ALPHA 300

NAV/COM

MAINTENENCE MANUAL

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SECTION I

GENERAL INFORMATION

1-1. Introduction

This service manual contains all of the information normally required to install, operate, and maintain the GENAVE ALPHA/300 communications and navigation radio.

1-2. Description

The ALPHA/300 is a self-contained navigation and communications radio complete with integral regulated power supply and converter-indicator. It is a completely solid state design utilizing 64 active silicon transistors. The ALPHA/300 features a built-in Omni accuracy self-test, a fully illuminated course deviation indicator, and an ident filter.

The navigation and communication frequencies are quartz crystal controlled and are selected on two independent digital readouts. A front panel NAV-COM switch selects the mode of operation enabling instant conversion from one mode to the other. In addition, when operating in the navigation mode, internal electronic switching automatically tunes the transmitter to the selected communication frequency when the microphone button is keyed. This enables the pilot to listen on an Omni frequency as easily as he does using simplex transmission.

The navigation receiver receives all 100 channels from 108.0 MHz to 117.9 MHz, including the 20 localizer channels. The converter-indicator is a state-of-the-art design using solid state computer circuitry and provides both Omni and Localizer course indications.

The communications receiver covers 360 channels, spaced 50 KHz apart, from 118.0 MHz to 135.95 MHz. The communications transmitter is a wide band solid-state unit modulated by an audio system with audio bypass and pre-emphasis circuitry to provide the best quality, distortion free transmission.

1-3. Specifications

GENERAL:

- WEIGHT: 5.3 lbs.
- FRONT PANEL SIZE: 6½" × 3½"
- DEPTH BEHIND PANEL: 12"
- INPUT POWER: Receive: 2.1 amps @ 14 VDC* Transmit: 2.8 amps @ 14 VDC*
  (*28 VDC adapter available)
- NUMBER OF TRANSISTORS: 60 All Silicon
- AUDIO AMPLIFIER: Sidetone output: 50 mw nom. into 600 ohms.
  Cabin Speaker output: 6 watts nom. into 3/4 ohm speaker
  Auxiliary inputs: 2 (1 vrms will provide 6 watts output)

RECEIVER (Front panel switch selects Nav or Com mode):

- RECEIVER CIRCUIT: double-conversion, superheterodyne, crystal tuned

Navigation

- FREQUENCY RANGE: 108.0 — 117.9 MHz
- NUMBER OF CHANNELS: 100 (80 Omni and 20 Localizer) all crystal controlled
- CHANNEL SPACING: 100 kHz
- SENSITIVITY: 1-2 microvolts for 6db $\frac{s+n}{n}$ nom. @ 30% modulation, 1000 Hz
- PRIMARY IMAGE REJECTION & SPURIOUS RESPONSES: —60 db nom.
- SELECTIVITY: —6 db 40 kHz, —60 db 200 kHz
- VOR ACCURACY: ±2 degrees
- LOC ACCURACY: ±½ dot
- AUDIO OUTPUT: 6 watts nom. into 3/4 ohm speaker; 50 mw. nom. into 600 ohm headset
- AUTOPILOT OUTPUT: Standard
- AGC: 3-6 db 10 – 30,000 microvolts

Communications:

- FREQUENCY RANGE: 118.0 — 127.9 MHz
- NUMBER OF CHANNELS: 100 all crystal controlled
- CHANNEL SPACING: 100 kHz
- SENSITIVITY: 1-2 microvolts for 6 db $\frac{s+n}{n}$ nom. @ 30% modulation, 1000 Hz
- PRIMARY IMAGE REJECTION AND SPURIOUS RESPONSES: —60 db nom.
- SELECTIVITY: —6 db 40 kHz, —60 db 200 kHz
- SQUELCH: Adjustable
- AGC: 3-6 db 10 – 30,000 microvolts
- AUDIO OUTPUT: 6 watts nom. into 3/4 ohm speaker; 50 mw nom. into 600 ohm headset

TRANSMITTER:

- (May be operated Simplex, or Duplex with Nav receive frequencies)
- TRANSMITTER CIRCUIT: 6 stage, solid state, crystal tuned
- FREQUENCY RANGE: 118.0 — 127.9 MHz
- NUMBER OF CHANNELS: 100 all crystal controlled
- CHANNEL SPACING: 100 kHz
- POWER OUTPUT: 8 watts PEP nom. (2-3 watts carrier)
- MODULATION. Audio processed, high level, automatic limiting

1-3. Specifications

1-4. Equipment Supplied

a. 1—ALPHA/300 Radio
b. 1—Mounting Tray with Hardware
c. 1—Cable Connector (12 Pin)
d. 2—RF Connectors (1 short, 1 long)

1-5. Equipment Required, But Not Supplied

a. 1—Microphone & Jack

b. 1—Communications Antenna (See Installation Manual)

c. 1—Navigation Antenna

d. Cabin Speaker and/or Headphones

e. Coaxial Cable, as required (RG 58A/U or equivalent)

f. 1—250 ohm, 5 Watt Dimmer Pot (Optional, See Installation Manual)

SECTION II

INSTALLATION MANUAL

The following Section

is reproduced

and included with every

ALPHA/300

It is made a part of

this manual

for your permanent

reference

Model: ALPHA/300

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Specifications:

GENERAL:

WEIGHT: 5¾ lbs.

FRONT PANEL SIZE: 6½" X 3½"

DEPTH BEHIND PANEL: 12"

INPUT POWER: Receive 2 amps @ 14 VDC*
Transmit: 2.8 amps @ 14 VDC*
(*28 VDC adapter available)

NUMBER OF TRANSISTORS: 64 All Silicon

AUDIO AMPLIFIER: Sidetone output: 50 mw nom. into 600 ohms.

Cabin Speaker output: 6 watts nom. into ¾ ohm speaker

Auxiliary inputs: 2 (1 vrms will provide 6 watts output)

RECEIVER (Front panel switch selects Nav or Com mode):

RECEIVER CIRCUIT: double-conversion, superheterodyne, crystal tuned

Navigation

FREQUENCY RANGE: 108.0 — 117.9 MHz

NUMBER OF CHANNELS: 100 (80 Omni and 20 Localizer) all crystal controlled

CHANNEL SPACING: 100 kHz

SENSITIVITY: 1-2 microvolts for 6db $\frac{s+n}{n}$ nom. @ 30% modulation, 1000 Hz

PRIMARY IMAGE REJECTION & SPURIOUS RESPONSES: −60 db nom.

SELECTIVITY: −6 db 40 kHz, −60 db 200 kHz

VOR ACCURACY: ±2 degrees

LOC ACCURACY: ±½ dot

AUDIO OUTPUT: 6 watts nom. into ¾ ohm speaker; 50 mw. nom. into 600 ohm headset

AUTOPILOT OUTPUT: Standard

AGC: 3-6 db 10 — 10,000 microvolts

Communications:

FREQUENCY RANGE: 118.0 — 135.95 MHz

NUMBER OF CHANNELS: 360 all crystal controlled

CHANNEL SPACING: 50 kHz

SENSITIVITY: 1-2 microvolts for 6 db $\frac{s+n}{n}$ nom. @ 30% modulation, 1000 Hz
@ 30% modulation, 1000 Hz

PRIMARY IMAGE REJECTION AND SPURIOUS RESPONSES: −60 db nom.

SELECTIVITY: −6 db 40 kHz, −60 db 200 kHz

SQUELCH: Adjustable

AGC: 3-6 db 10 — 10,000 microvolts

AUDIO OUTPUT: 6 watts nom. into ¾ ohm speaker; 50 mw nom into 600 ohm headset

TRANSMITTER:

(May be operated Simplex, or Duplex with Nav receive frequencies)

TRANSMITTER CIRCUIT: 6 stage, solid state, crystal tuned

FREQUENCY RANGE: 118.0 — 135.95 MHz

NUMBER OF CHANNELS: 360 all crystal controlled

CHANNEL SPACING: 50 kHz

POWER OUTPUT: 8 watts PEP nom. (2-3 watts carrier)

MODULATION. Audio processed, high level, automatic limiting

Unpacking

CAREFULLY REMOVE the ALPHA/300 and its mounting accessories from the shipping container by removing the staples from the top of the carton and lifting the contents straight out. The carton should be saved until the installation is complete in the event that damage is discovered or return of the unit is necessary for some reason. Any damage due to shipping should be reported and a claim filed as soon as possible with the shipping company.(If it is necessary to re-ship, use our container which is specifically designed for that purpose.)

Pre-Installation Check

VISUALLY INSPECT the radio for any obvious external damage, such as dents, broken knobs or meter faces, 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.

All ALPHA/300 radios are shipped in perfect operating condition. However, a pre-installation electrical test may be performed to assure that the unit has suffered no internal damage during shipment. For a detailed test procedure, refer to the Maintenance Section of the ALPHA/300 Service Manual. DO NOT ATTEMPT to bench test the radio without proper equipment as specified in the Service Manual.

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Installation Planning

THE LOCATION of the ALPHA/300 in the aircraft should be carefully selected with due consideration the following:

1. The ALPHA/300 generates only a very small amount of heat and, as such, does not require any forced air or ram air cooling. However, the unit must NOT be mounted directly above a vacuum tube device or any other equipments that generate a large amount of heat unness such equipments have cooling provisions installed to keep the heat generated therein from coming in contact with other equipments mounted in close proximity to them.

MOUNTING THE ALPHA/300 DIRECTLY OVER UNCOOLED VACUUM TUBE EQUIPMENT OR IN THE HOT AIR BLAST OF ANY DEVICE INCLUDING CABIN HEATERS WILL AUTOMATICALLY VOID THE WARRANTY

2. The radio will extend about 12 3/8 inches behind the front surface of the aircraft panel. Therefore, at least 12 7/8 inches of clear space behind the panel must be available to mount the unit.

3. The placement of the unit should be such that all controls are easily accessible and all readouts are easily visible to the pilot.

4. The ALPHA/300 may be connected in parallel with the same speaker and headphone used by other equipment. However, considerably improved audio performance from the speaker will be obtained if the headphone outputs of other equipment are fed to the two auxiliary audio inputs of the ALPHA/300 . Alternately, the auxiliary input of another piece of equipment or to an audio mixer control. Either of these methods is preferred to direct paralleling which will reduce the available audio power in most cases.

5. A communications antenna approved by Genave, or its equivalent, MUST be used in the installation to validate the warranty. A set of minimum specifications for evaluating antennas is shown below. Genave recommends its LAMBDA/100 Com Rod antenna. It is recommended that the Factory be contacted before installing antennas of questionable performance.

A "bent wire" type of antenna is NOT suitable in any case, and the use of such an antenna will VOID THE WARRANTY.

Minimum Specifications for COM Antenna:

Impedance . . . . 50 ohms nominal

VSWR . . . . 5:1 (Max) 118.0 to 127.9 mHz
(5:1 VSWR represents a 46% loss of output power)

Installation

1. The aircraft panel cutout for the ALPHA/300 is 6 1/4" wide X 3 11/32" high. Make this cutout in the selected location.

2. Insert the supplied mounting rack into the cutout. Mark the rack mounting holes on the panel support brackets on both sides of the cutout. If the location chosen does not provide the brackets, two angle brackets must be made and Installed. Drill out the marked mounting holes with a #27 drill.

3. The mounting rack alone will provide sufficient support for the radio in most cases. If further support is required or desired, a rack support bracket must be fabricated and installed, A mounting hole in the rack for a support bracket has been provided. (See mounting rack illustration)! Other locations will generally cause mechanical interference when inserting the radio.

4. Install the rack in the aircraft panel, using the holes drilled in step 2, the #6-32 Binder head screws, washers, and nuts supplied, and the support bracket if used. All screws must have their heads inside the rack.

5. Fabricate the power and signal cable using the connector socket supplied. A wiring diagram is shown in this manual. The cable wires should be long enough to allow the connector to be passed through the panel cutout from the rear and extended to about 2" in front of the panel.

6. Fabricate the two RF cables as illustrated using 50 ohm coax, such as RG-58 A/U. These cables should also be long enough to protrude 2" through the cutout.

7. Connect the 3 cables just fabricated to the appropriate points in the aircraft's electronic system. Bring the connector ends through the cutout. Mechanically secure the cables at appropriate support points.

8. Attach the cables to the radio. Make sure that the RF cables go to the proper jack on the radio. The COM antenna cable (long plug) goes to the recessed antenna jack.

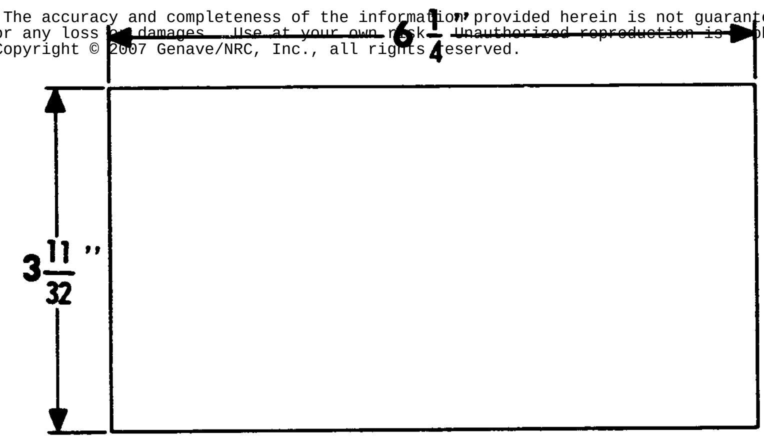
9. Insert the radio into the rack. Tighten the mounting bolt to secure the radio in the panel. Do not use excessive torque on the bolt. Tighten only until the radio is snugly secured against the front panel.

10. Update the appropriate logs and papers of the aircraft.

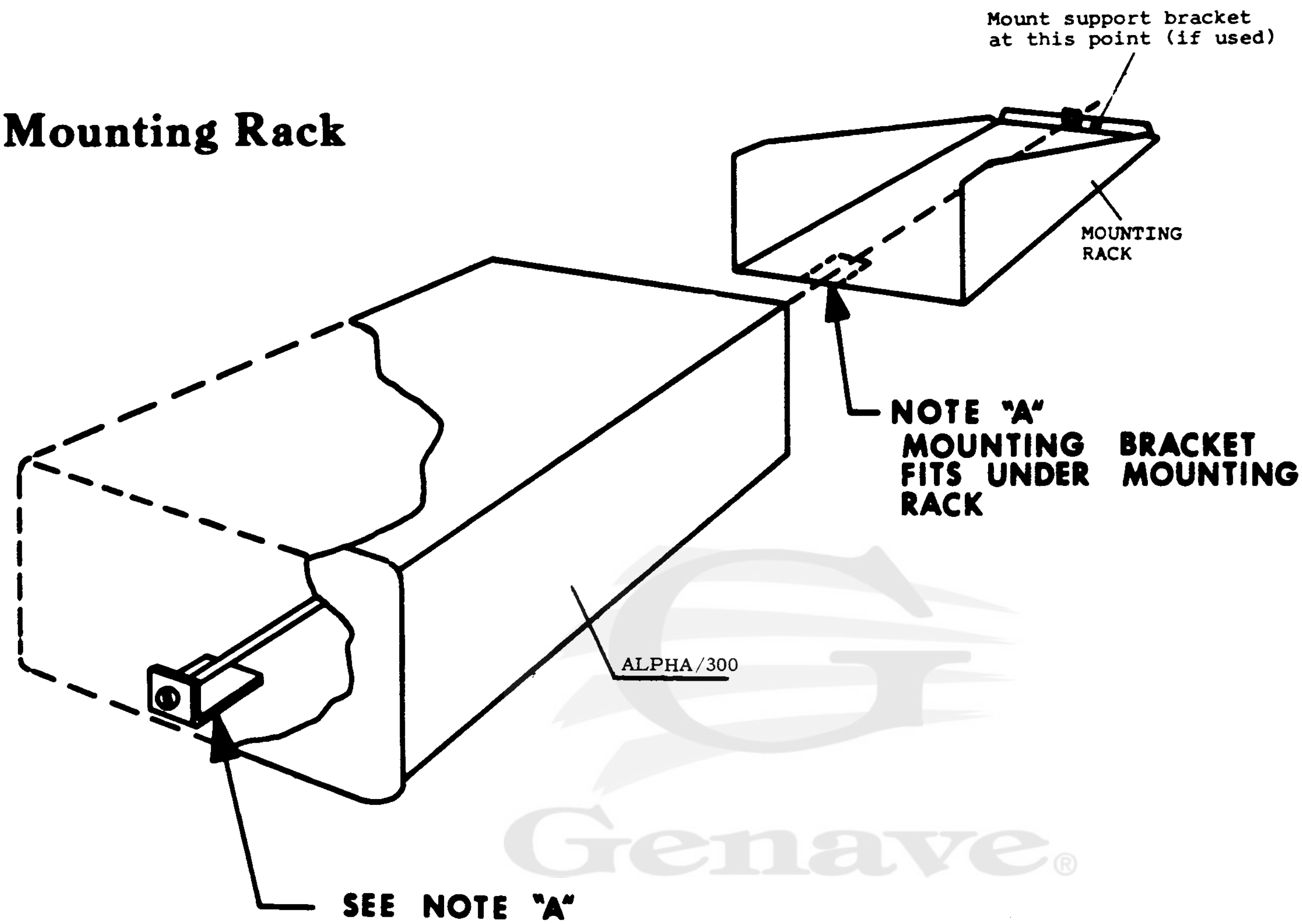
11. Fill out and return the bottom section of the warranty card.

12. Give the remainder of the warranty card and the Pilots Information Manual to your customer. The proper sections of the warranty card MUST be completed and returned to Genave by both the dealer and the customer for the warranty to be in effect.

Panel Cutout



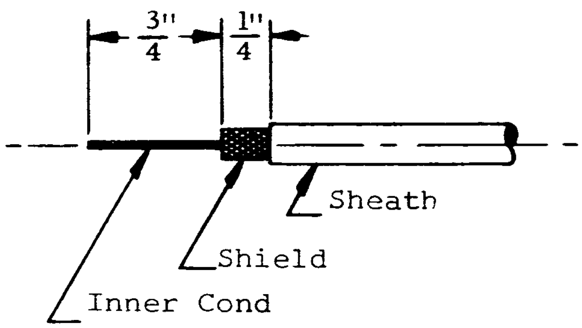
Mounting Rack



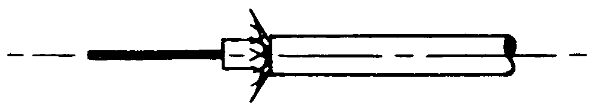
Post Installation Check

UPON COMPLETION of the installation, a flight test is desirable to insure that all three systems of the ALPHA/300 are operating properly. The navigation system should be checked on two or more different radials or on different Omnistations. The communications system should be checked for simplex operation on two or more frequencies and for duplex operation if possible. The localizer function should be checked if possible. A single frequency check is sufficient.

NAV Antenna Connector Assembly

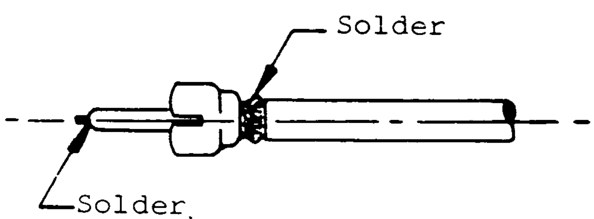


1. Cut and strip RG-58 A/U Coax as shown.



2. Spread shield. Do not pigtail.

3. Press short shank connector onto wire and against shield.



4. Fold shield over connector and solder all around. Flow solder into connector tip to secure inner conductor. Cut off tip of inner conductor which protrudes from connector.

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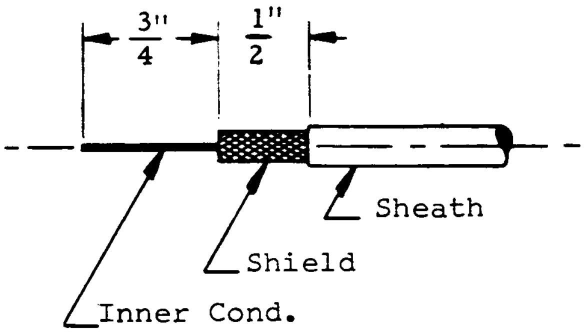
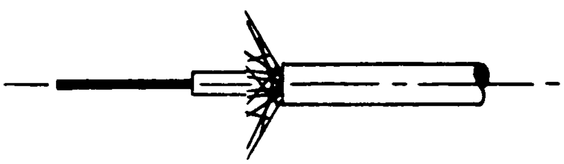
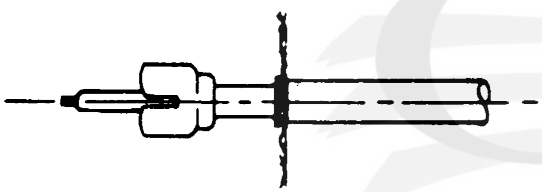
COM Antenna Connector Assembly



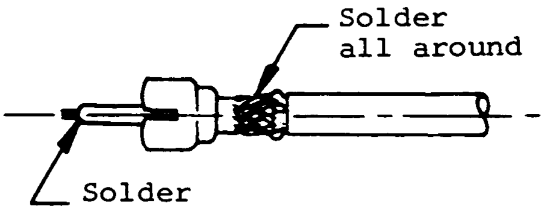
(1) Cut and strip RG-58 A/U Coax as shown.



(2) Spread shield. Do not pigtail.

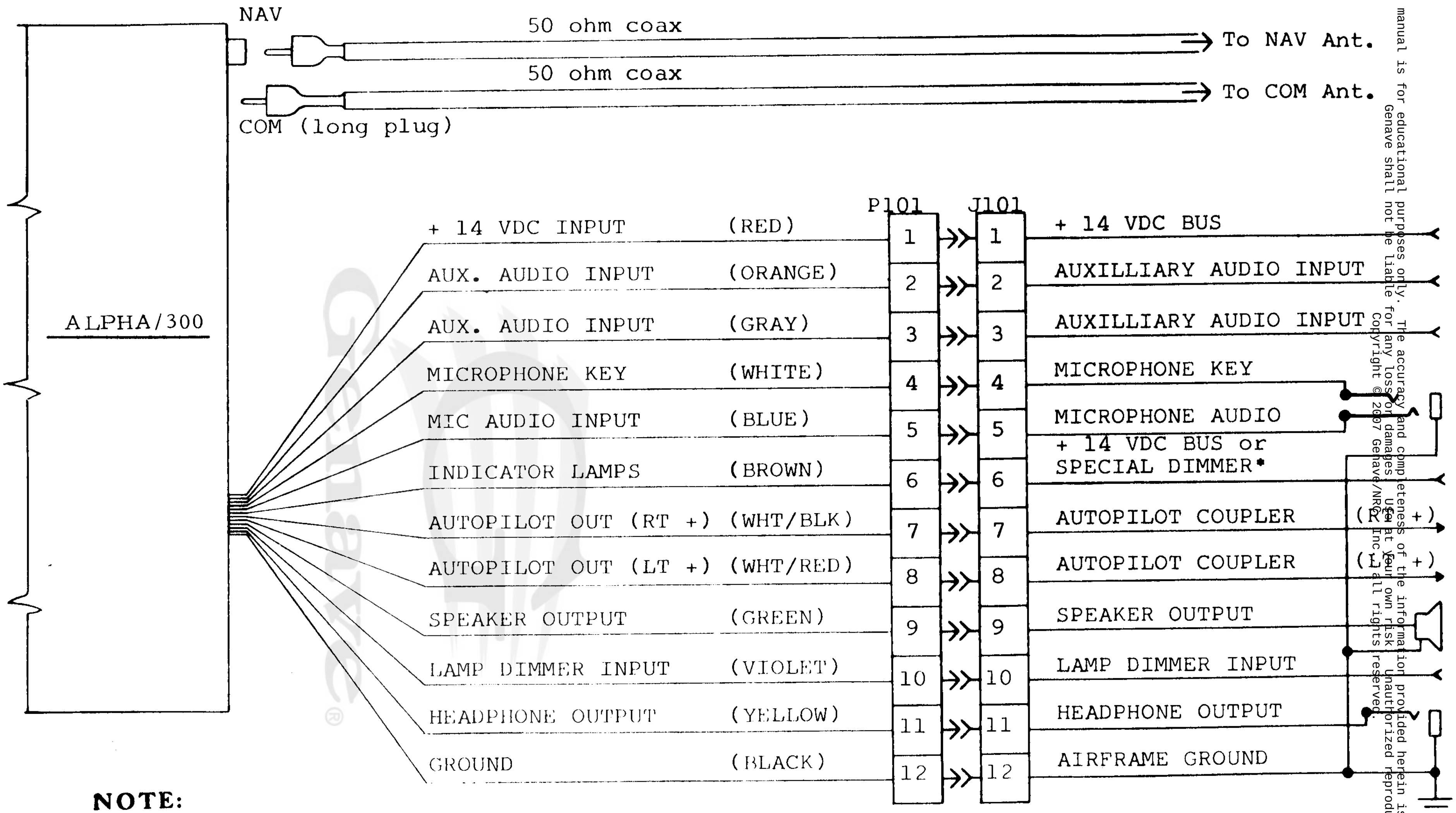


(3) Press long shank connector onto wire and against shield.



(4) Fold shield over connector and solder all around. Flow solder into connector tip to secure inner conductor. Cut off tip of inner connector which protrudes from connector.

Power and Signal Cable Connections



NOTE:

It is not necessary to connect power to pins 6 or 10 if dimming of the lamps is not required. These pins have been connected to switched A+ on the bottom of the unit with color coded jumper wires:

Brown jumper wire - Indicator lamps
Violet jumper wire - Backlighting lamps

IF DIMMING IS REQUIRED on either set of lamps, the appropriate jumper(s) MUST be removed. The wiring diagram should then be used to connect the lamps to the proper points in the aircraft electrical system.

*This input controls the intensity of the TO-FROM-OFF lamps. The following are alternate methods of installation:

1. Connect directly to the +14 VDC BUS, and the lamps will light at full intensity.
2. Connect through an auxilliary 250 ohm series dimmer potentiometer to the +14 VDC BUS.
3. Connect to existing panel dimmer, which will require panel lights to be set at full brightness during the day for the lamps to be visible.
4. Install a DAY-NIGHT switch, connecting input to +14 VDC BUS for DAY mode and to existing panel dimmer for NIGHT mode.

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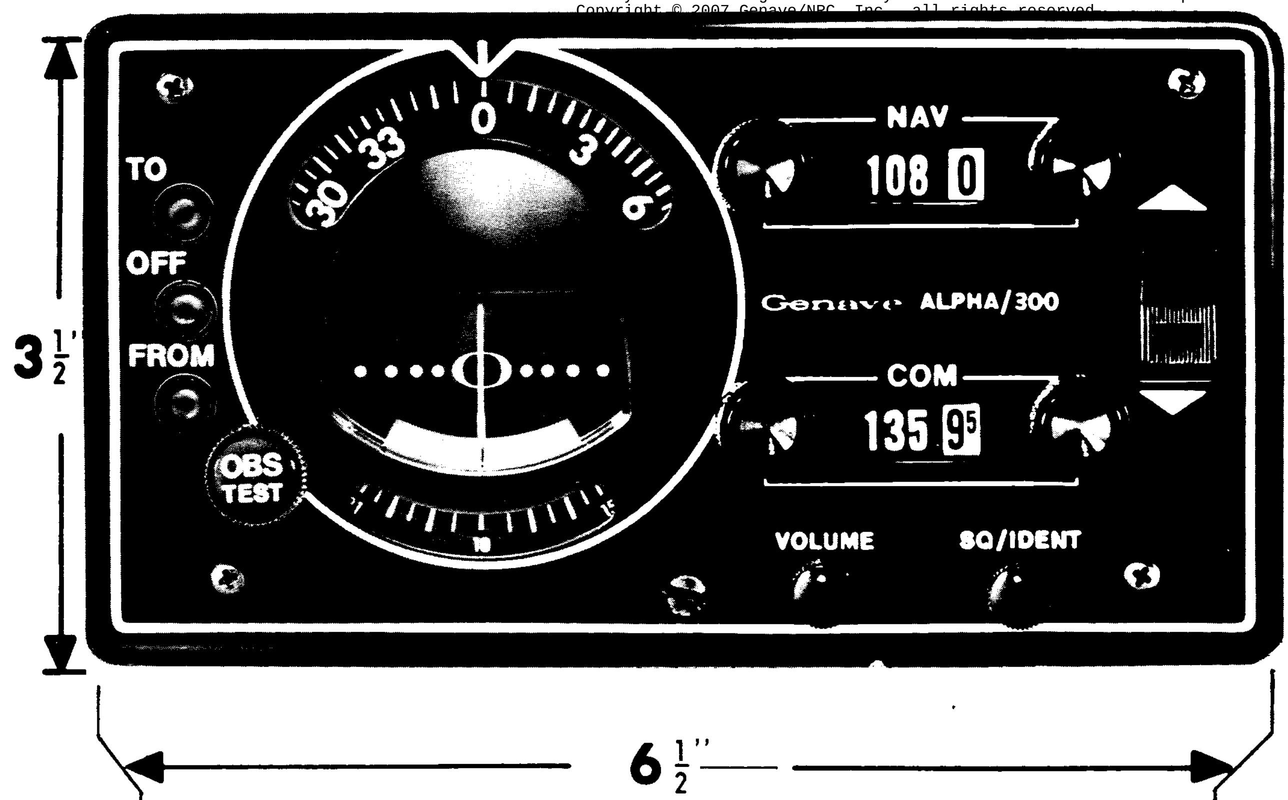
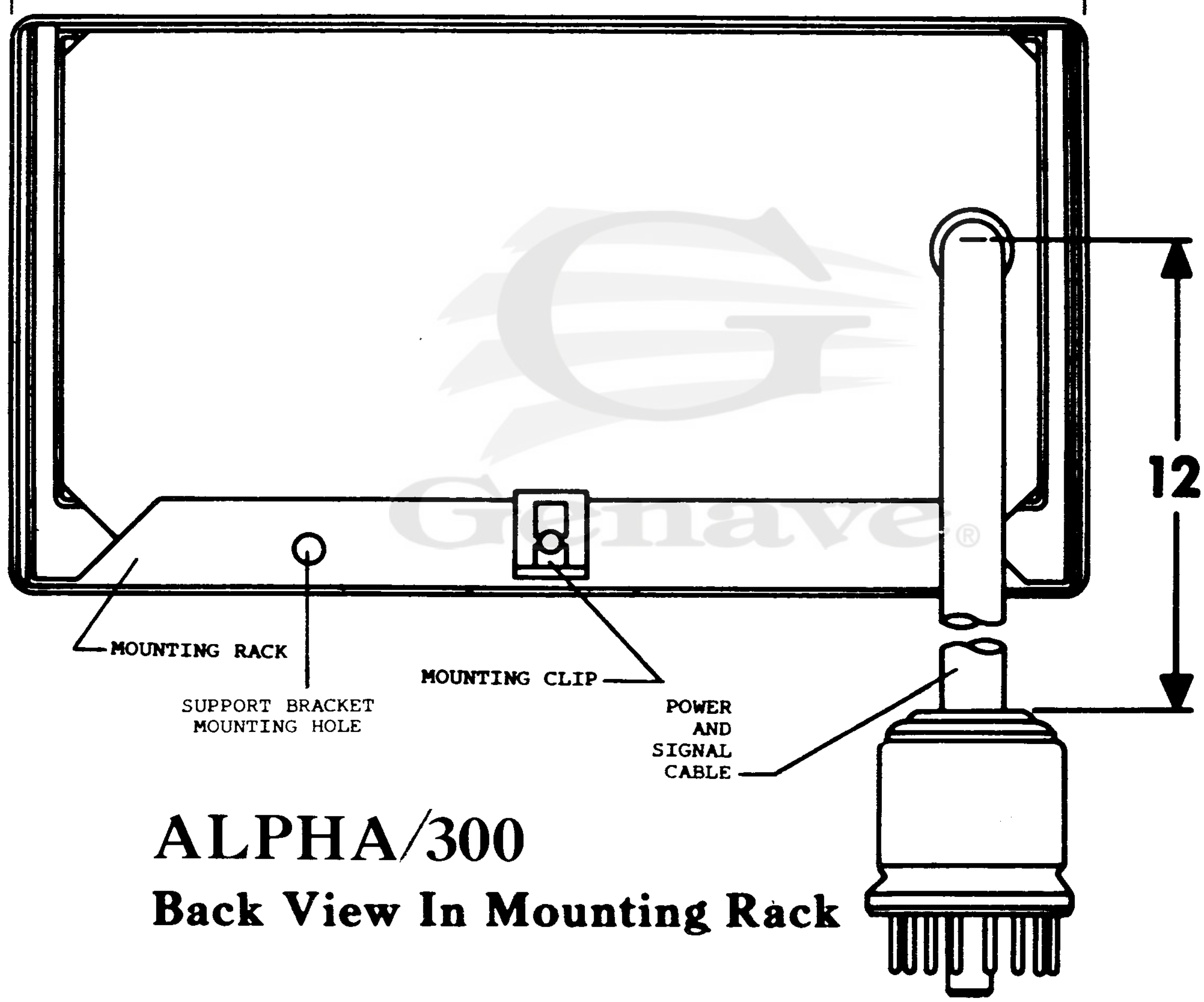
Front Panel





ALPHA/300
Back View In Mounting Rack

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SECTION III

OPERATING MANUAL

3-1. Operating Controls and Indicators

The ALPHA/300 has eight operating controls as listed below:

1. On/Off/Volume
2. Squelch/Ident
3. OBS Selector/Omni Test
4. Communications Frequency Selector, MHz
5. Communications Frequency Selector, KHz
6. Navigation Frequency Selector, MHz
7. Navigation Frequency Selector, KHz
8. NAV/COM Switch

The ALPHA/300 has five readout or indicator devices as listed below:

1. Omni Bearing Dial
2. Course Deviation Needle
3. To-Off-From Lamps
4. Communications Frequency Readout
5. Navigation Frequency Readout

To operate the ALPHA/300, turn the unit on by rotating the On/Off Volume control clockwise past the click.

For operation as a communications receiver set the NAV/COM switch to COM. Rotate the squelch control to the maximum clockwise position. Set the desired communications frequency in the COM window using the COM MHz and KHz controls. Adjust the On/Off/Volume control for the desired audio output level. Aujst the Squelch control counter-clockwise to quiet the receiver when no signal is present.

To operate as a communications transmitter, set the desired communications frequency in the COM window with the COM MHz and KHz controls and push the microphone switch.

To operate as a navigation receiver, Omni or Localizer, set the NAV/COM switch to NAV. Set the desired navigation frequency in the NAV window using the NAV MHz and KHz controls. Adjust the On/Off/Volume control for the desired audio output level.

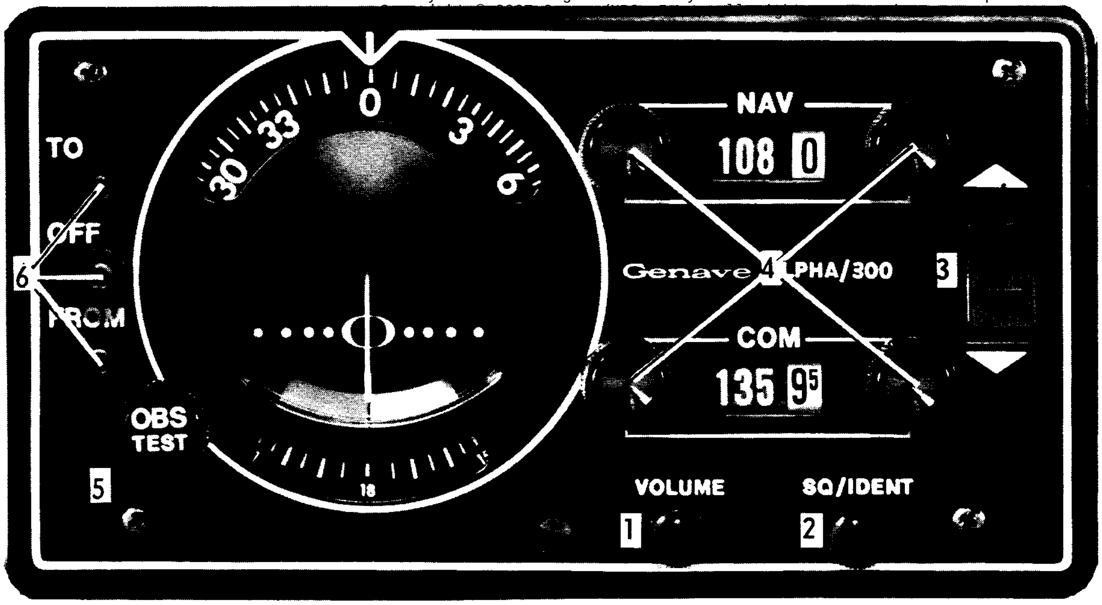
The squelch circuitry is automatically disabled when the unit is being used as a navigation receiver. The navigation station identifier can be filtered out of the audio by rotating the squelch control clockwise until the switch clicks. When operating the unit as an Omni receiver, adjust the OBS Heading Selector for a centered course needle and a "TO" or "From" lamp indication as desired. If insufficient signal is available for proper operation, the "Off" lamp will be on solid or intermittently at all OBS dial settings. A usable signal will always be indicated by a solid "To" or "From" lamp when the dial is set on the Omni radial corresponding to the aircraft in relation to the selected omni station. The Omni bearing "To" or "From" is read at the top of the rotating Omni Bearing Dial. The course reciprocal is read at the bottom of the dial.

To test Omni, set NAV frequency selector to receive any Omni station. Set NAV/COM Switch to NAV. Rotate OBS selector to 0° on the compass rose, and depress knob: meter needle should center and the "To" light should come on (Omni accuracy should be ± 2%).

When operating the unit as a Localizer receiver, select the desired frequency with the NAV MHz and KHz controls. The NAV/COM Switch should be set on NAV. The unit automatically switches to Localizer mode and feeds the proper signals to the course needle whenever a localizer frequency is selected. A usable signal is indicated by the solid illumination of the "To" lamp.

Duplex communication operation (transmission on a COM frequency, reception on an Omni or Localizer frequency) is effected by selection of the desired transmit and receive frequencies with the NAV/COM Switch in the NAV position. When the microphone switch is depressed, the unit automatically transmits on the selected communications frequency and receives on the selected navigation frequency.

Simplex communication operation (transmit and receive on the same frequency is accomplished by placing the NAV/COM switch in the COM position and operating the unit as indicated above.



1. VOL control

Controls volume of receiver for both NAV and COM. Also controls ON-OFF for entire unit.

Rotate clockwise to turn set on and to increase volume. Rotate counter-clockwise to reduce volume and to turn set off.

2. SQ/IDENT control

Adjusts squelch threshold to exclude noise between transmissions from ground.

Turns 1020 Hz morse code IDENT on or off.

Rotate Clockwise to disable squelch, then rotate counter-clockwise until noise stops. For weak or distant stations use full clockwise rotation. (Note: Squelch is disabled automatically when NAV-COM switch is in NAV position.)

Rotate fully clockwise until switch clicks to turn identifier off.

3. NAV-COM switch

Selects the NAV or COM mode of the unit.

Depress the top of the switch to activate the NAV frequency shown in the upper digital readout window and the converter indicator. Depress the bottom of the switch to activate the COM frequency shown in the lower digital readout window.

4. FREQUENCY SELECTOR knobs

These knobs select the MHz (white numbers on black) or tenth MHz (black numbers on white) dial readout adjacent to the knob being turned.

Turn knobs clockwise to increase frequency. (When the readouts are blank the radio is inoperative. Knobs may be rotated through blank positions without damage to radio.) Knobs may be turned counter-clockwise to reduce frequency.

5. OMNI BEARING SELECTOR (OBS)

Adjusts OMNI to desired radial. Tests OMNI operation.

Turn knob clockwise or counter-clockwise to desired bearing on compass rose. Top numbers (larger size) indicate bearing. Bottom numbers (smaller size) are reciprocal.

To test OMNI, set NAV frequency selector to receive any OMNI station. Set NAV/COM switch (3) to NAV. Rotate OBS selector to 0° on compass rose, and depress knob: meter needle should center, and the TO light (6) should come on (OMNI accuracy should be ±2°).

6. TO-FROM-OFF lights

Provide pilot with TO-FROM-OFF information in relation to course deviation display.

GREEN : (to) Illuminates when OMNI signal of adequate strength is received, and the bearing selected on the OMNI Bearing Selector (OBS) is (or is close to) the reciprocal of the radial on which aircraft is located.

Illuminates when the Localizer signal of the frequency shown in the NAV digital readout window is of adequate strength.

YELLOW: (from) Illuminates when OMNI signal of adequate strength is received, and the bearing selected on the OMNI Bearing Selector (OBS) is the same as (or close to) the radial on which the aircraft is located.

RED : (off) Illuminates when the NAV-COM switch is in COM position, or when microphone button is depressed.

Illuminates when the OMNI or the Localizer signal strength is too low.

Illuminates in the cone of silence over an OMNI station to indicate station passage.

NOTE: NEEDLE DEFLECTIONS OF COURSE DEVIATION DISPLAY METER SHOULD *NOT* BE USED WHEN OFF LIGHT (Red) IS PARTIALLY OR FULLY ILLUMINATED.

Model: ALPHA/300

SECTION IV

MAINTENANCE MANUAL

4-1. Introduction

This section provides the basic information required to electronically test, align, and repair the ALPHA/300. It is assumed that the person working on the unit has a reasonable familiarity with the principles and terminology of communications and navigation electronics as applied to the aviation field.

I. General

4-2. Theory of Operation

The ALPHA/300 employs 64 silicon transistors and 65 diodes in an all solid state design. The following is a breakdown of the functions and circuits within the unit:

A. Receiver (Nav & Com)

B. High Frequency Local Oscillator

C. Low Frequency Local Oscillator

D. Exciter—Transmitter

E. Converter—Indicator

F. Audio Amplifier & Modulator

G. Power Supply

The local oscillators and the exciter—transmitter are contained within separate, replaceable, shielded modules. The receiver, the converter—indicator, the power supply, and the audio amplifier—modulator circuits are on the main circuit board.

II. Detailed Theory

A. *Receiver*—The receiver in the ALPHA/300 is a shared receiver; that is, it may be crystal tuned on either Nav or Com channels. The NAV/COM switch on the front panel determines the mode of operation and the two frequency selectors control the frequency. The receiver is a double conversion superheterodyne with a 4.0 MHz second IF. The first IF is switched and has a center frequency of 30.5 MHz in NAV and 22.5 MHz in COM. The receiver is unique in that it does not employ mechanically tracked, tuned filters, or an RF amplifier.

Signals from the antenna (The Omni antenna is used by the receiver in both Nav and Com modes.) are applied to the band-stop filter. The band-stop filter consists of L100, L101, L102, L103, and their associated tuning and coupling capacitors. This filter reduces spurious receiver responses by suppressing all incoming signals in the 88 MHz to 108 MHz range. Band-stop filter output is applied to a broad-band, 108.0 MHz to 135.95 MHz 5-pole Chebyshev filter consisting of L104, L105, L106, L107, L108, and their associated tuning and coupling capacitors. This filter allows signals in the range from 108.0 MHz to 135.95 MHz to pass to the bases of Q100 (Nav. 1st mixer) and Q102 (Com 1st mixer).

The High Frequency Local Oscillator, LO1, applies a signal through C117 and C127 to the bases of Q100 and Q102, respectively. The input filter prevents radiation of the local oscillator signal. The local oscillator signal is controlled by the NAV/COM switch and the Nav and Com MHz dials. The LO1 signal is approximately 30.5 MHz above the selected signal when in the Nav mode and 22.5 MHz above the selected signal when in the Com mode. The Nav and Com 1st IF mixers are each followed by a single stage of amplification. Q101 is the Nav 1st IF amplifier while Q103 is the Com 1st IF amplifier. The Nav 1st mixer and 1st IF amp; and the Com 1st mixer and 1st IF amp are switched by S103, the NAV/COM switch. The NAV/COM switch grounds the emitters of the desired mixer and amplifier through two emitter resistors; thus providing proper bias on the desired stages.

The Nav 1st IF is tuned by means of T100, T101, T102, and T103 to a center frequency of 30.5 MHz and a bandwidth of 1 MHz. The Com 1st IF is tuned by T104, T105, T106, and T107 to a center frequency of 22.5 MHz and a bandwidth of 1 MHz. The outputs of T103 and T107 are connected to the base of Q104 the second mixer.

The second local oscillator, LO2, is connected to the base of Q104 through C138. LO2 operates 4.0 MHz above the first IF frequency in Com and 4.0 MHz below the first IF frequency in Nav. The exact frequency of LO2 is controlled by the NAV/COM switch and by the front panel .05 MHz and .1 MHż selector dials. Q104, Q105, Q106, Q107, and their associated circuitry form the 4.0 MHz center frequency second IF amplifier.

CR101 functions as a detector. CR101 is biased above ground by R140 and R141 to provide a reference (no signal) AGC voltage. The DC output level of CR101 is amplified by emitter follower Q108 and is used as AGC applied to Q100, Q101, Q102, Q103, and Q105. C166 is grounded in the Nav mode and slows the AGC action. The detected audio output from CR101 is applied through R142 and R143 (the volume control) to the emitter follower Q111.

CR102, R142, R144, and C164 form a noise limiter that removes impulse noise from the voice audio. The detected audio from CR101 is also connected to the base of Q109. Q109 is connected as an emitter follower and provides Omni and Localizer output to the converter—indicator in the Nav mode. CR103 is switched off when the NAV/COM switch is in the Com position. This blocks the audio path to the converter—indicator in the Com mode. Q110 functions as a squelch amplifier and feeds control voltage to the emitter of Q111. The squelch level is set on R145 (squelch control). In Nav, Q110 is disabled by means of CR104 and the NAV/COM switch.

Voice audio output from Q111 is applied to Q151 which functions as an emitter follower. The output of the voice audio emitter follower is applied to the ident filter. This filter consists of L109, C168, C169, and R154 in a T-bridge configuration. When S102 is opened this filter is placed in the audio line and provides a 15 db rejection of the 1020 Hz identification tone. R154 is used to adjust the depth of the rejection notch.

B. *High Frequency Local Oscillator*—The High Frequency Local Oscillator consists of three parts: two crystal oscillators and a frequency doubler. Q501 and Q503 along with their associated circuitry form the crystal oscillators. Both oscillators operate in a modified Colpitts configuration. Crystal selection for both of these oscillators is achieved by diode switching. The crystals range from 69.478 MHz to 80.973 MHz with each oscillator containing twelve of the twenty-four crystals. (See figure 4-4-14, Oscillator Frequency Tables) Crystal switching is accomplished by grounding one of the crystal switching terminals through either of the Nav or Com whole megahertz selectors, the transmit/receive relay, and the NAV/COM switch.

When one of the crystal switching terminals is grounded the emitter of the corresponding oscillator transistor is pulled to nearly ground potential through the corresponding 330 ohm resistor and the forward biased diode. This action applies proper bias to the oscillator transistor and places the desired crystal in the oscillator circuit. The remaining unused crystal and diode pairs in the running oscillator complete the capacitive feedback network.

The output of the crystal oscillators are capacitively tied to the base of Q502, the Class AB frequency doubler. The output of the doubler is filtered by a 3-pole Chebyshev bandpass filter which reduces all spurious levels 70 db or more below the reference output frequency. This filter is comprised of L502, L504, L505, and their associated tuning and coupling capacitors. The filter has a bandpass of 138.946 MHz to 150.946 MHz. The output of the filter is matched to a 50 ohm coaxial cable which is routed to the receiver and to the exciter—transmitter.

C. *Low Frequency Local Oscillator*—The Low Frequency Local Oscillator, consisting of Q401 and associated circuitry, is a modified Colpitts crystal controlled oscillator. The crystals are selected in the same manner as are the High Frequency Local Oscillator Crystals. The crystal frequencies are 25.996 to 26.946 MHz in 50 KHz steps.

T401, used to adjust the Low Frequency Oscillator, utilizes a pickup link. This link is the first element in a 9-pole Chebyshev lowpass filter consisting of the link on T401, L403, L404, L405, L406, C411, C413, C415, and C417. This filter suppresses all undesired outputs to 70 db or more below the desired output. The nominal cutoff frequency is 32.0 MHz. The output of the filter is matched to a 50 ohm coaxial cable which is routed to the main circuit board and then to the exciter—transmitter assembly.

D. *Exciter—Transmitter*—Inputs from the high and low frequency oscillators are fed through resistive attenuators to the balanced mixer, consisting of Q601, Q602, and their associated circuity. The low frequency input is applied through a tuned transformer, T601, and fed differentially to the transistor bases. The high frequency input is applied in-phase to both bases. Using this method of feeding the mixer, the high frequency input, it's harmonics, and all even order harmonics of the

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low frequency input are suppressed in the collector circuit. Mixing action occurs in the base-emitter junctions and produces primarily the high frequency input plus and minus the low frequency input. Harmonically related spurious outputs also occur, but at lowel levels. The desired output frequency is the high frequency input minus the low frequency input. The sum and difference frequencies appear in the collector circuit across the primary of T602. A pickup link on T602 forms the first element in a 3-pole Chebyshev bandpass filter consisting of the link on T602, C609, C610, C613, L601, C614 C615, C616, C611, C612, and L602. The nominal bandwidth of this filter is 19 MHz centered around a frequency of 127.95 MHz. The filter suppresses all undesired higher order outputs of the mixer to 60 db or more below the desired output frequency.

The output filter drives an emitter follower consisting of Q603 and associated circuitry. The output of the emitter follower drives two common emitter amplifiers consisting of Q604, Q605, and their circuitry. The two amplifiers are capable of being switched into an off condition by raising the emitter voltages.

One amplifier drives a 3-pole Chebyshev bandpass filter consisting of L603, L605, L606, and their associated tuning and coupling capacitors. This filter has a bandpass of 118 MHz to 127.95 MHz. The other amplifier drives a 3-pole Chebyshev bandpass filter consisting of L604, L607, L608, and their associated tuning and coupling capacitors. This filter has a bandpass of from 128 MHz to 135.95 MHz.

The amplifiers are selected by one section of the Com MHz switch SW106. The changeover occurring 127/128 MHz, on the Com MHz dial. By switching the filters, the lower order spurious responses such as 2LO1-2LO2 are reduced to 70 db or more below the desired output.

The outputs of both filters are combined in a diplexer consisting of C648, R627, L609, and C649. The diplexer provides 25 db of isolation between filters, thus reducing interaction between filters. The output of the diplexer is fed into a single-tuned bandpass amplifier, Q606 and associated circuitry. At this point all undesired outputs are more than 70 db below the desired output.

The output of Q606 is fed to a single-tuned Class C driver, Q607. The signal from Q607 is matched into the input of Q608 with a split inductor "pi" matching section, consisting of Z601, C658, C659, L611, and Z602. The output from Q608 is fed to Q609 through another "pi" matching section consisting of Z603, C666, Z604, and C667.

Q609 is the final power amplifier stage. It is single tuned into a 7-pole Chebyshev lowpass filter. The primary function of this filter is to remove harmonics of the output frequency which are generated in the Class C amplifier stages. The filter reduces all of the harmonics and spurious outputs to over 60 db below the desired output. The output of the filter is designed to match a 50 ohm communications antenna system.

The entire exciter—transmitter assembly is contained in one module consisting of tin-plated steel which reduces radiation from the module to a minimum.

E. *Converter-Indicator*—The converter-indicator circuitry is of the computer type and is identical to the circuitry employed in GENAVE's THETA/100 and THETA/200 converter-indicators, ALPHA/200, and ALPHA/200A Nav/Com Transceivers. The converter-indicator circuitry utilizes no transformers and operates on analog computer techniques.

The converter-indicator circuitry can be broken down in 5 sections: Omni Circuitry, Localizer Circuitry, Omni/Localizer Summing Amplifiers, Omni/Localizer Metering Circuitry, and Omni/Localizer Lamp Circuitry.

Omni and Localizer signals from Q109 are applied to Nav MHz and Nav KHz switches, SW104 and SW105 respectively. For frequencies from 112.0 to 117.9 MHz the signals are routed through SW104A Rear to the converter-indicators Omni input. For frequencies from 108.0 to 111.9 MHz the signals are routed through SW104A Front to the wipers on SW105A. When SW105A is on an odd tenth MHz the signal is fed to the converter-indicators Localizer input. When SW105A is on an even tenth MHz the signal is fed to the Omni input to the converter-indicator.

1. Omni Circuitry—When an omni signal is applied to the converter-indicator it is fed to two individual channels. One of these channels is the AM channel while the other is the FM channel.

The AM channel consists of a 30 Hz amplifier/splitter, a 90° phase shifting circuit, an amplifier/splitter, and the OBS potentiometer. The 30 Hz amplifier/splitter consisting of Q118, Q119, Q120, and associated circuitry removes the 30 Hz AM

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component of the 9960 Hz carrier. The amplifier is tuned to 30 Hz by means of R180 and C184 which form a resonant feedback network. This tuned amplifier/splitter provides one output in-phase and one output 180° out-of-phase with the input signal.

These two outputs are applied to the 90° and 270° terminals of the OBS potentiometer, respectively, and to an RC phase shifting network consisting of C186, R185, and R186. R186 allows the shift to be set at exactly 90°.

Output from the 90° phase shifting network is applied to an amplifier/splitter consisting of Q121, Q122, and associated circuitry. This amplifier/splitter provides two outputs, one which is in-phase with the input and one which is 180° out-of-phase. These two outputs are applied to the 0° and 180° terminals of the OBS potentiometer, respectively. The wiper on the OBS potentiometer, R190, will provide a 30 Hz AM signal whose phase may be selected.

The FM channel consists of two 9960 Hz amplifier/limiters, the first of which is LC tuned and the second which is RC tuned; a 50 microsecond one-shot multivibrator; a phase trimming circuit; and a 30 Hz RC tuned amplifier.

The Omni input is first applied to the 9960 Hz LC amplifier consisting of Q123, Q124 and associated circuitry. This amplifier/limiter is tuned to 9960 Hz by means of L110, C192, and C191. C191 is a selected value used to trim the circuit to 9960 Hz.

The second amplifier/limiter output is used to trigger the 50 microsecond one-shot multivibrator consisting of Q127, Q128, and associated circuitry. The 50 microsecond pulses which are generated are fed to a phase trimming circuit comprised of C198, R208, and R209. R209 is adjusted to compensate for any incidental phase shifts induced by the amplifier/limiters or the 50 microsecond multivibrator.

Once this phase compensation has been accomplished the 50 microsecond pulses are applied to a 30 Hz amplifier/splitter consisting of Q129, Q130, and associated circuitry. R216 and C201 form a resonant feedback circuit which tunes the amp/splitter to 30 Hz. With the feedback network tuned to 30 Hz the charge and discharge time of the capacitor is such that the output level of the amp/splitter is dependent upon the input pulse spacing. The result is that the 30 Hz FM modulating signal is reproduced at the amp/splitter outputs. One of the amp/splitter outputs is in-phase with the 30 Hz FM modulating signal while the other output is 180° out-of-phase. These two FM channel outputs along with the AM channel output are then applied to the Omni/Localizer summing amplifiers.

2. Localizer Circuitry—When a localizer signal is applied to the converter/indicator it is processed down two separate channels. One channel is the active processing channel while the other is the passive balance channel.

The active processing channel is comprised of a two-stage RC active filter and a 115 Hz amp/splitter. The two-stage RC active filter consists of Q131, Q132, and associated circuitry. The RC active filter provides an approximate 90° phase shift to both the 90 Hz and 150 Hz components of the localizer signal.

The RC active filter output is fed to the 115 Hz amp/splitter consisting of Q133, Q134, and associated circuitry. Since the amp/splitter is RC tuned to 115 Hz by means of C208 and R228, the 90 Hz component of the localizer signal tends to lead the 150 Hz component through this circuit. This action shifts the 90 Hz component ahead by approximately 10° and delays the 150 Hz component approximately the same amount. The output of the amp/splitter will be two composite signals (both 90 Hz and 150 Hz components with their respective phase shifts) one of which is inverted. These two outputs are each applied to one of the summing amplifiers.

3. Omni/Localizer Summing Amplifiers—The summing amplifiers are used to convert the processed Omni or Localizer signal to a directional signal. This conversion is done by means of a summing process.

Three signals from the Omni circuitry are applied to the summing amplifiers. The Omni summing amplifiers are comprised of Q135, Q136, and associated circuitry; and Q137, Q138, and associated circuitry. Each of the Omni summing amplifiers receives one of the FM Omni channel outputs and the AM channel output.

The summing amplifiers perform a vector addition of the omni inputs and provide an output which is a composite waveform. The amplitude of the summing amplifier outputs are dependent upon the phase of the input signals. When the AM channel input is exactly 90° out-of-phase with the FM channel inputs the amplitude of the summing amplifier outputs will be exactly the same. Any deviation from this 90° phase difference will cause one summing amplifier output to increase in amplitude while the other output decreases. These two outputs are fed to the metering circuits.

Three signals from the localizer circuitry are applied to the Omni/Localizer summing amplifiers. The Omni/Localizer summing amplifiers are comprised of Q135, Q136, and associated circuitry; and Q137, Q138, and associated circuitry. Each summing amplifier has two inputs: one from the 115 Hz amplifier/splitter and one from the balance circuit. The vector addition which takes place provides one summing amplifier output which is predominately 90 Hz and one summing amplifier output which is predominately 150 Hz. These two outputs are fed to the metering circuits.

4. Omni/Localizer Metering Circuits—The outputs from each of the summing amplifiers are fed to the metering circuits, here the directional signal is converted to a visual indication. The omni and localizer indication is provided via M1 the course deviation indicator.

The Omni/Localizer summing amplifier outputs are rectified by means of CR113 and CR114. The rectifier outputs, varying DC levels, are applied to the meter drivers Q138 and Q139. The meter drivers function similar to a differential amplifier and any difference between rectified summing amplifier output levels will cause more current flow through one meter driver transistor. This action will cause current flow through the meter and therefore a meter deflection. The Capacitor paralleling the meter controls the impulse sensitivity of the meter.

5. Omni/Localizer Lamp Circuitry—Two fixed 90° phase shift networks; R251 and C219, and R252 and C210; are connected to the outputs of the two summing amplifiers. The outputs of these networks have the same dependence upon the relative phase of the input signals as the summing amplifier outputs except that the amplitude response is shifted 90°. Therefore, when the outputs of the summing amplifiers are equal, the output of one of the phase shift networks is at maximum and the output of the other network it at minimum. The outputs of these networks are rectified to DC by Q141 and Q142. C220 and C221 filter out the rectification ripple and the signals obtained are applied to the TO and FROM DC amplifier transistors, Q146 and Q145 respectively. R256, R257, and R259 are connected to the DC signal inputs of the TO and FROM DC amplifiers and to the base of the OFF DC amplifier. These resistors preferentially bias Q144 "on" unless the difference in DC signal levels exceeds the threshold voltage determined by their ratio.

The outputs of the DC amplifiers are fed to the bases of the TO, OFF, and FROM lamp driver transistors Q147, Q148, and Q149 respectively, which in turn control the front panel indicator lamps.

When utilizing the converter indicator for localizer operation, the signal at the collector of Q134 is rectified by CR115 and amplified by Q143. The resulting DC current is filtered by C220 and applied to the TO lamp DC amplifier, Q146. The output of Q146 is applied to the TO lamp driver, Q147, which "turns-on" the TO lamp whenever the localizer signal is flyable.

F. *Audio Amplifier & Modulator*—The audio amplifier and modulator in the ALPHA/300 is a 3 stage direct-coupled, Class A, Heising circuit consisting of Q112, Q113, Q114, T116, and associated circuitry. Q112, the preamplifier, provides most of the open loop gain. Q113 is an emitter follower driver stage feeding Q114, the power output transistor. The voltage at the emitter of Q114 is fed directly back to the base of Q112 through the AC decoupling network R166, C178, and R164. This feedback stabilizes the bias conditions of the entire amplifier over the temperature range of −50 to +100° C.

High frequency band shaping and rolloff are controlled by two independent feedback networks. C176 reduces the available gain of the amplifier above 2.5 KHz. R163 and C177 determine the audio bandshape above 700 Hz.

During transmit, the low frequency response of the modulator is controlled by the input network C173 and R159. This network is effective at 700 Hz and below.

Relay K101 is activated by the microphone pushbutton switch. It converts the audio amplifier to a modulator during transmit. It also provides for switching of the microphone to the modulator, applying the operating voltages to the transmitter, and switching the high and low frequency oscillators to provide the selected communications frequency when in transmit.

R158 provides a noise free, regulated, current to the microphone element. It may be changed, if necessary, in the field to provide the proper modulation percentage with non-standard, low, or high output microphones. The design value is proper for all new single-button carbon microphones or their equivalent such as the various transistorized types designed for direct replacement of the carbon type. CR106, connected between Q114 base and collector, and R162 provide the modulation limiting during transmit. CR106 limits the maximum up modulation and R169 prevents "bottoming" or carrier cutoff. The combination limits to the modulation to 85% to 95% of maximum. It also provides moderate peak-clipping during receive to raise the intelligibility of the received audio in high noise environments.

G. *Power Supply*—All circuitry within the ALPHA/300 which are sensitive to input voltage variations are operated from a regulated power supply consisting of Q115, Q116, Q117, Q150 and associated circuitry. CR108 determines the necessary reference voltage on the base of Q116. The output level of the regulator, 8.5 volts, is set on R176 which determines the base bias of Q117. The differential amplifier formed by Q116 and Q117 applies regulating current to Q150 and Q115, which in a Darlington configuration form the regulating element. R171 supplies a portion of the load current, which allows Q115 to operate well within its dissipation characteristics.

CR107, although not a direct part of the regulated supply, limits the maximum input to the supply to about 16 volts. This protects the supply from over-voltage spikes on the input line.

4.3 Test Equipment Required

a. NAV/COM Generator or Simulator
Tel-Instruments T-12A, ARC H-14, or equivalent.

b. Sweep Generator covering at least 4 MHz ± 500 KHz, 22.5 MHz ± 1 MHz, and 30.5 MHz, ± 1 MHz.
Heathkit IG-52 (Modified, Schematics available from GENAVE) or equivalent.

c. Sweep Generator covering 80 MHz to 150 MHz in one sweep with an output of at least 0.25 V rms. (Heathkit IG-52 may be used in conjunction with a logarithmic amplifier such as Texscan's LN-40A or equivalent)

d. Frequency Marker Generator, producing 88, 108, 118.0, 122.9, 127.95, 128.0, 132.5, and 135.95 MHz markers.

e. Frequency Counter usable to at least 169 MHz.
GENAVE Model NU/200
Computer Measurements Corp. Model 616A
Hewlett Packard Model 5254 or equivalent.

f. Oscilloscope, low frequency, DC coupled preferred.

g. RF Signal Generator, 108 MHz to 128 MHz, capable of external modulation.

h. Audio Signal Generator.

i. Power Supply, 14.00 VDC @ 3 amps, filtered.

j. Dummy Load, 10 Watt.

k. VTVM and/or VOM.
Any accurate instrument.

l. RF Power Meter, 0-5 Watts

m. Attenuators, any combination to achieve 6 and 30 db.

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4-4. Alignment Procedures

NOTE: Alignment procedures for the high frequency oscillator filter are not included. This filter is prealigned at the factory and realignment is unnecessary unless components of the *filter itself* are damaged in which case the entire module should be replaced.

A. *General*—The receiver section of the ALPHA/300 employs several multi-element bandpass filters. These filters *MUST* be aligned using swept frequency techniques. Do not attempt to align any portion of the ALPHA/300 by "peaking" or other single frequency techniques.

B. *8.5 VDC Power Supply*

1. Connect an accurate VOM or VTVM to the output of the regulated 8.5 VDC power supply. (TP-1)
2. Adjust R176, 8.5 VDC ADJUST, for an output of 8.5 VDC.

C. *High Frequency Oscillator Alignment*

1. Connect the receiver to the Alignment and Test Setup shown in figure 4-4-2.
2. Connect a frequency counter to the high frequency oscillator output cable where the cable connects to the main circuit board. (TP-2) (See figure 4-4-5)
3. Connect the 10 watt dummy load to the Com antenna jack.
4. Turn on the receiver. Set the NAV/COM switch to NAV. Set the Nav frequency selectors to 108.5 MHz.
5. Turn the slug in L503 (See figure 4-4-4) counter clockwise 2 or 3 turns then back clockwise to the point at which the oscillator starts.
6. Check output on each whole Nav MHz to 117 MHz.
7. Place NAV/COM switch in COM position and continue to check output in the 126 and 127 MHz positions. (See figure 4-4-14)
8. If on any frequency no oscillator output is indicated readjust the oscillator slug of L503 slightly until the oscillator starts then go back and repeat steps 6 and 7 to insure oscillator operation on the lower frequencies.
9. With the NAV/COM switch still in the COM position set the Com MHz selector to the 128 MHz position.
10. Turn the slug in L501 counterclockwise 2 or 3 turns then back clockwise just to the point at which the oscillator starts.
11. Check oscillator output from 128 MHz to 135 MHz.
12. With microphone PTT depressed check output from 132 MHz to 135 MHz.
13. If on any frequency no oscillator output is indicated readjust the oscillator slug of L501 slightly until the oscillator starts then go back and repeat steps 11 and 12 to insure oscillator operation on the lower frequencies.
14. Turn receiver off. Disconnect.

D. *Low Frequency Oscillator Alignment*

1. Connect receiver to the Alignment and Test Setup shown in figure 4-4-2.
2. Connect the frequency counter to the low frequency oscillator output cable where it connects to the main circuit board. (TP-3) (See figure 4-4-5)
3. Turn the receiver on. Place the NAV/COM switch in the COM position and set the Com .05 MHz selector to .00 MHz.
4. Adjust the slug of T401, the low frequency oscillator tuning coil, counterclockwise 2 or 3 turns then back clockwise just to the point at which the oscillator starts.
5. Check the oscillator output as the .05 MHz frequency selector is advanced through all positions.
6. If on any frequency no oscillator output is indicated readjust the oscillator slug slightly until the oscillator starts. Repeat step 5.
7. Turn receiver off. Disconnect.

E. *Bandpass and Bandstop Filter Alignment*

1. Using either input filter alignment setup I or II (See figure 4-4-3), connect the RF output of the sweep generator to the ALPHA/300 receiver antenna connector.
2. Turn radio off.
3. Connect the high impedance detector to the tap point on L108. (TP-4)
4. Adjust capacitors C100, C102, C104 and C106 for their maximum capacitance. (The slug is about all of the way into the capacitor tube at this point.)
5. Adjust capacitors C107, C109, C111, C113 and C115 for a five-pole response similar to that shown in figure 4-4-6. This should be tuned for a maximum overall amplitude of five poles with only a minor readjustment for shape. The 108 MHz marker should be

on the low frequency edge of the response curve.

6. Connect the high impedance detector to the tap point on L104. (TP-5)
7. Readjust the sweep controls to produce the largest displayed pattern on the oscilloscope.
8. Adjust C106 for a notch just above 88 MHz.
9. Adjust C104, C102, and C100 consecutively to produce four frequency notches from 108 MHz down to 88 MHz. (It is imperative for proper operation of the filter to adjust for maximum stop band attenuation throughout the entire FM band of 88 MHz to 108 MHz as indicated in figure 4-4-7.)
10. Reconnect the high impedance detector to the tap point on L108. (TP-4)
11. A minor readjustment of C100 may be required to keep 108 MHz from appearing too far down the slope of the passband filter waveform. (See figure 4-4-7.)
12. Disconnect.

F. *First IF Alignment*

1. Connect the radio to the Test and Alignment Setup shown in figure 4-4-2.
2. Turn the radio off.
3. Connect the sweep generator to the Nav antenna jack using a 6 db pad.
4. Connect the high impedance detector to the tap on T103. (TP-6)
5. Turn the radio on. Set the NAV-COM Switch to NAV. Set the Nav frequency selectors to 117.9 MHz.
6. Set the sweep generator to sweep from 105 MHz to 119 MHz. Adjust sweep and bandwidth controls on the generator to obtain a bandpass presentation on the oscilloscope. Keep the input signal as low as possible.
7. Adjust the slugs of T100, T101, T102 and T103 (See figure 4-4-4) to obtain a passband waveform of the desired shape, frequency, and bandwidth as shown in figure 4-4-8. Proper bandwidth and frequency can be checked by using a marker generator.
8. Set the NAV/COM Switch to COM. Set the Com frequency selectors to 118.0 MHz. Adjust the sweep generator to sweep the frequencies from 117 MHz to 137 MHz.
9. Connect the high impedance detector to the tap on T107. (TP-7)
10. Adjust the slugs of T104, T105, T106 and T107 (See figure 4-4-4) to obtain a passband waveform of the desired shape, frequency, and bandwidth as shown in figure 4-4-9. Proper bandwidth and frequency can be checked by using a marker generator.

G. *4 MHz IF Alignment*

1. Connect the receiver to the Test and Alignment Setup shown in figure 4-4-2.
2. Connect an oscilloscope to the receiver detector using the isolation network shown in figure 4-4-13. (TP-8)
3. Using a .1 Mfd capacitor couple the output of the sweep generator into the base of Q104. (TP-9)
4. Connect the Omni/Localizer Simulator to the Nav antenna jack. Set the simulator up on a crystal controlled Omni frequency between 110 MHz and 117 MHz. Reduce all modulation to zero.
5. Turn on the receiver. Set the NAV/COM Switch to NAV. Tune the radio to the frequency selected in step 4.
6. Adjust the sweep generator frequency, width, and output controls for a bandpass presentation on the oscilloscope. Maintain the output well below clipping as indicated on the scope. The output level of the simulator should be adjusted to provide a marker for center band. Adjust T108 through T115 for the pattern shown in figure 4-4-10. Do not make large adjustments of any one core, 1/8 turn at a time is recommended. Several repeated adjustments of all 8 transformers will generally be required before the bandpass is correct. Any attempt to align this IF strip by "peaking" or tuning it for a single peak response will seriously degrade the performance of the receiver. The bandpass MUST be similar to that shown in figure 4-4-10 and 4-4-11 or the alignment is not correct.
7. Set the NAV/COM Switch to COM. The bandpass shape should remain approximately the same. A slight adjustment in the bandpass shape may be necessary if the shape changes radically from NAV to COM. In this case, the shape of the bandpass in NAV is more important than in COM and if a compromise is necessary it should be biased toward a proper shape in NAV.

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H. *Localizer Alignment*

1. Connect the receiver to the Alignment and Test Setup shown in figure 4-4-2.
2. Set the Omni/Localizer Simulator to a convenient Localizer frequency. Do not use an Omni frequency.
3. Adjust the RF output of the simulator to 500 microvolts. Set the modulation control for a centering signal. Adjust the modulation of the carrier to the proper level.
4. Turn the receiver on. Set the NAV/COM Switch to NAV. Tune the radio to the frequency selected in step 2. The "TO" lamp shall light.
5. Adjust R226, Localizer Balance, for a centered meter.
6. Set the modulation control on the generator to + 4 db. The meter should deflect approximately to the edge of the blue color band. There is no adjustment for deflection sensitivity. A deflection within 1/8" to 1/4" of the color band edge is considered normal.
7. Set the modulation control on the generator to —4 db. The meter should deflect approximately to the edge of the yellow color band. The same tolerances apply as in step 6.

I. *Omni Alignment*

1. Connect the receiver to the Test and Alignment Set-up shown in figure 4-4-2.
2. Set the Omni/Localizer Simulator to a convenient Omni frequency. Do not use a Localizer frequency. Adjust the RF output to 500 microvolts. Set the course selector for Omni modulation at 90°. Adjust the modulation of the carrier to the proper level.
3. Connect an ohmmeter between the brown and orange leads from the OBS potentiometer, R190. (See figure 4-6-1.) Set the ohmmeter to R.1. Adjust the OBS control for a minimum resistance reading. The resistance will be less than 10 ohms. The minimum should occur within 1/2 degree of 90° indicated on the OBS dial. If it is further off than this, loosen the set screw in the collar of the OBS drum and set the dial to 90° with a minimum resistance reading on the ohmmeter. Tighten the set screw. Disconnect the ohmmeter.
4. Turn on the receiver. Set the NAV/COM Switch to NAV. Tune the radio to the frequency selected in step 2. Set the OBS dial on the receiver to 90°.
5. Delete the 9960 Hz modulation of the carrier. Adjust R191, AM BALANCE, for a centered meter. (See figure 4-4-4.)
6. Delete the 30 Hz modulation from the carrier and apply the 9960 Hz modulation. Adjust R215, FM BALANCE, for a centered meter.
7. Rotate the OBS dial on the receiver to 270°. Readjust the FM BALANCE control for 1/2 of the indicated error if any.
8. Apply both 30 Hz and 9960 Hz modulation to the carrier. Set the receiver OBS dial to 90°. Adjust R209, PHASE CORRECT, for a centered meter. The "TO" light should be on.
9. Set the simulator course selector to 270°. Readjust the PHASE CORRECT control for 1/2 of the indicated error if any. The "FROM" light should be on.
10. Set the simulator course selector and the receiver OBS dial to 0°. Adjust R186, PHASE SHIFT, for a centered meter. The "TO" light should be on.
11. Set the simulator course selector to 180°. Readjust the PHASE SHIFT control for 1/2 of the indicated error if any. The "FROM" light should be on.
12. Check the accuracy of the Omni at the cardinal points. The accuracy should be within 2°. An error greater than this at any one point can be reduced by "trimming" the PHASE SHIFT or PHASE CORRECT controls.

J. *Omni Test Alignment*

1. With the receiver connected to the Omni alignment setup adjust the Omni signal generator to produce a 500 microvolt 90° Omni signal.
2. Adjust the OBS to the 0° position.
3. Depress the Omni test knob and adjust R210, OMNI TEST, to center the course deviation indicator.
4. Turn radio off. Disconnect.

K. *Ident Filter Alignment*

1. Connect the unit to the Alignment and Test Setup shown in figure 4-4-2. Connect the AC voltmeter or the oscilloscope to the audio output terminals. The audio output should be fed in addition to either a speaker or a speaker load resistor.

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2. Connect the RF generator to the receiver antenna jack and adjust the generator to produce a 500 microvolt signal on the same frequency as that selected on the receiver. The NAV/COM Switch must be in the position which corresponds to the frequency selected.
3. Apply a 1020 Hz signal to the RF generator in order to amplitude modulate the generator RF output.
4. Increase the volume using the volume control on the ALPHA/300 until around 2 volts rms of audio is indicated or audio is visible on the oscilloscope. Do not open the volume control so far that squaring of the audio waveform takes place.
5. Adjust R154 for minimum audio output.
6. Turn radio off. Disconnect.

L. *Exciter—Transmitter Alignment*

a. *Mixer and Switched Amplifier Filters*

CAUTION: The 3-pole filter of the balanced mixer and the switched amplifier filters have been prealigned at the factory. It should not be necessary to readjust this filter unless the components of the *filter itself* are damaged or replaced. It is highly recommended that alignment or repair of these filters be done at the factory.

1. Remove the exciter-transmitter assembly from the radio as described in Sub-Section 4-6 but do not disconnect coaxial cables or leads from feedthroughs.
2. Disconnect the exciter high frequency oscillator input cable (longest cable) where it connects to the main circuit board.
3. Unsolder and remove the black lead supplying 8.5 VDC to C510 on the high frequency oscillator.
4. Disconnect the modulated A+ lead from the junction of CR601 and R634 (33 ohm 2W) located on the main circuit board below the exciter-transmitter assembly. See figure 4-5-23.
5. Remove exciter-transmitter assembly cover panels.
6. Unsolder and remove C619 and C620. Replace cover panels.
7. Connect the exciter-transmitter to the alignment setup shown in figure 4-4-16.
8. Set sweep generator to sweep at least 136 MHz to 161 MHz and preferably wider.
9. Set the Com .05 MHz dial to .5 MHz.
10. Turn on radio and adjust power supply to 14 VDC.
11. Adjust T601, C610, C614, and C616 for the bandshape as shown in figure 4-4-18. The low band marker is at 118.0 MHz and the center band marker is at 127.95 MHz.

CAUTION: *DO NOT* adjust T602. The proper adjustment of this transformer requires the use of a spectrum analyzer. Return to the factory for adjustment.

12. Turn radio off.
13. Remove bottom cover panel and reconnect sweep generator to base of Q604.
14. Reconnect high impedance detector to the base of Q606.
15. Turn the radio on and set the Com MHz dial to 127 MHz.
16. Adjust C628, C645, and C647 for the passband shown in figure 4-4-19.
17. Turn radio off. Disconnect sweep generator and reconnect to the base of Q605.
18. Set the Com MHz dial to 128 MHz and turn the radio on.
19. Adjust C635, C638, and C641 for the passband shown in figure 4-4-20.
20. Turn radio off.
21. Disconnect sweep generator and replace C619 and C620.
22. Reconnect the sweep generator to the high frequency input of the exciter-transmitter.
23. Turn on radio and observe the passbands. Switch the Com MHz dial between 127 and 128 MHz. The two passbands should switch with slight overlaps.

b. *RF Power Alignment*

1. Connect the modulated A+ lead back to the junction of CR601 and R634 on the main circuit board.
2. Using a series of attenuators, connect 30 db of attenuation between the transmitter output and the 50 ohm detector. The sweep generator should still be connected to the exciter high frequency input.
3. Connect the oscilloscope vertical input to the 50 ohm detector and the horizontal input to

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the sweep generator horizontal output.

4. Set the Com .05 MHz dial to .5 MHz.
5. Turn on the radio and readjust the power supply, if necessary, to 14 VDC.
6. Key the transmitter.
7. Adjust C668 full clockwise and do not change.
8. Switch the low band filter in by putting the Com MHz dial on 127 MHz.
9. Adjust C658, C659, C666, C667, and L610 to give a passband as shown in figure 4-4-21. The low band marker is 118.0 MHz, center at 122.9 MHz, and high at 127.95. Several repeated adjustments are generally required to give proper band shape.
10. Set the Com MHz switch to 128 MHz. Adjust C658, C659, C666, C667, and L610 to give a passband shape similar to that of figure 4-4-22. The low band marker is at 128.0 MHz, mid-band at 132.5 MHz and high band at 135.95 MHz. Once the upper band pass looks proper, switch the filters back and forth between 127 and 128 MHz. Slight readjustments of C658, C659, C666, and C667 may be required to achieve a uniform pass band in both filter positions.
11. Disconnect sweep generator and reconnect exciter—transmitter high frequency input to the main circuit board. Reconnect the black lead supplying 8.5 VDC to C510 on the high frequency oscillator.
12. Connect a frequency counter to the 50 ohm detector.
13. Check the power output from 118.0 to 135.95 MHz. The indicated power shall be greater than 2 watts on all frequencies in this range.
14. Disconnect the radio from the alignment setup.
15. Replace and secure the exciter-transmitter assembly as described in Sub-Section 4-6.

SECTION V

ALPHA/300 PARTS LIST

Ref. No.	Genave Part No.	DESCRIPTION
		CAPACITORS
C100	1570004	Trimmer, 0.8—6 pfd
C101	1520011	NPO Disc, 22 pfd ±10%
C102	1570004	Trimmer, 0.8—6 pfd
C103	1520011	NPO Disc, 22 pfd ±10%
C104	1570004	Trimmer, 0.8—6 pfd
C105	1520011	NPO Disc, 22 pfd±10%
C106	1570004	Trimmer, 0.8—6 pfd
C107	1570004	Trimmer, 0.8—6 pfd
C108	1510009	NPO Gimmick, 0.68 pfd ±10%
C109	1570004	Trimmer, 0.8—6 pfd
C110	1510009	NPO Gimmick, 0.68 pfd ±10%
C111	1570004	Trimmer, 0.8—6 pfd
C112	1510008	NPO Gimmick, 0.56 pfd ±10%
C113	1570004	Trimmer, 0.8—6 pfd
C114	1510011	NPO Gimmick, 1.0 pfd ±10%
C115	1570004	Trimmer, 0.5—3 pfd
C116	1520033	Z5F Disc, 220 pfd ±10%
C117	1520001	NPO Disc, 2.2 pfd ±10%
C118	1520059	Disc, 0.1 Mfd +80—20%
C119	1520048	Z5P Disc, .001 Mfd ±10%
C120	1520059	Disc, 0.1 Mfd +80—20%
C121	1520048	Z5P Disc, .001 Mfd ±10%
C122	1510017	NPO Gimmick, 2.2 pfd ±10%
C123	1520048	Z5P Disc, .001 Mfd ±10%
C124	1520048	Z5P Disc, .001 Mfd ±10%
C125	1520059	Disc, .1 Mfd +80—20%
C126	1520015	NPO Gimmick, 2.2 pfd ±10%
C127	1520001	NPO Disc, 2.2 pfd ±10%
C128	1520033	Z5F Disc, 220 pfd ±10%
C129	1520048	Z5P Disc, .001 Mfd ±10%
C130	1520059	Disc, .1 Mfd +80—20%
C131	1520059	Disc, .1 Mfd +80—20%
C132	1510048	X5R Disc, .001 Mfd ±10%
C133	1520017	NPO Gimmick, 3.3 pfd ±10%
C134	1520048	Z5P Disc, .001 Mfd ±10%
C135	1520048	Z5P Disc, .001 Mfd ±10%
C136	1510059	Disc, .1 Mfd +80—20%
C137	1520017	NPO Gimmick, 3.3 pfd ±10%
C138	1520021	NPO Disc, 82 pfd ±10%
C139	1520059	Disc, .1 Mfd +80—20%
C140	1520059	Disc, .1 Mfd +80—20%
C141	1520059	Disc, .1 Mfd +80—20%
C142	1520018	N220 Dics, 56 pfd ±10%
C143	1520018	N220 Disc, 56 pfd ±10%
C144	1520011	NPO Disc, 22 pfd ±10%
C145	1520059	Disc, .1 Mfd +80—20%
C146	1520059	Disc, .1 Mfd +80—20%
C147	1520059	Disc, .1 Mfd +80—20%
C148	1520018	N220 Disc, 56 pfd ±10%
C149	1520018	N220 Disc, 56 pfd ±10%
C150	1520011	NPO Disc, 22 pfd ±10%
C151	1520059	Disc, .1 Mfd +80—20%
C152	1520059	Disc, .1 Mfd +80—20%
C153	1520059	Disc, .1 Mfd +80—20%
C154	1520018	N220 Disc, 56 pfd ±10%
C155	1520018	N220 Disc, 56 pfd ±10%
C156	1520059	Disc, .1 Mfd +80—20%
C157	1520059	Disc, .1 Mfd +80—20%
C158	1520018	N220 Disc, 56 pfd ±10%
C159	1520018	N200 Disc, 56 pfd ±10%
C160	1520011	NPO Disc, 22 pfd ±10%
C161	1540021	Aluminum Electrolytic, 64 Mfd, 4 VDC
C162	1520024	N1500 Disc, 100 pfd ±10%
C163	1520050	Disc, .003 Mfd +80—20%, 12VDC
C164	1540005	Aluminum Electrolytic, 2.5 Mfd, 10 VDC
C165	1520059	Disc, .01 Mfd ±20%, 25V
C166	1540021	Aluminum Electrolytic, 64 Ffd, 4 VDC
C167	1520048	Z5P Disc, .001 Mfd ±10%
C168	1500044	Metal Mylar, 1 Mfd, 50 VDC
C169	1500044	Metal Mylar, 1 Mfd, 50 VDC
C170	1520057	Disc, .22 Mfd, +80—20%
C171	1500024	Mylar, .022 Mfd ±10%, 100V
C172	1500024	Mylar, .022 Mfd ±10%, 100V
C173	1500024	Mylar, .022 Mfd ±10%, 100V
C174	1520048	Z5P Disc, .001 Mfd ±10%
C175	1520048	Z5P Disc, .001 Mfd ±10%
C176	1500014	Mylar, .0056 Mfd ±10%
C177		Z5F Disc, 220 pfd ±10%
C178	1520033	Aluminum Elecrolytic, 64 Mfd, 4 VDC
C179	1550005	Aluminum Electrolytic, 2.5 Mfd, 16 VDC
C180	1520051	Disc, .01 Mfd ±20%, 25 VDC
C181	1540023	Aluminum Electrolytic, 125 Mfd, 16 VDC
C182	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C183	1520048	X5R Disc, .001 Mfd ±10%
C184	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C185	1520048	Z5P Disc, .001 Mfd ±10%
C186	1500032	Metal Film, .1 Mfd, 10 VDC
C187	1520048	X5R Disc, .001 Mfd, ±10%
C188	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C189	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C190	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C191		Selected
C192	1500013	Mylar, .0047 Mfd ±10%, 100 VDC
C193	1500010	Mylar, .0033 Mfd ±10%, 100 VDC
C194	1520029	N1500 Disc, 150 pfd ±10%
C195	1500014	Mylar, .0056 Mfd ±10%, 100 VDC
C196	1500005	Mylar, .0015 Mfd ±10%, 100 VDC
C197	1520024	N1500 Disc, 100 pfd ±10%
C198	1500035	Mylar, .1 Mfd ±10%, 100 VDC
C199	1500025	Mylar, .033 Mfd ±10%, 100 VDC
C200	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C201	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C202	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C203	1500016	Mylar, .0068 Mfd ±10%, 100 VDC
C204	1500025	Mylar, .033 Mfd ±10%, 100 VDC
C205	1500016	Mylar, .0068 Mfd ±10%, 100 VDC
C206	1500025	Mylar, .033 Mfd ±10%, 100 VDC
C207	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C208	1500008	Mylar, .0022 Mfd ±10%, 100 VDC
C209	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C210	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C211	1500017	Mylar, .0082 Mfd ±10%, 100 VDC
C212	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C213	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C214	1500017	Mylar, .0082 Mfd ±10%, 100 VDC
C215	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C216	1540043	Aluminum Electrolytic, 1500 Mfd, 1V
C217	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C218	1500035	Mylar, .1 Mfd ±10%, 100 VDC
C219	1500035	Mylar, .1 Mfd ±10%, 100 VDC
C220	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C221	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C222	1500037	Mylar, .22 Mfd ±10%, 100 VDC
C223	1520048	Z5P Disc, .001 Mfd ± 10%
C224	1520048	Z5P Disc, .001 Mfd ±10%
C225	1540021	Aluminum Electrolytic, 64 Mfd ±10%, 4 VDC
C226	1520011	NPO Disc, 22 pfd ±10%
C227	1520048	Z5P Disc, .001 Mfd ±10%
C228	1540003	Aluminum Electrolytic, 1 Mfd ±10%, 40 VDC
C229	1520059	Disc, . Mfd +80—20%
C230	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C231		Unassigned
C232		Unassigned
C401	1520048	Z5P Disc, .001 Mfd ±10%
C402	1520033	Z5F Disc, 220 pfd ±10%
C403	1520061	Feedthrough, .001 Mfd ±10%
C404	1520061	Feedthrough, .001 Mfd ±10%
C405	1520050	Z5F Disc, .003 Mfd ±10%
C406	1520016	N1500 Disc, 47 pfd ±10%
C407	1520061	Feedthrough, .001 Mfd ±10%
C408	1520061	Feedthrough, .001 Mfd ±10%
C409	1520061	Feedthrough, .001 Mfd ±10%
C410	1520061	Feedthrough, .001 Mfd ±10%
C411	1520029	N1500 Disc, 150 pfd ±10%
C412	1520061	Feedthrough, .001 Mfd ±10%
C413	1520029	N1500 Disc, 150 pfd ±10%
C414	1520061	Feedthrough, .001 Mfd ±10%
C415	1520029	N1500 Disc, 150 pfd ±10%
C416	1520061	Feedthrough, .001 Mfd ±10%
C417	1520029	N1500 Disc, 150 pfd ±10%
C418	1520061	Feedthrough, .001 Mfd ±10%
C419	1520061	Feedthrough, .001 Mfd ±10%
C420	1520061	Feedthrough, .001 Mfd ±10%
C421	1520061	Feedthrough, .001 Mfd ±10%
C422	1520061	Feedthrough, .001 Mfd ±10%
C423	1520061	Feedthrough, .001 Mfd ±10%
C424	1520061	Feedthrough, .001 Mfd ±10%
C425	1520061	Feedthrough, .001 Mfd ±10%
C426	1520061	Feedthrough, .001 Mfd ±10%
C427	1520061	Feedthrough, .001 Mfd ±10%
C428	1520061	Feedthrough, .001 Mfd ±10%
C429	1520061	Feedthrough, .001 Mfd ±10%
C430		Unassigned
C501	1520048	Z5P Disc, .001 Mfd ±10%
C502	1520061	Feedthrough, .001 ±10%
C503	1520061	Feedthrough, .001 ±10%
C504	1520061	Feedthrough, .001 ±10%
C505	1520008	NPO Disc, 12 pfd ±10%
C506	1520013	NPO Disc, 33 pfd ±10%
C507	1520010	NPO Disc, 18 pfd ±10%
C508	1520061	Feedthrough, .001 Mfd ±10%
C509	1520061	Feedthrough, .001 Mfd ±10%
C510	1520061	Feedthrough, .001 Mfd ±10%
C511	1520061	Feedthrough, .001 Mfd ±10%
C512	1520061	Feedthrough, .001 Mfd ±10%
C513	1520048	Z5P Disc, .001 Mfd ±10%
C514	1520048	Z5P Disc, .001 Mfd ±10%
C515	1520061	Feedthrough, .001 Mfd ±10%
C516	1570004	Trimmer, .8—6 pfd
C517	1520061	Feedthrough, .001 Mfd ±10%
C518	1510011	Gimmick, 1.0 pfd ±10%
C519	1520061	Feedthrough, .001 Mfd ±10%
C520	1570004	Trimmer, .8—6 pfd

Section V Parts List (Continued)

Ref. No.	Genave Part No.	DESCRIPTION
C521	1520061	Feedthrough, .001 Mfd ±10%
C522	1520061	Feedthrough, .001 Mfd ±10%
C523	1510012	Gimmick, 1.2 pfd ±10%
C524	1520061	Feedthrough, .001 Mfd ±10%
C525	1570004	Trimmer, .8—6 pfd
C526	1520061	Feedthrough, .001 Mfd ±10%
C527	1520061	Feedthrough, .001 Mfd ±10%
C528	1520061	Feedthrough, .001 Mfd ±10%
C529	1520061	Feedthrough, .001 Mfd ±10%
C530	1520061	Feedthrough, .001 Mfd ±10%
C531	1520061	Feedthrough, .001 Mfd ±10%
C532	1520061	Feedthrough, .001 Mfd ±10%
C533	1520061	Feedthrough, .001 Mfd ±10%
C534	1520061	Feedthrough, .001 Mfd ±10%
C535	1520061	Feedthrough, .001 Mfd ±10%
C536	1520061	Feedthrough, .001 Mfd ±10%
C537	1520061	Feedthrough, .001 Mfd ±10%
C538	1520008	NPO Disc, 12 pfd ±10%
C539		Unassigned
C540		Unassigned
C601	1520061	Feedthrough, .001 Mfd ±10%
C602	1520061	Feedthrough, .001 Mfd ±10%
C603	1520033	Z5F Disc, 220 pfd ±10%
C604	1520033	Z5F Disc, 220 pfd ±10%
C605	1520029	Z5F Disc, 150 pfd ±10%
C606	1520029	Z5F Disc, 150 pfd ±10%
C607	1520048	Z5P Disc, .001 Mfd ±10%
C608	1520048	Z5P Disc, .001 Mfd ±10%
C609	1520007	NPO Disc, 10 pfd ±10%
C610	1570004	Trimmer, .8—6 pfd
C611	1510015	Gimmick, 2.2 pfd ±10%
C612	1510015	Gimmick, 2.2 pfd ±10%
C613	1520008	NPO Disc, 12 pfd ±10%
C614	1570004	Trimmer, .8—6 pfd
C615	1570004	Trimmer, .8—6 pfd
C616	1520008	NPO Disc, 18 pfd ±10%
C617	1520033	Z5F Disc, 220 pfd ±10%
C618	1520033	Z5F Disc, 220 pfd ±10%
C619	1520011	NPO Disc, 22 pfd ±10%
C620	1520011	NPO Disc, 22 pfd ±10%
C621	1520061	Feedthrough, .001 Mfd ±10%
C622	1520061	Feedthrough, .001 Mfd ±10%
C623	1520059	Z5F Disc, 220 pfd ±10%
C624	1520061	Feedthrough, .001 Mfd ±10%
C625	1520061	Feedthrough, .001 Mfd ±10%
C626	1520033	Z5F Disc, 220 pfd ±10%
C627	1520010	NPO Disc, 18 pfd ±10%
C628	1570004	Trimmer, .8—6 pfd
C629	1520033	Z5F Disc, 220 pfd ±10%
C630	1520061	Feedthrough, .001 Mfd ±10%
C631	1520061	Feedthrough, .001 Mfd ±10%
C632	1520033	Z5F Disc, 220 pfd ±10%
C633	1520033	Z5F Disc, 220 pfd ±10%
C634	1520008	NPO Disc, 12 pfd ±10%
C635	1570004	Trimmer, .8—6 pfd
C636	1520008	NPO Disc, 12 pfd ±10%
C637	1510013	Gimmick, 1.8 pfd ±10%
C638	1570004	Trimmer, .8—6 pfd
C639	1510013	Gimmick, 1.5 pfd ±10%
C640	1520010	NPO Disc, 18 pfd ±10%
C641	1570004	Trimmer, .8—6 pfd
C642	1510014	Gimmick, 1.8 pfd ±10%
C643	1510014	Gimmick, 1.5 pfd ±10%
C644	1520009	NPO Disc, 15 pfd ±10%
C645	1570004	Trimmer, .8—6 pfd
C646	1520010	NPO Disc, 18 pfd ±10%
C647	1570004	Trimmer, .8—6 pfd
C648	1520004	NPO Disc, 4.7 pfd ±10%
C649	1520011	NPO Disc, 22 pfd ±10%
C650	1520033	Z5F Disc, 220 pfd ±10%
C651	1520033	Z5FDisc, 220 pfd ±10%
C652		Unassigned
C653	1520009	NPO Disc, 15 pfd ±10%
C654	1520061	Feedthrough, .001 Mfd ±10%
C655	1520054	Z5F Disc, .05 Mfd ±10%
C656	1520033	Z5F Disc, 220 pfd ±10%
C657	1520033	Z5F Disc, 220 pfd ±10%
C658	1560004	Variable, 53—300 pfd
C659	1560003	Variable, 24—200 pfd
C660	1520054	Z5F Disc, .05 Mfd ±10%
C661	1520061	Feedthrough, .001 Mfd ±10%
C662	1520033	Z5F Disc, 220 pfd ±10%
C663	1520054	Z5F Disc, .05 Mfd ±10%
C664	1520061	Feedthrough, .001 Mfd ±10%
C665	1520033	Z5F Disc, 220 pfd ±10%
C666	1560003	Variable, 24—200 pfd
C667	1560003	Variable, 24—200 pfd
C668	1560002	Variable, 7—100 pfd
C669	1560002	Variable, 7—100 pfd
C670	1520010	NPO Disc, 18 pfd ±10%
C671	1520013	NPO Disc, 33 pfd ±10%
C672	1520013	NPO Disc, 33 pfd ±10%
C673	1520061	Feedthrough, .001 Mfd ±10%
C674	1520033	Z5F Disc, 220 pfd ±10%
C675	1520061	Feedthrough, .001 Mfd ±70%
C676	1520033	Z5F Disc, .05 Mfd ±10%
C677		Unassigned
C678		Unassigned

DIODES

Ref. No.	Genave Part No.	DESCRIPTION
CR101	4810021	Germanium, General Purpose, IN34A
CR102	4810017	Silicon, High Frequency Switching, FD 1936
CR103	4810017	Silicon, High Frequency Switching, FD 1936
CR104	4810017	Silicon, High Frequency Switching, FD 1936
CR105	4810001	Silicon, General Purpose, 100 V., 0.75A, TS-1
CR106	4810011	Zener, 24 V., 1 W.
CR107	4810011	Zener, 24 V., 1 W.
CR108	4810006	Zener, 5.6 V., 1 W.
CR109	4810017	Silicon, High Frequency Switching, FD 1936
CR110	4810017	Silicon, High Frequency Switching, FD 1936
CR111	4810017	Silicon, High Frequency Switching, FD 1936
CR112	4810017	Silicon, High Frequency Switching, FD 1936
CR113	4810021	Germanium, General Purpose, IN34A
CR114	4810021	Germanium, General Purpose, IN34A
CR115	4810021	Germanium, General Purpose, IN34A
CR116	4810017	Silicon, High Frequency Switching, FD 1936
CR117	4810017	Silicon, High Frequency Switching, FD 1936
CR118	4810017	Silicon, High Frequency Switching, FD 1936
CR119	4810017	Silicon, High Frequency Switching, FD 1936
CR120	4810017	Silicon, High Frequency Switching, FD 1936
CR121		Unassigned
CR122		Unassigned
CR401	4810017	Silicon, High Frequency Switching, FD 1936
CR402	4810017	Silicon, High Frequency Switching, FD 1936
CR403	4810017	Silicon, High Frequency Switching, FD 1936
CR404	4810017	Silicon, High Frequency Switching, FD 1936
CR405	4810017	Silicon, High Frequency Switching, FD 1936
CR406	4810017	Silicon, High Frequency Switching, FD 1936
CR407	4810017	Silicon, High Frequency Switching, FD 1936
CR408	4810017	Silicon, High Frequency Switching, FD 1936
CR409	4810017	Silicon, High Frequency Switching, FD 1936
CR410	4810017	Silicon, High Frequency Switching, FD 1936
CR411	4810017	Silicon, High Frequency Switching, FD 1936
CR412	4810017	Silicon, High Frequency Switching, FD 1936
CR413	4810017	Silicon, High Frequency Switching, FD 1936
CR414	4810017	Silicon, High Frequency Switching, FD 1936
CR415	4810017	Silicon, High Frequency Switching, FD 1936
CR416	4810017	Silicon, High Frequency Switching, FD 1936
CR417	4810017	Silicon, High Frequency Switching, FD 1936
CR418	4810017	Silicon, High Frequency Switching, FD 1936
CR419	4810017	Silicon, High Frequency Switching, FD 1936
CR420	4810017	Silicon, High Frequency Switching, FD 1936
CR421		Unassigned
CR422		Unassigned
CR501	4810017	Silicon, High Frequency Switching, FD 1936
CR502	4810017	Silicon, High Frequency Switching, FD 1936
CR503	4810017	Silicon, High Frequency Switching, FD 1936
CR504	4810017	Silicon, High Frequency Switching, FD 1936
CR505	4810017	Silicon, High Frequency Switching, FD 1936
CR506	4810017	Silicon, High Frequency Switching, FD 1936
CR507	4810017	Silicon, High Frequency Switching, FD 1936
CR508	4810017	Silicon, High Frequency Switching, FD 1936
CR509	4810017	Silicon, High Frequency Switching, FD 1936
CR510	4810017	Silicon, High Frequency Switching, FD 1936
CR511	4810017	Silicon, High Frequency Switching, FD 1936
CR512	4810017	Silicon, High Frequency Switching, FD 1936
CR513	4810017	Silicon, High Frequency Switching, FD 1936
CR514	4810017	Silicon, High Frequency Switching, FD 1936
CR515	4810017	Silicon, High Frequency Switching, FD 1936
CR516	4810017	Silicon, High Frequency Switching, FD 1936
CR517	4810017	Silicon, High Frequency Switching, FD 1936
CR518	4810017	Silicon, High Frequency Switching, FD 1936
CR519	4810017	Silicon, High Frequency Switching, FD 1936
CR520	4810017	Silicon, High Frequency Switching, FD 1936
CR521	4810017	Silicon, High Frequency Switching, FD 1936
CR522	4810017	Silicon, High Frequency Switching, FD 1936
CR523	4810017	Silicon, High Frequency Switching, FD 1936
CR524	4810017	Silicon, High Frequency Switching, FD 1936
CR525		Unassigned
CR526		Unassigned
CR601	4810001	Silicon, General Purpose, 100 V., 0.75A, TS-1

LAMPS

Ref. No.	Genave Part No.	DESCRIPTION
DS101	3900004	Clear, 14 V, 80 Ma, 50,000 Hr.
DS102	3900004	Clear, 14 V, 80 Ma, 50,000 Hr.
DS103	3900004	Clear, 14 V, 80 Ma, 50,000 Hr.
DS104	3900006	Green, 14 V, 80 Ma., 50,000 Hr.
DS105	3900005	Red, 14 V, 80 Ma, 50,000 Hr.
DS106	3900007	Amber. 14 V, 80 Ma, 50,000 Hr.

COILS

Ref. No.	Genave Part No.	DESCRIPTION
L100	1800017	Coil, Bandstop Filter
L101	1800017	Coil, Bandstop Filter
L102	1800017	Coil, Bandstop Filter
L103	1800017	Coil, Bandstop Filter
L104	1800024	Coil, Input Filter
L105	1800009	Coil, Input Filter
L106	1800009	Coil, Input Filter
L107	1800009	Coil, Input Filter
L108	1800044	Coil, Input Filter
L109	1800029	50 MHy ±10%
L110	1800033	50 MHy
L401		Unassigned
L402		Unassigned
L403	1800045	Coil, LF Filter
L404	1800045	Coil, LF Filter
L405	1800045	Coil, LF Filter
L406	1800006	Coil, LF Filter
L501	1800047	Coil, HF Oscillator
L502	1800050	Coil, HF Doubler
L503	1800049	Coil, HF Oscillator

Section V Parts List (Continued)

Ref. No.	Genave Part No.	DESCRIPTION
L504	1800050	Coil, HF Doubler
L505	1800052	Coil, HF Doubler
L601	1800012	Coil, Exciter Filter
L602	1800011	Coil, Exciter Filter
L603	1800012	Coil, Exciter Filter
L604	1800012	Coil, Exciter Filter
L605	1800012	Coil, Exciter Filter
L606	1800011	Coil, Exciter Filter
L607	1800012	Coil, Exciter Filter
L608	1800011	Coil, Exciter Filter
L609	1800008	Coil, Exciter Output
L610	1800055	Coil, Exciter Tuning
L611	1800054	Coil, Matching
L612		Unassigned
L613	1800019	Coil, Matching
L614	1800012	Coil, Transmitter Filter
L615	1800018	Coil, Transmitter Filter
L616	1800012	Coil, Transmitter Filter
L617		Unassigned
L618		Unassigned
		TRANSISTORS
Q100	4800024	Silicon, NPN, Blue, MPS 3563
Q101	4800024	Silicon, NPN, Blue, MPS 3563
Q102	4800024	Silicon, NPN, Blue, MPS 3563
Q103	4800024	Silicon, NPN, Blue, MPS 3563
Q104	4800026	Silicon, NPN, White, MPS 3693
Q105	4800026	Silicon, NPN, White, MPS 3693
Q106	4800026	Silicon, NPN, White, MPS 3693
Q107	4800026	Silicon, NPN, White, MPS 3693
Q108	4800029	Silicon, NPN, Orange, MPS 6514 S
Q109	4800008	Silicon, PNP, Black, 2N5086
Q110	4800008	Silicon, PNP, Black, 2N5086
Q111	4800029	Silicon, NPN, Orange, MPS 6514 S
Q112	4800029	Silicon, NPN, Orange, MPS 6514 S
Q113	4800002	Silicon, NPN, MPS 6531
Q114	4800001	Silicon, NPN, 2N3055
Q115	4800022	Silicon, PNP, MPS U51
Q116	4800029	Silicon, NPN, Orange, MPS 6514 S
Q117	4800029	Silicon, NPN, Orange, MPS 6514 S
Q118	4800008	Silicon, NPN, Red, MPS 6513 S
Q119	4800028	Silicon, NPN, Orange, MPS 6514 S
Q120	4800008	Silicon, PNP, Black, 2N5086
Q121	4800028	Silicon, NPN, Red, MPS 6513 S
Q122	4800008	Silicon, PNP, Black, 2N5086
Q123	4800008	Silicon, PNP, Black, 2N5086
Q124	4800008	Silicon, PNP, Black, 2N5086
Q125	4800008	Silicon, PNP, Black, 2N5086
Q126	4800008	Silicon, PNP, Black, 2N5086
Q127	4800008	Silicon, PNP, Black, 2N5086
Q128	4800008	Silicon, PNP, Black, 2N5086
Q129	4800008	Silicon, NPN, Red, MPS 6514 S
Q130	4800008	Silicon, PNP, Black, 2N5086
Q131	4800008	Silicon, PNP, Black, 2N5086
Q132	4800008	Silicon, PNP, Black, 2N5086
Q133	4800028	Silicon, NPN, Red, MPS 6514 S
Q134	4800008	Silicon, PNP, Black, 2N5086
Q135	4800028	Silicon, NPN, Red, MPS 6514 S
Q136	4800008	Silicon, PNP, Black. 2N5086
Q137	4800028	Silicon, NPN, Red, MPS 6514 S
Q138	4800008	Silicon, PNP, Black, 2N5086
Q139	4800008	Silicon, PNP, Black, 2N5086
Q140	4800008	Silicon, PNP, Black, 2N5086
Q141	4800008	Silicon, PNP, Black, 2N5086
Q142	4800008	Silicon, PNP, Black, 2N5086
Q143	4800029	Silicon, NPN, Orange, MPS 6514 S
Q144	4800008	Silicon, PNP, Black, 2N5086
Q145	4800008	Silicon, PNP, Black, 2N5086
Q146	4800008	Silicon, PNP, Black, 2N5086
Q147	4800040	Silicon, NPN, 39940
Q148	4800040	Silicon, NPN, 39940
Q149	4800040	Silicon, NPN, 39940
Q150	4800008	Silicon, PNP, Black, 2N5086
Q151	4800008	Silicon, PNP, Black, 2N5086
Q152		Unassigned
Q401	4800024	Silicon, NPN, Blue, MPS 3563
Q402		Unassigned
Q501	4800024	Silicon, NPN, Blue, MPS 3563
Q502	4800024	Silicon, NPN, Blue, MPS 3563
Q503	4800024	Silicon, NPN, Blue, MPS 3563
Q504		Unassigned
Q601	4800031	Silicon, NPN, Yellow
Q602	4800031	Silicon, NPN, Yellow
Q603	4800024	Silicon, NPN, Blue, MPS 3563
Q604	4800024	Silicon, NPN, Blue, MPS 3563
Q605	4800024	Silicon, NPN, Blue, MPS 3563
Q606	4800024	Silicon, NPN, Blue, MPS 3563
Q607	4800036	Silicon, NPN, PT 4133 A
Q608	4800039	Silicon, NPN, 38817
Q609	4800039	Silicon, NPN, 38817
Q610		Unassigned
		RESISTORS
R100	4700037	10K ±10%, ½ W
R101	4700033	4.7K ±10%, ½ W
R102	4700025	1K ±10%, ½ W
R103	4700036	8.2K ±10%, ½ W
R104	4700017	220 Ohm ±10%, ½ W
R105	4700012	82 Ohm ±10%, ½ W
R106	4700025	1K ±10%, ½ W
R107		Unassigned
R108	4700017	220 Ohm ±10%, ½ W
R109	4700036	8.2K ±10%, ½ W
R110	4700017	220 Ohm ±10%, ½ W
R111	4700003	10 Ohm ±10%, ½ W
R112	4700033	4.7K ±10%, ½ W
R113	4700025	1K ±10%, ½ W
R114	4700036	8.2K ±10%, ½ W
R115	4700017	220 Ohm ±10%, ½ W
R116	4700012	82 Ohm ±10%, ½ W
R117	4700025	1K ±10%, ½ W
R118		Unassigned
R119	4700017	220 Ohm ±10%, ½ W
R120	4700036	8.2K ±10%, ½ W
R121	4700017	220 Ohm ±10%, ½ W
R122	4700003	10 Ohm ±10%, ½ W
R123	4700022	82 Ohm ±10%, ½ W
R124	4700025	1K ±10%, ½ W
R125	4700033	4.7K ±10%, ½ W
R126	4700017	220 Ohm ±10%, ½ W
R127	4700017	220 Ohm ±10%, ½ W
R128	4700025	1K ±10%, ½ W
R129	4700017	220 Ohm ±10%, ½ W
R130	4700017	220 Ohm ±10%, ½ W
R131	4700003	10 Ohm ±10%, ½ W
R132	4700025	1K ±10%, ½ W
R133	4700029	2.2K ±10%, ½ W
R134	4700017	220 Ohm ±10%, ½ W
R135	4700017	220 Ohm ±10%, ½ W
R136	4700025	1K ±10%, ½ W
R137	4700029	2.2K ±10%, ½ W
R138	4700017	220 Ohm ±10%, ½ W
R139	4700017	220 Ohm ±10%, ½ W
R140	4700029	2.2K ±10%, ½ W
R141	4700033	4.7K ±10%, ½ W
R142	4700039	15K ±10%, ½ W
R143	4700009	Vol/Off, 25K Potentiometer, with Switch
R144	4700049	100K ±10%, ½ W
R145	4760007	SQ/Ident, 25K Potentiometer, with Switch
R146	4700039	15W ±10% ½ W
R147	4700033	47K ±10%, ½ W
R148	4700037	10K ±10%, ½ W
R149	4700025	1K ±10%, ½ W
R150	4700021	470 Ohm ±10%, ½ W
R151	4700025	1K ±10%, ½ W
R152	4700025	1K ±10%, ½ W
R153	4700029	2.2K ±10%, ½ W
R154	4760005	Potentiometer, 1K ±20%
R155	4700022	560 Ohm ±10%, ½ W
R156	4700041	22K ±10%, ½ W
R157	4700041	22K ±10%, ½ W
R158	4700023	680 Ohm ±10%, ½ W
R159	4700023	10K ±10%, ½ W
R160	4700029	2.2K ±10%, ½ W
R161	4700013	100 Ohm ±10%, ½ W
R162	4700013	100 Ohm ±10%, ½ W
R163	4700053	220K ±10%, ½ W
R164	4700025	1K ±10%, ½ W
R165	4700033	4.7K ±10%, ½ W
R166	4700021	470 Ohm ±10%, ½ W
R167	4740001	.47 Ohm ±10%, 2 W
R168	4700017	220 Ohm ±10%, ½ W
R169	4740003	10 Ohm ±10%, 2 W
R170	4700001	2.2 Ohm ±10%, ½ W
R171	4700017	220 Ohm ±10%, ½ W
R172	4700029	2.2K ±10%, ½ W
R173	4700019	330 Ohm ±10%, ½ W
R174	4700025	1K ±10%, ½ W
R175	4700025	1K ±10%, ½ W
R176	4760005	Potentiometer, 1K ±20%
R177	4700029	2.2K ±10%, ½ W
R178	4700051	150K ±10%, ½ W
R179	4700049	100K ±10%, ½ W
R180	4700053	220K ±10%, ½ W
R181	4720015	464K ±1%, ½ W
R182	4700025	1K ±10%, ½ W
R183	4720002	221 Ohm ±10%, ½ W
R184	4720002	221 Ohm ±10%, ½ W
R185	4720010	47.5K ±1%, ½ W
R186	4760020	Ø Shift, 20K Potentiometer
R187	4700025	1K ±10%, ½ W
R188	4720002	221 Ohm ±10%, ½ W
R189	4720002	221 Ohm ±10%, ½ W
R190	4760010	OBS Pot, 10K
R191	4760020	AM Bal, 20K Potentiometer
R192	4700037	10K ±10%, ½ W
R193	4700049	100K ±10%, ½ W
R194	4700025	1K ±10%, ½ W
R195	4700025	1K ±10%, ½ W
R196	4700033	4.7K ±10%, ½ W
R197	4700049	100K ±10%, ½ W
R198	4700049	100K ±10%, ½ W
R199	4700025	1K ±10%, ½ W
R200	4700025	1K ±10%, ½ W
R201	4700037	10K ±10%, ½ W
R202	4700049	100K ±10%, ½ W
R203	4700049	100K ±10%, ½ W
R204	4700037	10K ±10%, ½ W
R205	4700037	10K ±10%, ½ W
R206	4700037	10K ±10%, ½ W
R207	4700025	1K ±10%, ½ W

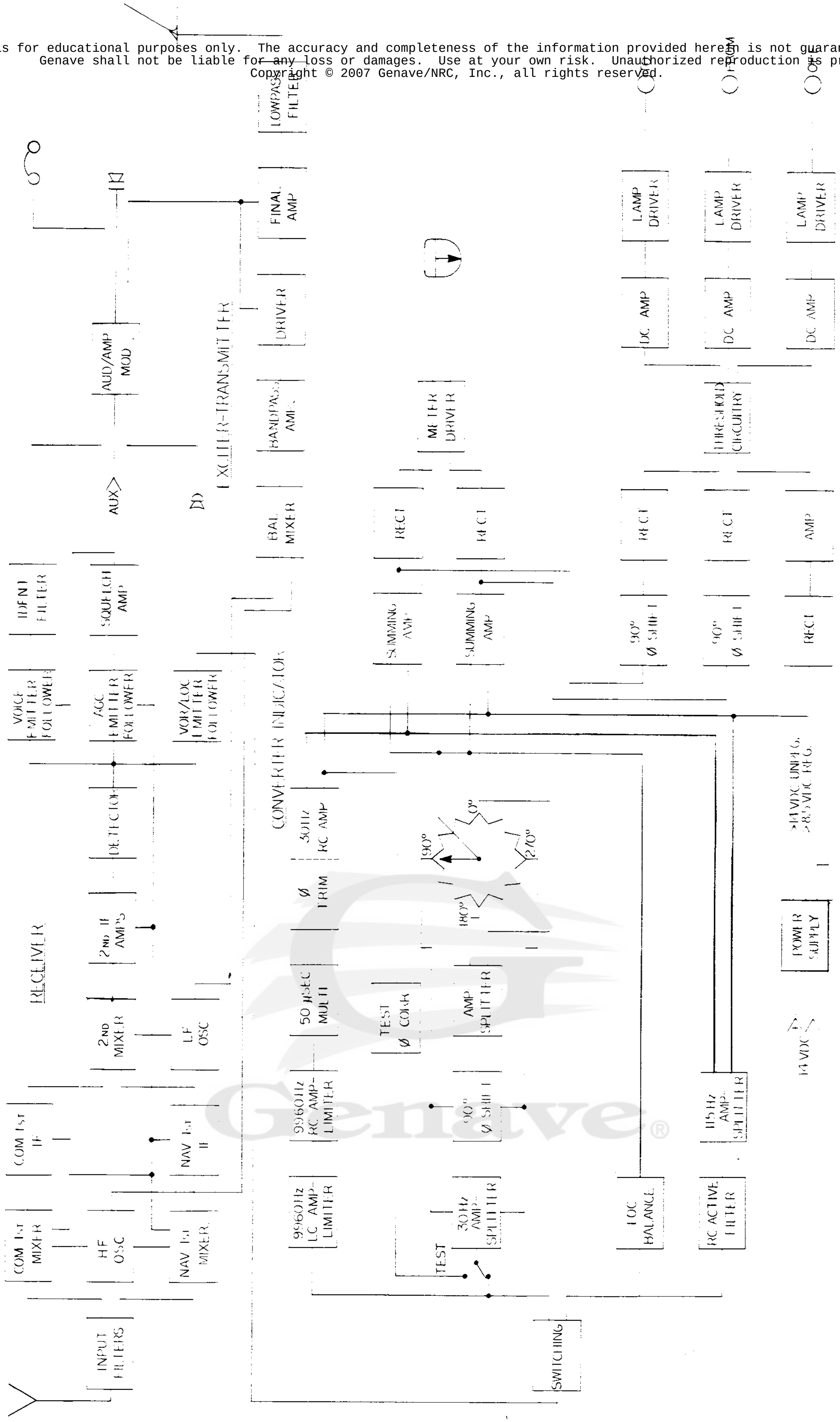
Ref. No.	Genave Part No.	Description
R208	4720010	47.5K ±1%, ½ W
R209	4760021	O Correct, 50K Potentiometer
R210	4760021	Omni Test, 50K Potentiometer
R211	4720005	1K ±1%, ½ W
R212	4700039	15K ±10%, ½ W
R213	4720033	47K ±10%, ½ W
R214	4720005	1K ±1%, ½ W
R215	4760020	FM Bal, 20K Potentiometer
R216	4720015	464K ±1%, ½ W
R217	4700040	18K ±10%, ½ W
R218	4700049	100K ±10%, ½ W
R219	4700037	10K ±10%, ½ W
R220	4700040	18K ±10%, ½ W
R221	4700049	100K ±10%, ½ W
R222	4700037	10K ±10%, ½ W
R223	4700049	100K ±10%, ½ W
R224	4720033	47K ±10%, ½ W
R225	4700039	15K ±10%, ½ W
R226	4760020	Loc. Bal, 20K Potentiometer
R227	4700025	1K ±10%, ½ W
R228	4700057	470K ±10%, ½ W
R229	4700025	1K ±10%, ½ W
R230	4700037	10K ±10%, ½ W
R231	4700013	140K ±1%, ½ W
R232	4720014	150K ±1%, ½ W
R233	4700049	100K ±10%, ½ W
R234	4760006	56.2K ±1%, ½ W
R235	4720015	464K ±1%, ½ W
R236	4700023	680 Ohm ±10%, ½ W
R237	4700037	10K ±10%, ½ W
R238	4700013	140K ±1%, ½ W
R239	4720014	150K ±1%, ½ W
R240	4700049	100K ±10%, ½ W
R241	4720011	56.2K ±1%, ½ W
R242	4720015	464K ±1%, ½ W
R243	4700037	10K ±10%, ½ W
R244	4700023	680 Ohm ±10%, ½ W
R245	4700037	10K ±10%, ½ W
R246	4720002	221 Ohm ±10%, ½ W
R247	4720002	221 Ohm ±10%, ½ W
R248	4720002	221 Ohm ±10%, ½ W
R249	4720002	221 Ohm ±10%, ½ W
R250	4700037	10K ±10%, ½ W
R251	4700045	47K ±10%, ½ W
R252	4700045	47K ±10%, ½ W
R253	4700025	1K ±10%, ½ W
R254	4700037	10K ±10%, ½ W
R255	4700037	10K ±10%, ½ W
R256	4700037	10K ±10%, ½ W
R257	4700037	10K ±10%, ½ W
R258	4700049	100K ±10%, ½ W
R259	4700048	82K ±10%, ½ W
R260	4700031	3.3K ±10%, ½ W
R261	4700037	10K ±10%, ½ W
R262	4700037	10K ±10%, ½ W
R263	4700037	10K ±10%, ½ W
R264	4700048	82K ±10%, ½ W
R265	4700030	2.7K ±10%, ½ W
R266	4700048	82K ±10%, ½ W
R267	4700030	2.7K ±10%, ½ W
R268	4700048	82K ±10%, ½ W
R269	4700030	2.7K ±10%, ½ W
R270	4700048	82K ±10%, ½ W
R271	4700009	47 Ohms ±10%, ½ W
R272	4700009	47 Ohms ±10%, ½ W
R273	4700027	1.5K ±10%, ½ W
R274		Unassigned
R275		Unassigned
R401	4710024	3.9K ±10%, ¼ W
R402	4710021	2.2K ±10%, ¼ W
R403	4710004	22 Ohm ±10%, ¼ W
R404	4710008	100 Ohm ±10%, ¼ W
R405	4710008	100 Ohm ±10%, ¼ W
R406	4710008	100 Ohm ±10%, ¼ W
R407	4710008	100 Ohm ±10%, ¼ W
R408	4710008	100 Ohm ±10%, ¼ W
R409	4710008	100 Ohm ±10%, ¼ W
R410	4710008	100 Ohm ±10%, ¼ W
R411	4710008	100 Ohm ±10%, ¼ W
R412	4710008	100 Ohm ±10%, ¼ W
R413	4710008	100 Ohm ±10%, ¼ W
R414	4710008	100 Ohm ±10%, ¼ W
R415	4710008	100 OHn ±10%, ¼ W
R416	4710008	100 Ohm ±10%, ¼ W
R417	4710008	100 Ohm ±10%, ¼ W
R418	4710008	100 Ohm ±10%, ¼ W
R419	4710008	100 Ohm ±10%, ¼ W
R420	4710008	100 Ohm ±10%, ¼ W
R421	4710008	100 Ohm ±10%, ¼ W
R422	4710008	100 Ohm ±10%, ¼ W
R423	4710008	100 Ohm ±10%, ¼ W
R424		Unassigned
R425		Unassigned
R501	4710021	2.2K ±10%, ¼ W
R502	4710019	1.5K ±10%, ¼ W
R503	4710012	330 Ohm ±10%, ¼ W
R504	4710012	330 Ohm ±10%, ¼ W
R505	4710004	22 Ohm ±10%, ¼ W
R506	4710025	4.7K ±10%, ¼ W
R507	4710016	820 Ohm ±10%, ¼ W
R508	4710012	330 Ohm ±10%, ¼ W
R509	4710005	47 Ohm ±10%, ¼ W
R510	4710008	100 Ohm ±10%, ¼ W
R511	4710012	330 Ohm ±10%, ¼ W
R512	4710012	330 Ohm ±10%, ¼ W
R513	4710012	330 Ohm ±10%, ¼ W
R514	4710012	330 Ohm ±10%, ¼ W
R515	4710012	330 Ohm ±10%, ¼ W
R516	4710012	330 Ohm ±10%, ¼ W
R517	4710012	330 Ohm ±10%, ¼ W
R518	4710012	330 Ohm ±10%, ¼ W
R519	4710012	330 Ohm ±10%, ¼ W
R520	4710012	330 Ohm ±10%, ¼ W
R521	4710012	330 Ohm ±10%, ¼ W
R522	4710012	330 Ohm ±10%, ¼ W
R523	4710012	330 Ohm ±10%, ¼ W
R524	4710012	330 Ohm ±10%, ¼ W
R525	4710012	330 Ohm ±10%, ¼ W
R526	4710012	330 Ohm ±10%, ¼ W
R527	4710012	330 Ohm ±10%, ¼ W
R528	4710012	330 Omh ±10%, ¼ W
R529	4710012	330 Ohm ±10%, ¼ W
R530	4710012	330 Ohm ±10%, ¼ W
R531	4710012	330 Ohm ±10%, ¼ W
R532		Unassigned
R601	4730009	220 Ohms ±10%, 1 W
R602	4700014	120 Ohm ±10%, ½ W
R603	4700017	470 Ohm ±10%, ½ W
R604	4700010	56 Ohm ±10%, ½ W
R605	4710005	47 Ohm ±10%, ¼ W
R606	4700033	4.7K ±10%, ½ W
R607	4700003	10 Ohm ±10%, ½ W
R608	4700025	1K ±10%, ½ W
R609	4700025	1K ±10%, ½ W
R610	4700013	100 Ohm ±10%, ½ W
R611	4700033	4.7K ±10%, ½ W
R612	4700003	10 Ohm ±10%, ½ W
R613	4700025	1K ±10%, ½ W
R614	4710023	3.3K ±10%, ¼ W
R615	4710017	1K ±10%, ¼ W
R616	4710011	220 Ohm ±10%, ¼ W
R617	4710023	3.3K ±10%, ¼ W
R618	4710018	1.2K ±10%, ¼ W
R619	4710011	220 Ohm ±10%, ¼ W
R620	4710011	220 Ohm ±10%, ¼ W
R621	4710025	4.7K ±10%, ¼ W
R622	4710023	3.3K ±10%, ¼ W
R623	4710018	1.2K ±10%, ¼ W
R624	4710011	220 Ohm ±10%, ¼ W
R625	4710011	220 Ohm ±10%, ¼ W
R626	4710025	4.7K ±10%, ¼ W
R627	4710008	100 Ohm ±10%, ¼ W
R628	4710020	1.8K ±10%, ¼ W
R629	4710011	220 Ohm ±10%, ¼ W
R630	4700012	82 Ohm ±10%, ½ W
R631	4700008	100 Ohm ±10%, ½ W
R632	4700030	2.7K ±10%, ½ W
R633	4700009	47 Ohm ±10%, ½ W
R634	4730003	33 Ohms ±10%, 1 W
R635	4700037	10K ±10%, ½ W
R636	4710027	6.8K ±10%, ¼ W
R637	4700003	10 Ohm ±10%, ½ W
R638	4700032	3.9K ±10%, ½ W
R639	4700011	68 Ohms ±10%, 2 W
R640	4700009	47 Ohm ±10%, ½ W
R641	4700009	47 Ohm ±10%, ½ W
R642	4700017	220 Ohm ±10%, ½ W
R643		Unassigned
		SWITCHES
S101	4760009	Off/On, Part of R143
S102	4760007	Ident, Part of R145
SW103	5100020	NAV/COM, Rocker 3PDT
SW104	5100029	Nav Frequency, MHz
SW105	5100030	Nav Frequency, KHz
SW106	5100027	Com Frequency, MHz
SW107	5100028	Com Frequency, KHz
SW108	5100021	Omni Test
		TRANSFORMERS
T100	5600020	Nav IF, 30.5 MHz
T101	5600020	Nav IF, 30.5 MHz
T102	5600020	Nav IF, 30.5 MHz
T103	5600020	Nav IF, 30.5 MHz
T104	5600021	Com IF, 22.5 MHz
T105	5600021	Com IF, 22.5 MHz
T106	5600021	Com IF, 22.5 MHz
T107	5600021	Com IF, 22.5 MHz
T108	5600019	Low IF, 4 MHz
T109	5600019	Low IF, 4 MHz
T110	5600019	Low IF, 4 MHz
T111	5600019	Low IF, 4 MHz
T112	5600019	Low IF, 4 MHz
T113	5600019	Low IF, 4 MHz
T114	5600019	Low IF, 4 MHz
T115	5600019	Low IF, 4 MHz
T116	5600006	Audio Output
T401	5600028	Low Frequency Oscillator
T601	5600024	Balanced Mixer, Input
T602	5600025	Balanced Mixer, Output

Section V Parts List (Continued)

Ref. No.	Genave Part No.	Description
		CRYSTALS
Y401	2300130	26.946 MHz
Y402	2300129	26.896 MHz
Y403	2300128	26.846 MHz
Y404	2300127	26.796 MHz
Y405	2300126	26.746 MHz
Y406	2300125	26.696 MHz
Y407	2300124	26.646 MHz
Y408	2300123	26.596 MHz
Y409	2300122	26.546 MHz
Y410	2300121	26.496 MHz
Y411	2300120	26.446 MHz
Y412	2300119	26.396 MHz
Y413	2300118	26.346 MHz
Y414	2300117	26.296 MHz
Y415	2300116	26.246 MHz
Y416	2300115	26.196 MHz
Y417	2300114	26.146 MHz
Y418	2300113	26.096 MHz
Y419	2300112	26.046 MHz
Y420	2300111	25.996 MHz
Y501	2300131	69.478 MHz
Y502	2300132	69.968 MHz
Y503	2300133	70.473 MHz
Y504	2300134	70.973 MHz
Y505	2300135	71.473 MHz
Y506	2300136	71.973 MHz
Y507	2300137	72.473 MHz
Y508	2300138	72.973 MHz
Y509	2300139	73.473 MHz
Y510	2300140	73.973 MHz
Y511	2300141	74.473 MHz
Y512	2300142	74.973 MHz
Y513	2300143	75.473 MHz
Y514	2300144	75.973 MHz
Y515	2300145	76.473 MHz
Y516	2300146	76.973 MHz
Y517	2300147	77.473 MHz
Y518	2300148	77.973 MHz
Y519	2300149	78.473 MHz
Y520	2300150	78.973 MHz
Y521	2300151	79.473 MHz
Y522	2300152	79.973 MHz
Y523	2300153	80.473 MHz
Y524	2300154	80.973 MHz
		CHOKES
Z501	1800038	RF Choke
Z502	1800038	RF Choke
Z601	1800056	Bias Choke
Z602	1800063	Bias Choke
Z603	1800057	Bias Choke
Z604	1800063	Bias Choke

Ref. No.	Genave Part No.	Description
		MISCELLANEOUS
CV101	2100018	Cover, (Part of P103 and J103)
CV102	2500200	Cover, Transistor (Q114)
HS601	5300004	Heatsink for Q607
HS602	5300001	Heatsink for Q608
HS603	5300003	Heatsink for Q609
J101	2100021	Connector, Photo, Rec
J102	2100020	Connector, Phono, Xmit
J103	2100010	Connector, 12 Pin Female
K101	4500007	Relay, Transmit/Receive
M101	2900004	Meter, Course Deviation, 500-0-500 Microamp
P101	2100023	Connector, Phono, Short Shank
P102	2100024	Connector, Phono, Long Shank
P103	2100013	Connector, 12 Pin Male
		HARDWARE
	2840010	Grommet, Rubber (2 Req'd)
	2500523	Panel, Trim
	2500502	Panel, Side (Left or Right)
	2500795	Panel, Sub
	2500497	Panel, Top
	2501230	Dial, Nav MHz
	2501235	Dial, Nav KHz
	2501245	Dial, Com MHz
	2501250	Dial, Com KHz
	2501395	Washer, Dial Drum (Between)
	2800040	Screw, Set
	2501335	Shaft, Drum
	2501445	Bushing, Drum
	2500745	Bracket, Switch & OBS Pot Mounting
	2500415	Clip, Radio Mounting
	2501325	Shaft, OBS Drive
	2500550	Drum, Assembly, OBS
	2500572	Rack, Mounting
	2500440	Gear, Spur, OBS Shaft
	3500004	Gear, Spur, OBS Drum
	3500001	Gear, Mitre, Frequency Selector (8 Req'd)
	2500405	Bushing, Internal, OBS Centering
	2501255	Bearing, External, OBS Centering
	2501162	Knob, Black, Frequency Selectors
	2501152	Knob, Black, SQ & VOL
	2500253	Knob, Black, OBS/Test
	2501490	Spring, Leaf, Test Switch
	2500772	Panel, Rear
	2500460	Spacer, Hex
	2500465	Bushing, Gear Stop, Nav
	6070013	Bushing, Gear Stop, Com
	2501365	Gear Stop, Mitre (4 Req'd)
	9050005	Plug, Button, Black
	2501515	Lense, Frequency Window

Specifications subject to change without notice



Model: ALPHA/300

Figure 4-4-1
Block Diagram

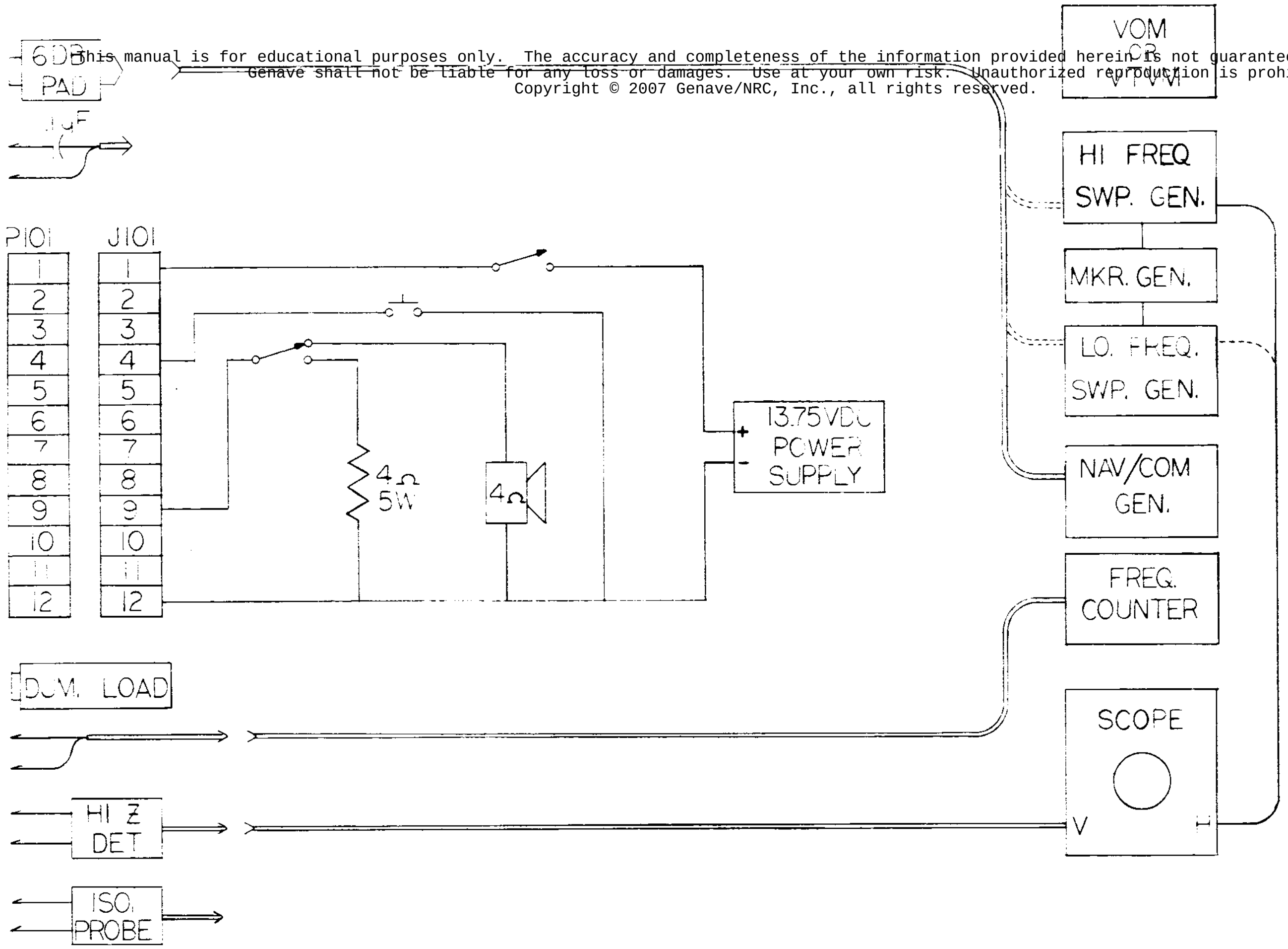


Figure 4-4-2
Alignment and Test Setup

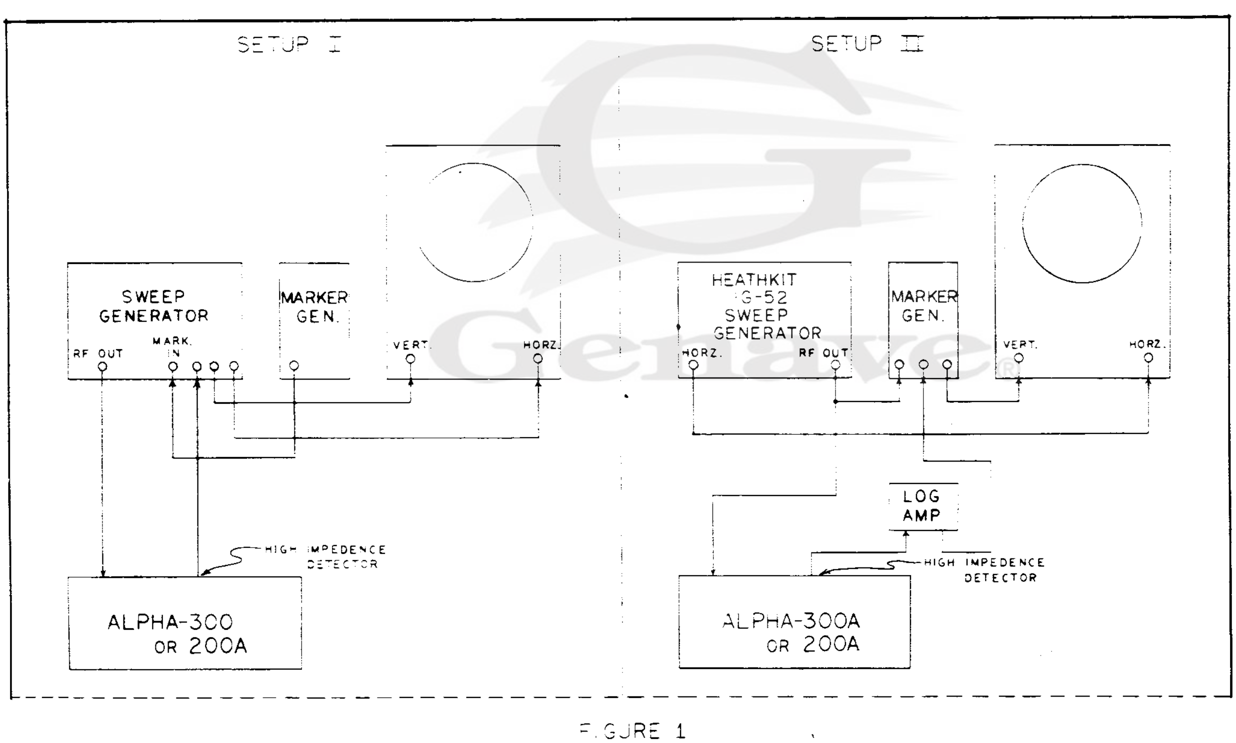


Figure 4-4-3
Input Filter Alignment Setup

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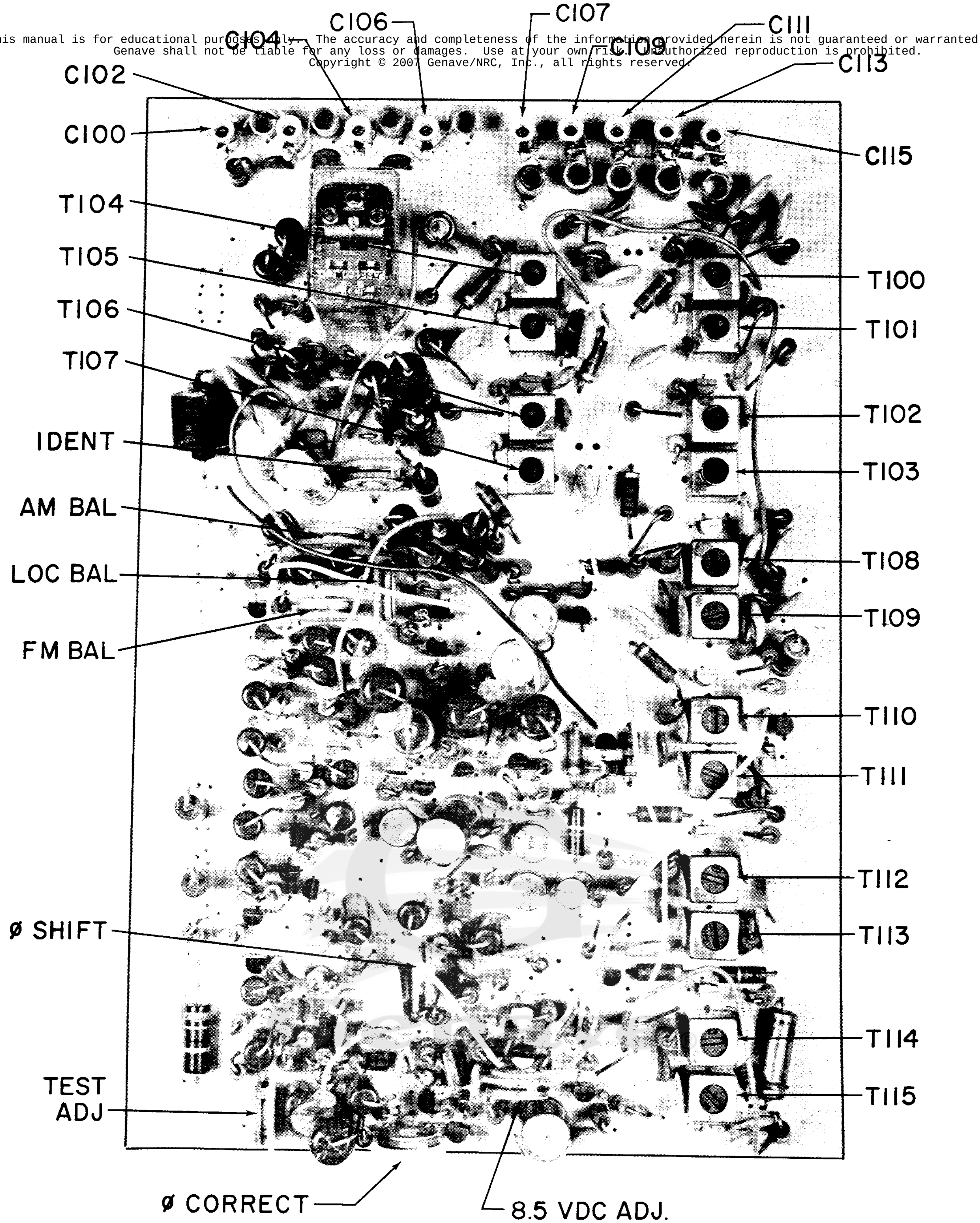


Model: ALPHA/300

Figure 4-4-4
Alignment Adjustments

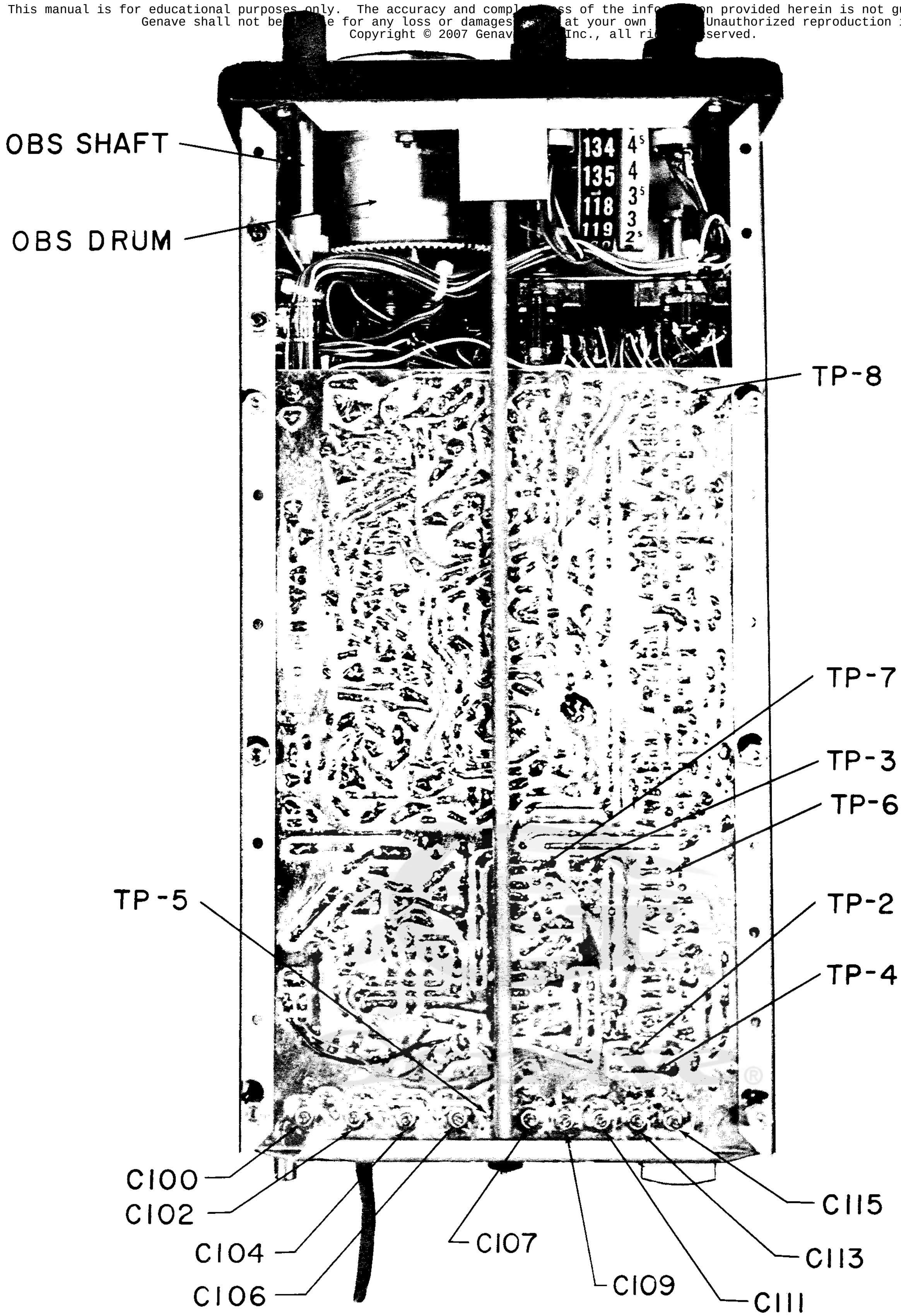


Figure 4-4-5
Radio, Bottom View

Model: ALPHA/300

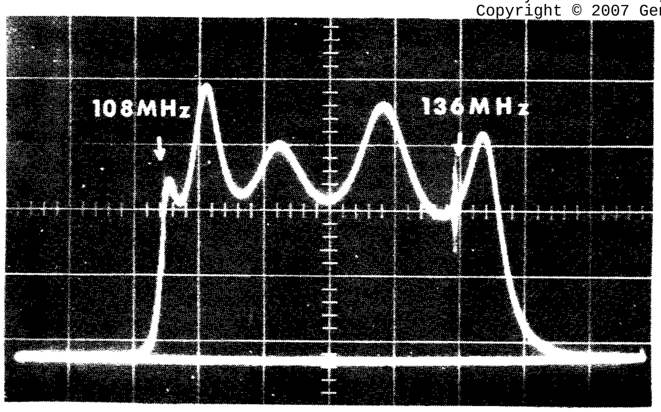


Figure 4-4-6
Input Filter

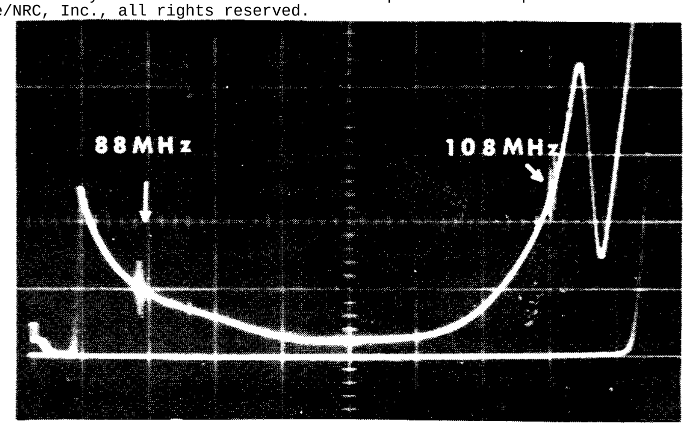


Figure 4-4-7
Bandstop Filter

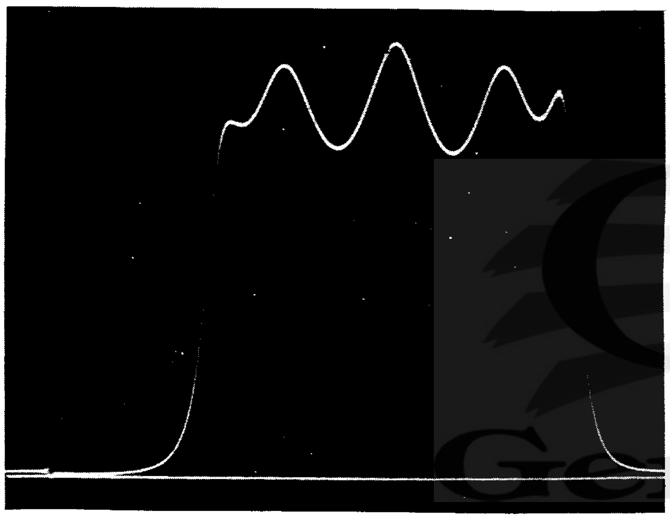


Figure 4-4-8
Nav 1st IF Bandpass

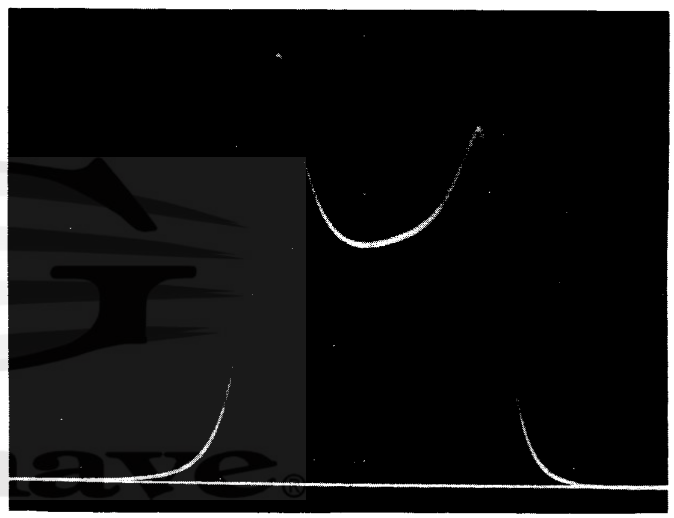


Figure 4-4-9
Com 1st IF Bandpass

Model: ALPHA/300

Figure 4-4-10

4 mHz PASSBAND (WITHOUT MARKER)

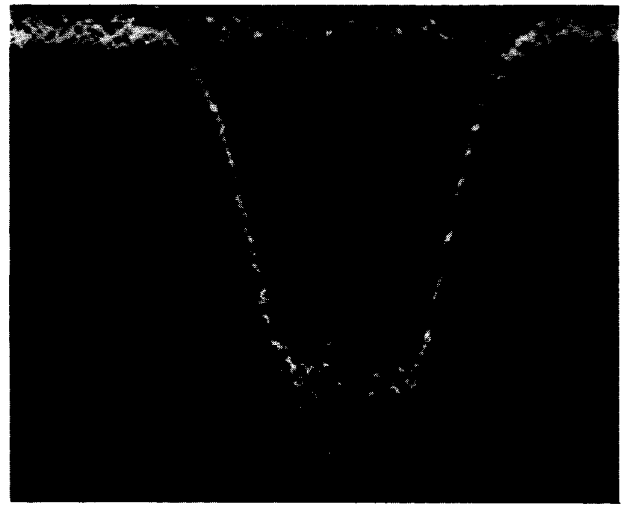
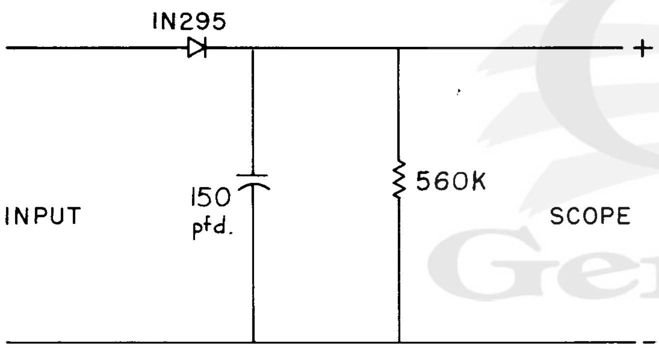


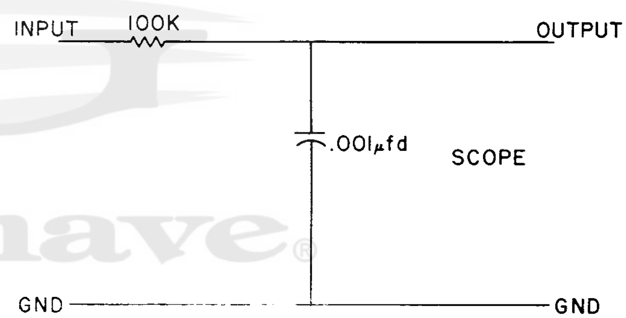
Figure 4-4-11

4 mHz PASSBAND (WITH MARKER)



HIGH IMPEDANCE DETECTOR

Figure 4-4-12
High Impedance Detector



SCOPE ISOLATION NETWORK

Figure 4-4-13
Scope Isolation Network

Figure 4-4-14

OSCILLATOR FREQUENCY TABLES
HIGH FREQUENCY OSCILLATOR
COM RECEIVE

Dial Reading	Crystal Frequency	Oscillator Output Frequency
118	70.473 MHz ± 1.25 KHz	140.946 MHz ± 2.5 KHz
119	70.973 MHz ± 1.25 KHz	141.946 MHz ± 2.5 KHz
120	71.473 MHz ± 1.25 KHz	142.946 MHz ± 2.5 KHz
121	71.973 MHz ± 1.25 KHz	143.946 MHz ± 2.5 KHz
122	72.473 MHz ± 1.25 KHz	144.946 MHz ± 2.5 KHz
123	72.973 MHz ± 1.25 KHz	145.946 MHz ± 2.5 KHz
124	73.473 MHz ± 1.25 KHz	146.946 MHz ± 2.5 KHz
125	73.973 MHz ± 1.25 KHz	147.946 MHz ± 2.5 KHz
126	74.473 MHz ± 1.375 KHz	148.946 MHz ± 2.75 KHz
127	74.973 MHz ± 1.375 KHz	149.946 MHz ± 2.75 KHz
128	75.473 MHz ± 1.375 KHz	150.946 MHz ± 2.75 KHz
129	75.973 MHz ± 1.375 KHz	151.946 MHz ± 2.75 KHz
130	76.473 MHz ± 1.375 KHz	152.946 MHz ± 2.75 KHz
131	76.973 MHz ± 1.375 KHz	153.946 MHz ± 2.75 KHz
132	77.473 MHz ± 1.375 KHz	154.946 MHz ± 2.75 KHz
133	77.973 MHz ± 1.375 KHz	155.946 MHz ± 2.75 KHz
134	78.473 MHz ± 1.5 KHz	156.946 MHz ± 3 KHz
135	78.473 MHz ± 1.5 KHz	156.946 MHz ± 3 KHz
135	78.973 MHz ± 1.5 KHz	157.946 MHz ± 3 KHz

COM TRANSMIT

Dial Reading	Crystal Frequency	Oscillator Output Frequency
118	72.473 MHz ± 1.25 KHz	144.946 MHz ± 2.5 KHz
119	72.973 MHz ± 1.25 KHz	145.946 MHz ± 2.5 KHz
120	73.473 MHz ± 1.25 KHz	146.946 MHz ± 2.5 KHz
121	73.973 MHz ± 1.25 KHz	147.946 MHz ± 2.5 KHz
122	74.473 MHz ± 1.375 KHz	148.946 MHz ± 2.75 KHz
123	74.973 MHz ± 1.375 KHz	149.946 MHz ± 2.75 KHz
124	75.473 MHz ± 1.375 KHz	150.946 MHz ± 2.75 KHz
125	75.973 MHz ± 1.375 KHz	151.946 MHz ± 2.75 KHz
126	76.473 MHz ± 1.375 KHz	152.946 MHz ± 2.75 KHz
127	76.973 MHz ± 1.375 KHz	153.946 MHz ± 2.75 KHz
128	77.473 MHz ± 1.375 KHz	154.946 MHz ± 2.75 KHz
129	77.973 MHz ± 1.375 KHz	155.946 MHz ± 2.75 KHz
130	78.473 MHz ± 1.5 KHz	156.946 MHz ± 3 KHz
131	78.973 MHz ± 1.5 KHz	157.946 MHz ± 3 KHz
132	79.473 MHz ± 1.5 KHz	158.946 MHz ± 3 KHz
133	79.973 MHz ± 1.5 KHz	159.946 MHz ± 3 KHz
134	80.473 MHz ± 1.5 KHz	160.946 MHz ± 3 KHz
135	80.973 MHz ± 1.5 KHz	161.946 MHz ± 3 KHz

NAV RECEIVE

Dial Reading	Crystal Frequency	Oscillator Output Frequency
108	69.478 MHz ± 1.25 KHz	138.956 MHz ± 2.5 KHz
109	69.968 MHz ± 1.25 KHz	139.936 MHz ± 2.5 KHz
110	70.473 MHz ± 1.25 KHz	140.946 MHz ± 2.5 KHz
111	70.973 MHz ± 1.25 KHz	141.946 MHz ± 2.5 KHz
112	71.473 MHz ± 1.25 KHz	142.946 MHz ± 2.5 KHz
113	71.973 MHz ± 1.25 KHz	143.946 MHz ± 2.5 KHz
114	72.473 MHz ± 1.25 KHz	144.946 MHz ± 2.5 KHz
115	72.973 MHz ± 1.25 KHz	145.946 MHz ± 2.5 KHz
116	73.473 MHz ± 1.25 KHz	146.946 MHz ± 2.5 KHz
117	73.973 MHz ± 1.25 KHz	147.946 MHz ± 2.5 KHz

Figure 4-4-15

OSCILLATOR FREQUENCY TABLES
LOW FREQUENCY OSCILLATOR
COM, ALL CONDITIONS

Dial Reading	Crystal and Output Frequency ± 1 KHz
.00	26.746 MHz
.05	26.696 MHz
.1	26.646 MHz
.15	26.596 MHz
.2	26.546 MHz
.25	26.496 MHz
.3	26.946 MHz
.35	26.896 MHz
.4	26.846 MHz
.45	26.796 MHz
.5	26.446 MHz
.55	26.396 MHz
.6	26.346 MHz
.65	26.296 MHz
.7	26.246 MHz
.75	26.196 MHz
.8	26.146 MHz
.85	26.096 MHz
.9	26.046 MHz
.95	25.996 MHz

NAV, ALL CONDITIONS

Dial Reading	Crystal and Output Frequency ± 1 KHz
.0	26.946 MHz
.1	26.846 MHz
.2	26.746 MHz
.3	26.646 MHz
.4	26.546 MHz
.5	26.446 MHz
.6	26.346 MHz
.7	26.246 MHz
.8	26.146 MHz
.9	26.046 MHz

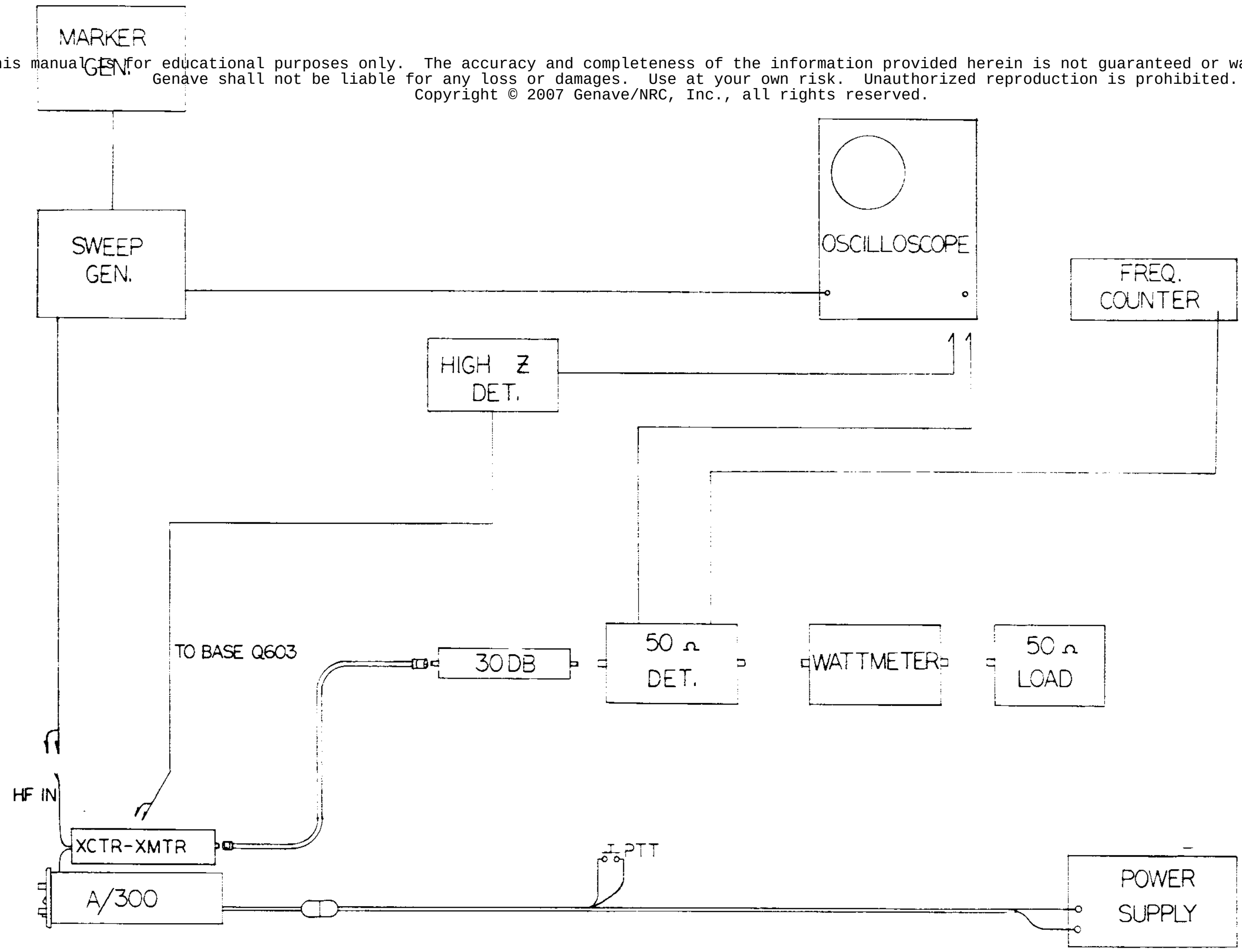


Figure 4-4-16
Exciter—Transmitter Alignment Setup

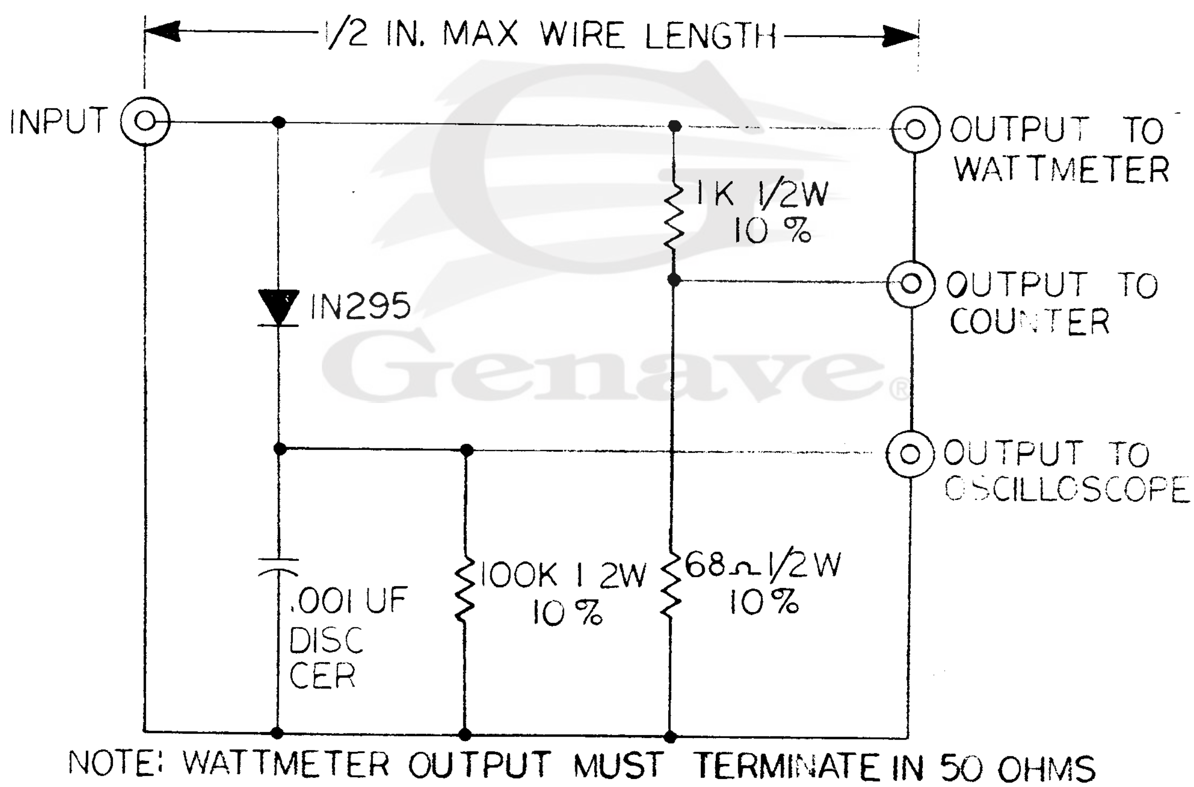


Figure 4-4-17
50 Ohm Detector

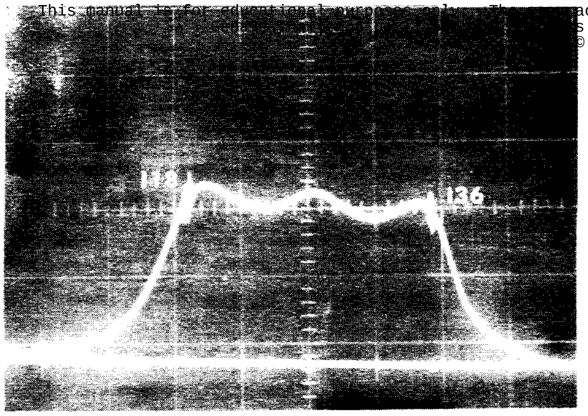


Figure 4-4-18
Mixer Filter Passband

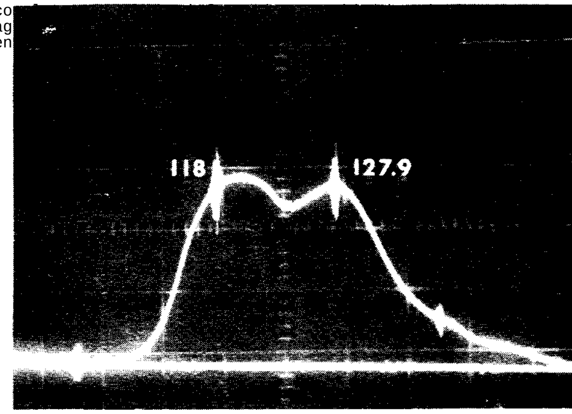


Figure 4-4-19
Low Amplifier Passband

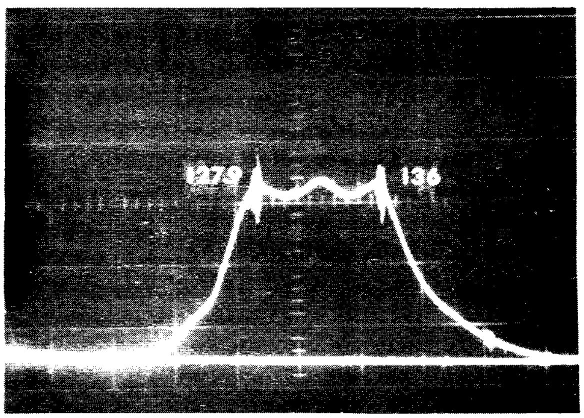


Figure 4-4-20
High Amplifier Filter Passband

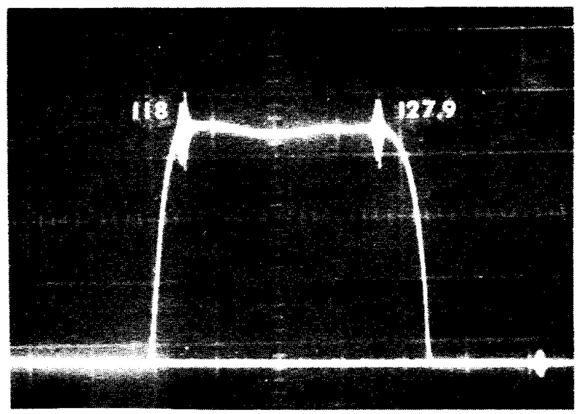


Figure 4-4-21
RF Low Frequency Passband

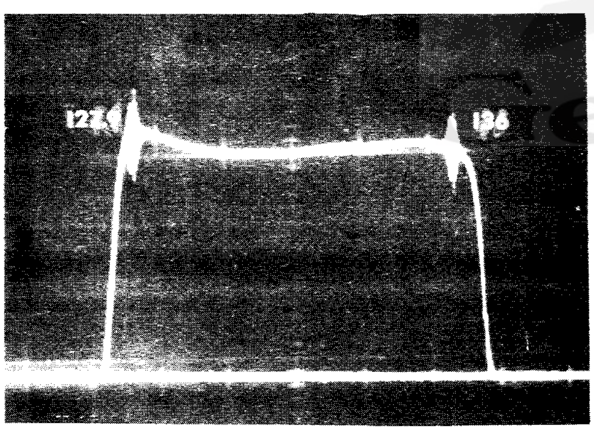


Figure 4-4-22
RF High Frequency Passband

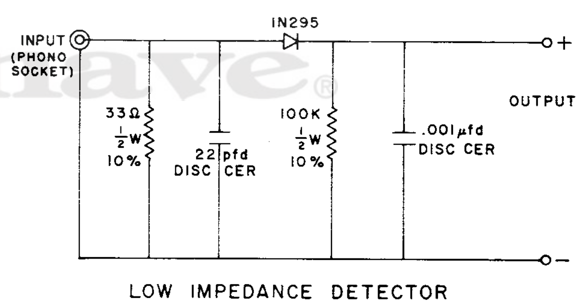


Figure 4-4-23
Low Impedance Detector

Model: ALPHA/300

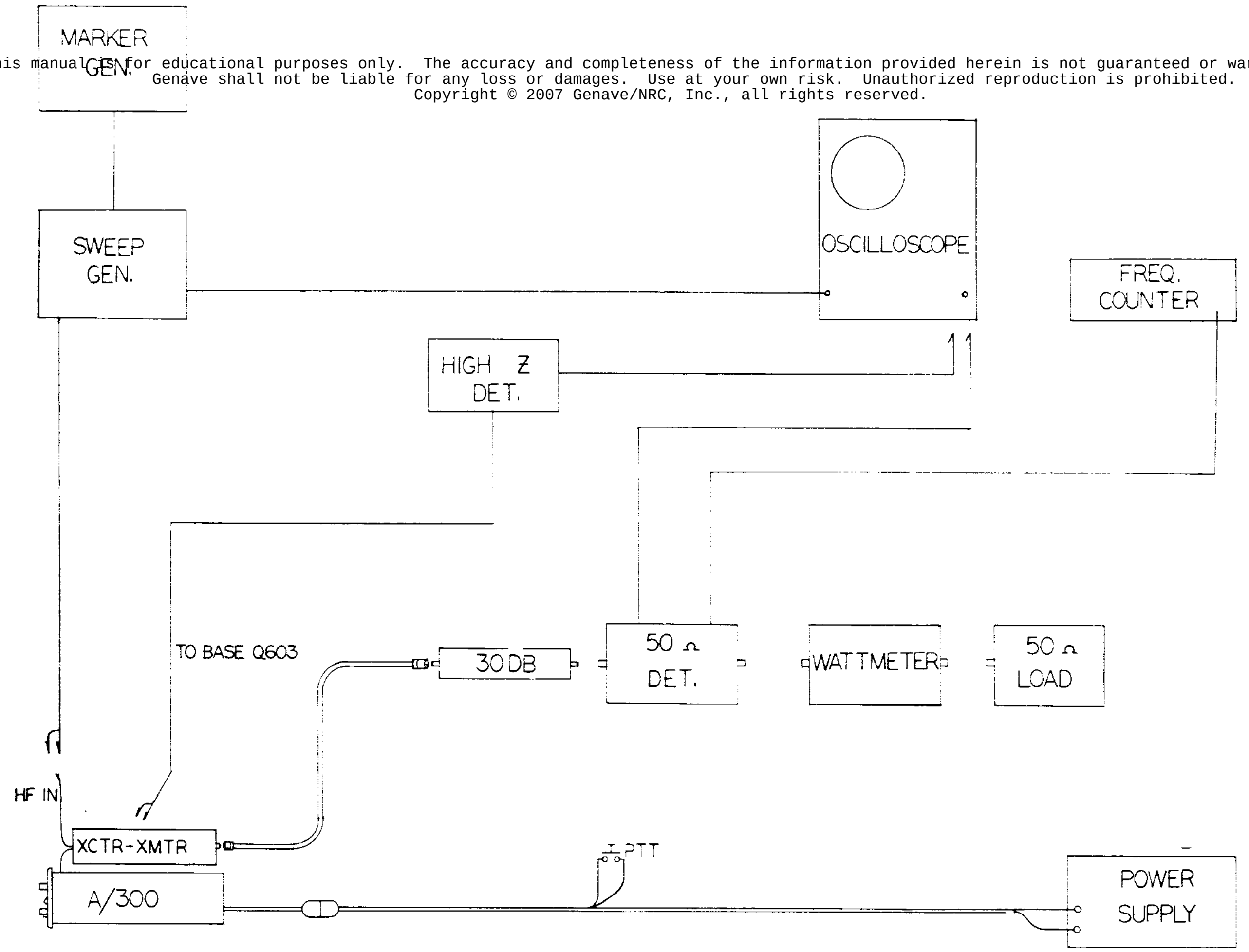


Figure 4-4-16
Exciter—Transmitter Alignment Setup

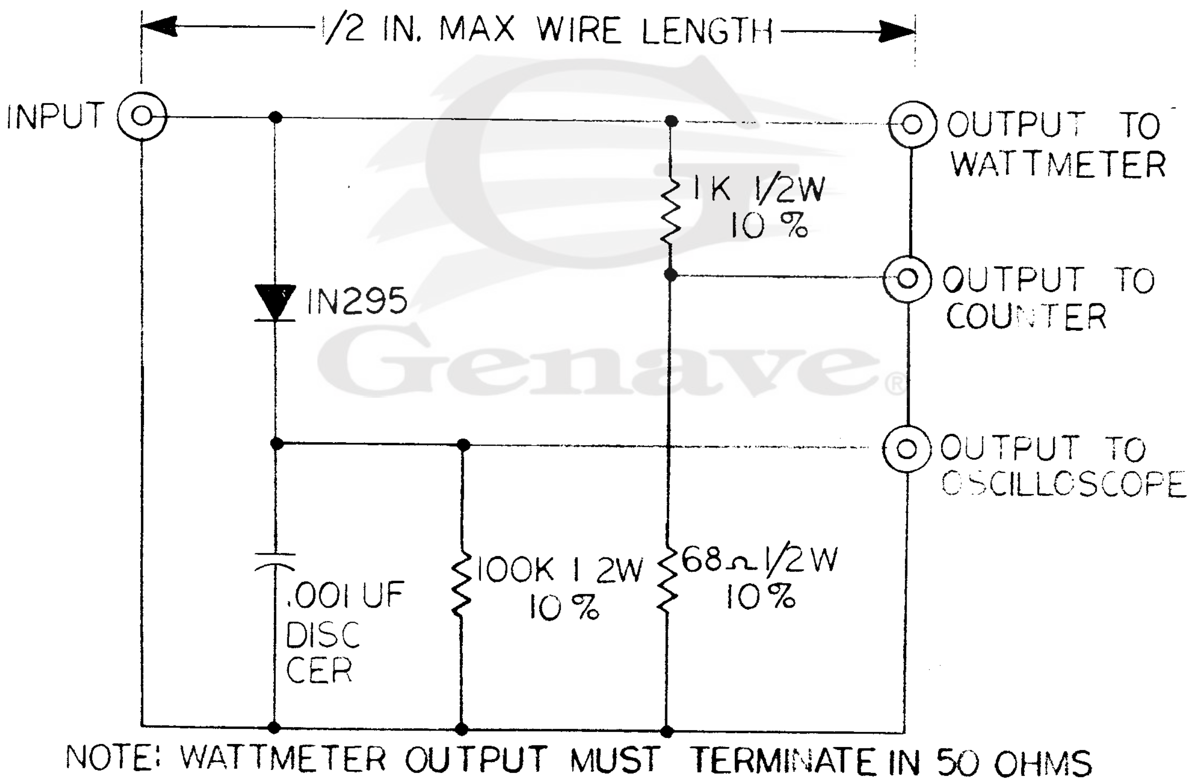


Figure 4-4-17
50 Ohm Detector

Model: ALPHA/300

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... ss or dama ... rohibited.
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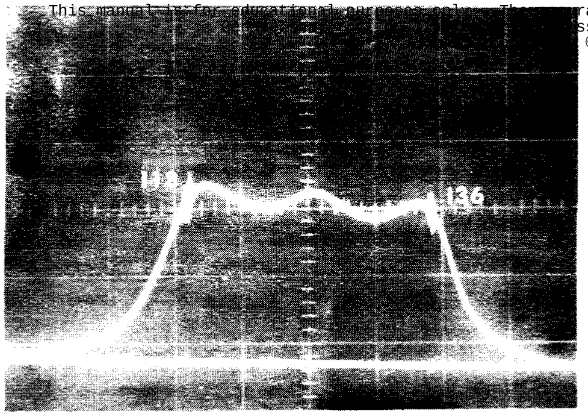


Figure 4-4-18
Mixer Filter Passband

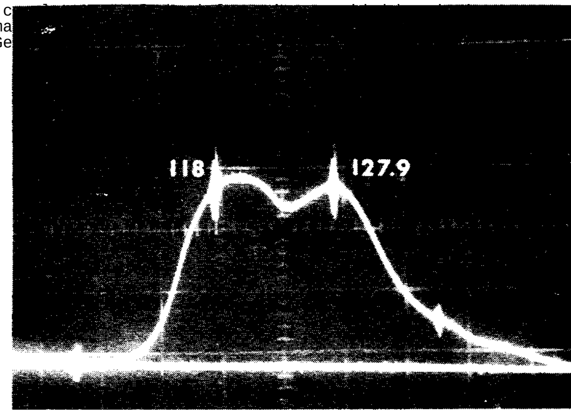


Figure 4-4-19
Low Amplifier Passband

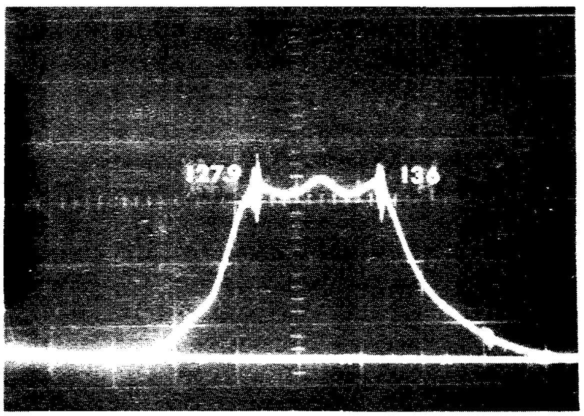


Figure 4-4-20
High Amplifier Filter Passband

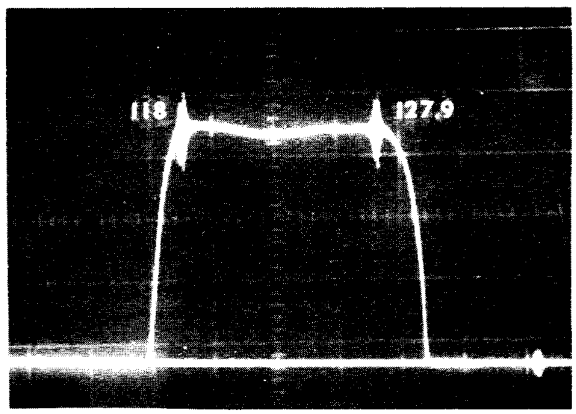


Figure 4-4-21
RF Low Frequency Passband

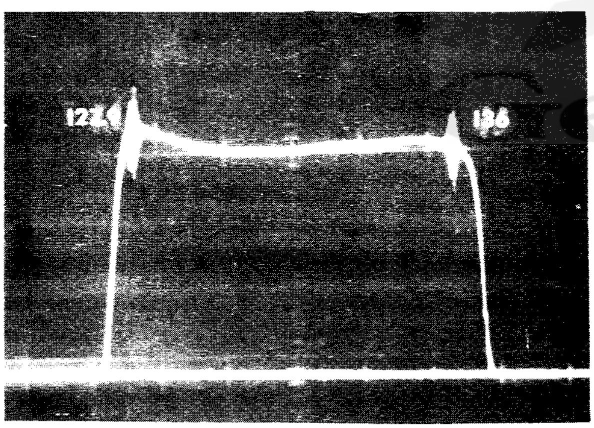


Figure 4-4-22
RF High Frequency Passband

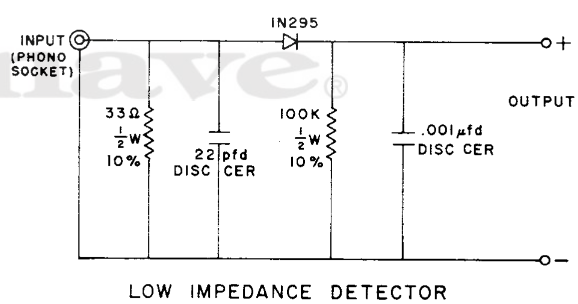


Figure 4-4-23
Low Impedance Detector

4-5. Troubleshooting Information

I. General

It is assumed that the technician performing any troubleshooting or repair work on this unit is familiar with the principles of aviation electronics and the procedures of troubleshooting electronics equipment. It is further assumed that he has a working knowledge of transistorized circuitry and the use of all the normal test equipment found in the field.

The primary aids to troubleshooting the radio are the DC Voltage Measurements given in Table 4-5-1, the Localizer Waveform Photographs *(figures 4-5-2 through 4-5-8)*, the Omni Waveform Photographs *(figures 4-5-9 through 4-5-17)*, the Schematic Diagrams *(figures 4-5-17 through 4-5-22)* and the Mainboard Parts/Track Map *(figure 4-5-23)*.

The above aids will locate the problem area in almost all cases. In some instances, however, the problem may be of such a nature that other approaches must be found. Table 4-5-28 lists a few such problems, and indicates possible causes, checks, and solutions.

It should be noted that some of the parts in the converter-indicator are matched pairs. Before replacing parts in this section check figure 4-5-27. If one component of the matched pair is defective, be sure to replace both parts with another matched set.

II. Table of Figures

DC VOLTAGE MEASUREMENTS

All voltages shown in this table must be measured with a VTVM. The input voltage to the radio should be set at 13.75 VDC and the 8.5 VDC power supply should be set to 8.50 VDC.

A variation of ± 20% of the measured voltage from those listed may be considered normal.

Ref. No.	Mode	Control Setting	No Signal Condition			500 microvolt Signal on Appropriate Frequency With Omni "TO" Modulation except as noted.			Notes
			E	B	C	E	B	C	
Q100	NAV		2.8	2.2	8.3	1.6	0.7	8.5	
Q100	COM		1.2	1.5	8.1	0.4	0.7	8.4	1.3 KHz, 30% Modulation
Q101	NAV		2.8	2.3	8.3	1.6	0.7	8.5	
Q101	COM		0.6	1.4	7.7	0.05	0.7	8.4	1.3 KHz, 30% Modulation
Q102	NAV		2.1	2.2	7.8	1.1	0.7	8.2	
Q102	COM		6.4	1.6	8.4	2.6	0.7	8.5	1.3 KHz, 30% Modulation
Q103	NAV		1.5	2.3	6.6	0.07	0.7	8.4	
Q103	COM		6.4	1.4	8.4	2.6	0.7	8.5	1.3 KHz, 30% Modulation
Q104			2.1	2.8	7.9	2.2	2.8	8.0	
Q105			1.6	0.9	6.6	0.9	0.7	8.3	
Q106			1.8	2.5	6.8	1.8	2.5	6.8	
Q107			1.8	2.4	6.8	1.8	2.4	6.7	
Q108		SQ CW	2.4	2.9	4.4	0.7	1.3	7.8	
Q108		SQ CCW	2.4	2.9	7.8	0.7	1.3	8.2	
Q109	NAV		3.7	3.1	0	1.9	1.3	0	
Q109	COM		3.7	3.1	0	1.9	1.2	0	1.3 KHz, 30% Modulation
Q110		SQ CW	8.5	8.5	2.7	8.5	8.5	0	
Q110		SQ CCW	8.5	7.8	8.4	8.5	8.2	0	
Q111	COM	VOL CW	2.4	3.0	8.5	1.4	2.0	8.5	1.3 KHz, 30% Modulation
Q111	COM	VOL CCW	2.7	3.4	8.5	2.8	3.4	8.5	1.3 KHz, 30% Modulation
Q112			0	.62	2.1	----	----	----	
Q113			1.5	2.1	11.9	----	----	----	
Q114			0.8	1.5	13.7	----	----	----	
Q115			13.4	12.7	8.5	----	----	----	
Q116			4.9	5.4	12.2	----	----	----	
Q117			4.9	5.5	8.5	----	----	----	
Q118			0.0	0.4	2.8	----	----	----	
Q119			2.3	2.8	5.4	----	----	----	
Q120			6.1	5.5	2.3	----	----	----	
Q121			1.7	2.2	6.1	----	----	----	
Q122			6.7	6.1	1.7	----	----	----	
Q123			8.5	7.9	6.6	----	----	----	
Q124			7.3	6.6	0	----	----	----	
Q125			8.5	7.9	6.8	----	----	----	
Q126			7.4	6.8	0	----	----	----	
Q127			8.5	8.6	8.0	8.5	8.7	8.0	
Q128			8.5	8.0	4.6	8.5	8.0	4.9	
Q129			0	0.4	5.0	----	----	----	

Ref. No.	Mode	Control Setting	No Signal Condition			500 microvolt Signal on Appropriate Frequency With Omni "TO" Modulation except as noted.			Notes
			E	B	C	E	B	C	
Q130			5.6	4.9	2.8	....	....	....	
Q131			3.8	3.2	0	2.6	1.9	0	Localizer Centering Signal
Q132			4.8	4.2	0	3.7	3.0	0	Localizer Centering Signal
Q133			0	0.4	5.4	....	....	....	Localizer Centering Signal
Q134			6.0	5.4	2.3	....	....	....	Localizer Centering Signal
Q135			0	.4	3.6	....	....	....	
Q136			4.2	3.6	0	....	....	....	
Q137			0	0.4	3.6	....	....	....	
Q138			4.2	3.6	0	....	....	....	
Q139			7.7	7.1	0.2-1.3	7.0	6.6	1.4	Centered Needle
Q140			7.7	7.1	0.2-1.3	7.0	6.6	1.4	Centered Needle
Q141			4.0	4.4	0.7	2.9	4.5	0.8	TO Signal
						4.9	4.3	0.8	FROM Signal
Q142			4.0	4.4	0.7	4.9	4.3	0.8	TO Signal
						2.9	4.5	0.8	FROM Signal
Q143			0	0	4.9	0	0.2	0.2	Localizer Modulation
Q144			4.4	3.8	0.7	3.6	3.7	0	Either TO or FROM Signal
Q145			4.4	4.0	<0.4	3.6	4.8	0	TO Signal
						3.6	3.0	0.7	FROM Signal
Q146			4.4	4.0	<0.4	3.6	3.0	0.7	TO Signal
						3.6	4.8	0	FROM Signal
Q147			0	<0.4	13.7	0	0.7	<3.0	TO Signal
Q148			0	0.7	<3.0	0	0	13.7	Either TO or FROM Signal
Q149			0	<0.4	13.7	0	0.7	<3.0	FROM Signal
Q150			12.7	12.2	8.5	....	....	....	

Figure 4-5-1
DC Voltage Measurements

Localizer Waveform Photographs

The Localizer waveform photographs were taken under the following conditions:

Frequency: Any Localizer channel

RF Input: 500 microvolts

Modulation: Standard Localizer centering signal.

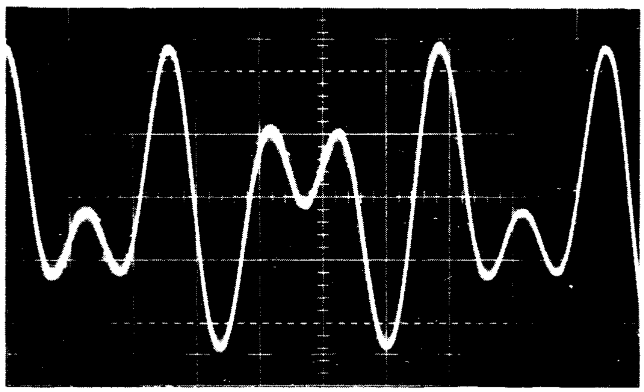


Figure 4-5-2
Localizer Input

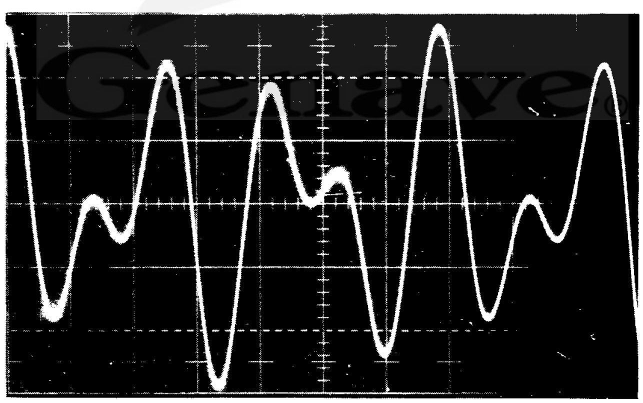


Figure 4-5-3
Emitter, Q134

Model: ALPHA/300

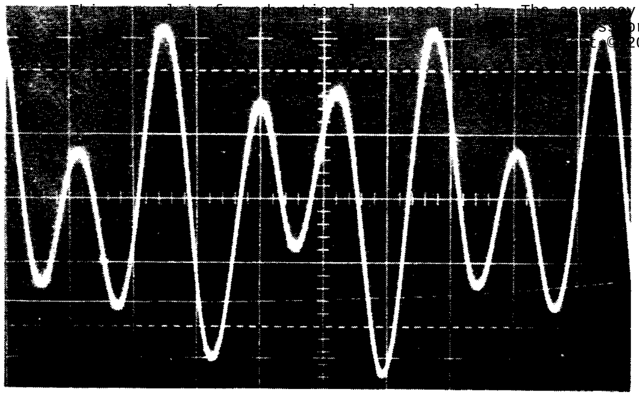


Figure 4-5-4
Emitter, Q136

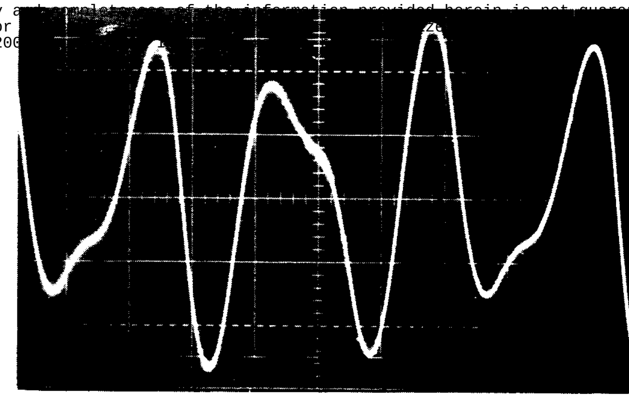


Figure 4-5-5
Emitter, Q138

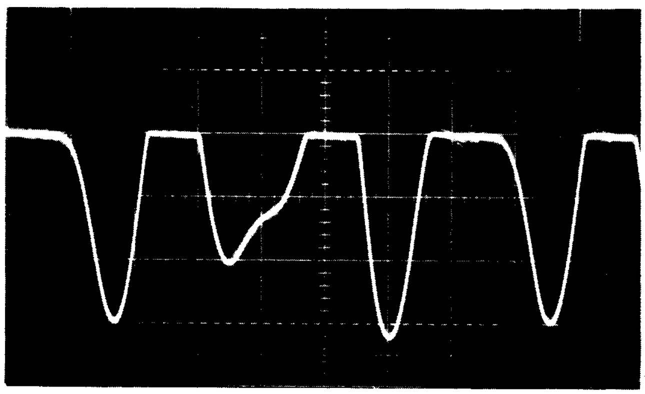


Figure 4-5-6
Emitter, Q139

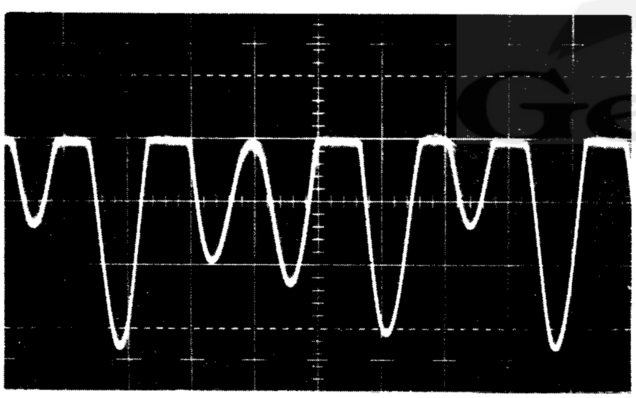


Figure 4-5-7
Emitter, 140

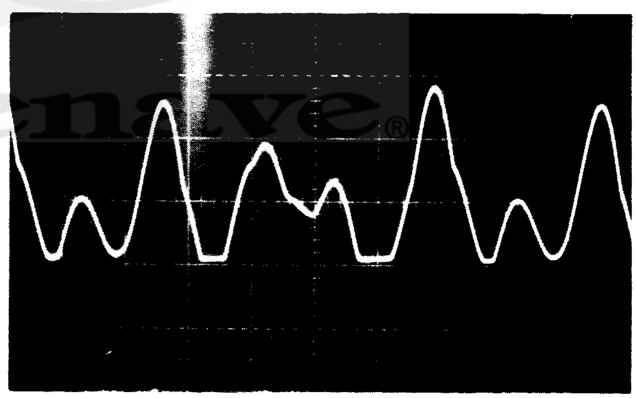


Figure 4-5-8
Collectors, Q139 & Q140

Omni Waveform Photographs

The OMNI waveform photographs were taken under the following conditions:

Frequency: Any Omni channel
RF Input: 500 microvolts
Modulation: Standard Omni 0°
OBS Pot: Set at 0°

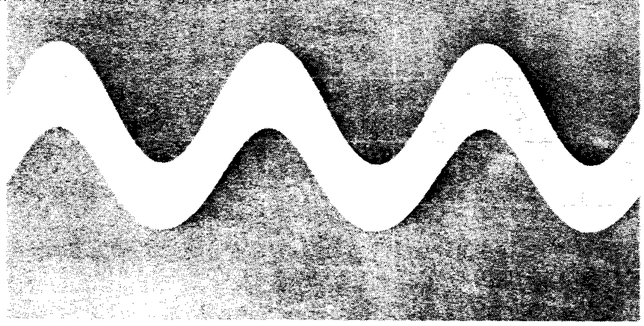


Figure 4-5-9
Omni Input

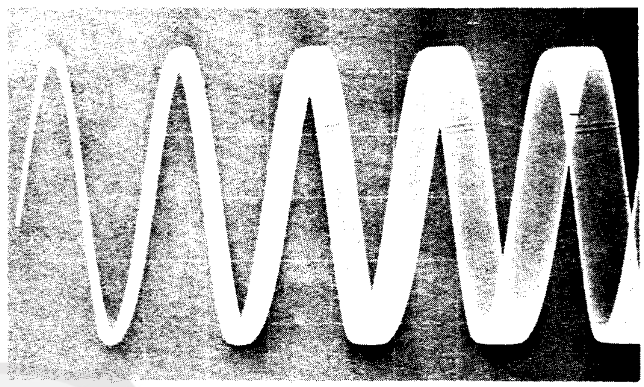
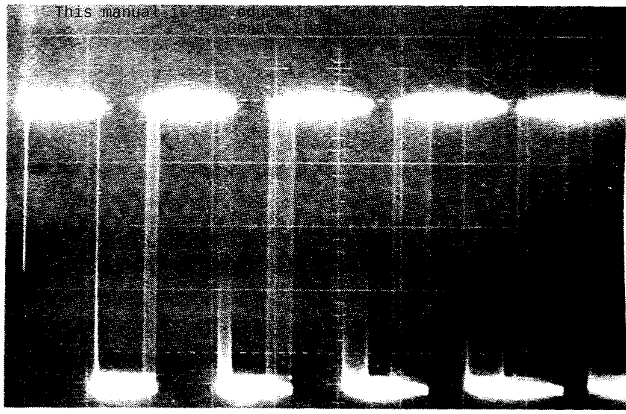


Figure 4-5-10
Emitter, Q124

Figure 4-5-11
Emitter, Q126



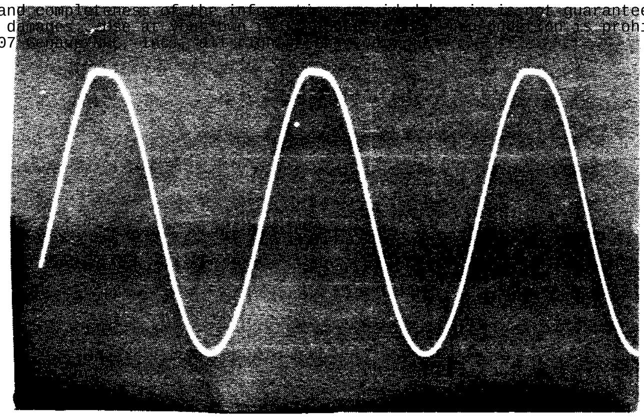
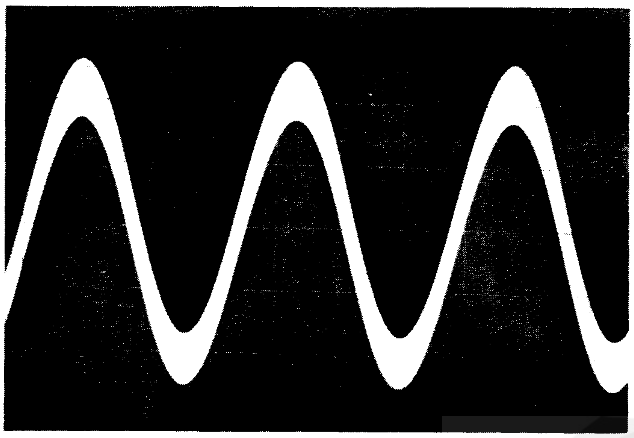


Figure 4-5-12
Collector, Q128

Figure 4-5-13
Emitters, Q136 & Q138
and Bases, Q139 & Q140



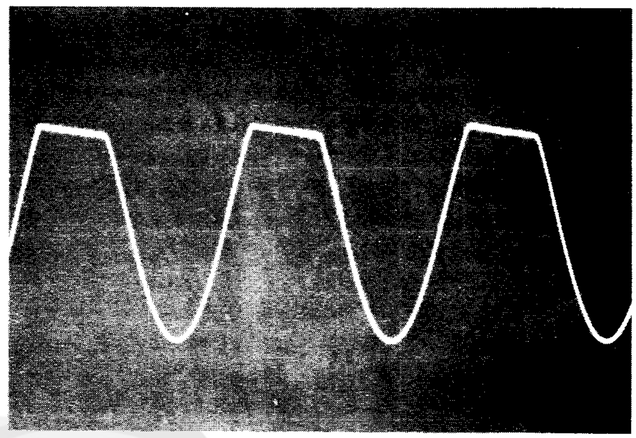
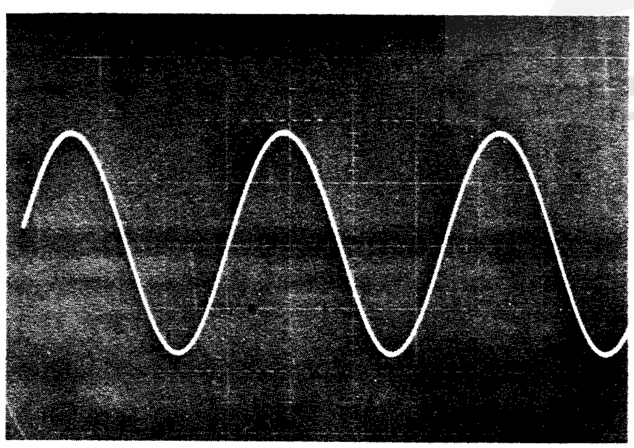


Figure 4-5-14
Collectors or Emitters, Q130

Figure 4-5-15
Emitters, Q139 & Q140



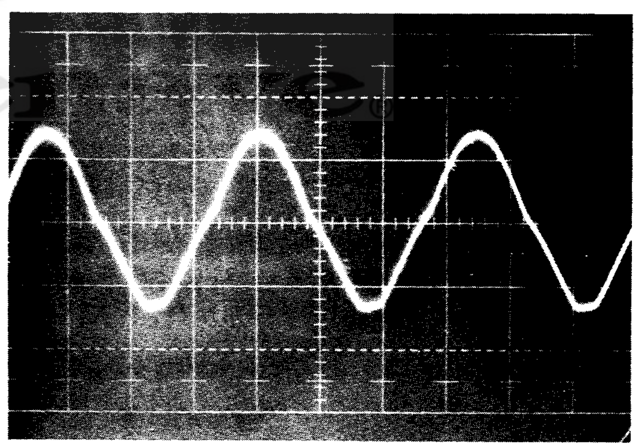
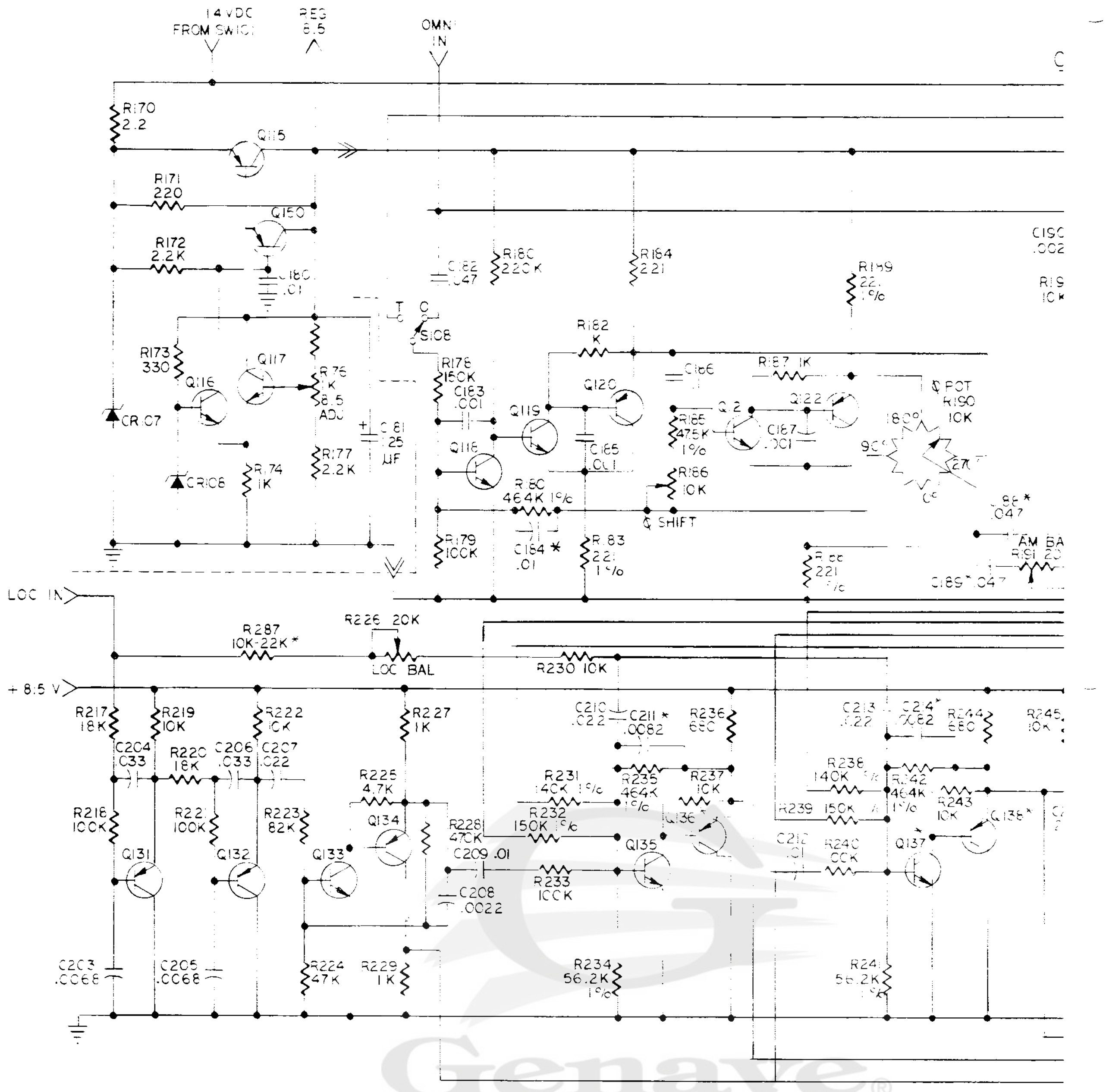


Figure 4-5-16
R190, OBS Pot Wiper, Any Position

Figure 4-5-17
Collectors, Q139 & Q140


14 VDC FROM SW101
REG 8.5
OMNI IN
R170 2.2
Q115
R171 220
Q150
R172 2.2K
C180 .01
R173 330
Q116
Q117
R176 1K 8.5 ADJ
CR107
CR108
R174 1K
R177 2.2K
C181 125 µF
S108
T
C
C182 .047
R180 220K
R184 221
R189 22.1 1%
R182 1K
R178 150K
C183 .001
Q119
Q118
Q120
C186
R187 1K
R185 475K 1%
Q121
Q122
C187 .001
C185 .001
0 POT R190 10K
180°
90°
270°
0°
R186 10K
R180 464K 1%
C184 * .01
0 SHIFT
R179 100K
R183 221 1%
C188 * .047
AM BAL
R191 20K
C189 * .047
LOC IN
R287 10K-22K *
R226 20K
LOC BAL
R230 10K
+ 8.5 V
R217 18K
R219 10K
R222 10K
R227 1K
C210 .022
C211 * .0082
R236 680
C213 .22
C214 * .0082
R244 680
R245 10K
C204 .033
R220 18K
C206 .033
C207 .022
R231 140K 1%
R235 464K 1%
R237 10K
R238 140K 1%
R242 464K 1%
R243 10K
R218 100K
R221 100K
R223 82K
R225 4.7K
Q134
R228 470K
R232 150K 1%
Q136 *
R239 150K 1%
Q138 *
Q131
Q132
Q133
C209 .01
Q135
C212 .01
R240 100K
Q137
C208 .0022
R233 100K
C203 .0068
C205 .0068
R224 47K
R229 1K
R234 56.2K 1%
R241 56.2K 1%

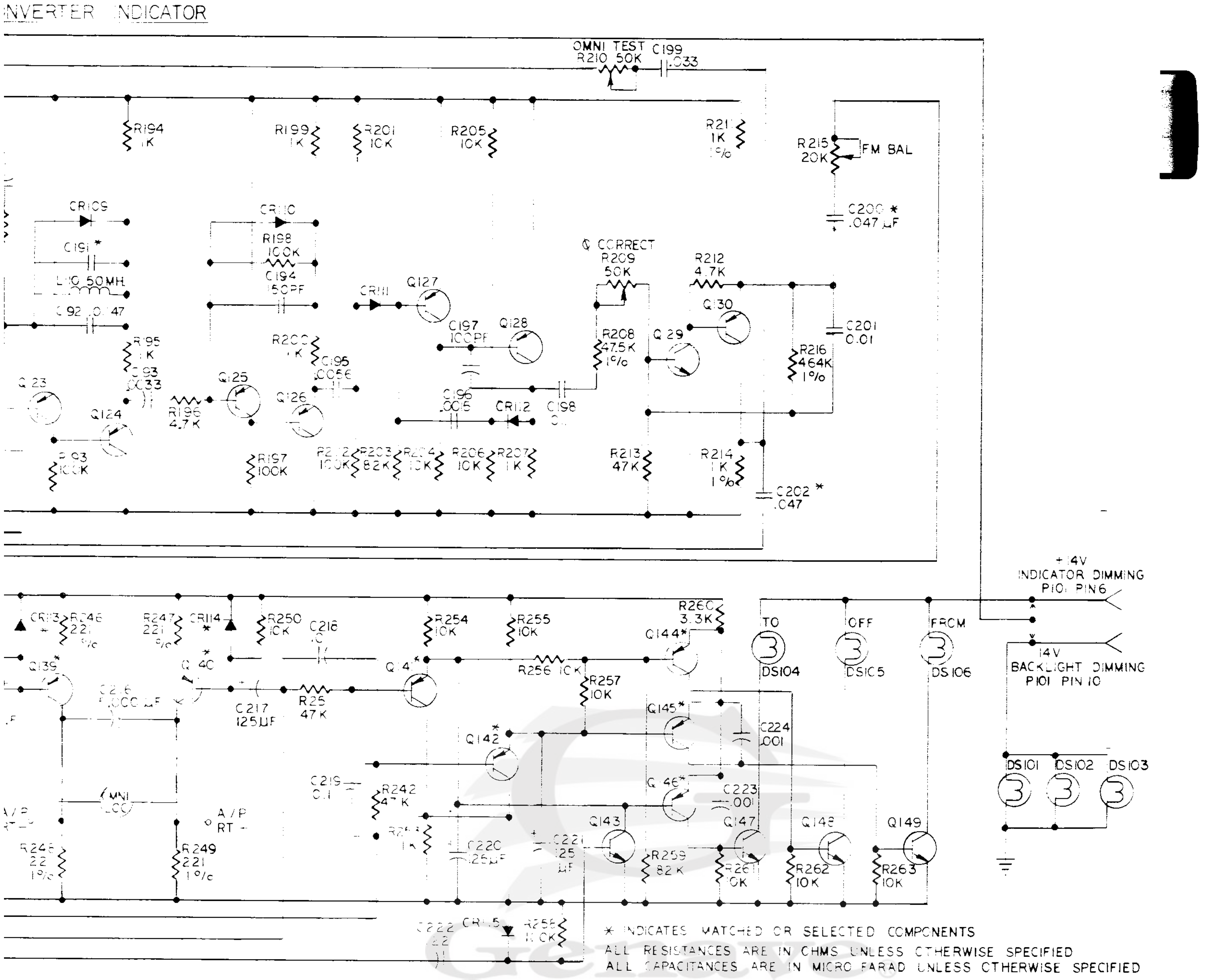


Figure 4-5-19
Converter—Indicator Schematic

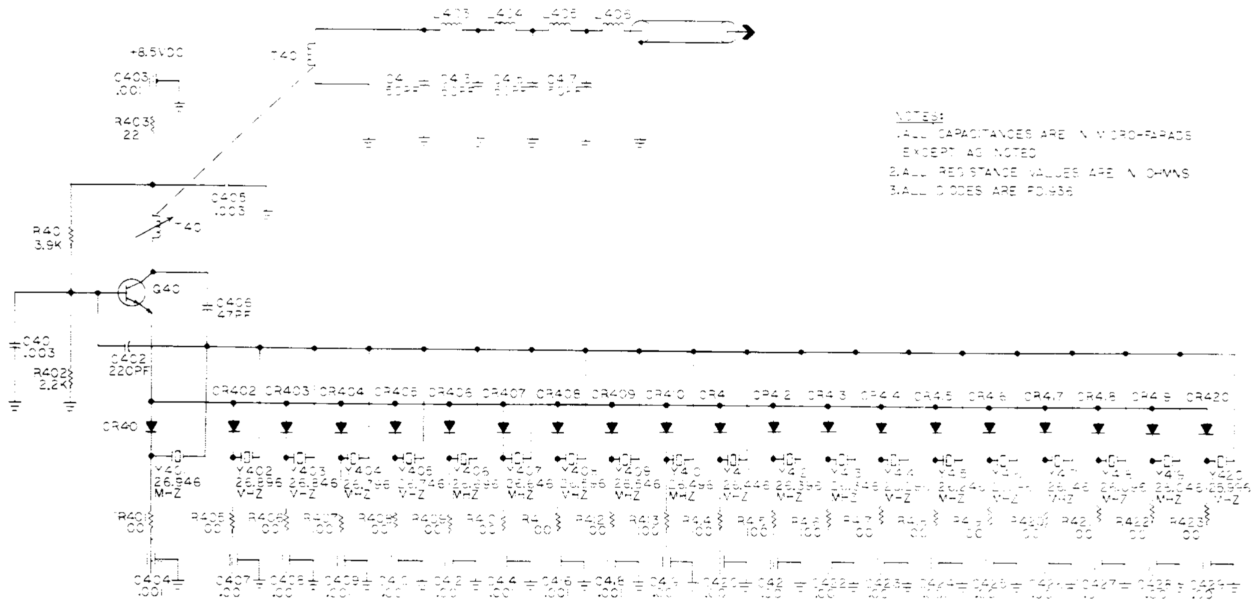


Figure 4-5-20
Low Frequency Oscillator Schematic

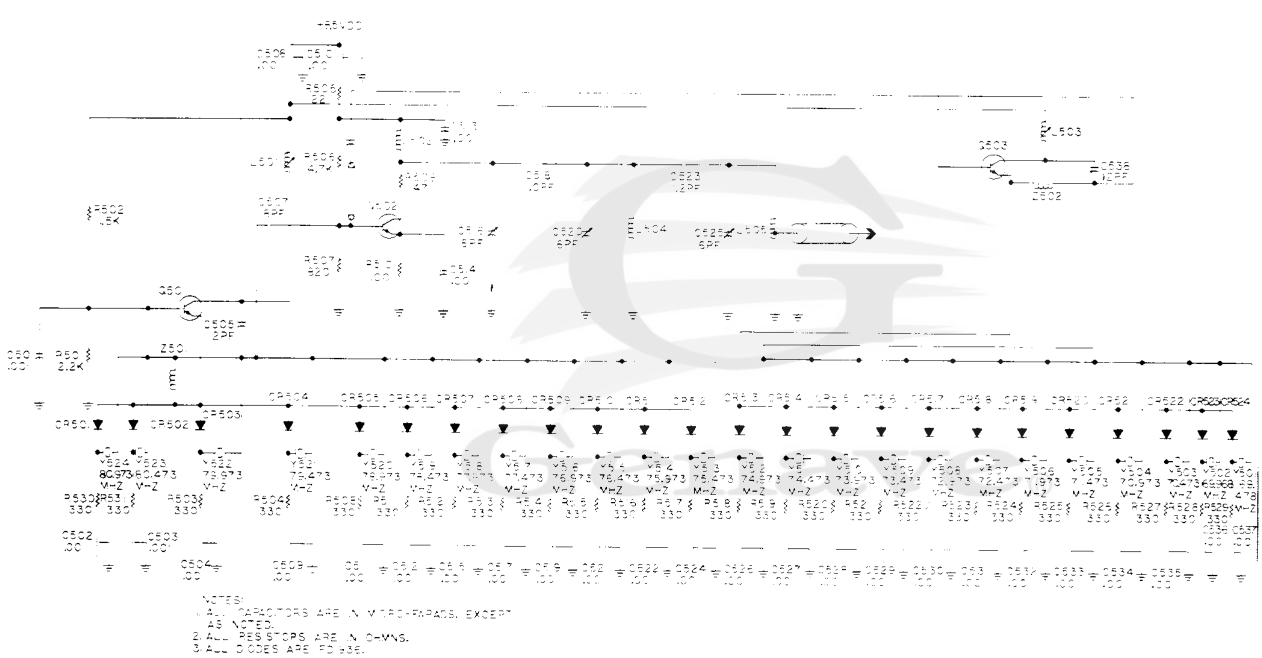
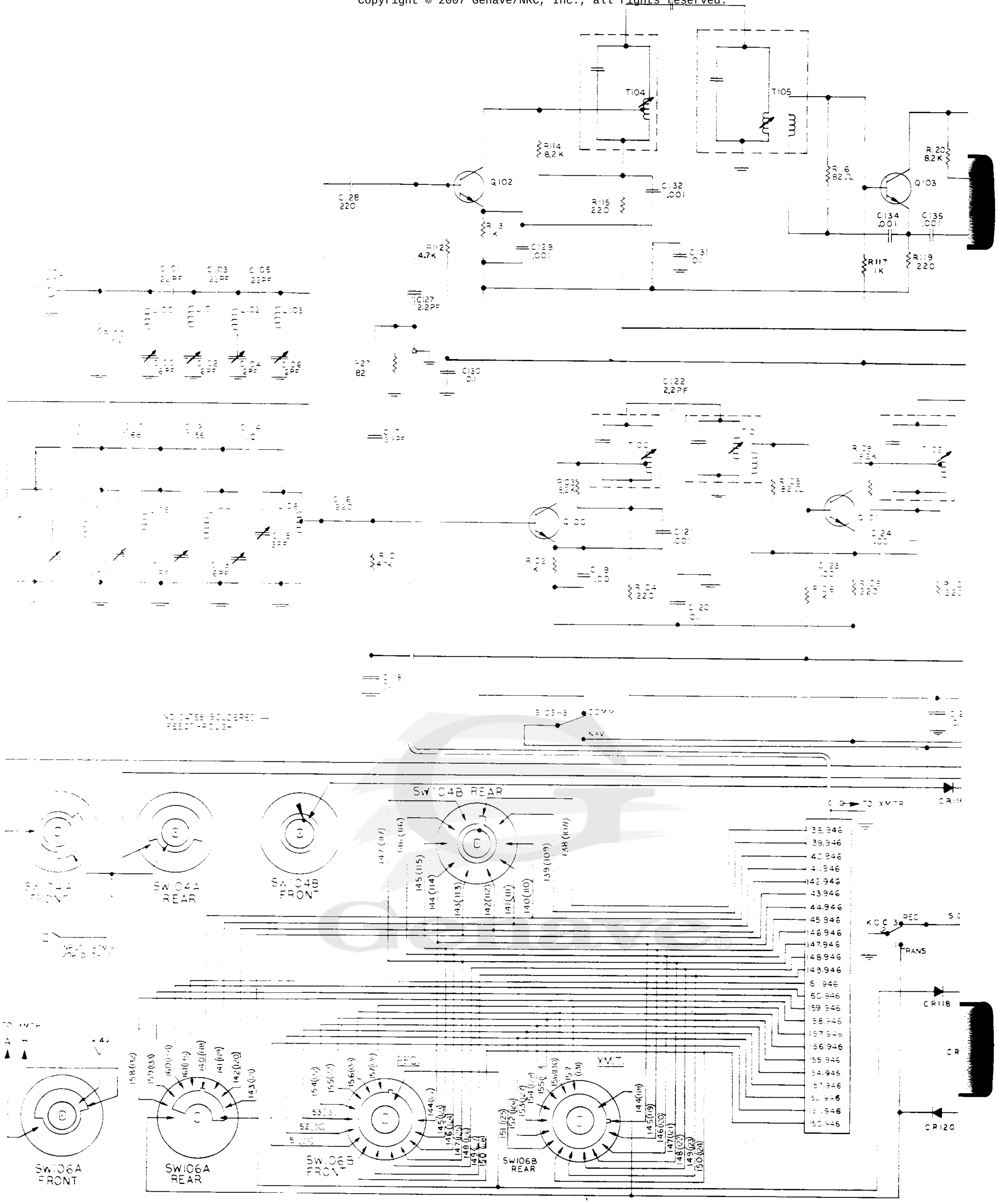
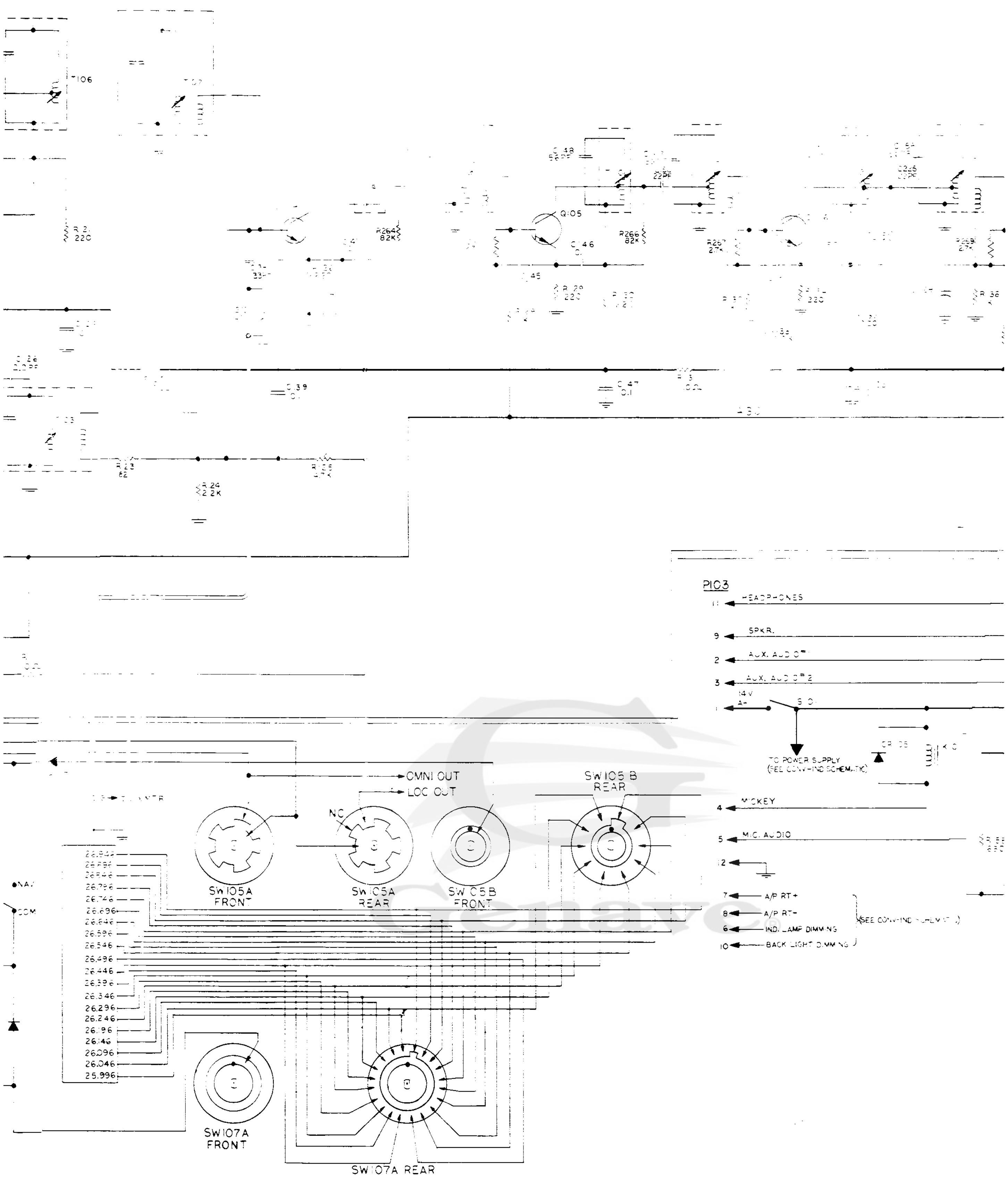


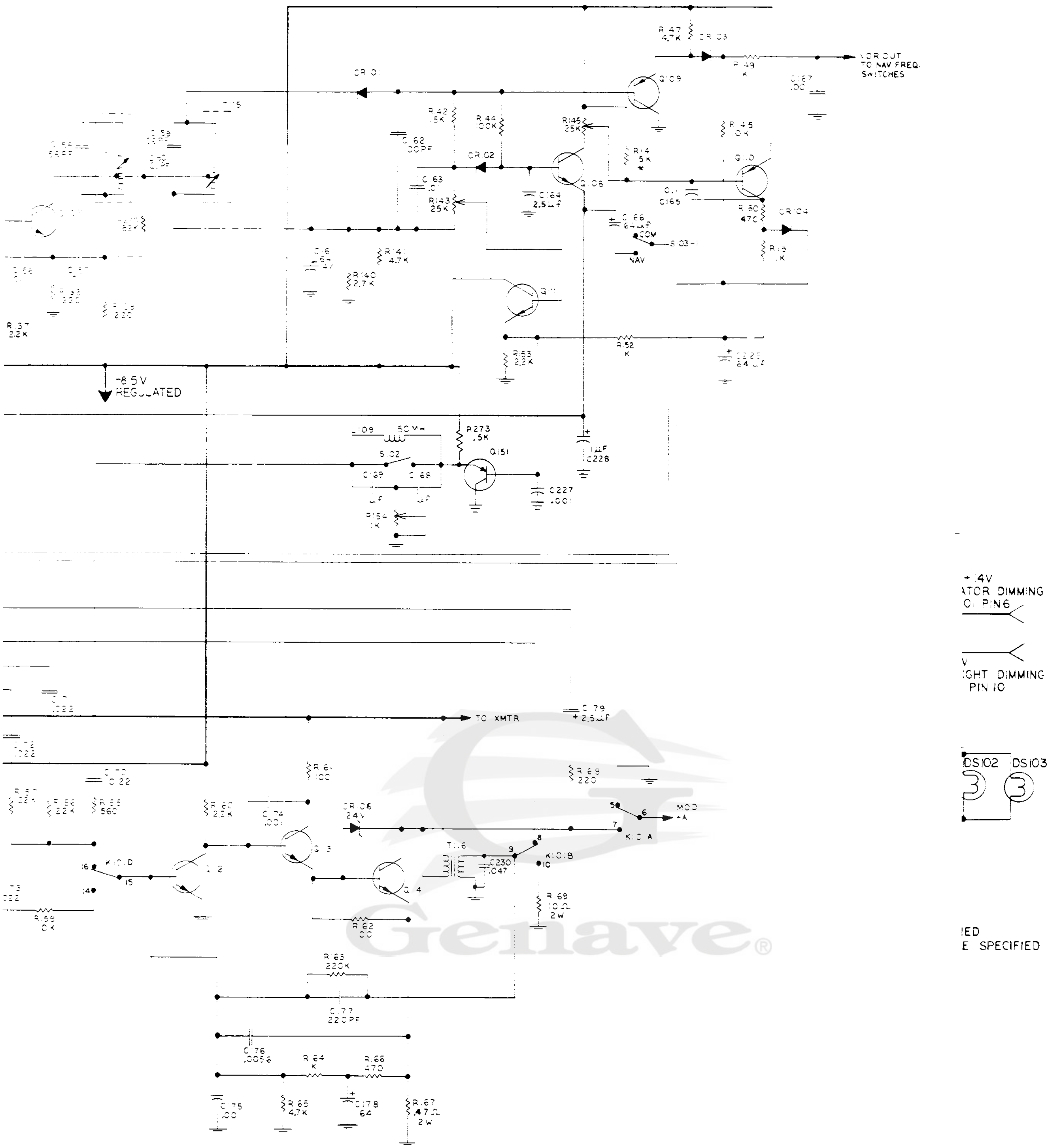
Figure 4-5-21
High Frequency Oscillator Schematic

Model: ALPHA/300



Model: ALPHA/300


T106
Q105
R264 82K
R266 82K
C146
AGC
R124 2.2K
P103
HEADPHONES
SPKR.
14 V
A+
TO POWER SUPPLY (SEE COMBINED SCHEMATIC)
MICKEY
MIC. AUDIO
A/P RT+
A/P RT-
IND. LAMP DIMMING
BACK LIGHT DIMMING
(SEE COMBINED SCHEMATIC)
OMNI OUT
LOC OUT
NC
SW105A FRONT
SW105A REAR
SW105B FRONT
SW105 B REAR
COM
26.796
26.746
26.696
26.646
26.596
26.546
26.496
26.446
26.396
26.346
26.296
26.246
26.196
26.146
26.096
26.046
25.996
SW107A FRONT
SW107A REAR



ematic

Figure 4-5-18
Mainboard Schematic

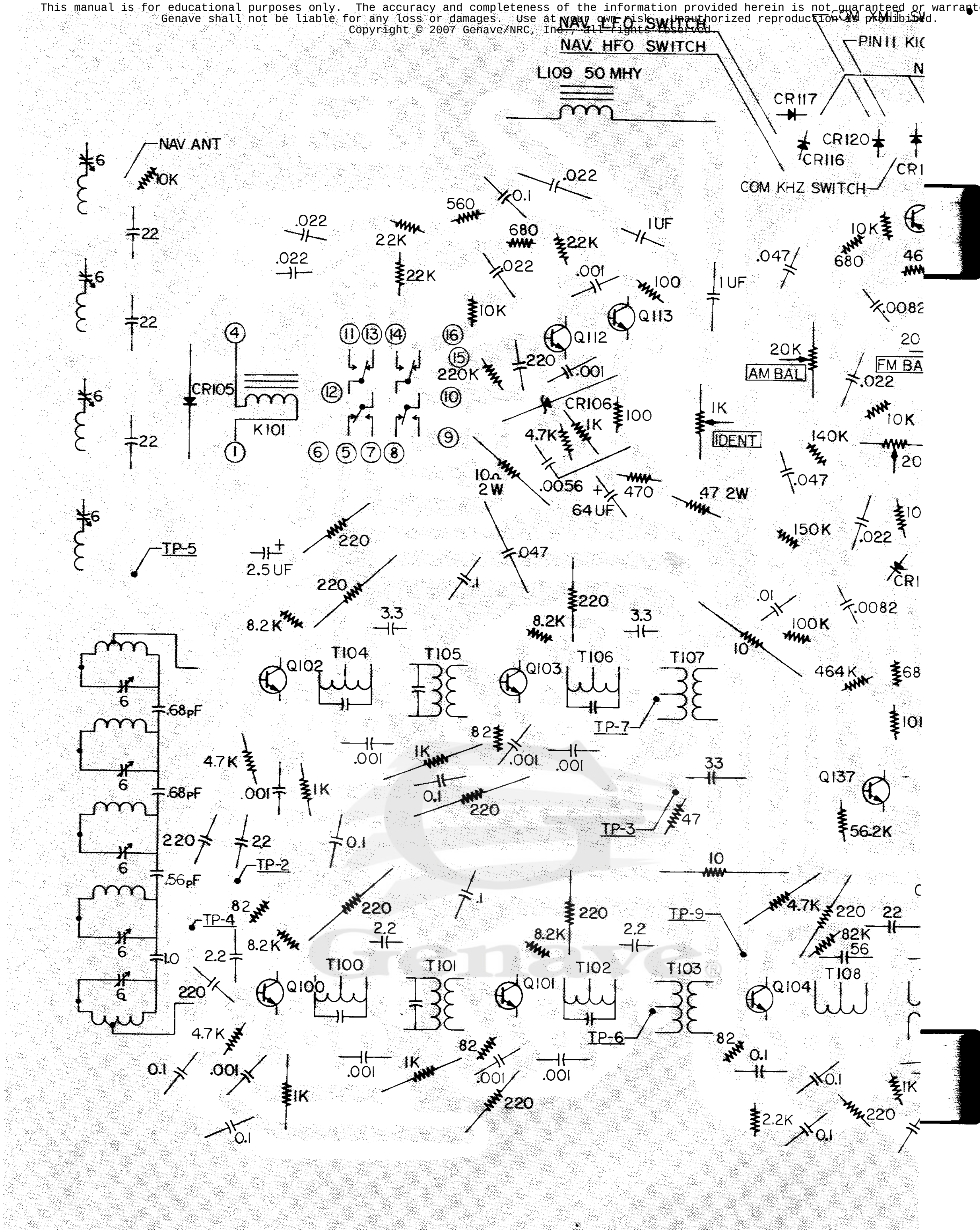
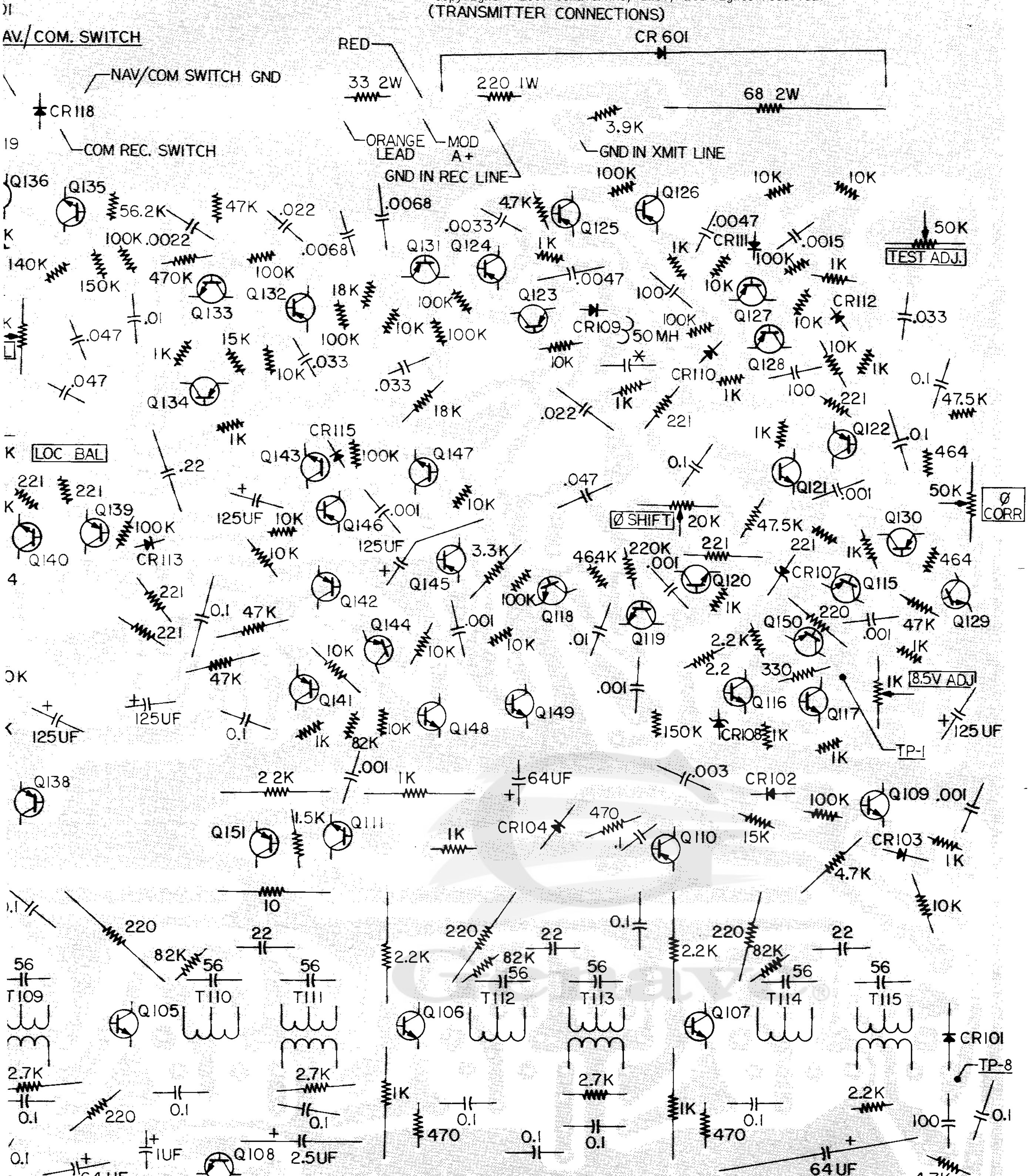
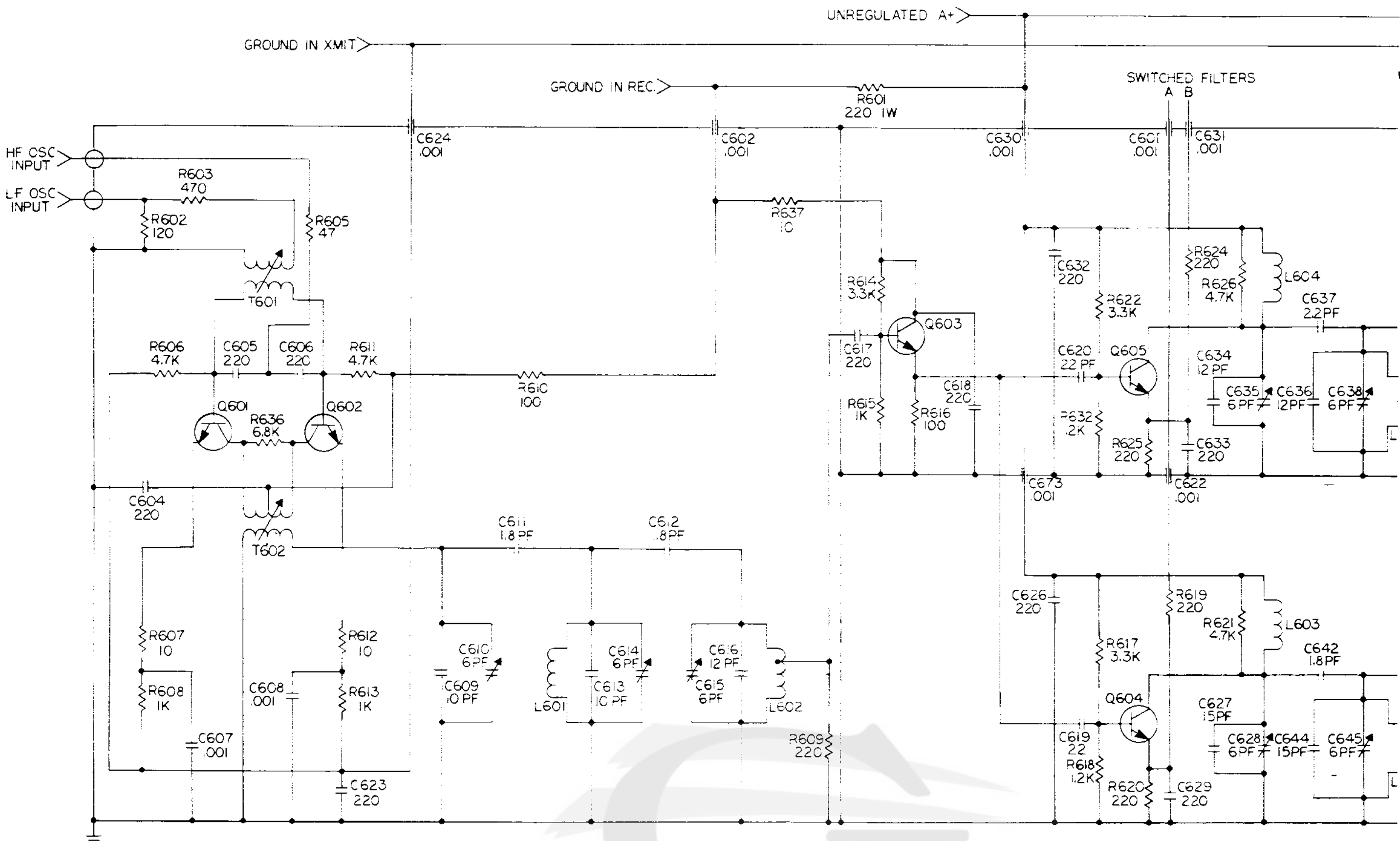


Figure 4-5-23
Mainboard Parts/Track Map



NOTE— UNLESS OTHERWISE SPECIFIED:
ALL RESISTANCES ARE IN OHMS
ALL CAPACITANCES ABOVE 1.0 ARE IN PFD
ALL CAPACITANCES BELOW 1.0 ARE IN MFD

Model: ALPHA/300



Model: ALPHA/300

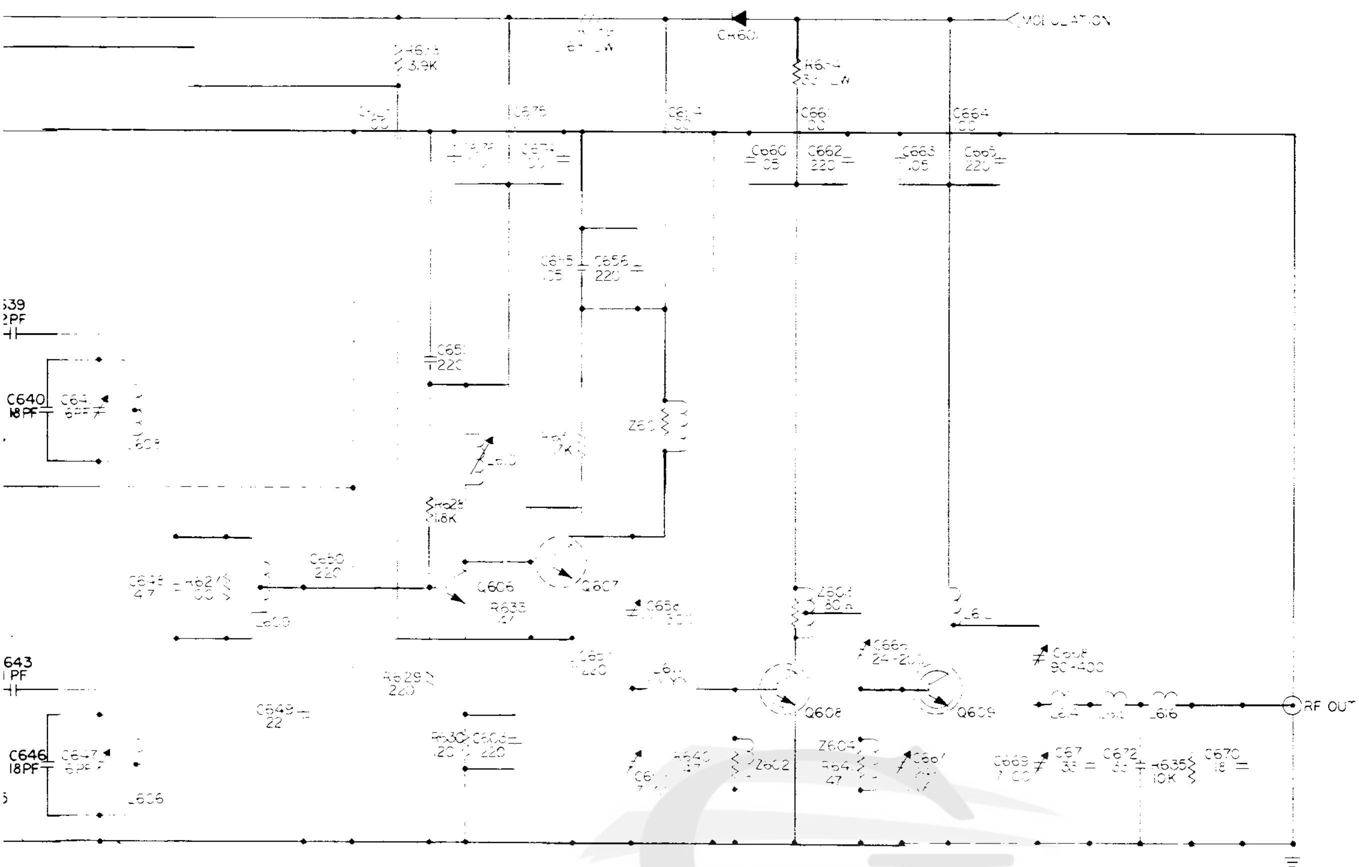
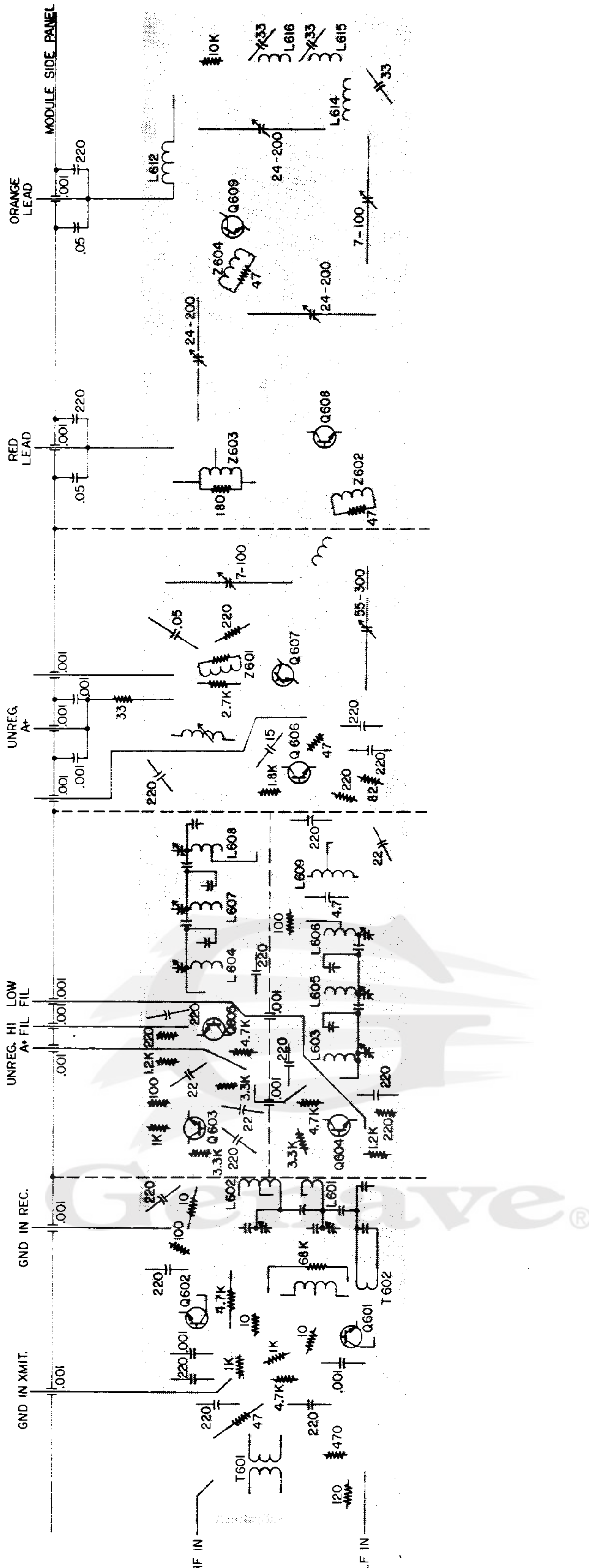
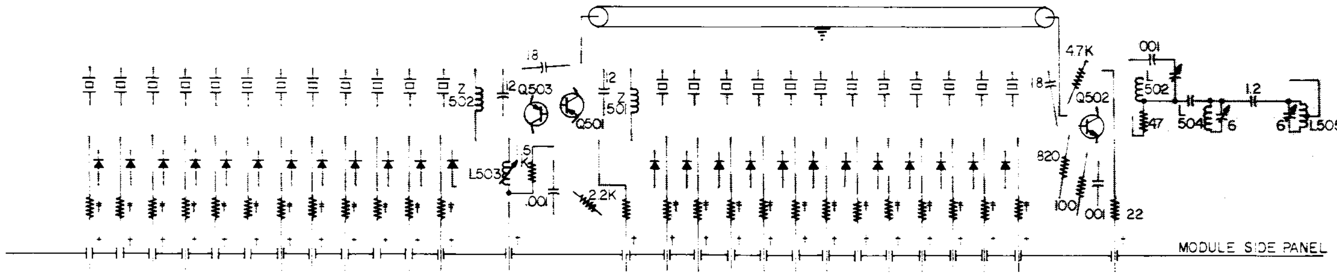


Figure 4-5-22
Exciter—Transmitter Schematic



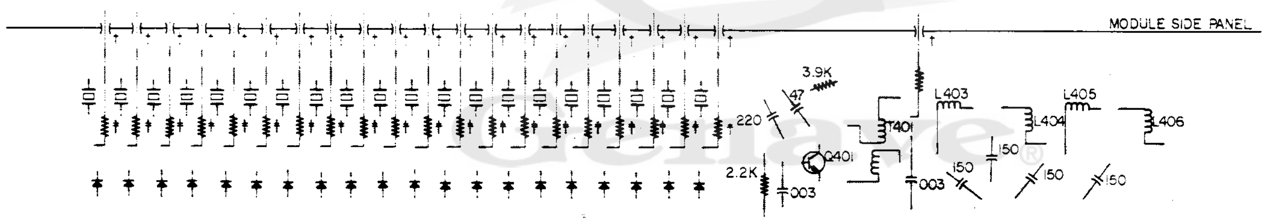
Model: ALPHA/300

Figure 4-5-24
Exciter—Transmitter Parts/Track Map



† = INDICATES .001 MICRO FARAD FEED THROUGH
‡ = INDICATES 100 OHM 1/4 WATT RESISTOR

Figure 4-5-25
HF Oscillator Parts/Track Map



† = INDICATES .001 MICRO FARAD FEED THROUGH
‡ = INDICATES 100 OHM 1/4 WATT RESISTOR

Figure 4-5-26
LF Oscillator Parts/Track Map

Model: ALPHA/300

MATCHED COMPONENTS

Part	Mate	Matching Criterion
C188	C189	Capacitance to ± 2%
C189	C188	Capacitance to ± 2%
C200	C202	Capacitance to ± 2%
C202	C200	Capacitance to ± 2%
C211	C214	Capacitance to ± 2%
C214	C211	Capacitance to ± 2%
CR113	CR114	Forward Voltage at 20 ma to ± .05 VDC
CR114	CR113	Forward Voltage at 20 ma to ± .05 VDC
Q135	Q137	DC Beta at + 6 V and 0.1 ma to ± 10%
Q136	Q138	DC Beta at — 6 V and 4 ma to ± 10%
Q137	Q135	DC Beta at + 6 V and 0.1 ma. to ± 10%
Q138	Q136	DC Beta at — 6 V and 4 ma to ± 10%
Q139	Q140	DC Beta at — 6 V and 4 ma to ± 10%
Q140	Q139	DC Beta at — 6 V and 4 ma to ± 10%
Q141	Q142	DC Beta at — 6 V and 4 ma to ± 10%
Q142	Q141	DC Beta at — 6 V and 4 ma to ± 10%
Q144	Q145, Q146	DC Beta at — 6 V and 4 ma to ± 10%
Q145	Q144, Q146	DC Beta at — 6 V and 4 ma to ± 10%
Q146	Q144, Q145	DC Beta at — 6 V and 4 ma to ± 10%

Figure 4-5-27
Table of Matched Components

Figure 4-5-28

SELECTED TROUBLESHOOTING PROBLEMS

PROBLEM	POSSIBLE SOLUTION
Unit inoperative on some channels, operative on others.	Check RF output of both oscillators using the high impedance detector and VTVM or VOM. Retune oscillators if necessary.
Extreme insensitivity on all channels.	Check all coaxial cables and input connectors for opens or shorts. Check that antenna(s) are properly connected.
Unit inoperative in one mode, operative in another.	Check switching signals to oscillators and to 1st IF's.
Severe changes in Omni accuracy with changes in RF input level.	Check for proper grounding signal to C166 from NAV/COM switch. Check C166.
Transmitter inoperative.	Check RF output of both oscillators using the high impedance detector and a VTVM. Check output of exciter on base of Q606 using the low impedance detector (figure 4-4-2) and a VTVM. Output should be 0.6 VDC or greater from exciter. Check switching signal to exciter filters.
Omni inoperative.	Check wiper of R190 for proper output (figure 4-5-16). Check emitter and collector of Q130 for proper output (figure 4-5-13).

Figure 4-5-28
Selected Troubleshooting Problems

4-6. Specialized Procedures

A. *Front Panel Removal*

Removing the front panel allows access to the volume control, squelch control, course deviation indicator, indicator lamps, backlighting lamps, and the NAV/COM switch.

1. Remove all of the control knobs from their shafts.
2. Remove the four (4) Phillips head machine screws from the corners of the front panel using a screwdriver and open end wrench.
3. Collect the four (4) spacers, nuts, and lockwashers for reassembly.
4. Pull the front panel off over the control shafts being careful not to damage the indicator lamps or their leads.
5. To reassemble reverse the above steps.

B. *OBS Pot Removal and Replacement*

1. Remove front panel as described in Part A.
2. Disconnect leads from meter, noting their locations for reassembly.
3. Loosen bushing setscrew on rear of OBS drum and remove OBS drum.
4. Remove the three (3) 3/16″ hex head screws from the OBS pot using an open end wrench.
5. Remove the five wires from the OBS pot noting their positions for reassembly.

C. *Exciter—Transmitter Module Removal and Installation*

1. Remove the long screw holding the meter damping capacitor (1500 MFd, 1V).
2. Remove the two (2) remaining screws.
3. Unsolder the leads from the feedthroughs noting their positions for reassembly.
4. Unsolder and remove the two coaxial cables from the main control board. The longest cable is the high frequency input.
5. Te reassemble reverse the above steps. Be sure to trim excess leads off the feedthroughs prior to resoldering leads. The transmitter cover panels are positioned so as to allow access for adjustments.
6. To reassemble reverse the above steps.

C. *Exciter—Transmitter Module Removal and Installation*

1. Remove the long screw holding the meter damping capacitor (1500 MFd, 1V).
2. Remove the two (2) remaining screws.
3. Unsolder the leads from the feedthroughs noting their positions for reassembly.
4. Unsolder and remove the two coaxial cables from the main circuit board. The longest cable is the high frequency input.
5. To reassemble reverse the above steps. Be sure to trim excess leads off the feedthroughs prior to resoldering leads. The transmitter cover panels are positioned so as to allow access for adjustments.

D. *Oscillator Repairs*

The ALPHA/300 high and low frequency oscillators are constructed in a manner which makes servicing easy.

1. To service a singular or multiple crystal(s) remove the oscillator assembly from the side panel by removing the two (2) retaining screws. There is no need to unsolder the oscillator leads unless the entire oscillator module is to be replaced.
2. Remove the top and bottom oscillator covers by unsoldering. This makes the entire oscillator easily accessible.

NOTE: Do not attempt to adjust the high frequency oscillator double filter trimmers. The high frequency oscillator doubler filter is prealigned at the factory. It should not be necessary to readjust this filter unless the components of the *filter itself* are damaged, in which case the high frequency oscillator module should be replaced and the old module returned to the factory for repair.

3. In order to replace the oscillator module with a new module the cable from the oscillator must be removed from the main circuit board and the leads must be removed from the feedthroughs. Be sure to note the location of these various leads and the cable for module replacement.
4. To replace the oscillator module reverse the above steps.

E. *Dial and Gear Servicing*

The following procedure is used to gain access to the frequency selector dials and gear train without major disassembly of the unit.

1. Remove the four (4) frequency selector knobs from the front panel.
2. Loosen the bushing setscrew on the rear of the OBS drum.

3. Disconnect meter leads and backlighting lamp lines from the main circuit board and allow about three inches (3") of slack.
4. Remove the four (4) sheet metal screws (2 per side) from the subpanel.
5. Pull the subpanel straight out over the switch shafts. Be sure to note the number and placement of the spacers on the OBS shaft for reassembly.
6. The dial bearing assembly is now accessible by sliding them off the switch shafts.
7. To reassemble reverse the above steps. The OBS pot must be realigned as described in Sub-Section 4-4, Part I, Step 3. Be sure to confirm the operation of the Omni Test switch and proper channeling of the frequency selectors and frequency readouts.

F. *Frequency Readout Alignment Procedures*

The method of readout alignment described here is applicable to both the Nav and Com readouts. Nav alignment adjustments are made from the top of the unit while Com adjustments are made from the bottom of the unit.

1. Set the Nav frequency selector switches to 111.6 MHz and the Com frequency selector switches to 131.25 MHz. This can be done by visual inspection of the switch wafers or by measuring the output frequency of the two oscillators in Nav and Com received modes with the frequency counter and referring to the Oscillator Frequency Tables, figures 4-4-14 and 4-4-15.
2. Slide the gears on the switch shafts forward until they mesh at a right angle with the gears on the dials.
3. Slide the gear locking collars up against the back of the gears and lock in place using a .035 in. hex key wrench.
4. Slide the MHz dial and gear outward until they mesh firmly with the gears on the switch shafts.
5. With the KHz dial displaying the selected frequency place a screwdriver between the KHz dial and the dial drive gear and force the gear outward until it meshes firmly with the gear on the KHz switch shaft.
6. Holding pressure between the KHz dial and the gear, lock the gear and dial in place by tightening the dial setscrew using a .050 in. hex key wrench.
7. Slide the MHz dial firmly against the KHz dial insuring that the selected frequency is being displayed in the readout.
8. Lock the dial in place by tightening the setscrew using a .050 in. hex key wrench.
9. Check for proper readout alignment in all positions.

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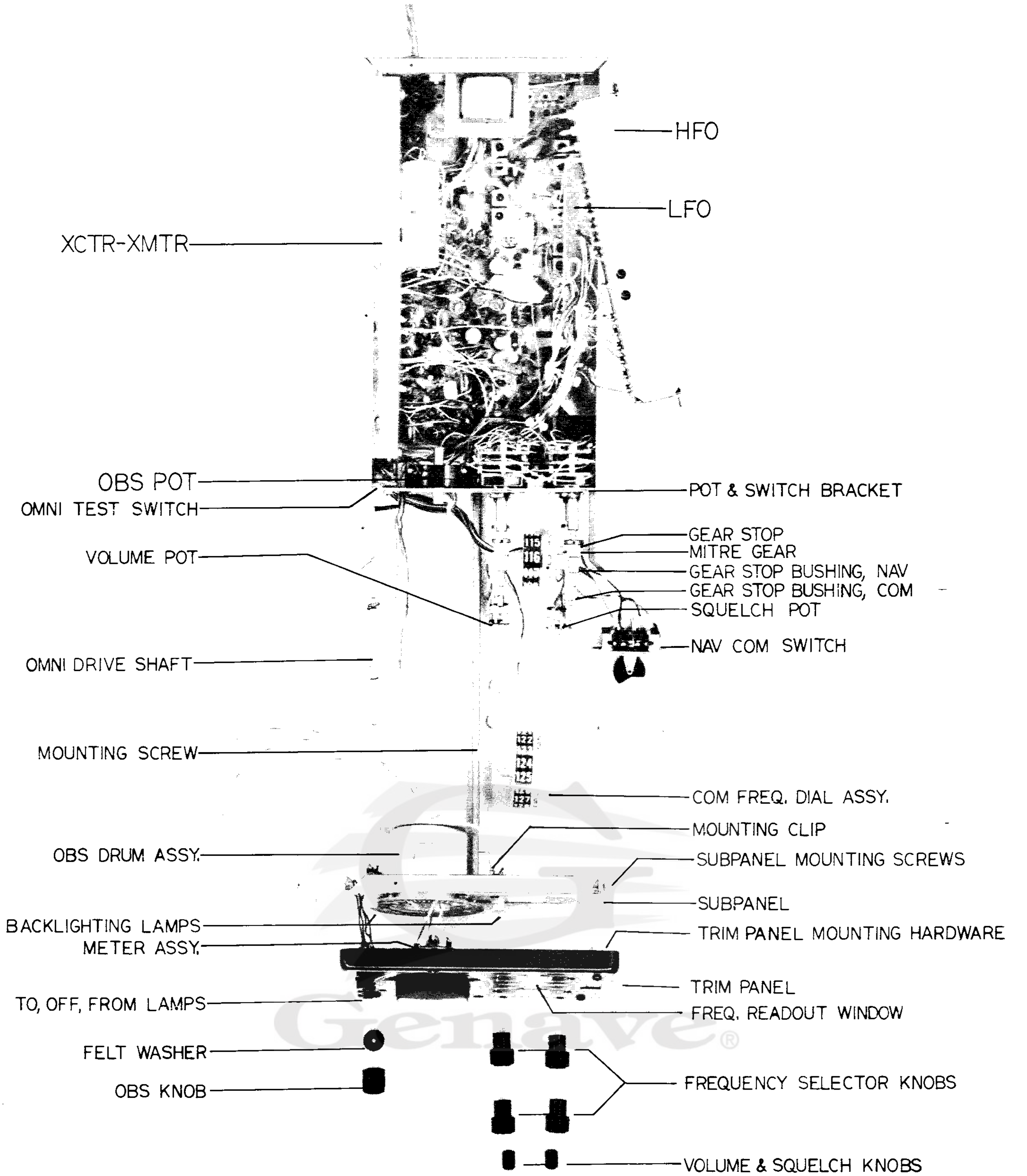


Model: ALPHA/300

Figure 4-6-1
Radio, Expanded View

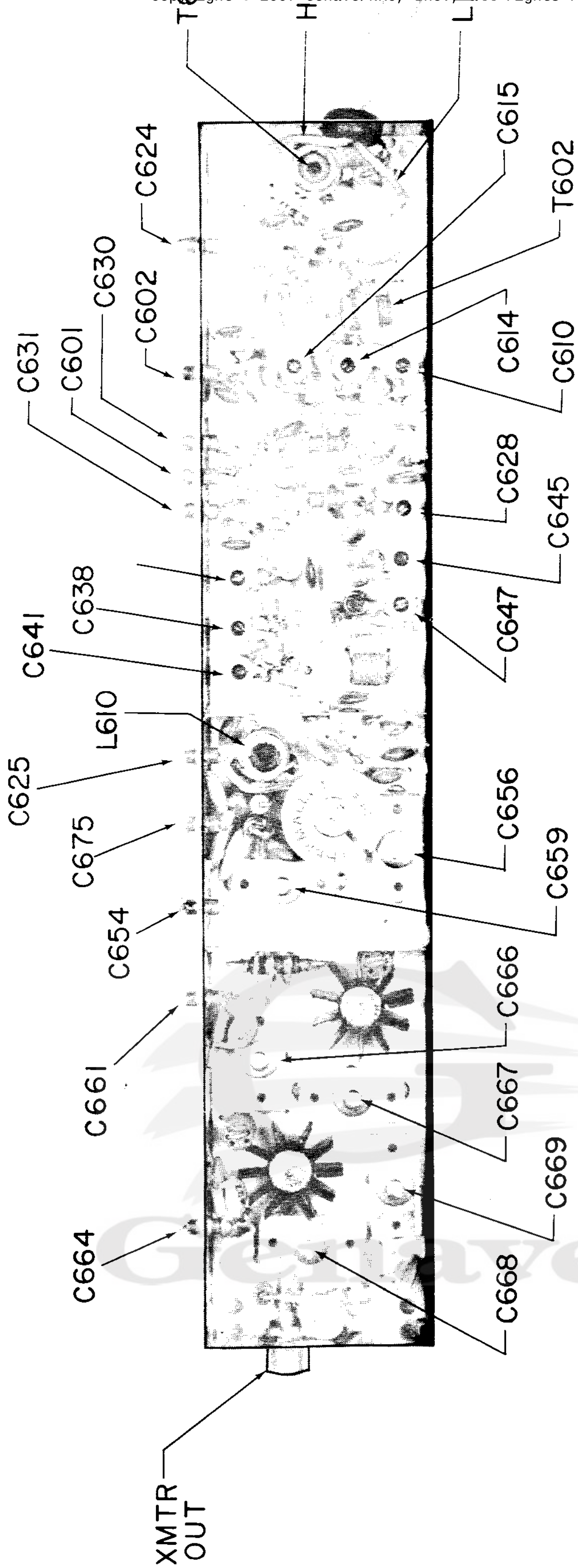
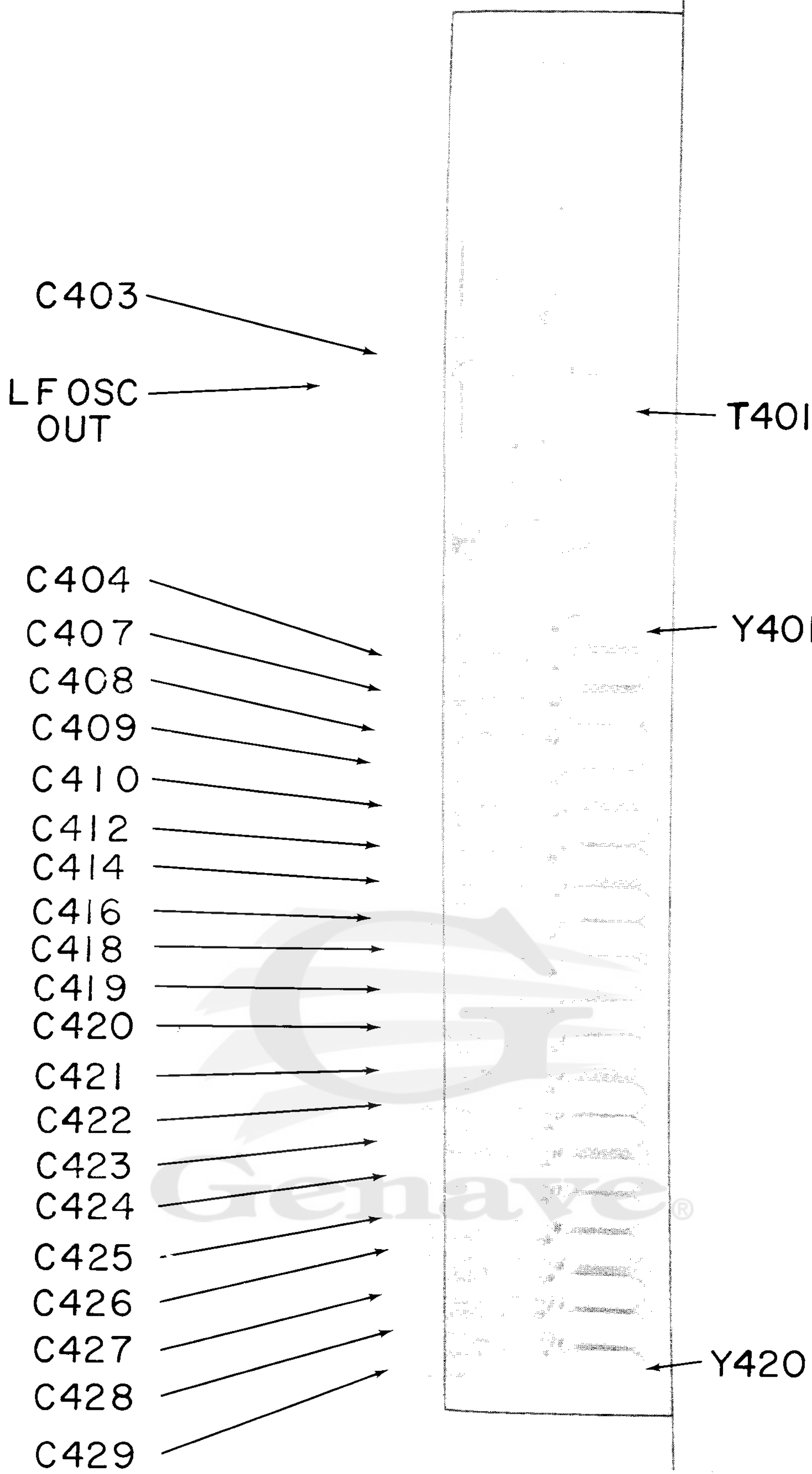


Figure 4-6-2
Exciter—Transmitter Lead Identification

Model: ALPHA/300



Model: ALPHA/300

Figure 4-6-3
LF Oscillator Lead Identification

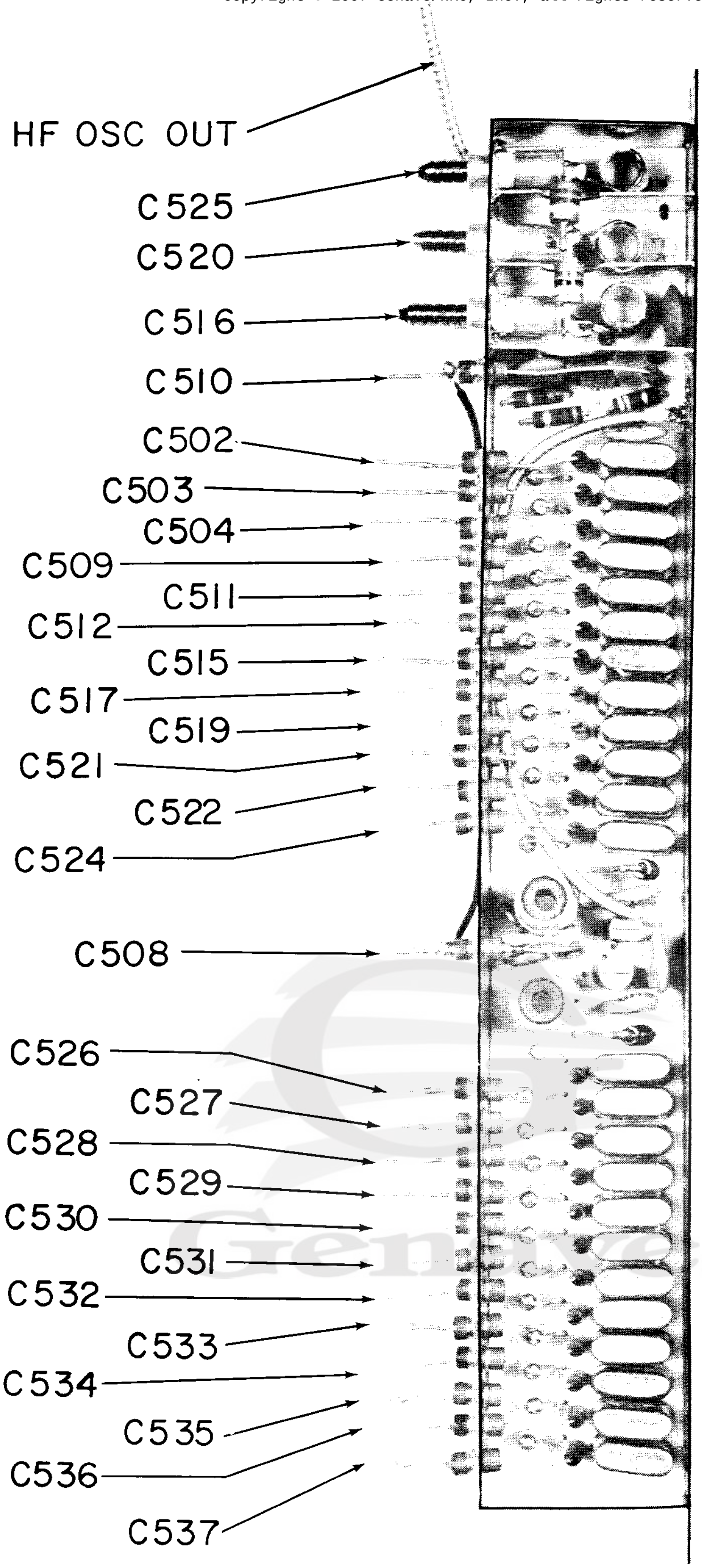


Figure 4-6-4
HF Oscillator Lead Identification

Model: ALPHA/300

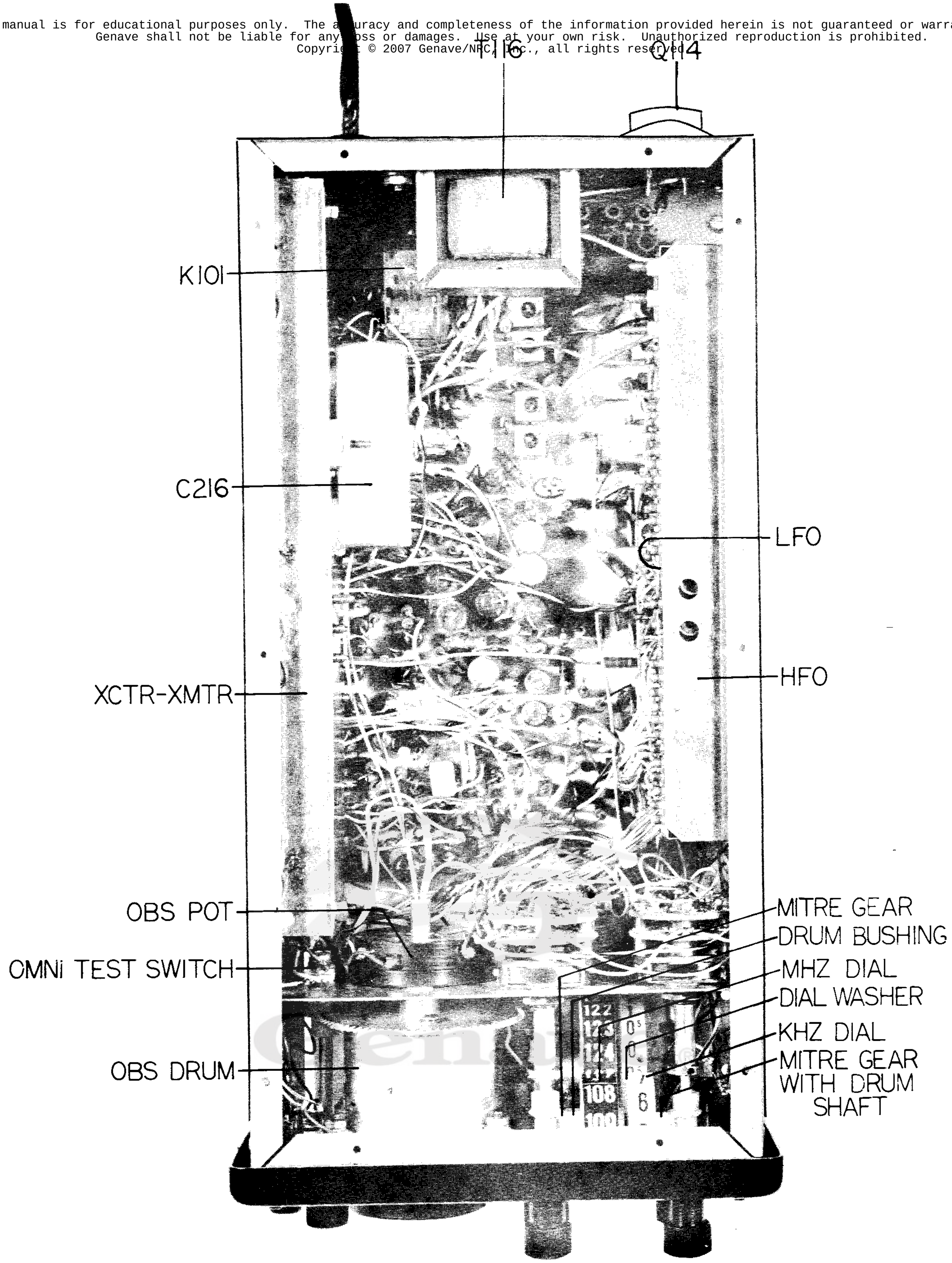


Figure 4-6-5

RADIO, TOP VIEW

Model: ALPHA/300

SECTION V
ALPHA/300 PARTS LIST

Ref. No.	Genave Part No.	DESCRIPTION
		CAPACITORS
C100	1570004	Trimmer, 0.8—6 pfd
C101	1520011	NPO Disc, 22 pfd ±10%
C102	1570004	Trimmer, 0.8—6 pfd
C103	1520011	NPO Disc, 22 pfd ±10%
C104	1570004	Trimmer, 0.8—6 pfd
C105	1520011	NPO Disc, 22 pfd±10%
C106	1570004	Trimmer, 0.8—6 pfd
C107	1570004	Trimmer, 0.8—6 pfd
C108	1510009	NPO Gimmick, 0.68 pfd ±10%
C109	1570004	Trimmer, 0.8—6 pfd
C110	1510009	NPO Gimmick, 0.68 pfd ±10%
C111	1570004	Trimmer, 0.8—6 pfd
C112	1510008	NPO Gimmick, 0.56 pfd ±10%
C113	1570004	Trimmer, 0.8—6 pfd
C114	1510011	NPO Gimmick, 1.0 pfd ±10%
C115	1570004	Trimmer, 0.5—3 pfd
C116	1520033	Z5F Disc, 220 pfd ±10%
C117	1520001	NPO Disc, 2.2 pfd ±10%
C118	1520059	Disc, 0.1 Mfd +80—20%
C119	1520048	Z5P Disc, .001 Mfd ±10%
C120	1520059	Disc, 0.1 Mfd +80—20%
C121	1520048	Z5P Disc, .001 Mfd ±10%
C122	1510017	NPO Gimmick, 2.2 pfd ±10%
C123	1520048	Z5P Disc, .001 Mfd ±10%
C124	1520048	Z5P Disc, .001 Mfd ±10%
C125	1520059	Disc, .1 Mfd +80—20%
C126	1520015	NPO Gimmick, 2.2 pfd ±10%
C127	1520001	NPO Disc, 2.2 pfd ±10%
C128	1520033	Z5F Disc, 220 pfd ±10%
C129	1520048	Z5P Disc, .001 Mfd ±10%
C130	1520059	Disc, .1 Mfd +80—20%
C131	1520059	Disc, .1 Mfd +80—20%
C132	1510048	X5R Disc, .001 Mfd ±10%
C133	1520017	NPO Gimmick, 3.3 pfd ±10%
C134	1520048	Z5P Disc, .001 Mfd ±10%
C135	1520048	Z5P Disc, .001 Mfd ±10%
C136	1510059	Disc, .1 Mfd +80—20%
C137	1520017	NPO Gimmick, 3.3 pfd ±10%
C138	1520021	NPO Disc, 82 pfd ±10%
C139	1520059	Disc, .1 Mfd +80—20%
C140	1520059	Disc, .1 Mfd +80—20%
C141	1520059	Disc, .1 Mfd +80—20%
C142	1520018	N220 Dics, 56 pfd ±10%
C143	1520018	N220 Disc, 56 pfd ±10%
C144	1520011	NPO Disc, 22 pfd ±10%
C145	1520059	Disc, .1 Mfd +80—20%
C146	1520059	Disc, .1 Mfd +80—20%
C147	1520059	Disc, .1 Mfd +80—20%
C148	1520018	N220 Disc, 56 pfd ±10%
C149	1520018	N220 Disc, 56 pfd ±10%
C150	1520011	NPO Disc, 22 pfd ±10%
C151	1520059	Disc, .1 Mfd +80—20%
C152	1520059	Disc, .1 Mfd +80—20%
C153	1520059	Disc, .1 Mfd +80—20%
C154	1520018	N220 Disc, 56 pfd ±10%
C155	1520018	N220 Disc, 56 pfd ±10%
C156	1520059	Disc, .1 Mfd +80—20%
C157	1520059	Disc, .1 Mfd +80—20%
C158	1520018	N220 Disc, 56 pfd ±10%
C159	1520018	N200 Disc, 56 pfd ±10%
C160	1520011	NPO Disc, 22 pfd ±10%
C161	1540021	Aluminum Electrolytic, 64 Mfd, 4 VDC
C162	1520024	N1500 Disc, 100 pfd ±10%
C163	1520050	Disc, .003 Mfd +80—20%, 12VDC
C164	1540005	Aluminum Electrolytic, 2.5 Mfd, 10 VDC
C165	1520059	Disc, .01 Mfd ±20%, 25V
C166	1540021	Aluminum Electrolytic, 64 Ffd, 4 VDC
C167	1520048	Z5P Disc, .001 Mfd ±10%
C168	1500044	Metal Mylar, 1 Mfd, 50 VDC
C169	1500044	Metal Mylar, 1 Mfd, 50 VDC
C170	1520057	Disc, .22 Mfd, +80—20%
C171	1500024	Mylar, .022 Mfd ±10%, 100V
C172	1500024	Mylar, .022 Mfd ±10%, 100V
C173	1500024	Mylar, .022 Mfd ±10%, 100V
C174	1520048	Z5P Disc, .001 Mfd ±10%
C175	1520048	Z5P Disc, .001 Mfd ±10%
C176	1500014	Mylar, .0056 Mfd ±10%
C177		Z5F Disc, 220 pfd ±10%
C178	1520033	Aluminum Elecrolytic, 64 Mfd, 4 VDC
C179	1550005	Aluminum Electrolytic, 2.5 Mfd, 16 VDC
C180	1520051	Disc, .01 Mfd ±20%, 25 VDC
C181	1540023	Aluminum Electrolytic, 125 Mfd, 16 VDC
C182	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C183	1520048	X5R Disc, .001 Mfd ±10%
C184	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C185	1520048	Z5P Disc, .001 Mfd ±10%
C186	1500032	Metal Film, .1 Mfd, 10 VDC
C187	1520048	X5R Disc, .001 Mfd, ±10%
C188	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C189	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C190	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C191		Selected
C192	1500013	Mylar, .0047 Mfd ±10%, 100 VDC
C193	1500010	Mylar, .0033 Mfd ±10%, 100 VDC
C194	1520029	N1500 Disc, 150 pfd ±10%
C195	1500014	Mylar, .0056 Mfd ±10%, 100 VDC
C196	1500005	Mylar, .0015 Mfd ±10%, 100 VDC
C197	1520024	N1500 Disc, 100 pfd ±10%
C198	1500035	Mylar, .1 Mfd ±10%, 100 VDC
C199	1500025	Mylar, .033 Mfd ±10%, 100 VDC
C200	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C201	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C202	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C203	1500016	Mylar, .0068 Mfd ±10%, 100 VDC
C204	1500025	Mylar, .033 Mfd ±10%, 100 VDC
C205	1500016	Mylar, .0068 Mfd ±10%, 100 VDC
C206	1500025	Mylar, .033 Mfd ±10%, 100 VDC
C207	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C208	1500008	Mylar, .0022 Mfd ±10%, 100 VDC
C209	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C210	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C211	1500017	Mylar, .0082 Mfd ±10%, 100 VDC
C212	1500018	Mylar, .01 Mfd ±10%, 100 VDC
C213	1500024	Mylar, .022 Mfd ±10%, 100 VDC
C214	1500017	Mylar, .0082 Mfd ±10%, 100 VDC
C215	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C216	1540043	Aluminum Electrolytic, 1500 Mfd, 1V
C217	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C218	1500035	Mylar, .1 Mfd ±10%, 100 VDC
C219	1500035	Mylar, .1 Mfd ±10%, 100 VDC
C220	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C221	1540023	Aluminum Electrolytic, 125 Mfd ±10%, 16 VDC
C222	1500037	Mylar, .22 Mfd ±10%, 100 VDC
C223	1520048	Z5P Disc, .001 Mfd ± 10%
C224	1520048	Z5P Disc, .001 Mfd ±10%
C225	1540021	Aluminum Electrolytic, 64 Mfd ±10%, 4 VDC
C226	1520011	NPO Disc, 22 pfd ±10%
C227	1520048	Z5P Disc, .001 Mfd ±10%
C228	1540003	Aluminum Electrolytic, 1 Mfd ±10%, 40 VDC
C229	1520059	Disc, . Mfd +80—20%
C230	1500027	Mylar, .047 Mfd ±10%, 100 VDC
C231		Unassigned
C232		Unassigned
C401	1520048	Z5P Disc, .001 Mfd ±10%
C402	1520033	Z5F Disc, 220 pfd ±10%
C403	1520061	Feedthrough, .001 Mfd ±10%
C404	1520061	Feedthrough, .001 Mfd ±10%
C405	1520050	Z5F Disc, .003 Mfd ±10%
C406	1520016	N1500 Disc, 47 pfd ±10%
C407	1520061	Feedthrough, .001 Mfd ±10%
C408	1520061	Feedthrough, .001 Mfd ±10%
C409	1520061	Feedthrough, .001 Mfd ±10%
C410	1520061	Feedthrough, .001 Mfd ±10%
C411	1520029	N1500 Disc, 150 pfd ±10%
C412	1520061	Feedthrough, .001 Mfd ±10%
C413	1520029	N1500 Disc, 150 pfd ±10%
C414	1520061	Feedthrough, .001 Mfd ±10%
C415	1520029	N1500 Disc, 150 pfd ±10%
C416	1520061	Feedthrough, .001 Mfd ±10%
C417	1520029	N1500 Disc, 150 pfd ±10%
C418	1520061	Feedthrough, .001 Mfd ±10%
C419	1520061	Feedthrough, .001 Mfd ±10%
C420	1520061	Feedthrough, .001 Mfd ±10%
C421	1520061	Feedthrough, .001 Mfd ±10%
C422	1520061	Feedthrough, .001 Mfd ±10%
C423	1520061	Feedthrough, .001 Mfd ±10%
C424	1520061	Feedthrough, .001 Mfd ±10%
C425	1520061	Feedthrough, .001 Mfd ±10%
C426	1520061	Feedthrough, .001 Mfd ±10%
C427	1520061	Feedthrough, .001 Mfd ±10%
C428	1520061	Feedthrough, .001 Mfd ±10%
C429	1520061	Feedthrough, .001 Mfd ±10%
C430		Unassigned
C501	1520048	Z5P Disc, .001 Mfd ±10%
C502	1520061	Feedthrough, .001 ±10%
C503	1520061	Feedthrough, .001 ±10%
C504	1520061	Feedthrough, .001 ±10%
C505	1520008	NPO Disc, 12 pfd ±10%
C506	1520013	NPO Disc, 33 pfd ±10%
C507	1520010	NPO Disc, 18 pfd ±10%
C508	1520061	Feedthrough, .001 Mfd ±10%
C509	1520061	Feedthrough, .001 Mfd ±10%
C510	1520061	Feedthrough, .001 Mfd ±10%
C511	1520061	Feedthrough, .001 Mfd ±10%
C512	1520061	Feedthrough, .001 Mfd ±10%
C513	1520048	Z5P Disc, .001 Mfd ±10%
C514	1520048	Z5P Disc, .001 Mfd ±10%
C515	1520061	Feedthrough, .001 Mfd ±10%
C516	1570004	Trimmer, .8—6 pfd
C517	1520061	Feedthrough, .001 Mfd ±10%
C518	1510011	Gimmick, 1.0 pfd ±10%
C519	1520061	Feedthrough, .001 Mfd ±10%
C520	1570004	Trimmer, .8—6 pfd

Section V Parts List (Continued)

Ref. No.	Genave Part No.	DESCRIPTION
C521	1520061	Feedthrough, .001 Mfd ±10%
C522	1520061	Feedthrough, .001 Mfd ±10%
C523	1510012	Gimmick, 1.2 pfd ±10%
C524	1520061	Feedthrough, .001 Mfd ±10%
C525	1570004	Trimmer, .8—6 pfd
C526	1520061	Feedthrough, .001 Mfd ±10%
C527	1520061	Feedthrough, .001 Mfd ±10%
C528	1520061	Feedthrough, .001 Mfd ±10%
C529	1520061	Feedthrough, .001 Mfd ±10%
C530	1520061	Feedthrough, .001 Mfd ±10%
C531	1520061	Feedthrough, .001 Mfd ±10%
C532	1520061	Feedthrough, .001 Mfd ±10%
C533	1520061	Feedthrough, .001 Mfd ±10%
C534	1520061	Feedthrough, .001 Mfd ±10%
C535	1520061	Feedthrough, .001 Mfd ±10%
C536	1520061	Feedthrough, .001 Mfd ±10%
C537	1520061	Feedthrough, .001 Mfd ±10%
C538	1520008	NPO Disc, 12 pfd ±10%
C539		Unassigned
C540		Unassigned
C601	1520061	Feedthrough, .001 Mfd ±10%
C602	1520061	Feedthrough, .001 Mfd ±10%
C603	1520033	Z5F Disc, 220 pfd ±10%
C604	1520033	Z5F Disc, 220 pfd ±10%
C605	1520029	Z5F Disc, 150 pfd ±10%
C606	1520029	Z5F Disc, 150 pfd ±10%
C607	1520048	Z5P Disc, .001 Mfd ±10%
C608	1520048	Z5P Disc, .001 Mfd ±10%
C609	1520007	NPO Disc, 10 pfd ±10%
C610	1570004	Trimmer, .8—6 pfd
C611	1510015	Gimmick, 2.2 pfd ±10%
C612	1510015	Gimmick, 2.2 pfd ±10%
C613	1520008	NPO Disc, 12 pfd ±10%
C614	1570004	Trimmer, .8—6 pfd
C615	1570004	Trimmer, .8—6 pfd
C616	1520008	NPO Disc, 18 pfd ±10%
C617	1520033	Z5F Disc, 220 pfd ±10%
C618	1520033	Z5F Disc, 220 pfd ±10%
C619	1520011	NPO Disc, 22 pfd ±10%
C620	1520011	NPO Disc, 22 pfd ±10%
C621	1520061	Feedthrough, .001 Mfd ±10%
C622	1520061	Feedthrough, .001 Mfd ±10%
C623	1520059	Z5F Disc, 220 pfd ±10%
C624	1520061	Feedthrough, .001 Mfd ±10%
C625	1520061	Feedthrough, .001 Mfd ±10%
C626	1520033	Z5F Disc, 220 pfd ±10%
C627	1520010	NPO Disc, 18 pfd ±10%
C628	1570004	Trimmer, .8—6 pfd
C629	1520033	Z5F Disc, 220 pfd ±10%
C630	1520061	Feedthrough, .001 Mfd ±10%
C631	1520061	Feedthrough, .001 Mfd ±10%
C632	1520033	Z5F Disc, 220 pfd ±10%
C633	1520033	Z5F Disc, 220 pfd ±10%
C634	1520008	NPO Disc, 12 pfd ±10%
C635	1570004	Trimmer, .8—6 pfd
C636	1520008	NPO Disc, 12 pfd ±10%
C637	1510013	Gimmick, 1.8 pfd ±10%
C638	1570004	Trimmer, .8—6 pfd
C639	1510013	Gimmick, 1.5 pfd ±10%
C640	1520010	NPO Disc, 18 pfd ±10%
C641	1570004	Trimmer, .8—6 pfd
C642	1510014	Gimmick, 1.8 pfd ±10%
C643	1510014	Gimmick, 1.5 pfd ±10%
C644	1520009	NPO Disc, 15 pfd ±10%
C645	1570004	Trimmer, .8—6 pfd
C646	1520010	NPO Disc, 18 pfd ±10%
C647	1570004	Trimmer, .8—6 pfd
C648	1520004	NPO Disc, 4.7 pfd ±10%
C649	1520011	NPO Disc, 22 pfd ±10%
C650	1520033	Z5F Disc, 220 pfd ±10%
C651	1520033	Z5FDisc, 220 pfd ±10%
C652		Unassigned
C653	1520009	NPO Disc, 15 pfd ±10%
C654	1520061	Feedthrough, .001 Mfd ±10%
C655	1520054	Z5F Disc, .05 Mfd ±10%
C656	1520033	Z5F Disc, 220 pfd ±10%
C657	1520033	Z5F Disc, 220 pfd ±10%
C658	1560004	Variable, 53—300 pfd
C659	1560003	Variable, 24—200 pfd
C660	1520054	Z5F Disc, .05 Mfd ±10%
C661	1520061	Feedthrough, .001 Mfd ±10%
C662	1520033	Z5F Disc, 220 pfd ±10%
C663	1520054	Z5F Disc, .05 Mfd ±10%
C664	1520061	Feedthrough, .001 Mfd ±10%
C665	1520033	Z5F Disc, 220 pfd ±10%
C666	1560003	Variable, 24—200 pfd
C667	1560003	Variable, 24—200 pfd
C668	1560002	Variable, 7—100 pfd
C669	1560002	Variable, 7—100 pfd
C670	1520010	NPO Disc, 18 pfd ±10%
C671	1520013	NPO Disc, 33 pfd ±10%
C672	1520013	NPO Disc, 33 pfd ±10%
C673	1520061	Feedthrough, .001 Mfd ±10%
C674	1520033	Z5F Disc, 220 pfd ±10%
C675	1520061	Feedthrough, .001 Mfd ±70%
C676	1520033	Z5F Disc, .05 Mfd ±10%
C677		Unassigned
C678		Unassigned

DIODES

Ref. No.	Genave Part No.	DESCRIPTION
CR101	4810021	Germanium, General Purpose, IN34A
CR102	4810017	Silicon, High Frequency Switching, FD 1936
CR103	4810017	Silicon, High Frequency Switching, FD 1936
CR104	4810017	Silicon, High Frequency Switching, FD 1936
CR105	4810001	Silicon, General Purpose, 100 V., 0.75A, TS-1
CR106	4810011	Zener, 24 V., 1 W.
CR107	4810011	Zener, 24 V., 1 W.
CR108	4810006	Zener, 5.6 V., 1 W.
CR109	4810017	Silicon, High Frequency Switching, FD 1936
CR110	4810017	Silicon, High Frequency Switching, FD 1936
CR111	4810017	Silicon, High Frequency Switching, FD 1936
CR112	4810017	Silicon, High Frequency Switching, FD 1936
CR113	4810021	Germanium, General Purpose, IN34A
CR114	4810021	Germanium, General Purpose, IN34A
CR115	4810021	Germanium, General Purpose, IN34A
CR116	4810017	Silicon, High Frequency Switching, FD 1936
CR117	4810017	Silicon, High Frequency Switching, FD 1936
CR118	4810017	Silicon, High Frequency Switching, FD 1936
CR119	4810017	Silicon, High Frequency Switching, FD 1936
CR120	4810017	Silicon, High Frequency Switching, FD 1936
CR121		Unassigned
CR122		Unassigned
CR401	4810017	Silicon, High Frequency Switching, FD 1936
CR402	4810017	Silicon, High Frequency Switching, FD 1936
CR403	4810017	Silicon, High Frequency Switching, FD 1936
CR404	4810017	Silicon, High Frequency Switching, FD 1936
CR405	4810017	Silicon, High Frequency Switching, FD 1936
CR406	4810017	Silicon, High Frequency Switching, FD 1936
CR407	4810017	Silicon, High Frequency Switching, FD 1936
CR408	4810017	Silicon, High Frequency Switching, FD 1936
CR409	4810017	Silicon, High Frequency Switching, FD 1936
CR410	4810017	Silicon, High Frequency Switching, FD 1936
CR411	4810017	Silicon, High Frequency Switching, FD 1936
CR412	4810017	Silicon, High Frequency Switching, FD 1936
CR413	4810017	Silicon, High Frequency Switching, FD 1936
CR414	4810017	Silicon, High Frequency Switching, FD 1936
CR415	4810017	Silicon, High Frequency Switching, FD 1936
CR416	4810017	Silicon, High Frequency Switching, FD 1936
CR417	4810017	Silicon, High Frequency Switching, FD 1936
CR418	4810017	Silicon, High Frequency Switching, FD 1936
CR419	4810017	Silicon, High Frequency Switching, FD 1936
CR420	4810017	Silicon, High Frequency Switching, FD 1936
CR421		Unassigned
CR422		Unassigned
CR501	4810017	Silicon, High Frequency Switching, FD 1936
CR502	4810017	Silicon, High Frequency Switching, FD 1936
CR503	4810017	Silicon, High Frequency Switching, FD 1936
CR504	4810017	Silicon, High Frequency Switching, FD 1936
CR505	4810017	Silicon, High Frequency Switching, FD 1936
CR506	4810017	Silicon, High Frequency Switching, FD 1936
CR507	4810017	Silicon, High Frequency Switching, FD 1936
CR508	4810017	Silicon, High Frequency Switching, FD 1936
CR509	4810017	Silicon, High Frequency Switching, FD 1936
CR510	4810017	Silicon, High Frequency Switching, FD 1936
CR511	4810017	Silicon, High Frequency Switching, FD 1936
CR512	4810017	Silicon, High Frequency Switching, FD 1936
CR513	4810017	Silicon, High Frequency Switching, FD 1936
CR514	4810017	Silicon, High Frequency Switching, FD 1936
CR515	4810017	Silicon, High Frequency Switching, FD 1936
CR516	4810017	Silicon, High Frequency Switching, FD 1936
CR517	4810017	Silicon, High Frequency Switching, FD 1936
CR518	4810017	Silicon, High Frequency Switching, FD 1936
CR519	4810017	Silicon, High Frequency Switching, FD 1936
CR520	4810017	Silicon, High Frequency Switching, FD 1936
CR521	4810017	Silicon, High Frequency Switching, FD 1936
CR522	4810017	Silicon, High Frequency Switching, FD 1936
CR523	4810017	Silicon, High Frequency Switching, FD 1936
CR524	4810017	Silicon, High Frequency Switching, FD 1936
CR525		Unassigned
CR526		Unassigned
CR601	4810001	Silicon, General Purpose, 100 V., 0.75A, TS-1

LAMPS

Ref. No.	Genave Part No.	DESCRIPTION
DS101	3900004	Clear, 14 V, 80 Ma, 50,000 Hr.
DS102	3900004	Clear, 14 V, 80 Ma, 50,000 Hr.
DS103	3900004	Clear, 14 V, 80 Ma, 50,000 Hr.
DS104	3900006	Green, 14 V, 80 Ma., 50,000 Hr.
DS105	3900005	Red, 14 V, 80 Ma, 50,000 Hr.
DS106	3900007	Amber, 14 V, 80 Ma, 50,000 Hr.

COILS

Ref. No.	Genave Part No.	DESCRIPTION
L100	1800017	Coil, Bandstop Filter
L101	1800017	Coil, Bandstop Filter
L102	1800017	Coil, Bandstop Filter
L103	1800017	Coil, Bandstop Filter
L104	1800024	Coil, Input Filter
L105	1800009	Coil, Input Filter
L106	1800009	Coil, Input Filter
L107	1800009	Coil, Input Filter
L108	1800044	Coil, Input Filter
L109	1800029	50 MHy ±10%
L110	1800033	50 MHy
L401		Unassigned
L402		Unassigned
L403	1800045	Coil, LF Filter
L404	1800045	Coil, LF Filter
L405	1800045	Coil, LF Filter
L406	1800006	Coil, LF Filter
L501	1800047	Coil, HF Oscillator
L502	1800050	Coil, HF Doubler
L503	1800049	Coil, HF Oscillator

Section V Parts List (Continued)

Ref. No.	Genave Part No.	DESCRIPTION
L504	1800050	Coil, HF Doubler
L505	1800052	Coil, HF Doubler
L601	1800012	Coil, Exciter Filter
L602	1800011	Coil, Exciter Filter
L603	1800012	Coil, Exciter Filter
L604	1800012	Coil, Exciter Filter
L605	1800012	Coil, Exciter Filter
L606	1800011	Coil, Exciter Filter
L607	1800012	Coil, Exciter Filter
L608	1800011	Coil, Exciter Filter
L609	1800008	Coil, Exciter Output
L610	1800055	Coil, Exciter Tuning
L611	1800054	Coil, Matching
L612		Unassigned
L613	1800019	Coil, Matching
L614	1800012	Coil, Transmitter Filter
L615	1800018	Coil, Transmitter Filter
L616	1800012	Coil, Transmitter Filter
L617		Unassigned
L618		Unassigned

TRANSISTORS

Ref. No.	Genave Part No.	DESCRIPTION
Q100	4800024	Silicon, NPN, Blue, MPS 3563
Q101	4800024	Silicon, NPN, Blue, MPS 3563
Q102	4800024	Silicon, NPN, Blue, MPS 3563
Q103	4800024	Silicon, NPN, Blue, MPS 3563
Q104	4800026	Silicon, NPN, White, MPS 3693
Q105	4800026	Silicon, NPN, White, MPS 3693
Q106	4800026	Silicon, NPN, White, MPS 3693
Q107	4800026	Silicon, NPN, White, MPS 3693
Q108	4800029	Silicon, NPN, Orange, MPS 6514 S
Q109	4800008	Silicon, PNP, Black, 2N5086
Q110	4800008	Silicon, PNP, Black, 2N5086
Q111	4800029	Silicon, NPN, Orange, MPS 6514 S
Q112	4800029	Silicon, NPN, Orange, MPS 6514 S
Q113	4800002	Silicon, NPN, MPS 6531
Q114	4800001	Silicon, NPN, 2N3055
Q115	4800022	Silicon, PNP, MPS U51
Q116	4800029	Silicon, NPN, Orange, MPS 6514 S
Q117	4800029	Silicon, NPN, Orange, MPS 6514 S
Q118	4800008	Silicon, NPN, Red, MPS 6513 S
Q119	4800028	Silicon, NPN, Orange, MPS 6514 S
Q120	4800008	Silicon, PNP, Black, 2N5086
Q121	4800028	Silicon, NPN, Red, MPS 6513 S
Q122	4800008	Silicon, PNP, Black, 2N5086
Q123	4800008	Silicon, PNP, Black, 2N5086
Q124	4800008	Silicon, PNP, Black, 2N5086
Q125	4800008	Silicon, PNP, Black, 2N5086
Q126	4800008	Silicon, PNP, Black, 2N5086
Q127	4800008	Silicon, PNP, Black, 2N5086
Q128	4800008	Silicon, PNP, Black, 2N5086
Q129	4800028	Silicon, NPN, Red, MPS 6514 S
Q130	4800008	Silicon, PNP, Black, 2N5086
Q131	4800008	Silicon, PNP, Black, 2N5086
Q132	4800008	Silicon, PNP, Black, 2N5086
Q133	4800028	Silicon, NPN, Red, MPS 6514 S
Q134	4800008	Silicon, PNP, Black, 2N5086
Q135	4800028	Silicon, NPN, Red, MPS 6514 S
Q136	4800008	Silicon, PNP, Black. 2N5086
Q137	4800028	Silicon, NPN, Red, MPS 6514 S
Q138	4800008	Silicon, PNP, Black, 2N5086
Q139	4800008	Silicon, PNP, Black, 2N5086
Q140	4800008	Silicon, PNP, Black, 2N5086
Q141	4800008	Silicon, PNP, Black, 2N5086
Q142	4800008	Silicon, PNP, Black, 2N5086
Q143	4800029	Silicon, NPN, Orange, MPS 6514 S
Q144	4800008	Silicon, PNP, Black, 2N5086
Q145	4800008	Silicon, PNP, Black, 2N5086
Q146	4800008	Silicon, PNP, Black, 2N5086
Q147	4800040	Silicon, NPN, 39940
Q148	4800040	Silicon, NPN, 39940
Q149	4800040	Silicon, NPN, 39940
Q150	4800008	Silicon, PNP, Black, 2N5086
Q151	4800008	Silicon, PNP, Black, 2N5086
Q152		Unassigned
Q401	4800024	Silicon, NPN, Blue, MPS 3563
Q402		Unassigned
Q501	4800024	Silicon, NPN, Blue, MPS 3563
Q502	4800024	Silicon, NPN, Blue, MPS 3563
Q503	4800024	Silicon, NPN, Blue, MPS 3563
Q504		Unassigned
Q601	4800031	Silicon, NPN, Yellow
Q602	4800031	Silicon, NPN, Yellow
Q603	4800024	Silicon, NPN, Blue, MPS 3563
Q604	4800024	Silicon, NPN, Blue, MPS 3563
Q605	4800024	Silicon, NPN, Blue, MPS 3563
Q606	4800024	Silicon, NPN, Blue, MPS 3563
Q607	4800036	Silicon, NPN, PT 4133 A
Q608	4800039	Silicon, NPN, 38817
Q609	4800039	Silicon, NPN, 38817
Q610		Unassigned

RESISTORS

Ref. No.	Genave Part No.	DESCRIPTION
R100	4700037	10K ±10%, ½ W
R101	4700033	4.7K ±10%, ½ W
R102	4700025	1K ±10%, ½ W
R103	4700036	8.2K ±10%, ½ W
R104	4700017	220 Ohm ±10%, ½ W
R105	4700012	82 Ohm ±10%, ½ W
R106	4700025	1K ±10%, ½ W
R107		Unassigned
R108	4700017	220 Ohm ±10%, ½ W
R109	4700036	8.2K ±10%, ½ W
R110	4700017	220 Ohm ±10%, ½ W
R111	4700003	10 Ohm ±10%, ½ W
R112	4700033	4.7K ±10%, ½ W
R113	4700025	1K ±10%, ½ W
R114	4700036	8.2K ±10%, ½ W
R115	4700017	220 Ohm ±10%, ½ W
R116	4700012	82 Ohm ±10%, ½ W
R117	4700025	1K ±10%, ½ W
R118		Unassigned
R119	4700017	220 Ohm ±10%, ½ W
R120	4700036	8.2K ±10%, ½ W
R121	4700017	220 Ohm ±10%, ½ W
R122	4700003	10 Ohm ±10%, ½ W
R123	4700022	82 Ohm ±10%, ½ W
R124	4700025	1K ±10%, ½ W
R125	4700033	4.7K ±10%, ½ W
R126	4700017	220 Ohm ±10%, ½ W
R127	4700017	220 Ohm ±10%, ½ W
R128	4700025	1K ±10%, ½ W
R129	4700017	220 Ohm ±10%, ½ W
R130	4700017	220 Ohm ±10%, ½ W
R131	4700003	10 Ohm ±10%, ½ W
R132	4700025	1K ±10%, ½ W
R133	4700029	2.2K ±10%, ½ W
R134	4700017	220 Ohm ±10%, ½ W
R135	4700017	220 Ohm ±10%, ½ W
R136	4700025	1K ±10%, ½ W
R137	4700029	2.2K ±10%, ½ W
R138	4700017	220 Ohm ±10%, ½ W
R139	4700017	220 Ohm ±10%, ½ W
R140	4700029	2.2K ±10%, ½ W
R141	4700033	4.7K ±10%, ½ W
R142	4700039	15K ±10%, ½ W
R143	4700009	Vol/Off, 25K Potentiometer, with Switch
R144	4700049	100K ±10%, ½ W
R145	4760007	SQ/Ident, 25K Potentiometer, with Switch
R146	4700039	15W ±10% ½ W
R147	4700033	47K ±10%, ½ W
R148	4700037	10K ±10%, ½ W
R149	4700025	1K ±10%, ½ W
R150	4700021	470 Ohm ±10%, ½ W
R151	4700025	1K ±10%, ½ W
R152	4700025	1K ±10%, ½ W
R153	4700029	2.2K ±10%, ½ W
R154	4760005	Potentiometer, 1K ±20%
R155	4700022	560 Ohm ±10%, ½ W
R156	4700041	22K ±10%, ½ W
R157	4700041	22K ±10%, ½ W
R158	4700023	680 Ohm ±10%, ½ W
R159	4700023	10K ±10%, ½ W
R160	4700029	2.2K ±10%, ½ W
R161	4700013	100 Ohm ±10%, ½ W
R162	4700013	100 Ohm ±10%, ½ W
R163	4700053	220K ±10%, ½ W
R164	4700025	1K ±10%, ½ W
R165	4700033	4.7K ±10%, ½ W
R166	4700021	470 Ohm ±10%, ½ W
R167	4740001	.47 Ohm ±10%, 2 W
R168	4700017	220 Ohm ±10%, ½ W
R169	4740003	10 Ohm ±10%, 2 W
R170	4700001	2.2 Ohm ±10%, ½ W
R171	4700017	220 Ohm ±10%, ½ W
R172	4700029	2.2K ±10%, ½ W
R173	4700019	330 Ohm ±10%, ½ W
R174	4700025	1K ±10%, ½ W
R175	4700025	1K ±10%, ½ W
R176	4760005	Potentiometer, 1K ±20%
R177	4700029	2.2K ±10%, ½ W
R178	4700051	150K ±10%, ½ W
R179	4700049	100K ±10%, ½ W
R180	4700053	220K ±10%, ½ W
R181	4720015	464K ±1%, ½ W
R182	4700025	1K ±10%, ½ W
R183	4720002	221 Ohm ±10%, ½ W
R184	4720002	221 Ohm ±10%, ½ W
R185	4720010	47.5K ±1%, ½ W
R186	4760020	0 Shift. 20K Potentiometer
R187	4700025	1K ±10%, ½ W
R188	4720002	221 Ohm ±10%, ½ W
R189	4720002	221 Ohm ±10%, ½ W
R190	4760010	OBS Pot, 10K
R191	4760020	AM Bal, 20K Potentiometer
R192	4700037	10K ±10%, ½ W
R193	4700049	100K ±10%, ½ W
R194	4700025	1K ±10%, ½ W
R195	4700025	1K ±10%, ½ W
R196	4700033	4.7K ±10%, ½ W
R197	4700049	100K ±10%, ½ W
R198	4700049	100K ±10%, ½ W
R199	4700025	1K ±10%, ½ W
R200	4700025	1K ±10%, ½ W
R201	4700037	10K ±10%, ½ W
R202	4700049	100K ±10%, ½ W
R203	4700049	100K ±10%, ½ W
R204	4700037	10K ±10%, ½ W
R205	4700037	10K ±10%, ½ W
R206	4700037	10K ±10%, ½ W
R207	4700025	1K ±10%, ½ W

Section V Parts List (Continued)

Ref. No.	Genave Part No.	Description
R208	4720010	47.5K ±1%, ½ W
R209	4760021	O Correct, 50K Potentiometer
R210	4760021	Omni Test, 50K Potentiometer
R211	4720005	1K ±1%, ½ W
R212	4700039	15K ±10%, ½ W
R213	4720033	47K ±10%, ½ W
R214	4720005	1K ±1%, ½ W
R215	4760020	FM Bal, 20K Potentiometer
R216	4720015	464K ±1%, ½ W
R217	4700040	18K ±10%, ½ W
R218	4700049	100K ±10%, ½ W
R219	4700037	10K ±10%, ½ W
R220	4700040	18K ±10%, ½ W
R221	4700049	100K ±10%, ½ W
R222	4700037	10K ±10%, ½ W
R223	4700049	100K ±10%, ½ W
R224	4720033	47K ±10%, ½ W
R225	4700039	15K ±10%, ½ W
R226	4760020	Loc. Bal, 20K Potentiometer
R227	4700025	1K ±10%, ½ W
R228	4700057	470K ±10%, ½ W
R229	4700025	1K ±10%, ½ W
R230	4700037	10K ±10%, ½ W
R231	4700013	140K ±1%, ½ W
R232	4720014	150K ±1%, ½ W
R233	4700049	100K ±10%, ½ W
R234	4760006	56.2K ±1%, ½ W
R235	4720015	464K ±1%, ½ W
R236	4700023	680 Ohm ±10%, ½ W
R237	4700037	10K ±10%, ½ W
R238	4700013	140K ±1%, ½ W
R239	4720014	150K ±1%, ½ W
R240	4700049	100K ±10%, ½ W
R241	4720011	56.2K ±1%, ½ W
R242	4720015	464K ±1%, ½ W
R243	4700037	10K ±10%, ½ W
R244	4700023	680 Ohm ±10%, ½ W
R245	4700037	10K ±10%, ½ W
R246	4720002	221 Ohm ±10%, ½ W
R247	4720002	221 Ohm ±10%, ½ W
R248	4720002	221 Ohm ±10%, ½ W
R249	4720002	221 Ohm ±10%, ½ W
R250	4700037	10K ±10%, ½ W
R251	4700045	47K ±10%, ½ W
R252	4700045	47K ±10%, ½ W
R253	4700025	1K ±10%, ½ W
R254	4700037	10K ±10%, ½ W
R255	4700037	10K ±10%, ½ W
R256	4700037	10K ±10%, ½ W
R257	4700037	10K ±10%, ½ W
R258	4700049	100K ±10%, ½ W
R259	4700048	82K ±10%, ½ W
R260	4700031	3.3K ±10%, ½ W
R261	4700037	10K ±10%, ½ W
R262	4700037	10K ±10%, ½ W
R263	4700037	10K ±10%, ½ W
R264	4700048	82K ±10%, ½ W
R265	4700030	2.7K ±10%, ½ W
R266	4700048	82K ±10%, ½ W
R267	4700030	2.7K ±10%, ½ W
R268	4700048	82K ±10%, ½ W
R269	4700030	2.7K ±10%, ½ W
R270	4700048	82K ±10%, ½ W
R271	4700009	47 Ohms ±10%, ½ W
R272	4700009	47 Ohms ±10%, ½ W
R273	4700027	1.5K ±10%, ½ W
R274		Unassigned
R275		Unassigned
R401	4710024	3.9K ±10%, ¼ W
R402	4710021	2.2K ±10%, ¼ W
R403	4710004	22 Ohm ±10%, ¼ W
R404	4710008	100 Ohm ±10%, ¼ W
R405	4710008	100 Ohm ±10%, ¼ W
R406	4710008	100 Ohm ±10%, ¼ W
R407	4710008	100 Ohm ±10%, ¼ W
R408	4710008	100 Ohm ±10%, ¼ W
R409	4710008	100 Ohm ±10%, ¼ W
R410	4710008	100 Ohm ±10%, ¼ W
R411	4710008	100 Ohm ±10%, ¼ W
R412	4710008	100 Ohm ±10%, ¼ W
R413	4710008	100 Ohm ±10%, ¼ W
R414	4710008	100 Ohm ±10%, ¼ W
R415	4710008	100 OHn ±10%, ¼ W
R416	4710008	100 Ohm ±10%, ¼ W
R417	4710008	100 Ohm ±10%, ¼ W
R418	4710008	100 Ohm ±10%, ¼ W
R419	4710008	100 Ohm ±10%, ¼ W
R420	4710008	100 Ohm ±10%, ¼ W
R421	4710008	100 Ohm ±10%, ¼ W
R422	4710008	100 Ohm ±10%, ¼ W
R423	4710008	100 Ohm ±10%, ¼ W
R424		Unassigned
R425		Unassigned
R501	4710021	2.2K ±10%, ¼ W
R502	4710019	1.5K ±10%, ¼ W
R503	4710012	330 Ohm ±10%, ¼ W
R504	4710012	330 Ohm ±10%, ¼ W
R505	4710004	22 Ohm ±10%, ¼ W
R506	4710025	4.7K ±10%, ¼ W
R507	4710016	820 Ohm ±10%, ¼ W
R508	4710012	330 Ohm ±10%, ¼ W
R509	4710005	47 Ohm ±10%, ¼ W
R510	4710008	100 Ohm ±10%, ¼ W
R511	4710012	330 Ohm ±10%, ¼ W
R512	4710012	330 Ohm ±10%, ¼ W
R513	4710012	330 Ohm ±10%, ¼ W
R514	4710012	330 Ohm ±10%, ¼ W
R515	4710012	330 Ohm ±10%, ¼ W
R516	4710012	330 Ohm ±10%, ¼ W
R517	4710012	330 Ohm ±10%, ¼ W
R518	4710012	330 Ohm ±10%, ¼ W
R519	4710012	330 Ohm ±10%, ¼ W
R520	4710012	330 Ohm ±10%, ¼ W
R521	4710012	330 Ohm ±10%, ¼ W
R522	4710012	330 Ohm ±10%, ¼ W
R523	4710012	330 Ohm ±10%, ¼ W
R524	4710012	330 Ohm ±10%, ¼ W
R525	4710012	330 Ohm ±10%, ¼ W
R526	4710012	330 Ohm ±10%, ¼ W
R527	4710012	330 Ohm ±10%, ¼ W
R528	4710012	330 Omh ±10%, ¼ W
R529	4710012	330 Ohm ±10%, ¼ W
R530	4710012	330 Ohm ±10%, ¼ W
R531	4710012	330 Ohm ±10%, ¼ W
R532		Unassigned
R601	4730009	220 Ohms ±10%, 1 W
R602	4700014	120 Ohm ±10%, ½ W
R603	4700017	470 Ohm ±10%, ½ W
R604	4700010	56 Ohm ±10%, ½ W
R605	4710005	47 Ohm ±10%, ¼ W
R606	4700033	4.7K ±10%, ½ W
R607	4700003	10 Ohm ±10%, ½ W
R608	4700025	1K ±10%, ½ W
R609	4700025	1K ±10%, ½ W
R610	4700013	100 Ohm ±10%, ½ W
R611	4700033	4.7K ±10%, ½ W
R612	4700003	10 Ohm ±10%, ½ W
R613	4700025	1K ±10%, ½ W
R614	4710023	3.3K ±10%, ¼ W
R615	4710017	1K ±10%, ¼ W
R616	4710011	220 Ohm ±10%, ¼ W
R617	4710023	3.3K ±10%, ¼ W
R618	4710018	1.2K ±10%, ¼ W
R619	4710011	220 Ohm ±10%, ¼ W
R620	4710011	220 Ohm ±10%, ¼ W
R621	4710025	4.7K ±10%, ¼ W
R622	4710023	3.3K ±10%, ¼ W
R623	4710018	1.2K ±10%, ¼ W
R624	4710011	220 Ohm ±10%, ¼ W
R625	4710011	220 Ohm ±10%, ¼ W
R626	4710025	4.7K ±10%, ¼ W
R627	4710008	100 Ohm ±10%, ¼ W
R628	4710020	1.8K ±10%, ¼ W
R629	4710011	220 Ohm ±10%, ¼ W
R630	4700012	82 Ohm ±10%, ½ W
R631	4700008	100 Ohm ±10%, ½ W
R632	4700030	2.7K ±10%, ½ W
R633	4700009	47 Ohm ±10%, ½ W
R634	4730003	33 Ohms ±10%, 1 W
R635	4700037	10K ±10%, ½ W
R636	4710027	6.8K ±10%, ¼ W
R637	4700003	10 Ohm ±10%, ½ W
R638	4700032	3.9K ±10%, ½ W
R639	4700011	68 Ohms ±10%, 2 W
R640	4700009	47 Ohm ±10%, ½ W
R641	4700009	47 Ohm ±10%, ½ W
R642	4700017	220 Ohm ±10%, ½ W
R643		Unassigned
		SWITCHES
S101	4760009	Off/On, Part of R143
S102	4760007	Ident, Part of R145
SW103	5100020	NAV/COM, Rocker 3PDT
SW104	5100029	Nav Frequency, MHz
SW105	5100030	Nav Frequency, KHz
SW106	5100027	Com Frequency, MHz
SW107	5100028	Com Frequency, KHz
SW108	5100021	Omni Test
		TRANSFORMERS
T100	5600020	Nav IF, 30.5 MHz
T101	5600020	Nav IF, 30.5 MHz
T102	5600020	Nav IF, 30.5 MHz
T103	5600020	Nav IF, 30.5 MHz
T104	5600021	Com IF, 22.5 MHz
T105	5600021	Com IF, 22.5 MHz
T106	5600021	Com IF, 22.5 MHz
T107	5600021	Com IF, 22.5 MHz
T108	5600019	Low IF, 4 MHz
T109	5600019	Low IF, 4 MHz
T110	5600019	Low IF, 4 MHz
T111	5600019	Low IF, 4 MHz
T112	5600019	Low IF, 4 MHz
T113	5600019	Low IF, 4 MHz
T114	5600019	Low IF, 4 MHz
T115	5600019	Low IF, 4 MHz
T116	5600006	Audio Output
T401	5600028	Low Frequency Oscillator
T601	5600024	Balanced Mixer, Input
T602	5600025	Balanced Mixer, Output

Section V Parts List (Continued)

Ref. No.	Genave Part No.	Description
		CRYSTALS
Y401	2300130	26.946 MHz
Y402	2300129	26.896 MHz
Y403	2300128	26.846 MHz
Y404	2300127	26.796 MHz
Y405	2300126	26.746 MHz
Y406	2300125	26.696 MHz
Y407	2300124	26.646 MHz
Y408	2300123	26.596 MHz
Y409	2300122	26.546 MHz
Y410	2300121	26.496 MHz
Y411	2300120	26.446 MHz
Y412	2300119	26.396 MHz
Y413	2300118	26.346 MHz
Y414	2300117	26.296 MHz
Y415	2300116	26.246 MHz
Y416	2300115	26.196 MHz
Y417	2300114	26.146 MHz
Y418	2300113	26.096 MHz
Y419	2300112	26.046 MHz
Y420	2300111	25.996 MHz
Y501	2300131	69.478 MHz
Y502	2300132	69.968 MHz
Y503	2300133	70.473 MHz
Y504	2300134	70.973 MHz
Y505	2300135	71.473 MHz
Y506	2300136	71.973 MHz
Y507	2300137	72.473 MHz
Y508	2300138	72.973 MHz
Y509	2300139	73.473 MHz
Y510	2300140	73.973 MHz
Y511	2300141	74.473 MHz
Y512	2300142	74.973 MHz
Y513	2300143	75.473 MHz
Y514	2300144	75.973 MHz
Y515	2300145	76.473 MHz
Y516	2300146	76.973 MHz
Y517	2300147	77.473 MHz
Y518	2300148	77.973 MHz
Y519	2300149	78.473 MHz
Y520	2300150	78.973 MHz
Y521	2300151	79.473 MHz
Y522	2300152	79.973 MHz
Y523	2300153	80.473 MHz
Y524	2300154	80.973 MHz
		CHOKES
Z501	1800038	RF Choke
Z502	1800038	RF Choke
Z601	1800056	Bias Choke
Z602	1800063	Bias Choke
Z603	1800057	Bias Choke
Z604	1800063	Bias Choke

Ref. No.	Genave Part No.	Description
		MISCELLANEOUS
CV101	2100018	Cover, (Part of P103 and J103)
CV102	2500200	Cover, Transistor (Q114)
HS601	5300004	Heatsink for Q607
HS602	5300001	Heatsink for Q608
HS603	5300003	Heatsink for Q609
J101	2100021	Connector, Photo, Rec
J102	2100020	Connector, Phono, Xmit
J103	2100010	Connector, 12 Pin Female
K101	4500007	Relay, Transmit/Receive
M101	2900004	Meter, Course Deviation, 500-0-500 Microamp
P101	2100023	Connector, Phono, Short Shank
P102	2100024	Connector, Phono, Long Shank
P103	2100013	Connector, 12 Pin Male
		HARDWARE
	2840010	Grommet, Rubber (2 Req'd)
	2500523	Panel, Trim
	2500502	Panel, Side (Left or Right)
	2500795	Panel, Sub
	2500497	Panel, Top
	2501230	Dial, Nav MHz
	2501235	Dial, Nav KHz
	2501245	Dial, Com MHz
	2501250	Dial, Com KHz
	2501395	Washer, Dial Drum (Between)
	2800040	Screw, Set
	2501335	Shaft, Drum
	2501445	Bushing, Drum
	2500745	Bracket, Switch & OBS Pot Mounting
	2500415	Clip, Radio Mounting
	2501325	Shaft, OBS Drive
	2500550	Drum, Assembly, OBS
	2500572	Rack, Mounting
	2500440	Gear, Spur, OBS Shaft
	3500004	Gear, Spur, OBS Drum
	3500001	Gear, Mitre, Frequency Selector (8 Req'd)
	2500405	Bushing, Internal, OBS Centering
	2501255	Bearing, External, OBS Centering
	2501162	Knob, Black, Frequency Selectors
	2501152	Knob, Black, SQ & VOL
	2500253	Knob, Black, OBS/Test
	2501490	Spring, Leaf, Test Switch
	2500772	Panel, Rear
	2500460	Spacer, Hex
	2500465	Bushing, Gear Stop, Nav
	6070013	Bushing, Gear Stop, Com
	2501365	Gear Stop, Mitre (4 Req'd)
	9050005	Plug, Button, Black
	2501515	Lense, Frequency Window

Specifications subject to change without notice