MAINTENANCE MANUAL
SERVICE SECTION
FOR
MLS TWO-WAY MOBILE RADIOS

TABLE OF CONTENTS

DESCRIPTION

The Service Section contains the information necessary for aligning and troubleshooting the MLS two-way FM mobile radio. In addition, information is provided for removing and replacing chip components, disassembly procedures and module replacement procedures.

INITIAL ADJUSTMENT

After the radio has been installed as described in the Installation Manual, the following adjustments should be made by a certified electronics technician.

TRANSMITTER ADJUSTMENT

The transmitter has been adjusted at the factory and should require no readjustment. However, the antenna length should be adjusted for optimum VSWR, and the frequency and modulation measured and recorded for future reference. For the complete transmitter adjustment, refer to the Alignment Procedure (see Table of Contents).

RECEIVER ADJUSTMENT

No inital adjustments to the receiver are required. Refer to the Table of Contents for the complete receiver alignment.

RE-INSTALLATION

The MLS series mobile radios are designed to operae in 12-Volt, negative ground vehicles only. If the mobile radio is moved to a different vehicle, always check the battery polarity of the new vehicle system.

MAINTENANCE

PREVENTIVE MAINTENACE

To insure high operating efficiency and to prevent mechanical and electrical failures from interrupting system operations, routine checks should be made of all mechanical and electrical parts at regular intervals. Preventive maintenance should include the following checks:

Connections

Ground connections to the voltage source should be periodically checked for tightness. Loose or poor connections to the power source will cause excessive voltage drops and faulty operation. When ground connections are not made directly to the battery, the connection from the battery to vehicle chassis must be checked for low impedance. A high impedance may cause excessive voltage drops and alternator noise problems.

Electrical System

Check the voltage regulator and alternator or generator periodically to keep the electrical system within safe and economical operating limits. Over-voltage is indicated when the battery loses water rapidly. Usage of 1 or 2 ounces of water per cell per week is acceptable for batteries in continuous operation. A weak battery will often cause excessive noise or faulty operation.

Mechanical Inspection

Since mobile units are subject to constant shock and vibration, check for loose plugs, nuts, screws and parts to make sure that nothing is working loose.

Antenna

The antenna, antenna base and all contacts should be kept clean and free from dirt or corrosion. If the antennas or its base should become coated or poorly grounded, loss of radiation and a weak signal will result.

Alignment

The transmitter and receiver meter readings should be checked periodically, and the alignment "touched up" when necessary. Refer to applicable Alignment Procedure and Troubleshooting sheet for typical voltage readings.

Frequency Check

Check transmitter frequency and deviation. Normally, these checks are made when the unit is first put into operation, after the first six months and once a year thereafter.

Disassembly

To gain access to the transmitter, receiver, and the system control/ synthesizer for servicing, loosen the four screws securing the cover at the rear of the radio. Then pull the cover out from under the edge of the front panel and lift the cover off.

PRE-DRIVER REPLACEMENT

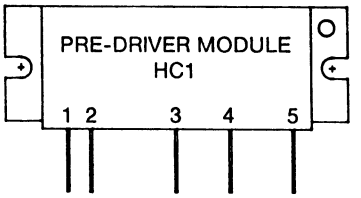
To remove Driver HC1:

1. Remove the two screws securing HC1 to the printed wire board.
2. Unsolder the five leads bridging HC1 to the printed board while lifting each lead as they are unsoldered.

   Service Note: These leads are soft and can be bent very easily.
3. Gently lift up on the module, taking care not to damage the spacer under the module. NOTE: The module may stick to the printed board.

To replace Driver HC1:

1. Position the module properly, aligning the screw holes and leads with the printed board. Trim leads if necessary (see Figure 1).
2. Replace the two screws securing the driver to the printed board, using a moderate torque of 0.5 ±0.1. Newton meter (5 inch-pounds).
3. Solder the five leads of driver HC1 to the printed board and ground strap.



RC-5424

Figure 1 - Driver Lead Identification

PA TRANSISTOR REPLACEMENT

NOTE

The PA transistor contains Beryllium Oxide, a TOXIC substance. If the ceramic or other encapsulation is opened, crushed, broken or abrided, the escaping dust may be hazardous if inhaled. Use care when replacing the module.

1. Remove the two retaining screws securing PA transistors TR1, 2 to chassis assembly.
2. Unsolder and remove capacitors. Use a desoldering tool as necessary while lifting the transistor leads with a small screw driver or pick. Discard old capacitors.
3. Unsolder the emitter, base and collector leads of the transistor, and remove it from the printed board.

4. Remove all excess solder from the board, and clean the holes to allow the new transistor to be positioned properly and the capacitors to fit into proper locations. Refer to Figure 2 and trim leads of TR1, 2.

5. Apply silicon grease to back of the replacement transistor and place the transistor into the mounting slot.

6. Replace the transistor mounting screws using a moderate torque of 0.5 Newton meter (4.5 inch-pounds).

7. Tack solder the four base d to the printed board, usin minimum solder. Then solder th emitter and collector leads.

8. Install the capacitors into their proper mounting areas, flush to the board.

9. Solder the capacitor bodies to the printed board by first soldering the outside edge. Then, holding the iron to the outside edge, touch the solder to the inside edge of the capacitor. Be careful not to create solder bridges at the front and back edges of the capacitors.

10. Remove any flux left on board.

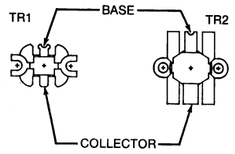


Figure 2 - PA Transistor Lead Identification

CHIP COMPONENT REPLACEMENT

Replacement of chip capacitors should always be done with a temperature controlled soldering iron, using a controlled temperature of 700°F (371°C). However, do NOT touch black metal film of the resistors or the ceramic body of capacitors with the soldering iron.

NOTE

The metalized end terminations of the parts may be touched with the soldering iron without causing damage.

To Remove Chip Components:

1. Using two soldering irons heat each end of the chip at the same time until solder flows, and then remove and discard the chip.

2. Remove excess solder with a vacuum solder extractor.

3. Carefully remove the epoxy adhesive and excess flux to prevent damage to the printed board.

To Replace Chip Components:

1. Using as little solder as possible, "tin" one end of the component and one of the pads on the printed wiring board.

2. Place the "tinned" end of the component on the "tinned" pad on the board and simultaneously touch the component and the pad with a well "tinned" soldering iron while pressing the component down on the board.

3. Place the "tinned" soldering iron on the other end of the component and the pad simultaneously. Apply solder to the top of the end of the component until the solder starts to flow. Use as little solder as possible while getting a good joint.

4. After the component has cooled, remove all flux from the component and printed wiring board area with alcohol.

CAUTION

The CMOS Integrated Circuit devices used in this equipment can be destroyed by static discharges. Before handling one of these devices, the serviceman should discharge himself by touching the case of a bench test instrument that has a 3-prong power cord connected to an outlet with a known good earth ground. When soldering or desoldering a CMOS device, the soldering iron should also have a 3-prong power cord connected to an outlet with a known good earth ground. A battery-operated soldering iron may be used in place of the regular soldering iron.

DISASSEMBLY PROCEDURE

Procedure:

To remove the System Control 2 Board:

1. Remove the two (2) screws (A) securing the top cover (refer to Figure 3).
2. Remove the five (5) screws (B) securing the System Control 2 Board to the frame and carefully lift up and remove the board.

To remove the System Control 1/Synthesizer Board:

1. Remove the top cover and Control 2 Board. Then disconnect the interconnecting cables.
2. Remove the seventeen (17) screws (C) , (D) securing the Synthesizer shield. Remove the shield.
3. Remove the four (4) screws (E) securing the board.
4. Remove the screws (F) securing regulator IC207 and carefully lift up and remove the board.

To remove the Receiver Board:

1. Remove the screws (A) and (G) securing the top cover and the bottom cover (refer to Figures 3 & 4).
2. Disconnect the interconnecting cables and then remove the seven (7) (H) securing the shield to the receiver board. Carefully lift up and remove the board.

Transmitter Board (Exciter/PA):

1. Remove the screws (A) and (G) securing the top and bottom covers (refer to Figures 3 & 4).
2. Disconnect the interconnecting cable. Remove the seven (7) screws (I) securing the exciter/PA shield and the antenna shield.
3. Remove the two (2) screws (J) connecting the power supply cable to the exciter/PA board and turn the cable stopper mounted on the rear of the frame assembly 90 degrees. Lift up the cable stopper up and remove the power supply cable.
4. Remove the two (2) screws (K) securing power module HC1. Remove the screws (L) securing power transistors TR1 and TR2.
5. Remove the five (5) screws (M) securing the transmitter board. Carefully lift up and remove the board.

To remove the Front Panel/Control Unit:

1. Remove the four (4) screws (N) securing the front panel to the frame assembly (refer to Figure 5).
2. Carefully disconnect the speaker cable from the connector on the Control 1/Synthesizer Board.
3. Separate the front panel from the frame assembly.
4. Carefully disconnect the ribbon cable connecting the Front Panel/Control unit to the Control 1/Synthesizer Board at (O).
5. Remove the two (2) screws located at (P) .
6. While pushing the lock tabs at (Q) remove the Control Panel - toward front.

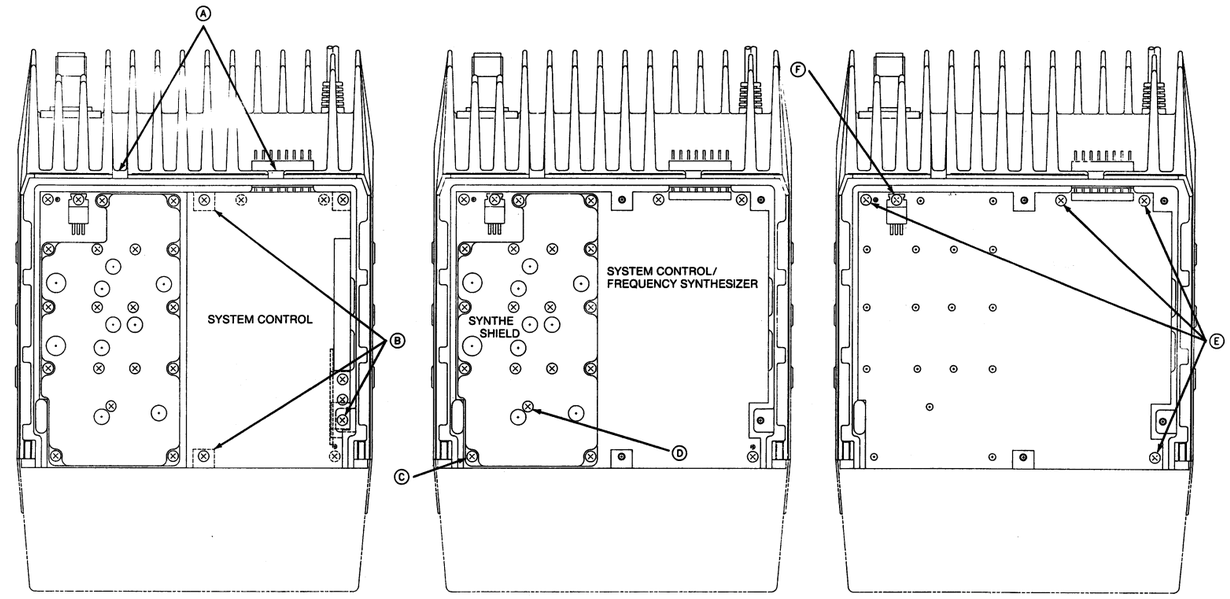


Figure 3 - Disassemble Procedure (Top View)

RC-5426

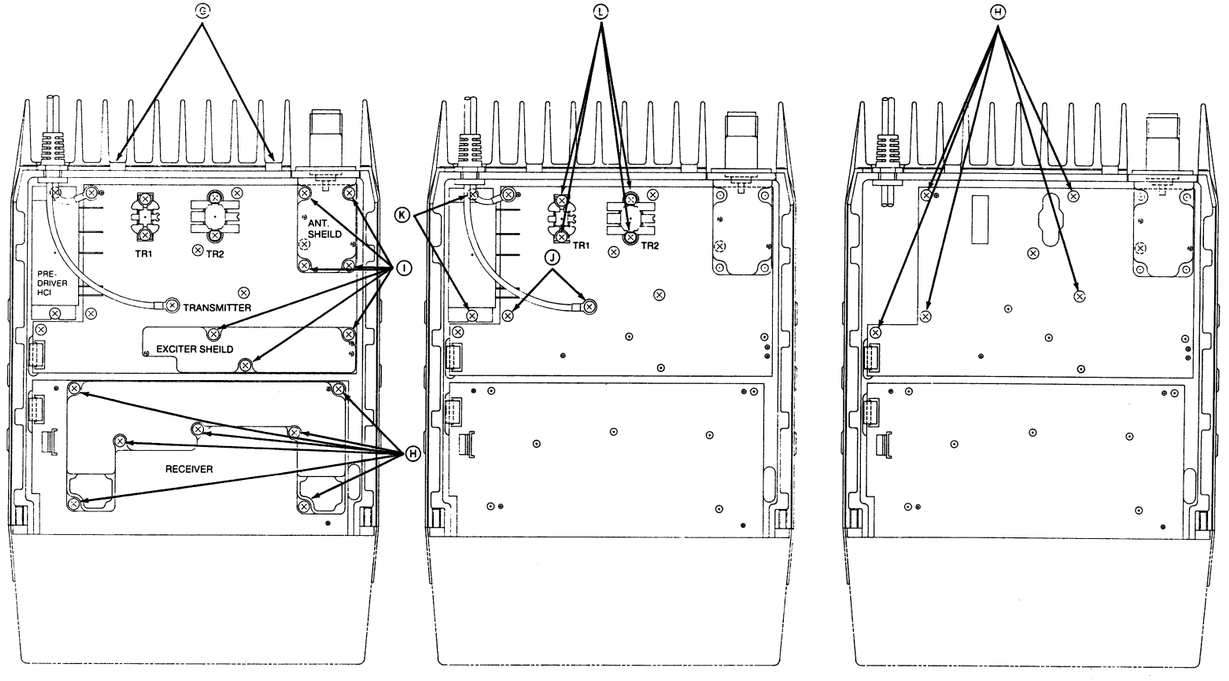


Figure 4 - Dissemble Procedure (Bottom View)

RC-5427

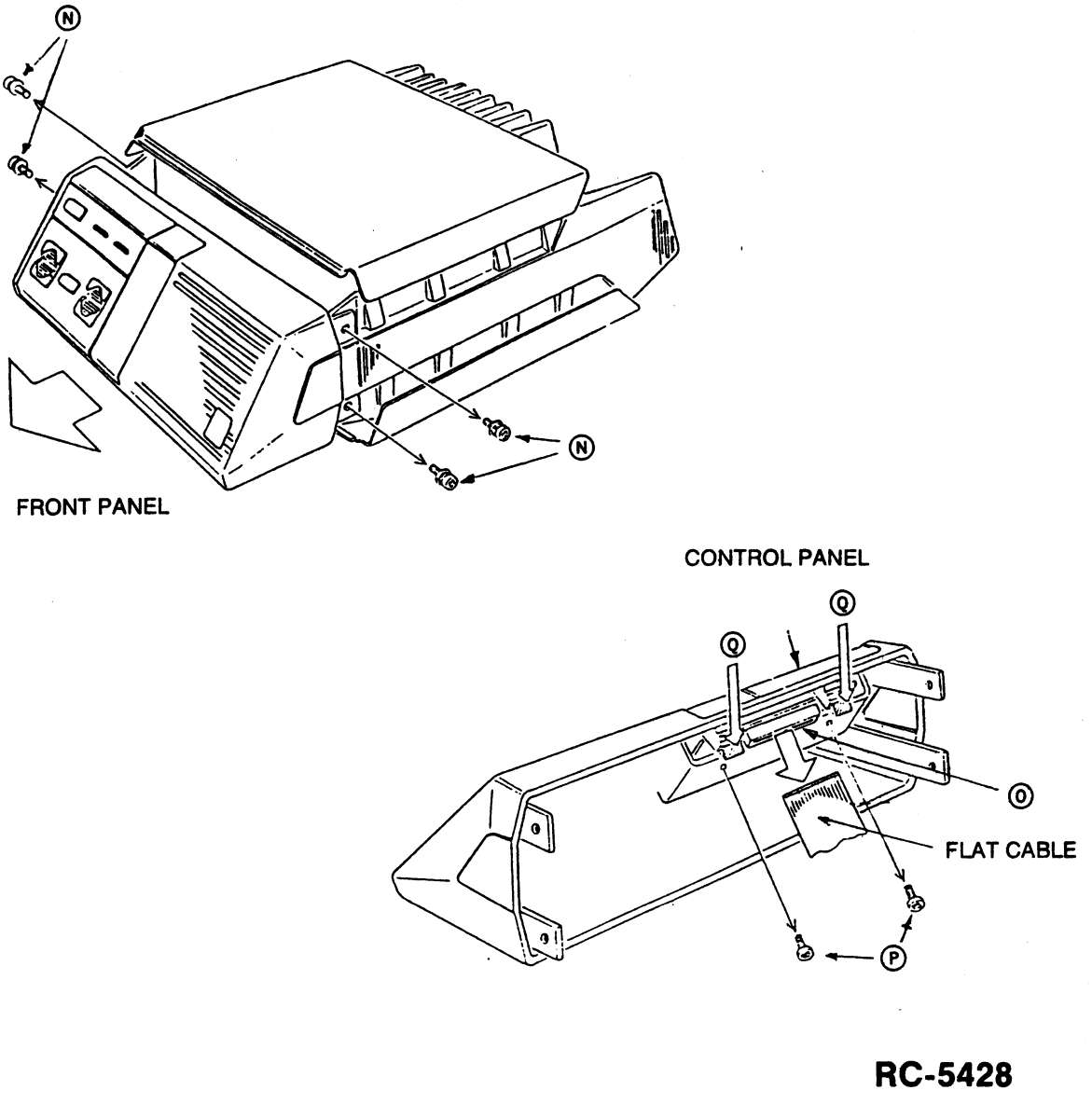


Figure 5 - Disassembly Procedure (Front Panel)

ALIGNMENT AND TROUBLESHOOTING PROCEDURE

Radio maintenance is facilitated by using the Troubleshooting Procedures and servicing techniques unique to this radio. The Troubleshooting Procedures are designed to lead the serviceman rapidly to the defective component or circuit.

Troubleshooting Procedures are provided for most major problems that might arise in the Exciter/Power Amplifier Receiver, System Control 1/Synthesizer Board.

Test equipment used in this section are listed as follows:

TEST EQUIPMENT

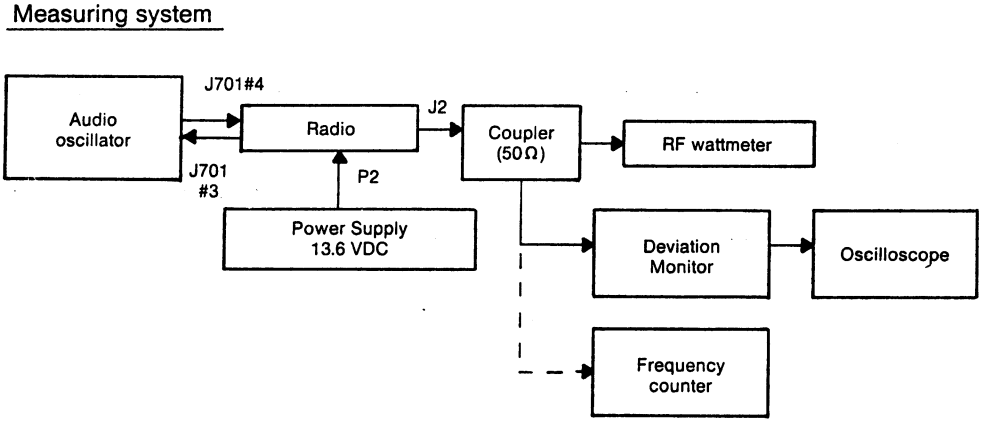
RF Signal Generator	(8642B HP)
Audio Distortion Analyzer	(8903B HP)
Audio Oscillator	(8903B HP)
DC Power Supply	(PAD35-5OLD KIKUSUI)
RF Millivolt Meter	(435B HP)
RF Power Meter	(TR-5J1D FUJISOKU)
Frequency Counter	(TR5210 ADVANTEST)
Test Cable	
Modulation Meter	(8901A HP)

SYNTHESIZER

Alignment and Troubleshooting for Synthesizer Circuitry on System Control 1/ Synthesizer Board CMC-404A/B

TEST EQUIPMENT REQUIRED

1. Audio Oscillator
2. Deviation Monitor
3. Oscilloscope
4. Frequency Counter
5. RF Wattmeter (50 ohms, 100 W)
6. VTVM
7. Digital Voltmeter
8. Power Supply, 13.6 VDC regulated



RC-5429

NOTE

Refer to Figure 6 for location of tuning and adjustment controls.

TX VCO & RX VCO ALIGNMENT

STEP	METERING POINT	TUNING CONTROL	METER READING	PROCEDURE
1	TP201 Control Voltage Monitor	CV202	7.0 VDC	Select highest frequency transmit channel. With 50 ohms load on the antenna connector J2, key the radio. Monitor TP201 with digital voltmeter and tune CV202 for 7.0 VCO ±0.1 V. Unkey the radio.
2	TP201	CV201	7.0 VDC	Select highest frequency receive channel. Monitor TP201 with digital voltmeter and tune CV201 for 7.0 VDC ±0.1 V.
3	TP201		3.5-7.5 VDC	Select lowest frequency channel. Voltage should be between 3.5 - 7.5 VDC transmit and receive for the lowest and highest frequency channels.
4	J202 J201		-3 to +3 dBm	Monitor TX injection at J202 and RX injection at J201. TX injection -3 to +3 dBm RX injection -3 to +3 dBm

TRANSMITTER FREQUENCY ADJUSTMENT

STEP	METERING POINT	TUNING CONTROL	METER READING	PROCEDURE
1	J202 (or J2)	FREQ TRIM Control on TCXO	Channel Operating Frequency	NOTE This step assumes the frequency is measured when the transmitter is first keyed. If delayed, the rapidly rising ambient temperature must be taken into consideration. The oscillator frequency should be set at 25°C ambient temperature. In the range of 10°C to 40°C, if the frequency deviates more than ±5 PPM, it may be reset according to Figure 7, Temperature/Frequency Correction Curve. Press the PTT switch while monitoring TX injection frequency at J202. Adjust FREQ TRIM Control on TXCO for the assigned channel frequency ±0.5 PPM.

RECEIVER FREQUENCY ADJUSTMENT

No receiver adjustment is required.

According as TX frequency adjustment, RX injection frequency will automatically be correct.

MODULATION LEVEL ADJUSTMENT

Procedure of Synthesizer Transmit Deviation

1. Select a center frequency channel.
2. Rotate CG MOD ADJUST, RV202 fully counterclock wise.
3. Apply a 1 KHz tone at 1 Vrms to MIC HI, J701-4. Connect the deviation monitor to the antenna connector, J2 through a 30 dB decoupler. Key the radio. Set MOD ADJUST, RV201 for ±3.75 KHz deviation.
4. Disconnect the audio oscillator and unkey the radio.
5. Select a channel with Channel Guard. Key the radio.
6. Select CG MOD ADJUST, RV202 for ±0.75 KHz deviation.

NOTE: If Channel Guard is not used on any frequency channel, MOD ADJUST, RV201 may be set for ±4.5 KHz deviation instead of ±3.75 KHz.

AUDIO CHECK

Audio Sensitivity

1. Connect audio oscillator output to MIC HI, J701-4. Adjust output for 1 KHz at 1 Vrms.
2. Reduce generator output until deviation falls to 3.0 KHz for radios without Channel Guard or to 2.25 KHz for radios with Channel Guard. Voltage should be less than 70 millivolts.

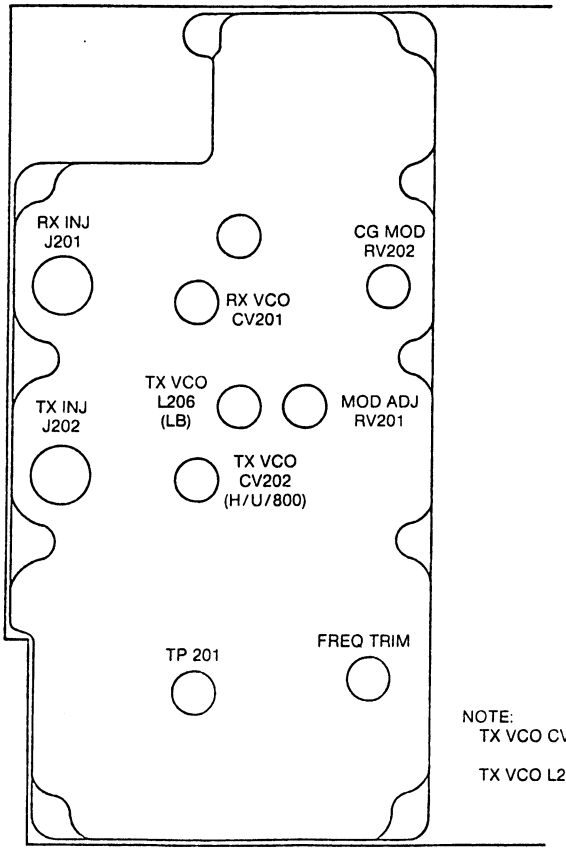
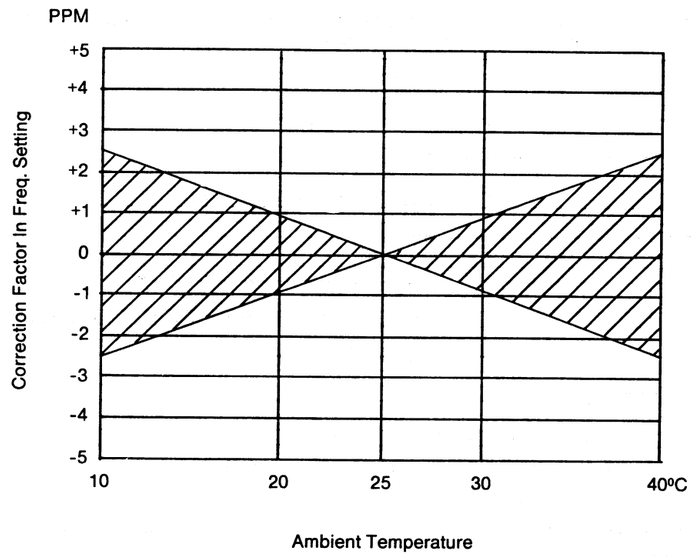


Figure 6 - Synthesizer Tuning & Adjustment Controls



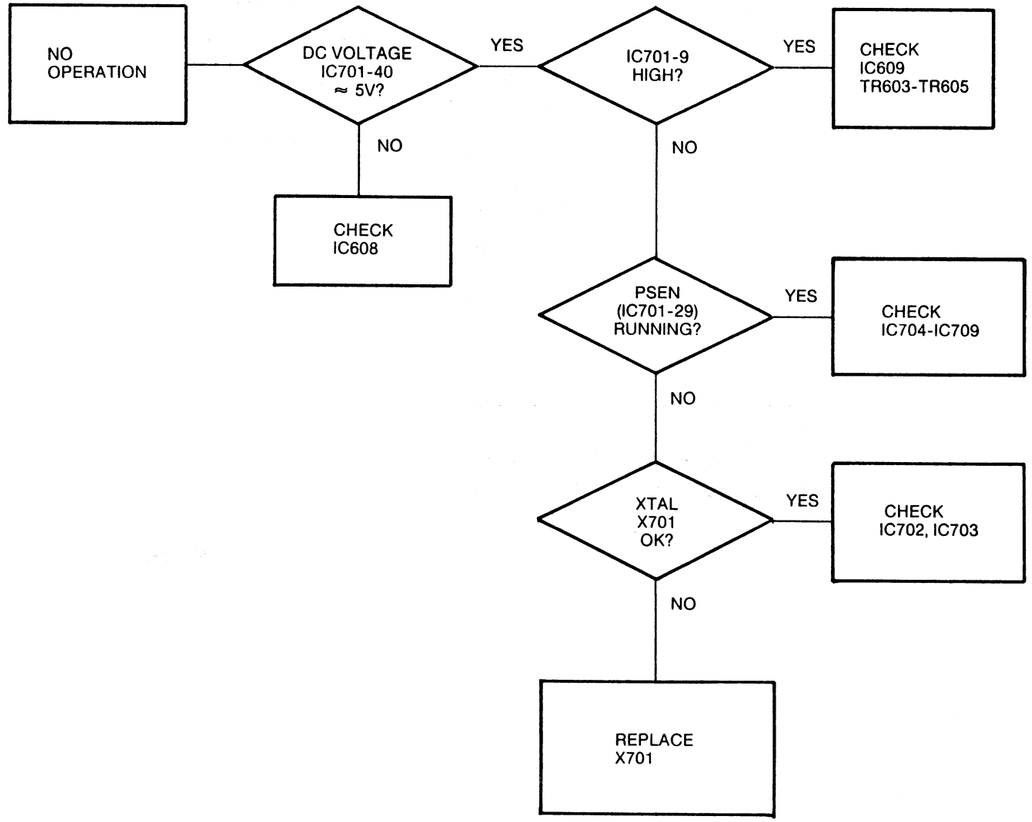
RC-5431

Figure 7-5 ppm TCXO Temperature/Frequency Correction Curve

AUDIO OUTPUT LEVEL ADJUSTMENT PROCEDURE

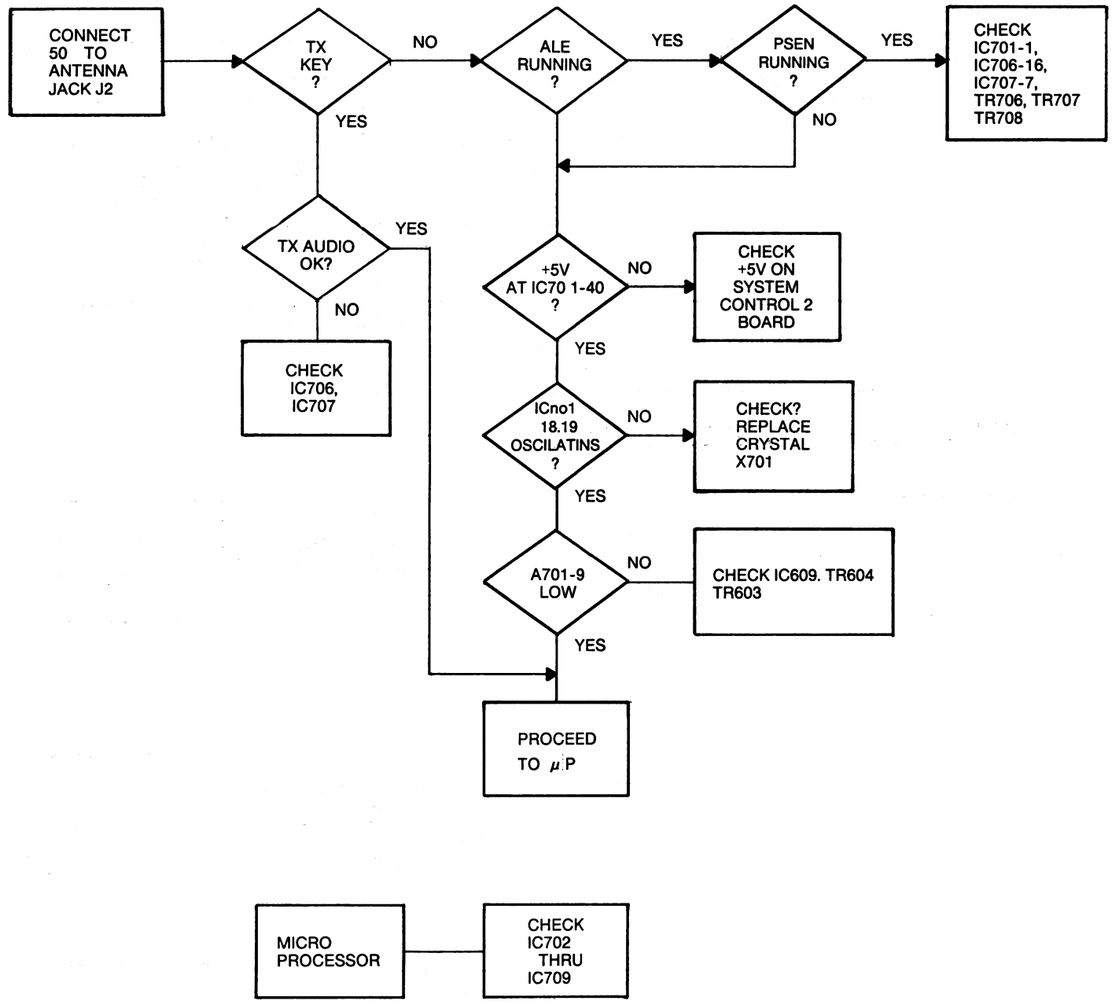
STEP	TEST POINT	TUNING CONTROL	METER READING	PROCEDURE
1	J701-1	RV601	SEE PROCEDURE	Set the signal generator to the receiver frequency with +3 KHz deviation and 1 KHz modulation. Set the RF signal level to 1000 microvolt. Move P703 from J703-1,2 to J703-2,3 on the System Control 1/ Synthesizer Board. Terminate J701-1,6 with a 4-ohm, 6-watt resistor, connect the audio level meter and the distortion analyzer input across the resistor. Set the volume to the maximum point. Press DOWN button two times. Adjust RV601 for 4-watt output (4 Vrms, using the distortion analyzer as Volt Meter).

SYNTHESIZER TROUBLESHOOTING



RC-5432

CONTROL LOGIC TROUBLESHOOTING



RC-5433

TRANSMITTER

Alignment and Troubleshooting for Exciter/Power Amplifier Board CAH-282A/B

1. GENERAL DESCRIPTION OF ADJUSTMENT

This manual is prepared for adjustments and confirmations of the Exciter/PA section and covers the following items.

Start

1 Initial setting

DC power ON →

2 Confirming the current

SG, PTT ON →

3 Confirming the APC section

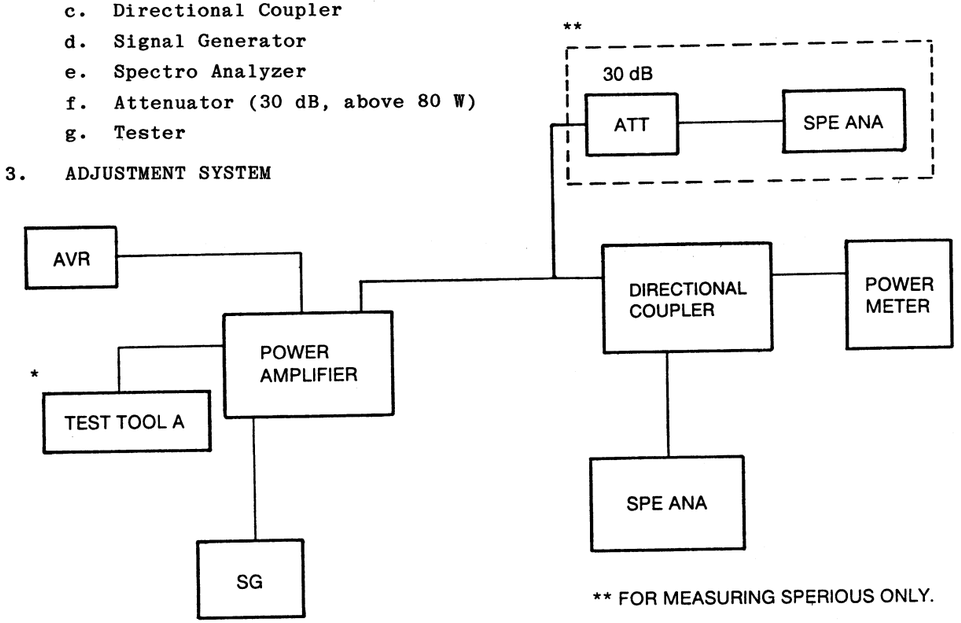
4 Adjustment and setting of the transmitting output

Stop

2. MEASURING INSTRUMENTS

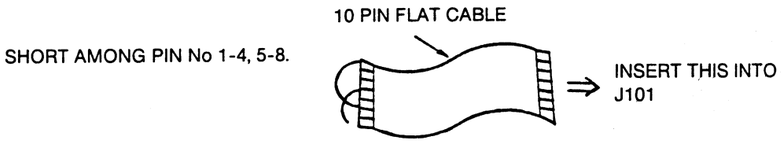
a. AVR (DC Power Supply DC 0-20V, 20A)
b. Power Meter (Usable at the value above 80 W)
c. Directional Coupler
d. Signal Generator
e. Spectro Analyzer
f. Attenuator (30 dB, above 80 W)
g. Tester

3. ADJUSTMENT SYSTEM



** FOR MEASURING SPERIOUS ONLY.

*TEST TOOL A

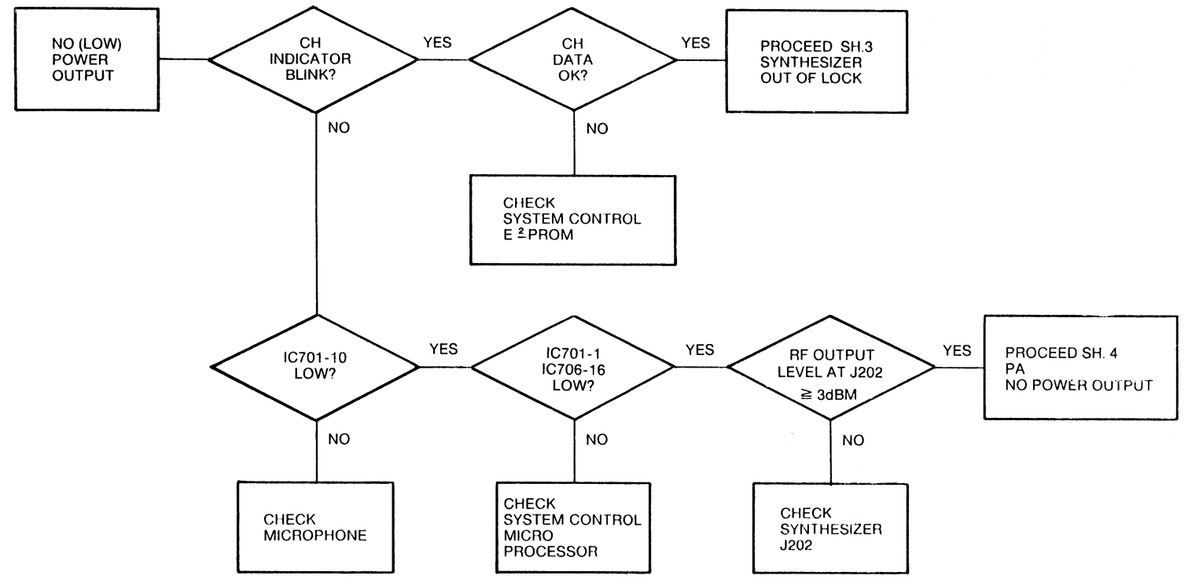


RC-5434

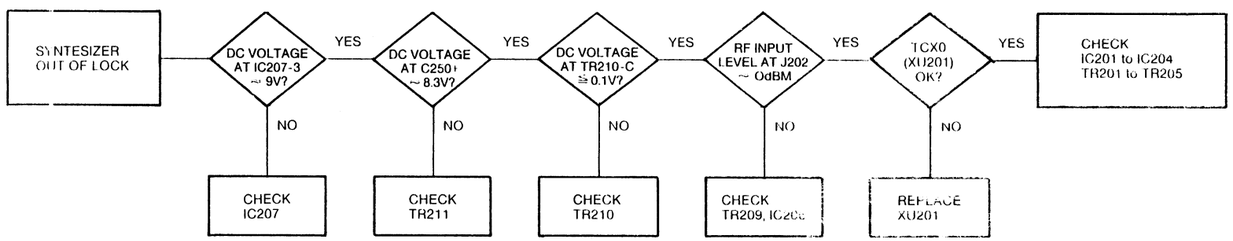
No.	Item	Procedures	Adjustment Point	Confirmation Point	Measuring Instrument	Specification
1	Initial setting	1 Turn off the power set SG to OFF. Then, make up the adjustment circuit shown in Fig. 8. 2 Turn the volume on APC, RV1, fully counterclockwise. 3 Insert the test tool A into J101.	RV1		Adjusting bar	
2	Confirming the current	1 Turn on the power. Confirm that the relay K1 clicks at this time.		TR104 Emitter	Ammeter Tester	0.1A or less 9 V
3	Confirming APC	1 Set the frequency of SG to 410 MHz in case of A band and 460 MHz in case of B band, and set the level to 0 dBm. 2 Set SG to ON and confirm that the APC voltage at TP2 varies between 2 and 10.0 V by turning the volume on APC.	RV1 RV2	TP2	SG Adjusting bar Tester	2 to 10 volt
		3 By tuning the volume RV2, APC to counterclockwise, set an output to 44-watt at the highest frequency of each band.	RV2		Adjustment Bar	44 W
		4 By turning the volume on APC, RV1, counterclockwise, confirm that the output can be reduced by 3 dB or less, compared with the rated output.	RV1		Power meter	20 W or less
		5 Set an output to the rated output at the above test frequency.	RV1		Power meter Ammeter	40 W 14A or less

NOTE

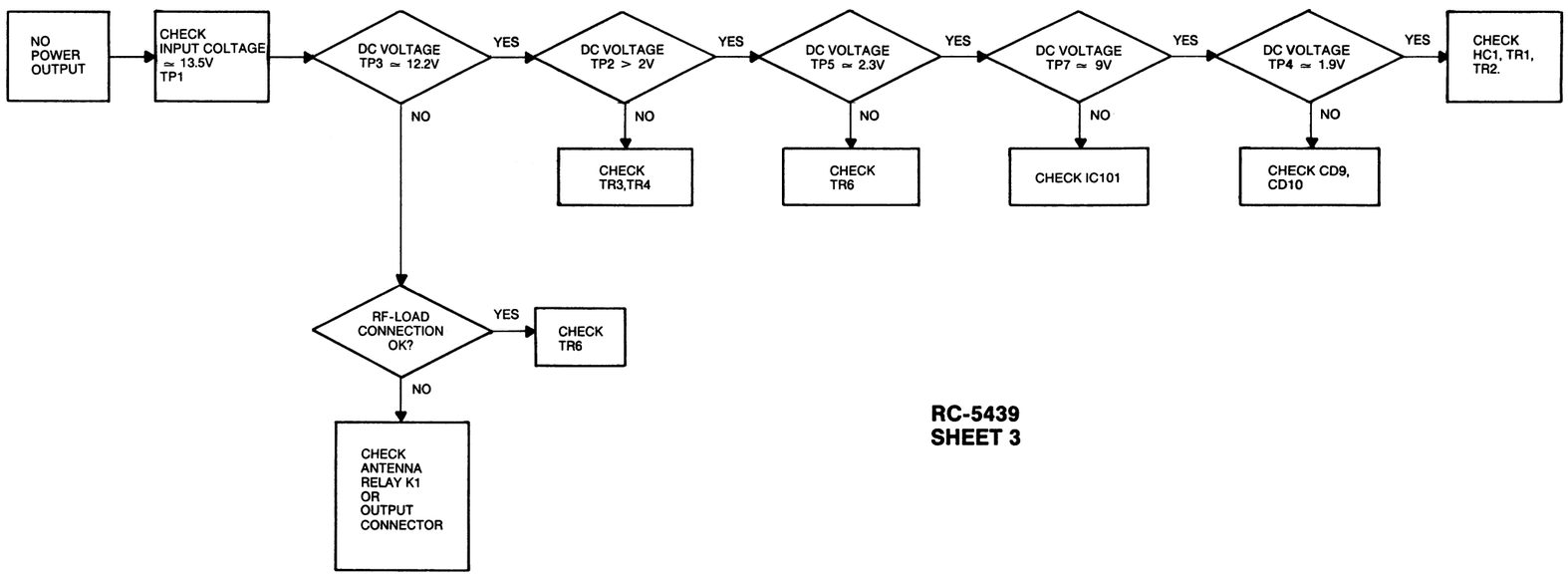
RV2 is factory tuned and does not require further adjustment.



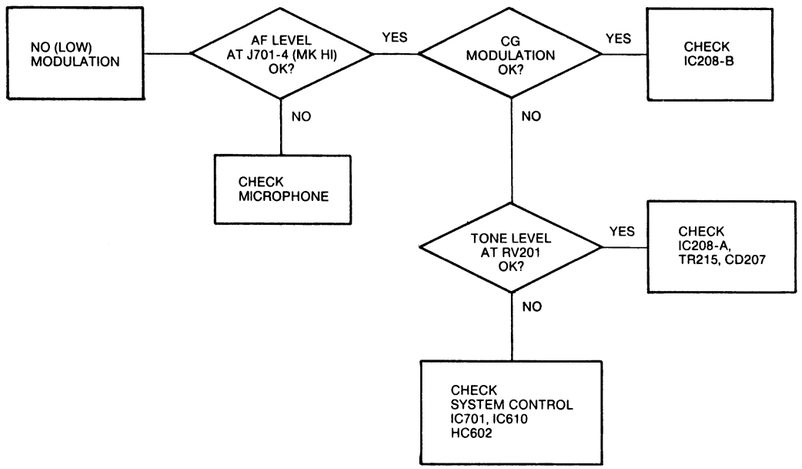
RC-5439 SHEET 1



RC-5439 SHEET 2



RC-5439
SHEET 3



RC-5439
SHEET 4

RECEIVER

Alignment and Troubleshooting for Receiver Board CMA-258A/B

1. Connect the audio oscillator and the AC voltmeter to J703-5 (MIC HI) and J703-3 (MIC LO) on the SS board.
2. Adjust the audio oscillator for a 1 Vrms at 1000 Hz.
3. Connect 50 ohm load to antenna jack.
4. Key the transmitter and adjust RV201 on the SS board for 4.5 KHz deviation.

RECEIVER ALIGNMENT

Equipment Required

1. RF Signal Generator (403-470 MHz)
2. DC Voltmeter
3. Frequency Counter (up to 500 MHz with 0.05 V sensitivity)
4. Audio Level Meter and Distoration Analyzer
5. 4 Ohm, 6 Watt Resistor

Preliminary Adjustment

1. Connect 13.8 VDC to P2
2. Set MONITOR switch to "out" position
3. Select desired channel
4. Disable Channel Guard by connecting ground to J701-7
5. Connect RF Signal Generator to antenna jack J2

NOTE

Make sure that the transmitter is properly aligned before aligning the receiver.

ALIGNMENT PROCEDURE

STEP	TEST POINT	TUNING CONTROL	METER READING	PROCEDURE
1	TP501		9.0 ±0.2 VDC	Connect the DC Volt-meter to TP501.
2	TP504	L506	See Procedure	Connect RF signal probe from the frequency counter to TP504. Check for a reading of 82.655 MHz ±200 Hz.
3	TP503	L508	See Procedure	Set the signal generator on the receive frequency with ±3 KHz deviation and 1 KHz modulation. Set the RF signal level to 1000 microvolt. Connect the audio level meter (use a high impedance meter) to TP503. Adjust the L508 until audio output level becomes maximum.
4	TP503	RV501	See Procedure	Adjust the RV501 until audio output level at TP503 becomes 400 mV ±20 mVrms.
5	J701-1 -6		See Procedure	Move P703 from J703-1 & 2 to J703-2 & 3 in receiver unit. Terminate J701-1 & -6 with a 4 ohm, 6 watt resistor. Connect the Audio Level Meter and Distortion Analyzer input across the resistor. Adjust the volume control for 4 W output (4.0 Vrms) using Audio Level Meter.
6	J701-1 -6	L503 L504 L505	See Procedure	Set the output signal level of RF signal generator so as to obtain 12 dB SINAD at audio output. Adjust coils L503 to L505 obtain maximum 12 dB SINAD SENSITIVITY.

FIXED SQUELCH ADJUSTMENT

1. Disable Channel Guard, if present, (ground J701-7). Set squelch control RV502 full CCW.
2. Connect a signal generator to antenna jack J2 and adjust for nominal 8 dB SINAD signal.
3. Adjust squelch control RV502 to maximum squelch. Receiver must be muted.
4. Adjust squelch control RV502 slowly until receiver unmutes.
5. Check that the squelch opens at an input signal level corresponding to 8 dB SINAD (±1 dB).
6. Remove ground from J701-7 or re-enable Channel Guard.

RECEIVER TEST PROCEDURES

TEST PROCEDURES

These Test Procedures are designed to help you to service a receiver that is operating---but not properly. The problems encountered could be low power, poor sensitivity, distortion, and low gain. By following the sequence of test steps starting with Step 1, the defect can be quickly localized. Once the defective stage is pin-pointed, refer to the "Service Check" listed to correct the problem. Additional corrective measures are included in the Troubleshooting Procedure. Before starting with the Receiver Test Procedures, be sure the receiver is tuned and aligned to the proper operating frequency and the transmitter is operating properly.

TEST EQUIPMENT REQUIRED

1. Distortion Analyzer
2. Signal Generator
3. 6-dB Attenuation Pad, and 4.0-ohm, 6-Watt Resistor

STEP 1: AUDIO OUTPUT AND DISTORTION

TEST PROCEDURE

Measure Audio Power Output as follows:

A. Apply a 1000 microvolt, on-frequency test signal modulated by 1,000 Hz with 3.0 KHz deviation to antenna jack J2.

B. With 4 Watt Speaker

Disconnect speaker plug if present.

Connect a 4.0-ohm, 6-watt load resistor across the external speaker loads.

C. Adjust the VOLUME control for rated power output of 4 watts (4.0 Vrms across the 4-ohm load) using the Distortion Analyzer as a voltmeter.

D. Make distortion measurements according to manufacturer's instructions. Reading should be less than 5%. If the receiver sensitivity is to be measured, leave all controls and equipment as they are.

SERVICE CHECK

If the distortion is more than 5%, or maximum audio output is less than 4 watts, make the followng checks: Battery and regulator voltage---low voltage will cause distortion.

Audio Gain (refer to Receiver Troubleshooting Procedure).

FM Detector Alignment (refer to Receiver Alignment).

STEP 2: USABLE SENSITIVITY (12 dB SINAD)

If Step 1 checks out properly, measure the receiver sensitivity as follows:

A. Apply a 1000 microvolt, on-frequency signal modulated by 1000 Hz with 3 KHz deviation to J3.

B. Place the RANGE switch on the Distrotion Analyzer in the 200 to 2000 Hz distortion range position (100 Hz filter in the circuit). Tune the filter for minimum reading or null on the lowest possible scale (1000%, 30%, etc.).

C. Place the RANGE switch to SET LEVEL position (filter out of the circuit) and adjust the input LEVEL control for a +2 dB reading on a mid range (30%).

D. Set signal generator output to 0.3 V. Switch the RANGE control from SET LEVEL to the distortion range. Readjust Distortion Analyzer SET LEVEL as required until a 12 dB difference (+2 dB to -10 dB) is obtained between the SET LEVEL and distortion range positions (filter out and filter in).

E. The 12 dB difference (Signal plus Noise and Distortion to noise plus distortion ratio) is the "usable" sensitivity level. The sensitivity should be less than rated 12 dB SINAD specifications with an audio input of at least 2 W Watts (2.83 RMS across the 4-ohm receiver load using the meter).

F. Leave all controls as they are and all equipment connected if the Modulation Acceptance Bandwidth test is to be performed.

SERVICE CHECK

If the sensitivity level is more than rated 12 dB SINAD, check the alignment of the IF stage as directed in the Alignment Procedure.

STEP 3: MODULATION ACCEPTANCE (BANDWIDTH OR IF BANDWIDTH)

If Steps 1 and 2 check out properly, measure the bandwidth as follows:

A. Set the Signal Generator output for twice the microvolt reading obtained in the 12 dB SINAD measurement.

B. Set the Range control on the Distortion Analyzer in the SET LEVEL position (1000 Hz filter out of the circuit), and adjust the input LEVEL control for a +2 dB reading on the 30% range.

C. While increasing the deviation of the Signal Generator, switch the RANGE control from SET LEVEL to distortion range until a 12 dB difference is obtained between the SET LEVEL and distortion range readings (from +2 dB to -10 dB).

D. The deviation control reading for the 12 dB difference is the Modulation Acceptance Bandwidth of the receiver. It should be more than ±6.5 KHz.

SERVICE CHECK

If the Modulation Acceptance Bandwidth test does not indicate the proper width, refer to the Receiver Troubleshooting Procedure.

RECEIVER DC BIAS VOLTAGE (Receive Mode)

1. RECEIVER BOARD

	Collector	Base	Emitter	
TR502	1.76	0.75	0.17	
TR503	9.0	7.83	7.34	
TR504		0.51	0.23	SQ
		0.62	0.06	un SQ
TR505	0.23		0.23	SQ
	8.92		0.06	un SQ
TR506	9.0	8.34	9.0	SQ
	0	8.94	9.0	un SQ
TR507		9	GND	SQ
		0	GND	un SQ
TR508	0.02	0.05	GND	FAST SQ
	0	0.72	GND	SLOW SQ
TR509	0.05			FAST SQ
	0.72		GND	SLOW SQ

	Gate	Source	Drain	
TR501	GND	1.35	9.0	

IC502

IC502-1	8.5
-2	8.5
-3	7.93
-4	8.5
-5	1.1
-6	1.1
-7	1.1
-8	8.5
-9	4.8
-10	3.9
-11	5.30
-12	2.4
-13	3.3
-14	GND
-15	8.0
-16	GND
-17	GND
-18	2.1

HC501

HC501-1	6.82
2	9.0
3	8.92
4	GND
5	1.43
6	GND
7	0
8	GND
9	0.16
10	NC
11	5.76
12	GND

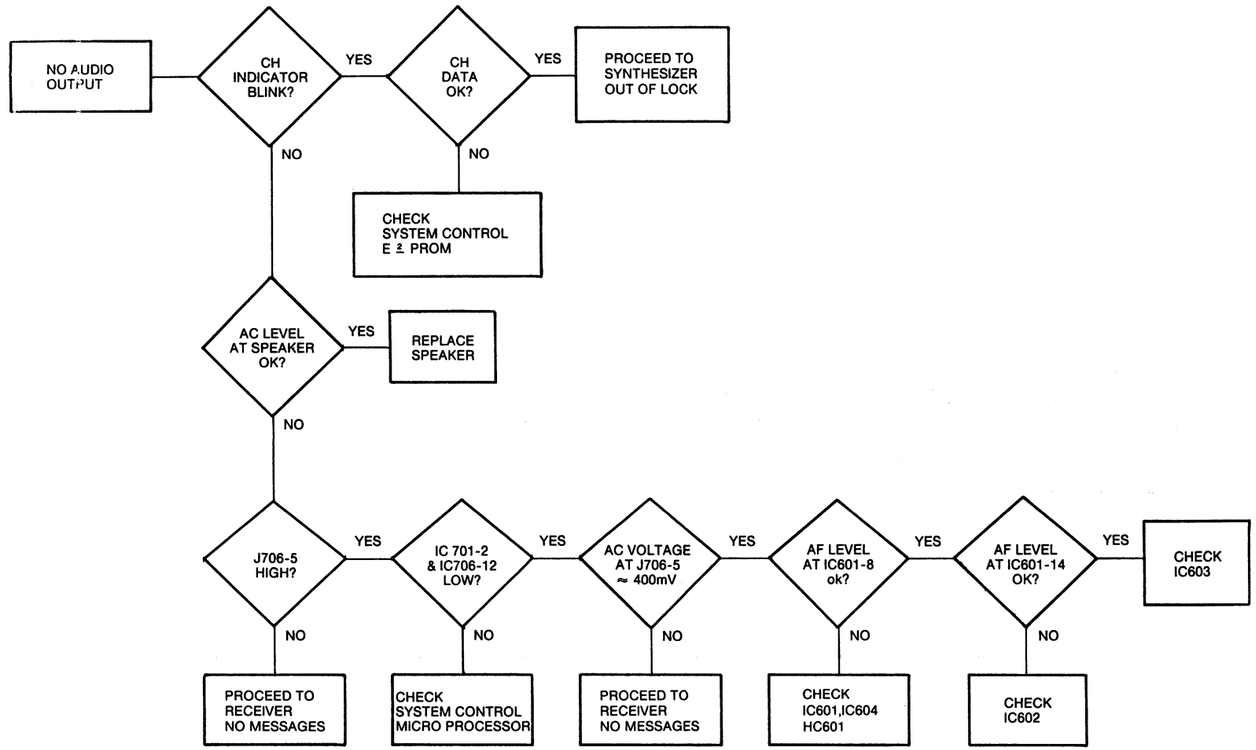
HC401

HC401-1	0
2	6.91
3	4.81
4	GND
5	4.81

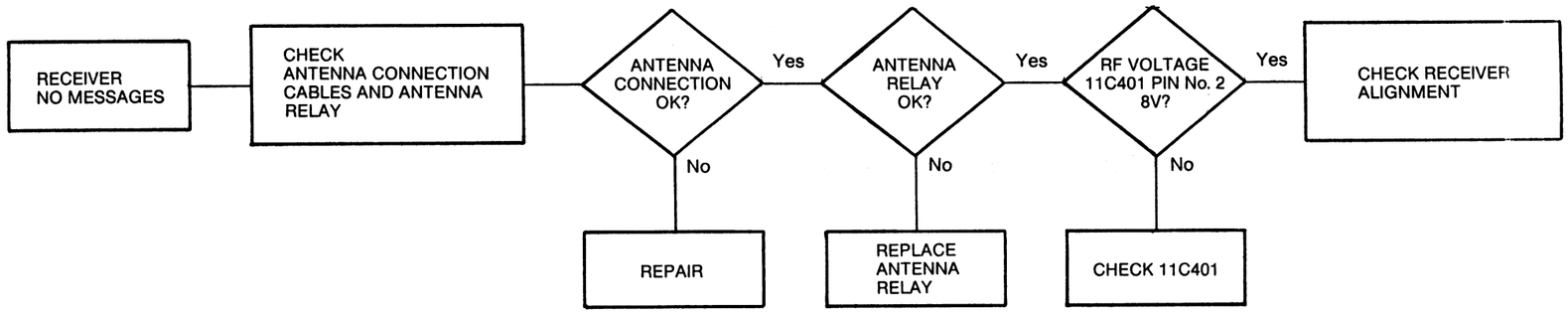
HC403

HC403-1	0
-2	6.93
-3	4.85
-4	GND
-5	4.85
-6	4.85

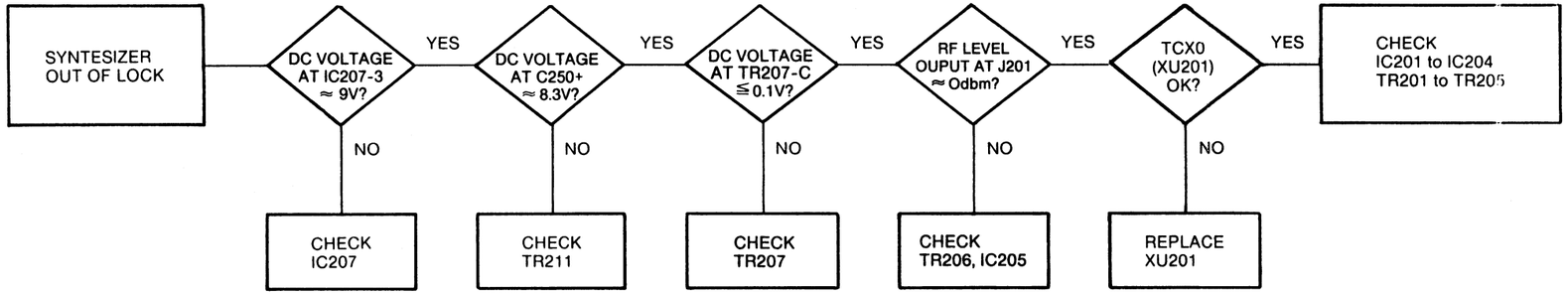
RECEIVER TROUBLESHOOTING



RC-5435



RC-5436



RC-5437

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

GENERAL ELECTRIC*
U.S.A.