

# Rockwell- Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

.350257

KWM-380 TRANSCEIVER (622-5093-101)  
HF-380 TRANSCEIVER (622-3580-101)  
RECEIVER-EXCITER CIRCUIT CARD A3 (638-6908-001)

SERVICE BULLETIN NO 1

PRODUCT IMPROVEMENT

This is a nonmandatory service bulletin which applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBER	PRODUCTION CUT-IN SERIAL NUMBER
KWM-380 622-5093-101	All units	None
HF-380 622-3580-101	All units	None
Production cut-in for receiver-exciter card A3 (638-6908-002) is REV G.		

The following product improvements are made by this service bulletin.

1. Mic termination is changed from 270- $\Omega$  to 3.3-k  $\Omega$  to allow either a low- or high-impedance mic to be used.
2. Mic gain is increased by approximately 18 dB.
3. A greater range of adjustment for VOX sensitivity is provided.
4. Minimum VOX delay time is decreased to less than 50 ms to allow faster semibreak in CW operation.
5. Preemphasis to VOX preamplification is added to improve SSB VOX operation.
6. Line audio (600  $\Omega$  ) output level is increased to ensure at least -10-dBm output.

All changes are on the receiver-exciter circuit card. The changes consist of replacing 7 resistors and 3 capacitors.

Estimated time required is 2 man-hours.

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The modification parts are itemized in the material information paragraph. For price and availability of parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 1 in all correspondence.

No special tools or equipment are required.

### MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
- B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver.  
  
NOTE: All component changes are on the receiver-exciter card A3, located on the bottom of the chassis. Refer to figure 1 for location of components on the receiver-exciter card.
- C. Remove 100-k  $\Omega$  resistor R554 and replace it with a 1-M  $\Omega$  resistor (745-2449-000).
- D. Remove 270-  $\Omega$  resistor R500 and replace it with a 3.3-k  $\Omega$  resistor (745-0767-000).
- E. Remove 33-k  $\Omega$  resistor R620 and replace it with an 18-k  $\Omega$  resistor (745-0794-000).
- F. Remove 1- $\mu$ F capacitor C311 and replace it with a 0.22- $\mu$ F capacitor (184-9102-310).
- G. Remove 1-M  $\Omega$  resistor R304 and replace it with a 100-k  $\Omega$  resistor (745-0821-000).
- H. Remove 0.01- $\mu$ F capacitor C300 and replace it with a 1000-pF capacitor (913-3281-270).
- I. Remove 0.1- $\mu$ F capacitor C304 and replace it with a 4.7- $\mu$ F capacitor (184-9102-390). The negative lead of the capacitor should be connected to the hole on the left.
- J. Remove 1-k  $\Omega$  resistor R306 and replace it with a 100-  $\Omega$  resistor (745-0713-000).
- K. Remove 47-k  $\Omega$  resistors R312 and R314 and replace them with 10-k  $\Omega$  resistors (745-0785-000).
- L. Reinstall the transceiver dust cover.
- M. Attach a service bulletin information chart (280-3778-010) near the transceiver nameplate and mark SB 1 on the chart.

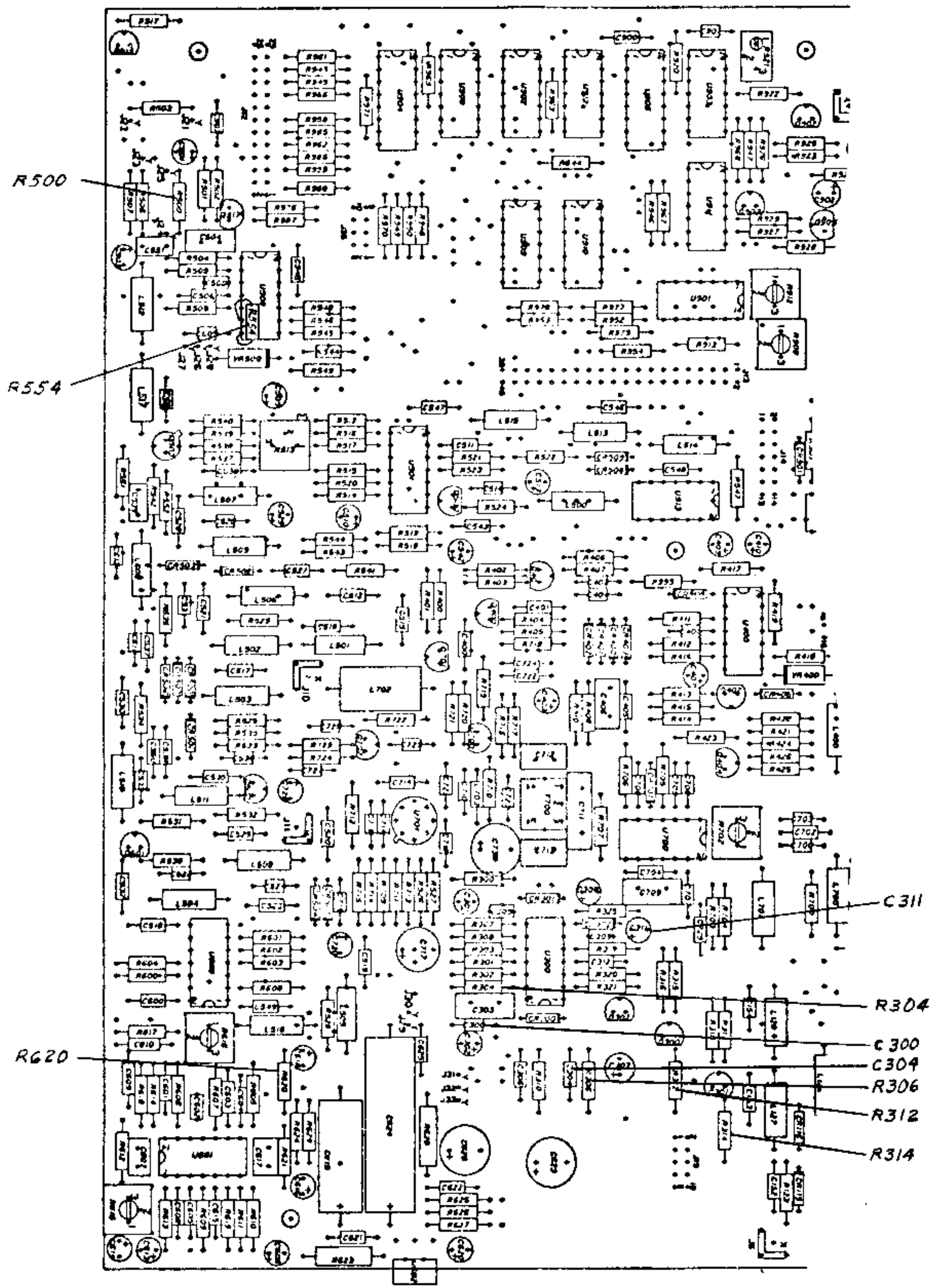
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Collins Telecommunications Products Division/Rockwell International

## MATERIAL INFORMATION

The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
745-2449-000	1		Resistor, 1 M $\Omega$ , R554
745-0767-000	1		Resistor, 3.3 k $\Omega$ , R500
745-0794-000	1		Resistor, 18 k $\Omega$ , R620
184-9102-310	1		Capacitor, 0.22 $\mu$ F, C311
745-0821-000	1		Resistor, 100 k $\Omega$ , R304
913-3281-270	1		Capacitor, 1000 pF, C300
184-9102-390	1		Capacitor, 4.7 $\mu$ F, C304
745-0713-000	1		Resistor, 100 $\Omega$ , R306
745-0785-000	2		Resistor, 10 k $\Omega$ , R312, R314
280-3778-010	1		Chart, information



P/O Receiver/Exciter Circuit Card A3  
Figure 1

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-350258

KWM-380 TRANSCEIVER (622-5093-001, -101)  
HF-380 TRANSCEIVER (622-3580-001, -101)  
SYNTHESIZER A5A1 (638-6916-001, -002)

## SERVICE BULLETIN NO 2

### IMPROVE TRANSMITTER SPECTRAL PURITY

This is a nonmandatory service bulletin that applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBER	PRODUCTION CUT-IN SERIAL NUMBER
KWM-380 622-5093-001, -101	1 through 63 and 65	64, 66 and above
HF-380 622-3580-001, -101	6 and below	7
Production cut-in for synthesizer A5A1 (638-6916-001, -002) is REV G.		

The purpose of this modification is to improve transmitter spectral purity when operating on a frequency ending in 257 kHz (ie 14, 257 kHz). This ensures that transmitter spurious output will be within the -50 dB specification limit.

This modification consists of making two circuit trace cuts, adding two pins and one coil, adding a jumper wire, and replacing one capacitor.

Estimated time required is two man-hours.

The modification parts are itemized in the material information paragraph. For price and availability of parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 2 in all correspondence.

No special tools or equipment are required.

#### MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.

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- B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver.
- C. Remove synthesizer assembly A5 from the transceiver card cage.  
  
NOTE: All changes are made on synthesizer card A5A1. Refer to figures 1 and 2 for location of components.
- D. Remove the shield cover from A5A1 card (638-6916-001, -002) by removing 19 screws.
- E. Remove A5A1 from A5 assembly by removing seven screws.
- F. On the top of A5A1, cut circuit trace at right lead of coil L15.
- G. On top of card, cut circuit trace located between thru holes where two new pins are shown in figures 1 and 2.
- H. From the top of the card, insert pins (372-2656-130) into two thru holes as shown in figures 1 and 2.
- I. Connect 4.7- $\mu$ H coil (240-1576-000) between the two new pins. Use sleeving (152-2483-000) on L21 leads if needed.
- J. Remove the 27-pF capacitor C32 and replace it with an 18-pF capacitor (913-1098-030).
- K. On the bottom of the card, install a jumper wire (428-0282-050) from the left lead of L15 to the thru hole located under L15.
- L. Mark RWK REV G on the card near the part number.
- M. Reassemble the transceiver in the reverse order of disassembly.
- N. Mark SB 2 on the service bulletin information chart. If the transceiver does not have an information chart, attach a chart (280-3778-010) near the nameplate.

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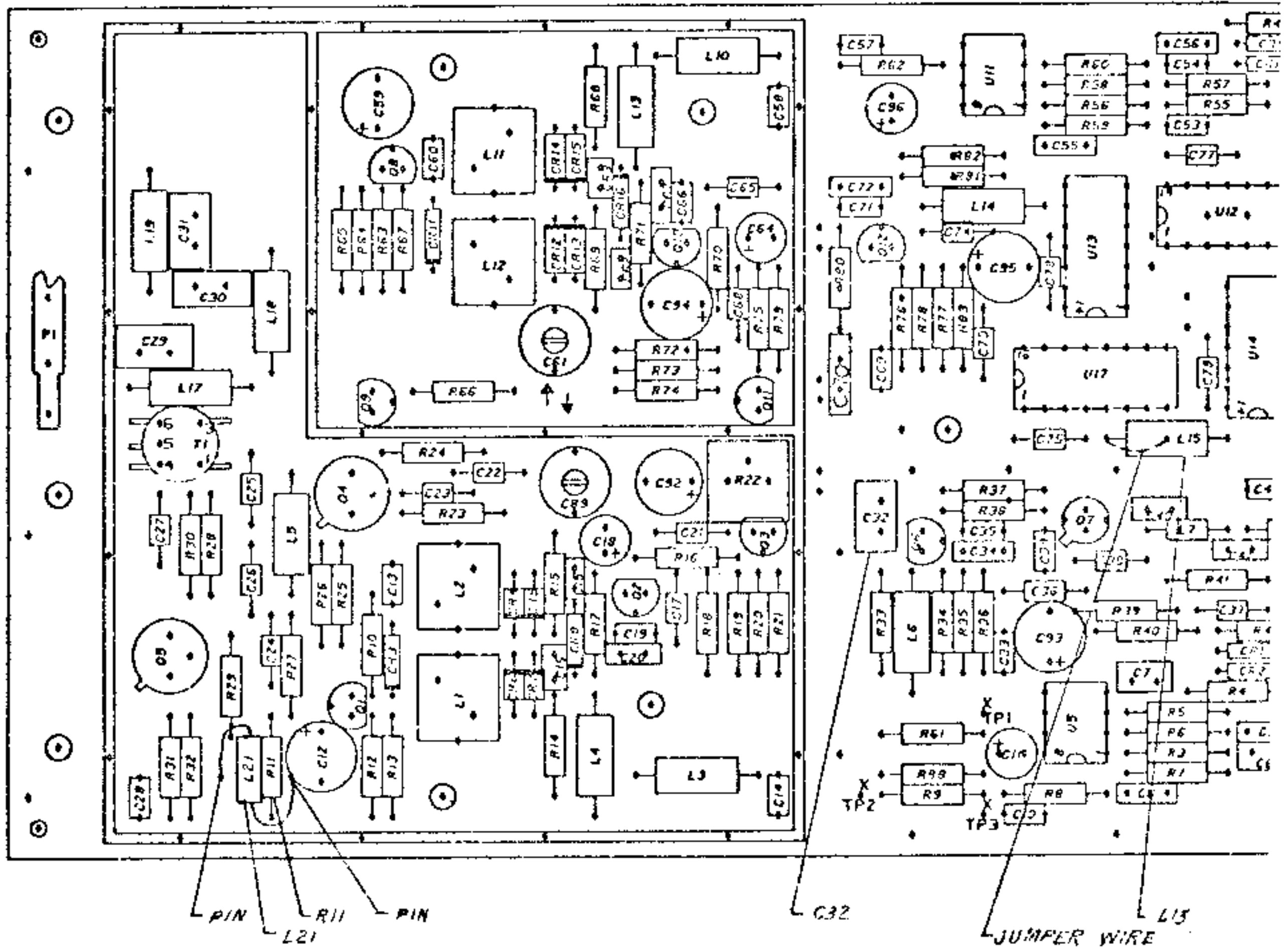
Collins Telecommunications Products Division/Rockwell International

## MATERIAL INFORMATION

The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
372-2656-130	2		Pins
240-1576-000	1		Coil, 4.7 $\mu$ H, L21
152-2483-000	152 mm (6 in)		Sleeving, insulation
913-1098-030	1		Capacitor, 18 pF, C32
428-0282-050	152 mm (6 in)		Wire, #30 AWG, bus, insulated
*280-3778-010	1		Chart, information

\*Order if needed.



P/O Synthesizer Card A5A1 (638-6916-002)  
Figure 2



KWM-380 TRANSCEIVER (622-5093-001, -101)  
 HF-380 TRANSCEIVER (622-3580-001, -101)  
 SYNTHESIZER VARIABLE REFERENCE  
 FREQUENCY LOOP A5A2 (638-6920-001)

SERVICE BULLETIN NO 3

POTENTIAL FREQUENCY WARBLE

This service bulletin may apply to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBERS
KWM-380  622-5093-001, -101  HF-380  622-3580-001, -101	56 and below, 58 through 67, 69 through 102, 105, 107 through 112, and 114 through 117  6 and below	57, 68, 103, 104, 106, 113, 118 and above  7
Production cut-in for circuit card A5A2 (638-6920-001) is REV G.		

A frequency warble may occur at certain frequencies in some radios. The warble will usually occur at the top end of each 1 MHz band. The problem has been traced to two integrated circuits on synthesizer variable reference frequency loop A5A2. When U14 and U26 are at the low end of their specified parameters, a low rf input may cause them to miscount.

This modification increases the rf input levels to the integrated circuits by replacing two coils and two capacitors.

Estimated time required is 1.5 man-hours.

The modification parts are listed in the material information paragraph. For price and availability of parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 3 in all correspondence.

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## MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
  - B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver.
  - C. Remove the card cage cover by removing all screws on the cover.
  - D. Remove A5 card from the card cage. Two cable clamps on the side of the card cage must be removed to provide enough slack in the cable to remove A5.
  - E. Remove the screws that secure A5A2 card to the center plate. This will allow access to the rear of A5A2 for soldering purposes.
- NOTE: Refer to figure 1 while performing steps F through H.
- F. Remove shield cover by removing seven screws.
  - G. Remove coils L6 and L7 and replace them with new 0.15  $\mu$ H coils (240-1562-000).
  - H. Remove capacitors C40 and C45 and replace them with new 4 pF capacitors (912-4141-080).
  - I. Mark RWK REV G on the A5A2 card.
  - J. Reassemble the transceiver in the reverse order of disassembly.
  - K. Mark SB 3 on the service bulletin information chart. If the transceiver does not have an information chart, install a chart (280-3778-010) near the nameplate.

## MATERIAL INFORMATION

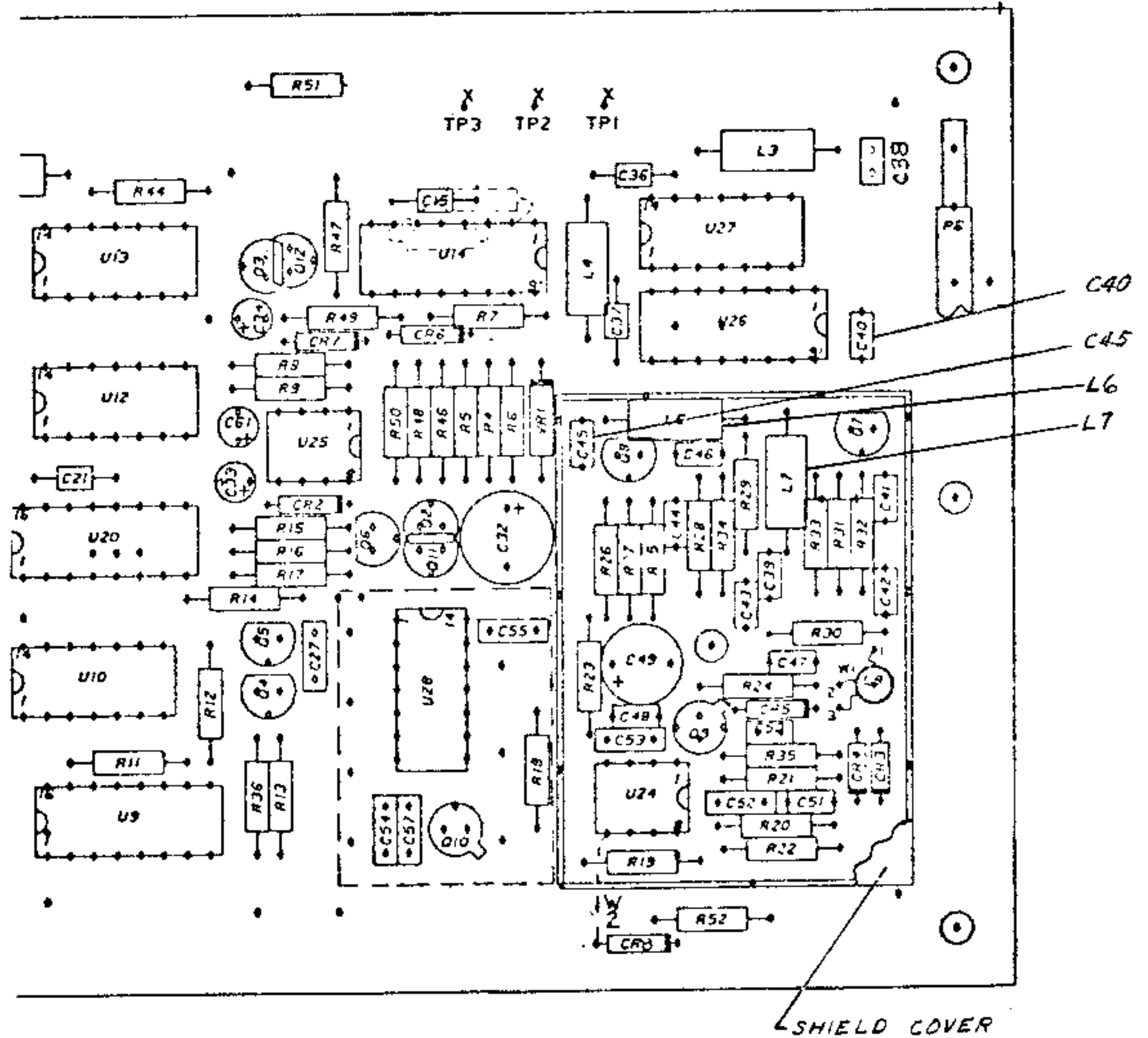
The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
240-1562-000	2		Coil 0.15 $\mu$ H, L6, L7
912-4141-080	2		Capacitor, 4 pF, C40, C45
*280-3778-010	1		Chart, information

\*Order if needed.

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P/O Synthesizer Variable Reference Frequency Loop A5A2  
Figure 1

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KWM-380/HF-380 SB 3  
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KWM-380 TRANSCEIVER (622-5093-001,-101)  
HF-380 TRANSCEIVER (622-3580-001,-101)

## SERVICE BULLETIN NO 4

### REPLACE OPTICAL ENCODER

KWM-380 (622-5093-001,-101) and HF-380 (622-3580-001,-101) units shipped prior to 4 August 1980 could exhibit the problem described below.

In some cases and on a random basis, the tuning dial drive will drag when turned in a clockwise direction resulting in an intermittent ratcheting noise or the dial drive may stick momentarily when initially turned.

This modification consists of replacing the defective encoder with a new part.

Estimated time required is 0.5 man-hour.

The modification parts listed in the material information paragraph are available upon request at no charge. The defective encoder must be returned to the factory service center to cancel billing invoice. Direct all correspondence to Rockwell/Collins Service Center, 6001 Threadgill Avenue, El Paso, Texas 79924.

No special tools or equipment are required.

#### MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
- B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver using a #2 Phillips-head screwdriver.
- C. Tip the front panel forward and down by removing the front one of two screws securing each of the front panel side brackets to the chassis. Be extremely careful not to pull or pinch any wires.
- D. Remove the tuning knob by loosening two set screws using a 5/64 inch Allen wrench.
- E. Remove the encoder from the front panel by using a 1/2 inch wrench or nutdriver to remove one retaining nut and the cable clamp attached to the case.
- F. Unsolder the four wires connected to the encoder printed circuit board.

NOTE: The encoder printed circuit board terminals are numbered 1 through 6 with number 4 being replaced by a keyway.

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- G. Install the four wires removed in step F into the printed circuit board of the new encoder (229-9702-010) as follows:
- (1) Orange wire to terminal 1.
  - (2) Red wire to terminal 3.
  - (3) Brown wire to terminal 5.
  - (4) Green wire to terminal 6.
  - (5) Solder all connections on BOTH SIDES of the printed circuit board.
- H. Install encoder onto front panel using the retaining nut.
- I. Install tuning knob onto encoder shaft and tighten the two set screws.
- J. Install new cable clamp (150-0836-010) onto back of encoder case and insert ribbon cable into clamp.
- K. Tip front panel up into place and secure with screws removed in step C.
- L. Reinstall dust cover using hardware removed in step B.

### MATERIAL INFORMATION

The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>DESCRIPTION</u>
229-9702-010	1	Encoder, optical
150-0836-010	1	Clamp, cable

KWM-380 TRANSCEIVER (622-5093-001, -101)  
HF-380 TRANSCEIVER (622-3580-001, -101)

## SERVICE BULLETIN NO 5

### AUDIO AND RF GAIN CONTROL TAPER

This service bulletin applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBERS
KWM-380 622-5093-001, -101	375 and below	376
HF-380 622-3580-001, -101	37 and below	38

Resistance tapers on the audio and rf gain control may be undesirable. Depending upon operator subjectivity, this may be an operational annoyance.

This modification replaces the original AF RF GAIN potentiometer with a new pot that has a more conventional taper (audio 10c log, rf linear).

Estimated time required is 0.5 man-hour.

The modification part is listed in the material information paragraph. For information concerning parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 5 in all correspondence.

No special tools or equipment are required.

#### MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
- B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver.

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## Collins Telecommunications Products Division/Rockwell International

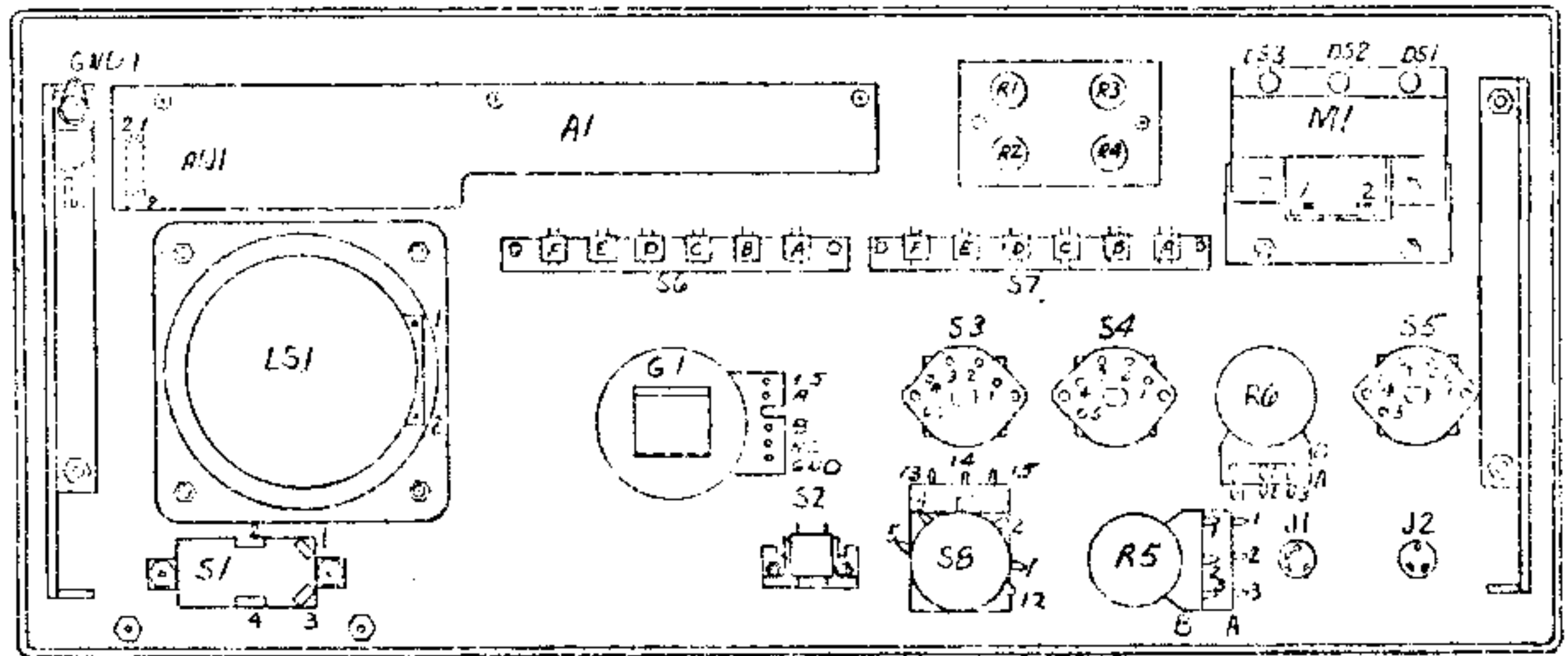
- C. Remove the AF RF GAIN knobs from the front panel by loosening two setscrews in each knob.  
  
NOTE: Refer to figure 1 while performing steps D through F.
- D. Remove R5 by removing one nut and one lockwasher.
- E. TAG AND REMOVE the wires connected to tandem potentiometer R5.
- F. Connect the wires that were removed in step E to the new R5.
- G. Install new potentiometer R5 (376-0276-050) using the nut and lockwasher supplied with the pot.
- H. Solder all electrical connections.
- I. Reinstall the AF RF GAIN knobs and tighten the setscrews in each knob.
- J. Reinstall the dust cover.
- K. Mark SB 5 on the service bulletin information chart. If the transceiver does not have an information chart, install a chart (280-3778-010) near the nameplate.

### MATERIAL INFORMATION

The part listed below is required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>DESCRIPTION</u>
376-0276-050	1	Potentiometer, tandem
*280-3778-010	1	Chart, information

\*Order only if needed.



KWM-380/HF-380 Front Panel, Rear View  
Figure 1



KWM-380 TRANSCEIVER (622-5093-001, -101)  
 HF-380 TRANSCEIVER (622-3580-001, -101)

SERVICE BULLETIN NO 6

CORRECT TRANSMIT HUM

This service bulletin applies as follows:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBERS
KWM-380  622-5093-001	268 and below, 270 through 481, 483, 484, 486, 488, 489, 491, 492, 494, 495, 497, 498, 500, 501, 502, 504, 505, 508, 509, 511, 513, 516, 520, 523, 525, 527, and 530 through 537	269, 482, 485, 487, 490, 493, 496, 499, 503, 506, 507, 510, 512, 514, 515, 517, 518, 519, 521, 522, 524 526, 528, 529, 538 and above
622-5093-101	All	None
HF-380		
622-3580-001	35 and below, 37 through 43, 45, 46, 49, and 50	36, 44, 47, 48, 51 and above
622-3580-101	All	None

The purpose of this service bulletin is to correct a transmit hum caused by a ground loop between the front panel and the receiver/exciter card ground plane.

This modification replaces the mic jack (J2) with a jack that has an insulated sleeve contact to break the ground loop.

Estimated time required is 1.0 man-hour.

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The modification parts are listed in the material information paragraph. For information concerning parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 6 in all correspondence.

No special tools or equipment are required.

## MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
- B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver.

CAUTION: EXTREME CARE MUST BE EXERCISED WHEN REMOVING THE EXISTING MIC JACK TO AVOID SCRATCHING THE FRONT PANEL OVERLAY. PROTECT THE SURROUNDING AREA WITH MASKING TAPE.

- C. Unsolder and remove the wires connected to mic jack J2 (figure 1).
- D. Remove and discard J2 by removing the nut that secures the jack to the front panel. Discard the bypass capacitors mounted on the jack.
- E. Install a new jack (647-2739-001) with the orientation shown in figure 2 using a black nut (334-1657-020).

NOTE: Refer to figure 2 while performing steps F through J.

- F. Install 0.01 uF capacitor C1 (913-3331-020) between J2 tip and sleeve.
- G. Install 0.001 uF capacitor C2 (913-3331-010) between J2 ring and sleeve.
- H. Install 0.01 uF capacitor C3 (913-3331-020) between J2 sleeve and J1 sleeve (front panel ground).
- I. Reconnect the blue wire (removed in step C) to J2 tip.
- J. Reconnect the shielded cable white wire to J2 ring and black wire to J2 sleeve.

NOTE: Refer to figure 3 for an interconnect diagram which includes the above changes.

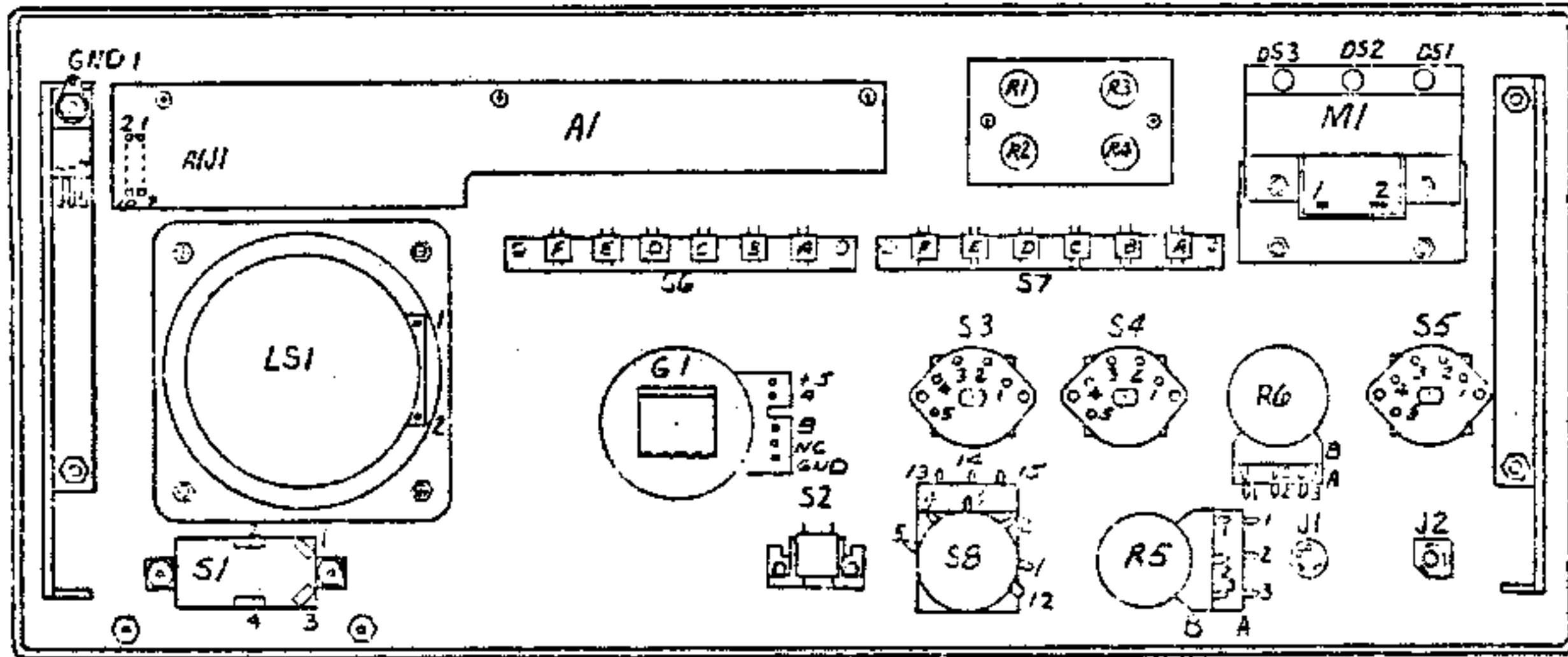
- K. Reinstall the transceiver dust cover.
- L. Mark SB 6 on the transceiver service bulletin information chart. If the unit does not have an information chart, attach a chart (280-3778-010) near the nameplate.

## MATERIAL INFORMATION

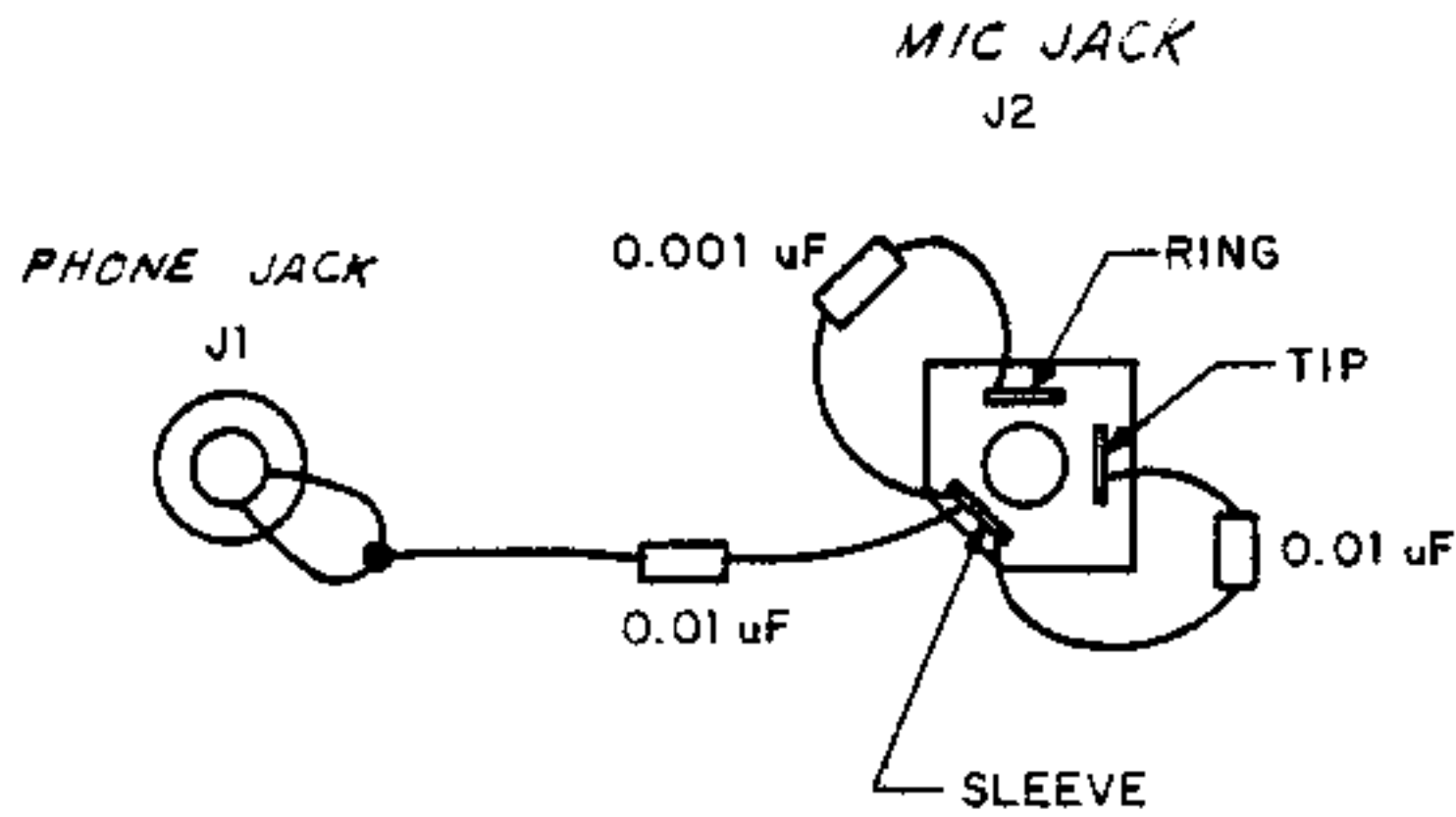
The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
647-2739-001	1		Jack, J2
334-1657-020	1		Nut
913-3331-020	2		Capacitor, 0.01 uF, C1, C3
913-3331-010	1		Capacitor, 0.001 uF, C2
*280-3778-010	1		Chart, information

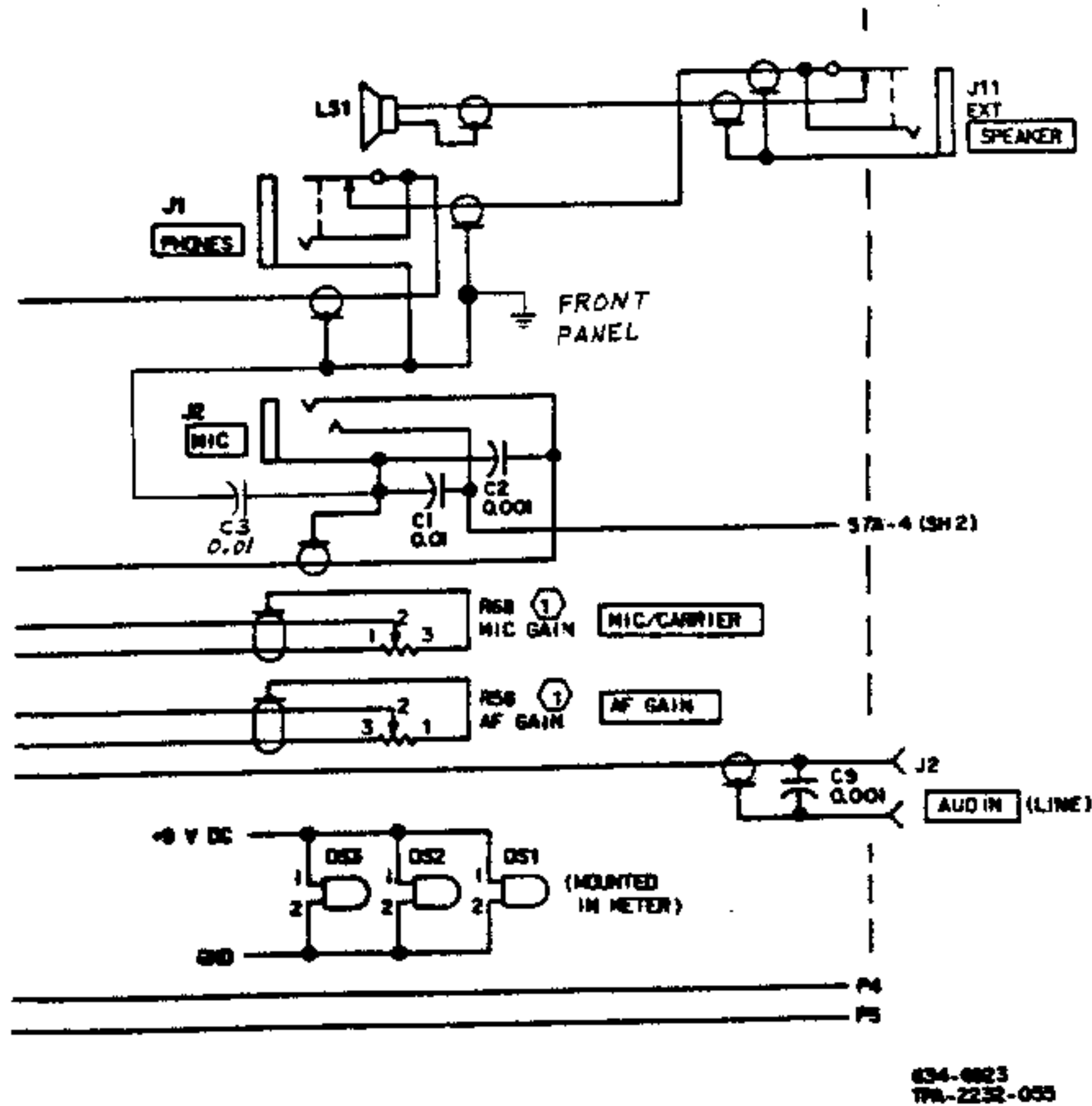
\*Order if needed.



KWM-380/HF-380 Front Panel, Rear View  
Figure 1



Mic Jack J2, Orientation Diagram  
Rear View of Front Panel  
Figure 2



P/O KWM-380/HF-380 Interconnect Diagram  
Figure 3

**Collins Divisions**  
Cedar Rapids, Iowa 52406  
(319) 395-1000  
Cable COLINRAD Cedar Rapids



**Rockwell  
International**

August 1, 1981

REVISION 1  
TO  
KWM/HP-380 SERVICE BULLETIN NO 7

Attached is a revised issue of KWM/HP-380 Service Bulletin No 7, titled "Prevent Excessive EMI (RCVR Birdies) and Eliminate Electronic Tuning Backlash," originally dated 22 December 1980.

At the time this service bulletin was originally published, the serial number effectivity of the change was not available. This revision supplies the missing effectivity.

The black bar in the margin indicates the location of the change. This revised service bulletin replaces the entire original publication.

KWM-380 TRANSCEIVER (622-5093-001, -101)  
 HF-380 TRANSCEIVER (622-3580-001, -101)  
 CONTROL CARD A8 (638-6929-001, -002)

SERVICE BULLETIN NO 7

PREVENT EXCESSIVE EMI (RCVR BIRDIES) AND  
 ELIMINATE ELECTRONIC TUNING BACKLASH

This service bulletin applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBER
KWM-380 (622-5093-001, -101)	431 and below, 433 through 443, 446 through 463, 465, 466, 468 through 472, 474 through 481, 483, 484, 486 through 489, and 491	432, 444, 445, 464, 467, 473, 482, 485, 490, 492, and above
HF-380 (622-3580-001, -101)	35 and below, and 37 through 41	36, 42, and above

Some of the HF-380 and KWM-380 Transceivers have exhibited excessive electromagnetic interference (birdies) in the 4- to 5-MHz frequency range and on certain frequencies that repeat on every band such as 7.259, 14.259, etc. This problem is solved by changing the values of nine coils in the control card A8 output to the low-pass filter and by adding cable clamps to properly position two cables in the synthesizer compartment.

At times, when moving the tuning knob in the opposite direction of its previous rotation, the frequency will go one count in the wrong direction before tuning properly. An example would be tuning up in frequency, stopping, then tuning down in frequency. The display may go up one additional count before starting down. This electronic backlash is eliminated by this modification which consists of making two circuit trace cuts and adding two jumper wires.

Estimated time required is 2.0 man-hours.

The modification parts are itemized in the material information paragraph. For information concerning parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 7 in all correspondence.

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This service bulletin references the KWM-380 Transceiver Service Manual, CPN 523-0769878, and HF-380 Transceiver Service Manual, CPN 523-0769880.

The next revision to the KWM-380 and HF-380 service manuals will include the changes covered by this service bulletin.

## MODIFICATION PROCEDURE

**CAUTION:** STATIC SENSITIVE DEVICES ARE LOCATED ON CONTROL CARD A8. DO ALL WORK ON A CONDUCTIVE SURFACE SUCH AS TINFOIL.

- A. Turn off all power to the transceiver.
- B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver.

**NOTE:** Refer to the KWM-380 service manual overall unit section, CPN 523-0770677, or HF-380 service manual overall unit section, CPN 523-0770689, for location of subassemblies and components. Figure and item numbers are in parentheses.

- C. Remove the card cage cover (7-5).
- D. Remove control card A8 (7-6) from the card cage.

**NOTE:** Refer to the control card A8 instructions, CPN 523-0770685, figure 5, located in the back of the KWM-380/HF-380 service manuals and to figure 1 of this bulletin while performing steps E through I. Refer to figure 2 while performing steps J and K. Figure 3 shows the changes in steps F through I schematically.

- E. Remove 100- $\mu$ H coils L1 through L9 and replace them with 560- $\mu$ H coils (240-2723-050).
- F. Cut the circuit trace from U9-2 to E1.
- G. Cut the circuit trace from U8-13 to E2.
- H. On the bottom of the card, install a jumper wire (422-2400-020) from E1 to U9-4.
- I. On the bottom of the card, install a jumper wire (422-2400-020) from E2 to U8-12.
- J. Install two cable clamps (150-0873-010) in the synthesizer compartment as shown in figure 2.
- K. Route the two cables on the back of the synthesizer assembly through the cable clamps and out the end of the card cage. This will hold the cables away from the circuit card components.
- L. Reassemble the transceiver in the reverse order of disassembly.



# Rockwell-Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

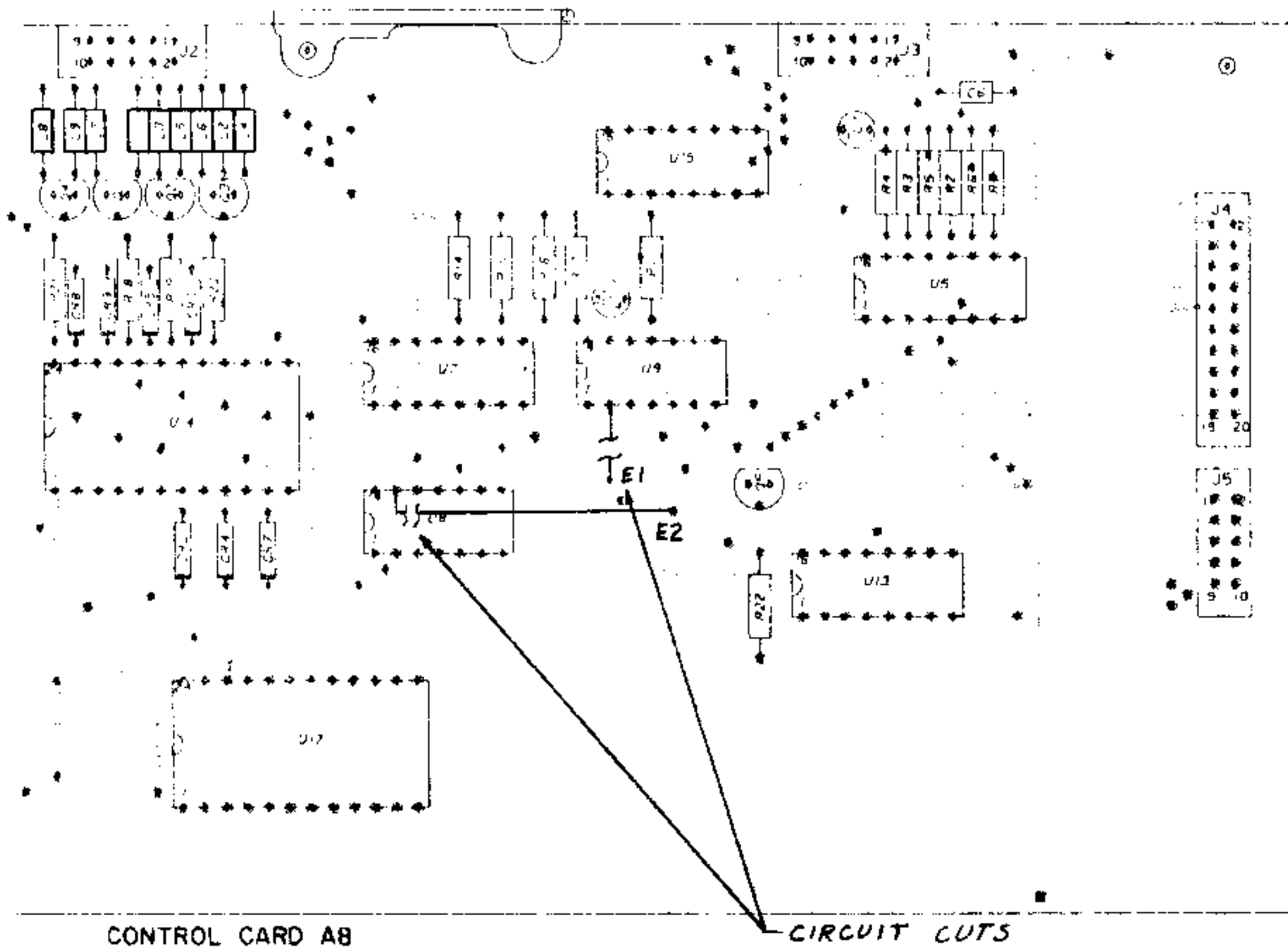
M. Mark SB 7 on the service bulletin information chart. If the transceiver does not have an information chart, install a chart (280-3778-010) near the nameplate.

## MATERIAL INFORMATION

The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
240-2723-050	9		Coil, 560 $\mu$ H, L1 through L9
422-2400-020	150 mm (6 in)		Wire, #30 AWG
150-0873-010	2		Clamp, cable
*280-3778-010	1		Chart, information

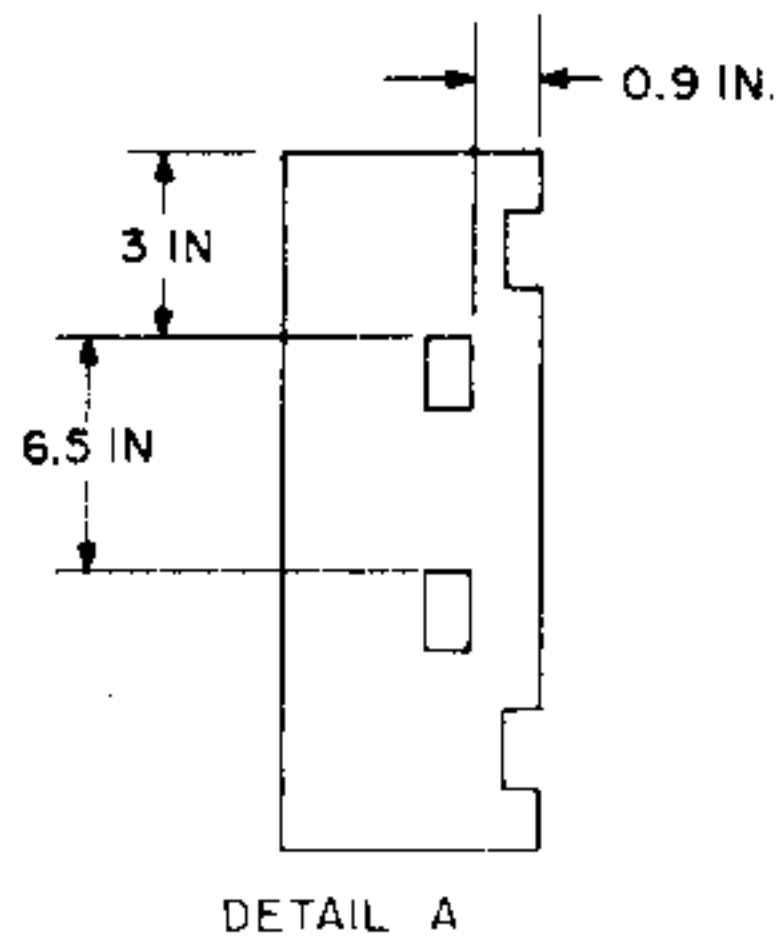
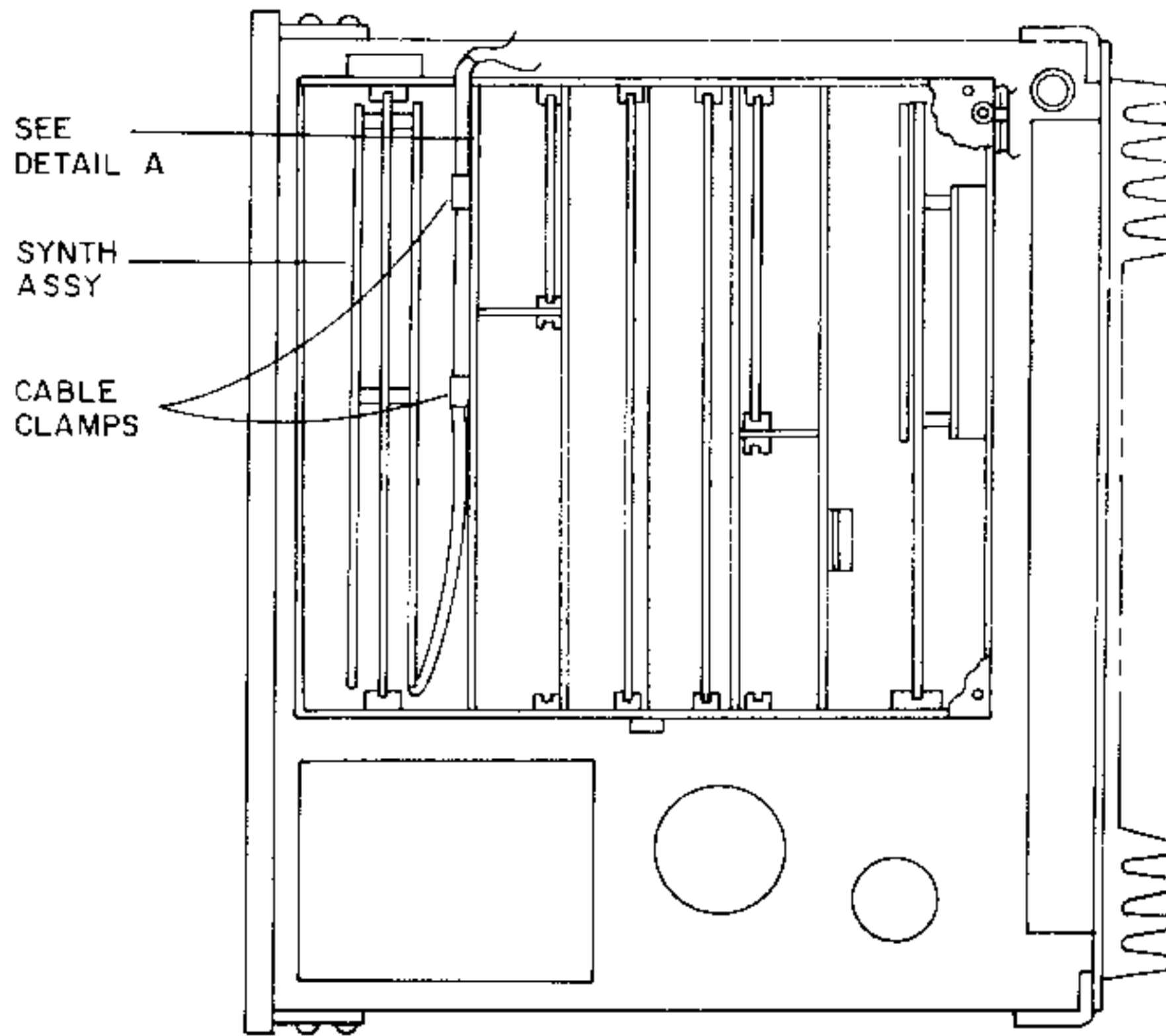
\*Order if needed.



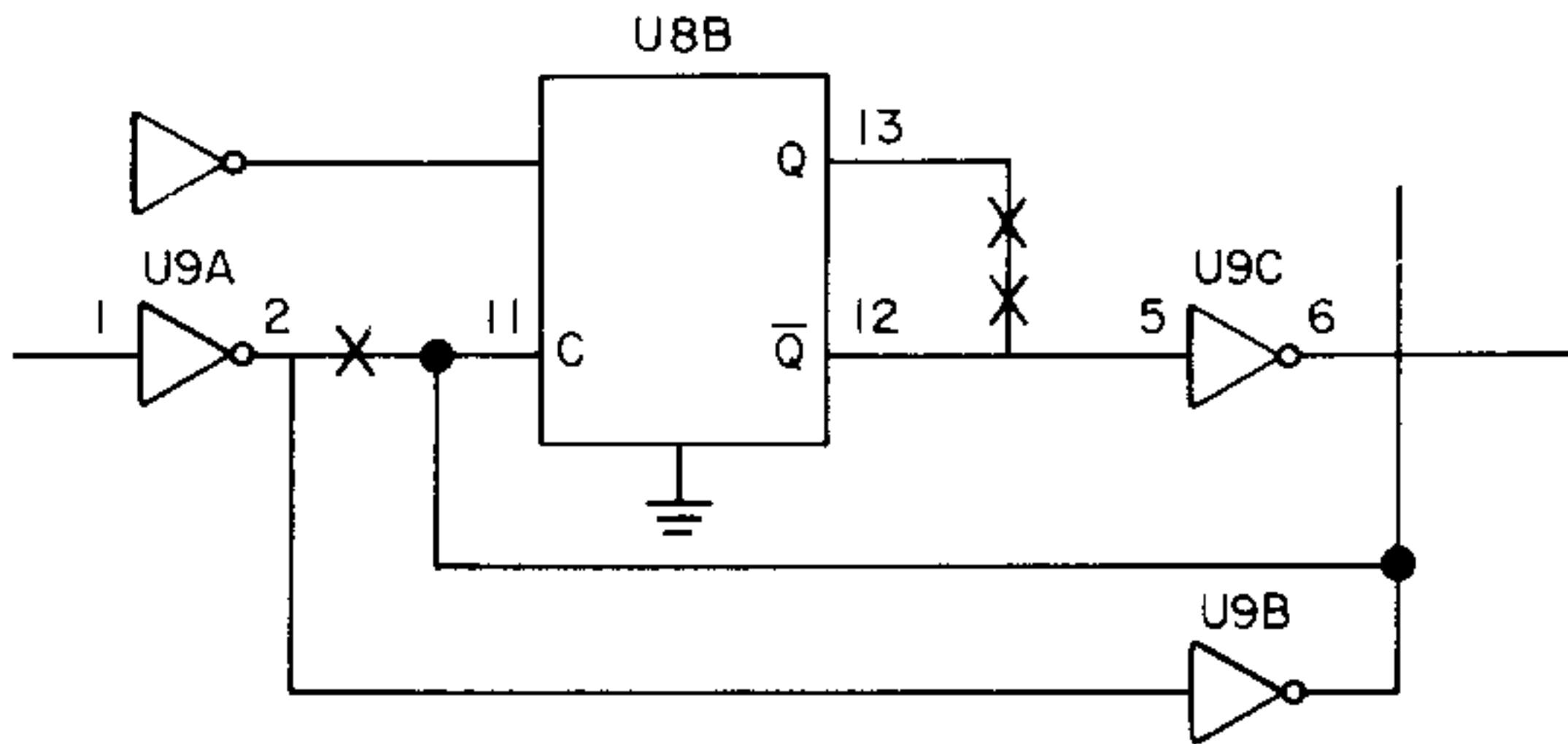
P/O Control Card A8  
Figure 1

# Rockwell- Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International



KWM-380/HF-380 Transceiver, Cable Clamp Location  
Figure 2



P/O Control Cable A8, Schematic Diagram  
Figure 3

Collins Divisions  
Cedar Rapids, Iowa 52498  
(319) 395-1000

October 1, 1982 Cable COLINRAD Cedar Rapids



Rockwell  
International

CHANGE 1  
TO  
KWM-380/HF-380 SERVICE BULLETIN NO 8

Attached is a revised issue of KWM-380/HF-380 Service Bulletin No 8 titled, "Product Improvement," dated 22 December 1980.

This revision makes the following changes:

1. Page 1, serial number effectivity table; TBD is replaced by serial numbers.
2. Page 3, step N; step is revised to remove R408 instead of lifting one lead.
3. Page 3, step P; step is revised to install new resistor instead of connecting lead of old resistor.
4. Page 4, parts list; added 680- $\Omega$  resistor R408, CPN 745-0743-000, quantity 1.
5. Page 9, figure 2 (Sheet 3); schematic changed to show revised connection of L109 from junction of C119, C120, R152, and R153 to junction of C183 and CR109.

Black bars in the margin indicate the location of the changes. This revised issue replaces the entire original publication.

KWM-380 TRANSCEIVER (622-5093-001)  
 HF-380 TRANSCEIVER (622-3580-001)  
 RECEIVER/EXCITER ASSEMBLY A3 (638-6908-002)

SERVICE BULLETIN NO 8

PRODUCT IMPROVEMENT

This service bulletin applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBERS
KWM-380 622-5093-001	17 and below, 19, 20, 21, 23 thru 29, 31, 32, 33, 35, 36, 37, 39, 41 thru 52, 54 thru 57, 59, 60, 61, 63, 65, 66, 67, 69, 71 thru 75, 81 thru 86, 88 thru 100, 102 thru 111, 113, 114, 115, 117 thru 129, 132 thru 152, 154, 155, 157, 158, 160 thru 181, 183 thru 189, 191 thru 199, 201 thru 212, 214, 215, 216, 221 thru 231, 233 thru 237, 239, 241, 243 thru 247, 249 thru 274, 277 thru 282, 284 thru 293, 295, 297, 298, 300, 302, 303, 306 thru 319, 321, 322, 324 thru 329, 331 thru 334, 336 thru 340, 342, 343, 344, 346 thru 350, 352, 354 thru 377, 379, 380, 382 thru 396, 399, 400, 402, 403, 405 thru 411, 413 thru 416, 418 thru 431, 433 thru 440, 442, 443, 444, 446 thru 463, 465, 466, 468 thru 472, 474 thru 484, 486 thru 489, and 491	18, 22, 30, 34, 38, 40, 53, 58, 62, 64, 68, 70, 76, 77, 78, 79, 80, 87, 101, 112, 116, 130, 131, 153, 156, 159, 182, 190, 200, 213, 217 thru 220, 232, 238, 240, 242, 248, 275, 276, 283, 294, 296, 299, 301, 304, 305, 320, 323, 330, 335, 341, 345, 351, 353, 378, 381, 397, 398, 401, 404, 412, 417, 432, 441, 445, 464, 467, 473, 485, 490, 492 and above
HF-380 622-3580-001	12 and below, 14 thru 19, 21, 22, 23, 24, 26 thru 35, 37 thru 41, 44, and 46	13, 20, 25, 36, 42, 43, 45, 47 and above
Production cut-in for receiver-exciter circuit card A3 (638-6908-002) is REV J.		

## Collins Telecommunications Products Division/Rockwell International

Three product improvement modifications are made to receiver/exciter assembly A3 by this service bulletin.

1. A capacitor is added to prevent the meter from pinning when AGC is switched on.
2. Two diodes are added to the if amplifier output to reduce the popping noise during AGC attack.
3. RF gain function is changed by adding two resistors and two diodes. This will produce a true "ORing" operation and allow the AGC threshold to be preset. The control range of the rf gain pot is spread out over the full rotation of the pot.

Estimated time required is 3 man-hours.

The modification parts are itemized in the material information paragraph. For information concerning parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 8 in all correspondence.

No special tools or equipment are required.

#### MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
- B. Remove the dust cover by removing the four screws adjacent to the four feet on the bottom of the transceiver.

**NOTE:** All changes are made to receiver/exciter assembly A3, located on the bottom of the unit. Taking care to not damage adjacent components, these modifications can be made without removing A3 from the chassis. If circuit card A3 is not removed, installation of contacts (gold-plated square pins) can be made easier by first removing the square plastic spacers from the contacts before soldering. Refer to figure 1 while performing steps C through T. Sleeve leads as required using insulation sleeving (152-2473-000). Figure 2, sheets 1 and 4, show the changes to the schematic diagram made by this service bulletin. Figure 2, sheets 2, 3, 5, 6, 7, and 8, show additional changes necessary to update the schematic to the REV J configuration of receiver/exciter assembly A3.

- C. Install contacts, 372-2656-130 (square pins) at E1 and E2 (holes in board) and solder. Refer to figure 1, detail A.
- D. Install 1N4454 diode CR702 (353-3644-010) with cathode to E1 as shown in figure 1, detail A.
- E. Install 1N4454 diode CR703 (353-3644-010) with cathode to E2 as shown in figure 1, detail A.

- F. Remove both leads of resistor R407 and install a contact (372-2656-130) in each hole.
- G. Connect the R407 leads to the new contacts.
- H. Install 100- $\mu$ F capacitor C411 (184-9102-100) to the new contacts with the positive side to the bottom of R407 as shown in figure 1, detail C.
- I. Remove the right-hand lead (cathode) of CR403 and install a contact (372-2656-130) in the vacated hole. Connect the CR403 lead to the new contact.
- J. Remove the right-hand lead (cathode) of CR400 and install a contact (372-2656-130) in the vacated hole. Connect the CR400 lead to the new contact.
- K. Position 1N4454 diode CR406 (353-3644-010) as shown in figure 1, detail B, section BB. Connect the cathode end to the contact installed in step I.
- L. Position 1N4454 diode CR407 (353-3644-010) as shown in figure 1, detail B, section BB. Connect the cathode end to the contact installed in step J.
- M. Remove the right-hand lead of C405 and install a contact (372-2656-130) in the vacated hole. Connect the C405 lead to the contact.
- N. Remove resistor R408 and install a contact (372-2656-130) in the hole that was occupied by the right-hand lead.
- O. Remove the right-hand lead of resistor R410 and install a contact (372-2656-130) in the vacated hole. Connect the R410 lead to the new contact.
- P. Install a new R408 (745-0743-000) between the original left-hand hole and the contact installed in step M.
- Q. Connect the right-hand lead of 5.11-k $\Omega$  resistor R424 (705-1030-000) to the contact (E3) installed in step N.
- R. Connect the right-hand lead of 7.50-k $\Omega$  resistor R425 (705-1038-000) to the contact installed in step O.
- S. Cut a terminal strip (797-3615-001) into one block of five holes.
- T. Position the terminal block as shown in figure 1, detail B, and secure it to the circuit card using commercially available epoxy or bonding adhesive.
- U. Connect the left-hand leads of CR406, CR407, R424, and R425 into the terminal block as shown.
- V. Stamp RWK REV J on receiver/exciter card A3 near the latest REV letter.
- W. Reinstall the transceiver dust cover.
- X. Mark SB 8 on the service bulletin information chart. If the transceiver does not have an information chart, install a chart (280-3778-010) near the nameplate.

## MATERIAL INFORMATION

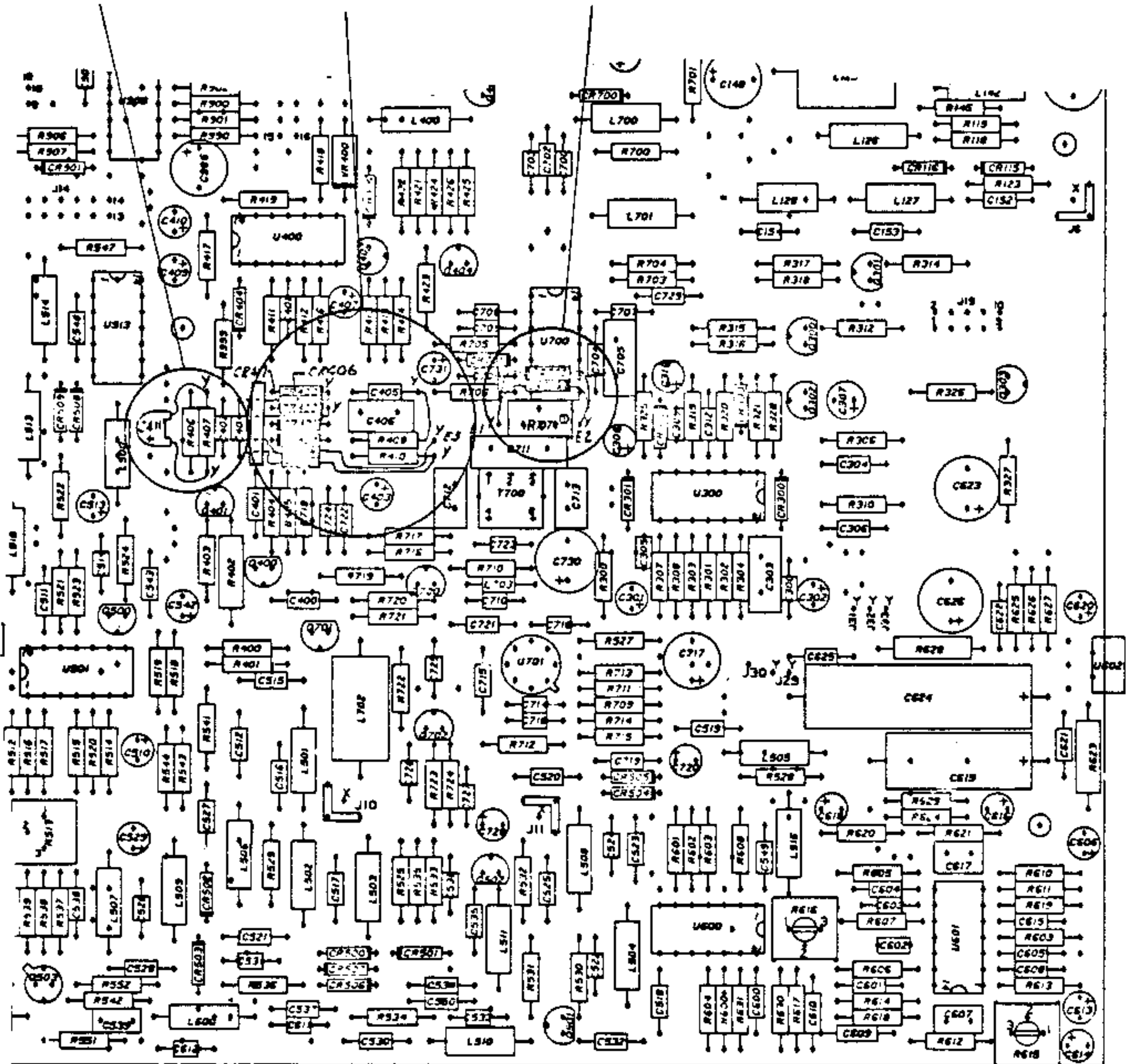
The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
353-3644-010	4		Diode, 1N4454, CR406, CR407, CR702, CR703
372-2656-130	9		Contact (gold-plated square pin)
705-1030-000	1		Resistor, 5.11 k $\Omega$ , R424
705-1038-000	1		Resistor, 7.50 k $\Omega$ , R425
184-9102-100	1		Capacitor, 100 $\mu$ F, C411
152-2473-000	150 mm (6 in)		Sleeving, insulation
797-3615-001	1		Strip, terminal
745-0743-000	1		Resistor, 680 $\Omega$ , R408
*280-3778-010	1		Chart, information

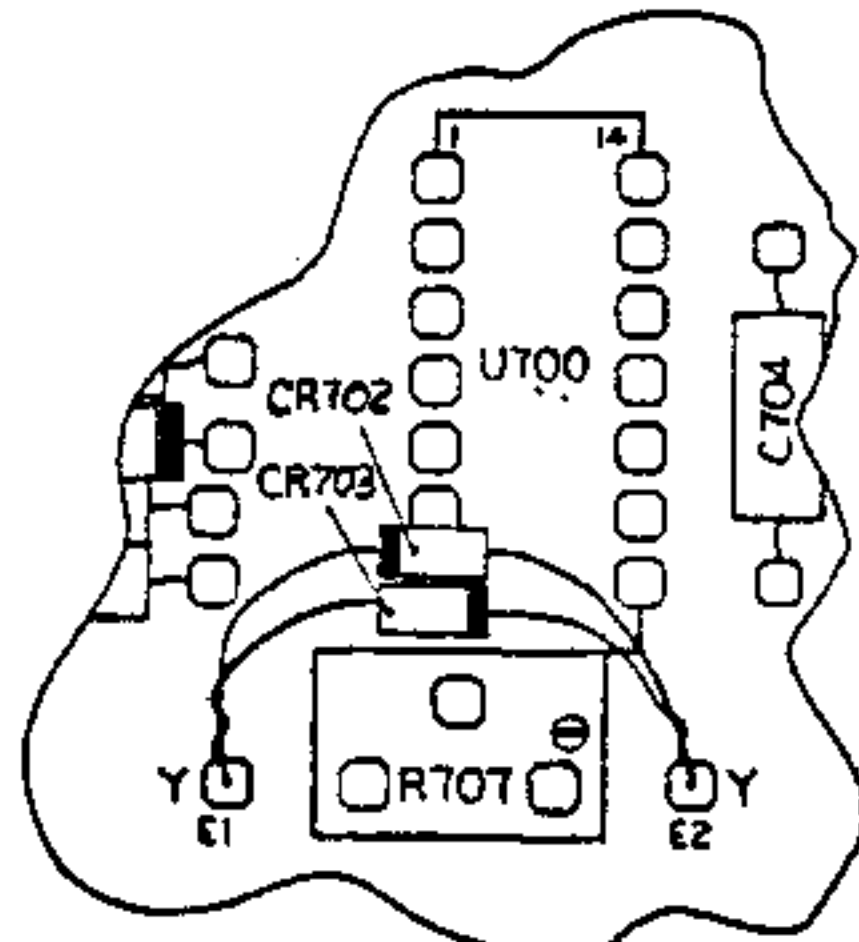
\*Order if needed.



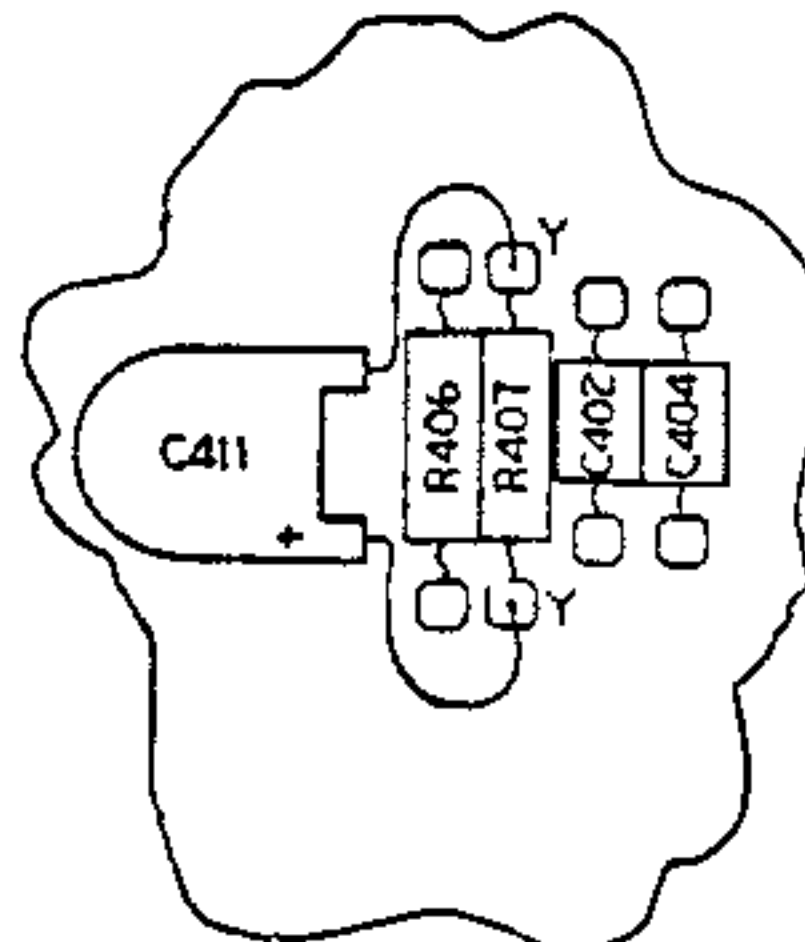
DETAIL B      DETAIL C      DETAIL A



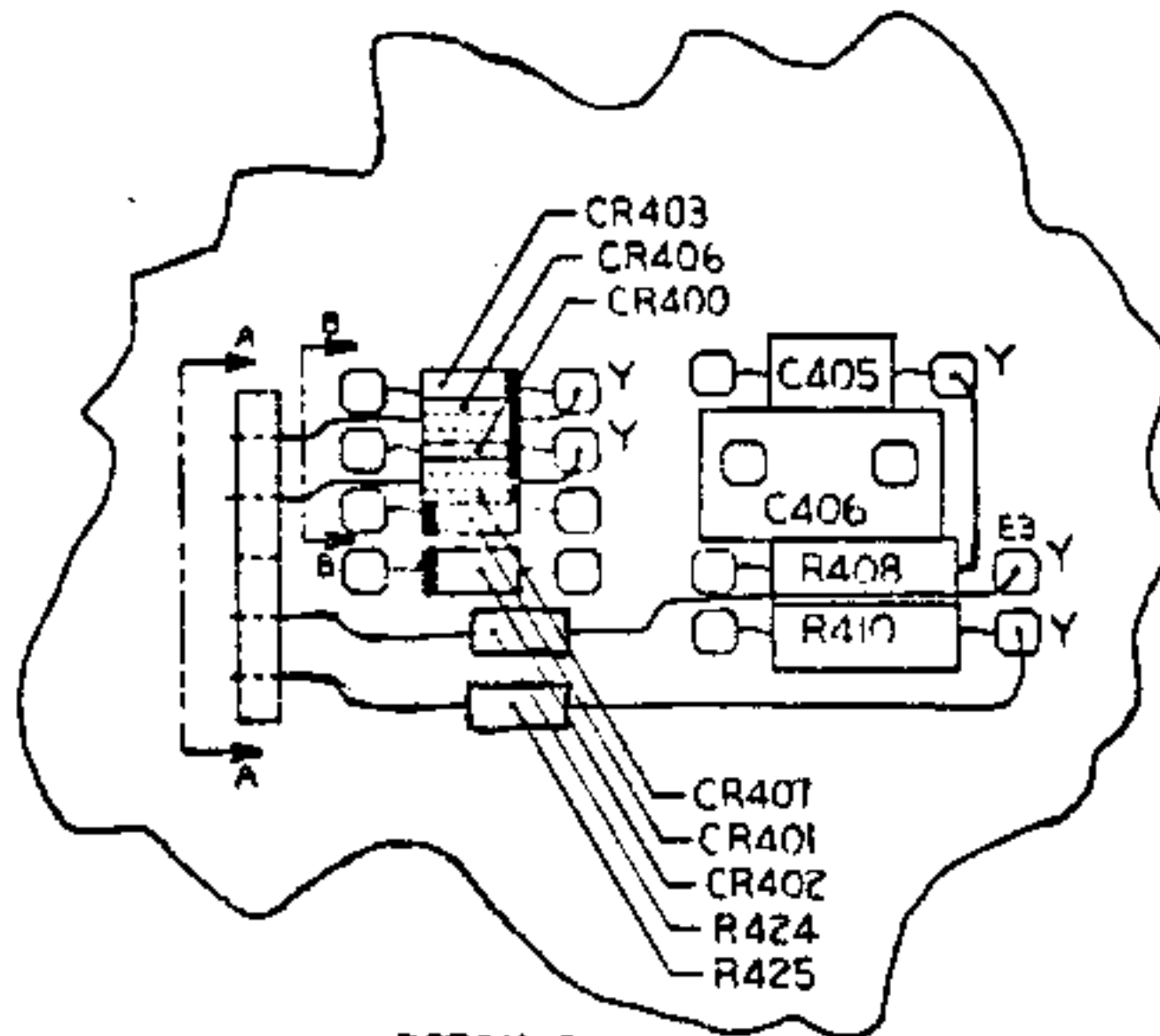
P/O Receiver/Exciter A3, Component Installation Diagram  
Figure 1 (Sheet 1 of 2)



DETAIL A



DETAIL C



DETAIL B

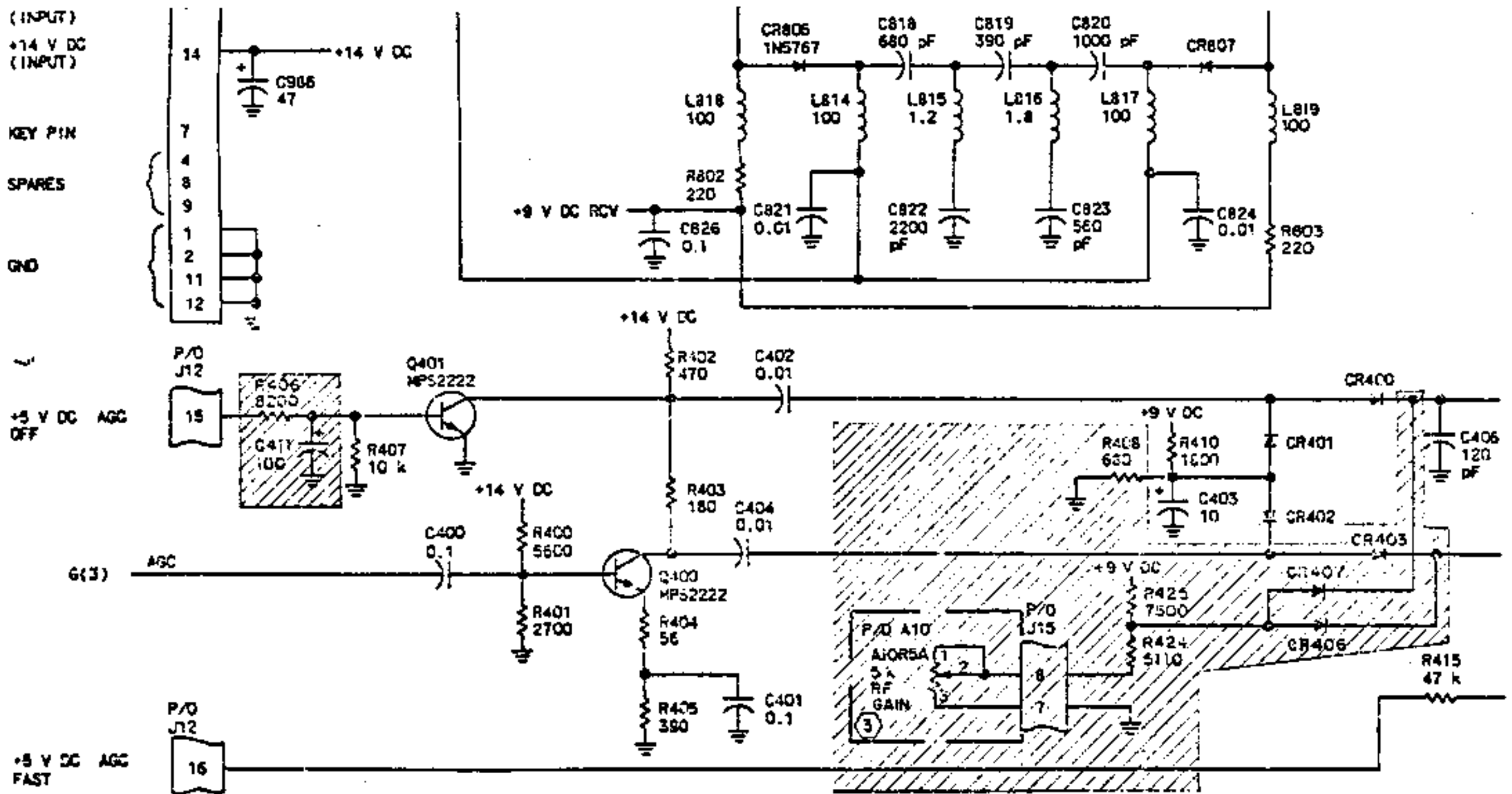


SECTION A-A  
ROTATED 90°  
COUNTERCLOCKWISE

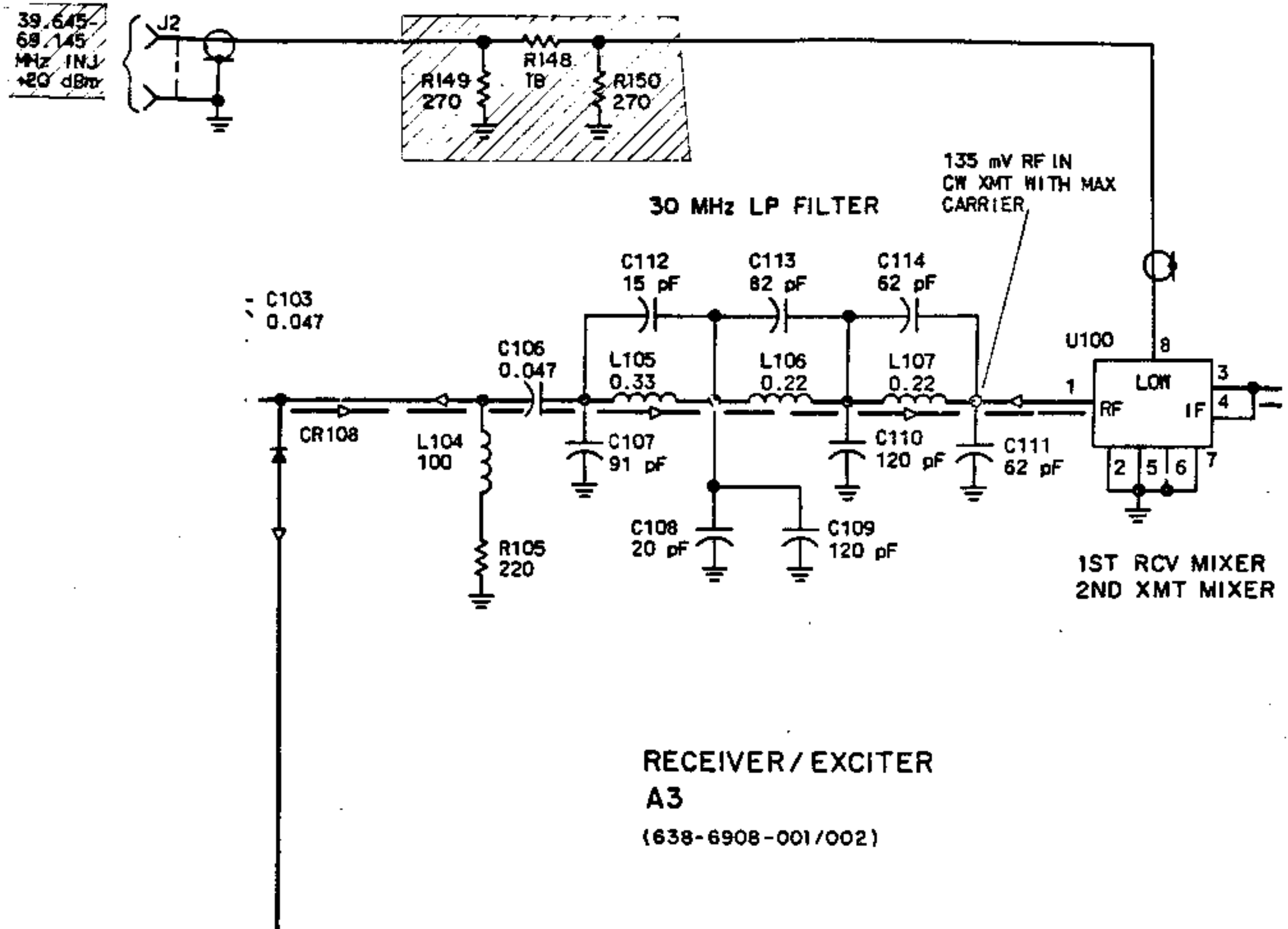


SECTION B-B  
ROTATED 90°  
COUNTERCLOCKWISE

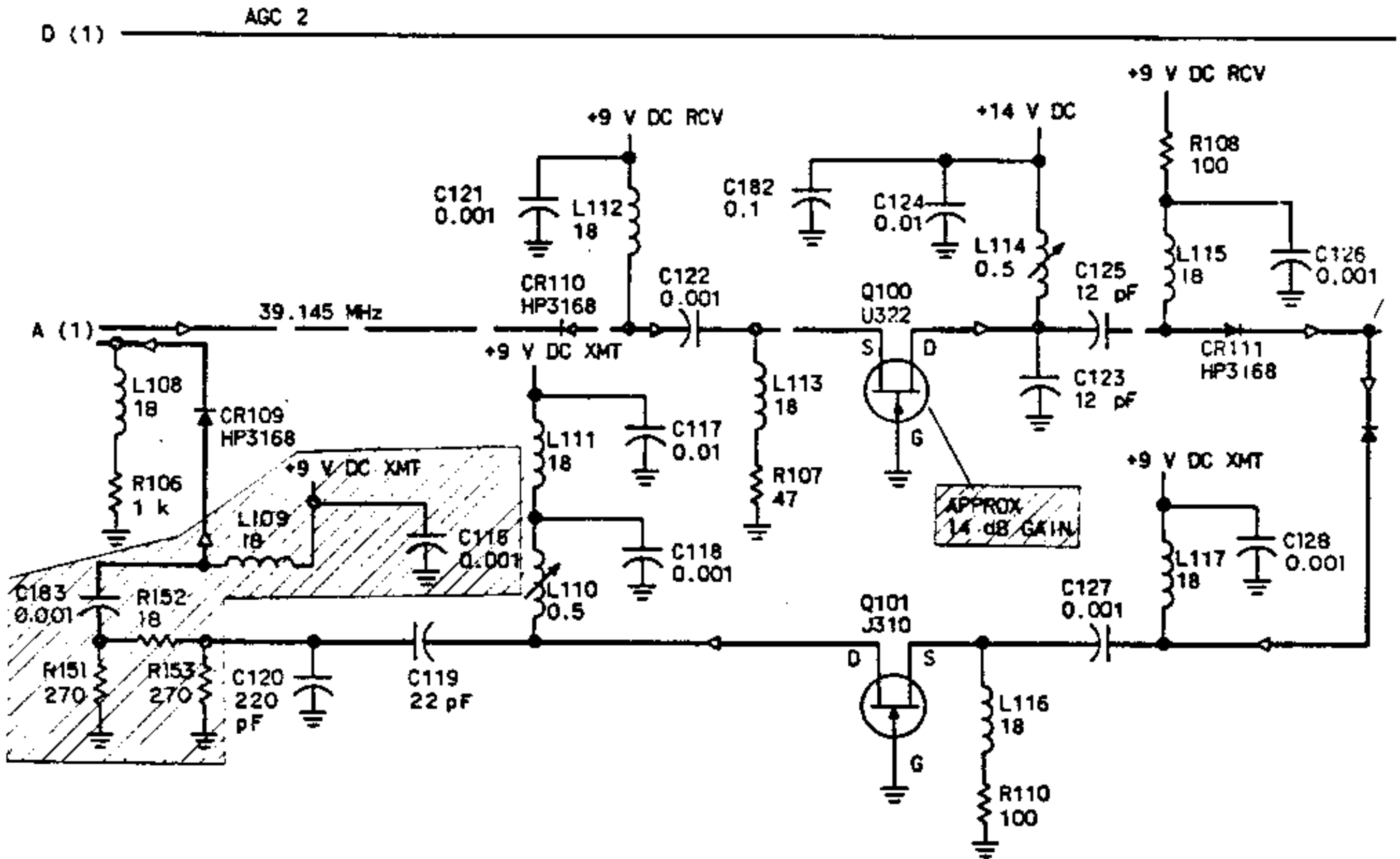
P/O Receiver/Exciter A3, Component Installation Diagram  
Figure 1 (Sheet 2)



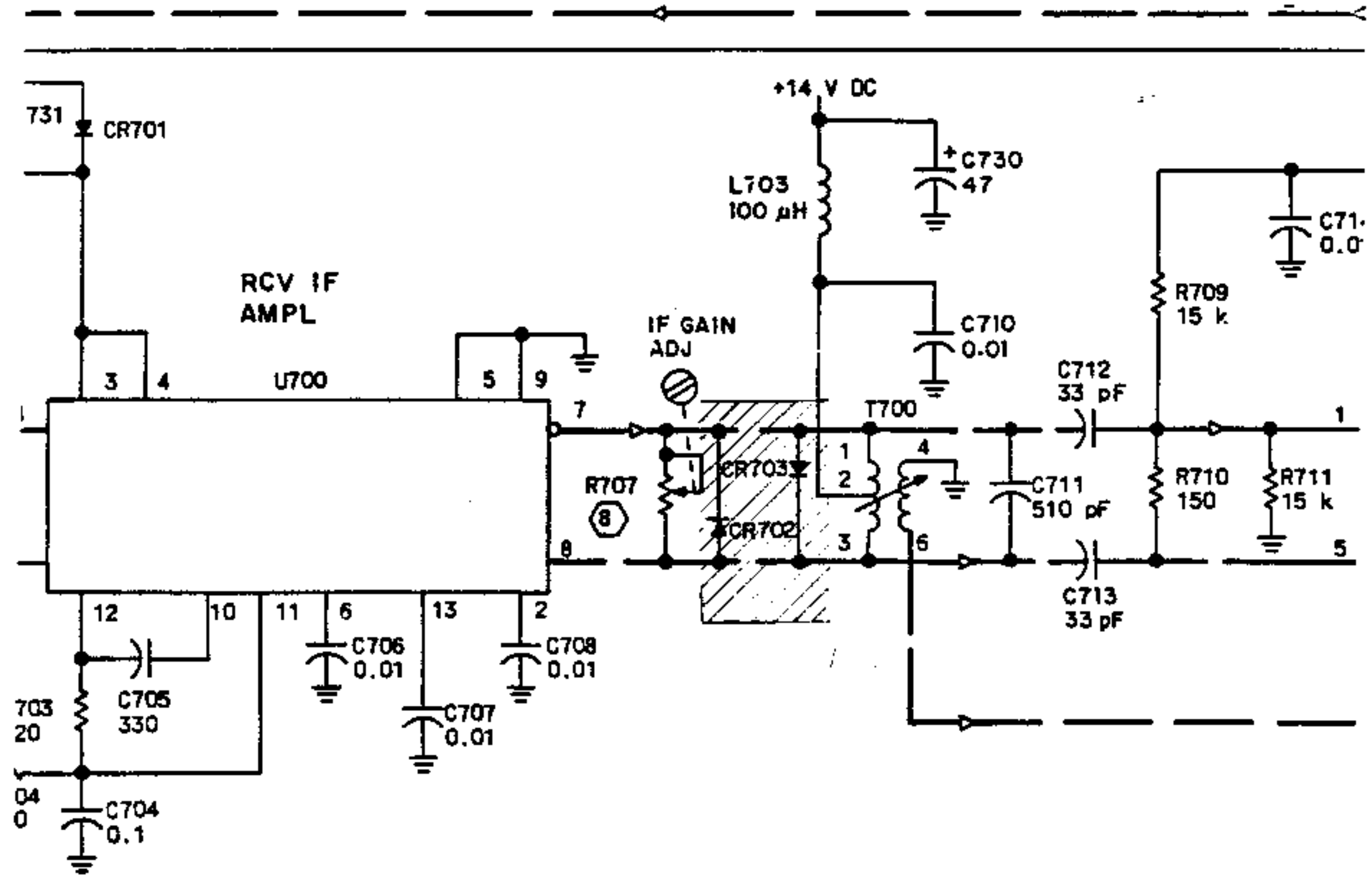
P/O Receiver/Exciter A3, Schematic Diagram  
Figure 2 (Sheet 1 of 8)



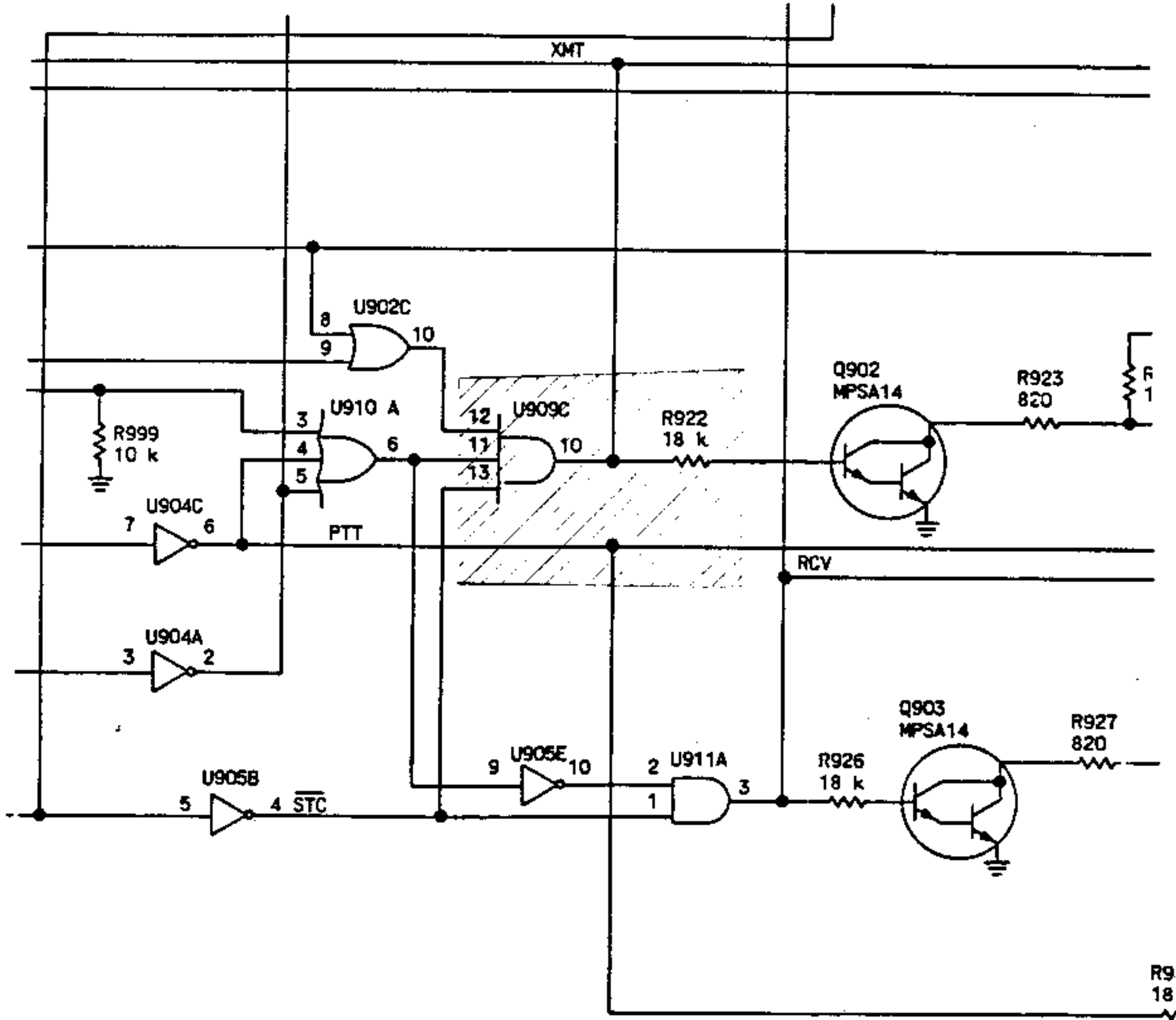
P/O Receiver/Exciter A3, Schematic Diagram  
Figure 2 (Sheet 2)



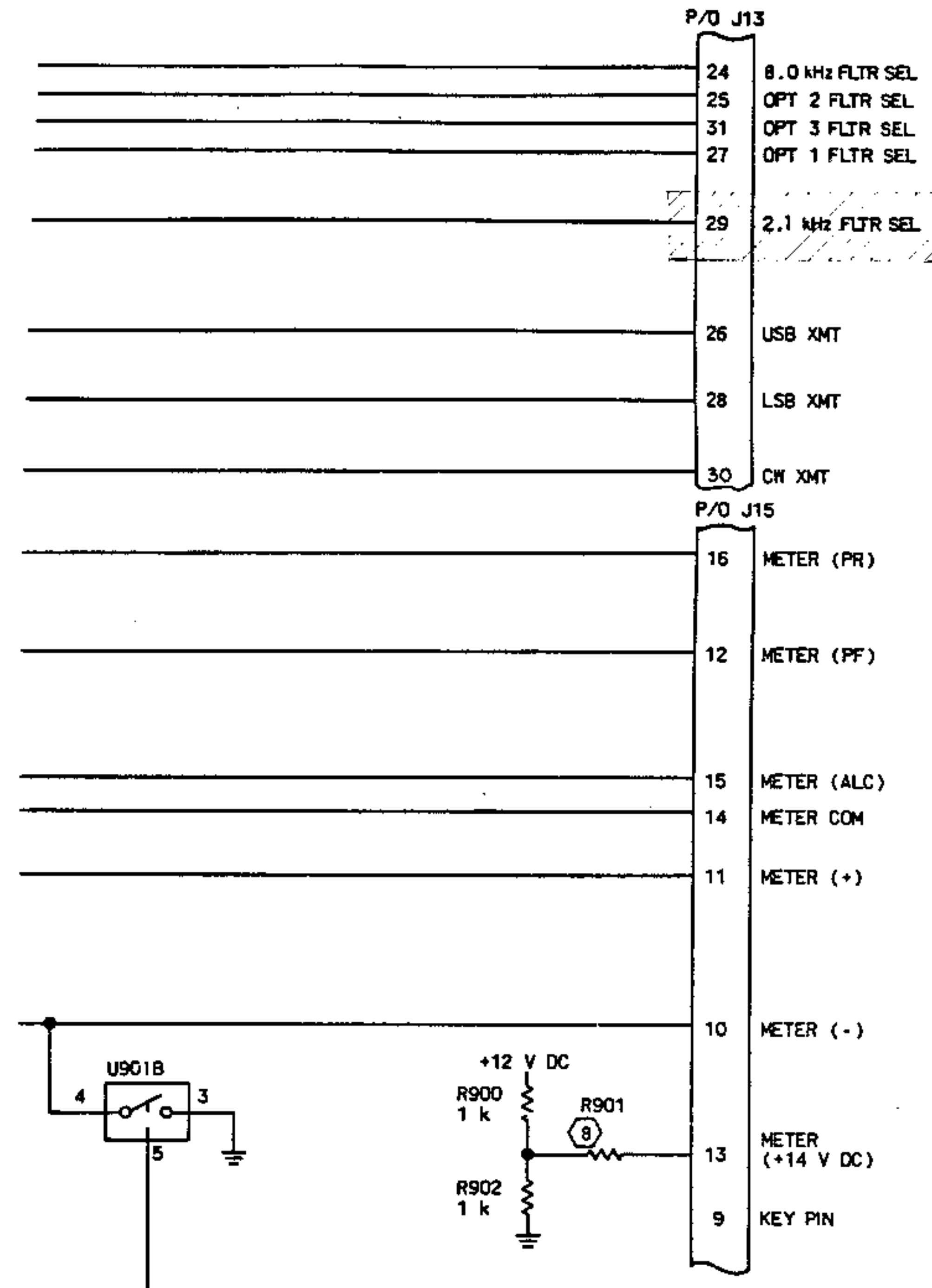
P/O Receiver/Exciter A3, Schematic Diagram  
Figure 2 (Sheet 3)



P/O Receiver/Exciter A3, Schematic Diagram  
Figure 2 (Sheet 4)

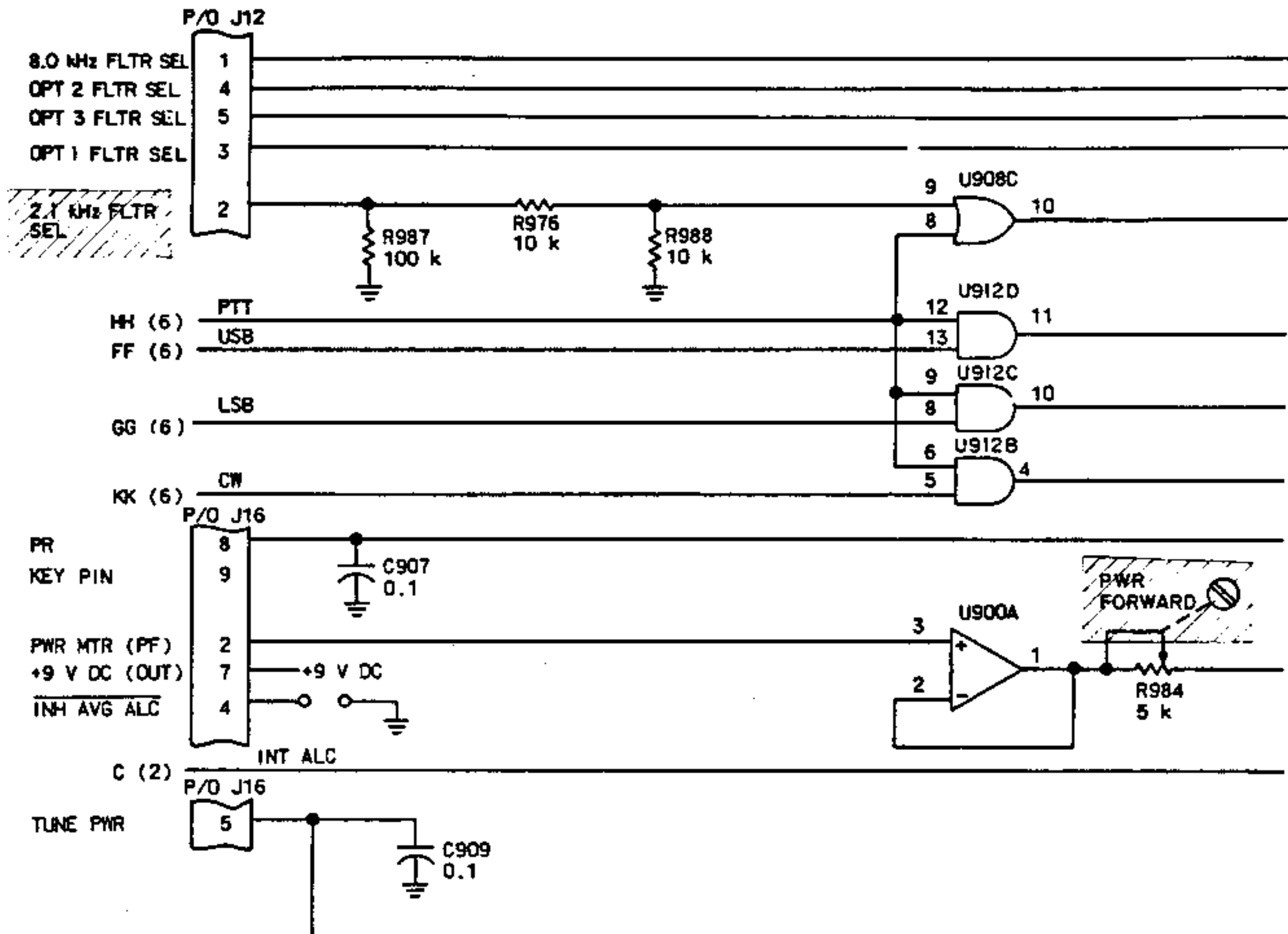


P/O Receiver/Exciter A3, Schematic Diagram  
Figure 2 (Sheet 5)



P/O Receiver/Exciter A3, Schematic Diagram  
Figure 2 (Sheet 6)





P/O Receiver/Exciter A3, Schematic Diagram  
Figure 2 (Sheet 7)

NOTES:

- ① UNLESS OTHERWISE SPECIFIED; RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, INDUCTANCE VALUES ARE IN MILLIHENRYS AND DIODES ARE TYPE 1N4454.
- ② PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT AND/OR ASSEMBLY DESIGNATION.
- ③ RF GAIN, AF GAIN, CARRIER LEVEL, MIC GAIN, VOX AND ANTIVOX GAINS, AND CW AND SSB DELAYS ARE FRONT PANEL CONTROLS.
- ④ SPARE RESISTOR.
- ⑤ J4 AND J5 ARE JUMPED TOGETHER IF NOISE BLANKER IS NOT INSTALLED.
- ⑥ TYPE DESIGNATIONS SHOWN MAY BE GENERIC IN FORM AND ARE FOR REFERENCE ONLY. SEE APPLICABLE PART LIST FOR REPLACEMENT PARTS.
- ⑦ OPTIONAL SPEECH PROCESSOR CONNECTS BETWEEN J26 AND R508 (MIC GAIN POT)
- ⑧ COMPONENT VALUES THAT DIFFER BETWEEN CARD PART NUMBER ENDINGS.

REF DES	COMPONENT VALUE	
	-001	-002
C119	18 pF	22 pF
C120	180 pF	220 pF
C131	180 pF	220 pF
C132	18 pF	22 pF
C133	18 pF	22 pF
C134	180 pF	220 pF
C162	180 pF	220 pF
C163	18 pF	22 pF
L208	NOT USED	2.7 μH
L209	NOT USED	2.7 μH
R144	715	2200
R216	330	820
R223	330	820
R304	1 M	100 k
R306	1 k	100
R312	47 k	10 k
R314	47 k	10 k
R526	1200	NOT USED
R554	100 k	1 M
R604	100 k	1 k
R702	1 k VAR	NOT USED
R707	22 k FIX	20 k VAR
R901	5600	5900
R990	NOT USED	100 k

CHANGES



- ⑨ THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. SPECIAL HANDLING METHODS AND MATERIALS MUST BE USED TO PREVENT EQUIPMENT DAMAGE.
- ⑩ TEST VOLTAGES AND WAVEFORMS SHOWN ARE NOMINAL.

**Collins Divisions**  
Cedar Rapids, Iowa 52498  
(319) 395-1000  
Cable COLINRAD Cedar Rapids



**Rockwell  
International**

October 1, 1982

CHANGE 1  
TO  
KWM-380/HF-380 SERVICE BULLETIN NO 9

Attached is a revised issue of KWM-380/HF-380 Service Bulletin No 9 titled, "Stop PA Oscillations and Adjust Circuit Gain," dated 2 January 1981.

This revision makes the following changes:

1. Page 1, serial number effectivity table: TBD is replaced by serial numbers.
2. Pages 9/10: Figure 1, sheet 3, was revised to show the correct circuit connections of transformers A1A1T2 and A1A1T3.

Black bars in the margin indicate the location of the changes. This revised issue replaces the entire original publication.



# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

● 350510

KWM-380 TRANSCEIVER (622-5093-001, -101)  
HF-380 TRANSCEIVER (622-3580-001, -101)  
POWER AMPLIFIER/HEAT SINK ASSEMBLY A1 (634-8481-003)  
POWER AMPLIFIER CIRCUIT CARD ASSEMBLY A1A1 (638-6775-001)

## SERVICE BULLETIN NO 9

### STOP PA OSCILLATIONS AND ADJUST CIRCUIT GAIN

This service bulletin applies to the following:

EQUIPMENT	APPLICABLE TO SERIAL NUMBER	PRODUCTION CUT-IN SERIAL NUMBER
KWM-380 622-5093-001, -101 634-8481-003 638-6775-001	500 and below, 508  484 and below, 486 through 489, 491, 498, and 500	501 through 507, 509 and above  485, 490, 492 through 497, 499, 501 and above
HF-380 622-3580-001, -101 634-8481-003 638-6775-001	35 and below, 37, 38, 39, 41, 42, and 44  50 and below, 52	36, 40, 43, 45 and above  51, 53 and above
Production cut-in for power amplifier assembly A1 (634-8481-003) is REV G. Production cut-in for power amplifier circuit card assembly A1A1 (638-6775-001) is REV N.		

The purpose of this service bulletin is as follows:

1. Power amplifier oscillations at 0.5 MHz are stopped by adding feedback. The oscillations can be detected by observing higher than normal reflected power when transmitting into an antenna on 21- or 28-MHz bands.
2. Power amplifier oscillations at miscellaneous frequencies, due to high vswr, are stopped by making miscellaneous component changes.



3. Circuit gain can vary due to transistor parameter variations between vendors. This problem is solved by selecting the value of resistor R7 to match the selected vendor for Q41 at time of installation.

Estimated time required is 4.0 man-hours.

The modification parts are itemized in the material information paragraph. For information concerning parts, contact Collins Service Center, Rockwell International, 6001 Threadgill Avenue, El Paso, Texas 79924. Reference KWM-380/HF-380 Service Bulletin No 9 in all correspondence.

No special tools or equipment are required.

This service bulletin references the KWM-380, CPN 523-0769878, and HF-380, CPN 523-0769880, service manuals.

## MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
- B. Remove the dust cover by removing the four screws located adjacent to the four feet on the bottom of the transceiver.
- C. Remove power amplifier/heat sink assembly A1 by removing three screws on each side of the heat sink. Refer to the service manual overall unit section, figure 7.
- D. Remove the metal cover from power amplifier circuit card assembly A1A1. Refer to the service manual chassis/power supply A9 and front panel A10 section, figure 3, item 1.

NOTE: Do not remove circuit card A1A1 from power amplifier/heat sink assembly A1. Refer to figure 1 while performing steps E through T. Refer to figure 2 for a schematic diagram of the latest configuration.

- E. Remove 1500-pF capacitor C55 by cutting the leads close to the body of the component. Leave the capacitor leads soldered into the circuit card.
- F. Install a 1000-pF capacitor (912-3315-000), connecting the leads to the leads of the capacitor removed in step E.
- G. Install a 2.7- $\mu$ H coil L44 (240-2715-180) as shown in figure 1, detail A.
- H. Remove 0.27- $\mu$ H inductors L23 and L24 by cutting the leads close to the component body. Leave the inductor leads soldered into the circuit card.
- I. Install two 3.3- $\mu$ H inductors (240-2029-000), connecting the leads to the leads of the inductors removed in step H.
- J. Install 100- $\Omega$  resistor R123 (745-1310-000) in parallel with L23. Wrap the resistor leads around the coil leads and solder.

- K. Install 100- $\Omega$  resistor R124 (745-1310-000) in parallel with L24. Wrap the resistor leads around the coil leads and solder.
  - L. Examine transistors Q41A/B and resistor R7. If Q41 was manufactured by Motorola, the value of R7 should be 15  $\Omega$ . If Q41 was manufactured by CTC, the value of R7 should be 27  $\Omega$ . If it is necessary to replace R7, cut the resistor leads close to component body, leaving the leads soldered into the circuit card. Install the new resistor (15  $\Omega$ , 745-0683-000, or 27  $\Omega$ , 745-0692-000), attaching the leads to the old resistor leads.
  - M. Install a wire (421-2020-000) in parallel with resistor R23. Wrap the ends of the wire around the R23 leads and solder.
  - N. Install a wire (421-2020-000) in parallel with resistor R24. Wrap the ends of the wire around the R24 leads and solder.
  - O. Remove 40.2-k $\Omega$  resistor R93 by cutting the leads close to the body of the component. Leave the leads soldered into the circuit card.
  - P. Install a 44.2-k $\Omega$  resistor (705-1075-000) attaching the leads to the leads of the resistor removed in step O.
  - Q. Remove and discard 68- $\Omega$  resistor R116.
  - R. Install electronic components assembly A1A2 (647-2781-001) onto the circuit card as shown in figure 1 using the existing hardware.
  - S. Wind two turns of brown wire (422-0795-000) in transformer T3 as shown in figure 1, detail B. Connect to A1A2 assembly as shown in figure 1, detail D. If the transformer core has potting in the holes, carefully clear a way for the brown wire, using a stiff wire such as a straightened paper clip.
  - T. Wind two turns of red wire (442-0796-000) in transformer T2 as shown in figure 1, detail D. If necessary, clear the core of potting as in step S.
- NOTE: The added wires in steps S and T must be oriented as shown in figure 1, details B and C, to prevent oscillation.
- U. Reassemble the transceiver in the reverse order of disassembly.
  - V. Mark SB 9 on the service bulletin information chart. If the transceiver does not have an information chart, install a chart (280-3778-010) near the nameplate.



# SERVICE BULLETIN

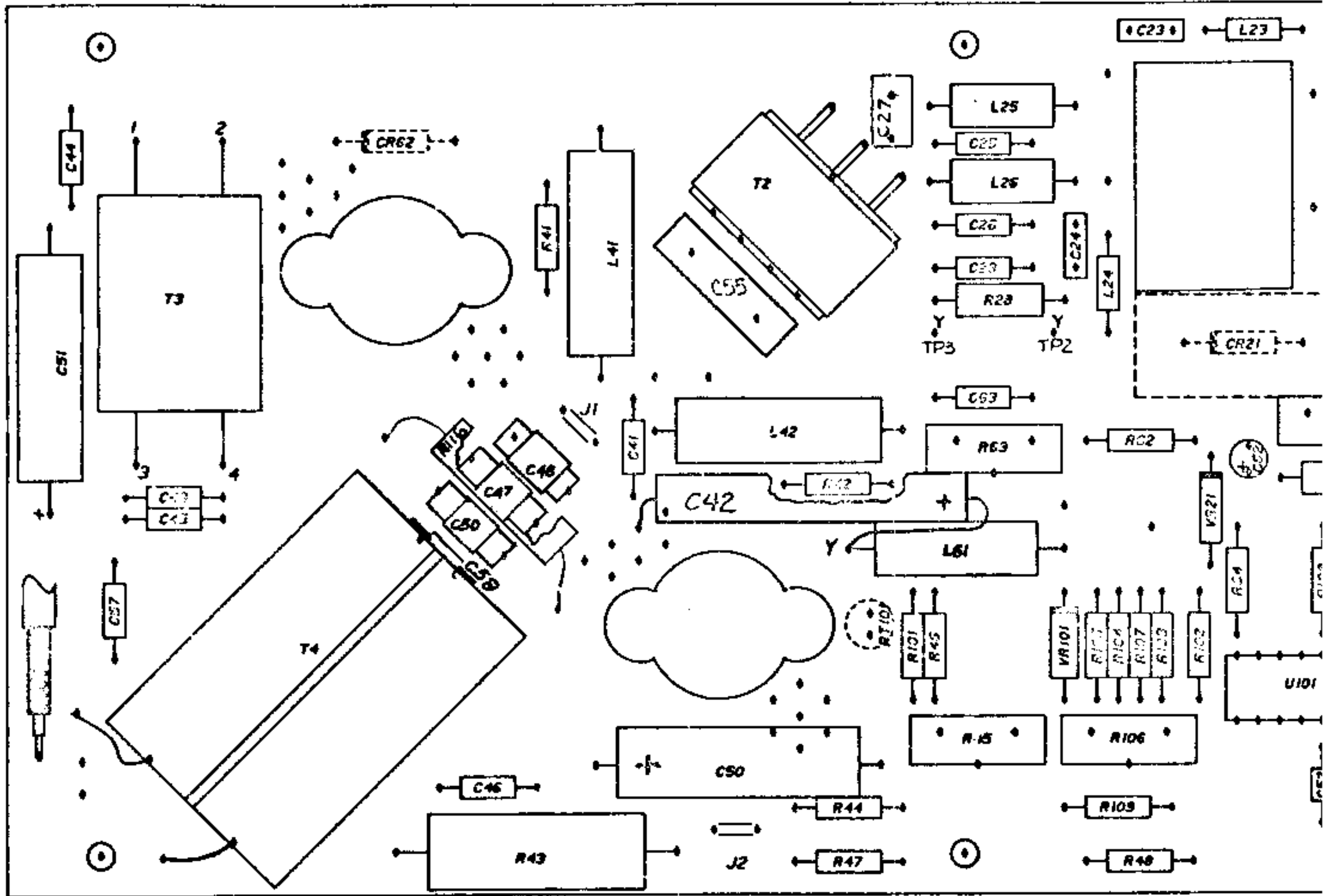
Collins Telecommunications Products Division/Rockwell International

## MATERIAL INFORMATION

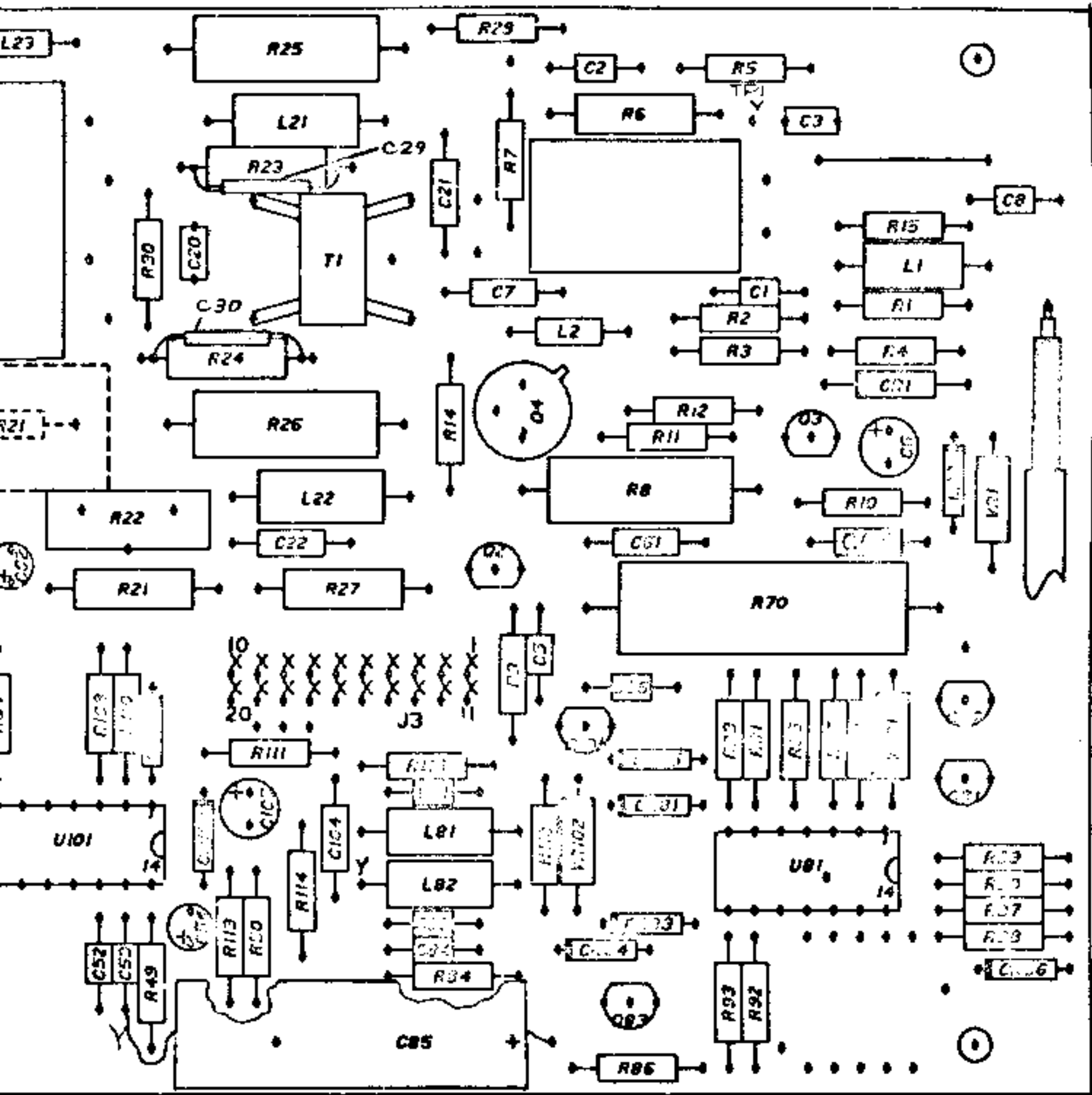
The parts listed below are required to modify one KWM-380 or one HF-380.

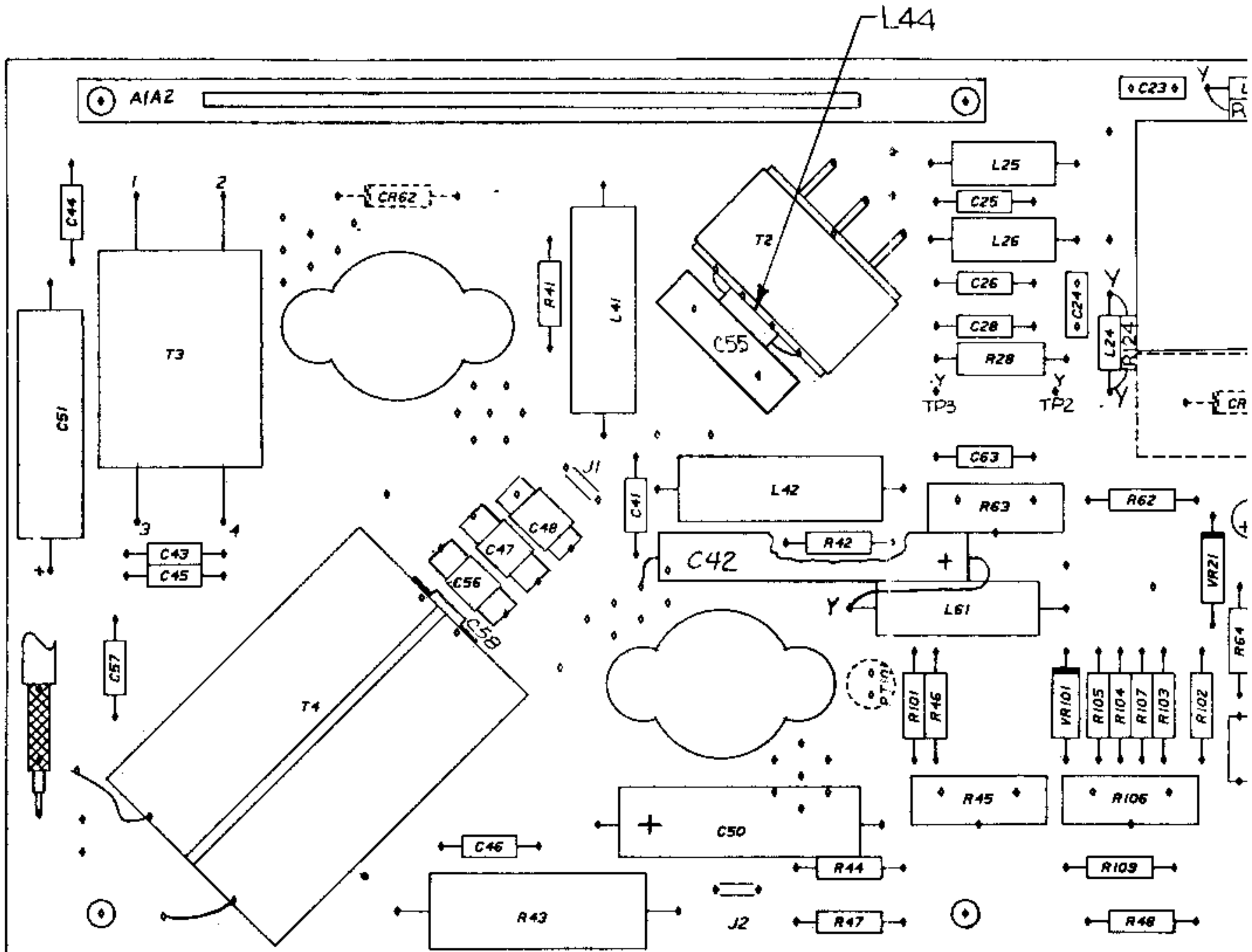
<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
912-3315-000	1		Capacitor, 1000 pF, C55
240-2715-180	1		Coil, 2.7 $\mu$ H, L44
240-2029-000	2		Inductors, 3.3 $\mu$ H, L23, L24
745-1310-000	2		Resistor, 100 $\Omega$ , R123, R124
745-0683-000	1		Resistor, 15 $\Omega$ , R7
745-0692-000	1		Resistor, 27 $\Omega$ , R7
421-2020-000	75 mm (3 in)		Wire, #20 AWG, bus
705-1075-000	1		Resistor, 44.2 k $\Omega$ , R93
647-2781-001	1		Assembly, electronic components, A1A2
422-0795-000	250 mm (10 in)		Wire, A26TA00X1XXX
422-0796-000	250 mm (10 in)		Wire, A26TA00X2XXX
*280-3778-010	1		Chart, information

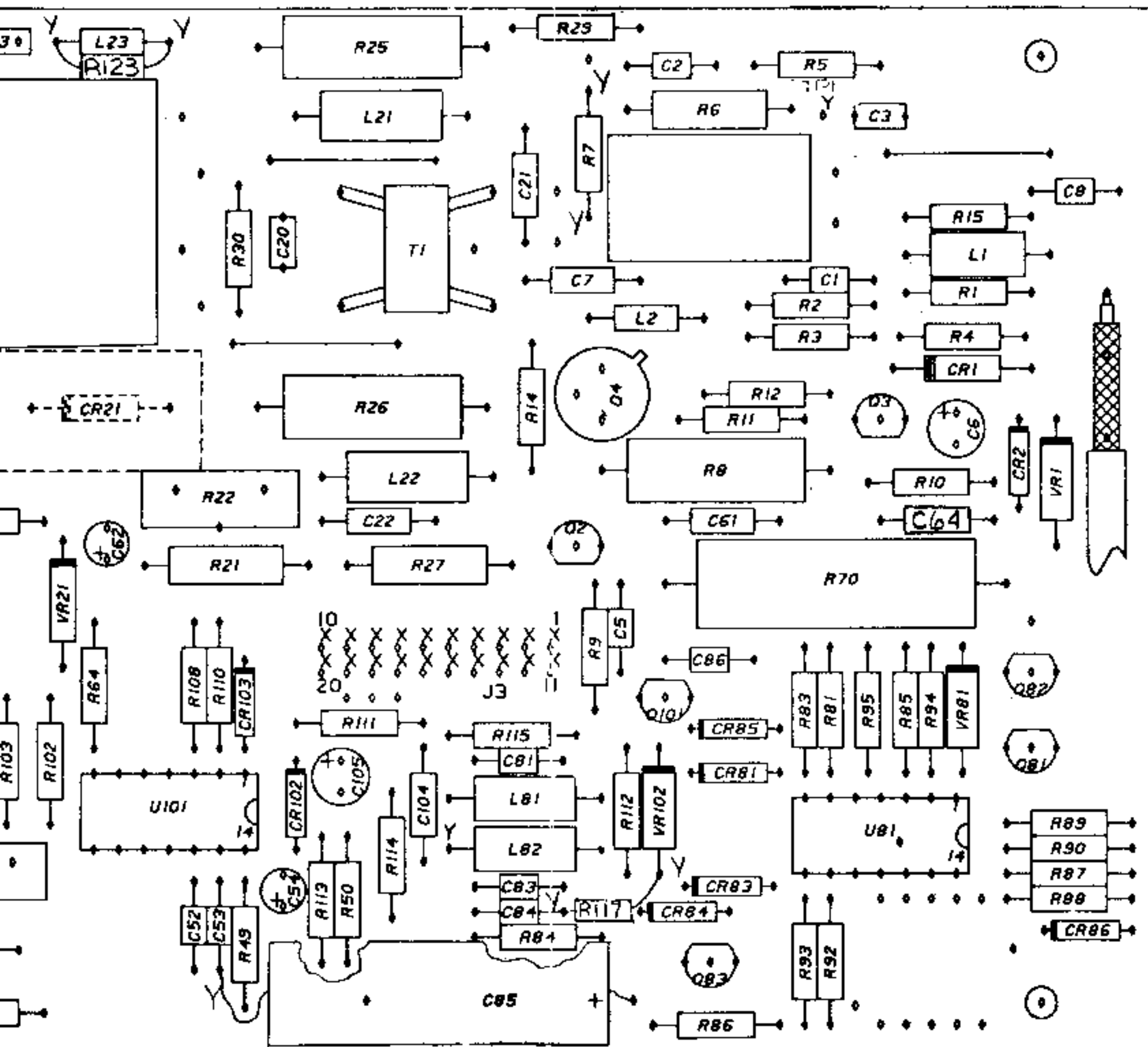
\*Order if needed.

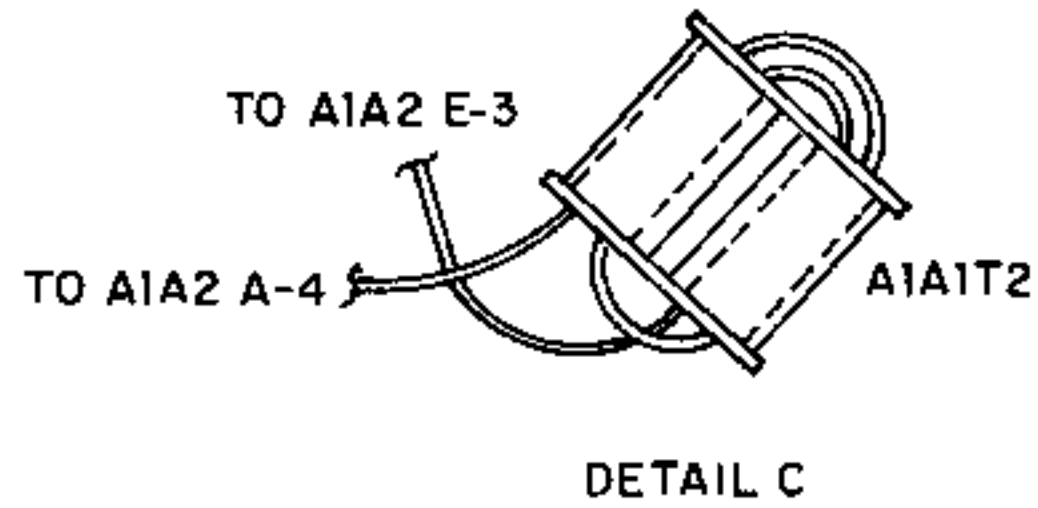
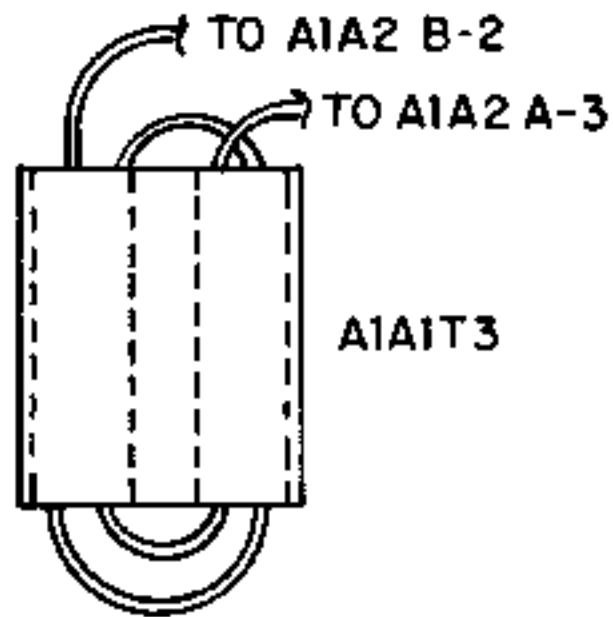
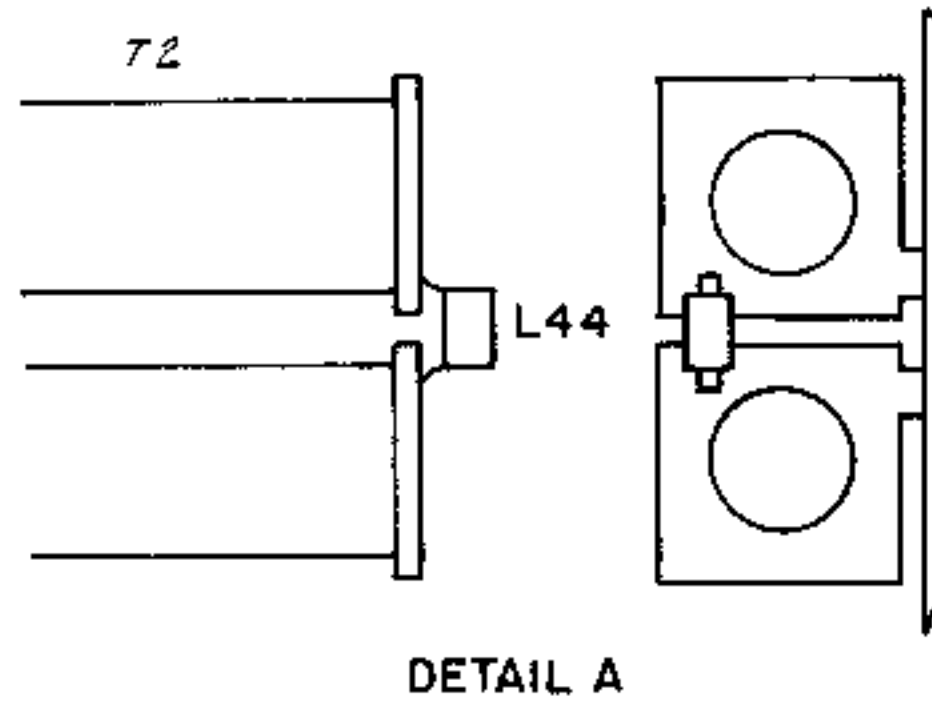




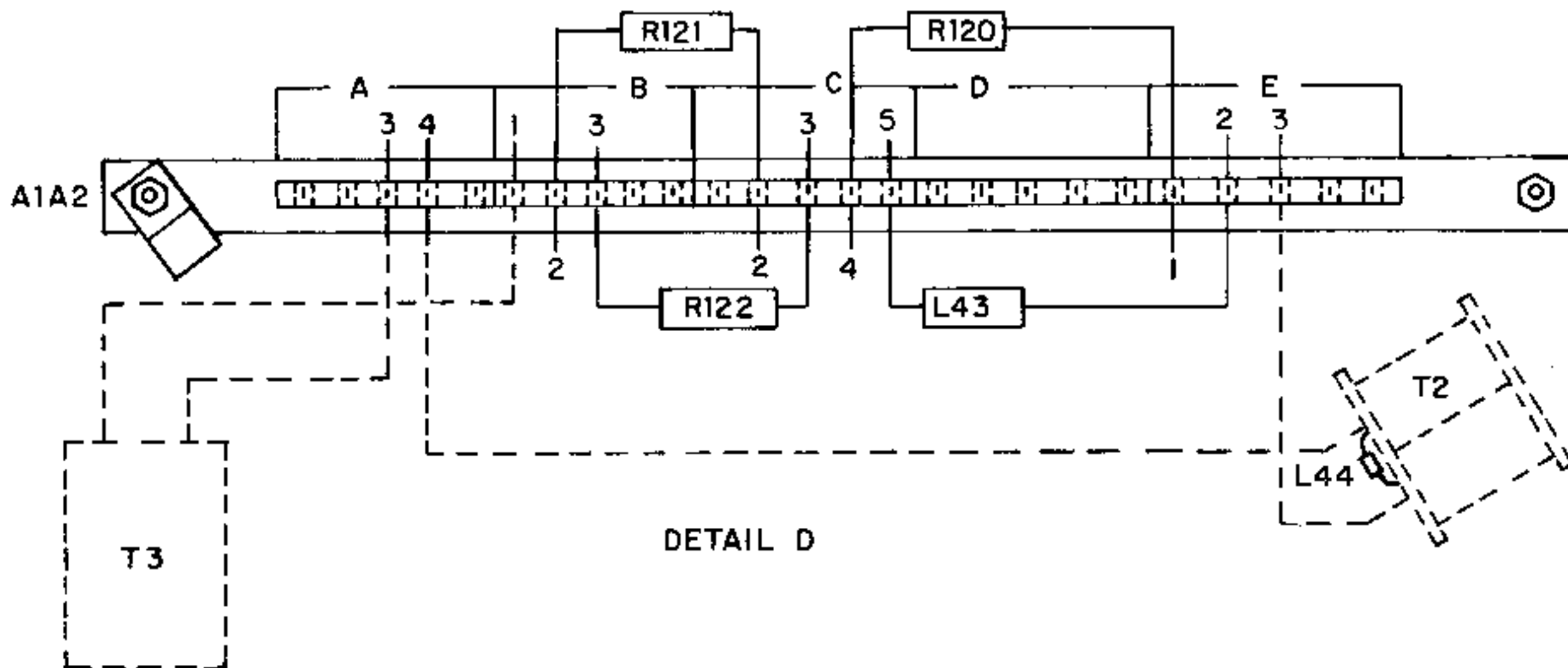








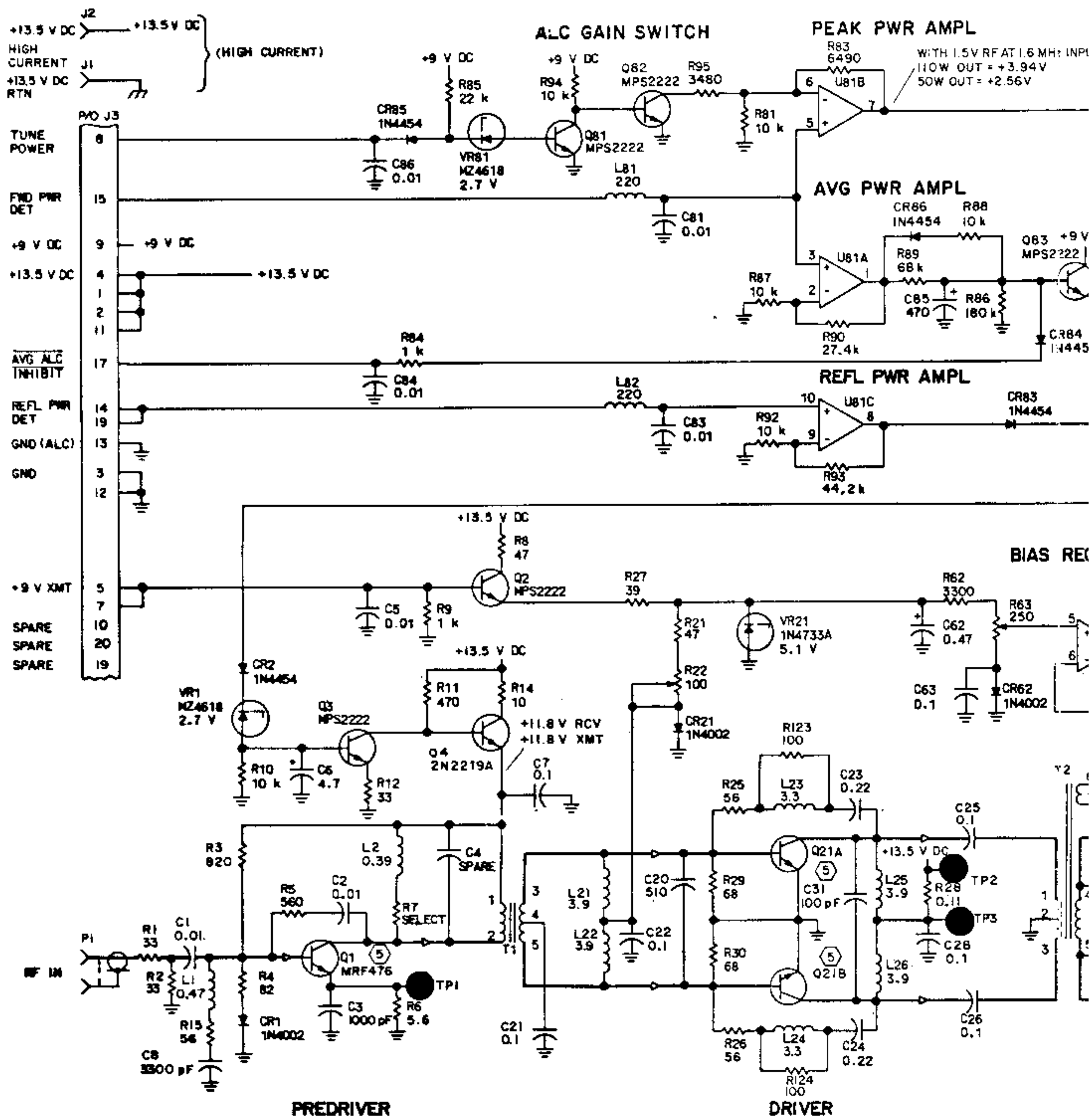
NOTE: LEADS FROM T2 AND T3 MUST BE CAREFULLY POSITIONED AS SHOWN TO PREVENT DESTRUCTIVE OSCILLATION.





# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International



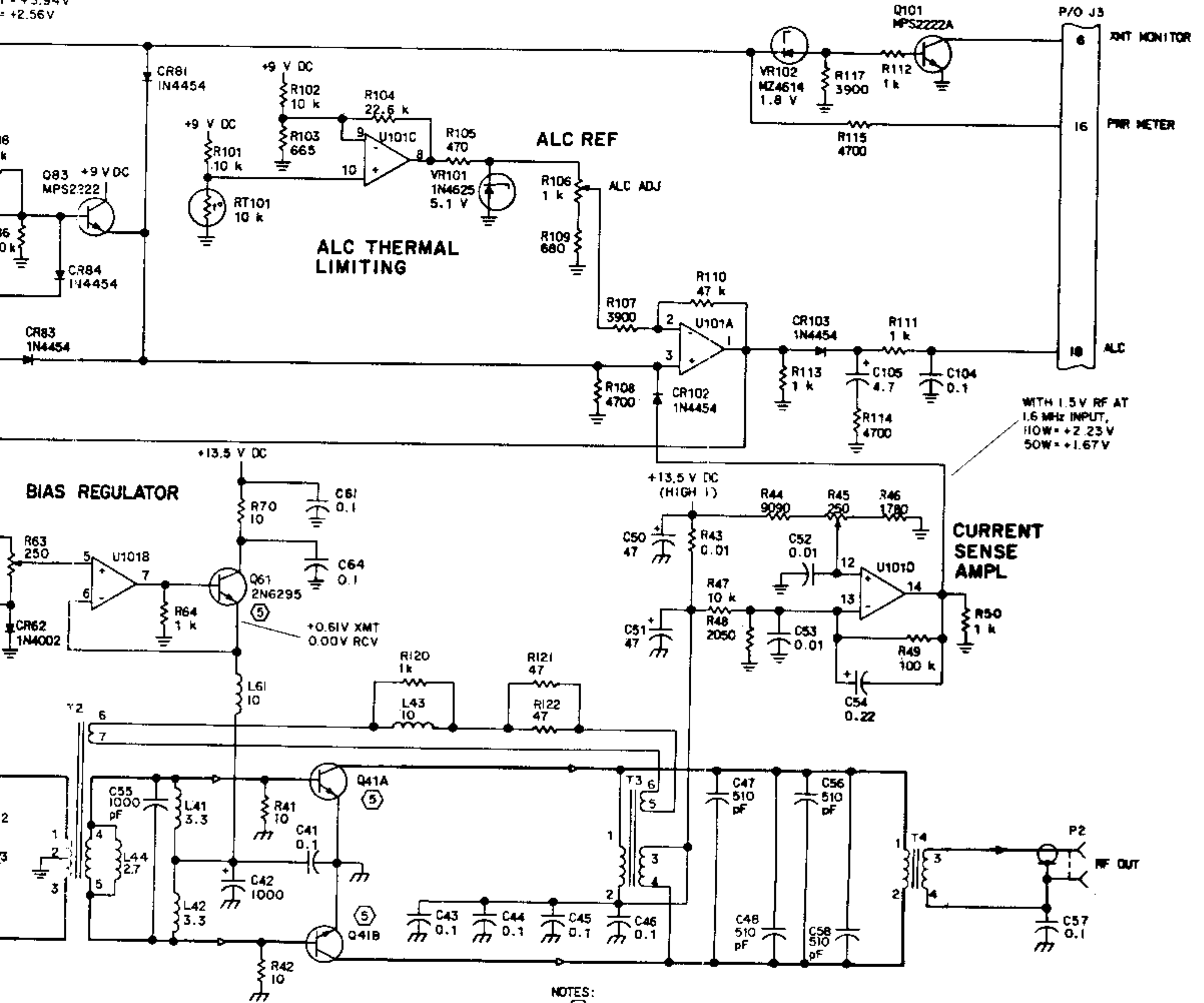
Power Amplifier A1A1,  
Schematic Diagram  
Figure 2

Jan 2/81  
1 - Oct 1/82

KWM-380/HF-380 SB 9  
Pages 11/12

# POWER AMPLIFIER A4 (638-6775-001)

RF AT 1.6 MHz INPUT,  
 T = +3.94V  
 = +2.56V



WITH 1.5 V RF AT  
 1.6 MHz INPUT,  
 I10W = +2.23 V  
 50W = +1.67 V

OUTPUT

**NOTES:**

- ① UNLESS OTHERWISE SPECIFIED; RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS AND INDUCTANCE VALUES ARE IN MICRohenrys.
- ② PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATIONS, PREFIX WITH UNIT AND/OR ASSEMBLY DESIGNATION.
- ③ ON MICROCIRCUITS U81 AND U101, PIN 4 IS +9 V DC AND PIN 11 IS GROUND. BOTH ARE LM324.
- ④ — RF PATH
- ⑤ Q21A/Q21B AND Q41A/Q41B ARE MATCHED PAIRS AND ARE MOUNTED ON POWER AMPLIFIER HEAT SINK. Q1 AND Q61 ARE MOUNTED ON POWER AMPLIFIER HEAT SINK.
- ⑥ VOLTAGES SHOWN ARE NOMINAL.

**Collins Divisions**  
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**Rockwell  
International**

August 15, 1981

REVISION 1  
TO  
KWM-380 SERVICE BULLETIN NO 10

Attached is a revised issue of KWM-380 Service Bulletin No 10 titled "Extend KWM-380 Frequency Coverage" dated 25 June 1981.

In the original service bulletin 10, the frequency coverage in table 1 for the 16-metre band is given as 18.068 to 18.168 MHz with SB 10 installed. This revision changes the 16-metre coverage to 18.060 to 18.170 MHz.

A black bar in the margin indicates the location of the change. This revised issue replaces the entire original publication.

523-0771456-00121E  
.350417

KWM-380 TRANSCEIVER (622-5093-001)  
CONTROL CARD A8 (638-6929-001)

**SERVICE BULLETIN NO 10**

**EXTEND KWM-380 FREQUENCY COVERAGE**

This service bulletin applies to KWM-380 (622-5093-001) units with serial numbers 2099 and below.

Production cut-in is serial number 2100.

The price of the modification kit, Collins part number 642-2435-001, is \$79.00 which includes installation by an authorized service agency. Customers who want this modification installed should contact their dealer and reference KWM-380 Service Bulletin No 10.

The current KWM-380 Transceiver is limited in transmit operation within the pre-WARC-79 amateur bands. Installation of this service bulletin will allow transmit operation on three new WARC bands and expand the 80 through 15 meter bands to include MARS frequencies. It will provide proper switching points for the low-pass filter assembly and maintain the protection circuits via the transmit inhibit line that prevents relay damage due to hot switching. Receiver operation is unaffected. The three new WARC bands are 10.10 to 10.15 MHz, 18.068 to 18.168 MHz, and 24.890 to 24.990 MHz. The following table lists the KWM-380 frequency band coverage without and with Service Bulletin No 10 installed.

**Table 1. KWM-380 Frequency Band Coverage**

BAND	WITHOUT SB 10	WITH SB 10
160 metres	1.8 to 2.0 MHz	No change
80 metres	3.5 to 4.0 MHz	3.25 to 4.25 MHz
40 metres	7.0 to 7.3 MHz	6.75 to 7.55 MHz
30 metres	----	10.10 to 10.15 MHz
20 metres	14.0 to 14.35 MHz	13.75 to 14.60 MHz
16 metres	----	18.060 to 18.170 MHz
15 metres	21.00 to 21.45 MHz	20.75 to 21.70 MHz
12 metres	----	24.890 to 24.990 MHz
10 metres	28.0 to 29.7 MHz	No change



# Rockwell- Collins | SERVICE BULLETIN

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This modification consists of replacing one ROM on control card A8. Installation of the new ROM will provide 11 frequency memories. These can be addressed with the optional AC-3803 Control Interface Kit and a key pad. The memory locations are two-digit entries: 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10.

Special tools required are a 25-watt soldering iron and a solder removal tool such as a solder sucker or solder wick.

This service bulletin references the KWM-380 Transceiver Service Manual, Collins part number 523-0769878.

## MODIFICATION PROCEDURE

- A. Turn off all power to the transceiver.
- B. Remove the dust cover after removing the four screws adjacent to the four feet on the bottom of the transceiver.
- C. Remove all screws, flat washers, and lockwashers from the card cage cover and remove the cover. Note the three larger diameter (and shorter screw length) screws removed from the synthesizer assembly. These screws must be used in the same location when the cover is reassembled. Longer screws may damage the synthesizer.
- D. Refer to the KWM-380 service manual overall unit section, figure 7, item 6, for location of control card A8.

**CAUTION:** THERE ARE NINE CONNECTORS ON CONTROL CARD A8. USE CAUTION WHEN REMOVING THE CARD TO PREVENT DAMAGE TO CONNECTORS AND PLUGS.

CONTROL CARD A8 CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. PROTECTIVE CARRIERS FOR ESDS DEVICES SHOULD BE PLACED ON GROUNDED CONDUCTIVE WORK STATION SURFACES. THIS PERMITS THE DISSIPATION OF ANY STATIC CHARGE PRIOR TO REMOVAL, TRANSFER, OR INSERTION OF ANY ESDS DEVICE INTO A SUBASSEMBLY.

- E. Carefully remove control card A8 from the card cage while removing the plugs from connectors J1 through J9.
- F. Place A8 on a grounded conductive work surface.
- G. In the back of the KWM-380 service manual, refer to control card A8 instructions, CPN 523-0770685, figure 5, for location of ROM A8U17.

**NOTE:** There are two configurations of control card A8. One configuration has a socket for integrated circuit U17 and the other configuration has a soldered-in integrated circuit. Step H applies to a card with a socket. Steps I through S apply to a card with a soldered-in integrated circuit.

# Rockwell- Collins | SERVICE BULLETIN

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- H. Using a small flat blade screwdriver, lift each end of A8U17 in small increments until it is loose from the socket. Proceed to step T and continue.
- I. Note the position, lead conformation, and physical alignment of A8U17. Observe the position of the orientation tab. Determine pads and thru holes used for mounting.
- J. Using small diagonal cutters, clip the leads on A8U17 connected to the circuit card. Remove A8U17.

**CAUTION:** DO NOT APPLY HEAT AT A PAD OR THRU HOLE FOR LONGER THAN 5 SECONDS. A 25-WATT GROUNDED-TIP SOLDERING IRON IS REQUIRED.

- K. Use needle-nose pliers and soldering iron to remove a lead from the card.
- L. Allow circuit card to cool before applying heat to a thru hole in the same area. Repeat the procedure for each lead.
- M. When all leads have been removed, reheat each thru hole. When the solder is melted, use a solder wick or a solder sucker to remove excess solder. Allow the circuit card to cool before reapplying heat in the same area. Repeat the procedure as required until each thru hole is clean, indicated by absence of solder from walls, top, or bottom.
- N. Using a small brush or the tip of a pipe cleaner dipped in solvent (alcohol, Freon, or equivalent), carefully clean both sides of the circuit card in the mounting area. Clean mounting thru holes and pads.
- O. Refer to the control card A8 instructions, figure 5, for tab orientation and install the ROM socket into the proper thru holes.
- P. Using solder sparingly, solder one lead on the side opposite to the socket. Ensure that socket did not shift position during soldering.
- Q. Solder all remaining leads taking care not to apply heat at a thru hole for more than 5 seconds.
- R. Carefully inspect all new solder joints for evidence of poor connections, cold or excess solder, or a short circuit. Solder should completely fill hole without excess.
- S. Using a small brush or the tip of a pipe cleaner dipped in solvent (alcohol, Freon, or equivalent), thoroughly clean all new solder joints. Ensure all flux is removed. Solder joints should appear clean, smooth, and bright.
- T. While still in its protective carrier, carefully bend the leads of the new ROM to fit freely into the socket.
- U. Carefully remove the ROM from its protective carrier holding it by the two ends with no contacts.

# Rockwell- Collins | SERVICE BULLETIN

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- V. Observing correct tab orientation, insert new ROM into the socket.
- W. Carefully insert control card A8 into the card cage while connecting plugs to J1 through J9. Be certain all plugs are connected properly.
- X. Temporarily secure card cage cover with three or four screws.
- Y. Plug radio in, turn on, and check transmitter for proper operation into a dummy load. The radio should now transmit on all frequencies listed in table 1.

NOTE: Proper authorization is necessary to operate a transmitter into other than a dummy load.

- Z. Install card cage cover using the 39 screws removed in step C.
- AA. Reinstall the dust cover and secure with the four screws removed in step B.
- AB. Mark SB 10 on the service bulletin information chart. If the transceiver does not have an information chart, install a chart near the nameplate.

## MATERIAL INFORMATION

The modification kit listed below is required to modify one KWM-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
642-2435-001	1	\$79.00	Kit, modification

KWM-380 TRANSCEIVER (622-5093-001, -101)  
HF-380 TRANSCEIVER (622-3580-001, -101)

**SERVICE BULLETIN NO 11****ADD RCV AUDIO LOW-PASS FILTER**

This service bulletin applies to the following:

<b>EQUIPMENT</b>	<b>APPLIES TO SERIAL NUMBERS</b>	<b>PRODUCTION CUT-IN SERIAL NUMBER</b>
KWM-380 622-5093-001, -101	2099 and below	2100
HF-380 622-3580-001, -101	259 and below	260

The change made by this service bulletin is a product improvement. The audio response of the receiver is improved by adding an electronic low-pass filter with a 3-kHz cutoff point to reduce high frequency hiss. The filter is an active 5-pole elliptic function low-pass filter placed just before the rcv audio gain control. The filter has no effect on the 300- to 3000-Hz passband but rolls off very rapidly above 3000 Hz.

Estimated time required is 1.0 man-hour.

The modification kit, Collins part number 651-7476-001, is itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference KWM/HF-380 Service Bulletin No 11 in all correspondence.

No special tools or equipment are required.

**MODIFICATION PROCEDURE**

- A. Turn off all power to the transceiver and remove the power cord.
- B. Remove the dust cover by removing the four screws adjacent to the four feet on the bottom of the transceiver.
- C. Place the unit on a work bench with the bottom up.

# Rockwell- Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

- D. Install filter circuit card A15 (646-5802-001) onto mounting bracket (647-2929-001) using two hex nuts (333-1299-000). Refer to figure 2.

NOTE: Refer to figures 1, 2, and 3 while performing steps E through M. Refer to figure 4 for a schematic diagram of the new filter card A15. Refer to figure 5 for schematic diagram changes to receiver-exciter card A3. Refer to figure 6 for interconnect diagram changes.

- E. Remove spacer as shown in figure 1.
- F. Install mounting bracket and circuit card A15 (step D) into transceiver using screw where spacer was removed and one additional screw (343-0167-000) in an existing hole in chassis.
- G. Inspect receiver-exciter card A3 to determine if W3 is connected from R713 to E5 as shown in figure 3. If this wire has been installed, proceed to step N. If W3 is not present, perform steps H through M.
- H. Lift the left-hand lead of 180- $\Omega$  resistor R713 and install a square pin (372-2601-045) from the top of the card into the hole vacated by the lead. Solder the square pin.
- I. Reconnect the R713 lead to the square pin.
- NOTE: It may be easier to replace R713 with a new 180- $\Omega$  resistor (745-0722-000).
- J. Remove and discard 100- $\Omega$  resistor R629.
- K. Insert a square pin (372-2601-045) from the top of the card at E5 (right end of R629) and solder.
- L. Connect one end of W3 (421-0023-000) to the square pin at E5. Insulate this wire with sleeving (152-2643-000).
- M. Connect the other end of W3 to the square pin at R713.
- N. Disconnect the leads from A3J31, A3J32, and A3J33. Connect the white lead to A15J31, brown lead to A15J32, and black lead to A15J33. This connects the front panel audio gain pot to the low-pass filter card A15.
- O. Connect A15P31 (white lead) to A3J31, A15P32 (brown lead) to A3J32, and A15P33 (black lead) to A3J33. This connects the low-pass filter card A15 to receiver-exciter card A3.
- P. Connect A15P1 (red lead) to A3E5.
- Q. Reinstall the receiver dust cover.
- R. Mark SB 11 on the service bulletin information chart. If the unit does not have an information chart (280-3778-010), order one and attach it near the nameplate.

# Rockwell- Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

## MATERIAL INFORMATION

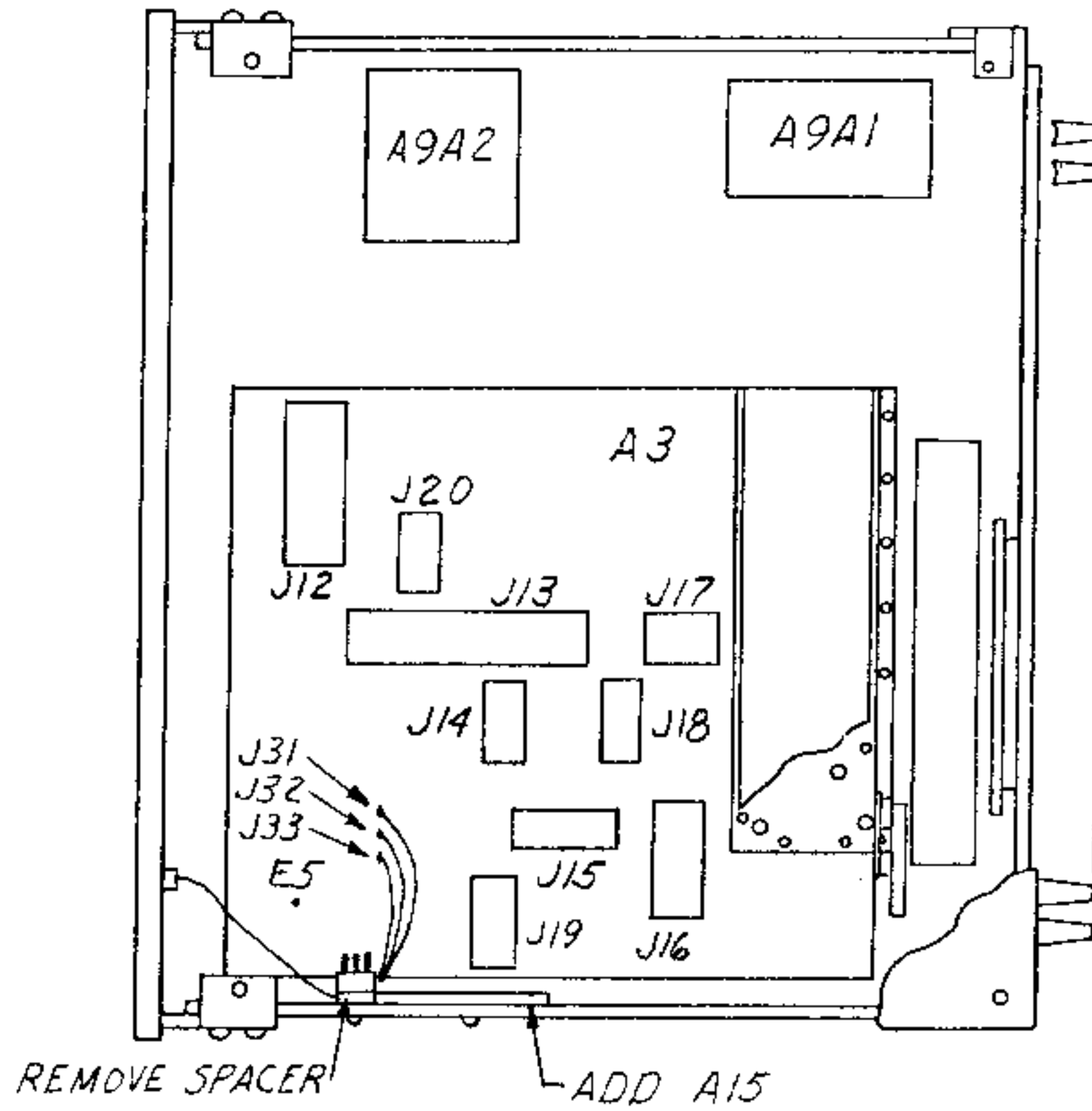
The modification kit, CPN 651-7476-001, is itemized below and is required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
343-0167-000	1		Screw, 0.138-32 x 0.250
647-2924-001	1		Bracket, mounting, audio board
333-1299-000	2		Nut, hex, 0.112-40
646-5802-001	1		Circuit card assembly, A15
745-0722-000	1		Resistor, 180Ω , R713
372-2601-045	2		Square pin
421-0023-000	150 mm (6 in)		Wire, #30 AWG, W3
152-2643-000	150 mm (6 in)		Sleeving, insulation
*280-3778-010	1		Chart, information

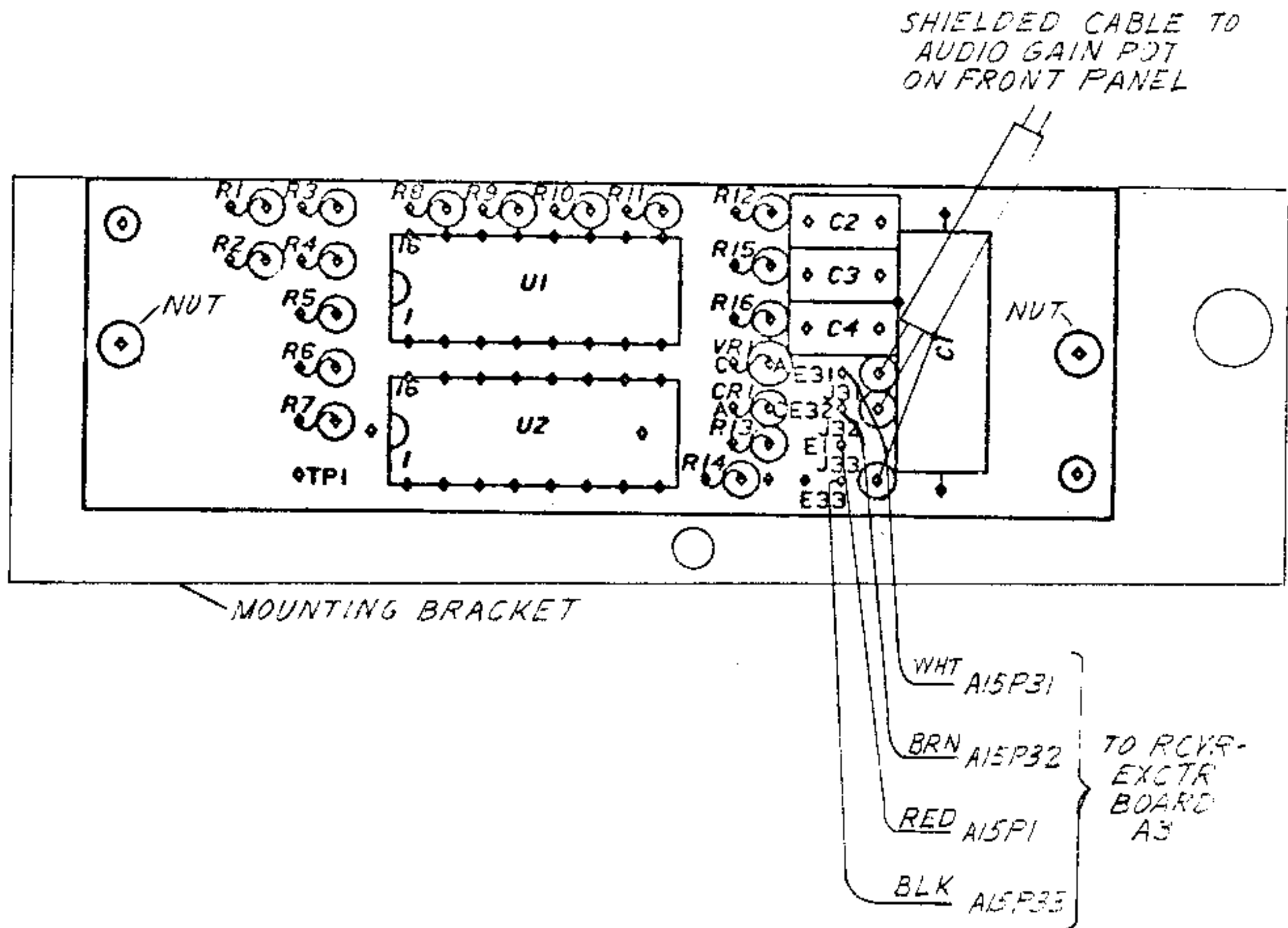
\*The information chart is not part of the modification kit. The chart should be ordered separately if needed.

# Rockwell- Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International



Transceiver, Bottom View  
Figure 1

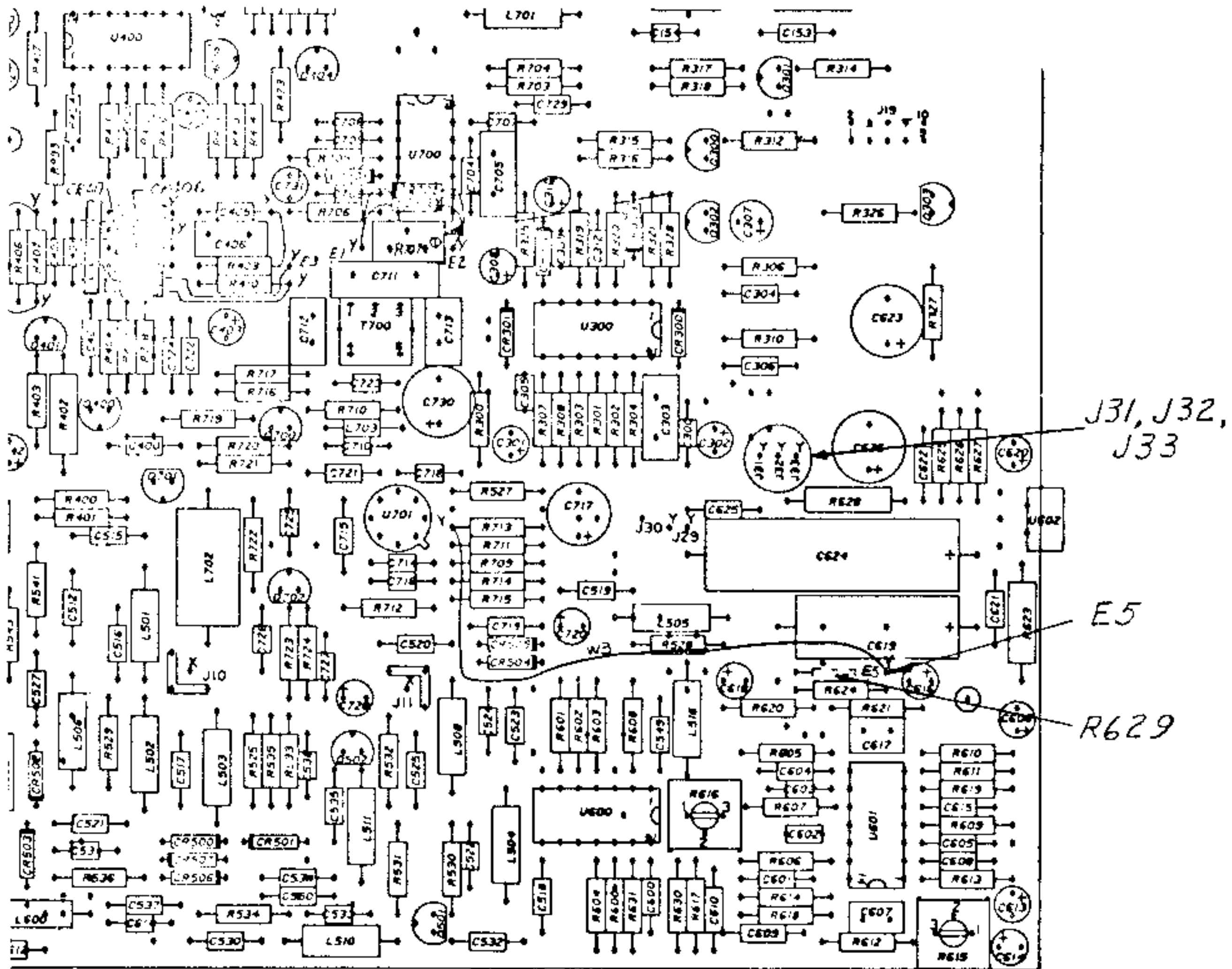


Low-Pass Filter Card A15  
Figure 2



# Rockwell-Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International



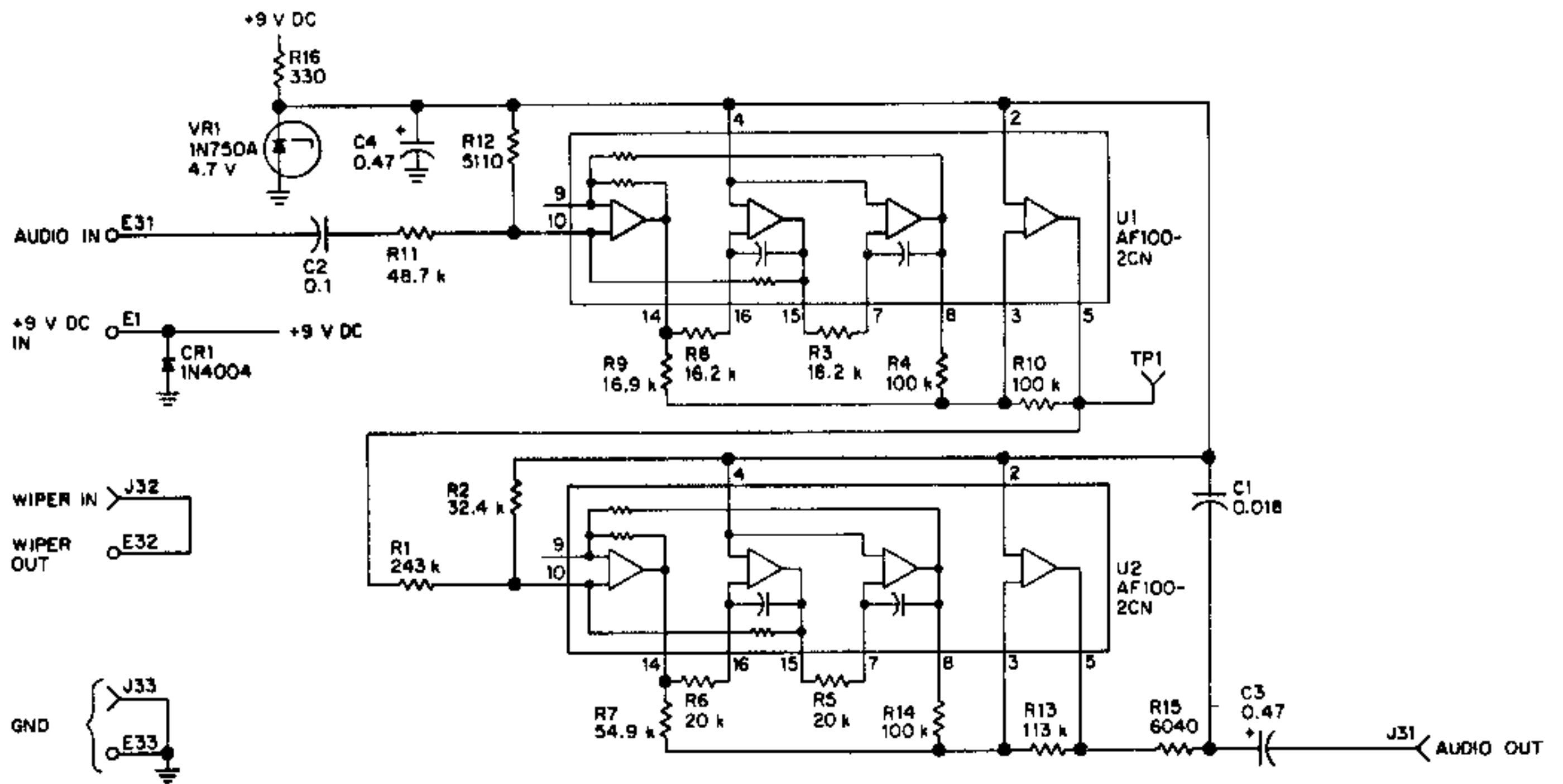
FRONT OF TRANSCEIVER

NOTE:  
"Y" INDICATES LOCATION  
OF SQUARE PIN

P/O Receiver-Exciter Card A3  
Figure 3

# Rockwell- Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International



**NOTES:**

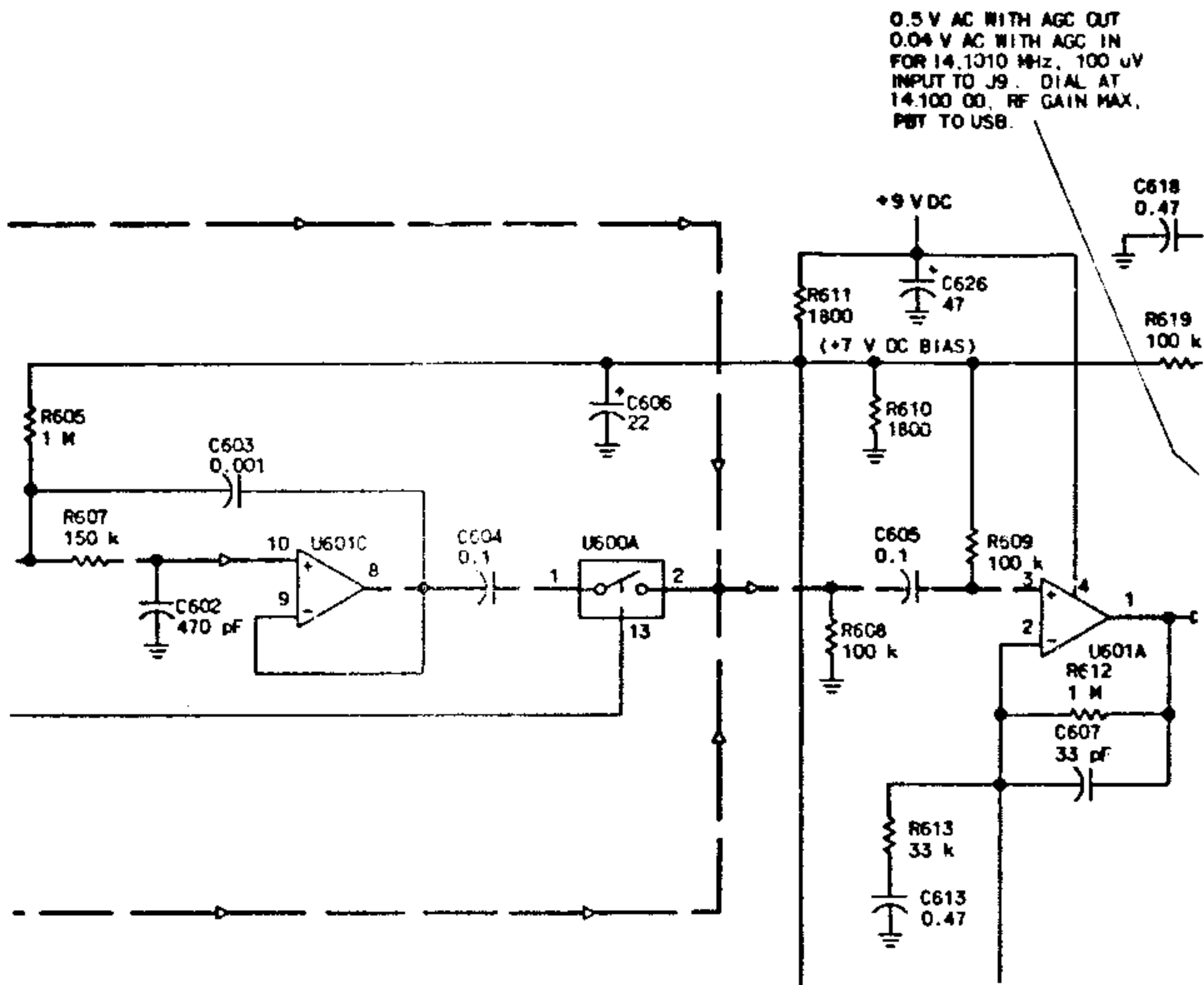
- ① UNLESS OTHERWISE SPECIFIED; RESISTANCE VALUES ARE IN OHMS AND CAPACITANCE VALUES ARE IN MICROFARADS.
- ② ON U1 AND U2, PIN 6 IS +9 V DC AND PIN 1 IS GROUND.

651-4969

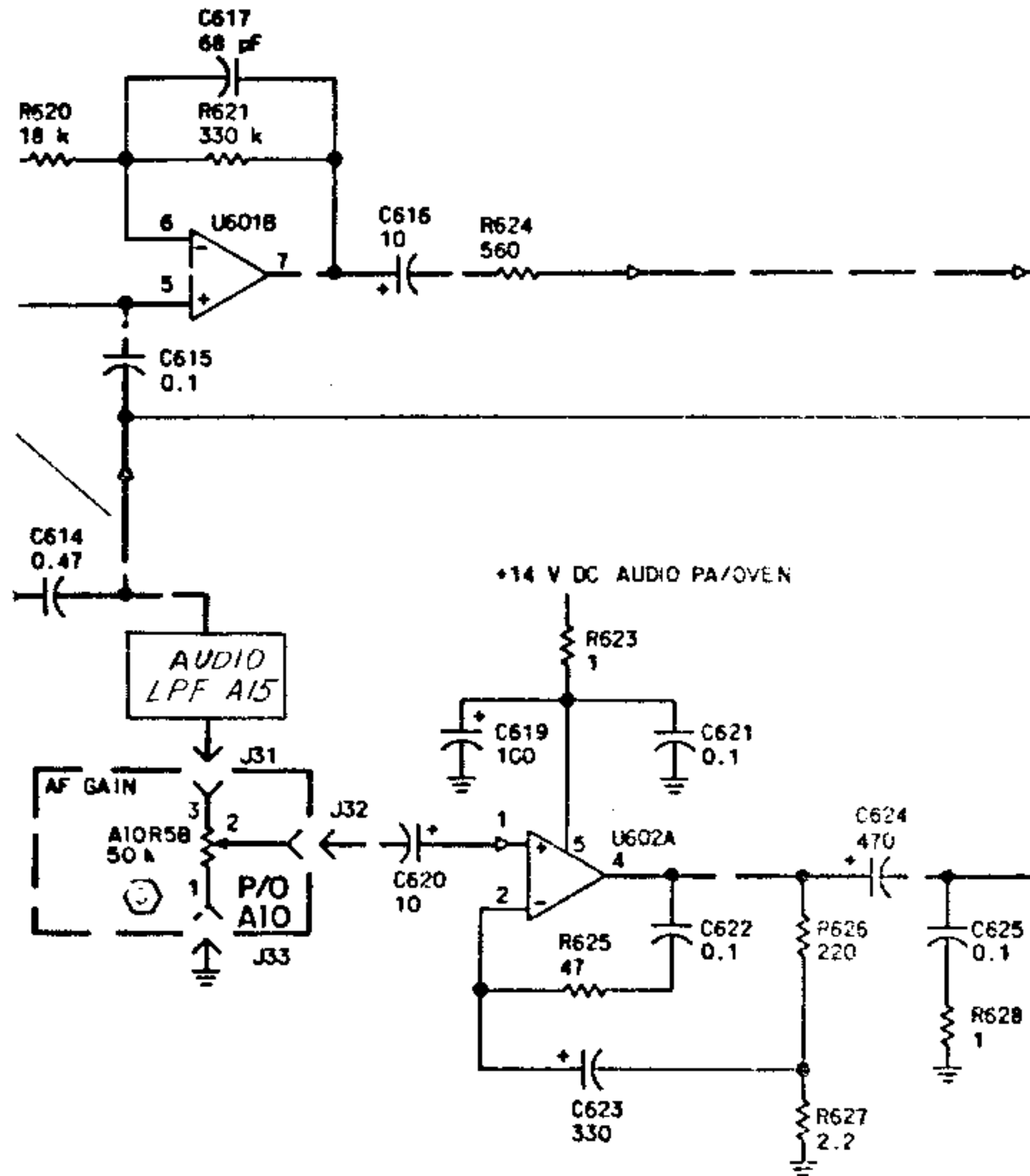
Audio Low-Pass Filter Assembly A15, Schematic Diagram  
Figure 4

# Rockwell-Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International



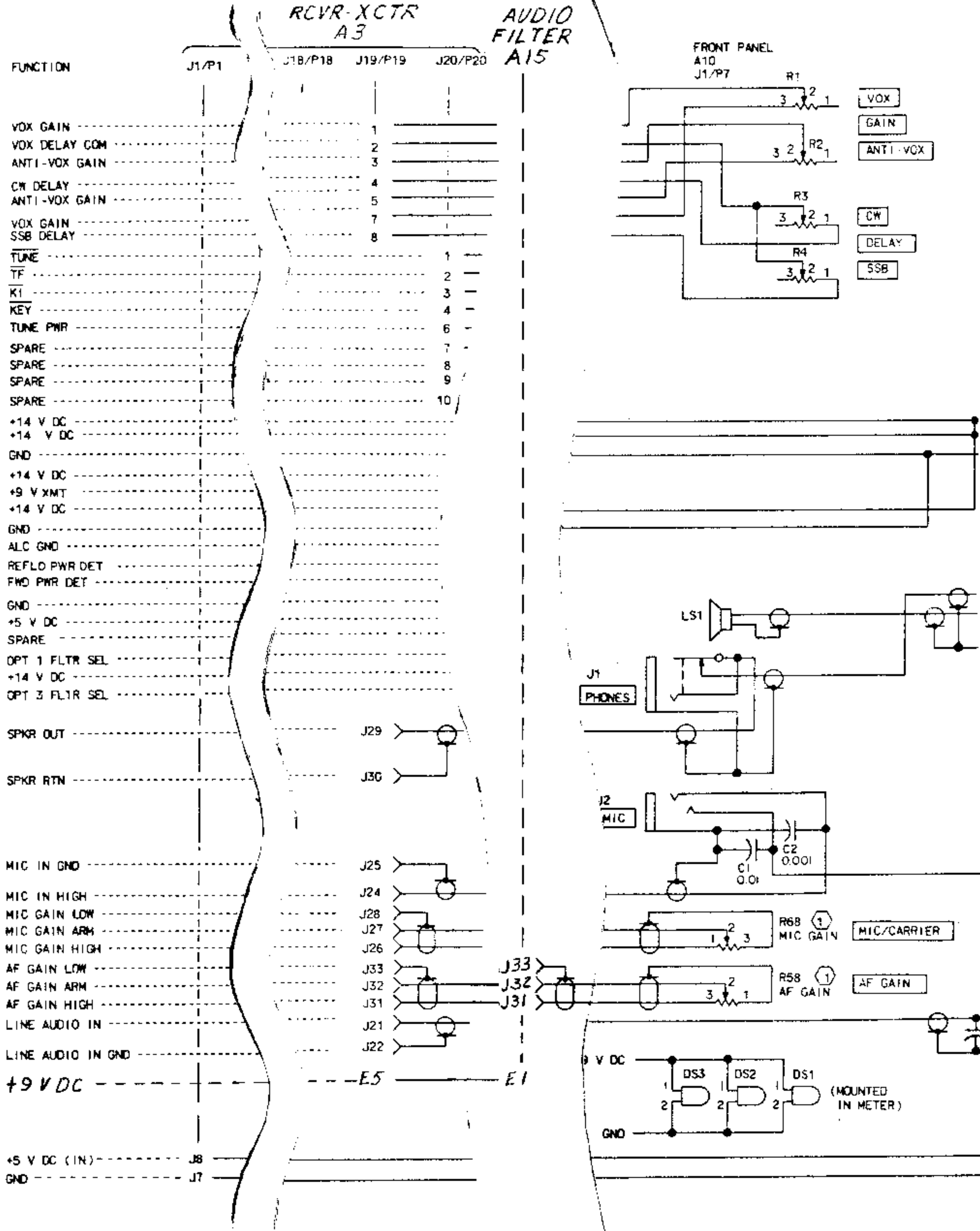
P/O Receiver-Exciter Card A3, Schematic Diagram  
 Figure 5 (Sheet 1 of 2)



P/O Receiver-Exciter Card A3, Schematic Diagram  
Figure 5 (Sheet 2)

# Rockwell-Collins | SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International



P/O Interconnect Diagram  
Figure 6



# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

● 350481

HF-380 TRANSCEIVER (622-3580-001)  
KWM-380 TRANSCEIVER (622-5093-001)  
RECEIVER-EXCITER A3 (638-6908-001, -002)

## SERVICE BULLETIN NO 12

### CW WAVESHAPE IMPROVEMENT

HF/KWM-380 Service Bulletin No 18 should be installed in conjunction with this bulletin. This service bulletin applies to the following:

EQUIPMENT	APPLICABLE TO SERIAL NUMBER	PRODUCTION CUT-IN SERIAL NUMBER
HF-380 622-3580-001	206 and below	207
KWM-380 622-5093-001	2099 and below	2100
Production cut-in for Receiver-Exciter A3 (638-6908-001, -002) is REV R.		

The rise and decay time of the cw envelope is less than 1 ms which may cause key clicks to be evident. This modification increases the rise and decay times to a nominal 4 ms. This still produces a hard, but click-free, waveform. This timing may be altered if desired by changing the value of R549. Increase the value to soften the keying, decrease the value to harden the keying.

The modification consists of adding one capacitor and one diode, deleting one zener diode, two resistors, and two capacitors, and changing the value of one capacitor.

Estimated time required to perform the modification is 1.5 man-hours.

The modification parts are itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference HF/KWM-380 Service Bulletin No 12 in all correspondence.

No special tools or equipment are required.

This service bulletin references the HF-380 (523-0769880) and KWM-380 (523-0769878) Transceiver Service Manuals.

**MODIFICATION PROCEDURE**

- A. Disconnect primary power from the transceiver.
- B. Set the transceiver on its side with the power transformer on top. Remove the dust cover by removing four screws adjacent to the four feet on the bottom of the transceiver.

**NOTE:** All changes are made to receiver-exciter assembly A3, located on the bottom of the unit. Taking care to not damage adjacent components, these modifications can be made without removing A3 from the chassis. Refer to Receiver-Exciter A3 instructions in the circuit cards section located in the back of the HF-380 and KWM-380 service manuals for location of components to be removed. Refer to figure 1 of this bulletin for location of added components. Refer to figure 2 for a schematic diagram which includes the changes made by this modification.

Use a 25- to 30-watt soldering iron with a tip designed for use with printed circuits. The tip should be clean to ensure proper melting of the solder prior to component removal or when securing new components to the card. Take care to avoid application of excessive heat.

- C. Unplug ribbon cables as necessary to gain access to the areas to be modified.
- D. Unplug cable connected to J26, J27, and J28.
- E. Cut circuit trace that leads from U910-10.
- F. Insert and solder a square pin (372-2601-045) in the hole that was connected to U910-10.
- G. Insert and solder a square pin (372-2601-045) in the hole just below U911-7.
- H. Wrap the anode lead of diode CR914 (353-3644-010) around U910-10 and the cathode lead around the square pin installed in step F.
- I. Install a 0.47- $\mu$ F capacitor C987 (184-9102-330) between the square pins added in steps F and G.
- J. Remove and discard VR500, C544, C545, and R548.
- K. Remove R542 and install a square pin (372-2601-045) in the R542 hole nearest Q503.
- L. Install a 0.15- $\mu$ F capacitor C554 (913-5019-460) from the square pin installed in step K to the other hole where R542 was connected.

## Collins Telecommunications Products Division/Rockwell International

- M. Install 33-k $\Omega$  resistor R549 (745-0803-000) as shown in figure 1.
- N. Mark RWK REV R on the A3 circuit card near the existing REV letter.
- O. Plug the cables in that were removed in steps C and D.
- P. Reinstall the dust cover.
- Q. Mark SB 12 on the service bulletin information chart. If the transceiver does not have an information chart (280-3778-010), order one and attach it near the name-plate.

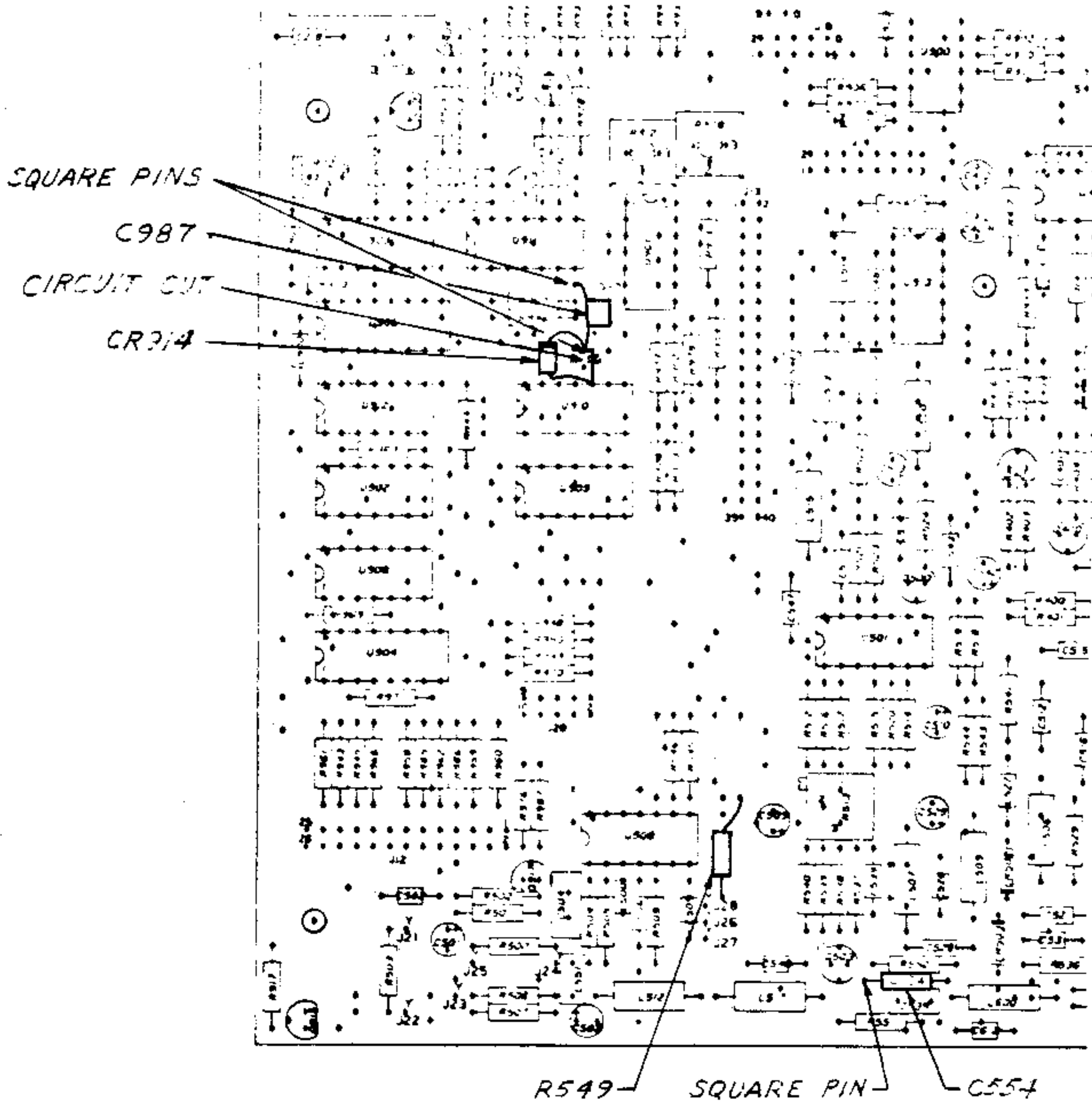
### MATERIAL INFORMATION

The parts listed below are required to modify one HF-380 or KWM-380.

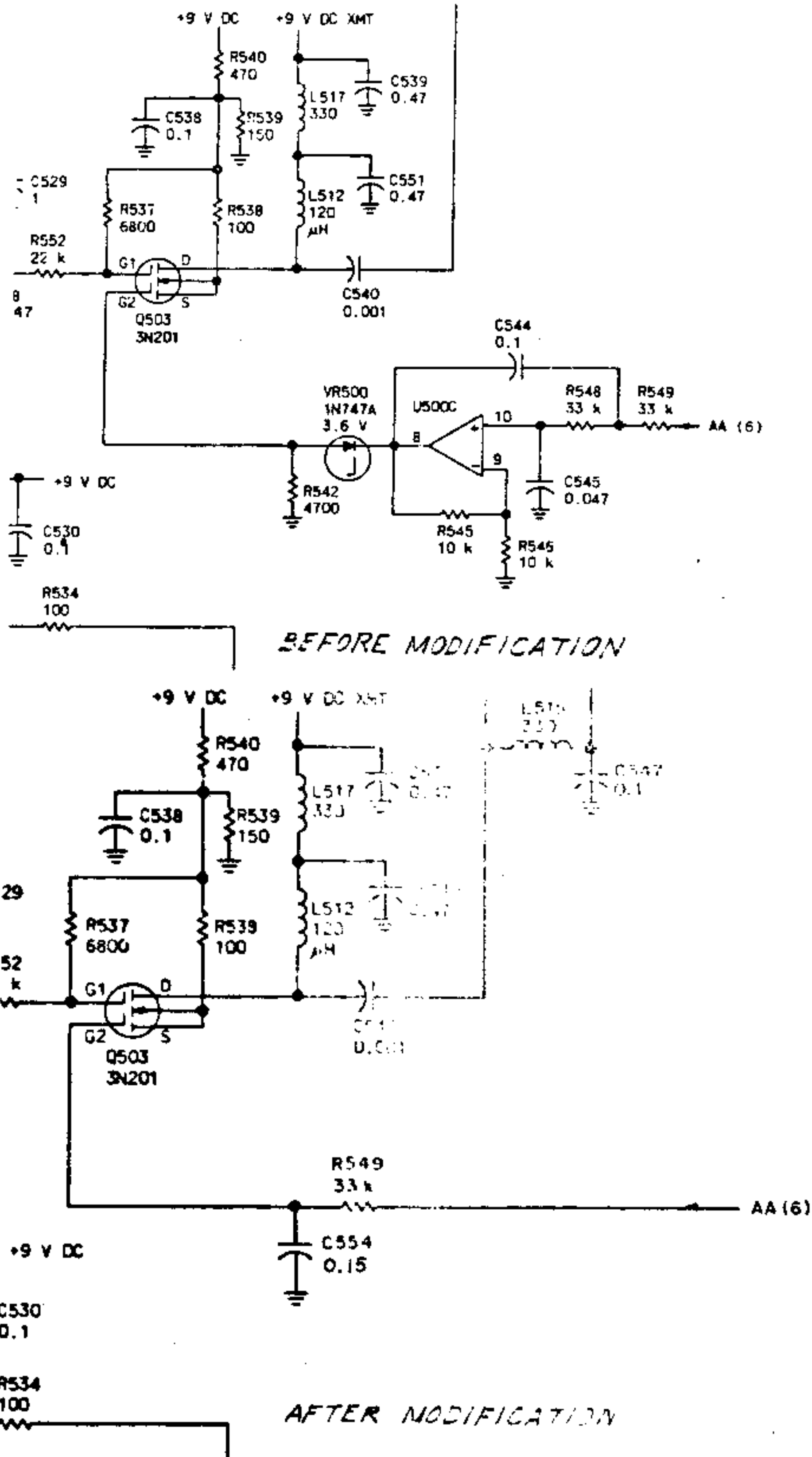
<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
372-2601-045	3		Pin, square
353-3644-010	1		Diode, 1N4454, CR914
184-9102-330	1		Capacitor, 0.47 $\mu$ F, C987
913-5019-460	1		Capacitor, 0.15 $\mu$ F, C554
745-0803-000	1		Resistor, 33 k $\Omega$ , R549
*280-3778-010	1		Chart, information

\*Order if needed.

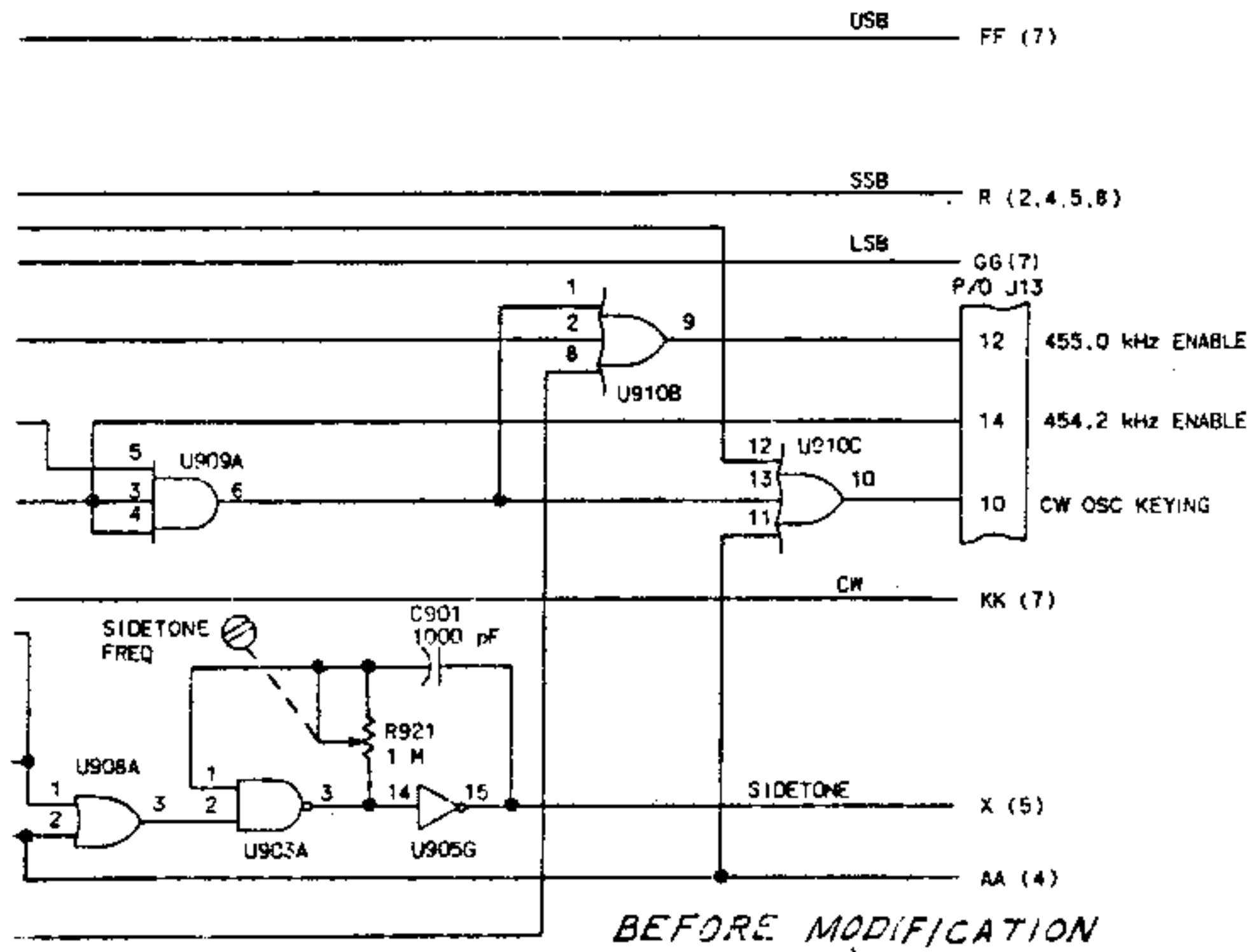




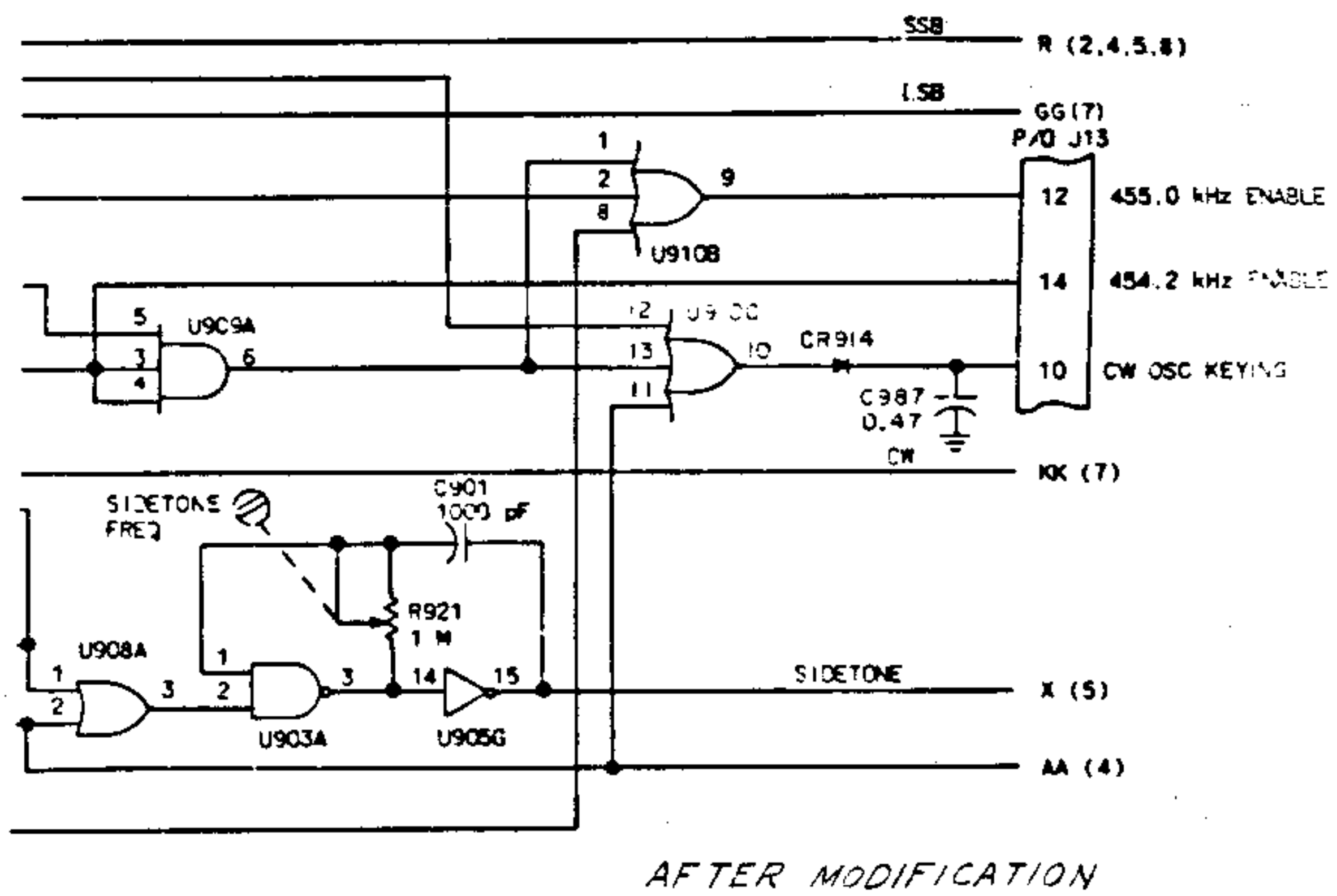
P/O Receiver-Exciter Card A3  
Figure 1



P/O Receiver-Exciter A3, Schematic Diagram  
Figure 2 (Sheet 1 of 2)



USB FF (7)



P/O Receiver-Exciter A3, Schematic Diagram  
Figure 2 (Sheet 2)



# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

● 350482

HF-380 TRANSCEIVER (622-3580-001)  
KWM-380 TRANSCEIVER (622-5093-001)  
RECEIVER-EXCITER ASSEMBLY A3 (638-6908-001, -002)

## SERVICE BULLETIN NO 13

### AGC TIME CONSTANT CHANGES

This service bulletin applies to the following:

EQUIPMENT	APPLICABLE TO SERIAL NUMBER	PRODUCTION CUT-IN SERIAL NUMBER
HF-380 622-3580-001	206 and below	207
KWM-380 622-5093-001	2099 and below	2100
Production cut-in for receiver-exciter assembly A3 (638-6908-001, -002) is REV P.		

This modification improves the performance of the automatic gain control (AGC) by changing AGC time constants. The attack time is lengthened to a nominal 12 ms, the fast release time is reduced to a nominal 400 ms, and the slow release hang time is made longer but the discharge time after hang is shortened. The increased attack time improves the noise immunity of the AGC, making it less susceptible to hanging up on short noise pulses, and eliminating any AGC instability when a strong signal is on the skirt of the if crystal frequency.

This change is accomplished by changing the values of three resistors and one capacitor on receiver-exciter assembly A3.

Estimated time required is 0.5 man-hour.

The modification parts are itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference HF-380/KWM-380 Service Bulletin No 13 in all correspondence.

No special tools or equipment are required.

## MODIFICATION PROCEDURE

- A. Disconnect the transceiver from primary power.
- B. Set the transceiver on its side with the power transformer on top. Remove the dust cover by removing four screws adjacent to the four feet on the bottom of the transceiver.

**CAUTION:** THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. SPECIAL HANDLING METHODS AND MATERIALS MUST BE USED TO PREVENT EQUIPMENT DAMAGE. THE MAINTENANCE OPERATOR AND ALL TOOLS SHOULD BE GROUNDED.

- C. Place the transceiver on a workbench with the bottom side up.

**NOTE:** Refer to figure 1 for location of components.

Use a 25- to 30-watt soldering iron with a tip designed for use with printed circuits. The tip should be clean to ensure proper melting of the solder prior to component removal or when securing new components to the card. Take care to avoid application of excessive heat.

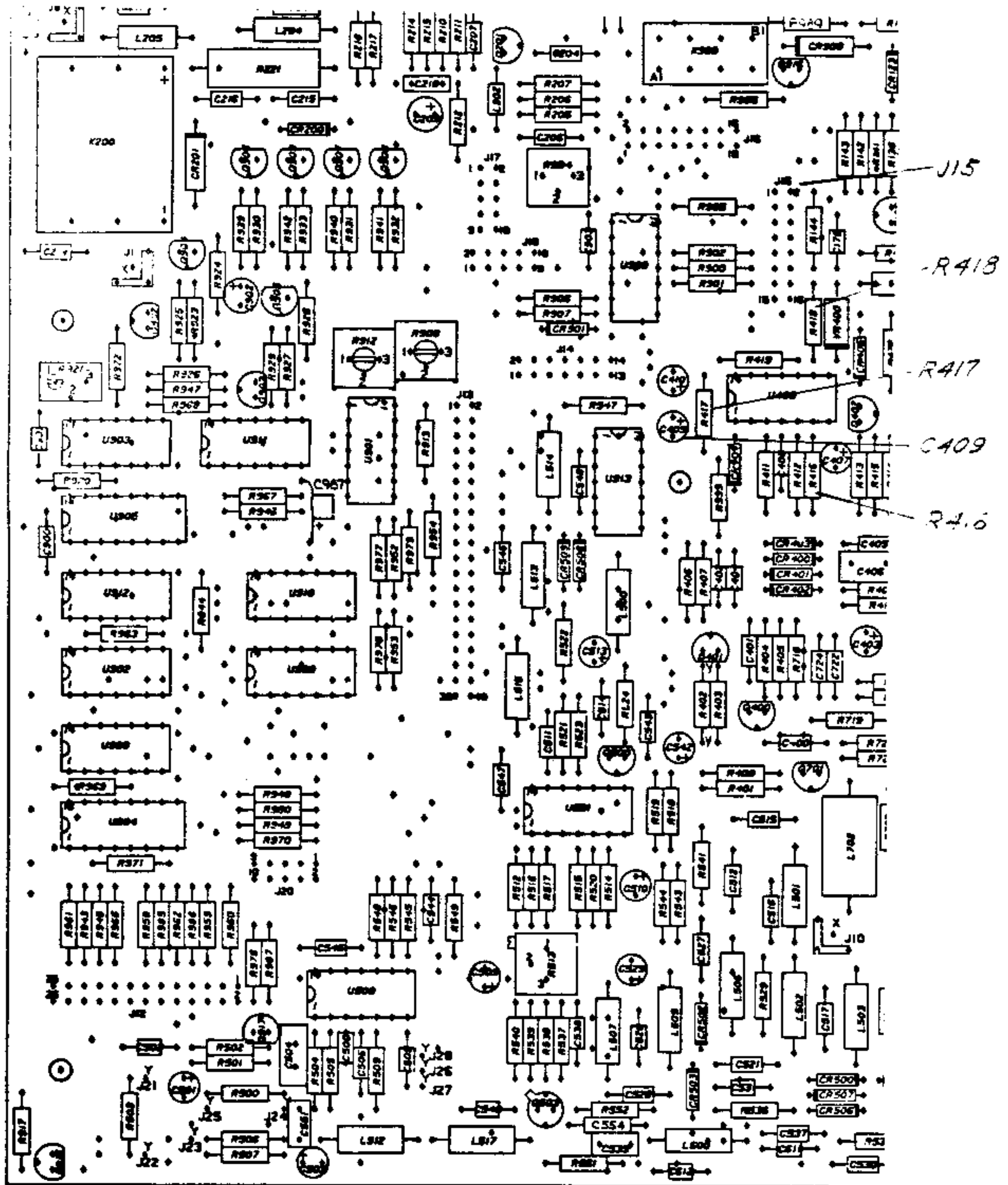
- D. Disconnect the cable connected to J15.
- E. Remove 3.3- $\mu$ F capacitor C409 and replace it with a new 1.0  $\mu$ -F capacitor (184-9102-350).
- F. Remove 2.2-M $\Omega$  resistor R416 and replace it with a new 3.3-M $\Omega$  resistor (745-0875-000).
- G. Remove 910- $\Omega$  resistor R417 and replace it with a new 2.7-k $\Omega$  resistor (745-0764-000).
- H. Remove 27-k $\Omega$  resistor R418 and replace it with a new 2.7-k $\Omega$  resistor (745-0764-000).
- I. Reconnect the cable that was removed from J15 in step D.
- J. Reinstall the dust cover.
- K. Mark SB 13 on the service bulletin information chart. If the transceiver does not have an information chart (280-3778-010), order one and attach it near the nameplate.

## MATERIAL INFORMATION

The parts listed below are required to modify one HF-380 or one KWM-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
184-9102-350	1		Capacitor, 1.0 $\mu$ F, C409
745-0875-000	1		Resistor, 3.3 M $\Omega$ , R416
745-0764-000	2		Resistor, 2.7 k $\Omega$ , R417, R418
*280-3778-010	1		Chart, information

\*Order if needed



P/O Receiver-Exciter Assembly A3  
Figure 1

KWM-380 TRANSCEIVER (622-5093-001)  
 HF-380 TRANSCEIVER (622-3580-001)  
 RECEIVER-EXCITER ASSEMBLY A3 (638-6908-002)

SERVICE BULLETIN NO 14

TRANSMIT AUDIO FREQUENCY RESPONSE AND MIC CARRIER CONTROL NOISE

This service bulletin applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBERS
KWM-380 622-5093-001	2099 and below	2100
HF-380 622-3580-001	206 and below	207
Production cut-in for receiver-exciter assembly A3 (638-6908-001, -002) is REV P.		

Some radios may exhibit restricted transmit audio response. This modification extends the frequency range of the mic preamplifiers to ensure proper audio frequency response in transmit. After this service bulletin is installed, there should be no more than 5 dB variation in rf output over the audio frequency range of 300 to 2400 Hz.

When the mic carrier control is rotated, it may produce noise in the transmit audio output. This modification adds a dc blocking capacitor in series with the top of the mic carrier control potentiometer to prevent noise generation.

Estimated time required is 1.0 man-hour.

The modification parts are itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference KWM-380/HF-380 Service Bulletin No 14 in all correspondence.

The following test equipment is required to align the passband tuning oscillator after completion of the modification.



ITEM	SUGGESTED TYPE	MINIMUM SPECIFICATIONS
Audio oscillator	Hewlett-Packard 204C	300 - 3000 Hz, 0 - 50 mV
Dummy load	Bird 813T	150 watts continuous, 50 ohms
Rf wattmeter	Bird 43 with 250H element	0 to 150 watts

## MODIFICATION PROCEDURE

- A. Disconnect the transceiver from primary power.
- B. Set the transceiver on its side with the power transformer on top. Remove the dust cover by removing four screws adjacent to the four feet on the bottom of the transceiver.

**CAUTION:** THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. SPECIAL HANDLING METHODS AND MATERIALS MUST BE USED TO PREVENT EQUIPMENT DAMAGE. THE MAINTENANCE OPERATOR AND ALL TOOLS SHOULD BE GROUNDED.

- C. Place the transceiver on a workbench with the bottom side up.

NOTE: Refer to figure 1 for location of C500 and C509.

Use a 25- to 30-watt soldering iron with a tip designed for use with printed circuits. The tip should be clean to ensure proper melting of the solder prior to component removal or when securing new components to the card. Take care to avoid application of excessive heat.

- D. Remove 470-pF capacitor C500 and replace it with a 2200-pF capacitor (913-5019-120).
- E. Remove 1- $\mu$ F capacitor C509 and replace it with a 4.7- $\mu$ F capacitor (184-9102-390).

NOTE: Refer to figure 2 while performing steps F through H. Capacitor C553 is part of receiver-exciter assembly A3 but is mounted on front panel assembly A10. If C553 were mounted on the A3 card, a circuit trace cut on the bottom of the card would be required making it necessary to remove the card from the radio. Refer to figure 3 for a schematic diagram which shows the location of C553.

- F. Install an insulated terminal (306-1018-000) on the S4 mounting screw nearest potentiometer R6. If not enough threads are available, remove the nut.
- G. At R6B-1, remove the white wire and reconnect it to the new terminal installed in step F.

- H. Install 0.1- $\mu$ F capacitor C553 (913-3331-030) from the new terminal to R6B-1.
- I. Solder and check all new connections.
- J. Perform the following passband tuning oscillator alignment:
  - (1) Set front panel SELECTIVITY BW switch to 2.2 and MODE to LSB.
  - (2) Connect the transceiver to primary power.
  - (3) Connect a wattmeter (with a 250-watt element) and a 50-ohm load to the antenna jack.
  - (4) Connect an audio oscillator to the line AUD IN jack on the chassis rear.
  - (5) Turn transceiver POWER switch on and set tuning knob to a convenient frequency for receiver operation check. Vary PBT control and check for proper operation.
  - (6) Set frequency to 7.0000 MHz.
  - (7) Set audio oscillator frequency to 1000 Hz and output to 50 mV.
  - (8) Push MOX switch in and carefully adjust MIC/CARRIER control for 80-watts rf output. Without changing MIC/CARRIER or audio oscillator level adjustments, change oscillator frequency to 300 Hz.
  - (9) Adjust potentiometer R34 (LSB adjust) on the A4 card to obtain 25-watts output. (5 dB below the 1000-Hz, 80-watt reference).
  - (10) Slowly increase the audio oscillator frequency from 300 to 2400 Hz. Not more than 5 dB variation in rf output should be noted.
  - (11) Unkey the exciter (set MOX switch to the out position) and set MODE switch to USB.
  - (12) Repeat steps (7) and (8).
  - (13) Adjust potentiometer R28 (USB adjust) on the A4 card to obtain 25-watts output.
  - (14) Slowly increase the audio oscillator frequency from 300 to 2400 Hz. Not more than 5 dB variation in rf output should be noted.
  - (15) Unkey exciter (set MOX switch to out position) and disconnect all test equipment.



# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

(16) Disconnect the transceiver from primary power.

K. Reinstall the transceiver dust cover.

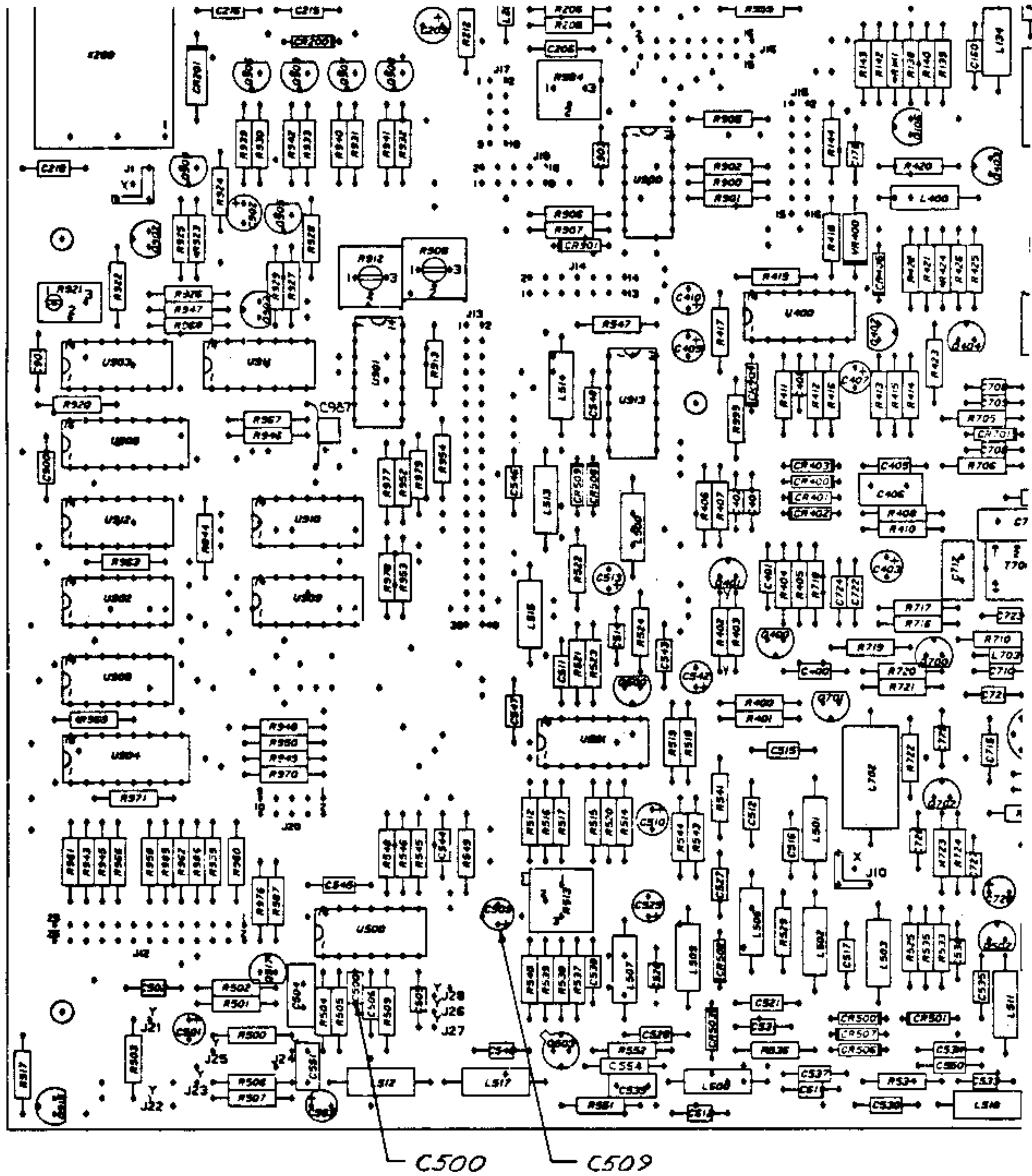
L. Mark SB 14 on the service bulletin information chart. If the transceiver does not have a chart (280-3778-010), order one and attach it near the nameplate.

## MATERIAL INFORMATION

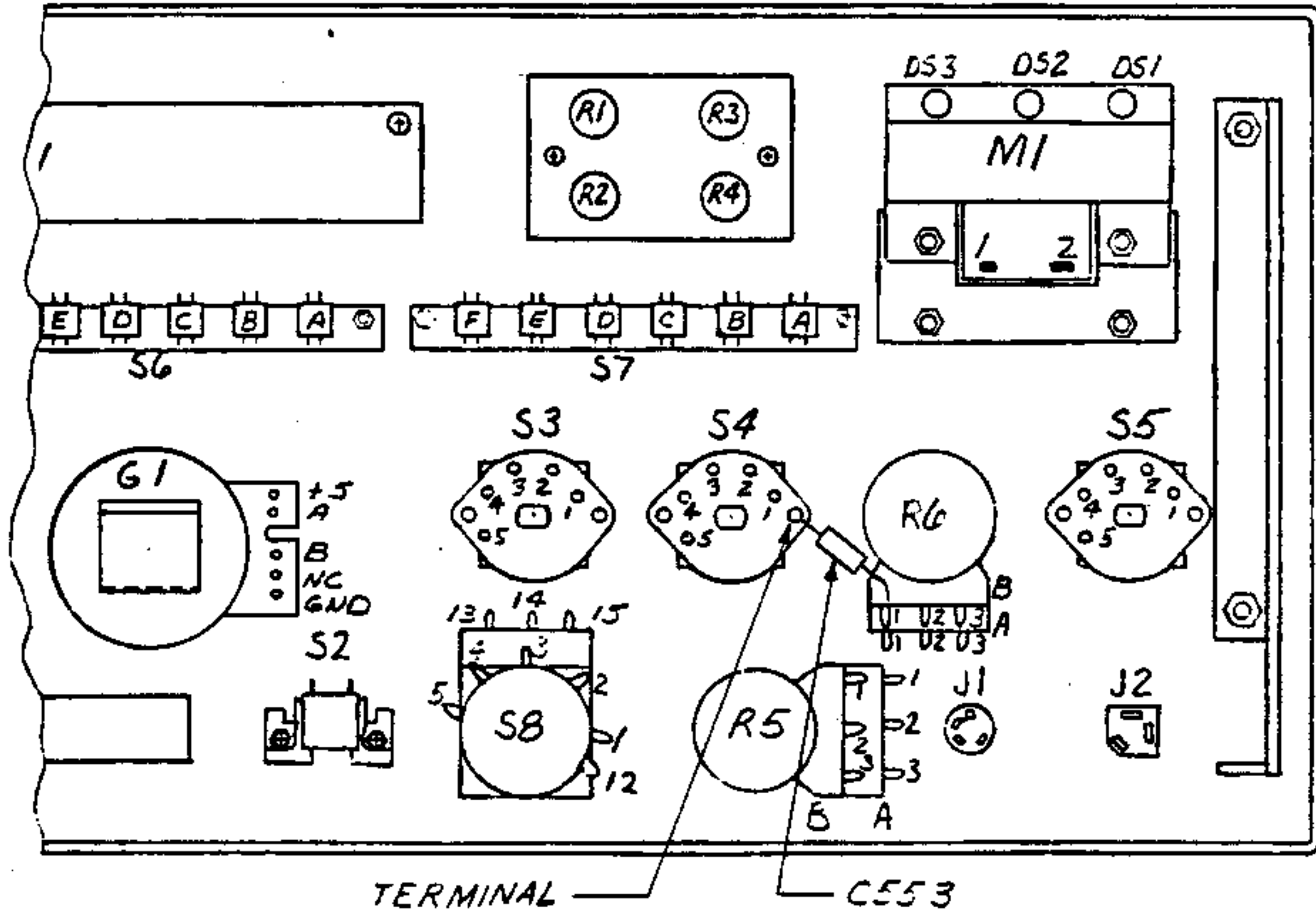
The parts listed below are required to modify one KWM-380 or one HF-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
913-5019-120	1		Capacitor, 2200 pF, C500
184-9102-390	1		Capacitor, 4.7 $\mu$ F, C509
306-1018-000	1		Terminal, insulated
913-3331-030	1		Capacitor, 0.1 $\mu$ F, C553
*280-3778-010	1		Chart, information

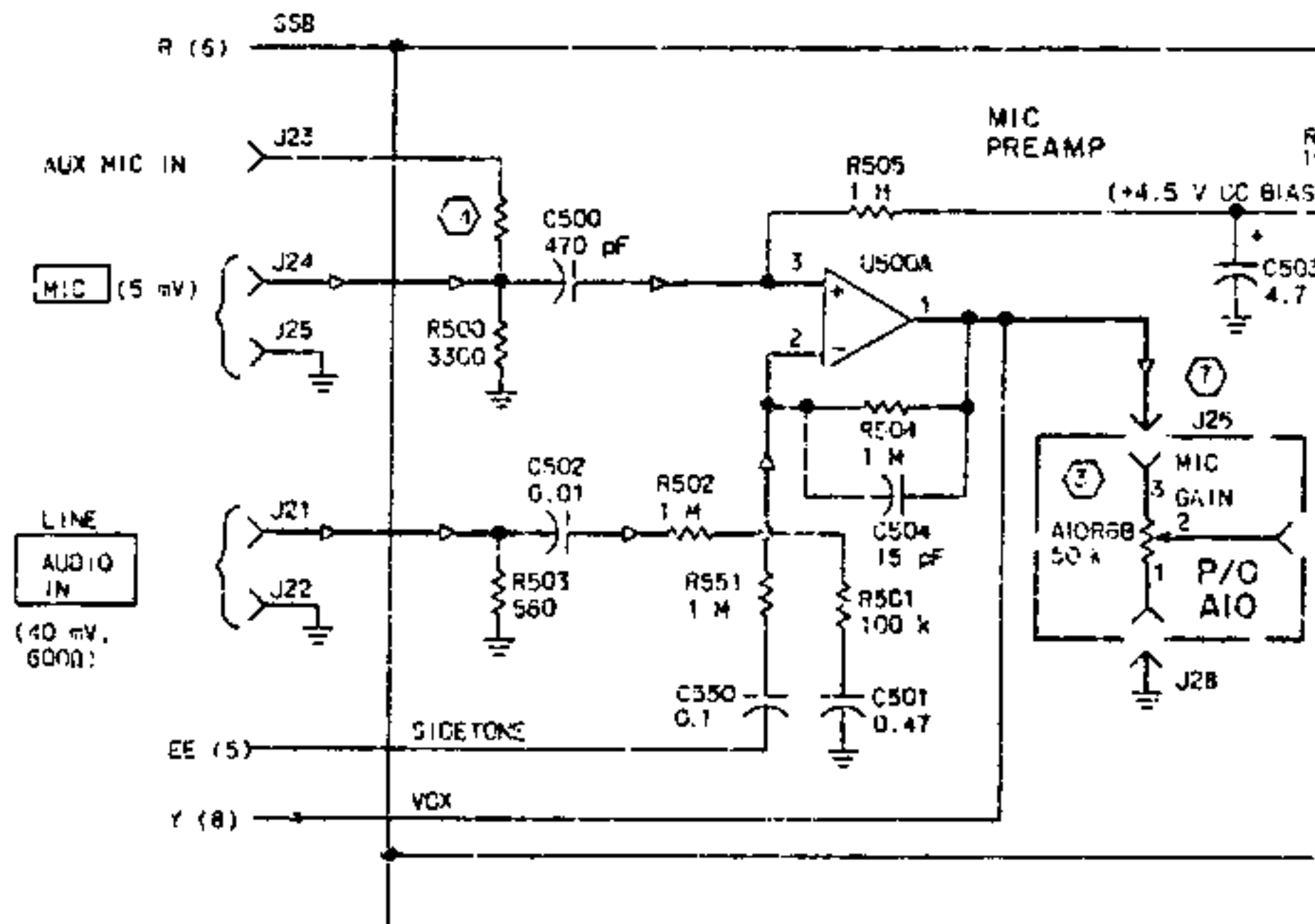
\*Order if needed.



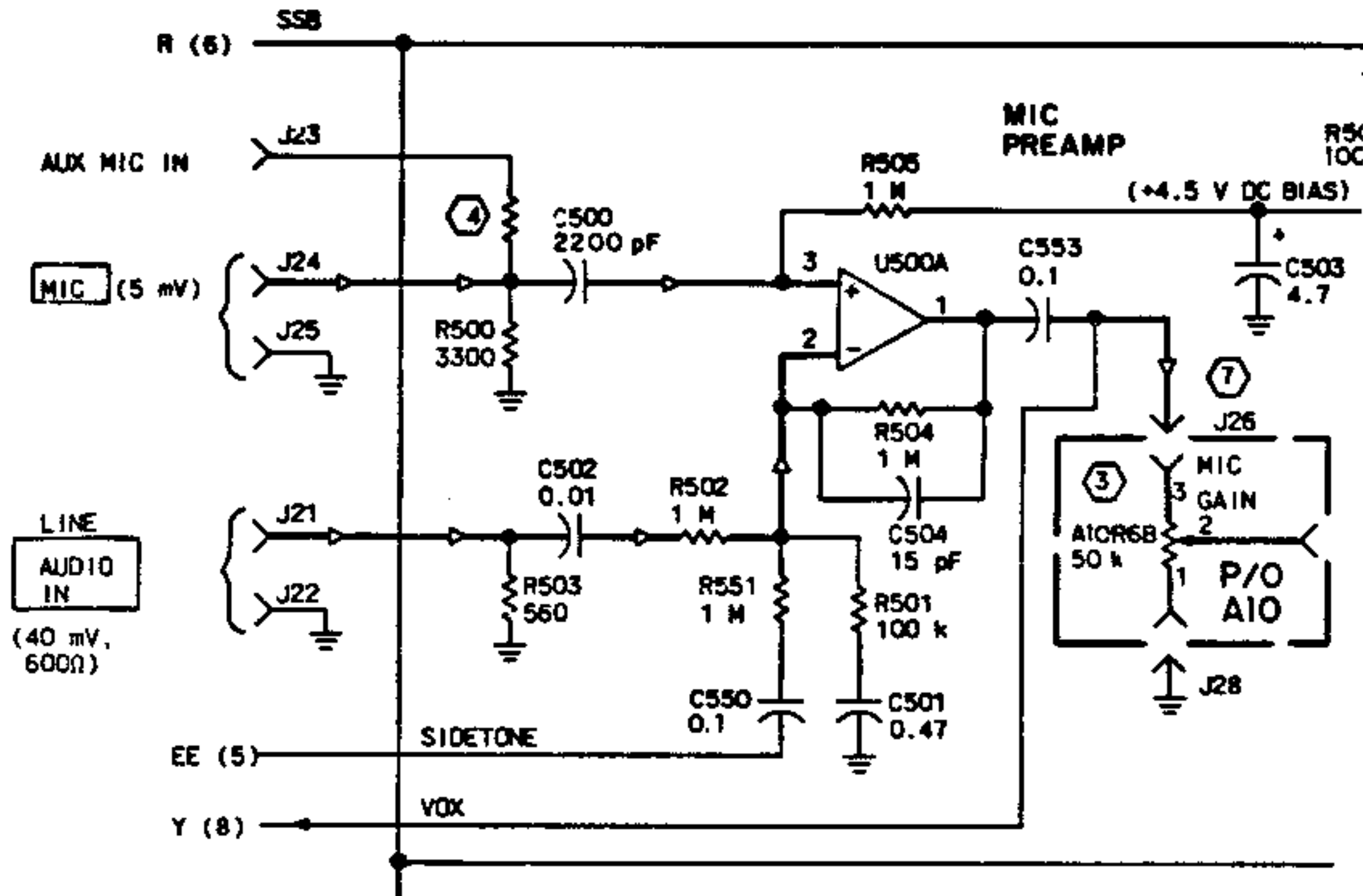
P/O Receiver-Exciter Assembly A3  
Figure 1



P/O Front Panel Assembly A10  
Figure 2



BEFORE MODIFICATION



AFTER MODIFICATION

P/O Receiver-Exciter Assembly A3,  
Schematic Diagram  
Figure 3

HF-380 TRANSCEIVER (622-3580-001)  
 KWM-380 TRANSCEIVER (622-5093-001)  
 LOW-PASS FILTER ASSEMBLY A2 (641-7096-002)  
 LOW-PASS FILTER ASSEMBLY A2 (641-7132-001)  
 DIRECTIONAL COUPLER A2A2 (638-6788-001)

**SERVICE BULLETIN NO 15**

**PROVIDE ANTENNA STATIC DISCHARGE PATH**

This service bulletin applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBERS
HF-380 622-3580-001	206 and below	207
KWM-380 622-5093-001	2099 and below	2100
Production cut-in for directional coupler A2A2 (638-6788-001) is REV N.		

This modification adds a choke on directional coupler circuit card A2A2 to provide an antenna static discharge path. This will greatly reduce the possible loss of directional coupler diodes in the field.

Estimated time required is 0.5 man-hour.

The modification parts are listed in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference HF-380/KWM-380 Service Bulletin No 15 in all correspondence.

No special tools or equipment are required.

**MODIFICATION PROCEDURE**

- A. Disconnect transceiver from primary power.
- B. Set transceiver on its side with power transformer on top. Remove dust cover by removing four screws adjacent to four feet on transceiver bottom.

- C. Remove card cage cover.

**CAUTION:** THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. SPECIAL HANDLING METHODS AND MATERIALS MUST BE USED TO PREVENT EQUIPMENT DAMAGE. THE MAINTENANCE OPERATOR AND ALL TOOLS SHOULD BE GROUNDED.

- D. Lift up low-pass filter A2 and disconnect two ribbon cables and three coax cables. Tag the coax cables which connect to directional coupler jacks J1 and J2.

- E. Remove low-pass filter A2 from card cage.

**CAUTION:** BE CAREFUL TO NOT BEND ANY COILS ON FILTER BOARDS.

**NOTE:** Use a 25- to 30-watt soldering iron with a tip designed for use with printed circuits. The tip should be clean to ensure proper melting of the solder prior to component removal or when securing new components to the card. Take care to avoid application of excessive heat.

- F. Refer to figure 1. Install 220- $\mu$ H choke L8 (240-2524-000) as follows:

- (1) Lay choke next to diode CR1 on A2A2 card.
- (2) Connect and solder one end of choke to square pin at capacitor C9.
- (3) Keeping leads as short as possible, lay other lead of choke on ground plane between C1 and L1 and solder.

- G. Mark SB 15 on directional coupler card A2A2.

- H. Reassemble transceiver in reverse order of disassembly. Ensure that the proper coax cables are connected to directional coupler jacks J1 and J2.

- I. Mark SB 15 on the service bulletin information chart. If the transceiver does not have an information chart (280-3778-010), order one and attach it near the nameplate.

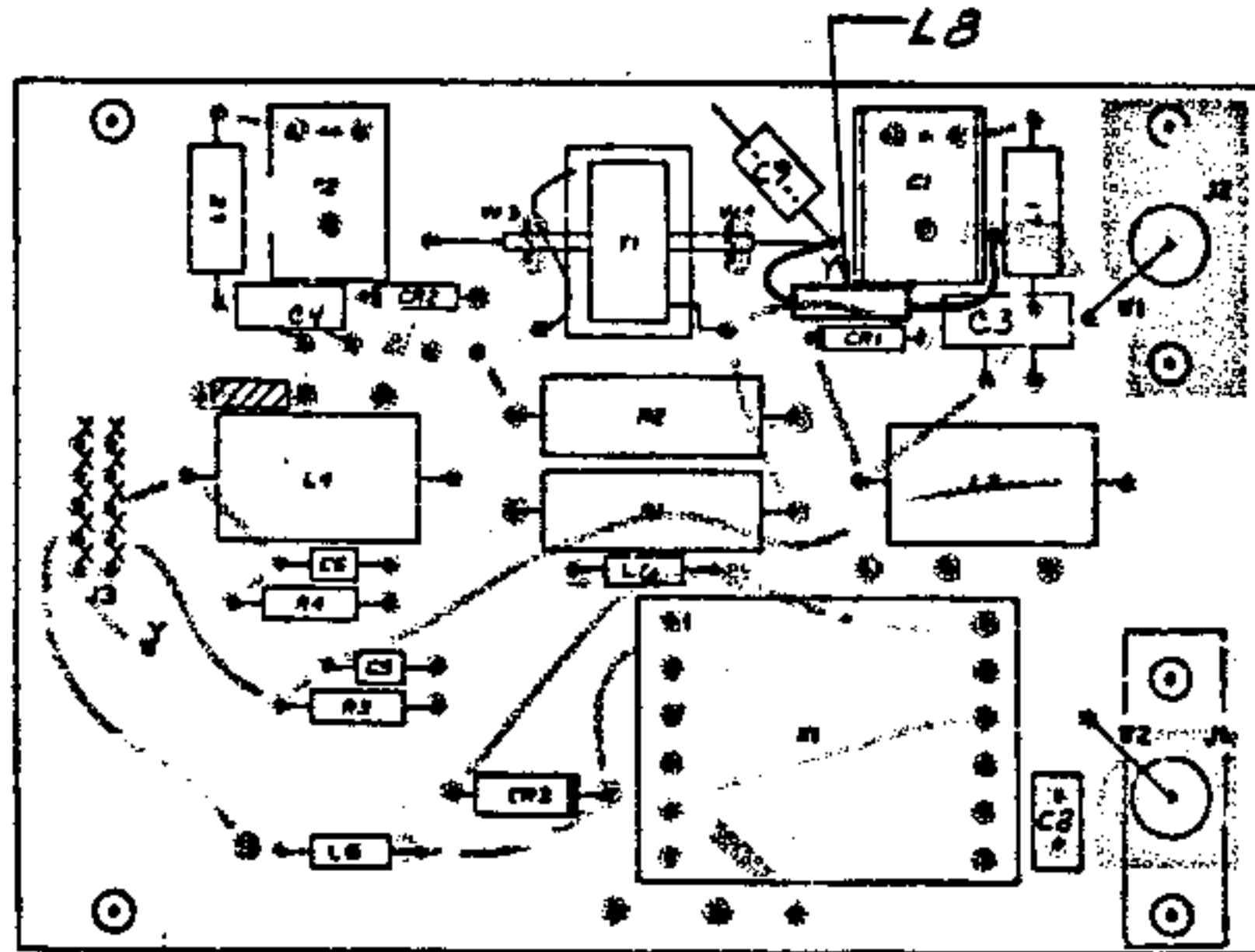
## MATERIAL INFORMATION

The parts listed below are required to modify one HF-380 or one KWM-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
240-2524-001	1		Choke, 220 $\mu$ H, L8
*280-3778-010	1		Chart, information

\*Order if needed





DIRECTIONAL COUPLER / TR RELAY A2A2

Directional Coupler/TR Relay A2A2  
Figure 1



# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

● 350485

HF-380 TRANSCEIVER (622-3580-001)  
KWM-380 TRANSCEIVER (622-5093-001)  
SYNTHESIZER VARIABLE REFERENCE FREQUENCY LOOP A5A2 (638-6920-001)

SERVICE BULLETIN NO 16  
(SUPERSEDES SERVICE BULLETIN NO 3)

## ELIMINATE FREQUENCY WARBLE AND REDUCE 500-Hz SIDEBANDS ON INJECTION FROM SYNTHESIZER

This service bulletin applies to the following:

EQUIPMENT	APPLICABLE TO SERIAL NUMBER	PRODUCTION CUT-IN SERIAL NUMBER
HF-380 622-3580-001	206 and below	207
KWM-380 622-5093-001	2099 and below	2100
Production cut-in for circuit card A5A2 (638-6920-001) is REV K.		

A frequency warble may occur at certain frequencies in some radios. The warble will usually occur at the top end of each 1-MHz band. The problem has been traced to two integrated circuits on synthesizer variable frequency loop A5A2. When U14 and U26 are at the low end of their specified parameters, a low rf input may cause them to miscount. Steps F through L of the modification procedure will correct this problem.

The synthesizer 500-Hz sidebands can be observed as a false signal 500 Hz away from a strong cw carrier when tuning with a narrow cw crystal filter. This service bulletin (steps M and N of the modification procedure) reduces the 500-Hz sideband level on the synthesizer output (first receiver mixer local oscillator).

Estimated time required to perform the modification is 1.5 man-hours.

The modification parts are itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference HF-380/KWM-380 Service Bulletin No 16 in all correspondence.

No special tools or equipment are required.

## MODIFICATION PROCEDURE

- A. Disconnect the transceiver from primary power.
- B. Set the transceiver on its side with the power transformer on top. Remove the dust cover by removing four screws located adjacent to the four feet on the bottom of the transceiver.

**CAUTION:** THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. SPECIAL HANDLING METHODS AND MATERIALS MUST BE USED TO PREVENT EQUIPMENT DAMAGE. THE MAINTENANCE OPERATOR AND ALL TOOLS SHOULD BE GROUNDED.

- C. Remove the card cage cover by removing all screws on the cover.
- D. Remove the A5 assembly from the card cage. Two cable clamps on the side of the card cage must be removed to provide enough slack in the cable to remove A5.
- E. Remove the screws that secure A5A2 card to the center plate. This will allow access to the rear of the card for soldering purposes.

**NOTE:** Refer to figure 1 for location of components. Refer to figure 2 for a schematic diagram showing the revised U10/U19 connections.

A 25- to 30-watt soldering iron with a tip designed for printed circuit use should be used. The tip should be clean to ensure proper melting of the solder prior to component lead removal or securing new components to the card. However, excessive applications of heat should be avoided.

- F. Remove 4-pF capacitor C40 and replace it with a 12-pF capacitor (912-4141-120).
- G. Remove 4-pF capacitor C45 and replace it with a 12-pF capacitor (912-4141-120).
- H. Remove transistor Q9 (2N5486) and replace it with a 2N5397 transistor (352-0998-010).
- I. Remove 0.15- $\mu$ H coil L6 and replace it with a 0.10- $\mu$ H coil (240-2723-140).
- J. Remove 0.15- $\mu$ H coil L7 and replace it with a 0.10- $\mu$ H coil (240-2723-140).
- K. Remove 47-pF capacitor C50 and replace it with a 27-pF capacitor (913-1098-570).
- L. Remove 154- $\Omega$  resistor R24 and replace it with a 56- $\Omega$  resistor (745-0704-000).
- M. On the bottom of the card, cut the circuit trace which connects U10-5 to U10-10.
- N. Install a jumper wire (428-0282-050) from U19-2 to U10-5 on the bottom of the card.
- O. Mark SB 16 on the circuit card near the part number.



# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

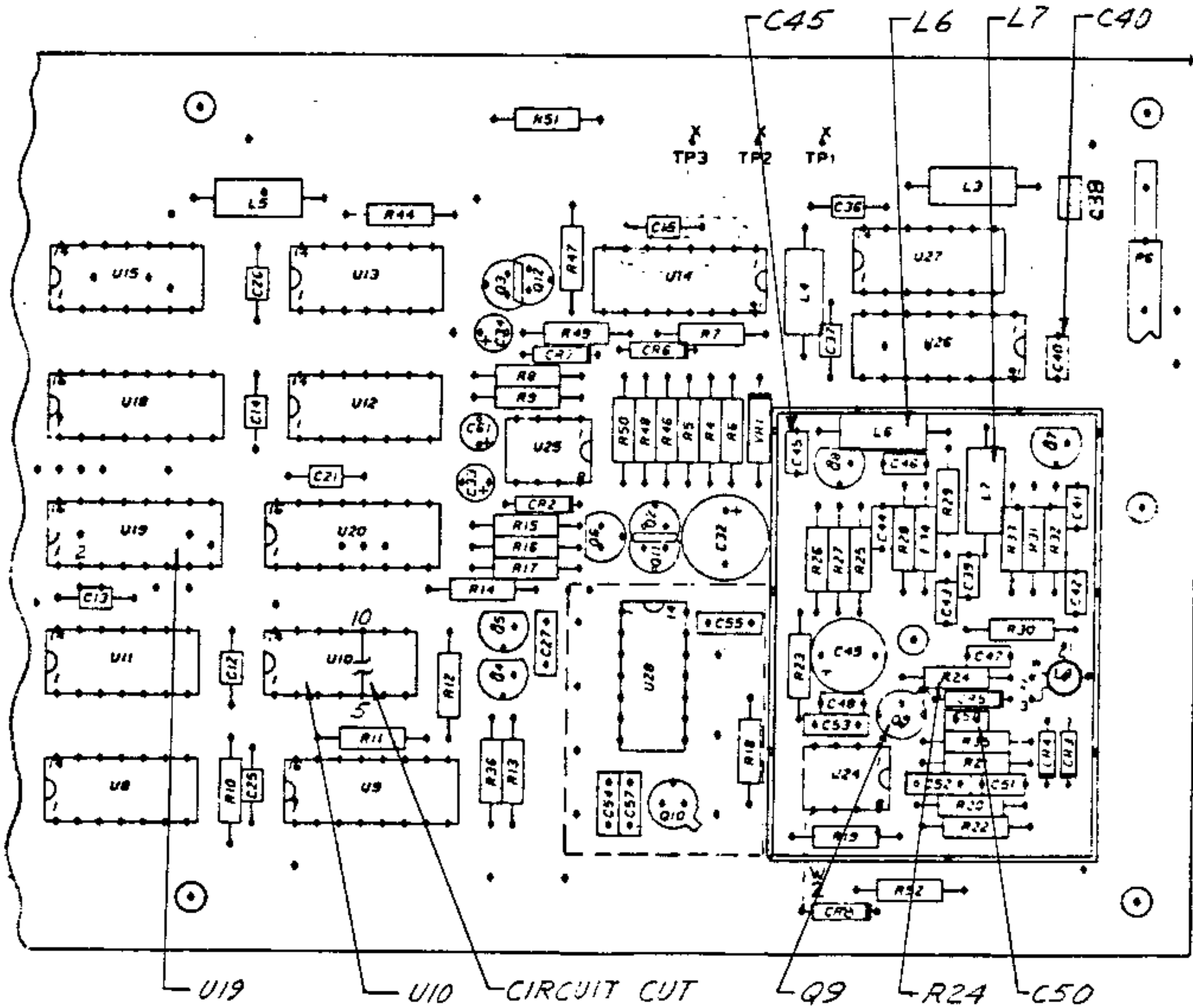
- P. Reassemble the transceiver in the reverse order of disassembly.
- Q. Mark SB 16 on the service bulletin information chart. If the transceiver does not have an information chart (280-3778-010), order one and attach it near the name-plate.

## MATERIAL INFORMATION

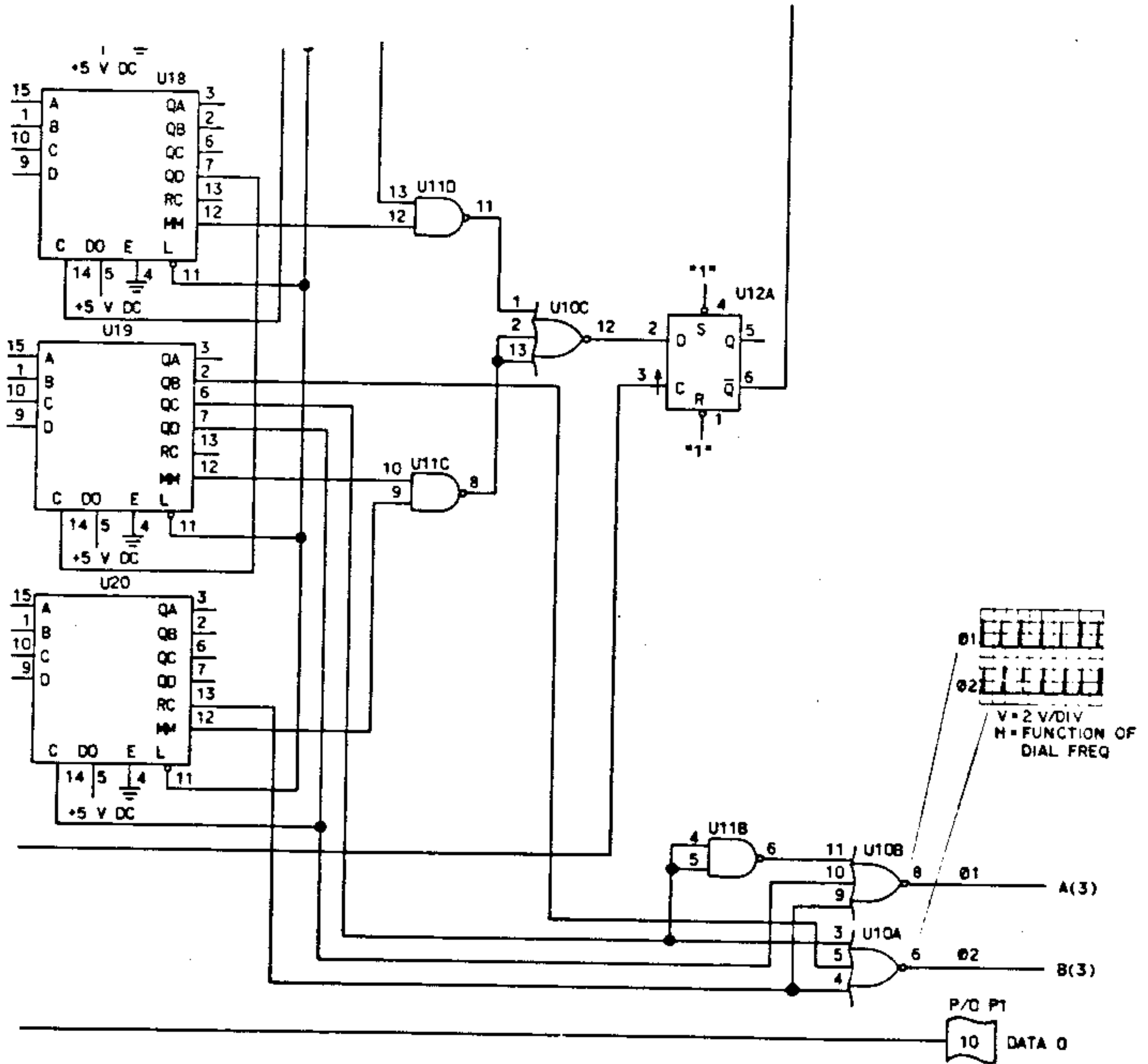
The parts listed below are required to modify one HF-380 or one KWM-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
912-4141-120	2		Capacitor, 12 pF, C40, C45
352-0998-010	1		Transistor, 2N5397, Q9
240-2723-140	2		Coil, 0.10 $\mu$ H, L6, L7
913-1098-570	1		Capacitor, 27 pF, C50
745-0704-000	1		Resistor, 56 $\Omega$ , R24
428-0282-050	75 mm (3 in)		Wire, jumper
*280-3778-010	1		Chart, information

\*Order as needed.



P/O Synthesizer Variable Reference Frequency Loop A5A2  
Figure 1



P/O Synthesizer Variable Reference Frequency Loop A5A2, Schematic Diagram  
Figure 2



# SERVICE BULLETIN

Collins Telecommunications Products Division/Rockwell International

● 350486

HF-380 TRANSCEIVER (622-3580-001)  
KWM-380 TRANSCEIVER (622-5093-001)  
RECEIVER-EXCITER CIRCUIT CARD A3 (638-6908-002)

## SERVICE BULLETIN NO 17

MAKE TRANSCEIVER RECEIVER-EXCITER BOARD  
COMPATIBLE WITH CU-380 COUPLER

This service bulletin applies to the following:

EQUIPMENT	APPLICABLE TO SERIAL NUMBER	PRODUCTION CUT-IN SERIAL NUMBER
HF-380 622-3580-001	206 and below	207
KWM-380 622-5093-001	2099 and below	2100
Production cut-in for receiver-exciter card A3 (638-6908-002) is REV R.		

This modification is necessary if the HF-380 or KWM-380 transceiver is to be used in a system with the CU-380 coupler. This change enables proper operation of the tune function and creates a system keyline.

**NOTE:** For total transceiver compatibility with the CU-380 Antenna Coupler, AC-3803 Control Interface Service Bulletin No 1, HF-380 Service Bulletin No 10, and/or KWM-380 Service Bulletin No 10 may be required. Service Bulletin No 10 on the HF-380 and KWM-380 changes the read-only memory on control card A8 to be compatible with the CU-380.

The change consists of adding six contacts, six diodes, one resistor, two jumper wires, and making one circuit trace cut.

Estimated time required is 2.0 man-hours.

The modification parts are itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference HF/KWM-380 Service Bulletin No 17 in all correspondence.

No special tools or equipment are required.

## MODIFICATION PROCEDURE

- A. Disconnect primary power and other external cables from the transceiver.

**CAUTION:** THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. SPECIAL HANDLING METHODS AND MATERIALS MUST BE USED TO PREVENT EQUIPMENT DAMAGE. THE MAINTENANCE OPERATOR AND ALL TOOLS SHOULD BE GROUNDED.

- B. Set the transceiver on its side with the power transformer on top. Remove the dust cover by removing four screws adjacent to the four feet on the bottom of the transceiver.

- C. Place the transceiver on workbench with the bottom side up.

**NOTE:** All changes are made to the receiver-exciter circuit card A3, located on the bottom of the unit.

Taking care to not damage adjacent components, this modification can be made without removing A3 from the chassis. Refer to figure 1 for location of components. Refer to figure 2 for a schematic diagram which includes the changes made by this service bulletin.

Unplug ribbon cables as necessary to gain access to the area to be modified.

- D. Cut the circuit trace that connects R970 and R949 right-hand leads as shown in figure 1. Cover the circuit trace cut with a nonconductive material such as epoxy.

**NOTE:** Use a 25- to 30-watt soldering iron with a tip designed for use with printed circuits. The tip should be clean to ensure proper melting of the solder prior to component removal or when securing new components to the card. Take care to avoid application of excessive heat.

- E. Unsolder and lift the R970 and R949 right-hand leads.

- F. Install a contact (372-2601-045) in the hole where the R949 lead was removed.

- G. Connect and solder the R970 and R949 right-hand leads to the contact installed in step F.

- H. Install and solder a #30 AWG jumper wire (428-0282-050) from E8 to E6 as shown in figure 1.

- I. Unsolder and lift the bottom lead of resistor R960.

- J. Install and solder a contact (372-2601-045) in the hole from which the R960 lead was removed.



- K. Connect the R960 lead to the new contact.
- L. Install 1N4454 diode CR913 (353-3644-010) as shown in figure 1 with the cathode end connected to the contact installed in step J. Solder connections on both ends.
- M. Unsolder and lift the top lead of R958 and the left-hand lead of R969.
- N. Install and solder contacts (372-2601-045) in the holes vacated by the resistor leads.
- O. Connect the R958 and R969 leads to the new contacts.
- P. Install 1N4454 diode CR909 (353-3644-010) between the two contacts installed in step N with the cathode end connected to R969.
- Q. Install 1N4454 diodes CR911 and CR912 (353-3644-010) as shown in figure 1 with the cathodes connected to R969. Solder all connections.
- R. Unsolder and lift the right-hand lead of resistor R948.
- S. Install and solder a contact (372-2601-045) in the hole where the R948 lead was removed.
- T. Connect the R948 lead to the new contact.
- U. Install 1N4454 diode CR910 (353-3644-010) as shown in figure 1 with the cathode end connected to the contact installed in step S. Solder all connections.
- V. Unsolder and lift the right-hand lead of resistor R146.
- W. Install and solder three contacts (372-2601-045) in the vicinity of R146 as shown in figure 1.
- X. Connect the R146 lead to one of the new contacts as shown in figure 1.
- Y. Install 100-k $\Omega$  resistor R154 (745-0821-000) between two of the new contacts as shown in figure 1.
- Z. Install 1N4454 diode CR127 (353-3644-010) as shown in figure 1 with the cathode end connected to R154.
- AA. Install a #30 AWG jumper wire (428-0282-050) from E7 to the anode end of CR127. Solder all connections.
- AB. Mark SB 17 on the A3 card near the part number.
- AC. Reassemble the transceiver in the reverse order of disassembly.
- AD. Mark SB 17 on the service bulletin information chart. If the unit does not have an information chart (280-3778-010), order one and attach it near the nameplate.



# SERVICE BULLETIN

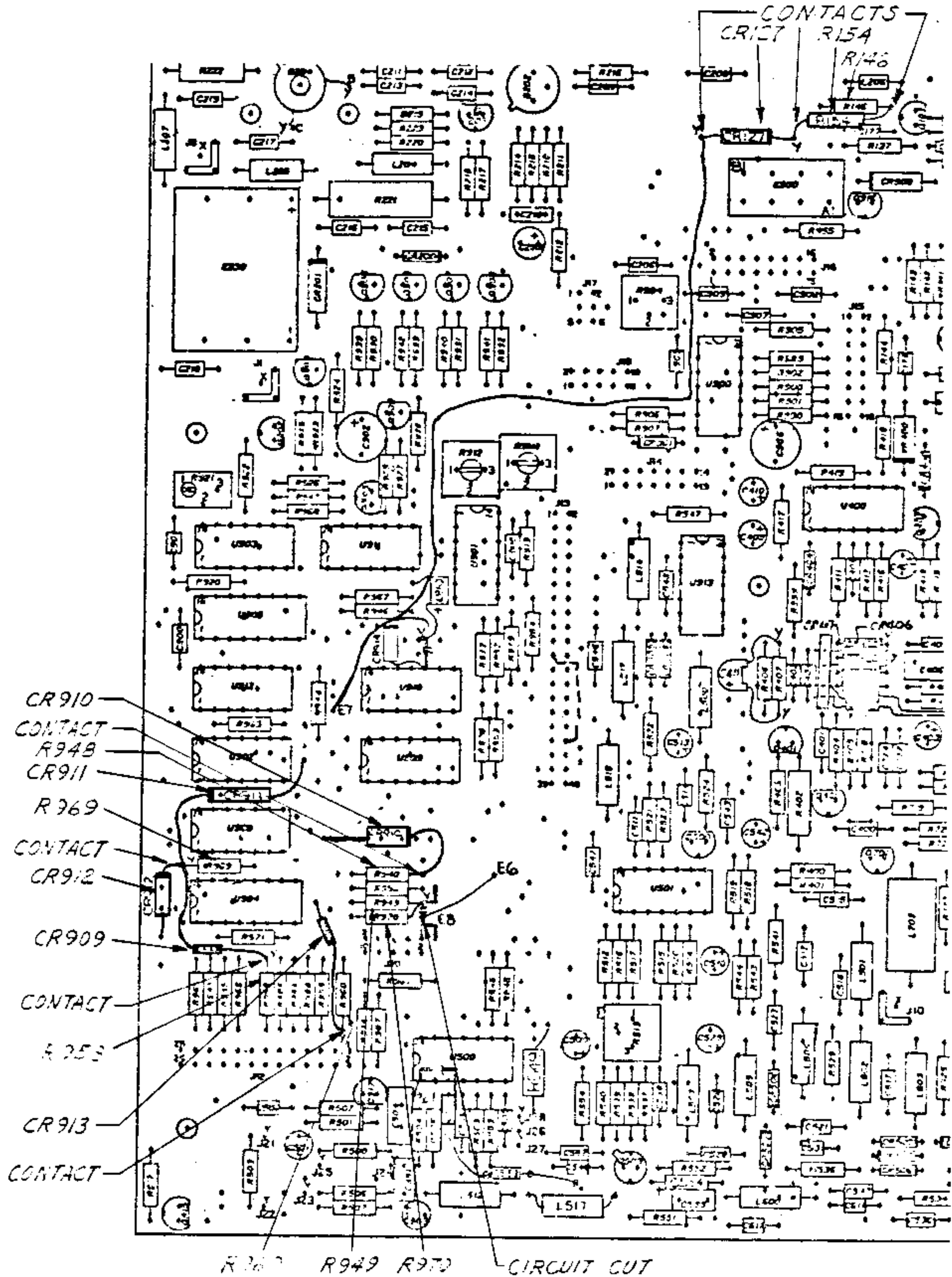
Collins Telecommunications Products Division/Rockwell International

## MATERIAL INFORMATION

The parts listed below are required to modify one HF-380 or one KWM-380.

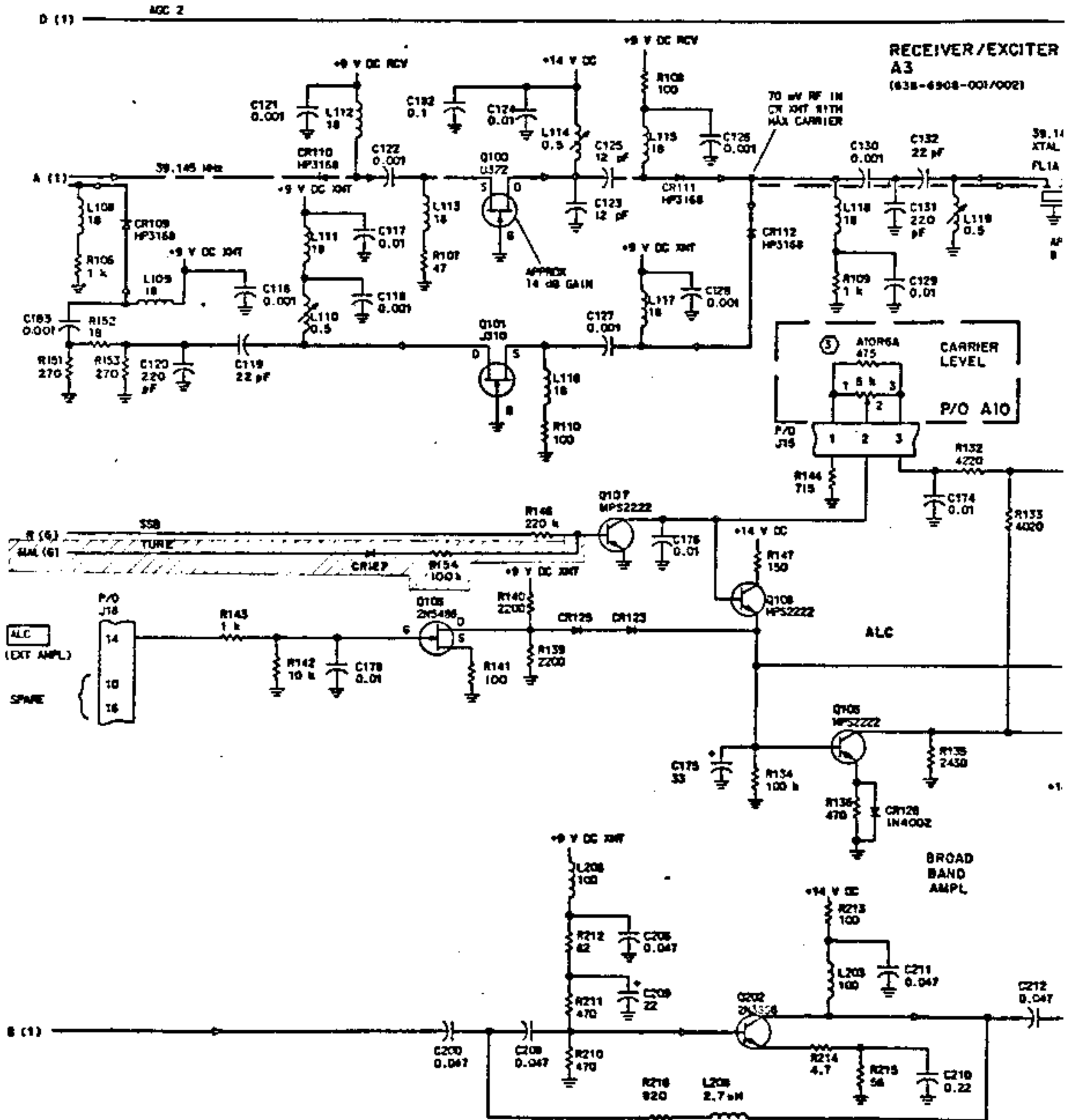
<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
372-2601-045	8		Contact
353-3644-010	6		Diode, 1N4454, CR127, CR909, CR910, CR911, CR912, CR913
428-0282-050	150 mm (6 in)		Wire, #30 AWG
*280-3778-010	1		Chart, information
745-0821-000	1		Resistor, 100 k $\Omega$ , R154

\*Order if needed

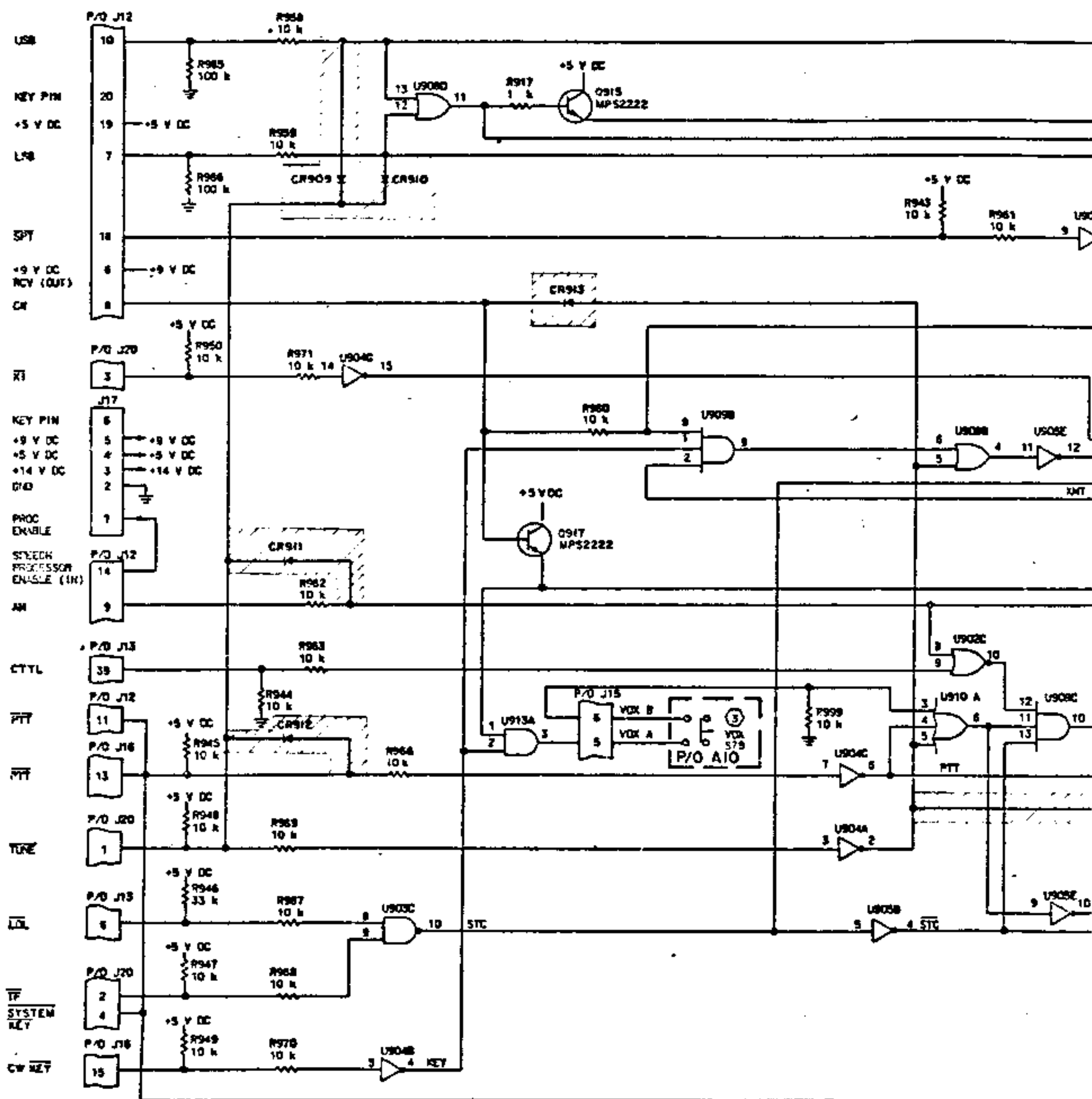


P/O Receiver-Exciter Circuit Card A3

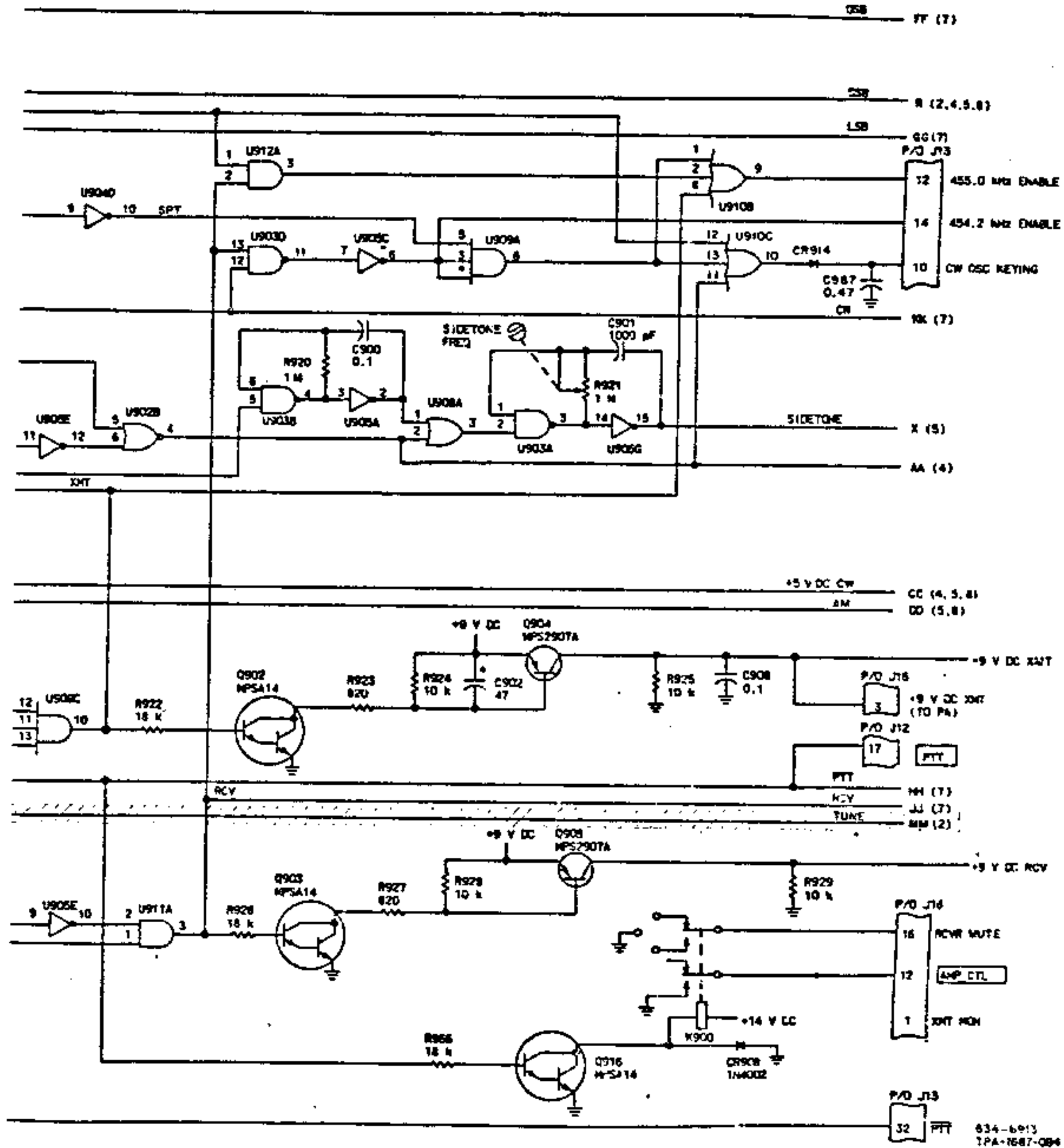
Figure 1



P/O Receiver-Exciter Circuit Card A3, Schematic Diagram  
Figure 2 (Sheet 1 of 3)



P/O Receiver-Exciter Circuit Card A3, Schematic Diagram  
Figure 2 (Sheet 2)



P/O Receiver-Exciter Circuit Card A3, Schematic Diagram  
Figure 2 (Sheet 3)

HF-380 TRANSCEIVER (622-3580-001)  
 KWM-380 TRANSCEIVER (622-5093-001)  
 RECEIVER-EXCITER CIRCUIT CARD A3 (638-6908-002)

## SERVICE BULLETIN NO 18

### ELIMINATE RF POWER BURST WHEN UNKEYING TRANSCEIVER

HF/KWM-380 Service Bulletin No 12 must be installed prior to installation of this bulletin. This service bulletin applies to the following:

EQUIPMENT	APPLIES TO SERIAL NUMBERS	PRODUCTION CUT-IN SERIAL NUMBER
HF-380 622-3580-001	206 and below	207
KWM-380 622-5093-001	2099 and below	2100
Production cut-in for receiver-exciter card A3 (638-6908-002) is REV T.		

This modification eliminates the 2-ms rf power burst which occurs when the transceiver is unkeyed. It also increases the delay time to a nominal 20 ms between keying the transceiver and the start of rf output. This allows more time for an external linear amplifier tr relay to switch into transmit before rf is present.

The change consists of making seven circuit trace cuts; adding seven square pins, two jumper wires, two capacitors, one resistor, and two diodes; changing the value of two capacitors and one resistor.

Estimated time required is 2.0 man-hours.

The modification parts are itemized in the material information paragraph. For additional information concerning parts, contact Collins Telecommunications Products Division/Rockwell International, Service Parts Department, Cedar Rapids, Iowa 52498. Reference HF/KWM-380 Service Bulletin No 18 in all correspondence.

No special tools or equipment are required.

### MODIFICATION PROCEDURE

- A. Disconnect primary power and other external cables from the transceiver.

**CAUTION:** THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. SPECIAL HANDLING METHODS AND MATERIALS MUST BE USED TO PREVENT EQUIPMENT DAMAGE. THE MAINTENANCE OPERATOR AND ALL TOOLS SHOULD BE GROUNDED.

- B. Set the transceiver on its side with the power transformer on top. Remove the dust cover by removing four screws adjacent to the four feet on the bottom of the transceiver.
- C. Place the transceiver on a work bench with the bottom side up.

**NOTE:** All changes are made to the receiver-exciter circuit card A3, located on the bottom of the transceiver. Taking care to not damage adjacent components, these modifications can be made without removing A3 from the chassis. Refer to figure 1 for location of components. Refer to figure 2 for a schematic diagram which includes the changes made by this service bulletin.

Unplug ribbon cables, as necessary, to gain access to the areas to be modified.

Use a 25- to 30-watt soldering iron with a tip designed for use with printed circuits. The tip should be clean to ensure proper melting of the solder prior to component removal or when securing new components to the card. Take care to avoid application of excessive heat.

- D. Cut the circuit trace just below U911 to disconnect U910-8 from R922.
- E. Cut the circuit trace to the right of R922 to disconnect R922 from the rest of the circuit line.
- F. Make five circuit cuts near U913 to disconnect U913-8, -9 from ground. U913-8 and U913-9 will still be connected together.
- G. Remove and discard resistor R968. Mount a new 10-k $\Omega$  resistor R968 (745-0785-000) above R947 as shown in detail M, section DD, to make room for a square pin.
- H. Refer to figure 1, detail M, for location and install five square pins (372-2601-045). Lift component leads, as necessary, and reconnect the leads to the pins after the square pins are installed.
- I. Lift the right-hand lead of L517 and install a square pin (372-2601-045) in the hole vacated by the lead. Connect the L517 lead to the new square pin.
- J. Install 1N4454 diode CR510 (353-3644-010) with the cathode connected to the square pin at the right-hand lead of L517 and the anode connected to the square pin at the left-hand lead of C554.
- K. Install a jumper wire (428-0282-050) from the square pin at the bottom lead of R922 to the thru hole to the right of U913-9.



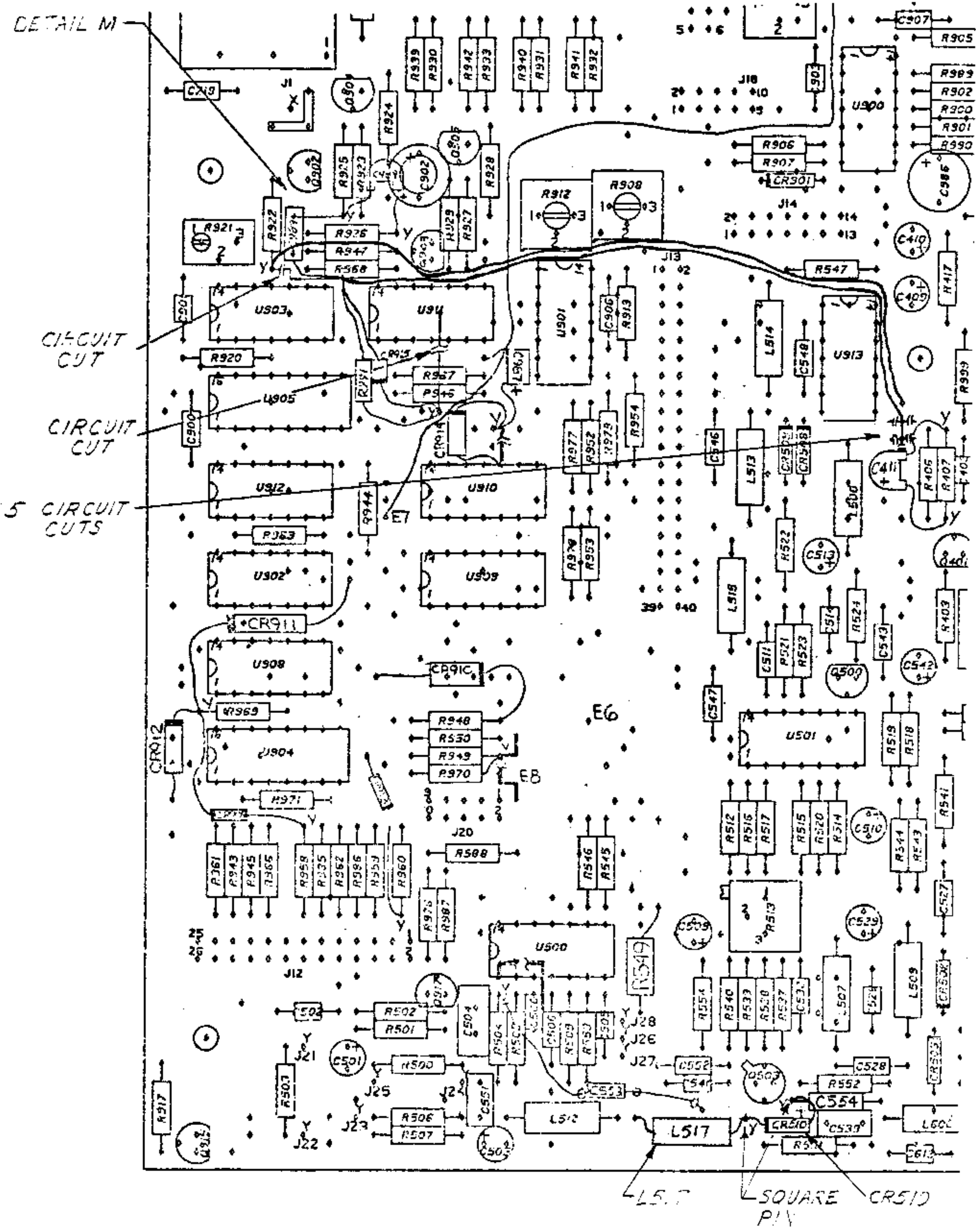
- L. Install a jumper wire (428-0282-050) from the square pin just below R968 to the thru hole to the right of U913-8.
- M. Remove 47- $\mu$ F capacitor C902 and replace it with a 10- $\mu$ F capacitor (184-9102-610).
- N. Install 0.1- $\mu$ F capacitor C988 (913-5019-440) from the square pin at the bottom lead of R925 to the square pin below R968.
- O. Install 1.5- $\mu$ F capacitor C989 (184-9102-800) with the positive lead connected to the square pin at the right-hand lead of R926 and the other lead connected to the square pin at the bottom of R925. Refer to figure 1, detail M, section D-D.
- P. Install 220-k $\Omega$  resistor R991 (745-0833-000) from the square pin below R968 to the square pin below R946.
- Q. Install 1N4454 diode CR915 (353-3644-010) with the anode to the square pin below R968 and the cathode to the square pin below R946.
- R. Solder and inspect all new connections.
- S. Mark SB 18 on the receiver-exciter card near the part number.
- T. Reinstall the dust cover.
- U. Mark SB 18 on the service bulletin information chart. If the equipment does not have an information chart (280-3778-010), order one and attach it near the nameplate.

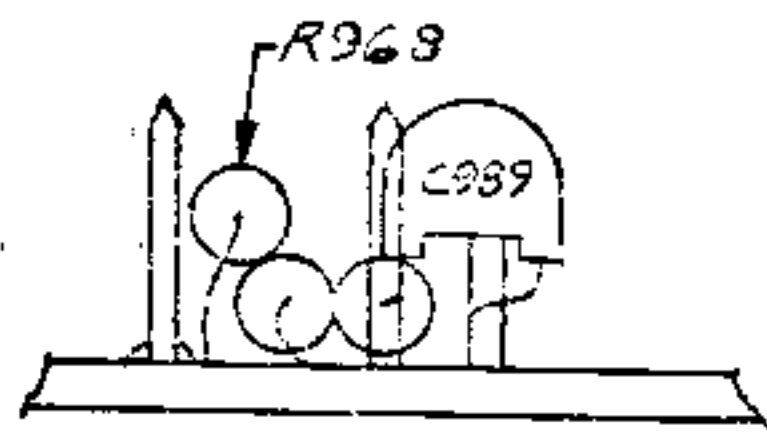
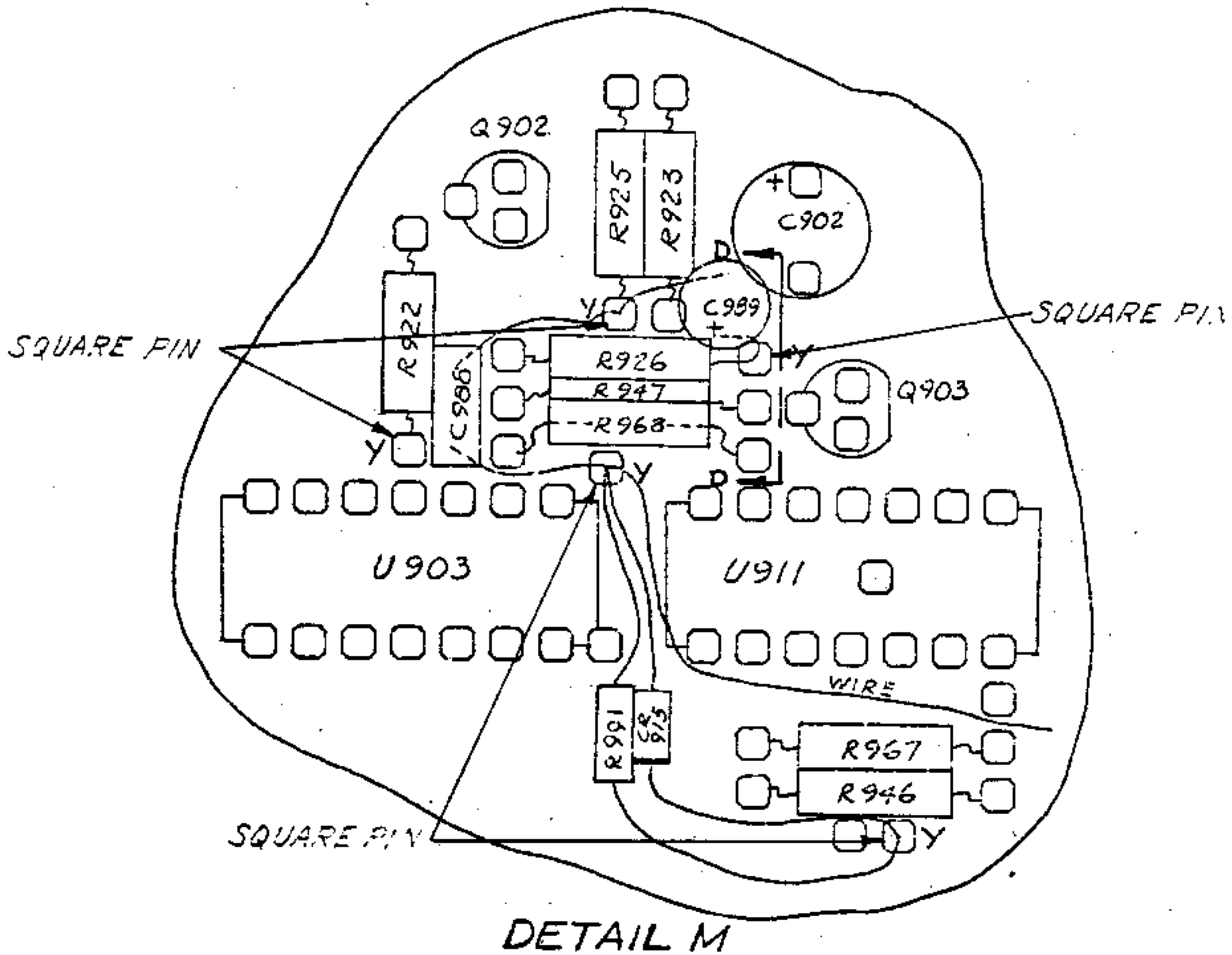
## MATERIAL INFORMATION

The parts listed below are required to modify one HF-380 or KWM-380.

<u>COLLINS PART NUMBER</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>DESCRIPTION</u>
745-0785-000	1		Resistor, 10 k $\Omega$ , R968
372-2601-045	7		Pin, square
913-5019-460	1		Capacitor, 0.15 $\mu$ F, C554
353-3644-010	2		Diode, 1N4454, CR510, CR915
184-9102-610	1		Capacitor, 10 $\mu$ F, C902
913-5019-440	1		Capacitor, 0.1 $\mu$ F, C988
184-9102-800	1		Capacitor, 1.5 $\mu$ F, C989
745-0833-000	1		Resistor, 220 k $\Omega$ , 1/4W, R991
428-0282-050	450 mm (18 in)		Wire, #30 AWG
*280-3778-010	1		Chart, information

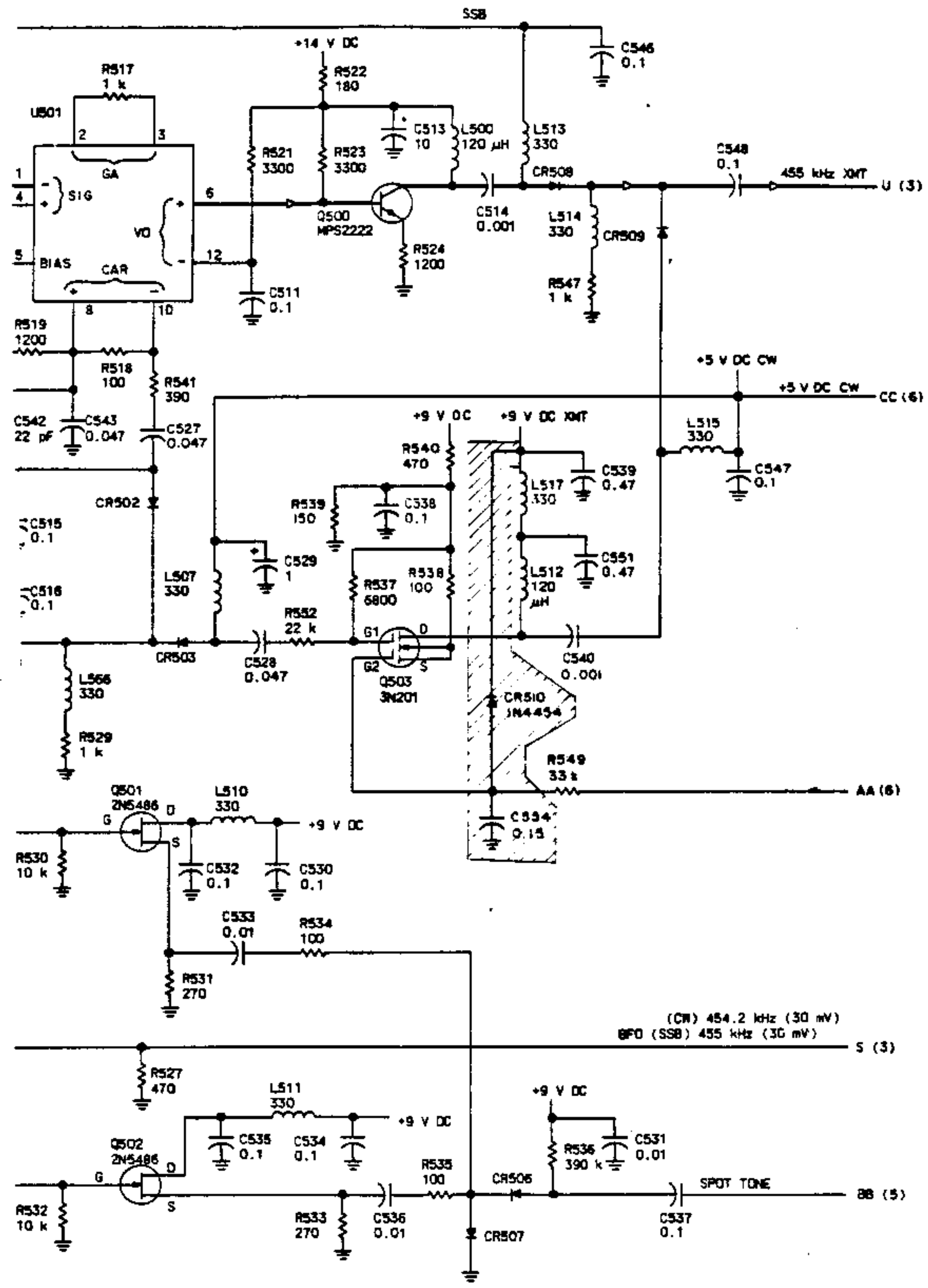
\*Order if needed.





SECTION D-D  
ROTATED 90°  
CLOCKWISE

P/O Receiver-Exciter Circuit Card A3.  
Figure 1 (Sheet 2)



(CW) 454.2 kHz (30 mV)  
 (SSB) 455 kHz (30 mV)

634-6913  
 TPA-1687-084

