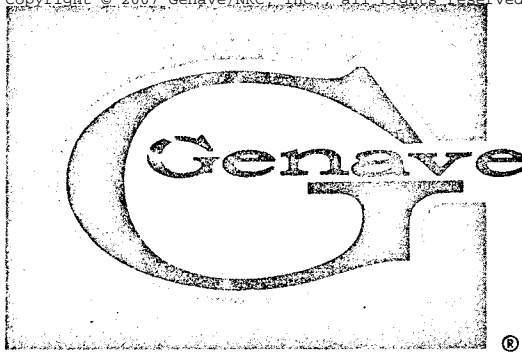


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# **RFA-10 RECEIVER PREAMPLIFIER MAINTENANCE MANUAL**

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- Section I  
GENERAL INFORMATION
- Section II  
INSTALLATION MANUAL
- Section III  
OPERATING MANUAL
- Section IV  
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- Section V  
PARTS LIST

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(Area 317) 536-1111

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Price: Single Copy \$4.00

# SECTION I

## GENERAL INFORMATION

### 1-1. Introduction

This service manual contains all of the information normally required to install, operate, and maintain the Genave RFA-10 Receiver Preamplifier.

### 1-2. Description

The RFA-10 is a complete, solid state, internal mounting, receiver preamplifier which is designed

to be utilized with the Genave Mobiline VHF FM Communications Transceivers.

The Receiver preamplifier consists of a single N-channel dual-gate MOS FET RF amplifier with LC tuned input and output. The input and output are LC coupled to 50 ohm coaxial cables which connect to the receiver circuit board. The broadband preamplifier circuitry provides a nominal 6 to 9 db of additional gain over the transceiver tuning range. All power necessary for operation of the preamplifier is provided by the transceiver.

### 1-3. Specifications

Size:	1" W x .55" H v 1.35" long
Weight:	1 oz.
Mounting:	Internal
Components:	1 MOS FET
Power Requirements:	13.75 VDC (from receiver)
Current Drain:	5 milliamperes
Operating Frequency Range:	143.9 MHz to 173.4 MHz
Bandwidth:	3 MHz
Gain:	6 to 9 DB

### 1-4. Equipment Supplied

- a. 1—RFA-10 Receiver Preamplifier, complete with all coaxial cable and wire required.

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# **SECTION II**

# **INSTALLATION MANUAL**

The following Section  
is reproduced  
and included with every

**RFA-10**

It is made a part of  
this manual  
for your permanent  
reference

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**Model: RFA-10**

# Specifications:

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Current Drain:	5 milliamperes
Operating Frequency	-
Range:	143.9 to 173.4 MHz
Bandwidth:	3 MHz
Gain:	6 to 9 DB.

## Pre-Installation Check

VISUALLY INSPECT the unit for any obvious external damage, such as dents, loose wires, etc. Any damage not related to shipping should be reported to General Aviation Electronics, Inc., 4141 Kingman Drive, Indianapolis, Indiana (46226), Area Code 317-546-1111, as soon as possible.

Damage due to shipping should be reported to and a claim should be filed promptly with the transportation company.

## Description

The receiver preamplifier consists of a single N-channel dual-gate MOS FET RF amplifier with LC tuned input and output. The input and output are LC coupled to 50 ohm coaxial cables which connect to the receiver circuit board. The broadband preamplifier circuitry provides a nominal 6 to 9 db of additional gain over the receiver tuning range. All power necessary for operation of the preamplifier is provided by the transceiver.

The entire preamplifier is constructed on a 1 inch by 1.4 inch epoxyfiberglass circuit board. The preamplifier is enclosed on four sides by a tin-plated steel enclosure which is predrilled on one side for convenient mounting.

## Installation

1. Remove the transceiver from its protective case.
2. Using a knife or similar instrument, carefully cut the receiver input track and relay ground connection in the appropriate locations as shown in Figure A.
3. Remove the speaker from its mounting tabs.
4. Locate the appropriate holes in the circuit board as shown in Figure A. Remove the jumper shown.
5. Prepare the preamplifier input and output cables, insert them into their appropriate circuit board holes and solder them in place (See Figure B).
6. Insert the red preamplifier A+ lead into its appropriate hole in the circuit board and solder.
7. Place the predrilled side of the preamplifier case over the speaker mounting tab located on the siderail closest to the power lead grommet. Secure the preamplifier in place between the speaker and the speaker mounting tab using the speaker mounting screw (See Figure D). Replace the other speaker mounting screw.
8. Reinstall the transceiver in its protective case.



**CIRCUIT BOARD CONNECTIONS**

Figure A

### CABLE CONNECTIONS

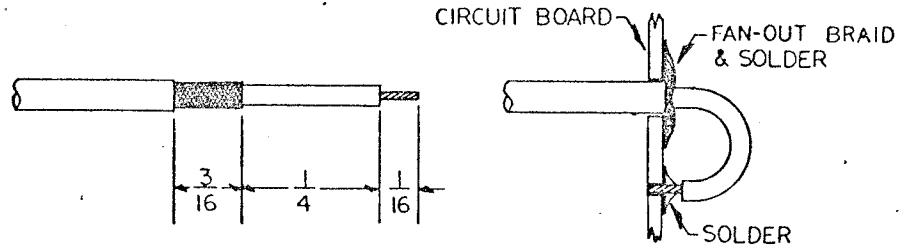


Figure B

### MOUNTING LOCATION

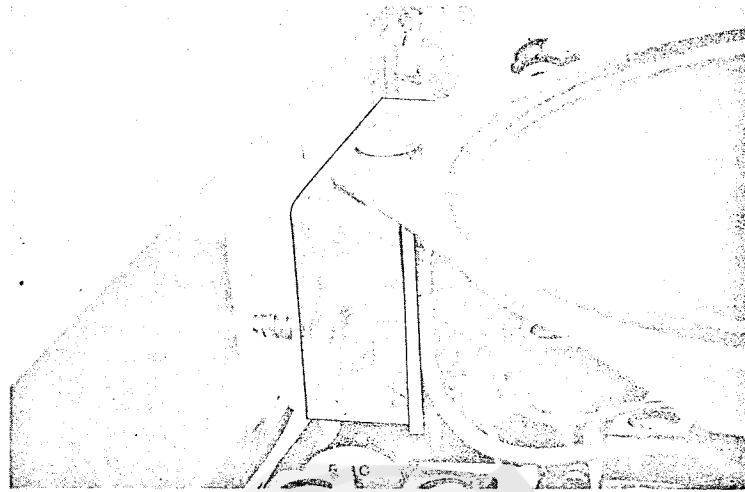


Figure C

Genave®

# SCHEMATIC DIAGRAM

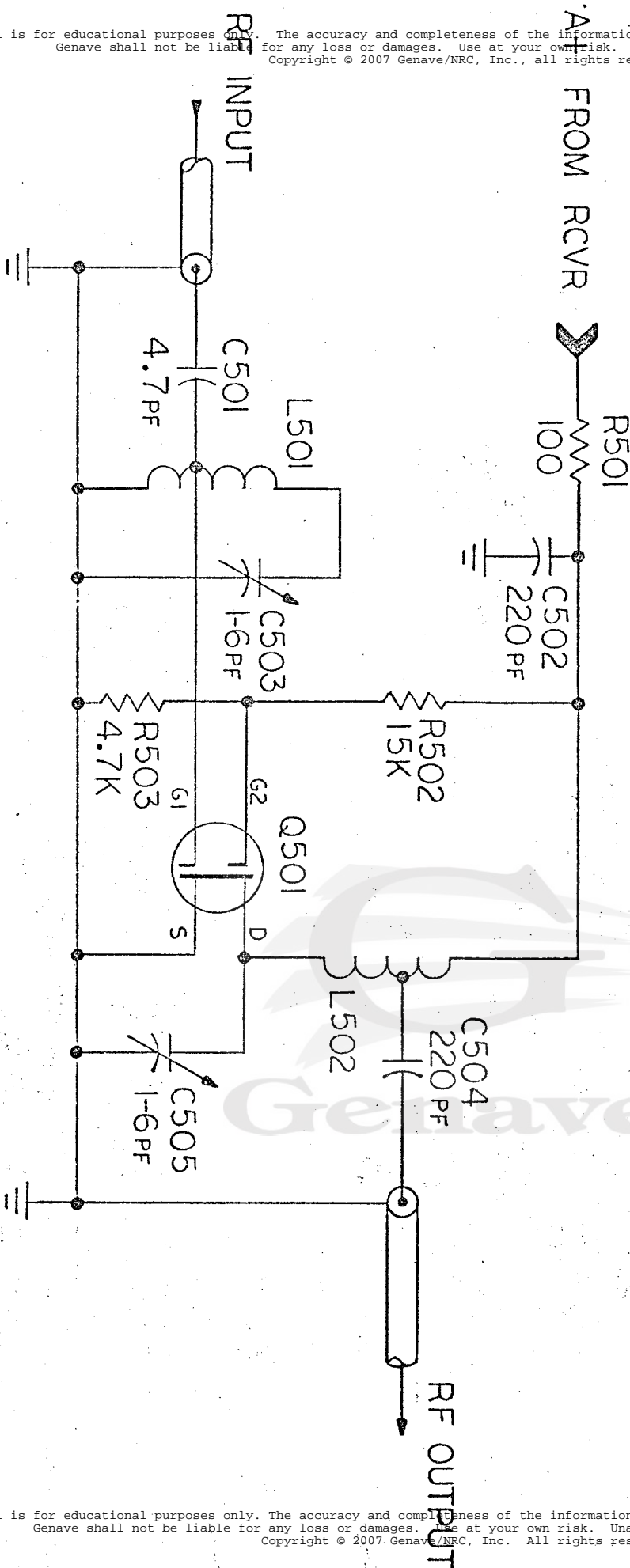


Figure D

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Ref. No.	GENAVE Part No.	Description	Ref. No.	GENAVE Part No.	Description
C501	1520004	NPO Disc, 4.7 pfd, 10%	R501	4710008	100 ohm, 10%, 1/4w
C502	1570120	Trimmer, 1-6 pfd	R502	4710030	15k, 10%, 1/4w
C503	1520033	Z5F Disc, 220 pfd, 10%	R503	4710025	4.7k, 10%, 1/4w
C504	1520120	Trimmer, 1-6 pfd			
C505	1520033	Z5F Disc, 220 pfd, 10%			
L501	1800073	R.F. Input	Q501	4800054	Dual Gate, N-Channel, MOS-FET, MPF-120 or 3N201
L502	1800074	R.F. Output			

**PREAMPLIFIER PARTS LIST**

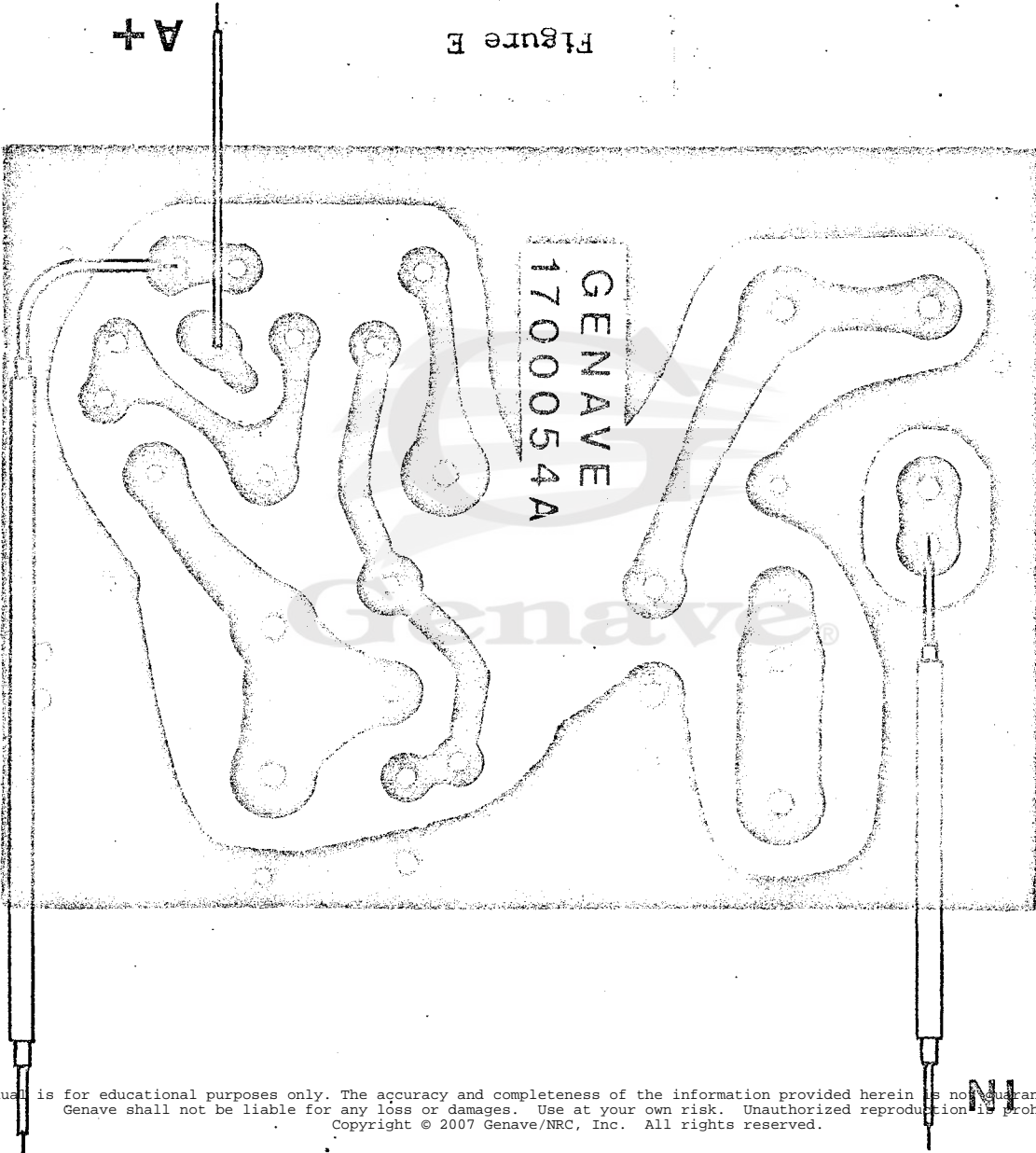


Figure E

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## SECTION III

# OPERATING MANUAL

### 3-1. Operating Instructions

Operating procedures for the Mobiline trans-

ceiver equipped with the RFA-10 are the same as those for all Mobiline transceivers.

## SECTION IV

# MAINTENANCE MANUAL

### 4-1. Introduction

This section provides the basic information required for electronic testing, alignment, and repair of the RFA-10. It is assumed that the technician working on the unit has a reasonable familiarity with the principles and terminology of electronics.

### 4-2. Theory of Operation

#### 1. General

The RFA-10 employs 1 FET transistor in all solid state design. It operates on 13.75 VDC, supplied by the transceiver. The RFA-10 was designed to increase the sensitivity of the Mobiline.

#### 2. Detailed Theory

The amplifier is a single FET circuit designed to provide a nominal 6 to 9 db of additional gain over the tuning range. The incoming signals from the antenna are applied via C501 to the first parallel tuned LC circuit comprised of C503 and L501. The 50 ohm antenna input impedance is matched by means of the tap on L501 and C501, the input capacitor. The output from the first tuned circuit is applied to Gate 1 of Q501. Q501 and associated circuitry amplifies the signal and applies it to the series tuned LC circuit, comprised of C504 and L502. Both tuned circuits are used to adjust the operating frequency and bandwidth of the entire amplifier. L502 and C504 match the amplifier output to the 50 ohm receiver input impedance.

A+ for the preamplifier is applied through R501, which provides RF decoupling. C502 functions as RF bypassing on the A+ line.

### 4-3. Test Equipment Required

- Oscilloscope, Low Frequency, DC coupled preferred, Heathkit IO-14 or equivalent.
- VHF Sweep Generator, Capable of sweeping 140 to 170 MHz. Texscan LS-40 or equivalent.
- Power Supply, 13.75 VDC @ 6 amps., filtered.
- Marker Generator, Optional, capable of producing markers at highest and lowest receive frequency.

### 4-4. Alignment Procedure

- Connect the transceiver to the Test and Alignment Setup of Figure 4-4-1.
- Connect the output of the VHF sweep generator to the antenna connector of the transceiver.
- Connect the scope vertical input to the emitter of the transceiver's first mixer transistor (TP-5 in Mobiline I).
- Adjust the sweep generator to sweep the frequency band from 140 MHz to 170 MHz.
- If an external marker generator is to be used, disable the first local oscillator output (In Mobiline I transceivers the secondary of L104 can be shorted.) and apply to the sweep generator a marker signal at the highest receive frequency.
- If the first local oscillator is to be used to generate the frequency markers, select the highest receive frequency on the transceiver frequency selector.

7. Adjust C503, C505 and the input filter trimmers of the transceiver for a waveform as shown in Figure 4-4-2 for external marker generation, or in Figure 4-4-3 for first L.O. marker generation. Adjust the capacitors for maximum amplitude, steep skirts, proper bandwidth to cover the frequencies to be received, and placement of the highest frequency marker at the top of the high frequency end of the response waveform. To check for proper bandwidth, switch the marker to the lowest frequency to be used and check that the marker falls within the low frequency limits of the bandpass waveform.

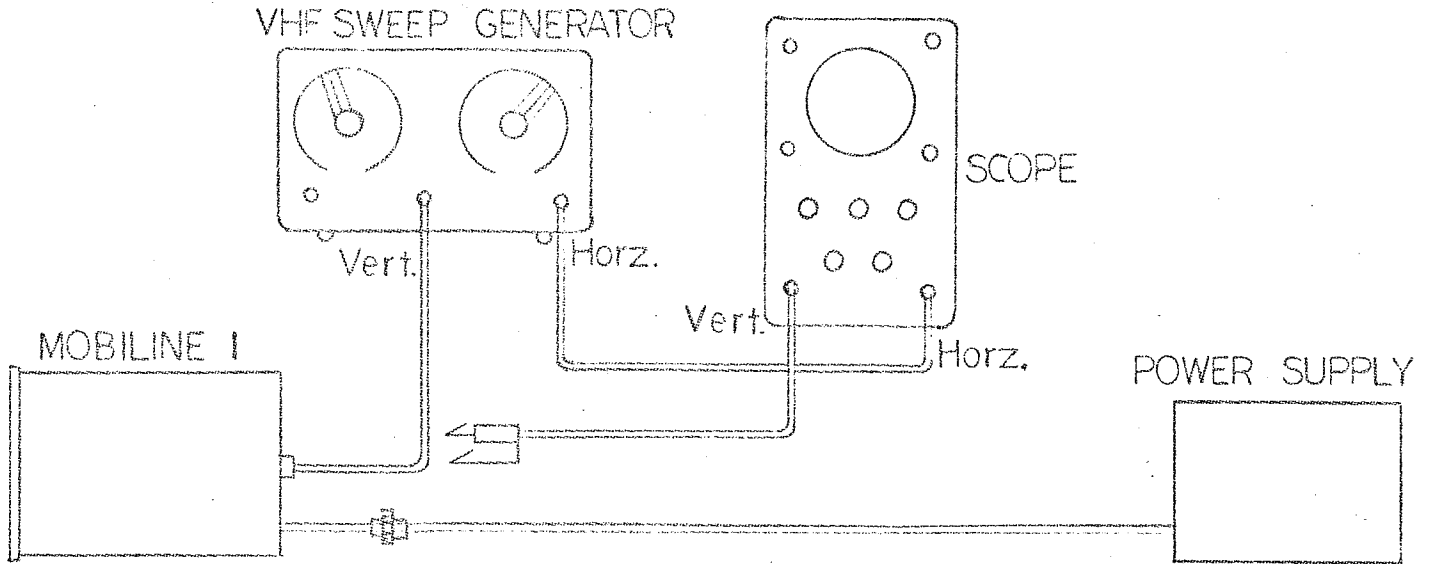


Figure 4-4-1  
Alignment and Test Setup

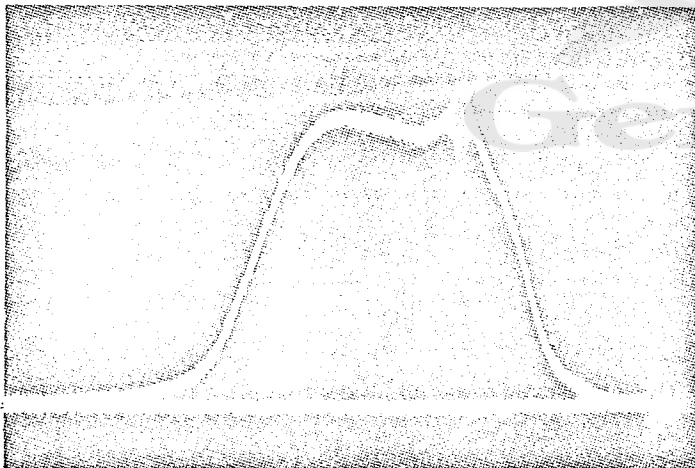


Figure 4-4-2  
Swept Preamplifier and Input Filter  
With Marker Generator Set to Highest  
Receive Frequency and Secondary of  
L104 Shorted.



Figure 4-4-3  
Swept Preamplifier and Input Filter  
With First L.O. Used as Marker and  
Frequency Selector Set to Highest  
Receive Frequency

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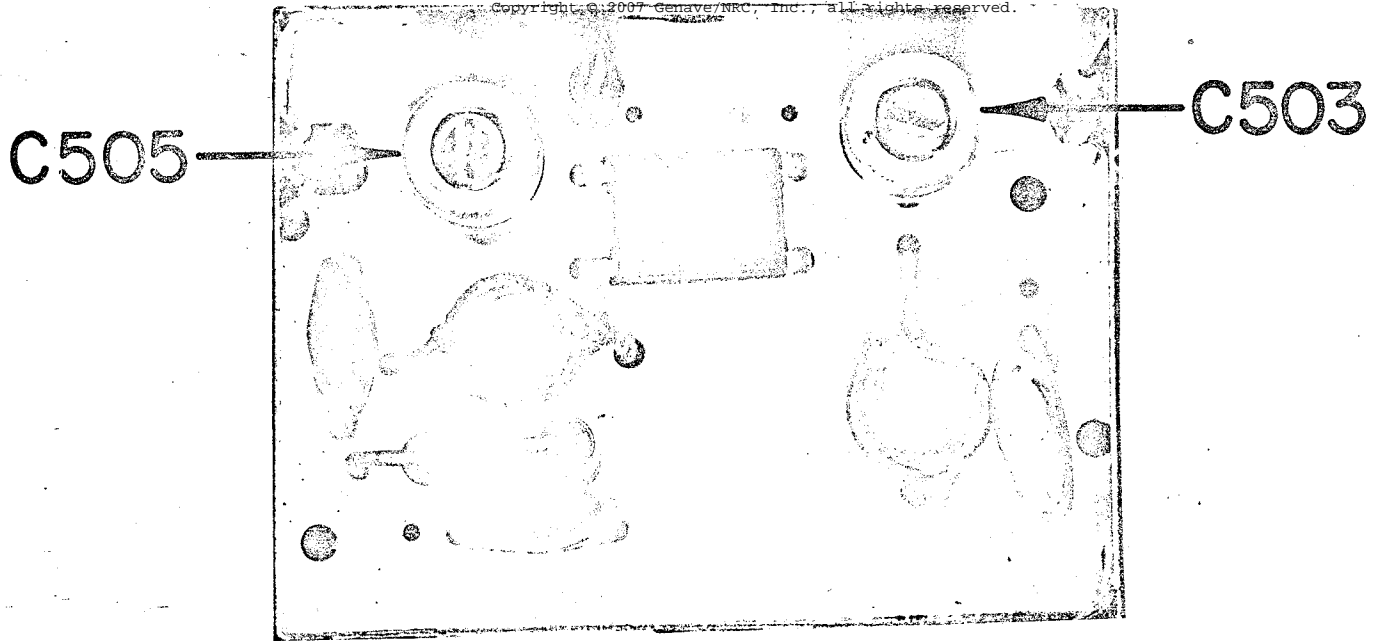
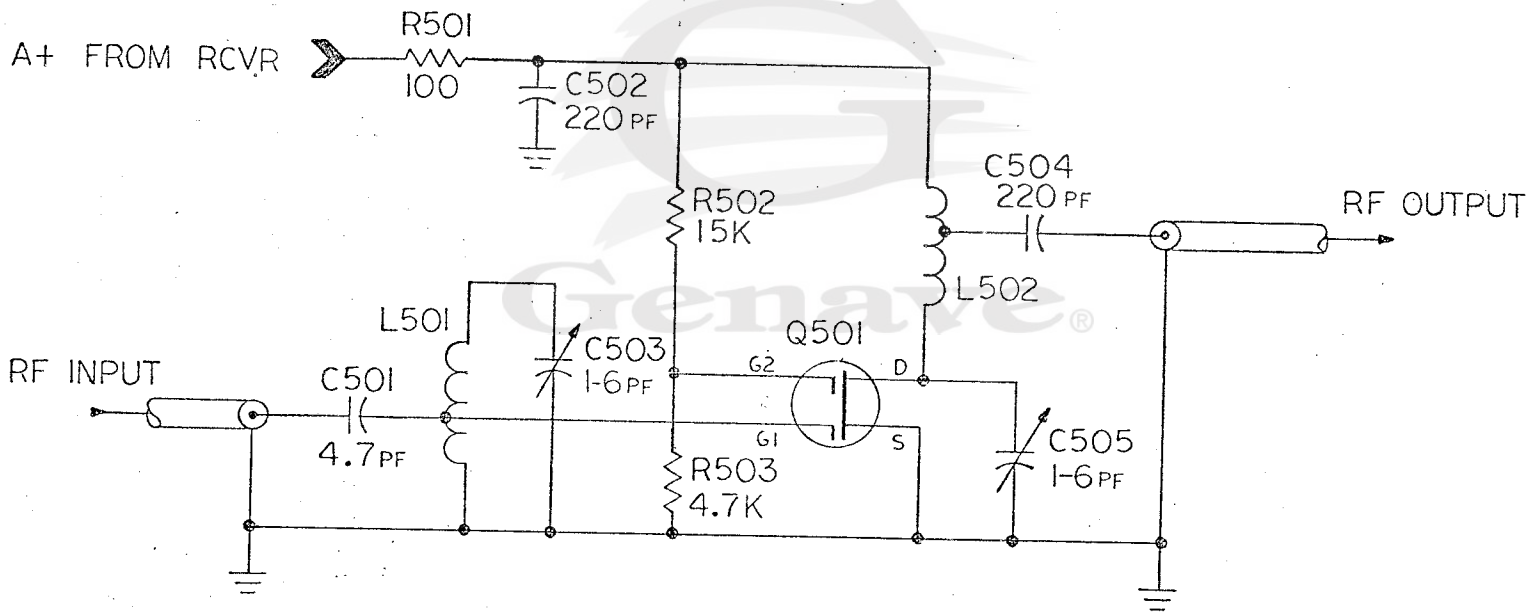


Figure 4-4-4  
TOP VIEW



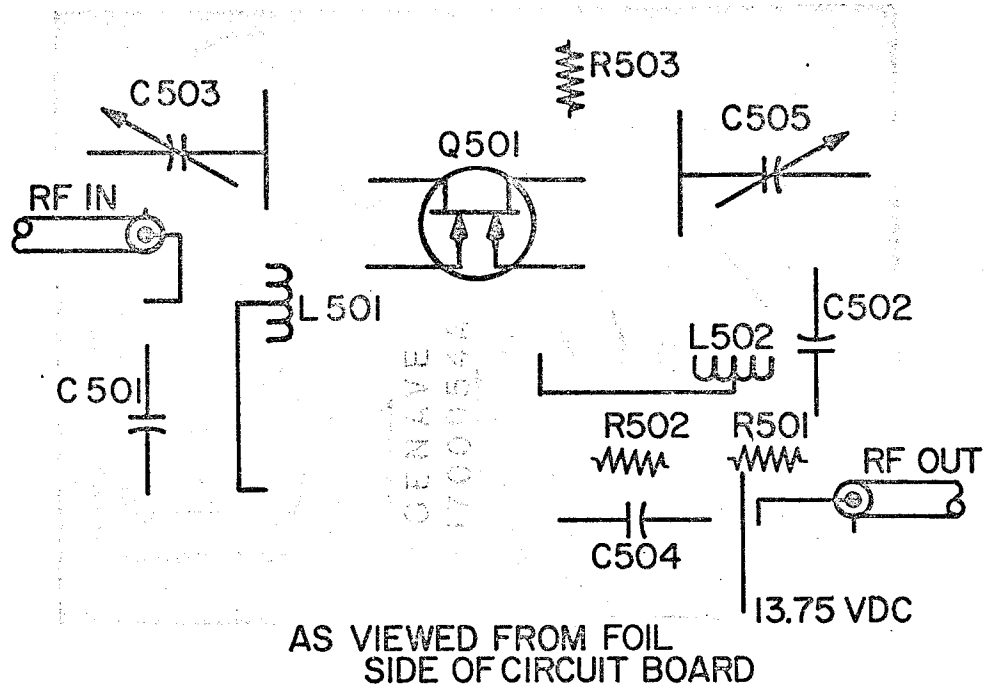


Figure 4-5-2  
PARTS/TRACK MAP

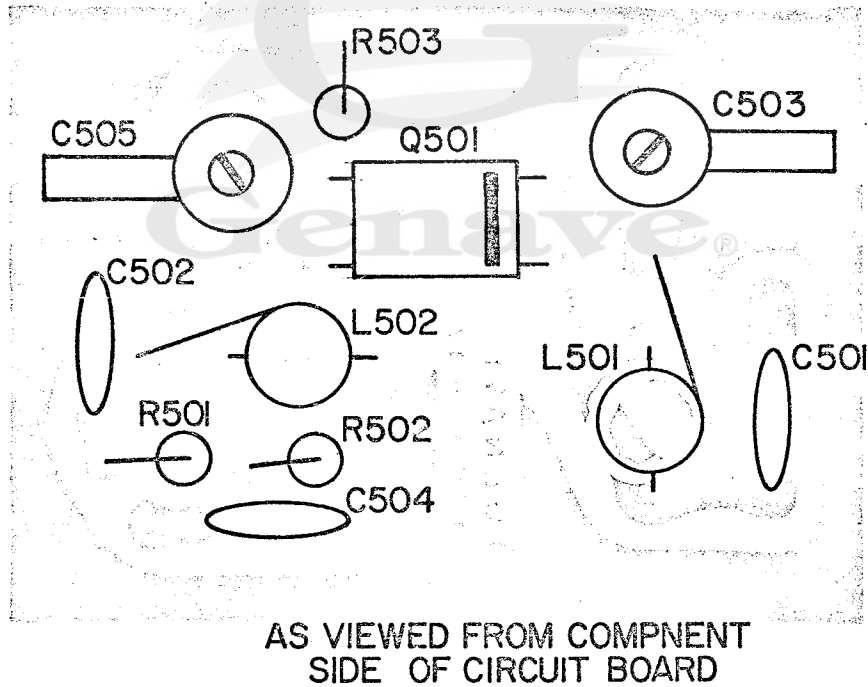


Figure 4-5-3  
COMPONENT LOCATION DIAGRAM

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# SECTION V

## RFA-10

### PARTS LIST

Ref. No.	GENAVE Part No.	Description
<b>CAPACITORS</b>		
C301	1520004	NPO Disc, 4.7 pfd, 10%
C302	1570120	Trimmer, 1-6 pfd
C303	1520035	Z5F Disc, 220 pfd, 10%
C304	1520120	Trimmer, 1-6 pfd
C305	1520033	Z5F Disc, 220 pfd, 10%
<b>COILS</b>		
L301	1800073	R.F. Input
L302	1800074	R.F. Output
<b>RESISTORS</b>		
R301	4710008	100 ohm, 10%, 1/4W
R302	4710030	15K, 10%, 1/4W
R303	4710025	4.7K, 10%, 1/4W
<b>SEMICONDUCTORS</b>		
Q301	4800054	Dual Gate, N-Channel, MOS-FET, MPF-120 or 3N201

Specifications Subject To Change Without Notice



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