



BULLETIN

July 23, 1965

To: All NCX-5 Owners

Subject: NCX-5 Balanced Modulator
Modification

Sales Bulletin: ES 65-1

We've developed a new balanced modulator for the NCX-5 which replaces the 7360 with a solid state ring-type circuit. It is characterized by extreme stability with respect to external or magnetic influences, on-off cycling, aging or warm-up time. In fact, it will hold carrier suppression to a minimum of 50 db through all of the above, and typically can be adjusted to provide 65 or 70 db of suppression.

The new balanced modulator works so well that the carrier balance control no longer has enough effect to provide sufficient carrier for AM and CW operation! We therefore replaced the carrier balance control with a new CARRIER INSERTION control which provides zero to full carrier as it is rotated clockwise from the fully counter-clockwise position. The CARRIER INSERTION control also makes it much easier to put in and take out carrier when desired for AM, CW, or tune-up of a linear amplifier. The carrier balance control becomes an internal adjustment which need never be touched by the operator.

These changes will appear in the next production run of the NCX-5, scheduled for shipment in August, and they work so well that we have designed a modification kit for present NCX-5's which is now available from our Customer Service Department at our cost of \$13.00. The kit includes a plug-in pre-wired balanced modulator assembly and the parts necessary to modify the NCX-5 function switch, the input and output to the balanced modulator, and to add an additional amplifier/gating tube in the output of the modulator. Very complete step-by-step instructions are provided as well as two-color pictorials to aid in the modification. We must advise you, though, that this is not a half-hour job. Based upon extensive field trials, the average amateur with home-brew or kit-building experience will require about five hours to accomplish the conversion. The amateur without such experience should not attempt to make the change.

The plug-in balanced modulator assembly is pre-aligned, and the only special test equipment necessary is a VTVM or an oscilloscope good to 6 Mc.

The kit should be ordered by sending your check to the following address:

Balanced Modulator Kit for NCX-5
Customer Service Department
National Radio Company, Inc.
37 Washington Street
Melrose, Massachusetts 02176

MF/chc

Distribution:

NCX-5 Customer List
Lists E and F

National Radio Company, Inc. • 37 Washington St., Melrose, Mass. 02176 • Area Code 617 665-4800 • TWX-617-665-5032

73,

Michael Ferber, W1GKX
Sales Manager, Equipment Division

MARK II MODIFICATION KIT
NCX-5 BALANCED MODULATOR

PARTS LIST

<u>Quantity</u>	<u>Description</u>	<u>Part Number</u>
1	Balanced Modulator Plug-In Assembly	
1	6BA6 Tube	
1	Ceramic Stand-Off	A51849
1	Ground Lug	A50044-4
1	4-40 Screw	
1	#6 Sheet Metal Screw	
1	100 K, 1/2 w Resistor	
2	22K, 1/2 w Resistor	
1	6.8 K, 1/2 w Resistor	
1	56 ohms, 1 w Resistor	
1	56 K, 1/2 w Resistor	
1	68 uufd Capacitor	
1	47 uufd Capacitor	
1	75 uufd Capacitor	
1	.02 ufd Capacitor (Ceramic)	
3	.01 ufd Capacitor (Ceramic)	
1	#22 Wire (White 4 1/2" Long)	
1	#22 Wire (Orange 2 1/2" Long)	
1	#22 Wire (Yellow 1 1/4" Long)	
1	#22 Wire (Green 4 1/2" Long)	
1	#22 Wire (Grey 3 1/4" Long)	
1	#22 Wire (Blue 7" Long)	
1	#22 Wire (Buss 1 1/2" Long)	
1	Sleeving (2")	
1	Solder (36")	
1	CARRIER INSERTION Label	
1	1N34 Diode	
1	Schematic	
1	Assembly and Alignment Instructions	
	Pictorials Marked "Add" and "Omit"	

NECESSARY EQUIPMENT

- A. Suitable Construction Tools:
 Phillips Screwdriver
 Soldering Iron
 1/4" Nut Driver
 Hex-Head Alignment Tool
 Pliers (Needle Nose Preferred)
- B. Alignment Equipment:
 50 ohm Dummy Load (150 Watt Bulb May Be Used)
 VTVM
 Monitoring Receiver (3.75 Mc)
 1N34 Diode (Supplied)
 .01 ufd Capacitor (Supplied)
- or
- 50 ohm Dummy Load
High Frequency Oscilloscope (At Least 6 Mc)
- C. Step-by-Step Instructions
- D. Two Pictorials Marked "Add" and "Omit"
- E. Schematic

GENERAL DESCRIPTION

The Balanced Modulator Modification Kit is a complete balanced modulator and IF assembly designed to plug into the 7360 socket in the NCX-5. There are a number of wiring changes that must be made in the NCX-5 to accommodate this new circuit. The carrier oscillator output impedance is changed to accept the low impedance input of the diode modulator, the gain of the microphone preamplifier is increased to provide sufficient audio power, and the FUNCTION switch is modified slightly. Additional changes provide the necessary voltages at the 7360 socket to power the new circuit. The CARRIER BALANCE control now becomes a CARRIER INSERTION control and maximum suppression is in the full counter-clockwise position. This eliminates the necessity of finding a balance point when changing from CW or AM to SSB. The CARRIER INSERTION control is turned fully counter-clockwise for SSB operation, and clockwise as required for CW or AM operation.

PROCEDURE FOR MODIFICATION

When following the modification procedure, close attention should be paid to the pictorials. First, read the step. Second, locate the part on the pictorial. (If adding a part, locate it on the "Add" pictorial, and if removing a part, locate it on the "Omit" pictorial.) Third, locate this part in the set, and make the modification. Fourth, check off the step in the step-by-step instructions. The new schematic supplied with the balanced modulator kit is a partial NCX-5 schematic including all of the areas which are affected by the kit. Do not solder any connections until specifically directed to do so by the instructions. When removing components, leads may be clipped to facilitate removal and to prevent heat damage to remaining components.

STEP-BY-STEP MODIFICATION PROCEDURE

- ✓ 1. Remove the two screws holding the internal control bracket to the top of the front panel and turn the bracket over.
- ✓ 2. Remove R-28 (4.7 K) which runs from Terminal 2 of R-9 (CARRIER BALANCE) to solder lug.
- ✓ 3. Remove the black lead from Terminal 3 of R-9 (CARRIER BALANCE).
- ✓ 4. Reconnect the black lead to Terminal 2 of R-9 (CARRIER BALANCE) (solder one lead).
- ✓ 5. Connect a buss wire from Terminal 3 on R-9 (CARRIER BALANCE) (solder one lead) to ground lug (solder one lead).
- ✓ 6. Replace the control bracket.
- ✓ 7. Attach CARRIER INSERTION label over words CARRIER BALANCE.
- ✓ 8. Remove C-57 (220 uufd) located on TB-2, Terminal 3 to Terminal 8.
- ✓ 9. Connect C-506 (75 uufd) from Terminal 3 (solder three leads) to Terminal 8 on TB-2.
- ✓ 10. Connect C-504 (47 uufd) from Terminal 8 (solder three leads) of TB-2 to grounded center post of V-7 socket (solder).
- ✓ 11. Connect C-515 (.02 ufd, disk ceramic capacitor) from V-8, Terminal 3 (solder two leads) to ground lug on V-8 socket (solder).

12. ✓ Remove C-58 (.01 ufd disk ceramic) which runs from V-10, Pin 1 to center post.
13. ✓ Remove R-23 (2.2 K) which runs from V-10, Pin 1 to ground lug.
14. ✓ Remove C-66 (.01 ufd disk ceramic) which runs from V-10, Pin 2 to center post.
15. ✓ Remove R-26 (150 K) which runs from V-10, Pin 2 to CL-6, Terminal 2.
16. ✓ Remove R-22 (470 K) which runs from V-10, Pin 3 to CL-6, Terminal 3.
17. ✓ Remove R-118 (1 K) which runs from CL-6, Terminal 3 to CL-6, Terminal 4.
18. ✓ Remove C-61 (.01 ufd disk ceramic) which runs from CL-6, Terminal 3 to V-10, Pin 4.
19. ✓ Remove buss wire from V-10, Pin 6 to T-1, Terminal 3.

CAUTION: DO NOT OVERHEAT PINS OF T-1.

20. ✓ Remove R-20 (47 K) which runs from V-10, Pin 8 to CL-5, Terminal 4.
21. ✓ Remove C-67 (.01 ufd disk ceramic) which runs from V-10, Pin 9 to center post.
22. ✓ Remove R-27 (47 K) which runs from V-10, Pin 9 to CL-5 Terminal 3.
23. ✓ Remove the blue lead connected to V-10, Pin 9. (This lead will be reconnected later.)
24. ✓ Remove R-21 (100 K) which runs from CL-5, Terminal 1 to CL-5, Terminal 3.
25. ✓ Remove R-29 (100 K) which runs from CL-5, Terminal 1 to CL-5, Terminal 4.
26. ✓ Remove buss wire T-1, Terminal 2 to C-7 (mica trimmer).

- ✓ 27. Remove C-7 (mica trimmer) from chassis. (The lug soldered directly to the chassis may be cut.)
- ✓ 28. Remove R-24 (47 K) which runs from T-1, Terminal 2 to CL-8, Terminal 5. (Again, exercise care in unsoldering and soldering to terminals of T-1)
- ✓ 29. Remove R-25 (47 K) which runs from T-1, Terminal 3 to CL-8, Terminal 5.
- ✓ 30. Remove C-62 (10 uufd) capacitor which runs from T-1, Terminal 3 to V-10 ground lug.
- ✓ 31. Remove C-19 (82 uufd) which runs from T-1, Terminal 2 to T-1, Terminal 3.
- ✓ 32. Remove C-191 (.01 ufd disk ceramic) which runs from CL-6, Terminal 2 to CL-6, Terminal 1.

NOTE: WHEN WIRING SWITCH (S-3), NOTE THAT THERE ARE TWELVE EQUI-SPACED FRONT TERMINAL POSITIONS AVAILABLE AND ONLY TEN EQUI-SPACED REAR POSITIONS. (See Pictorial) F = FRONT TERMINAL. R = REAR TERMINAL.

- ✓ 33. Remove jumper on S-3 which runs from Terminal F-11 to Terminal F-12.
- ✓ 34. On S-3, disconnect the two jumpers from Terminal R-10.
- ✓ 35. Place sleeving (supplied) over one, and solder the two leads together. Slide the sleeving over the joint.
- ✓ 36. Remove the red lead from CL-5, Terminal 4.
- ✓ 37. Reconnect the red lead to CL-7, Terminal 1. (It is necessary to back this lead out of two ties in the cable.)

CAUTION: DO NOT TEAR INSULATION FROM LEADS. IF NECESSARY, CUT CABLE TIES.

- ✓ 38. Screw the ceramic standoff designated as CL-501 over the mounting screw of T-3 as shown. Mount the ground lug with a 4-40 screw on the top end of the standoff (supplied).

39. Remove the terminal strip end of R-14 (150 K) which runs from V-6, Pin 1 to CL-10, Terminal 3.
40. Reconnect the free end of R-14 (150 K) to CL-501.
41. Connect and solder the white lead (supplied) from CL-501 to T-1, Terminal 3.
42. Connect R-501 (6.8 K, 1/2 watt) from T-1, Terminal 2 to T-1, Terminal 3.
43. Connect and solder C-501 (68 uufd) from T-1, Terminal 2 to T-1, Terminal 3.
44. Connect C-502 (.01 ufd disk ceramic) from T-1, Terminal 3 to V-10 ground lug (solder).
45. Connect and solder R-502 (22K, 1/2 watt) from CL-5, Terminal 3 to CL-5, Terminal 4.
46. Connect R-503 (22K, 1/2 watt) from CL-5, Terminal 4 to V-10, Pin 8 (solder three leads).
47. Connect C-503 (.01 ufd disk ceramic) from CL-5, Terminal 4 to CL-5, Terminal 2 (solder two leads).
48. Connect the blue lead from Step 23 to CL-5, Terminal 4 (solder four leads).
49. Connect an orange lead from CL-6, Terminal 2 to T-1, Terminal 3 (solder five leads).
50. Connect R-514 (56 ohms, 1 watt) from V-10, Pin 5 (solder two leads) to V-10 ground lug (solder).
51. Connect a yellow lead from CL-6, Terminal 2 (solder three leads) to V-10, Pin 2 (solder one lead).
52. Connect R-513 (100 K, 1/2 watt) from CL-7, Terminal 1 (solder two leads) to CL-7, Terminal 6 (solder four leads).
53. Connect a green lead from CL-7, Terminal 3 (solder five leads) to S-3, Terminal R-10 (solder one lead).
54. Connect R-504 (56 K, 1/2 watt) from S-3, Terminal F-12 to S-3, Terminal R-8 (solder one lead).
55. Connect a blue lead from S-3, Terminal F-12 (solder two leads) to V-10, Pin 1 (solder one lead).

56. Connect a grey lead from V-10, Pin 9 (solder one lead) to CL-7 Terminal 2 (solder four leads).
57. Remove 7360 tube.
58. Plug sub-assembly into 7360 tube socket.
59. Insert drive screw into bottom of sub-assembly through trimmer hole adjacent to V-10 socket to fasten sub-assembly to chassis.
60. You have completed the construction portion. Carefully inspect all connections to be sure they are accurate and well soldered. Remove all solder splashes or drops that may cause a short circuit. Shake chassis to remove any remaining clipped wire leads or solder.

Upon completion of the step-by-step instructions, alignment should be performed as follows:

Alignment

The NCX-5 should be warmed up for at least twenty minutes in the receive condition before alignment is attempted. Preset controls as follows:

BANDSWITCH:	3.5
MAIN TUNING:	250
PA LOAD:	0
FUNCTION Switch:	CW
SIDEBAND Switch:	USB

Connect the NCX-5 to a suitable dummy load, preferably 50 ohms. If a 50-ohm load is not available, a 150-watt lamp bulb will do.

Turn the FUNCTION switch to the TUNE position, and adjust the EXCITER TUNE control for maximum meter indication. Promptly tune the PA TUNE control for minimum indication. Turn the FUNCTION switch to CW.

CAUTION: AT THIS POINT, DO NOT ATTEMPT TO ADVANCE THE PA LOAD CONTROL.

Alignment of the Balanced Modulator and Transmit IF Transformer

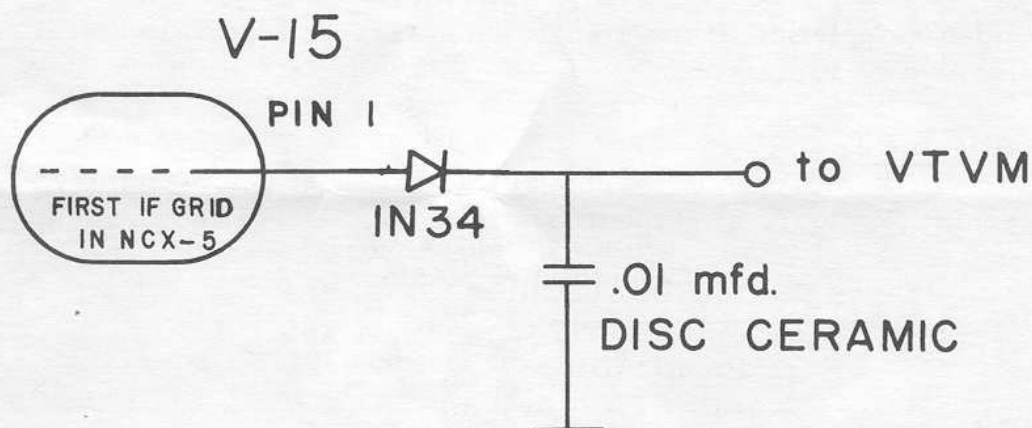
Place the MOX-OFF switch in the MOX position. Advance the CARRIER INSERTION control until the meter reads 100 ma. Tune the top and bottom slugs in T-1 and the slug in T-501 for maximum meter indication. Return the MOX-OFF switch to OFF, allowing the NCX-5 to return to the receive condition.

CAUTION

IF THE METER READING IS INCREASED TO 300 MA BY THE PREVIOUS ADJUSTMENT, REDUCE THE CARRIER INSERTION CONTROL SO A SHARPLY DEFINED PEAK IS STILL APPARENT BY ADJUSTMENT OF T-1 AND T-501.

Adjustment of Carrier Oscillator Crystals

Because of the change in carrier oscillator output impedance, the carrier oscillator crystals must be reset to the proper point on the slope of the filter as follows, using a DC VTVM:



Using the above circuit for an RF probe, adjust C-6 for .07 volt indication on the VTVM with the FUNCTION switch in the TUNE position and the EXCITER TUNE control detuned for minimum plate current. Turn the USB-LSB switch to the LSB position and adjust C-5 for .07 volt VTVM reading. Turn the NCX-5 off and disconnect the RF probe from V-15.

An alternate procedure may be employed if a high frequency oscilloscope is available (accurate to at least 6 Mc): Connect the scope at the grid, Pin 1, of the first IF V-15. Turn the FUNCTION switch to TUNE, and detune the EXCITER TUNE control for minimum NCX-5 plate current. Adjust C-6 for .2 volt peak-to-peak deflection on the oscilloscope. Turn the USB-LSB switch to LSB and adjust C-5 for .2 volt deflection. Disconnect the oscilloscope and tune up the NCX-5 to 300 ma, as per NCX-5 instruction manual.

Carrier Suppression Adjustment

A separate receiver may be used to listen for minimum carrier. With the dummy load still connected, tune in the output signal of the NCX-5. When the NCX-5 is loaded to 300 ma, place the FUNCTION switch in the SSB position with the CARRIER INSERTION control fully ccw. Place the MOX-OFF switch in the MOX position, and tune R-507 (carrier balance) for minimum signal in the receiver. Tune C-508 for minimum signal. (C-508 should not be moved far from its factory-adjusted position.) Place the MOX-OFF switch in the OFF position.

Alternately, if an oscilloscope is available, connect the dummy load and oscilloscope to the output of the NCX-5, and tune the NCX-5 to 300 ma in the 3.5 Mc band. Place the FUNCTION switch in the SSB position. Place the MOX-OFF switch in the MOX position. Turn the CARRIER INSERTION control fully ccw. Adjust R-507 (carrier balance) for minimum deflection on the oscilloscope. Now adjust C-508 for minimum deflection. (C-508 should not be moved far from its factory-adjusted position.) The deflection at this point should be less than .5 volt peak-to-peak. Place the MOX-OFF switch in the OFF position.

NOTE: ONCE SET, R-507 AND C-508 NEED NOT BE RE-ADJUSTED IN THE FUTURE.

This completes the NCX-5 balanced modulator modification.

CIRCUIT OPERATION

The Balanced Modulator modification kit slightly changes the operation of the FUNCTION switch. With the FUNCTION switch in the SSB position, the CARRIER INSERTION control must be set fully ccw to obtain complete carrier suppression. In the SSB position, a negative bias is applied to V-501 (transmit IF stage), reducing the gain. Full output is obtained when audio is applied to the balanced modulator. When the FUNCTION switch is in the AM or CW position, the bias on V-501 is zero, increasing the gain. This increase is enough to obtain full output with the CARRIER INSERTION control fully CW, and the carrier oscillator still 20 db down the filter slope. Thus, the CARRIER INSERTION control now serves to set the plate current at the appropriate level for AM or CW operation without changing the CARRIER BALANCE control. With the FUNCTION switch in the TUNE position, full carrier is inserted, V-501 grid bias is again zero, and full output can be obtained for tune-up conditions.

SERVICE INSTRUCTIONS

If difficulty is experienced after the balanced modulator kit is installed in the NCX-5, carefully check to make certain that:

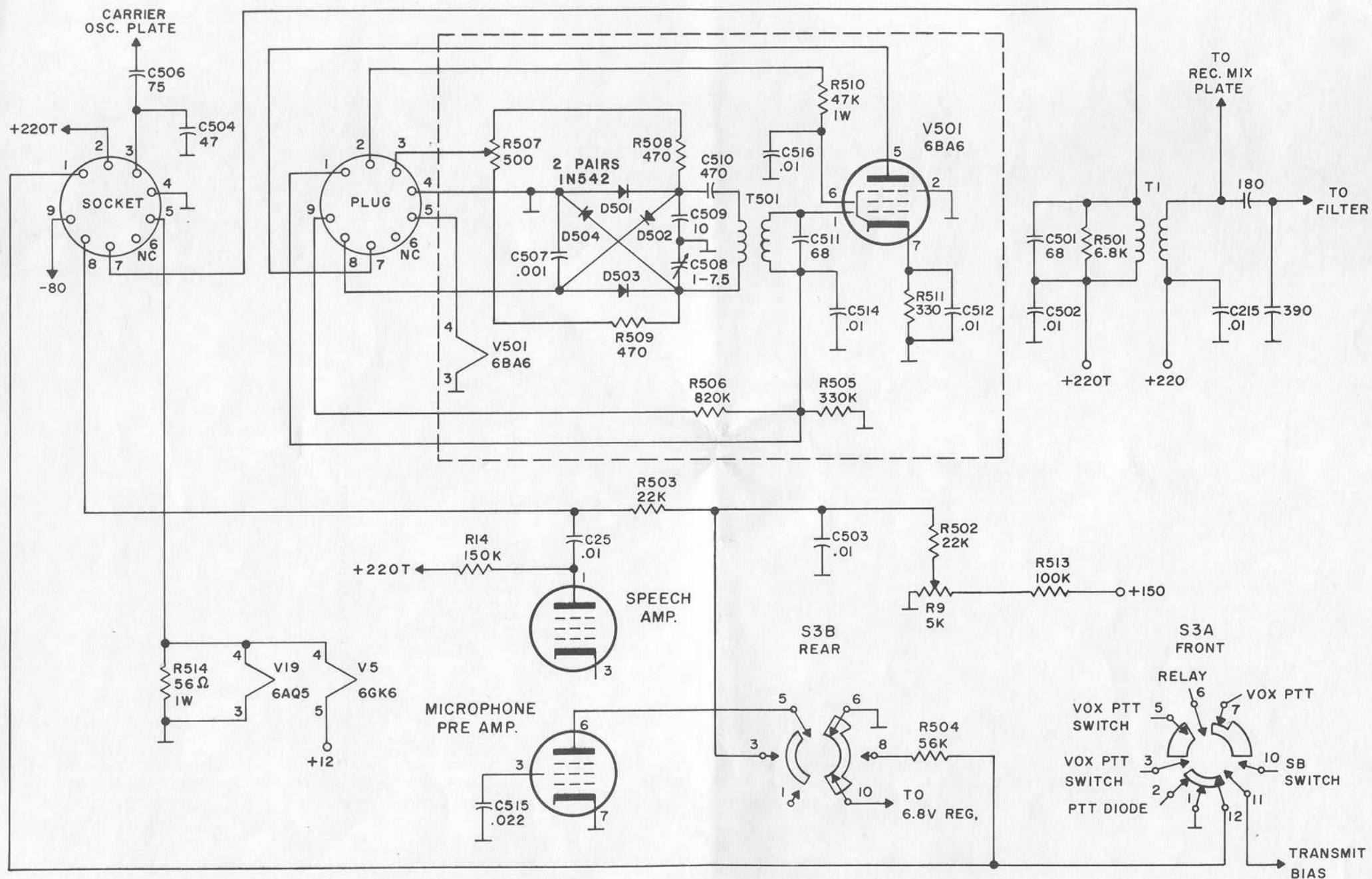
1. All omit components have been removed.
2. All add components have been properly soldered in place.
3. There are no shorted solder connections or components damaged by soldering iron heat.
4. Lead dress or components in other areas of the NCX-5 have not been disturbed during the process of modification.

Should difficulty still be encountered, write the Customer Service Manager at National Radio Company with a complete description of the nature of the problem. It is probable that he will be able to determine the fault if sufficient information is provided. Should this not be the case, the modified NCX-5 may be returned, upon receipt of authorization, freight pre-paid, to National Radio Company or the closest authorized service agency for examination and repair.

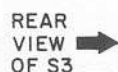
Any defective kit components will be replaced and the balanced modulator will be properly aligned and adjusted at no charge for parts or labor if the modification has been performed correctly and the fault is due to a defective component.

Should the difficulty be determined to be the result of improper kit installation or damage incurred in other portions of the NCX-5 during kit installation, necessary parts and labor will be billed as regular repair charges after an estimate of same is provided to you and authorized by you.

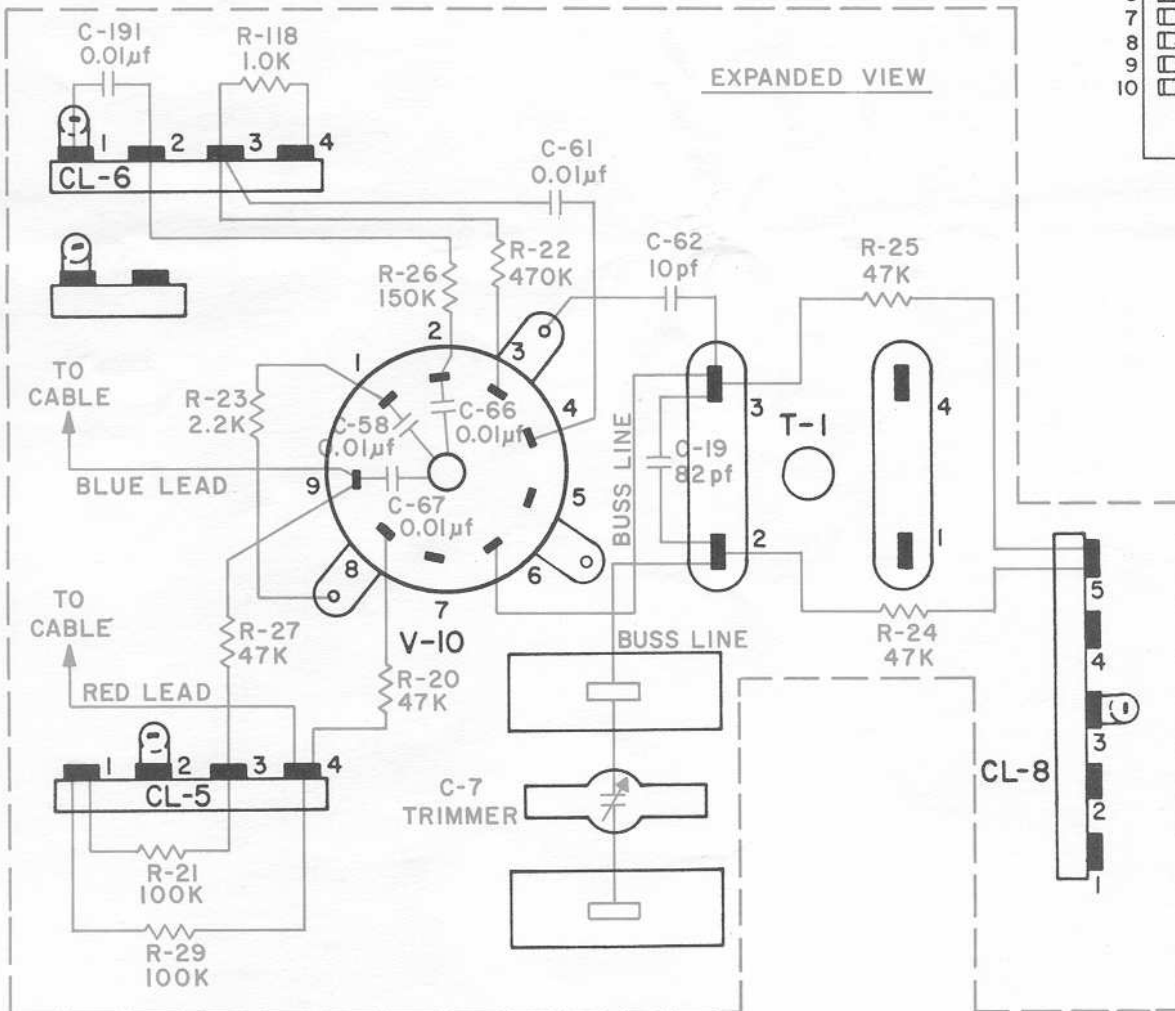
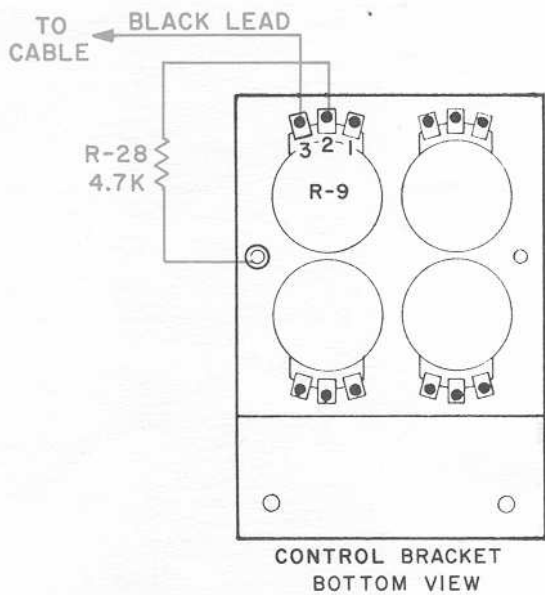
Should the difficulty be determined to be the result of a malfunction not in any way associated with the balanced modulator modification, the unit will be serviced according to the warranty status of the unit.



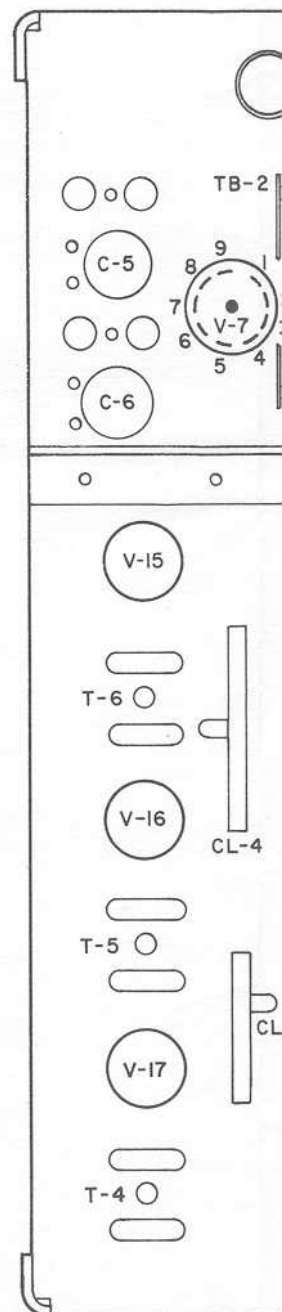
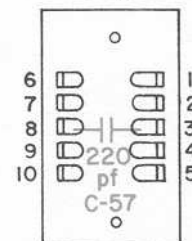
SCHEMATIC
BALANCE MOD. KIT
B-51872



ADDED DURING MODIFICATION



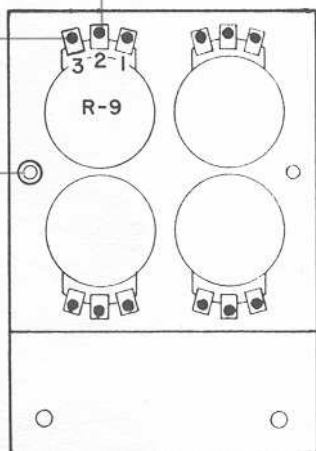
TB-2
FROM THIS
DIRECTION



PARTS TO BE OMITTED DURING MO

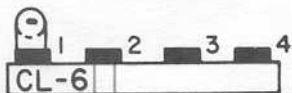
TO BLACK LEAD
CABLE

JUMPER
NO.22 BUSS



CONTROL BRACKET
BOTTOM VIEW

S3
TERM. F-12



ORANGE LEAD

YELLOW LEAD

BLUE LEAD

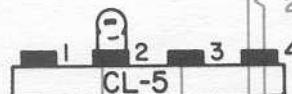
CL-7-2

EXPANDED VIEW

GREY LEAD

TO
CABLE

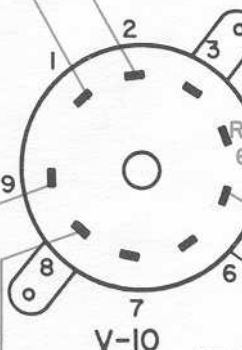
BLUE LEAD



R-503
22K

R-502
22K

C-503
0.01μf

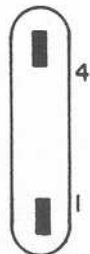


C-502
0.01μf

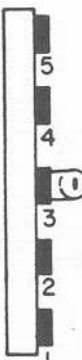
R-501
6.8K

R-514
56Ω

T-1

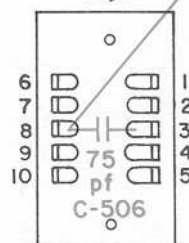


CL-8

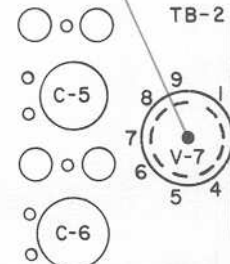


WHITE LEAD → CL-501

TB-2
FROM THIS
DIRECTION



C-504
47pf



V-15

T-6

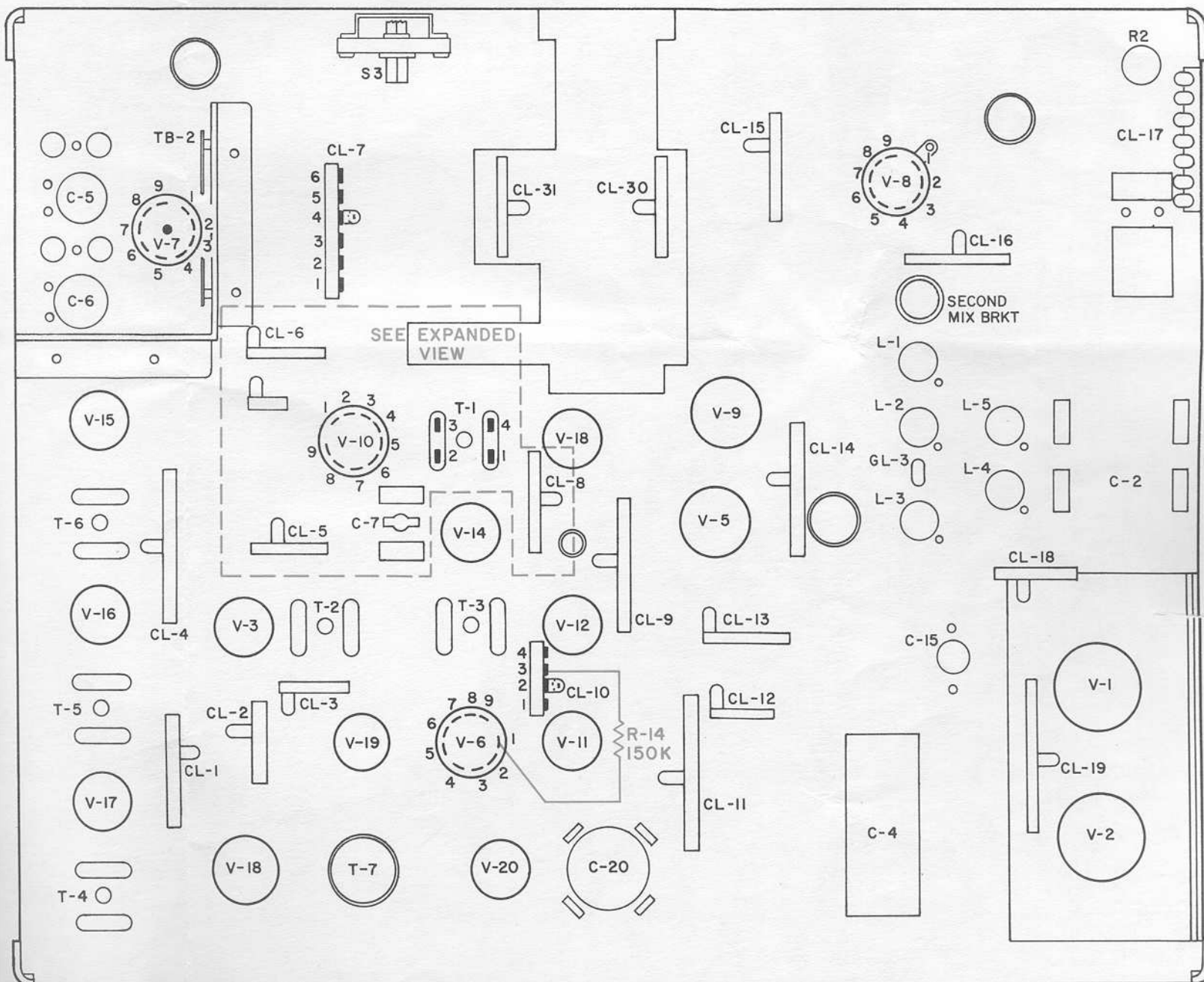
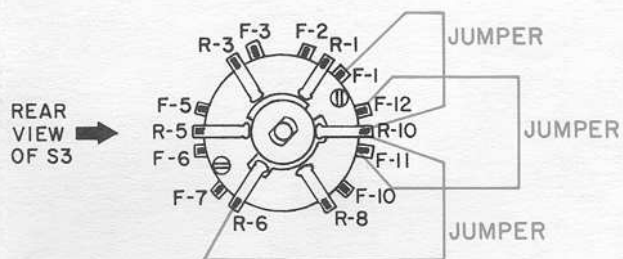
V-16

T-5

V-17

T-4

PARTS TO BE ADDED DURING MOD





National Radio Company, Inc.

37 Washington Street
Melrose, Massachusetts 02176

January 20, 1967

Mr. Edward Sebahar
17953 Exchange
Lansing, Illinois 60438

Dear Mr. Sebahar:

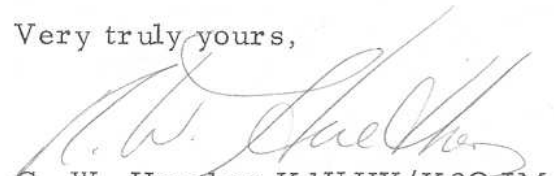
Thanks for the purchase of National's NCX-5 and for the prompt return of your guarantee card.

On the very early model NCX-5's, we found that the slipping dial is due to the nylon helical gear slipping on its shaft. This may be easily corrected by applying a bead of epoxy cement to the right-hand side of the gear. Do not get any cement on the sliding shaft or in the slot. We are enclosing a new gear with instructions, should you desire to replace it.

Please find enclosed a bulletin describing the solid state balanced modulator kit, plus all modifications and bulletins to date.

We appreciate this opportunity to say "thanks" and to offer our comments.

Very truly yours,



C. W. Huether K1UHY/K2QJM
Service Manager

CWH:dk

Enclosure: (1) helical gear and bulletins

CUSTOMER SERVICE BULLETIN

April 29, 1966

NCX-5

CSB 66-1

National Radio Customer Service Bulletins are provided free to all registered owners of our equipment. Information contained herein is gathered from our factory and field service organizations as well as from National owners.

We do not recommend the "automatic" incorporation of modifications except when the trouble description is identical to your problem, or when suggested for preventative maintenance.

IMPROVED TUBE LIFE---FINAL AMPLIFIERS

Numerous reports indicate some of our customers believe reduced loading is desirable for extra tube life. Just the opposite is true. Per NCX-5 instruction manual, finals should be loaded to not less than 300 ma. for optimum life. Underloading tubes results in excess screen current and hence reduced life. Power output may be reduced, if desired, by inserting less carrier.

TUBE CONVERSION

Due to a cutback in the production of 6GJ5 tubes, late-run models have incorporated the 6JB6 tube, which is identical except that the suppressor grid is brought out to Pin 8 (in the 6GJ5, it is grounded internally).

If your equipment uses the 6GJ5 tubes, Pin 8 of V-1 is used as a common tie point and conversion is mandatory before substituting 6JB6's. Such conversion may be accomplished as follows:

1. Locate the terminal strip running parallel to the final amplifier tubes. On the lug nearest the rear of the chassis--
 - (a.) Remove the white wire.
 - (b.) Remove the end of the .01 capacitor.

2. Locate V-1, Pin 8--
 - (a.) Remove the end of 100-ohm resistor.
 - (b.) Remove the white wire.
 - (c.) Reconnect the resistor and white wire to the empty terminal lug mentioned in Step #1, above.
 - (d.) Ground Pin 8.
3. Connect the white wire (removed in Step #1--(a.)) to the free end of the .01 capacitor (removed in Step #1--(b.)). Cover this joint with insulated sleeving.

When 6JB6 tubes are used it might be necessary to change R36 to obtain proper idling current of 60 ma. Values of resistance from 12K to 27K ohms may be selected to meet your unit's particular requirement.

NOTE: It is imperative that only a matched pair of tubes be used in the final amplifier. Reports suggest Sylvania 6JB6 tubes exhibit superior operating life.

CHIRP ON C. W.

This generally results from excessive carrier insertion. Carrier should be limited to a level which allows plate current to just approach normal plate current obtained in Tune position.

DRIVE FALLS OFF AT HIGH END---15 METERS

L-13 and associated wiring sets up a stray resonant trap which acts as a suck-out on 15 meters.

The following steps should be taken to eliminate this condition:

1. Disconnect the white coax lead (labelled #11), at 10 o'clock on the switch wafer section (S1-G) located between power amplifier cage and crystal mixer shield.
2. Reconnect the coax to the fourth (4th) unused terminal on S1-G, counting clockwise from the original terminal. This unused terminal is located at approximately 2 o'clock.
3. Connect a 100-ohm 1/2 watt resistor between the two terminals of S1-G mentioned above.

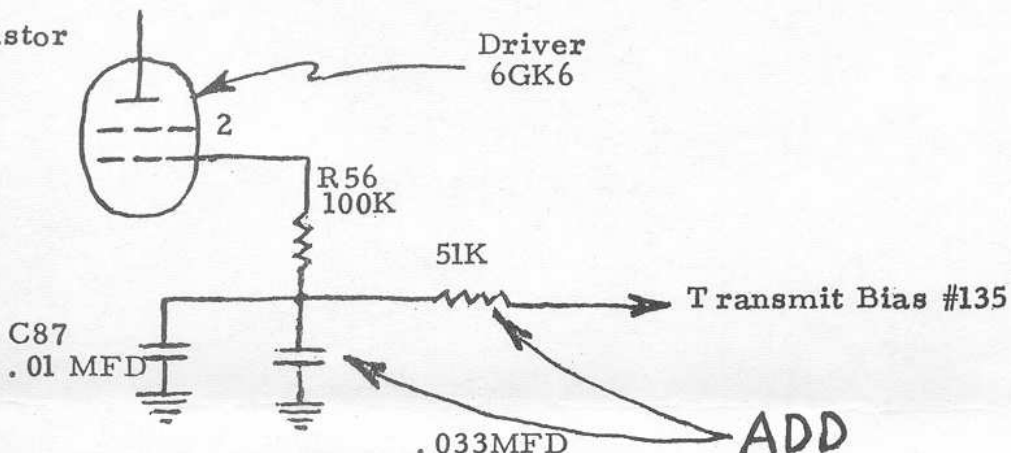
KEY CLICKS

To eliminate possible key clicks, we suggest the circuit modification on the following page. The RC component changes noted will alter the key pulse wave shape and eliminate undesirable transients.

KEY CLICKS (c ont.)

Add:

51K ohm resistor
& .033 MFD
capacitor as
shown



LOW MIKE GAIN (MK I modified to MK II)

Carefully check T-1 and T-7 located in the balanced modulator circuit for proper alignment. If alignment checks OK, change R-15, 1K cathode resistor of V6A, to 470 ohms, thereby effectively increasing the gain of the speech amplifier.

S-METER ZEROS LOW

The following change was incorporated in late production runs to eliminate the possibility of S-Meter not being adjustable above S-0. Replace R 43 (82K ohms) in the plate circuit of V6B with a 68K ohm 1/2 watt resistor.

NOISY, ERRATIC VFO TUNING (Often Described as "burble")

Solder the VFO wiper brush rivet to the VFO tuning condenser frame. This will insure positive ground connection and eliminate a resistive path which may build up through corrosion at the rivet contact.

Additional corrective action consists in cleaning the wiper contacts with a commercial type contact cleaner such as IRC.

LOW RECEIVER GAIN

MARK I Remove R119, Pin 6 to ground (V16).

MARK II Replace 150-ohm resistor, located in series with the RF gain control to ground, with a 47-ohm 1/2 watt resistor.

LOW RECEIVER GAIN
(cont.)

NOTE: The 150-ohm resistor is a production change not shown on the schematic.

As a secondary measure, R119 may also be removed.

NO LOCAL OSCILLATOR (V4A) ON 40 METERS

Equipment operates normally on all bands except 40 meters. This condition can be eliminated by the following modification--

1. Disconnect the wire between C8 and the 10 meter mixer coil at the coil end. Back this wire through the sub-chassis and reconnect it to V4A, Pin 1.
2. Change R74 from 47K ohms to 4700 ohms.
3. Adjust C8 and C9 to maximum drive at 7.3 Mc.

Series 74 (If above fails to give results)

- (a.) Decrease C103 from 560 Pf to 510 Pf
- (b.) If still intermittent after above, shunt C103 with from 22 to 47Pf.

Series 77 and 82

- (a.) In this series C103 is already 510Pf. Simply shunt with from 22 to 47Pf as in (b.) above.

4. If oscillator is still intermittent, replace L-12.
5. Re-align 10 meter mixer and driver coils.

CARRIER LEAKAGE
(after bal. mod. installation)

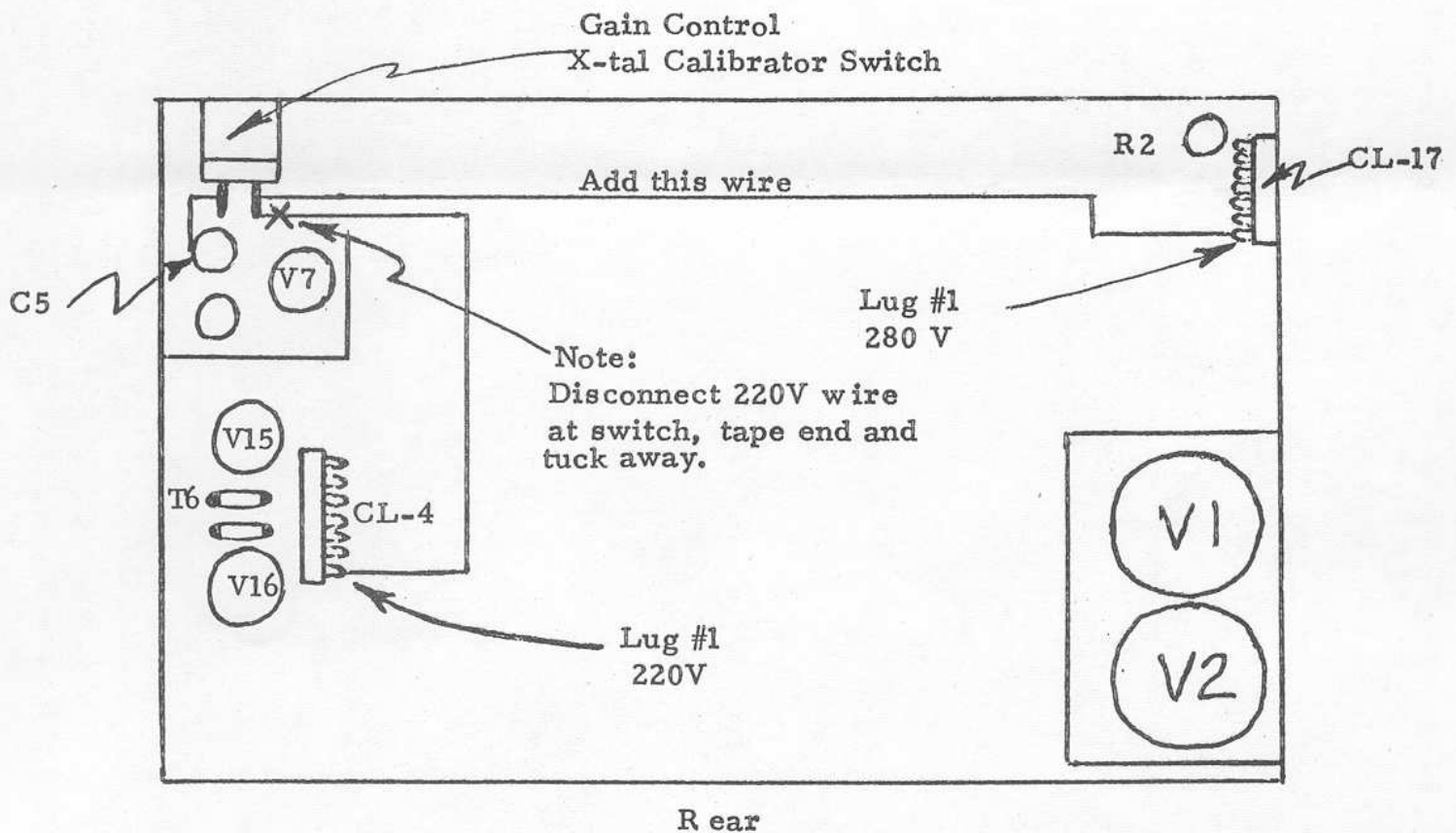
This is usually due to faulty lead dress. Solution: Keep all leads as short as possible and dress close to chassis.

LOOSE DIAL COUNTER GEAR

A simple field cure consists in bonding the fiber gear to its metal shaft with Epoxy Cement. Use sparingly and keep cement off sliding shaft.

WIRING CHANGE TO ACCOMMODATE VX-501
(Serial #77 series or lower)

VX-501 manual, Page 2, Figure 1 is incorrect. Sketch below shows proper connections of new wire.



Service Department
Technical Services Section

KHB:vfl

Distribution: All NCX-5 Owners
List "L"
List "F"

LUBRICATION CHART FOR NCX-5

The following are points which should be lubricated every six months.

1. The helical gears, i.e., those which meet at right angles to each other may be lubricated with SAE 50 oil.
2. Any of the shafts at the busings through which they pass can be lubricated very lightly with a light oil, such as "3 in 1."
3. The Geneva wheel and the mutilated pinion wheels, at their hubs with "3 in 1."
4. The clutch gear stem at the busing, "3 in 1."
5. The thrust washer at the front end inside (spring area). "3 in 1".
6. Worm gear and worm at their meshing point, SAE 50.
7. Spline: A.) Fingers, SAE 50, B .) Groove (where locating buttons rub). SAE 50
8. Roller on actuator pin, SAE 50 or Lubriplate.
9. Locking gears do not need lubrication.