Channel A IF (637-2650-( ))

Rockwell International

instructions

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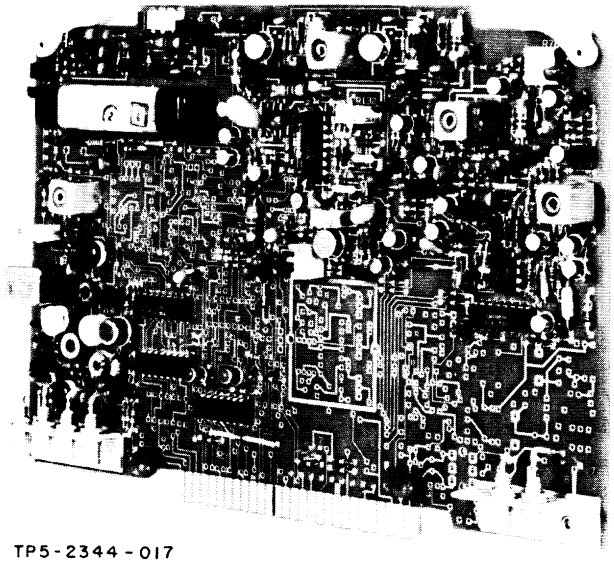
1. DESCRIPTION

Channel A IF 637-2650-( ), shown in figure 1, is a 2-layer planar card with 56-pin edge-on connector (2 layers, 28 pins each). The channel A if card has subminiax rf connectors for connecting to channel B if input (J1), 9.45-MHz receive input (J2), 9.9-MHz injection input (J3), channel B if output (J4), 450-kHz injection input (J5), and 450-kHz receive if input (J6).

The channel A if card consists of filter control, channel A if, channel A audio detector, and channel A AGC circuits.



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Channel A IF
Figure 1

The channel A if configuration differences are as follows:

a. 637-2650-001, FL1 has 2.75-kHz bandwidth (250 to 3000 Hz, USB).
b. 637-2650-002, FL1 has 3.05-kHz bandwidth (250 to 3300 Hz, USB).
c. 637-2650-003, FL1 has 3.10-kHz bandwidth (300 to 3400 Hz, USB).
d. 637-2650-004, reserved.
e. 637-2650-005, FL1 has 5.80-kHz bandwidth (200 to 6000 Hz, USB).

2. PRINCIPLES OF OPERATION

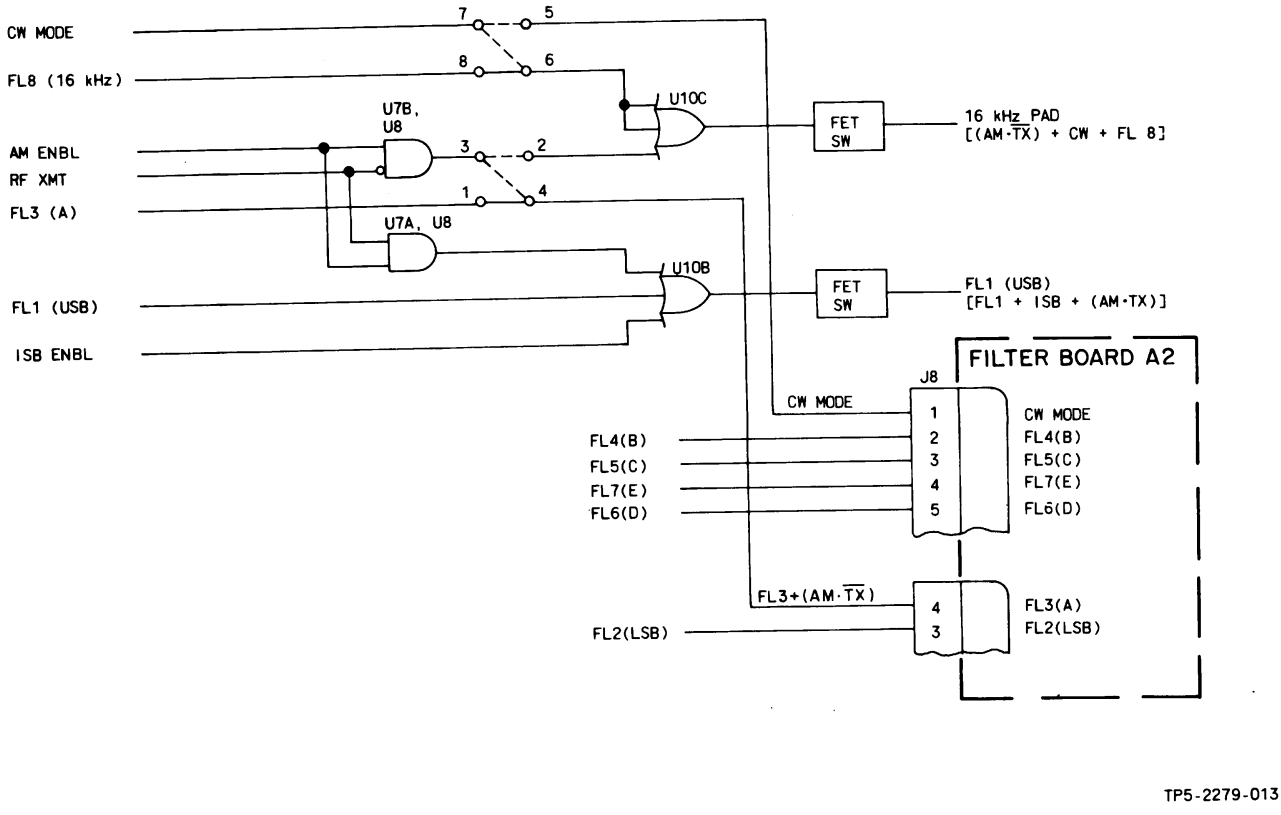
2.1 General

The channel A if receives the 9.45-MHz receive if input; mixes it with a 9.9-MHz fixed injection signal; filters the resulting 450-kHz receive if signal; and provides (1) 450-kHz receive if output, (2) AM audio output, (3) a product detected channel A SSB audio output, and (4) AGC control signals.

2.2 Bandpass Filter Control Circuits (Refer to figure 2.)

The channel A if provides filter selection for receive if signals. Filter selection is initiated by the mode control signal, bandwidth control signal, and/or rf transmit signal. This means only that these signals are applied to the channel A if card to initiate filter selection and does not reflect a mode of operation, selection of a bandwidth, or transmission of an rf signal.

NOTICE: This section replaces second edition dated 1 June 1978.



Bandpass Filter Control Circuits
Figure 2

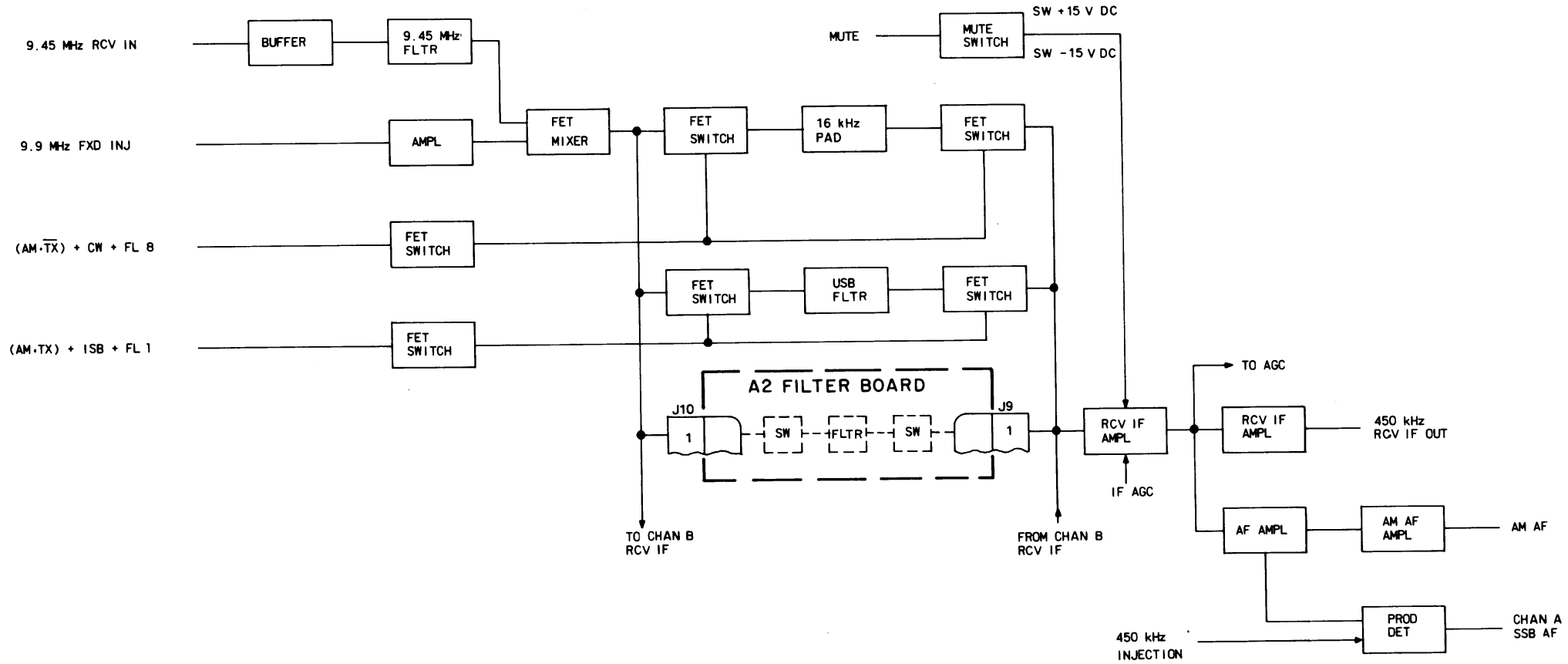
FL1 (USB) is selected when an FL1 (USB) enable signal, an ISB enable signal, and/or AM enable and rf transmit signals are applied to the channel A if card.

When strapped, 8-6 and 1-4: FL8 (16-kHz pad) is selected when an FL8 (16 kHz) enable signal is applied to the channel A if card. FL3 (A) is selected on A2 filter board when an FL3 (A) enable signal is applied to channel A if card (A2 is optional board).

FL2 (LSB), FL4 (B), FL5 (C), FL6 (D), and FL7 (E) are selected when the associated enable signal is applied to the channel A if card. These filters are mounted (if used) on the optional A2 filter board.

2.3 Channel A IF Circuits (Refer to figure 3.)

The channel A if card receives 9.45-MHz receive if through a buffer and a 9.45-MHz filter. The 9.45-MHz receive if is mixed in an FET mixer with a 9.9-MHz fixed injection signal and supplies a 450-kHz if frequency to the bandpass filter networks. Bandpass filters are located on the channel A if card, the A2 filter board, and/or an associated channel B if card. After mode/bandwidth selection, the 450-kHz if signal is supplied through the associated bandpass filter and amplified. The amplified 450 kHz is then



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Channel A IF Circuits
Figure 3

applied to AGC circuits, a receive if amplifier as an external 450-kHz receive if output, an audio amplifier to an AM audio detector, and/or the SSB audio product detector. The AM audio amplifier detects the audio and provides an AM audio output. The SSB product detector receives the receive if and a 450-kHz injection and supplies a product detected SSB audio output.

2.4 AGC Circuits (Refer to figure 4.)

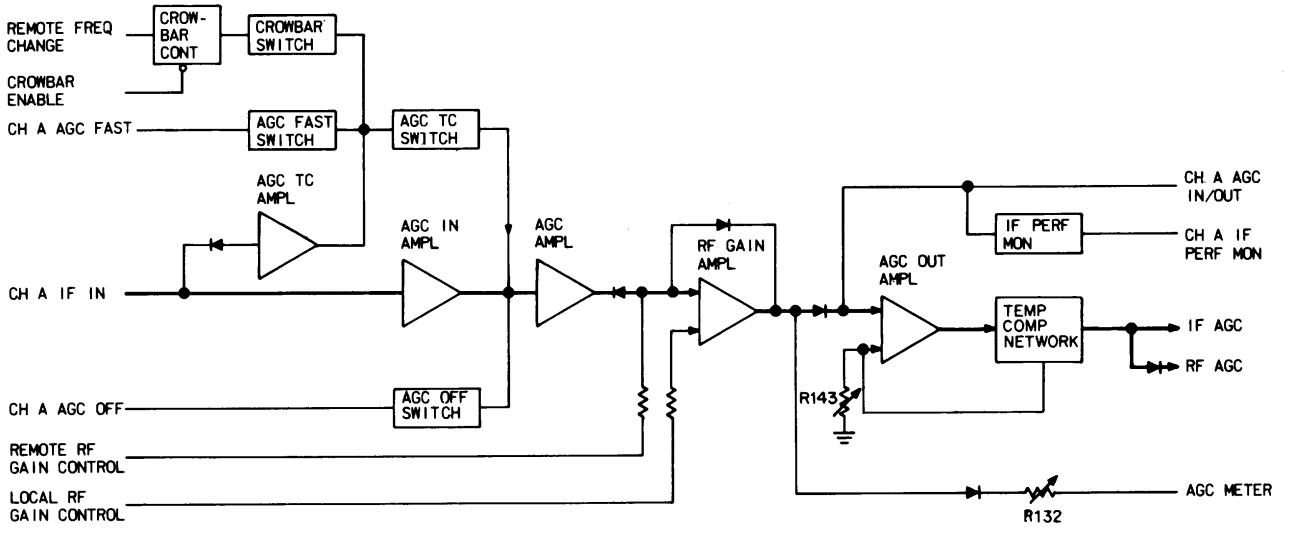
Channel A if is received by the AGC input amplifier. The AGC input amplifier and associated AGC time constant switches develop the AGC level and decay time to be used by the receiver. The AGC level is amplified and applied through rf gain amplifier and supplied to the if performance monitor and AGC output amplifier. The if AGC and rf AGC signals are developed and supplied to the associated attenuator circuits. With the AGC control in the SLOW position, only the AGC time constant amplifier and AGC time constant switch are enabled and establish a 1.0-second AGC decay time. (The AGC to amplifier and AGC to switch are enabled for all AGC functions.)

With the AGC control in the FAST position, the AGC fast switch is enabled reducing the time constant of the AGC circuits and establishing a 0.1-second AGC decay time. With the AGC control in the OFF position, the output of the AGC input amplifier is disabled and removed from the input of the AGC amplifier.

With the receiver in remote control and a crowbar enable applied, a remote frequency change enables the crowbar switch and reduces the AGC time constant and establishes the AGC decay time at about 2 milliseconds. The crowbar function is used for fast frequency hopping or scanning operation under processor control.

The gain of the rf gain amplifier is controlled by a local rf gain control signal. The dc voltage level applied to the noninverting input of the rf gain amplifier establishes its gain. The remote rf gain control signal establishes the minimum gain output of the rf gain amplifier.

R132 sets the level for the correct reading of the AGC meter (0 dB at 1-μV input to 100 dB above the 1-μV input).



AGC Circuits
Figure 4

From the rf gain amplifier, the AGC output is supplied to channel A AGC output for use by other cards and to the channel A if performance monitor for channel A AGC indications. The rf gain amplifier output is supplied to AGC output amplifier that develops the if/rf AGC outputs. R143 and temperature compensating network are used to keep the if/rf AGC outputs constant throughout the temperature range.

2.5 Differential Output Operational Amplifier 351-1050-030 (Refer to figure 5.)

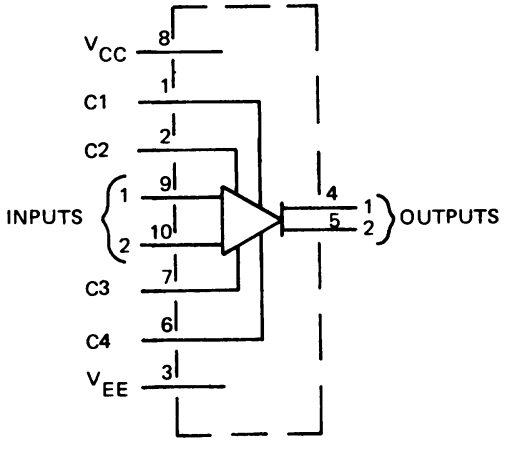
The 351-1050-030 is a wide-band general-purpose operational amplifier that features both differential inputs and outputs. Open loop gain is adjustable with external feedback components.

2.6 Quad Operational Amplifier 351-1141-030 (Refer to figure 6.)

The 351-1141-030 consists of four independent, high gain, internally frequency-compensated operational amplifiers that are designed to operate from a single power supply over a wide range of voltages. Common applications include transducer amplifiers, dc gain blocks, and all conventional operational amplifier circuits.

2.7 Dual Operational Amplifier 351-1071-070 (Refer to figure 7.)

The 351-1071-070 consists of two operational amplifiers in one package designed for use as summing amplifiers, integrators, or amplifiers with operating characteristics as a function of the external feedback components.



CHARACTERISTICS

SUPPLY VOLTAGE: V_{CC} +8 V DC MAX., V_{EE} −8 V DC MAX.

INPUT DIFF VOLTAGE: ±8 V DC MAX.

INPUT COMMON MODE VOLTAGE: ±3.0 V PEAK

INPUT RESISTANCE: 2.0 M OHM TYPICAL

OUTPUT RESISTANCE: 50 OHM TYPICAL

OPEN LOOP GAIN: SINGLE ENDED– 750 V/V MIN, 1500 V/V TYPICAL; DIFFERENTIAL – 1500 V/V MIN,. 3000 V/V TYPICAL

BANDWIDTH: OPEN LOOP–2.0 MHz TYPICAL; CLOSED LOOP –10.0 MHz TYPICAL

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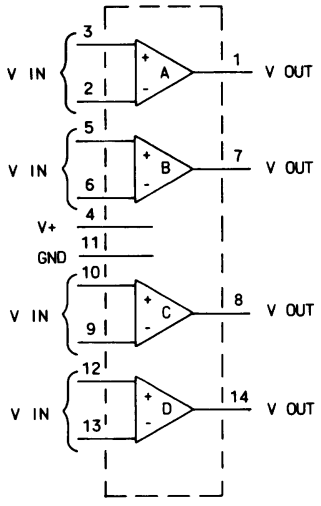
Differential Output Operational Amplifier 351-1050-030
Figure 5



CHARACTERISTICS
SUPPLY VOLTAGE (V+): 32 V DC MAX
INPUT DIFF VOLTAGE: 32 V DC MAX
INPUT COMMON MODE VOLTAGE: V+ (-1.5 V DC)
OUTPUT SHORT CIRCUIT DURATION:
CONTINUOUS ⟨1⟩
VOLTAGE GAIN: 25 MIN

NOTE:
⟨1⟩ SUPPLY VOLTAGE EQUAL TO OR LESS THAN 15 V.

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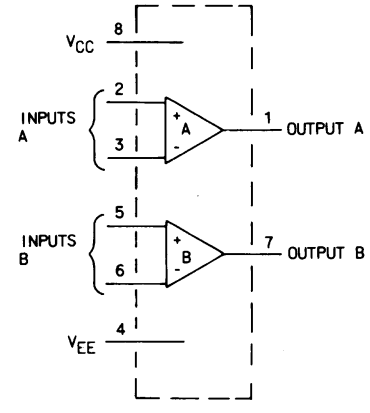
Quad Operational Amplifier 351-1141-030
Figure 6



CHARACTERISTICS
SUPPLY VOLTAGE: V_{CC} +18 V DC MAX
V_{EE} -18 V DC MAX
INPUT DIFF VOLTAGE: ±30 V MAX
INPUT COMMON MODE VOLTAGE:
±15 V MAX ⟨1⟩
OUTPUT SHORT CIRCUIT DURATION:
CONTINUOUS ⟨2⟩
INPUT RESISTANCE: 300 kΩ MIN, 2.0 MΩ MAX
OUTPUT RESISTANCE: 75Ω TYPICAL
VOLTAGE GAIN: 15 MIN

NOTES:
⟨1⟩ FOR SUPPLY VOLTAGE LESS THAN ±15.0 V, MAX INPUT VOLTAGE EQUAL TO SUPPLY VOLTAGE.
⟨2⟩ SUPPLY VOLTAGE EQUAL TO OR LESS THAN 15 V.

TP5-2285-013

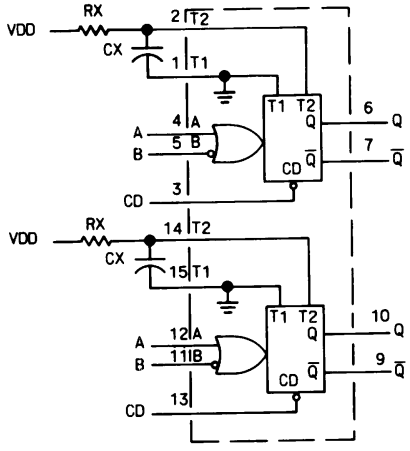
Dual Operational Amplifier 351-1070-070
Figure 7

2.8 Dual Monostable Multivibrator 351-8278-010 (Refer to figure 8.)

The 351-8278-010 is a dual, retriggerable, resettable monostable multivibrator. It may be triggered from either edge of an input pulse and will produce an accurate output pulse over a wide range of widths, the duration and accuracy of which are determined by the external timing components, C_X and R_X.

2.9 Balanced Modulator-Demodulator 351-0043-020 (Refer to figure 9.)

The 351-0043-020 is designed for use where the output voltage is a product of an input voltage (signal) and a switching function carrier. Typical applications include suppressed carrier and amplitude modulation, synchronous detection, FM detection, phase detection, and chopper applications.



NOTE:
RX AND CX ARE EXTERNAL COMPONENTS.

CHARACTERISTICS:
SUPPLY VOLTAGE (VDD): -0.5 TO +18 V DC.
INPUT VOLTAGE: EQUAL TO VDD, MAX.

CHARACTERISTIC		VDD 5.0 V DC	VDD 10.0 V DC	VDD 15.0 V DC
OUTPUT VOLTAGE	"0"	0.05 V DC MAX.	0.05 V DC MAX.	0.05 V DC MAX.
	"1"	4.95 V DC MIN.	9.95 V DC MIN.	14.95 V DC MIN.
INPUT VOLTAGE	"0"	2.25 V DC MAX.	4.50 V DC MAX.	6.75 V DC MAX.
	"1"	2.75 V DC MIN.	5.50 V DC MIN.	8.25 V DC MIN.
EXTERNAL TIMING	RX	1000 Ω MIN.	1000 Ω MIN.	1000 Ω MIN.
	CX	NO LIMITS	NO LIMITS	NO LIMITS

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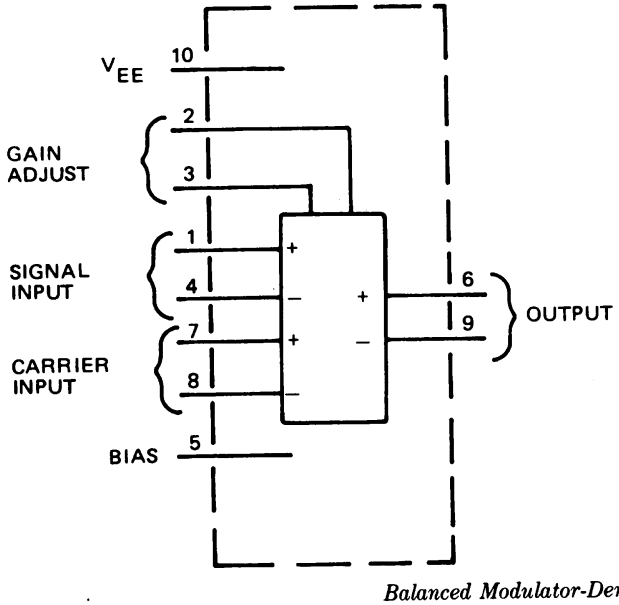
Dual Monostable Multivibrator 351-8278-010
Figure 8



CHARACTERISTICS

APPLIED VOLTAGE: 30 V DC MAX PIN–TO–IN.

DIFFERENTIAL INPUT VOLTAGE: ±5 V DC MAX

CARRIER SUPPRESSION: 65 dB TYPICAL AT 0.5 MHz; 50 dB TYPICAL AT 10 MHz.

TRANSADMITTANCE BANDWIDTH:
CARRIER INPUT–300 MHz TYPICAL;
SIGNAL INPUT–80 MHz TYPICAL

SINGLE-ENDED INPUT RESISTANCE (SIGNAL INPUT): 200 k OHM TYPICAL (AT 5.0 MHz)

SINGLE-ENDED INPUT RESISTANCE (SIGNAL INPUT): 40 k OHM TYPICAL (AT 10 MHz)

DIFFERENTIAL OUTPUT VOLTAGE SWING: 8.0 V P–P TYPICAL

TP5-2291-011

Balanced Modulator-Demodulator 351-0043-020
Figure 9

3. TESTING/TROUBLESHOOTING PROCEDURES

3.1 Test Equipment and Power Requirements

Test equipment and power sources required to test, troubleshoot, and repair the channel A if card are listed in the maintenance section of this instruction book.

3.2 Testing

The test procedures in table 1 check total performance of the channel A if card. 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.

Note

In emergencies, Channel A IF 637-2650-( ) can be replaced by Channel A IF 635-0819-( ). In this type of repair, use the test procedures given in table 1 to test Channel A IF 635-0819-( ).

Table 1. Channel A IF, Testing and Troubleshooting Procedures.

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1. Setup	a. Remove top cover of unit containing the channel A if that is to be tested.		
	b. Remove channel A if. Install it on an extender card 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 (TP1, brown):		
	P1-23 and P1-51	+15 ±1.0 V dc	Check associated power supply.
	P1-27	+5 ±0.5 V dc	
	P1-6	-15 ±1.0 V dc	
2. FL1 (USB) filter enable	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to A.		
	b. Measure dc voltage at TP2 to ground.	-9.5 ±1.0 V dc	Proceed to step n.
	c. Set front panel BANDWIDTH switch to USB.		
	d. Measure dc voltage at TP2 to ground.	NMT 0.5 V dc	Proceed to step o.
	e. Set front panel MODE switch to ISB.		
	f. Measure dc voltage at TP2 to ground.	NMT 0.5 V dc	Proceed to step p.
	g. Set front panel MODE switch to AM and BANDWIDTH switch to A.		
	h. Measure dc voltage at TP2 to ground.	-9.5 ±1.0 V dc	Proceed to step q.
	i. Connect a 4700-Ω resistor between P1-41 and +5 V dc.		
	j. Measure dc voltage at TP2 to ground.	NMT 0.5 V dc	Proceed to step r.
	k. Set front panel MODE switch to SSB/CW.		
	l. Measure dc voltage at TP2 to ground.	-9.5 ±1.0 V dc	Proceed to step s.
	m. Remove 4700-Ω resistor from P1-41 and +5 V dc.		
(Cont)	FL1 (USB) FILTER ENABLE TESTING COMPLETE		

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
2. (Cont)	TROUBLESHOOTING		
	n. Measure dc voltages at the following pins:		
	P1-14	NMT 0.5 V dc	Check FL1 (USB) input circuit.
	P1-35	NMT 0.5 V dc	Check AM enable input circuit.
	P1-41	NMT 0.5 V dc	Check rf transmit input circuit.
	P1-44	NMT 0.5 V dc	Check ISB enable input circuit.
		If voltages in step n are all normal, check U7, U8, U10, Q32, and associated circuit.	
	o. Measure dc voltage at P1-14.	NLT +3.0 V dc. Check U10, Q32, and associated circuit.	Check FL1 (USB) input circuit.
	p. Measure dc voltage at P1-44.	NLT +3.0 V dc. Check U10, Q32, and associated circuit.	Check ISB enable input circuit.
	q. Measure dc voltages at the following pins:		
	P1-14	NMT 0.5 V dc	Check FL1 (USB) input circuit.
	P1-35	NLT +3.0 V dc	Check AM enable input circuit.
	P1-41	NMT 0.5 V dc	Check rf transmit input circuit.
	P1-45	NMT 0.5 V dc	Check ISB enable input circuit.
		If voltages in step q are all normal, check U7, U8, U10, Q32, and associated circuit.	
	r. Measure dc voltage at P1-35.	NLT +3.0 V dc. If voltage is normal, check U7, U8, U10, Q32, and associated circuit.	Check AM enable input circuit.
(Cont)			

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
2. (Cont)	s. Measure dc voltages at the following pins:		
	P1-14	NMT 0.5 V dc	Check FL1 (USB) input circuit.
	P1-35	NMT 0.5 V dc	Check AM enable input circuit.
	P1-41	NLT +3.0 V dc	Check rf transmit input circuit.
	P1-45	NMT 0.5 V dc	Check ISB enable input circuit.
		If voltages in step s are all normal, check U7, U8, U10, Q32 and associated circuit.	
3. FL3 (A) filter enable	***Note***		
	With channel A if strapped 1-4, perform steps a thru d.		
	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to 16.		
	b. Measure dc voltage at J10-4.	NMT 0.5 V dc	Proceed to step k.
	c. Set BANDWIDTH switch to A.		
	d. Measure dc voltage at J10-4.	NLT +3.0 V dc	Proceed to step l.
	Note		
	With channel A if strapped 3-4, perform steps e thru j.		
	e. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to 16.		
	f. Measure dc voltage at J10-4.	NMT 0.5 V dc	Proceed to step m.
	g. Set MODE switch to AM.		
	h. Measure dc voltage at J10-4.	NLT +3.0 V dc	Proceed to step n.
	i. Apply +4.0-V dc signal to P1-41.		
	j. Measure dc voltage at J10-4.	NMT 0.5 V dc	Check U8, U7, and associated circuit.
(Cont)	FL3 (A) FILTER ENABLE TESTING COMPLETE		

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
3. (Cont)	TROUBLESHOOTING		
	k. Measure dc voltage at P1-15.	NMT 0.5 V dc. Check that a strap is installed from 1 to 4, and that no other strap is attached to 4.	Check FL3 (A) input circuit.
	l. Measure dc voltage at P1-15.	NLT +3.0 V dc. Check that a strap is installed from 1 to 4.	Check FL3 (A) input circuit.
	m. Measure dc voltage at P1-35.	NMT 0.5 V dc. Check U7, U8, and associated circuit. Check that a strap is installed from 3 to 4.	Check AM enable input circuit.
	n. Measure dc voltage at P1-35.	NLT +3.0 V dc. Proceed to step o.	Check AM enable input circuit.
	o. Measure dc voltage at P1-41.	NMT 0.5 V dc. Check U7, U8, and associated circuit. Check that a strap is installed from 3 to 4, and that no other strap is attached to 4.	Check rf transmit input circuit.
4. FL4 (B), FL5 (C), FL6 (D), and filter enable FL (E)	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to 16.		
	b. Measure dc voltage at each of the following pins:		
	J8-2	NMT 0.5 V dc	Proceed to step k.
	J8-3	NMT 0.5 V dc	
	J8-5	NMT 0.5 V dc	
	J8-4	NMT 0.5 V dc	
	c. Set BANDWIDTH switch to B.		
	d. Measure dc voltage at J8-2.	NLT +3.0 V dc	Proceed to step l.
	e. Set BANDWIDTH switch to C.		
	f. Measure dc voltage at J8-3.	NLT +3.0 V dc	Proceed to step m.
	g. Set BANDWIDTH switch to D.		
(Cont)	h. Measure dc voltage at J8-5.	NLT +3.0 V dc	Proceed to step n.

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
4. (Cont)	i. Set BANDWIDTH switch to E.		
	j. Measure dc voltage at J8-4.	NLT +3.0 V dc	Proceed to step o.
	FL4 (B), FL5 (C), FL6 (D), AND FL7 (E) FILTER ENABLE TESTING COMPLETE		
	TROUBLESHOOTING		
	k. Measure dc voltage at each of the following pins:		
	P1-43	NMT 0.5 V dc	Check FL4 (B) input circuit.
	P1-16	NMT 0.5 V dc	Check FL5 (C) input circuit.
	P1-45	NMT 0.5 V dc	Check FL6 (D) input circuit.
	P1-17	NMT 0.5 V dc	Check FL7 (E) input circuit.
		If the above voltages are normal and those in step b are not, check card for shorts.	
	l. Measure dc voltage at P1-43.	NLT +3.0 V dc. Check card for open circuit between P1-43 and J8-2.	Check FL4 (B) input circuit.
	m. Measure dc voltage at P1-16.	NLT +3.0 V dc. Check card for open circuit between P1-16 and J8-3.	Check FL5 (C) input circuit.
	n. Measure dc voltage at P1-45.	NLT +3.0 V dc. Check card for open circuit between P1-45 and J8-5.	Check FL6 (D) input circuit.
	o. Measure dc voltage at P1-17.	NLT +3.0 V dc. Check card for open circuit between P1-17 and J8-4.	Check FL7 (E) input circuit.
5. FL8 (16 kHz) filter enable	*Note* With channel A if strapped 6-8, perform steps a thru d.		
	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to B.		
	b. Measure dc voltage at TP4 to ground.	-9.5 ±1.0 V dc	Proceed to step q.
(Cont)	c. Set BANDWIDTH switch to 16.		

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
5. (Cont)	d. Measure dc voltage at TP4 to ground.	NMT 0.5 V dc	Proceed to step r.
	Note With channel A if strapped 6-7, perform steps e thru i.		
	e. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to B.		
	f. Measure dc voltage at TP4 to ground.	-9.5 ±1.0 V dc	Proceed to step s.
	g. Apply +5.0 V dc at P1-38.		
	h. Measure dc voltage at TP4 to ground.	NMT 0.5 V dc	Check U10, Q33, and associated circuit. Check that a strap is installed from 6 to 7.
	i. Remove +5.0 V dc from P1-38.		
	Note With channel A if strapped 2-3, perform steps j thru p.		
	j. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to B.		
	k. Measure dc voltage at TP4 to ground.	-9.5 ±1.0 V dc	Proceed to step t.
	l. Set front panel MODE switch to AM.		
	m. Measure dc voltage at TP4 to ground.	NMT 0.5 V dc	Proceed to step u.
	n. Apply +5.0 V dc at P1-41.		
	o. Measure dc voltage at TP4 to ground.	-9.5 ±1.0 V dc.	Check U7, U8, U10, Q33, and associated circuit.
	p. Remove +5.0 V dc from P1-41.		
	FL8 (16 kHz) FILTER ENABLE TESTING COMPLETE		
	TROUBLESHOOTING		
(Cont)	q. Measure dc voltage at P1-46.	NMT 0.5 V dc. Check U10, Q33, and associated circuit. Check that a strap is installed from 6 to 8 and that no other strap is attached to 6.	Check FL8 (16 kHz) input circuit.

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
5. (Cont)	r. Measure dc voltage at P1-46.	NLT +3.0 V dc. Check U10, Q33, and associated circuit. Check that a strap is installed from 6 to 8.	Check FL8 (16 kHz) input circuit.
	s. Measure dc voltage at P1-38.	NMT 0.5 V dc. Check U10, Q33, and associated circuit. Check that a strap is installed from 6 to 7 and that no other strap is attached to 6.	Check CW mode input circuit.
	t. Measure dc voltage at P1-35.	NMT 0.5 V dc. Check U7, U8, U10, Q33, and associated circuit. Check that a strap is installed from 2 to 3 and that no other strap is attached to 2.	Check AM enable input circuit.
	u. Measure dc voltage at P1-35.	NLT +3.0 V dc. Proceed to step v.	Check AM enable input circuit.
	v. Measure dc voltage at P1-41.	NMT 0.5 V dc. Check U7, U8, U10, Q33, and associated circuit. Check that a strap is installed from 2 to 3.	Check rf transmit input circuit.
6. CW mode enable	***Note*** With channel A if strapped 5-7, perform steps a thru d.		
	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to 16.		
	b. Measure dc voltage at J8-1.	NMT 0.5 V dc	Proceed to step e.
	c. Apply +5.0 V dc to P1-38.		
	d. Measure dc voltage at J8-1.	NLT +3.0 V dc	Check CW mode circuit. Check that strap is installed from 5 to 7 and that no other strap is attached to 5.
(Cont)	CW MODE ENABLE TESTING COMPLETE		

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
6. (Cont)	TROUBLESHOOTING		
	e. Measure dc voltage at P1-38.	NMT 0.5 V dc. Check CW mode circuit. Check that strap is installed from 5 to 7 and that no other strap is attached to 5.	Check CW mode input circuit.
7. Filter card interface	a. Set power off.		
	b. Measure resistance between each of the following pins and ground (TP1, brown): J8-6 J8-7 J9-5 J9-6 J10-2 J10-5	NMT 3 Ω each pin	Repair circuit connections.
	c. Measure resistance between the following pins: J10-1 to J1 J9-1 to J4	NMT 3 Ω each pin	
	d. Set power on.		
	e. Measure dc voltage between each of the following pins and ground (TP1, brown):		
	J9-2	-9.5 ±0.5 V dc	Check VR5 and associated circuit.
	J9-4	+14.5 ±0.5 V dc	Check R157 and associated circuits.
	f. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	g. Apply a 9.4483-MHz, 20-mV signal (measured) to J2.		
	h. Using an rf voltmeter (with high impedance probe), measure gain from J2 to J1.	≅ 3 to 1	Check J10-1 and associated input circuit.
	i. Using an rf voltmeter, measure voltage gain from J1 to J4.	8.2 ±2.0 dB	Check J9-1 and associated filter circuit.
8. 2.75-kHz USB filter measurement (Cont)	*Note* This test applies only to 2.75-kHz USB filter (526-9955-010).		

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
8. (Cont)	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set AGC switch to OFF.		
	c. Set receive input at J2 for 9.4483 MHz.		
	d. Using an rf voltmeter (with high impedance probe), measure rf voltage at J4. Adjust receive input level and frequency for a 70-mV peak reading at J4.	Reference	
	e. Adjust input frequency down until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NMT 9.447 000 MHz	Check FL1, Q4, Q8, and associated circuit.
	f. Adjust input frequency up until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NLT 9.449 750 MHz	Check FL1, Q4, Q8, and associated circuit.
8A. 3.05-kHz USB filter measurement	***Note*** This test applies only to 3.05-kHz USB filter (526-9980-010).		
	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set AGC switch to OFF.		
	c. Set receive input at J2 for 9.4482 MHz.		
	d. Using an rf voltmeter (with high impedance probe), measure rf voltage at J4. Adjust receive input level and frequency for a 70-mV peak reading at J4.	Reference	
	e. Adjust input frequency down until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NMT 9.446 700 MHz	Check FL1, Q4, Q8, and associated circuit.
	f. Adjust input frequency up until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NLT 9.449 750 MHz	Check FL1, Q4, Q8, and associated circuit.
8B. 3.10-kHz USB filter measurement	***Note*** This test applies only to 3.10-kHz USB filter (526-9985-010).		
	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set AGC switch to OFF.		
(Cont)	c. Set receive input at J2 for 9.4482 MHz.		

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
8B. (Cont)	d. Using an rf voltmeter (with high impedance probe), measure rf voltage at J4. Adjust receive input level and frequency for a 70-mV peak reading at J4.	Reference	
	e. Adjust input frequency down until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NMT 9.446 600 MHz	Check FL1, Q4, Q8, and associated circuit.
	f. Adjust input frequency up until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NLT 9.449 700 MHz	Check FL1, Q4, Q8, and associated circuit.
8C. 5.80-kHz USB filter measurement	***Note*** This test applies only to 5.80-kHz USB filter (526-9976-010).		
	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set AGC switch to OFF.		
	c. Set receive input at J2 for 9.4459 MHz.		
	d. Using an rf voltmeter (with high impedance probe), measure rf voltage at J4. Adjust receive input level and frequency for a 70-mV peak reading at J4.	Reference	
	e. Adjust input frequency down until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NMT 9.444 000 MHz	Check FL1, Q4, Q8, and associated circuit.
	f. Adjust input frequency up until rf voltage at J4 is 3 dB below level of step d. Note input frequency.	NLT 9.449 800 MHz	Check FL1, Q4, Q8, and associated circuit.
9. AGC attack and decay times	a. Set receive input at J2 to 9.4483 MHz at 1 mV at output of switching device. Set the switching device for 0.25 s on and 2.5 s off.		
	Note If a switching device is not available, one may be fabricated using figure 10.		
	b. Set front panel AGC switch to FAST.		
(Cont)	c. Using an oscilloscope, measure AGC attack time at Q18-C.	NMT 5 ms	

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
9. (Cont)	***Note*** AGC attack time is the time interval from the first appearance of an rf burst to the point where the rf envelope stays within 6 dB of the final value.		
	d. Set receive input at J2 to 9.4483 MHz at 200 μV at output of switching device. Set the switching device to alternate between a 200- and a 10-μV output.		
	e. Using an oscilloscope, measure AGC decay time at Q18-C.	75 to 200 ms	Check Q29, Q30, U3, and associated circuits.
(Cont)	***Note*** AGC decay time is the time interval from the 200- to 10-μV transition		

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
9. (Cont)	and the point when the rf envelope reaches 70% of the final value.		
	f. Repeat steps d and e with the front panel AGC switch at SLOW.	1 to 2 s	Check U3 and associated circuits.
10. 450-kHz injection frequency suppression	a. Set receive input at J2 to 9.4483 MHz at 1000 μV.		
	b. Set AGC switch to FAST.		
	c. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	d. Using a spectrum analyzer, measure the desired if out at J6 (CH A IF jack on rear panel).	Note level.	
	e. Measure the 450-kHz injection frequency leakage at the receive if out jack J6 (CH A IF jack on rear panel).	NLT 40 dB down from receive if above **Note** It may be necessary to remove the receive input to locate the 450-kHz leakage. Measure if with the receiver input applied.	Check U6, Q2, and associated circuit.
11. Receive audio distortion	a. Set receive input at J2 to 9.4483 MHz at 500 μV.		
	b. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	c. Using an audio distortion analyzer, measure the audio distortion at RCV AF 600 Ω - A on rear panel (TB1-1, -3).	NMT 0.5%	Check U14, U1, U2, Q14, Q17, Q18, and associated circuits.
12. AGC range	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set AGC switch to FAST.		
	c. Set receive input at J2 to 9.4483 MHz at 0 μV.		
	d. Connect dvm to P1-21.		
	e. Increase receive input until dvm just begins to increase from 70 mV dc.	Note input level at this point. (Nominally 5 μV rms)	
(Cont)	f. Using an rf voltmeter, note rf level at J6 (CH A IF jack on rear panel).	Reference	

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
12. (Cont)	g. Increase receive input 80 dB higher than the input level noted in step e.		
	h. Note the rf level at J6 (CH A IF jack on rear panel) and that no sign of an overload exists on Q18-C.	NMT 6 dB above that noted in step f. No overload on Q18-C.	Check U1, U2, and associated circuits.
13. Remote rf gain	***Note*** This test applies only to unit with a remote control connected.		
	a. Set receive input at J2 to 9.4483 MHz at 5 μV.		
	b. Set front panel CONT switch to REM.		
	c. Set remote control MODE switch to SSB/CW and BANDWIDTH switch to USB.	Reference if output level at J6 (CH A IF jack on rear panel).	
	d. Set remote control AGC switch off.		
	e. Adjust remote control RF GAIN control full counterclockwise. Increase receive input at J2 until if output level equals reference of step c.	Total attenuation over RF GAIN control range 80 dB minimum.	Check U3 and associated circuits.
	f. Set receive input for 60 dB above 5-μV input. Adjust remote control RF GAIN control until if output level equals reference of step c.		
	g. Note the input at P1-11.	-5.0 ±0.1 V dc	Same as step c.
	h. Set front panel CONT switch to LCL.		
14. Local rf gain	a. Set receive input at J2 to 9.4483 MHz at 5 μV.		
	b. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.	Reference if output level at J6 (CH A IF jack on rear panel).	
	c. Set front panel AGC switch to OFF.		
	d. Adjust front panel RF GAIN control full counterclockwise. Increase receive input at J2 until if output level equals reference of step b.	Total attenuation over RF GAIN control range 80 dB minimum.	Check U3 and associated circuits.
	e. Set receive input for 60 dB above 5-μV input. Adjust RF GAIN control until if output level equals reference of step b.		
	f. Note the input at P1-39.	+2.8 ±0.3 V dc	Same as step d.

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

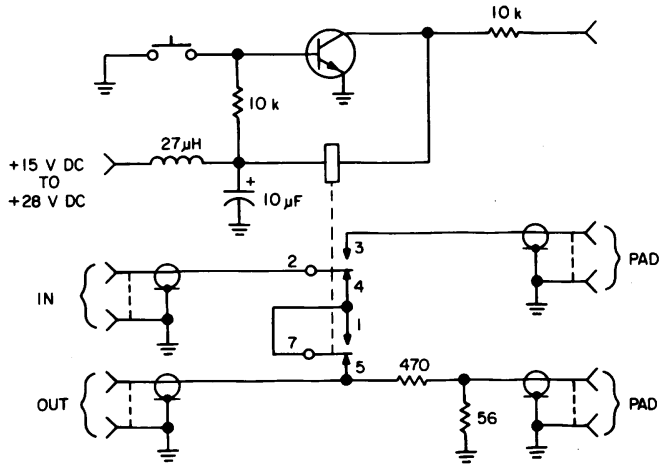
TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
15. AGC in/out	a. Set the front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set front panel AGC switch to FAST.		
	c. Set receive input at J2 to 9.4483 MHz at 5 μV.		
	d. Check the AGC in/out voltage at P1-21 with this input applied.	≅ 70 mV dc	Check U3B and associated circuits.
	e. Increase the receive input at J2 by 80 dB.		
	f. Check the AGC in/out voltage at P1-21 with this input applied.	7.8 ±0.8 V dc	Same as step d
16. RF AGC	a. Set the front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set front panel AGC switch to FAST.		
	c. Set receive input at J2 to 9.4483 MHz at 5 μV.	Reference	
	d. Using a dvm, monitor the rf AGC voltage at P1-18.		
	e. Adjust front panel RF GAIN control for 0 V dc at P1-18.		
	f. Note the rf AGC voltage while slowly increasing the receive input to 80 dB above level in step c.	Rf AGC increases at a constant rate from 0 to 3 V dc. (60-dB point = NLT 3.0 V dc)	Check Q19, U3A, U3B, and associated circuits.
17. Mute	a. Set the front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set receive input at J2 to 9.4483 MHz at 50 μV.		
	c. Using an rf voltmeter, monitor the if output at J6 (CH A IF jack on rear panel).	Output signal is present.	Check U1, U2, and associated circuits.
	d. Apply a ground at P1-13.	Output signal is muted.	Check Q10 thru Q13 and associated circuits.
	e. Remove P1-13 ground.	Output signal is restored.	

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
18. Performance monitor	a. Set the front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set receive input at J2 to 9.4483 MHz at 50 μV.		
	c. Using a dvm, measure the dc voltage at P1-2.	0.5 ±0.5 V dc	Check Q25 and associated circuit.
	d. Remove receive input and measure the dc voltage at P1-2.	+4.5 ±0.5 V dc	Same as step c.
19. AGC meter voltage	a. Set the front panel MODE switch to SSB/CW and BANDWIDTH switch to USB.		
	b. Set receive input at J2 to 9.4483 MHz at 5 μV.		
	c. Using a dvm, measure the dc voltage at P1-12.	0.5 ±0.5 V dc (with front panel METER switch at any position other than RCV SIG)	Check U3A, U3B, and associated circuits.
	d. Increase the receive input voltage and verify that the dc voltage at P1-12 increases.	Increased voltage	
20. Crowbar enable	a. Set the front panel CONT switch to REM.		
	b. Apply +5 V dc to P1-37.		
	c. Using an oscilloscope, monitor the waveform at U5-7.	NLT +3.0 V dc	Check U5 and associated circuits.
	d. Note dc level and duration of U5-7 pulse while slowly changing the remote control frequency settings.	0.5 ±0.5 V dc for 20 ±10 ms between each frequency change	Same as step b.
	e. Using an oscilloscope, monitor the waveform at P1-18.	During the logic 0 pulse, waveform at P1-18 shall be 0.5 ±0.5 V dc.	Check Q29 and associated circuit.
	f. Remove +5 V dc from P1-37.		
	g. Set the front panel CONT switch to LCL.		
21. AM audio	a. Set front panel MODE switch to AM and BANDWIDTH switch to 16.		
	b. Set receive input at J2 to 9.4500 MHz at 500 μV, AM modulated at 1000 Hz and 50%.		
	c. Using an audio distortion analyzer, measure the audio signal level at P1-8 (A6TP2) and the audio distortion at RCV AF 600 Ω-A on rear panel (TB1-1, -3).	Output: 10 ±2 mV. Distortion NMT 3.0%.	Check Q21 and associated circuits.

Table 1. Channel A IF, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
22. Sensitivity	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB. b. Set AGC switch to OFF. c. Using an audio voltmeter, monitor the audio at P1-34 (A6TP2) (with no receive input). d. Set receive input at J2 to 9.4483 MHz. e. Adjust receive input for +10 dB (s+n)/n at P1-34 (A6TP2). f. Note the receive input level.	Reference NMT 1 μV rms (into 50-Ω, 2-μV rms open circuit)	Check U1, U2, and associated circuits.
23. If output	a. Set front panel MODE switch to SSB/CW and BANDWIDTH switch to USB. b. Set receive input at J2 to 9.4483 MHz at 15 μV. c. Set front panel AGC switch to FAST. d. Using an rf voltmeter, measure the receive if output at J6 (CH A IF jack on rear panel).	27 ±10 mV rms	Check Q15, Q16, and associated circuits.



TPA-1345-013

AGC Switching Device
Figure 10

4. ALIGNMENT/ADJUSTMENT

4.1 Input Strapping

Inputs to FL3 and FL8 are strapped as required for special applications. FL3(A) through FL7(E) bandpass filters are located on piggyback filter board A8A2 if used. Refer to table 2 for input-strap-filter relationships.

Table 2. Input Strapping.

INPUT	STRAP	FILTER
FL3 (A) (P1-15)	1-4	FL3 (A) (J10-4)
FL8 (P1-46)	8-6	FL8 (16 kHz)

4.2 Filter Amplifier Gain Adjustments (Adjustment of R6 and Selection of R49, R56, R94, and R97)

a. Set front panel MODE switch to SSB/CW and the BANDWIDTH switch to USB. Set AGC switch to FAST.
b. Measure signal level at J1 with no receive input signal (9.9 MHz from Q5 mixer). Adjust R6 for a signal null at J1.
c. Connect receive input of 9.4483 MHz to J2. Measure gain from J2 to J1. Should be ≅3 to 1. (Receive input must be set higher than 9.9-MHz leakage.)

Note

Perform step d only if FL1, Q8, and/or Q9 circuits have been repaired.

d. Set receive signal to 50 μV (9.4483 MHz). Find a passband response minimum between 9.4493 and 9.4489 MHz at J4. Measure voltage gain between J1 and J4. Should be 8.2 ±2.0 dB. Select values of R94 and R97 (200 through 1000 Ω) to give a voltage gain of 8.2 ±2.0 dB.
e. Set front panel MODE switch to AM and the BANDWIDTH switch to 16.

Note

Perform step f only if Q6 and/or Q7 circuits have been repaired.

f. Find a passband response minimum between 9.4493 and 9.4489 MHz at J4. Measure voltage gain between J1 and J4. Should be 8.2 ±2.0 dB. Select values of R49 and R56 (200 through 1000 Ω) to give a voltage gain of 8.2 ±2.0 dB.

4.3 Receive Gain Adjustment (Adjustment of C5, C8, L10, L13, R78, and R143)

a. Set front panel MODE switch to SSB/CW and the BANDWIDTH switch to USB. Adjust R78 for minimum gain (full ccw). Increase receive input until AGC voltage (measured at P1-21) increases to about +1.0 V dc.
b. Adjust C5, C8, L10, and L13 for a peak AGC voltage. Decrease the receive input as necessary to maintain AGC voltage at about +1.0 V dc.
c. Repeat step b until no further increase in peak AGC voltage is possible.
d. Set the receive input to 5.0 μV (9.4483 MHz) and adjust R78 for +70 ±5 mV dc AGC voltage (measured at P1-21).
e. Increase receive input to 5.0 mV (9.4483 MHz) and adjust R143 until AGC voltage (measured at P1-21) equals +5.0 ±0.1 V dc.
f. Repeat steps d and e until no further improvement is possible.

4.4 SSB Output Level Adjustment (Adjustment of R262)

a. Set front panel MODE switch to SSB/CW and the BANDWIDTH switch to USB.
b. Set receive input for 15.0 μV (9.4483 MHz) and adjust R262 for 10 ±0.5-mV rms audio output (measured at P1-34).

4.5 AGC Meter Level Adjustment (Adjustment of R132)

AGC meter level adjustment is made at the unit level for the level required by the associated meter circuit.

5. REPAIR

Repair of the channel A if card 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 equipment. A parts location illustration, schematic

diagram, parts list tabulation, and modification history are included in the schematic diagram (figures 11 and 12). The parts location illustration is a design engineering drawing that shows exact component placement on the circuit cards.

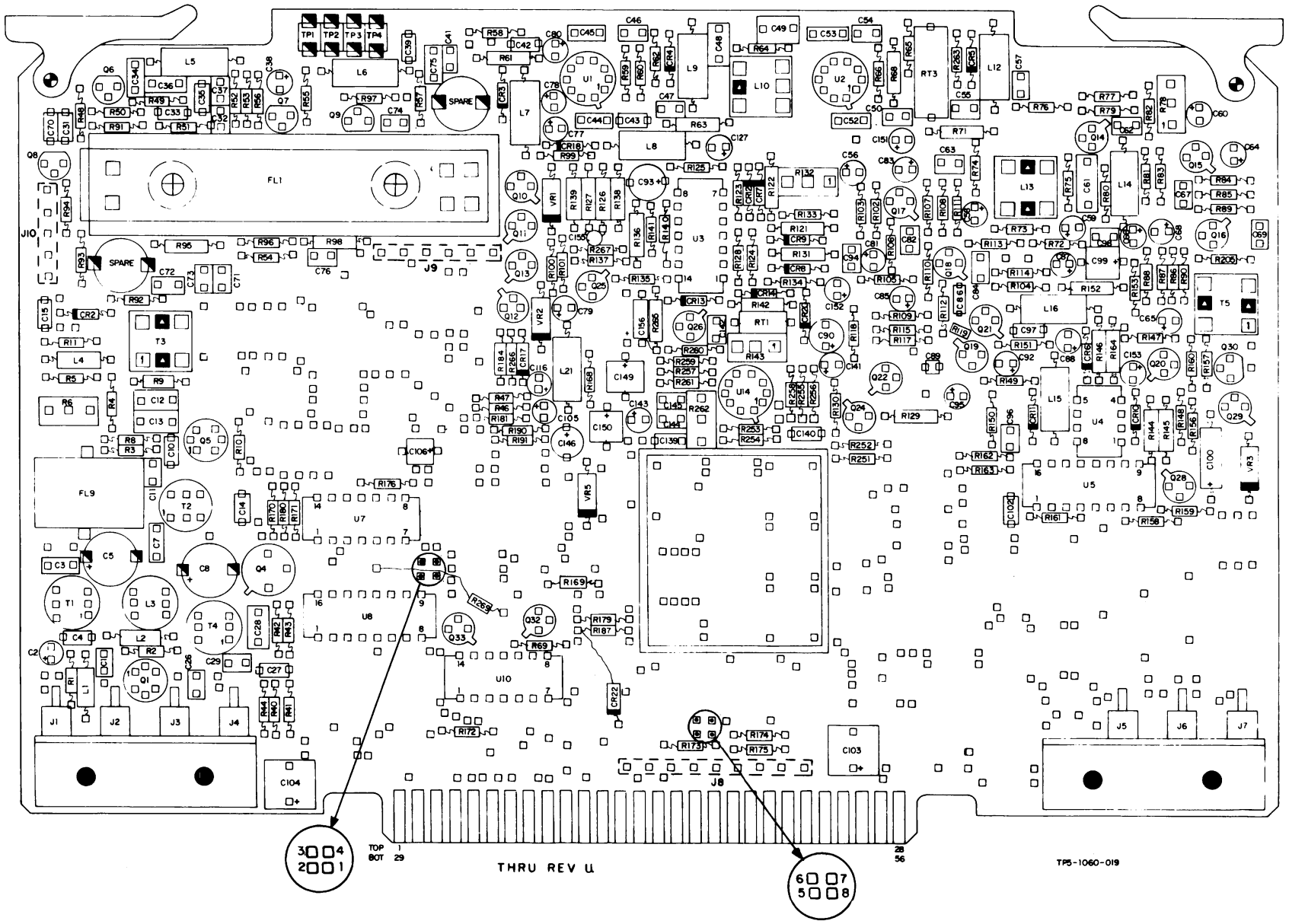
Use the reference designator indicated on schematic and parts location diagram to locate parts in the parts list tabulation. The Collins part number and description are listed for each reference designator.

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 at 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
Channel A if	637-2650-001	REV AD
Channel A if	637-2650-002	REV AD
Channel A if	637-2650-003	REV AC
Channel A if	637-2650-004	*
Channel A if	637-2650-005	*

*Not covered in this printing.



Channel A IF, Through REV AC, Schematic Diagram
Figure 11 (Sheet 1 of 5)

PARTS LIST

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
	CHANNEL A IF A8	637-2650-001	A
	CHANNEL A IF A8	637-2650-002	B
	CHANNEL A IF A8	637-2650-003	C
CR1	NOT USED		
CR2	SEMICOND DEVICE 1N4454	353-3644-010	
CR3-CR5	SEMICOND DEVICE 1N5767	922-6119-010	
CR6-CR8	SEMICOND DEVICE 1N4454	353-3644-010	
CR9	SEMICOND DEVICE 1N4454 (A1)	353-3644-010	
CR10-CR14	SEMICOND DEVICE 1N4454	353-3644-010	
CR15, CR16	NOT USED		
CR17	SEMICOND DEVICE 1N4454 (A7)	353-3644-010	
CR18	SEMICOND DEVICE 1N816 (A2)	353-2564-000	
CR18	SEMICOND DEVICE 1N5767	922-6119-010	
CR19	NOT USED		
CR20	SEMICOND DEVICE 1N4454	353-3644-010	
CR21	NOT USED		
CR22	SEMICOND DEVICE 1N4454 (A2)	353-3644-010	
C1	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C2	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C2	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C3	CAPACITOR,FXD MICA DIEL, 20PF, PORM 0.5PF, 100V	912-4141-150	
C4	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C5	CAPACITOR,VAR CER DIEL, 9 TO 35PF, 200V	917-1225-000	
C6	NOT USED		
C7	CAPACITOR,FXD MICA DIEL, 47PF, 5%, 50V (A5)	912-4141-280	
C7	CAPACITOR,FXD MICA DIEL, 68PF, 5%, 50V	912-4141-330	
C8	CAPACITOR,VAR CER DIEL, 9 TO 35PF, 200V	917-1225-000	
C9	NOT USED		
C10	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C11	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-180	
C12,C13	CAPACITOR,FXD CER DIEL, 2200PF, 5%, 100V	913-3281-300	
C14	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V (B1)	913-5019-200	
C14	CAPACITOR,FXD CER DIEL, 470PF, 10%, 200V	913-4014-000	
C15	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V (A5)	913-5019-200	
C15	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V (A8)	184-9102-350	
C15	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C16-C25	NOT USED		
C26	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C27	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C28	CAPACITOR,FXD CER DIEL, 120PF, 10%, 100V	913-3281-110	
C29	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V (A5)	913-3279-110	
C29	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C30	NOT USED		
C31	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C32	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C33	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V (A2)	913-5019-200	
C33	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C34	CAPACITOR,FXD MICA DIEL, 24PF, PORM 0.5PF, 50V	912-4141-160	
C35	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C36	CAPACITOR,FXD MICA DIEL, 24PF, PORM 0.5PF, 50V	912-4141-160	
C37	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C38	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C39	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C40	NOT USED		
C41-C43	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C44,C45	CAPACITOR,FXD MICA DIEL, 4PF, PORM 0.5PF, 300V	912-4141-080	
C46,C47	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C48	CAPACITOR,FXD CER DIEL, 1200PF, 5%, 100V	913-3281-290	
C49	CAPACITOR,FXD MICA DIEL, 400PF, 5%, 50V	912-4141-520	
C50	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C51	NOT USED		
C52,C53	CAPACITOR,FXD MICA DIEL, 4PF, PORM 0.5PF, 300V	912-4141-080	
C54,C55	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C56	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C56	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C57	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C58,C59	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C58,C59	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C60	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C61	CAPACITOR,FXD CER DIEL, 5600PF, 5%, 100V	913-3281-380	
C62,C63	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C64	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C65	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V (A8)	184-9102-350	
C65	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C66	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A8)	184-9102-290	
C66	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C67	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C68	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V (A8)	184-9102-350	
C68	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C69	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C70	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C71	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C72	CAPACITOR,FXD MICA DIEL, 15PF, PORM 0.5PF, 300V (A4)	912-4141-130	
C72	CAPACITOR,FXD MICA DIEL, 18PF, PORM 0.5PF, 100V	912-4141-140	
C73	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V (A2)	913-3279-110	
C73	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C74	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	

PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
C75	CAPACITOR,FXD MICA DIEL, 20PF, PORM 0.5PF, 100V (A8)	912-4141-150	
C75	CAPACITOR,FXD MICA DIEL, 6PF, PORM 0.5PF, 300V	912-4141-090	
C76	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C77-C81	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C77-C81	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C82	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C83	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C83	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C84	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-180	
C85	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V (A8)	184-9102-350	
C85	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C86	CAPACITOR,FXD CER DIEL, 470PF, 10%, 200V	913-4014-000	
C87	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C87	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C88	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C88	CAPACITOR,FXD CER DIEL, 0.1UF, 10%, 100V	913-5019-440	
C89	CAPACITOR,FXD CER DIEL, 1000PF, 20%, 50V	913-3279-030	
C90	CAPACITOR,FXD ELCTLT, 22UF, 20%, 15V	184-9102-140	
C91	NOT USED		
C92	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C93	CAPACITOR,FXD ELCTLT, 47UF, 20%, 6V	184-9102-470	
C94	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C95	CAPACITOR,FXD ELCTLT, 6.8UF, 20%, 6V	184-9102-450	
C96	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-180	
C97	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C98	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C99	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-610	
C100	CAPACITOR,FXD ELCTLT, 4.7UF, 10%, 10V (A2)	184-9086-140	
C100	CAPACITOR,FXD ELCTLT, 2.2UF, 10%, 20V	184-9086-430	
C101	NOT USED		
C102	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C102	CAPACITOR,FXD CER DIEL, 0.1UF, 10%, 100V	913-5019-440	
:103, C104	CAPACITOR,FXD ELCTLT, 47UF, 20%, 20V	184-9102-630	
C105	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C105	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C106	CAPACITOR,FXD ELCTLT, 6.8UF, 20%, 6V (A9)	184-9102-450	
C107-C115	NOT USED		
C116	CAPACITOR,FXD ELCTLT, 1.5UF, 20%, 25V (A7)	184-9102-210	
C117-C126	NOT USED		
C127	CAPACITOR,FXD ELCTLT, 0.47UF, 20%, 35V	184-9102-330	
C128-C138	NOT USED		
C139, C140	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C141	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C141	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C142	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C143	CAPACITOR,FXD ELCTLT, 0.1UF, 20%, 35V (A12)	184-9102-290	
C143	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C144, C145	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V (A8)	913-3279-110	
C144, C145	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C146	CAPACITOR,FXD ELCTLT, 6.8UF, 20%, 25V	184-9102-670	
C147, C148	NOT USED		
C149	CAPACITOR,FXD ELCTLT, 22UF, 20%, 10V	184-9102-520	
C150	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-610	
C151	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C152	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V (A8)	184-9102-350	
C152	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C153	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C154	NOT USED		
C155	CAPACITOR,FXD ELCTLT, 47UF, 20%, 20V (A5)	184-9102-630	
C156	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V (A11)	184-9102-220	
FL1	FILTER,USB,2.75 KHZ	526-9955-010	A
FL1	FILTER,USB,3.05 KHZ	526-9980-010	B
FL1	FILTER,USB,3.10 KHZ	526-9985-010	C
FL2-FL8	NOT USED		
FL9	FILTER,XTAL,BP 9.45 MHZ	293-1319-010	
J1-J6	CONNECTOR,RCPT ELEC	357-7207-100	
J7	NOT USED		
J8	HOUSING,CONN	372-2625-018	
J9	HOUSING,CONN	372-2625-015	
J10	HOUSING,CONN	372-2625-014	
L1,L2	COIL,RF 100UH	240-2047-000	
L3	TRANSFORMER,RF	278-0430-040	
L4	COIL,RF 100UH	240-2047-000	
L5,L6	COIL,RF 1000UH	240-2715-490	
L7	COIL,RF 2700UH (B2)	240-2715-540	
L7	COIL,RF 5600UH	637-3767-001	
L8,L9	COIL,RF 1000UH	240-2715-490	
L10	INDUCTOR,RF VAR	242-0441-010	
L11	NOT USED		
L12	COIL,RF 1000UH	240-2715-490	
L13	INDUCTOR,RF VAR	242-0441-020	
L14	COIL,RF 1000UH	240-2715-490	
L15,L16	COIL,RF 8200UH	240-2715-600	

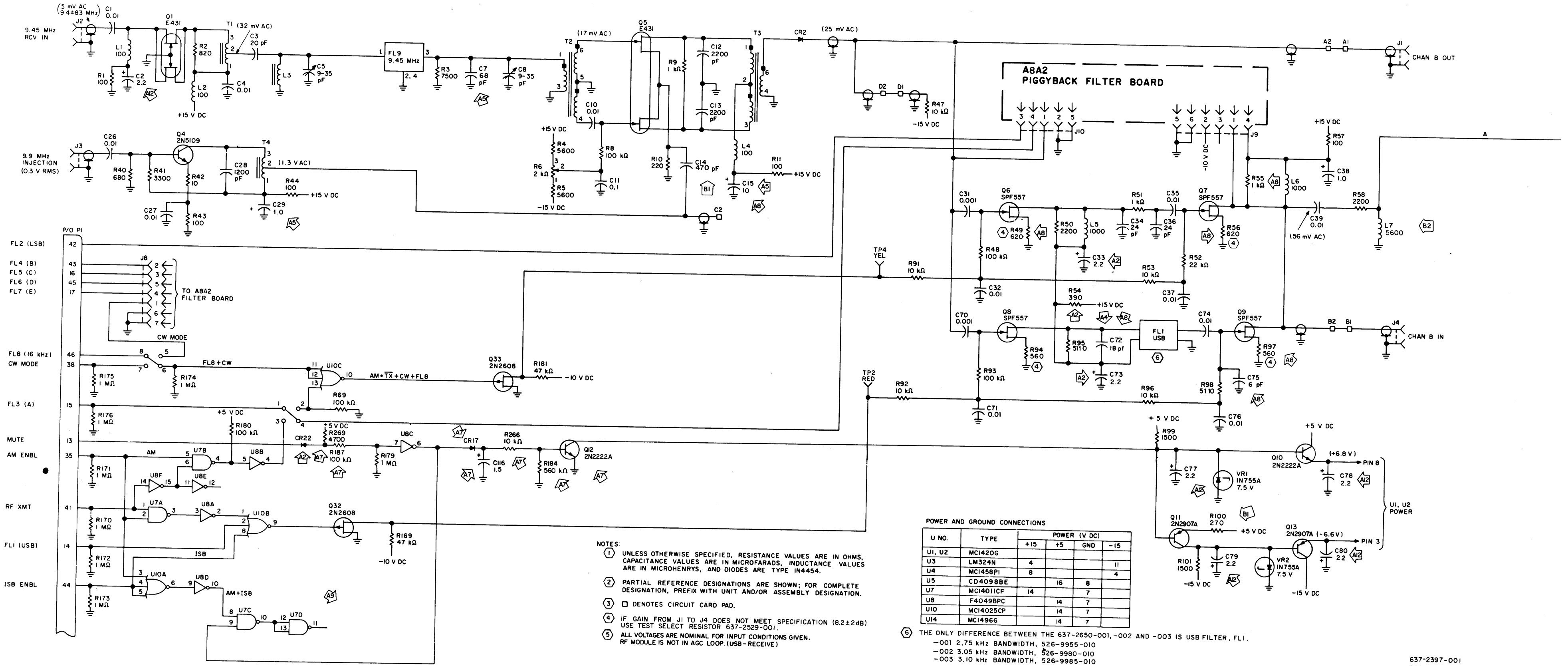
PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
L17-L20	NOT USED		
L21	COIL,RF 1000UH	240-2715-490	
Q1	TRANSISTOR,FET E431	351-0194-010	
Q2,Q3	NOT USED		
Q4	TRANSISTOR 2N5109	352-0766-010	
Q5	TRANSISTOR,FET E431	351-0194-010	
Q6-Q9	TRANSISTOR SPF557	352-1068-010	
Q10	TRANSISTOR 2N2222A	352-0661-020	
Q11	TRANSISTOR 2N2907A	352-0551-010	
Q12	TRANSISTOR 2N2222A (A7)	352-0661-020	
Q13	TRANSISTOR 2N2907A	352-0551-010	
Q14-Q18	TRANSISTOR 2N2222A	352-0661-020	
Q19	TRANSISTOR 2N2907A	352-0551-010	
Q20	TRANSISTOR 2N2222A	352-0661-020	
Q21	TRANSISTOR 2N2222A (A6)	352-0661-020	
Q21	TRANSISTOR 2N2907A	352-0551-010	
Q22	TRANSISTOR 2N2907A	352-0551-010	
Q23	NOT USED		
Q24	TRANSISTOR 2N2608	352-0605-010	
Q25,Q26	TRANSISTOR 2N2222A	352-0661-020	
Q27	NOT USED		
Q28,Q29	TRANSISTOR 2N2907A	352-0551-010	
Q30	TRANSISTOR 2N2608	352-0605-010	
Q31	NOT USED		
Q32,Q33	TRANSISTOR 2N2608	352-0605-010	
RT1	RESISTOR,THRM 100K, 10%, 0.5W	714-1736-000	
RT2	NOT USED		
RT3	RESISTOR,THRM 3K, 10%, 1W	714-1715-000	
R1	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R2	RESISTOR,FXD CMPSN, 820 OHMS, 10%, 1/8W	745-2338-000	
R3	RESISTOR,FXD CMPSN, 7.5K, 5%, 1/8W	745-1863-700	
R4,R5	RESISTOR,FXD CMPSN, 5.6K, 10%, 1/8W	745-2368-000	
R6	RESISTOR,VAR NON-WW,2K, 10%	382-0052-440	
R7	NOT USED		
R8	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R9	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R10	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/8W	745-2317-000	
R11	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R12-R39	NOT USED		
R40	RESISTOR,FXD CMPSN, 680 OHMS, 10%, 1/8W	745-2335-000	
R41	RESISTOR,FXD CMPSN, 3.3K, 10%, 1/8W	745-2359-000	
R42	RESISTOR,FXD CMPSN, 10 OHMS, 10%, 1/8W	745-2268-000	
R43,R44	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R45,R46	NOT USED		
R47	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R48	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R49	RESISTOR,FXD,CMPSN, 2000HM THRU 7500HM,5%,1/8W (A8)	637-2529-000	
R49	RESISTOR,FXD CMPSN, 620 OHMS, 5%, 1/8W	745-1863-440	
R50	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R51	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R52	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R53	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R54	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W (A2)	745-2341-000	
R54	RESISTOR,FXD CMPSN, 390 OHMS, 10%, 1/8W	745-2326-000	
R55	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W (A8)	745-2341-000	
R55	RESISTOR,FXD CMPSN, 1K, 5%, 1/8W	745-1863-490	
R56	RESISTOR,FXD,CMPSN, 2000HM THRU 7500HM,5%,1/8W (A8)	637-2529-000	
R56	RESISTOR,FXD CMPSN, 620 OHMS, 5%, 1/8W	745-1863-440	
R57	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R58	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R59	RESISTOR,FXD CMPSN, 18K, 10%, 1/8W	745-2386-000	
R60	RESISTOR,FXD CMPSN, 820 OHMS, 10%, 1/8W	745-2338-000	
R61	RESISTOR,FXD FILM, 20.5K, 1%, 1/8W	705-1059-000	
R62	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R63	RESISTOR,FXD FILM, 14.3K, 1%, 1/8W	705-3605-550	
R64	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R65	RESISTOR,FXD CMPSN, 680 OHMS, 10%, 1/8W	745-2335-000	
R66	RESISTOR,FXD CMPSN, 33K, 10%, 1/8W	745-2395-000	
R67	NOT USED		
R68	RESISTOR,FXD FILM, 1.40K, 1%, 1/8W	705-1003-000	
R69	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R70	NOT USED		
R71	RESISTOR,FXD FILM, 24.9K, 1%, 1/8W	705-1063-000	
R72	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R73	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R74	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R75	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R76	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R77	RESISTOR,FXD CMPSN, 36 OHMS, 5%, 1/8W	745-1863-140	
R78	RESISTOR,VAR NON-WW,200 OHMS, 10%	382-0052-410	
R79	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R80	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R81,R82	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/8W	745-2356-000	
R83	RESISTOR,FXD CMPSN, 470 OHMS, 10%, 1/8W (A10)	745-2329-000	
R83	RESISTOR,FXD CMPSN, 330 OHMS, 10%, 1/8W	745-2323-000	
R84	RESISTOR,FXD CMPSN, 150 OHMS, 10%, 1/8W	745-2311-000	
R85	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R86	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/8W	745-2317-000	
R87	RESISTOR,FXD CMPSN, 4.7K, 10%, 1/8W	745-2365-000	
R88	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/8W	745-2356-000	

PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
R89	RESISTOR,FXD CMPSN, 390 OHMS, 10%, 1/8W	745-2326-000	
R90	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R91,R92	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R93	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R94	RESISTOR,FXD CMPSN, 560 OHMS, 10%, 1/8W	745-2332-000	
R95	RESISTOR,FXD FILM, 5.11K, 1%, 1/8W	705-1030-000	
R96	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R97	RESISTOR,FXD,CMPSN, 2000HM THRU 7500HM,5%,1/8W (A8)	637-2529-000	
R97	RESISTOR,FXD CMPSN, 560 OHMS, 5%, 1/8W	745-1863-430	
R98	RESISTOR,FXD FILM, 5.11K, 1%, 1/8W	705-1030-000	
R99	RESISTOR,FXD CMPSN, 1.5K, 10%, 1/8W	745-2347-000	
R100	RESISTOR,FXD CMPSN, 470 OHMS, 10%, 1/8W (B1)	745-2329-000	
R100	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/8W	745-2320-000	
R101	RESISTOR,FXD CMPSN, 1.5K, 10%, 1/8W	745-2347-000	
R102	RESISTOR,FXD CMPSN, 15K, 10%, 1/8W	745-2383-000	
R103	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R104	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W (A10)	745-2377-000	
R104	RESISTOR,FXD CMPSN, 6.6K, 10%, 1/8W	745-2371-000	
R105	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R106	RESISTOR,FXD CMPSN, 470 OHMS, 10%, 1/8W	745-2329-000	
R107	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/8W	745-2317-000	
R108	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R109	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R110	RESISTOR,FXD CMPSN, 15K, 10%, 1/8W	745-2383-000	
R111	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R112	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/8W	745-2317-000	
R113	RESISTOR,FXD CMPSN, 36 OHMS, 5%, 1/8W	745-1863-140	
R114	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/8W	745-2320-000	
R115	RESISTOR,FXD CMPSN, 330 OHMS, 10%, 1/8W	745-2323-000	
R116	NOT USED		
R117	RESISTOR,FXD CMPSN, 8.2MEGO, 5%, 1/8W	745-1864-470	
R118	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R119	RESISTOR,FXD CMPSN, 3.3K, 10%, 1/8W	745-2359-000	
R120	NOT USED		
R121	RESISTOR,FXD FILM, 10K, 1%, 1/8W	705-1044-000	
R122	RESISTOR,FXD FILM, 47.5K, 1%, 1/8W	705-3605-800	
R123	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R124	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/8W	745-2356-000	
R125	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R126	RESISTOR,FXD FILM, 1.40K, 1%, 1/8W	705-1003-000	
R127	RESISTOR,FXD FILM, 18.7K, 1%, 1/8W	705-1057-000	
R128	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R129	RESISTOR,FXD FILM, 100K, 1%, 1/8W	705-1092-000	
R130	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R131	RESISTOR,FXD FILM, 47.5K, 1%, 1/8W	705-3605-800	
R132	RESISTOR,VAR NON-WW,5K, 10%	382-0052-450	
R133	RESISTOR,FXD CMPSN, 6.8K, 10%, 1/8W	745-2371-000	
R134	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R135	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R136	RESISTOR,FXD FILM, 37.4K, 1%, 1/8W	705-3605-750	
R137	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R138	RESISTOR,FXD FILM, 10K, 1%, 1/8W	705-1044-000	
R139	RESISTOR,FXD FILM, 12.4K, 1%, 1/8W	705-3605-520	
R140	RESISTOR,FXD FILM, 30.1K, 1%, 1/8W	705-1067-000	
R141	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R142	RESISTOR,FXD FILM, 22.6K, 1%, 1/8W (A3)	705-1061-000	
R142	RESISTOR,FXD FILM, 15.4K, 1%, 1/8W	705-1053-000	
R143	RESISTOR,VAR NON-WW,20K, 10%	382-0052-470	
R144	RESISTOR,FXD FILM, 38.3K, 1%, 1/8W	705-1072-000	
R145	RESISTOR,FXD FILM, 13K, 1%, 1/8W	705-3605-530	
R146	RESISTOR,FXD FILM, 100K, 1%, 1/8W	705-1092-000	
R147	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/8W	745-2356-000	
R148	RESISTOR,FXD CMPSN, 270K, 10%, 1/8W (A5)	745-2428-000	
R148	RESISTOR,FXD CMPSN, 470K, 10%, 1/8W	745-2437-000	
R149	RESISTOR,FXD CMPSN, 680 OHMS, 10%, 1/8W	745-2335-000	
R150	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R151	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R152	RESISTOR,FXD FILM, 7.32K, 1%, 1/8W	705-3605-410	
R153	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R154, R155	NOT USED		
R156	RESISTOR,FXD CMPSN, 18K, 10%, 1/8W	745-2386-000	
R157	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R158	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R159	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R160	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R161	RESISTOR,FXD CMPSN, 560K, 10%, 1/8W	745-2440-000	
R162, R163	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R164	RESISTOR,FXD FILM, 221K, 1%, 1/8W	705-3604-170	
R165-R167	NOT USED		
R168	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W (A13)	745-2353-000	
R168	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R169	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R170-R176	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R177, R178	NOT USED		
R179	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R180	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	

Channel A IF, Through REV AC, Schematic Diagram
Figure 11 (Sheet 2)



POWER AND GROUND CONNECTIONS

U NO.	TYPE	POWER (V DC) +15	+5	GND	-15
U1, U2	MC1420G				
U3	LM324N	4			11
U4	MC1458PI	8			4
U5	CD4098BE		16	8	
U7	MC14011CP	14		7	
U8	F4049BPC		14	7	
U10	MC14025CP		14	7	
U14	MC1496G		14	7	

NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, INDUCTANCE VALUES ARE IN MICROHENRYS, AND DIODES ARE TYPE IN4454.
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT AND/OR ASSEMBLY DESIGNATION.
3. □ DENOTES CIRCUIT CARD PAD.
4. IF GAIN FROM J1 TO J4 DOES NOT MEET SPECIFICATION (8.2±2dB) USE TEST SELECT RESISTOR 637-2529-001.
5. ALL VOLTAGES ARE NOMINAL FOR INPUT CONDITIONS GIVEN. RF MODULE IS NOT IN AGC LOOP (USB-RECEIVE)
6. THE ONLY DIFFERENCE BETWEEN THE 637-2650-001, -002 AND -003 IS USB FILTER, FL1.
   -001 2.75 kHz BANDWIDTH, 526-9955-010
   -002 3.05 kHz BANDWIDTH, 526-9980-010
   -003 3.10 kHz BANDWIDTH, 526-9985-010

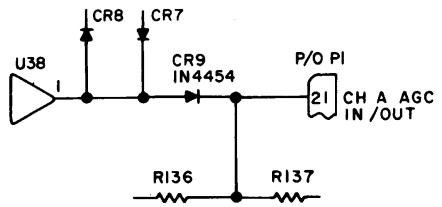
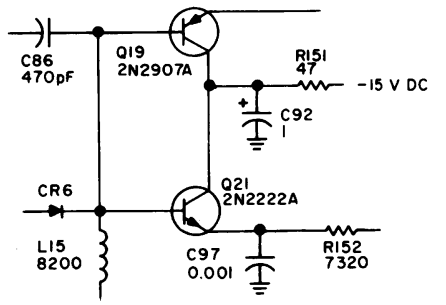
637-2397-001
TPA-0441-016 SH 1

Channel A IF, Through REV AC, Schematic Diagram
Figure 11 (Sheet 3)

PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
R181	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R182,	NOT USED		
R183			
R184	RESISTOR,FXD CMPSN, 560K, 10%, 1/8W (A7)	745-2440-000	
R185,	NOT USED		
R186			
R187	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W (A7)	745-2413-000	
R188,	NOT USED		
R189			
R190	RESISTOR,FXD CMPSN, 3.9K, 10%, 1/8W	745-2362-000	
R191	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W (A9)	745-2389-000	
R192-	NOT USED		
R204			
R205	RESISTOR,FXD CMPSN, 22 OHMS, 10%, 1/8W	745-2280-000	
R206-	NOT USED		
R250			
R251	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R252	RESISTOR,FXD CMPSN, 820 OHMS, 10%, 1/8W	745-2338-000	
R253	RESISTOR,FXD CMPSN, 56 OHMS, 10%, 1/8W	745-2295-000	
R254	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R255,	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R256			
R257	RESISTOR,FXD CMPSN, 1.3K, 5%, 1/8W	745-1863-520	
R258	RESISTOR,FXD CMPSN, 180 OHMS, 10%, 1/8W	745-2314-000	
R259	RESISTOR,FXD CMPSN, 3K, 5%, 1/8W	745-1863-600	
R260	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R261	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R262	RESISTOR,VAR NON-WW,2K, 10%	382-0052-440	
R263	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R264	NOT USED		
R265	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/4W	745-0713-000	
R266	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R267	RESISTOR,FXD CMPSN, 330K, 5%, 1/8W (A2)	745-1864-130	
R267	RESISTOR,FXD CMPSN, 430K, 5%, 1/8W	745-1864-160	
R268	NOT USED		
R269	RESISTOR,FXD CMPSN, 4.7K, 10%, 1/8W (A7)	745-2365-000	
TP1	JACK,TIP BRN	360-0484-070	
TP2	JACK,TIP RED	360-0484-020	
TP3	JACK,TIP ORN	360-0484-050	
TP4	JACK,TIP YEL	360-0484-060	
T1	TRANSFORMER,RF	278-0430-010	
T2	TRANSFORMER,RF	278-0430-180	
T3	TRANSFORMER,RF	278-0432-010	
T4	TRANSFORMER,RF	278-0430-030	
T5	TRANSFORMER,RF	278-0432-030	
U1,U2	INTEGRATED CKT MC1420G	351-1050-030	
U3	AMPLIFIER,QUAD LM324N	351-1141-030	
U4	INTEGRATED CKT MC1458P1	351-1071-070	
U5	INTEGRATED CKT CD4098BE	351-8278-010	
U6	NOT USED		
U7	INTEGRATED CKT MC14011CP	351-8159-040	
U8	INTEGRATED CKT F4049BPC	351-8159-210	
U9	NOT USED		
U10	INTEGRATED CKT MC14025CP	351-8159-150	
U11-U13	NOT USED		
U14	INTEGRATED CKT MC1496G	351-0043-020	
VR1,VR2	SEMICOND DEVICE 1N755A	353-2718-000	
VR3	SEMICOND DEVICE 1N751A	353-2710-000	
VR4	NOT USED		
VR5	SEMICOND DEVICE 1N758A	353-2724-000	
R49,R56, R94,R97	RESISTOR,FXD,CMPSN, 200OHM THRU 1K,5%,1/8W (TEST SELECT)	637-2529-001	

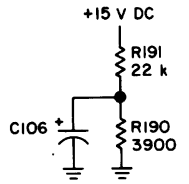
MODIFICATION HISTORY

REVISION IDENT	DESCRIPTION OF REVISION AND REASON FOR CHANGE	EFFECTIVITY
A1	Deleted CR9 from AGC in/out line as shown below: 	REV E and above
A2	Added CR22, 1N4454. Changed: CR18 from 1N816 to 1N5767. C33 from 0.01μF to 2.2μF. C73 from 0.01μF to 2.2μF. C100 from 4.7μF to 22μF. R54 from 1kΩ to 390Ω. R267 from 300kΩ, 10% to 430 kΩ, 5%.	REV E and above
A3	Changed R142 from 22.6kΩ to 15.4kΩ.	REV F and above
A4	Removed C72, 15pF from across R95 (input to FL1, USB filter).	REV G and above
A5	Added C155, 47μF electrolytic. Changed: C7 from 47;F to 68pF. C15 from 0.01μF ceramic to 1.0μF electrolytic. C29 from 0.01μF to 1.0μF. R148 from 270kΩ to 470kΩ.	REV G and above
A6	Changed Q21 from 2N2222A to 2N2907A. (Circuit was as shown below.) 	REV G and above

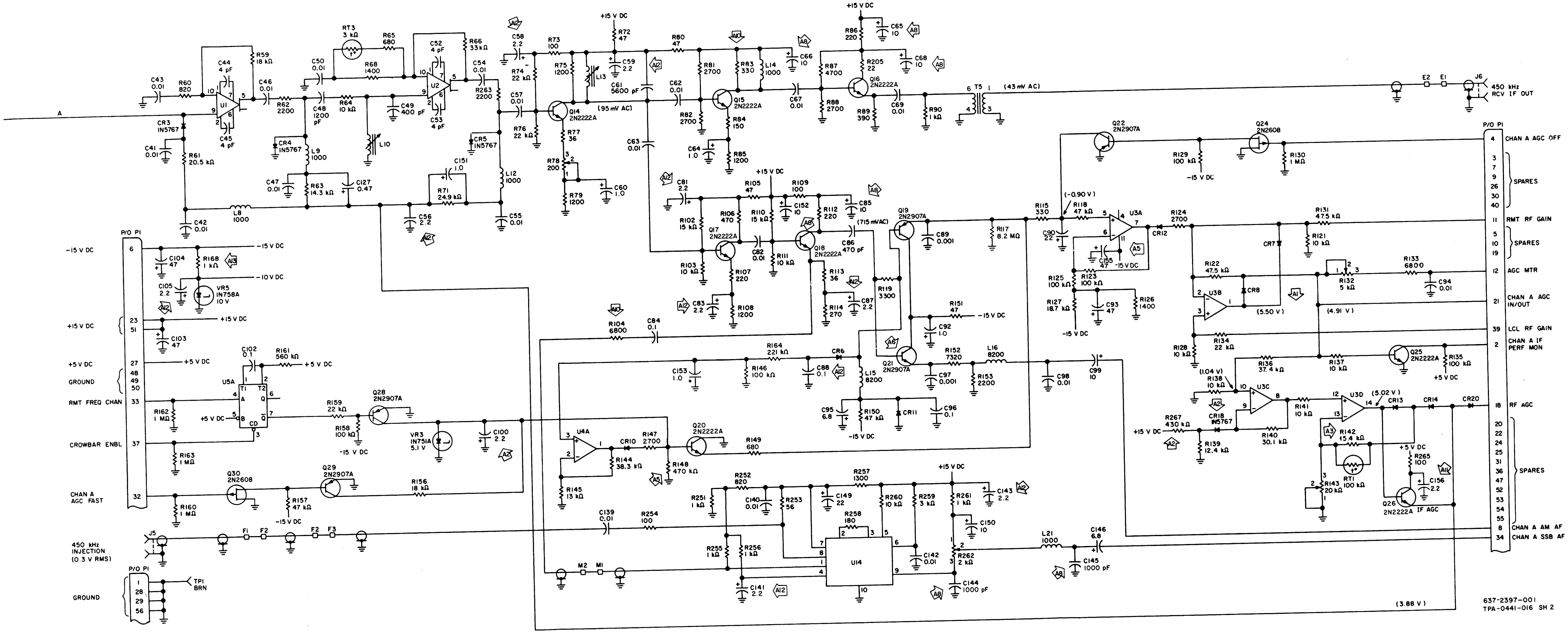
A7	Added CR17, 1N4454.
	Added C116, 1.5μH.
	Added Q12, 2N2222A.
	Added R184, 560kΩ.
	Added R187, 100kΩ.
	Added R266, 10kΩ.
	Added R269, 4700Ω.
		REV H and above

A8	Added C72, 18pF. Changed: C15 from 1.0μF to 10μF. C85 from 1.0μF to 10μF. C66 from 0.1μF to 10μF. C68 from 1.0μF to 10μF.	REV K and above

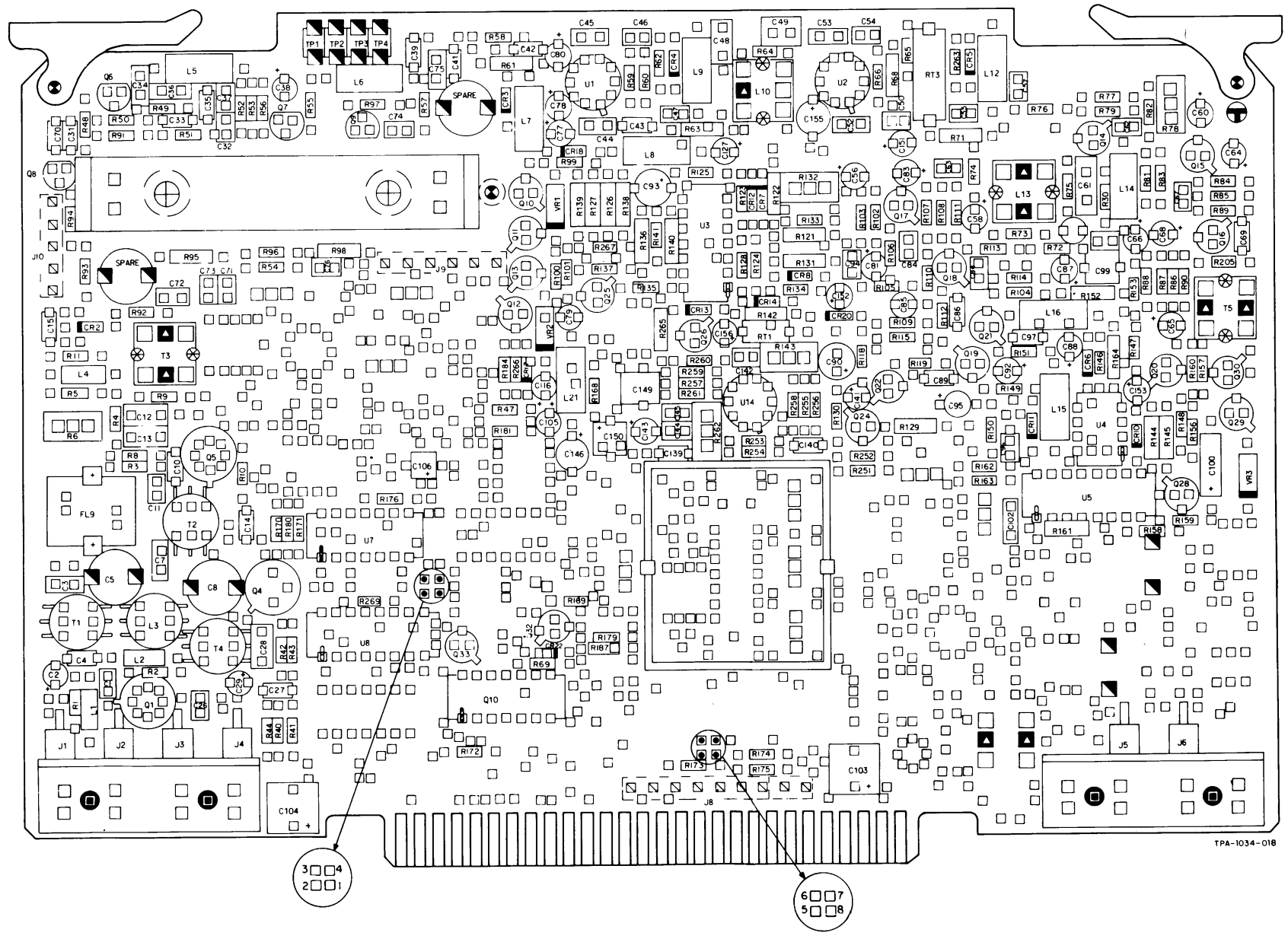
MODIFICATION HISTORY (Cont)

REVISION IDENT	DESCRIPTION OF REVISION AND REASON FOR CHANGE	EFFECTIVITY
	C75 from 20pF to 6 pF. C85 from 1.0μF to 10μF. C144 from 0.01μF to 1000pF. C145 from 0.01μF to 1000pF. C152 from 1.0μF to 10μF. R49 from test select of 200Ω to 750Ω, to fixed 620Ω. R55 from 1kΩ, 10% to 1kΩ, 5%. R56 from test select of 200Ω to 750Ω, to fixed 620Ω. R97 from test select of 200Ω to 750Ω, to fixed 560Ω.	
A9	Removed C106, 6.8μF; R190, 3900Ω; and R191, 22kΩ from circuit as shown below: 	REV K and above
A10	Changed: R83 from 470Ω to 330Ω. R104 from 10kΩ to 6800Ω.	REV N and above
A11	Added C156, 2.2μF electrolytic.	REV P and above
A12	Changed: C2 from 0.1μF to 2.2μF. C56 from 0.1μF to 2.2μF. C58 from 0.1μF to 2.2μF. C59 from 0.1μF to 2.2μF. C77 from 0.1μF to 2.2μF. C78 from 0.1μF to 2.2μF. C79 from 0.1μF to 2.2μF. C80 from 0.1μF to 2.2μF. C81 from 0.1μF to 2.2μF. C83 from 0.1μF to 2.2μF. C87 from 0.1μF to 2.2μF. C88 from 0.1μF electrolytic to 0.1 μF ceramic. C105 from 0.1μF to 2.2μF. C141 from 0.1μF to 2.2μF. C143 from 0.1μF to 2.2μF.	REV R and above
A13	Changed R168 from 2200Ω to 1kΩ.	REV T and above
B1	Changed: C14 from 0.01μF to 470pF. R100 from 470Ω to 270Ω.	REV AA and above
B2	Changed L7 from 2700μH to 5600μH.	REV AC and above

Channel A IF, Through REV AC, Schematic Diagram
Figure 11 (Sheet 4)



Channel A IF, Through REV AC, Schematic Diagram
Figure 11 (Sheet 5)



Channel A IF, REV AD and Above, Schematic Diagram
Figure 12 (Sheet 1 of 5)

PARTS LIST

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
	CHANNEL A IF A8	637-2650-001	A
	CHANNEL A IF A8	637-2650-002	B
CR1	NOT USED		
CR2	SEMICOND DEVICE 1N4454	353-3644-010	
CR3-CR5	SEMICOND DEVICE 1N5767	922-6119-010	
CR6-CR8	SEMICOND DEVICE 1N4454	353-3644-010	
CR9	NOT USED		
CR10-CR14	SEMICOND DEVICE 1N4454	353-3644-010	
CR15, CR16	NOT USED		
CR17	SEMICOND DEVICE 1N4454	353-3644-010	
CR18	SEMICOND DEVICE 1N5767	922-6119-010	
CR19	NOT USED		
CR20	SEMICOND DEVICE 1N4454	353-3644-010	
CR21	NOT USED		
CR22-CR26	SEMICOND DEVICE 1N4454	353-3644-010	
C1	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C2	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C3	CAPACITOR,FXD MICA DIEL, 20PF, PORM 0.5PF, 100V	912-4141-150	
C4	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C5	CAPACITOR,VAR CER DIEL, 9 TO 35PF, 200V	917-1225-000	
C6	NOT USED		
C7	CAPACITOR,FXD MICA DIEL, 68PF, 5%, 50V	912-4141-330	
C8	CAPACITOR,VAR CER DIEL, 9 TO 35PF, 200V	917-1225-000	
C9	NOT USED		
C10	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C11	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-180	
C12,C13	CAPACITOR,FXD CER DIEL, 2200PF, 5%, 100V	913-3281-300	
C14	CAPACITOR,FXD CER DIEL, 470PF, 10%, 200V	913-4014-000	
C15	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C16-C25	NOT USED		
C26	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C27	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C28	CAPACITOR,FXD CER DIEL, 1200PF, 5%, 100V	913-3281-290	
C29	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C30	NOT USED		
C31	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C32	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C33	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C34	CAPACITOR,FXD MICA DIEL, 24PF, PORM 0.5PF, 50V	912-4141-160	
C35	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C36	CAPACITOR,FXD MICA DIEL, 24PF, PORM 0.5PF, 50V	912-4141-160	
C37	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C38	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C39	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C40	NOT USED		
C41-C43	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C44,C45	CAPACITOR,FXD MICA DIEL, 4PF, PORM 0.5PF, 300V	912-4141-080	
C46,C47	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C48	CAPACITOR,FXD CER DIEL, 1200PF, 5%, 100V	913-3281-290	
C49	CAPACITOR,FXD MICA DIEL, 400PF, 5%, 50V	912-4141-520	
C50	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C51	NOT USED		
C52,C53	CAPACITOR,FXD MICA DIEL, 4PF, PORM 0.5PF, 300V	912-4141-080	
C54,C55	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C56	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C57	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C58,C59	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C60	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C61	CAPACITOR,FXD CER DIEL, 5600PF, 5%, 100V	913-3281-380	
C62	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C63	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C64	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C65,C66	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C67	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C68	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C69	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C70	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C71	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C72	CAPACITOR,FXD MICA DIEL, 18PF, PORM 0.5PF, 100V	912-4141-140	
C73	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C74	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C75	CAPACITOR,FXD MICA DIEL, 6PF, PORM 0.5PF, 300V	912-4141-090	
C76	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C77-C81	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C82	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C83	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C84	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-180	
C85	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C86	CAPACITOR,FXD CER DIEL, 470PF, 10%, 200V	913-4014-000	
C87	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C88	CAPACITOR,FXD ELCTLT, 0.22UF, 20%, 35V	184-9102-310	
C89	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C90	CAPACITOR,FXD ELCTLT, 22UF, 20%, 15V	184-9102-140	
C91	NOT USED		
C92	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C93	CAPACITOR,FXD ELCTLT, 47UF, 20%, 6V	184-9102-470	
C94	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C95	CAPACITOR,FXD ELCTLT, 6.8UF, 20%, 6V	184-9102-450	

PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
C96	CAPACITOR,FXD CER DIEL, 0.1UF, 20%, 50V	913-3279-180	
C97	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C98	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C99	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-610	
C100	CAPACITOR,FXD ELCTLT, 2.2UF, 10%, 20V	184-9086-430	
C101	NOT USED		
C102	CAPACITOR,FXD CER DIEL, 0.1UF, 10%, 100V	913-5019-440	
C103,	CAPACITOR,FXD ELCTLT, 47UF, 20%, 20V	184-9102-630	
C104			
C105	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C106	CAPACITOR,FXD ELCTLT, 6.8UF, 20%, 6V	184-9102-450	
C107-	NOT USED		
C115			
C116	CAPACITOR,FXD ELCTLT, 1.5UF, 20%, 25V	184-9102-210	
C127	CAPACITOR,FXD ELCTLT, 0.47UF, 20%, 35V	184-9102-330	
C128-	NOT USED		
C138			
C139,	CAPACITOR,FXD CER DIEL, 0.01UF, 10%, 100V	913-5019-200	
C140			
C141	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C142	CAPACITOR,FXD CER DIEL, 0.01UF, 20%, 50V	913-3279-110	
C143	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C144,	CAPACITOR,FXD CER DIEL, 1000PF, 10%, 200V	913-4018-000	
C145			
C146	CAPACITOR,FXD ELCTLT, 6.8UF, 20%, 25V	184-9102-670	
C147,	NOT USED		
C148			
C149	CAPACITOR,FXD ELCTLT, 22UF, 20%, 10V	184-9102-520	
C150	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-610	
C151	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C152	CAPACITOR,FXD ELCTLT, 10UF, 20%, 20V	184-9102-170	
C153	CAPACITOR,FXD ELCTLT, 1UF, 20%, 35V	184-9102-350	
C154	NOT USED		
C155	CAPACITOR,FXD ELCTLT, 47UF, 20%, 20V	184-9102-630	
C156	CAPACITOR,FXD ELCTLT, 2.2UF, 20%, 25V	184-9102-220	
C157	NOT USED		
C158	CAPACITOR,FXD ELCTLT, 15UF, 20%, 20V	184-9102-620	
C159,	CAPACITOR,FXD CER DIEL, 0.1UF, 10%, 100V	913-5019-440	
C160			
FL1	FILTER,USB,2.75 KHZ	526-9955-010	A
FL1	FILTER,USB,3.05 KHZ	526-9980-010	B
FL2-FL8	NOT USED		
FL9	FILTER,XTAL,BP 9.45 MHZ	293-1319-010	
J1-J6	CONNECTOR,RCPT ELEC	357-7207-100	
J7	NOT USED		
J8	HOUSING,CONN	372-2625-018	
J9	HOUSING,CONN	372-2625-015	
J10	HOUSING,CONN	372-2625-014	
L1,L2	COIL,RF 100UH	240-2047-000	
L3	TRANSFORMER,RF	278-0430-040	
L4	COIL,RF 100UH	240-2047-000	
L5,L6	COIL,RF 1000UH	240-2715-490	
L7	COIL,RF 2700UH	240-2715-540	
L8,L9	COIL,RF 1000UH	240-2715-490	
L10	INDUCTOR,RF VAR	242-0441-010	
L11	NOT USED		
L12	COIL,RF 1000UH	240-2715-490	
L13	INDUCTOR,RF VAR	242-0441-020	
L14	COIL,RF 1000UH	240-2715-490	
L15,L16	COIL,RF 8200UH	240-2715-600	
L17-L20	NOT USED		
L21	COIL,RF 1000UH	240-2715-490	
Q1	TRANSISTOR U431	351-1151-010	
Q2,Q3	NOT USED		
Q4	TRANSISTOR 2N5109	352-0766-010	
Q5	TRANSISTOR U431	351-1151-010	
Q6-Q9	TRANSISTOR SPF557	352-1068-010	
Q10	TRANSISTOR 2N2222A	352-0661-020	
Q11	TRANSISTOR 2N2907A	352-0551-010	
Q12	TRANSISTOR 2N2222A	352-0661-020	
Q13	TRANSISTOR 2N2907A	352-0551-010	
Q14-Q18	TRANSISTOR 2N2222A	352-0661-020	
Q19	TRANSISTOR 2N2907A	352-0551-010	
Q20	TRANSISTOR 2N2222A	352-0661-020	
Q21,Q22	TRANSISTOR 2N2907A	352-0551-010	
Q23	NOT USED		
Q24	TRANSISTOR 2N2608	352-0605-010	
Q25,Q26	TRANSISTOR 2N2222A	352-0661-020	
Q27	NOT USED		
Q28,Q29	TRANSISTOR 2N2907A	352-0551-010	
Q30	TRANSISTOR 2N2608	352-0605-010	
Q31	NOT USED		
Q32,Q33	TRANSISTOR 2N2608	352-0605-010	
Q34-Q46	NOT USED		
Q47	TRANSISTOR 2N2608	352-0605-010	
Q48	TRANSISTOR 2N5116	352-0915-030	
RT1	RESISTOR,THRM 100K, 10%, 0.5W	714-1736-000	
RT2	NOT USED		
RT3	RESISTOR,THRM 3K, 10%, 1W	714-1715-000	
R1	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R2	RESISTOR,FXD CMPSN, 820 OHMS, 10%, 1/8W	745-2338-000	
R3	RESISTOR,FXD CMPSN, 7.5K, 5%, 1/8W	745-1863-700	
R4,R5	RESISTOR,FXD CMPSN, 56K, 10%, 1/8W	745-2404-000	

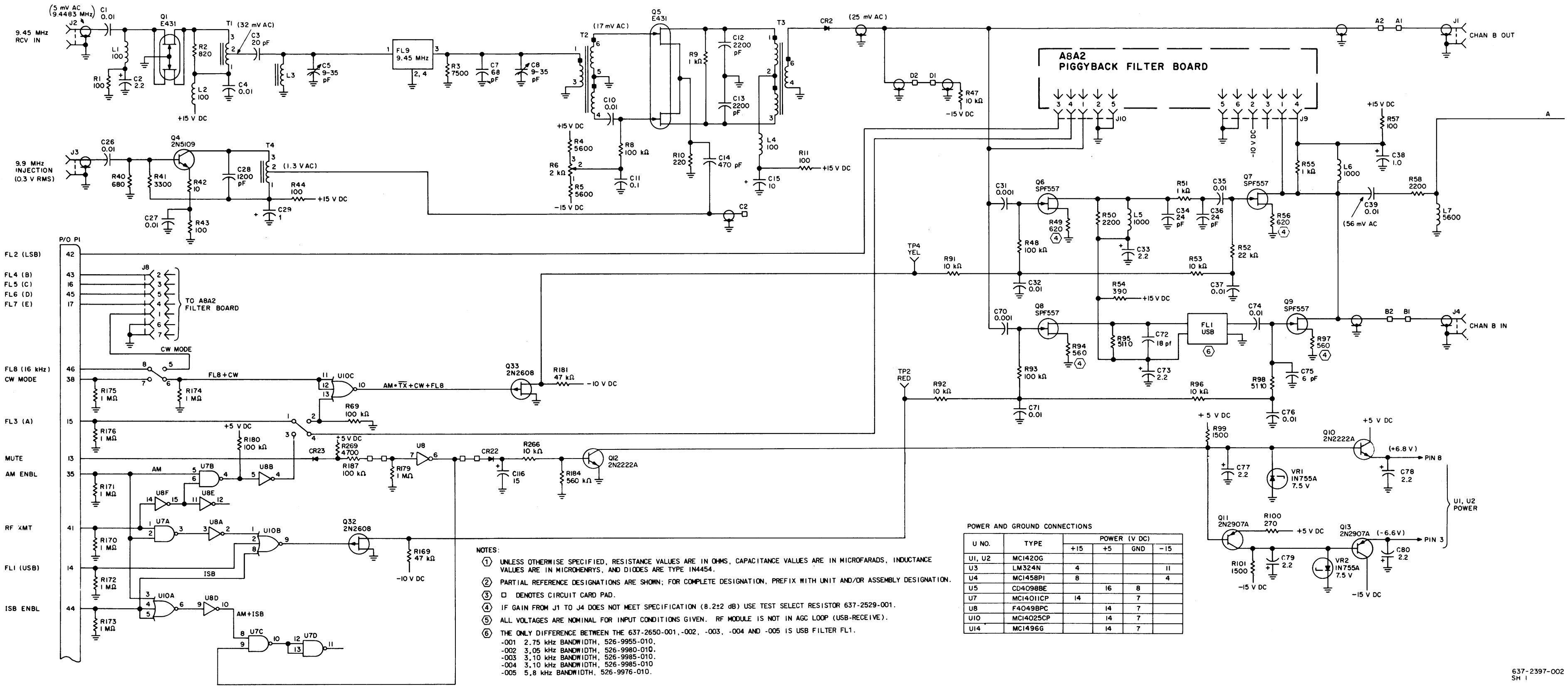
PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
R6	RESISTOR,VAR NON-WW,10K, 10%	382-0052-460	
R7	NOT USED		
R8	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R9	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R10	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/8W	745-2317-000	
R11	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R12-R39	NOT USED		
R40	RESISTOR,FXD CMPSN, 680 OHMS, 10%, 1/8W	745-2335-000	
R41	RESISTOR,FXD CMPSN, 3.3K, 10%, 1/8W	745-2359-000	
R42	RESISTOR,FXD CMPSN, 10 OHMS, 10%, 1/8W	745-2268-000	
R43,R44	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R45,R46	NOT USED		
R47	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R48	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R49	RESISTOR,FXD CMPSN, 620 OHMS, 5%, 1/8W	745-1863-440	
R50	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R51	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R52	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R53	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R54	RESISTOR,FXD CMPSN, 390 OHMS, 10%, 1/8W	745-2326-000	
R55	RESISTOR,FXD CMPSN, 1K, 5%, 1/8W	745-1863-490	
R56	RESISTOR,FXD CMPSN, 620 OHMS, 5%, 1/8W	745-1863-440	
R57	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R58	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R59	RESISTOR,FXD CMPSN, 18K, 10%, 1/8W	745-2386-000	
R60	RESISTOR,FXD CMPSN, 820 OHMS, 10%, 1/8W	745-2338-000	
R61	RESISTOR,FXD FILM, 20.5K, 1%, 1/8W	705-1059-000	
R62	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R63	RESISTOR,FXD FILM, 14.3K, 1%, 1/8W	705-3605-550	
R64	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R65	RESISTOR,FXD CMPSN, 680 OHMS, 10%, 1/8W	745-2335-000	
R66	RESISTOR,FXD CMPSN, 33K, 10%, 1/8W	745-2395-000	
R67	NOT USED		
R68	RESISTOR,FXD FILM, 1.40K, 1%, 1/8W	705-1003-000	
R69	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R70	NOT USED		
R71	RESISTOR,FXD FILM, 24.9K, 1%, 1/8W	705-1063-000	
R72	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R73	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R74	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R75	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R76	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R77	RESISTOR,FXD CMPSN, 36 OHMS, 5%, 1/8W	745-1863-140	
R78	RESISTOR,VAR NON-WW,200 OHMS, 10%	382-0052-410	
R79	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R80	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R81,R82	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/8W	745-2356-000	
R83	RESISTOR,FXD CMPSN, 330 OHMS, 10%, 1/8W	745-2323-000	
R84	RESISTOR,FXD CMPSN, 150 OHMS, 10%, 1/8W	745-2311-000	
R85	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R86	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/8W	745-2317-000	
R87	RESISTOR,FXD CMPSN, 4.7K, 10%, 1/8W	745-2365-000	
R88	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/8W	745-2356-000	
R89	RESISTOR,FXD CMPSN, 390 OHMS, 10%, 1/8W	745-2326-000	
R90	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R91,R92	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R93	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R94	RESISTOR,FXD CMPSN, 560 OHMS, 10%, 1/8W	745-2332-000	
R95	RESISTOR,FXD FILM, 5.11K, 1%, 1/8W	705-1030-000	
R96	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R97	RESISTOR,FXD CMPSN, 560 OHMS, 5%, 1/8W	745-1863-430	
R98	RESISTOR,FXD FILM, 5.11K, 1%, 1/8W	705-1030-000	
R99	RESISTOR,FXD CMPSN, 1.5K, 10%, 1/8W	745-2347-000	
R100	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/8W	745-2320-000	
R101	RESISTOR,FXD CMPSN, 1.5K, 10%, 1/8W	745-2347-000	
R102	RESISTOR,FXD CMPSN, 15K, 10%, 1/8W	745-2383-000	
R103	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R104	RESISTOR,FXD CMPSN, 6.8K, 10%, 1/8W	745-2371-000	
R105	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R106	RESISTOR,FXD CMPSN, 470 OHMS, 10%, 1/8W	745-2329-000	
R107	RESISTOR,FXD CMPSN, 220 OHMS, 10%, 1/8W	745-2317-000	
R108	RESISTOR,FXD CMPSN, 1.2K, 10%, 1/8W	745-2344-000	
R109	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R110	RESISTOR,FXD CMPSN, 15K, 10%, 1/8W	745-2383-000	
R111	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R112	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/8W	745-2320-000	
R113	RESISTOR,FXD CMPSN, 36 OHMS, 5%, 1/8W	745-1863-140	
R114	RESISTOR,FXD CMPSN, 270 OHMS, 10%, 1/8W	745-2320-000	
R115	RESISTOR,FXD CMPSN, 330 OHMS, 10%, 1/8W	745-2323-000	
R116, R117	NOT USED		
R118	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R119	RESISTOR,FXD CMPSN, 3.3K, 10%, 1/8W	745-2359-000	
R120	NOT USED		
R121	RESISTOR,FXD FILM, 10K, 1%, 1/8W	705-1044-000	
R122	RESISTOR,FXD FILM, 47.5K, 1%, 1/8W	705-3605-800	
R123	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R124	RESISTOR,FXD CMPSN, 2.7K, 10%, 1/8W	745-2356-000	
R125	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R126	RESISTOR,FXD FILM, 1.96K, 1%, 1/8W	705-1010-000	
R127	RESISTOR,FXD FILM, 18.7K, 1%, 1/8W	705-1057-000	
R128	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R129	RESISTOR,FXD FILM, 100K, 1%, 1/8W	705-1092-000	

PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
R130	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R131	RESISTOR,FXD FILM, 47.5K, 1%, 1/8W	705-3605-800	
R132	RESISTOR,VAR NON-WW,5K, 10%	382-0052-450	
R133	RESISTOR,FXD CMPSN, 6.8K, 10%, 1/8W	745-2371-000	
R134	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R135	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R136	RESISTOR,FXD FILM, 37.4K, 1%, 1/8W	705-3605-750	
R137	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R138	RESISTOR,FXD FILM, 10K, 1%, 1/8W	705-1044-000	
R139	RESISTOR,FXD FILM, 12.4K, 1%, 1/8W	705-3605-520	
R140	RESISTOR,FXD FILM, 30.1K, 1%, 1/8W	705-1067-000	
R141	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R142	RESISTOR,FXD FILM, 15.4K, 1%, 1/8W	705-1053-000	
R143	RESISTOR,VAR NON-WW,20K, 10%	382-0052-470	
R144	RESISTOR,FXD FILM, 38.3K, 1%, 1/8W	705-1072-000	
R145	RESISTOR,FXD FILM, 64.9K, 1%, 1/8W	705-1083-000	
R146	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R147	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R148	RESISTOR,FXD CMPSN, 330K, 10%, 1/8W	745-2431-000	
R149	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R150	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R151	RESISTOR,FXD CMPSN, 47 OHMS, 10%, 1/8W	745-2292-000	
R152	RESISTOR,FXD FILM, 7.32K, 1%, 1/8W	705-3605-410	
R153	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R154, R155	NOT USED		
R156	RESISTOR,FXD CMPSN, 18K, 10%, 1/8W	745-2386-000	
R157	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R158	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R159	RESISTOR,FXD CMPSN, 22K, 10%, 1/8W	745-2389-000	
R160	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R161	RESISTOR,FXD FILM, 196K, 1%, 1/8W	705-1106-000	
R162, R163	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R164	RESISTOR,FXD FILM, 221K, 1%, 1/8W	705-3604-170	
R165-R167	NOT USED		
R168	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R169	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R170-R176	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R177, R178	NOT USED		
R179	RESISTOR,FXD CMPSN, 1MEGO, 10%, 1/8W	745-2449-000	
R180	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R181	RESISTOR,FXD CMPSN, 47K, 10%, 1/8W	745-2401-000	
R182, R183	NOT USED		
R184	RESISTOR,FXD CMPSN, 560K, 10%, 1/8W	745-2440-000	
R185, R186	NOT USED		
R187	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R188-R204	NOT USED		
R205	RESISTOR,FXD CMPSN, 22 OHMS, 10%, 1/8W	745-2280-000	
R206-R250	NOT USED		
R251	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R252	RESISTOR,FXD CMPSN, 820 OHMS, 10%, 1/8W	745-2338-000	
R253	RESISTOR,FXD CMPSN, 56 OHMS, 10%, 1/8W	745-2295-000	
R254	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R255, R256	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R257	RESISTOR,FXD CMPSN, 1.3K, 5%, 1/8W	745-1863-520	
R258	RESISTOR,FXD CMPSN, 180 OHMS, 10%, 1/8W	745-2314-000	
R259	RESISTOR,FXD CMPSN, 3K, 5%, 1/8W	745-1863-600	
R260	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R261	RESISTOR,FXD CMPSN, 1K, 10%, 1/8W	745-2341-000	
R262	RESISTOR,VAR NON-WW,2K, 10%	382-0052-440	
R263	RESISTOR,FXD CMPSN, 2.2K, 10%, 1/8W	745-2353-000	
R264	NOT USED		
R265	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/4W	745-0713-000	
R266	RESISTOR,FXD CMPSN, 10K, 10%, 1/8W	745-2377-000	
R267	RESISTOR,FXD CMPSN, 430K, 5%, 1/8W	745-1864-160	
R268	NOT USED		
R269	RESISTOR,FXD CMPSN, 4.7K, 10%, 1/8W	745-2365-000	
R270	RESISTOR,FXD CMPSN, 100K, 10%, 1/8W	745-2413-000	
R271-R274	NOT USED		
R275, R276	RESISTOR,FXD CMPSN, 100 OHMS, 10%, 1/8W	745-2304-000	
R277	RESISTOR,FXD CMPSN, 4.7K, 10%, 1/8W	745-2365-000	
TP1	JACK,TIP BRN	360-0484-070	
TP2	JACK,TIP RED	360-0484-020	
TP3	JACK,TIP ORN	360-0484-050	
TP4	JACK,TIP YEL	360-0484-060	
T1	TRANSFORMER,RF	278-0430-010	
T2	TRANSFORMER,RF	278-0430-180	
T3	TRANSFORMER,RF	278-0432-010	
T4	TRANSFORMER,RF	278-0430-030	
T5	TRANSFORMER,RF	278-0432-030	
U1,U2	INTEGRATED CKT MC1420G	351-1050-030	
U3	AMPLIFIER,QUAD LM324	351-1141-030	

Channel A IF, REV AD and Above, Schematic Diagram
Figure 12 (Sheet 2)



POWER AND GROUND CONNECTIONS					
U NO.	TYPE	POWER (V DC)			
		+15	+5	GND	-15
U1, U2	MC1420G				
U3	LM324N	4			11
U4	MC1458PI	8			4
U5	CD4098BE		16	8	
U7	MC1401ICP	14		7	
U8	F4049BPC		14	7	
U10	MC14025CP		14	7	
U14	MC1496G		14	7	

NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, INDUCTANCE VALUES ARE IN MICROHENRYS, AND DIODES ARE TYPE IN4454.
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT AND/OR ASSEMBLY DESIGNATION.
3. □ DENOTES CIRCUIT CARD PAD.
4. IF GAIN FROM J1 TO J4 DOES NOT MEET SPECIFICATION (8.2±2 dB) USE TEST SELECT RESISTOR 637-2529-001.
5. ALL VOLTAGES ARE NOMINAL FOR INPUT CONDITIONS GIVEN. RF MODULE IS NOT IN AGC LOOP (USB-RECEIVE).
6. THE ONLY DIFFERENCE BETWEEN THE 637-2650-001,-002, -003, -004 AND -005 IS USB FILTER FL1.
   -001 2.75 kHz BANDWIDTH, 526-9955-010.
   -002 3.05 kHz BANDWIDTH, 526-9980-010.
   -003 3.10 kHz BANDWIDTH, 526-9985-010.
   -004 3.10 kHz BANDWIDTH, 526-9985-010
   -005 5.8 kHz BANDWIDTH, 526-9976-010.

637-2397-002
SH 1

Channel A IF, REV AD and Above, Schematic Diagram
Figure 12 (Sheet 3)

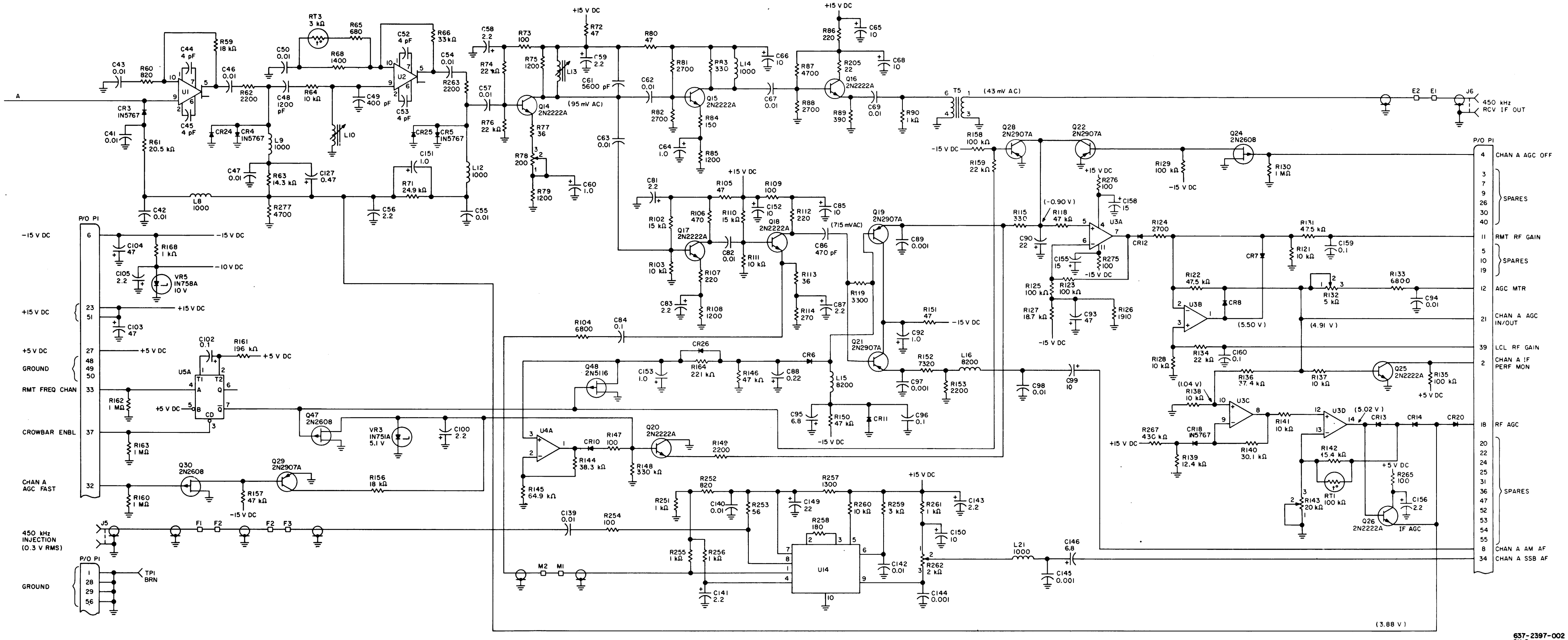
PARTS LIST (Cont)

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE
U4	INTEGRATED CKT MC1458G	351-1071-070	
U5	INTEGRATED CKT CD4098BE	351-8278-010	
U6	NOT USED		
U7	INTEGRATED CKT CD4011G	351-8159-040	
U8	INTEGRATED CKT CD4049A	351-8159-210	
U9	NOT USED		
U10	INTEGRATED CKT CD4025A	351-8159-150	
U11-U13	NOT USED		
U14	INTEGRATED CKT MC1496G	351-0043-020	
VR1,VR2	SEMICOND DEVICE 1N755A	353-2718-000	
VR3	SEMICOND DEVICE 1N751A	353-2710-000	
VR4	NOT USED		
VR5	SEMICOND DEVICE 1N758A	353-2724-000	
R49,R56, R94,R97	RESISTOR,FXD,CMPSN, 200OHM THRU 1K,5%,1/8W (TEST SELECT)	637-2529-001	

MODIFICATION HISTORY

REVISION IDENT	DESCRIPTION OF REVISION AND REASON FOR CHANGE	EFFECTIVITY
None	Note For configuration before REV AD, refer to figure 10. Changed layout of base planar board. Deleted CR17, 1N4454 R117, 8.2 MΩ Changed C88 from 0.1μF to 0.22μF. C155 from 47μF to 15μF. R126 from 1400Ω to 1910Ω. R145 from 13kΩ to 84.9kΩ. R146 from 100kΩ to 47kΩ. R147 from 2700Ω to 100Ω. R148 from 470kΩ to 330kΩ. R149 from 680Ω to 220Ω. Added CR23, 1N4454. CR24, 1N4454. CR25, 1N4454. CR26, 1N4454. C158, 15μF electrolytic. C159, 0.1μF. C160, 0.1μF. R275, 100Ω. R276, 100Ω. R277, 4700Ω. Q47, 2N2608. Q48, 2N5116.	AD and above

Channel A IF, REV AD and Above, Schematic Diagram
Figure 12 (Sheet 4)



637-2397-002 SH 2

Channel A IF, REV AD and Above, Schematic Diagram
Figure 12 (Sheet 5)