



SERVICE BULLETIN

COLLINS RADIO COMPANY

Cedar Rapids, Iowa 52406

EQUIPMENT SERIES: KWM

BULLETIN NO.

DATE 8-8-60

Page 1 of 4

(Revision 10-1-60)

EQUIPMENT TYPE: KWM-2, KWM-2A TRANSCEIVER

SUBJECT: ADD VOX RELAY TIME CONSTANT CONTROL.

NOTE: This revision supersedes and replaces KWM Service Bulletin 2 dated 8-8-60. Changes are indicated by black lines in margin.

Modifying Transceiver KWM-2/2A according to this bulletin will allow the time constant of the vox-control relay to be adjusted. Adjusting the time constant will enable the operator to obtain a more uniform operation of the relay by compensating for variations in microphone and voice characteristics. Increasing the time constant will increase the time between the last spoken word or keyed character and the release of the relay; decreasing it will have converse effects.

MODIFICATION PROCEDURE:

See figure 1 for circuit changes.

1. Remove the feet from cabinet.
2. Lift lid and remove the two unpainted screws from the top rim of the front panel.
3. Slide unit out of cabinet.
4. Remove and discard the 10-megohm resistor R43 located between V4, pin 9 and ground.
5. Add 0.047-uf capacitor (931-0295-00) in parallel with 0.01-uf disc capacitor located between pins 1 and 3 of E50. E50 is a mounting turret post located between XV4 and XV14 tube sockets. Sleeve leads of new capacitors with insulation (152-1613-00). See figure 2.
6. Solder 18-inch length of wire (439-7036-00) to V14, pin 3 and another 16-inch length to V14, pin 1. Lay these wires along chassis and push through cable grommet (in corner near front panel) to the top of the chassis.
7. With transceiver in upright position, remove the two nuts holding the shield to the back of the meter.
8. Mount VOX TIME CONSTANT control bracket (546-7971-00) on the meter shield using hardware removed in step 7. See figure 3.

(1st Revision 10-1-60)

9. Solder either one of the 18-inch wires to the center terminal of the control.
10. Solder the other wire to the counterclockwise terminal (as viewed from the shaft end) of the control. Refer to figure 3.
11. Mount VOX TIME CONSTANT control (376-7206-00) in the new bracket, using hardware and knob included in kit.
12. Reassemble unit.

ADJUSTMENT PROCEDURE:

1. To set controls, place the VOX TIME CONSTANT control in midrange and the VOX and ANTI-VOX controls fully counterclockwise.
2. Speak into microphone and advance the VOX GAIN until satisfactory vox action is attained.
3. Continuing to speak into the microphone, rotate the VOX TIME CONSTANT control clockwise to increase delay and counterclockwise to shorten delay time. As the control is rotated counterclockwise to reduce the release time, vox sensitivity will be reduced. It may be necessary to advance the VOX GAIN control.
4. Set the ANTI-VOX control as outlined in the instruction book.

PARTS REQUIRED:

Modification kit 546-7969-00 which consists of: * Price \$3.50

QTY	DESCRIPTION	COLLINS PART NUMBER
1	Bracket mounting, resistor	546-7971-002
1	Nut, lock hex 3/8-32	313-0061-00
1	Washer, 3/8	373-0085-00
1	Resistor, variable - 10 meg	376-7206-00
1	Knob, black phenolic	281-0069-00
1	Capacitor, 0.047 uuf ±10%, Fixed paper dielectric	931-0295-00
3 (ft)	Wire, no. 22 Electrical, white-green	439-7036-00
0.3 (ft)	Insulation Sleeving, electrical	152-1613-00

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 546-7969-00 and make reference to KRM Bulletin No. 2.

1

* Original bulletin showed incorrect price of \$9.25. Refunds will be made of monies received over this amount. Orders received but not yet shipped will be billed at the corrected price.

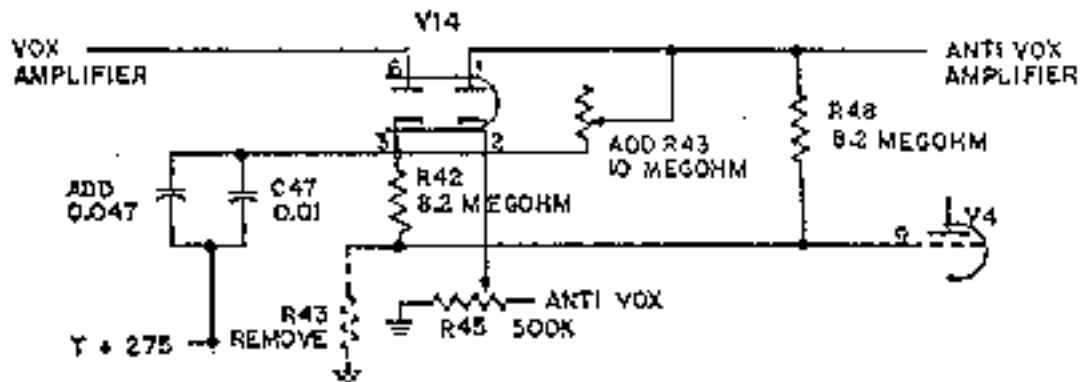


Figure 1. KWM-2/2A VOX Circuit Schematic Changes

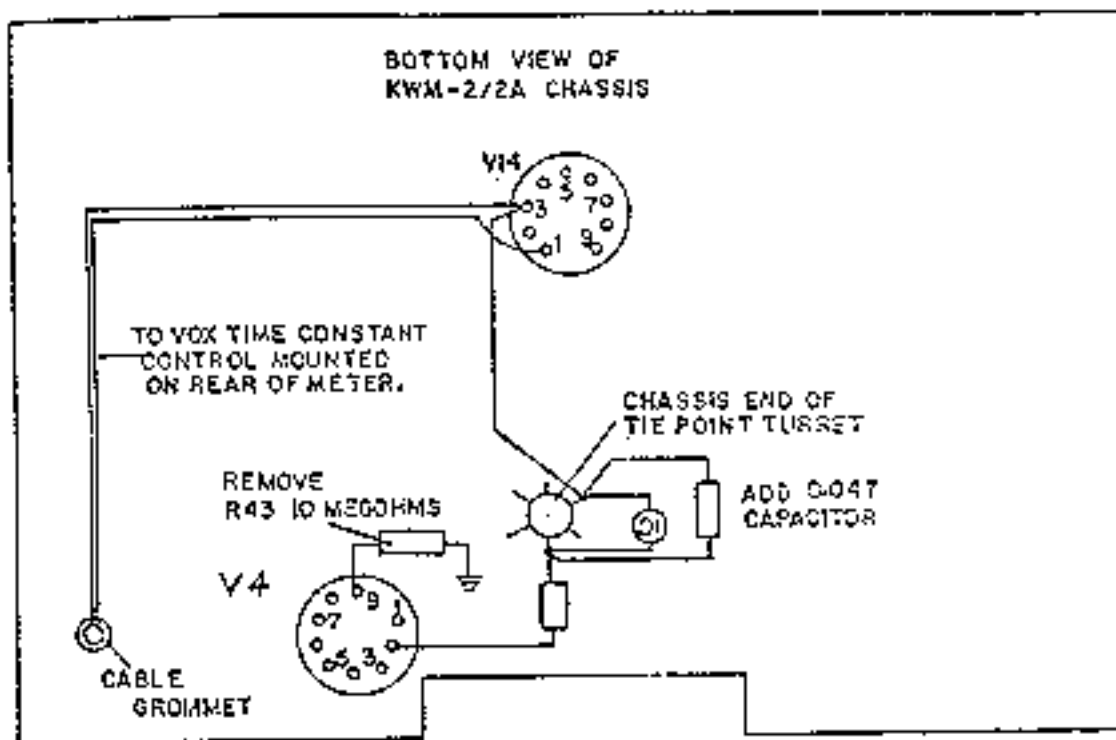


Figure 2. Parts Location - Under Chassis

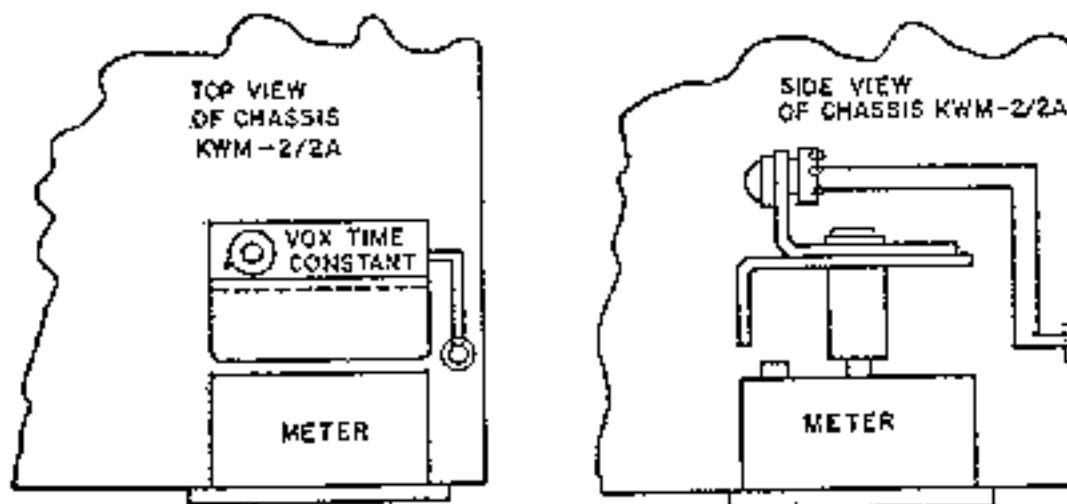


Figure 3. Installation of VOX Time Constant Control and Brackets



SERVICE BULLETIN

1 October 1971

FROM: Publications Engineering Department, Cedar Rapids, Iowa 52406

KWM-2/KWM-2A TRANSCEIVERS SERVICE BULLETIN NO 3 (REISSUE)

EQUIPMENT: KWM-2 Transceiver (522-1611-000)
KWM-2A Transceiver (522-1792-000)

SUBJECT: Correlation Between Frequencies on Different Bands

This issue completely supersedes the original KWM-2 Service Bulletin No 3, with the same subject, and dated 12 July 1960. The reasons for this reissue are that this new issue offers improved equipment performance over the original, brings the equipment up to the latest production configuration, and includes instructions to cover modification of the KWM-2A (not covered in the original publication).

The correlation between frequencies on different bands of the KWM-2/2A is improved by this modification. This results in less need for pto zero hairline adjustment when switching between bands and also in overall improved equipment performance.

For modification parts, price quotation, and availability dates, contact Collins Radio Company, Service Parts Department, Cedar Rapids, Iowa 52406. All prices are subject to change without notice, and the minimum order charge is \$15.00. Orders must specify the Collins part numbers, quantity of parts required, and must reference KWM-2/2A Service Bulletin No 3.

This modification is recommended for all units, including those having the original service bulletin (no 3) installed. Newer units are modified in production, and it is suggested that a quick inspection of the equipment for the parts and circuit changes of this modification be made to determine whether these changes are included in each unit.

MODIFICATION PROCEDURES

- a. Remove transceiver from cabinet as follows:
 1. Remove all four feet and the screw that is midway between the two rear feet.
 2. Turn the transceiver right side up, lift lid, and remove the two bright-plated screws in the style frame under the lid.
 3. Carefully slide the chassis forward, and set cabinet aside.
- b. Examine unit to determine if this modification is installed. Disregard procedures if it is incorporated.

NOTE: Refer to the KWM-2/2A instruction book for location and identification of XV13 components located in figure 6-2 on page 6-11.



SERVICE BULLETIN

SERVICE BULLETIN NO 3

CAUTION: WHEN PERFORMING ANY OF THE MODIFICATIONS, IF THE TRANSCIEVER IS WIRED WITH POLYVINYL CHLORIDE-INSULATED WIRE, EXERCISE EXTREME CARE SO AS NOT TO DAMAGE THE INSULATION WITH A SOLDERING IRON.

NOTE: The following step (c.) does not apply to the KWM-2A.

- c. Remove and discard 27-pF capacitor C266, if present, from XV13A pin 2 to the center shield of V13 (ground), and install at this location a 12.0-pF capacitor (912-2757-000), KWM-2 only.
- d. Remove and discard 47-kΩ resistor R125 from XV13A pin 2 to vector terminal board E100, and replace with 33-kΩ resistor (745-1415-000).
- e. Remove and discard 47-pF capacitor C74 from XV13A pin 3 to ground, and replace with 43.0-pF capacitor (912-2789-000).
- f. Inspect unit for damage incurred during modification, dress wires and cables, and remove debris.
- g. Reassemble unit by reversing step a.
- h. Check transceiver for proper operation.
- i. Mark information chart (280-3778-010) 5B 3R. Apply chart to convenient location on unit if one is not present.

PARTS REQUIRED

The following parts are required to modify one KWM-2 (the KWM-2A requires one less part as noted):

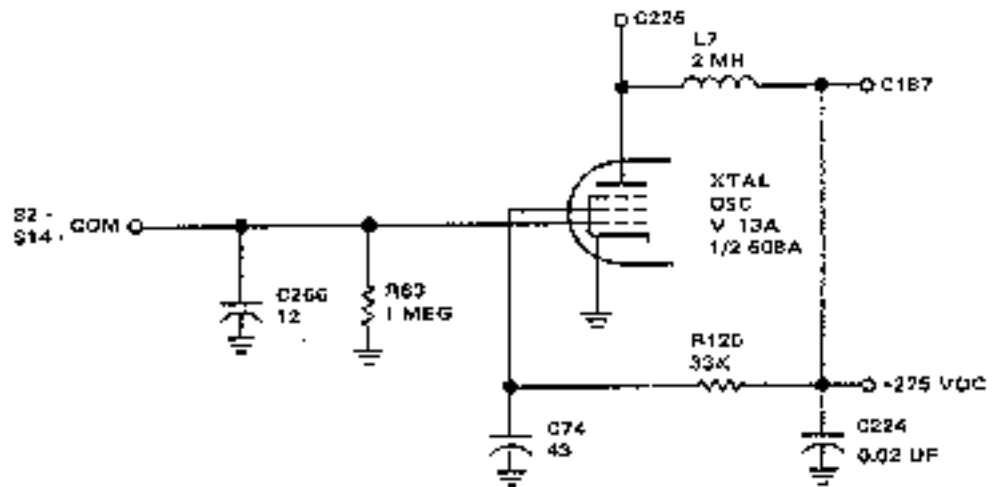
<u>NEW COLLINS PART NUMBER</u>	<u>QTY</u>	<u>DESCRIPTION</u>
280-3778-010	1	Information chart
745-1415-000	1	Resistor, 33 kΩ, 1/2 watt, (R125)
912-2789-000	1	Capacitor, 43.0 pF, (C74)
*912-2757-000	1	Capacitor, 12.0 pF, (C266)

*Not used on KWM-2A.



SERVICE BULLETIN

SERVICE BULLETIN NO 8



NOTE:
C266 NOT USED IN KWM-2A.

KWM-2 After Modification, Schematic Change



SERVICE BULLETIN

COLLINS RADIO COMPANY

Order Report Form 32406

EQUIPMENT SERIES: KWM

BULLETIN NO. 4

DATE 9-2-60

Page 1 of 2

EQUIPMENT TYPE: KWM-2, KWM-2A TRANSCEIVER

SUBJECT: IMPROVEMENT OF ALC ACTION AND ELIMINATION OF ALC OVERSHOOT.

Alc action can be improved and alc overshoot minimized by changing component values and circuitry relating to the alc rectifier and transmitter r-f amplifier. Alc overshoot, which occurs after the first oral syllable in some transceivers, is a result of the delay voltage on the alc rectifier and the relatively slow attack time of the alc voltage.

The following changes have been factory installed at different intervals; examine unit for changes before attempting modification.

MODIFICATION PROCEDURE:

1. Remove the four feet from bottom of transceiver.
2. Open lid, and remove the two unpainted screws in the top panel rim. Slide unit out of cabinet.
3. Turn unit bottom side up with front panel toward operator.
4. Check for a 1K-ohm, 1/2-watt resistor R10 and a 270K-ohm, 1/2-watt resistor R11 located on parts mounting turret between tube sockets XV7 and XV17. If present clip out and discard, and solder a piece of wire between tube socket XV17, pin 2 and the nearest ground point.
5. Clip out and discard 3.3-megohm, 1/2-watt resistor R119, and install in its place a 1.5-megohm 1/4-watt resistor (745-0883-00). This resistor is on parts mounting turret, located at the front center of the chassis adjacent to tube socket XV14.

6. Clip out and discard 3.3-megohm, 1/2-watt resistor R34, and install in its place a 100K-ohm, 1/4-watt resistor (745-0821-00). This resistor is on parts mounting turret located between tube sockets XV7 and XV13.
7. Place unit in upright position.
8. Remove the two black Phillips-head screws in the top corners of the PTO dial escutcheon.
9. Remove the cadmium-plated, sheet-metal screw in the top left side of the ALC ZERO potentiometer mounting bracket.
10. Lift out bracket.
11. Clip out and discard 220-ohm resistor R170 which is soldered across the terminals of ALC ZERO potentiometer R30.
12. Remount bracket.



Be sure 47-ohm resistor R19 on ALC ZERO potentiometer does not touch exciter tuning shaft.

13. Slide unit into cabinet, replace panel screws, and remount feet.
14. Connect power plug and antenna lead.
15. Check grid drive and adjust if necessary. It may be low especially on the higher bands.
16. Alignment of the stage affected may be checked as follows:
 - a. Set MIC GAIN control fully counter-clockwise.

- b. Turn FUNCTION switch to ON.
- c. Set MAIN TUNING dial to 100.
- d. Set EMISSION switch to TUNE.
- e. Set EXCITER TUNING to 2.0 on logging scale.
- f. Set BAND switch to 3.5.
- g. Set METER switch to PLATE position.
- h. Turn P. A. TUNING control to white portion of dial, indicating proper band.
- i. Advance MIC GAIN to full clockwise position, and rock EXCITER TUNING until maximum plate current is obtained.
- j. Dip plate current immediately with P. A. TUNING.
- k. Return MIC GAIN to full counterclockwise position.
- l. Set METER switch to GRID position.

- m. Advance MIC GAIN until some grid-current indication is obtained.
- n. Rock EXCITER TUNING to a peak grid-current indication.

NOTE

In the following steps reduce setting of MIC GAIN as necessary to keep grid current below "S8."

- o. Adjust trimmer capacitor C37 marked "(A) 3.5" in mixer plate section for peak grid current indication.
- p. Repeat steps n and o for peak grid-current indication.
- q. Return MIC GAIN to full counterclockwise position.
- r. Repeat steps g through q for each of the remaining bands: Use the following table for selection of EXCITER TUNING and BAND switch position and identification of mixer plate trimmer capacitors.

EXCITER TUNING	BAND SWITCH	ADJUST TRIMMER	MARKED
3.75	7.0	C32	(E) 7.0
6.50	14.2	C34	(C) 14.0
7.60	21.2	C36	(D) 21.0
9.00	28A	C39	(E) 28.0

PARTS REQUIRED:

QTY	DESCRIPTION	COLLINS PART NUMBER
1	Resistor, fixed composition, 1.5 megohm $\pm 10\%$	745-0883-00
1	Resistor, fixed composition, 0.1 megohm $\pm 10\%$	745-0821-00

For modification parts, price quotations (minimum order charge is \$15.00), and availability contact Collins Radio Company, Service Parts Department, Cedar Rapids, Iowa 52406. All parts orders must specify the Collins modification kit number, or part numbers, quantity required, and reference this service bulletin.



EQUIPMENT SERIES: KWM

BULLETIN NO. 5

DATE: 11-23-60
Page 1 of 4
(Revised 1-3-61)

EQUIPMENT TYPE: TRANSCEIVERS KWM-2, KWM-2A

SUBJECT: TO IMPROVE TRANSMIT-RECEIVE EXCITER TUNING COINCIDENCE

Better transmit-receive exciter tuning coincidence can be obtained by the modification described in this bulletin.

As the PA driver tube V8 is switched from transmit (conducting) to receive (nonconducting), tube capacitance changes approximately 4 uuf. This change is reflected in the plate circuit of r-f amplifier tube V7 and results in noncoincidence of transmit-receive exciter tuning on the high frequency bands.

Using the effect of capacitance change proportional to back bias voltage applied to a silicon capacitor, it is possible to add 4 uuf of capacitance to the plate circuit when the driver is in receive (nonconducting) function.

Before adding the capacitor make the following check to determine if unit was wired so that tube V8 conducts when operating in receive. Units wired in this manner must be modified according to section A before adding the silicon capacitor.

1. With transceiver turned off, raise top lid and remove PA shield cover.
2. Remove driver tube V8 and measure the resistance from pins 3 and 8 to pin 6 of tube socket XV8. If either resistance is approximately 22K ohms proceed with section A. If both resistances are quite high (above 60K ohms) proceed with section B.

To identify and locate components referred to in this service bulletin, refer to drawings supplied with Amateur Service Information Letter dated 11-15-60.

The modification and tuning procedure in this bulletin will permit peaking of the EXCITER TUNE for maximum PA grid current in transmit function and will not require re-peaking for receive. This will not degrade receive operation.

MODIFICATION PROCEDURE:

Section A: Removal of B+ from the Screen Grid of Tube V8 and Application of Bias to Control Grid of V8, When in Receive Function.

1. Remove the four feet from bottom of transceiver.
2. Open lid and remove the two unpainted screws in the top front panel rim. Slide unit out of cabinet.

3. Turn unit bottom side up, with front panel toward operator.
4. Disconnect 22k-ohm 2-watt resistor R105 from junction of 100-ohm, 1/2-watt resistor R104 and 1000-uuf feedthrough capacitor C5 in PA grid compartment shield and reconnect to 1000-uuf feedthrough capacitor C82 in PA shield.
5. Remove bus wire located between tie points "D" and "G" on parts mounting turret E80.
6. From tie point "D" on this same parts mounting turret, transfer choke L11 to the adjacent clockwise tie point "E".
7. Proceed with Section B.

Section B: Installation of Silicon Capacitor

1. Connect new 10-uuf capacitor C272 (912-2753-00) from terminal "I" at the chassis end of parts mounting turret E80 to point "D" on the same mounting turret. Do not solder "D" connection.
2. Connect new 680K-ohm resistor R184 (745-0851-00) from tube socket XV17, pin 9 to tie-point "D" on parts mounting turret E80. Do not solder "D" connection.
3. Observe polarity of silicon capacitor CR5 (922-6002-00). Connect anode (end marked with manufacturer's trade mark) to the ground shield of tube socket XV7. Connect cathode (color coded end) to tie point "D" on parts mounting turret E80. Do not solder "D" connection.
4. Connect new 1 meg-ohm resistor R183 (745-0857-00) from tie point "B" on parts mounting turret E70 to tie point "D" on parts mounting turret E80.
5. Solder connections to tie point "D".
6. Place chassis in upright position, and connect power cables and antenna load.
7. Check alignment in accordance with the following procedure. Some realignment of r-f trimmers, especially on the higher frequency bands, will be necessary. NOTE: This is not a standard alignment procedure. Refer to KWM-2 and KWM-2A Instruction Books for complete procedure.
 - a. Set MIC GAIN control fully counterclockwise.
 - b. Turn function switch to ON.
 - c. Set main tuning dial to 100.
 - d. Set EMISSION switch to TUNE.

- e. Set EXCITER TUNE to 2.1 on the logging scale.
- f. Set BAND switch to 3.6.
- g. Set METER switch to PLATE position.
- h. Turn PA TUNING control to white portion of dial, indicating the proper band.
- i. Advance MIC GAIN to full clockwise position, and rock EXCITER TUNING control until maximum plate current is obtained.
- j. Dip plate current immediately with the PA TUNING control.
- k. Return MIC GAIN control to full counterclockwise position.
- l. Set meter switch to GRID position.
- m. Advance MIC GAIN control until some grid current indication is obtained.
- n. Rock EXCITER TUNING control to a peak grid current indication.

NOTE: In the following steps, reduce the setting of the MIC GAIN control as necessary to keep grid current below "86".

- o. Adjust trimmer capacitor marked 3.8 (C109 in r-f amplifier section) for peak grid current indication.
- p. Repeat steps m and o until a peak indication is reached.
- q. Return MIC GAIN to full counterclockwise position.
- r. Repeat steps g through q for each of the remaining bands using the following table for selection of EXCITER TUNING, BAND switch position, and identification of r-f amplifier trimmer capacitance.

EXCITER TUNING LOGGING SCALE	BAND SWITCH	R-F AMPLIFIER STAGE	CAPACITOR
2.1	3.6	3.8	C109
3.5	7.0	7.0	C113
6.1	14.0	14.0	C115
7.6	21.2	21.0	C116
9.0	28A	28.0	C111

- s. Turn off transceiver, remove cable, and return chassis to cabinet. Install the two screws in the front rim and replace feet.

PARTS REQUIRED: Modification Kit 547-1543-00 which consists of the following items:

QTY	DESCRIPTION	COLLINS PART number
1	Capacitor, 10 uuf $\pm 5\%$, 500 vdc, Fixed mica	912-2753-00
1	Resistor, 1 megohm $\pm 10\%$, 1/4 watt, Fixed composition	745-0857-00
1	Resistor, 680K-ohm $\pm 10\%$, 1/4 watt, Fixed composition	745-0851-00
1	Capacitor, Silicon 6-88 uuf, 130 vdc	922-6002-00

For modification parts, price quotations (minimum order charge is \$15.00), and availability contact Collins Radio Company, Service Parts Department, Cedar Rapids, Iowa 52406. All parts orders must specify the Collins modification kit number, or part numbers, quantity required, and reference this service bulletin.

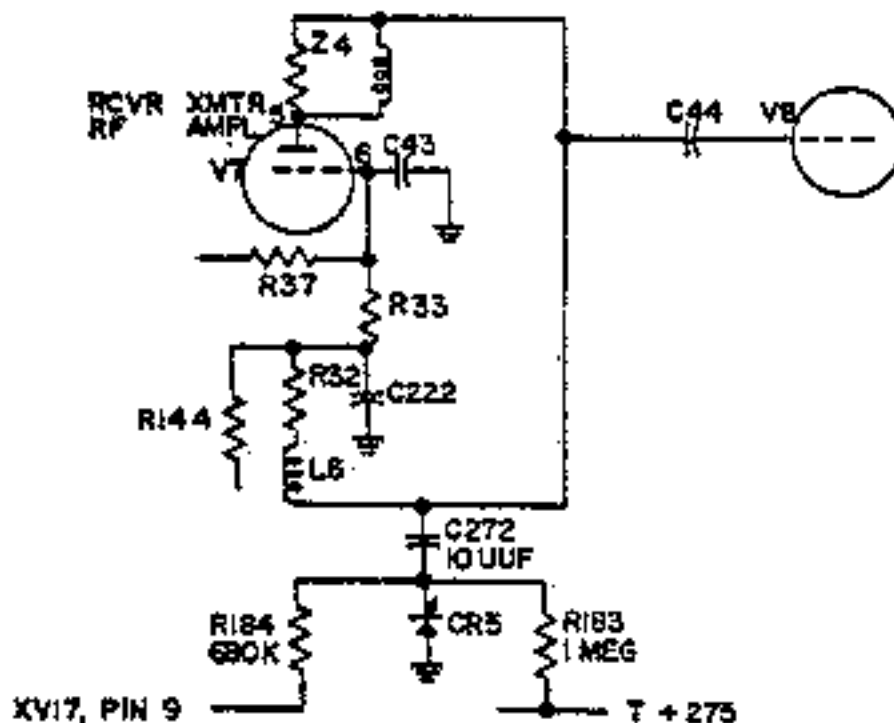


Figure 1. Schematic Diagram, After Modification



SERVICE BULLETIN

EQUIPMENT SERIES: KWM

BULLETIN NO. 6

DATE: 1-11-62
Page 1 of 2

EQUIPMENT TYPE: TRANSCEIVERS KWM-2, KWM-2A

SUBJECT: TO ELIMINATE DELAY IN OPERATION WHEN SWITCHING FROM TRANSMIT TO RECEIVE FUNCTION

A few transceivers may exhibit indications of a delay in operation when switching from transmit to receive function. This delay of from 20 to 30 seconds may be caused by screen grid emission of the PA tubes. If so, it can be eliminated by changing PA tubes, or if a more permanent fix is desired, a 1N1490 diode can be installed as indicated below. Included below is a test that can be used to determine if this delay in operation is present, and is caused by screen grid emission of the 6146 PA tubes.

MODIFICATION PROCEDURE:

1. Remove cover of unit.
2. Connect a voltmeter from terminal 3 of tube socket XV9 to chassis ground. Set meter on 300-volt scale.
3. With power applied, turn EMISSION switch knob to LOCK KEY. Meter should read approximately 280 volts.
4. Turn EMISSION switch knob to USB so that unit is in receive function. Immediately upon switching, turn meter to 30-volt scale. If voltage is indicated and dies off slowly, there is screen grid emission on one or both 6146 tubes.
5. If screen grid emission is present, remove bus wire that is connected from terminal E3 (feedthrough terminal located near rear apron in PA grid box) to terminal 4 of terminal strip T51. Install in its place a 1N1490 diode (353-1659-00) with anode connected to E3. Refer to figures 1 and 2.

CALUTION: Check that case of diode does not touch chassis or other ground.

PARTS REQUIRED:

<u>Qty</u>	<u>Description</u>	<u>Collins Part Number</u>
1	Diode, 1N1490	353-1659-00

For modification parts, price quotations (minimum order charge is \$15.00), and availability contact Collins Radio Company, Service Parts Department, Cedar Rapids, Iowa 52406. All parts orders must specify the Collins modification kit number, or part numbers, quantity required, and reference this service bulletin.

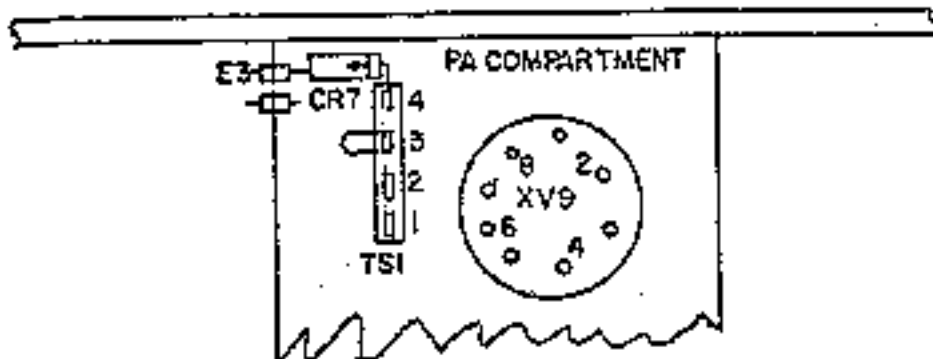


Figure 1. Location of Components Affected by this Modification.

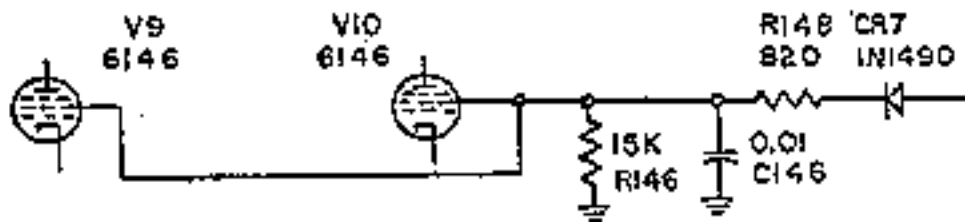


Figure 2. Partial Schematic Diagram Of PA Circuit Showing Addition Of IN1490 Diode CR7.



COMMUNICATIONS

KWM-2 TRANSCEIVER (522-1611-000)

KWM-2A TRANSCEIVER (522-1792-000)

REPLACEMENT RELAYS K2 AND K4

SERVICE BULLETIN NO 7 (REISSUE)

Improved reliability of the KWM-2/2A Transceiver is achieved by installing plastic encased plug-in type relays for K2 and K4. The original open telephone type relays were more likely to be affected by dusty environmental conditions. Protection from overheating to the relay K2 energizing coil during key-down use is achieved by installing a current limiting resistor in the VOX actuator plate circuit.

The estimated time to perform this modification is approximately 8 hours, but it is recommended that only those persons who have daily activity in electronics and access to adequate test bench facilities attempt this modification. Otherwise, units may be sent to an Authorized Service Agency or to the Collins Radio Company, Product Modification and Repair Department, for installation of this modification.

For modification parts, price quotations (minimum order charge is \$15.00), and availability contact Collins Radio Company, Service Parts Department, Cedar Rapids, Iowa 52406. All parts orders must specify the Collins modification kit number, or part numbers, quantity required, and reference this service bulletin.

MODIFICATION PROCEDURE

1. Place KWM-2 upside down, and remove four feet and screw located between two rear feet.
2. Turn unit over and release two lid fasteners.
3. Remove two unpainted flathead screws located under front edge of cabinet lid.
4. Remove KWM-2/2A from cabinet.
5. Position unit upside down with front side to the right. Refer to figure 1 for component locations.

NOTE: Newer KWM-2/2A units have this modification installed. At this point, following step 5, you may determine whether your unit has all (or part of) the modification installed. Referencing figure 1 with the unit, look for plastic encased relays K2 and K4 and for terminal E9 with a 12-k Ω resistor to pin 8 of tube socket V4. The presence of these components indicates inclusion of the basic modification.



6. Remove the three screws holding the cover over relays K2 and K4. Discard screws and cover.
7. Remove two screws mounting relay K4.
8. Move relay K4 to one side to gain access to the mounting hardware for terminal strip TS3.
9. Remove and discard screw and nut securing TS3. Remove and retain two screws securing transformer T6 and lean T6 back out of way.
10. Remove and discard the screw securing the ground lug at grd-7 adjacent to K2 shown in figure 1.
11. Remove and discard the two screws mounting K2, and remove lacing on harness to relays back to the main harness.
12. Swing relays aside, preferably toward front of unit and secure them temporarily out of the way using string, rubber band, tape or similar means.

NOTE: A number of relay mounting brackets already have the hole A drilled to proper size and location. Check bracket (768-5928-001) with figure 2, and if hole A exists, disregard step 13.

13. Drill hole in relay mounting bracket (768-5928-001) according to the instructions on figure 2.
14. Position relay bracket in chassis with hole B centered on the sheet metal screw located approximately 1 1/4 inches from PA cage, with bracket parallel to the PA. Holding in this position, center punch through bracket holes A and C.
15. Remove relay bracket and drill two holes (step 14) in chassis with 0.089 inch diameter or number 43 size drill bit.
16. Mount relay sockets XK2 (220-1471-000) and KK4 (220-1511-000) onto relay mounting bracket from the same side as the bracket mounting flange. Secure (through rear holes only) with one each of 4-40X1/4 inch screws (343-0285-000), no 4 lockwashers (310-0278-000) and 4-40 nuts (313-0156-000).
17. Referring to figure 3 for locations, perform the following:
 - a. Install 68-ohm resistor R157 (745-3303-000) from terminal B to K4-18 placing sleeving (152-1351-000) on resistor leads.
 - b. Install 100-ohm resistor R70 (745-0821-000) from terminal D to terminal E.
 - c. Install 47-ohm resistor R101 (745-1296-000) from terminal C to K4-13 placing sleeving (152-1351-000) on resistor leads.
 - d. Install 0.01- μ F capacitor C108 (913-3013-000) from terminal C to K4-12 placing sleeving (152-1351-000) on capacitor leads.



- e. Install 100-ohm resistor R167 (745-1310-000) from K4-1 to K2-7 placing sleeving (152-1351-000) on resistor leads.
 - f. Install insulated bus wires (428-4824-000) from terminal D to K2-15, terminal E to K2-13, K2-13 to K2-14, and K2-16 to K2-11.
18. Place the relay mounting bracket in position over the two new holes (step 15) with the socket terminals toward operator.
 19. Place solder lug (304-0317-000) over relay bracket hole C, position toward front of unit, and secure bracket to chassis with screws (330-0731-000) through holes A and C (figure 2).
 20. Install ground lug (304-2800-000) on capacitor C153 (figure 1) with shake washer (373-7050-000) between lug and chassis.
 21. Disconnect white wire and white-red-orange wire at Terminal strip TS3-2 and reconnect white wire to ground lug installed in step 20. Reconnect white-red-orange wire to terminal B on relay mounting bracket (figure 3). If either wire is found to be too short, replace entire wire with equivalent type and proper length. Discard terminal strip TS3.
- NOTE:** The following two steps have to do with wire connections only. Some of the terminals on the relays (K2, K4) have leads from components connected to them. Examine all wires for color code matching, labeling any that differ, before removing the old relays. All but the most recent issues of the KWM2 instruction books show the old relay wiring in figure 7-2 on pages 7-3/7-4.
22. Disconnect wires from old relay K4, connect and solder to new relay socket XK4 one at a time placing 1/2-inch length of sleeving (152-1351-000) over each wire or group of wires prior to connection to a terminal. After soldering, slide sleeving over terminal to insulate from other terminals. Bus to K2 or K4 ground lug requires use of new length of insulated bus (428-4824-000).



OLD K4 TERMINAL	NEW XK4 TERMINAL	NUMBER OF WIRES	WIRE COLOR CODES
2	4	2	White-brown-red-green
1	1	1	White-black-red-green
14	14	1	White-orange-green
13	15	1	White-orange-green-blue
8	5	1	White-orange-blue
12	16	1	White-red-blue
7	6	1	White-black-blue
6	7	1	White-black-red-orange
17	17	1	White-orange
16	18	1	Bus (see step 21)
5	8	2	White-green-blue
15	19	2	White-red
4	9	1	White-blue
3	10	2	White-black-red
20	20	1	Coax, 75-ohm
19	21	1	Coax, 50-ohm
11	11	None	None
18	22	2	Bus, strap to grd.
10	12	1	White of shielded pair
9	13	1	Black of shielded pair

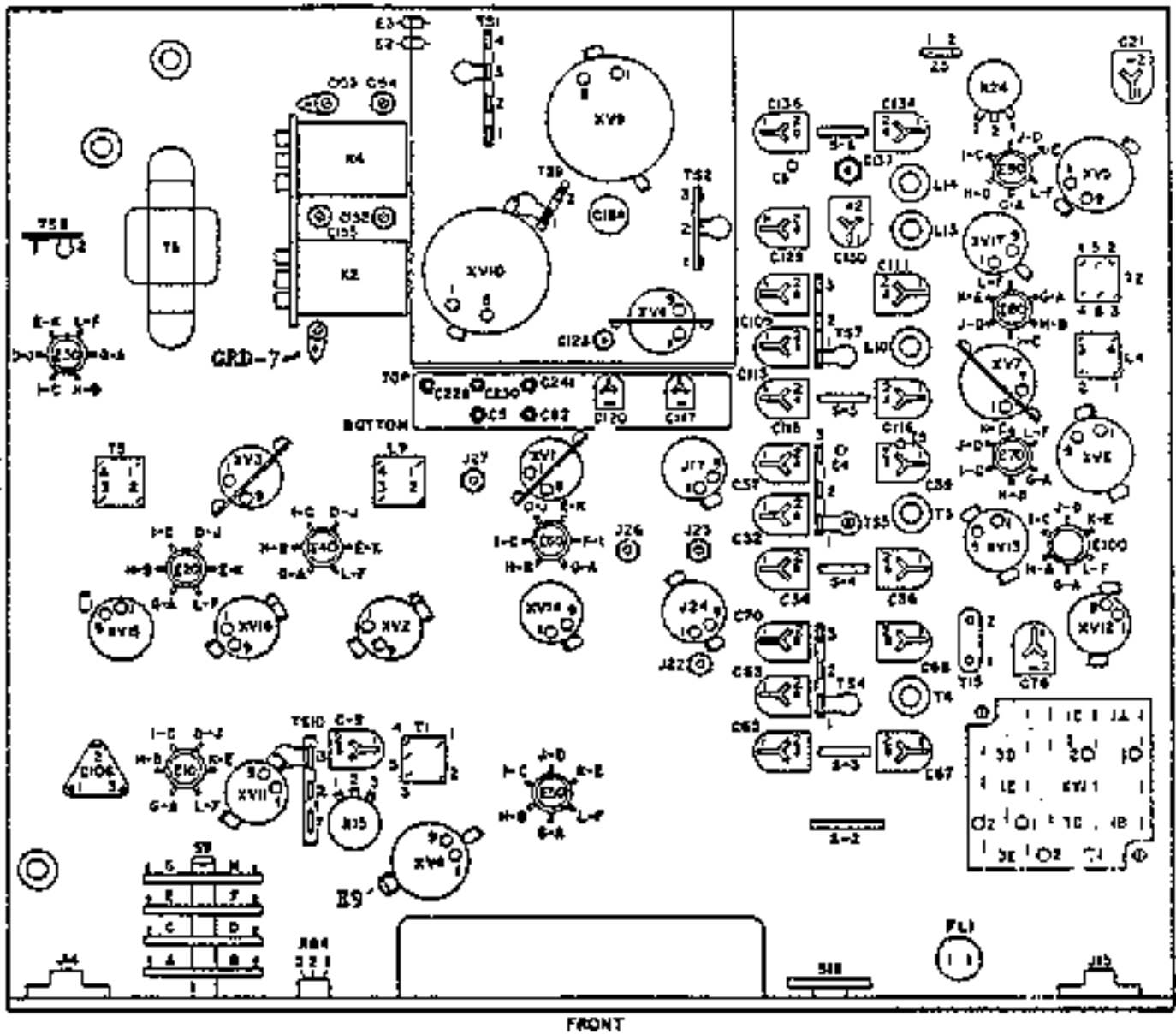
Repeat, as above, for wires on old relay K2 and transfer them to new relay socket XK2.

OLD K2 TERMINAL	NEW XK4 TERMINAL	NUMBER OF WIRES	WIRE IDENTIFICATION
2	4	1	White-red
1	1	3	White-red-orange
3	11	1	White-brown-orange
7	12	1	White and ground lead to K4
14	5	2	White-black
5	13	1	Bus to 14, bus to tie pin
13	8	1	Bus to K2 ground lug
11	8	1	Coax
8	16	1	Bus from pin 11 (see step 17 f.)
10	9	2	2-coax
9	10	4	*Bus to coax shields and bus to K2 ground lug
4	15	1	Bus to tie pin
6	14	1	Bus from pin 13
12	7	1	100-ohm resistor R167



***CAUTION:** GROUND BUS FROM XK2 GROUND LUG TO XK2 TERMINAL 10 SHOULD BE ROUTED AS DIRECTLY AS PRACTICAL. ALLOW BUS TO PASS THROUGH TERMINAL 10 AND PROTRUDE 3/8 INCH TO MAKE CONNECTION TO THE THREE COAX SHIELDS.

23. Refer to figure 3 for locations and connect the free end of white-brown-green wire (formerly to old K2) to new terminal D, and connect the free end of white-red-green, blue wire (formerly to old K2) to new terminal E.
24. Hook a relay holddown spring into each relay socket. Discard the small hairpin shaped wire packed with each socket.
25. Plug in relays K2 (970-2439-010) and K4 (970-2439-020) and position relay holddown springs over each relay.
26. Locate nut nearest pin 5 on tube socket XV4 (VOX relay amp). Remove and replace with Winchester standoff terminal E9 (306-0977-000).
27. Disconnect the red-white wire from pin 8 (plate) of XV4 and reconnect it to new terminal E9.
28. Install 12-k Ω resistor R202 (746-5698-000) from new terminal E9 to pin 8 (plate) of XV4.
29. Resecure transformer T6 loosened to step 9. Check unit for proper solder connections and for potential shorts. Remove any remaining debris.
30. Replace chassis in cabinet and secure with two flathead screws removed in step 3.
31. Replace four feet and screw removed in step 1.
32. Lock cabinet lid with two fasteners.
33. Enter SB 7 on information chart (280-3778-010) and adhere to an appropriate location on the outside of the KWM-2/2A unit. Enter all previous service bulletins that have been performed on the unit ahead of the entry for SB 7.
34. Check unit for proper operation.



KWM-2/2A Chassis, Component Locations, Bottom View
Figure 1



PARTS REQUIRED

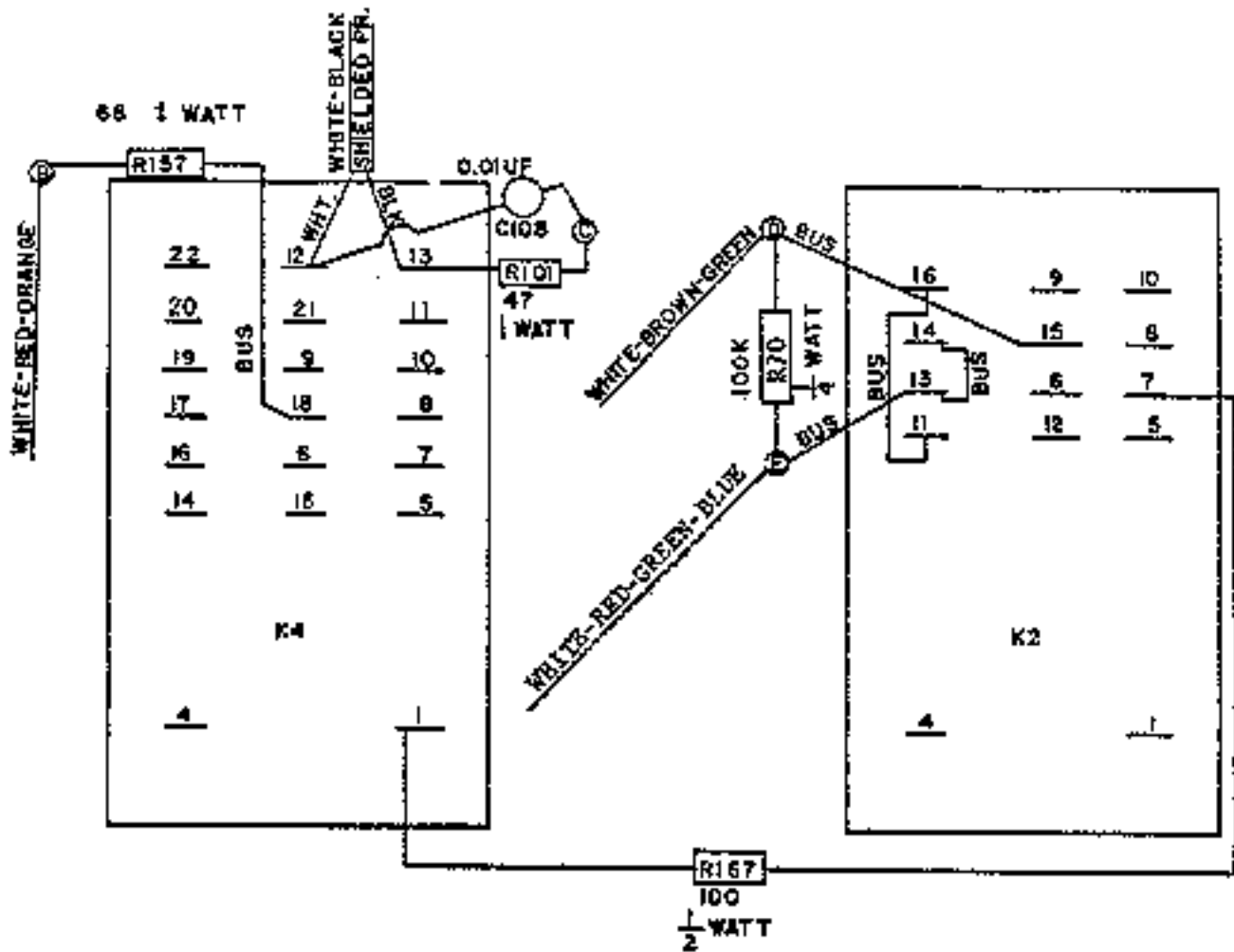
Modification kit 772-5718-001 consists of the following items:

<u>NEW COLLINS PART NUMBER</u>	<u>QTY</u>	<u>DESCRIPTION</u>
768-5928-001	1	Bracket, relay mounting (K2, K4)
220-1511-000	1	Socket, relay, 22 contact (XK4)
220-1471-00	1	Socket, relay, 16 contact (XK2)
343-0285-000	2	Screw, machine, 4-40X1/4 inch
310-0278-000	2	Washer, lock, no. 4
313-0156-000	2	Nut, 4-40
745-3303-000	1	Resistor, 68 ohm, 1 watt (R157)
745-0821-000	1	Resistor, 100 k Ω 1/4 watt (R70)
745-1296-000	1	Resistor, 47 ohm, 1/2 watt (R101)
745-1310-000	1	Resistor, 100 ohm, 1/2 watt (R167)
745-5698-000	1	Resistor, 12 k Ω 2 watt (R202)
152-1351-000	1.0 ft	Sleaving, insulated
913-3013-000	1	Capacitor, ceramic, 0.01 μ F (C108)
428-4824-000	2.0 ft	Wire #22 AWG, bus, insulated
304-0317-000	2	Solder lug, no. 4
330-0731-000	2	Screw, self-tapping
304-2800-000	1	Lug, ground
373-7050-000	1	Washer, shake, 1/4 inch
306-0977-000	1	Terminal, standoff (E9)
280-3778-010	1	Chart, information
970-2439-010	1	Relay, 16 contact (K2)
970-2439-020	1	Relay, 22 contact (K4)



CENTER PUNCH AT CENTER LINE A. DRILL 0.125-INCH DIA.

KVM-2/2A Relay Mounting Plate Drilling Instructions
Figure 2



KWM-2/2A Relay K2, K4 Terminal Locations
Figure 3

1 September 1970

FROM: Publications Engineering Department, Cedar Rapids, Iowa 52406

**KWM-2/KWM-2A TRANSCEIVERS
SERVICE BULLETIN NO 8**

AMATEUR PRODUCT LINE

EQUIPMENT: KWM-2 Transceiver (522-1611-000)
KWM-2A Transceiver (522-1792-000)

SUBJECT: A. Eliminate AGC overshoot on noise pulses and provide dual time-constant action
B: Change source of delay bias to the AGC rectifier
C. Add delayed-decay (hang) AGC to the rf amplifier

Part A is applicable to KWM-2/2A Transceiver manufactured prior to March 1964, at which time production units incorporated the modification. Part A modification is recommended as it results in significantly improved performance.

Part B is applicable to all KWM-2/2A Transceivers built before August 1970 as this modification will be incorporated in production units at about the time of issuance of this service bulletin. Part B is also recommended as it also results in significantly improved performance. This change eliminates coupling from the AGC rectifier to the first audio tube.

Part C aids in reducing the effect of strong adjacent channel SSB signals on weaker wanted signals. Part C applies to all KWM-2/2A Transceivers built before August 1970. It is to be performed at the option of the customer. This change will be incorporated in production units.

For modification parts, price quotations, and availability dates, contact Collins Radio Company, Service Parts Department, Cedar Rapids, Iowa 52406. All parts orders must specify the Collins part numbers, quantity of parts required, and reference KWM-2/2A Service Bulletin No 8.

Serial numbers are assigned to amateur equipment in random sequence and give no indication of age or status. It often proves possible to estimate the approximate manufacture date by observing the date code on the tubes. Ideally, your unit must be circuit-traced to positively determine whether these revisions are, or are not, included.

MODIFICATION PROCEDURES:

1. Remove transceiver from cabinet as follows:
 - (a) Remove all four feet and the screw that is midway between the two rear feet.
 - (b) Turn the transceiver right side up, lift lid, remove the two bright-plated screws in the style-frame under the lid.

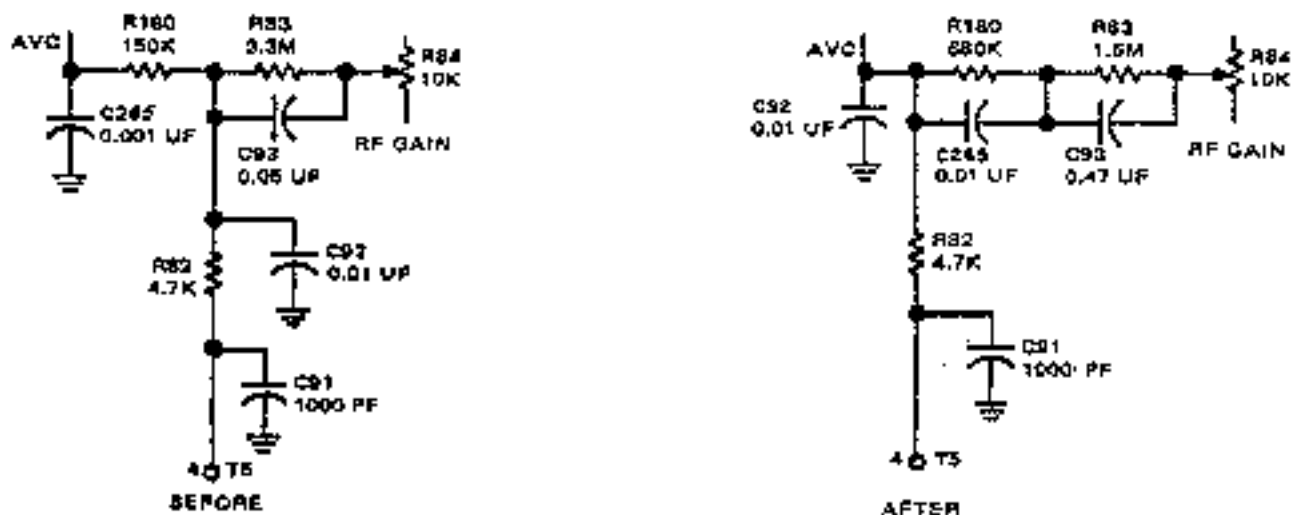
(c) Carefully slide the chassis forward, and set cabinet aside.

2. Examine unit to determine which of these modifications; A, B, or C might be installed. Disregard procedures for any that are incorporated.

NOTE: Refer to the KWM-2/2A instruction book for location and identification of components and terminals located in figure 7-2 on pages 7-3/7-4.

CAUTION: WHEN PERFORMING ANY OF THE MODIFICATIONS, IF THE TRANSCIEVER IS WIRED WITH POLYVINYL CHLORIDE-INSULATED WIRE EXERCISE EXTREME CARE SO AS NOT TO DAMAGE THE INSULATION WITH A SOLDERING IRON.

3. Part A: Eliminate AGC overshoot on noise pulses and provide dual time-constant action:



Part A, Schematic Change

NOTE: If both modifications A and C are to be installed, it is suggested they be done together.

- (a) Place transceiver upside down on workbench with knobs to the right. Remove and save the screws used to attach the two nylon cable buttons to the strengthening rail. Remove and save the screw attaching the rear of the strengthening rail to the chassis. Remove and save the screw attaching the front of the strengthening rail to the chassis, taking care not to lose the nut, lockwasher, and flat washer underneath the rail. Remove the rail, saving any protective material located between the cable and the rail.
- (b) Remove all components attached to E30-C, as follows:

- 1) 4700-ohm 1/4-W resistor, R82, connected from T5 terminal 4 to E30-C.
- 2) 0.01 μ F disc ceramic capacitor, C92, connected from E30-I to E30-C.
- 3) 3.3-m Ω 1/4-W resistor, R83, connected from E30-C to E30-J.
- 4) 0.05- μ F capacitor, C93, connected from E30-C to E30-J.

NOTE: T58 has been referred to as T58 in some publications.

- 5) 150-k Ω 1/2-W resistor, R180, connected from T58-1 to E30-C.

- (c) Remove 0.001- μ F disc ceramic capacitor, C256, connected from T53-1 to ground ring on power connector.
- (d) Connect R83, 1.5-M Ω 1/2-W resistor (745-1485-00), from E30-C to E30-J.
- (e) Connect C93, 0.47- μ F capacitor (913-3804-00) from E30-C to E30-J.

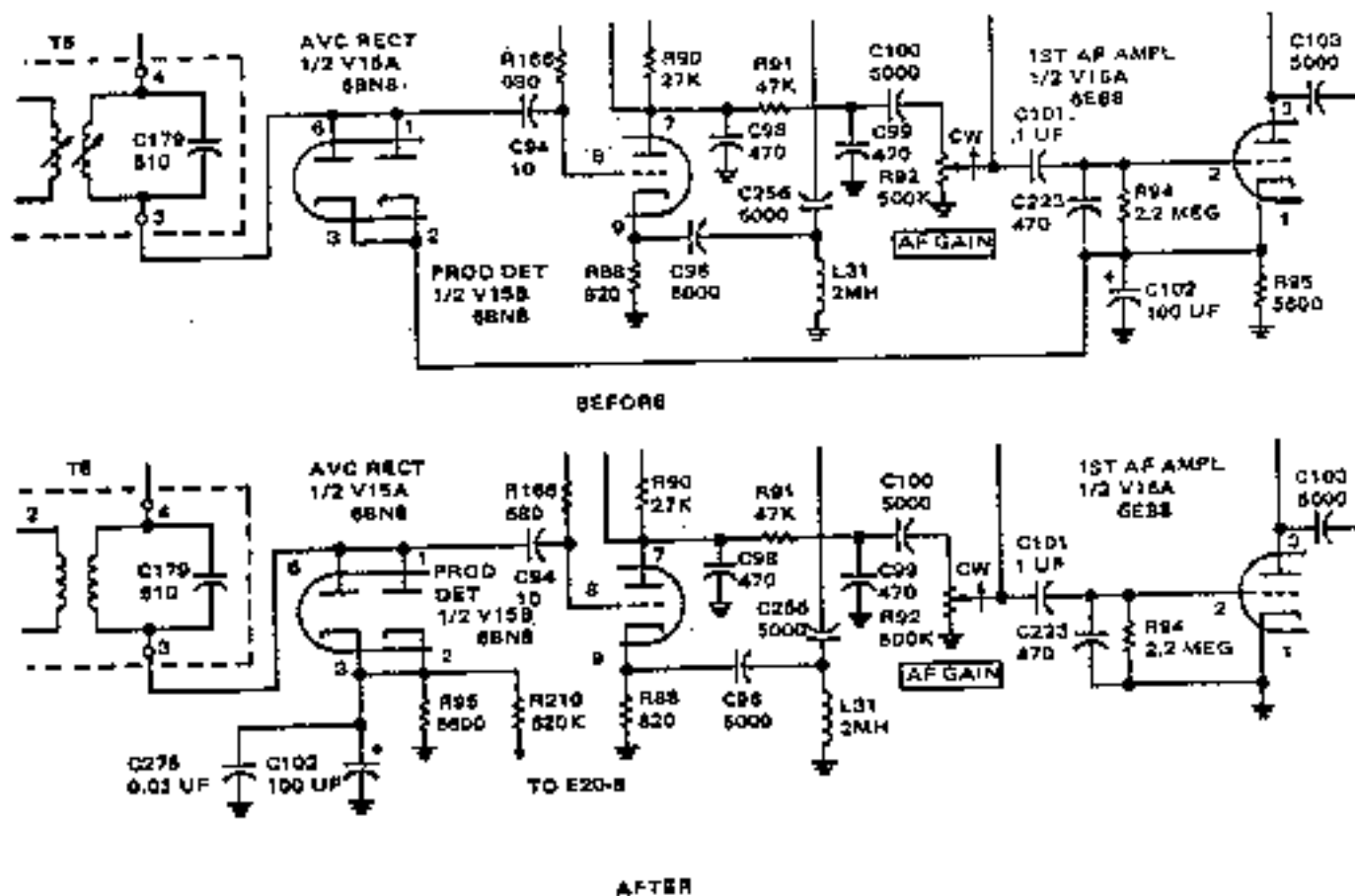
NOTE: In following steps (f), (g), (h), and (i) do not solder if you intend to perform modification C (refer to part C steps (d), (e), and (i) involving TS8).

- (f) Connect R82, 4700-ohm 1/2-W resistor (745-1380-00), from T5 terminal 4 to TS8-1. Use sleeving on leads and route this resistor around E30.
- (g) Connect R180, 680-k Ω 1/2-W resistor (745-1471-00), from TS8-1 to E30-C.
- (h) Connect C265, 0.01- μ F disc ceramic capacitor (913-3013-00), from TS8-1 to E30-C.
- (i) Connect C90, 0.01- μ F disc ceramic capacitor (913-3013-00), from TS8-1 to ground ring on power connector.
- (j) If no additional modifications are to be implemented, replace all hardware by reversing step (a).
- (k) Mark SB 8A on information chart (280-3778-010) and apply chart to convenient location on unit, or mark existing chart if one is present.

PARTS REQUIRED LIST: Part A

<u>QTY</u>	<u>COLLINS PART NUMBER</u>	<u>DESCRIPTION</u>
1	745-1380-000	Resistor, 4700 ohms, 1/2 W, R82
1	745-1471-000	Resistor, 680 k Ω 1/2 W, R180
1	745-1485-000	Resistor, 1.5 M Ω , 1/2 W, R83
2	913-3013-000	Capacitor, 0.01 μ F disc ceramic, C92, C265
1	913-3804-000	Capacitor, 0.47 μ F disc ceramic, C93
4.0 inches	152-2513-000	Sleeving, insulation, R82
1	280-3778-010	Chart, information

4. Part B: Change source of delay bias to the AGC rectifier:



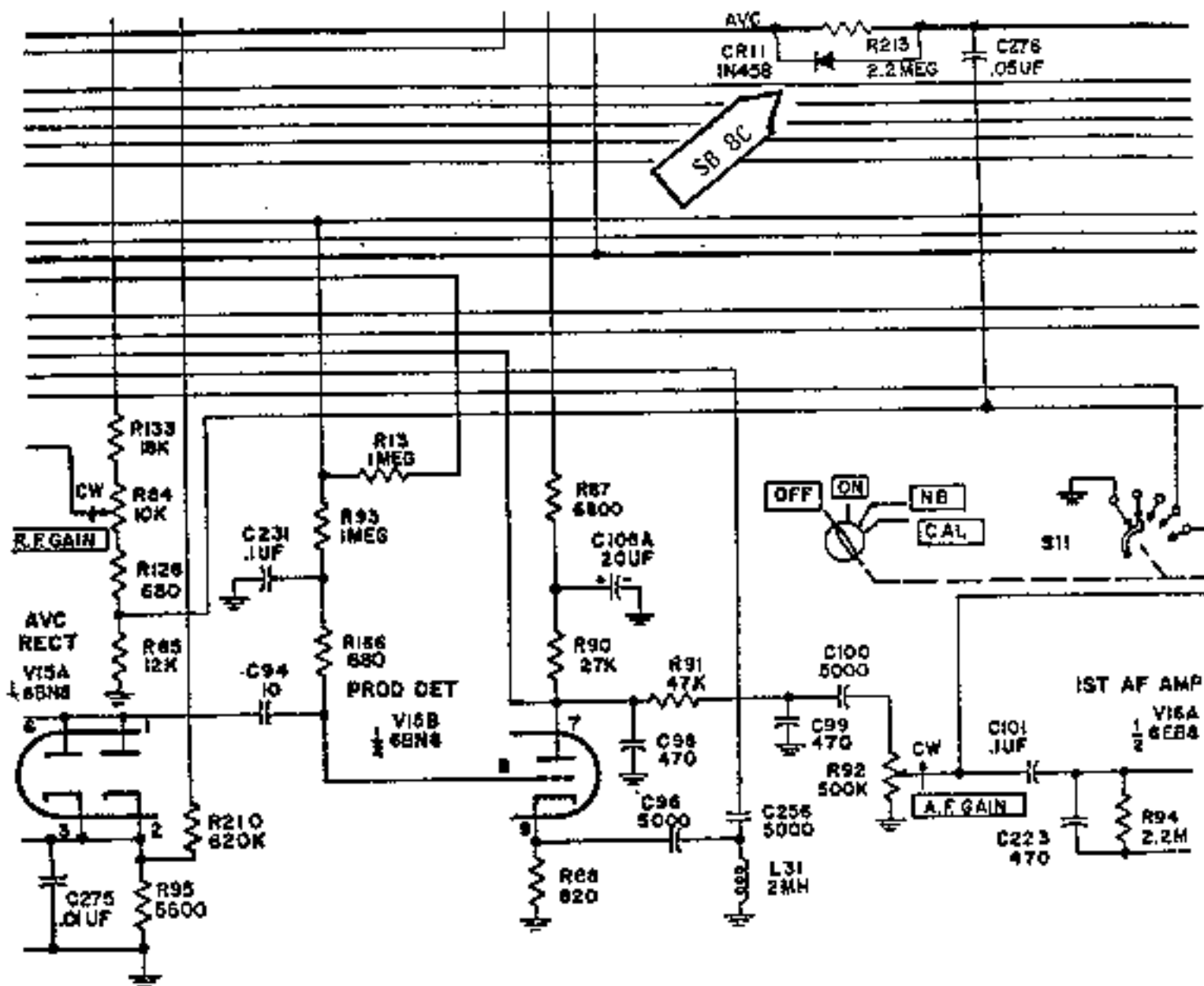
Part B Schematic Change

- Disconnect bus wire at tube socket XV15-2. Remove sleeving and route wire to center shield on XV16. Shorten wire as necessary, connect and solder.
- Add 620 k Ω resistor R210 (745-1469-000) from E20-B to XV15-2.
- Add 0.01 μ F capacitor C275 (913-3013-000) from XV15-3 to nearest ground.
- Mark information chart (280-3778-010) SB 8B. Apply chart to convenient location on unit if one is not present.

PARTS REQUIRED LIST: Part B

QTY	COLLINS PART NUMBER	DESCRIPTION
1	745-1469-000	Resistor, 620 k Ω 1/2 W, R210
1	913-3013-000	Capacitor, 0.01 μ F, ceramic, C275
1	280-3778-010	Chart, information

5. Part C: Add delayed-decay (hang) AGC to the rf amplifier;



Part C Revised Circuitry

- (a) Perform step (a) of Part A.
- (b) Remove and save the screw and lockwasher, nearer the front panel, used to mount audio output transformer T6.
NOTE: Production units that contain this modification use a 3-terminal strip for T58 in place of adding TS11.
- (c) Install TS-11 (306-0299-000) using the screw and lockwasher removed in step (b).
- (d) Disconnect the white-green-blue wire from TS8-1, pull it back through the cabling and reconnect it to TS11-1.
- (e) Connect R213, 2.2-M Ω 1/2-watt resistor (745-0639-000), from TS8-1 to TS11-1. Sleeve resistor leads with (152-2513-000) as necessary.

- (f) Connect CR11, 1N458 diode, from TSS-1 (cathode/banded end) to TS11-1 (anode end). Sleeve diode leads with (152-2513-000) as necessary.
- (g) Connect C276, .05- μ F capacitor, from TS11-1 to E30-B.
- (h) Of the two white-green-blue wires connected to E40-I, disconnect, tape, and tie back the one showing continuity to the wire on TS11-1.
- (i) Connect a white-green-blue wire (439-4020-000) from E40-I to TS8-1, routing it through the cabling.
- (j) Replace all hardware by reversing step (a).
- (k) Mark information chart (280-3778-010) SB 8C. Apply chart to convenient location on unit if applicable.

PARTS REQUIRED LIST: Part C

QTY	COLLINS PART NUMBER	DESCRIPTION
1	745-0869-000	Resistor, 2.2 M Ω 1/2 W, R213
1	913-3153-000	Capacitor, .05 μ F, disc ceramic, C276
1	353-0205-000	Diode, 1N458, CR11
1	306-0299-000	Terminal strip, TS11
3 inches	152-2513-000	Sleeving
1	280-3778-010	Chart, information
1 foot	439-4020-000	Wire, A22, white-green-blue

- 6. Inspect unit for damage incurred during modification, dress wires and cables, and remove debris.
- 7. Reassemble unit by reversing step 1.
- 8. Check transceiver for proper operation.

AMATEUR PRODUCTS S-LINE

32S-1 TRANSMITTER (522-1169-000)
KWM-2 TRANSCEIVER (522-1611-000)

SERVICE INFORMATION LETTER 1-75

OVERCOME INSTABILITY CAUSED BY AGING

On 27 July 1971, Amateur Product Line Information Letter No 28 was issued which contained the following information:

Some 32S-1 Transmitters and early KWM-2 Transceivers are beginning to exhibit various forms of instability that fails to respond to usual corrective efforts.

A common cause is capacitor C56 in the 32S-1 and C123 in the KWM-2. These are axial-lead ceramic feed-through capacitors which are mounted immediately to the right of the 6CL6 driver tube in the PA cage. As they age, they become frequency sensitive.

At one time the typical symptom of a defective capacitor was for the transmitter to operate properly on all bands except for 15 meters, where it would oscillate. More recent reports include almost any set of instability symptoms you might describe.

The conclusion is, that if an older unit comes in for servicing that shows instabilities, this capacitor should be changed before other repair efforts are made. For a number of years a mica feed-through capacitor (912-5232-000) has been used in the 32S-1 and KWM-2 with complete success. The hole will have to be enlarged to accommodate the new capacitor.

Another problem that is difficult to determine involves instability and eventually oscillation appearing first on the 80 meter band, and then including 40, etc. This is caused by the fact that over a period of time aluminum will become covered with oxide. In spite of finger-stock between the shield cans over the rf coils and bandswitch wafers, the cans eventually become floating which allows feedback to occur.

Correction is simple. Merely loosen the hex nuts that lie under the slug rack, shift the position of the shield cans, and retighten the nuts. This regrounds the shields and usually the instability disappears.

SERVICE INFORMATION LETTER

AMATEUR PRODUCTS S-LINE

KWM-2/2A TRANSCEIVERS (522-1611-000/522-1782-000)
 32S-1/2/3/3A TRANSMITTERS (522-1168-000/522-1488-000/
 522-2955-000/522-2958-000)
 75S-1/2/3/3A/3B/3C RECEIVERS (522-1168-000/522-1489-000/
 522-2562-000/522-2664-000/522-3316-000/
 522-3317-000)

SERVICE INFORMATION LETTER 2-75

EXTENDED OPERATING RANGE

The region between 5.0 and 6.5 MHz has always been defined as unsuitable for operation with the S-Line and KWM-2A equipments due to spurious signals inherent in the equipment. Many requirements for operation in that frequency segment have caused a complete study and resulted in the following list of acceptable operations in that range.

<u>DIAL ZERO</u>	<u>ACCEPTABLE OPERATION</u>	<u>HF CRYSTAL MHz</u>	<u>COLLINS CRYSTAL PART NUMBER</u>
5.0 MHz	5.0 - 5.2 MHz	8.155	290-9017-000
5.1 MHz	5.1 - 5.3 MHz	8.255	290-9027-000
5.2 MHz	5.2 - 5.4 MHz	8.355	290-9018-000
5.3 MHz	5.3 - 5.5 MHz	8.455	None
5.4 MHz	5.4 - 5.6 MHz	8.555	290-9019-000
5.5 MHz	5.5 - 5.7 MHz	8.655	None
5.6 MHz	5.6 - 5.770 MHz	8.755	290-9020-000
5.7 MHz	5.7 - 5.830 MHz	8.855	None
5.8 MHz	5.8 - 5.9 MHz	8.955	290-9021-000
5.9 MHz	5.9 - 5.970 MHz	9.055	None
6.0 MHz	6.0 - 6.035 MHz	9.155	290-9022-000
6.0 MHz	6.165 - 6.2 MHz	9.155	290-9022-000
6.1 MHz	6.230 - 6.3 MHz	9.255	None
6.2 MHz	6.3 - 6.4 MHz	9.355	290-9023-000
6.3 MHz	6.370 - 6.5 MHz	9.455	None
6.4 MHz	6.430 - 6.6 MHz	9.555	290-9024-000

Frequency bands of non operation are:

5.970 to 6.0 MHz
 6.035 to 6.165 MHz
 6.2 to 6.230 MHz

SERVICE INFORMATION LETTER 2-75

The lowest operating frequency can be extended below 3.4 MHz to at least 3.32 MHz and usually as low as 3.3 MHz.

<u>DIAL ZERO</u>	<u>OPERATING RANGE</u>	<u>HF CRYSTAL MHZ</u>	<u>CRYSTAL PART NUMBER</u>
3.3 MHz	3.3 - 3.5 MHz	6.455	290-9229-000
3.2 MHz	3.3 - 3.4 MHz	6.355	290-9178-000

To order crystals directly from crystal manufacturers: Specify: The hf crystal MHz frequency, and crystal type CR-18/U per MIL-C-3096B except temperature range 0° to +60° inclusive.