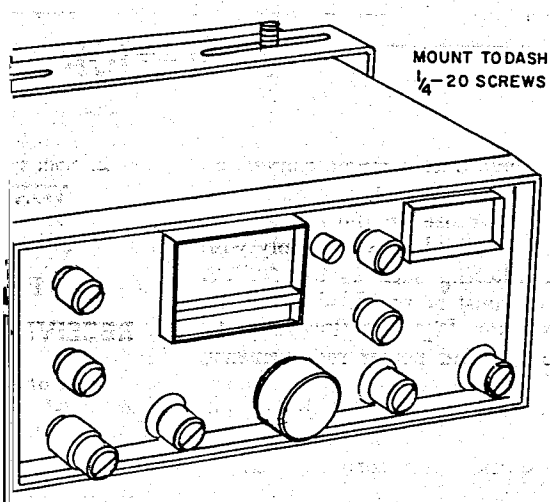

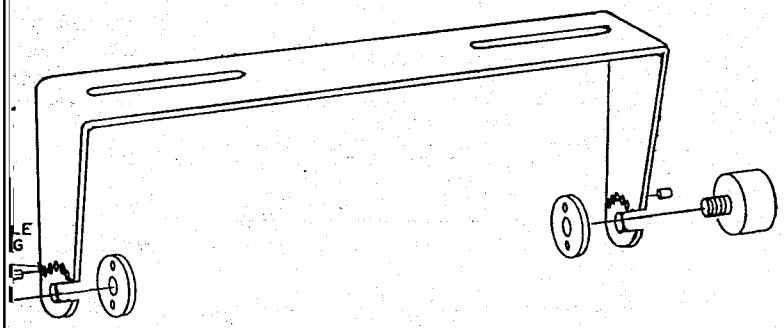

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POSITION

W POWER

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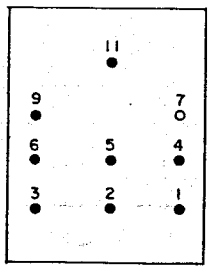
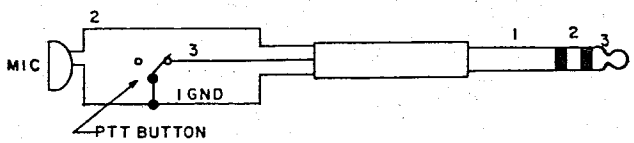
XILIARY RELAY
TROL TERMINALS

INS

1 POWER SWITCH
2 POWER SWITCH
3 -80 VOLT BIAS @ 6MA
4 12.6 VOLT HEATER @ 5A
5 SPEAKER GROUND
6 COMMON GROUND
7 SPEAKER
9 +280 VOLT @ 125 MA
11 +700 VOLT @ 300 MA



POWER CONNECTIONS



MICROPHONE CONNECTIONS

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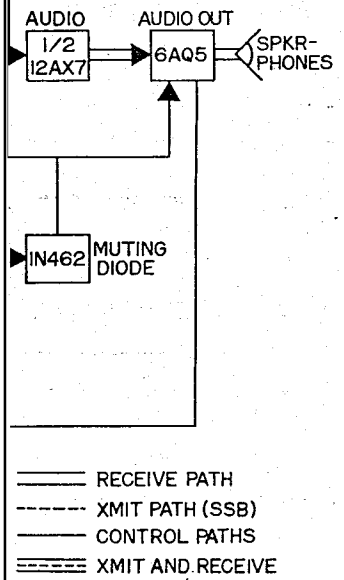
NCX-3 is best understood by
agram, figure 2.



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AM reception without BFO. At the same time, the cathode of the product detector is grounded to convert it to a grid-leak AM detector. When transmit bias is removed, the bias on the carrier oscillator disappears and normal carrier generation is obtained.

With the front panel function switch in the CW position, the plate circuit of the speech amplifier is grounded. This eliminates the possibility of the microphone producing unwanted modulation during CW operation and also prevents tripping of the VOX circuit by information entering a live microphone channel. The key is connected to the transmit bias bus on the CW position. However, to prevent accidental tripping of the transceiver, it is not connected on the AM and SSB positions. The function of the keying circuit is identical to that of the push-to-talk circuit with the exception that after the relay has tripped, as discussed on the push-to-talk function above, the delay time constant of the VOX circuit will hold the relay in a transmit condition. The key is directly connected to the transmit bias bus and each time it is opened, the transmitter will cease functioning due to the presence of bias on the transmit mixer, driver and balanced modulator. The relay will trip at the instant the key is touched. The relay will then remain open resulting in grid block keying. When keying stops, the delay time constant will allow the relay to close returning the NCX-3 to a receive condition.

Finally, with the function switch in the TUNE position the transmit bias is grounded, again placing the NCX-3 in transmit and tripping the relay. In this case, the function switch also grounds one of the deflection electrodes of the 7360 balanced modulator, providing complete carrier unbalance for purposes of tuning the transmitter.

Metering is accomplished by using an accurate D'Arsonval meter designed to read voltage across a very small value cathode resistor in the cathode return of the two 6GJ5 final amplifiers. During transmit, the S-meter side of the metering circuit is grounded, providing a direct return of the cathode current metering circuit. During receive, there is no current flowing in the 6GJ5 amplifier tubes due to the removal of screen voltage from the 6GJ5 final amplifier by the relay terminals. The S-meter amplifier cathode is ungrounded and the S-meter circuit return path is completed through the cathode resistance of the final amplifier. Thus a single meter functions as a cathode current meter when the NCX-3 is placed in a transmit condition, and as an S-meter when in a receive condition.

ED USE OF THE
UAL CONTROLS

THE PA TUNE AND PA LOAD CONTROLS

Adjustment of the PA TUNE and PA LOAD controls is inter-dependent. For normal use, the NCX-3 is placed in a TUNE position. The EXCITER TUNE control is set for maximum meter indication. The PA TUNE control is then set for minimum indication, indicating resonance of the Pi network. For a normal 40 to 60 ohm resistive antenna, the PA LOAD control should then be rotated from a maximum ccw position to increase the meter reading. As this is done, there will be some inter-action with the PA TUNE control and it will be necessary to slightly retune for minimum meter indication. As the PA LOAD is advanced, the minimum meter reading will increase. Proper loading for 200 watts peak input occurs at 300 ma. (marked in red on the meter scale). This loading current should not be exceeded since the Pi network design is such that additional power input from a 700 volt supply will not result in additional power output. Above 300 ma. the efficiency of the NCX-3 final amplifier will be impaired and no further output will be obtained.

Proper operation of any linear final amplifier depends on proper idling current adjustment and on sufficient drive for adequate peak plate current during an off-resonance condition. The adjustment of the bias setting of the NCX-3 final amplifier is discussed under a separate bias adjustment paragraph. Assuming this setting has been made for an idling current between 50 and 60 ma., it should be possible to obtain a maximum off-resonance plate current in excess of 350 ma. with the NCX-3 final amplifier. As the PA TUNE control is rotated through the minimum current point (dip), the meter should indicate a definite rise to either side of the resonant point. If 700 volts is being properly supplied to the plate circuit of the final amplifier and the EXCITER TUNE control is properly adjusted, this off-resonance current should exceed 350 ma. If this current cannot be achieved, the cause should be investigated. Typical reasons may include any of the following: improper BIAS setting, improper EXCITER TUNE adjustment, low plate supply voltage to the final amplifier under full load conditions, low driver B+, defective final amplifier tubes, or improper operation of the exciter stages resulting in low driving signal.

As mentioned above, low plate supply voltage to the final amplifier will frequently result in difficulty in obtaining a suitable off-resonance current. The NCX-A power supply is rated to deliver 700 volts to the final amplifier with a 115 VAC input. The NCX-D power supply is rated to deliver 700 volts to the plate circuit of the final amplifier with a 12.0 volt input to the power supply. If the AC line voltage or the mobile

-3 is properly matched and
ortion can result with any
3 transmitter or transceiver

ONTROL

itions discussed under PA
control settings above, one
7360 balanced modulator is
complete carrier unbalance.
per transmitter tune-up, it is
RIER BALANCE control to
-3 transceiver for operation
ration. For SSB operation,
a transmit condition, either
-to-talk button or the VOX
ıe MIC GAIN control should
so that no audio modulation
ry to rotate the EXCITER
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ontrol is then adjusted for
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ıtrol is properly set, it may
r all subsequent single-side-
ise indication of CARRIER
; may be obtained through
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ıg to the carrier on a sepa-
carrier balance and tuning
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l 0.5 volts peak-to-peak on

is necessary to adjust the
ıtrol either cw or ccw from
he final amplifier cathode
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to approximately 100 watts
er, thus assuring operation
s within their plate dissipa-

on, it is necessary to adjust
control either cw or ccw
a cathode current indica-
ed. This assures an input
00 watts during key down
operation. Normal keying
nately a 50% duty cycle;
put for approximately ½
r input for the remaining
the Time-Averaged input
ll approximately 100 watts,
tion of the final amplifier.

as been set up for proper
r and exciter stages and the
trol has been properly set

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AND RF GAIN CONTROLS

need be said about the operation of the GAIN and RF GAIN controls. The AUDIO control is adjusted for comfortable listening the loud speaker or ear phones. The RF control may be set to individual operator pref- with the exception that the S-meter reading a function of the RF GAIN control setting.

operation of the NCX-3 S-meter is obtained RF GAIN control set in its full cw position.

ER ADJUSTMENT

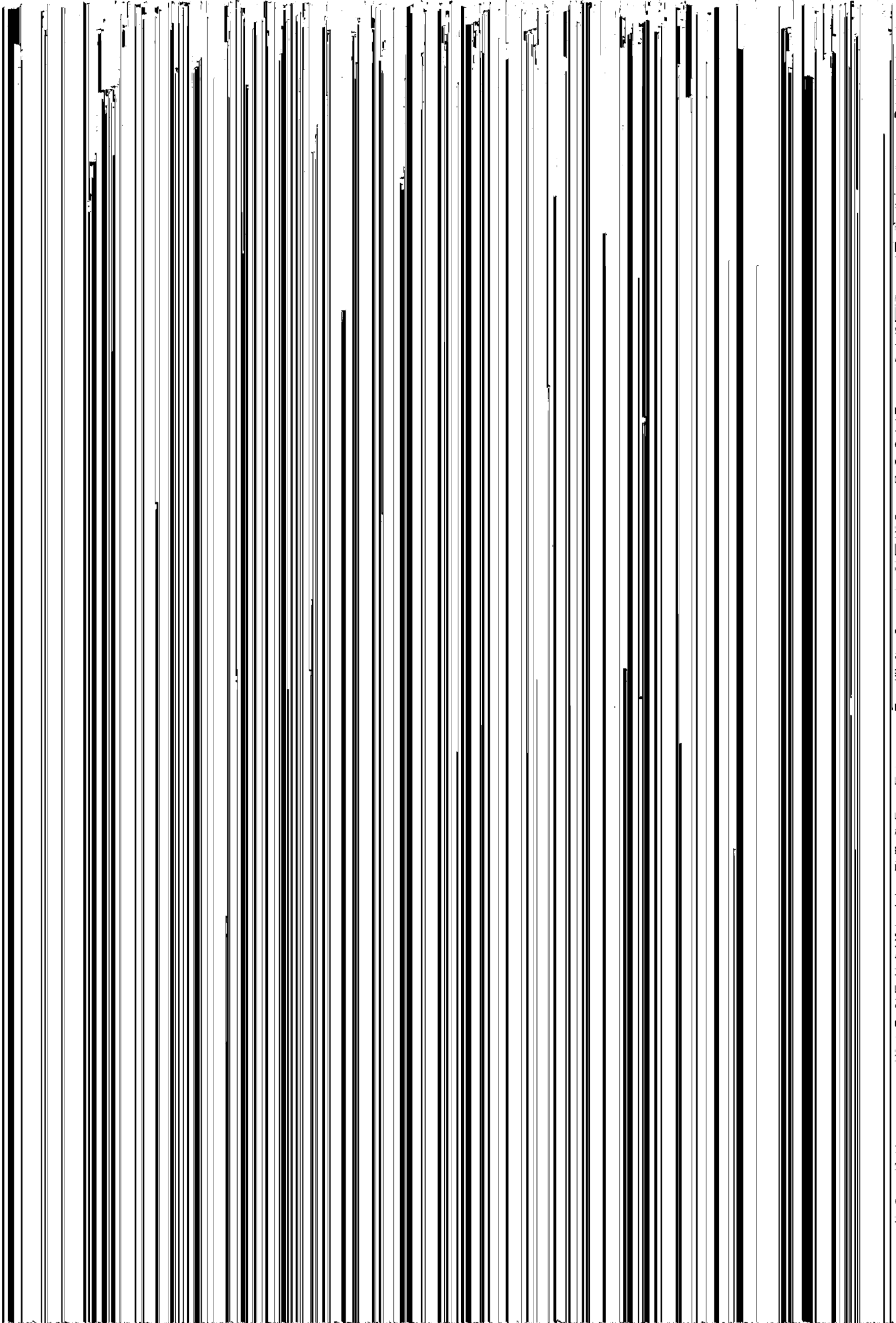
r S-meter adjustment of the NCX-3 is ob- by disconnecting the antenna with the NCX-3 SSB reception and the RF gain fully cw. The adjustment is rotated until the meter indicates 0 and 1 "S" unit on the S-meter. When the is reconnected, the S-meter will indicate the strength of incoming signal or background the antenna circuit.

TT SWITCH AND VOX CIRCUIT TMENTS

VOX-PTT switch is located on the rear panel. be set to either mode of operation depending vidual operator preference or whether or not rophone is equipped with a push-to-talk but- oper microphone jack connections are illus- figure 1.

ning that VOX operation is selected, the oper- find that the VOX SENSITIVITY and VOX control settings of the NCX-3 are remarkably m interaction. The extreme VOX sensitivity e in the NCX-3 permits full anti-vox insertion mes. As a result no control potentiometer is . The VOX SENSITIVITY control is advanced until the microphone just trips with normal level. Mobile operation at this level should be lose talk to the microphone since the high level wind and motor noises will otherwise tend to ally trip the VOX circuit. The VOX DELAY is then adjusted for the desired release time. time in the order of 1/10 of a second will be in the full ccw position of the VOX DELAY nd in the order of a second or more in the full ion of the VOX DELAY control.

uld be further noted that PTT and CW break- tion is obtained through use of the VOX cir- wever, the VOX SENSITIVITY control will effect on this operation and may be left in any The VOX DELAY control is effective on both l CW break-in operation and should be ad- the operator's individual preference for delay d of the keying sequence or upon release of the ton.



. Adjust the 80 meter coil (L16) for zero
ow set the signal generator input for 3.5 mc.
the main tuning dial toward 3.5 mc. A beat
ld be obtained in the region of 3.5 mc. on the
this beat note occurs at a dial setting above
he 80 meter trimmer (C40) should be turned
ction to increase capacity. If the beat note
low 3.5 mc. on the dial, decrease the trimmer
Return the signal generator and main dial
Repeak the 80 meter coil slug for zero beat
n observe the location of the beat note near
ith the input generator set to 3.5 mc. Repeat
edure until the 3.5 mc. beat note occurs at
c. dial marking with the 4 mc. setting exactly
eat.

he input signal generator set at 4 mc., tune
beat with the main tuning dial. Switch the
nerator input to 14.4 mc. and switch the
vitch to 20 meters. A beat note should be
indicating correct alignment of the 20 meter
he difference in beat note between 80 and 20
the BAND switch is changed should not ex-
. Repeat this test at 3.5 and 13.9 mc. Again
ence in the beat note should not exceed 2 kc.
no alignment adjustment for correction of
his band-switching process. If this beat note
ed 2 kc., it will be necessary to trouble-shoot
switching circuits of the VFO.

signal generator to 7.3 mc. and the main
al to 7.3 mc. and the BAND switch to 40
Adjust the 40 meter coil (L15) for zero beat,
gnal generator to 7 mc. and tune the main
al and observe the location of zero beat. Re-
process used on the 80 meter band, adjusting
eter trimmer (C38) for alignment of the 7.3
c. points. Remove the signal generator.

IIT MIXER AND DRIVER
IENT

t the high frequency oscilloscope to the junc-
23, R3, R4 and R7 in the grid circuit of the
l amplifier. Set the BAND switch to 80
d the FUNCTION switch to tune. The relay
ain drop out indicating that the unit has
ed in a transmit condition. Set the main
l to 3.5 mc. and the EXCITER TUNE con-
Adjust the 80 meter mixer coil (L11) and
ter driver coil (L7) slugs for maximum in-
n the oscilloscope. When the slugs are prop-
ted, the peak-to-peak output voltage on the
e should exceed 100 volts. Set the main
al to 4.0 mc. and rotate the EXCITER
ntrol clockwise until a maximum is reached
cilloscope presentation. At this setting, the
ld indicate in excess of 100 volts peak-to-
compromise may be made with the settings
xer and driver slugs to achieve proper tun-
h ends of the band while remaining within
of the EXCITER TUNE control, and still
the requirement that more than 100 volts
k be available at both extremes.

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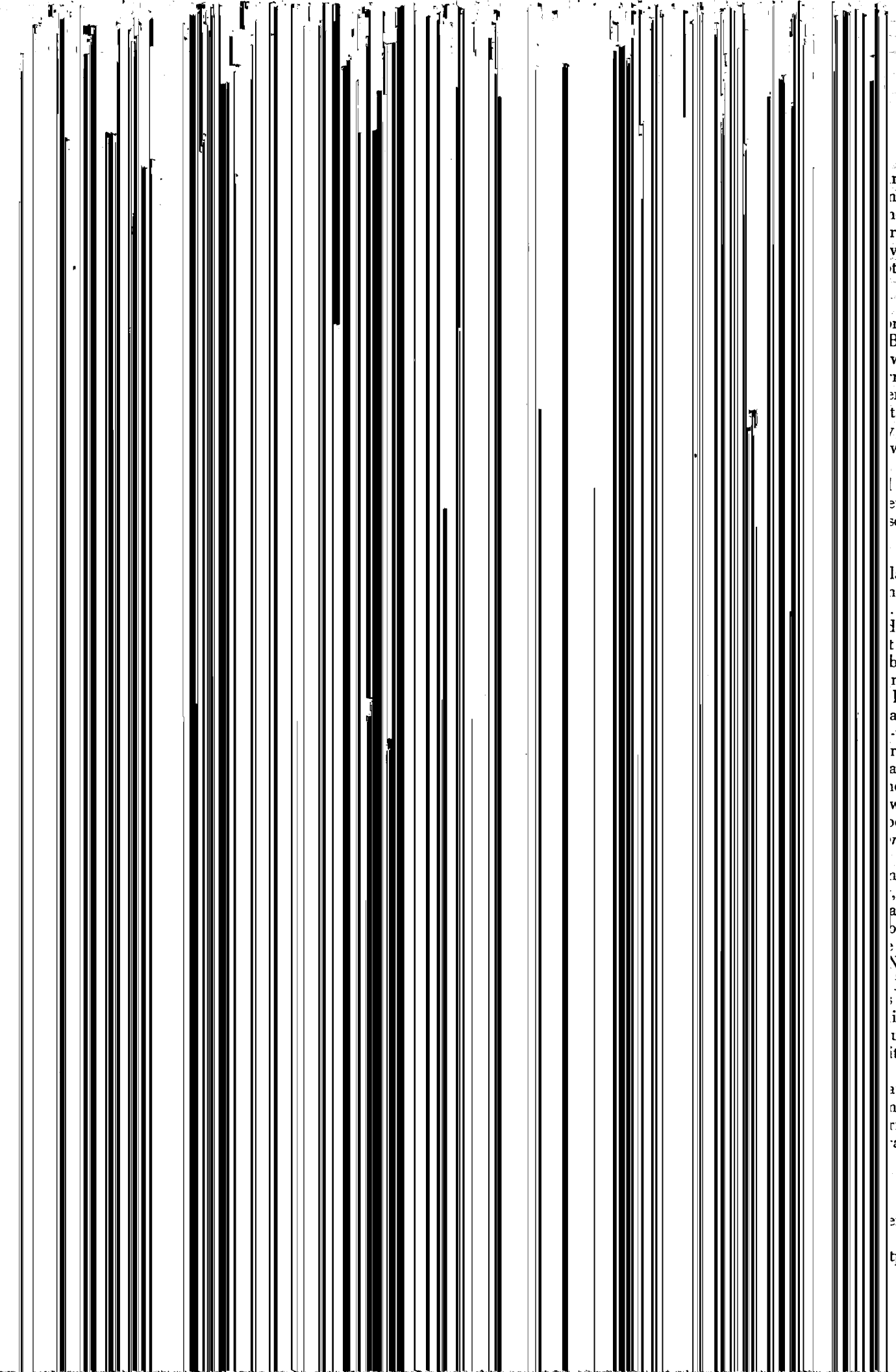

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onditions established, check the entire uence in the following manner:
ie FUNCTION switch in SSB and the itch in the PTT position. Press the utton and speak into the microphone. A output should appear on the oscilloscope. hould make a noiseless transition from nsmit. Release the push-to-talk button. ould revert to receive.
ie VOX-PTT switch in the VOX posi- speaking into the microphone, slowly VOX SENSITIVITY control until the ie unit into transmit. This transition seless except for the click of the relay. and the transmitter should return to

nto the microphone to cause the NCX-3 d adjust the VOX DELAY control full eaking and the NCX-3 should go back pproximately 1/10 of a second.
ie VOX DELAY control full cw and he microphone. The NCX-3 should nsmit; stop speaking and the NCX-3 to receive in two to three seconds. In tandard SSB signal should be observed cope while speaking into the microphone. FUNCTION switch to AM and repeat s for PTT and VOX operation.
peaking into the microphone, adjust the LANCE control from the null point and oscilloscope the introduction of carrier and signal.
e FUNCTION switch in the CW posi- e the VOX SENSITIVITY control full sensitivity). Speaking into the micro- condition should *not* result in transmit- ng.
VOX-PTT switch to PTT and press the ie NCX-3 should *not* switch into transmit. key into the key jack. A tap of the ace the NCX-3 into a transmit condi- lease of the key, the unit should revert 1/10 of a second to 2 or 3 seconds de- e setting of the VOX DELAY control.
e key closed, speak into the microphone he MIC GAIN control. There should of modulation on the oscilloscope.

11. Set the transmitting key for a long series of dots. Adjust the CARRIER BALANCE control for transmitter output just below full power. Observe the series of keying pulses on the high-frequency oscilloscope. A proper keying pulse should appear as in figure 5-K. Figure 5-L and 5-M indicate improper keying sequences.
12. Set the FUNCTION switch to TUNE. Observe that full power output is attained on the oscilloscope. Adjusting the CARRIER BALANCE control should produce no change in the output signal.
13. Speak into the microphone and advance the MIC GAIN control. There should be no evidence of modulation on the oscilloscope.

CAUTION

IN THE FOLLOWING SERIES OF TESTS, THERE IS NO LOAD ON THE TRANSMITTER OUTPUT. IF THE UNIT SHOULD GO INTO TRANSMIT UNDER THIS CONDITION, SERIOUS DAMAGE MAY OCCUR IN THE FINAL OUTPUT STAGE AND TO THE SIGNAL GENERATOR WHICH WILL BE CONNECTED TO THE ANTENNA TERMINALS.

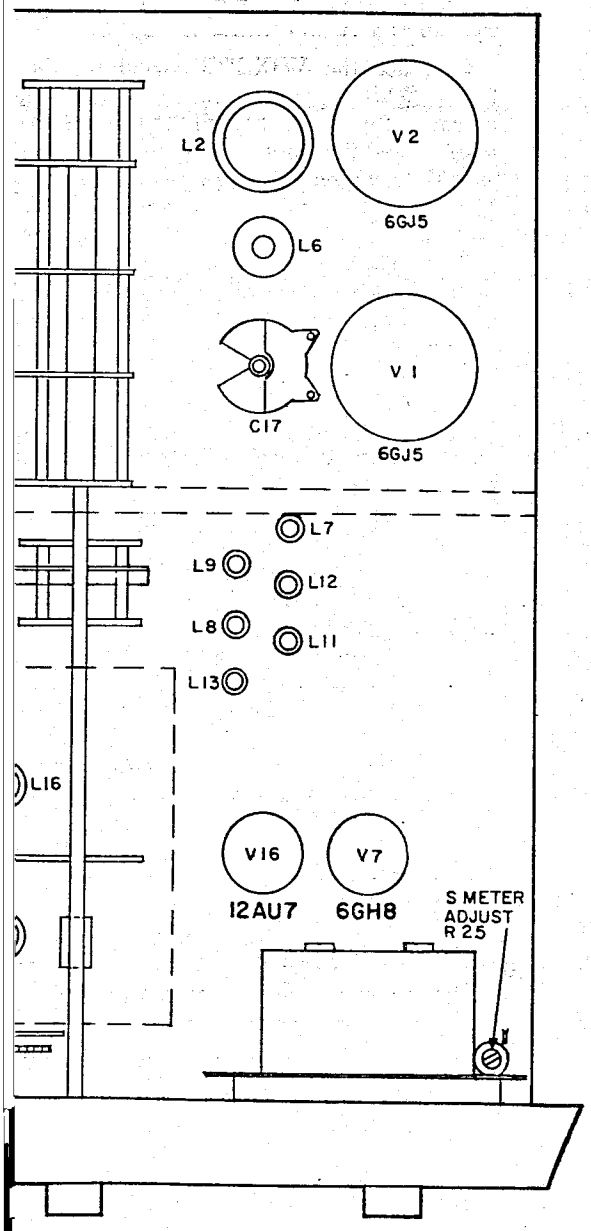
SENSITIVITY MEASUREMENTS

With the RF GAIN control in the full cw position, reduce the signal generator input to the region of 1 μv. Tune the NCX-3 for a beat note of approximately 1000 cycles and peak the EXCITER TUNE and PA LOAD Controls. Switch the signal generator output on and off and observe the change in the audio output meter reading. Adjust the signal generator input until the audio output meter rises 10 db when the signal generator is turned on. The resulting signal generator output is the receiver sensitivity. Sensitivity figures should be less than 1 μ volt at all frequencies.

Rotate the RF and AUDIO GAIN controls full ccw, set the S-meter adjust control R25 for zero on the S-meter scale.

S-METER ZERO ADJUST

Rotate the RF and AUDIO GAIN controls full ccw. set the S-meter adjust control R25 for zero on the S-meter scale.



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View

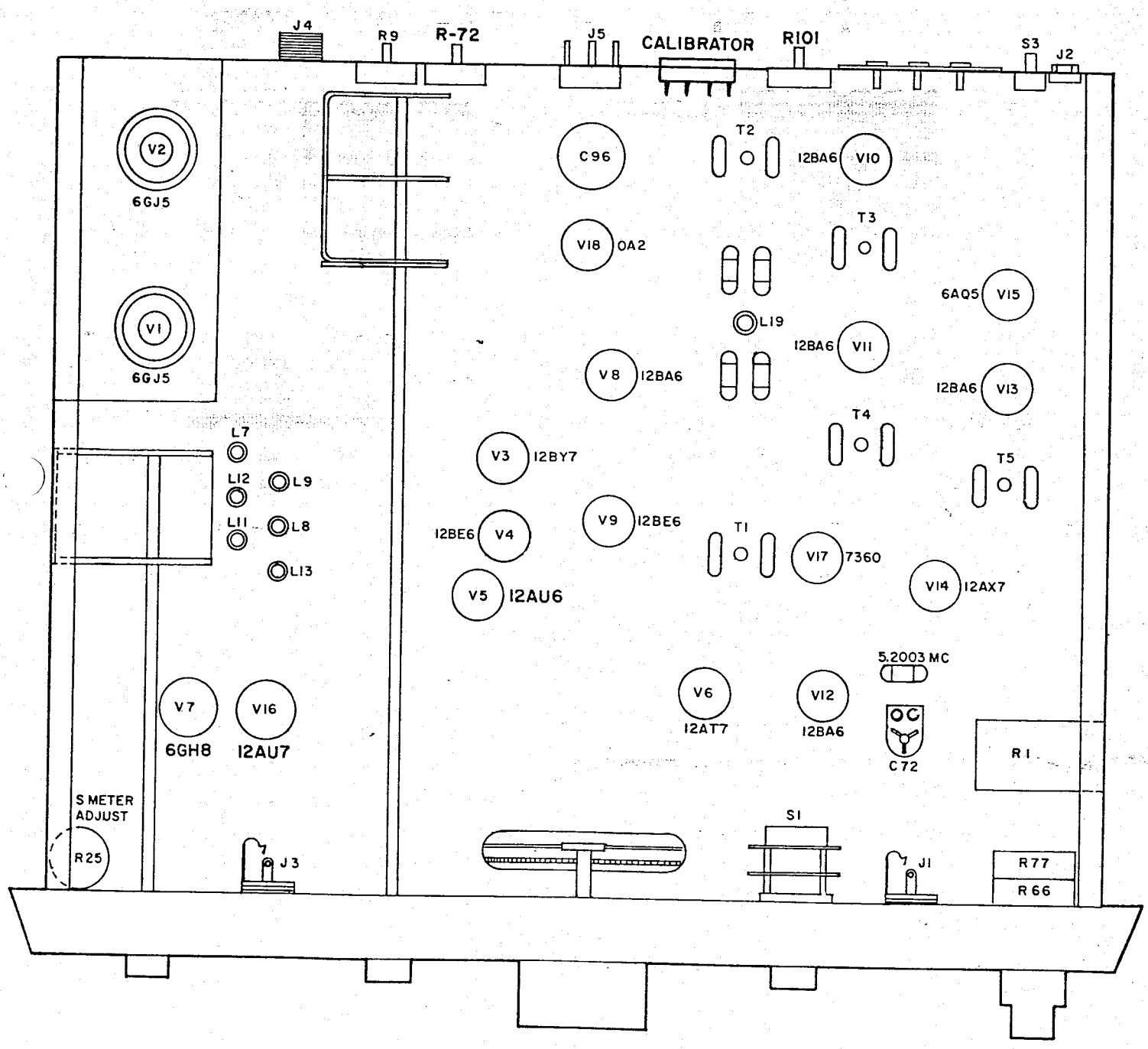

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Figure 4. NCX-3 Chassis Layout, Bottom View

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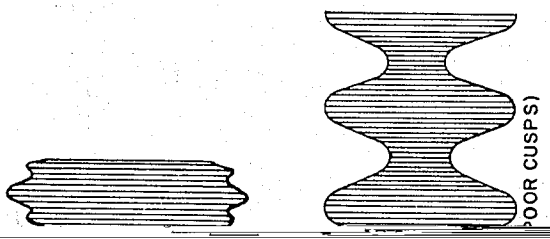

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ION	PART NUMBER
± 10%	A-50849-5
KV ± 20%	A-50849-6
Zero Coef ± 2%	A-50113-3
Zero Coef ± 2%	A-50113-2
750 ± 5%	CC 20-UJ-150-K
470 ± 5%	CC 20-TH-150-K
	A-50832
	A-50893
	A-50841
	A-50842
	B-50819-2
	A-50820
	A-50821
	A-50824
	6GJ5
	12BY7
	12BE6
	12BA6
	12AU6
	6AQ5
	12AX7-A
	12AU7
	6AN8
	7360
	OA2
	12AT7
	NPL-47
	B-50829
tor	A-50769
	A-50767-1
	A-50767-2
	A-50828
	C-50826
	E-50810-4
	C-50833
Aluminum Cap.	NPS-D-17-2-L-A
luminum Cap.	NPS-F-7-2-L-A
) and Dot	NPS-N-7-3-L-C
	B-50901-1
	C-50815
	B-50855
ot	NPS-D-7-2-L-C
	A-50818-1
	A-50818-2
	A-50818-3
	B-25000
	A-50840
	E-50812-8
	A-50850
	A-50851
t	A-50817
t	A-50117-7
	B-50836
	A-50835
	A-50860-1

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DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A VTVM WITH AN INPUT RESISTANCE MEGOHMS. RECEIVE VOLTAGES ARE TAKEN AT MAXIMUM RF GAIN WITH NO SIGNAL VOLTAGES ARE TAKEN FULL POWER OUTPUT INTO A 50 OHM DUMMY LOAD.

Function	*Pin*	*Receive*	*Transmit*
FINAL AMPLIFIER	1	0	+ 220 V
	2	− 45 to − 55 V ADJUSTABLE WITH BIAS CONTROL	
	3	0	+ .96 V
	4	V1 — 12.6 V2 — 6.3	AC OR DC DEPENDING ON SUPPLY
	5	V1 — 6.3 V2 — 0	
	6	− 45 to − 55 V ADJUSTABLE WITH BIAS CONTROL	
	7	0	+ 220
	8	0	0
	9	0	0
	CAP	+ 800	+ 700 DO NOT MEASURE ON TRANSMIT
DRIVER	1	0	+ 3.5 V
	2	− 40	−.2 V
	3	0	0
	4	0	0
	5	12.6 AC OR DC DEPENDING ON SUPPLY	
	6	*	*
	7	+ 280	+ 280
	8	+ 220	+ 220
	9	0	0
TRANSMIT MIXER	1	− 40	− 1.7
	2	0	0
	3	0	0
	4	12.6 AC OR DC DEPENDING ON SUPPLY	
	5	+ 280	+ 230
	6	+ 260	+ 70
	7	− 40	0
VFO	1	− 1.4	− 1.4
	2	0	0
	3	0	0
	4	12.6 AC OR DC DEPENDING ON SUPPLY	
	5	+ 130	+ 130
	6	+ 140	+ 140
	7	+ .1	+ .1
SPEECH AMPLIFIER AND "S" METER AMPLIFIER	1	+ 60	+ 60
	2	0	0
	3	+ 1V	+ 1V
	4	12.6 AC OR DC DEPENDING ON SUPPLY	
	5	12.6 AC OR DC DEPENDING ON SUPPLY	
	6	+ 220	− .8
	7	− .25	− .65
	8	+ 2.5	0
	9	0	0
MICROPHONE PRE-AMPLIFIER AND RELAY CONTROL	1	+ 90	+ 280
	2	− 1	− 32
	3	0	0
	4	0	0
	5	0	0
	6	0 ON CW OR TUNE FUNCTIONS + 95 ON SSB OR AM FUNCTIONS	
	7	+ 27	+ 16
	8	− .6	− .6
	9	0	0
RF AMPLIFIER	1	− .2	− 110
	2	0	0
	3	0	0
	4	12.6 AC OR DC DEPENDING ON SUPPLY	
	5	+ 280	+ 280
	6	+ 100	− .9
	7	+ 2.5	+ .7
RECEIVER MIXER	1	− .5	− 40
	2	0	0
	3	0	0
	4	12.6 AC OR DC DEPENDING ON SUPPLY	
	5	+ 220	+ 200
	6	+ 70	− .8
	7	0	0
1ST IF AMPLIFIER	1	0	0
	2	0	0
	3	0	0
	4	12.6 AC OR DC DEPENDING ON SUPPLY	
	5	+ 210	+ 210
	6	+ 60	+ 60
	7	+ .6	+ .6

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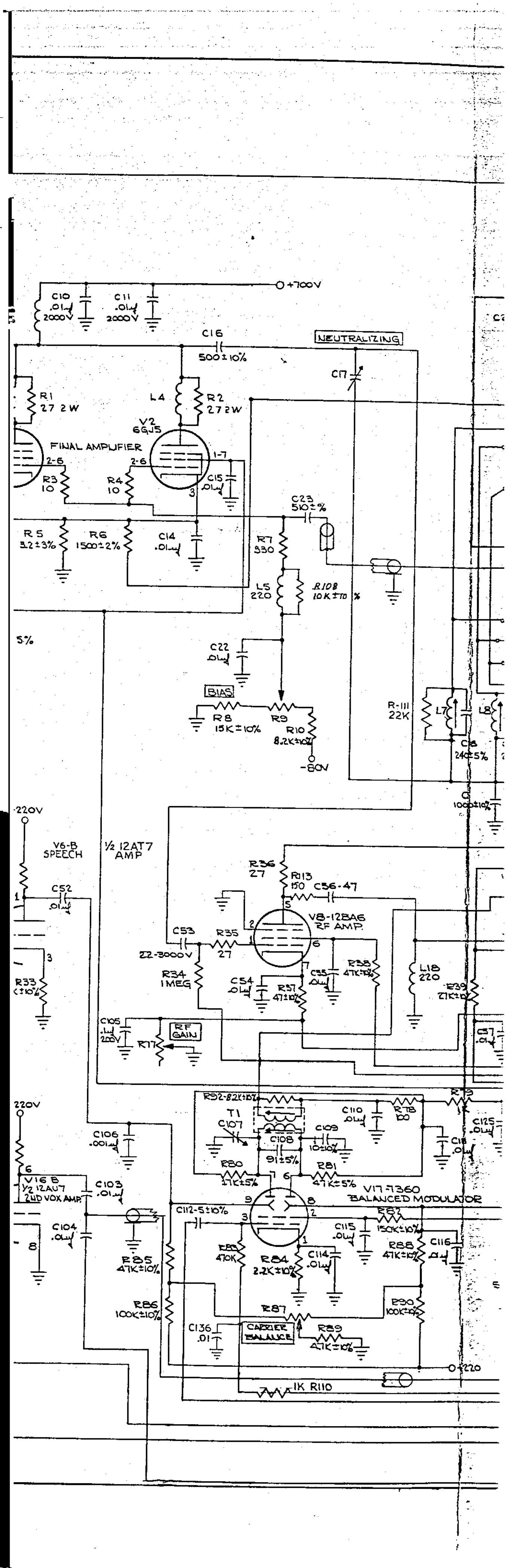
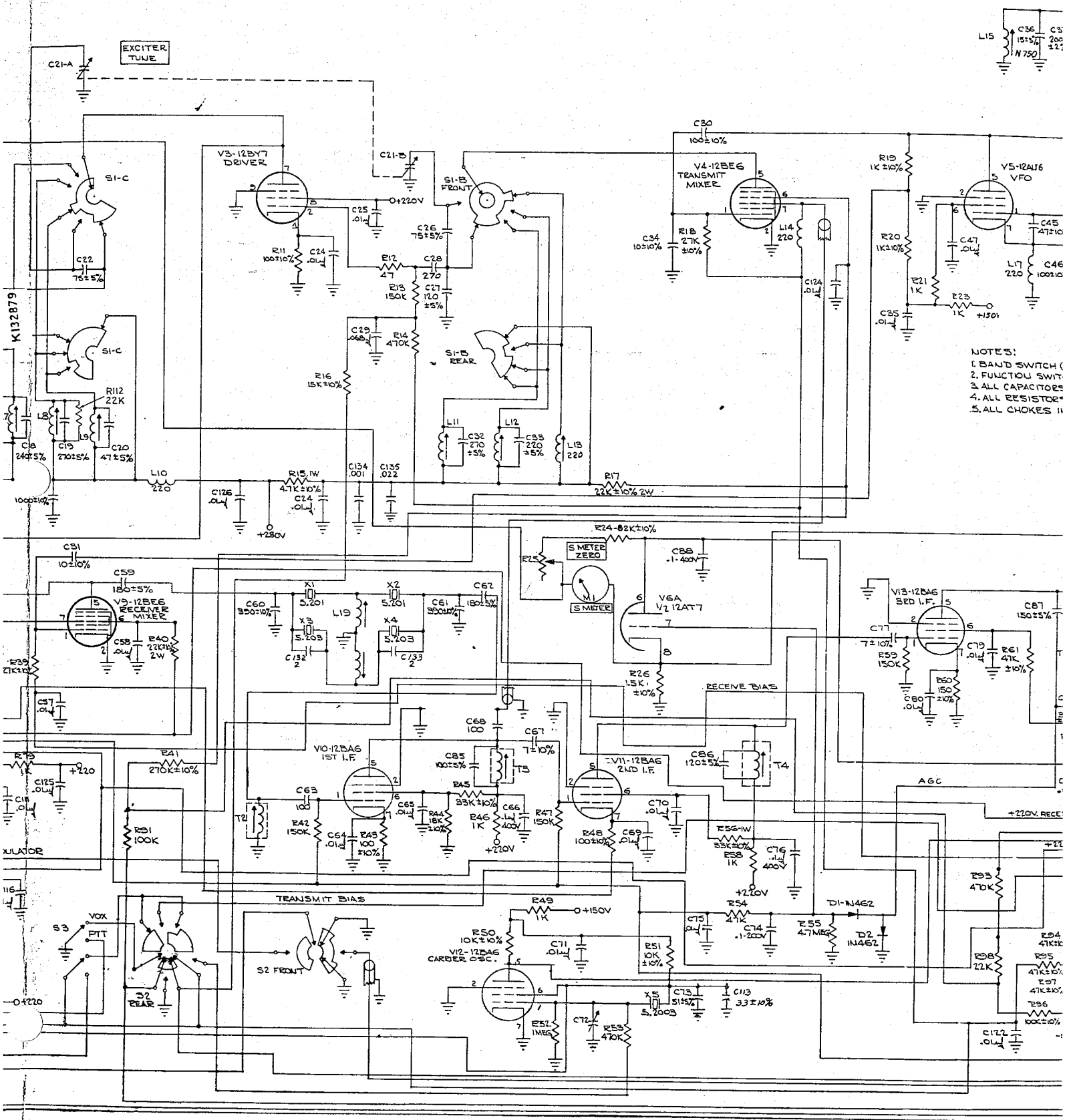
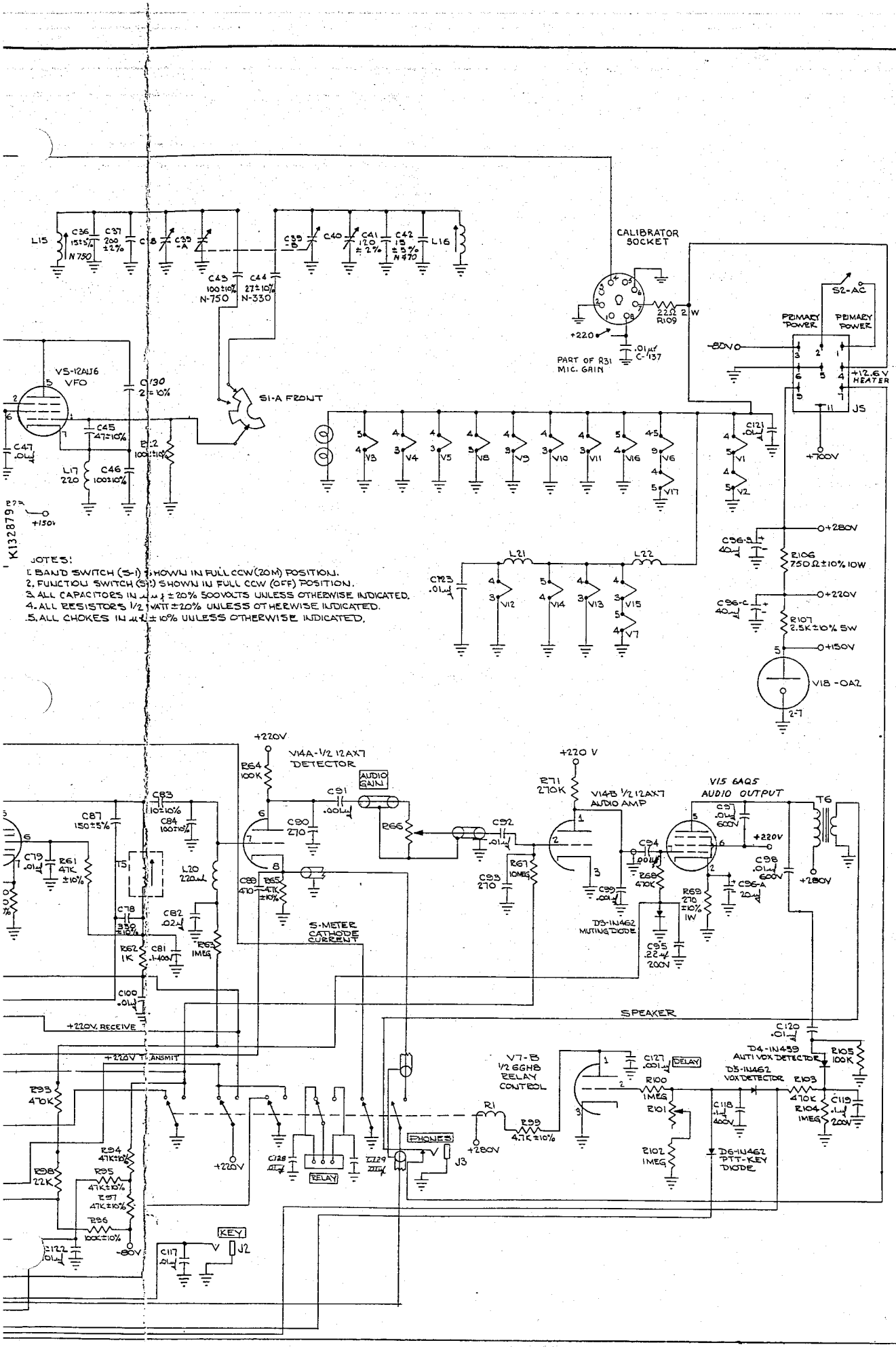
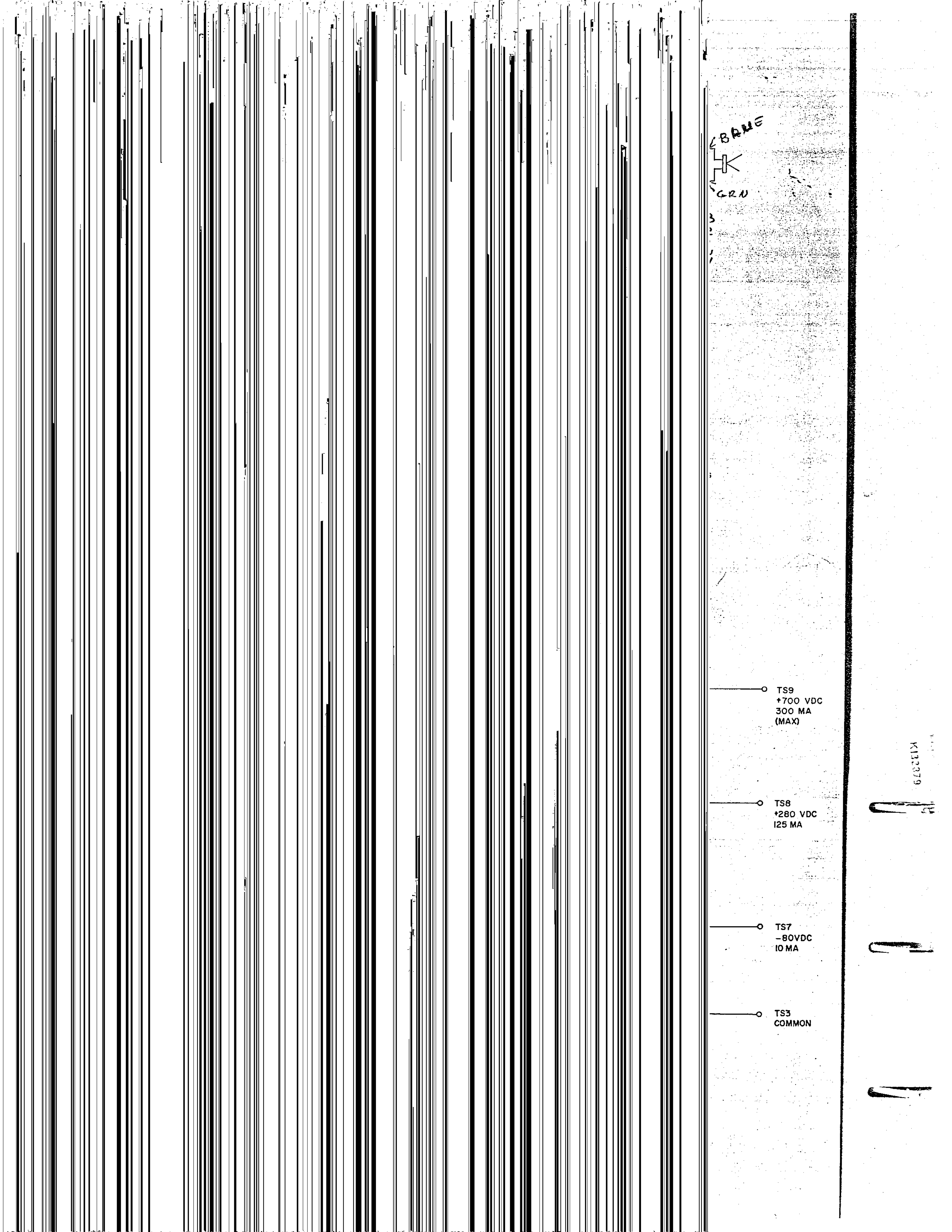


+700V
C10 .01 2000V
C11 .01 2000V
C16 500±10%
NEUTRALIZING
C17
R1 27 2W
L4
R2 27 2W
V2 6GJ5
FINAL AMPLIFIER
R3 10
R4 10
C15 .01
C23 510±%
R5 3.2±3%
R6 1500±2%
C14 .01
R7 330
L5 220
R108 10K±10%
C22 .01
BIAS
R8 15K±10%
R9
R10 8.2K±10%
-80V
R-111 22K
C8 24±5%
220V
V6-B SPEECH
½ 12AT7 AMP
C52 .01
R36 27
R113 150
C56-47
V8-12BA6 RF AMP.
C53 22-3000V
R35 27
R34 1MEG
C54 .01
R37 47±10%
C55 .01
R38 47K±10%
L18 220
R39 27K±10%
R33
C105 .1 200V
R17
RF GAIN
R92-82K±10%
T1
C107
C108 91±5%
C109 10±10%
C110 .01
R78 100
C125 .01
R80 47K±5%
R81 47K±5%
V17-7360 BALANCED MODULATOR
C106 .001
V16 B ½ 12AU7 2ND VOX AMP.
C103 .01
C104 .01
C112-5±10%
R82 150K±10%
C115 .01
R83 470K
R84 2.2K±10%
C114 .01
R88 47K±10%
C116 .01
R85 47K±10%
R86 100K±10%
R87
C136 .01
CARRIER BALANCE
R89 47K±10%
R90 100K±10%
220
1K R110


EXCITER TUNE
C21-A
V3-12BY7 DRIVER
C21-B
S1-C
S1-B FRONT
S1-B REAR
V4-12BE6 TRANSMIT MIXER
V5-12AU6 VFO
V9-12BE6 RECEIVER MIXER
V6A 1/2 12AT7
V10-12BA6 1ST I.F.
V11-12BA6 2ND I.F.
V13-12BA6 3RD I.F.
V12-12BA6 CARRIER OSC.
S METER ZERO
S METER
RECEIVE BIAS
TRANSMIT BIAS
AGC
VOX
PTT
S3
S2 FRONT
S2 REAR
D1-IN462
D2 IN462
K132879
NOTES:
1. BAND SWITCH (
2. FUNCTION SWIT
3. ALL CAPACITORS
4. ALL RESISTOR
5. ALL CHOKES


L15
C36 15±5% N750
C37 200 ±2%
C38
C39 -A
C39 -B
C40
C41 120 ±2%
C42 15 ±5% N470
L16
C43 100±10% N-750
C44 27±10% N-330
CALIBRATOR SOCKET
22Ω 2W R109
+220
.01μf C-137
PART OF R31 MIC. GAIN
S2-AC
PRIMARY POWER
PRIMARY POWER
-80VO
+12.6V HEATER
J5
+700V
V5-12AU6 VFO
C130 2±10%
S1-A FRONT
C45 47±10%
C47 .01μf
R12 100±10%
L17 220
C46 100±10%
V3
V4
V5
V8
V9
V10
V11
V16
V6
V17
V1
V2
C121 .01μf
+150V
+280V
C96-B 40μf
R106 750Ω±10% 10W
+220V
C96-C 40μf
R107 2.5K±10% 5W
+150V
V18 -0A2
L21
L22
C123 .01μf
V12
V14
V13
V15
V7
K1328791
NOTES:
1. BAND SWITCH (S-1) SHOWN IN FULL CCW (20M) POSITION.
2. FUNCTION SWITCH (S-2) SHOWN IN FULL CCW (OFF) POSITION.
3. ALL CAPACITORS IN μμf ±20% 500VOLTS UNLESS OTHERWISE INDICATED.
4. ALL RESISTORS 1/2 WATT ±20% UNLESS OTHERWISE INDICATED.
5. ALL CHOKES IN μh ±10% UNLESS OTHERWISE INDICATED.
+220V
V14A-1/2 12AX7 DETECTOR
R64 100K
AUDIO GAIN
C91 .001μf
C83 10±10%
C87 150±5%
C84 100±10%
C90 270
R66
C92 .01μf
C79 .01μf
R61 47K ±10%
T5
L20 220μh
C88 410
R65 47K ±10%
C78 330 ±10%
C82 .02μf
R62 1K
C81 .1μf
R63 1MEG
S-METER CATHODE CURRENT
C100 .01μf
+220V RECEIVE
+220V TRANSMIT
+220V
V14B 1/2 12AX7 AUDIO AMP
R71 270K
C93 270
R67 10MEG
C94 .001μf
R68 470K
C99 .001μf
D3-1N462 MUTING DIODE
C95 .22μf 200V
V15 6AQ5 AUDIO OUTPUT
C97 .01μf 600V
+220V
C98 .01μf 600V
+280V
T6
C96-A 20μf
R69 270 ±10% 1W
SPEAKER
C120 .01μf
D4-1N459 ANTI VOX DETECTOR
R105 100K
D5-1N462 VOX DETECTOR
R103 470K
C119 .1μf 200V
R104 1MEG
C118 .1μf 400V
D6-1N462 PTT-KEY DIODE
R100 1MEG
R101
R102 1MEG
V7-B 1/2 6GH8 RELAY CONTROL
C127 .001μf
DELAY
R1
R99 4.7K ±10%
+280V
PHONES
J3
C128 .01μf
RELAY
C129 .01μf
R93 470K
R94 47K±10%
R95 47K±10%
R97 47K±10%
R98 22K
R96 100K±10%
-80V
C122 .01μf
KEY
J2
C117 .01μf


BRN
GRN
TS9
+700 VDC
300 MA
(MAX)
TS8
+280 VDC
125 MA
TS7
-80VDC
10 MA
TS3
COMMON
K132379

AL RADIO COMPANY, INC.
HOLLY OWNED SUBSIDIARY OF NATIONAL CO., INC.

National

ESTABLISHED 1914

37 WASHINGTON STREET
MELROSE 76, MASS.

for purchasing the NCX-3 transceiver, and at the same time
ıd kinks which will help you to get even more enjoyment out

se mail your warranty card immediately, since as
:eived you will be placed on our NCX-3 customer
ep you immediately informed of forthcoming
difications or improvements, service notes etc.

hone is important, since the NCX-3 is designed
ıoothest, cleanest audio possible. All necessary
riction of audio bandwidth is done in the NCX-3,
restricted" or "communications quality" micro-
ıis design feature. Avoid ceramic or crystal
.gned for Citizens Band use, since these mikes
ned to sell for a price -- and sound like it. Use
ɔne you can afford -- preferably a flat, wide range
found the Electro-Voice 664 and Shure 545 to be
ɔr fixed station use, although relatively expensive,
4 dynamic and the new EV 600E are excellent for
n.

ıt is one of the best indicators of proper operation
d since there is no separate screen meter in the
ent substitute is the VR tube at the rear of the
the final amplifier be operating improperly,
current will be drawn by the 6GJ5's which will
oltage drop in the +280V bus to extinguish the VR
neously remove all oscillator regulation). The VR
lit with full carrier inserted during tune-up, and
ıish on SSB voice peaks. Typical reasons for VR
nsufficient loading, excessive microphone gain,
:ge to the power supply (low line voltage with the
:ry voltage under idling or engine-off conditions
ɔr use of an improper power supply. It's always
nce at the VR tube after loading up on a new band
verything is O. K. Caution: Do not attempt to
NCX-3 if the VR tube indicates a malfunction,
:ill be distortion, frequency shift, non-linearity
:k of the above trouble areas will show where the

tional, and we will welcome your comments on your new

73,

Mike Ferber

Mike Ferber, W1GKX
Equipment Sales Manager

tuned to tomorrow

ɔF PRECISION COMMUNICATION EQUIPMENT AND COMPONENTS . . .

CUSTOMER SERVICE BULLETIN

December 4, 1963
Sales Bulletin: #CIB 63-7

Many of our customers have expressed surprise that there is mechanical vibration apparent in some of the NCX-A power supplies--which is particularly remarkable in view of the husky "iron" used to provide conservative and cool operation of the NCX-A. We've been somewhat embarrassed ourselves, since we've just recently traced the vibration to the magnetic field induced around the power transformer and swinging choke. As a result of this strong magnetic field, the perforated metal cabinet enclosure vibrates at the same rate. This effect can be almost completely eliminated by remounting the swinging choke in a different position, so that the plane of the magnetic field is altered. (The swinging choke is the open frame choke part No. B50863.) For many months now, this hum has been practically unnoticeable in the NCX-A because of other steps taken during manufacture, and the following modification should result in removal of the last trace of vibration (if any still exists in your supply).

1. Remove the brackets that presently bolt the swinging choke to the chassis and discard these brackets.

2. Rotate the choke 1/4 turn so that the long side of the choke is now against the chassis. The new brackets should then be bolted to the choke.

3. Bolt the choke to the chassis utilizing two of the holes previously used. These will be the two nearest the power transformer. Drill two additional No. 22 size holes to mount the other end of the choke to the chassis.

4. The modification is now complete.

73,

Harvey Whitmore

Harvey Whitmore, K1GXO
Customer Service Manager

HW/tlw

K132879

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control,
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the spaghetti tubing on the leg of the resistor that will be soldered
ontrol. The new 4.7K resistor should be soldered to the same points
2K resistor which was removed. The resistor should also be dressed
anner.

k should now be made for possible errors or short circuits. Replace
er in the cabinet, and secure all the mounting screws. This will
modification of your NCX-3.

73,

Harvey Whitmore

Harvey Whitmore, K1GXO
Customer Service Manager

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K132879

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e VOX circuit should
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check the VOX
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ıe circuit. If you
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vhen insufficiently
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and normal VOX

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negative bias voltage
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gent (such as Joy, or any dishwashing de-
job. Also, cleaning with an alcohol base
ol or rubbing alcohol, will also do an ex-
ether keytone base material, such as

the significant information available on the
u experience any particular problem, we
e to contact us for assistance.

73's

Harvey Whitmore

Harvey Whitmore, KIGXO
Customer Service Manager

MODEL NCX-A and NCX-D

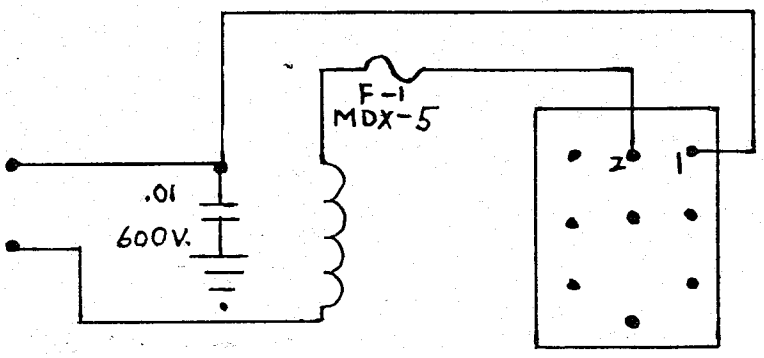
ADDENDA SHEET

MODEL NCX-A

1. Resistor R7 has been changed from 1000 Ω ± 10% to 1800 Ω ± 10%.

2. A 0.01 uf 600 volt capacitor from one side of the AC line to chassis is not indicated on the schematic.

3. A revised primary power schematic is shown below:



MODEL NCX-D

1. A 0.25 uf 600 volt capacitor has been added from terminal 4 to terminal 8 of the power transformer.

AY fully ccw

ophone has

After several
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CX-3 is now
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TUNE for
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THEORY OF OPERATION

transceiver, designed to cover the 80, eter amateur bands, combines a single perheterodyne receiver and single side- ter, both employing a common crystal The final Pi network and driver tuning transmitter serve as common RF circuits er. The carrier oscillator and VFO are e receiver and transmitter circuits while the receiver first IF stage is used as a low level amplifier in the transmitter-exciter function. The use of common filter and RF input components, in particular, results in an extremely sensitive and image-free selective receiver as well as a high quality, low distortion SSB transmitter.

The operation of the NCX-3 is best understood by reference to the block diagram, figure 2.

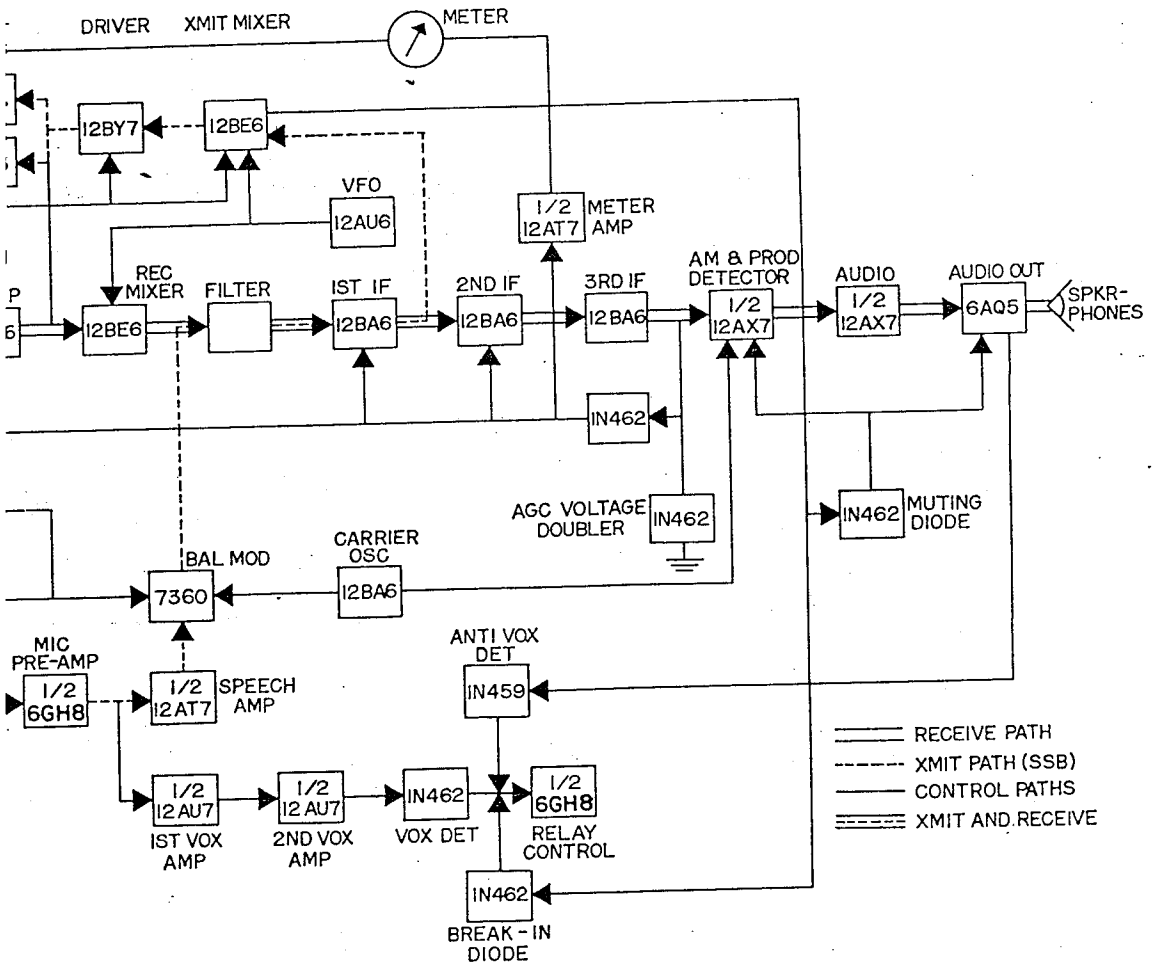

Figure 2. NCX-3 Block Diagram

K132879

e same time, the
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n transmit bias is
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witch in the CW
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ation during CW
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transmit bias bus
prevent accidental
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on of the keying
ush-to-talk circuit
ay has tripped, as
n above, the delay
vill hold the relay
directly connected
time it is opened,
g due to the pres-
, driver and bal-
rip at the instant
then remain open
hen keying stops,
the relay to close
ondition.

h in the TUNE
led, again placing
the relay. In this
ounds one of the
lanced modulator,
e for purposes of

sing an accurate
voltage across a
the cathode return
uring transmit, the
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e current metering
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ier cathode is un-
eturn path is com-
ance of the final
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aced in a transmit
n a receive condi-

E

S

NE AND PA LOAD CONTROLS

of the PA TUNE and PA LOAD con-
dependent. For normal use, the NCX-3
TUNE position. The EXCITER TUNE
for maximum meter indication. The PA
is then set for minimum indication, in-
ance of the Pi network. For a normal 40
esistive antenna, the PA LOAD control
e rotated from a maximum ccw position to
neter reading. As this is done, there will
-action with the PA TUNE control and
cessary to slightly retune for minimum
ion. As the PA LOAD is advanced, the
ter reading will increase. Proper loading
peak input occurs at 300 ma. (marked
he meter scale). This loading current
e exceeded since the Pi network design
additional power input from a 700 volt
not result in additional power output.
ma. the efficiency of the NCX-3 final
be impaired and no further output will

ration of any linear final amplifier de-
oper idling current adjustment and on
e for adequate peak plate current during
nce condition. The adjustment of the bias
NCX-3 final amplifier is discussed under
as adjustment paragraph. Assuming this
een made for an idling current between
a., it should be possible to obtain a maxi-
nance plate current in excess of 350 ma.
X-3 final amplifier. As the PA TUNE
ated through the minimum current point
neter should indicate a definite rise to
the resonant point. If 700 volts is being
plied to the plate circuit of the final
the EXCITER TUNE control is properly
s off-resonance current should exceed 350
current cannot be achieved, the cause
vestigated. Typical reasons may include
llowing: improper BIAS setting, improper
UNE adjustment, low plate supply voltage
amplifier under full load conditions, low
defective final amplifier tubes, or improper
the exciter stages resulting in low driving

ned above, low plate supply voltage to the
er will frequently result in difficulty in
suitable off-resonance current. The NCX-A
y is rated to deliver 700 volts to the final
th a 115 VAC input. The NCX-D power
ed to deliver 700 volts to the plate circuit
amplifier with a 12.0 volt input to the
y. If the AC line voltage or the mobile

K132879

matched and
sult with any
or transceiver

ed under PA
gs above, one
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K132879