

# SERVICE BULLETIN

EQUIPMENT TYPE: 32S-1, 32S-2

BULLETIN NO. 2

DATE: 4-1-60

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## SUBJECT: IMPROVE CARRIER SUPPRESSION

Improved carrier suppression in the transmitted signal of the 32S-1 and 32S-2 transmitters can be obtained by means of the modification detailed in this bulletin.

The carrier balance variable capacitor, C11, will require readjustment after modification; padder capacitor, C12, may require replacement to allow proper adjustment of C11. Additional padder capacitors of nominal values are included in the modification kit for selecting C12.

This modification now is incorporated into 32S-1 and 32S-2 production. If there is any question regarding the status of a 32S-1 or 32S-2, visually inspect the balanced modulator circuit; if only

two diodes are utilized as indicated in figures 1 and 4, it is recommended that this modification be incorporated.

### MODIFICATION PROCEDURE:

1. Remove 32S-1, -2 chassis from cabinet by first removing screws holding the four legs of the transmitter and then the unpainted screws inside top cover at front of unit.
2. Locate T2, C11, and R14 on topside of chassis. C11 and R14 are the carrier balance controls and are marked accordingly.

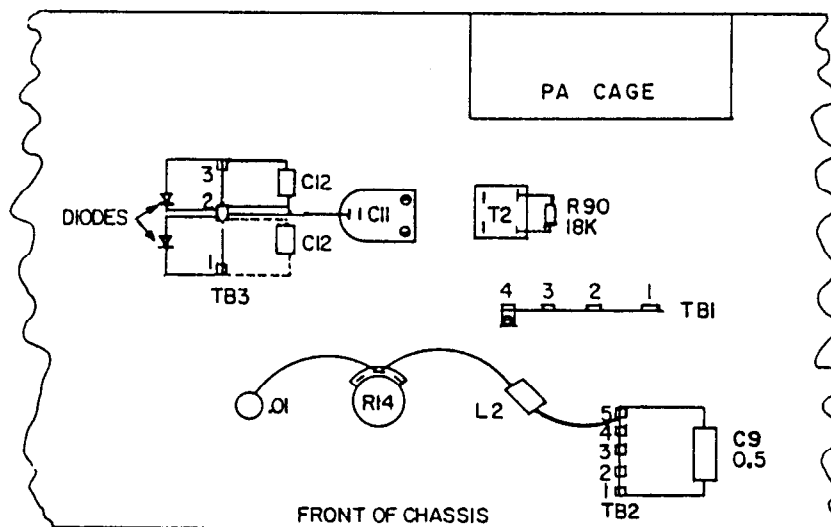


Figure 1. Simplified Layout of Underside of Chassis - Before Modification

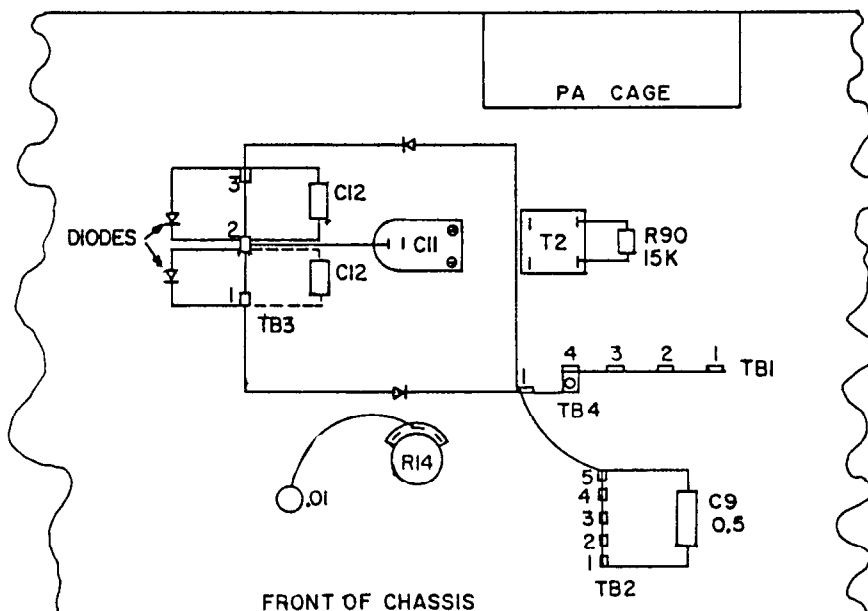


Figure 2. Simplified Layout of Underside of Chassis -  
After Modification

3. Turn chassis over, and facing front panel, locate L2, T2, C9, C11, R14, and TB1 on underside of chassis. Refer to figure 1.
4. Remove retaining screw from terminal strip TB1, and mount new terminal strip (306 0299 00), TB4, and TB1 with same screw. Refer to figure 2.
5. Remove L2, a 2-mh choke, connected from center terminal of potentiometer R14 to terminal strip TB2-5. Refer to figure 1.
6. Install #22 wire (439 7031 00) from TB4-1, the new terminal strip, to TB2-5. Refer to figure 2.
7. Install one 1N34A diode (353 0103 00) from TB4-1 to TB3-3 so that arrowhead on diode points toward TB3-3; install other 1N34A diode (353 0103 00) from TB3-1 to TB4-1 so that arrowhead on diode points toward TB4-1. Make sure arrowheads point as indicated. Refer to figure 2.
8. Replace R90, the 18K-ohm resistor connected across T2, with 15K-ohm resistor (745 1401 00).
9. Carrier balance adjustments will require use of either a receiver or an r-f vacuum-tube voltmeter. If using receiver, the following procedure applies; if using vacuum-tube voltmeter, refer to step 10.
  - a. With chassis still removed from cabinet, set BAND switch to 3.8 and VFO dial to 100. Connect a 50-ohm resistive load to transmitter r-f output jack. Tune and load transmitter. Set receiver to 3.9 mc.
  - b. Set transmitter EMISSION switch to LSB position to disable transmitter while preparing for next step.
  - c. Connect about two feet of hookup wire to the receiver antenna jack, and place it

**CAUTION**

Grasp diode leads being soldered in step 7 with an alligator clip or long-nosed pliers to bleed off excessive heat and prevent diode from being damaged. Make sure wires that are being soldered are pretinned properly so connection can be made quickly. Excessive heat will damage diodes permanently.

- near enough to the transmitter so that with receiver in USB function and tuned to the transmit frequency, a near full-scale receiver S-meter indication is attained with the transmitter yielding full output with EMISSION switch in lock key position.
- d. Turn transmitter EMISSION switch to LSB position, and turn MIC GAIN control full counterclockwise.
  - e. Key transmitter by turning VOX GAIN control counterclockwise until switch clicks. S-meter should show some indication due to carrier.
  - f. Adjust C11 and R14 (carrier balance) for a null in S-meter indication. Adjust first one control and then the other until neither produces any decrease in S-meter indication.
  - g. Turn transmitter EMISSION switch from LSB to USB; if a difference between nulled S-meter readings exists, turn to position with higher reading and reduce by readjusting C11 and R14 to a level which is a compromise between LSB and USB positions.
  - h. If C11 reaches minimum or maximum according to figure 3 before proper carrier balance is obtained, the value of C12 must be changed in accordance with note 1 or note 2 following step 10. C12 may be connected in either of two places depending on the unit in which it is installed.
10. To make carrier balance adjustments using an r-f vtvm, use following procedure:
    - a. With chassis still removed from cabinet, set BAND switch to 3.8 and VFO dial to 100. Connect a 50-ohm resistive dummy load to transmitter r-f output jack. Tune and load transmitter.
    - b. Set the EMISSION switch to LSB position, and turn the MIC GAIN control full counterclockwise.
    - c. Connect r-f vtvm across dummy load and set to lowest scale. Be sure MIC GAIN control is full counterclockwise.
    - d. Key transmitter by turning VOX GAIN control counterclockwise until switch clicks. Adjust the carrier balance controls for a null in r-f vtvm indication. Adjust, first one and then the other, until neither produces a decrease in r-f vtvm indication. Set EMISSION switch to USB and check carrier level; if it varies considerably from LSB carrier level, turn to position with the higher level and reduce by readjusting carrier balance controls, C11 and R14, to a level which is a compromise between LSB and USB positions. The carrier output level should be less than 0.2 volt.
    - e. If C11 reaches minimum or maximum according to figure 3 before proper carrier balance is obtained, the value of C12 must be changed in accordance with notes below. C12 may be connected in either of two places depending on the unit in which it is installed.

## NOTE 1

If C12 is in parallel with C11, as shown by dotted line in figure 5, and if C11 is at maximum capacitance, increase the value of C12 by 33 uuf. Conversely, if C11 is at minimum, decrease C12 by 33 uuf. This is a trial-and-error adjustment, and C12 may have to be increased by 60 uuf or more in some transmitters.

## NOTE 2

If C12 is on opposite side of balanced modulator circuit as shown by solid line in figure 5 and if C11 is at maximum capacitance, decrease value of C12 by 33 uuf. It might be necessary to remove C12 from the solid-line position entirely and add it in parallel with C11 (dotted-line position in figure 5). Conversely, if C11 is at minimum, increase C12 by 33 uuf.

If the above suggested values of C12 do not provide adequate carrier suppression, it will be necessary to repeat the procedure with a different value of C12. The two 33-uuf capacitors supplied can be put in series or parallel either

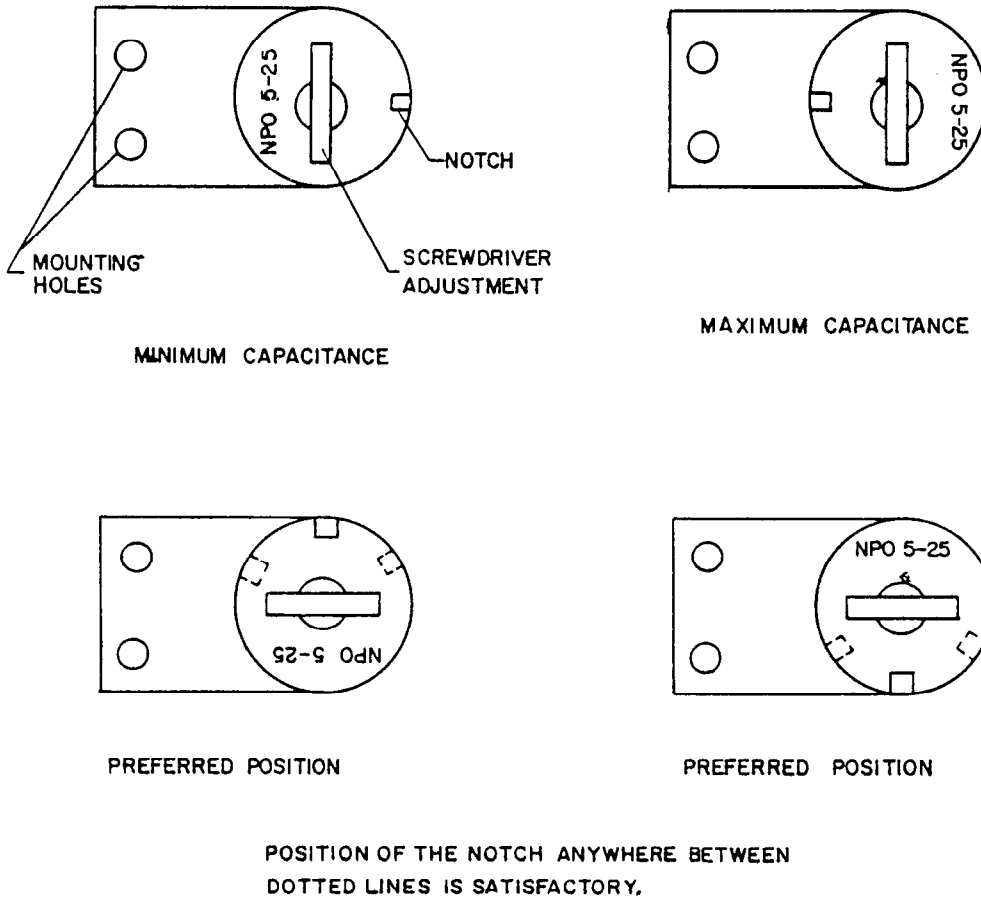


Figure 3. Carrier Balance Capacitor, C11

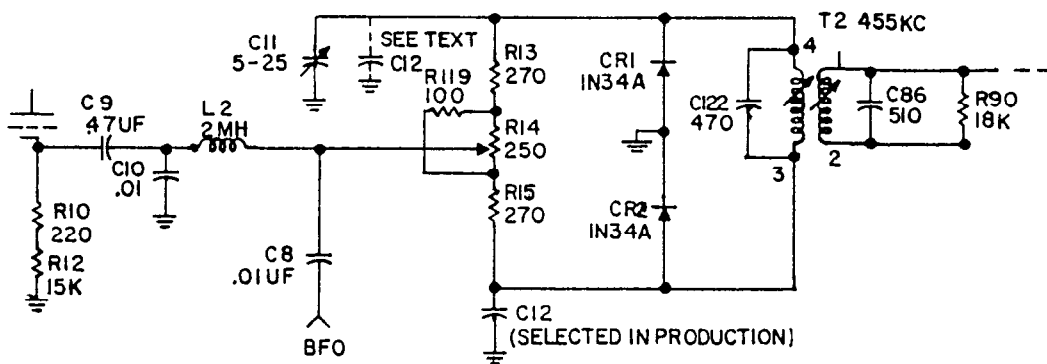
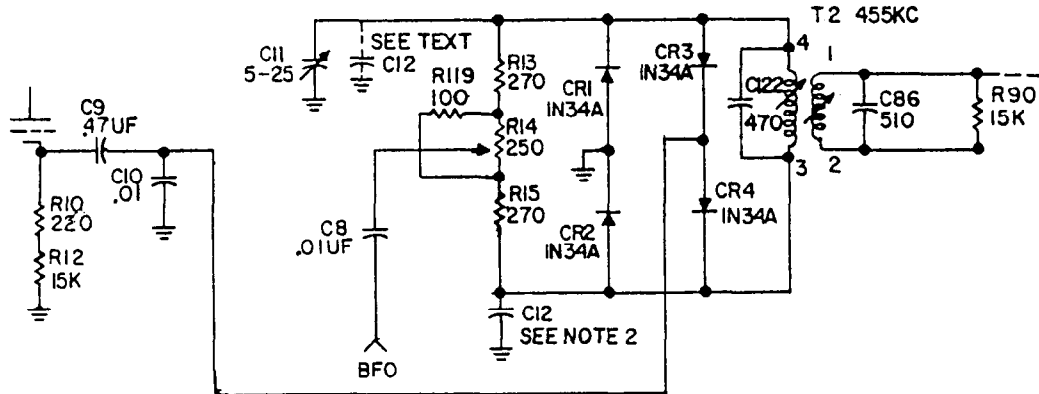


Figure 4. Balanced Modulator Before Modification



- NOTES:
1. RESISTANCE VALUES ARE IN OHMS AND CAPACITANCE VALUES ARE IN UUF UNLESS OTHERWISE NOTED.
  2. C12 MAY REQUIRE REPLACEMENT TO ALLOW CORRECT SETTING OF C11.

Figure 5. Balanced Modulator After Modification

on one side or the other of the balanced modulator to provide the correct value of C12 on most transmitters.

11. Replace transmitter in cabinet, using hardware removed in step 1. Reconnect dummy load on antenna, and recheck carrier balance adjustments.

**PARTS REQUIRED:**

Modification Kit 546 4071 00      Price \$3.00

This modification kit contains:

Qty	Description	Collins Part Number
2	Diodes, 1N34A	353 0103 00
1	Resistor, 15K ohms ±10%, 1/2 watt	745 1401 00
0.5	Wire, #22 AWG (ft)	439 7031 00
1	Terminal, strip	306 0299 00
2	Capacitors, 33 uuf ±10%	912 2781 00

The above kit may be obtained from Collins Radio Company, Service Parts Department, Cedar Rapids, Iowa, at the price indicated. All orders should specify Modification Kit 546 4071 00 and make reference to 32S Bulletin 2. Shipments of this kit will begin April 20, 1960.