calibration

Equipment: HP 608
Speaker/Audio VTVM
Dummy Load/Wattmeter
Xtals 8.333, 8.500, 8.666 mc.

1. Connect VLO B+.
2. Set dial pointer at left marker. Check VLO tuning-capacitor (C-61) at max. (full mesh).
3. Set C-15 & C-2 at half way points.

4. Connect HP-608 (via. coax.) to antenna connector. Set HP-608 to 51 mc. (30% 1KC 50 UV).
5. Set 66'er dial to 51 mc. Tune L-8 & C-15 for max. Signal on audio VTVM connected across speaker leads.
6. Reduce HP-608 output to .5 uv. Check still audible. Then reduce HP-608 output to zero.
7. Insert 8.333 mc. xtal and set 66'er to spot.
8. Set dial to 50 mc. and tune L-8 for max. output. (s-Meter)
9. Insert 8.666 mc. xtal. and set dial to 52 mc. Adjust C-62 for max. output.
10. Repeat steps 8 & 9 until 50 & 52 mc. are on calibration.

B. Squelch (0.5 uv 1 kc, 30%)

1. Set HP-608 & dial to 51 mc. Reduce HP-608 output to zero. Advance squelch (CCW) until just past threshold of quieting. Increase HP-608 output. Squelch must break before .5 uv of output.

C. ANL

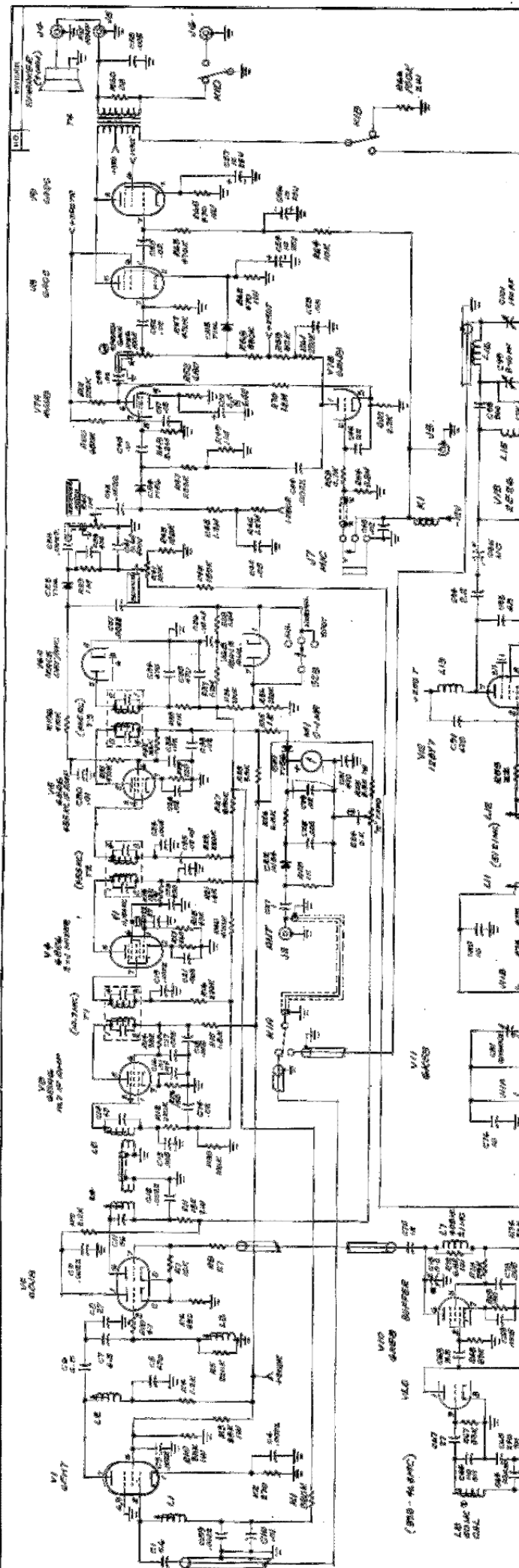
1. Set HP-608 to 2 uv (30% 1KC 51 mc.)
2. Turn on noise generator and loosely couple into antenna circuit.
3. Turn ANL on Noise should disappear from signal.

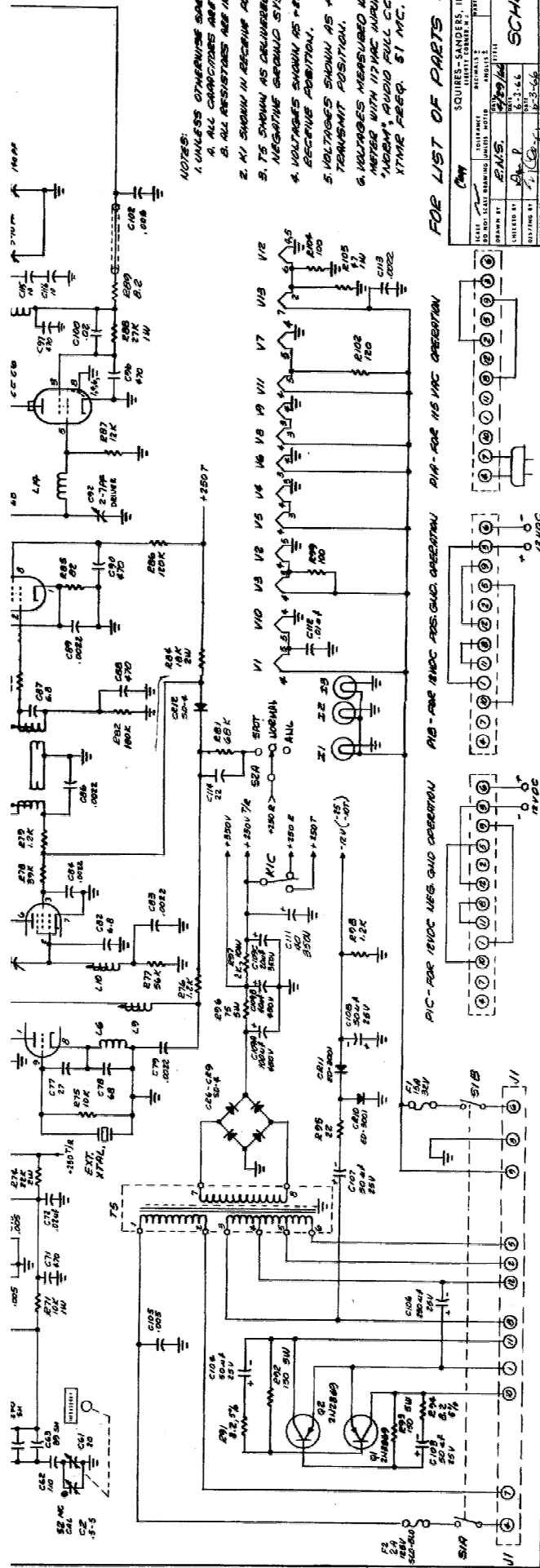
D. Sensitivity

1. Set HP-608 to .6 uv. (30% 1 Kc 51 mc.).
2. Establish 0 db audio output reference with receiver audio.
3. Remove mod and record drop in audio output. (db) Drop must be at least 10 db at any point in the band.
4. Set S-meter so S-9 = 50-u-v.

E. Audio output

1. Set HP-608 to 3 uv (30% 1KC 51 Mc.). Advance receiver audio until onset of audible distortion. At least 2.5 vac should be obtained.





FOR LIST OF PARTS SEE PL-196

QUIRES - SANDERS, INC.

SCALE	TOLERANCE	SECTION	LIBRARY
DO NOT SCALE DRAWING	(UNITS) NOTED		
DRAWN BY	E.N.S.	DATE	4-29-66
CHECKED BY	APR 2	DATE	6-3-66
DRAWING BY	A. CO.	DATE	6-3-66

ON 11 MAY 1968