



publications engineering

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# SERVICE BULLETIN

COLLINS RADIO COMPANY

Cedar Rapids, Iowa 52406

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## REISSUE

### KWM-2/2A SERVICE BULLETIN NO 7

Attached is a revised copy of KWM-2/2A Service Bulletin No 7 titled "Replacement of Relays K2 and K4." The original issue of this bulletin was dated April 11, 1967, and a subsequent revision was issued on October 27, 1967 to cover changes and additions to the original parts list.

This issue offers the advantages of including recent production improvements in existing equipment. It is written to cover all configurations of the KWM-2/2A. Therefore, this reissue completely replaces all previous publications of KWM-2/2A Service Bulletin No 7.

Feb 1/1970



## 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 $\Omega$  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-k $\Omega$  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- $\mu$ 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 KWM 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

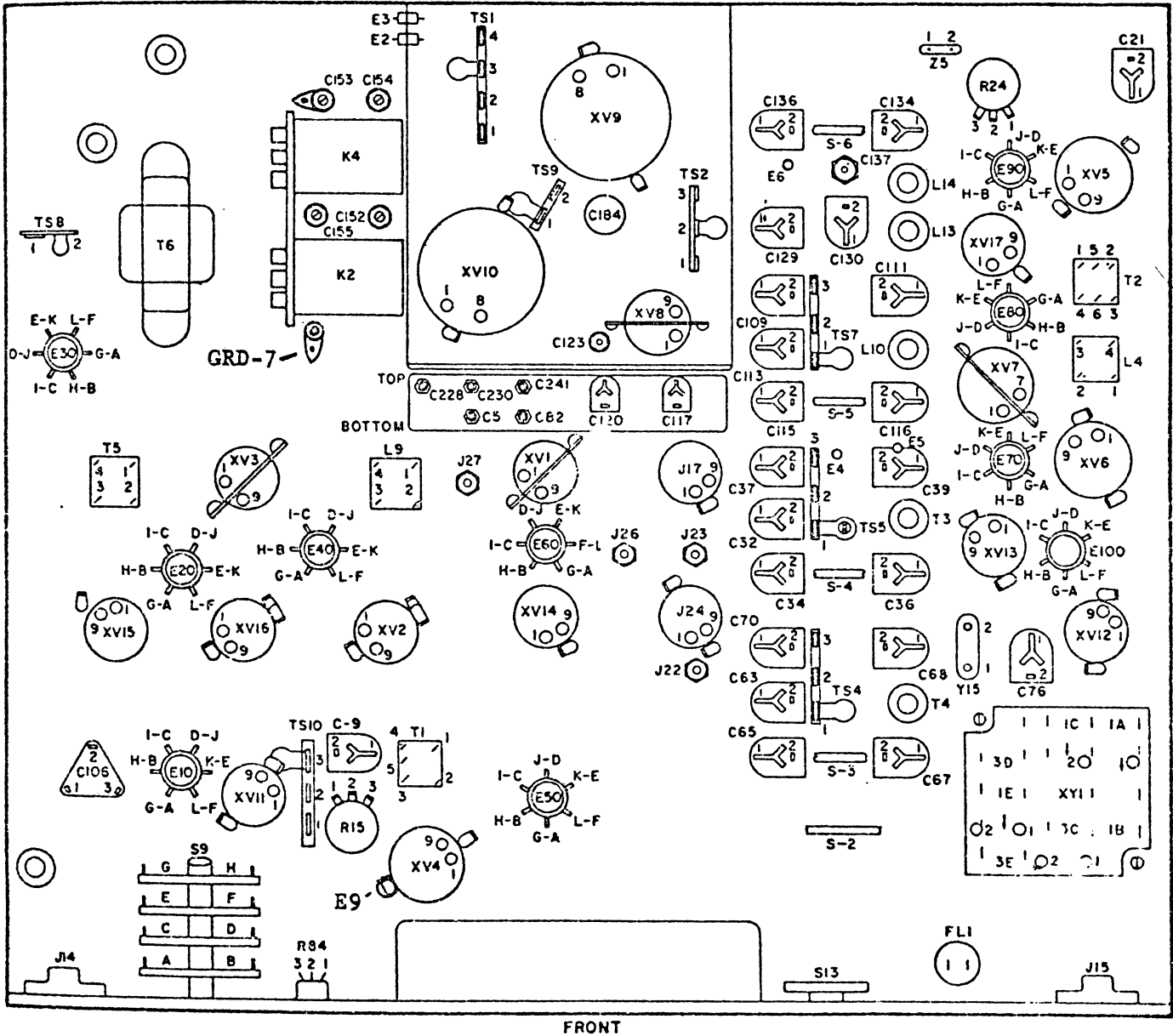
Repeat, as above, for wires on old relay K2 and transfer them to new relay socket XK2.

OLD K2 TERMINAL	NEW <del>XK4</del> K2 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	6	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 $\Omega$  resistor R202 (745-5698-000) 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.



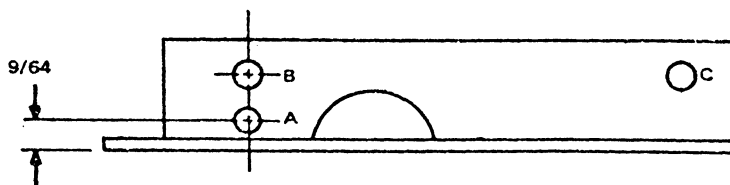
KWM-2/2A Chassis, Component Locations, Bottom View  
Figure 1



PARTS REQUIRED

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

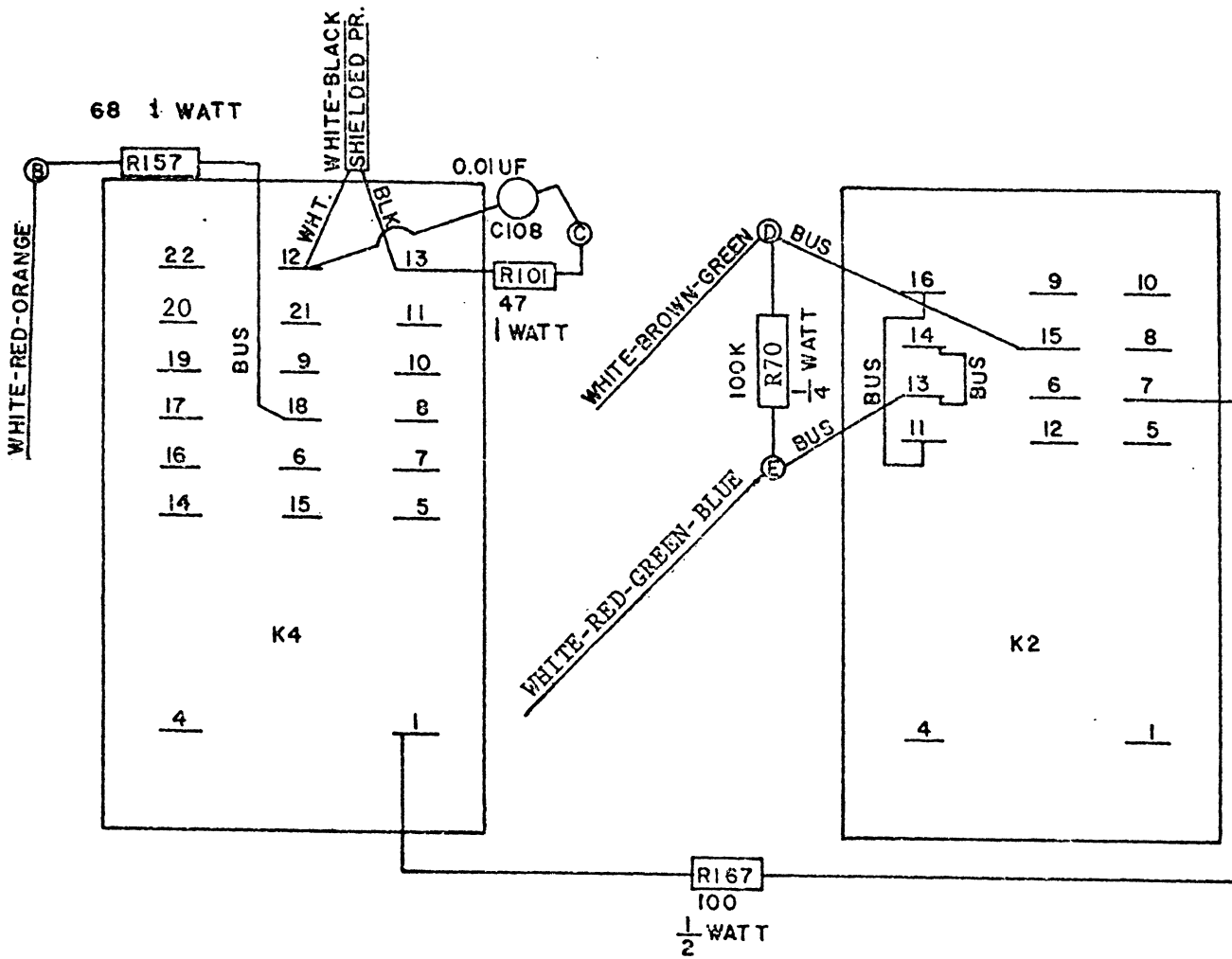
<u>NEW COLLINS PART NUMBER</u>	<u>QTY</u>	<u>DESCRIPTION</u>
768-5928-001	1	Bracket, relay mounting (K2, K4)
220-1511-000	1	Socket, relay, 22 contact (XK4)
220-1471-00	1	Socket, relay, 16 contact (XK2)
343-0285-000	2	Screw, machine, 4-40X1/4 inch
310-0278-000	2	Washer, lock, no. 4
313-0156-000	2	Nut, 4-40
745-3303-000	1	Resistor, 68 ohm, 1 watt (R157)
745-0821-000	1	Resistor, 100 k $\Omega$ 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 $\Omega$ 2 watt (R202)
152-1351-000	1.0 ft	Sleeving, insulated
913-3013-000	1	Capacitor, ceramic, 0.01 $\mu$ 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.

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





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