RF Translator (1/2-Octave RF Filters) (637-3757-001)

Rockwell International

instructions

Collins Telecommunications Products Division

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1. DESCRIPTION

RF Translator 637-3757-001, shown in figure 1, is a module enclosed in an rf secure compartment (metal box construction). The rf translator module contains a metal box subassembly with internal shielding between various circuit elements and four 2-layer planar cards. It uses a 56-pin edge-on connector (2 layers, 28 pins each) and four subminiax rf connectors for external connections.

The rf translator module consists of a receive overload circuit, ten 1/2-octave rf filters, and two mixer circuits.

(To Be Supplied)

RF Translator
Figure 1

2. PRINCIPLES OF OPERATION

2.1 General (Refer to figure 2.)

The rf translator converts the 100-kHz (0.100-MHz) to 30.0-MHz receive rf input to a 9.45-MHz receive if frequency.

2.2 Receive Function (Refer to figure 2.)

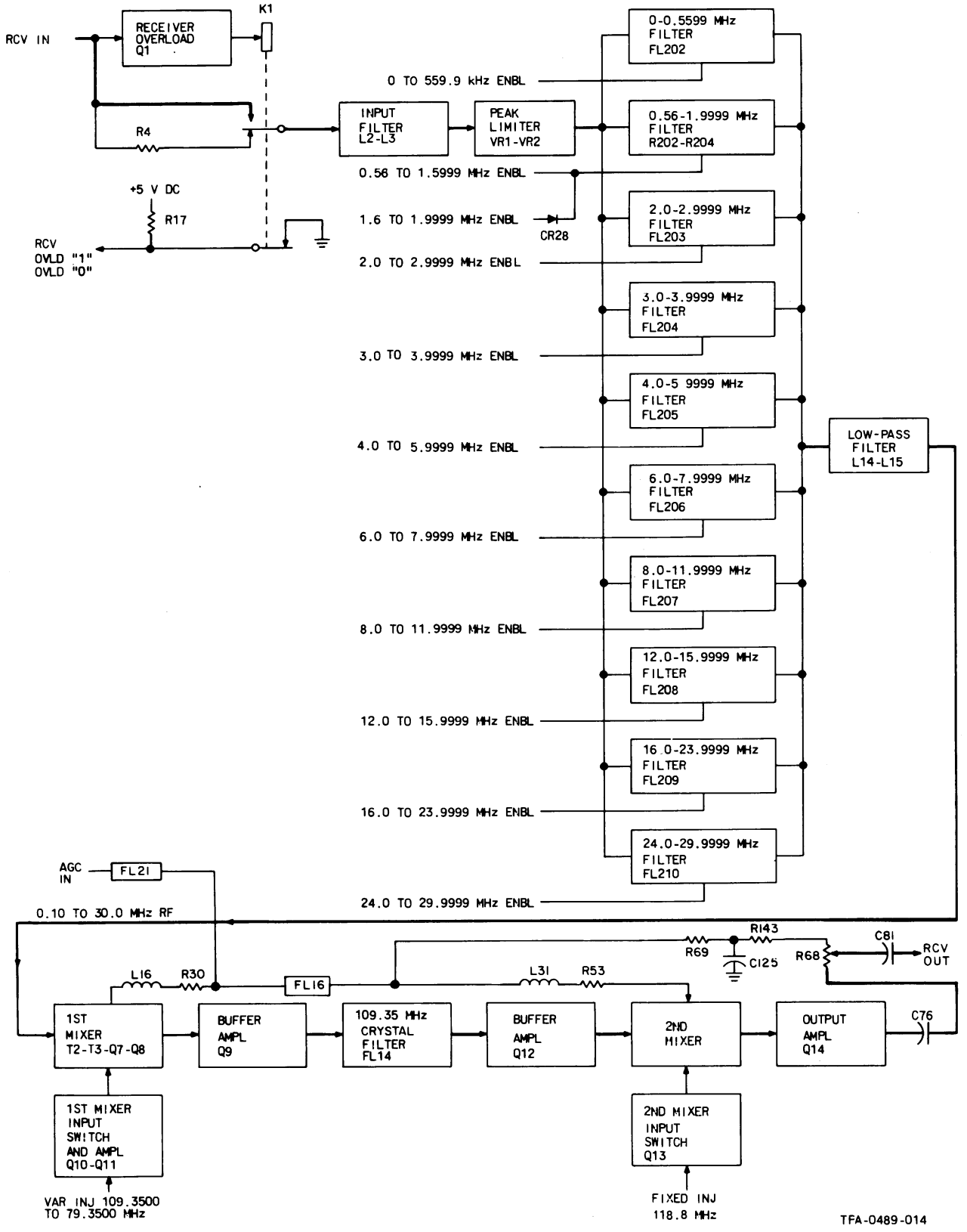
When a receive signal is supplied to the rf translator, it is overload checked and supplied through K1 to the associated 1/2-octave rf filter. If an overload exists, Q1 causes K1 to deenergize, and the receive rf is loaded through R4 and supplied as receive rf through K1 to the associated 1/2-octave rf filter.

The 1/2-octave rf filter is selected by the receiver frequency control. Enable signals from the receiver frequency control enable the applicable filter for the received frequency. Refer to table 1 for received frequency and associated 1/2-octave rf filter.

The signal from K1 is supplied through the selected 1/2-octave rf filter and through low-pass filter L14-L15 to the grounded gate balanced FET first mixer circuit T1-T2, Q7-Q8.

In the first mixer the 0 to 30.0-MHz signal is mixed with a 109.35- to 79.35-MHz variable injection signal to provide a 109.35-MHz if signal. This signal is supplied through FET buffer amplifier Q9, crystal filter FL14, and a second FET buffer amplifier Q12 to the second mixer circuit.

In the second mixer the 109.35-MHz if signal is mixed with a 118.8-MHz fixed injection signal to provide a 9.45-MHz receive if output signal. The receive if output signal is supplied through output amplifier Q14, and output control R68, to the rf translator receive if output.



Block Diagram
Figure 2

Table 1. 1/2-Octave RF Filters Versus Bandwidth.

FREQUENCY	ASSOCIATED FILTER
0 to 559.9 kHz	FL202
560 kHz to 1.9999 MHz	R202 thru R204
2.0 to 2.9999 MHz	FL203
3.0 to 3.9999 MHz	FL204
4.0 to 5.9999 MHz	FL205
6.0 to 7.9999 MHz	FL206
8.0 to 11.9999 MHz	FL207
12.0 to 15.9999 MHz	FL208
16.0 to 23.9999 MHz	FL209
24.0 to 29.9999 MHz	FL210

3. TESTING/TROUBLESHOOTING PROCEDURES

3.1 Test Equipment and Power Requirements

Test equipment and power sources required to test, troubleshoot, and repair the rf translator module are listed in the maintenance section of this instruction book.

3.2 Testing

The test procedures in table 2 check total performance of the rf translator module. These test procedures permit isolation of a fault to a specific component or circuit when the results are used with the schematic to circuit trace the fault.

Table 2. RF Translator, Testing and Troubleshooting Procedures.

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1. Setup	a. Remove top cover of unit containing the rf translator that is to be tested. b. Remove rf translator. Install rf translator on extender and place it in the unit. c. Set unit LINE SELECTOR switch to 115 V. d. Connect unit to 115 V ac power source and set power on. e. Measure dc voltages between the following pins and ground (P1-1, 28, 29, 56):		
	P1-25 P1-53	+24.0 ±1.0 V dc	Check associated power supply.
	P1-23 P1-51	+15.0 ±1.0 V dc	
	P1-27	+5.0 ±0.2 V dc	
	P1-6	-15.0 ±1.0 V dc	
2. Receiver ssb sensitivity (Cont)	a. Set front-panel MODE switch to SSB/CW and BANDWIDTH switch to USB. b. Connect an rf signal generator to J1 (RCV ANT jack on rear panel). c. Connect an audio vtvm to A6TP2 (ssb audio). d. Set the rf signal generator 101.0 and receiver front panel frequency controls to 100.0 kHz.		

Table 2. RF Translator, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
2. (Cont)	e. Set the rf signal generator level at 0.00 μV.		
	f. Note noise level on audio vtvm.	Reference.	
	g. Adjust signal generator level to 0.30 μV and note signal level on audio vtvm.	NLT 2 dB above reference.	Check M1, Q14, Q12, FL14, Q9, Q8, Q7, Q5, and associated circuits.
	h. Repeat steps e, f, and g with rf signal generator at each of the following frequencies (receiver front-panel frequency controls set 1000 Hz below each frequency given).		
	250 kHz	NLT 3 dB above reference.	Same as step g.
	500 kHz	NLT 3 dB above reference.	Same as step g.
	1.0 MHz	NLT 3 dB above reference.	Check Q4 and associated circuits.
	1.8 MHz	NLT 10.5 dB above reference.	Check Q2, Q3, K2, and associated circuits.
	2.5 MHz	NLT 10.5 dB above reference.	Same as 1.8 MHz.
	3.5 MHz	NLT 10.5 dB above reference.	
	5.0 MHz	NLT 10.5 dB above reference.	
	7.0 MHz	NLT 10.5 dB above reference.	
	10.0 MHz	NLT 10.5 dB above reference.	
	15.0 MHz	NLT 10.5 dB above reference.	
	20.0 MHz	NLT 10.5 dB above reference.	
	25.0 MHz	NLT 10.5 dB above reference.	
	30.0 MHz	NLT 10.5 dB above reference.	
3. Receiver gain	a. Connect an rf signal generator to J1 (RCV ANT jack on rear panel).		
	b. Connect an rf vtvm (with 50-Ω load) to J3.		
	c. Set the rf signal generator and receiver front-panel frequency controls to 0.500 MHz.		
(Cont)	d. Set the rf signal generator level at -30 dB mW.		

Table 2. RF Translator, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
	e. Note the signal level on the rf vtvm.	NLT -12.0 dB mW.	
	f. Repeat steps d and e at each of the following frequencies:		Same as test 2.
	1.0 MHz	NLT -11.5 dB mW.	
	2.5 MHz	NLT -11.5 dB mW	
	3.5 MHz	NLT -11.5 dB mW	
	5.0 MHz	NLT -11.5 dB mW	
	7.0 MHz	NLT -11.5 kB mW	
	10.0 MHz	NLT -11.5 dB mW	
	15.0 MHz	NLT -10.1 dB mW	
	20.0 MHz	NLT -11.5 dB mW	
	25.0 MHz	NLT -11.5 dB mW	
	29.9 MHz	NLT -11.1 dB mW	
4. Receiver overload protection	a. Connect an rf signal generator to J1 (RCV ANT jack on rear panel).		
	b. Connect a dvm to P1-3. Note voltage.	0 V.	Check Q1, K1, and associated circuits.
	c. Set the rf signal generator and the receiver front-panel frequency controls to 500 kHz.		
	d. Increase the rf signal generator output level until the receive overload relay just clicks.		
	e. Note rf output level of rf signal generator.	1.4 to 1.9 V rms.	Same as step b.
	f. Note dvm reading.	NLT +3.0 V dc.	Check K1 and associated output circuit.
	g. Remove rf signal generator.		
5. Receive agc	a. Remove rf translator from extenders and install it in unit.		
	b. Remove channel A if. Install it on extender card and place it in unit.		
	c. Connect an rf signal generator to J1 (RCV ANT jack on rear panel).		
	d. Connect an rf vtvm (with high impedance probe) to J3 (A8J2).		
	e. Set front-panel AGC switch to OFF.		
	f. Set the rf signal generator and receiver front-panel frequency controls to 15.0000 MHz.		
(Cont)	g. Set the rf signal generator level at -30 dB mW.		

Table 2. RF Translator, Testing and Troubleshooting Procedures (Cont).

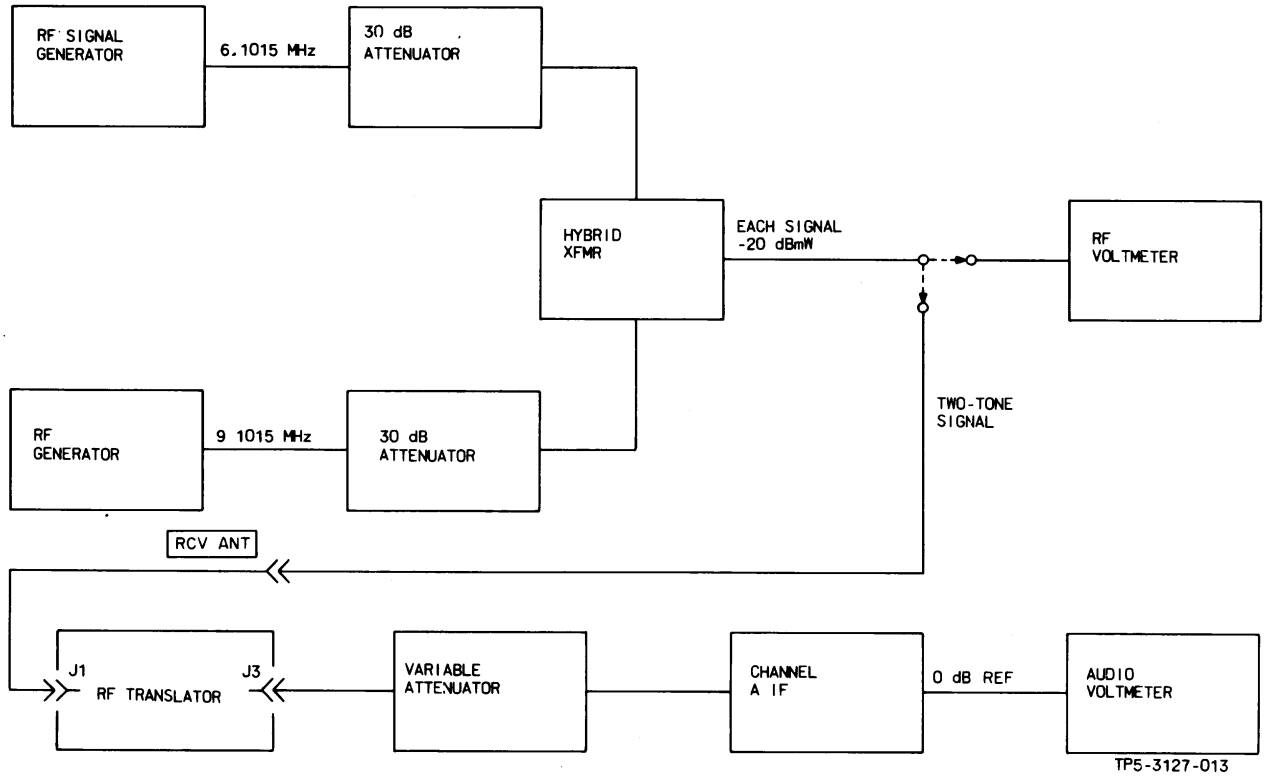
TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
	h. Note the signal level on the rf vtvm.	Reference.	
	i. Set front-panel AGC switch to FAST.		
	j. Increase rf signal generator level until reference on rf vtvm is reached.		
	k. Note increase in rf signal generator level.	37 to 43 dB.	Check CR19, CR20, CR22, CR23, CR26, CR27, and associated circuits.
	l. Remove channel A if from extenders and install it in unit.		
	m. Remove rf translator. Install it on extender card and place it in unit.		
6. Filter ripple	a. Connect an rf signal generator to J1 (RCV ANT jack on rear panel).		
	b. Connect an rf vtvm (with 50-Ω load) to J3.		
	c. Set the rf signal generator and receiver front-panel frequency controls to 15.0000 MHz.		
	d. Set the rf signal generator level for -10-dB mW rf vtvm reading.		
	e. Adjust the rf signal generator down to 14.9970 MHz and up to 15.0030 MHz while noting the variation in the rf vtvm reading.	NMT 0.7 dB variation.	Check M1, FL14, and associated circuits.
	f. Adjust the rf signal generator down to 14.9940 MHz and up to 15.0060 MHz while noting the variation in the rf vtvm reading.	NMT 5.0 dB variation.	Same as step e.
7. Receiver inter-modulation, 3rd order products	a. Connect two rf signal generators to rf translator as shown in figure 3.		
	b. Set one rf signal generator to 6.1015 MHz.		
	c. Set the second rf signal generator to 9.1015 MHz.		
	d. Using the rf vtvm (with 50-Ω load) connected at the output of the hybrid transformer, independently adjust each rf signal generator for -20 dB mW outputs.		

Table 2. RF Translator, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
7. (Cont)	e. Connect the two-tone signal to J1 (RCV ANT jack on rear panel).		
	f. Set the receiver front-panel frequency controls to 3000.00 kHz.		
	g. Slightly adjust (300 to 2000 Hz) the frequency of the 6.1015-MHz generator for a peak audio output (at A6TP2) as indicated on the audio voltmeter.		
	h. Adjust the variable attenuator for 0-dB reference on the audio voltmeter.	Reference.	
	Note Adjust variable attenuator for a 0-dB reference at point where AGC just begins to effect the audio output.		
	i. Note 6.1015-MHz rf signal generator output.	Reference.	
	j. Set the receiver front-panel frequency controls to 6100.00 kHz.		
	k. Slightly adjust the frequency of the 6.1015-MHz generator for a peak audio output as indicated on the audio voltmeter.		
	l. Adjust the output level of the rf signal generator for 0-dB reference in step h on the audio voltmeter.		
	m. Note the decrease in dB of the rf signal generator output from that referenced in step i.	NLT 83 dB down.	To repair, return to factory.
	n. Repeat steps g through m with the receiver front-panel frequency controls at each of the following settings:		
	12100.00 kHz 21300.00 kHz 24300.00 kHz	NLT 83 dB down. NLT 83 dB down. NLT 83 dB down.	Same as step m.
8. Receiver intermodulation, 2nd order products	a. Connect two rf signal generators to rf translator as shown in figure 3.		
	b. Set one rf signal generator to 6.1015 MHz.		
(Cont)	c. Set the second rf signal generator to 9.1015 MHz.		

Table 2. RF Translator, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
8. (Cont)	d. Using the rf vtvm (with 50-Ω load) connected at the output of the hybrid transformer, independently adjust each rf signal generator for -20-dB mW outputs.		
	e. Connect the two-tone signal to J1 (RCV ANT jack on rear panel).		
	f. Set the receiver front-panel frequency controls to 3000.00 kHz.		
	g. Slightly adjust (300 to 2000 Hz) frequency of the 6.1015-MHz generator for a peak audio output (at A6TP2) as indicated on the audio voltmeter.		
	h. Adjust the variable attenuator for 0-dB reference on the audio voltmeter.	Reference.	
	Note Adjust variable attenuator for a 0-dB reference at point where AGC just begins to effect the audio output.		
	i. Note 6.1015-MHz rf signal generator output.	Reference.	
	j. Set the receiver front-panel frequency controls to 6100.00 kHz.		
	k. Slightly adjust the frequency of the 6.1015-MHz generator for a peak audio output as indicated on the audio voltmeter.		
	l. Adjust the output level on the rf signal generator for 0-dB reference in step h on the audio voltmeter.		
	m. Note the decrease in dB of the rf signal generator output from that referenced in step i.	NLT 70 dB down.	To repair, return to factory.
	n. Repeat steps g through m with the receiver front-panel frequency controls at 15200.00 kHz.	NLT 70 dB down.	Same as step m.



Receive Intermodulation Test Setup
Figure 3

4. ALIGNMENT/ADJUSTMENT

4.1 Receiver Alignment (Adjustment of T3, L24, L26, and L29.)

a. Connect an rf signal generator through a 6-dB load to J1 (RCV ANT jack on rear panel).
b. Connect an rf vtvm (with 50-Ω load) to J3.
c. Set input to J1 at 15.0000 MHz and -30 dB mW.
d. Set front-panel controls for 15 000.0 kHz.
e. Set R68 (receive gain) at full counterclockwise position.
f. Adjust T3, L24, L26, and L29 for maximum output, as indicated by rf vtvm.
g. Perform step f a minimum of three times.

4.2 Mixer Balance (Adjustment of R31.)

a. Use a dvm with 10-μH choke in series with a test probe to measure voltage readings at T2-2 and T2-5 to ground.
b. Adjust R31 for equal voltage reading at T2-2 and T2-5 to ground.

4.3 Injection Level Adjustment (Adjustment of T4.)

a. Connect an rf vtvm (set to 10-V scale) between T2-1 and ground.
b. Vary input frequency from 2.0 to 29.9 MHz and note that voltage varies between 3.0- and 7.0-V rms and that the higher voltage readings occur between 27 and 29.9 MHz.
c. If voltage exceeds the limits of step b or is higher at other than 27 to 29.9 MHz, adjust slug of T4 to achieve the desired levels.

4.4 Translator Gain Adjustment (Adjustment of R68, T1, and T2.)

a. Set the rf signal generator for 15.000 00 MHz at -30 dB mW and the front-panel frequency controls to 15 000.00 kHz.
b. Connect an rf vtvm (with 50-Ω load) to J3.
c. Adjust R68 for -10-dB mW reading on the rf vtvm.
d. Set the rf signal generator for 29.9000 MHz at -30 dB mW and the front-panel frequency controls to 29 900.00 kHz.

e. Using a pointed plastic tool, carefully adjust the leads and windings of T1 and T2 for maximum reading on the rf vtvm.

Note

The objective is to make the output at 29.900 00 MHz as large as possible with an output difference between 29.900 00 and 15.000 00 MHz of not more than 1.0 dB.

f. Repeat steps c, d, and e until no improvement is possible.

4.5 Final Noise Balance (Adjustment of R31.)

a. Set the front-panel frequency controls for 15 000.00 kHz and disconnect the rf signal generator.
b. Connect an audio voltmeter to the channel A if ssb audio output. Reference the background noise level on the audio voltmeter.
c. Adjust R31 (20-turn potentiometer) for a minimum noise level. Make this adjustment very slowly to assure a true minimum.

4.6 T1 and T2 Position Fixing

Note

If T1 and T2 require position fixing it is recommended that the rf translator be returned to the factory. If field repair of T1 and T2 is desired, the following procedures may be used. Do not make these adjustments unless repair has been made to the T1 and/or T2 area of the rf translator.

a. Set the rf signal generator for 29.900 00 MHz at -24 dB mW and the front-panel frequency controls to 29 900.00 kHz.
b. Connect an rf vtvm (with 50-Ω load) to J3. Reference the rf vtvm reading of paragraph 4.4.
c. Using a pipe cleaner, carefully apply a very thin coat of Q-Max to the windings of T1 and T2 and the support rods that hold T1 and T2 in position.
d. After Q-Max is applied, it may be necessary to slightly readjust wires for maximum output. Refer to paragraph 4.4.

5. REPAIR

Repair of the rf translator module is accomplished using standard maintenance and planar card repair procedures. Refer to the maintenance section of this instruction book for planar card repair procedures.

6. PARTS LIST/DIAGRAMS

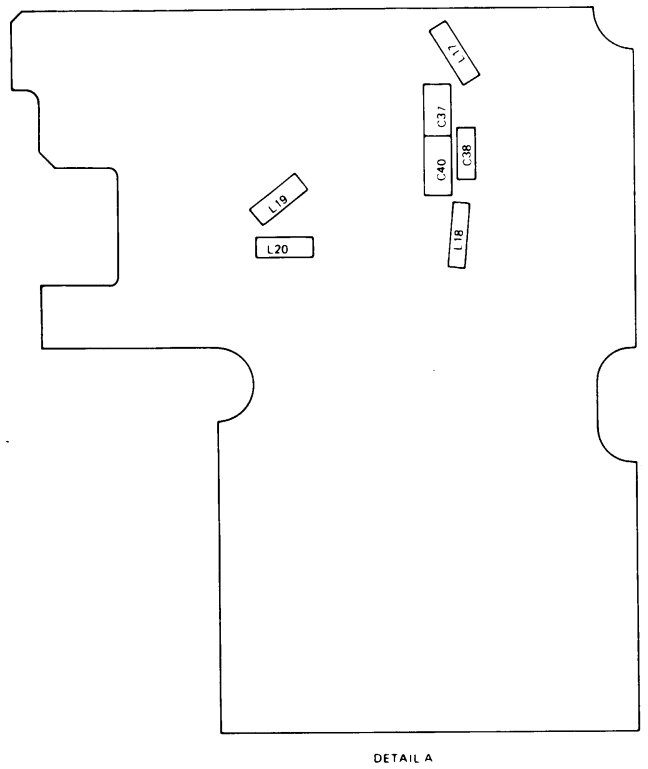
This paragraph assists in identification, requisition, and issuance of parts and in maintenance of the equipment. A parts location illustration, schematic diagram, parts list tabulation, and modification history are included in the schematic diagram, figure 4. The parts location illustration is a design engineering drawing that shows exact component placement on the circuit cards.

Use the reference designator indicated on schematic and parts location diagram to locate parts in the parts list tabulation. The Collins part number and description are listed for each reference designator.

Modifications are identified by an alphanumeric identifier assigned to each design change. These identifiers are referenced in the DESCRIPTION column of the parts list in parentheses and on the schematic diagram inside an arrow that points to the change. Each change relates to the revision identifier (REV) stamped on the circuit card/subassembly and is listed in the EFFECTIVITY column of the modification history.

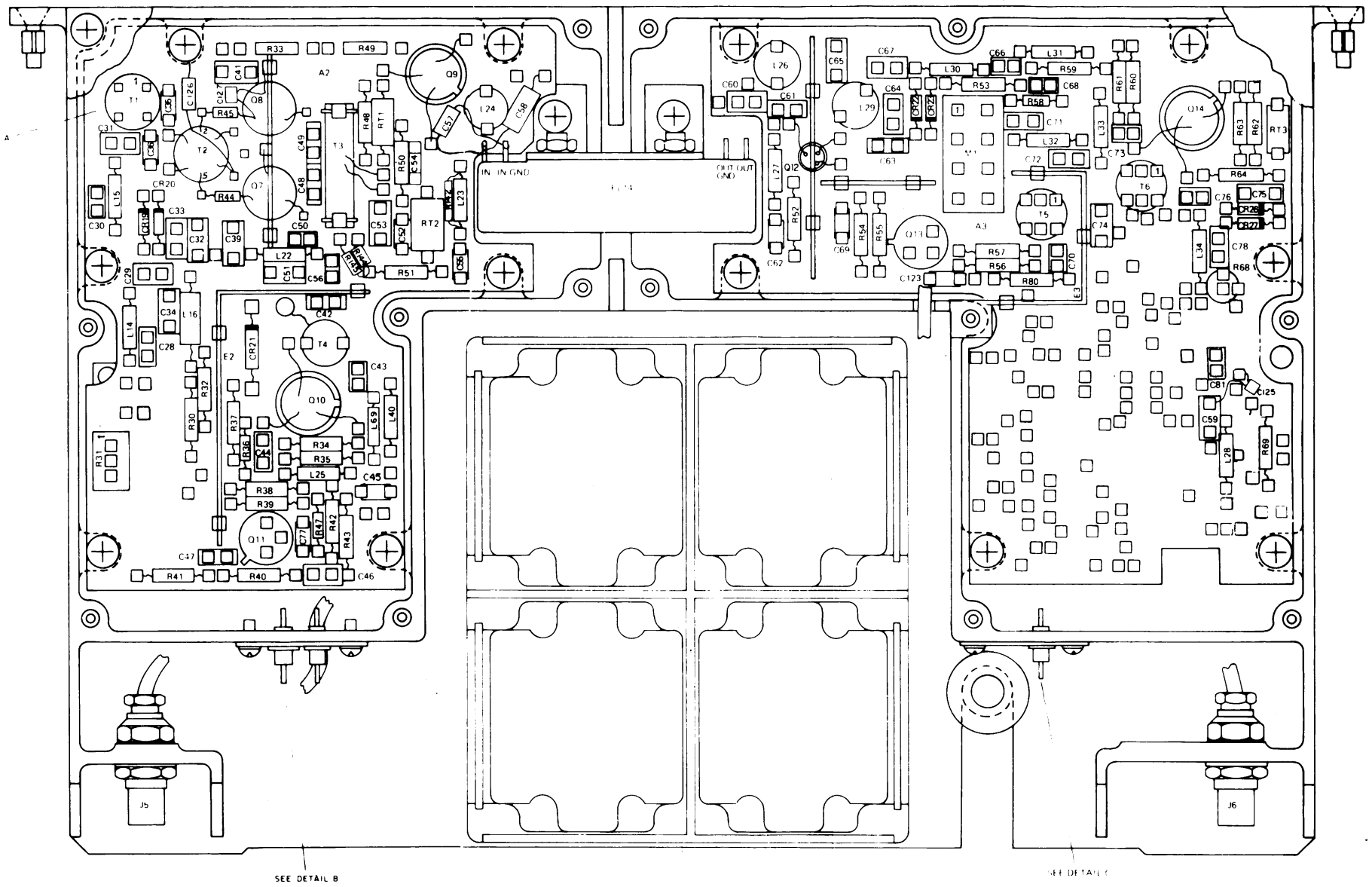
Listed below are the circuit cards/subassemblies with the latest effectivity covered by these instructions.

CIRCUIT CARD/ SUBASSEMBLY	COLLINS PART NUMBER	LATEST EFFECTIVITY
Rf translator module	637-3757-001	REV C
Rf filter board A1	638-6099-001	REV B
First mixer board A2	635-0782-003	REV U
Second mixer board A3	635-0784-004	REV N
1/2-Octave filter board A4	606-9880-004	REV —
Diode switching board	778-2934-004	REV H



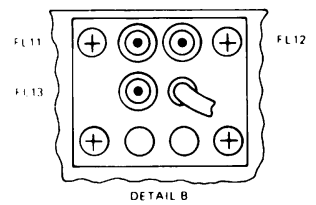
DETAIL A

SEE DETAIL A

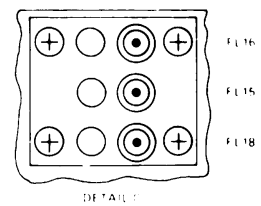


SEE DETAIL B

SEE DETAIL C



DETAIL B



DETAIL C

TPA-1047-028

RF Translator, Schematic Diagram
Figure 4 (Sheet 1 of 6)

PARTS LIST

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
	RF TRANSLATOR	637-3757-001	
A1	RF FILTER BOARD	638-6099-001	
A2	FIRST MIXER BOARD	635-0782-003	
A3	SECOND MIXER BOARD	635-0784-004	
A4	1/2 OCTAVE FILTER BOARD	606-9880-004	
CR1-CR27	NOT USED		
CR28	SEMICOND DEVICE 1N4454	353-3644-010	
C1-C56	NOT USED		
C57	CAPACITOR,FXD MICA DIEL, 68PF, 5%, 50V	912-4141-330	
C58	CAPACITOR,FXD MICA DIEL, 47PF, 5%, 50V	912-4141-280	
C59-C121	NOT USED		
C122	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C123-C125	NOT USED		
	CAPACITOR, TEST SELECT		
C126	CAPACITOR,FXD MICA DIEL, 2PF, PORM 0.5PF, 300V	912-4141-540	
C126	CAPACITOR,FXD MICA DIEL, 3PF, PORM 0.5PF, 300V	912-4141-070	
C126	CAPACITOR,FXD MICA DIEL, 4PF, PORM 0.5PF, 300V	912-4141-080	
C126	CAPACITOR,FXD MICA DIEL, 5PF, PORM 0.5PF, 300V	912-4141-010	
C126	CAPACITOR,FXD MICA DIEL, 6PF, PORM 0.5PF, 300V	912-4141-090	
C127,	CAPACITOR,FXD CER DIEL, 0.1UF, 10%, 100V	913-5019-440	
C128			
FL1,FL2	FILTER,RAD INTR 1750PF	241-5006-010	
FL3	NOT USED		
FL4,FL5	FILTER,RAD INTR 1750PF	241-5006-010	
FL6-FL9	NOT USED		
FL10-FL13	FILTER,RAD INTR 1750PF	241-5006-010	
FL14	FILTER,BP 109.35 MHZ	293-1222-030	
FL15,	FILTER,RAD INTR 1750PF	241-5006-010	
FL16			
FL17	NOT USED		
FL18	FILTER,RAD INTR 1750PF	241-5006-010	
FL19,	NOT USED		
FL20			
FL21	FILTER,RAD INTR 1750PF	241-5006-010	
FL22,	NOT USED		
FL23			
FL24-FL27	FILTER,RAD INTR 1750PF	241-5006-010	
FL28	NOT USED		
FL29-FL46	FILTER,RAD INTR 1750PF	241-5006-010	
J1	CONNECTOR,RCPT ELEC	357-7207-030	
J2	NOT USED		
J3	CONNECTOR,RCPT ELEC	357-7207-030	
J4	NOT USED		
J5,J6	CONNECTOR,RCPT ELEC	357-7207-030	
L1-L43	NOT USED		
L44	COIL,RF 220UH	240-2723-060	
L45-L56	NOT USED		
L57	COIL,RF 12UH	240-1581-000	
L58	COIL,RF 4.70UH	240-2711-210	
L59,L60	COIL,RF 15UH	240-1602-000	
L61	COIL,RF 470UH	240-2715-450	
L62-L70	COIL,RF 100UH	240-2715-370	
Q1-Q8	NOT USED		
Q9	TRANSISTOR, FET U322 (TEST SELECT)	637-9117-002	
Q10	TRANSISTOR 2N5109	352-0766-010	
Q11-Q13	NOT USED		
Q14	TRANSISTOR 2N5109	352-0766-010	
R1-R16	NOT USED		
R17	RESISTOR,FXD CMPSN, 4.7K, 10%, 1/4W	745-0773-000	
R18-R138	NOT USED		
	RESISTOR, TEST SELECT		
R139	RESISTOR,FXD CMPSN, 180 OHMS, 10%, 1/4W	745-0722-000	
R139	RESISTOR,FXD CMPSN, 82 OHMS, 10%, 1/4W	745-0710-000	
R139	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/4W	745-0713-000	
R139	RESISTOR,FXD CMPSN, 150 OHMS, 10%, 1/4W	745-0719-000	
R139	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/4W	745-0728-000	
	RF FILTER BOARD A1	638-6099-001	
CR1-CR4	SEMICOND DEVICE 1N4454	353-3644-010	
CR5	SEMICOND DEVICE 1N5711	353-3691-010	
CR6-CR8	NOT USED		
CR9,CR10	SEMICOND DEVICE MPD400	353-3723-030	
C1	CAPACITOR,FXD MICA DIEL, 180PF, 5%, 500V	912-2834-000	
C2	CAPACITOR,FXD MICA DIEL, 330PF, 5%, 500V	912-2852-000	
C3	CAPACITOR,FXD ELCTLT, 4.7UF, 20%, 35V	184-9102-390	
C4	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C5	CAPACITOR,FXD MICA DIEL, 3PF, PORM 0.5PF, 300V	912-4141-070	
C6	CAPACITOR,FXD MICA DIEL, 18PF, PORM 0.5PF, 100V	912-4141-140	
C7	CAPACITOR,FXD MICA DIEL, 200PF, 5%, 50V	912-4141-440	
C8	CAPACITOR,FXD MICA DIEL, 110PF, 5%, 50V	912-4141-370	
C9,C10	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C11-C13	NOT USED		
C14	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C15-C20	NOT USED		
C21	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
K1	RELAY,AMT	974-1065-090	
L1	COIL,RF 220UH	240-2723-060	

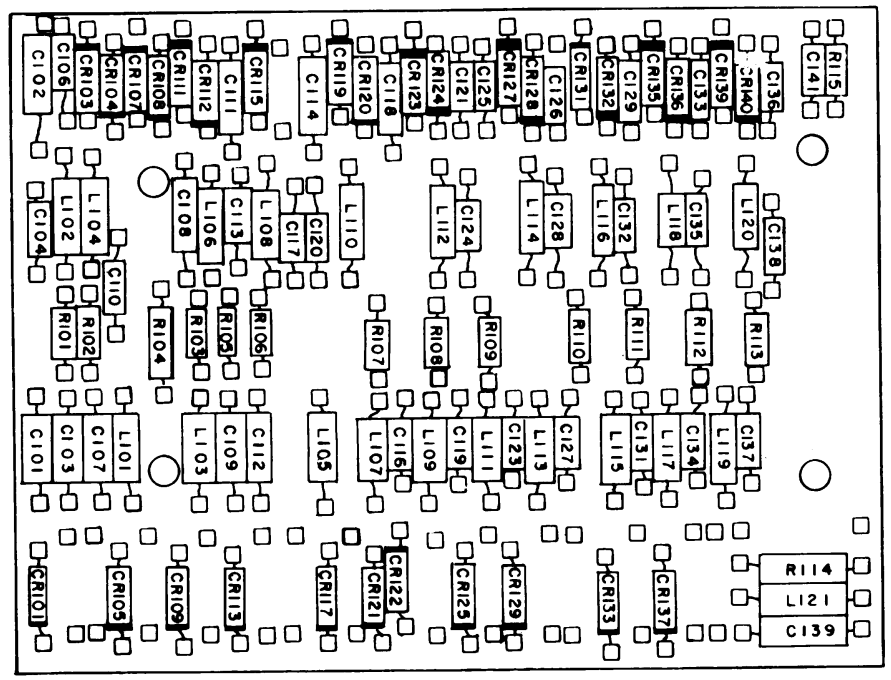
PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
L2,L3	COIL,RF 0.33UH	240-2745-010	
L4-L8	NOT USED		
L9	COIL,RF 1000UH	240-2540-000	
L10-L20	NOT USED		
L21	COIL,RF 220UH	240-2723-060	
Q1	TRANSISTOR 2N2222A	352-0661-020	
R1	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/4W	745-0764-000	
R2	RESISTOR,FXD CMPSN, 68K, 10%, 1/4W	745-0815-000	
R3	RESISTOR,FXD CMPSN, 1K, 10%, 1/4W	745-0749-000	
R4	RESISTOR,FXD CMPSN, 2.2K, 10%, 1W	745-3366-000	
R5	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/4W	745-0701-000	
VR1,VR2	SEMICOND DEVICE 1N753A	353-2714-000	
	FIRST MIXER BOARD A2	635-0782-003	
CR1-CR18	NOT USED		
CR19, CR20	SEMICOND DEVICE 1N5767	922-6119-010	
CR21	SEMICOND DEVICE 1N4001	353-6442-010	
C1-C27	NOT USED		
C28	CAPACITOR,FXD MICA DIEL, 27PF, 5%, 50V	912-4141-180	
C29	CAPACITOR,FXD MICA DIEL, 150PF, 5%, 50V	912-4141-400	
C30	CAPACITOR,FXD MICA DIEL, 12PF, PORM 0.5PF, 300V	912-4141-120	
C31	CAPACITOR,FXD MICA DIEL, 36PF, 5%, 50V	912-4141-240	
C32	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C33	CAPACITOR,FXD MICA DIEL, 240PF, 5%, 50V	912-4141-460	
C34	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C35,C36	CAPACITOR,FXD CER DIEL, 0.047UF, 10%, 50V	913-5019-280	
C37	CAPACITOR,FXD MICA DIEL, 180PF, 5%, 50V	912-4141-430	
C38	CAPACITOR,FXD CER DIEL, 0.047UF, 10%, 50V	913-5019-280	
C39	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C40	CAPACITOR,FXD MICA DIEL, 180PF, 5%, 50V	912-4141-430	
C41	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C42	CAPACITOR,FXD MICA DIEL, 22PF, PORM 0.5PF, 300V	912-4141-030	
C43	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C44	CAPACITOR,FXD MICA DIEL, 33PF, 2%, 50V	912-4141-210	
C45	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C46	CAPACITOR,FXD MICA DIEL, 15PF, PORM 0.5PF, 300V	912-4141-130	
C47	CAPACITOR,FXD MICA DIEL, 330PF, 5%, 50V	912-4141-490	
C48,C49	CAPACITOR,FXD MICA DIEL, 20PF, PORM 0.5PF, 100V	912-4141-150	
C50	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C51	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C52	CAPACITOR,FXD CER DIEL, 470PF, 10%, 200V	913-4014-000	
C53	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C54,C55	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C56	CAPACITOR,FXD CER DIEL, 1000PF, 20%, 50V	913-3279-030	
C57-C76	NOT USED		
C77	CAPACITOR,FXD MICA DIEL, 47PF, 5%, 50V	912-4141-280	
L1-L13	NOT USED		
L14	COIL,RF 0.22UH	240-2015-000	
L15	COIL,RF 0.27UH	240-2016-000	
L16	COIL,RF 220UH	240-2723-060	
L17,L18	COIL,RF 2.70UH	240-2028-000	
L19,L20	COIL,RF 1UH	240-2023-000	
L21	NOT USED		
L22,L23	COIL,RF 2.70UH	240-2028-000	
L24	COIL,RF,VAR	242-0439-030	
L25	COIL,RF 0.15UH	240-2013-000	
L26-L39	NOT USED		
L40	COIL,RF 2.70UH	240-2028-000	
L41-L68	NOT USED		
L69	COIL,RF 0.15UH	240-2013-000	
L70-L100	NOT USED		
L101	COIL,RF 27UH	240-2040-000	
Q1-Q6	NOT USED		
Q7,Q8	TRANSISTOR, FET U322 (MATCHED SET)	637-9117-001	
Q9,Q10	NOT USED		
Q11	TRANSISTOR 2N5109	352-0766-010	
RT1	RESISTOR,THRM 40 OHMS, 10%, 0.5W	714-1725-000	
RT2	RESISTOR,THRM 100 OHMS, 10%, 1W	714-1730-000	
R1-R29	NOT USED		
R30	RESISTOR,FXD CMPSN, 68 OHMS, 10%, 1/4W	745-0707-000	
R31	RESISTOR,VAR 1K, 5%, 3/4W	381-1853-170	
R32	RESISTOR,FXD FILM, 226 OHMS, 1%, 1/8W	705-0965-000	
R33	RESISTOR,FXD FILM, 681 OHMS, 1%, 1/8W	705-0988-000	
R34	RESISTOR,FXD CMPSN, 3.3K, 10%, 1/4W	745-0767-000	
R36	RESISTOR,FXD CMPSN, 330 OHMS, 10%, 1/8W	745-2323-000	
R37	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/4W	745-0725-000	
R38	RESISTOR,FXD CMPSN, 27 OHMS, 10%, 1/4W	745-0692-000	
R39	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/4W	745-0728-000	
R40	RESISTOR,FXD CMPSN, 18 OHMS, 10%, 1/4W	745-0686-000	
R41	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/4W	745-0728-000	
R42	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/4W	745-0764-000	
R43	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/4W	745-0761-000	
R44,R45	RESISTOR,FXD CMPSN, 16 OHMS, 5%, 1/8W	745-1863-060	
R46	NOT USED		
R47	RESISTOR,FXD CMPSN, 68 OHMS, 10%, 1/8W	745-2298-000	
R48	RESISTOR,FXD CMPSN, 68 OHMS, 10%, 1/4W	745-0707-000	
R49	RESISTOR,FXD CMPSN, 390 OHMS, 10%, 1/4W	745-0734-000	

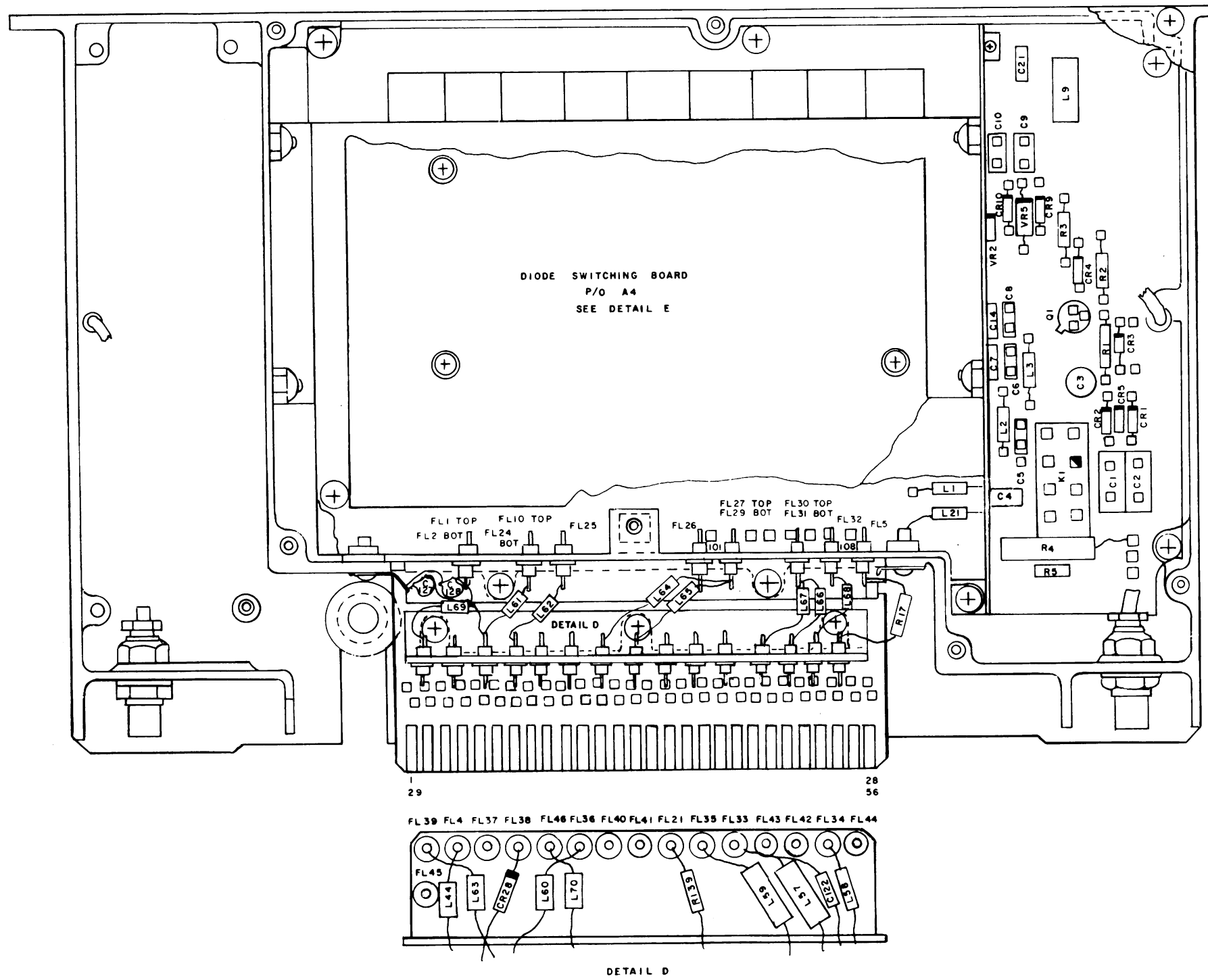
PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
R50	RESISTOR,FXD CMPSN, 27 OHMS, 10%, 1/4W	745-0692-000	
R51	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/4W	745-0713-000	
R52-R141	NOT USED		
R142	RESISTOR,FXD CMPSN, 1.6K, 5%, 1/8W	745-1863-540	
R143	NOT USED		
R144, R145	RESISTOR,FXD CMPSN, 110 OHMS, 5%, 1/8W	745-1863-260	
T1	TRANSFORMER,RF	278-0430-160	
T2	TRANSFORMER,RF	278-0430-190	
T3	TRANSFORMER,RF	278-0431-020	
T4	TRANSFORMER,RF	278-0431-010	
	SECOND MIXER BOARD A3	635-0784-004	
CR1-CR21	NOT USED		
CR22, CR23	SEMICOND DEVICE 1N5767	922-6119-010	
CR24, CR25	NOT USED		
CR26, CR27	SEMICOND DEVICE 1N5767	922-6119-010	
C1-C58	NOT USED		
C59	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C60	CAPACITOR,FXD MICA DIEL, 36PF, 5%, 50V	912-4141-240	
C61	CAPACITOR,FXD MICA DIEL, 27PF, 5%, 50V	912-4141-180	
C62	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C63	CAPACITOR,FXD MICA DIEL, 15PF, PORM 0.5PF, 300V	912-4141-130	
C64	CAPACITOR,FXD MICA DIEL, 110PF, 5%, 50V	912-4141-370	
C65	CAPACITOR,FXD MICA DIEL, 220PF, 5%, 50V	912-4141-450	
C66	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C67	CAPACITOR,FXD MICA DIEL, 240PF, 5%, 50V	912-4141-460	
C68	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C69	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C70	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C71	CAPACITOR,FXD MICA DIEL, 62PF, 5%, 50V	912-4141-320	
C72	CAPACITOR,FXD MICA DIEL, 150PF, 5%, 50V	912-4141-400	
C73	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-180	
C74,C75	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-200	
C76	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C77	NOT USED		
C78	CAPACITOR,FXD MICA DIEL, 24PF, PORM 0.5PF, 50V	912-4141-160	
C79,C80	NOT USED		
C81	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C82-C122	NOT USED		
C123	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C124	NOT USED		
C125	CAPACITOR,FXD CER DIEL, 4700PF, 20%, 50V	913-3279-090	
L1-L25	NOT USED		
L26	COIL,RF,VAR	242-0439-020	
L27	COIL,RF 2.70UH	240-2028-000	
L28	COIL,RF 22UH	240-2039-000	
L29	COIL,RF,VAR	242-0439-020	
L30	COIL,RF 2.70UH	240-2028-000	
L31	COIL,RF 27UH	240-2040-000	
L32,L33	COIL,RF 0.15UH	240-2013-000	
L34	COIL,RF 0.33UH	240-2017-000	
M1	MIXER,RF	277-0405-010	
Q1-Q11	NOT USED		
Q12	TRANSISTOR,FET U310	352-1042-010	
Q13	TRANSISTOR 2N5109	352-0766-010	
RT1,RT2	NOT USED		
RT3	RESISTOR,THRM 40 OHMS, 10%, 0.5W	714-1725-000	
R1-R51	NOT USED		
R52	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/4W	745-0701-000	
R53	RESISTOR,FXD CMPSN, 68 OHMS, 10%, 1/4W	745-0707-000	
R54	RESISTOR,FXD CMPSN, 470 OHMS, 10%, 1/4W	745-0737-000	
R55	RESISTOR,FXD CMPSN, 27 OHMS, 10%, 1/4W	745-0692-000	

RF Translator, Schematic Diagram
Figure 4 (Sheet 2)



DETAIL E



DETAIL D

TPA-1047-028

RF Translator, Schematic Diagram
Figure 4 (Sheet 3)

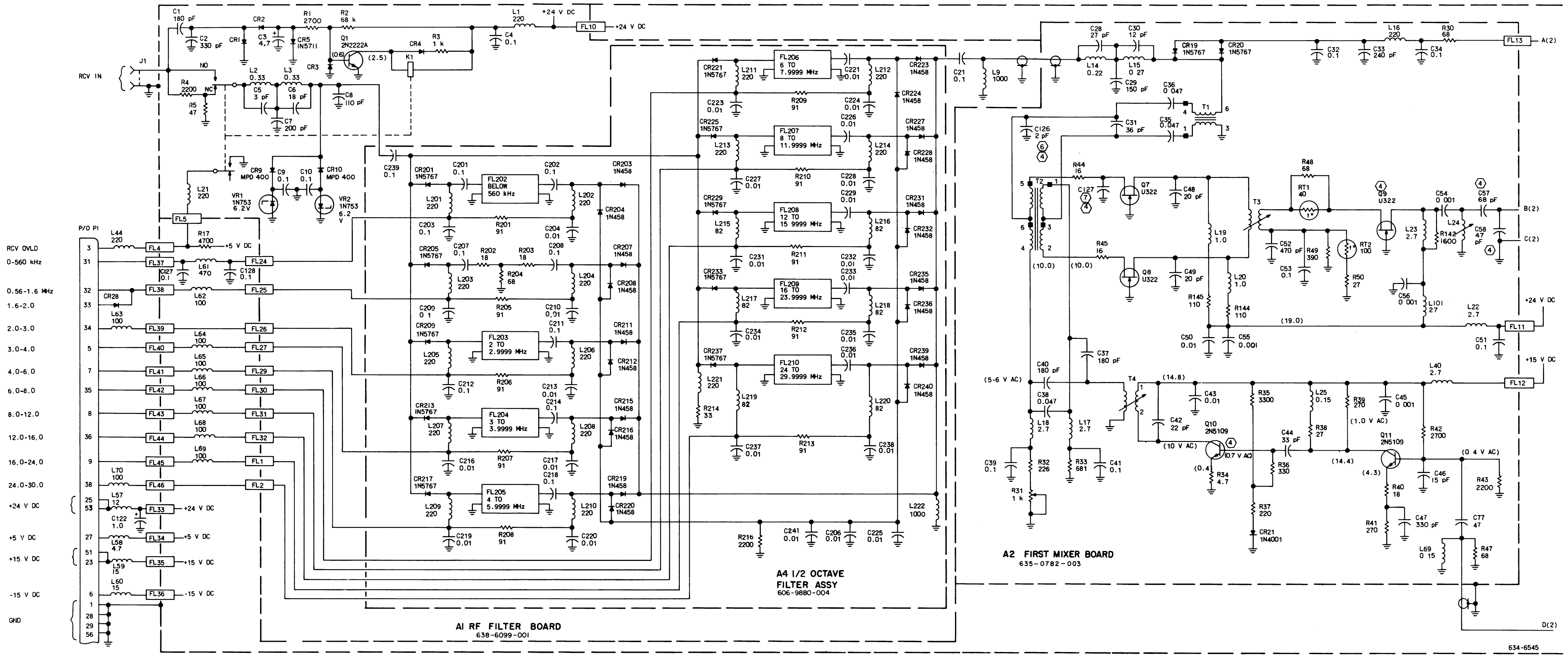
PARTS LIST

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
R56,R57	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/4W	745-0764-000	
R58	RESISTOR,FXD CMPSN, 56 OHMS, 10%, 1/8W	745-2295-000	
R54	RESISTOR,FXD CMPSN, 56 OHMS, 10%, 1/4W	745-0704-000	
R60,R61	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/4W	745-0764-000	
R62	RESISTOR,FXD CMPSN, 4.7 OHMS, 5%, 1/4W	745-4382-000	
R63	RESISTOR,FXD CMPSN, 10 OHMS, 10%, 1/4W	745-0677-000	
R64	RESISTOR,FXD CMPSN, 150 OHMS, 10%, 1/4W	745-0719-000	
R65-R67	NOT USED		
R68	RESISTOR,VAR 100 OHMS, 30%, 1/2W	382-0008-040	
R69	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/4W	745-0728-000	
R70-R79	NOT USED		
R80	RESISTOR,FXD CMPSN, 68 OHMS, 10%, 1/4W	745-0707-000	
R81-R142	NOT USED		
R143	RESISTOR,FXD CMPSN, 22 OHMS, 10%, 1/4W	745-0689-000	
T1-T4	NOT USED		
T5	TRANSFORMER,RF	278-0430-170	
T6	TRANSFORMER,RF	278-0430-150	
	1/2 OCTAVE FILTER BOARD A4	606-9880-004	
FL1-FL201	NOT USED		
FL202	FILTER,LP	241-0685-010	
FL203	FILTER,BANDPASS	241-0619-010	
FL204	FILTER,BANDPASS	241-0619-020	
FL205	FILTER,BANDPASS	241-0619-030	
FL206	FILTER,BANDPASS	241-0619-040	
FL207	FILTER,BANDPASS	241-0619-050	
FL208	FILTER,BANDPASS	241-0619-060	
FL209	FILTER,BANDPASS	241-0619-070	
FL210	FILTER,BANDPASS	241-0619-080	
	DIODE SWITCHING BOARD (P/O A4)	778-2934-004	
CR1-CR200	NOT USED		
CR201	SEMICOND DEVICE 1N5767	922-6119-010	
CR202	NOT USED		
CR203,CR204	SEMICOND DEVICE 1N458	353-0205-000	
CR205	SEMICOND DEVICE	922-6119-010	
CR206	NOT USED		
CR207,CR208	SEMICOND DEVICE 1N458	353-0205-000	
CR209	SEMICOND DEVICE 1N5767	922-6119-010	
CR210	NOT USED		
CR211,CR212	SEMICOND DEVICE 1N458	353-0205-000	
CR213	SEMICOND DEVICE 1N5767	922-6119-010	
CR214	NOT USED		
CR215	SEMICOND DEVICE 1N458	353-0205-000	
CR216	NOT USED		
CR217	SEMICOND DEVICE 1N5767	922-6119-010	
CR218	NOT USED		
CR219,CR220	SEMICOND DEVICE 1N458	353-0205-000	
CR221	SEMICOND DEVICE 1N5767	922-6119-010	
CR222	NOT USED		
CR223,CR224	SEMICOND DEVICE 1N458	353-0205-000	
CR225	SEMICOND DEVICE 1N5767	922-6119-010	
CR226	NOT USED		
CR227,CR228	SEMICOND DEVICE 1N458	353-0205-000	
CR229	SEMICOND DEVICE 1N5767	922-6119-010	
CR230	NOT USED		
CR231,CR232	SEMICOND DEVICE 1N458	353-0205-000	
CR233	SEMICOND DEVICE 1N5767	922-6119-010	
CR234	NOT USED		
CR235,CR236	SEMICOND DEVICE	353-0205-000	
CR237	SEMICOND DEVICE 1N5767	922-6119-010	
CR238	NOT USED		
CR239,CR240	SEMICOND DEVICE 1N458	353-0205-000	
C1-C200	NOT USED		
C201-C203	CAPACITOR,FXD CER DIEL, 100,000PF, 20%, 50V	913-5661-240	
C204	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
C205	NOT USED		
C206	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
C207-C209	CAPACITOR,FXD CER DIEL, 100,000PF, 20%, 50V	913-5661-240	
C210	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
C211,C212	CAPACITOR,FXD CER DIEL, 100,000PF, 20%, 50V	913-5661-240	
C213	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
C214	CAPACITOR,FXD CER DIEL, 100,000PF, 20%, 50V	913-5661-240	
C215	NOT USED		
C216,C217	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
C218	CAPACITOR,FXD CER DIEL, 100,000PF, 20%, 50V	913-5661-240	
C219-C221	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	

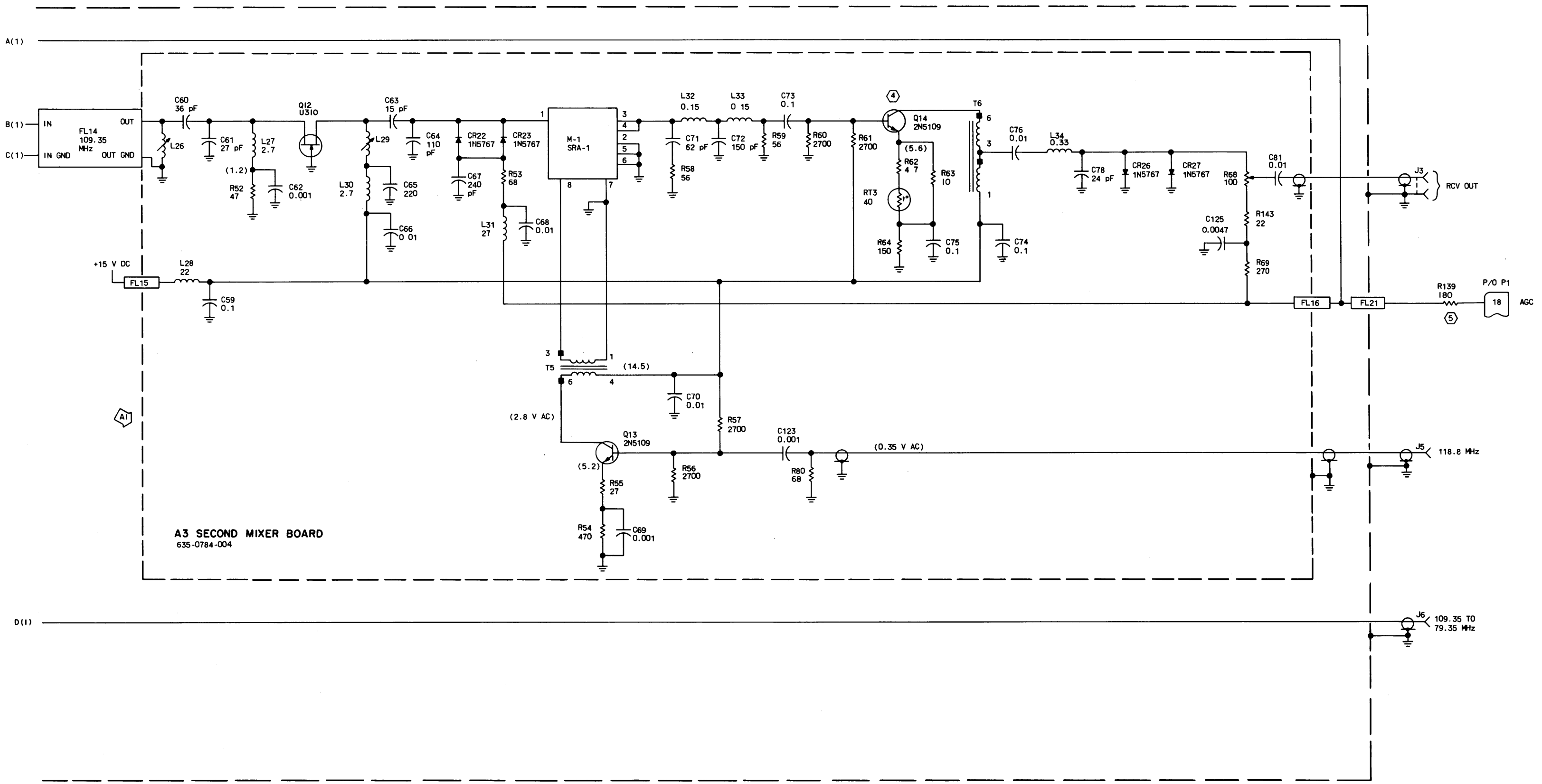
PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
C222	NOT USED		
C223-C229	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
C230	NOT USED		
C231-C238	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
C239	CAPACITOR,FXD CER DIEL, 100,000PF, 20%, 50V	913-5661-240	
C240	NOT USED		
C241	CAPACITOR,FXD CER DIEL, 10,000PF, 10%, 100V	913-5661-120	
L1-L200	NOT USED		
L201-L214	COIL,RF 220UH	240-2524-000	
L215-L220	COIL,RF 82UH	240-2514-000	
L221	COIL,RF 220UH	240-2524-000	
L222	COIL,RF 1000UH	240-2540-000	
R1-R200	NOT USED		
R201	RESISTOR,FXD CMPSN, 91 OHMS, 5%, 1/4W	745-0711-000	
R202,R203	RESISTOR,FXD CMPSN, 18 OHMS, 5%, 1/4W	745-0685-000	
R204	RESISTOR,FXD CMPSN, 68 OHMS, 5%, 1/2W	745-1302-000	
R205-R213	RESISTOR,FXD CMPSN, 91 OHMS, 5%, 1/4W	745-0711-000	
R214	RESISTOR,FXD CMPSN, 33 OHMS, 10%, 1/2W	745-1289-000	
R215	NOT USED		
R216	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/4W	745-0761-000	

RF Translator, Schematic Diagram
Figure 4 (Sheet 4)



RF Translator, Schematic Diagram
Figure 4 (Sheet 5)



NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, AND INDUCTANCE VALUES ARE IN MICROHENRYS.
2. UNLESS OTHERWISE SPECIFIED, DIODES ARE TYPE 1N4454
3. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR COMPLETE DESIGNATION PREFIX WITH UNIT AND/OR ASSEMBLY DESIGNATION.
4. INSTALLED ON NEXT HIGHER ASSEMBLY (637-3757-001).
5. TEST SELECT (82,100,150,180,270 OHM)
6. TEST SELECT (2,3,4,5,6 pF)
7. TEST SELECT (1,2 pF)

634-6545

RF Translator, Schematic Diagram
Figure 4 (Sheet 6)