GTM-D-166D

TECHNICAL MANUAL

G166D UHF RECEIVER

(PART NO. G166D00000-1)

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INTRODUCTION

G166D UHF RECEIVER

This equipment manual provides sufficient information for a maintenance specialist or system mechanic to install, operate, and maintain a specific unit.

Operation or maintenance of the unit as a part of a system requires reference to the applicable system manual.

Various NOTES, CAUTIONS, and WARNINGS are used throughout this manual to emphasize important and critical instructions and shall be used for the following conditions:

NOTE

An operating procedure, condition, etc., which it is essential to highlight

CAUTION

Operating procedures, practices, etc., which, if not strictly observed, will result in damage to or destruction of equipment

WARNING

Operating procedures, practices, etc., which will result in personal injury or loss of life if not correctly followed

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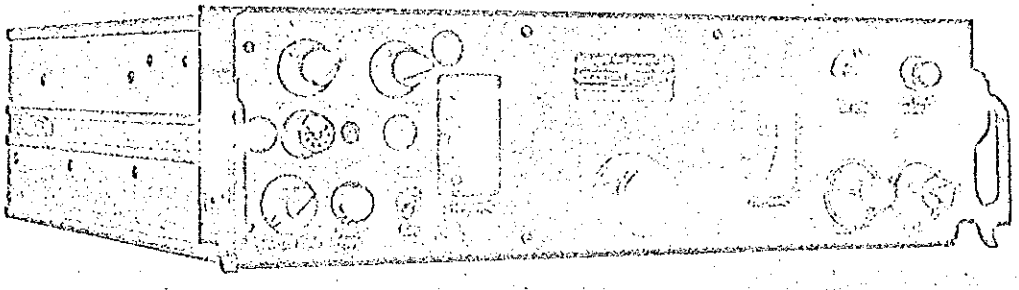
G166D UHF RECEIVER



SECTION I

GENERAL DESCRIPTION

1-1. GENERAL

The G166D Receiver covers a frequency range of 220 mc to 1000 mc in two bands; 220 mc to 500 mc and 490 mc to 1000 mc. The G166D is a single-channel AM-FM receiver with two bandwidths, 40 kc and 300 kc, available in either mode of operation. A 75-kc bandwidth is available by performing a simple modification on the 40-kc i-f strip, as described in paragraph 5-3.

An audio squelch with adjustable threshold and a carrier operated relay (COR) are incorporated into the G166D. A beat frequency oscillator (BFO) is incorporated to provide carrier wave (CW) and single side band (SSB) reception.

1-2. EQUIPMENT SUPPLIED

QTY	ITEM	PART NO.
1	Receiver	G166D00000-1

1-3. EQUIPMENT REQUIRED BUT NOT SUPPLIED

QTY	ITEM	PART NO.
2	Connector	DS07-19S
2	Connector	DS07-19P
2	Connector	DS07-12S
1	Connector	DS07-7S
1	Power Supply	G227 (or equivalent)

1-4. ELECTRICAL SPECIFICATIONS

Power requirements, signal inputs and outputs, frequency range, bandwidths, and other electrical specifications of the G166D Receiver are as follows:

Type Reception:	AM-FM
Tuning Range:	220 mc - 1000 mc (in two bands)
Tuning Band A:	
Frequency Range	220 mc - 500 mc (±1%)
IF Rejection	65 db (minimum)
Image Rejection	50 db (minimum)

Spurious Rejection	50 db (minimum)
Noise Figure	10.5 db (maximum)
Oscillator Radiation at Antenna Terminal	150 μv (maximum)
Antenna Impedance	50 ohms
Tuning Band B:	
Frequency Range	490 mc - 1000 mc (±1%)
IF Rejection	65 db (minimum)
Image Rejection	50 db (minimum)
Spurious Rejection	50 db (minimum)
Noise Figure	14 db (maximum)
Oscillator Radiation at Antenna Terminal	300 μv (maximum)
Antenna Impedance	50 ohms
IF Characteristics:	
1st IF Amplifier	
Center Frequency	60 mc
Bandwidth	3 mc
2nd IF Amplifier	
Center Frequency	21.4 mc
Bandwidth	300 kc
Absolute Sensitivity in 300-kc Bandwidth Position:	8 μv produces at least 10-db S/N with 50% AM, 1-kc modulation 8 μv produces at least 20-db S/N with 100-kc deviation and a 1-kc modulating frequency
Video (for FM):	approximately 0.10 volt minimum-per-kc deviation
Video Output Stability for FM:	2.5 db or less increase in output for an input variation of 60 db above 2 μv at approximately 0.10 volt, 1 kc deviation
Video Output Stability for AM:	8 db or less increase in output for an input variation of 40 db above 5 μv, 50% modulation at 1000 cps
Video Output Response:	within 3 db from 20 cps to 100 kc (minimum)
Audio Output Response:	within 3 db from 150 cps to 12 kc (minimum)
Harmonic Distortion (AM):	100 μv of 220 mc signal, modulated 50% at 1000 cps shall produce 3.0% maximum distortion
Harmonic Distortion (FM):	500 μv of 200 mc signal, deviated 100 kc at 1000 cps shall produce 1.0% maximum distortion

Local Oscillator Output Level:	60 μv (minimum)
SDU Output Frequency:	21.4 mc
SDU Output Bandwidth:	700 kc
COR Operation Level:	Adjustable from 2.0 μv input with an instantaneous pickup and variable dropout delay from 3 to 10 seconds. Override switch provided for dropout without delay
Input Power Required:	115(±5)VAC, 60 cps 28(±2)VDC at 0.32 amps (edgelights) 250 VDC at 0.076 amps 150 VDC at 0.0105 amps (regulated) 150 VDC at 0.01 amps

1-5. MECHANICAL SPECIFICATIONS

Weight, dimensions, start times, and heat dissipation of the G166D Receiver are:

Weight:	30.9 lbs
Dimensions:	
Height	5 inches
Width	18.12 inches
Depth	17.06 inches
Start Time:	approximately 60 seconds for operation and 30 minutes for stability
Heat Dissipation:	118 watts

SECTION II

PREPARATION FOR USE AND RESHIPMENT

2-1. UNPACKING AND INSPECTION

The following procedures should be adhered to when unpacking and inspecting the G166D Receiver.

a. Carefully remove the shipping container.
b. As soon as equipment is uncrated, check it against the packing list.
c. Examine the humidity indicator, when used. If excessive humidity is indicated, thoroughly inspect the equipment.
d. Inspect all connectors for bent pins.
e. Inspect all exterior surfaces for dents and scratches.
f. Remove dust covers and inspect internal components for apparent damage.
g. Report all damages or missing equipment to the officer or supervisor in charge.

2-2. INSTALLATION

The G166D Receiver is designed for panel mounting. Center of gravity and over-all dimensions are shown in figure 2-1. To install, slide the receiver into suitable slide tracks until the stops are engaged. Depress the pushbutton located at the top of each locking handle and rotate handle outward. Engage hook-shaped lower portion of handle into fork fitting and return to locked (pushed in) position.

2-3. PREPARATION FOR USE AND RESHIPMENT

The receiver is shipped ready for installation with COR dropout period set at a nominal 5 seconds. If desired, the length of dropout period may be adjusted for operator convenience or unusual operating conditions. The procedure for COR dropout period adjustment is outlined in paragraph 5-36.

No special preparation is necessary to make the receiver ready for reshipment. The equipment is shipped as an integral, self-contained unit.

G166D CRITICAL DIMENSIONS

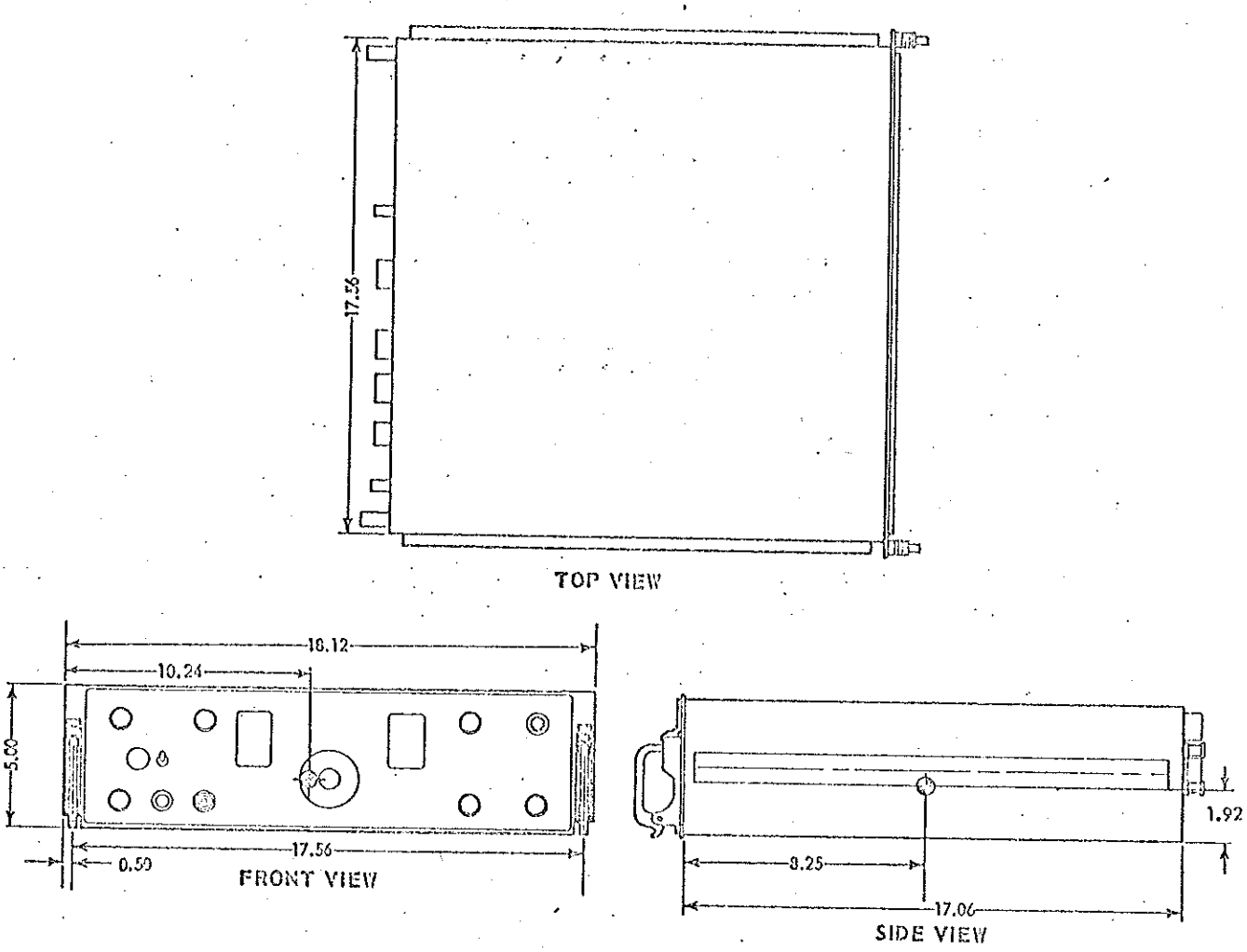


Figure 2-1

SECTION III

OPERATION

3-1. GENERAL

This section presents the operating instructions for the G166D Receiver. The operating capabilities of the receiver are briefly described, followed by listings of receiver operating controls and their functions.

The G166D is a single-channel, AM-FM receiver covering a frequency range of 220 mc to 1000 mc in two bands; 200 mc to 500 mc, and 490 mc to 1000 mc. Two bandwidths, 40 kc or 300 kc, are available in either the AM or FM mode of operation. A 75-kc bandwidth is available in lieu of the 40 kc by performing a simple internal modification on the receiver. (See paragraph 5-3.)

An adjustable audio squelch is incorporated in the unit to disable the audio portion of the G166D in the absence of a received carrier.

A carrier operated relay (COR) is incorporated in the unit to energize auxiliary equipment. When the COR is energized, the COR DELAY-DISABLE switch illuminates.

A variable beat frequency oscillator (BFO) with a frequency variance of 21.388 mc (±5 kc) to 21.412 mc (±2 kc) is installed for AM mode of operation.

3-2. CONTROLS AND INDICATORS

With the exception of the COR delay control, all operating controls of the G166D Receiver are located on the front panel. See figure 3-1 for control functions.

G166D RECEIVER OPERATING CONTROLS

CONTROLS	DESCRIPTION AND FUNCTION
1. POWER Switch	The G166D POWER switch is a pushbutton type switch. Pressing the POWER switch applies operating power to the entire receiver system. The power on condition is indicated by an illuminated lamp located in the POWER switch. NOTE To minimize frequency drift, allow a 30-minute warm-up period before operating the equipment.

Figure 3-1. (Sheet 1 of 4)

G166D RECEIVER OPERATING CONTROLS (Cont)

CONTROLS	DESCRIPTION AND FUNCTION
2. AM BFO ON-OFF Switch	The AM BFO ON-OFF switch applies operating power to the beat frequency oscillator circuit for the AM mode of operation.
3. AM BFO FREQ Control	The AM BFO FREQ dial, when rotated, varies the BFO frequency from 21.388 mc to 21.4 mc (±12.0 kc). The dial is divided into numbered divisions of 0 through 9, and each division is subdivided in increments of 50 providing a total of 500 reset points.
4. BAND SWITCH	The BAND SWITCH selects either the low-frequency tuning range (220 mc - 500 mc), or the high-frequency tuning range (490 mc - 1000 mc).
5. Mode-Bandwidth Selector Switch	This switch selects the 300 KC or 40 KC bandwidth (75 kc available in the 40 KC selector position with the substitution of the 75-kc coupling network board) for either AM or FM mode.
6. Tuning Knob	The tuning knob is geared to both the high band and the low band tuners. The large diameter wheel is used for course, and the center knob for fine frequency tuning.
7. AVC-MAN Switch	The AVC-MAN switch completes the AVC circuit when in the AVC position. In the MAN position, this switch places the RF GAIN control into operation only when the mode-bandwidth selector switch is in the 300-KC AM mode.
8. RF GAIN	The RF GAIN control is used with the AVC-MAN switch in the MAN position during 300-kc AM operation. This control is used to set the gain of the 21.4-mc i-f sections and should be adjusted for maximum output without distortion. With the AVC-MAN switch in the AVC position or the mode-bandwidth switch in an FM or 40-KC AM position, the RF GAIN control becomes inoperative and the i-f gain is controlled by the AVC circuit.
9. AUDIO GAIN	The AUDIO GAIN control is used to set the desired audio and video output levels simultaneously.

Figure 3-1. (Sheet 2 of 4)

G166D RECEIVER OPERATING CONTROLS (Cont)

CONTROLS	DESCRIPTION AND FUNCTION
10. SQUELCH SENS	The squelch circuit holds the audio section cutoff when the G166D is not tuned to an r-f carrier wave, eliminating audible effects of atmospheric noise. Average noise levels change from time to time and may also be different in different portions of the r-f spectrum. Therefore the SQUELCH SENS is provided to adjust the squelch circuit to the ambient noise level. During system operation the SQUELCH SENS control must be adjusted periodically, and when the G166D tuning dial setting is altered by more than 10 mc. This is done to keep the noise level near the threshold of audibility at all times, enabling audible detection of weaker signals. To adjust the SQUELCH SENS control, tune the G166D to the approximate frequency to be monitored but not to an actual carrier. Rotate the SQUELCH SENS control counterclockwise until normal atmospheric noise is audible, then rotate clockwise until this noise is just squelched. This sets the final squelching level at the threshold of audibility so that any signal stronger than the ambient noise can be audibly detected.
11. COR SENS	A double-pole, double-throw set of relay contacts is provided by the G166D for the use of external auxiliary equipment. The carrier operated relay (COR) actuates when the receiver detects an i-f carrier. Sensitivity of the circuit operating the COR is determined by the COR SENS control. COR sensitivity should be adjusted so that the COR energizes during normal r-f reception, and deenergizes when carrier reception terminates. Because of the noise considerations explained in figure 3-1, 10, the COR SENS control must be adjusted periodically, and when the G166D tuning dial is altered by more than 10 mc. Proper adjustment of the COR SENS control is outlined in figure 3-1, item 12.

Figure 3-1. (Sheet 3 of 4)

G166D RECEIVER OPERATING CONTROLS (Cont)

CONTROLS	FUNCTION
12. COR DELAY DISABLE	Normally the COR actuates upon r-f carrier reception and drops out, after a time delay, when carrier reception terminates. The time delay is controlled by screwdriver adjust potentiometer R135 located on the G166D rear panel. Adjustment of R135 is discussed in figure 3-1, 13. The time delay can be overridden by depressing the COR DELAY DISABLE pushbutton switch. This switch illuminates when the COR is actuated. The COR DELAY DISABLE is used during adjustment of the COR SENS control. The G166D is set to the approximate frequency to be monitored but not to an actual carrier. While depressing the COR DELAY DISABLE rotate the COR SENS control clockwise until the indicator lamp illuminates. Then rotate the COR SENS control counterclockwise until the indicator lamp extinguishes. This sets the final sensitivity level to that required to actuate the COR during weak r-f carrier reception, but not in the presence of atmospheric noise.
13. COR DELAY ADJUST	After carrier reception terminates, the COR remains activated for a period of time determined by the setting of potentiometer R135. Approximately ten seconds delay is produced by full clockwise rotation of R135 and three seconds by full counterclockwise rotation. To adjust R135, adjust the COR SENS control as outlined in figure 3-1, item 12. Tune the G166D to an r-f carrier and note that the COR lamp illuminates. Quickly tune the G166D off the carrier and note the time required to extinguish the COR lamp. Adjust R135 for greater or less time delay. Repeat this procedure until the desired delay is achieved.

Figure 3-1. (Sheet 4 of 4)

3-3. OPERATING PROCEDURES

Figure 3-2 lists the possible operating modes available to the monitoring operator. The operator should acquaint himself with the system so that he experiences no difficulty in choosing a satisfactory mode for the reception requirements involved. If the coupling network board is changed on the 40-kc bandwidth i-f strip to produce 75-kc bandwidth, operation of the G166D receiver is not affected. The front panel controls are simply set as for 40-kc bandwidth operation. To change the i-f bandwidth, refer to paragraph 5-3 of this handbook.

G166D RECEIVER OPERATING MODES

POWER	BAND SWITCH	MODE BANDWIDTH SELECTOR	AVC-MAN	BFO
ON	220 MC - 500 MC	300 KC AM	MAN or AVC	ENABLED
		300 KC FM	AVC	DISABLED
		40 KC AM	AVC	ENABLED
		40 KC FM	AVC	DISABLED
		*75 KC AM	AVC	ENABLED
		*75 KC FM	AVC	DISABLED
ON	490 MC - 1000 MC	300 KC AM	MAN or AVC	ENABLED
		300 KC FM	AVC	DISABLED
		40 KC AM	AVC	ENABLED
		40 KC FM	AVC	DISABLED
		*75 KC AM	AVC	ENABLED
		*75 KC FM	AVC	DISABLED

*75-KC bandwidth (AM or FM) is available with the mode-bandwidth selector switch in the 40 KC AM or 40 KC FM position. This is accomplished by substituting the 75-kc coupling network board for the 40-kc coupling network board on the 40-kc - 75-kc bandwidth i-f strip.

Figure 3-2

SECTION IV

THEORY OF OPERATION

4-1. GENERAL

The G166D Receiver, functionally depicted in the block diagram (figure 4-1) is an AM-FM multiple-conversion superheterodyne receiver which covers the frequency range between 220 mc and 1000 mc in two bands with available i-f bandwidths of either 40 kc or 300 kc. The 40-kc bandwidth may be converted to a 75-kc bandwidth by a simple modification of the narrow bandwidth i-f section. The conversion is performed in accordance with the instructions in paragraph 5-3, of this handbook.

A single antenna input is automatically switched by a coaxial relay to the r-f tuner of the band selected. Each r-f tuner includes a separate first mixer and first local oscillator. The first local oscillator frequencies are made available for sampling at a local oscillator output. The low band tuner contains two stages of r-f amplification. The high band tuner uses a triple-tuned pre-selector feeding directly to a crystal first mixer.

Both tuners produce 60-mc i-f signals which pass to a 60 to 21.4-mc i-f converter unit. This unit provides separate 60-mc i-f amplification for each band, the high band using two stages and the low band using one. Two stages are necessary for the high band to compensate for the lack of r-f amplification in this band. The unit also contains separate second mixers for each band, but the two second mixers share a common second local oscillator with a fixed frequency of 81.4 mc, making the output of both second mixers a 21.4-mc i-f signal. The output of the 60 to 21.4-mc i-f converter unit is made available for sampling at an SDU output and is also passed to two 21.4-mc i-f strips.

The wide bandwidth i-f strip, the output of which has a 300-kc bandwidth, contains five stages. During AM operation, only the first four stages are operated, with the first three being used as i-f amplifiers and the fourth acting as an AM detector. During FM operation, all five stages are operated with the first two stages being used as i-f amplifiers, the third and fourth stages acting as limiters and the fifth stage operating as a discriminator.

The narrow bandwidth i-f strip, the output of which has a 40-kc or 75-kc bandwidth, also contains five stages. During AM operation, only the first four stages are operated. The first and third stages are used as i-f amplifiers, the second as a mixer, and the fourth stage as an AM detector. During FM operation, all five stages are operated. The first stage is used as an i-f amplifier, the second stage as a mixer, the third and fourth stages as limiters, and the fifth stage as a discriminator.

During operation, only the i-f section selected by the position of the mode-bandwidth selector switch is operating. The remaining i-f section is disabled by removing the B+ voltage.

Beat frequency oscillators (BFO) are included in the 300-kc and 40/75-kc i-f strips for use in the CW mode of operation. BFO operation is disabled in the FM, AM AVC, and AM MAN modes. Varying the pitch of CW audio signals is accomplished by rotation of the BFO control which, in turn, varies the local oscillator frequency in the tuner.

Separate r-f gain control systems exist for the FM and AM modes. During FM operation, manual r-f gain is cut off in order to ensure that the limiters are always driven to saturation. To provide gain control in the 300 KC FM mode, an AVC voltage derived from the first limiter of the wide bandwidth i-f strip is fed back to the 21.4-mc i-f amplifiers of the two strips and also to the high and low band sections of the 60 to 21.4-mc i-f converter unit. During AM and 40 KC FM operation, an AVC voltage is developed in the detector stages of the narrow bandwidth i-f strip and fed back along the same route as that of the AVC in the FM mode. During 300 KC AM operation with manual gain control, the AVC line to the i-f sections is grounded and a manual r-f gain control is applied to the cathode of the 21.4-mc i-f amplifiers in the wide bandwidth i-f strip.

The demodulated output of either i-f strip is developed by the detector in the AM mode and the discriminator in the FM mode. In either the AM or FM mode, this demodulated output is applied to the video amplifier. From the video amplifier, a signal is available at the video output and a portion of the video signal is also used to drive the audio amplifier. The audio amplifier provides an audio output of either 150-ohm or 600-ohm impedance depending upon connections made at J108. A gain control is provided in the video section to control the video and audio outputs.

The carrier operated relay (COR) circuit and the squelch circuit function during all receiver operations and both are controlled by an AVC voltage developed in the AM detector/FM second limiter stage of the two i-f strips. During carrier reception, the COR circuit operates an electro-mechanical relay with two sets of auxiliary equipment contacts. A white panel lamp lights when the relay is energized. The COR circuit has a sensitivity adjustment, a carrier-off delay action which can be adjusted, and a COR delay disable switch to disable the carrier-off delay action for adjustment of sensitivity. The squelch circuit applies a cut-off bias to the audio amplifier when the carrier strength drops below intelligibility and restores the audio output when the carrier strength rises again. The circuit has a sensitivity adjustment.

The receiver requires the following sources of power, all of which are supplied from the G227 Power Supply: 115-volt, 60-cps ac; 250-volt dc, unregulated; 150-volt dc, unregulated; and -1200-volt dc (through the receiver to the spectrum display unit).

4-2. ANTENNA INPUT

The antenna input, J101, is coupled to the K101 coaxial switching relay which is energized by the 6.3-volt a-c filament voltage source applied to the relay through the S102 band switch. Carrier signals reach the r-f tuner inputs at J201 and J301 through coaxial cables leading from the coaxial relay.

4-3. R-F TUNER, 490 MC - 1000 MC BAND

a. Triple-Tuned Preselector - The high band r-f tuner input at L301 presents an impedance to the antenna of approximately 50 ohms throughout the tuned-frequency range. Tuning is accomplished by three sections of tuned cavities through which the signal passes by means of coupling irises. Each cavity is resonated to the input frequency by changing the capacitance between the inner conductor and the wall. The action effectively produces quarter-wave tuning and is analagous to coaxial-line cavity tuning in which the resonant frequency is determined by the position of the plunger. From the third tuned cavity, the signal is coupled by inductor L305 to the CR301 crystal mixer.

b. Local Oscillator - The high band first local oscillator, V301, is a 6AF4A triode tube operated as a Colpitts oscillator in which the tank circuit is a length of balanced transmission line loaded by capacitors C304D and C304E. These capacitors are ganged with the tuning control causing the oscillator to operate at a frequency 60 mc higher than the received signal. Temperature compensated capacitors are used throughout the circuit to increase stability. Inductor L312 is a small r-f probe which samples the oscillator signal from inside the cavity and passes a signal through a coaxial cable to the local oscillator output at J103.

c. Crystal Mixer - The signals received in the preselector are mixed with the first local oscillator signals in a CR301 r-f crystal diode. The 60-mc i-f output of the crystal mixer is applied through a length of coaxial cable to the input of the 490-mc to 1000-mc section of the 60-mc to 21.4-mc converter unit.

4-4. R-F TUNER, 220 MC - 500 MC BAND

a. First R-F Amplifier - The low band r-f tuner input, J201, connects to a pi-network made up of the L201 indicator, C201 capacitor, and C230 capacitor. The pi-network presents an impedance of approximately 50 ohms to the antenna across the entire band and applies the signal to the cathode circuit of the first r-f amplifier, a 7077 planar triode tube operated as a conventional grounded-grid amplifier. The cathode and plate circuits are tuned by inductors L202A and L202B, respectively. Both are part of a Mallory Inductuner unit. The plate circuit is in the form of a modified pi-network used to couple the high output impedance of the first r-f amplifier to the low input impedance of the following stage.

b. Second R-F Amplifier - The pi-network output of the low band first r-f amplifier drives the cathode of the second r-f amplifier, V202, also a 7077 planar triode tube in a grounded-grid circuit. A low noise second stage is used to reduce the noise figure of the entire r-f system to essentially that of the first stage. The second stage plate circuit is coupled to the grid of the first mixer by a double-tuned network. The coupling element is a series circuit composed of inductor L210 and capacitor C211, a combination which resonates at slightly above 500 mc, thus assuring more uniform coupling throughout the tuning range.

c. First Local Oscillator - The low band first local oscillator is V204, a 6AF4A triode tube in a modified Colpitts circuit. The tank circuit consists of one section of Mallory Inductuner, L202E, and fixed inductor L213 shunted by the interelectrode capacitance of V204. The inductuner, ganged to the tuning knob, causes the oscillator to operate at a frequency 60 mc above the received signal. Temperature-compensated capacitors are used throughout the circuit to increase stability. The oscillator signal reaches the mixer through capacitor C220. Inductor L218 is a small r-f probe in the vicinity of the tank circuit which passes a portion of the oscillator signal through a coaxial cable to the local oscillator output at J103.

d. First Mixer - The low band first mixer, a 6AK5 pentode tube, V203, receives the oscillator signal at its control grid simultaneously with the signals from the second r-f amplifier. A decoupled test point, TP201, is connected to the junction of the two mixer grid resistors, R206 and R207, to provide a convenient means for observing the output of either the second r-f amplifier or the first local oscillator.

4-5. 60 MC - 21.4 MC CONVERTER

a. High Band 60-mc IF Amplifier Stages - To compensate for the lack of gain in the high band r-f tuner, the high band section of the 60-mc to 21.4-mc i-f converter uses two stages of 60-mc i-f amplification. The first stage, V401, is a 5842 triode tube in a grounded-grid circuit which provides a low input impedance to match that of the crystal mixer output. A double-tuned network couples the plate of the first stage to the grid of the second 60-mc i-f stage. The second 60-mc i-f amplifier, V402, uses a 6BA6W pentode tube in a grounded-cathode configuration. In the FM mode, and in the AM mode with AVC, the second stage is gain-controlled by an AVC voltage applied to its grid circuit.

b. High Band Second Mixer - The high band second mixer, V403B, is the pentode portion of a 6U8 electron tube. This mixer receives the output from both the second 60-mc i-f amplifier and the second local oscillator. A decoupled test point, TP401, is connected to the junction of the two mixer grid resistors, R411 and R412. This provides a convenient point for observing either the output from the high band 60-mc i-f amplifier or that of the second local oscillator. The high band second mixer output, a 21.4-mc i-f signal, is passed to the wide and narrow bandwidth i-f strips through a coaxial cable.

c. Second Local Oscillator - A second local oscillator, V403A, used by both the high band and low band second mixers, is provided by the triode portion of a 6U8 tube. A Colpitts configuration is used with the oscillator being operated at 81.4 mc. Temperature compensated capacitors are employed to provide frequency stability. The oscillator output connects to the high band second mixer through capacitor C415 and to the low band second mixer through capacitor C418.

d. Low Band 60-MC I-F Amplifier - The output of the low band first mixer is coupled through a double-tuned network to the low band 60-mc i-f amplifier, V404, a 6BA6W pentode tube. In the FM mode, and in the AM mode with the AVC active, the stage is gain-controlled by an AVC voltage applied to its grid circuit. The output of the stage is coupled to the low band second mixer through a double-tuned coupling.

e. Low Band Second Mixer - The low band second mixer, V405, is a 6AK5 pentode tube. This mixer receives the low band 60-mc i-f signal and the 81.4-mc second local oscillator signal at its control grid. Test point TP402 is useful for observing the two signals applied to the mixer grid. This test point is connected to the junction of the two grid resistors, R423 and R424. The output of the stage, a 21.4-mc i-f signal, is passed through a coaxial cable to the input of the wide and narrow band i-f strips.

4-6. BANDSWITCHING

Bandswitching within the receiver is accomplished by switching B+ voltage to the stages of the selected band. Corresponding stages in the other band are rendered inoperative by the removal of such voltages. The BANDSWITCH, S102, contains five sections. One section switches the 6.3-volt ac used to control the coaxial relay at the antenna input; one section

controls the two tuning dial lights, DS101 and DS102; and the remaining three switch the B+ voltage. Among the latter three sections, two are used to apply both screen and plate voltages to the r-f tuners. The third section switches plate and screen voltage to the 60-mc i-f amplifiers as well as screen voltage to the second mixer stage of the desired band section. The removal of screen voltage from the unused second mixer prevents noise generated in previous stages from passing through.

4-7. MODE SWITCHING

Selection of either the high bandwidth or low bandwidth 21.4-mc i-f strip is made by a front panel control, S104-1, activating one of the four possible modes of operation in the receiver. Both the narrow bandwidth and the wide bandwidth i-f strips have AM and FM modes of operation. The S104-1 (a six-pole rotary switch) controls B+ voltage, AVC voltage, discriminator/detector operation, plus COR/squelch from the selected operation and i-f section. All circuitry not being used for a particular mode of operation is rendered inoperative. The switch is shown in the 40 KC AM position in figure 7-1. A clockwise rotation of S104-1 from this position selects the sequence 300 KC AM, 300 KC FM, and 40 KC FM.

4-8. NARROW BANDWIDTH I-F STRIP

a. Input - The frequency of the signal input of the narrow bandwidth i-f strip is 21.4 mc and operates from an impedance level of 50 ohms. This signal input is obtained from a capacity tap at the input circuitry of the 300-kc bandwidth i-f strip. A wide band transformer, T601 matches the low source impedance to a value more suitable for low noise operation of the first i-f amplifier tube.

b. I-F Amplifier - The 21.4-mc first i-f amplifier is an AVC controlled stage using V601 and V602 in a cascade circuit for low noise characteristics. Fixed bias is used on the second triode in order to increase the dynamic range of the stage. Neutralization is provided in order to obtain in excess of 80-db gain reduction by AVC control.

c. 2.5-MC Mixer - A tetrode Nuvistor, V603, is used as a mixer. The 21.4-mc signal and an 18.9-mc oscillator frequency are applied to the control grid for mixing to produce an i-f frequency of 2.5 mc.

A triode Nuvistor, V604, is used as an 18.9-mc crystal controlled oscillator.

The bandwidth of the narrow bandwidth i-f strip can be controlled by selection of the coupling network for the 2.5-mc i-f interstage. The unit, as normally supplied, has a 40-kc network installed. Conversion to 75-kc bandwidth is discussed in Section V.

L603 and L604 form a double tuned network with a coupling provided by a capacitor network connected across the high impedance terminals. In order to make the changeable strips non-critical, only a portion of the complete network is mounted on the strips. In the case of the 75-kc bandwidth condition, the external circuit consists only of a jumper wire; and the actual coupling is determined by 6.8-pf and 10-pf capacitors mounted internally. For the 40-kc bandwidth position, an additional 10-pf capacitor is connected in series in order to reduce the coupling. Two additional capacitors are connected across the input and output terminals of the printed board to maintain peak response at 2.5 mc.

d. FM First Limiter/AM I-F Amplifier - The 2.5-mc stage, V605, immediately following the mixer, serves as a linear i-f amplifier for the reception of AM signals and a first limiter when receiving FM signals. This dual-function operation is accomplished through control of the screen-grid voltage. For linear operation, a relatively high screen-grid voltage is used. For limiter operation, the voltage is reduced by shunting a bleeder resistor from screen to ground at switch S104.

The AVC circuit is similar to that of the wide bandwidth i-f strip. A lead is brought from V606 on the narrow bandwidth i-f strip, and is switched in the proper receiver sections to produce the normal AVC response.

e. FM Second Limiter/AM Detector - The second stage, V606, following the mixer also serves two functions. For AM reception, detection is provided by the control grid to cathode signal rectification. For FM signal reception, limiting action takes place due to a large signal on the control grid which is rectified and used to bias the tube to cutoff. A very sharp cutoff characteristic is obtained by operation at greatly reduced plate and screen-grid voltages.

f. FM Discriminator - The FM detector used is a conventional Foster-Seeley type except that the center tap usually found on the secondary of the transformer is replaced by a capacitor tap. This method of tapping provides better balance and is independent of coil characteristics or tuning-slug position. Diodes CR601 and CR602 are used for rectification.

g. Narrow Bandwidth I-F Amplifier Function Switching - Both the FM and AM audio outputs are switched by mode-bandwidth selector S104-1 to relay K103. When this relay is energized, its signal input is passed on to the first video amplifier V101. Relay K103 is controlled by another section of S104-1. The relay is energized except when S104-1 selects the 300 KC FM mode of operation.

Switch S104-1 also controls the function of V606. In 40 KC AM operation, the screen potential of V606 is high, causing this tube to function linearly, operating as an i-f amplifier. In the 40 KC FM mode, the screen potential is low causing V606 to act as a limiter. This control of V606 is accomplished by switching resistor R640 to chassis ground or to open circuit by S104-1. At chassis ground, R640 becomes part of a voltage divider and reduces screen potential to 10-volt dc. When the path to ground is opened by S104-1, divider action is arrested and screen potential rises to +22 volts.

Another section of S104-1 switches B+ to the narrow bandwidth i-f strip when a 40-kc mode is desired. When a 300-kc is chosen, B+ is removed disabling the i-f strip.

4-9. WIDE BANDWIDTH I-F STRIP

a. Input - Input to the wide bandwidth i-f strip feeds across inductor T501 which functions as a plate tank circuit common to both second mixer stages. These stages can share the same output circuit because the band switch, S102, allows only one mixer of the 60-mc to 21.4-mc i-f converter to be operative at a time.

b. First and Second I-F Amplifiers - The first and second stages of the wide bandwidth i-f strip, V501 and V502, are 6DC6 pentode tubes. During FM operation, a provision for manual gain control is not included since FM operation requires that the limiters be driven

to saturation. Therefore, in the FM mode, the R102, RF GAIN potentiometer is shorted out by a section of the S104-1 mode selector switch. The first and second 21.4 mc i-f amplifiers are then gain controlled by an AVC voltage. The AVC action is voltage-delayed by the drop across the forward resistance of diode CR102 in series with resistor R105 between 150-volts dc and ground. The AVC is then time-delayed by a resistor-capacitor combination made up of R503 and C506 in the first stage and R509 and C517 in the second stage. During AM operation with manual r-f gain control, the AVC voltage is grounded by switch S103. The short is also removed from the RF GAIN control, R102, allowing adjustment of the cathode biases of each of the first and second 21.4-mc i-f amplifier tubes.

To avoid regeneration, which might distort the response curve shape or even bring about oscillation, the plate-to-grid capacity in each of the first two 21.4-mc i-f amplifier stages is neutralized. This neutralization is accomplished by connecting a pi-network, made up of three capacitors, between the plate and screen grid circuits. The pi-network is comprised of capacitors, C510, C511, and C512 in the first stage and capacitors C521, C522, and C523 in the second stage. A pi-network is used since a single capacitor large enough to produce neutralization might be self-resonant with the connecting lead inductance.

Double-tuned coupling is used at the input of the wide bandwidth i-f strip and between all stages in order to achieve accurate control of the bandwidth while producing a steep-side, flat-topped response curve.

c. FM First Limiter/AM Third I-F Amplifier - The third stage of the i-f strip, V503, uses a 6CB6 type sharp-cutoff pentode tube.

In the FM mode, V503 functions as a first limiter. When used as such, limiting takes place in both the negative- and positive-going directions because the screen potential is quite low. The screen potential is low due to the dividing action between resistors R517 and R518. R517 is returned to ground in the FM mode by a section of switch S104-1. During FM operation, the first limiter stage also functions to provide an AVC voltage generated by grid rectification. This AVC voltage is applied through a section of mode-bandwidth selector switch S104-1 to stages which are then gain-controlled automatically.

In the AM mode, V503 functions as a third i-f amplifier. Such use is made possible by an increase in gain brought about by operating the screen grid at a higher voltage than that used when the tube is operating as a limiter. The higher screen voltage is provided because mode-bandwidth selector switch S104-1 breaks the ground connection from resistor R517. This eliminates the voltage-divider action of resistors R517 and R518, raising the screen-grid voltage.

Test point TP503, connected to the junction of the V503 grid resistors R515 and R537, provides a convenient point to monitor the signals reaching the stage.

d. FM Second Limiter/AM Detector - The fourth stage of the wide bandwidth i-f strip, V504, is a 6AK5 pentode tube. This stage is designed to function without circuit modification either as an FM limiter or as an AM detector. In the FM mode, V504 receives the signal from the first limiter through a double-tuned coupling and limits both the positive and negative excursions of the signal. The stage's output signal is applied to the discriminator

through another double-tuned coupling. In the AM mode, V504 receives the signal from the third IF amplifier and detects the modulation using grid detection. The intelligence is passed through inductor L513 to a voltage divider made up of resistors R533 and R534 to ground. An output signal is tapped off from the junction of these two resistors and passed through capacitor C557 to relay K103, then to the video amplifier input. Inductor L513 is a self-resonant choke used to prevent any i-f energy from reaching the output. Also during AM operation, a portion of the output at inductor L513 is tapped off through resistor R535 and feed-through capacitor C556, then passed to a section of switch S104-1. This voltage is applied to the automatically gain-controlled stages when AVC operation is selected in 300 KC AM mode. If manual gain control is selected in the 300 KC AM mode, the AVC-MAN switch, S103, grounds the AVC voltage produced in the AM detector circuit.

During either 300 KC FM or 300 KC AM operation, a separate AVC voltage is tapped from the junction of inductor L513 and resistor R533. This voltage is applied to the input of the COR circuit at resistor R115 and the input of the squelch circuit at resistor R116.

Test point TP501, connected to the junction of inductor L513 and resistor R533, provides a convenient point at which to monitor the signal in the grid circuit of V504. This test point is used when it is desired to check the output from the first limiter during FM operation or to check the demodulated detector output during AM operation.

e. FM Discriminator - The fifth stage of the wide bandwidth i-f strip, V505, is a 6AL5 tube used as a Foster-Seely discriminator during FM operation. A bifilar winding in the secondary of transformer T508 provides accurate balance because such windings equalize the capacity to ground from each side of the secondary. TP502 is convenient test point at which the discriminator output can be monitored. A self-resonant choke, L514, acts to keep any i-f signals from appearing in the discriminator output. This output is coupled to the video amplifier through the contacts of relay K103.

4-10. VIDEO AMPLIFIER

The video amplifier contains two stages: V101A, a triode section of a 12AU7A tube; and V102, a 12AU7A tube with both triode sections paralleled. Input to the first video amplifier V101A is from relay K103 through resistor R108, shunted by capacitor C104 to extend the high-frequency response. The output of V101A is coupled through R112, AUDIO GAIN control, and to V102 which is a cathode follower. V102 provides the video output, a high impedance output fed through capacitor C107 and terminating on a chassis rear-apron mounted outlet marked J104. The output of V102, is also applied to the audio amplifier through the C106 capacitor. In the second video amplifier, distortion is reduced by omitting a cathode resistance bypass capacitor. The overall video output is flat from 20 cps to 100 kc.

4-11. AUDIO AMPLIFIER

The audio amplifier consists of one triode section of a 12AU7A tube, V103B, and both triode sections (separately operated) of another 12AU7A tube, V104. Input to V103B is through capacitor C106 from the cathode circuit of the second video amplifier stage. RC coupling is used between stages and the third audio amplifier terminates in transformer T102 which acts

as a plate-load for the power output stage. T102 provides either 150-ohm or 600-ohm outputs from a center tapped secondary. Low distortion results from degenerative feedback which is obtained by omitting bypass capacitors across cathode resistors R120, R125, and R128. The audio output is flat from 150 cps to 12 kc.

4-12. CARRIER OPERATED RELAY

The carrier operated relay (COR) circuit (figure 4-2) provides carrier-on, carrier-off control of any auxiliary equipment connected to the two available sets of relay contacts through a connector J108 on the chassis rear apron. Relay K102 is energized when a carrier of adequate strength is received. The energized condition of relay K102 is indicated by illuminated panel lamp DS110. When the carrier disappears, the relay transfers to its deenergized position within 3 to 10 seconds. The exact length of time being adjustable within those limits through adjustment of potentiometer R135 mounted on the rear apron of the chassis. The sensitivity of the circuit to varying levels of carrier strength is adjustable by means of a panel-mounted COR SENS control. A panel-mounted COR DELAY DISABLE pushbutton (physically combined with indicator light DS110) is available to cancel the carrier-off delay action during sensitivity adjustment. Carrier control of the relay is accomplished through the use of three stages of d-c amplification. Resistor R130 and COR SENS control R122, in the cathode circuit of first COR amplifier V101B, comprise a voltage divider between the 150-volt d-c power supply and ground. Values of these two components are chosen so that the potential at pin 8 can be varied between zero and approximately 25-volts dc. The grid bias of the tube can therefore be adjusted between the limits of approximately 0 volts and complete cutoff. Thus, the sensitivity of this input amplifier has a wide dynamic range.

For typical operation, in the absence of a carrier, COR SENS control R129 is adjusted so that V101B is in a state of heavy conduction, with the plate potential as low as 25-volts dc due to the drop across plate-load resistor R131. The cathode of the second COR amplifier V105A is returned to 150 volts so that its grid potential is far beyond cutoff (since the grid is directly coupled through isolating resistor R132 to the plate of V101B).

The cathode bias of the third COR amplifier, V105B, is fixed at approximately 115 volts above ground by the divider action of resistor R137 connected in series with the parallel combination of resistors R138 and R139. No voltage-drop exists across the cathode resistor (R133) of V105A since the tube is cut off. The grid potential of V105B is therefore at the same level as the 150-volt d-c supply. Thus, the grid is approximately 5 volts negative with respect to its cathode (pin 8) and current flow through V105B is insufficient to cause relay K102 to energize.

During r-f reception an AVC voltage is generated, driving the grid of V101B negative so that current through the tube approaches cutoff. The plate then rises toward 160 volts (its supply voltage) driving V105A into conduction. When V105A conducts, the potential at its cathode rises toward the plate value (250-volt dc) charging capacitor C112 through the low forward resistance of the diode CR103. The consequent positive voltage increase at the grid of V105B increases plate current through V105B, causing relay K102 to energize.

COR CIRCUIT SCHEMATIC

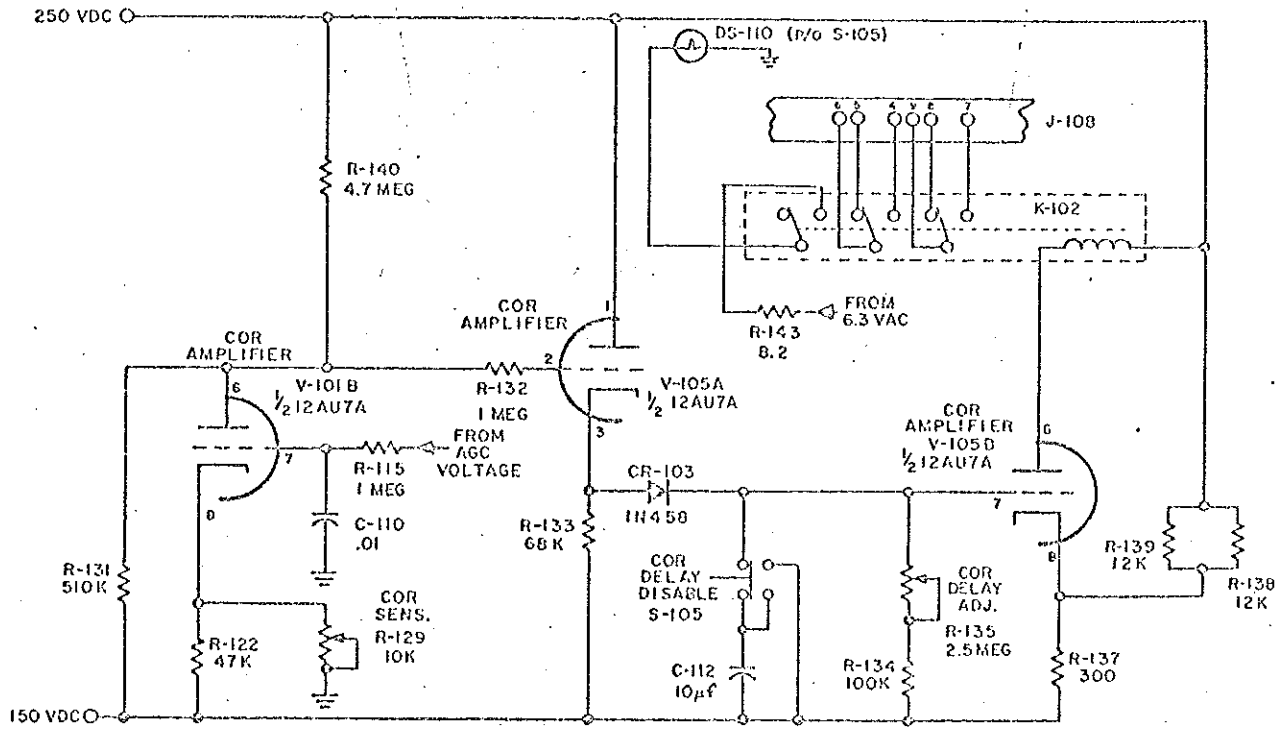


Figure 4-2

If the carrier at the antenna input vanishes or falls significantly in amplitude, the current through V105A falls and the potential at its cathode drops toward 150 volts. However, capacitor C112 holds its charge for a period of time dependent on the setting of COR delay adjustment control R135 so that the relay is not immediately deenergized. This period of time is a function of the R-C time constant of the circuitry composed of C112, R135, and R134. No other electrical part affects the R-C time constant as the positive charge on C112 cannot leak off through the grid of V105B or the high back resistance of diode CR103.

4-13. SQUELCH CIRCUIT

The squelch circuit (figure 4-3) suppresses the audio output in the absence of a carrier. The circuit uses the carrier controlled squelch amplifier to block the gated audio amplifier used for the first audio amplifier. The V103A squelch amplifier, a triode section of a 12AU7A tube, is carrier-controlled because a carrier of sufficient level blocks the tube by means of a negative AVC voltage. The gated audio amplifier, V103B, is governed by the squelch amplifier stage. These two stages are directly coupled so that the gated audio amplifier grid voltage is established by the drop across the squelch amplifier plate load resistor, R118. The circuit design is such that this bias blocks the gated audio amplifier when the squelch amplifier is conducting. Thus, the absence of a carrier means that no AVC voltage is present at the grid of V103A and the tube conducts sufficiently to bias V103B to cutoff. With V103B blocked, signals cannot pass through the audio amplifier.

Since potentiometer R117 controls the level of cathode bias on V103B, it governs the level of AVC voltage (and hence carrier level) required to bring about the opening of the gated audio amplifier. Thus, resistor R117 functions as a SQUELCH SENS control and is used to adjust the carrier level at which the blocking action of the squelch circuit disappears.

When receiving AM signals with a high percentage of modulation, the squelch circuit tends to actuate at those periods when the carrier envelope amplitude becomes zero. To prevent this, the values of resistor R116 and capacitor C108 provide a time constant which keeps the squelch action from taking place at the lowest audio frequency likely to be received. The time constant is not long enough however, to delay prompt squelch action when the carrier is removed.

4-14. G175H10000 AM BFO ASSEMBLY

The G175H10000 AM BFO Assembly, as shown in figure 7-2, enables beat frequency oscillation (BFO) for AM operation. The BFO assembly has a fundamental center frequency of 21.4 mc and operates in the AM mode only. AM BFO ON-OFF switch, S0091, mounted on the receiver front panel, is used to apply regulated +150-volt dc to the BFO assembly through C1002. Helical potentiometer R0091 (AM BFO FREQ), also mounted on the receiver front panel, is connected to the BFO assembly through C1001, C1003, and C1004 and is used to vary the oscillator frequency up to a minimum of ±12.0 kc from the 21.4-mc center frequency. Capacitor C1005 of the BFO assembly is connected to ground through the AM position of the receiver mode switch S104. The oscillator output is applied through J1001 to J0091 of the 21.4 mc i-f strip. Crystal Y1101 is cut for oscillation at 21.435 mc. The fixed and variable capacitance of the tank circuit provides a center crystal operating frequency of

SQUELCH CIRCUIT SCHEMATIC

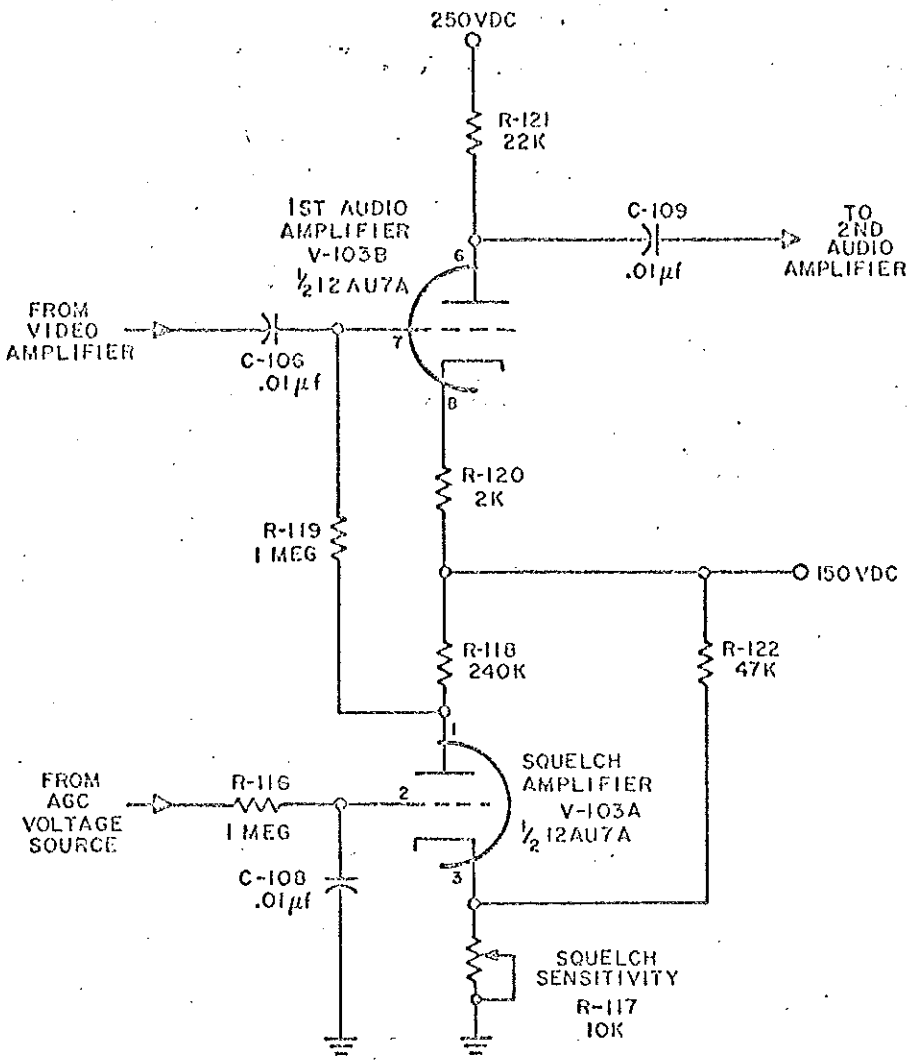


Figure 4-3

21.4 mc. The frequency adjust potentiometer R0091, of the receiver front panel varies the voltage applied to variactors CR1101 and CR1102. Varying the voltage applied to CR1101 and CR1102 varies the capacitance of the tank circuit. The capacitance of the tank circuit varies sufficiently to change the crystal operating frequency ±12.0 kc. Potentiometer R1101 adjusts the operating voltage of the frequency adjust potentiometer for the low frequency. Tank circuit L1102 and C1104 forms a decoupling circuit for the oscillator output to keep oscillations out of the receiver mode switch. C1108 and R1108 form a suppression network to keep the oscillator output from appearing on the +150-volt d-c supply line. The BFO output is applied through J1001 to J0091 of the 21.4-mc i-f strip.

4-15. LOCAL OSCILLATOR OUTPUT CONTROL CIRCUIT

The local oscillator output control circuit provides a minimum output of 60 millivolts into a 25-ohm load from the 490 - 1000 mc tuner. The minimum output of the 220 - 500 mc tuner will not be less than 60 millivolts or greater than 65 millivolts. The maximum output through the entire band will not be greater than 6 db above the minimum value observed. Coaxial relay K0091 provides selection of the low band oscillator, consisting of triode V204 and associated circuitry, or the high band oscillator, consisting of triode V301 and associated circuitry, for monitoring at J103. Relay K0091 is deenergized with BAND SWITCH S102 in the 490 -1000 MC position applying the high band oscillation output to J103. Relay K0091 is energized with BAND SWITCH S102 in the 220 - 500 MC position applying the low band oscillator output to J103.

SECTION V

MAINTENANCE

5-1. GENERAL

This section contains inspection, repair and alignment information for the G166D Receiver. The G166D block diagram in Section IV and the schematics in Section VII provide additional maintenance information. If maintenance is to be performed on the receiver at a location remote from its installation, it must be accompanied by its associated G227 Power Supply.

Power requirements are: 115-volt, 60-cps ac; 115-volt, 400-cps ac; and 28-volt dc. In the G166D Receiver, the gear train stop collars are permanently pinned to the gear train shaft and mechanical adjustment of the tuning dials should not be attempted. If the tuning dials do not read properly, corrections may be made by following the first local oscillator adjustment procedure in the alignment of the receiver. The gear train bearings have been factory lubricated for life.

Inspection and performance checks are required for all subassemblies within the units.

CAUTION

All maintenance work with the r-f tuners should be kept to a minimum and performed by trained and experienced personnel only. The replacement of components and dressing of leads within the tuner have been engineered to give maximum performance. In replacing these components, care should be exercised to duplicate the exact physical layout of the original assembly. In replacing V204 and V301, 6AF4A tubes used for the first local oscillator, RCA tubes manufactured in 1960 or later should be used.

The required test equipment for performance of the following maintenance procedures is listed in figure 5-1.

5-2. ALIGNMENT PROCEDURES

When performing alignment procedures, the following general instructions should be followed.

In order to minimize the effects of frequency response of the detectors, (including their decoupling networks), used for visual alignment, the sweep generator width and output should be no greater than that required to produce a suitable oscilloscope pattern.

A post detection type of marker adder is recommended, and the alignment procedures in this book assume one is to be used. However, if such a marker adder is not available, the marker generator output should be loosely coupled to the sweep generator output. This can

NECESSARY TEST EQUIPMENT

PREFERRED TYPE	SUITABLE ALTERNATE
G196 Oscilloscope	Tektronix Type 545 (equivalent)
Telonic SM2000 with E1 and SH1 Heads	TS452 C/U Radio Test Set
G286 Signal Generator	AN/URM25F Signal Generator
G266 Signal Generator	AN/USM26 Signal Generator
G267 Signal Generator	AN/URM49 Signal Generator
G200 VTVM	Hewlett-Packard Model 410B (equivalent)
G295 VTVM	MD30A/U Voltmeter (electronic)
G199 Tube Checker	TV2A/U Test Set, Electron Tube
G151A Frequency Meter	AN/URM32 Frequency Meter
Telonic SM2000 with LH2 Head	No suitable alternate
G198 Signal Generator	Hewlett-Packard Model 612 Signal Generator
Hewlett-Packard 524C Frequency Counter with 525A, 525B, and 525C plug-in heads	Hewlett-Packard Model 5245L with 5253A Head
Hewlett-Packard 540B Transfer Oscillator	Hewlett-Packard Model 2590A
UG274/U "TEE" Connectors (2)	Amphenol 31-208
Microlab TA5MB 50-OHM Dummy Load (2)	Amphenol 39575-51
Telonic XD3A Detector	No suitable alternate
RG58U Coaxial Cable	RG62U Coaxial Cable
Hewlett-Packard Model 411A RF Voltmeter	Boonton Model 91D RF Voltmeter

Figure 5-1

be done by connecting the marker signal source to a turn or two of insulated wire wrapped around the sweep generator lead near the point of connection to the circuit under test, or by coupling to the sweep generator through a small capacitor. Care should be exercised to ensure that the marker does not interfere with the response curve by removing the coupling from time to time during alignment.

A low-capacity shielded cable, such as RG58U coaxial cable, should be used for connection to the oscilloscope. The cable capacity plus oscilloscope input should be held to a maximum of 100 pf. The oscilloscope should be used in the DC position on the vertical amplifier preamplifier.

5-3. I-F STRIP BANDWIDTH ALTERATION

The narrow bandwidth i-f strip is easily converted to produce either of two bandwidths. This is done by changing printed circuit network boards. Two plainly marked boards are supplied: one producing 40-kc bandwidth and one producing 75-kc bandwidth.

a. Visually inspect the markings on the coupling network board mounted on top of one of the transformer shields of the narrow bandwidth i-f strip. If the board for the undesired bandwidth is being used, remove the three retaining screws. Store the board in a safe place.

b. Place the board producing the desired bandwidth, marked side up with the mounting holes properly aligned, on top of the transformer shield. Secure the board, using the three screws previously removed.

5-4. DISCRIMINATOR ALIGNMENT

a. Remove V403 and V502.
b. Remove I-F bottom cover and connect test equipment as shown in figure 5-2.
c. Place bandwidth switch in 300 KC FM position, BAND SWITCH in 220-500 MC position, and POWER switch to ON.
d. Adjust G268 Signal Generator to 21.4 mc using electronic counter and adjust SM2000 Sweep Generator center frequency to 21.4 mc.
e. Set G196 Oscilloscope vertical sensitivity to 100 millivolts per centimeter.
f. Adjust generator output (using HP355B Attenuator if needed) for a low level response curve on G196 Oscilloscope. Adjust sweep width as needed to clearly display response curve.
g. Adjust L509 and L510 of T508 for symmetrical "S" curve centered about the 21.4-mc marker with equal negative and positive peaks. Discriminator peak-to-peak separation should be 750 kc (±30) kc.

5-5. V503 THROUGH V504 INTERSTAGE ALIGNMENT

a. Remove V403 and V502 and connect test equipment as shown in figure 5-2, except transfer connection shown at TP502 to TP501 and connection at V504, pin 1 to V503, pin 1.
b. Place bandwidth switch in the 300 KC AM position and AVC-MAN switch in the AVC position.
c. Adjust oscilloscope vertical sensitivity to 50 millivolts per centimeter.

300 KC BANDWIDTH ALIGNMENT SETUP

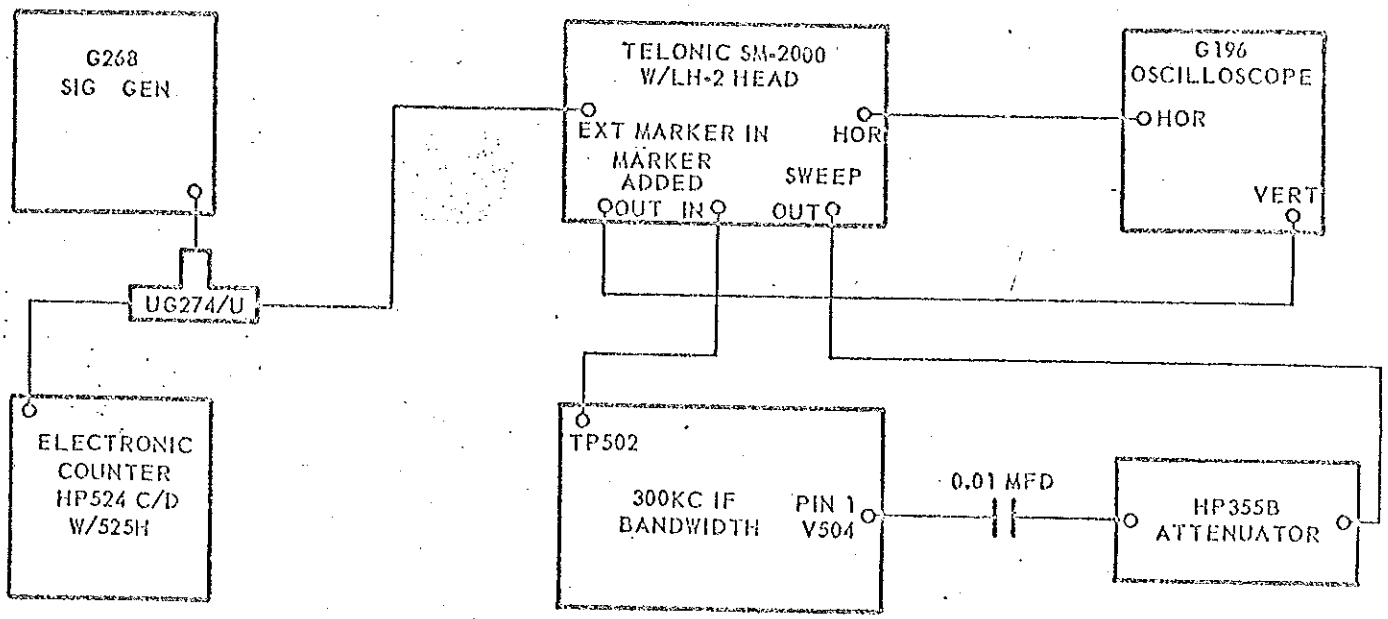


Figure 5-2

d. Tune the signal generator to 21.4 mc as displayed by the electronic counter.

e. Adjust sweep generator output and sweep width for a low level response curve on G196.

f. Adjust L507 and L508 of T507 for symmetrical response curve centered about the 21.4-mc marker.

5-6. V502 THROUGH V503 INTERSTAGE ALIGNMENT

a. Replace V502 and connect test equipment as shown in figure 5-2, except transfer connection shown at V504, pin 1 to V502, pin 1.

b. Place bandwidth switch in 300 KC AM position and AVC-MAN switch in AVC position.

c. Adjust oscilloscope vertical sensitivity to 50 millivolts per centimeter.

d. Tune the G268 Signal Generator to 21.4 mc as displayed by the electronic counter.

e. Adjust sweep generator output and sweep width for a low level response curve on oscilloscope.

f. Adjust T505 and T506 for a symmetrical response curve centered about the 21.4-mc marker.

5-7. V501 THROUGH V502 INTERSTAGE ALIGNMENT

a. Connect test equipment as shown in figure 5-2, except transfer connection shown at V504, pin 1 to V501, pin 1.

b. Adjust oscilloscope vertical sensitivity to 50 millivolts per centimeter.

c. Adjust sweep generator for a low level response curve on G196.

d. Place bandwidth switch in 300 KC AM position and the AVC-MAN switch in the AVC position.

e. Adjust T503 and T504 for a symmetrical response curve centered about the 21.4-mc marker.

5-8. FINAL ALIGNMENT, V501 THROUGH V504

a. Replace I-F bottom cover.

b. Set bandwidth selector switch in 300 KC AM position and BAND SWITCH in 220-500 MC position.

c. Connect test equipment as shown in figure 5-2, except transfer connection shown at V504, pin 1, to TP402 (located in low band tuner).

d. Set oscilloscope vertical sensitivity to 100 millivolts per centimeter.

e. Adjust signal generator to 21.4 mc and sweep generator frequency and output for a low level response curve as displayed on oscilloscope.

f. Adjust T501 through T507 for a symmetrical response curve centered about the 21.4-mc marker and 300 (±25) kc wide at the 3-db points.

5-9. 40-KC BANDWIDTH I-F AMPLIFIER ALIGNMENT

The procedures outlined in paragraphs 5-10 through 5-15 must be performed with the i-f strip set for 40-kc bandwidth operation. If, after an alignment is performed, it is decided

to change the i-f strip bandwidth to 75 kc, a realignment is not necessary as alignment is maintained when the coupling boards are interchanged. The i-f strip must be removed from the main receiver chassis.

During alignment of the 40-kc strip, the sweep generator output should be set to obtain a very low level response curve on the G196 Oscilloscope. The sweep width should be no greater than that required to produce the desired oscilloscope pattern.

5-10. 18.9-MC CRYSTAL OSCILLATOR TEST. Using the G200 VTVM, connect a one meg-ohm resistor in series with the probe, measure the voltage at V604 pin 4. This voltage should be between six and eight volts, dc. This will check the 18.9-mc crystal oscillator for proper operation. It is still possible that the 18.9-mc oscillator frequency could deviate far enough from 18.9 mc to affect alignment adversely.

5-11. 40-KC BANDWIDTH I-F DISCRIMINATOR ALIGNMENT. Perform the following steps:

a. Remove 40/75-kc i-f strip from receiver, and disconnect P602 from J602.

b. Connect test equipment as shown in figure 5-3, except transfer connection shown at J602 to V606, pin 4, and transfer connection shown at junction of L607, R625, R624, and R623 to FM output (junction CR602 and C636).

c. Set receiver functions as follows: bandwidth switch in 40 KC FM position, BAND SWITCH in 220-500 MC position, and POWER switch to ON.

d. Set oscilloscope vertical number 1 sensitivity to 100 millivolts.

e. Tune G268 Signal Generator to 2.5 mc as displayed on electronic counter, then adjust sweep generator to secure a response curve on G196 Oscilloscope. This will appear on upper trace and marker will appear on lower trace. The HP355B should be adjusted as necessary for a low level response curve.

f. Using calibrated marker as a reference, adjust L608 and L609 for a discriminator "S" shape curve having equal positive and negative peaks separated 150 kc ±6 kc, and zero amplitude at 2.5 mc.

40 KC BANDWIDTH ALIGNMENT SETUP

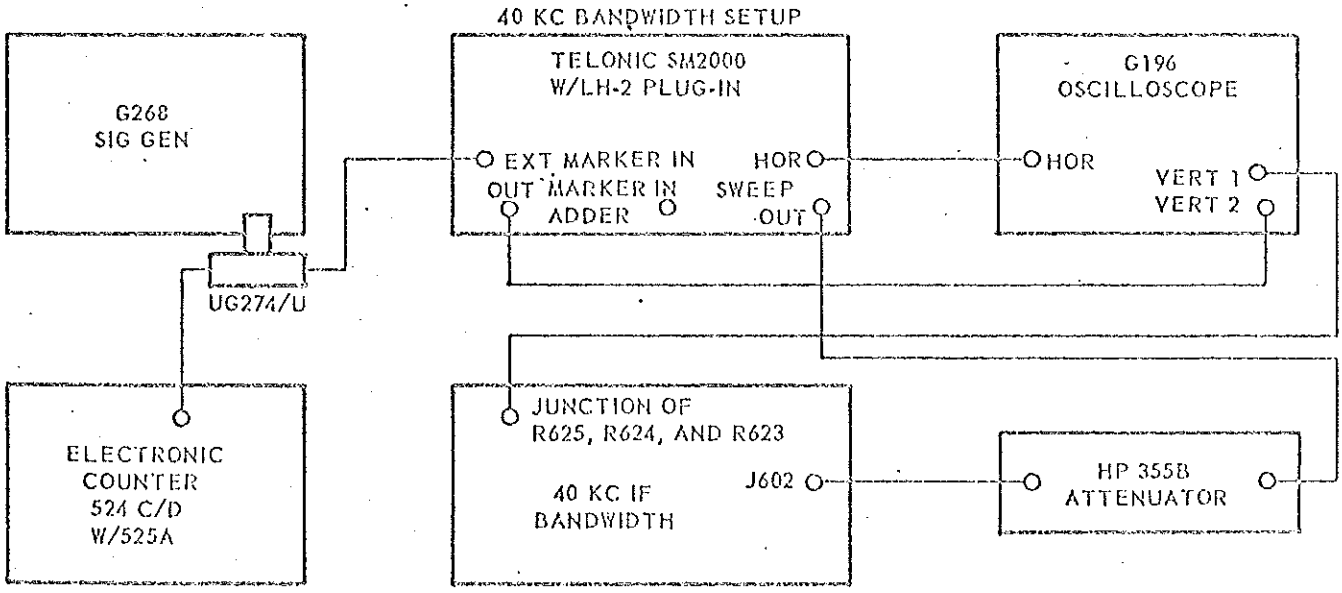


Figure 5-3

5-12. V605 THROUGH V606 INTERSTAGE ALIGNMENT. Perform the following steps.

a. Connect test equipment as shown in figure 5-3, except transfer connection shown at J602 to V605, pin 4.

b. Set receiver functions as follows: BAND SWITCH in 220-500 MC position, bandwidth switch in 40 KC AM position and POWER switch to ON.

c. Tune G268 Signal Generator to 2.5 mc as displayed on electronic counter.

d. Adjust sweep generator and HP355B to secure a response curve on upper trace of oscilloscope. Marker will appear on lower trace.

e. Adjust L606 for a symmetrical response curve centered about the 2.5-mc marker.

5-13. V603 THROUGH V605 INTERSTAGE ALIGNMENT. Perform the following steps.

a. Connect test equipment as shown in figure 5-3, except connection shown at J601 should be transferred to V603, pin 4.

b. Set BAND SWITCH at 220-500 MC position, bandwidth switch to 40 KC AM position and POWER switch to ON.

c. Tune G268 signal generator to 2.5 mc as displayed on electronic counter.

d. Adjust sweep generator and HP355B to secure a response curve on upper trace of oscilloscope. Marker will appear on lower trace.

e. Adjust L604 for a symmetrical response curve centered about the 2.5-mc marker.

5-14. V601 THROUGH V603 INTERSTAGE ALIGNMENT. Perform the following steps.

a. Connect test equipment as shown in figure 5-3.

b. Set BAND SWITCH to 220-500 MC position, bandwidth switch to 40 KC AM position and POWER switch to ON.

c. Tune signal generator to 21.4 mc as displayed on electronic counter and adjust vertical sensitivity (upper trace) for 1.0 volt per centimeter.

d. Tune sweep generator center frequency to 21.4 mc and adjust as necessary to obtain a low level response curve on oscilloscope.

e. Adjust vertical sensitivity (lower trace) of oscilloscope to obtain 21.4-mc marker.

f. Adjust L602 to obtain a symmetrical response curve centered about the 21.4-mc marker and 40 (±4) kc wide at the 3-db points.

5-15. FINAL ALIGNMENT, V501 THROUGH V606. Perform the following steps.

a. Connect test equipment as shown in figure 5-3, except transfer connection shown at J602 to TP402 (located in low band 60-21.4-mc converter). Transfer connection shown at junction of L607, R625, R624, and R623 to junction of K103, R108, and C104.

b. Fasten 40-kc i-f bandwidth strip to the receiver.

c. Connect P602 to J602 and check to ensure that V403 is removed.

d. With receiver functions and test equipments adjusted as given in steps a and b, a symmetrical response curve centered about the 21.4-mc marker and 40 (±6) kc wide at the 3-db points should be displayed on the oscilloscope. Slight adjustment of L602, L604, L605, and L606 may be required to secure this response. These adjustments must be made by removing the 40-kc i-f strip from receiver. After the i-f strip is installed, check the response again.

e. Remove test equipment and replace V403.

5-16. SECOND LOCAL OSCILLATOR ALIGNMENT

a. Set mode switch to 300 KC FM position.

b. Set the G266 Signal Generator to 60 mc using the G151A Frequency Meter. Connect G266 to J401.

c. Set BAND SWITCH to 220-500 MC position.

d. Adjust zero set of G200 VTVM for zero indication and connect VTVM to discriminator output, TP502.

e. Adjust T403 (L407) for zero indication on the G200 VTVM.

5-17. 60-21.4 MC CONVERTER ALIGNMENT, LOW BAND SECTION

NOTE

Before accomplishing 60-21.4-mc converter and tuner alignment, the sweep output should be leveled over frequency range desired. Use figure 5-4 for equipment connections.

SWEEP OUTPUT ALIGNMENT SETUP

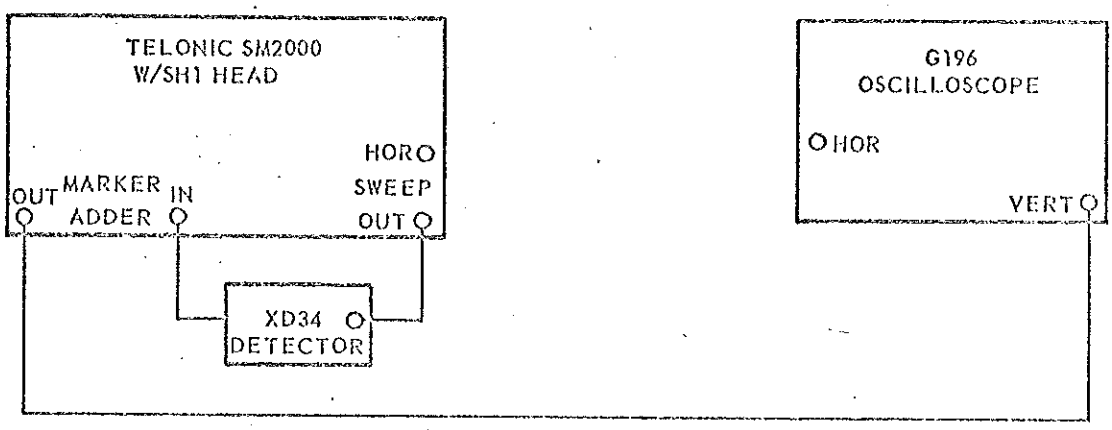


Figure 5-4

a. Set mode switch to 300 KC AM position and AVC-MAN switch to MAN position. Set BAND SWITCH to 220-500 MC position.

b. Connect the G196 Oscilloscope to TP402.

c. Remove bottom cover from 60 to 21.4-mc i-f converter assembly.

d. Connect the sweep generator to V404 pin 1. Set the G266 Signal Generator to 60 mc, using the G151A Frequency Meter or electronic counter, and couple to EXT MARKER IN jack on sweep generator.

e. Set the sweep generator to produce approximately 5- to 6-mc sweep, centered about the 60-mc marker, as viewed on the G196 CRT. Make sure there is adequate r-f grounding and shielding between the receiver and the test equipment. This may be checked by grasping the test leads, one at a time, noting the G196 CRT trace each time to see if it is distorted.

f. Detune T404 (L409) by turning slug nearly all the way in.

g. With G196 sensitivity and sweep generator setup output set to produce peak G196 deflection of 0.25 volts, adjust both primary (L410) and secondary (L411) of T405 to give double-tuned symmetrical response curve centered about the 60-mc marker.

h. Replace the bottom cover of converter assembly, leaving the G196 connected to TP402.

i. Reconnect sweep generator to TP201 on the low band r-f tuner. Do not disturb the frequency settings of this equipment. After connections are made, again check for adequate r-f grounding and shielding.

j. Adjust both T404 (L409) and L212 for double-tuned symmetrical response centered around 60 mc, with the G196 sensitivity and sweep generator output set to produce peak G196 CRT trace deflection of 0.25 volts. The response should be nearly flat topped and approximately 4 mc in width at the 3-db points (slight adjustment of L410 and L411 of T405 may be made to obtain this response); however, the exact bandwidth is not critical since the overall receiver bandwidth is governed by the 21.4-mc i-f amplifiers. If the sweep generator output is not strong enough to produce a peak G196 CRT trace deflection of 0.25 volts, connect the sweep generator output directly to the grid of the first mixer at V203, pin 1.

CAUTION

Be careful not to disturb the layout of the components inside the RF tuner chassis if the tuner bottom cover has been removed.

5-18. 60-21.4 MC CONVERTER ALIGNMENT, HIGH BAND SECTION

a. Leave mode switch on 300 KC AM, AVC-MAN switch on MAN, and operate BAND SWITCH to 490-1000 MC position.

b. Connect the G196 Oscilloscope to TP401.

c. Connect the sweep generator to V402 pin 1. Set the G266 Signal Generator to 60 mc, using the G151A Frequency Meter or electronic counter, and couple to EXT MARKER IN jack on sweep generator.

d. Set the sweep generator to produce 5- to 6-mc sweep, centered about the 60-mc marker as viewed on the G196 CRT. Make sure there is adequate r-f grounding and shielding. This may be checked by grasping the test leads, one at a time, noting the G196 CRT trace each time to see if it is distorted.

e. Detune primary (L402) and secondary (L403) of T401 by turning slugs nearly all the way in.

f. Adjust both primary (L404) and secondary (L405) of T402 to produce double-tuned symmetrical response centered around 60 mc.

g. Disconnect C401 from V401 pin 6 and apply sweep generator output to V401 pin 6. Do not disturb the frequency settings of this equipment. After connections are made, check again for adequate r-f grounding and shielding.

h. Adjust both primary (L402) and secondary (L403) of T401 to produce double-tuned response centered around 60 mc. The response shape should be nearly flat-topped or slightly peaked, having a 3-db bandwidth of approximately 4 mc. Slight adjustment of L404 and L405 of T402 may be needed to obtain this response. Replace 60-21.4-mc converter bottom cover.

5-19. LOCAL OSCILLATOR ADJUSTMENT, 220-500 MC BAND

The only adjustment necessary in the low band local oscillator is to make the tuning dial indicate correctly. Error in the dial reading can be introduced by aging or replacement of the oscillator tube, V204. If tuning dial error exists, proceed with the following steps:

a. Set mode switch to the 300 KC FM position, AVC-MAN switch to AVC position, BAND SWITCH to 220-500 MC, and tune the receiver to 500 MC.

b. Accurately set the G267 Signal Generator to 500 mc using G151A Frequency Meter. Couple the G267 to the antenna input.

c. Connect VTVM to C420 on 60-21.4-mc i-f converter chassis. Adjust G267 output such that G200 reading does not exceed -2-volt dc for the remainder of the procedure.

d. Adjust C222 for maximum negative voltage reading as indicated by the G200.

NOTE

The low frequency range of oscillator operation is controlled by inductor L213 which has been correctly adjusted at the factory and should not be readjusted in the field. Disturb the layout of components inside the tuner as little as possible. When the layout is altered due to procedural instructions, duplicate the former layout during component replacement.

5-20. R-F AMPLIFIER ALIGNMENT, LOW BAND

The alignment of the RF circuits is highly critical and should not be attempted in the field unless considered absolutely necessary. The sweep output should be leveled over the frequency range used during alignment.

a. Remove both top and bottom covers from low band RF tuner assembly.

b. Unsolder L220 and R202 from junction post located near cathode of second RF amplifier, V202.

c. Set receiver functions as follows: BAND SWITCH to 220-500 MC position, AVC-MAN switch to MAN, bandwidth switch to 300 KC AM, and POWER switch to ON.

d. Connect test equipment as shown in figure 5-5, except transfer connection shown at J101 to junction of post (located near cathode of V202) and C207.

e. Set vertical sensitivity of oscilloscope to 50 millivolts per centimeter.

f. Set the sweep generator, receiver, and marker generator to 350 mc. (Use the electronic counter to properly set the marker generator.)

g. Adjust the sweep generator as needed to produce a response curve on the oscilloscope.

h. Detune C203 by turning it counterclockwise against the stop.

i. Adjust C210 and C212 for a double-tuned response curve with the marker located 20 percent down on the high frequency side slope.

j. Check receiver response over the entire band. This is done by varying the tuning knob, then adjusting the center frequency of the sweep generator until a response curve is again obtained on the oscilloscope. In general, the response should appear round topped at

R-F AMPLIFIER ALIGNMENT SETUP

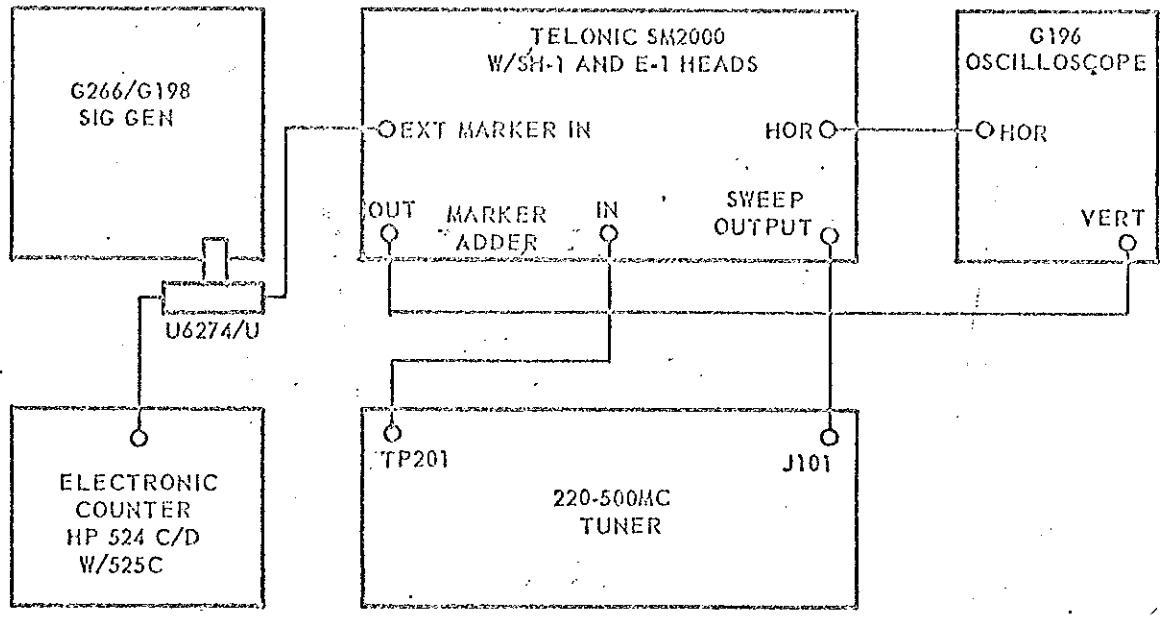


Figure 5-5

the high frequencies and double humped at the middle and low frequencies. Check the response at 220 mc, 350 mc, and 500 mc using a calibrated marker. The marker should appear not more than 30 percent down on the response curve.

NOTE

Avoid adjusting the length of either L209 or L211 unless the high frequency response appears greatly out of adjustment.

k. Solder L220 and R202 back to the junction post from which they were removed and connect the test equipment as shown in figure 5-5.

l. Tune the sweep generator to 350 mc and adjust C203 for maximum trace amplitude on G196 CRT.

m. Adjust sweep generator center frequency and receiver tuning to 500 mc. If the response curve is significantly lower than that of step k, adjust the length of wire between C203 and inductuner until G196 CRT trace amplitude increases.

NOTE

When component layout is altered due to procedural instructions, duplicate the former layout during component replacement, except where otherwise noted.

n. Remove test equipment and replace top and bottom covers removed in step a.

5-21. LOCAL OSCILLATOR ALIGNMENT, 490-1000 MC BAND

Adjustment of the high band local oscillator may be required to improve the tracking and sensitivity after replacement of the 6AF4A oscillator tube, V301. If necessary, proceed as follows:

a. Set mode switch to 300 KC FM, AVC-MAN switch to AVC, BAND SWITCH to 490-1000 MC, and dial to 500 mc. Set the G267 Signal Generator to 500 mc using the G151A Frequency Meter and connect to antenna input.

b. Connect the G200 VTVM to TP501.

c. Using a non-metallic screwdriver, adjust C306 for G200 maximum negative voltage reading. Limit the G267 output to less than 1000 microvolt as a large signal may cause the oscillator to pull and damage the crystal mixer.

d. Set the G267 to 1000 mc using G151A. Set the dial to 1000 mc.

e. Adjust C305 for G200 maximum negative voltage reading.

5-22. R-F ALIGNMENT, HIGH BAND

NOTE

Under no circumstances should adjustment be made in the high band r-f tuner section.

The tuning circuits are factory aligned and will need no adjustment in the field. If the receiver is unusually noisy, check all cable connections. The most likely cause of trouble in the r-f section of the high band is a damaged crystal mixer and replacement will usually restore the original performance.

NOTE

Be careful not to disturb the layout of components inside the tuner.

5-23. G175H11000 AM BFO ADJUSTMENTS

In addition to performing the alignment procedures on the G166D Receiver, it may be necessary to perform the following adjustments which have been performed at the factory. Prior to performing the following procedures, replace transistor Q1101 and determine if the correct output is obtained. The AM BFO adjustment is to be performed if the AM BFO FREQ front panel control fails to provide proper frequency variations of the BFO assembly.

a. Gain access to the junction of capacitors C1105, C1106, and C1107. Attach the frequency counter probe to this point.

b. Press the POWER switch on the front panel to the ON position. The white light in the POWER switch should illuminate.

c. Place the AM BFO ON-OFF toggle switch on the front panel to the ON position. Rotate the mode-bandwidth selector to the 40 KC AM position.

d. Rotate the AM BFO FREQ control on the front panel fully counterclockwise.

e. Rotate screwdriver-adjust potentiometer R1101 to obtain a 21.385-mc (±5 kc) reading as displayed by the frequency counter.

f. Pull out on the POWER switch located on the front panel. The white light should extinguish. Remove the frequency counter input probe from the BFO assembly.

g. Secure mountings removed in step a.

5-24. PREVENTIVE MAINTENANCE

Preventive maintenance consists of special and operational inspections which must be performed at daily, 100 operational hour, and 1000 operational hour intervals.

5-25. DAILY INSPECTION

Inspect for loose mountings; frayed, crimped, or deteriorated cables; and damaged connectors. Assure that adequate ventilation is provided to prevent damage from overheating.

5-26. 100-HOUR INSPECTION

Perform daily inspection. Disconnect all power supply cables. Remove all dust covers and blow accumulated dust from interior of components using dry compressed air.

5-27. 1000-HOUR INSPECTION

Perform daily and 100-hour inspection. Deenergize all components. Remove all vacuum tubes and check with the G199 Tube Checker. Replace all low-performance tubes with new, tested units. Perform the sensitivity checks outlined below in paragraphs 5-28 through 5-37.

5-28. FUNCTIONAL TEST

For functional tests, proceed as follows.

5-29. RECEIVER SENSITIVITY, 300-KC AM BANDWIDTH

a. Connect test equipment as shown in figure 5-6.

300-KC BANDWIDTH TEST SETUP

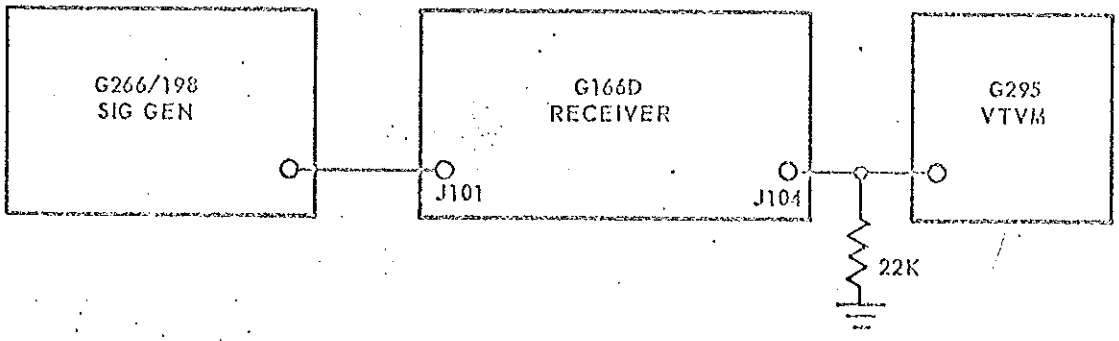


Figure 5-6

b. Set receiver functions to 220-500 MC, 300 KC-AM, dial to 220 mc, and AVC-MAN switch in AVC position.

c. Set signal generator to 220 mc with 50% modulation at 1 kc and adjust output level to 8 microvolts.

d. Adjust signal generator frequency for maximum indication on VTVM.

e. Adjust audio gain control for a convenient level on VTVM and to avoid signal saturation.

f. Set signal generator in CW position and note VTVM level decreases by at least 10 db.

g. Repeat steps a through f with bandwidth selector switch in 40 KC AM position. Results should be the same.

h. Replace G266 Signal Generator with G198 Signal Generator.

i. Tune receiver and G198 Signal Generator to 500 mc. Place receiver bandwidth switch in 300 KC AM position.

j. Adjust signal generator output to 8 microvolts with 50% modulation at 1 kc and adjust audio gain control to a convenient level.

k. Tune signal generator for maximum indication on VTVM. Record this level.

l. Adjust audio gain control to avoid signal saturation.

m. Place signal generator in CW position and note VTVM decreases at least 10 db.

n. Place bandwidth selector switch in 40 KC AM position, and repeat steps h through m. Results should be the same.

o. Place BAND SWITCH in 490-1000 MC position and repeat steps h through n at 500 mc and 1000 mc.

5-30. DIAL CALIBRATION TEST

a. Connect test equipment as shown in figure 5-7 and set BAND SWITCH in 220-500 MC position. Check dial accuracy at 220 mc, 360 mc, and 500 mc. Local oscillator frequency (as displayed by counter), should be the dial reading plus 60 mc (±1% of dial reading).

b. Set BAND SWITCH in 490-1000 MC position. Check dial accuracy at 490 mc, 750 mc, and 1000 mc. Local oscillator frequency (as indicated by counter) should be the dial reading plus 60 mc (±1% of dial reading).

DIAL CALIBRATION TEST SETUP

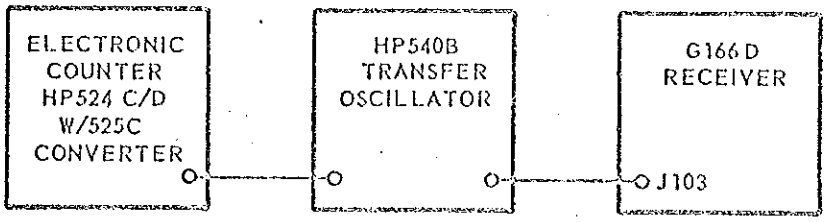


Figure 5-7

5-31. 300-KC FM DISCRIMINATOR TEST

a. Remove V403 local oscillator tube.

b. Set receiver functions as follows: bandwidth selector switch in 300 KC FM position, BAND SWITCH in 220-500 MC position, and POWER switch to ON.

c. Set VTVM sensitivity to 30-volts dc full scale and adjust VTVM ZERO SET for mid-scale (15 V) reading.

d. Connect test equipment as shown in figure 5-8.

300-KC FM DISCRIMINATOR TEST SETUP

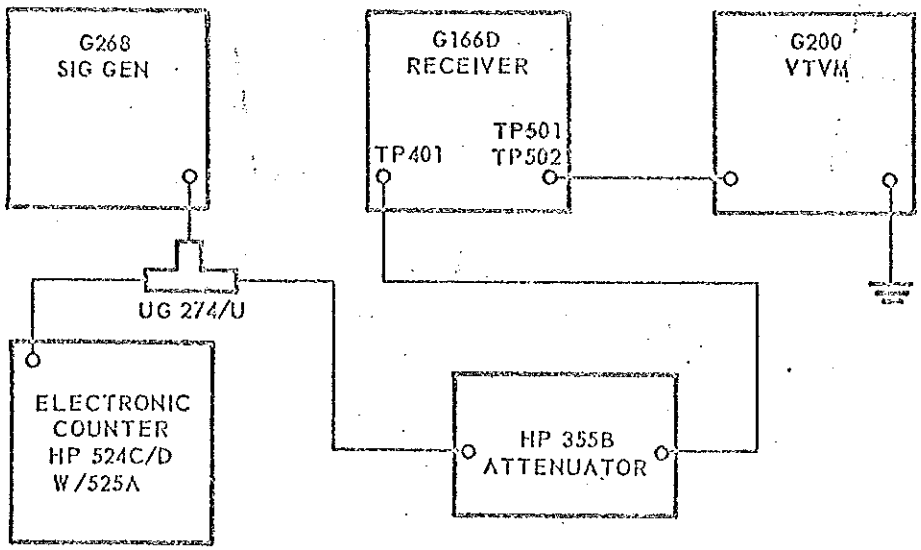


Figure 5-8

e. Connect VTVM to TP502 and ground lead to receiver chassis.

f. Set G268 Signal Generator to CW position and output to 30 millivolts.

g. Set HP355B to 20 db position.

h. Tune G268 Signal Generator for midscale reading on VTVM. Frequency as displayed by electronic counter should be 21.400 mc ±30 kc. Vary frequency of G268 for maximum negative and positive peaks. These peaks should be equal.

5-32. 300-KC AM BANDWIDTH TEST

a. Set receiver functions as follows: bandwidth selector switch in 300 KC AM position, AVC-MAN switch in MAN position, BAND SWITCH in 220-500 MC position, and POWER switch to ON.

b. Set sensitivity of VTVM to 3-volt dc full scale. Adjust ZERO SET for zero reading.

c. Connect test equipment as shown in figure 5-8.

d. Connect VTVM DC lead to TP501 and ground lead to receiver chassis.

e. Set G268 Signal Generator output to 300 millivolts and frequency to 21.4 mc.

f. Set HP355B Attenuator to 20-db position.

g. Adjust RF gain control for 3 volts on VTVM.

h. Decrease frequency of signal generator until VTVM reads 2.20 volts. Frequency as indicated by electronic counter should be 21.250 mc (±25 kc).

i. Increase frequency of signal generator until VTVM reads 2.20 volts. Frequency as indicated by electronic counter should be 21.550 mc (±25 kc).

5-33. 40-KC FM DISCRIMINATOR TEST

a. Set receiver functions as follows: bandwidth selector switch in 40 KC FM position, BAND SWITCH in 220-500 MC position; and POWER switch to ON.

b. Set VTVM sensitivity to 30-volt dc full scale and adjust VTVM ZERO SET for midscale (15 V) reading.

c. Connect test equipment as shown in figure 5-9, with VTVM DC lead to junction of C104, R108, and K103 and ground lead to receiver chassis.

40-KC FM DISCRIMINATOR ALIGNMENT SETUP

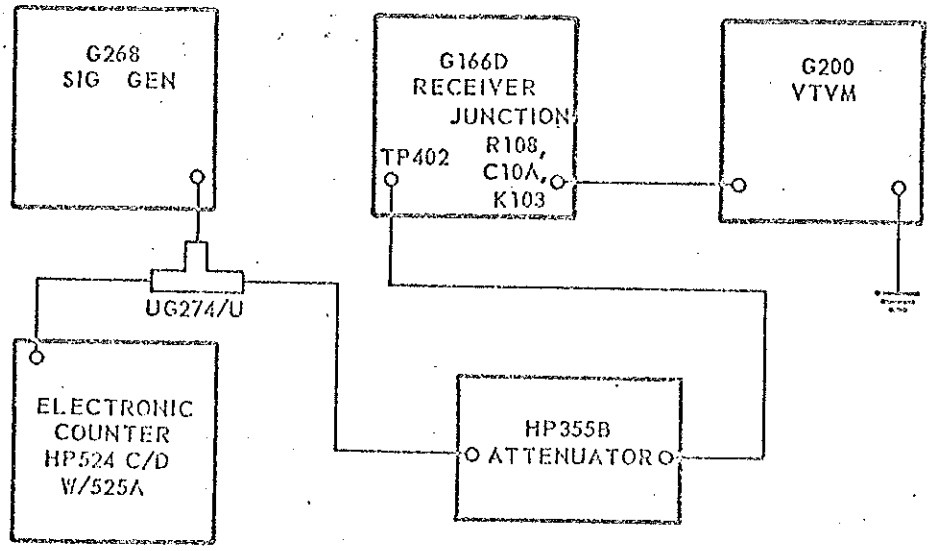


Figure 5-9

d. Set G268 Signal Generator to CW position and output to 30 millivolts.

e. Set HP355B to 20-db position.

f. Tune signal generator for midscale reading on VTVM. Frequency as displayed by electronic counter should be 21.400 mc (±6 kc). Vary frequency of G268 for maximum negative and positive peaks. These peaks should be equal.

5-34. 40-KC AM BANDWIDTH TEST

a. Set receiver functions as follows: bandwidth selector switch in 40 KC AM position, BAND SWITCH in 220-500 MC position, and POWER switch to ON.

b. Set VTVM sensitivity to 1.0-volt dc full scale, and adjust ZERO SET for zero reading.

c. Connect test equipment as shown in figure 5-9 with VTVM DC lead to junction of R102 and R105.

d. Set G268 to CW position and output to 30 millivolts.

e. Set HP355B to 20-db position.

f. Set frequency of G268 to 21.4 mc and output for 1.0-volt dc reading on VTVM.

g. Decrease frequency of G268 until VTVM reads 0.70 volts. Frequency, as indicated by electronic counter, should be 21.380 mc (±3 kc).

h. Increase frequency of signal generator until VTVM reads 0.70 volts. Frequency, as indicated by electronic counter, should be 21.420 mc (±3 kc).

i. Replace V403 and disconnect test equipment.

5-35. COR SENSITIVITY TEST

a. Connect test equipment as shown in figure 5-10.

COR SENSITIVITY ALIGNMENT SETUP

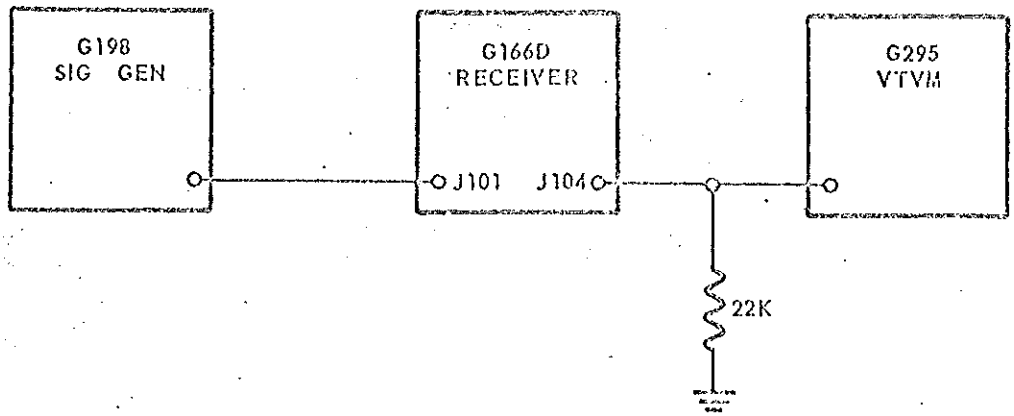


Figure 5-10

b. Set receiver functions as follows: bandwidth switch in 300 KC AM position, BAND SWITCH in 220-500 MC position, AVC-MAN switch in AVC, AUDIO GAIN control as desired, and POWER switch to ON.

c. Tune receiver to 500 mc and adjust COR SENS control counterclockwise just to point where the light goes out, while pressing in COR DELAY disabling switch.

d. Set G198 MOD. SELECTOR switch to 1000 cycles, frequency to 500 mc, and output to 2 microvolts.

e. Tune signal generator for maximum indication on VTVM. COR light should illuminate.

f. Repeat procedure for 40 KC AM position.

g. Place BAND SWITCH in 490-1000 MC position. Repeat procedure at 1000 mc for 300 KC AM and 40 KC AM position.

5-36. COR DELAY TEST

a. Connect equipment as shown in figure 5-10.

b. Set receiver functions as follows: BAND SWITCH in 220-500 MC position, AVC-MAN switch in AVC, bandwidth switch in 300 KC AM position, AUDIO GAIN control as desired, and POWER switch to ON.

c. Tune receiver to 500 mc and with no signal applied, adjust COR SENS control counterclockwise just to the point where the light goes out.

d. Set output of signal generator to 4 microvolts and tune for maximum indication of VTVM. The COR light should illuminate.

e. Return output of signal generator to zero. After a time delay, the COR light should extinguish.

f. Adjust R315 for a delay of 5 seconds.

g. Disconnect test equipment.

5-37. OSCILLATOR MONITOR TEST

a. Connect test equipment as shown in figure 5-11.

OSCILLATOR MONITOR ALIGNMENT SETUP

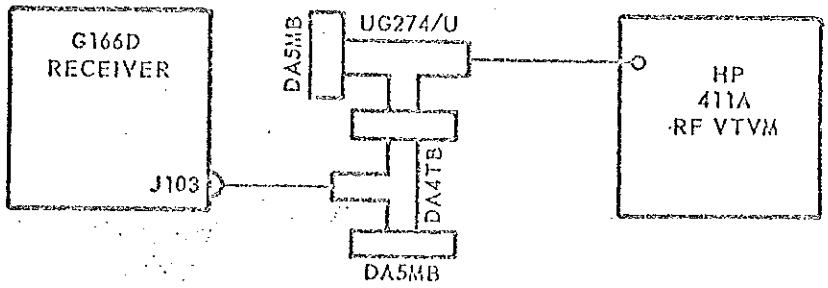


Figure 5-11

b. Place BAND SWITCH in 220-500 MC position and POWER switch to ON.

c. Tune receiver through entire band and note oscillator monitor output variations indicated by HP411A VTVM. The minimum output observed through the entire band should not be less than 60 millivolts or greater than 65 millivolts. The maximum output through the entire band should not be greater than 6 db above the minimum value observed. (Example: If the observed minimum output is 61 millivolts, the maximum output must not be greater than 122 millivolts.)

d. Place BAND SWITCH in 490-1000 MC position.

e. Tune receiver through entire band and note oscillator monitor output variations indicated by the HP411A VTVM. If output levels fall below 60 millivolts, replace oscillator tube, V301.

f. Pull POWER switch on front panel to off and remove test equipment.

5-38. CORRECTIVE MAINTENANCE

The greatest percentage of troubles will be caused by failures of replaceable parts such as fuses, relays, diodes, and tubes. Proper functioning of these parts, either by test or by replacement with parts known to be good, should be assured before troubleshooting techniques are employed.

Initial troubleshooting should be directed at localizing the trouble to a specific portion of the receiver. The best means to accomplish this is to feed a signal in the antenna input, then check the receiver operation for each mode of operation across each band. Overall failure of the receiver usually indicates power supply trouble; therefore, it should always be definitely established that the power supply is functioning perfectly before other circuitry is suspected. Observation of the signal from each r-f tuner, from both the AM detector and FM discriminator, and from the video amplifier can be made through the use of test points mentioned in the discussion of Section IV. Figure 5-12 is a guide for initial trouble localization. When the source of trouble has been narrowed to a particular section of a subassembly, voltage and resistance measurements, along with direct observation, will usually give an indication of the faulty components. Figure 5-13 gives the diode and electron tube complement and figure 5-14 gives the tube pin voltages of the G166D Receiver. All connections should be checked to ensure that they are electrically adequate. Suspected electrical components should be tested to see that values have not changed. Always replace electrical parts showing visual evidence of burning or physical damage. Further guides to checking the receiver performance are listed in paragraph 1-4, which presents the performance specifications. Finally, it is recommended that even though a realignment is not necessary, maintenance personnel familiarize themselves with these procedures. This familiarization is recommended because methods of checking performance, which might be of value in other work, are included.

TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	REMEDY
1. BANDWIDTH SELECTOR AT 300 KC		
Receiver does not operate	a. 60-cycle power supply fuse blow in the power supply	a. Replace fuse F102.
	b. 400-cycle power supply (1.25 amp) fuse blown in the power supply	b. Replace fuse F101.
	c. Defective power switch	c. Replace S101.
Receiver operates on AM, but not on FM	Defective discriminator	Replace V505.
No output to SDU on 490-1000 MC band	a. Defective 2nd mixer b. Defective 60 MC IF's c. Defective diode mixer	a. Replace V403. b. Replace V401 or V402. c. Replace CR301.
No output to SDU 220-500 MC band	a. Defective 2nd mixer b. Defective 60 MC IF c. Defective 1st mixer d. Defective oscillator e. Defective 1st or 2nd RF	a. Replace V405. b. Replace V404. c. Replace V203. d. Replace V204. e. Replace V201 or V202.
Receiver remains squelched when carrier signal is received, but the COR light goes on	a. SQUELCH SENS control not adjusted correctly b. Defective squelch tube	a. Readjust the SQUELCH SENS control. b. Replace V103.
Squelch operates normally, but COR light remains off	a. COR SENS control not adjusted correctly b. Defective COR tubes	a. Readjust the COR SENS control. b. Replace V101 or V105.
No audio output when video output is present	a. Defective 1st audio amplifier tube	a. Replace V103.
	b. Defective 2nd audio and power amplifier tube	b. Replace V104.
2. BANDWIDTH SELECTOR AT 40 KC		
Receiver does not operate	a. 60-cycle power supply fuse blown in power supply	a. Replace fuse.
	b. 400-cycle power supply fuse (1.25 amps) blown in power supply	b. Replace fuse.
	c. Defective power switch	c. Replace S101.

Figure 5-12. (Sheet 1 of 2)

TROUBLESHOOTING CHART (Cont)

SYMPTOM	PROBABLE CAUSE	REMEDY
Receiver operates on AM. FM mode reception poor	Defective diode	Replace CR602 or CR601.
No output to SDU on 490-1000 MC band	a. Defective 2nd mixer b. Defective 60 MC IF's	a. Replace V403. b. Replace V401 or V402.
No output to SDU on 220-500 MC band	a. Defective 2nd mixer b. Defective 60 MC IF c. Defective 1st mixer d. Defective oscillator e. Defective 1st or 2nd RF	a. Replace V405. b. Replace V404. c. Replace V203. d. Replace V204. e. Replace V201 or V202.
Receiver remains squelched when carrier signal is received but COR light goes on	a. SQUELCH SENS control not adjusted properly b. Defective squelch tube	a. Readjust the SQUELCH SENS control. b. Replace V103.
Squelch operates normally, but COR lamp remains off	a. COR SENS control not adjusted correctly b. Defective COR tubes	a. Readjust the COR SENS control. b. Replace V101 or V105.
No audio output when video output is present	a. Defective 1st audio amplifier tube b. Defective 2nd audio and power amplifier tube	a. Replace V103. b. Replace V104.

Figure 5-12.(Sheet 2 of 2)

DIODE AND ELECTRON TUBE COMPLEMENT

SYMBOL	TYPE	FUNCTION
CR101		Not Used
CR102	1N457	AGC Delay
CR103	1N458	COR
V101	12AU7A	Video Amplifier: COR Amplifier
V102	12AU7A	Video Amplifier
V103	12AU7A	Squelch Amplifier; Audio Amplifier
V104	12AU7A	Audio Amplifier
V105	12AU7A	COR Amplifier
V201	7077	1st RF Amplifier, Low Band Tuner
V202	7077	2nd RF Amplifier, Low Band Tuner
V203	6AK5	Mixer, Low Band Tuner
V204	6AF4A	Oscillator, Low Band Tuner
V301	6AF4A	Oscillator, High Band Tuner
V401	5842	1st 60-mc IF Amplifier, High Band
V402	6BA6W	2nd 60-mc IF Amplifier, High Band
V403	6U8	2nd Mixer, High Band; 2nd Oscillator, High and Low Bands
V404	6BA6W	60-mc IF Amplifier, Low Band
V405	6AK5	2nd mixer, Low Band
V501	6DC6	1st 21.4-mc IF Amplifier
V502	6DC6	2nd 21.4-mc IF Amplifier
V503	6CB6	3rd 21.4-mc IF Amplifier, AM; 1st Limiter, FM
V504	6AK5	Detector, AM; 2nd Limiter, FM
V505	6AL5	Discriminator
V601	6CW4	21.4-mc IF Amplifier
V602	6CW4	
V603	7587	Mixer
V604	6CW4	18.9-mc oscillator
V605	7587	2.5-mc Amplifier AM; 1st Limiter, FM
V606	7587	Detector, AM; 2nd Limiter, FM

Figure 5-13

TUBE		NOTES							
SCHEMATIC DESIGNATION	TYPE NUMBER		1	2	3	4	5	6	7
V101	12AU7A		70	6.5	8.1	0	0	168	-4.
V102	12AU7A		280	155	175	0	0	280	155
V103	12AU7A		62	-4.3	0	0	0	225	61
V104	12AU7A		105	0	5.8	0	0	275	0
V105	12AU7A		275	160	170	0	0	200	160
V201	7077	1	-	-	-	-	-	-	-
V202	7077	1	-	-	-	-	-	-	-
V203	6AK5	1	-4.2	0	6.3 ac	0	140	36	0
V204	6AF4A	1	86	-8	0	6.3 ac	0	-8	86
V301	6AF4A	2	-	-	-	-	-	-	-
V401	5842	3	155	0	0	0	0	1.4	0
V402	6BA6W	3	1.9	0	0	6.3 ac	160	90	0.
V403	6V8	3	115	-2.7	5.8	6.3 ac	0	150	0
V404	6BA6W	1	-1.9	0	0	6.3 ac	175	120	0.
V405	6AK5	1	-1.75	0	0	6.3 ac	150	57	0
V501	6DC6	4	0.28	1.5	6.3 ac	0	270	88	0
V502	6DC6	4	0.28	1.1	6.3 ac	0	270	74	0
V503	6CB6	4	-0.57	0.07	6.3 ac	0	145	34	0
V503		5	-0.38	0.28	6.3 ac	0	140	58	0
V504	6AK5	4	-14	0	6.3 ac	0	33	80	0
V504		5	-32	0	6.3 ac	0	36	82	0
V505	6AL5	4	-0.42	0.7	5.0 ac	0	0	N.C.	-8.
V601	6CW4	6	-	6.8	-	-0.3	-	-	-
V602	6CW4	6	-	125	-	64	-	-	-
V603	7587	6.8	-	10	-	-6	-	-	-
V604	6CW4	6.8	-	55	-	-7	-	-	-
V605	7587	6	-	22	-	-0.3	-	-	-
V605		7	-	10	-	-0.3	-	-	-
V606	7587	6	-	15	-	-0.3	-	-	-

When using this chart set all variable controls clockwise, and AVC-MAN switch to MAN

SECTION VI

ILLUSTRATED PARTS BREAKDOWN

INTRODUCTION

PURPOSE AND FORMAT

This Illustrated Parts Breakdown lists and describes electrical and mechanical parts to assist in requisitioning, storing, and identifying spare parts. Four major parts comprise this section: (1) Introduction, (2) Group Assembly Parts Breakdown, (3) Numerical Index, and (4) Reference Designation Index.

SUMMARY OF CONTENTS

INTRODUCTION

Included in the Introduction are: (1) Purpose and Format, (2) Summary of Contents, (3) How to Use, (4) Abbreviations, and (5) List of Manufacturers' Codes and Addresses.

GROUP ASSEMBLY PARTS BREAKDOWN

The Group Assembly Parts Breakdown contains illustrations and parts lists of installations, assemblies, and detailed parts. The illustrations and text are arranged according to function and/or next assembly. When it is necessary to show a subassembly in detail, and it is not possible to do so in the same illustration as its major assembly, it is referenced to another illustration in which the subassembly is exploded in as much detail as necessary and its component parts listed in the accompanying text.

The nomenclature of each part, the units per assembly, and the usable on code, if any, are listed to the right of the part number in the text. Next assembly sequence is determined by indenture position; that is, a part listed one column to the right of the position of the part above it is a component of that assembly or installation. The first indenture line in the text is used for the text title and is not used to show part relationship. Attaching parts are shown directly below in the same indenture column as the parts they attach.

When a manufacturer's part is listed, the manufacturer's code is given in the nomenclature along with any other information thought necessary or helpful. Alternate manufacturers are given when available. The manufacturer's name and address may be found from the code symbol by consulting the "List of Manufacturers' Codes and Addresses" in the Introduction. The codes are in accordance with Federal Supply Code for Manufacturers, cataloging handbook H4-1.

The manufacturer's code for LTV Electrosystems, Inc. is 05395 and will not appear in the next unless the part numbers are dissimilar to the examples noted below.

(1) GM906-02041-2
(2) GS102-00031-1
(3) G000035-1
(4) G159-01000-1
(5) TAS8601
(6) TS2114-6A8
(7) 8082-19002-3

The column entitled "Usable on Code" is not utilized in this publication.

The number of parts given under the column entitled "Units per Assembly" constitute that number required to make up a single assembly.

Left- and right-hand parts are listed separately. Component parts of left- and right-hand assemblies are identified by determining next assembly order. When a left- or right-hand assembly has both left- and right-hand parts as components, the nomenclature will show the assembly to which each belongs.

NUMERICAL INDEX

Each part number appearing in the Group Assembly Parts Breakdown is listed in the Numerical Index. This index is compiled in accordance with the numerical part number filing system described below. Read part numbers from left to right, one digit at a time, to determine part number numerical arrangement. The order of precedence in part number numerical arrangement is as follows:

(1) Space (blank column)
(2) Dash (-)
(3) Letters A thru Z
(4) Numerals 0 thru 9

All part numbers are listed with the figure and index number of each appearance.

The column entitled "Stock Number" is not utilized in this publication.

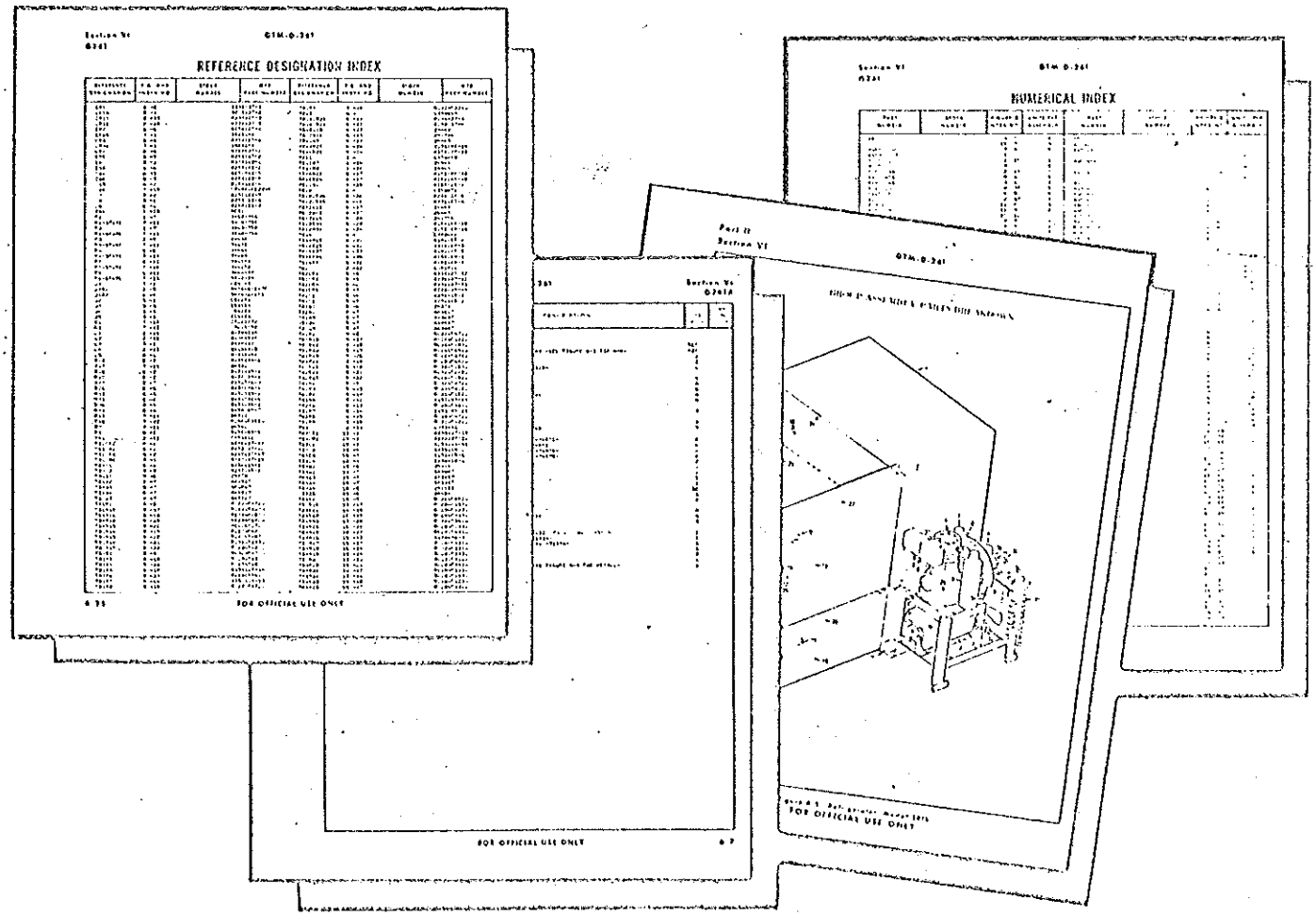
REFERENCE DESIGNATION INDEX

The Reference Designation Index includes all components of electronic equipment having reference designators.

The Reference Designation Index is divided into four columns consisting of the following: (1) REFERENCE DESIGNATION - Reference designators listed in alphanumerical order; (2) FIG. AND INDEX NO. - Used to locate the corresponding part in the Group Assembly Parts Breakdown; (3) STOCK NUMBER - This column is not used in this publication; and (4) MFR PART NUMBER - The part number assigned by the manufacturer of the part.

HOW TO USE

KNOWN ⇩	MFR PART NO.	REFERENCE DESIGNATION NO. (COMPONENT NUMBERS ON SCHEMATICS)
WANT TO KNOW ⇩	SEQUENCE OF ASSEMBLY	MFR PART NO., DESCRIPTION, AND WHERE PART IS PHYSICALLY INSTALLED
SOLUTION ⇩	IN NUMERICAL INDEX FIND MFR PART NUMBER. SEQUENCE OF ASSEMBLY MAY BE FOUND ON INDICATED FIGURE AND INDEX NO. IN GROUP ASSEMBLY PARTS BREAKDOWN.	IN REFERENCE DESIGNATION INDEX FIND REFERENCE DESIGNATION NUMBER. FIND MFR PART NO., DESCRIPTION, AND WHERE PART IS PHYSICALLY INSTALLED ON INDICATED FIGURE AND INDEX NO. IN GROUP ASSEMBLY PARTS BREAKDOWN.



ABBREVIATIONS

AR..... As Required	MEGO... Megohms
ASSY.... Assembly	N..... Nano (10^{-9})
COMP... Composition	NHA .... Next Higher Assembly
F..... Farad	NP..... Nonprocurable
FIG..... Figure	P..... Pico (10^{-12})
GMV.... Guaranteed Minimum Value	U..... Micro (10^{-6})
H..... Henry	V..... Volts
INSTL... Installation	W..... Watts
K..... Kilohm or Kilo (10^{3})	WW..... Wire Wound

LIST OF MANUFACTURERS' CODES AND ADDRESSES

CODE	NAME AND ADDRESS
00656	Aerovox Corp. New Bedford, Massachusetts
01121	Allen-Bradley Co. Milwaukee, Wisconsin
01281	TRW Semiconductors,Inc. Lawndale, California
04062	Elmenco Products Co. New York, New York
04435	Jettron Products,Inc. Hanover, New Jersey
04651	Sylvania Electric Products,Inc. Microwave Device Division Mountain View, California
07047	Ross Milton Co. Hatboro, Pennsylvania
08310	Electro-Physics Laboratories San Marino, California
08524	Deutsch Fastener Corp. Los Angeles, California
09922	Burndy Corp. Norwalk, Connecticut

LIST OF MANUFACTURERS' CODES AND ADDRESSES

CODE	NAME AND ADDRESS
13499	Collins Radio Co. Ceder Rapids, Iowa
13812	Dialco Electric Corp. Brooklyn, New York
14632	Communication Electronics, Inc. Bethesda, Maryland
28520	Heyman Mfg. Co. Kenilworth, New Jersey
30684	Industrial Products Co. Philadelphia, Pennsylvania
42542	Vitro Electronics Division of Vitro Corp. of America Silver Springs, Maryland
56289	Sprague Electric Co. North Adams, Massachusetts
71279	Cambridge Thermionic Corp. Cambridge, Massachusetts
71286	Camloc Fastener Corp. Paramus, New Jersey
71450	CTS Corp. Elkhart, Indiana
71590	Centralab Division of Globe-Union, Inc. Milwaukee, Wisconsin
71785	Cinch Mfg. Co. and Howard B. Jones Div. Chicago, Illinois
72982	Erie Technological Products, Inc. Erie, Pennsylvania
74306	Piego Crystal Co. Carlisle, Pennsylvania

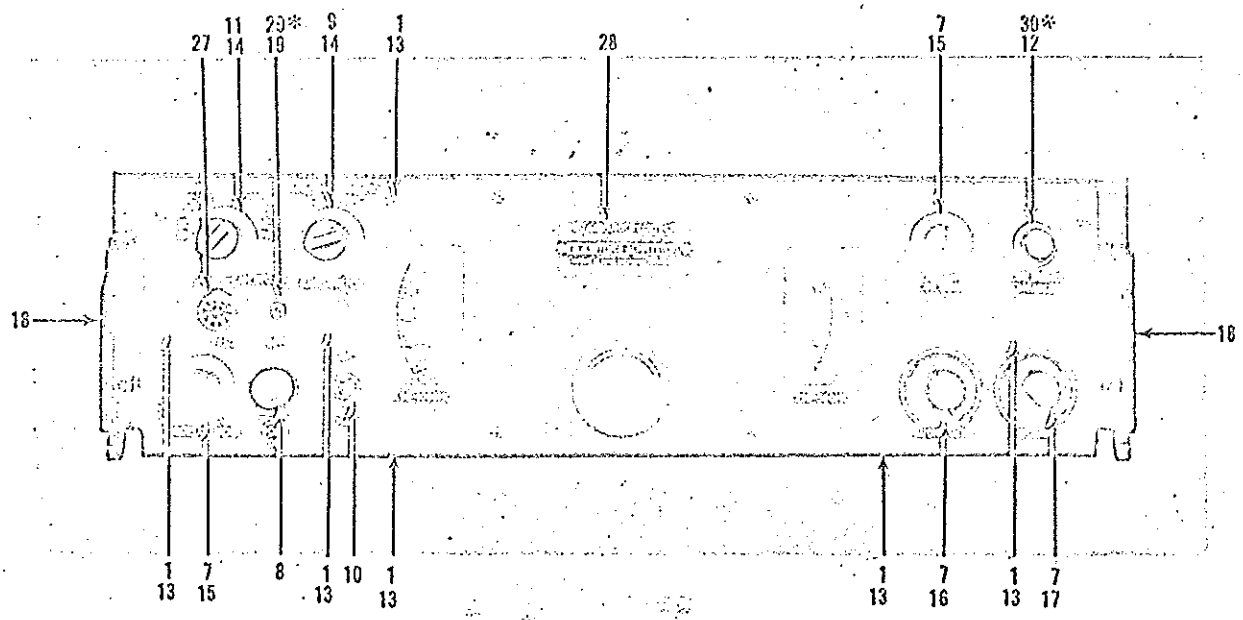
LIST OF MANUFACTURERS' CODES AND ADDRESSES (Cont)

CODE	NAME AND ADDRESS
74868	FXR Division of Amphenol-Borg Electronics Corp. Danbury, Connecticut
80702	Wahlgren Magnetics A Division of Jamieson Industries,Inc. Bakersfield, California
80294	Bourns Laboratories,Inc. Riverside, California
81073	Grayhill,Inc. La Grange, Illinois
81640	Control Switch Division Controls Co. of America Folcraft, Pennsylvania
82376	Astron Division Renwell Industries,Inc. East Newark, New Jersey
83330	Smith, Herman H., Inc. Brooklyn, New York
84171	Arco Electronics,Inc. Great Neck, New York
86684	Radio Corp. of America Electronic Components and Devices Harrison, New Jersey
88245	Litton Industries USECO Division Van Nuys, California
91506	Augat,Inc. Attleboro, Massachusetts
91662	Elco Corp. Willow Grove, Pennsylvania
91929	Honeywell,Inc.,Micro Switch Division Freeport, Illinois

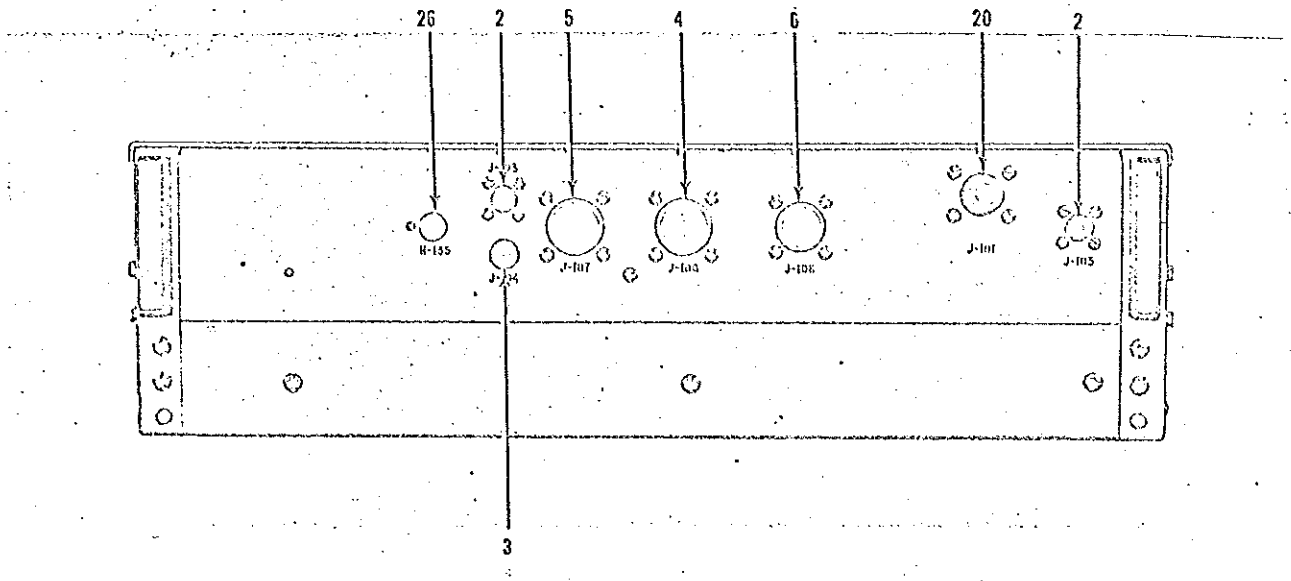
LIST OF MANUFACTURERS' CODES AND ADDRESSES (Cont)

CODE	NAME AND ADDRESS
92825	Whitso, Inc. Schiller Park, Illinois
95121	Quality Components, Inc. St. Marys, Pennsylvania
98926	Iron Fireman Mfg. Corp. Portland, Oregon
99687	Raytheon Co. Equipment Division Wayland Laboratory Weyland, Massachusetts
99800	Delevan Electronics Corp. East Aurora, New York
99848	Wilco Corp. Indianapolis, Indiana

GROUP ASSEMBLY PARTS BREAKDOWN



FRONT VIEW



REAR VIEW

*DENOTES HIDDEN PARTS

Figure 6-1. UHF Receiver, Model G166D, Front and Rear Views.

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
1	G166D00000-1	UHF RECEIVER, MODEL 166D, FRONT AND REAR VIEWS		
-1	MS25237-327	• LAMP	1	
-2	UG291U	• CONNECTOR	6	
-3	UG1094U	• CONNECTOR	2	
-4	DS00-19P	• CONNECTOR -11139-	1	
-5	DS00-19S	• CONNECTOR -11139-	1	
-6	DS00-12P	• CONNECTOR -11139-	1	
-7	EB1032	• RESISTOR, VARIABLE, 10 K, 1/2 W, 20% -01121-	1	
-8	A324	• SWITCH -81640-	4	
-9	24005-2	• SWITCH, ROTARY -81073-	1	
-10	521	• SWITCH, TOGGLE -83330-	1	
-11	24004-2	• SWITCH, ROTARY -81073-	1	
-12	A3234RCF	• SWITCH, PUSH BUTTON SNAP -81640-	1	
-13	TT61AB7	• LAMP, INCANDESCENT, 28 VDC -13812-	1	
-14	70-3-2G3	• KNOB -99687-	6	
-15	70-3-2G	• KNOB -99687-	2	
-16	70-3-2G4	• KNOB -99687-	1	
-17	70-3-2G1	• KNOB -99687-	1	
-18	2111BB0	• HANDLE -71279-	1	
-19	6AT2	• SWITCH -91929-	2	
-20	UG21RU	• CONNECTOR, PLUG	1	
-21	DELETED		1	
-22	DELETED			
-23	DELETED			
-24	DELETED			
-25	DELETED			
-26	RV5NAXSD255B	• RESISTOR, VARIABLE, 2.5 MEG, 1/2 W, 10% -71450-	1	
-27	3600S1-103	• POTENTIOMETER -80294-	1	
-28	G166D00001-1	• NAMEPLATE	1	
		-ATTACHING PARTS-		
	AN535-0-3	• SCREW	2	
		******		
-29	G175H00951	• PLATE	1	
		-ATTACHING PARTS-		
	2-56NC2B	• NUT, HEXAGONAL	2	
	2LOCK	• WASHER, LOCK	2	
	256X3-8	• SCREW	2	
		******		
-30	MS25237-330	• LAMP	1	

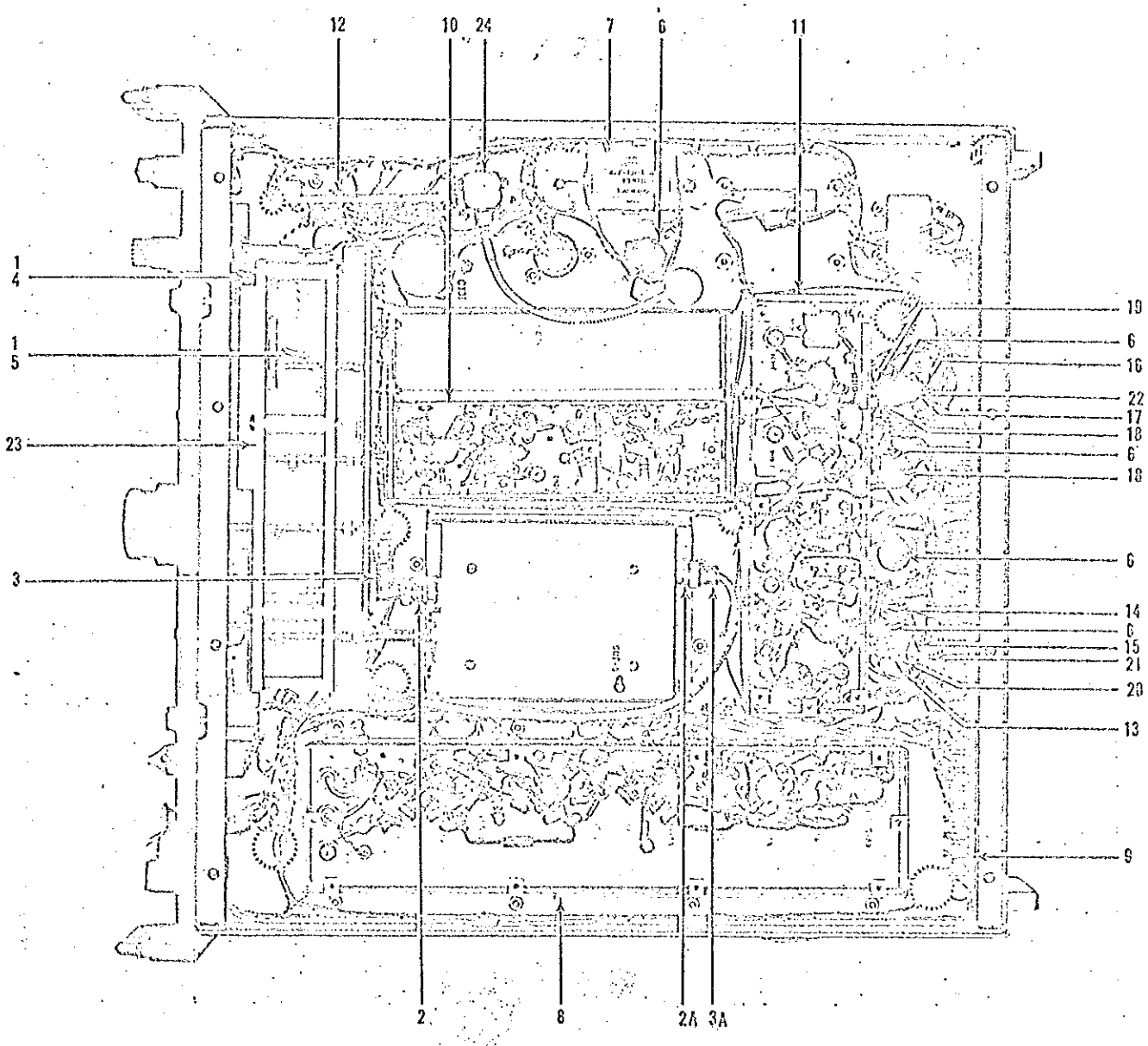
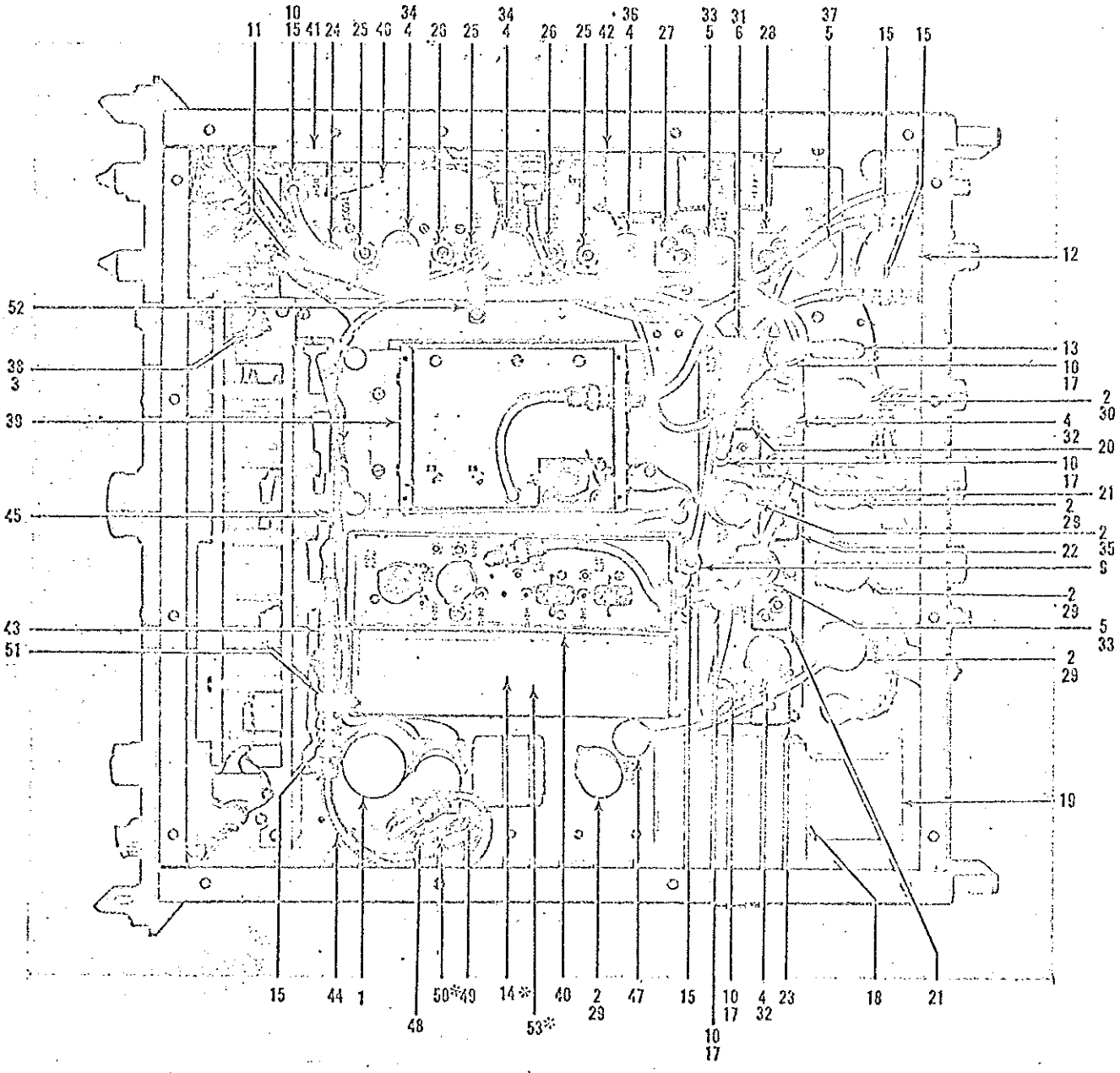


Figure 6-2. UHF Receiver, Model G166D, Bottom View

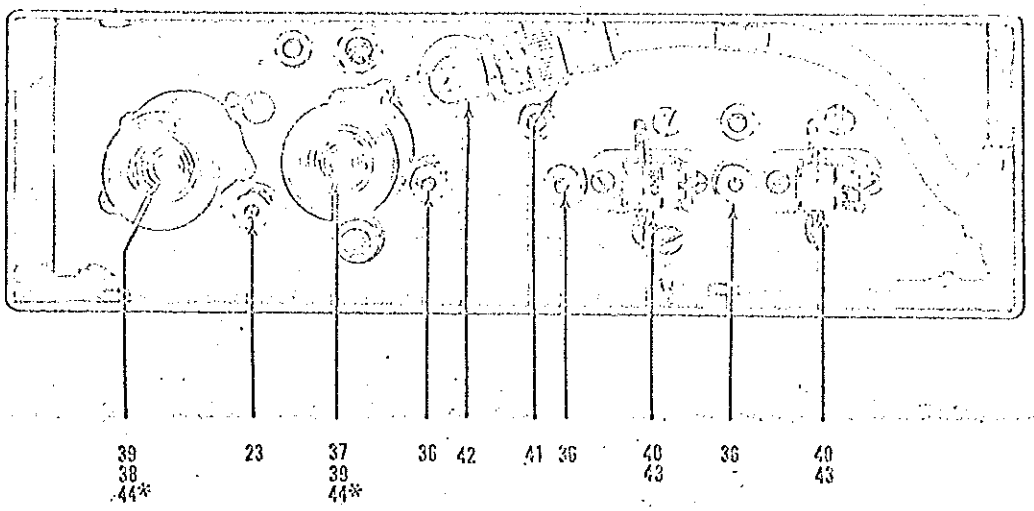
FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
2	G166D00000-1	UHF RECEIVER, MODEL 166D, BOTTOM VIEW	REF	
-1	MS25237-327	• LAMP INCANDESCENT, 28 VDC	2	
-2	UG290U	• CONNECTOR, RECEPTICAL	1	
-2A	UG697U	• CONNECTOR	1	
-3	UG913U	• CONNECTOR, PLUG	1	
-3A	UG88U	• CONNECTOR	1	
-4	8-1930XP24	• LAMPHOLDER -13812-	1	
-5	107-1930-975	• LAMPHOLDER, EDGE LIGHT -13812-	1	
-6	TS103P01	• SOCKET -91662-	5	
-7	MRF1-5-10M	• CAPACITOR, PAPER METALIZED, 10 UF, 150 WVDC, 20% -82376-	1	
-8	AC41236	• COMPONENT ASSEMBLY, 21.4 MC IF STRIP -SEE FIGURE 6-7 FOR DETAIL -42542-	1	
-9	NO NUMBER	• TERMINAL BOARD ASSEMBLY -SEE FIGURE 6-5 FOR DETAIL-	1	
-10	NO NUMBER	• LOW BAND TUNER, BOTTOM VIEW -SEE FIGURE 6-4 FOR DETAIL-	1	
-11	NO NUMBER	• COMPONENT ASSEMBLY, 60 MC IF STRIP -SEE FIGURE 6-6 FOR DETAIL-	1	
-12	NO NUMBER	• TERMINAL BOARD ASSEMBLY -SEE FIGURE 6-8 FOR DETAIL-	1	
-13	EB1041	• RESISTOR, FIXED COMPOSITION, 100 K, 1/2 W, 10% -01121-	1	
-14	EB2241	• RESISTOR, FIXED COMPOSITION, 220 K, 1/2 W, 10% -01121-	1	
-15	EB3325	• RESISTOR, FIXED COMPOSITION, 3.3 K, 1/2 W, 5% -01121-	1	
-16	EB2441	• RESISTOR, FIXED COMPOSITION, 240 K, 1/2 W, 10% -01121-	1	
-17	EB1031	• RESISTOR, FIXED COMPOSITION, 10 K, 1/2 W, 10% -01121-	1	
-18	EB1051	• RESISTOR, FIXED COMPOSITION, 1 MEG, 1/2 W, 10% -01121-	2	
-19	EB1021	• RESISTOR, FIXED COMPOSITION, 1 K, 1/2 W, 10% -01121-	1	
-20	CM15E151J	• CAPACITOR, MICA, 150 PF, 500 WVDC, 5% -04062-	1	
-21	CM15E301J	• CAPACITOR, MICA, 300 PF, 500 WVDC, 5% -04062-	1	
-22	29C9B8	• CAPACITOR, CERAMIC DISC, 0.01 UF, 500 WVDC, GMV -56289-	1	
-23	AD50868	• GEAR TRAIN ASSEMBLY -42542-	1	
-24	18750	• CONNECTOR -74868-	1	



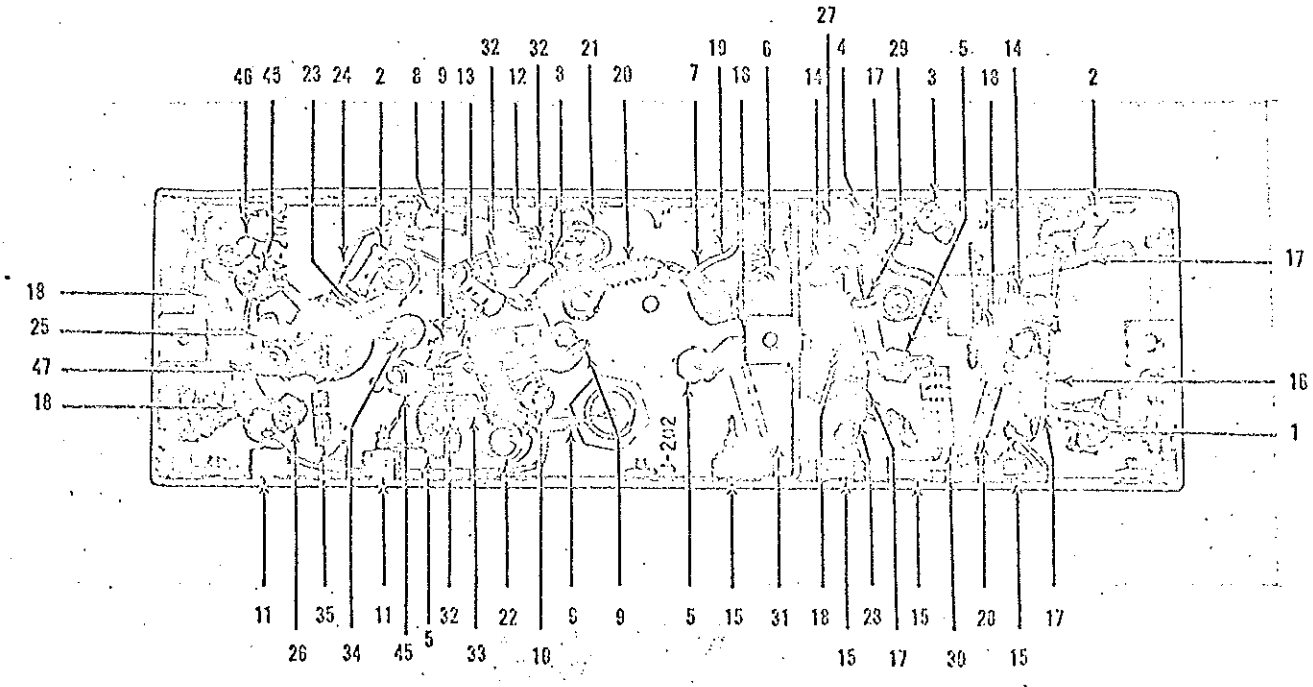
*DENOTES HIDDEN PARTS

Figure 6-3. UHF Receiver, Model G166D, Top View

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
3	G166D00000-1	UHF RECEIVER, MODEL 166D, TOP VIEW	REF	
-1	TVL3561-7	• CAPACITOR, 60 UF, 300 WVDC, 30 UF, 250 WVDC, 250 WVDC -56289-	1	
-2	04-991-02	• SHIELD, ELECTRON TUBE -91662-	6	
-3	MS25237-327	• LAMP INCANDESCENT, 26 VDC	1	
-4	04-791-02	• SHIELD, ELECTRON TUBE -91662-	5	
-5	04-791-01	• SHIELD, ELECTRON TUBE -91662-	3	
-6	04-991-01	• SHIELD, ELECTRON TUBE -91662-	1	
-7	DELETED			
-8	DELETED			
-9	UG1098U	• CONNECTOR, RECEPTICAL	1	
-10	UG1094U	• CONNECTOR, RECEPTICAL	5	
-11	MX1530U	• CONNECTOR, CABLE TERMINATION	2	
-12	317-010202-3	• RELAY, COAXIAL SWITCH -74868-	1	
-13	R685-4D10K	• RELAY -98926-	1	
-14	HT163-1	• INDUCTOR, VARIABLE -42542-	1	
-15	UG88U	• CONNECTOR, PLUG	5	
-16	DELETED			
-17	UG260U	• CONNECTOR, PLUG	4	
-18	AB31818	• TRANSFORMER, FILAMENT -42542-	1	
-19	AB31575	• TRANSFORMER, AUDIO -42542-	1	
-20	AB32036	• TRANSFORMER, IF -42542-	1	
-21	AB31972	• TRANSFORMER, IF -42542-	2	
-22	AB31973-2	• TRANSFORMER, IF -42542-	1	
-23	AB31970	• TRANSFORMER, IF -42542-	1	
-24	AB31678	• TRANSFORMER, IF -42542-	1	
-25	AB31680	• TRANSFORMER, IF -42542-	3	
-26	AB31679	• TRANSFORMER, IF -42542-	2	
-27	AB14799	• TRANSFORMER, IF -42542-	1	
-28	AB14976	• TRANSFORMER, IF DISCRIMINATOR -42542-	1	
-29	12AU7A	• ELECTRON TUBE	4	
-30	6AF4A	• ELECTRON TUBE	1	
-31	5842	• ELECTRON TUBE	1	
-32	6BA6W	• ELECTRON TUBE	2	
-33	6AK5	• ELECTRON TUBE	2	
-34	6DC6	• ELECTRON TUBE	2	
-35	6U8A	• ELECTRON TUBE	1	
-36	6CB6A	• ELECTRON TUBE	1	
-37	6AL5	• ELECTRON TUBE	1	
-38	107-1930-975	• LAMPHOLDER, EDGE LIGHT -13812-	1	
-39	G166D00951-1	• HIGH BAND TUNER -SEE FIGURE 6-9 FOR DETAIL-	1	
-40	NO NUMBER	• LOW BAND TUNER, TOP VIEW -SEE FIGURE 6-4 FOR DETAIL-	1	
-41	G175H10000-1	• BEAT FREQUENCY OSCILLATOR -SEE FIGURE 6 10 FOR DETAIL-	1	
-42	AC41235	• COMPONENT ASSEMBLY, FM75F CONVERTER KIT -SEE FIGURE 6-11, 6-12 FOR DETAIL-	1	
-43	G000094-1	• FILTER	1	
-44	G166D00100-1	• CABLE ASSEMBLY	1	
-45	G166D00100-3	• CABLE ASSEMBLY	1	
-46	G175H00100-2	• CABLE ASSEMBLY	1	
-47	MS35489-11	• GROMMET	1	
-48	G166D01000-1	• EDGELIGHT PLATE	1	
-49	94CSA1-2-126	• SWITCH, RELAY	1	
-50	G166D00002-1	• SPACER	1	
		-ATTACHING PARTS-		
	440X1-2BHSSP	• SCREW	4	
	4LOCK	• WASHER, LOCK	8	
		*********		
-51	HP10N	• NYLOCLIP -09922-	1	
		-ATTACHING PARTS-		
	440X1-4BHSSP	• SCREW	1	
		*********		
-52	HP6N	• NYLOCLIP -09922-	1	
		-ATTACHING PARTS-		
	632X1-2BHSSP	• SCREW	1	
		*********		
-53	EB6841	• RESISTOR, FIXED COMPOSITION, 680 K, 1/2 W, 10% -01121-	1	



TOP VIEW



BOTTOM VIEW

DENOTES HIDDEN PARTS

Figure 6-4. Component Assembly, Low Band Tuner, Top and Bottom Views

FIGURE AND INDEX NO.	PART NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
4	NO NUMBER	COMPONENT ASSEMBLY, LOW BAND TUNER, TOP AND BOTTOM VIEWS-SEE FIGURE 6-2 FOR NHA-	REF	
-1	CC20CJ2R2C	. CAPACITOR	1	
-2	331-000X5U0470K	. CAPACITOR, CERAMIC, 470 PF, 500 WVDC, 10% -72982-	2	
-3	CC20CG120J	. CAPACITOR	1	
-4	301-000C0H0689C	. CAPACITOR, CERAMIC, 6.8 UF, 500 WVDC, 0.25 PF -72982-	1	
-5	BH240	. CAPACITOR, CERAMIC STANDOFF, 0.001 UF, 500 WVDC, GMV -56289-	3	
-6	CC20CG120K	. CAPACITOR	1	
-7	12PFPORM5PCT	. CAPACITOR, CERAMIC, 0.12 PF, 500 WVDC, 5% -95121-	1	
-8	CC20CJ3R3C	. CAPACITOR	2	
-9	40C214	. CAPACITOR, CERAMIC DISC, 0.001 UF, 1000 WVDC, GMV -56289-	3	
-10	300-000C0G0470J	. CAPACITOR, CERAMIC, 47 PF, 500 WVDC, 5% -72982-	1	
-11	SMFB2	. CAPACITOR, CERAMIC, FEEDTHRU, 1000 PF, 200 WVDC, GMV -01121-	2	
-12	BH305	. CAPACITOR, CERAMIC, FEEDTHRU, 47 PF, 500 WVDC, 20% -56289-	1	
-13	301-000C0K0129F	. CAPACITOR, CERAMIC, 1.2 PF, 500 WVDC, 0.1 PF -72982-	1	
-14	301-000C0K0479C	. CAPACITOR, CERAMIC, 4.7 PF, 500 WVDC, 0.25 PF -72982-	2	
-15	BH340	. CAPACITOR, CERAMIC, FEEDTHRU, 0.001 UF, 500 WVDC, GMV -56289-	3	
-16	A25-113	. INDUCTOR, END VARIABLE -42542-	1	
-17	209-11-22	. CHOKE, RF -99848-	4	
-18	A25-121	. COIL, RF -42542-	5	
-19	A25-114	. INDUCTOR, END VARIABLE -42542-	1	
-20	A25-115	. INDUCTOR, FIXED -42542-	1	
-21	A25-116	. INDUCTOR, END VARIABLE -42542-	1	
-22	A25-117	. INDUCTOR, VARIABLE -42542-	1	
-23	A25-118	. INDUCTOR, FIXED -42542-	1	
-24	A25-119	. INDUCTOR, FIXED -42542-	1	
-25	A25-120	. INDUCTOR, FIXED -42542-	1	
-26	A25-123	. INDUCTOR, FIXED -42542-	1	
-27	A25-122	. INDUCTOR, FIXED -42542-	1	
-28	EB8205	. RESISTOR, FIXED COMPOSITION, 82 OHM, 1/2 W, 5% -01121-	2	
-29	EB4725	. RESISTOR, FIXED COMPOSITION, 4.7 K, 1/2 W, 5% -01121-	1	
-30	GB1335	. RESISTOR, FIXED COMPOSITION, 13 K, 1 W, 5% -01121-	1	
-31	HB1835	. RESISTOR, FIXED COMPOSITION, 18 K, 2 W, 5% -01121-	1	
-32	EB1031	. RESISTOR, FIXED COMPOSITION, 10 K, 1/2 W, 10% -01121-	3	
-33	EB1035	. RESISTOR, FIXED COMPOSITION, 10 K, 1/2 W, 5% -01121-	1	
-34	GB6825	. RESISTOR, FIXED COMPOSITION, 6.8 K, 1 W, 5% -01121-	1	
-35	EB1041	. RESISTOR, FIXED COMPOSITION, 100 K, 1/2 W, 10% -01121-	1	
-36	CST6	. CAPACITOR, CERAMIC TRIMMER, 0.5-4.5 PF, 500 WVDC -71279-	3	
-37	6AK5	. ELECTRON TUBE	1	
-38	12AU7A	. ELECTRON TUBE	1	
-39	04-791-01	. SHIELD, ELECTRON TUBE -91662-	2	
-40	7077	. ELECTRON TUBE	2	
-41	UG260U	. CONNECTOR, PLUG	1	
-42	UG1096U	. CONNECTOR, RECEPTICLE	1	
-43	86070	. SOCKET, ELECTRON TUBE, CERAMIC -04435-	2	
-44	TS102P01	. SOCKET, ELECTRON TUBE -91662-	2	
-45	X2045F4	. TERMINAL -71279-	2	
-46	301C0K508C	. CAPACITOR, CERAMIC, 0.5 PF -72982-	1	
-47	RC07GF181J	. RESISTOR	1	

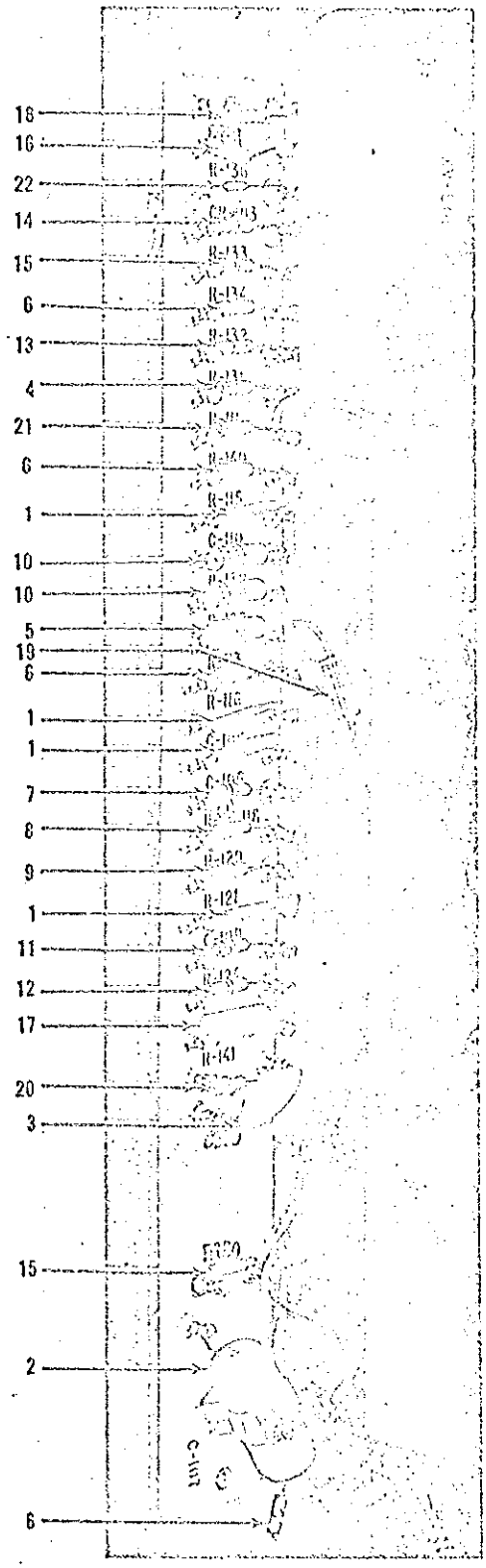


Figure 6-5. Terminal Board Assembly

FIGURE AND INDEX NO.	PART NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
5	NO NUMBER	TERMINAL BOARD ASSEMBLY -SEE FIGURE 6-2 FOR RHA-	REF	
-1	29C988	• CAPACITOR, CERAMIC DISC, 0.01 UF, 500 WVDC, GMV -56289-	4	
-2	P123Z6P	• CAPACITOR, PAPER METALIZED, 1 UF, 200 WVDC, 20% -00656-	1	
-3	MD103	• CAPACITOR, 0.01 UF, 500 WVDC -71590-	1	
-4	EB4735	• RESISTOR, FIXED COMPOSITION, 47 K, 1/2 W, 5% -01121-	1	
-5	GB1031	• RESISTOR, FIXED COMPOSITION, 10 K, 1 W, 10% -01121-	1	
-6	EB1051	• RESISTOR, FIXED COMPOSITION, 1 MEG, 1/2 W, 10% -01121-	1	
-7	EB2441	• RESISTOR, FIXED COMPOSITION, 240 K, 1/2 W, 10% -01121-	4	
-8	EB2021	• RESISTOR, FIXED COMPOSITION, 2 K, 1/2 W, 10% -01121-	1	
-9	EB2231	• RESISTOR, FIXED COMPOSITION, 22 K, 1/2 W, 10% -01121-	1	
-10	GB4731	• RESISTOR, FIXED COMPOSITION, 47 K, 1 W, 10% -01121-	1	
-11	EB4741	• RESISTOR, FIXED COMPOSITION, 470 K, 1/2 W, 10% -01121-	2	
-12	EB2241	• RESISTOR, FIXED COMPOSITION, 220 K, 1/2 W, 10% -01121-	1	
-13	EB5145	• RESISTOR, FIXED COMPOSITION, 510 K, 1/2 W, 5% -01121-	1	
-14	EB6831	• RESISTOR, FIXED COMPOSITION, 68 K, 1/2 W, 10% -01121-	1	
-15	EB1041	• RESISTOR, FIXED COMPOSITION, 100 K, 1/2 W, 10% -01121-	1	
-16	EB2031	• RESISTOR, FIXED COMPOSITION, 20 K, 1/2 W, 10% -01121-	2	
-17	HB5625	• RESISTOR, FIXED COMPOSITION, 5.6 K, 2 W, 5% -01121-	1	
-18	RC20GF221J	• RESISTOR	1	
-19	RC32GF472J	• RESISTOR	1	
-20	RC20GF153J	• RESISTOR	1	
-21	EB4755	• RESISTOR, FIXED COMPOSITION, 4.7 MEG, 1/2 W, 5% -01121-	1	
-22	1N458	• CRYSTAL DIODE, SILICON	1	

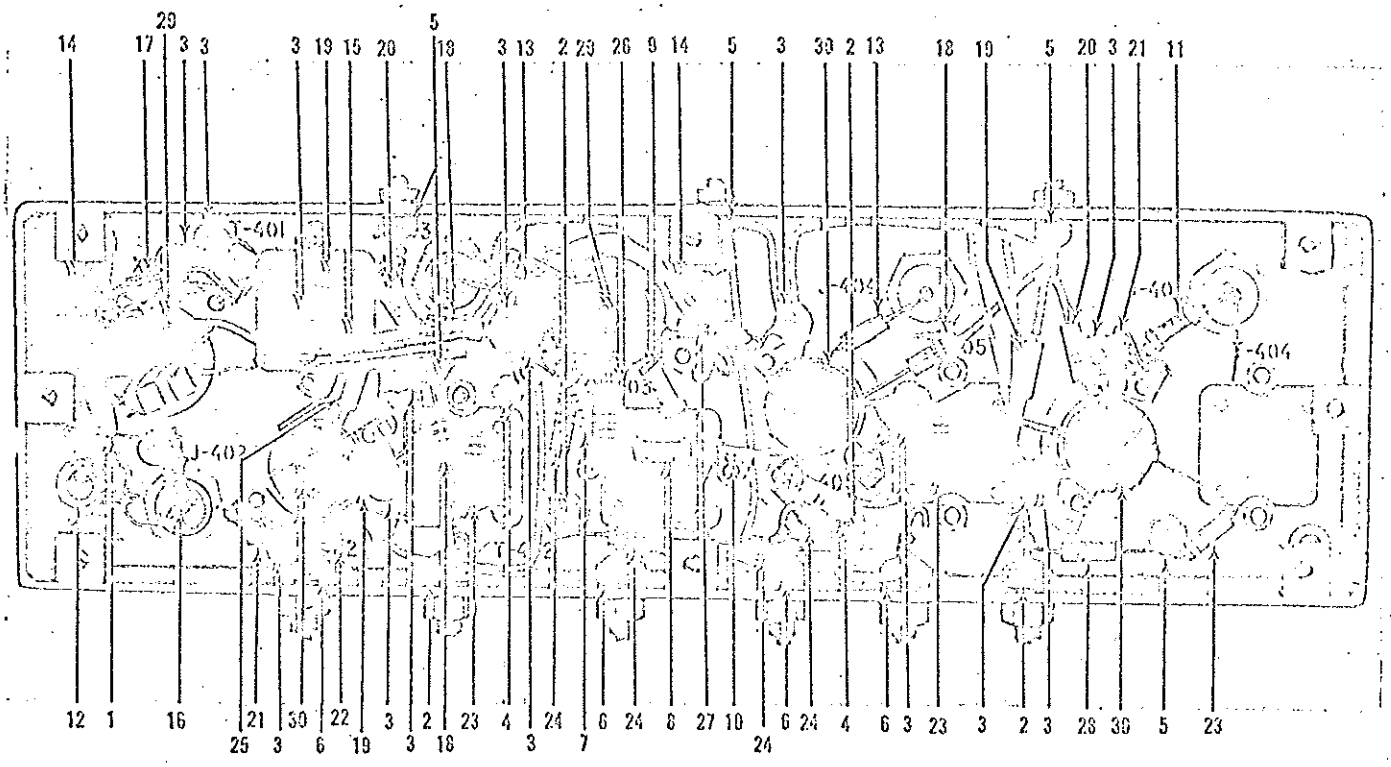


Figure 6-6. Component Assembly, 60 MCIF Strip

FIGURE AND INDEX NO.	PART NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
6	NO NUMBER	COMPONENT ASSEMBLY, 60 MC IF STRIP -SEE FIGURE 6-2 FOR NHA-	REF	
-1	29C988	• CAPACITOR, CERAMIC DISC, 0.01 UF, 500 WVDC, GMV -56289-	1	
-2	BN305	• CAPACITOR, CERAMIC FEEDTHRU, 471 PF, 500 WVDC, 20% -56289-	4	
-3	40C214	• CAPACITOR, CERAMIC DISC, 0.001 UF, 1000 WVDC, GMV -56289-	13	
-4	309-000C0G0470K	• CAPACITOR, CERAMIC, 47 PF, 500 WVDC, 10% -72982-	2	
-5	BH240	• CAPACITOR, CERAMIC STANDOFF, 0.001 UF, 500 WVDC, GMV -56289-	5	
-6	514C2	• CAPACITOR, CERAMIC FEEDTHRU, 0.001 UF, 500 WVDC, GMV -56289-	4	
-7	CC20CKR58C	• CAPACITOR	1	
-8	301-000C0J0399C	• CAPACITOR, CERAMIC, 3.9 PF, 500 WVDC, 0.25 PF -72982-	1	
-9	301-000C0H0829D	• CAPACITOR, CERAMIC, 8.2 PF, 500 WVDC, 0.5 PF -72982-	1	
-10	301-000C0K0509F	• CAPACITOR, CERAMIC, 0.5 PF, 500 WVDC, 0.1 PF -72982-	1	
-11	301-000U2M0101K	• CAPACITOR, CERAMIC, 100 PF, 500 WVDC, 10% -72982-	1	
-12	AA25382	• CHOKE, VARIABLE -42542-	1	
-13	A14737	• COIL, RF FIXED -42542-	1	
-14	212-11-39	• CHOKE,RF -99848-	2	
-15	211-11-33	• CHOKE,RF -99848-	2	
-16	A25383	• COIL, FIXED -42542-	1	
-17	EB6805	• RESISTOR, FIXED COMPOSITION, 68 OHM, 1/2 W, 5% -01121-	1	
-18	EB2261	• RESISTOR, FIXED COMPOSITION, 220 K, 1/2 W, 10% -01121-	1	
-19	EB1025	• RESISTOR, FIXED COMPOSITION, 1 K, 1/2 W, 5% -01121-	3	
-20	EB2231	• RESISTOR, FIXED COMPOSITION, 22 K, 1/2 W, 10% -01121-	3	
-21	EB1035	• RESISTOR, FIXED COMPOSITION, 100 OHM, 1/2 W, 5% -01121-	2	
-22	EB4731	• RESISTOR, FIXED COMPOSITION, 47 K, 1/2 W, 10% -01121-	2	
-23	EB3925	• RESISTOR, FIXED COMPOSITION, 3.9 K, 1/2 W, 5% -01121-	1	
-24	EB4741	• RESISTOR, FIXED COMPOSITION, 470 K, 1/2 W, 10% -01121-	3	
-25	EB1011	• RESISTOR, FIXED COMPOSITION, 100 OHM, 1/2 W, 10% -01121-	4	
-26	GB1031	• RESISTOR, FIXED COMPOSITION, 10 K, 1 W, 10% -01121-	1	
-27	EB1041	• RESISTOR, FIXED COMPOSITION, 100 K, 1/2 W, 10% -01121-	1	
-28	EB3941	• RESISTOR, FIXED COMPOSITION, 390 K, 1/2 W, 10% -01121-	1	
-29	TS103P01	• SOCKET, ELECTRON TUBE -91662-	1	
-30	TS102P01	• SOCKET, ELECTRON TUBE -91662-	2	
			3	

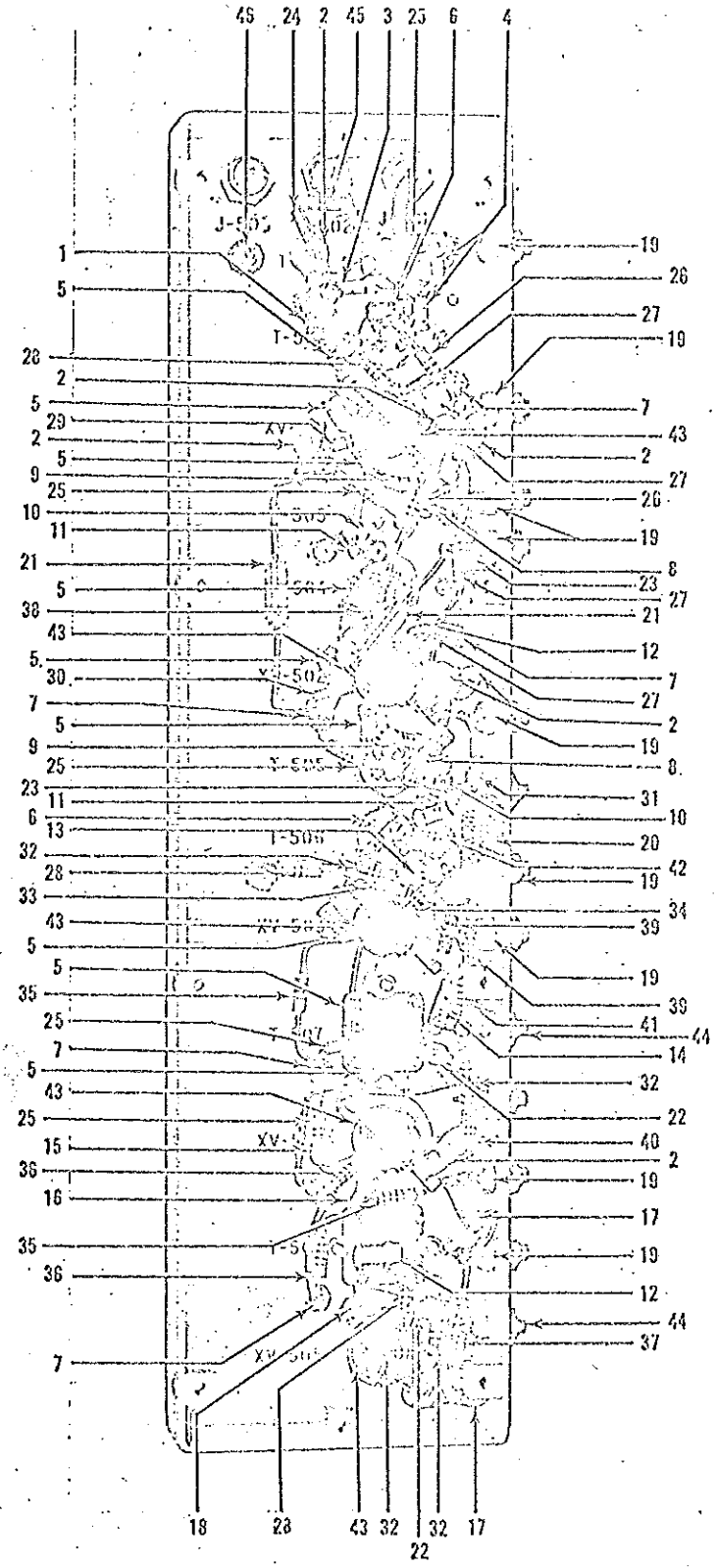


Figure 6-7. Component Assembly, 21.4 MCIF Strip

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
7	NO NUMBER	COMPONENT ASSEMBLY: 21.4 MC IF STRIP -SEE FIGURE 6-2 FOR RHA-	REF	
-1	CM15F221J	• CAPACITOR, SILVER MICA, 220 PF, 500 WVDC, 5% -04062-	1	
-2	5HKD47	• CAPACITOR, CERAMIC DISC, 0.0047 UF, 500 WVDC, GMV -56289-	7	
-3	CC20CH6R7D	• CAPACITOR	1	
-4	301-000C0K0229F	• CAPACITOR, CERAMIC, 2.2 PF, 500 WVDC, 0.1 PF -72982-	2	
-5	331-000X5U0470K	• CAPACITOR, CERAMIC, 470 PF, 500 WVDC, 10% -72962-	9	
-6	308-000C0G0330J	• CAPACITOR, CERAMIC, 33 PF, 500 WVDC, 5% -72982-	2	
-7	BH240	• CAPACITOR, CERAMIC STANDOFF, 0.001 UF, 500 WVDC, GMV -56289-	5	
-8	331-000X5U0391K	• CAPACITOR, CERAMIC, 390 PF, 500 WVDC, 10% -72982-	2	
-9	CC20CG120K	• CAPACITOR	2	
-10	CC20CK1R5F	• CAPACITOR	2	
-11	301-000C0K0189F	• CAPACITOR, CERAMIC, 1.8 PF, 500 WVDC, 0.1 PF -72982-	2	
-12	CC20CG390J	• CAPACITOR	2	
-13	CC20CG220J	• CAPACITOR	1	
-14	CM15E330J	• CAPACITOR	1	
-15	40C214	• CAPACITOR, CERAMIC DISC, 0.001 UF, 1000 WVDC, GMV -56289-	1	
-16	D6-102	• CAPACITOR, CERAMIC TUBULAR, INSULATED, 0.001 UF, 600 WVDC, 20% -71590-	1	
-17	29C988	• CAPACITOR, CERAMIC DISC, 0.01 UF, 500 WVDC, GMV -56289-	2	
-18	CM15E270J	• CAPACITOR	1	
-19	514C2	• CAPACITOR, CERAMIC FEEDTHRU, 0.001 UF, 500 WVDC, GMV -56289-	9	
-20	P1232GP	• CAPACITOR, PAPER METALIZED, 0.033 UF, 4 WVDC, 20% -00656-	1	
-21	A14805	• COIL, RF -42542-	2	
-22	A14804	• COIL, RF -42542-	2	
-23	A16625	• COIL, RF -42542-	2	
-24	EB5101	• RESISTOR, FIXED COMPOSITION, 51 OHM, 1/2 W, 10% -01121-	1	
-25	EB1021	• RESISTOR, FIXED COMPOSITION, 1 K, 1/2 W, 10% -01121-	5	
-26	EB2241	• RESISTOR, FIXED COMPOSITION, 220 K, 1/2 W, 10% -01121-	2	
-27	EB8205	• RESISTOR, FIXED COMPOSITION, 82 OHM, 1/2 W, 5% -01121-	4	
-28	EB1031	• RESISTOR, FIXED COMPOSITION, 10 K, 1/2 W, 10% -01121-	3	
-29	EB1141	• RESISTOR, FIXED COMPOSITION, 110 K, 1/2 W, 5% -01121-	1	
-30	RC20GF154K	• RESISTOR	1	
-31	EB8241	• RESISTOR, FIXED COMPOSITION, 820 K, 1/2 W, 10% -01121-	1	
-32	EB1041	• RESISTOR, FIXED COMPOSITION, 100 K, 1/2 W, 10% -01121-	4	
-33	EB5105	• RESISTOR, FIXED COMPOSITION, 51 OHM, 1/2 W, 5% -01121-	1	
-34	EB2231	• RESISTOR, FIXED COMPOSITION, 22 K, 1/2 W, 10% -01121-	1	
-35	EB4731	• RESISTOR, FIXED COMPOSITION, 47 K, 1/2 W, 10% -01121-	2	
-36	EB3331	• RESISTOR, FIXED COMPOSITION, 33 K, 1/2 W, 10% -01121-	2	
-37	GB4765	• RESISTOR, FIXED COMPOSITION, 4.7 OHM, 1 W, 5% -01121-	1	
-38	EB2035	• RESISTOR, FIXED COMPOSITION, 20 K, 1/2 W, 5% -01121-	1	
-39	EB2435	• RESISTOR, FIXED COMPOSITION, 24 K, 1/2 W, 5% -01121-	2	
-40	EB1011	• RESISTOR, FIXED COMPOSITION, 100 OHM, 1/2 W, 10% -01121-	1	
-41	EB3341	• RESISTOR, FIXED COMPOSITION, 330 K, 1/2 W, 10% -01121-	1	
-42	EB3035	• RESISTOR, FIXED COMPOSITION, 30 K, 1/2 W, 5% -01121-	1	
-43	TS102P01	• SOCKET, ELECTRON TUBE -91662-	5	
-44	1433	• TEST POINT, TERMINAL FEEDTHRU -88245-	2	
-45	RC20GF752J	• RESISTOR	1	
-46	R50-100	• CONNECTOR -80702-	1	

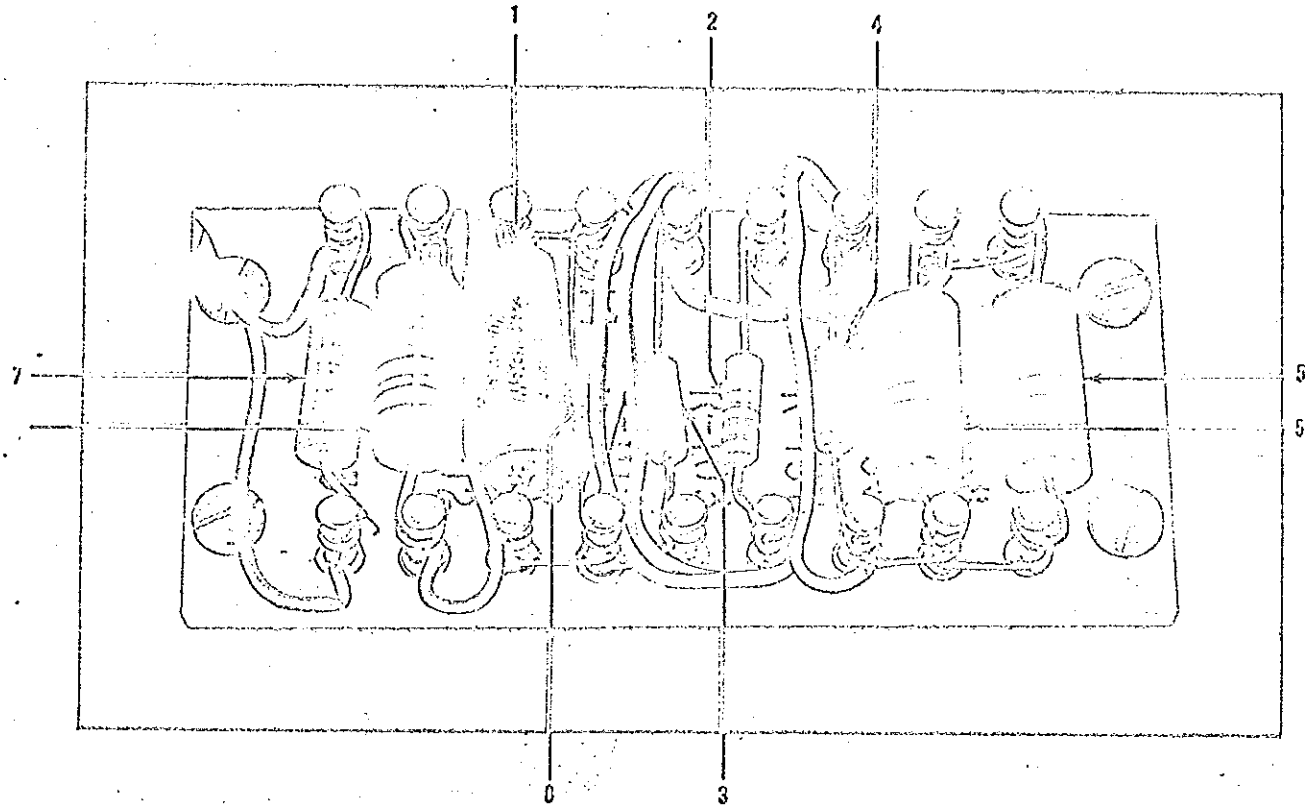
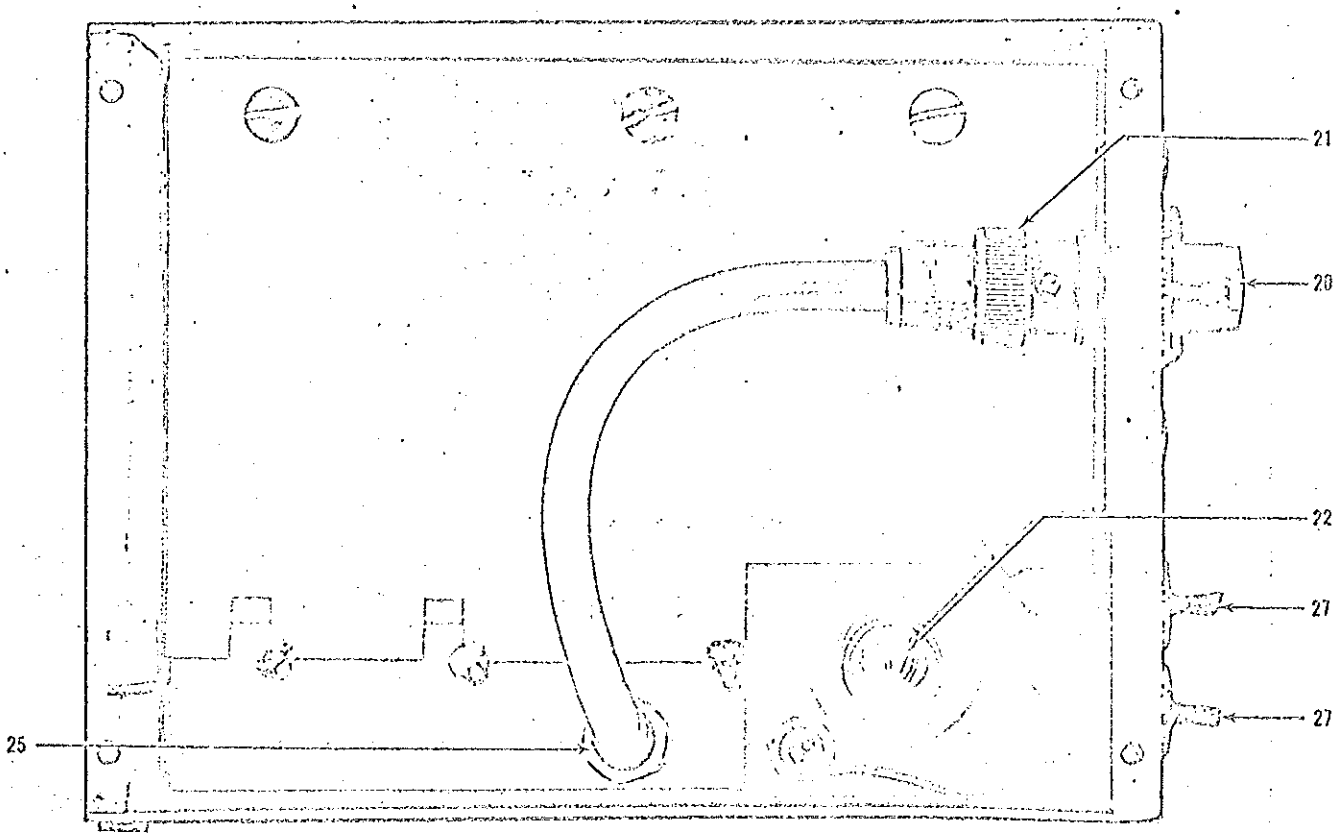
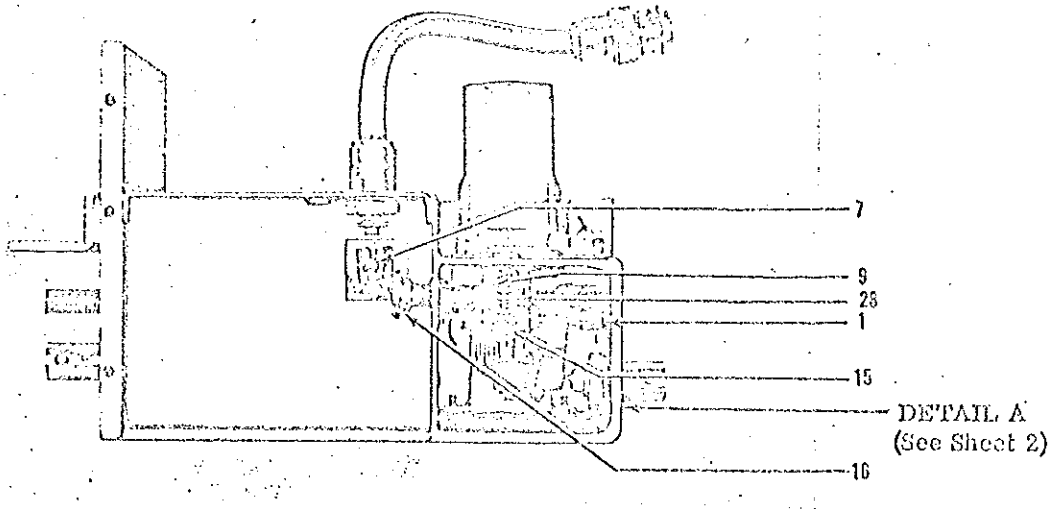


Figure 6-8. Terminal Board Assembly

FIGURE AND INDEX NO.	PART NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
8	NO NUMBER	TERMINAL BOARD ASSEMBLY -SEE FIGURE 6-2 FOR NHA-	REF	
-1	P1232GP	* CAPACITOR, PAPER METALIZED, 0.1 UF, 200 WVDC, 10% -00656-	1	
-2	EB3341	* RESISTOR, FIXED COMPOSITION, 330 K, 1/2 W, 10% -01121-	1	
-3	EB2061	* RESISTOR, FIXED COMPOSITION, 20 MEG, 1/2 W, 10% -01121-	1	
-4	EB3015	* RESISTOR, FIXED COMPOSITION, 300 OHM, 1/2 W, 5% -01121-	1	
-5	HB1235	* RESISTOR, FIXED COMPOSITION, 12 K, 2 W, 5% -01121-	2	
-6	HB1335	* RESISTOR, FIXED COMPOSITION, 13 K, 2 W, 5% -01121-	1	
-7	EB1031	* RESISTOR, FIXED COMPOSITION, 10 K, 1/2 W, 10% -01121-	1	
-8	1N457	* CRYSTAL DIODE, SILICON	1	

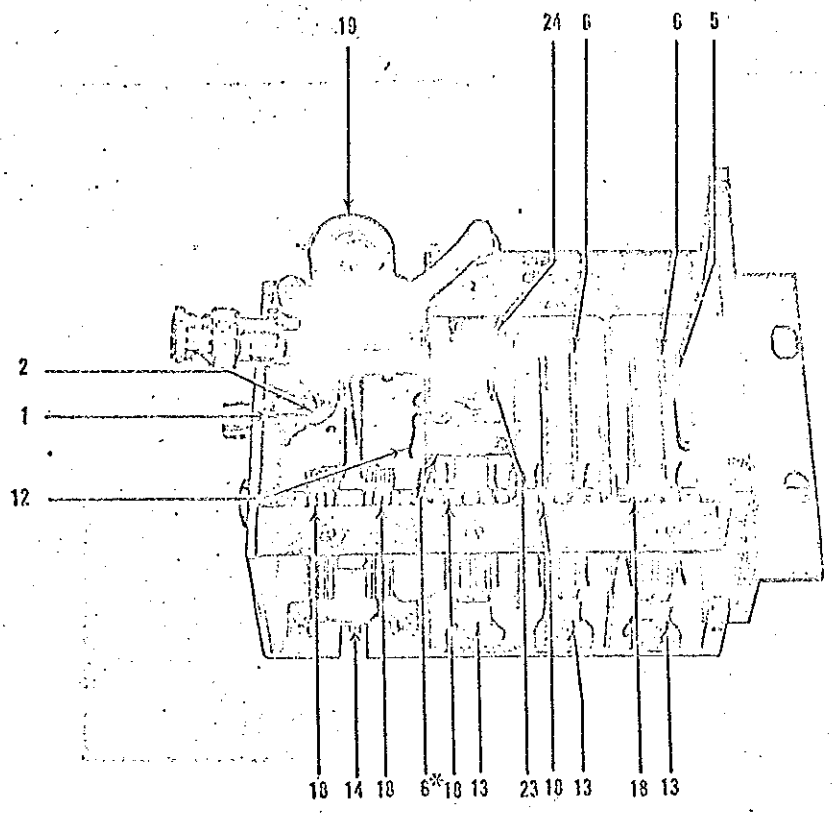


TOP VIEW

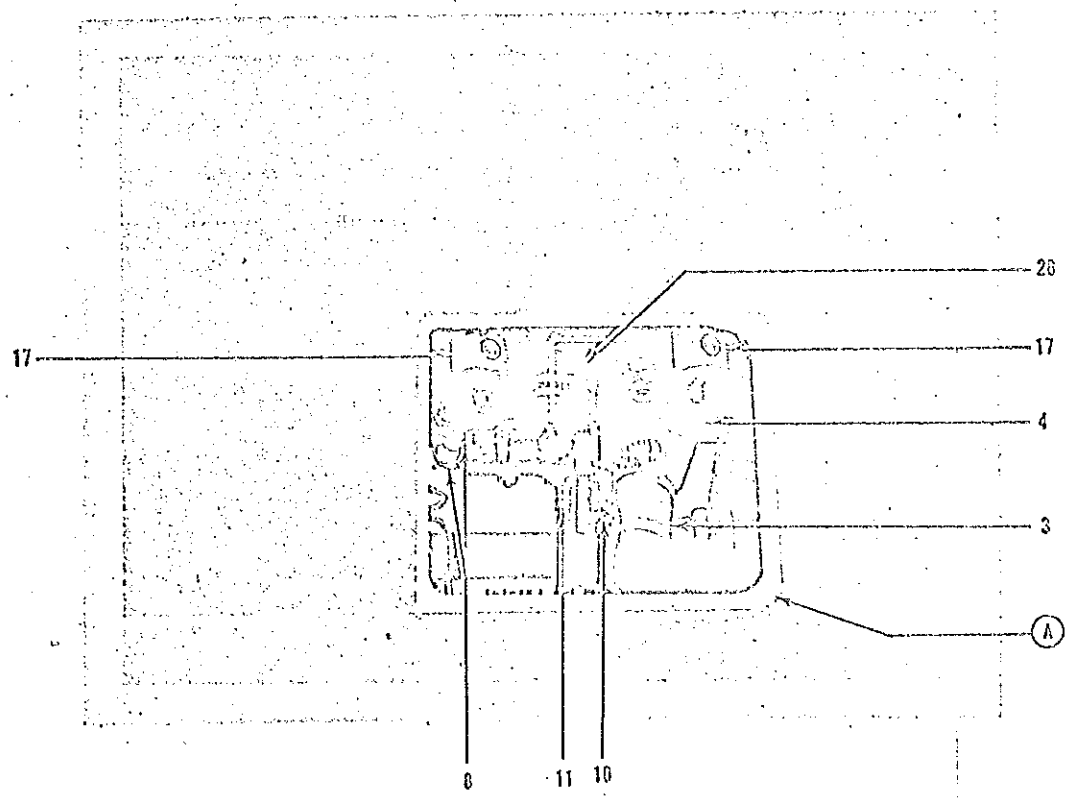


LEFT SIDE VIEW

Figure 6-9. Converter Assembly, High Band Tuner (Sheet 1 of 2)



RIGHT SIDE VIEW

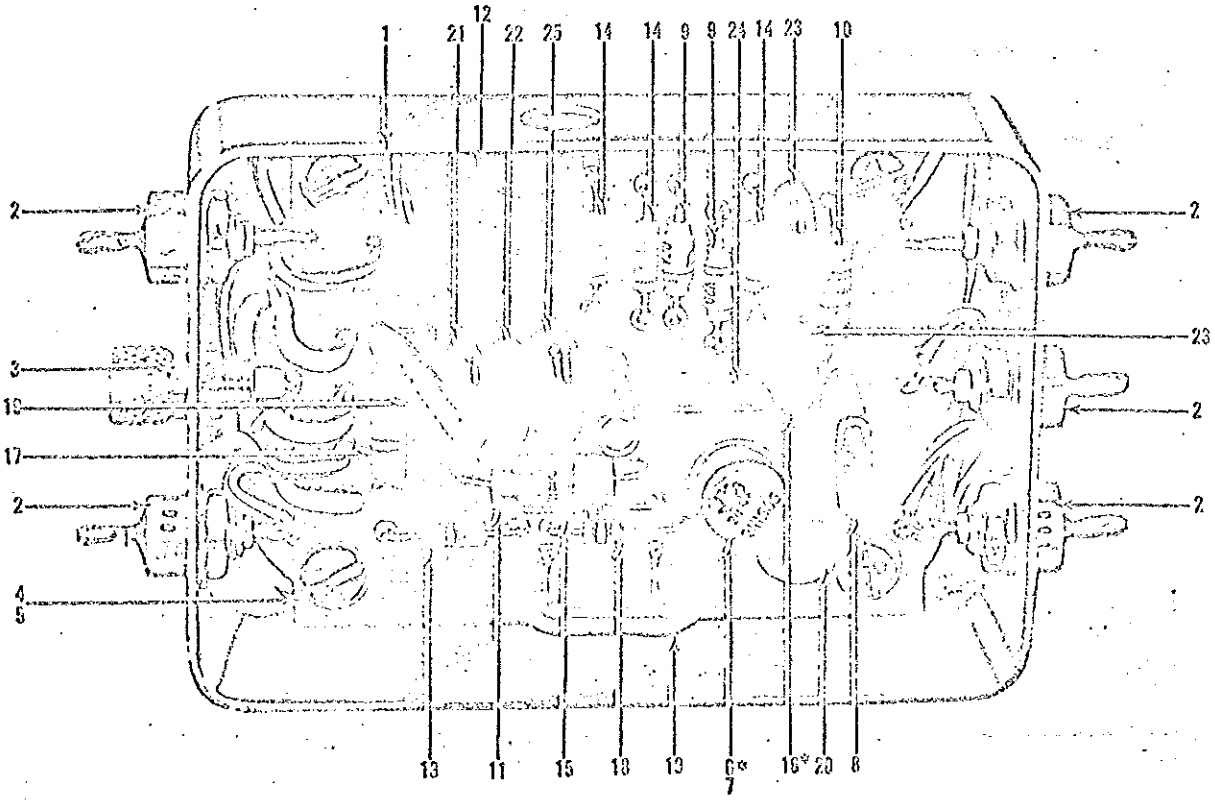


DETAIL A

*DENOTES HIDDEN PARTS

Figure 6-9. Converter Assembly, High Band Tuner (Sheet 2 of 2)

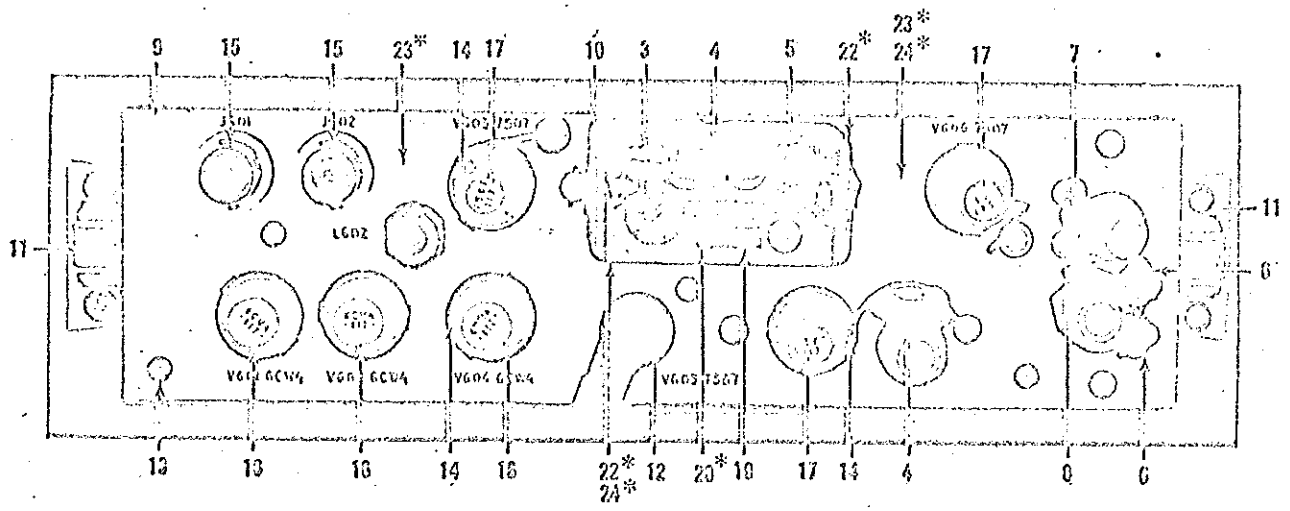
FIGURE AND INDEX NO.	PART NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
9	NO NUMBER	CONVERTER ASSEMBLY, HIGH BAND TUNER -SEE FIGURE 6-3 FOR NHA-	REF	
-1	X2045F4	• STANDOFF -71279-	1	
		-ATTACHING PARTS-		
	440X1-4BHSSP	• SCREW	1	
	AN936A4A	• WASHER, LOCK	1	
		••••*••••		
-2	5GAD10	• CAPACITOR, 0.001 UF, 1000 WVDC, 20% -56289-	1	
-3	RC42GF472K	• RESISTOR	1	
-4	RC32GF101K	• RESISTOR	1	
-5	A25155	• COIL -42542-	1	
-6	A25156	• TUNER ASSEMBLY -42542-	3	
-7	A25157	• COIL -42542-	1	
-8	A25158	• COIL -42542-	2	
-9	A25160	• COIL -42542-	1	
-10	A25161	• STRIP TUNER -42542-	1	
-11	A25162	• STRIP TUNER -42542-	1	
-12	A25519	• COIL -42542-	1	
-13	A25153	• CAPACITOR, TRIMMER -42542-	3	
-14	A25154	• CAPACITOR, TRIMMER -42542-	1	
-15	829-6	• CAPACITOR, TUBULAR, TRIMMER, 6 PF, 500 WVDC, 2% -71590-	1	
-16	370FA150J	• CAPACITOR, SILVER MICA BUTTON, 15 PF, 350 WVDC, 5% -72982-	1	
-17	SMFB2	• CAPACITOR, CERAMIC, FEEDTHRU, 5500 PF, 200 WVDC, GMV -01121-	2	
-18	AC41261	• TUNING BLADE ASSEMBLY	1	
-19	04-791-02	• SHIELD, ELECTRON TUBE -91662-	1	
-20	UG262U	• CONNECTOR, RECEPTACLE	1	
-21	UG260U	• CONNECTOR, PLUG	1	
-22	6AF4A	• ELECTRON TUBE	1	
-23	8940-0005	• CRYSTAL HOLDER -04651-	1	
-24	1N82ACDS	• CRYSTAL DIODE	1	
-25	MX1530U	• CONNECTOR, CABLE TERMINATION	1	
-26	A25685	• SOCKET, ELECTRON TUBE -42542-	1	
-27	370CB102K	• CAPACITOR, SILVER MICA FEEDTHRU, 1000 PF, 350 WVDC, 10% -72982-	2	
-28	EB1031	• RESISTOR, FIXED COMPOSITION, 10 K, 1/2 W, 10% -01121-	1	



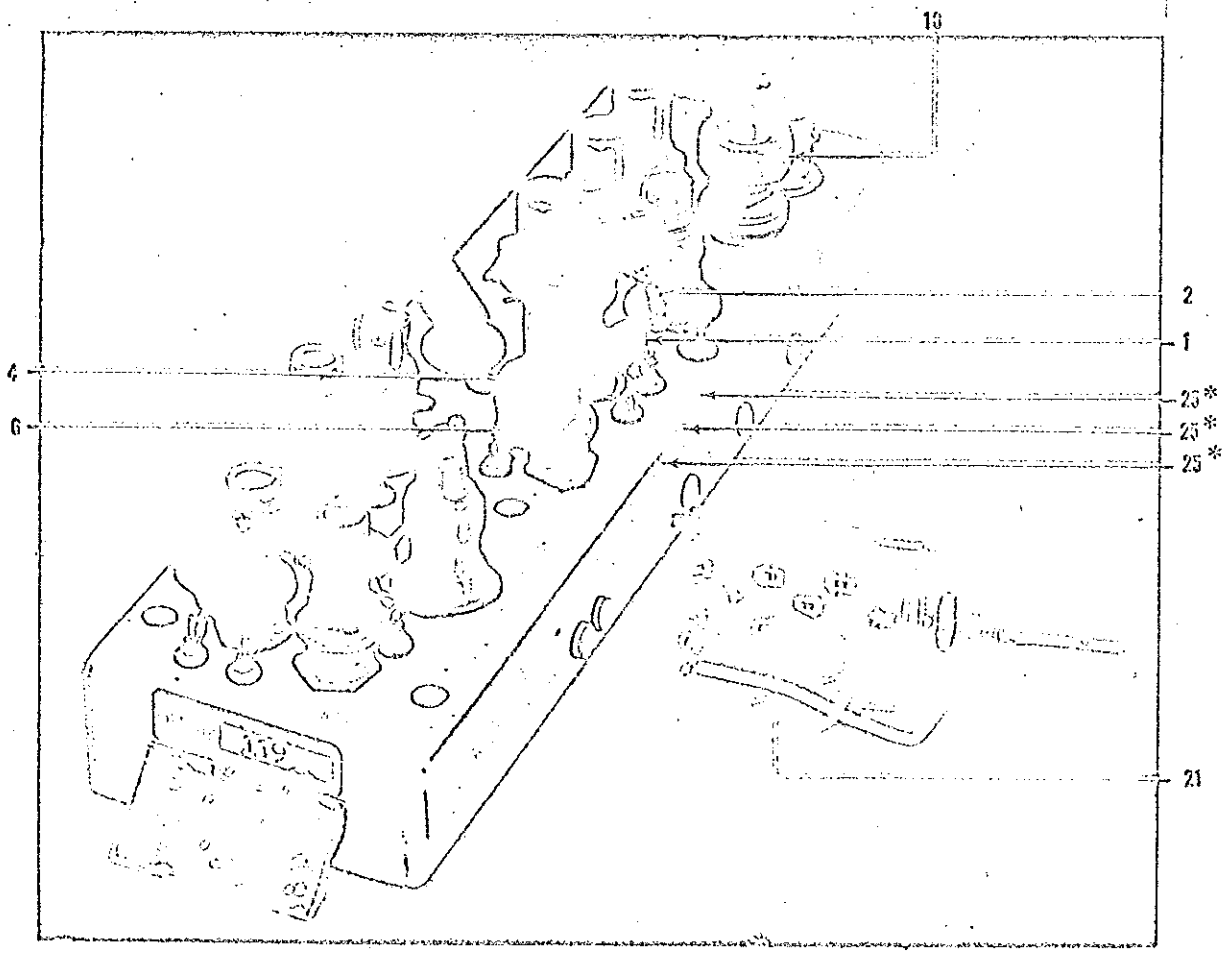
*DENOTES HIDDEN PARTS

Figure 6-10. Component Assembly, Beat Frequency Oscillator, 21.435 MC

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
10	G175H10000-1	COMPONENT ASSEMBLY; BEAT FREQUENCY OSCILLATOR; 21.435 MC *SEE FIGURE 6-3 FOR NEXT HIGHER ASSEMBLY	REF	
-1	G175H10020-1	. BOX	1	
-2	FB2B	. CAPACITOR; CERAMIC; FEEDTHRU 0.001 PF; 500 WVDC; 10% *01121*	5	
		ATTACHING PARTS		
	M6351	. WASHER *01121*	5	
	M6377	. NUT *01121*	5	
		****.****		
-3	R50-100	. CONNECTOR *08310*	1	
-4	G175H11000-1	. COMPONENT ASSEMBLY	1	
		ATTACHING PARTS		
	440X1-4BHSSP	. SCREW; MACHINE	4	
	4 LOCK	. WASHER; LOCK	4	
		****.****		
-5	G175H11200-1	. . CIRCUIT BOARD	1	
-6	A10044	. . TRANSIPAD *07047*	1	
-7	6000051-1	. . TRANSISTOR	1	
-8	2083127	. . CRYSTAL; 21.435 MC; PORM 2 KC *74306*	1	
-9	V20	. . DIODE; VARICAP *01281*	2	
-10	1537-20	. . RF CHOKE; 2.2 UH; 10% *99600*	1	
-11	2500-24	. . RF CHOKE; 820 UH; 5% *99800*	1	
-12	3250P1-202	. . POTENTIOMETER; 2K *80294*	1	
-13	RC07GF683J	. . RESISTOR	1	
-14	RC07GF473J	. . RESISTOR	3	
-15	RC07GF134J	. . RESISTOR	1	
-16	RC07GF474J	. . RESISTOR	1	
-17	RC20GF184J	. . RESISTOR	1	
-18	RC07GF394J	. . RESISTOR	1	
-19	5HKS10	. . CAPACITOR; FIXED CERAMIC; 0.01 UF; 1000 WVDC *56289*	2	
-20	5GAD10	. . CAPACITOR; FIXED CERAMIC; 0.001 UF; 1000 WVDC *56289*	1	
-21	DM15-010M	. . CAPACITOR; FIXED MICA; 1 PF; 20% *84171*	1	
-22	DM15-430J	. . CAPACITOR; FIXED MICA; 43 PF; 5% *84171*	1	
-23	DM15-500J	. . CAPACITOR; FIXED MICA; 50 PF; 5% *84171	2	
-24	DM15-680J	. . CAPACITOR; FIXED MICA; 68 PF; 5% *84171*	1	
-25	DM15-471J	. . CAPACITOR; FIXED MICA; 470 PF; 5% *84171*	1	



TOP VIEW

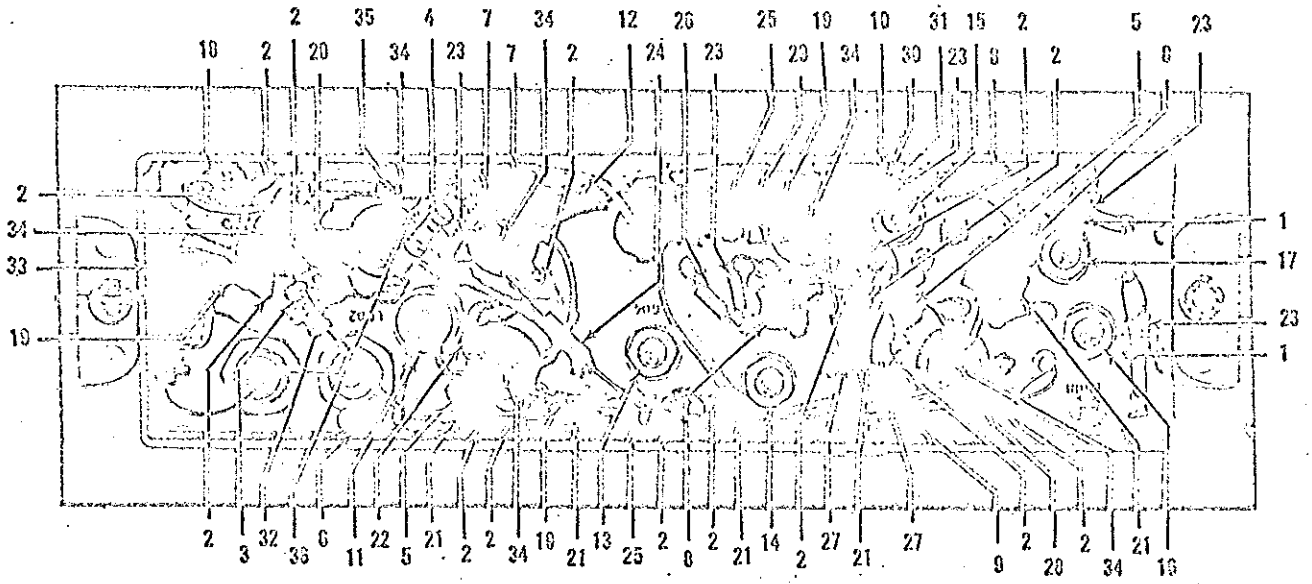


END VIEW

*DENOTES HIDDEN PARTS

Figure 6-11. Component Assembly, FM75F Converter Kit

FIGURE AND INDEX NO.	PART NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
11	9004	COMPONENT ASSEMBLY; FM75F CONVERTER KIT -SEE FIGURE 6-3 FOR NHA-	REF	
-1	DM10-470J	• CAPACITOR; SILVER MICA; 47 PF; 500 WVDC; 5% -84171-	1	
-2	CC20CH6R8C	• CAPACITOR	1	
-3	CC20CJ3R3C	• CAPACITOR	1	
-4	DM10-100J	• CAPACITOR; SILVER MICA; 10 PF; 500 WVDC; 5% -84171-	3	
-5	CC20CH4R7C	• CAPACITOR	1	
-6	DM10-101J	• CAPACITOR; CERAMIC DISC; 100 PF; 500 WVDC; 5% -84171-	3	
-7	DM10-620J	• CAPACITOR; SILVER MICA; 82 PF; 500 WVDC; 5% -84171-	1	
-8	DM10-330J	• CAPACITOR; SILVER MICA; 33 PF; 500 WVDC; 5% -84171-	1	
-9	3014	• CHASSIS; BRASS; SILVER PLATED -14632-	1	
-10	1081	• SHIELD CAN; ALUMINUM -14632-	1	
-11	5R3-1	• RECEPTACLE -71286-	2	
-12	SB375-4	• GROMMET; PLASTIC -28520-	1	
-13	1486-10	• SOLDER LUG -83330-	1	
-14	6010	• PLATE CLIP -71785-	3	
-15	UG1094U	• CONNECTOR; BNC -30684-	2	
-16	6CW4	• TUBE -86684-	3	
-17	7587	• TUBE -86684-	3	
-18	202-4	• CABLE ASSEMBLY; RG58U -14632-	1	
-19	1079	• COUPLING NETWORK FOR 40 KC OPERATION -14632-	1	
-20	NO NUMBER	• COUPLING NETWORK FOR 75 KC OPERATION -14632-	1	
-21	1084	• SWITCH; ROTARY -14632-	1	
-22	1091	• SHIELD CAN; ALUMINUM -14632-	2	
-23	555-4	• STUD -71286-	2	
-24	553-1	• RETAINING WASHER -71286-	2	
-25	7A1A1	• TIE POST -92825-	3	



*DENOTES HIDDEN PARTS

Figure 6-12. Component Assembly, FM75F Converter Kit, Bottom View

FIGURE AND INDEX NO.	PART NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
12	9004	COMPONENT ASSEMBLY, FM75F CONVERTER KIT, BOTTOM VIEW -SEE FIGURE 6-3 FOR RHA-	REF	
-1	1N99	• DIODE, GERMANIUM -03877-	2	
-2	40C272	• CAPACITOR, CERAMIC DISC, 0.001 UF 500 WVDC, 20% -56289-	14	
-3	CC20CK0R5C	• CAPACITOR	1	
-4	CC20CJ2R2C	• CAPACITOR	1	
-5	DM10-100J	• CAPACITOR, SILVER MICA, 10 PF, 500 WVDC, 5% -84171-	2	
-6	DM10-201J	• CAPACITOR, SILVER MICA, 200 PF, 500 WVDC, 5% -84171-	1	
-7	DM10-220J	• CAPACITOR, SILVER MICA, 22 PF, 500 WVDC, 5% -84171-	2	
-8	DM10-101J	• CAPACITOR, CERAMIC DISC, 100 PF, 500 WVDC, 5% -84171-	3	
-9	29C262	• CAPACITOR, CERAMIC DISC, 0.0047 UF, 500 WVDC, 20% -56289-	1	
-10	29C986	• CAPACITOR, CERAMIC DISC, 0.01 UF, 500 WVDC, 20% -56289-	1	
-11	1095	• COIL -14632-	1	
-12	1096	• COIL -14632-	1	
-13	1034-1	• COIL, VARIABLE,-14632-	1	
-14	1034-2	• COIL, VARIABLE -14632-	1	
-15	2060-8	• COIL, VARIABLE -71279-	1	
-16	2060-6	• COIL, VARIABLE -71279-	1	
-17	1041	• COIL, VARIABLE -14632-	1	
-18	CB2241	• RESISTOR, FIXED COMPOSITION, 220 K, 1/4 W, 10% -01121-	1	
-19	CB5605	• RESISTOR, FIXED COMPOSITION, 56 OHM, 1/4 W, 5% -01121-	2	
-20	CB4735	• RESISTOR, FIXED COMPOSITION, 47 K, 1/4 W, 5% -01121-	1	
-21	CB1021	• RESISTOR, FIXED COMPOSITION, 1 K, 1/4 W, 10% -01121-	4	
-22	CB1051	• RESISTOR, FIXED COMPOSITION, 1 MEG, 1/4 W, 10% -01121-	2	
-23	CB4045	• RESISTOR, FIXED COMPOSITION, 100 K, 1/4 W, 5% -01121-	5	
-24	EB4735	• RESISTOR, FIXED COMPOSITION, 47 K, 1/2 W, 5% -01121-	1	
-25	EB1035	• RESISTOR, FIXED COMPOSITION, 10 K, 1/4 W, 5% -01121-	2	
-26	CB8241	• RESISTOR, FIXED COMPOSITION, 820 K, 1/4 W, 10% -01121-	1	
-27	EB1045	• RESISTOR, FIXED COMPOSITION, 100 K, 1/2 W, 5% -01121-	2	
-28	EB8235	• RESISTOR, FIXED COMPOSITION, 82 K, 1/2 W, 5% -01121-	1	
-29	CB1235	• RESISTOR, FIXED COMPOSITION, 12 K, 1/4 W, 5% -01121-	1	
-30	CB3635	• RESISTOR, FIXED COMPOSITION, 36 K, 1/4 W, 5% -01121-	1	
-31	CB3341	• RESISTOR, FIXED COMPOSITION, 330 K, 1/4 W, 10% -01121-	1	
-32	CB1001	• RESISTOR, FIXED COMPOSITION, 10 OHM, 1/4 W, 10% -01121-	1	
-33	1092	• TRANSFORMER, MATCHING -14632-	1	
-34	133-65-10-001	• TUBE SOCKET -71785-	6	
-35	8004-161	• CLIP, CRYSTAL -91506-	1	
-36	4202	• CRYSTAL, QUARTZ -74306-	1	

NUMERICAL INDEX

PART NUMBER	STOCK NUMBER	FIGURE & INDEX NO.	UNITS PER ASSEMBLY
AA25302		6 -12	1
AB14799		3 -27	1
AB14976		3 -28	1
AB31575		3 -19	1
AB31678		3 -24	1
AB31679		3 -26	2
AB31680		3 -25	3
AB31816		3 -18	1
AB31970		3 -23	1
AB31972		3 -21	2
AB31973-2		3 -22	1
AB32036		3 -20	1
AC41235		3 -42	1
AC41236		2 -8	1
AC41261		9 -18	1
AD50868		2 -23	1
AN535-0-3		1 -	2
AN936A4A		9 -	1
A10044		10 -6	1
A14737		6 -13	2
A14804		7 -22	2
A14805		7 -21	2
A16625		7 -23	2
A25-113		4 -16	1
A25-114		4 -19	1
A25-115		4 -20	1
A25-116		4 -21	1
A25-117		4 -22	1
A25-118		4 -23	1
A25-119		4 -24	1
A25-120		4 -25	1
A25-121		4 -18	5
A25-122		4 -27	1
A25-123		4 -26	1
A25153		9 -13	3
A25154		9 -14	1
A25155		9 -5	1
A25156		9 -6	3
A25157		9 -7	1
A25158		9 -8	2
A25160		9 -9	1
A25161		9 -10	1
A25162		9 -11	1
A25383		6 -16	1
A25519		9 -12	1
A25685		9 -26	1
A3234RCF		1 -12	1
A324		1 -8	1
BH240		4 -5	3
		6 -5	5
		7 -7	5
BH305		4 -12	1
		6 -2	4
BH340		4 -15	3
CB1001		12 -32	1
CB1021		12 -21	4
CB1051		12 -22	2
CB1235		12 -29	1
CB2241		12 -18	1
CB3341		12 -31	1
CB3635		12 -30	1
CB4045		12 -23	5
CB4735		12 -20	1
CB5605		12 -19	2
CB6241		12 -26	1
CC20CG120J		4 -3	1
CC20CG120K		4 -6	1
		7 -9	2
CC20CG220J		7 -13	1
CC20CG390J		7 -12	2
CC20CH4R7C		11 -5	1
CC20CH4R7D		7 -3	1
CC20CH6R8C		11 -2	1
CC20CJ2R2C		4 -1	1
		12 -4	1
CC20CJ3R3C		4 -8	2
		11 -3	1
CC20CKR60C		6 -7	1
CC20CK0R5C		12 -3	1
CC20CK1R5F		7 -10	2
CM15E151J		2 -20	1
CM15E221J		7 -1	1
CM15E270J		7 -16	1
CM15E301J		2 -21	1
CM15E330J		7 -14	1
CST6		4 -36	3
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		1 -23	
		1 -24	
		1 -25	
		3 -7	
		3 -8	
		3 -16	
DM10-100J		11 -4	3
		12 -5	2
DM10-101J		11 -6	3
		12 -8	3
DM10-201J		12 -6	1
DM10-220J		12 -7	2
DM10-330J		11 -8	1
DM10-470J		11 -1	1
DM10-820J		11 -7	1
DM15-010K		10 -21	1
DM15-430J		10 -22	1
DM15-471J		10 -25	1
DM15-500J		10 -23	2
DM15-600J		10 -24	1
DS00-12P		1 -6	1
DS00-19P		1 -4	1
DS00-19S		1 -5	1
D6-102		7 -16	1
EB1011		6 -25	1
		7 -40	1
EB1015		6 -21	2
EB1021		2 -19	1
		7 -25	5
EB1025		6 -19	3
EB1031		2 -17	1
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		9 -28	1
EB1032		1 -7	4
EB1035		4 -33	1
		12 -25	2
EB1041		2 -13	1
		4 -35	1
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		6 -27	1
		7 -32	4
EB1045		12 -27	2
EB1051		2 -18	2
		5 -6	4
EB1141		7 -29	1
EB2021		5 -8	1
EB2031		5 -16	1
EB2035		7 -38	1
EB2061		8 -3	1
EB2231		5 -9	1
		6 -20	2
		7 -34	1
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EB2435		7 -39	2
EB2441		2 -16	1
		5 -7	1
EB3015		8 -4	1
EB3035		7 -42	1
EB3325		2 -15	1
EB3331		7 -36	2
EB3341		7 -41	1
		8 -2	1
EB3925		6 -23	3
EB3941		6 -28	1
EB4725		4 -29	1
EB4731		6 -22	1
		7 -35	2
EB4735		5 -4	1
		12 -24	1
EB4741		5 -11	1
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EB4755		5 -21	1
EB5101		7 -24	1
EB5105		7 -33	1
EB5145		5 -13	1
EB6005		6 -17	1
EB6631		5 -14	1
EB6841		3 -53	1
EB8205		4 -28	2
		7 -27	4
EB8235		12 -28	1
EB8241		7 -31	1
FD2B		10 -2	5

PART NUMBER	STOCK NUMBER	FIGURE & INDEX NO.	UNITS PER ASSEMBLY
GB1031		5 -5	1
		6 -26	1
GB1335		4 -30	1
GB47G5		7 -37	1
GB4731		5 -10	2
GB6825		4 -34	1
G000051-1		10 -7	1
G000094-1		3 -43	1
G166D00000-1		1 -	1
		2 -	REF
		3 -	REF
G166D00001-1		1 -28	1
G166D00002-1		3 -50	1
G166D00100-1		3 -44	1
G166D00100-3		3 -45	1
G166D00951-1		3 -39	1
G166D01000-1		3 -48	1
G175H00100-2		3 -46	1
G175H00951		1 -29	1
G175H10000-1		3 -41	1
		10 -	REF
G175H10020-1		10 -1	1
G175H11000-1		10 -4	1
G175H11200-1		10 -5	1
HB1235		8 -9	2
HB1335		8 -6	1
HB1835		4 -31	1
HB5625		5 -17	1
HP10N		3 -51	1
HP6N		3 -52	1
HT163-1		3 -14	1
MD103		5 -3	1
MRF1-5-10M		2 -7	1
MS25237-327		1 -1	6
		2 -1	2
		3 -3	1
MS25237-330		1 -30	1
MS35489-11		3 -47	1
MX1530U		3 -11	2
		9 -25	1
M6351		10 -	5
M6377		10 -	5
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P1232GP		8 -1	1
RC07GF134J		10 -15	1
RC07GF181J		4 -47	1
RC07GF394J		10 -18	1
RC07GF473J		10 -14	3
RC07GF474J		10 -16	1
RC07GF683J		10 -13	1
RC20GF153J		5 -20	1
RC20GF154K		7 -30	1
RC20GF184J		10 -17	1
RC20GF221J		5 -18	1
RC20GF752J		7 -45	1
RC32GF101K		9 -4	1
RC32GF472J		5 -19	1
RC42GF472K		9 -3	1
RV5NAXSD255B		1 -26	1
R50-100		7 -46	1
		10 -3	1
R685-4D10K		3 -13	1
SB375-4		11 -12	1
SMFB2		4 -11	2
		9 -17	2
TS102P01		4 -44	2
		6 -30	3
		7 -43	5
TS103P01		6 -29	2
TS103P01		2 -6	5
T161A87		1 -13	6
TVL3561-7		3 -1	1
UG1094U		1 -3	1
		3 -10	5
		11 -15	2

PART NUMBER	STOCK NUMBER	FIGURE & INDEX NO.	UNITS PER ASSEMBLY
UG1098U		3 -9	1
		4 -42	1
UG21RU		1 -20	1
UG260U		3 -17	4
		4 -41	1
		9 -21	1
UG262U		9 -20	1
UG290U		2 -2	1
UG291U		1 -2	2
UG697U		2 -2A	1
		9 -29	1
UG86U		2 -3A	1
		3 -15	5
UG913U		2 -3	1
V20		10 -9	2
X2045F4		4 -45	2
		9 -1	1
04-791-01		3 -5	3
		4 -39	2
04-791-02		3 -4	5
		9 -19	1
04-991-01		3 -6	2
04-991-02		3 -2	6
1N457		8 -8	1
1N458		5 -22	1
1N82ACBS		9 -24	1
1N99		12 -1	2
1034-1		12 -13	1
1034-2		12 -14	1
1041		12 -17	1
107-1930-975		2 -5	1
		3 -38	1
1079		11 -19	1
1081		11 -10	1
1084		11 -21	1
1091		11 -22	2
1092		12 -33	1
1095		12 -11	1
1096		12 -12	1
12AU7A		3 -29	4
		4 -38	1
12PFPORH5PCT		4 -7	1
133-65-10-001		12 -34	6
1433		7 -44	2
1486-10		11 -13	1
1537-20		10 -10	1
18750		2 -24	1
2-56NC2B		1 -	2
2LOCK		1 -	2
202-4		11 -18	1
2060-6		12 -16	1
2060-8		12 -15	1
2083127		10 -6	1
209-11-22		4 -17	4
211-11-33		6 -15	1
2111880		1 -18	2
212-11-39		6 -14	2
24004-2		1 -11	1
24005-2		1 -9	1
2500-24		10 -11	1
256X3-8		1 -	2
29C262		12 -9	1
29C986		12 -10	1
29C988		2 -22	1
		5 -1	4
		6 -1	1
		7 -17	2
301-000C0H0479C		4 -14	2
301-000C0H0689C		4 -4	1
301-000C0H0829D		6 -9	1
301-000C0J0399C		6 -8	1
301-000C0K0129F		4 -13	1
301-000C0K0189F		7 -11	2
301-000C0K0229F		7 -4	2
301-000C0K0509F		6 -10	1
301-000U2H0101K		6 -11	1
301C0K506C		4 -46	1
3014		11 -9	1
308-000C0G0330J		7 -6	2
308-000C0G0470J		4 -10	1
308-000C0G0470K		6 -4	2
317-010202-3		3 -12	1
3250P1-202		10 -12	1
331-000X5U0391K		7 -8	2
331-000X5U0470K		7 -5	9
331-000X5U0470K		4 -2	2
3600S1-103		1 -27	1
370C8102K		9 -27	2

PART NUMBER	STOCK NUMBER	FIGURE & INDEX NO.	UNITS PER ASSEMBLY	PART NUMBER	STOCK NUMBER	FIGURE & INDEX NO.	UNITS PER ASSEMBLY
370FA150J		9 -16	1				
4 LOCK		10 -	4				
4LOCK		3 -	8				
40C214		4 -9	3				
		6 -3	13				
		7 -15	1				
40C272		12 -2	14				
4202		12 -30	1				
440X1-2BHSSP		3 -	4				
440X1-4BHSSP		3 -	1				
		9 -	1				
		10 -	4				
5GAP10		9 -2	1				
		10 -20	1				
5HKD47		7 -2	7				
5HKS10		10 -19	2				
5R3-1		11 -11	2				
553-1		11 -24	2				
5S5-4		11 -23	2				
514C2		6 -6	4				
		7 -19	9				
521		1 -10	1				
5842		3 -31	1				
6AF4A		3 -30	1				
		9 -22	1				
6AK5		3 -33	2				
		4 -37	1				
6AL5		3 -37	1				
6AT2		1 -19	1				
6BA6W		3 -32	2				
6CB6A		3 -36	1				
6CW4		11 -16	3				
6DC6		3 -34	2				
6U8A		3 -35	1				
6010		11 -14	3				
632X1-2BHSSP		3 -	1				
7A1A1		11 -25	3				
70-3-2G		1 -15	1				
70-3-2G1		1 -17	1				
70-3-2G3		1 -14	2				
70-3-2G4		1 -16	1				
7077		4 -40	2				
7587		11 -17	3				
8-1930XP24		2 -4	1				
8004-1G1		12 -35	1				
829-6		9 -15	1				
66070		4 -43	2				
8940-0005		9 -23	1				
9004		11 -	REF				
		12 -	REF				
94CSA1-2-126		3 -49	1				

REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIG. AND INDEX NO.	STOCK NUMBER	MFR PART NUMBER
A212	3 -53		EB6641
CR102	8 -8		1N457
CR103	5 -22		1N458
CR1101	10 -9		V20
CR1102	10 -9		V20
CR301	9 -24		1N82ACDS
CR601	12 -1		1N99
CR602	12 -1		1N99
C0091	4 -46		301C0K508C
C0093	9 -2		5GAD10
C1001	10 -2		FB2B
C1002	10 -2		FB2B
C1003	10 -2		FB2B
C1004	10 -2		FB2B
C1005	10 -2		FB2B
C102	8 -1		P1232GP
C104	2 -20		CM15E151J
C105	2 -21		CM15E301J
C106	5 -1		29C9B8
C107	5 -2		P1232GP
C108	5 -1		29C9B8
C109	5 -1		29C9B8
C110	5 -1		29C9B8
C1101	10 -23		DM15-500J
C1102	10 -23		DM15-500J
C1103	10 -24		DM15-680J
C1104	10 -20		5GAD10
C1105	10 -22		DM15-430J
C1106	10 -25		DM15-471J
C1107	10 -21		DM15-010M
C1108	10 -19		5HK510
C1109	10 -19		5HK510
C111	2 -22		29C9D8
C112	2 -7		MRF1-5-10M
C130	5 -3		MD103
C131	3 -1		TUL3561-7
C201	4 -1		CC20CJ2R2C
C202	4 -2		331-000X5U0470K
C203	4 -36		CST6
C204	4 -3		CC20CG120J
C205	4 -4		301-000C0H0689C
C206	4 -5		BH240
C207	4 -2		331-000X5U0470K
C208	4 -5		BH240
C209	4 -6		CC20CG120K
C210	4 -36		CST6
C211	4 -7		12PFPORM5PCT
C212	4 -36		CST6
C213	4 -8		CC20CJ3R3C
C214	4 -5		BH240
C215	4 -9		40C214
C216	4 -10		308-000C0G0470J
C217	4 -9		40C214
C218	4 -11		SMFB2
C219	4 -12		BH305
C220	4 -13		301-000C0K0129F
C221	4 -14		301-000C0H0479C
C223	4 -8		CC20CJ3R3C
C224	4 -11		SMFB2
C225	4 -9		40C214
C226	4 -15		BH340
C227	4 -15		BH340
C228	4 -15		BH340
C230	4 -14		301-000C0H0479C
C301	9 -13		A25153
C302	9 -13		A25153
C303	9 -13		A25153
C304A	9 -18		AC41261
C304B	9 -18		AC41261
C304C	9 -18		AC41261
C304D	9 -18		AC41261
C304E	9 -18		AC41261
C305	9 -14		A25154
C306	9 -15		829-6
C307	9 -16		370FA150J
C308	9 -17		SMFB2
C309	9 -17		SMFB2
C310	9 -27		370CB102K
C311	9 -27		370CB102K
C401	6 -1		29C9B8
C404	6 -2		BH305
C405	6 -3		40C214
C406	6 -5		BH240
C407	6 -3		40C214
C408	6 -3		40C214
C409	6 -3		40C214
C410	6 -4		308-000C0G0470K
C411	6 -3		40C214
C412	6 -5		BH240
C413	6 -2		BH305
C414	6 -6		514C2
C415	6 -7		CC20CKR68C
C416	6 -8		301-000C0J0399C
C417	6 -9		301-000C0H0829E
C418	6 -10		301-000C0K0568F
C419	6 -11		301-000UZM0101K
C420	6 -2		BH305
C421	6 -5		BH240
C422	6 -3		40C214
C423	6 -5		BH240
C424	6 -4		308-000C0G0470J
C425	6 -3		40C214
C426	6 -2		BH305
C427	6 -3		40C214
C428	6 -3		40C214
C429	6 -3		40C214
C430	6 -5		BH240
C431	6 -6		514C2
C432	6 -3		40C214
C433	6 -3		40C214
C434	6 -6		514C2
C435	6 -6		514C2
C439	6 -3		40C214
C501	7 -1		CM15E221J
C502	7 -2		5HKD47
C503	7 -3		CC20CH4R7D
C504	7 -4		301-000C0K0229F
C505	7 -4		301-000C0K0229F
C506	7 -5		331-000X5U0470J
C507	7 -6		308-000C0G0330J
C508	7 -7		BH240
C509	7 -2		5HKD47
C510	7 -5		331-000X5U0470K
C511	7 -5		331-000X5U0470K
C512	7 -8		331-000X5U0391K
C513	7 -9		CC20CG120K
C514	7 -2		5HKD47
C515	7 -10		CC20CK1R5F
C516	7 -11		301-000C0K0189F
C517	7 -5		331-000X5U0470K
C518	7 -12		CC20CG390J
C519	7 -7		BH240
C520	7 -2		5HKD47
C521	7 -5		331-000X5U0470K
C522	7 -5		331-000X5U0470K
C523	7 -8		331-000X5U0391K
C524	7 -7		BH240
C525	7 -9		CC20CG120K
C526	7 -10		CC20CK1R5F
C527	7 -11		301-000C0K0189F
C528	7 -6		308-000C0G0330J
C529	7 -13		CC20CG220J
C530	7 -5		331-000X5U0470K
C531	7 -5		331-000X5U0470K
C532	7 -7		BH240
C533	7 -14		CM15E330J
C534	7 -7		BH240
C535	7 -15		40C214
C536	7 -16		D6-102
C539	7 -17		29C9B8
C540	7 -12		CC20CG390J
C541	7 -18		CM15E270J
C542	7 -2		5HKD47
C543	7 -2		5HKD47
C544	7 -2		5HKD47
C545	7 -17		29C9B8
C546	7 -19		514C2
C547	7 -19		514C2
C548	7 -19		514C2
C549	7 -19		514C2
C550	7 -19		514C2
C551	7 -19		514C2
C552	7 -19		514C2
C553	7 -19		514C2
C554	7 -5		331-000X5U0470J
C556	7 -19		514C2
C557	7 -20		P1232GP
C601	12 -2		40C272
C602	12 -2		40C272
C603	12 -2		40C272
C604	12 -2		40C272
C605	12 -3		CC20CK0R5C
C606	12 -4		CC20CJ2R2C
C607	12 -5		DM10-100J
C608	12 -6		DM10-201J
C609	12 -2		40C272

REFERENCE DESIGNATION	FIG. AND INDEX NO.	STOCK NUMBER	MFR PART NUMBER
C610	12 -7		DM10-220J
C611	12 -7		DM10-220J
C612	12 -2		40C272
C613	12 -2		40C272
C614	11 -1		DM10-470J
C615	11 -2		CC20CH6R8C
C616	11 -3		CC20CJ3R3C
C617	11 -4		DM10-100J
C618	11 -5		CC20CH4R7C
C619	12 -2		40C272
C620	11 -4		DM10-100J
C621	11 -6		DM10-101J
C622	12 -8		DM10-101J
C623	12 -2		40C272
C624	12 -2		40C272
C625	12 -2		40C272
C626	11 -4		DM10-100J
C627	12 -2		40C272
C628	12 -5		DM10-100J
C629	12 -8		DM10-101J
C630	12 -2		40C272
C631	12 -2		40C272
C632	11 -7		DM10-820J
C633	11 -8		DM10-330J
C634	11 -6		DM10-101J
C635	11 -6		DM10-101J
C636	12 -8		DM10-101J
C637	12 -9		29C262
C638	12 -10		29C986
DS101	2 -1		MS25237-327
DS101	3 -3		MS25237-327
DS103	1 -1		MS25237-327
DS104	1 -1		MS25237-327
DS105	1 -1		MS25237-327
DS106	1 -1		MS25237-327
DS107	1 -1		MS25237-327
DS108	1 -1		MS25237-327
DS109	2 -1		MS25237-327
DS110	1 -30		MS25237-330
E1	4 -45		X2045F4
E101	3 -2		04-991-02
E102	3 -2		04-991-02
E103	3 -2		04-991-02
E104	3 -2		04-991-02
E105	3 -2		04-991-02
E2	4 -45		X2045F4
E203	4 -39		04-791-01
E204	4 -39		04-791-01
E301	9 -19		04-791-02
E401	3 -6		04-991-01
E402	3 -4		04-791-02
E403	3 -2		04-991-02
E404	3 -4		04-791-02
E405	3 -5		04-791-01
E501	3 -4		04-791-02
E502	3 -4		04-791-02
E503	3 -4		04-791-02
E504	3 -5		04-791-01
E505	3 -5		04-791-01
E601	11 -9		3014
E602	11 -10		1081
E603	11 -22		1091
E604	11 -22		1091
E605	11 -11		5R3-1
E606	11 -11		5R3-1
E607	11 -23		5S5-4
E608	11 -23		5S5-4
E609	11 -24		5S3-1
E610	11 -24		5S3-1
E611	11 -12		SB375-4
E612	11 -13		1486-10
E613	11 -14		6010
E614	11 -14		6010
E615	11 -14		6010
E616	11 -25		7A1A1
E617	11 -25		7A1A1
E618	11 -25		7A1A1
J0091	7 -46		R50-100
J1001	10 -3		R50-100
J103	1 -2		UG291A-U
J104	1 -3		UG1094U
J105	1 -2		UG291A-U
J106	1 -4		DSGG-19P
J107	1 -5		DSGG-19S
J108	1 -6		DSGG-32P
J202	4 -42		UG1098U
J203	3 -9		UG1098U
J301	2 -2		UG290U
J302	9 -25		MX1530U
J303	2 -2A		UG697U
J303	9 -29		UG657U
J304	9 -20		UG262U
J401	3 -10		UG1094U
J402	3 -10		UG1094U
J403	3 -10		UG1094U
J404	3 -10		UG1094U
J501	3 -11		MX1530U
J502	3 -11		MX1530U
J503	3 -10		UG1094U
J601	11 -15		UG1094U
J602	11 -15		UG1094U
K0091	3 -49		94CSA1-2-126
K101	3 -12		317-010202-3
K103	3 -13		R685-4D10K
L1101	10 -10		1537-20
L1102	10 -11		2500-24
L201	4 -16		A25-113
L202	3 -14		HT163-1
L203	4 -17		209-11-22
L204	4 -17		209-11-22
L205	4 -18		A25-121
L206	4 -17		209-11-22
L207	4 -17		209-11-22
L208	4 -18		A25-121
L209	4 -19		A25-114
L210	4 -20		A25-115
L211	4 -21		A25-116
L212	4 -22		A25-117
L213	4 -23		A25-118
L214	4 -24		A25-119
L215	4 -25		A25-120
L216	4 -18		A25-121
L217	4 -18		A25-121
L218	4 -26		A25-123
L219	4 -18		A25-121
L220	4 -27		A25-122
L301	9 -5		A25155
L302	9 -6		A25156
L303	9 -6		A25156
L304	9 -6		A25156
L305	9 -7		A25157
L306	9 -8		A25158
L307	9 -8		A25158
L308	9 -9		A25160
L309	9 -10		A25161
L310	9 -11		A25162
L311	9 -12		A25519
L401	6 -12		AA25302
L406	6 -13		A14737
L408	6 -14		212-11-39
L412	6 -13		A14737
L413	6 -15		211-11-33
L414	6 -16		A25303
L415	6 -14		212-11-39
L511	7 -21		A14805
L512	7 -21		A14805
L513	7 -22		A14804
L514	7 -22		A14804
L515	7 -23		A16625
L516	7 -23		A16625
L602	12 -11		1095
L603	12 -12		1096
L604	12 -13		1034-1
L605	12 -14		1034-2
L606	12 -15		2060-8
L608	12 -16		2060-6
L609	12 -17		1041
P101	1 -20		UG218U
P110	3 -15		UG88U
P111	3 -15		UG88U
P201	3 -15		UG88U
P202	4 -41		UG260U
P205	3 -15		UG88U
P302	2 -3		UG913U
P303	2 -3A		UG88U
P304	9 -21		UG260U
P401	3 -17		UG260U
P402	3 -17		UG260U
P403	3 -17		UG260U
P404	3 -17		UG260U
P503	3 -15		UG88U
Q1101	10 -7		G000051-1
R0091	1 -27		3600S1-103
R0092	7 -45		RC20GF752J
R0093	4 -47		RC07GF181J
R0094	9 -4		RC32GF101K

REFERENCE DESIGNATION	FIG. AND INDEX NO.	STOCK NUMBER	MFR PART NUMBER
R0095	9 -3		RC42GF472K
R102	1 -7		EB1032
R103	8 -2		EB3341
R105	8 -3		EB2061
R106	2 -13		EB1041
R109	2 -14		EB2241
R110	2 -15		EB3325
R1101	10 -12		3250P1-202
R1102	10 -14		RC07GF473J
R1103	10 -14		RC07GF473J
R1104	10 -14		RC07GF473J
R1105	10 -16		RC07GF474J
R1106	10 -15		RC07GF134J
R1107	10 -13		RC07GF683J
R1108	10 -18		RC07GF394J
R1109	10 -17		RC20GF184J
R111	5 -4		EB4735
R112	1 -7		EB1032
R113	5 -5		GB1031
R114	5 -6		EB1051
R115	5 -6		EB1051
R116	5 -6		EB1051
R117	1 -7		EB1032
R118	5 -7		EB2441
R119	2 -18		EB1051
R120	5 -8		EB2021
R121	5 -9		EB2231
R122	5 -10		GB4731
R123	2 -16		EB2441
R124	5 -11		EB4741
R125	2 -17		EB1031
R126	5 -12		EB2241
R127	2 -18		EB1051
R128	2 -19		EB1021
R129	1 -7		EB1032
R131	5 -13		EB5145
R132	5 -6		EB1051
R133	5 -14		EB6831
R134	5 -15		EB1041
R135	1 -26		RV5NAXSD255B
R136	5 -16		EB2031
R137	8 -4		EB3015
R138	8 -5		HB1235
R139	8 -5		HB1235
R140	5 -21		EB4755
R141	5 -17		HB5625
R142	8 -6		HB1335
R143	8 -7		EB1031
R150	5 -15		EB1041
R151	5 -18		RC20GF221J
R152	5 -19		RC32GF472J
R154	5 -20		RC20GF153J
R201	4 -28		EB8205
R202	4 -29		EB4725
R203	4 -30		GB1335
R204	4 -28		EB8205
R205	4 -31		HB1835
R206	4 -32		EB1031
R207	4 -32		EB1031
R208	4 -32		EB1031
R209	4 -33		EB1035
R210	4 -34		GB6825
R211	4 -35		EB1041
R212	3 -53		EB6841
R301	9 -28		EB1031
R401	6 -17		EB6805
R404	6 -18		EB2241
R405	6 -19		EB1025
R406	6 -20		EB2231
R407	6 -21		EB1015
R408	6 -22		EB4731
R409	6 -19		EB1025
R410	6 -23		EB3925
R411	6 -24		EB4741
R412	6 -24		EB4741
R413	6 -18		EB2241
R414	6 -25		EB1011
R415	6 -26		GB1031
R416	6 -27		EB1041
R417	6 -28		EB3941
R418	6 -23		EB3925
R419	6 -21		EB1015
R420	6 -20		EB2231
R421	6 -19		EB1025
R422	6 -23		EB3925
R423	6 -24		EB4741
R424	6 -24		EB4741
R425	6 -18		EB2241

REFERENCE DESIGNATION	FIG. AND INDEX NO.	STOCK NUMBER	MFR PART NUMBER
R501	7 -24		EB5101
R502	7 -25		EB1021
R503	7 -26		EB2241
R504	7 -27		EB8205
R505	7 -28		EB1031
R506	7 -27		EB8205
R507	7 -29		EB1141
R508	7 -25		EB1021
R509	7 -26		EB2241
R510	7 -27		EB8205
R511	7 -27		EB8205
R512	7 -30		RC20GF154K
R513	7 -25		EB1021
R514	7 -31		EB8241
R515	7 -32		EB1041
R516	7 -33		EB5105
R517	7 -34		EB2231
R518	7 -35		EB4731
R519	7 -25		EB1021
R520	7 -25		EB1021
R523	7 -36		EB3331
R524	7 -36		EB3331
R525	7 -35		EB4731
R526	7 -40		EB1011
R527	7 -32		EB1041
R528	7 -32		EB1041
R529	7 -28		EB1031
R530	7 -37		GB4765
R531	7 -38		EB2035
R532	7 -32		EB1041
R533	7 -39		EB2435
R534	7 -39		EB2435
R535	7 -41		EB3341
R536	7 -42		EB3035
R537	7 -28		EB1031
R601	12 -18		CB2241
R602	12 -19		CB5605
R603	12 -20		CB4735
R604	12 -21		CB1021
R605	12 -22		CB1051
R606	12 -21		CB1021
R607	12 -23		CB4045
R608	12 -24		CB4735
R609	12 -22		CB1051
R610	12 -25		EB1035
R611	12 -23		CB4045
R612	12 -26		CB8241
R613	12 -19		CB5605
R614	12 -25		EB1035
R615	12 -21		CB1021
R616	12 -27		EB1045
R617	12 -21		CB1021
R618	12 -27		EB1045
R619	12 -28		EB8235
R620	12 -23		CB4045
R621	12 -23		CB4045
R622	12 -29		CB1235
R623	12 -30		CB3635
R624	12 -31		CB3341
R625	12 -23		CB4045
R626	12 -32		CB1001
SDX101	2 -5		107-1930-975
SDX109	2 -4		8-1930XP24
S0091	1 -19		6AT2
S0092	1 -8		A324
S102	1 -9		24005-2
S103	1 -10		521
S104	1 -11		24004-2
S104-1	11 -21		1084
S105	1 -12		A3234RCF
TP501	7 -44		1433
TP502	7 -44		1433
T101	3 -18		AB31816
T102	3 -19		AB31575
T401	3 -20		AB32036
T402	3 -21		AB31972
T403	3 -22		AB31972-2
T404	3 -23		AB31970
T405	3 -21		AB31972
T501	3 -24		AB31678
T502	3 -25		AB31680
T503	3 -26		AB31679
T504	3 -25		AB31680
T505	3 -26		AB31679
T506	3 -25		AB31680
T507	3 -27		AB14799
T508	3 -28		AB14976
T601	12 -33		1092

REFERENCE DESIGNATION	FIG. AND INDEX NO.	STOCK NUMBER	MFR PART NUMBER	REFERENCE DESIGNATION	FIG. AND INDEX NO.	STOCK NUMBER	MFR PART NUMBER
V101	4 -38		12AU7A				
V102	3 -29		12AU7A				
V103	3 -29		12AU7A				
V104	3 -29		12AU7A				
V105	3 -29		12AU7A				
V201	4 -40		7077				
V202	4 -40		7077				
V203	3 -33		6AK5				
V204	3 -30		6AF4A				
V301	9 -22		6AF4A				
V401	3 -31		5842				
V402	3 -32		6BA6W				
V403	3 -35		6U8				
V404	3 -32		6BA6W				
V405	3 -33		6AK5				
V501	3 -34		6DC6				
V502	3 -34		6DC6				
V503	3 -36		6CB6A				
V504	4 -37		6AK5				
V505	3 -37		6AL5				
V601	11 -16		6CW4				
V602	11 -16		6CW4				
V603	11 -17		7587				
V604	11 -16		6CW4				
V605	11 -17		7587				
V606	11 -17		7587				
W601	11 -18		202-4				
XCR301	9 -23		8940-0005				
XDS102	3 -38		107-1930-975				
XDS103	1 -13		TT61AB7				
XDS104	1 -13		TT61AB7				
XDS105	1 -13		TT61AB7				
XDS106	1 -13		TT61AB7				
XDS107	1 -13		TT61AB7				
XDS108	1 -13		TT61AB7				
XV101	2 -6		TS103P01				
XV102	2 -6		TS103P01				
XV103	2 -6		TS103P01				
XV104	2 -6		TS103P01				
XV105	2 -6		TS103P01				
XV201	4 -43		86070				
XV202	4 -43		86070				
XV203	4 -44		TS102P01				
XV204	4 -44		TS102P01				
XV301	9 -26		A25685				
XV401	6 -29		TS103P01				
XV402	6 -30		TS102P01				
XV403	6 -29		TS103P01				
XV404	6 -30		TS102P01				
XV405	6 -30		TS102P01				
XV501	7 -43		TS102P01				
XV502	7 -43		TS102P01				
XV503	7 -43		TS102P01				
XV504	7 -43		TS102P01				
XV505	7 -43		TS102P01				
XV601	12 -34		133-65-10-001				
XV601	12 -35		8004-1G1				
XV602	12 -34		133-65-10-001				
XV603	12 -34		133-65-10-001				
XV604	12 -34		133-65-10-001				
XV605	12 -34		133-65-10-001				
XV606	12 -34		133-65-10-001				
Y1101	10 -8		2083127				
Y601	12 -36		4202				
Z601	11 -19		1079				
Z602	11 -20		NO NUMBER				

mponent information is presented in the List of Added Parts, below.

LIST OF ADDED PARTS

REFERENCE DESIGNATOR	COMPONENT	MFR CODE
T1	Transformer (G000340-1)	05395
CR1	Rectifier (MDA942-4)	04713
R1	*Resistor (RC42GF222J)	
C1, C2	Capacitor (TVA1512)	56289
A1	Amplifier (G166E10000-1)	05395
	Cable Assembly (G166E00200-1)	05395
R2	Resistor (RC07GF510J)	
R3	Resistor (RC20GF910J)	

NOTE

The following parts are a breakdown of A1 amplifier.

C1, C2	Capacitor (5GAT15)	56289
C3, C4	Capacitor (FA5C. 001uf)	01121
L1, L2	Choke (WEE 3.3)	43543
V1	Tube (GL7768)	33173
R1	Resistor (RC07GF100J)	
R2	Resistor (RC20GF331J)	

*Nominal value - Exact value selected to limit plate current of A1V1 to 35 ma.

SECTION VII

WIRING DIAGRAMS & SCHEMATICS

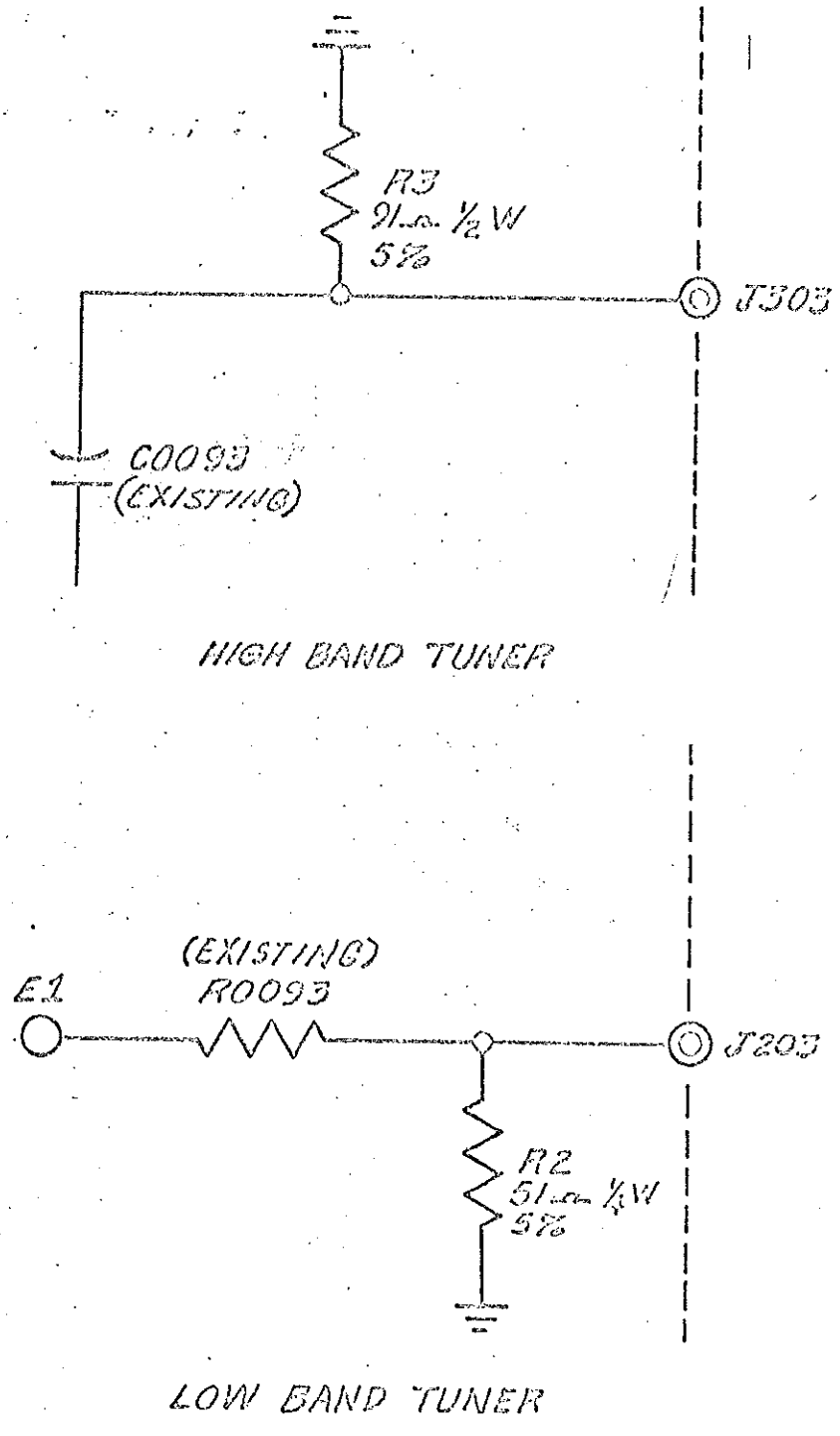
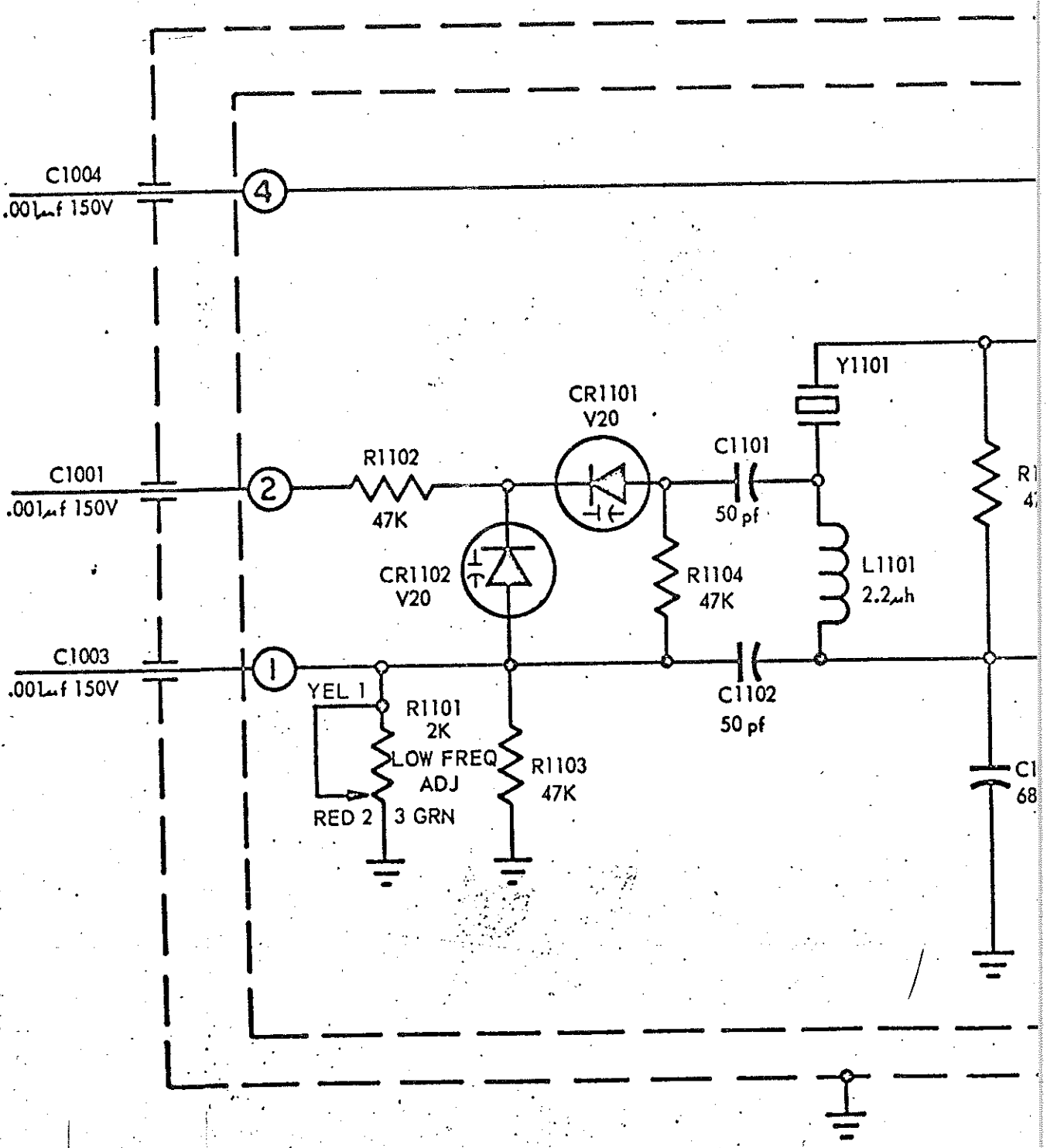
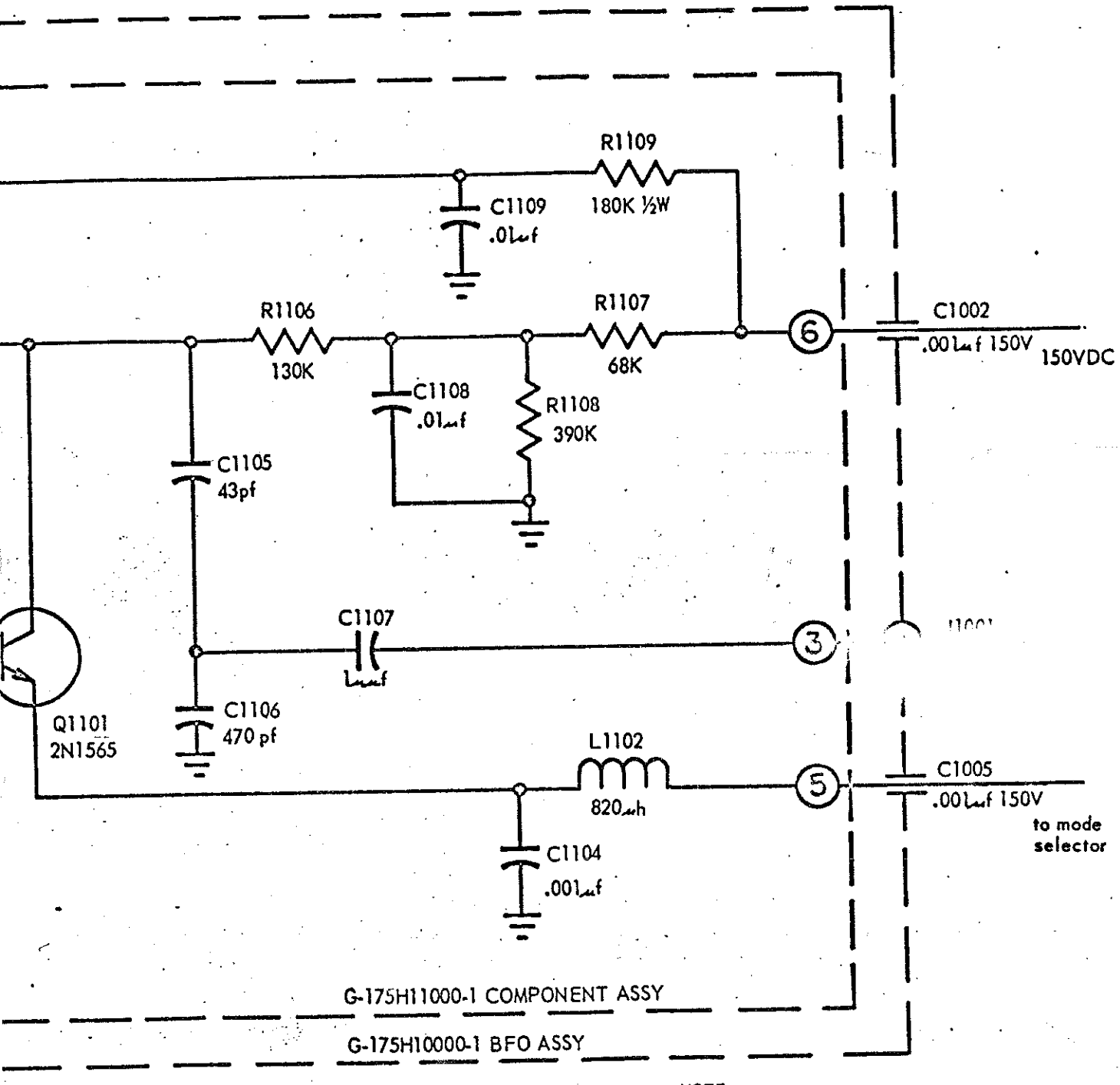


Figure 3. High And Low Band Tuner Modification


C1004
.001μf 150V
4
C1001
.001μf 150V
2
C1003
.001μf 150V
1
R1102
47K
CR1101
V20
CR1102
V20
Y1101
C1101
50 pf
R1104
47K
L1101
2.2μh
C1102
50 pf
YEL 1
R1101
2K
LOW FREQ
ADJ
RED 2
3 GRN
R1103
47K



NOTE:
1. Unless otherwise specified,
(a) resistors are in ohms
¼w ±5%

Figure 7-2. G175H10000-1 BFO Assembly Schematic

GTM-D-166E

SUPPLEMENT

TECHNICAL MANUAL

G166E UHF RECEIVER

(PART NO. G166E00000-1)

THIS PUBLICATION SUPPLEMENTS TECHNICAL MANUAL GTM-D-166D. Reference to this supplement will be made on the title page of the basic publication by personnel responsible for maintaining the publication in current status.

FOR OFFICIAL USE ONLY

(AFR 11-30)

This supplement consists of 8 pages.

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GREENVILLE, TEXAS

1 JULY 1965

The G166E UHF Receiver (P/N G166E00000-1) is an improved version of the G166D UHF Receiver (P/N G166D00000-1).

Modification of the G166D to the G166E is made by adding a G166E10000-1 Isolation Amplifier A1, Rectifier CR1, Transformer T1, and other biasing components (figure 1).

The G166E10000-1 Isolation Amplifier (figure 2) is a single stage, grounded grid amplifier. C1 provides a signal to the cathode of V1. The signal output from the plate of V1 is coupled to J2 by C2. The amplifier requires two voltage inputs, 6.3-volt ac for filament voltage and +150-volt dc for plate voltage.

The low band tuner is modified by removing loop L0091 from J203 and replacing it with resistor R2. The high band tuner is modified by adding resistor R3 to J303 (figure 3).

All electrical specifications are the same as the G166D except for local oscillator output level which is changed to 55 mv minimum and 210 mv maximum for the low band tuner, and 55 mv minimum and 240 mv maximum for the high band tuner.