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**overhaul manual**

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**51Y-4/4A**

**ADF Receiver**

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## FOREWORD

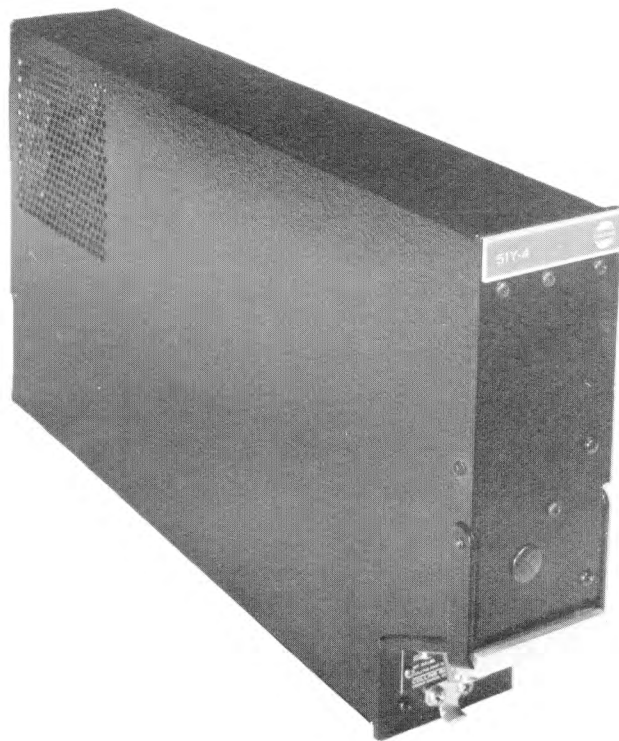
Included within this manual are overhaul instructions with an illustrated parts list prepared in conformance with ATA Specification No. 100 for Manufacturers' Technical Data for the 51Y-4/4A ADF Receiver.

The overhaul instructions are presented in the following sections: description and operation; disassembly; cleaning; inspection/check; repair; assembly; testing; troubleshooting; storage instructions; special tools, fixtures, and test equipment; and an illustrated parts list.

The standards presented in this manual preclude their use for acceptance testing. The information enables the user to restore equipment, which has been removed from service, to proper operating condition.

The following is a list of related publications.

PUBLICATION	COLLINS PART NO.
DF-203 ADF System, Maintenance Manual (with installation data)	523-0755450
614L-8 ADF Control Unit, Overhaul Manual (with illustrated parts list)	523-0755493
179J-5/6/7/8 Sense Antenna Couplers, Overhaul Manual (with illustrated parts list)	523-0755502
DF-203 ADF System R-F Cables, Overhaul Manual (with illustrated parts list)	523-0755504
137A-4/5/6/6A/6B Fixed Loop Antennas, Overhaul Manual (with illustrated parts list)	523-0755617
Electromechanical Components, Overhaul Manual	523-0757895



51Y-4/4A ADF Receiver  
Figure 1



## 51Y -4/ 4A ADF Receiver - Description and Operation

### 1. GENERAL.

Included within this section is the purpose of equipment, the equipment specifications, the equipment description, and theory of operation. Refer to figure 1 for an overall view of the equipment. Figure 2 is a table of equipment covered in this manual.

NOTE: The nomenclature 51Y-4/4A ADF Receiver will be used throughout this manual when the information applies to both the 51Y-4 (serial no. 250 and above) ADF Receiver and the 51Y-4A ADF Receiver. The nomenclature 51Y-4 or 51Y-4A will be used when the information is applicable to only one specific ADF receiver.

NOMENCLATURE	FUNCTION	COLLINS PART NUMBER	DIMENSIONS (inches)			WEIGHT (lb)
			WIDTH	DEPTH	HEIGHT	
51Y-4 ADF Receiver	ADF receiver for DF-203 ADF System (3000-pf sense input capacitance)	522-1836-00	2-1/4	14-5/8	7-5/8	9.8
51Y-4A ADF Receiver	ADF Receiver for DF-203 ADF System (150-pf or 270-pf sense input capacitance)	522-2587-00	2-1/4	14-5/8	7-5/8	9.8
51Y-4A ADF Receiver	ADF receiver for DF-203 ADF System (150-pf or 270-pf sense input capacitance) with self-test circuitry	522-2587-013	2-1/4	14-5/8	7-5/8	9.8



2. PURPOSE OF EQUIPMENT.

The purpose of the 51Y-4/4A ADF Receiver is to receive radio signals from 190 to 1750 kHz in any of three modes. The 51Y-4/4A is the principal component of the DF-203 ADF System. In ADF mode, the DF-203 system automatically determines the direction to the station. The DF-203 also may be used as a manual direction finder by selecting the LOOP mode or as a conventional lf and broadcast-band aural receiver in ANT mode. The 51Y-4/4A, in any mode, provides an aural output of any audio modulation carried on the received rf signal. The 51Y-4/4A receives rf information from a fixed loop antenna, a sense antenna, and provides bearing information for an RMI (radio magnetic indicator) or similar type of indicator. A 614L-8 ADF Control Unit provides frequency selection and other control facilities. The difference between the 51Y-4 and 51Y-4A is the capacitance required at the sense antenna input. The 51Y-4 requires 3000 pf while the 51Y-4A requires either 150 pf or 270 pf.

3. EQUIPMENT SPECIFICATIONS.

The 51Y-4/4A ADF Receiver specifications are listed in figure 3. The designation and quantity of each type of semiconductor used in the 51Y-4/4A ADF Receiver is listed in figure 4.

CHARACTERISTIC	SPECIFICATION
ARINC compliance	Characteristic 550.
Specification	51Y-4: FAA TSO C41a 51Y-4A: FAA TSO C41b, Category $\frac{A}{D}$ ABAAAX Class A
Weight	9.8 lb.
Dimensions	
Depth	14-5/8 in.
Width	2-1/4 in.
Height	7-5/8 in.
ARINC size designation	1/4 ATR short.
Environment	
Temperature	
Storage	-65 °C (-85 °F) to +85 °C (+185 °F).
Operating without cooling	-54 °C (-65 °F) to +55 °C (+131 °F).
Operating with cooling	-54 °C (-65 °F) to +65 °C (+149 °F).



CHARACTERISTIC	SPECIFICATION	
Humidity	Up to 95% relative humidity at +50 °C (+122 °F) for 48 hr.	
Altitude	45,000 ft max.	
Shock  51Y-4/4A in 390D-11 Shockmount  51Y-4/4A in 390R-6A Rigid Mount	15 g operating, 30 g impact.  6 g operating, 15 g impact.	
Frequency range	190 kHz to 1750 kHz covered in three bands.	
Frequency accuracy	Band 1 - 190-400 kHz    1.5 kHz Band 2 - 400-840 kHz    2.5 kHz Band 3 - 840-1750 kHz    5.0 kHz	
Bearing accuracy	2 degrees.	
Aural sensitivity (Field strength required to produce a signal-plus-noise-to-noise ratio of at least 6 db with a minimum audio output of 20 mw with 30 percent modulation on.)	<u>51Y-4</u>	<u>51Y-4A</u>
ADF  200 kHz	55 uv/m                      70 uv/m	
1700 kHz	20 uv/m                      25 uv/m	
Antenna  200 kHz	<u>270 pf</u> <u>150 pf</u> 30 uv/m    50 uv/m    40 uv/m	
1700 kHz	15 uv/m    22 uv/m    18 uv/m	
Loop  200 kHz	100 uv/m                      100 uv/m	
1700 kHz	30 uv/m                      30 uv/m	
Maximum time to obtain bearing	7 sec.	
Intermediate frequency	142.5 kHz .	



CHARACTERISTIC	SPECIFICATION
Total bandwidth	
51Y-4	Bandwidth at 6 db is 2.5 to 3.5 kHz (at frequency of 190 to 1750 kHz). Bandwidth at 60 db is 9.0 to 11.0 kHz (at frequency of 190 to 1750 kHz).
51Y-4A	Bandwidth at 6 db is 2.7 to 3.8 kHz (at frequency of 190 to 1750 kHz). Bandwidth at 60 db is 8.0 to 11.0 kHz (at frequency of 190 to 1750 kHz).
Power consumption including 614L-8 ADF Control Unit and indicator	
27.5 volts dc	19 watts.
26 volts ac	0.53 amp, 0.38 power factor.
Susceptibility to spurious radiation	In accordance with the requirements of RTCA paper 120-61/DO-108.
Bearing output	Will drive 1, 2, or 3 indicators in accordance with the requirements of ARINC Characteristic 530, Airborne ADF Systems.
Audio output	Not less than 100 mw into a 600-ohm load with input of 1000 uv/m modulated 30 percent at 400 Hz.

Equipment Specifications (Sheet 3 of 3)  
Figure 3

TRANSISTOR TYPE	QUANTITY	DIODE TYPE	QUANTITY
51Y-4, MCN 1 through 1687; 51Y-4A, MCN 1 through 1083			
2N1285	12	1N270	10
2N525	6		
2N1131	1		



TRANSISTOR TYPE	QUANTITY	DIODE TYPE	QUANTITY
2N2405	5	41N17Z5	1
2N2270	1		
2N1711	4	1N1775A	1
2N174	2	1N1116	1
51Y-4, MCN 1688 and above; 51Y-4A, MCN 1084 and above			
2N3638A	17	1N270	10
2N2905	1		
2N1131	1		
2N2405	5	.41N17Z5	1
2N2270	1		
2N1711	4	1N1775A	1
2N174	2	1N1116	1
51Y-4A Collins part number 522-2857-013			
2N3638A	18	1N270	10
2N2905	1	41N17Z5	1
2N1131	1	1N1775A	1
2N2405	5	1N1116	1
2N2270	1		
2N1711	5		
2N274	2		

Semiconductor Complement (Sheet 2 of 2)  
Figure 4



#### 4. EQUIPMENT DESCRIPTION.

##### A. Mechanical.

The 51Y-4/4A ADF Receiver is housed in a 1/4 ATR short case and weights 9.8 pounds maximum. The internal parts of the 51Y-4/4A are protected by a removable dust cover. Five surfaces of the chassis are exposed when the dust cover is removed. Access to the sixth surface of the chassis (located behind the front panel) can be gained from either side of the receiver unit. The chassis of the 51Y-4/4A ADF Receiver is a partially closed aluminum framework which is fastened directly to the front panel of the receiver unit. A gearcase physically divides the chassis into two sections and electrically isolates the rf circuits (located in the front section) from the servo system and power supply (located in the rear section).

The rear section of the chassis is hinged and may be folded back for access to components on the rear chassis. The front section of the chassis supports several sub-chassis in addition to a ganged variable tuning capacitor. Each subchassis is secured by screws and can be removed for repair.

Wiring in the 51Y-4/4A is point to point. Capacitors and resistors are mounted on Teflon supports. To facilitate maintenance, low-power transistors that do not require heat sinks are retained in sockets.

##### B. Electrical.

The 51Y-4 and 51Y-4A ADF Receivers are similar with the exception of the capacitance required at the sense antenna input. The 51Y-4 ADF Receiver requires approximately 3000 pf of capacitance at the sense antenna input. The 51Y-4A ADF Receiver requires either a 270-pf sense capacitance when the sense antenna is connected to pin A of the sense antenna connector, or a 150-pf sense capacitance when the sense antenna is connected to pin F of the sense antenna connector. The combined capacitance of the sense antenna and the cable capacitance (and the sense antenna coupler when used) must be matched with the capacitance of the 51Y-4/4A ADF Receiver.

The 51Y-4A ADF Receiver (Collins part number 522-2857-013) is equipped with a self-test circuit that can be activated by the CW-VOICE-TEST switch on the 614L-8 ADF Control Unit (Collins part number 522-2357-024).

The 51Y-4/4A ADF Receiver is a single-conversion superheterodyne low-frequency and broadcast-band receiver. The 51Y-4/4A circuits include two rf amplifiers, a 5-stage if. amplifier, a 3-stage audio amplifier, and a 2-stage agc amplifier.

The 51Y-4/4A is tunable from 190 to 1750 kHz in three bands. An electrically controlled multisection combined band/mode switch selects the tank and rf transformer circuits for each band and makes the proper connections for each mode of operation. A multisection air-dielectric variable capacitor controlled by a servo motor tunes the 51Y-4/4A in each band. The 51Y-4/4A has two antenna inputs; a loop antenna input and a sense antenna input. During ANT mode of operation, the loop antenna input circuitry is disabled, and the 51Y-4/4A operates as a conventional low-frequency and broadcast-band radio receiver. During LOOP mode of operation, the sense antenna input is terminated with a fixed capacitor, and the only rf input is through a resolver





from the 137A-( ) Fixed Loop Antenna. The resolver rotor is driven by a servo motor which is controlled electrically from the 614L-8 ADF Control Unit. During ADF mode of operation, a phase comparison of signals from the resolver rotor and the sense antenna determines whether the resolver rotor is to the left or right of the null position. The position of the resolver rotor during ADF mode operation corresponds to the relative bearing of the station. A synchro transmitter geared to the resolver rotor in the 51Y-4/4A supplies as many as three bearing indicators in the aircraft with bearing information.

A regulated power supply, temperature-compensating thermistors, and hermetically sealed if. transformers ensure frequency stability, and reduce the effects of ambient environmental conditions on the performance of the 51Y-4/4A. ADF performance is improved by the use of a synchronous filter circuit which rejects undesirable modulation components. In addition, critical voltages are regulated to compensate for line-voltage variations between 20 and 32 volts. All circuitry is protected against damage resulting from voltage transients between -40 and +80 volts. The 51Y-4/4A is made insensitive to large variations of input signal levels by a 2-storage agc amplifier which controls the gain of the rf amplifier and the first and second if. amplifiers.

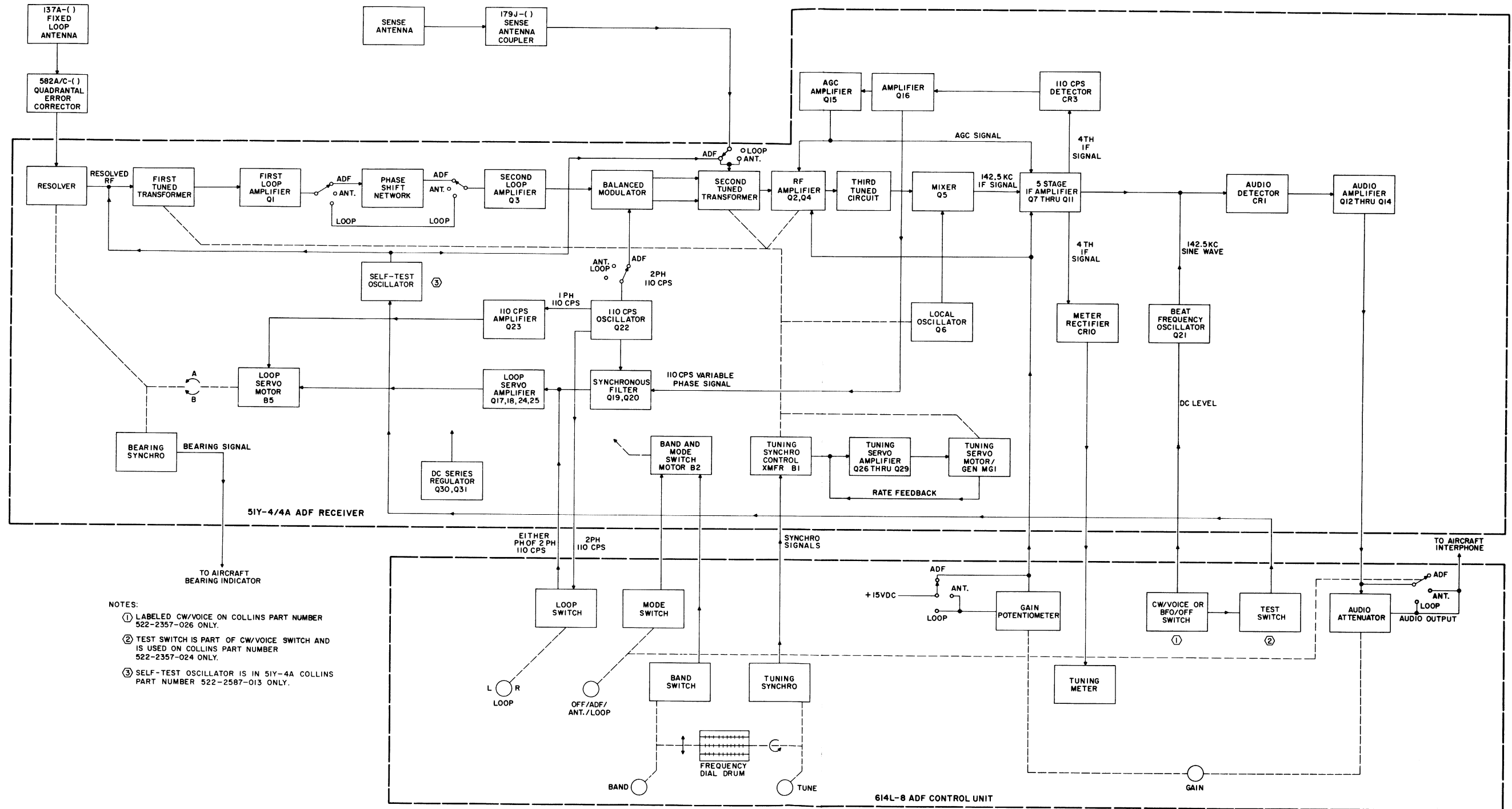
## 5. THEORY OF OPERATION.

### A. General.

The following paragraphs describe the circuit theory of operation for the 51Y-4/4A. The 51Y-4/4A is the principal component of the DF-203 ADF System. Block diagram theory of the DF-203 ADF System is given in paragraph 5.B with a complete system block diagram shown in figure 5. Paragraph 5.B describes the operation of each section of the 51Y-4/4A in all modes. Functional theory is given in paragraph 5.C. The functional theory is subdivided into three separate discussions, each covering one of the three modes of operation. A complete description of each circuit of the 51Y-4/4A is given in paragraph 5.D, the detailed theory of operation.

### B. Block Diagram Theory.

The rf signal is coupled from the directional 137A-( ) Fixed Loop Antenna through the 582A/C-( ) Quadrantal Error Corrector to the rf resolver in the 51Y-4/4A (refer to figure 5). The angular position of the resolver rotor determines the amplitude and phase of the loop rf signal reaching the first tuned transformer. The first tuned transformer is selected by the band/mode switch motor from three transformers that cover the three frequency bands of the 51Y-4/4A. One transformer covers the range from 190 to 400 kHz. A second covers the range from 400 to 840 kHz. The third covers frequencies from 840 to 1750 kHz. The loop rf signal is amplified in the first loop amplifier Q1. A 90-degree phase shift is applied to the output of the first loop amplifier in ADF mode so the loop antenna and sense antenna rf signals are exactly in phase or 180 degrees out of phase. In LOOP mode, the phase-shift network is bypassed to avoid attenuation since the phase of the loop signal has no effect on operation in LOOP mode. The loop signal is disconnected from the remaining circuits at the switch preceding the phase-shift network in ANT mode since only the sense antenna signal is used in ANT mode. The loop signal is then amplified in the second loop amplifier in ADF and LOOP modes. In the ADF mode, the loop signal is modulated at a 110-Hz rate in the balanced modulator. The balanced modulator output is a double-sideband suppressed-carrier signal (two 110-Hz sidebands). The 110-Hz gating



- NOTES:
- ① LABELED CW/VOICE ON COLLINS PART NUMBER 522-2357-026 ONLY.
  - ② TEST SWITCH IS PART OF CW/VOICE SWITCH AND IS USED ON COLLINS PART NUMBER 522-2357-024 ONLY.
  - ③ SELF-TEST OSCILLATOR IS IN 51Y-4A COLLINS PART NUMBER 522-2587-013 ONLY.

51Y-4/4A ADF Receiver (with Associated  
Equipment), Detailed Block Diagram  
Figure 5



voltage applied to the balanced modulator is provided by the 110-Hz oscillator. The loop signal bypasses the balanced modulator in LOOP mode and is applied directly to the second tuned transformer.

The sense signal originating in the sense antenna is transferred through the 179J-( ) Sense Antenna Coupler (51Y-4 only) to the second tuned transformer in ADF and ANT modes. The sense signal is not used in LOOP mode. The loop and sense signals are mixed in the second tuned transformer in ADF mode. The combined sense antenna carrier signal and double-sideband suppressed carrier loop signal forms an amplitude-modulated signal which has a modulation frequency of 110 Hz, with depth of modulation determined by the angular difference between the resolver rotor position and its null position, and with the phase of the modulation envelope determined by the direction from the null position of the resolver rotor. The sense signal is the only signal reaching the second tuned transformer in the ANT mode.

The combined sense and loop antenna signal is amplified in the rf amplifier and applied through double-tuned circuits to the mixer where the signal is mixed with the output of a CW local oscillator. The local oscillator frequency is always 142.5 kHz higher than the signal from the rf amplifier so the mixer output is always 142.5 kHz. This is the intermediate frequency. The five if. amplifier stages amplify this signal and the audio sidebands but reject all other frequencies: The fifth if. stage drives an audio detector. The audio signal is amplified in an audio amplifier which is connected to the 614L-8 ADF Control Unit.

In ADF mode, the DF-203 audio output level is controlled by an audio attenuator in the 614L-8. The audio attenuator is bypassed in ANT and LOOP modes since 51Y-4/4A gain is controlled at the rf and if. stages by a dc bias voltage from the gain potentiometer in the 614L-8. In ADF mode, the 614L-8 gain potentiometer does not affect rf and if. gain.

The output of the fourth if. amplifier stage is demodulated with a diode detector and applied to the input of the agc amplifier and loop servo amplifier.

The dc component of the demodulated signal is amplified in the 2-stage agc amplifier to provide the agc voltage which is applied to the bases of the agc-controlled stages.

Rf and if. gain is varied by the agc amplifier in all modes. As the rf signal at the antenna increases, the increase in if. input to the agc amplifier reduces gain of the rf and if. stages. This prevents rapid changes in audio output and eliminates the possibility of distortion from overloading.

The 110-Hz ac signal from the detector is amplified in the loop servo amplifier, shifted in phase, and applied to the control winding of the loop servo motor. A synchronous filter in the low-level loop servo amplifier provides a very narrow passband. The center frequency of the passband is automatically synchronized with the 110-Hz oscillator frequency. Audio signals other than 110 Hz are rejected to improve ADF performance. In ANT and LOOP mode, the 110-Hz detector signal is disconnected from the loop servo motor. The second winding is energized by an amplified 110-Hz reference signal from the 110-Hz oscillator. The loop servo motor is geared to the resolver rotor. This motor can rotate in either direction and always drives a null in the figure-eight rotor pattern toward the signal source. Positioning of the rotor null toward the signal direction is accomplished automatically in ADF mode only. In LOOP



mode, the loop servo motor and the rotor position are controlled manually from the LOOP L-R switch in the 614L-8. The rotor position is transferred to an external indicator by the bearing synchro system.

The beat-frequency oscillator (bfo) injects a 142.5-kHz signal into the if. signal path. This signal creates an audio beat frequency when mixed with the 142.5-kHz if. that is adjusted for a zero beat to attain proper tuning. The bfo may be switched on or off by the CW/VOICE/(TEST) or the BFO/OFF switch on the 614L-8.

The fourth if. amplifier signal is also applied to the meter rectifier which causes the tuning meter to defect in proportion to the if. signal strength.

The band and mode switches in the 614L-8 control the position of the band/mode switch of the 51Y-4/4A through the band/mode-switch motor. The band switch selects the proper rf transformers for each of the three bands into which the tuning range is divided. The mode switch interconnects and energizes the various circuits properly for each mode of operation. The band/mode-switch motor rotates only one switch which has many wafers, and provides both mode-switching and band-switching functions.

The 51Y-4/4A tuning capacitor is positioned from the 614L-8 by a tuning synchro system. The tuning synchro transmitter is connected mechanically to the tuning knob and dial of the 614L-8. The synchro signal is transferred to the tuning synchro control transformer in the 51Y-4/4A. The control transformer output, with amplitude and phase dependent upon rotor position, is amplified and applied to the variable phase winding of the tuning servomotor. This motor is geared to the control transformer rotor which is driven to a null position by the motor. The motor also is geared to the tuning capacitor which is then driven with the control transformer rotor to the position selected in the 614L-8.

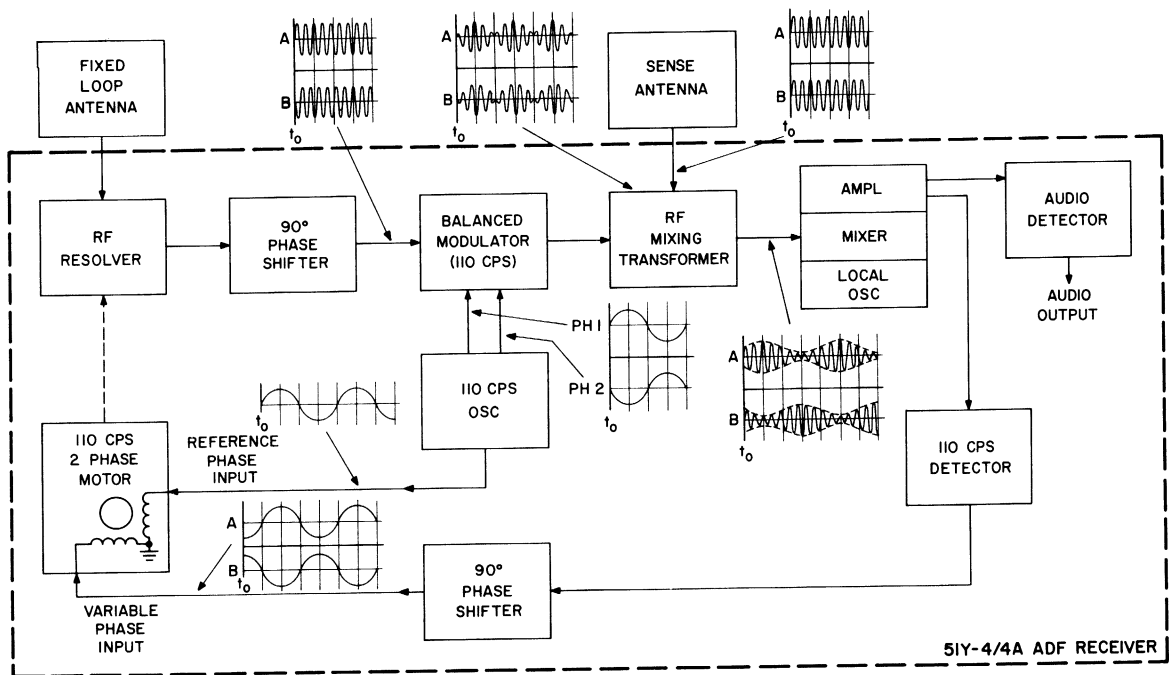
The 51Y-4A (Collins part number 522-2587-013) contains a crystal controlled self-test oscillator. This oscillator provides a 100-kHz signal that is used to simulate the signals from the fixed loop and sense antennas. The CW-VOICE-TEST switch on the 614L-8 activates the self-test oscillator and turns on the BFO. The receiver can then be tuned to a harmonic of the self-test oscillator for a performance check.

The dc supply voltage for the 51Y-4/4A transistors is provided by a voltage regulator. The voltage regulator receives power from the +27.5-volt dc aircraft primary power source, and provides regulated +16-volt dc and +15-volt dc outputs.

### C. Functional Theory.

#### (1) ADF Mode.

The 51Y-4/4A receives a signal from both the 137A-( ) Fixed Loop Antenna and from the sense antenna in the ADF mode (refer to figure 6). The rf signal received at the 137A-( ) Fixed Loop Antenna is generated with the same relative direction and magnitude by the stator coils within the rf resolver of the 51Y-4/4A (refer to figure 7). The receiving pattern of a loop coil is a figure-eight. Maximum voltage is induced into the loop coil when the signal source is perpendicular to the coil axis. Minimum voltage is induced when the signal source is on the

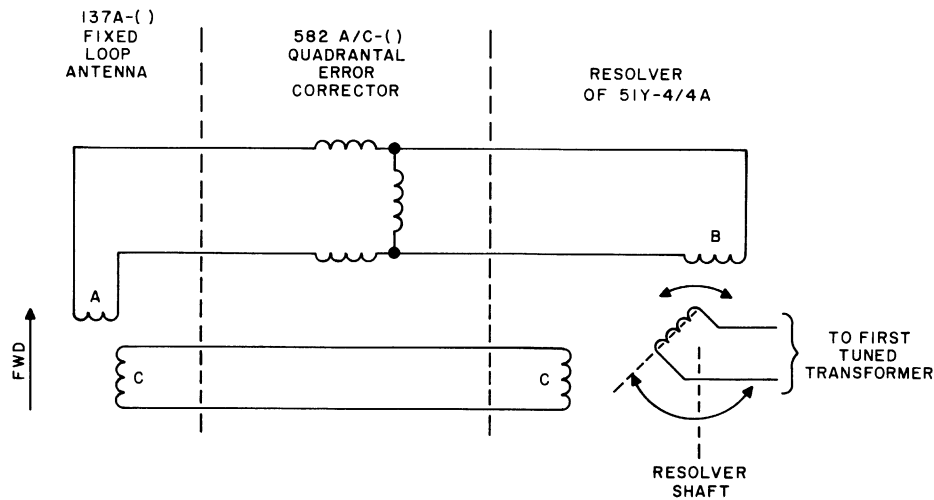


NOTE:  
WAVEFORM "A" PRESENT WHEN TRUE RESOLVER ROTOR NULL IS AT ANGLES OF 0° TO 180° FROM RF RESULTANT; WAVEFORM "B" PRESENT AT ANGLES OF 180° TO 360°.

ADF Mode, Functional Block Diagram  
Figure 6

coil axis (null points). There is a 180-degree phase difference between voltage induced into opposite lobes of the figure-eight pattern. Thus, as a null point is crossed, the phase of the rf output shifts 180 degrees. A signal source directly off either wing of the aircraft will induce maximum voltage into coil C of the 137A-( ) Fixed Loop Antenna and minimum voltage into coil A (refer to figure 7). Maximum voltage will then be generated by a stator coil C in the resolver. Since a coil has a figure-eight pattern, maximum voltage will be generated on a line perpendicular to the coil axis. The resultant signal in the resolver will have the same relative direction as the original signal source. When the signal source is directly in front of the aircraft, maximum signal will be induced into coil A of the 137A-( ) and transferred to stator coil B of the resolver. The resultant signal at the resolver rotor will have a relative direction of 0 degree as did the original signal source. If the signal source is at a bearing of 45 degrees from the aircraft fore-aft axis, equal voltage will be induced into loop antenna coils A and C and be transferred to stator coils B and C. The result will be a composite of the signals from stator coils B and C and will have an apparent relative source direction of 45 degrees. Therefore, for any direction, the 137A-( ) coils and the resolver stator coils generate a signal within the resolver that has the same relative direction as the original signal source at the 137A-( ).

The 582A/C-( ) Quadrantal Error Corrector is inserted into the wires connecting one pair of coils for the 137A-( ) to the 51Y-4/4A resolver stator. This attenuates



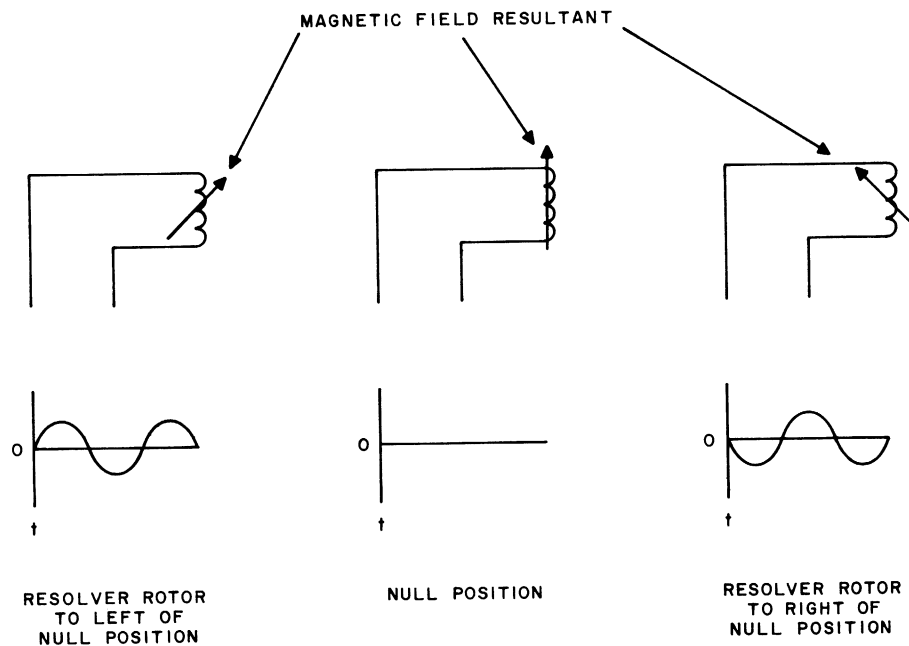
POSITION OF STATION	SIGNAL AT A	SIGNAL AT B	SIGNAL AT C	POSITION OF RESULTANT IN RESOLVER
• ⊕	—	—	~	←
• ⊕	~	~	—	↑
⊕ •	~	~	~	↗
⊕ •	—	—	~	→

Operation of 137A-( ) Fixed Loop Antenna with Resolver  
Figure 7

the signal from one pair of coils, thus correcting the error introduced by the bending of the incoming signals toward a path parallel to the fore-aft aircraft axis.

The 51Y-4/4A resolver functions as a miniature rotating loop in receiving the resultant rf signal (refer to figure 8). The receiving pattern of the rotor is a figure-eight, and the phase of the rf output shifts 180 degrees as the null points are crossed.

After amplification and phase shifting, the loop signal from the resolver rotor is balance modulated by the voltage from the 110-Hz oscillator as shown in figure 6 (refer to figure 9). The loop rf carrier signal is applied to one end of a grounded center-tap transformer primary during half of the cycle of the 110-Hz modulating signal and to the opposite end of the transformer primary during the second half of the cycle. The carrier signal in each side of the grounded center-tap transformer primary is equal in magnitude but 180 degrees out of phase and will cancel



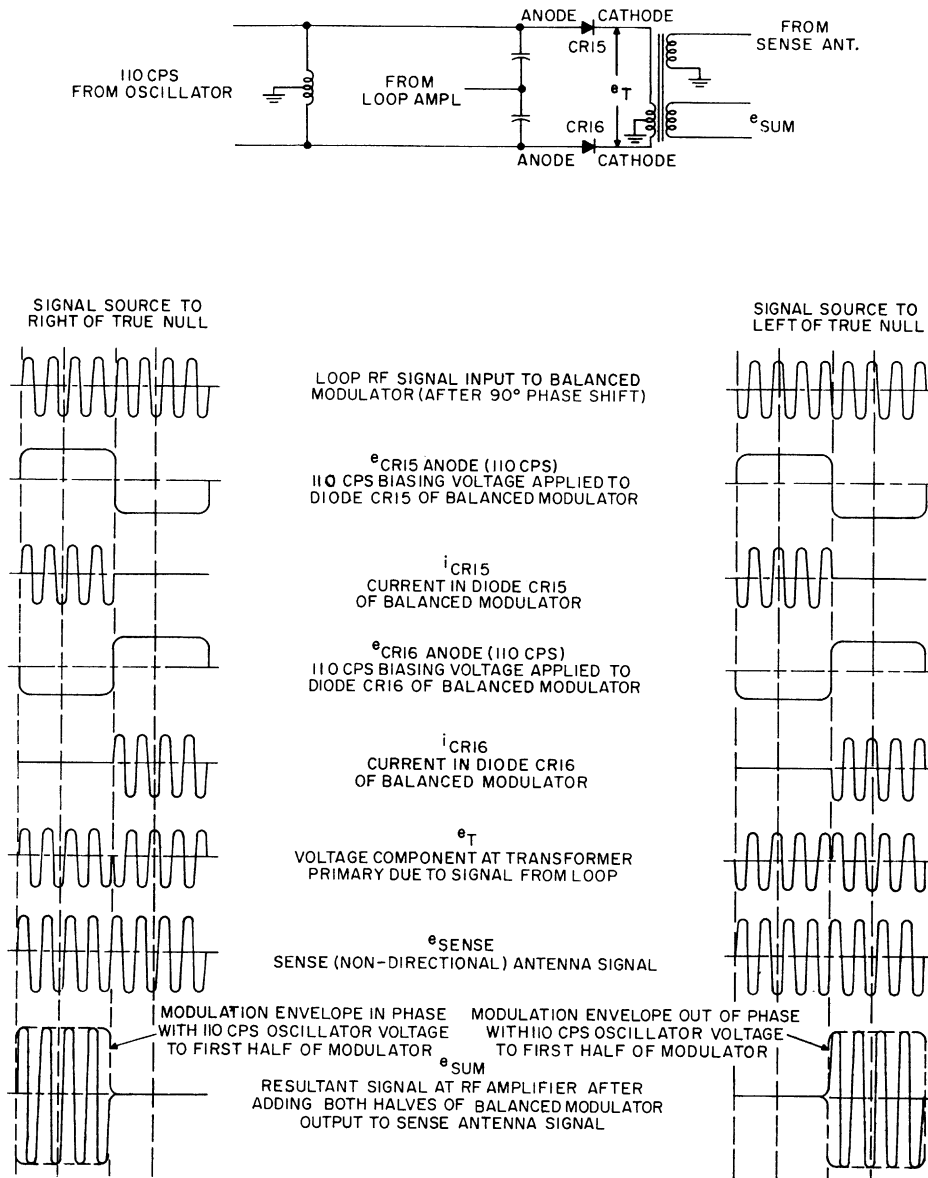
Resolver Output  
Figure 8

giving a double-sideband suppressed-carrier signal. The sense antenna signal is induced into the transformer secondary through a third winding. Since the non-directional sense signal does not shift phase, the sense and loop signals add during half of the modulating cycle, then subtract during the other half-cycle. The output from the transformer secondary thus has a 100-Hz modulated envelope.

If the aircraft changes position so that the resultant rf within the resolver reaches the rotor on the opposite side of the resolver axis, the loop rf signal shifts phase 180 degrees. When half of the 110-Hz modulating cycle during which the loop and sense rf voltages add and the half in which they subtract are interchanged, the resulting 110-Hz modulation envelope then shifts phase 180 degrees.

The 2-phase loop servomotor must be excited by two 110-Hz voltages that are 90 degrees out of phase. One winding is excited by an amplified reference voltage from the 110-Hz oscillator. The second winding is driven by the detected and amplified signal from the 110-Hz modulation envelope from the balanced modulator. The signal from the 110-Hz detector is phase shifted 90 degrees in the loop servo amplifier so that the variable-phase detected voltage in the control winding either leads or lags the reference voltage by 90 degrees depending on the phase of the loop rf. The loop servo motor then serves as a phase detector, rotating in one direction when the variable phase leads the reference phase and rotating in the opposite direction when the variable phase lags the reference phase.

The loop servo motor is geared to the resolver rotor. As the motor rotates, the resolver is driven toward one of the two nulls. As the rotor approaches the null,



Operation of Balanced Modulator  
Figure 9

the loop rf voltage and therefore, the percentage modulation from the balanced modulator is reduced. The variable phase voltage from the 110-Hz detector is reduced and the motor slows down. When the null is reached, the loop rf voltage from the resolver drops to zero, and the 110-Hz modulation envelope cannot develop in the balanced modulator and transformer. When no modulation can be detected by the 110-Hz detector, no voltage is present in the control winding of the motor. The motor and resolver rotor do not rotate until the direction of the resultant rf in the resolver changes. If the rotor revolves past the null, the loop rf





voltage and the phase of the resulting 110-Hz variable-phase voltage shifts 180 degrees. The loop servo motor then changes direction and drives the rotor back toward the null. The rotor is always driven toward the correct null and away from the other since direction of rotation changes as either null is crossed. The position of the resolver rotor is transferred to a panel-mounted indicator by a transmitting synchro in the 51Y-4/4A and a receiving synchro in the ADF bearing indicator.

(2) LOOP Mode.

The 51Y-4/4A receives signals only from the loop antenna in LOOP mode (refer to figure 10). The sense antenna is then disconnected from the circuit. The loop signal from the resolver rotor bypasses the balanced modulator since 110-Hz modulation is not desired. The rf, mixer, if., and audio stages function as a standard low-frequency receiver.

The reference winding of the loop motor is energized by the amplified output from the 110-Hz oscillator. The same 110-Hz signal is applied to one position of a normally open switch (LOOP L-R switch) in the 614L-8 ADF Control Unit. Another position of the switch receives a 110-Hz signal of the same amplitude but of a phase spring 180 degrees from the other. The switch rotor is connected to the control winding of the motor after a 90-degree phase shift (and amplification). The control winding of the loop motor is energized by rotating the spring-loaded switch either to the left or right. A signal is then applied to the control winding of the motor which either leads or lags the reference winding voltage 90 degrees, depending on the switch position connected. The motor and the resolver rotor, to which the motor is connected, rotate clockwise or counterclockwise, according to the switch position.

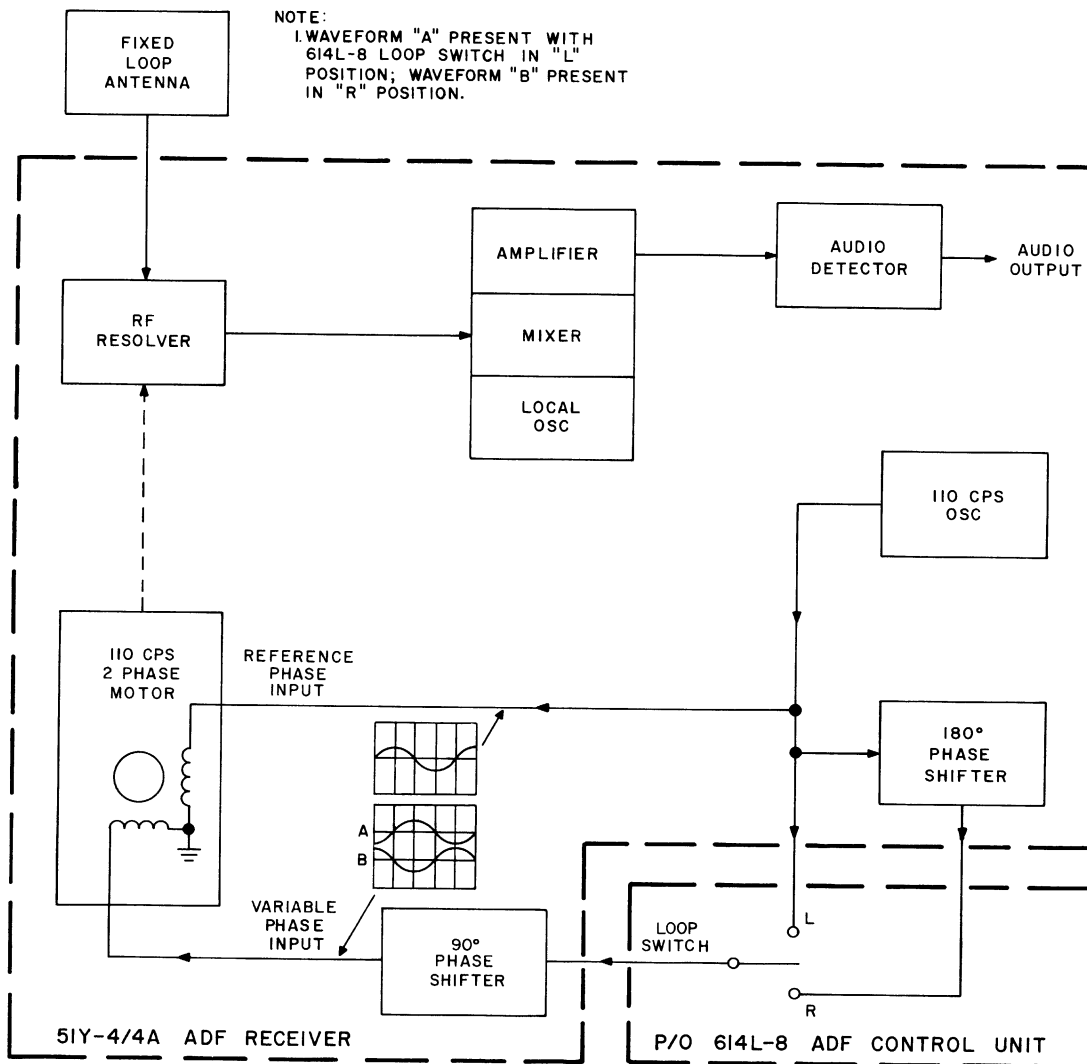
The operator can determine the direction to the station by either listening for a reduction in the aural output or by watching the tuning meter. This reduction indicates that the null in the loop receiving pattern has been rotated to the direction of the station. There are two nulls spaced 180 degrees apart in the loop pattern so 180-degree ambiguity of the station direction exists. At the null, the station is either in the direction indicated by the head of the ADF pointer or 180 degrees from this direction. The loop pattern can also be rotated by the LOOP L-R switch with 51Y-4/4A in the ADF mode.

(3) ANT Mode.

In ANT mode, the 51Y-4/4A accepts signals only from the sense antenna (refer to figure 11). The loop antenna is disconnected from the circuitry. The 51Y-4/4A operates as a low-frequency and broadcast-band receiver in ANT mode. Signals from all directions are received equally well. The 110-Hz oscillator and loop motor do not operate when the 51Y-4/4A is in ANT mode.

D. Detailed Theory of Operation.

The 51Y-4/4A schematics are shown in figures 813 and 814, and can be used as an overall reference to supplement the information provided in the following paragraphs.

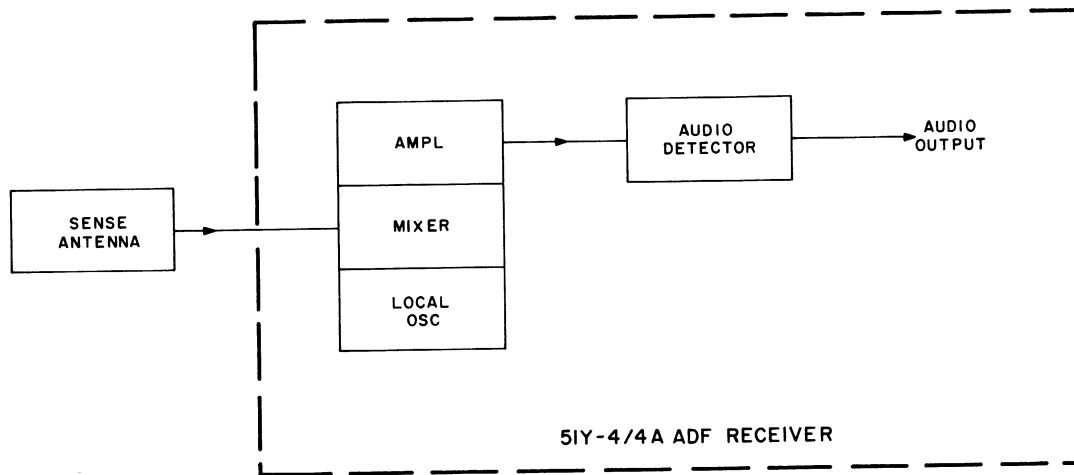


Loop Mode, Functional Block Diagram  
Figure 10

(1) Loop Input, First Loop Amplifier, Phase-Shift Network, Second Loop Amplifier, and Balanced Modulator.

(a) Loop Input and First Loop Amplifier.

The rf field within the resolver, which is generated by the resolver stators, induces a current into the resolver rotor. The output from the resolver rotor is applied to the grounded center-tap primary of transformer T1, T2, or T3. The transformer is selected by band/mode-switch wafer S1F. Transformer T1 is selected for band 1 frequencies (0.19 to 0.40 MHz), T2 for band 2 frequencies (0.40 to 0.84 MHz), and T3 for band 3 frequencies (0.84 to 1.75 MHz). The



Antenna Mode, Functional Block Diagram  
Figure 11

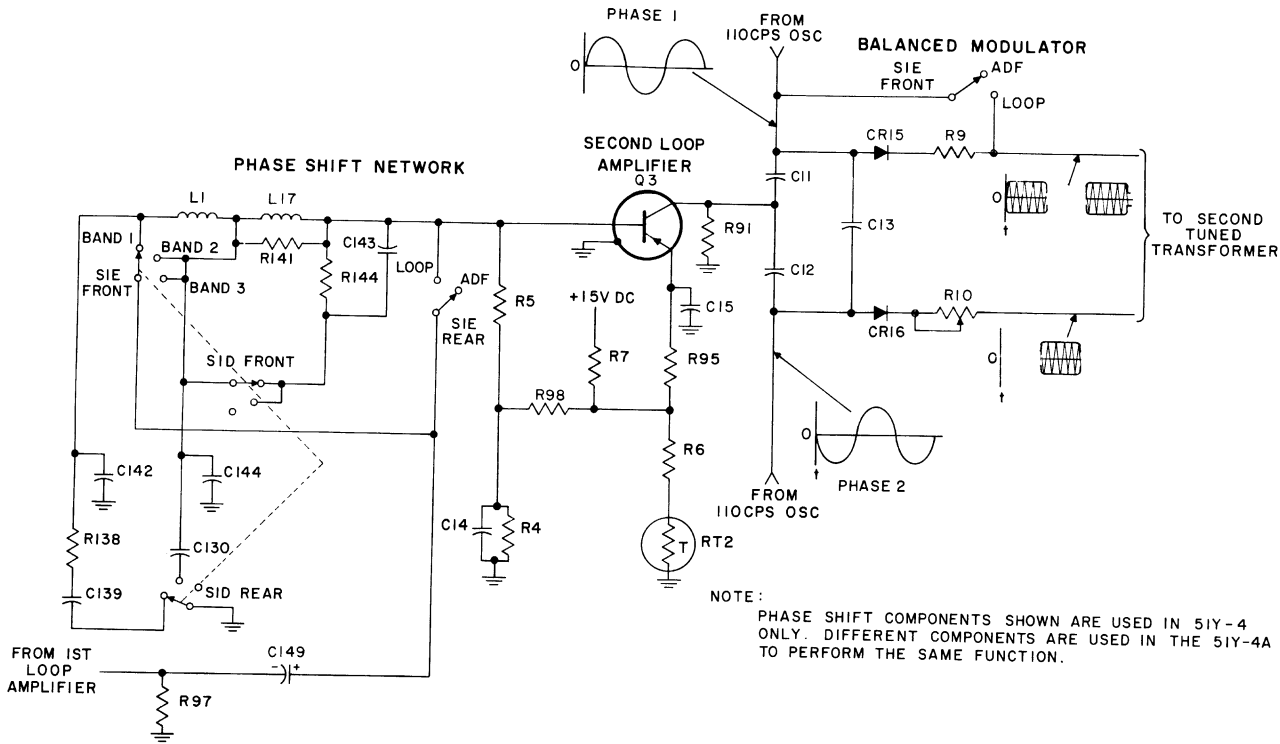
variable transformer secondary is tuned by the C1B section of tuning servo-controlled tuning capacitor C1. The tuning capacitor rotates through its entire area of travel for each band. Trimmer capacitors C2, C3, and C4 provide adjustment of the resonant frequency of each transformer secondary to assure proper tracking of each band. The unused secondaries are disabled by the front side of band/mode switch wafer S1G. The rear side of wafer S1G connects the transformer being used to first loop amplifier Q1. Resistors R1 and R2 provide base bias for Q1 through the input transformer secondary.

(b) Phase-Shift Network and Second Loop Amplifier.

A primary difference between the 51Y-4 and 51Y-4A is in the phase-shift network and second loop amplifier circuits. Because of these circuit differences, phase-shift network and second loop amplifier circuit theory are separated into two paragraphs.

1. 51Y-4 (refer to figure 12.)

After amplification in first loop amplifier Q1, loop rf voltage is developed across R97 and applied through C149 to a phase-shift network in ADF mode by switch wafer S1E front or to the base of second loop amplifier Q3 in LOOP mode by switch wafer S1E rear. In ANT mode, supply voltage is removed from loop amplifiers Q1 and Q3 so the loop signal is not passed. During LOOP mode of operation, the loop rf bypasses the phase-shift network through switch wafer S1E rear. The loop rf signal is amplified by second loop amplifier Q3. Base bias for Q3 is provided by resistors R4 and R98, and gain is temperature stabilized by thermistor RT2. The loop signal then bypasses diode CR15 through switch wafer S1E front to avoid attenuation. The loop rf signal energizes the primary of transformer T4, T5, or T6.

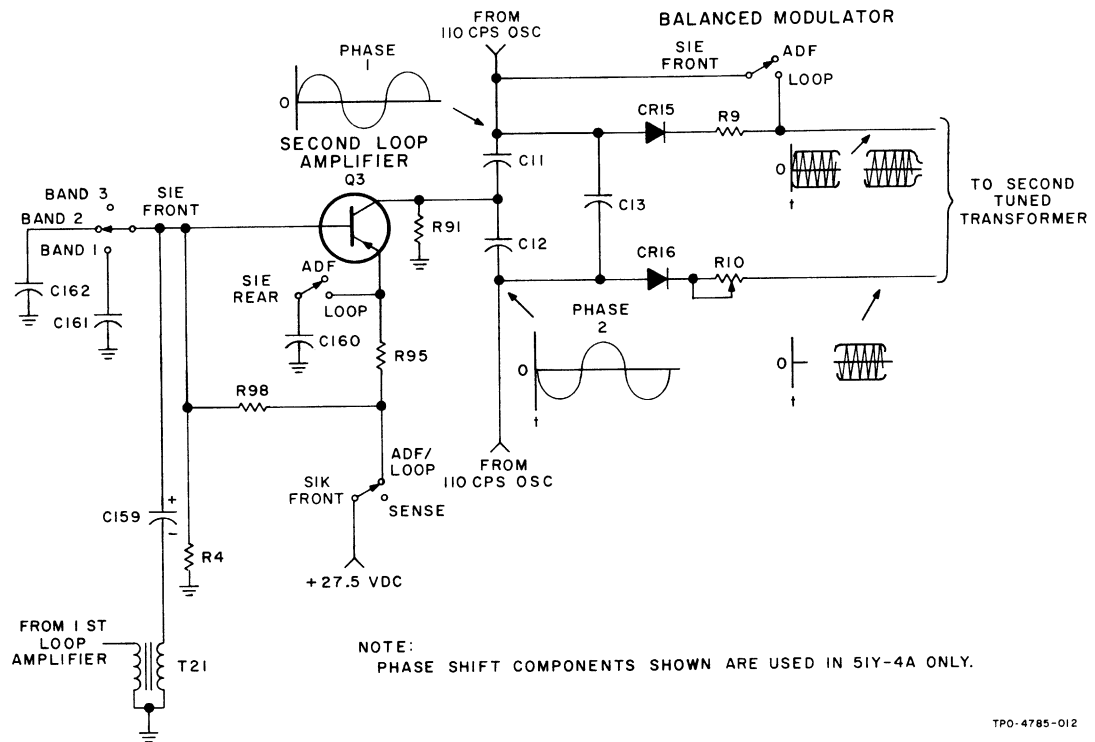


Phase Shift Network, Second Loop Amplifier and Balanced Modulator  
of 51Y-4, Simplified Schematic Diagram  
Figure 12

In ADF mode, the phase of the loop signal is lagged 90 degrees by a combination of inductors L1, L17, and other circuit impedances. The change of impedance is necessary to provide the 90-degree phase shift at the frequencies of each of the three bands. The loop signal is then, either in phase or 180 degrees out of phase with the sense antenna rf signal. Capacitor C14 provides an ac bypass for resistor R4 to prevent feedback through the power supply line.

2. 51Y-4A. (Refer to figure 12A.)

After amplification in first loop amplifier Q1, loop rf voltage is developed across transformer T21 and applied through C159 to the base of second loop amplifier Q3. The combined phase shift of T21 and C159 is used to effect 90 degrees phase lag for ADF mode of operation. In ANT mode, supply voltage is removed from loop amplifiers Q1 and Q3 so the loop signal is not passed. During LOOP mode of operation, signal is phase shifted ahead by 90 degrees when S1E rear switches C160 in parallel with Q3 emitter circuit. The loop rf signal is amplified by second loop amplifier Q3. Base bias for Q3 is provided by resistors R4 and R98. The loop rf signal then bypasses CR15 and resistor R9 through switch wafer S1E front to avoid attenuation. The loop rf signal energizes the primary of transformer T104, T105, or T106 depending upon which band is selected.



Phase Shift Network, Second Loop Amplifier, and Balanced Modulator  
of 51Y-4A, Simplified Schematic Diagram  
Figure 12A

In ADF mode, the phase of the loop signal is lagged 90 degrees by the combined phase shifts of T21, C159, and C161 or C162. The change of impedance provided by SIE front switching is necessary to provide the 90-degree phase shift at the frequencies of each of the three bands. The loop signal is then either in phase with or 180 degrees out of phase with the sense antenna signal.

(c) Balanced Modulator.

The signal is amplified in loop amplifier Q3 and applied to the anodes of CR15 and CR16. Signals from the 110-Hz oscillator are also applied to the anodes of CR15 and CR16 through switch wafer S1D. The phase of the 110-Hz voltage at the anode of CR15 is 180 degrees out of phase with the 110-Hz voltage at the anode of CR16. The cathodes of CR15 and CR16 are connected to opposite ends of the grounded center-tap primary of transformer T4, T5, or T6 (T104, T105, or T106 in the 51Y-4A). Diode CR15 is forward biased during the positive half-cycle of the applied 110-Hz signal and reverse biased during the second half. Diode CR16 is also forward biased during one-half of each cycle and reverse biased during the other half. Since the 110-Hz voltage at the diode anodes is 180 degrees out of phase, CR15 conducts during the half-cycle that CR16 is cut off and CR16 conducts during the half-cycle that



CR15 is cut off. Because of this 110-Hz switching action, the loop rf carrier signal is applied to the top end of the transformer primary during half the 110-Hz cycle and to the bottom end during the other half. The carrier signal in the top end of the primary is equal in magnitude to the signal in the lower half of the transformer and is 180 degrees out of phase with the signal in the lower end of the primary. Therefore, the carrier will cancel, and the signal on the secondary will be a double-sideband suppressed-carrier signal. The sense signal is applied to a third winding in transformer T4, T5, or T6 (T104, T105, or T106 in 51Y-4A). In ADF mode, the loop and sense rf signals combine to form an amplitude-modulated signal with a modulation frequency of 110 Hz. Depth of modulation is determined by the angular difference between resolver rotor position and its null, and by the phase of the modulation envelope determined by the direction from null of the resolver rotor.

(2) Sense Input.

Another significant difference between the 51Y-4 and 51Y-4A is in the sense input circuit. Because of these circuit differences, sense input circuit theory is separated into two paragraphs.

(a) 51Y-4.

In LOOP mode, the sense antenna is disconnected from the transformer winding and grounded by switch wafer S1A front. (Refer to the schematic diagram, figure 812.) An impedance equal to the sense system impedance is connected in place of the sense antenna to prevent detuning of the secondary resonant circuit. During ANT mode or ADF mode of operation, the sense antenna is connected to the sense winding of the transformer through switch wafers S1A rear and S1C rear. The sense winding of T4, T5, or T6 is tuned by section A of tuning servo-controlled tuning capacitor C1. The sense windings of the transformers which are not in use are grounded by switch wafer S1C front.

(b) 51Y-4A.

The sense antenna can be connected either to pin A or pin F of the 51Y-4A sense antenna connector depending on the capacitance of the sense antenna and cable. (Refer to the schematic diagram, figure 813.) A sense antenna and cable of 270 pf capacitance is connected to pin A which is switched to a tap on the sense winding of transformer T104, T105, or T106 in ANT or ADF mode. Pin A is switched to the sense winding of the proper transformer through switch wafers S1R rear and S1C rear. A sense antenna and cable of 150-pf capacitance is connected to pin F which is switched to a second, higher impedance tap on transformer T104, T105, and T106 in ANT or ADF mode. Pin F is switched to the sense winding of the proper transformer through switch wafers S1R front and S1O rear. The sense winding of T104, T105, or T106 is tuned by section A of tuning capacitor C1. The sense windings of the transformers which are not in use are grounded by switch wafer S1C front. In LOOP mode, the sense antenna is disconnected from the transformer winding and grounded by switch wafer S1N front. A 270-pf capacitor is then connected to the sense winding in place of the sense antenna and cable by switch wafer S1R rear to prevent detuning of the tuned sense input circuit.



(3) RF Amplifier.

The balanced push-pull output winding of transformer T4, T5, or T6, (T104, T105, or T106 in the 51Y-4A) is connected to push-pull rf amplifier Q2 and Q4 through switch wafers S1C rear and S1N (S1N rear in 51Y-4A). A dc voltage from the rf gain potentiometer in the 614L-8 controls the base emitter bias (and gain) of Q2 and Q4 in ANT and LOOP modes by controlling the dc voltage on the emitters. In ADF mode, bias is fixed and rf gain cannot be varied. Gain of the 51Y-4 is then controlled at the audio stage. A dc voltage from the agc amplifier also affects the bias through the emitter voltage. Potentiometer R136 allows balancing of current flow through the two transistors.

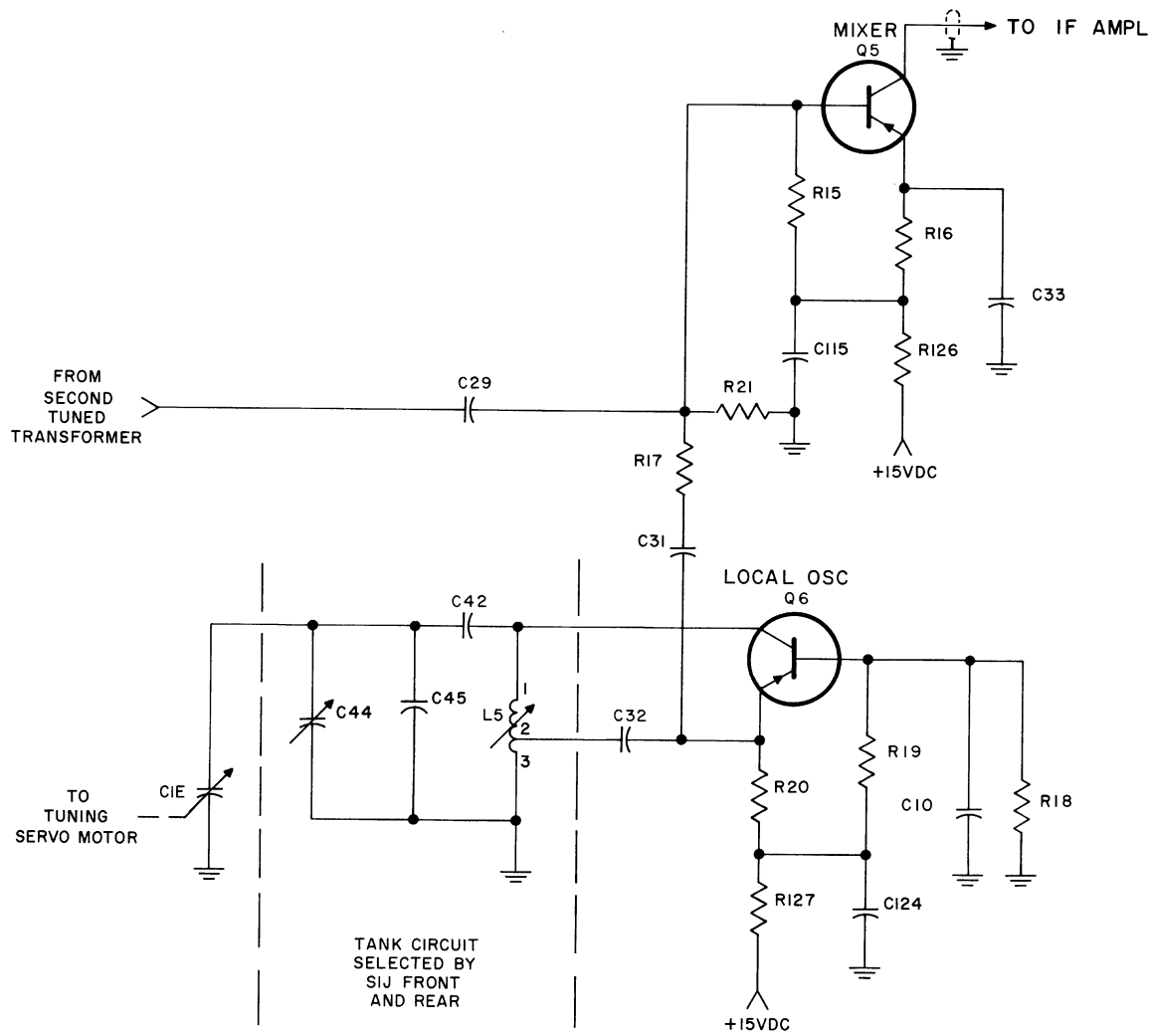
The push-pull output of the rf amplifier is developed across the grounded center-tap primary of transformer T7, T8, or T9 (T107, T108, or T109 in the 51Y-4A). Switch wafer S1P rear applies the push-pull output to the primary of the transformer in use and also connects section D of tuning capacitor C1 to the proper transformer secondary. Switch wafer S1P front grounds the two transformer secondaries which are not in use. The variable inductance secondary of transformer T7, T8, or T9 (T107, T108, or T109 in 51Y-4A) is tuned by tuning capacitor C1D. A portion of the voltage of the secondaries of T7, T8, or T9 (T107, T108, or T109) is developed across C152, L8 or C96 respectively. This voltage also is developed across the resonant primary circuit of transformer T10, T11, or T12. The variable inductance primaries of transformers T10, T11, and T12 are tuned by section C of tuning capacitor C1 which is connected to the transformer in use through switch wafer S1I front. The unused primaries of T10, T11, and T12 are grounded by switch wafer S1I rear. The two sets of transformers provide high selectivity for improved rejection of spurious responses. The output from the secondary of T10, T11, or T12 is applied to the base of mixer Q5 through switch wafer S1I front and capacitor C29.

(4) Local Oscillator.

The signal from the local oscillator also is coupled to the base of the mixer (refer to figure 13). The local oscillator frequency is determined by section E tuning capacitor C1. The local oscillator frequency is always 142.5 kHz higher than the frequency of the carrier being received. The resonant collector circuit, which changes for each band, is selected by switch wafer S1J front. Each tuned circuit has a variable trimmer capacitor for separate frequency adjustment on each band. Feedback is applied from the collector through the resonant circuit to the emitter. Since the base is at ac ground, changing the emitter voltage changes the base-emitter bias. This feedback to the emitter is of the proper phase to have the same effect as positive feedback to the base. Oscillation occurs at the resonant frequency of the tuned circuit. The oscillator voltage is applied from the emitter through coupling capacitor C31 and isolation resistor R17 to the base of mixer Q5.

(5) Mixer/IF. Amplifiers.

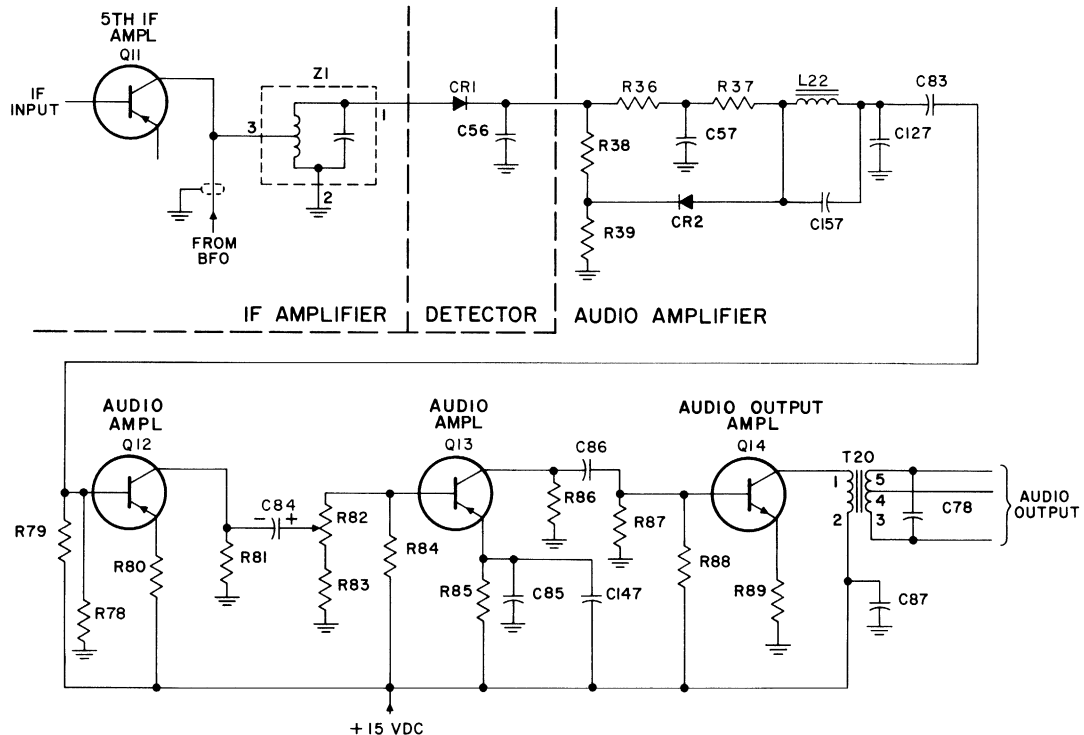
The collector of Q5 is tapped to a coil which is part of a resonant circuit in T13. The tap is at the proper point on the coil to provide the correct load impedance for Q5. The signal developed in the first resonant circuit of T13 is inductance and capacitance coupled to the second resonant circuit. The coil of the second resonant circuit is tapped to provide the correct output impedance. All if. transformers



Local Oscillator and Mixer, Simplified Schematic Diagram  
Figure 13



have a resonant frequency and bandwidth which passes the 142.5 kHz if. and sidebands. The signal is applied to the base of the 1st if. amplifier Q7 through potentiometer R90 which provides if. gain adjustment. The agc amplifier affects the base bias and thus the gain of Q7 through R24. The bias of Q7 also may be controlled by the GAIN control knob of the 614L-8 ADF Control Unit in LOOP and ANT modes. The if. is amplified in Q7 and applied to the first tuned circuit of T14. The signal is inductance and capacitance coupled to the second-tuned circuit of T14 where it is tapped to the base of the 2nd if. amplifier Q8. The base bias of Q8 is controlled by the agc amplifier in all modes and by the 614L-8 GAIN control in LOOP and ANT modes. The collector of Q8 is loaded by the inductance of the first-tuned circuit of T15. The signal is inductance and capacitance coupled to the second-tuned circuit of T15, then to the base of the 3rd if. amplifier Q9. The gain of Q9 is temperature stabilized by thermistor RT5. Amplified if. signal from Q9 passes the two-tuned circuits of T16 and is amplified by the 4th if. amplifier Q10. The output of Q10 is coupled through two-tuned circuits of T17. The signal from T17 is applied to the base of the 5th if. amplifier Q11, to the 110-Hz detector, and to the tuning meter rectifier. The if. amplifier, Q11, is loaded by the inductor of tuned circuit Z1 (refer to figure 14). The beat-frequency oscillator (BFO) output, when present, is mixed with the if. signal at the collector of Q11. The voltage across Z1 is detected and applied to the base of audio amplifier Q12.



Audio Detector and Audio Amplifier, Simplified Schematic Diagram  
Figure 14



(6) Detectors.

The output of the 4th if. stage is detected by diode CR3, and applied to the input of the agc amplifier and loop servo amplifier. Meter rectifier diode CR10, resistor R40, and capacitor C117 provide the 614L-8 tuning meter with a dc voltage which is proportional to the if. amplitude.

Audio amplifier detector diode CR1 allows positive half-cycles of the audio-modulated if. to pass (refer to figure 14). The if. is bypassed to ground by capacitor C56 and the audio derived from the if. modulating envelope passes limiter diode CR2. Since the negative half-cycles are eliminated by CR1, when audio peaks occur, the anode of CR2 becomes positive. The cathode of CR2 also becomes positive on audio peaks because of voltage divider R38 and R39 but not as positive as the anode. The voltage differential across CR2 increases as the audio voltage increases. Diode CR2 conducts more at audio peaks and therefore limits the audio. The detected and limited audio is applied to the base of the audio amplifier Q12.

(7) Audio Amplifier

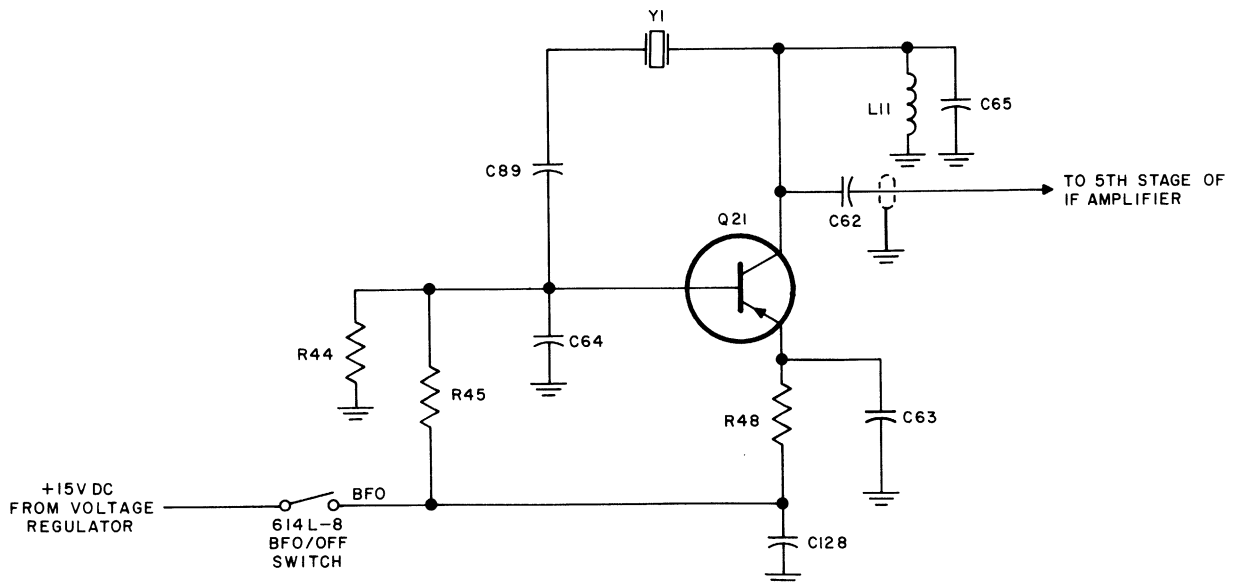
The audio from the audio detector is applied to the base of audio amplifier Q12 through C83 (refer to figure 14). Base-to-emitter bias of Q12 is provided by resistors R78 and R79. The amplified output from Q12 is applied to the base of audio amplifier Q13 through audio output adjustment potentiometer R82. The audio is amplified in Q13, and is applied to the base of the audio output amplifier Q14. The primary of audio transformer T20 is the collector load for Q14. The center-tapped transformer secondary provides the audio signal at an impedance of 600 ohms for the external audio system.

(8) BFO Oscillator.

An ac voltage with a frequency of 142.5 kHz is provided by the bfo when the 614L-8 BFO switch is closed. The BFO switch applies +15 volts dc to the bfo transistor, Q21 (refer to figure 15). The circuit is an electron-coupled, crystal-controlled oscillator. The frequency of the oscillator is fixed at 142.5 kHz by crystal Y1.

(9) AGC Amplifier.

Audio frequencies superimposed on a positive dc voltage are applied to the base of Q16 from CR3. The base bias of Q16 is provided by voltage divider R41 and R42 through CR3. The total dc level at the base increases as the if. level increases because of increased dc from the detector. The dc level at the collector of Q16 is applied directly to the base of agc amplifier Q15, but the audio voltage is eliminated by C60. The gain of Q15 is temperature stabilized by thermistor RT3. As increasing if. raises the base-to-emitter forward bias of Q16, the current through Q16 increases, and the positive dc voltage on the base of Q15 decreases. This reduces the base-to-emitter forward bias and the current through Q15. The base bias on agc-controlled stages is provided by a voltage divider for each stage between a positive voltage and ground through Q15 and R46. As the if. amplitude increases and the positive current flowing from the bases of the agc-controlled transistors to ground is cut off by Q15, the transistor bases become more positive.



Beat-Frequency Oscillator, Simplified Schematic Diagram  
Figure 15

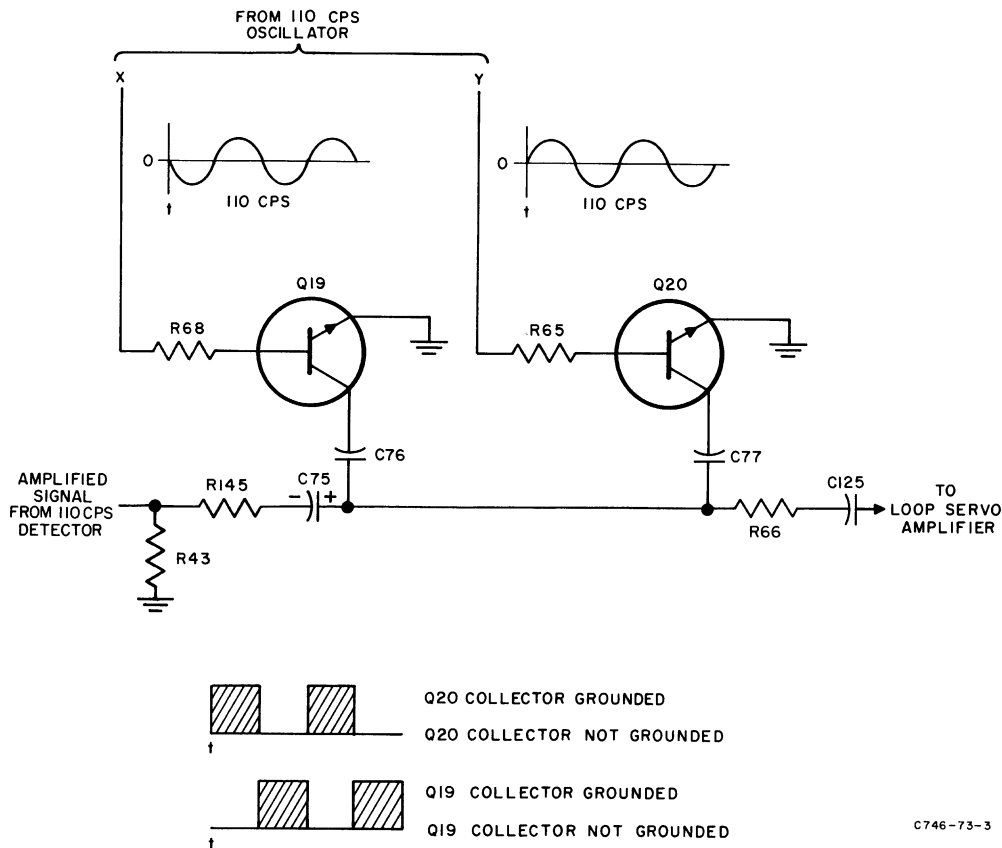
This reduces the base-to-emitter forward bias on the agc-controlled stages and reduces the gain. Thus, the variation in if. and audio voltages resulting from rf input variation is greatly reduced.

When +27.5 volts dc is applied to band/mode switch motor B2, a portion of this voltage is applied through diode CR5 and resistor R116 to the base of amplifier Q16. This positive dc voltage saturates Q16 and changes the agc voltage. Gain is reduced in the stages controlled by agc. Noise produced when the band/mode switch motor runs is cut off.

#### (10) Synchronous Filter.

The synchronous filter, Q19 and Q20, has a response curve which is much like that of an LC filter tuned to 110 Hz. That is, maximum signal transfer occurs at 110 Hz, with response falling off on either side (refer to figure 16).

The two 110-Hz signals applied to the opposing diodes in the balanced modulator also are applied to the bases of transistors Q19 and Q20 respectively. The 110-Hz signal detected by diode CR3 is either in phase with Q19 base voltage and 180 degrees out of phase with Q20 base voltage or in phase with Q20 and out of phase with Q19. Assuming that the base of Q19 is in phase with the voltage applied to the junction of C76 and C77, when Q19 base is positive, the resistance from collector to emitter of Q19 is low. The positive charge on the signal side of C76 attracts a negative charge to the transistor side of C76 which flows through the low resistance of Q19. During the half-cycle in which the base of Q19 is negative, the resistance from collector to emitter of Q19 is high. The signal side of C76 is negative but the negative charge on the transistor side of C76 cannot leak off to ground through the



Synchronous Filter Operation  
Figure 16

high resistance of Q19. After several cycles of the 110-Hz signal, C76 is fully charged. The impedance to ground through C76 and Q19 is then very high to 110 Hz.

The collector-emitter resistance of Q20 is low when the signal side of C77 is negative and high when the signal side of C77 is positive. Therefore, the transistor side of C77 acquires a positive charge in the same manner that C76 acquires a negative charge. After C76 and C77 are charged, the synchronous filter provides a high impedance to ground for the 110-Hz signal resulting from balanced modulation. The 110-Hz signal then is applied to the stages that follow the synchronous filter.

Assuming that a different frequency (220 Hz, for example) is applied to the filter along with the 110-Hz signal, transistor Q19 will have low resistance to ground for a full cycle of the 220-Hz signal while Q20 has high resistance to ground. When the positive half-cycle of 220 Hz adds to the positive half-cycle of 110 Hz, the combined voltage is higher than the voltage which originally charged C76. Current flows from C76 to ground through Q19, and the transistor side of C76 becomes more negative. When the negative half-cycle of 220 Hz subtracts from the positive half-cycle of 110 Hz, the combined voltage is lower than the voltage which originally charged C76. Current flows from ground to C76 through Q19 and the transistor



side of C76 becomes more positive. The charge on C76 at the beginning and ending of any full 220-Hz cycle remains nearly the same because they charge increases for a half-cycle and decreases for a half-cycle. Capacitor C76 and transistor Q19 provide a low impedance since 220-Hz current continues to flow through them. During the second half of the 110-Hz cycle, Q19 has a high resistance, but Q20 has a low resistance. A similar analysis shows that C77 and Q20 have low impedance to 220 Hz during the second half of the 110-Hz signal. The synchronous filter as a whole presents a low impedance to ground for 220 Hz while maintaining a high impedance for 110 Hz.

A similar analysis applies for a voltage of any frequency other than 110 Hz, but the filter is less effective as the undesired frequency approaches 110 Hz.

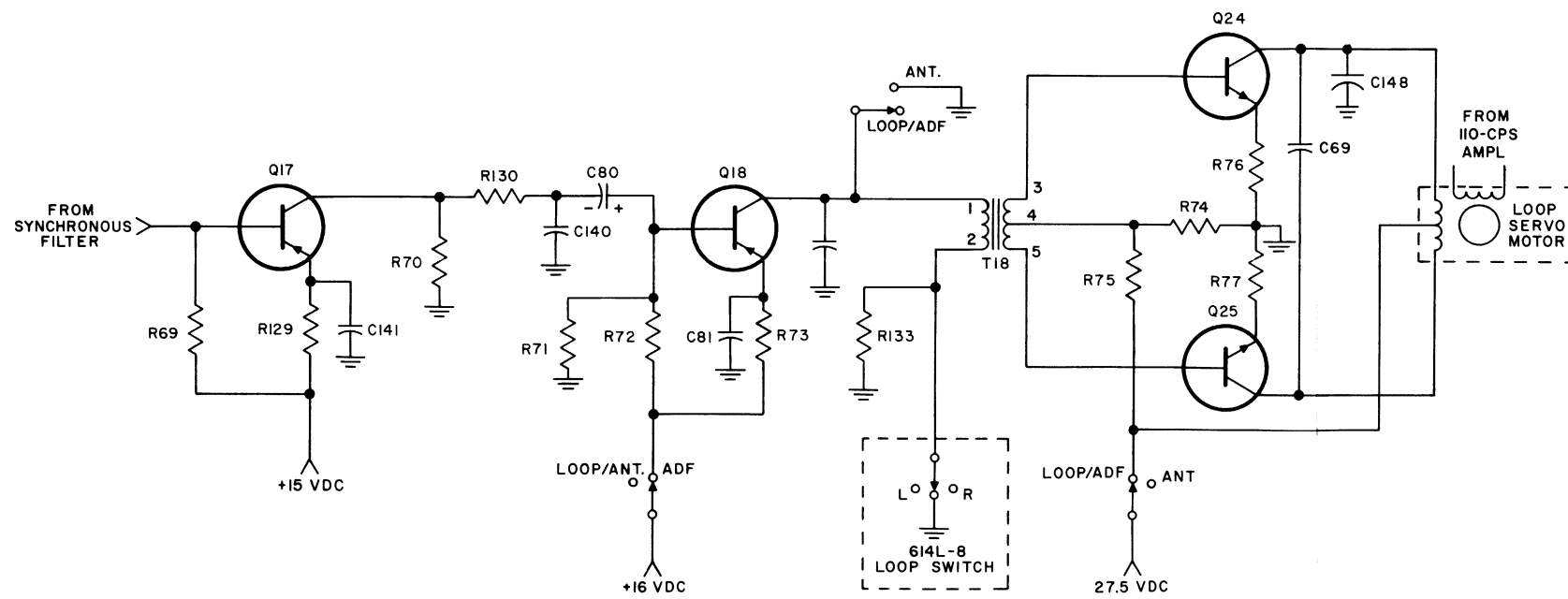
#### (11) Loop Servo Amplifier.

The 110-Hz signal which passes the synchronous filter is amplified in loop servo amplifier Q17 (refer to figure 17). The collector of loop amplifier Q18 is connected through the primary of the loop servo-amplifier push-pull driver transformer to ground by the 614L-8 LOOP L-R switch. The 110-Hz signal which originated in the balanced modulator is phase shifted 90 degrees in the push-pull driver transformer and other loop servo-amplifier circuits. Push-pull loop servo amplifier Q24, Q25 energizes the control winding of the loop servo motor. The energizing voltage is a 110-Hz voltage which has been shifted 90 degrees in phase from the 110-Hz modulation originating in the balanced modulator.

#### (12) Loop Servo Motor.

An amplified 110-Hz signal is applied to the reference winding of the loop servo motor directly from the 110-Hz oscillator (refer to figure 17). The voltage in the control winding either leads or lags the reference phase voltage by 90 degrees. The 2-phase loop servo motor rotates in one direction if the variable phase voltage leads the reference phase voltage by 90 degrees and rotates in the other direction if the variable phase voltage lags the reference phase voltage by 90 degrees. The phase depends upon the phase of the loop signal input to the balanced modulator, and the loop signal changes phase 180 degrees as the resolver rotor pattern null shifts across the apparent rf source within the resolver. Therefore, the motor rotates in one direction if the apparent rf source is on one side of the rotor pattern null and rotates in the other direction if the source is on the other side of the null.

The loop servo motor is geared to the resolver rotor. Since there are two nulls in the figure-eight rotor pattern, the motor turns the rotor in one direction when the rotor axis is from 0 degree to 180 degrees from the signal source and in the other direction at any angle from 180 to 360 degrees from the signal source. The rotor then is turned so that one null is on the signal source and the second null (180 degrees from the first) is away from the source. As the true rotor null approaches the source direction, the loop signal amplitude decreases, and the loop signal modulation in the balanced modulator decreases. As a result, the amplitude of the voltage in the loop servo-motor control winding decreases (though the phase does not change). The motor slows down and stops when the loop signal disappears as the true null is reached. If the signal source should appear exactly within the



Loop Servo Amplifier, Simplified Schematic Diagram  
 Figure 17



null opposite the true null, the slight hunting of the rotor would cause an rf loop signal to appear, and the motor and rotor would begin the rotation toward the true null.

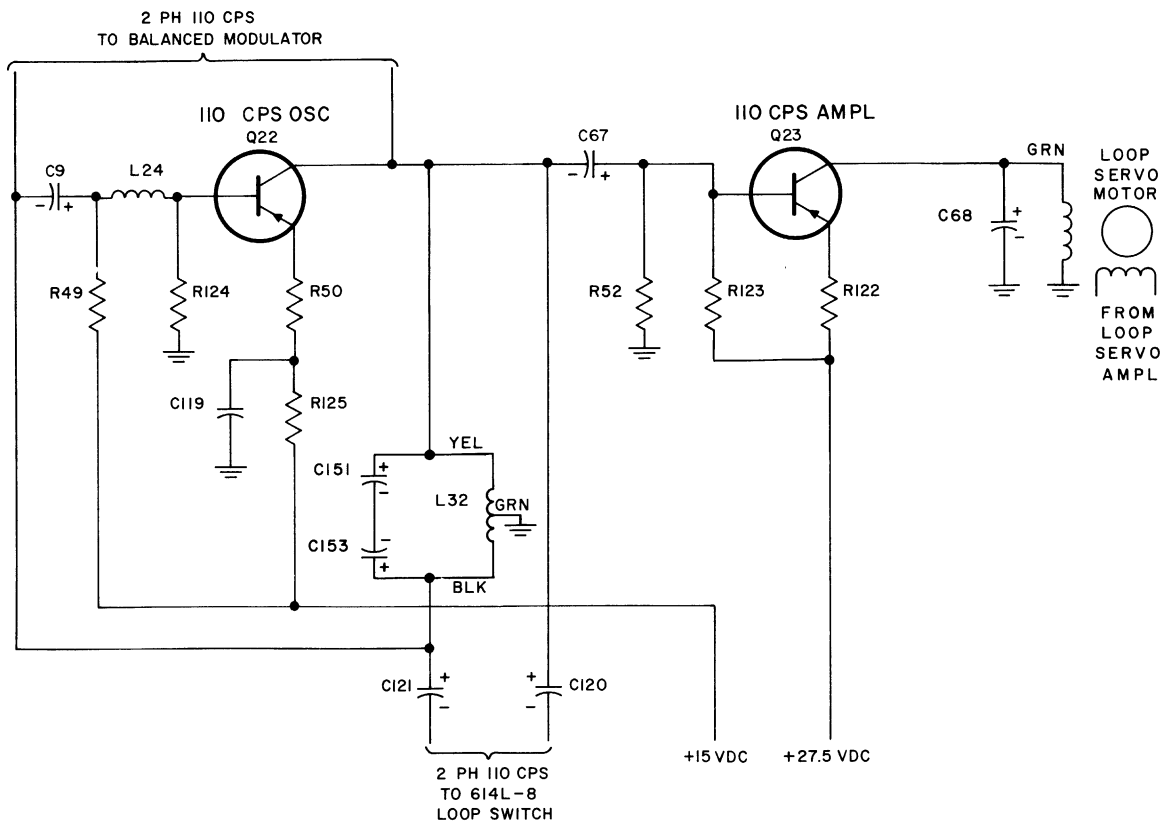
The primary of the loop servo-amplifier push-pull driver transformer T18 also may be energized from the normally grounded LOOP L-R switch end. This takes place when the 614L-8 LOOP L-R switch is rotated from the normally grounded position to any position which connects a 110-Hz signal to the transformer primary. A signal from the 110-Hz oscillator collector, or the oscillator signal shifted 180 degrees in phase, may be applied through the switch. The collector of loop servo amplifier Q18 has much higher load impedance when the loop switch is not in ground position. The amplification of Q18 drops, and the 110-Hz signal from the balanced modulator is greatly reduced. The ac signal from the LOOP L-R switch has low impedance to ground through Q18. The 110-Hz signal from the LOOP L-R switch overrides the balanced modulator signal and controls the motor.

#### (13) Indicator Synchro System.

The rotor of synchro transmitter B4 is geared one-to-one to the rotor of resolver B3. The synchro transmitter rotor is energized by the aircraft 400-Hz power source. Currents are induced into the three stators of the synchro transmitter and transferred to the stator windings of the synchro receiver in the bearing indicator. A magnetic field identical to the field in the synchro transmitter is generated in the receiver by the stator windings. The receiver rotor winding also is energized by the aircraft 400-Hz supply, and the magnetic field produced by the receiver rotor locks in with the field produced by the receiver stators. The synchro receiver rotor winding is connected directly to the ADF pointer of the indicator dial. The position of the resolver rotor of the 51Y-4/4A is thus transferred to the ADF indicator. The indicator may be a simple one-needle, fixed-card bearing indicator which gives the relative bearing to the station or an RMI type which combines magnetic heading with the ADF indication.

#### (14) 110-Hz Oscillator and Manual Loop Control.

The 110-Hz oscillator is a modified Hartley oscillator (refer to figure 18). The collector of Q22 is coupled back to the base of Q22 through the impedance of L32, C151, and C153. A center tap on the inductor is grounded, providing a 180-degree phase shift at the inductor-capacitor junction opposite the input at the resonant frequency of 110 Hz. The 110-Hz voltage at the base is of sufficient amplitude and of proper phase to cause oscillation. The 110-Hz oscillator operates only in ADF and LOOP modes. The collector of Q22 is connected to one position of the 614L-8 LOOP L-R switch. The output of the impedance network (L32, C151, and C153), which is 180 degrees out of phase with the collector of Q22, is connected to another position of the LOOP L-R switch. The loop servo amplifier then may be rotated in either direction by connecting the LOOP L-R switch rotor to the 0-degree phase or 180-degree phase position. The collector of Q22 also is coupled to the base of the 110-Hz amplifier Q23. The amplified 110-Hz oscillator voltage energizes the reference phase winding of the loop servo motor. The dc supply voltage is applied to the 110-Hz amplifier in ADF and LOOP modes only.

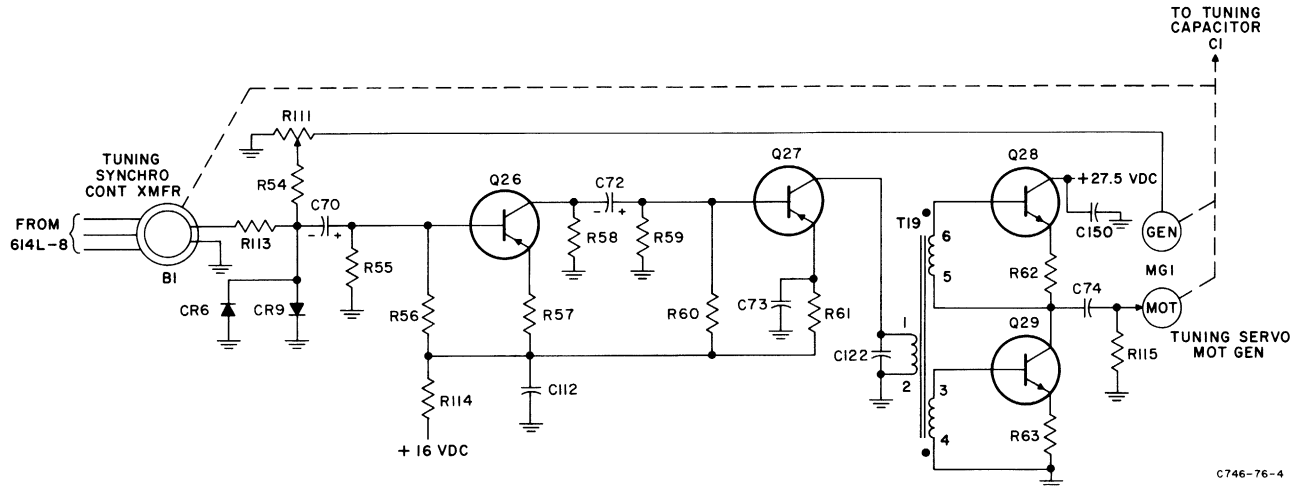


110-Hz Oscillator, Simplified Schematic Diagram  
Figure 18

(15) Tuning System.

The 51Y-4/4A is tuned within each band by tuning servo-controlled tuning capacitor C1. Tuning capacitor C1 is positioned by a synchro control transformer in the 51Y-4/4A to which C1 is mechanically connected (refer to figure 19). The synchro control transformer is controlled by a synchro transmitter in the 614L-8 ADF control unit. The stators of the tuning synchro transmitter in the 614L-8 transfer the magnetic field generated by the rotor of the synchro transmitter to the tuning synchro control transformer B1 in the 51Y-4/4A. The manually positioned rotor of the synchro transmitter is energized by a 26-volt, 400-Hz supply voltage. The magnetic field of the rotor induces currents into the three stator windings which are in a plane with equally spaced angles (120 degrees) between them. The time of maximum current is the same in all windings; although, for any one position, the same maximum current is not obtained in all windings. The induced currents are transferred to three respective and equally spaced stator windings in the tuning synchro control transformer of the 51Y-4/4A. The currents in the three stators produce magnetic fields that, when added, result in a magnetic field with the same





Tuning Servo Amplifier, Simplified Schematic Diagram  
Figure 19

relative phase and direction as the original field produced by the synchro transmitter rotor. The rotor of the synchro control transformer has a figure-eight receiving pattern. Nulls are obtained with the apparent signal source on either end of the rotor axis. Maximum voltage is induced into the coil when the apparent signal source is perpendicular to the sides of the rotor coil. The signals induced from sources in opposite lobes of the figure-eight pattern are 180 degrees out of phase.

Induced voltages with high amplitude are attenuated by limiter diodes CR6 and CR9. This limiter permits a sensitive system at the low-voltage null points while preventing overdriving of the amplifier at maximum induced voltages. The voltage from the limiter is amplified in Q26 and Q27. The collector of Q27 energizes the primary winding of driver transformer T19.

Pins 3 and 5 of the T19 secondary have the same ac polarity. On half-cycles during which the base-emitter junction of Q28 is forward biased, the base-emitter of Q29 is reverse biased. Therefore Q28 conducts and has low resistance while Q29 is cut off and has high resistance. During this half-cycle, the collector of Q29 is near ground. When Q28 is cut off and Q29 conducts, the collector of Q29 is at a high positive voltage. This 400-Hz voltage on the collector of Q29 is coupled through capacitor C74 to the control-phase winding of MG1.

The 400-Hz voltage energizes the control-phase winding of the 2-phase tuning motor-generator MG1. The reference-phase winding is energized by the 26-volt, 400-Hz aircraft supply voltage. The voltage in the control-phase winding of the motor either leads or lags the reference-phase voltage by 90 degrees. The direction of rotation of the motor (and of the rotor of synchro B1 to which it is geared) changes as the control-phase voltage shifts from leading to lagging phase. This phase shift (and rotation direction change) occurs as a null of the synchro transformer rotor pattern crosses the apparent signal source. Therefore, the



rotor is always turned toward one null and away from the other null. Tuning capacitor C1, which is geared to motor-generator MG1, is at the selected position when the apparent signal source is within the true rotor null.

The position of the synchro transmitter rotor in the 614L-8 is changed by selecting a different frequency with the 614L-8 TUNE knob. This changes the apparent signal source direction in the synchro control transformer in the 51Y-4/4A. An error signal is induced into the tuning servo amplifier. The synchro rotor and tuning capacitor then are rotated to the new position. To prevent overshoot and continual searching around the true null position, a rate feedback generator is attached to the motor. The rate generator output, which is proportional to motor-generator speed, is fed back to the base of Q26 through variable resistor R111. Since the generator output is 180 degrees out of phase with the input voltage at Q26, the effective voltage is reduced.

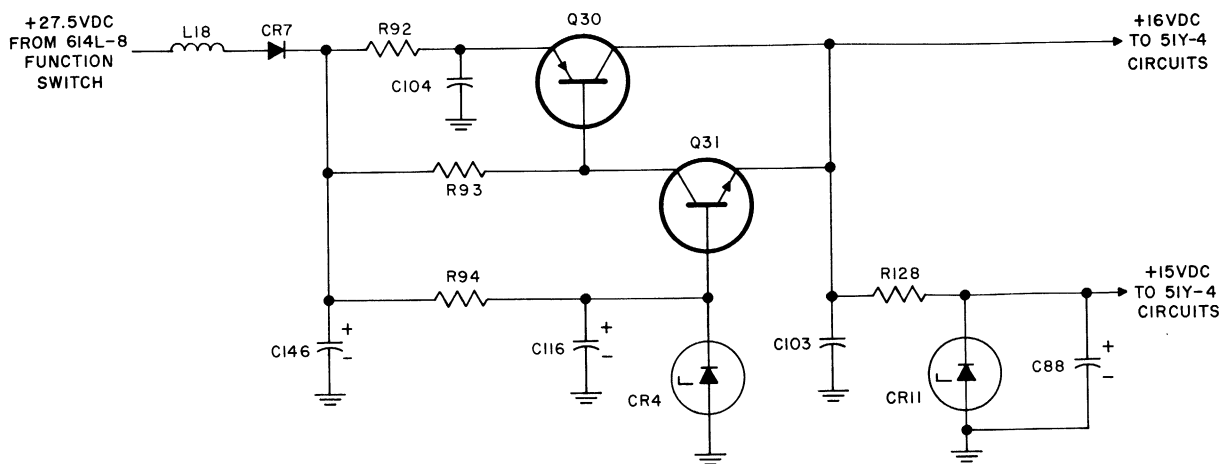
#### (16) Band- and Mode-Switching System.

Switch S1-M of the 51Y-4/4A is a multiwafer combination band and mode switch. Each wafer of switch S1-M is divided into three equal parts with each third representing a particular mode. A +27.5-volt dc voltage is applied to two of the three mode wires in the 614L-8 while the third is left open. This  $\pm 27.5$  volts dc is applied through wafer S1-M rear to band mode switch motor B2 in the 51Y-4/4A. As motor B2 rotates switch S1 (including wafer S1-M rear), the two positions with +27.5-volt dc do not contact the switch rotor. At the same time the position with no voltage is in contact with the switch rotor. Switch S1-M is then in the third of its angle which activates the circuits of the mode represented by the open wire in the 614L-8.

Switch S1-M may come to rest at any of three positions within the appropriate third of switch rotation depending upon band selected on the 614L-8. There are a total of nine possible positions at which band/mode-switch S1 may be set. (Switch S1 is actually a 12-position switch, but one position between each third of rotation is blank.) Switches in the 614L-8 apply +27.5 volts dc to two of the three band-switch wires which are connected to contacts on switch wafer S1-M front. The third wire, which represents the band selected, is grounded through a low-value resistor in the 614L-8. The +27.5-volt dc is applied to band/mode-switch motor B2 through the rotor of S1-M front until the position is reached which is grounded in the 614L-8. Motor B2 then is braked by the ground and stopped if mode selection wafer S1-M rear is in the proper third of switch rotation; +27.5 volts dc is developed across the grounded resistor in the 614L-8. Motor B2 then rotates through this position and stops when the second or third rotor contact of S1-M front is at the grounded position.

#### (17) DC Voltage Regulator.

A simplified schematic of the dc series regulator is shown in figure 20. The voltage drop across the series transistor, Q30, increases whenever the voltage at the output is increased. Conversely, whenever the output voltage is decreased, the voltage drop across Q30 decreases. Thus the voltage drop across Q30 compensates for fluctuations in input voltage maintaining a constant output voltage.



DC Series Regulator, Simplified Schematic Diagram  
Figure 20

The output voltage is normally 1 volt lower than the reference voltage, the voltage across breakdown diode CR4. This difference in potential means that Q31 is forward biased. If the output voltage is too high, the forward bias between base and emitter of Q31 increases. The increased collector current in Q31 increases the voltage drop across R93, resulting in a reduction of the base potential of Q30. A drop in base potential of Q30 decreases the base-to-emitter bias of that transistor, thus increasing the collector to emitter voltage drop. Thus, the output voltage at the collector of Q30 is reduced to the normal value. If the output voltage of the dc series regulator is too low, the induced current and voltage changes will be opposite those just described. The result is that the output voltage of the regulator remains nearly constant even with large variations in aircraft supply voltage. The input to the dc series regulator is filtered by L18 and C123. Diode CR7 protects the 51Y-4/4A circuitry from reversed polarity power input.

The output of the dc series regulator is connected to a second regulator consisting of R128, CR11, and C88. Diode CR11 is a breakdown type. The voltage drop across this diode is a constant 15 volts with the difference between the dc series regulator output voltage and the potential across CR11 dissipated by R128. This second voltage regulator provides a high degree of isolation between the circuits supplied by 16 volts and those supplied by 15 volts.

Breakdown diodes generate a considerable amount of electrical noise during conduction. For this reason breakdown diodes CR4 and CR11 are bypassed by capacitors C116 and C88 respectively.



(18) Self-Test Oscillator.

The self-test oscillator is activated when the 614L-8 (Collins part number 522-2357-024) CW-VOICE-TEST switch is placed in the TEST position. This applies a positive voltage to the base of Q33 which energizes relay K1 and also supplies operating bias for Q32. The output from the 100 kHz oscillator is applied to the receiver through the 150 pf sense antenna input. The 270 pf sense antenna input is connected to a 270 pf capacitor, C175, by the contacts of relay K1. The oscillator output is also applied to the S2 - S4 winding of resolver B3 so that when the oscillator is activated, the 51Y-4A can be tuned to a harmonic of the oscillator frequency and tested in ADF mode.



## 51Y-4/4A ADF Receiver - Disassembly

### 1. GENERAL.

Included within this section are instructions for the disassembly of the 51Y-4/4A ADF Receiver. Disassembly procedures should be accomplished only when repair is required. Do not perform the disassembly procedures as a part of routine maintenance. Disassembly procedures are arranged proceeding from the highest to the lowest subassembly. The disassembly of electronic equipment can usually be accomplished by inspection. However, if only one section of the 51Y-4/4A is to be disassembled, it is not necessary to perform the instructions of all the preceding paragraphs, except as noted.

**CAUTION:** BE SURE THAT THE POWER CABLE IS REMOVED BEFORE DISASSEMBLING ANY PORTION OF THE EQUIPMENT. FAILURE TO COMPLY MAY CAUSE VOLTAGE TRANSIENTS WHICH COULD DESTROY THE TRANSISTORS.

**NOTE:** Numbers in parentheses, following reference to a component of the gear case, are index numbers in figure 103.

### 2. DISASSEMBLY.

#### A. Removal of Dust Cover.

- (1) Loosen two clamping screws at front of 51Y-4/4A on each side of dust cover.
- (2) Loosen screw at rear of dust cover.
- (3) Remove 51Y-4/4A from dust cover.

#### B. Access to Rear of Gearcase.

- (1) Remove two outside, rearmost, screws on top of chassis.
- (2) Remove two rearmost screws on bottom of chassis.
- (3) Carefully swing rear of chassis to right as seen from front of 51Y-4/4A.

#### C. Removal of Switch Shaft.

- (1) Remove dust plug from front panel of 51Y-4/4A.
- (2) Loosen setscrews (8) on front of coupler (6) (refer to figure 103).
- (3) Slide switch shaft toward front of 51Y-4/4A.
- (4) Remove switch shaft from 51Y-4/4A through access hole in front panel.



D. Removal of Sense Amplifier.

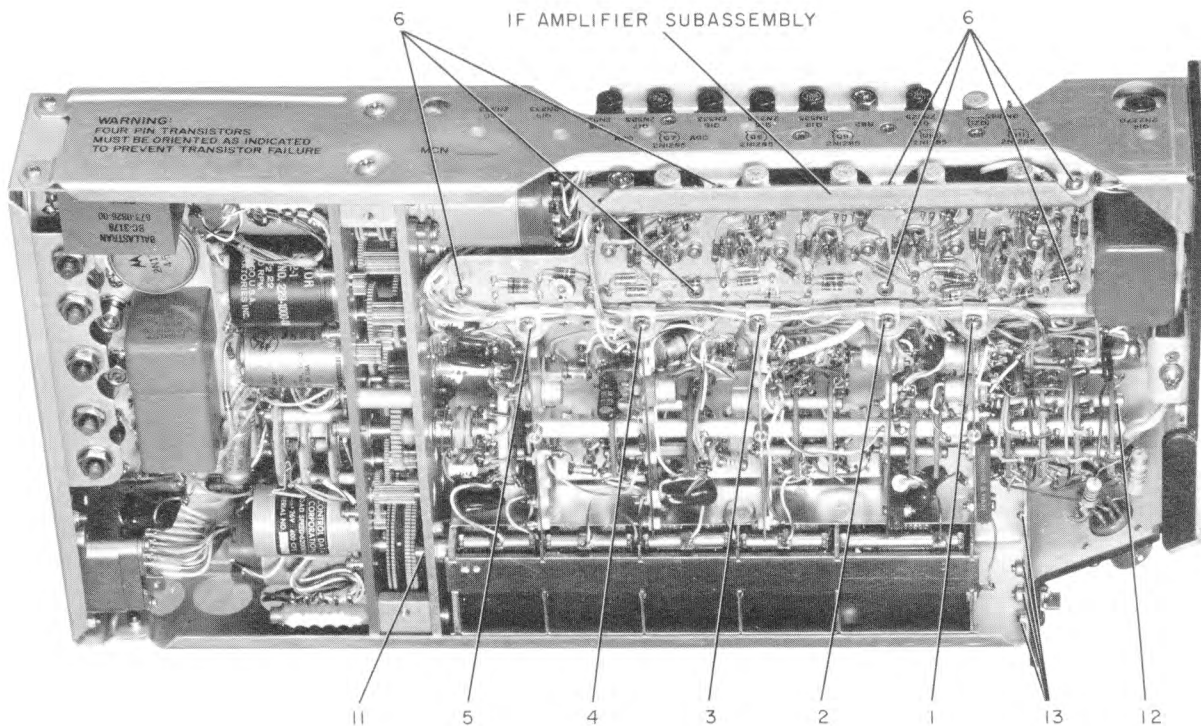
- (1) Remove switch shaft as described in paragraph 2.C and remove four screws (1, figures 101 and 102) securing radio-frequency amplifier subchassis to 51Y-4/4A chassis.
- (2) Remove wires as necessary to withdraw subchassis as far as desired.

E. Removal of Balanced Modulator.

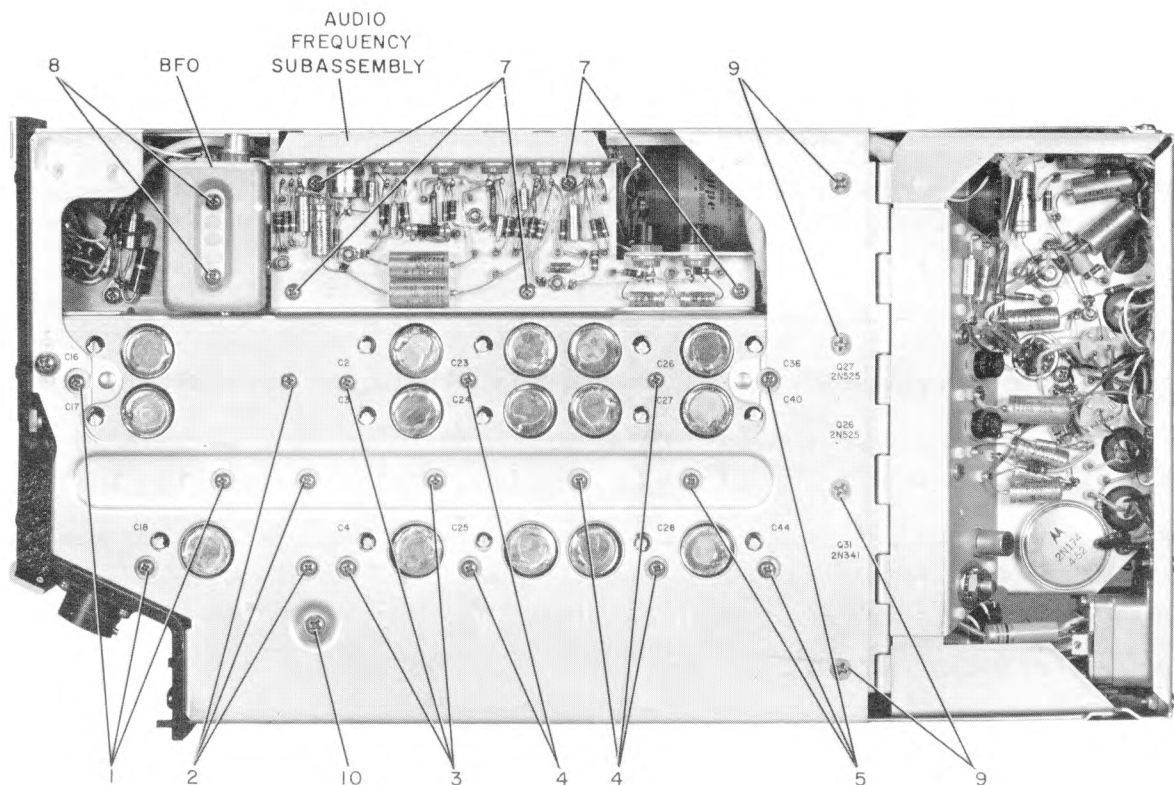
- (1) Remove switch shaft as described in paragraph 2.C, and remove four screws (2, figures 101 and 102) securing balanced modulator subchassis to 51Y-4/4A chassis.
- (2) Remove wires as necessary to withdraw balanced modulator as far as desired.

F. Removal of Loop Amplifier.

- (1) Remove switch shaft as described in paragraph 2.C, and remove four screws (3, figures 101 and 102) securing loop amplifier subchassis to 51Y-4/4A chassis.
- (2) Remove wires as necessary to withdraw loop amplifier as far as desired.



51Y-4/4A ADF Receiver, Left Side  
Figure 101



51Y-4/4A ADF Receiver, Right Side  
Figure 102

G. Removal of Mixer.

- (1) Remove switch shaft as described in paragraph 2.C, and remove six screws (4, figures 101 and 102) securing mixer subchassis to 51Y-4/4A chassis.
- (2) Remove wires as necessary to withdraw mixer as far as desired.

H. Removal of Local Oscillator.

- (1) Remove switch shaft as described in paragraph 2.C, and remove four screws (5, figures 101 and 102) securing local oscillator subchassis to 51Y-4/4A chassis.
- (2) Remove wires as necessary to withdraw local oscillator as far as desired.

I. Removal of IF. Amplifier Subassembly.

NOTE: Refer to figure 101 for the location of the if. amplifier subassembly.



- (1) Unsolder coaxial cable connected to pin 3 of Z1, and remove three screws at top of 51Y-4/4A chassis, securing if. amplifier subassembly to 51Y-4/4A chassis.
- (2) Remove four screws from lower edge of if. amplifier subassembly and three screws (6, figure 101) from upper lip of if. amplifier subassembly.
- (3) Withdraw if. amplifier subassembly from 51Y-4/4A chassis. It is not necessary to disconnect if. amplifier subassembly from 51Y-4/4A wiring harness (except the coaxial cable noted above) to effect inspection or repair.

J. Removal of Audio-Frequency Subassembly.

NOTE: Refer to figure 102 for the location of the audio-frequency subassembly.

- (1) Remove five screws (7, figure 102) securing audio-frequency subassembly to 51Y-4/4A chassis.
- (2) Withdraw audio-frequency subassembly from 51Y-4/4A chassis. It is not necessary to disconnect audio-frequency subassembly from 51Y-4/4A wiring harness to effect inspection or repair.

K. Removal of BFO.

NOTE: Refer to figure 102 for the location of the BFO.

- (1) Remove two screws (8, figure 102) securing BFO to 51Y-4/4A chassis.
- (2) Disconnect coaxial lead terminated at pin 3 of Z1.

L. Removal of Gearcase. (Refer to figure 103.)

NOTE: The gearcase cannot be removed from the 51Y-4/4A chassis unless the instructions given in paragraph 2.B have been carried out.

- (1) Gain access to rear of gearcase as described in paragraph 2.B, and remove connecting lugs from terminals of resolver (52) and synchros (145, 162).
- (2) Carefully remove wires of 51Y-4/4A wiring harness from two multiterminal posts (19, 36).
- (3) Remove two leads to dc motor (153).
- (4) Remove two screws (10), six washers (11) and two spacers (12) from switch assembly at rear of gearcase.
- (5) Remove switch wafer (9) from switch shaft (106).
- (6) Remove two screws (15), two washers (16) and four spacers (17, 18) from switch assembly at rear of gearcase.
- (7) Remove switch wafers (13, 14) from switch shaft (106).





NOTE: Do not disconnect the leads to switch wafers (9, 13, or 14) unless replacement of a switch wafer is contemplated. If leads are removed, a note should be made of their original destination.

- (8) Remove switch shaft as described in paragraph 2.C.
- (9) Remove two screws (2) and gearcase cover (1) from gearcase.
- (10) Remove screw in lower left corner of front bearing plate (11, figure 101) securing tuning capacitor to gearcase.
- (11) Loosen two setscrews (31). Check that gear (33) is not binding on tuning capacitor shaft by sliding gear (33) toward center of gearcase.
- (12) Remove two screws on top of the 51Y-4/4A chassis securing gearcase to chassis.
- (13) Remove two screws on bottom of the 51Y-4/4A chassis securing gearcase to chassis.
- (14) Remove four screws (9, figure 102) securing gearcase to right side of 51Y-4/4A chassis.
- (15) Slide gearcase toward rear of 51Y-4/4A chassis until it is free of 51Y-4/4A, or obtain earlier freedom by springing top and bottom of chassis.

M. Removal of Tuning Capacitor.

- (1) Perform procedures given in paragraphs 2.L.(9), (10), (11), and (13).
- (2) Loosen lowest screw (9, figure 102) approximately three turns.
- (3) Remove four front panel screws (13, figure 101).
- (4) Disconnect all leads to tuning capacitor at tuning capacitor. The majority of these leads are terminated at wafer switches which are easily damaged during removal and replacement of leads.
- (5) Remove screw (10, figure 102) securing tuning capacitor to 51Y-4/4A chassis.
- (6) Slide tuning capacitor to front of 51Y-4/4A chassis. Spring bottom of chassis away enough to allow removal of tuning capacitor.

N. Disassembly of Gearcase. (Refer to figure 103.)

NOTE: The gearcase cannot be disassembled while installed in the 51Y-4/4A. Paragraph 2.L. provides instructions for removal of the gearcase from the 51Y-4/4A.

- (1) Loosen four setscrews (80, 86).
- (2) Loosen thirteen screws (163, 158, 154, 150, and 146).
- (3) Remove two screws (20, 37), two lockwashers (21, 38), and two flat washers (22, 39).



- (4) Rotate rim-clinching clamps on screws loosened in step (2) until they clear notches at bottom of motors and synchros.
- (5) Remove synchro (145), motor (149), motor (153), motor (157), and synchro (162) from gearcase.
- (6) Loosen two setscrews (74).
- (7) Loosen three screws (53) and rotate rim-clinching clamps (55) until they clear notches at bottom of resolver (52).
- (8) Remove resolver (52) from gearcase.
- (9) Remove two screws (140), two lockwashers (141), two flat washers (142), two rim-clinching clamps (143), and remove switch mounting plate (139) from gearcase.
- (10) Remove four screws (57), four lockwashers (58), two screws (43), two lockwashers (45), two flat washers (46), two dowels (47), two screws (26), two lockwashers (28), two flat washers (29), two dowels (30), one screw (49), and one lockwasher (50) from gearcase.
- (11) Gently pull rear gearplate (166) away from the remaining gears and housings (25, 42).
- (12) Loosen four setscrews (8), and remove coupling (6) from shaft (106).
- (13) Remove gears from front gearplate (70).
- (14) Remove bearings from front gearplate (70), and rear gearplate (166) if desired. Do not remove bushings (167, 71).
- (15) Remove remaining screws in both plates (70, 166).



## 51Y-4/4A ADF Receiver - Cleaning

### 1. GENERAL.

Included within this section are instructions for cleaning dismantled and disassembled components, subassemblies, and parts of the 51Y-4/4A ADF Receiver.

Wherever practical, instructions are in tabular form, arranged to facilitate reference by paragraph to the procedure for cleaning the various parts and assemblies. All parts requiring particular methods of cleaning are considered separately, and parts which are similar enough to permit identical cleaning procedures are grouped. The referenced cleaning agents are listed in figure 201.

CLEANING AGENT	DESCRIPTION
Solvent	Methylene chloride 25 percent (by volume) Perchloroethylene 5 percent (by volume) Dry-cleaning solvent Fed. Spec. P-S 661a, or equivalent, 70 percent (by volume)
Cloth	Soft cotton, lintless
Detergent	Commerical powder containing no bleach or abrasive.

Cleaning Agents  
Figure 201

**WARNING:** PERFORM OPERATION INVOLVING CLEANING SOLVENT UNDER A VENTILATED HOOD. AVOID BREATHING SOLVENT VAPOR AND FUMES; WEAR A SUITABLE MASK WHEN NECESSARY. AVOID CONTINUOUS CONTACT WITH THE SOLVENT. USE GOGGLES, GLOVES, AND APRON TO PREVENT IRRITATION DUE TO PROLONGED CONTACT. CHANGE CLOTHING THAT HAS BECOME SATURATED WITH SOLVENTS. OBSERVE ALL FIRE PRECAUTIONS FOR FLAMMABLE MATERIALS. THESE MATERIALS SHOULD BE USED IN A HOOD PROVIDED WITH EXPLOSION-PROOF ELECTRICAL EQUIPMENT AND AN EXHAUST FAN WITH SPARKPROOF BLADES. OTHER PERSONS SHOULD BE WARNED TO KEEP AWAY FROM HAZARDOUS AREA OR WORKING ENCLOSURE.

References to air jet in this section indicate a hand-operated air nozzle supplied with clean and dry compressed air at a pressure of 28 pounds per square inch maximum.



**WARNING:** GOGGLES SHOULD BE WORN WHEN USING THE AIR JET TO BLOW DUST AND DIRT FROM EQUIPMENT PARTS. OTHER PERSONS SHOULD BE WARNED TO KEEP AWAY FROM HAZARDOUS AREA OR WORKING ENCLOSURE.

2. CLEANING PROCEDURES.

The following paragraphs provide instructions and procedures for cleaning the various parts of the dismantled and disassembled 51Y-4/4A preparatory to the inspection procedures. Figure 202 lists an index of cleaning procedures. Opposite each part to be cleaned, a paragraph containing the correct procedure is referenced. Refer to figure 202.

ITEM	REFER TO PARAGRAPH
Bearings, sealed and porous bronze	A
Cables, covered	B
Castings	C
Chassis, wired	D
Connectors	E
Covers and shields	F
Gears, metal and fiber	G
Insulators, ceramic or plastic	H
Jacks	I
Machined metal parts	J
Mechanical metal parts	K
Molded plastic parts	L
Sockets	M
Switches, concentric rf	N
Switches, wafer	O
Variable tuning capacitor	P

Index of Cleaning Procedures  
Figure 202



A. Bearings, Sealed and Porous Bronze.

NOTE: Refer to figures 103 and 501 for location and type of all bearings.

Normally, sealed bearings require no cleaning or lubrication since they are lubricated by the manufacturer for lifetime operation. It is recommended that these bearings be replaced if faulty. However, under certain circumstances lubrication may be required. If lubrication is to be accomplished, bearings must be thoroughly cleaned as follows:

(1) Sealed Ball Bearings.

- (a) Sealed ball bearings must be cleaned in a suitable bearing cleaning machine, such as spray cleaner or an ultrasonic installation. Observe manufacturer's instructions for proper use of these machines.
- (b) Protect bearings from dust and moisture pending inspection. If bearings are not to be lubricated, protect bearings from dust and moisture pending inspection.

CAUTION: PERMANENT DAMAGE MAY RESULT FROM FORCIBLY SPINNING A BEARING BEFORE IT IS THOROUGHLY CLEANSSED OF FOREIGN MATTER. BEARINGS MUST NOT BE HANDLED WITH BARE HANDS DURING AND AFTER CLEANING AND PRESERVATION. OPERATORS MUST WEAR RUBBER GLOVES OR FINGERSTALLS TO AVOID CONTAMINATION OF BEARINGS BY FINGERPRINTS. HANDLING SHOULD BE KEPT TO A MINIMUM.

(2) Porous Bronze Bearings.

It is recommended to not lubricate porous bronze bearings. However, under certain circumstances lubrication may be desired. If bearings are not to be lubricated, wipe dust from items that contain porous bronze bearings with a clean, dry, lintless cloth. Protect from dust and moisture pending inspection.

CAUTION: DO NOT SUBMERGE GEAR PLATES CONTAINING POROUS BRONZE BEARINGS IN SOLVENT. LUBRICANT IN OILITE BUSHINGS IN GEAR PLATES WOULD BE DILUTED AND CONTAMINATED BY DIRT IN THE SOLVENT. IF POROUS BRONZE BEARINGS HAVE BEEN REMOVED FROM GEAR PLATES, REPLACE WITH NEW BEARINGS.

B. Cables, Covered.

- (1) Clean outer surface of flexible Vinylite conduit by wiping dirt from surfaces with a solvent-moistened, lintless cloth.
- (2) Wipe dry using a clean, dry, lintless cloth.
- (3) Treat any connector terminations as directed in paragraph D. Wipe lug terminations clean with a solvent-moistened, lintless cloth, and dry with a clean, dry, lintless cloth.



C. Castings.

Unfinished, finished, or partly finished casting should be cleaned as follows:

- (1) Remove bulk of surface grease with rags.
- (2) Blow dust from surfaces, holes, and recesses using air jet.
- (3) Immerse casting in washing bath of solvent, and scrub until clean, working over all surfaces and into all holes and recesses with a suitable nonmetallic brush. Flat, wood-backed brushes with soft fiber bristles are recommended for surfaces; round brushes, similar to those used for washing bottles and test tubes, are recommended for holes and recesses.
- (4) Raise casting from bath, and permit solvent to drain into bath.
- (5) Immerse in rinsing bath of cleaning solvent, rinse, and raise from bath. Position casting to drain dry so that solvent is not trapped in holes or recesses. When practical positioning will not permit complete draining, use air jet to blow out any trapped solvent.
- (6) When thoroughly dry, touch up any minor damage to finish. Extensive damage to finish may require complete refinishing.
- (7) Protect casting from dust and moisture, pending inspection.

D. Chassis, Wired.

The following cleaning procedures should be used for chassis containing terminal boards, resistor and capacitor assemblies, rf coils, switches, tube sockets, inductors, transformers, and other wired parts.

- (1) Remove dust and dirt from all surfaces, including parts and wiring, using soft-bristled brushes in conjunction with air jet.

**CAUTION:** AVOID AIR BLASTING SMALL COILS, LEADS, AND OTHER DELICATE PARTS BY TOO CLOSE AN APPROACH WITH AIR JET NOZZLE. USE CAUTION IN USE OF BRUSHES ON DELICATE PARTS.

**NOTE:** When necessary to disturb the dress of wiring and cables, dressing should be noted, and wiring and cables restored to positions and dress after cleaning is completed.

- (2) Clean jacks as instructed in paragraph I.
- (3) Clean sockets as instructed in paragraph M.
- (4) With minimum disturbance of wiring, clean connectors as prescribed in paragraph E.
- (5) Clean wafer switches as instructed in paragraph O.
- (6) Clean ceramic or plastic insulators as instructed in paragraph H.



- (7) Complete chassis cleaning by wiping all finished surfaces with a solvent-moistened, lintless cloth.
- (8) Dry and polish these surfaces, using a dry, clean, lintless cloth.
- (9) Protect chassis from dust, moisture, and damage, pending inspection.

E. Connectors.

- (1) Wipe dust and dirt from bodies, shells, and cable clamps using solvent-moistened, lintless cloth. Wipe dry with a clean, dry, lintless cloth.
- (2) Remove dust from inserts using a small soft-bristled brush and air jet.
- (3) Wash dirt and any traces of lubricant from inserts, insulation, and contacts using a solvent applied sparingly with a small camel-hair brush.

CAUTION: DO NOT ALLOW SOLVENT TO RUN INTO SLEEVES OR CONDUIT COVERING ANY WIRES OR CABLES CONNECTED TO CONTACT TERMINALS OF THE INSERT.

- (4) Dry insert with air jet.

F. Covers and Shields.

Clean all unfinished, finished, and partly finished sheet-metal covers, such as dust covers, inspection covers, chassis covers, and housings, according to applicable steps of procedures used for cleaning castings. Refer to paragraph C.

G. Gears, Metal, and Fiber.

If gear trains are disassembled for replacement or defective gears, the gears should be cleaned according to the following procedures:

- (1) Metal gears should be cleaned according to applicable steps of paragraph J.
- (2) Composition or plasticized gears and nylon friction clutches should be cleaned according to procedures given in steps (3) and (4).
- (3) Remove all surface dust and dirt by using soft-bristled brush in conjunction with air jet.
- (4) Using a clean, lintless cloth lightly moistened with solvent, clean composition gears by wiping clean.

CAUTION: SOLVENT SHOULD NOT BE USED TO CLEAN GEARS COMPOSED OF OR CONTAINING NYLON. CLEAN THESE GEARS USING A WASHING BATH OF 2 OUNCES OF DETERGENT POWDER TO A GALLON OF WATER AND USING SUITABLE BRUSHES TO REMOVE SURFACE DIRT OR FOREIGN MATTER. GEARS COMPOSED OF EPOXY AND SUPPORTING BASE MATERIAL ARE SUSCEPTIBLE TO SOFTENING IF SOLVENT IS APPLIED FOR EXCESSIVE PERIODS OF TIME OR IF EXCESSIVE AMOUNTS OF



SOLVENT ARE USED. USE CARE IN CLEANING THESE GEARS WITH SOLVENT, AND DRY WITH CLEAN, LINTLESS CLOTH.

H. Insulators, Ceramic or Plastic.

Clean all ceramic insulators and plastic standoff insulators as follows:

- (1) Wipe clean with clean, lintless cloth lightly moistened with solvent.
- (2) Wipe dry and polish using dry, clean, lintless cloth.

I. Jacks.

- (1) Remove dust from exteriors with a camel-hair brush and air jet.
- (2) Blow dust from interior of female contact with air jet.

J. Machined Metal Parts.

Detached shafts, keys, pins, collars, worms, spring, and similar machined parts should be cleaned in a suitable cleaning machine, if available; otherwise, proceed as follows:

- (1) Use procedures listed in steps (1), (3), (4), and (5) of paragraph C and steps (2) and (3) of this paragraph.

**CAUTION:** TO PREVENT CORROSION, AVOID TOUCHING WITH BARE HANDS ANY MACHINED OR NONFINISHED SURFACES AFTER CLEANING.

- (2) Dry in dust-free, dry area or suitable enclosure. Radiant heat used in a ventilated enclosure is recommended for drying, particularly where atmospheric humidity is high.
- (3) When dry, immediately apply a light coat of MIL-L-6085 lubricating oil to any bare steel surfaces.

K. Mechanical Metal Parts.

The detached miscellaneous mechanical metal parts include ventilating grilles, mounting plates, mounting clamps and brackets, nuts, bolts, screws, washers, handles, fasteners, and hardware. These should be cleaned in a suitable cleaning machine or according to applicable steps of procedures for castings. Refer to paragraph C.

L. Molded Plastic Parts.

Plastic parts include insulating members, terminal boards, mounting blocks, etc. These should be cleaned in the following manner.

- (1) Using an air jet, blow loose dust and dirt from surfaces, holes, and crevices.
- (2) Wipe clean using a solvent-moistened, lintless cloth.
- (3) Dry and polish with a clean, dry, lintless cloth.





M. Sockets.

Bakelite sockets are cleaned as follows:

- (1) Remove any resin adhering to silver-plated contacts using a hardwood stick dressing to a wedge point.

CAUTION: DO NOT USE METAL TOOLS TO REMOVE FOREIGN MATTER FROM THESE CONTACTS, AS DAMAGE TO THE CONTACT PLATING INVITES CORROSION WHICH ULTIMATELY MAY END IN EQUIPMENT FAILURE. EXISTING CORROSION CONTACTS SHOULD NOT BE DISTURBED. ITS PRESENCE WILL INDICATE POSITIVE DAMAGE OF PLATING TO INSPECTION AND NECESSITY FOR SOCKET REPLACEMENT.

- (2) Wash contacts with solvent applied lightly with small, soft-bristled brush.
- (3) Using a solvent-moistened, lintless cloth, remove any foreign matter adhering to socket body or wafer.
- (4) Dry all parts with air jet.

N. Switches, Concentric RF.

Clean all concentric rf switches as follows:

- (1) Carefully remove dust with air jet, gently turning switch rotor while applying air.
- (2) Carefully wash only movable and stationary contacts with solvent applied lightly with a small brush.
- (3) Dry carefully with air jet; take care that solvent is not blown into switch bearings.

O. Switches, Wafer.

Clean switches of the phenolic wafer type as follows:

- (1) Remove all dust with air jet, turning switch rotor back and forth several times while blowing.
- (2) Wash all contacts and insulation with solvent lightly applied with a small, camel-hair brush.
- (3) Dry with air jet; then repeat wash using clean solvent while rotating switch rotor.

P. Variable Tuning Capacitor.

Use a low-velocity air jet to blow dust from plates. Remove residual dirt with solvent applied with a brush. Use care not to wash dirt into ball bearings.





## 51Y-4/4A ADF Receiver - Inspection/Check

### 1. GENERAL.

Included within this section are instructions necessary to verify, by inspection, the condition of disassembled and cleaned assemblies of the 51Y-4/4A. Inspection will reveal defects that result from wear, physical damage, deterioration, or other causes. Detailed inspection procedures are arranged alphabetically. Wear tolerances are listed in the fits and clearances section of this manual where applicable. Refer to the repair section of this manual for replacement of defective components. Refer to the illustrated parts list in this manual for a description and Collins part number of the components which are to be replaced.

### 2. INSPECTION PROCEDURES.

Figure 301 lists mechanical and electrical parts to be inspected and contains references to applicable paragraphs.

REFERENCE	PARAGRAPH
Bearings	A
Capacitors	B
Castings	C
Chassis	D
Connectors	E
Covers and shields	F
Gaskets and seals	G
Gears, metal and fiber	H
Insulators, ceramic or plastic	I
Jacks	J
Machined metal parts	K
Mechanical metal parts	L

Index of Inspection Procedures (Sheet 1 of 2)

Figure 301



REFERENCE	PARAGRAPH
Molded plastic parts	M
Printed circuit boards	N
Rf coils	O
Receptacles	P
Resistors	Q
Semiconductors	R
Sockets	S
Switch wafers, rotary	T
Soldered terminal connections	U
Transformers and reactors	V
Variable tuning capacitor	W
Wiring	X

Index of Inspection Procedures (Sheet 2 of 2)  
Figure 301

A. Bearings.

(1) Bearings, Porous Bronze.

Inspect bearings for pitted, scarred, or scuffed load-bearing surfaces. Inspect for burns, corrosion, and any other abnormal conditions occurring on load-bearing surfaces.

**CAUTION: IF POROUS BRONZE BEARINGS HAVE BEEN REMOVED FROM GEAR-PLATES, REPLACE WITH NEW BEARINGS.**

(2) Bearings, Ball.

The following inspection procedure applies to all ball bearings of the shielded type found in this equipment. After the bearing has been cleaned, it is inspected to determine whether it is serviceable, and the bearing is cleaned again. After final cleaning, lubricate for installation. Inspect bearings as outlined below:



CAUTION: ALL INSPECTION WORK MUST BE PERFORMED UNDER CONDITIONS OF EXTREME CLEANLINESS. OPERATORS MUST WEAR RUBBER GLOVES OR FINGERSTALLS TO PREVENT CORROSION DUE TO FINGER-PRINT CONTAMINATION WHEN HANDLING BEARINGS.

- (a) Check for blue or purple discoloration of any part of bearing due to overheating.
- (b) Check for tarnished external surfaces. This is indicated by a light discoloration of highly finished surfaces.
- (c) Check for rust.
- (d) Check for pitted, scarred, scuffed, or galled surfaces of bearings, balls, and races.
- (e) Check for flat bearing balls, broken ball separators, flaking or spalling of load-carrying surfaces, and all other abnormal conditions.

In addition to the above inspection, refer to the fits and clearances section of this manual, and check for undersized od (outside diameter) caused by creepage of outer race in its housing. This applies to all ball bearings, with races that do not separate when the bearing is removed from companion parts. Also, check with a plug gauge for oversize or defective bore caused by the inner race having turned on its shaft and for excessive radial play. Use a suitable radial gauge equipped with a dial indicator calibrated in ten-thousandths inch when checking radial play of each bearing. A noise inspection of this type of bearing can be accomplished by mechanical rotation. If motor-driven, the bearing should be lubricated lightly with recommended lubricant (see lubricant chart, figure 501), and rotated at 500 to 1000 rpm. A dental lathe can be used to drive the inner race while the outer race is held in gloved fingers. A used but serviceable bearing will develop a certain amount of noise. A slight, uniform noise is to be expected, but loud noise, nonuniform noises, such as clicks or buzzes, and vibration originating in the bearing, indicate that it is unfit for service. If manually rotated, the bearing must be clean and dry (unlubricated), and the outer race should be spun with the gloved finger while the bearing is held by means of a bearing holder inserted in its bore. Hold the bearing in several positions while making the check, and listen for any vibration or intermittent resistance.

B. Capacitors.

Inspect capacitors for defects listed in figure 302.

C. Castings.

Inspect castings for cracks or breaks and marred or damaged machined surfaces, holes, counterbores, or threads. Determine whether finish requires touchup repairs.



DEFECT	METAL TYPE	MOLDED TYPE	CERAMIC TYPE
Leakage (at case seams or around terminal insulation)	X		
Cracked, broken, or charred terminal insulation	X		
Case damage (dents or holes)	X		
Case damage (cracks or breakage)		X	
Loose, broken, or corroded terminal studs, lugs, or leads	X	X	X
Loose, broken, or poorly soldered connections	X	X	X

Table of Fixed Capacitor Inspection  
Figure 302

D. Chassis.

Inspect chassis for deformation, dents, punctures, badly worn surfaces, damaged connectors, damaged fastener devices, or damaged handles. Inspect for corrosion and damage to finish that requires work in finishing department.

E. Connectors.

Inspect connector bodies for broken parts, deformed shells or clamps, and other irregularities. Inspect for cracked or broken insulation and for contacts that are broken, deformed, or out of alignment. Inspect for corroded or damaged plating on contacts and for loose, poorly soldered, broken, or corroded terminal connections.

F. Covers and Shields.

Inspect covers and shields, for punctures, deep dents, and badly worn surfaces. Inspect for damaged fastener devices, corrosions, and damage to finish that requires work in finishing department.

G. Gaskets and Seals.

Inspect gaskets and seals for deformation and for damage, such as tears, creases, rough surfaces, and imbedded foreign matter.

H. Gears, Metal and Fiber.

Inspect gears for broken, chipped, or badly worn teeth. Inspect gear bodies for cracks and deformation. Inspect surfaces for corrosion or other abnormal conditions.



I. Insulators, Ceramic or Plastic.

Inspect ceramic or plastic insulators for evidence of damage, such as broken or chipped edges, burned areas, or presence of foreign material.

J. Jacks.

Inspect jacks for corrosion, rust, loose or broken parts, cracked insulation, bad contacts, and other irregularities.

K. Machined Metal Parts.

Inspect machined metal parts for physical damage to surfaces, corners, and edges. Inspect closely all machined surfaces, holes, bores, counterbores, slots, grooves, shoulder, flanges, teeth, tapped holes, and all threaded members, both male and female, for physical damage of any sort including roughness of surface, corrosion, or presence of foreign matter. Inspect plated or finished areas for damage requiring replating or refinishing beyond touch-up repair.

L. Mechanical Metal Parts.

Inspect mechanical metal parts, including mounting plates, chassis, mounting clamps and brackets, nuts, bolts, screws, washers, handles, fasteners, and hardware, for physical damage or deformation. Inspect for corrosion and any damage which would require replating or refinishing beyond practical touchup.

M. Molded Plastic Parts.

Inspect molded plastic parts, such as terminal boards, mounting blocks, and insulating members, for signs of corrosion, cracked or charred insulation, and loose or missing mounting hardware. Inspect for other abnormal indications which might be a source of future breakdown.

N. Printed Circuit Boards.

Inspect printed circuit boards for loose, broken, corroded, or poorly soldered terminal connections. Inspect printed circuits for any evidence of damage, such as burned, broken, cracked, or corroded plating. Inspect for loose mounting of printed circuit boards.

O. RF Coils.

Inspect rf coils for broken leads and loose, poorly soldered, or broken terminal connections. Inspect for crushed, scratched, cut, bruised or charred windings; corrosion on windings, leads, terminals, and connections; and for physical damage to forms.

P. Receptacles.

Inspect receptacles for cracked, broken, or charred insulation. Inspect for physical damage to all other parts, loose or bent contacts, damage to contact plating, corrosion, and other abnormal conditions.



Q. Resistors.

Inspect fixed composition resistors for cracked, broken, blistered, or charred bodies and loose, broken, poorly soldered, or corroded terminal connections.

Inspect fixed wire-wound resistors for signs of heating; cracked, broken, or charred insulation; loose, poorly soldered, broken, or corroded terminal connections; and loose mounting.

R. Semiconductors.

Inspect diodes, silicon controlled rectifiers, and transistors for cracked, broken, blistered, or charred bodies. Inspect for loose, broken, poorly soldered, or corroded terminal connections.

Check that nuts on top of all power transistors are tight. Check that mica insulating washers are in place between transistors and chassis.

S. Sockets.

Inspect sockets for loose, broken, or missing socket mounting rings. Inspect for cracked, broken, or charred insulation. Inspect for broken, corroded, or deformed contacts and loose, poorly soldered, broken, or corroded connections.

T. Switch Wafers, Rotary.

Inspect switch wafers for bent, weak, broken, or deformed contacts. Inspect for corrosion, damage to contact plating, and cracked or broken contact insulation. Check to see that movable contacts are free to rotate properly without binding throughout entire excursion. Inspect components mounted on switch wafers for physical damage.

U. Soldered Terminal Connections.

Inspect soldered terminal connections for cold-soldered or resin joints. These joints present a porous or dull, rough appearance. Check for strength of bond using the point of a tool. Examine for excess of solder; protrusions from the joint; pieces adhering to adjacent insulation; and particles lodged between joints, conductor, or other parts. Inspect for insufficient solder and unsoldered strands of wire protruding from conductor at joint. Also, look for insulation that is stripped back too far from joint or badly frayed at joint. Inspect for corrosion (verdigris) on copper conductor at the joint.

V. Transformers and Reactors.

Inspect transformers and reactors for signs of excessive heating, physical damage to case, cracked or broken ceramic insulators, and other irregularities. Inspect for corroded, poorly soldered, or loose terminals and loose, broken, or missing mounting hardware.

W. Variable Tuning Capacitor.

Check that the plates of the rotor do not touch the plates of the stator. Check that the rotor is easily turned with no sign of roughness in the bearings. Check that the wiper contacts which make connection to the rotor are resilient and are making good contact.





CAUTION: THE END PLATES ON EACH GROUP OF STATOR PLATES MAY BE BENT. THE PLATES HAVE BEEN BENT TO ADJUST THE CAPACITANCE OF EACH GROUP; DO NOT ATTEMPT TO STRAIGHTEN THE PLATES.

X. Wiring.

Inspect open and laced wiring of chassis, terminal boards, and parts of equipment by checking insulation for physical damage and charring. Inspect wires for breakage and for improper dress in relation to adjacent wiring and chassis.





## 51Y-4/4A ADF Receiver - Repair

### 1. GENERAL.

Included within this section are instructions for the replacement or repair of damaged or defective components of the 51Y-4/4A. Faulty components usually are detected through procedures in the inspection or testing section of this manual. If a new part is to be installed, it should first be inspected and tested. Refer to the illustrated parts list in this manual for a description and Collins part number of components which are to be replaced.

Most of the repair or replacement instructions apply to disassembled equipment. Refer to the disassembly section for proper instructions.

### 2. REPAIR PROCEDURES.

The following paragraphs provide instructions and procedures for repairing components of the equipment. Figure 401 lists an index of repair procedures, and opposite each repairable part a paragraph containing the correct procedure is referenced.

REFERENCE	PARAGRAPH
Bearings	A
Capacitors	B
Connectors	C
Covers and shields	D
Frame	E
Gears, metal and fiber	F
Resistors	G
Semiconductors	H
Soldered terminal connections	I
Switches	J
Transformers and inductors	K
Variable resistors	L
Wiring	M

Index of Repair Procedures  
Figure 401



A. Bearings.

Shielded bearings will rarely need lubrication. If found defective, replacement with another bearing, new or known to be good, is advised.

B. Capacitors.

If found defective or suspected of causing difficulties, capacitors should be replaced. Clean all connections thoroughly, and apply new solder.

C. Connectors.

Straighten bent pins and damaged shell areas. Replace bad connections, broken wires, or wires with split insulation. If connector insert is broken, replace connector.

D. Covers and Shields.

Replace damaged screws, straighten any dents or warped sections, and retouch scratched or worn painted surfaces.

E. Frame.

Straighten misshapen areas. Remove all corrosion with a suitable cleaner. Retouch silk screening, and refinish where needed.

F. Gears, Metal and Fiber.

Metal or fiber gears should be replaced if found defective in inspection or testing sections. Instructions are given in assembly and disassembly sections of this manual.

G. Resistors.

Replace defective resistors with components known to be good, and carefully resolder bad connections.

H. Semiconductors.

(1) Maintenance and Repair of Transistorized Circuits.

When maintaining and repairing transistor circuits, observe the following factors:

- (a) In a transistor amplifier, any change in the output circuit of one stage can affect all preceding stages. Therefore, any deviation in the operating characteristics of a certain stage can be reflected back to affect the operation of the preceding stages.
- (b) Common-emitter transistor amplifiers have a 180-degree phase shift between the input and output voltages. However, there will be no phase shift between the input and output signals if the base is shorted to the collector of the transistor.
- (c) The dc base voltage should be slightly higher than the emitter voltage during normal operation of a common-emitter transistor amplifier. However, an open circuit between the base and the emitter of the transistor will result in the emitter voltage approximating ground potential and a base voltage considerably greater than normal.



- (d) An unusually high dc collector voltage can be caused by an open emitter circuit, an open collector circuit, or a short between the base and the emitter of the transistor. However, an open circuit either between the base and the emitter or in the load impedance of the stage under consideration will also cause an unusually high dc collector voltage.
- (e) An unusually low dc collector voltage indicates a short circuit between the collector and ground, the collector and the emitter, the collector and the base, or across the output impedance.

When checking the base-to-emitter resistance of an npn transistor, the ground of the Voltohmyst must be connected to the emitter lead. The resistance indicated on the RX1 scale then should be greater than 10 ohms but less than 50 ohms. However, when the meter leads are reversed, the indicated emitter-to-base resistance will be several thousand times greater.

When soldering transistor leads to terminal points, use the same precautions normally followed when working with crystal diodes.

**CAUTION: WHEN SOLDERING TRANSISTOR LEADS, USE PLIERS AS A HEAT SINK BY HOLDING BETWEEN THE TRANSISTOR AND THE POINT OF HEAT APPLICATION TO DIVERT THE HEAT FROM THE TRANSISTOR.**

(2) Soldering Instructions.

(a) General.

Use a 35-watt iron to solder or unsolder all connections except ground connections made directly to the chassis. For ground connections to a chassis, use a 100-watt iron.

**CAUTION: COMPONENT DRESS AND LEAD DRESS ARE CRITICAL. WHENEVER A COMPONENT OR A LENGTH OF WIRING IS BEING REPLACED, ENSURE THAT THE PROPER DRESS IS MAINTAINED. IN ALL REPAIR WORK WHICH INCLUDES THE REPLACEMENT OF WIRING, BE ESPECIALLY CAREFUL TO DUPLICATE THE ORIGINAL TYPE, LENGTH, AND ROUTING OF WIRES. TO ASSURE THE PROPER LEAD DRESS, USE ANOTHER UNIT AS A GUIDE.**

I. Soldered Terminal Connections.

Resolder cold-solder or resin joints. Remove all traces of corrosion.

J. Switches.

Switches are usually replaced and seldom repaired. Wafers in wafer-type switches may be replaced separately and so may defective pins in the crimped-pin type of connector. Leads should be properly identified to simplify rewiring.



K. Transformers and Inductors.

Replace or resolder as required.

(1) Removal of Covers on Sealed Transformers and Inductors.

NOTE: Do not remove the covers of transformers or inductors unless adjustment is necessary.

- (a) Allow a 200-watt soldering iron to reach operating temperature.
- (b) Heat soldered end of transformer or inductor cover with soldering iron until solder is fluid. It is not necessary to remove coils from 51Y-4/4A.
- (c) Insert a pick between cover and case of transformer or inductor. Gently pry cover away from case.

(2) Replacement of Covers on Sealed Transformers and Inductors.

- (a) Clean edges of transformer or inductor cover with a scraper.
- (b) Apply solder to cover and edge of case.
- (c) Use soldering iron mentioned in previous paragraph to heat cover and case.
- (d) Place cover into open end of inductor or transformer case, and apply sufficient solder to seal all gaps.

L. Variable Resistors.

Add a drop or two of contact cleaner (carbon tetrachloride) to windings of a resistor with rough operation. Clean corroded terminals. Replace resistor if shaft is loose in case.

M. Wiring.

Replace damaged wiring with wire of same size and color coding. Ensure that no bare wires are touching chassis, other bare wires, or metal cases of other parts.

If any wire is to be removed from a terminal or component, it should be marked with an identification tag to minimize incorrect connections.

NOTE: When necessary to disturb the dress of the wires, carefully ensure that the original wire dress is maintained when replacing wires.



## 51Y-4/4A ADF Receiver - Assembly

### 1. GENERAL.

Included in this section are assembly instructions and mechanical alignment procedures for the 51Y-4/4A. The order of assembly starts with the lowest subassembly or component proceeding to the completed module or equipment. Refer to the fits and clearances section of this manual for assembly tolerances and torque values. Required lubrication procedures are also listed in this section.

### 2. LUBRICATION DATA.

Figure 501 lists all items that can be lubricated prior to assembly, and specifies the type of lubricant to be used. The lubricants listed for each item in figure 501 must be used; no substitutions are recommended.

Paragraph 4 of this section provides lubrication instructions for items to be lubricated after assembly of the 51Y-4/4A.

DESCRIPTION	ITEM NUMBER (Refer to figure 103)	COLLINS PART NUMBER	LUBRICANT	LUBRICANT COLLINS PART NUMBER
Bearing, ball	59 through 66, 68, 69, 128, 129, and 131 through 138	309-1519-00	MIL-L-6085	005-0392-00
Bearing, ball	67 and 130	309-1518-00	MIL-L-6085	005-0392-00

51Y-4/4A Lubrication Data  
Figure 501

#### A. Contamination and Compatibility.

Major contamination problems which arise between conventional lubricants and silicone lubricants or hydraulic fluids are a result of some additives used in conventional lubricants (oxidation inhibitors, corrosion inhibitors, etc.). Many of these additives are not soluble in silicone lubricants and will be precipitated as gummy or crystalline sludges when the fluids are mixed. When inadequate cleaning procedures lead to this type of contamination, high torques, sticking mechanisms, lubrication failure, and ultimate equipment failure may result. The importance of maintaining the correct lubricant in bearings or other areas cannot be emphasized too strongly. Since failure can result from improper use of lubricants, it is imperative that the correct lubricants be used in the right place and in the right amount.



B. Bearings.

(1) Ball Bearings.

It is recommended that ball bearings not be lubricated; however, under certain circumstances, lubrication may be necessary. Figure 501 incorporates all bearing lubrication data required.

CAUTION: ENSURE THAT BALL BEARINGS ARE COMPLETELY CLEAN BEFORE LUBRICATING.

CAUTION: DO NOT OVERLUBRICATE ANY BEARING.

(2) Bronze Bearings.

It is recommended that bronze bearings not be lubricated; however, under certain circumstances, lubrication may be necessary. Reference should be made to figure 501.

CAUTION: DO NOT OVERLUBRICATE ANY BEARING. IF A PRESS FIT BRONZE BEARING IS REMOVED, IT MUST BE REPLACED WITH A NEW BEARING.

3. ASSEMBLY.

A. Assembly of Gear Case. (Refer to figure 103.)

(1) Insert ball bearings (59 through 69) into front gear plate (72). Front gear plate (72) may be distinguished from rear gear plate (168) by holes in each plate. Rear gear plate (166) provides mounting holes for servomotors. Ball bearings (59 through 66, 68, 69) are identical. They have been numbered differently as an aid to establishing correct location of gears in a later step. Ball bearing (67) is smaller than the others and will fit only in the correct hole in front gear plate (72). Each ball bearing has a shoulder which should be against the inner surface of front gear plate (72).

(2) Place gear (119) into bearing (69). Gear (119) has fewer teeth than gear (91).

NOTE: Gears may be identified by reference to figure 103. The profile of each gear, except gears (119, 91), is unique.

(3) Place gear (122) into bearing (66).

(4) Place gear (116) into bearing (68).

(5) Place gear (125) into bearing (67).

(6) Insert shorter end of switch shaft (106) into Oilite sleeve bearing (71).

(7) Place gear (110) into bearing (65).

(8) Place gear (107) into bearing (63).

(9) Place gear (113) into bearing (64).





- (10) Place gear (91) into bearing (59).
- (11) Place gear (94) into bearing (60).
- (12) Place gear (97) into bearing (61).
- (13) Place gear (100) into bearing (62).
- (14) Use three screws (53) and three lockwashers (54) to secure three rim clinching clamps (55) loosely to outside of front gear plate (70).
- (15) Place resolver shaft (52) between rim clinching clamps (55). Rotate rim clinching clamps (55) until they engage notch on resolver (52), and tighten three screws (53).
- (16) Give spur gear assembly (73) a right-hand loading of six teeth after taking up slack. Hold spur gears (78, 76) so that loading is not lost.
- (17) Place spur gear assembly (73) on resolver shaft (52) with gear collar (75) toward resolver shaft (52). Both spur gears (78, 76) should be engaged with section of pinion (121) nearest resolver shaft (52).
- (18) Lightly tighten two setscrews (74).
- (19) Fasten gear case housings (25, 42) to inside of front gear plate (70) using screws (26, 27, 43, 44), lockwashers (28, 45), washers (29, 46), and dowels (30, 47). Screws (26, 43) associated with dowels shall be tightened first.
- (20) Fasten gear case side plate (56) to inside of gear case using four screws (57) and four lockwashers (58).
- (21) Place retaining ring (104) on switch shaft (106) if not still in place.
- (22) Insert bearings (128, 138) into rear gear plate (166) as shown in figure 103.
- (23) Place spur gear assemblies (85, 33/35) back to back and in position near gear (91) as shown in figure 103.
- (24) Mate bearings on rear gear plate (166) with spur gears installed on front gear plate (70). Do not force rear gear plate (166) into place.
- (25) Fasten rear gear plate (166) using screws (43, 57), lockwashers (58, 45), flat washers (46, 29), and dowels (30, 47). Screws (26, 43) associated with dowels should be tightened first.
- (26) Place spur gear assembly (79) in position near gear (119).
- (27) Insert synchro shaft (162) into hole in rear gear plate (166) while sliding spur gear assembly (79) onto synchro shaft.
- (28) Spur gear assembly (79) need not be loaded until bearing alignment is performed.



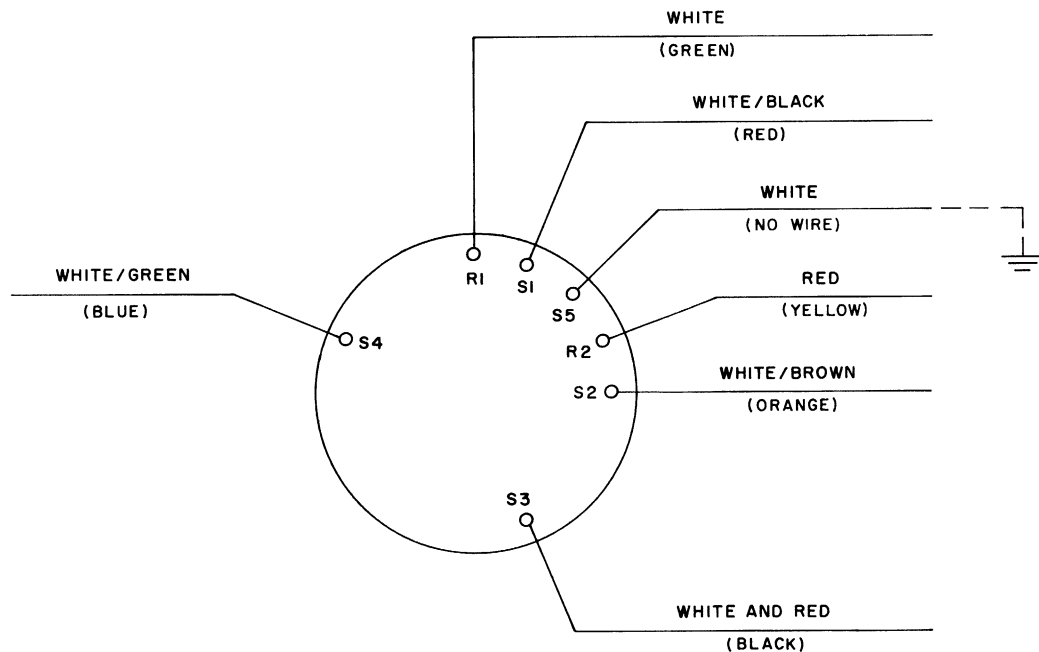
- (29) Use three screws (163), three lockwashers (164), and three rim clinching clamps (165) to fasten synchro shaft (162) to rear gear plate (166).
- (30) Use two screws (158), two lockwashers (159), and two rim clinching clamps (160) to fasten servomotor (157) to rear gear plate (166). Servomotor leads should be toward upper end of gear case.
- (31) Insert end of synchro (145) into hole in rear gear plate (166) while sliding spur gear assembly (85) onto synchro shaft.
- (32) Use three screws (146), three lockwashers (147), and three rim clinching clamps (148) to secure synchro (145) to rear gear plate (166).
- (33) Give spur gear assembly (85) a right-hand loading of five teeth after taking up slack. Engage entire spur gear assembly (85) with gear (91) without losing any loading.
- (34) Use screws (150), lockwashers (151), and clamps (152) to fasten servomotor (149) to rear gear plate (166). Leads from servomotor should be toward lower end of gear case.
- (35) Use three screws (154), three lockwashers (155), and three rim clinching clamps (156) to fasten motor (153) to rear gear plate (166).
- (36) Place sleeve spacer (48) between rear gear plate (166) and front gear plate (70). Secure sleeve spacer (48) with screw (49) and lockwasher (50).
- (37) Secure two multiterminal standoffs (19, 36) to upper left and lower left corners of gear case using two screws (20, 37), two lockwashers (21, 38), and two flat washers (22, 39).

B. Installation of Tuning Capacitor.

- (1) Use screw and lockwasher (10, figure 102) to secure tuning capacitor to 51Y-4/4A chassis. The correct location of tuning capacitor is shown in figure 101.
- (2) Reconnect leads to tuning capacitor. Refer to figures 810, 811 for connection of leads which have been removed from tuning capacitor.

C. Installation of Gear Case.

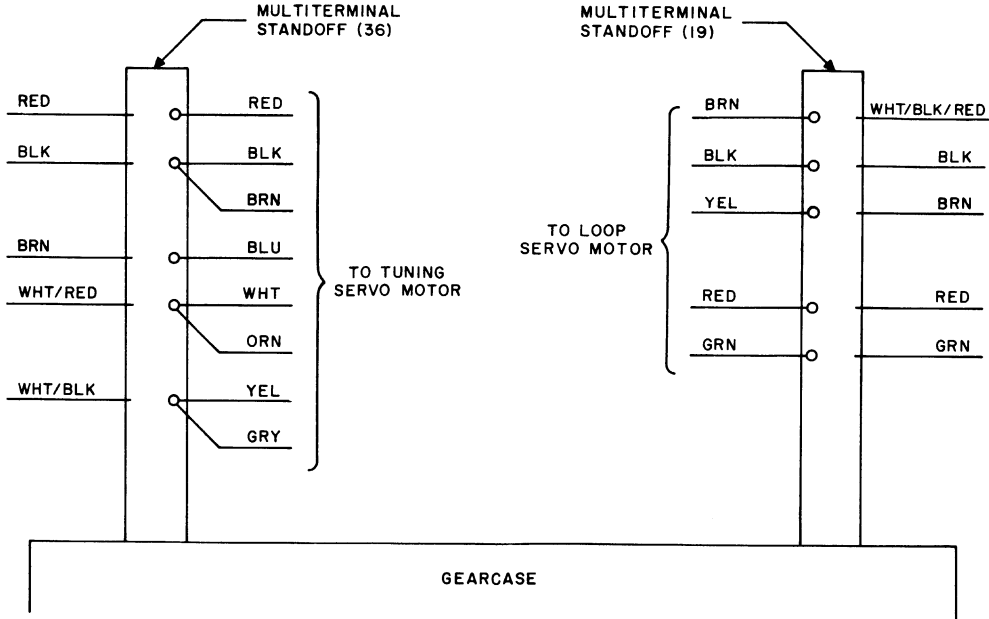
- (1) Partially slide gear case into rear of 51Y-4/4A chassis. Be careful not to pinch wiring harness.
- (2) Refer to figure 502 for proper connection of leads to resolver shaft (52). Make connections to resolver as indicated.
- (3) Slide gear case toward front of 51Y-4/4A and ensure that gear (33) is seated on tuning capacitor shaft.
- (4) Use four screws to fasten gear case housings (25, 42) to top and bottom of 51Y-4/4A chassis.
- (5) Place hinge section on rear portion of 51Y-4/4A chassis between gear case and right side of chassis.



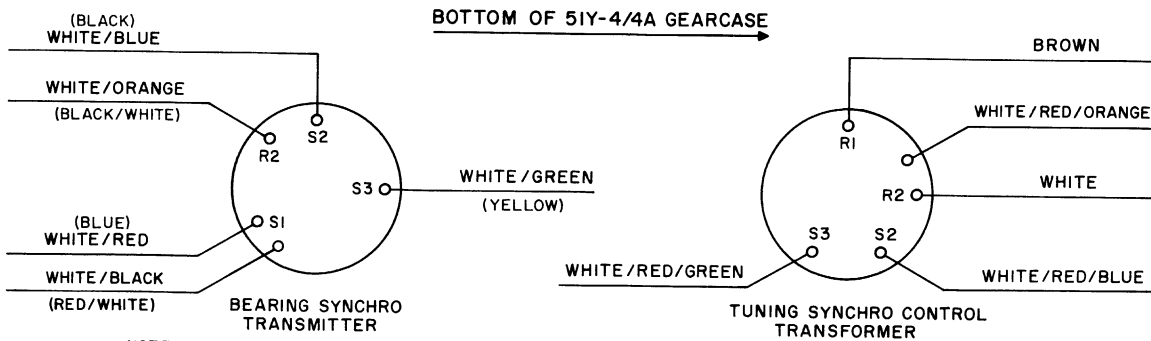
NOTE:  
( ) DENOTES WIRE COLORS FOR RESOLVER USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS ABOVE 1172 FOR 51Y-4 AND 636 FOR 51Y-4A. THE NEW RESOLVER DOES NOT PROVIDE SCREW TERMINALS FOR WIRE CONNECTIONS. WIRES NOT IN ( ), AND R1, R2, S1 THROUGH S5 DENOTE RESOLVER USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS BELOW 1172 AND 636 RESPECTIVELY.

Connections to Resolver  
Figure 502

- (6) Secure hinge section of step (5) to gear case with four screws (9, figure 102).
- (7) Loosen screw (10, figure 102). Insert and tighten screw (11, figure 101) which secures tuning capacitor to gear case.
- (8) Load gears (33, 35) four teeth to the right after taking up slack. Engage both gears with gear (91) without diminishing loading.
- (9) Reconnect leads to multiterminal standoffs on gear case as shown in figure 503.
- (10) Reconnect leads to bearing synchro shaft (162) as shown in figure 504.
- (11) Reconnect leads to loop synchro control transformer (145) as shown in figure 504.
- (12) Use two screws (140), two lockwashers (141), two flat washers (142), and two rim clinching clamps (143) to secure switch mounting plate (139) to gear case. The large hole in center of switch mounting plate (139) should be over sleeve bearing (167).
- (13) Place switch wafers (14, 13) on switch shaft (106). There is a dimple in shaft slot of each wafer rotor. Both dimples should be on same flat of switch shaft (106).



Connections to Servomotor  
Figure 503



NOTE:

( ) DENOTES WIRE COLORS FOR SYNCHRO USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS ABOVE 1355 FOR 51Y-4 AND 749 FOR 51Y-4A. THE NEW SYNCHRO DOES NOT PROVIDE SCREW TERMINALS FOR WIRE CONNECTIONS. WIRES NOT IN ( ), R2, S1, S2, S3 DENOTE SYNCHRO USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS BELOW 1355 AND 749 RESPECTIVELY.

Connections to Bearing and Tuning Synchro  
Figure 504



- (14) Use two screws (15), two insulating washers (16), and four spacers (17, 18) as shown in figure 103 to secure switch wafers (13, 14) to gear case. Mounting holes designated with letter "X" on both switch wafers (13, 14) should be nearest tuning servomotor (149).
- (15) Place switch wafer (9) on switch shaft (106). Dimple in shaft slot of wafer rotor should be on same flat as those in step (14).
- (16) Use two screws (10), six insulating washers (11), and two spacers (12) as shown in figure 103 to fasten switch wafer (9) to switch plate mounting (139).
- (17) Connect red terminal of motor (153) to topmost terminal on rear of switch wafer (9). Connect black terminal to white wire from wiring harness.

D. Installation of BFO.

NOTE: Refer to figure 102 for the location of the BFO.

- (1) Reconnect any leads removed from BFO.
- (2) Secure BFO to 51Y-4/4A with two screws (8, figure 102) and two lockwashers.

E. Installation of Audio Frequency Subassembly.

NOTE: Refer to figure 102 for the location of the audio frequency subassembly.

- (1) Reconnect any leads removed from audio frequency subassembly.
- (2) Use five screws (7, figure 102) to secure audio frequency subassembly to 51Y-4/4A chassis. Avoid pinching wires.

F. Installation of IF. Amplifier Subassembly.

NOTE: Refer to figure 101 for the location of the if. amplifier subassembly.

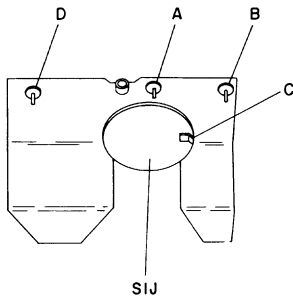
- (1) Reconnect any leads removed from if. amplifier subassembly.
- (2) Use seven screws (6, figure 101) to secure if. amplifier subassembly to 51Y-4/4A chassis. Avoid pinching wires.

G. Installation of Local Oscillator.

- (1) Reconnect any leads removed from local oscillator. Refer to figure 505.
- (2) Use four screws (5, figures 101, 102) to secure local oscillator loosely to 51Y-4/4A chassis.

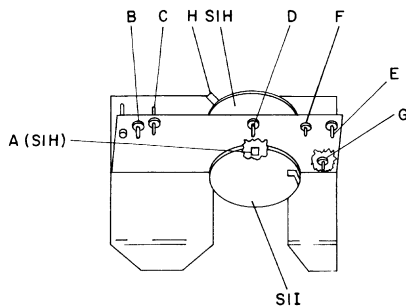
H. Installation of Mixer.

- (1) Reconnect any leads removed from mixer. Refer to figure 506.
- (2) Use six screws (4, figures 101, 102) to secure mixer loosely to 51Y-4/4A chassis.



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE/BLUE	MIXER, TERMINAL D
B	WHITE/BLUE	TUNING CAPACITOR GROUND
C	WHITE/BLUE	FIRST (FROM REAR) TUNING CAPACITOR STATOR
D	WHITE/RED/BLACK	RI27

Connections to Local Oscillator Assembly  
Figure 505



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE/BLACK	SENSE AMPLIFIER TERMINAL A
B	WHITE/BRN/RED	CI15 (BEHIND HINGE)
C	WHITE/BLACK	TERMINAL 2 OF T13
D	WHITE/BLUE	RF OSCILLATOR TERMINAL A
E	WHITE/BLUE	TUNING CAPACITOR GROUND
F	WHITE/BLUE	SECOND (FROM REAR) TUNING CAPACITOR STATOR
G	WHITE/BLUE	THIRD (FROM FRONT) TUNING CAPACITOR STATOR
H	WHITE/BROWN	SENSE AMPLIFIER

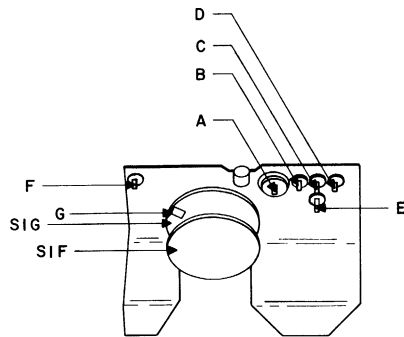
Connections to Mixer Assembly  
Figure 506

**I. Installation of Loop Amplifier.**

- (1) Reconnect any leads removed from loop amplifier. Refer to figure 507.
- (2) Use four screws (3, figures 101, 102) to secure loop amplifier loosely to 51Y-4/4A chassis.

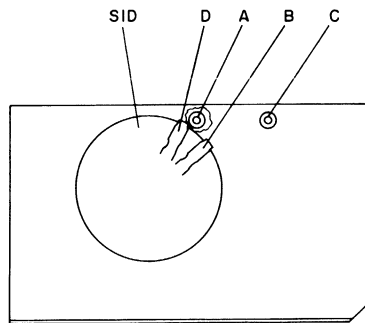
**J. Installation of Balanced Modulator.**

- (1) Reconnect any leads removed from balanced modulator. Refer to figure 508.
- (2) Use four screws (2, figures 101, 102) to secure balanced modulator loosely to 51Y-4/4A chassis.



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE/BLUE	BALANCED MODULATOR TERMINAL A
B	RED	TEFLON COVERED SHIELDED CABLE (MOTOR B3)
C	SHIELD	SHIELD FOR TEFLON COVERED CABLE
D	WHITE	TEFLON COVERED SHIELDED CABLE (MOTOR B3)
E	WHITE/RED/ORN	BALANCED MODULATOR TERMINAL C
F	WHITE/BLUE	TUNING CAPACITOR GROUND
G	WHITE/BLUE	SECOND (FROM FRONT) TUNING CAPACITOR STATOR

Connections to Loop Amplifier Assembly  
Figure 507



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE / BLUE	LOOP AMPLIFIER, TERMINAL A
B	WHITE	C9
C	WHT/RED/ORN	LOOP AMPLIFIER, TERMINAL E
D	BROWN	C67

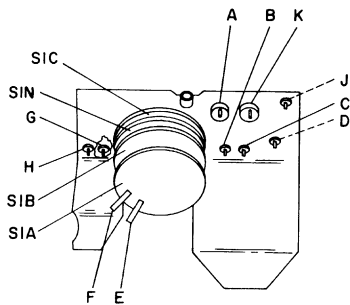
Connections to Balanced Modulator Assembly  
Figure 508

**K. Installation of Sense Amplifier.**

- (1) Reconnect any leads removed from sense amplifier. Refer to figure 509.
- (2) Use four screws (1, figures 101, 102) to secure sense amplifier loosely to 51Y-4/4A chassis.

**L. Installation of Switch Shaft.**

- (1) Check that all subassemblies containing switch wafers through which switch shaft (12, figure 101) will pass are fastened loosely to 51Y-4/4A chassis.
- (2) Remove dust cap on access hole in front panel of 51Y-4/4A.



TERMINAL	WIRE	ORIGIN OF WIRE
A (Q4 COLLECTOR)	WHITE/BLACK, SHIELDED	MIXER, TERMINAL A
B	GREEN	Q15
C	WHT/ORN/GRN	R100
D	GREEN	BALANCED MODULATOR, PRECISION RESISTOR
E	BUS	JI, PIN C
F	BUS	JI, PIN A
G	WHITE/BLUE	FIRST (FROM FRONT) TUNING CAPACITOR STATOR
H	WHITE/BLUE	ROTOR OF ABOVE SECTION
J	YELLOW	R9
K (Q2 COLLECTOR)	WHITE/BROWN, SHIELDED	MIXER, TERMINAL H

Connections to Sense Amplifier Assembly  
Figure 509

- (3) Insert switch shaft (12, figure 101) through hole in front panel and into slot in rotor of first switch wafer.
- (4) The dimples in the slots in switch wafer rotors should all be located on same flat of switch shaft when shaft has been completely inserted. Rotate switch shaft as necessary to accomplish this orientation while inserting switch shaft through each rotor in succession.
- (5) After switch shaft has been inserted, fasten rf cover shield on top of rf subassemblies.
- (6) Tighten central screws holding rf subassemblies to 51Y-4/4A chassis. The heads of central screws are located in indented area of right side of 51Y-4/4A chassis.
- (7) Tighten remaining screws securing rf subassemblies.
- (8) Use a torque meter to check that torque required to rotate switch shaft, with coupling to gear case disconnected, does not exceed 36 inch-ounces at approximately 20 rpm. If torque exceeds 36 inch-ounces, repeat steps (4) through (7).
- (9) Rotate switch shaft so dimples on switch rotors point toward upper right corner of 51Y-4/4A chassis.
- (10) Tighten setscrews engaging switch shaft and switch shaft coupling. One setscrew must bear on flat of switch shaft.
- (11) Replace rf cover shield.





(12) Ensure that spring (7) is securely in place over coupling (6). (Refer to figure 103.)

(13) Replace dust cap into hole on front panel of 51Y-4/4A.

M. Securing Rear of 51Y-4/4A Chassis.

NOTE: Do not secure the rear of the 51Y-4/4A chassis if the alignment or testing of the 51Y-4/4A is not complete.

(1) Swing rear of 51Y-4/4A chassis into same place as front of chassis.

(2) Secure rear of 51Y-4/4A chassis with four screws at rear of 51Y-4/4A top and bottom.

N. Installation of Dust Cover.

NOTE: Do not install the dust cover unless the alignment and testing procedures of the following sections have been accomplished, or the 51Y-4/4A is to be stored for some time prior to alignment and testing.

(1) Slide 51Y-4/4A chassis into dust cover.

(2) Tighten captive screw at rear of dust cover.

(3) Tighten clamping screws on each side of 51Y-4/4A immediately behind front panel.

4. LUBRICATION AFTER ASSEMBLY.

Apply gear lubricant, Collins part number 005-0732-00, to large gears in the gear case. Rotate gears by hand to spread lubricant to mating pinions.

The composition of the gear lubricant is given in figure 510.

CAUTION: AFTER THE APPLICATION OF GEAR LUBRICANT, DO NOT PERMIT THE GEAR CASE TO BE EXPOSED TO SETTLING DUST. REPLACE COVER (1), SCREWS (2), AND LOCKWASHERS (3) WHEN ADJUSTMENTS ARE NOT BEING MADE TO GEAR CASE.

Apply switch lubricant, Collins part number 005-0774-00, lightly to all 10 wafer switches in the rf section and the 3 wafer switches on the other side of the gear train. Use either a small touchup brush or a pipe cleaner.

NOTE: Switch lubricant, Collins part number 005-0774-00, consists of 25 percent by weight of Rykon grease no. 2 E.P. and 75 percent by weight of Stanisol solvent (both are Standard Oil Company products).

PARTS BY WEIGHT	COMPONENT
26	Beacon 325 grease
37	Butyl alcohol
37	Xylene

Gear Lubricant Composition  
Figure 510



## 5. INSPECTION AFTER ASSEMBLY.

### A. Wiring.

- (1) Ensure that wiring harness is not pinched between gearcase and chassis.
- (2) Ensure that wires are not broken at switches on rear of gearcase.
- (3) Ensure that wires are not exposed to abrasion.

### B. Gearcase.

- (1) Ensure that all gears in gearcase show evidence of lubrication.
- (2) Ensure that no grit or dirt has settled in gearcase after assembly.

### C. Tuning Capacitor.

Ensure that plates of tuning capacitor were not bent during assembly.

### D. Transistor Placement.

- (1) Ensure that correct type of transistors are installed in proper sockets.
- (2) Ensure that transistors are oriented properly in sockets.

## 6. ALIGNMENT.

Abnormal behavior or indications during alignment operations is evidence of faulty circuits in the 51Y-4/4A. Refer to the troubleshooting section of this manual for troubleshooting data relevant to any trouble encountered.

The following procedures require that the test equipment be connected to the 51Y-4/4A as shown in figure 701 or 702 as applicable. A list of test equipment required for the alignment of the 51Y-4/4A is shown in figure 1001.

### A. Adjustment of Tuning Servo Hunt Control.

**NOTE:** If there is a loss of tuning capacitor synchronization before applying power to the 51Y-4/4A, loosen the setscrews that secure the gear to the shaft of the tuning capacitor.

- (1) Position 614L-8 mode switch to ANT and frequency to 300 kHz.
- (2) Position 477V-2 or 477U-3 POWER switch to ON.
- (3) If gearcase cover (1) is in place, remove screws (2) and cover. (Refer to figure 103.)
- (4) Loosen locking nut on R111 (refer to figure 808). Rotate R111 fully clockwise.
- (5) Rotate 614L-8 TUNE control while observing operation of gear train connected to tuning capacitor.



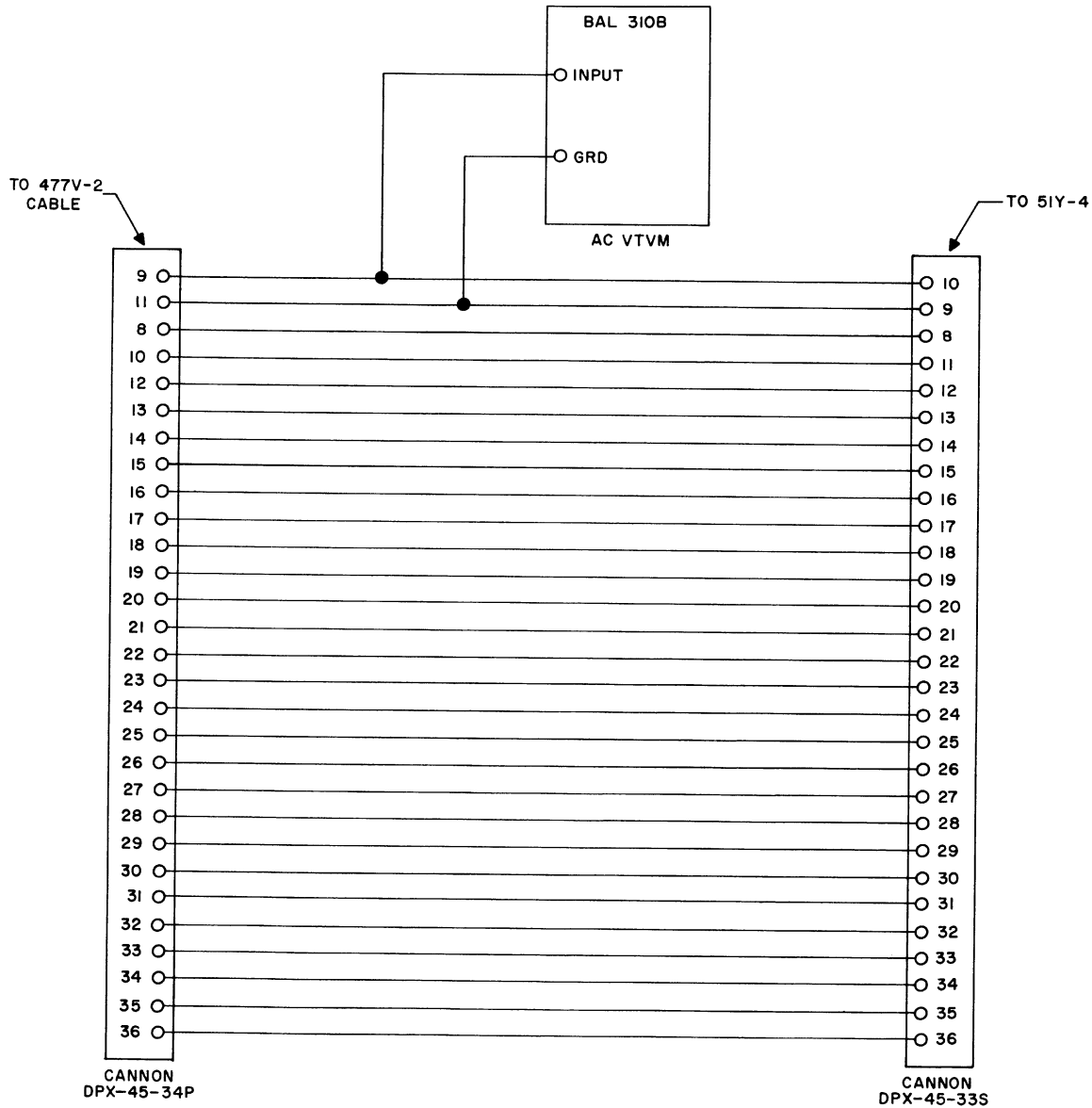
- (6) Rotate R111 counterclockwise until gear train overshoots the new proper position and reverses direction to correct. When this effect is small but noticeable, R111 is correctly adjusted.
- (7) Tighten locking nut on R111.

B. Band and Mode Switch Alignment.

- (1) Gain access to rear of gearcase as described in paragraph 2.B of disassembly section of manual.
- (2) Position 614L-8 mode switch to ANT.
- (3) Position 614L-8 band switch to .40-.84.
- (4) Position 477V-2 or 477U-3 POWER switch to ON.
- (5) Position 614L-8 mode switch to LOOP and back to ANT.
- (6) Note position of narrow tabs on switch rotors in front section of 51Y-4/4A chassis. The rotor tabs should be centered about either stator contacts or the space for a stator contact closest to rf cover.
- (7) Loosen screws (140), and rotate switch wafer (9) if tabs were not centered in step (6). (Refer to figure 103.)
- (8) Repeat steps (5), (6), and (7) until switch tabs are centered.
- (9) Tighten screws (140).

C. Synchronization of Tuning Capacitor.

- (1) Loosen setscrews (31) on tuning capacitor shaft. (Refer to figure 103.)  
NOTE: Fabricate test fixture shown in figure 511.
- (2) Connect test fixture and ac vacuum-tube voltmeter between 51Y-4/4A rear power receptacle and power cable from 477V-2 or 477U-3 as shown in figure 511.
- (3) Position 614L-8 band switch to .84-1.75.
- (4) Adjust 614L-8 TUNE control so that hairline bisects small circle to right of 1.4-MHz mark on drum dial.
- (5) Position 614L-8 mode switch to ANT.
- (6) Position 477V-2 or 477U-3 POWER switch to ON.
- (7) Slowly adjust 614L-8 TUNE control until ac vacuum-tube voltmeter indicates a null. Hairline of 614L-8 window should still lie within circle on drum dial. If it does not, 614L-8 ADF Control Unit is out of adjustment. Refer to 614L-8 overhaul manual.



Tuning Capacitor Synchronization Test Fixture, Schematic Diagram  
Figure 511



(8) Adjust shaft of tuning capacitor so that plates of rotor in oscillator section are fully meshed with plates of stator. Plates must be exactly meshed, with tops of stator plates exactly in line with tops of rotor plates.

(9) Tighten setscrews (31) which secure spur gear assembly to tuning capacitor shaft.

CAUTION: AFTER TIGHTENING SETSCREWS (31), DO NOT ROTATE 614L-8 TUNE CONTROL WITH TUNING CAPACITOR SYNCHRONIZATION TEST FIXTURE IN PLACE.

(10) Position 477V-2 or 477U-3 POWER switch to OFF.

(11) Remove capacitor synchronization test fixture from rear of 51Y-4/4A, and reconnect cable from 477V-2 or 477U-3 ADF Test Set.

(12) Slowly rotate tuning control clockwise, and note that capacitor rotor plates rotate out of mesh with stator plates.

D. Alignment of Oscillator.

(1) Position controls of 477V-2 or 477U-3, 614L-8, and internal adjustments of 51Y-4/4A as indicated in figure 512.

(2) Position 477V-2 or 477U-3 POWER switch to ON.

(3) Adjust 614L-8 frequency to 390 kHz.

(4) Adjust signal generator frequency to 390 kc  $\pm$ 0.1 kHz.

(5) Adjust C36 until zero beat is detected in 477V-2 speaker or at 477U-3 PHONE output.

UNIT	CONTROL OR ADJUSTMENT	SETTING
51Y-4/4A	R131 R82 R90	Fully clockwise Fully clockwise Fully clockwise
614L-8	BFO switch Mode switch Band switch	ON ANT .190-.400
477V-2 only	PHONE/SPEAKER/600 $\Omega$ switch 100 KC SPECTRUM switch	SPEAKER OFF
477V-2 or 477U-3	GONIO DRIVE switch	ON
Signal generator	Modulated 30 percent with 400 Hz	

Initial Control Settings for Alignment of Oscillator

Figure 512



- (6) Adjust 614L-8 frequency to 200 kc.
  - (7) Adjust signal generator frequency to 200 kc  $\pm$ 1.0 kc.
  - (8) The 614L-8 should now be tuned within 1.5 kc of zero beat. If not, remove cover of band 1 oscillator coil (refer to paragraph 2.K.(1) in the repair section of this manual), and adjust L3 for zero beat at 200 kc: Repeat steps (3) through (8) until zero beat is detected at both 200 and 390 kc.
  - (9) Temporarily replace L3 cover (do not solder).
  - (10) Adjust 614L-8 frequency to 800 kc.
  - (11) Adjust signal generator frequency to 800 kc  $\pm$ 0.1 kc.
  - (12) Adjust C40 for zero beat.
  - (13) Adjust 614L-8 to 420 kc.
  - (14) Adjust signal generator frequency to 420 kc  $\pm$ 0.1 kc.
  - (15) The 614L-8 should now be tuned within 2.5 kc of zero beat. If it is not, remove cover of band 2 oscillator coil (refer to paragraph 2.K.(1) in the repair section of this manual), and adjust L4 for zero beat at 420 kc; then repeat steps (10) through (15) until zero beat is detected at both 800 kc and 420 kc.
  - (16) Temporarily replace L4 cover (do not solder).
  - (17) Adjust 614L-8 to 1700 kc.
  - (18) Adjust signal generator frequency to 1700 kc  $\pm$ 0.1 kc.
  - (19) Adjust C44 for zero beat.
  - (20) Adjust 614L-8 to 900 kc.
  - (21) Adjust signal generator frequency to 900 kc  $\pm$ 0.1 kc.
  - (22) The 614L-8 should now be tuned within 5 kc of zero beat. If it is not, remove cover of band 3 oscillator coil (refer to paragraph 2.K.(1) in the repair section of this manual), and adjust L5 for zero beat at 900 kc; then repeat steps (17) through (22) until zero beat is detected at both 900 and 1700 kc.
  - (23) Replace coil covers and solder in place. (Refer to paragraph 2.K.(2) in the repair section of this manual.)
- E. RF Alignment and RF Balance Adjustment.
- (1) Position equipment controls as indicated in figure 512; however, for alignment of 51Y-4A, set sense adapter to 270 pf. (Refer to figure 702.)



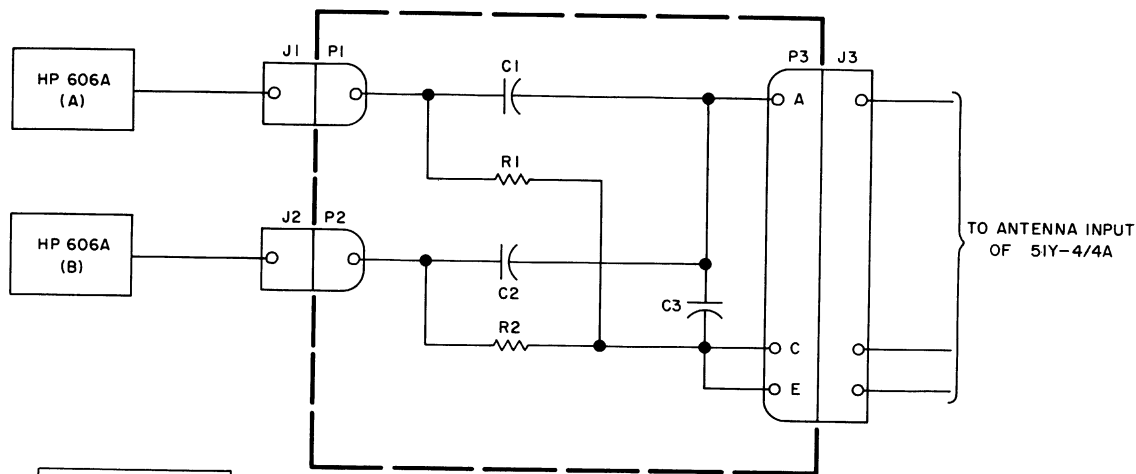
- (2) Position 477V-2 or 477U-3 POWER switch to ON.
  - (3) Adjust signal generator controls for a signal generator output modulated 30 percent with 400 Hz.
  - (4) Adjust 614L-8 to 390 kHz.
  - (5) Tune signal generator to 51Y-4/4A by listening for zero beat in 477V-2 speaker or at 477U-3 PHONE output.
  - (6) Position 614L-8 BFO switch to OFF.
  - (7) Adjust signal generator output amplitude and rf gain control for a reading of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- NOTE: Adjust the receiver GAIN control to approximately three-quarters maximum; then adjust signal generator output to produce 20-mw indication.
- (8) Adjust C16, C23, and C26 in succession for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
  - (9) The screwdriver slots in capacitors, step (8), should not be parallel to fore-to-aft axis of 51Y-4. If slots lie in this plane, T4, T7, or T10 (T104, T107, or T10 for 51Y-4A) must be readjusted. If transformer must be readjusted, proceed as follows:
  - (10) Adjust signal generator frequency to 200 kHz.
  - (11) Position 614L-8 BFO switch to BFO, and adjust 614L-8 until zero beat is detected in 477V-2 speaker or at 477U-3 PHONE output.
  - (12) Position 614L-8 BFO switch to OFF.
  - (13) Remove cover of transformer T104, T107, and T10. (Refer to paragraph 2.K.(1) in the repair section of this manual.
    - (a) Adjust output of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
    - (b) Adjust transformer T4 (T104 for 51Y-4A) for maximum indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
    - (c) Replace cover of T4 (T104 for 51Y-4A). (Refer to paragraph 2.K.(2) in the repair section of this manual.)
  - (14) Adjust 614L-8 to 800 kHz.
  - (15) Position 614L-8 BFO switch to BFO, and tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker or 477U-3 PHONE output.
  - (16) Adjust output of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
  - (17) Adjust C17, C24, and C27 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.



- (18) Repeat steps (9) through (17), but substitute C17, C24, and C27 for C16, C23, and C26; T5, T108, and T11 for T4, T107, and T10 (T105, T108, and T11 for T104, T107, and T10 for 51Y-4A); and 420 kHz for 200 kHz.
- (19) Adjust 614L-8 to 1700 kHz.
- (20) Position 614L-8 BFO switch to BFO, and tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker or 477U-3 PHONE output.
- (21) Position 614L-8 BFO switch to OFF.
- (22) Adjust output of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- (23) Adjust C18, C25, and C28 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- (24) Repeat steps (9) through (17), but substitute C18, C25, and C28 for C16, C23, and C26; T6, T9, and T12 for T4, T7, and T10 (T106, T109, and T12 for T104, T107, and T10 for 51Y-4A); and 900 kHz for 200 kHz.

NOTE: Steps (25) through (32) provide procedures to be used for rf balance adjustment.

- (25) Fabricate balance network, and interconnect 51Y-4/4A with signal generators as shown in figure 513.



PART VALUES		
	51Y-4A	51Y-4
R1	51 OHM	51 OHM
R2	51 OHM	51 OHM
C1	10 PF	43 PF
C2	10 PF	43 PF
C3	240 PF	3000PF

C746-128-3

RF Balance Adjustment Test, Interconnection Diagram  
Figure 513





(26) Position 614L-8 controls as follows:

- (a) BFO to OFF.
- (b) Mode to ANT.
- (c) Band to 1.
- (d) Frequency to 400 kHz.

(27) Adjust signal generator A for zero output.

(28) Adjust signal generator B for a 400-kHz, 30-percent modulated, 100-uv signal, and tune 51Y-4/4A for maximum audio output.

(29) Adjust 614L-8 GAIN control for an output of 20 mw.

(30) Adjust signal generator A for a 960-kHz output, and adjust signal generator B for a 560-kHz output.

NOTE: Do not change the 614L-8 GAIN control. Adjust the output of each signal generator for a 1-volt signal output, and tune signal generator A for maximum audio output.

(31) Adjust signal generator outputs to equal levels to produce a 20-mw audio output of 477V-2.

(32) Adjust R136 (figure 811) to maximum counterclockwise position, then rotate R136 5 turns clockwise. Adjust R136 for minimum audio output. The signal generator levels must be adjusted to maintain audio level between 10 and 20 mw at all times during adjustment.

NOTE: Balance must occur within  $\pm 3$  turns from this position.

F. Loop Amplifier Adjustment.

(1) Position equipment controls as indicated in figure 512.

(2) Position 477V-2 or 477U-3 POWER switch to ON.

(3) Position 614L-8 mode switch to LOOP.

(4) Rotate LOOP SIMULATOR 90 degrees with respect to BEARING INDICATOR.

(5) Adjust 614L-8 to 390 kHz.

(6) Position 614L-8 BFO switch to BFO.

(7) Tune signal generator to 614L-8 by listening for zero beat from 477V-2 speaker or at 477U-3 PHONE output.

(8) Position 614L-8 BFO switch to OFF.



- (9) Adjust output amplitude of signal generator for an indication of approximately 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- (10) Adjust C2 for a peak indication on reading 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- (11) Adjust 614L-8 frequency to 200 kHz.
- (12) Vary frequency of signal generator in vicinity of 200 kHz, and note peak indication of 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- (13) Adjust signal generator to 200 kHz, and note indication of 477V-2 meter or at 477U-3 AUDIO OUT jacks. The indication in this step must be within 1 db of indication noted in preceding step. If difference is more than 1 db, proceed as follows:
  - (a) Remove cover of transformer T1. (Refer to paragraph 2.K.(1) in the repair section of this manual.)
  - (b) Adjust signal generator to 200 kHz.
  - (c) Adjust output amplitude of signal generator for an indication of approximately 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
  - (d) Adjust transformer T1 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
  - (e) Repeat steps (4) through (13) until no further adjustment is required.
  - (f) Temporarily replace cover of transformer T1 (do not solder).
- (14) Position 614L-8 to 390 kHz.
- (15) Position 614L-8 BFO switch to BFO.
- (16) Tune signal generator to the 51Y-4/4A by listening for zero beat from 477V-2 speaker or at 477U-3 PHONE output.
- (17) Position 614L-8 BFO switch to OFF.
- (18) Adjust output amplitude of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- (19) Adjust C2 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.
- (20) Check that screwdriver slot of C2 is not parallel to fore-to-aft axis of 51Y-4/4A. Maladjustment of transformer T1 is indicated if C2 screwdriver slot is parallel to axis. Repeat steps (4) through (20).
- (21) Repeat steps (1) through (20), but substitute 420 kHz for 200 kHz, 800 kHz for 390 kHz, T2 for T1, and C3 for C2.
- (22) Repeat steps (1) through (20), but substitute 900 kHz for 200 kHz, 1700 kHz for 390 kHz, T3 for T1, and C4 for C2.
- (23) Replace T1, T2, and T3 covers, and solder in place. (Refer to paragraph 2.K.(2) in the repair section of this manual.)



G. Audio and IF. Amplifier Gain Adjustment.

- (1) Audio and if. gain set adjustment.
- (2) 614L-8 control positions:
  - (a) BFO to ON.
  - (b) Gain to maximum.
  - (c) Mode to ANT.
  - (d) Frequency to 200KC
  - (e) Input signal to 1000 uv/m modulated 30 percent at 400 Hz.
- (3) Adjust signal generator to receiver frequency by tuning for zero beat.
- (4) Position 614L-8 BFO switch to OFF. Adjust audio gain set control R82 (figure 808) to produce 100-mw audio output. Tighten R82 locknut.
- (5) Adjust signal generator output to 20 uv/m, modulated 30 percent at 400 Hz.
- (6) Adjust if. gain set control R90 (figure 811) for 80-mw output. Tighten locknut on R90.

H. Bearing Synchro Alignment.

- (1) Position 477V-2, 477U-2, or 477U-3 and 614L-8 controls as indicated in figure 514.
- (2) Adjust 614L-8 frequency to 390 kHz.
- (3) Adjust output of signal generator for approximately 390 kHz, unmodulated, at 1000 uv.
- (4) Tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker or at 477U-3 PHONE output. (Allow 477U-2 or 477U-3 BEARING INDICATOR to stabilize.)
- (5) Position 614L-8 BFO switch to OFF.
- (6) Note and record indication of 477U-2 or 477U-3 BEARING INDICATOR.
- (7) Position 614L-8 mode switch to LOOP.
- (8) Use 614L-8 LOOP L-R switch to return 477U-2 or 477U-3 BEARING INDICATOR needle to indication recorded in step (6).
- (9) Use 614L-8 LOOP L-R switch to reduce to a minimum tone heard in 477V-2 speaker or at 477U-3 PHONE output. The BEARING INDICATOR should indicate approximately the bearing noted in step (6).
- (10) Note position of spur gear assembly (73) with respect to the gearcase. (Refer to figure 103.) Gear position may be marked with a soft crayon.



UNIT	CONTROL OR ADJUSTMENT	POSITION OR SETTING
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	100 KC SPECTRUM switch PHONE/SPEAKER/600 $\Omega$ switch METER FUNCTION switch	OFF SPEAKER X10
477U-2	LOOP SIMULATOR control	0 degree
614L-8	GAIN control Function switch BFO switch	Fully clockwise ADF BFO

Control Settings for Synchro Alignment  
Figure 514

- (11) Position 477V-2 or 477U-3 GONIO DRIVE switch to OFF.
- (12) Rotate spur gear assembly (79) as necessary to expose setscrew (80) and loosen setscrews. (Refer to figure 103.)
- (13) Rotate spur gear assembly (73) back to position noted in step (10).
- (14) Lock shaft of loop servo motor (157). (Refer to figure 103.) Shaft may be locked by a rubber band placed over gear or shaft and stretched to some other part of 51Y-4/4A chassis.
- (15) Slide spur gear assembly (79) along synchro (162) shaft until groove in gear (119) is reached. (Refer to figure 103.)
- (16) Rotate spur gear assembly (79) and synchro shaft until 477U-2 or 477U-3 BEARING INDICATOR indicates as close to zero degree as possible.
- (17) Rotate gear (82), without rotating gear (84), until a right-hand loading of six teeth (after slack takeup) is achieved. (Refer to figure 103.)
- (18) Slide spur gear assembly (79) along synchro shaft (162) until spur gear assembly (79) is meshed properly with gear (119). Hold gears (82, 84) so that loading is not lost. (Refer to figure 103.)
- (19) Tighten setscrews (80).
- (20) Remove rubber band from loop servomotor shaft.



- (21) Position 477V-2 or 477U-3 GONIO DRIVE switch to ON.
- (22) Loosen four screws to swing away hinged assembly.
- (23) Loosen three screws (163) just enough to rotate synchro shaft (162). (Refer to figure 103.)
- (24) Use 614L-8 LOOP L-R switch to reposition bearing indicator to null position near zero degree indication on 477U-2 or 477U-3 BEARING INDICATOR. Null position is the point at which 477V-2 meter indicates as close to zero as possible.
- (25) Rotate synchro shaft (162) until 477U-2 BEARING INDICATOR indicates zero degree.
- (26) Tighten three screws (163).
- (27) Replace four screws to secure hinged assembly.





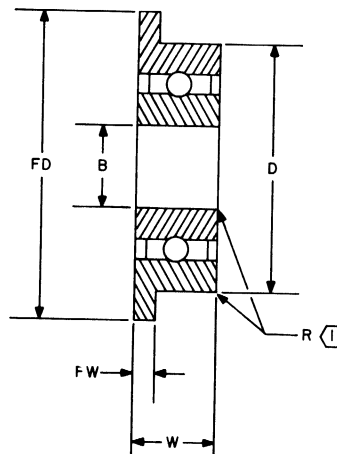
## 51Y-4/4A ADF Receiver - Fits and Clearances

### 1. GENERAL.

Included within this section are all fits and clearances for ball bearings located in the front and rear gearplates of the 51Y-4/4A. The index number for each bearing corresponds to the index numbers on figure 103. Items included are permissible wear tolerances, Collins part number, radial play, and dimensions. Refer to figures 601, 602.

INDEX	BORE DIA B	OUTSIDE DIA D	RING WIDTH W	LUBRICATION	FLANGE		RADIUS R	RADIAL PLAY	COLLINS PART NUMBER
					WIDTH FW	DIA FD			
59 through 66, 68, 69, 128, 129, and 131 through 139	0.1250	0.3125	0.1406	MIL-L-6085	0.031	0.359	0.006	0.0001- 0.0005	309-1519-00
67 and 130	0.1250	0.2500	0.1094	MIL-L-6085	0.031	0.296	0.005	0.0001- 0.0005	309-1518-00

51Y-4/4A Ball Bearing Data  
Figure 601



NOTE:  
Ⓡ RADIUS INDICATED IS MAXIMUM SHAFT OR HOUSING  
FILLET BEARING WILL CLEAR.



Tolerances for bearings listed in figure 601 are shown in figure 603. Runout indicated for inner ring is radial runout of bore with respect to inner ring ball groove. Runout indicated for outer ring is radial runout of outside diameter with respect to outer ring ball groove.

RING	BORE DIA	OUTSIDE DIA	RING WIDTH	RADIAL RUNOUT	FLANGE DIA	FLANGE WIDTH
INNER	-0.0002		-0.005	0.0002	+0.000	+0.000
OUTER		-0.0003	-0.005	0.0004	-0.005	-0.002

51Y-4/4A Bearing Tolerances  
Figure 603





## 51Y-4/4A ADF Receiver - Testing

### 1. GENERAL.

Included in this section are procedures for bench testing the 51Y-4/4A ADF Receiver.

Paragraph 4 gives procedures using the 477U-2 ADF Antenna Simulator and the 477V-2 ADF Test Set; paragraph 5 gives procedures using the 477U-3 ADF Test Set.

If the equipment fails to meet the specification of a particular test, refer to the troubleshooting section to locate the faulty stage or component.

### 2. EQUIPMENT REQUIRED.

Refer to figure 1001 for test equipment required for test.

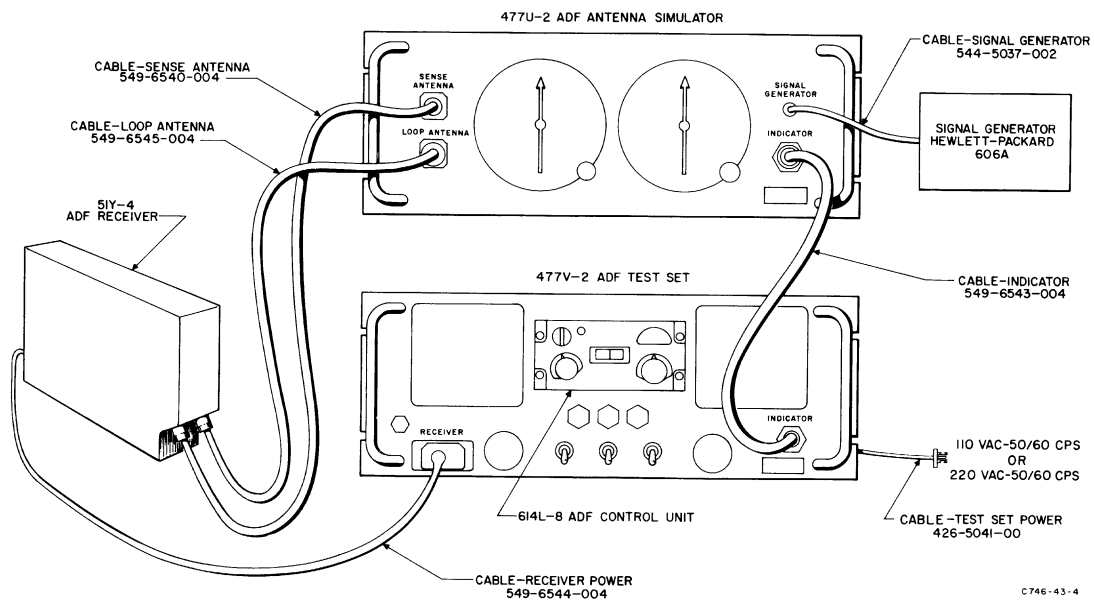
### 3. PRELIMINARY PROCEDURES.

For test setup, remove the dust cover from the 51Y-4/4A, and connect the 51Y-4/4A to the test equipment as shown in figure 701 or 702.

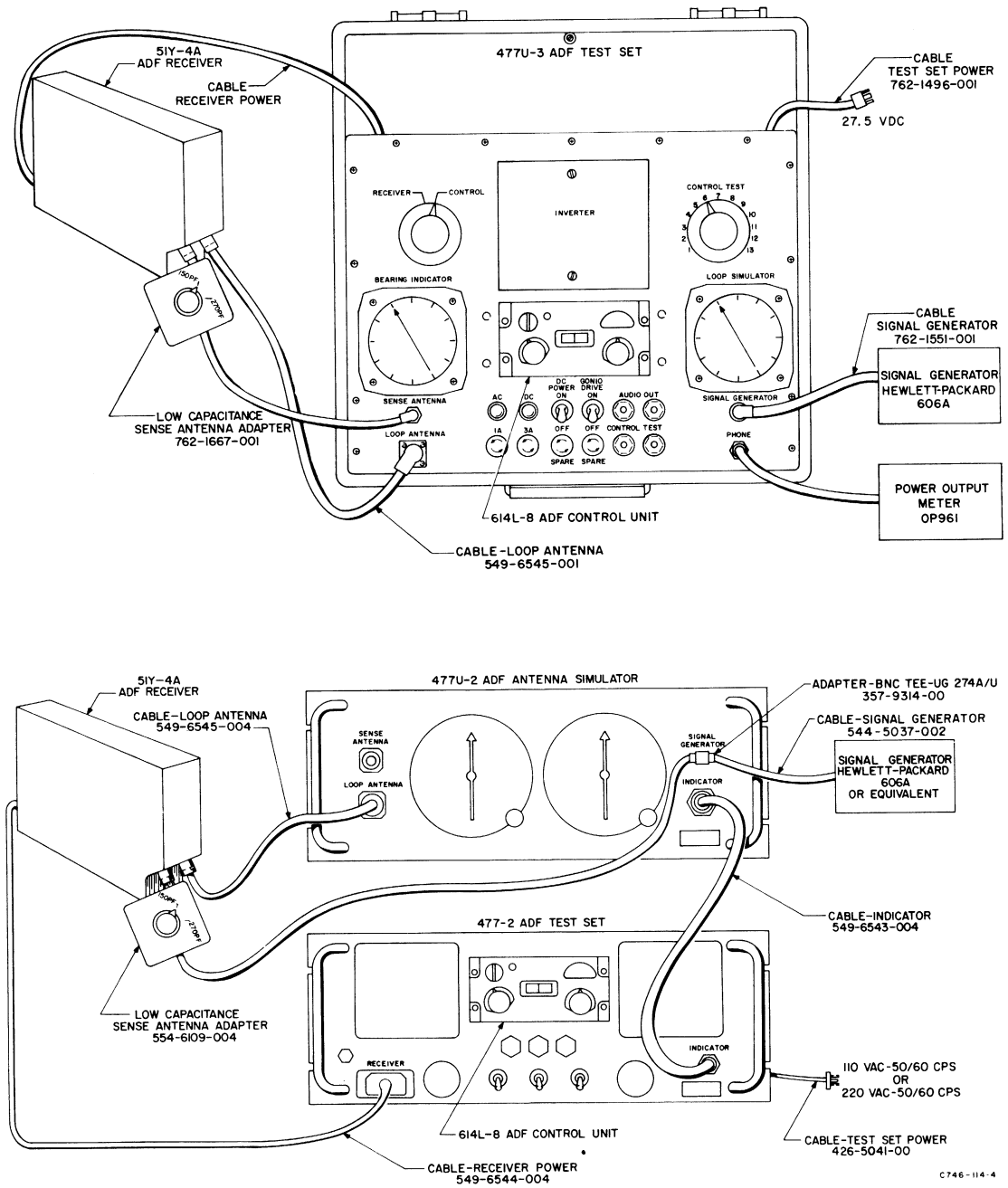
### 4. TEST PROCEDURES. (Using 477U-2 and 477V-2)

#### A. Antenna Sensitivity.

- (1) Position 614L-8 BFO switch to BFO.
- (2) Position 614L-8 GAIN control fully clockwise.
- (3) Position 614L-8 mode switch to ANT.
- (4) Position sense antenna adapter to 270 pf for 51Y-4A.
- (5) Position 477V-2 100 KC SPECTRUM switch to OFF.
- (6) Position 477V-2 PHONE/SPEAKER/600  $\Omega$  switch to SPEAKER. If phones are used, position switch to PHONE.
- (7) Position 477V-2 POWER switch to ON.
- (8) Adjust output of signal generator for a 200-kHz unmodulated signal.
- (9) Tune 51Y-4/4A to signal generator by adjusting 614L-8 band switch and TUNE controls to obtain zero beat signal from 477V-2 speaker or phones.
- (10) Position 614L-8 BFO switch to OFF. If desired, the 477V-2 PHONE/SPEAKER/600  $\Omega$  switch may be positioned to 600  $\Omega$  after tuning is accomplished.
- (11) Modulate input signal from signal generator 30 percent with 400 Hz.
- (12) Adjust signal generator attenuator to maximum signal generator output (uv) level specified in figure 703.



Test Interconnection Diagram with 51Y-4  
Figure 701



Test Interconnection Diagram with 51Y-4A  
Figure 702



- (13) Adjust 614L-8 GAIN control for a 20-mw indication on 477V-2 meter.
- (14) Remove signal generator modulation.
- (15) 477V-2 meter indication should drop at least 6 db.
- (16) Repeat steps (1) through (15) of this paragraph for each signal generator frequency shown in figure 703. (For the 51Y-4A, position sense adapter to 150 pf, and repeat steps (1) through (16) for each specified frequency.)

**B. Loop Sensitivity.**

- (1) Position 614L-8 mode switch to LOOP.
- (2) Position 477V-2 GONIO DRIVE switch to ON.
- (3) Adjust 477U-2 LOOP SIMULATOR control until 477U-2 LOOP SIMULATOR indicates 90 degrees more or less than 477U-2 BEARING INDICATOR.
- (4) Repeat steps (1), (2), and (5) through (10) of paragraph 4.A.
- (5) Modulate input signal from signal generator 30 percent with 400 Hz at level specified in figure 704.
- (6) Repeat steps (13), (14), and (15) of paragraph 4.A.
- (7) Repeat steps (1) through (6) of this paragraph for each signal generator frequency shown in figure 704.

SIGNAL GENERATOR FREQUENCY (kHz)	MAXIMUM SIGNAL GENERATOR OUTPUT (uv)		
	51Y-4	51Y-4A	
		270	150
200	30	50	40
390	40	25	20
420	20	35	28
800	35	20	17
900	15	25	22
1700	15	22	18

Antenna Sensitivity  
Figure 703

SIGNAL GENERATOR FREQUENCY (kHz)	MAXIMUM SIGNAL GENERATOR OUTPUT (uv)
200	100
390	75
420	80
800	50
900	50
1700	30

Loop Sensitivity  
Figure 704



C. ADF Sensitivity.

- (1) Position 614L-8 mode switch to ADF.
- (2) Position 477V-2 GONIO DRIVE switch to ON.
- (3) Repeat steps (1), (2), and (5) through (10) of paragraph 4.A.
- (4) Modulate input signal from signal generator 30 percent with 400 Hz at level specified in figure 705.
- (5) Repeat steps (13), (14), and (15) of paragraph 4.A.
- (6) Repeat steps (1) through (5) of this paragraph for each signal generator frequency shown in figure 705.

SIGNAL GENERATOR FREQUENCY (kHz)	MAXIMUM SIGNAL GENERATOR OUTPUT (uv)	
	51Y-4	51Y-4A
200	55	70
390	65	50
420	40	65
800	50	50
900	20	50
1700	20	25

D. ADF Bearing Threshold.

ADF Sensitivity  
Figure 705

- (1) Adjust signal generator for an output of 1000 uv at 200 kHz unmodulated.
- (2) Position 614L-8 mode switch to ADF.
- (3) Position 477V-2 GONIO DRIVE switch to ON.
- (4) Position 477V-2 POWER switch to ON.
- (5) Position 614L-8 BFO switch to BFO.
- (6) Position 477V-2 PHONE/SPEAKER/600  $\Omega$  switch to SPEAKER or PHONE.
- (7) Tune 51Y-4/4A to signal generator by adjusting the 614L-8 TUNE and GAIN controls to obtain zero beat from 477V-2 speaker or phones.
- (8) Position 614L-8 BFO switch to OFF.
- (9) Record indication of 477U-2 BEARING INDICATOR.

**NOTE:** This indication may be any point between 0 and 360 degrees.

- (10) Reduce output of signal generator to 40 uv.
- (11) Record indication of 477U-2 BEARING INDICATOR. The value recorded should be the same as that obtained in step (9)  $\pm 2$  degrees.

**NOTE:** Due to the presence of noise at the 40-uv input level, the reading of the BEARING INDICATOR will be slightly erratic. The average bearing should be recorded. The maximum fluctuation should be not more than 5 degrees. ADF HUNT CONTROL R131 (refer to figure 810) adjusts the amount of ADF needle



activity. When R131 is in the extreme clockwise position, the speed of taking a bearing and the needle activity is maximum. As R131 is turned counter-clockwise, the needle activity becomes slower. When R131 is set for approximately the needle hunt desired, the speed of taking a bearing should be checked per paragraph 4.E. If the speed is too slow, the control must be readjusted clockwise.

- (12) Check resolution as follows: Manually rotate loop to each side of indicated bearing, and note how much difference there is in indicated bearing when approaching it from either side. The difference should be less than 2 degrees.

**CAUTION:** PERFORMANCE CAN BE SERIOUSLY DEGRADED BY POSITIONING R131 TOO FAR FROM THE EXTREME CLOCKWISE POSITION.

- (13) Position 614L-8 mode switch to LOOP.
- (14) Use 614L-8 LOOP switch to rotate 477U-2 BEARING INDICATOR 175 degrees from its present position.
- (15) Position 614L-8 mode switch to ADF.
- (16) 477U-2 BEARING INDICATOR should rotate back to indication recorded in step (11).
- (17) Increase signal generator output to 0.1 volt.
- (18) 477U-2 BEARING INDICATOR should indicate within 2 degrees of indication recorded in step (11).

- (19) Repeat steps of this paragraph for each signal generator frequency shown in figure 706. The signal generator output, corresponding to that used in step (10), is also shown in figure 706.

SIGNAL GENERATOR FREQUENCY (kHz)	ADF BEARING THRESHOLD (uv)
200	40
390	40
420	35
800	35
900	25
1700	25

E. Hunting and Bearing Speed.

- (1) Adjust signal generator for an output of 1000 uv unmodulated at 300 kHz.
- (2) Repeat steps (2) through (10) of paragraph 4.D.
- (3) Total excursion of 477U-2 BEARING INDICATOR should be not more than 5 degrees.
- (4) Position 614L-8 mode switch to LOOP.

ADF Bearing Threshold  
Figure 706



- (5) Use 614L-8 LOOP L-R switch to rotate 477U-2 BEARING INDICATOR 175 degrees to right or left of its present reading.
- (6) Position 614L-8 mode switch to ADF.
- (7) No more than 7 seconds should elapse from time 51Y-4/4A switching mechanism stops rotating until 477U-2 resumes previous indication. (See paragraph D, steps (11) and (12).

F. Audio Output Level.

- (1) Adjust signal generator for an output of 1000 uv modulated 30 percent with 400 Hz at 300 kHz.
- (2) Repeat steps (2) through (8) of paragraph 4.D.
- (3) Position 477V-2 PHONE/SPEAKER/600Ω to 600Ω.
- (4) Position 477V-2 METER FUNCTION switch to AUDIO MW X 10. The 477V-2 meter should indicate not less than 80 mw (100 mw nominal).

G. Frequency Accuracy.

- (1) Position 614L-8 BFO switch to BFO.
- (2) Position 477V-2 POWER switch to ON.
- (3) Position 477V-2 PHONE/SPEAKER/600Ω switch to SPEAKER. PHONE position may be used if phones are connected to 477V-2 PHONE jack.
- (4) Position 477V-2 100 KC SPECTRUM switch to ON.
- (5) Adjust 614L-8 GAIN control as desired.
- (6) Adjust 614L-8 to zero beat at 100-kHz increments from 200 kHz to 1700 kHz as indicated in 614L-8 frequency window. Zero beats should occur within limits shown in figure 707.

BAND	FREQUENCY (kHz)	LIMITS (kHz)
1	200	±1.5
1	300	±1.5
1	400	±1.5
2	400	±2.5
2	500	±2.5
2	600	±2.5
2	700	±2.5
2	800	±2.5
3	900	±5.0
3	1100	±5.0
3	1300	±5.0
3	1500	±5.0
3	1700	±5.0

Frequency Calibration  
Figure 707



5. TEST PROCEDURES. (Using 477U-3.) (Refer to figure 702.)

A. Antenna Sensitivity.

- (1) Position 614L-8 BFO switch to OFF.
- (2) Adjust 614L-8 GAIN control fully clockwise.
- (3) Position 614L-8 mode switch to ANT.
- (4) Position 477U-3 POWER switch to ON.
- (5) Position sense antenna adapter to 270 pf.
- (6) Adjust the output of HP-606A for 200-kHz, and the output level to the setting given in figure 703. Set modulation for 30 percent with 400 Hz.
- (7) Carefully tune DF-203 to signal generator frequency. This is done by adjusting 614L-8 band switch and TUNE control to obtain maximum audio signal power indication on OP961.
- (8) Find a setting of 614L-8 GAIN control and signal generator attenuator so that:
  - a. OP961 indicates 20 milliwatts with signal generator modulation on.
  - b. OP961 indicates a drop of 6 db when signal generator modulation is off.
- (9) Signal generator rf output should be not more than that shown in figure 703.
- (10) Repeat steps (6) through (9) for each signal generator frequency listed in figure 703.
- (11) Position sense antenna adapter (used with 51Y-4A only) to 150 pf and repeat steps (6) through (10).

B. Loop Sensitivity.

- (1) Position 614L-8 mode switch to LOOP.
- (2) Position 477U-3 GONIO DRIVE switch to ON.
- (3) Adjust 477U-3 LOOP SIMULATOR control until 477U-3 LOOP SIMULATOR indicates 90 degrees more or less than 477U-3 BEARING INDICATOR.
- (4) Adjust the output of HP-606A for 200-kHz, and the output level to the setting given in figure 704. Set modulation for 30 percent with 400 Hz.
- (5) Repeat steps (7) and (8) of paragraph A.
- (6) Signal generator rf output should be not more than that shown in figure 704.
- (7) Repeat steps (4) through (6) for each signal generator frequency listed in figure 704..





C. ADF Sensitivity.

- (1) Position 614L-8 mode switch to ADF.
- (2) Position 477U-3 GONIO DRIVE switch to ON.
- (3) Adjust the output of HP-606A for 200-kHz, and the output level to the setting given in figure 705. Set modulation for 30 percent with 400 Hz.
- (4) Repeat steps (7) and (8) of paragraph A.
- (5) Signal generator rf output should be not more than that shown in figure 705.
- (6) Repeat steps (3) through (5) for each signal generator frequency listed in figure 705.

D. ADF Bearing Threshold

- (1) Adjust HP-606A for an output of 1000 microvolts at 200-kHz unmodulated.
- (2) Position 614L-8 mode switch to ADF.
- (3) Position 477U-3 GONIO DRIVE switch to ON.
- (4) Position 477U-3 POWER switch to ON.
- (5) Position 614L-8 BFO switch to OFF.
- (6) Tune DF-203 to signal generator frequency by adjusting 614L-8 band switch and TUNE control to obtain maximum audio signal power indication on OP961.
- (7) Record indication of 477U-3 BEARING INDICATOR.
- (8) Reduce output of signal generator to 40 uv.
- (9) Record indication of 477U-3 BEARING INDICATOR. Value recorded should be the same as that obtained in step (7),  $\pm 2$  degrees.

NOTE: Due to the presence of noise at the low input level, the reading of the 477U-3 BEARING INDICATOR will be slightly erratic. The average bearing should be recorded. The maximum fluctuation should be not more than 5 degrees.

- (10) Position 614L-8 mode switch to LOOP.
- (11) Use 614L-8 LOOP switch to rotate 477U-3 BEARING INDICATOR 175 degrees from present position.
- (12) Position 614L-8 mode switch to ADF.
- (13) 477U-3 BEARING INDICATOR should rotate back to indication recorded in step (9).
- (14) Increase signal generator output to 0.1 volt.



- (15) 477U-3 BEARING INDICATOR should indicate within 2 degrees of bearing recorded in step (9).
- (16) Repeat steps of this paragraph for each signal generator frequency shown in figure 706. Signal generator output corresponding to step (8) is also shown in this figure.

E. Hunting and Bearing Speed.

- (1) Adjust HP-606A for an output of 1000 microvolts unmodulated at 300 kHz.
- (2) Repeat steps (2) through (6) of paragraph (D).
- (3) Total excursion of 477U-3 BEARING INDICATOR should be not more than 5 degrees.
- (4) Position 614L-8 mode switch to LOOP.
- (5) Use 614L-8 LOOP switch to rotate 477U-3 BEARING INDICATOR 175 degrees to right or left of present position.
- (6) Position 614L-8 mode switch to ADF and measure time required for 477U-3 BEARING INDICATOR to resume previous position.
- (7) Elapsed time measured in step (6) should be not more than 7 seconds.

F. Audio Output Level.

- (1) Adjust HP-606A for an output of 1000 microvolts at 200 kHz, modulated 30 percent with 400 Hz.
- (2) Tune DF-203 by adjusting for zero beat with 614L-8 BFO switch on; then position BFO switch to OFF.
- (3) Adjust 614L-8 GAIN control maximum clockwise.
- (4) OP961 should indicate not less than 80 milliwatts (100 mw nominal).

G. Frequency Accuracy

- (1) Position 614L-8 BFO switch to BFO.
- (2) Adjust HP-606A for an output of 1000 microvolts at 200 kHz unmodulated. Use HP-5532A electronic counter to ensure accurate adjustment of frequency.
- (3) Carefully tune DF-203 to signal generator frequency by adjusting 614L-8 band switch and TUNE control to obtain a zero beat.
- (4) Read the frequency shown on 614L-8 dial and record the difference from the input frequency.
- (5) The difference in frequency recorded will be not more than 1.5 kHz from the input frequency.
- (6) Repeat steps (2) through (4) for each signal frequency listed in figure 707.
- (7) The differences in frequency recorded in step (6) will be within the limits shown in figure 707.



## 51Y-4/4A ADF Receiver - Troubleshooting

### 1. GENERAL.

Included within this section are troubleshooting procedures, troubleshooting charts, control settings, test points, and 51Y-4/4A schematic diagrams with operating voltages.

Procedures in this section can be used to determine, in sequence, the gain of each stage of the 51Y-4/4A. Use the gain measurement procedures to locate the faulty or inoperative stage, then use normal component tests to locate the source of trouble within each stage. Typical dc voltage levels for each stage are shown in figure 813 for the 51Y-4, and figure 814 for the 51Y-4A.

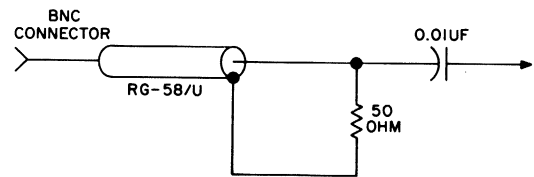
After a difficulty is located and repaired, the equipment should be completely tested to verify that the repairs have not affected other portions of the circuit. Refer to the testing section of this manual.

### 2. EQUIPMENT REQUIRED.

The test equipment required for troubleshooting the 51Y-4/4A is listed in figure 1001. Figure 801 shows the schematic diagram for the 50-ohm probe used in troubleshooting the 51Y-4/4A.

### 3. PRELIMINARY PROCEDURES.

For the initial setup remove the dust cover from the 51Y-4/4A and connect the 51Y-4/4A to the test equipment as shown in figure 701 or 702.



50-Ohm Probe, Schematic Diagram  
Figure 801

### 4. GAIN MEASUREMENTS.

#### A. Gain of IF. Amplifier.

- (1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF



- (2) Connect a dc vtvm between ground and cathode of CR1.
- (3) Connect agc test point E60 located on if. amplifier subassembly near R90 to ground.
- (4) Adjust R90 fully clockwise. (Refer to figure 811.)
- (5) Connect signal generator through 50-ohm probe between ground and collector of Q11.
- (6) Adjust frequency output of signal generator to 142.5.kHz modulated 30 percent at 400 Hz. Adjust output amplitude as necessary for a 5.0-volt dc indication on dc vtvm.
- (7) Output of signal generator should be approximately 2.1 volts. If output of signal generator is abnormally high, check Z1, detector, and noise limiter circuitry.
- (8) Connect signal generator to base of Q11.
- (9) Repeat step (6). A typical output of signal generator is 0.50 volt. If output of signal generator is abnormally high, check Q11 and associated circuitry.
- (10) Connect signal generator to collector of Q10, and repeat step (6). A typical output of signal generator is 3.0 volts. If output of signal generator is abnormally high, check T17.
- (11) Connect signal generator to base of Q10, and repeat step (6). If output of signal generator is much more than typical 67-mv reading, replace Q10, and check associated circuitry.
- (12) Connect signal generator to collector of Q9 and repeat step (6). If output of signal generator is much more than typical 380-mv reading, check T16.
- (13) Connect signal generator to base of Q9, and repeat step (6). Output of signal generator should not be much greater than typical 13.5-mv reading. If it is, third if. amplifier is not operating properly. Replace Q9, and check associated circuitry.
- (14) Connect signal generator to collector of Q8, and repeat step (6). If output of signal generator greatly exceeds a typical reading of 76 mv, misalignment of T15 is indicated.

(Figure 801A deleted.)

- (15) Connect signal generator to base of Q8, and repeat step (6). Replace Q8 and check associated circuitry if output of signal generator greatly exceeds 270 uv.
- (16) Connect signal generator to collector of Q7, and repeat step (6). If output of signal generator greatly exceeds typical 2.5-mv reading, T14 is probably misaligned.
- (17) Connect signal generator to base of Q7, and repeat step (6). Replace Q7 if output of signal generator greatly exceeds typical reading of 6.5 uv.

NOTE: Record the output of the signal generator for future reference.



(18) Connect signal generator to collector of Q5. Transformer T13 is probably misaligned if output of signal generator greatly exceeds typical reading of 110 uv.

(19) Refer to paragraph 6.G in assembly section of this manual for alignment instructions needed to reset R90.

B. Operation of Detectors.

(1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Adjust signal generator controls for a signal generator output of approximately 2.8 uv modulated 30 percent with 400 Hz at 142.5 kHz.

(3) Connect signal generator between base of Q9 and ground.

(4) Connect dc vtvm between cathode of CR1 and ground, and connect agc test point E60 to ground. (Agc test point is located on if. amplifier subassembly near R90.)

(5) Adjust output amplitude of signal generator until dc vtvm indicated 0.013 volt.

(6) Connect ac vtvm between cathode of CR1 and ground.

(7) The ac vtvm should indicate approximately 0.8 volt; if not, check components of detector CR1, CR2, and noise limiter circuitry.

(8) 614L-8 tuning meter should indicate approximately three divisions deflection. Full-scale reading of this meter is 100 ua so 3 divisions are equal to 60 ua. If meter indicates improperly, check CR10, C117, and R40.

(9) Connect a dc vtvm between agc test point E60 and ground. Remove jumper used in step (4).

(10) Increase output of signal generator until dc vtvm indicates +2.4 volts dc.



- (11) Use dc vtvm to measure potential between cathode of CR1 and ground. If this potential is much greater than typical 4.7 volts, check components of agc amplifier and CR3.

C. Gain of Audio Amplifier.

- (1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

- (2) Connect ac vtvm between cathode of CR1 and ground.
- (3) Adjust generator output to 142.5 kHz modulated 30 percent with 400 Hz at 2.8 mv.
- (4) Connect signal generator to base of Q9.
- (5) Adjust R82 fully clockwise. (Refer to figure 811.)
- (6) Adjust output amplitude of signal generator until ac vtvm indicates 0.77 volt ac.
- (7) Connect ac vtvm to base of Q12. Typical ac vtvm indication is 42 mv. A voltage much smaller than 42 mv indicates a defective component or connection in noise limiter or Q15 circuitry.
- (8) Connect ac vtvm to collector of Q12: Typical ac vtvm indication is 37 mv. Q12 or associated components are defective if indication is much below typical.
- (9) Connect ac vtvm to base of Q13. Typical ac vtvm indication is 33 mv. A reading much smaller than 33 mv indicates fault is in output circuitry of Q12.
- (10) Connect ac vtvm to collector of Q13. Typical ac vtvm indication is 860 mv. If indication is much less, replace Q13, and check output coupling circuitry.
- (11) Connect ac vtvm to collector of Q14. Typical ac vtvm indication is 5.2 volts. A smaller voltage indicates trouble in Q14 or associated components.
- (12) Meter on 477V-2 should indicate not less than 280 mv (connect ac vtvm to AUDIO OUT jacks of 477U-3 to measure level). If indication is much less, trouble lies in T20.



(13) After completing troubleshooting and repair, refer to paragraph 6.G in assembly section of this manual for alignment instructions needed to reset R82.

D. Output of Local Oscillator.

(1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Short first section of tuning capacitor C1A to ground.

(3) Connect an ac vtvm to E43. Typical indications of ac voltmeter are shown in figure 802 at 614L-8 frequencies shown in same figure.

(4) Remove short on first section of tuning capacitor.

E. Gain of Mixer Stage at IF. Frequency.

(1) Position test equipment controls as indicated in paragraph 4.D.

(2) Adjust R90 to maximum clockwise position.

(3) Connect signal generator to 50-ohm probe, and connect 50-ohm probe to test point E40 shown in figure 811.

(4) Adjust signal generator frequency to 142.5 kHz.

(5) Position 614L-8 BFO switch to BFO.

(6) Tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker.

(7) Position 614L-8 BFO switch to OFF.

614L-8 FREQUENCY (kHz)	TYPICAL LOCAL OSCILLATOR OUTPUT (volt)
200	0.20
320	0.27
390	0.32
420	0.30
650	0.36
800	0.38
950	0.47
1350	0.50
1750	0.52

Output of Local Oscillator  
Figure 802



- (8) Connect dc vtvm to cathode of CR1.
- (9) Short agc bus to ground.
- (10) Note output of signal generator required to produce an indication of 5.0 volts dc on dc vtvm.
- (11) A typical ratio of indication recorded in step (17) of paragraph 4.A. to indication recorded in previous step is 1:1.
- (12) Repeat steps (1) through (11) for frequencies shown in figure 803. Typical gain at each frequency is also shown.
- (13) Remove short on agc bus.
- (14) Reset R90. Refer to paragraph 6.G. in assembly section of this manual for alignment instructions needed to reset R90.

614L-8 FREQUENCY (kHz)	TYPICAL GAIN
320	1.200
390	1.200
420	1.050
650	1.000
800	0.985
950	0.775
1350	0.775
1750	0.775

Gain of Mixer at IF. Frequency  
Figure 803

F. Gain of Mixer Stage at Receiver Frequency.

- (1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

- (2) Adjust R90 to maximum clockwise position.
- (3) Connect signal generator to test point E40 through 50-ohm probe (figure 811).
- (4) Connect test point E60 to ground.





- (5) Adjust 614L-8 to 200 kHz.
- (6) Position 614L-8 BFO switch to BFO.
- (7) Tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker.
- (8) Position 614L-8 BFO switch to OFF.
- (9) Connect dc vtvm to cathode of CR1.
- (10) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm.
- (11) Divide indication recorded in paragraph 4.A.(17) of this section by output of signal generator. A typical ratio is 0.52.
- (12) Repeat steps (5) through (11) for frequencies shown in figure 804. Typical ratio for each frequency is also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	0.50
390	0.52
420	0.72
650	0.59
800	0.54
950	0.54
1350	0.50
1750	0.38

Gain of Mixer at Receiver Frequency  
Figure 804

G. Gain of RF Amplifier.

- (1) Position test equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP BFO Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

- (2) Short E60, shown in figure 811, to ground.
- (3) Connect signal generator to 477U-2.



- (4) Adjust output amplitude of signal generator to 100 uv.
- (5) Tune 614L-8 to zero beat as detected by 477V-2 speaker.
- (6) Position 614L-8 BFO switch to OFF.
- (7) Connect dc vtvm to cathode of CR1.
- (8) Adjust LOOP SIMULATOR 90 degrees from indicated bearing or maximum meter indication.
- (9) Adjust R90 for an indication of 5.0 volts dc on meter connected in step (7).
- (10) Connect signal generator to base of Q4 through 50-ohm probe.
- (11) Position 614L-8 mode switch to ANT.
- (12) Adjust signal generator to 200 kHz.
- (13) Position 614L-8 BFO switch to BFO.
- (14) Tune 614L-8 to signal generator by listening for zero beat from 477V-2 speaker. Position 614L-8 BFO switch to OFF.

(15) Note output of signal generator required to produce an indication of 5.0 volts on dc vtvm.

(16) Connect signal generator probe to test point E40 (figure 811).

(17) Note signal generator output required to produce an indication of 5.0 volts on dc vtvm.

(18) Divide indication obtained in step (17) by indication obtained in step (15). A typical ratio is 32.

(19) Repeat steps (1) through (18) for frequencies shown in figure 805. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	67.0
390	50.0
420	54.3
650	40.0
800	28.6
950	46.1
1350	46.7
1750	28.1

H. Gain of Sense Antenna Input Circuitry.

- (1) Position test equipment controls as follows:

Gain of RF Amplifier  
Figure 805



UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP BFO Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Adjust R90 as described in steps (1) through (9) of paragraph 4.G.

(3) Position 614L-8 mode switch to ANT.

(4) Adjust signal generator for maximum deflection of dc vtvm.

(5) Measure output amplitude of signal generator required to produce an indication of 5.0 volts on dc vtvm.

(6) Divide indication recorded in step (15) of preceding paragraph by indication recorded in step (5). Typical ratio is 0.05.

(7) Repeat steps of this paragraph for frequencies shown in figure 806. Approximate ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	0.029
390	0.014
420	0.026
650	0.022
800	0.018
950	0.065
1350	0.034
1750	0.060

I. Gain of Balanced Modulator.

(1) Position test equipment controls as follows:

Gain of Sense Antenna Input Circuitry  
Figure 806



UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

- (2) Connect test point E60 to ground, and adjust R90 as described in paragraph 4.G.(1) through (9).
- (3) Connect signal generator to base of Q4 through 50-ohm probe.
- (4) Adjust frequency output of signal generator for peak indication of dc vtm.
- (5) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtm. Record signal generator output.
- (6) Connect signal generator to base of Q3 through 50-ohm probe.
- (7) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtm.
- (8) Divide value recorded in step (5) by output of signal generator required in step (7). A typical ratio is 0.73.
- (9) Repeat steps of this paragraph for frequencies shown in figure 807. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	1.600
390	1.200
420	1.300
650	1.820
800	2.140
950	0.715
1350	0.690
1750	0.875

Gain of Balanced Modulator  
Figure 807



J. Gain Measurements of Loop Amplifier and Phase-Shift Network.

(1) Position equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Adjust R90 as described in paragraph 4.G.(1) through (9).

(3) Connect test point E60 to ground.

(4) Connect signal generator to base of Q3 through 50-ohm probe.

(5) Adjust frequency output of signal generator to 200 kHz.

(6) Tune 614L-8 to signal generator as indicated by maximum deflection of dc vtm.

(7) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtm. Record output amplitude of signal generator.

(8) Connect signal generator to base of Q1 through 50-ohm probe.

(9) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtm.

(10) Divide indication recorded in step (7) by present output of the signal generator. A typical ratio is 4.6.

(11) Repeat steps of this paragraph for each frequency shown in figure 808. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	9.45
390	9.66
420	9.10
650	8.15
800	8.20
950	5.90
1350	5.90
1750	5.15

Gain of Loop Amplifier and  
Phase-Shift Network  
Figure 808



K. Gain of Loop Antenna Input Circuitry.

(1) Position equipment control as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

- (2) Connect test point E60 to ground.
- (3) Adjust R90 as described in paragraph 4.G.(1) through (9).
- (4) Adjust signal generator frequency to 200 kHz.
- (5) Connect dc vtm to cathode of CR1.
- (6) Connect signal generator to base of Q1 through 50-ohm probe.
- (7) Tune 614L-8 to signal generator as indicated by maximum deflection of dc vtm.
- (8) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtm. Record output amplitude of signal generator.
- (9) Connect signal generator to 477U-2 or to 477U-3.
- (10) Adjust LOOP SIMULATOR to 90 degrees more than indication of BEARING INDICATOR.
- (11) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtm.
- (12) Divide indication recorded in step (8) by present output amplitude of signal generator. A typical ratio is 0.0082.
- (13) Repeat steps of this paragraph for frequencies shown in figure 809. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	0.017
390	0.026
420	0.011
650	0.022
800	0.021
950	0.020
1350	0.023
1750	0.032

Gain of Loop Antenna  
Input Circuitry  
Figure 809



L. Gain of Loop Servo Amplifier and Synchronous Filter.

(1) Position equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Position 614L-8 BFO switch to BFO.

(3) Connect signal generator to 477U-2 or to 477U-3.

(4) Adjust frequency output of signal generator to 300 kHz.

(5) Tune 614L-8 to signal generator as detected by zero beat from 477V-2 speaker.

(6) Position 614L-8 BFO switch to OFF.

(7) Connect an ac vtvm to emitter of Q16.

(8) Position 614L-8 mode switch to ADF.

(9) Lock shaft of loop servo motor B5 when 477U-2 or 477U-3 BEARING INDICATOR and LOOP SIMULATOR both have same indication. Shaft of loop servo motor is most easily locked with a rubberband stretched between gear on motor shaft and a corner of 51Y-4/4A chassis.

(10) Adjust 477U-2 or 477U-3 LOOP SIMULATOR clockwise as necessary for an indication of 20 mv on ac vtvm.

(11) Adjust R131 to maximum clockwise position.

(12) Measure ac voltages at points shown in figure 810. Typical voltages for each point of measurement are also shown. If voltage at any point is much less than typical voltage shown, check transistor and circuitry associated with points shown in figure 810.

(13) Reset R131 per paragraph 4.D.(11) and (12) in testing section of this manual.



POINT OF MEASUREMENT	TYPICAL VOLTAGE AT POINT OF MEASUREMENT
Q17 base	1.7 mv
Q17 collector	4.0 mv
Q18 base	4.1 mv
Q18 collector	3.0 volts
T18 pin 1	2.9 volts
T18 pin 3	450.0 mv
T18 pin 5	450.0 mv
B5 red	6.0 volts
B5 black	5.6 volts
B5 green	4.1 volts
Q23 collector	4.1 volts
Q23 base	2.0 volts
Q22 collector	2.0 volts

Loop Servo-Voltage Measurements  
Figure 810

M. Selected Components.

This paragraph provides the test procedures required to determine the correct value of selected components.

(1) Selection of C151 and C153.

Capacitors C151 and C153 are selected from 47 uf, 56 uf, 68 uf, or 100 uf to obtain a frequency of  $110 \pm 6$  Hz from the 110-Hz oscillator. This selection is necessary due to variations in components of the oscillator circuitry.

(a) Position the equipment controls as follows.





UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch	ADF OFF
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON OFF
477V-2 only	100 KC SPECTRUM switch	OFF

- (b) Refer to figure 811. Unsolder and disconnect one end of C153 from point P or from point Q. Select a capacitor combination from the following table. Connect the selected capacitor combination between point P and the positive side of C151.

CAPACITOR COMBINATIONS	TOTAL SERIES CAPACITANCE
47 uf and 47 uf	23.5 uf
47 uf and 56 uf	25.6 uf
47 uf and 68 uf	27.8 uf
56 uf and 56 uf	28.0 uf
56 uf and 68 uf	30.7 uf
47 uf and 100 uf	32.0 uf
68 uf and 68 uf	34.0 uf
56 uf and 100 uf	46.0 uf
68 uf and 100 uf	40.5 uf
100 uf and 100 uf	50.0 uf

- (c) Connect frequency counter probe to point V and measure the frequency out of the 110-Hz oscillator. If the frequency is lower than 104 Hz, a capacitor combination with a lower total capacitance will be required. If the frequency is above 116 Hz, a capacitor combination with a higher total capacitance will be required. Several attempts may be necessary to determine which capacitor combination is capable of providing 110  $\pm$ 6-Hz operation from the 110-Hz oscillator.



(d) Install the selected values of C151 and C153.

(2) Selection of C82.

Capacitor C82 is selected from a value of .16, .34, .50, or .75 uf to obtain a 90-degree phase shift between the 110-Hz oscillator and the loop servo amplifier. This selection is necessary due to variations in the components of the loop servo-amplifier circuitry.

(a) Position the equipment controls as follows.

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch Frequency control	ADF OFF 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON OFF
477V-2 only	100 KC SPECTRUM switch	OFF

(b) Refer to figure 811. Select a value for C82 (.16, .34, .50, or .75 uf). Connect positive lead to point S and negative lead to point R.

(c) Connect signal generator to 477U-2 or 477U-3.

(d) Adjust signal generator for an output of 40 uv at 200 kHz.

(e) Adjust vertical and horizontal sweep of oscilloscope to same amplitude.

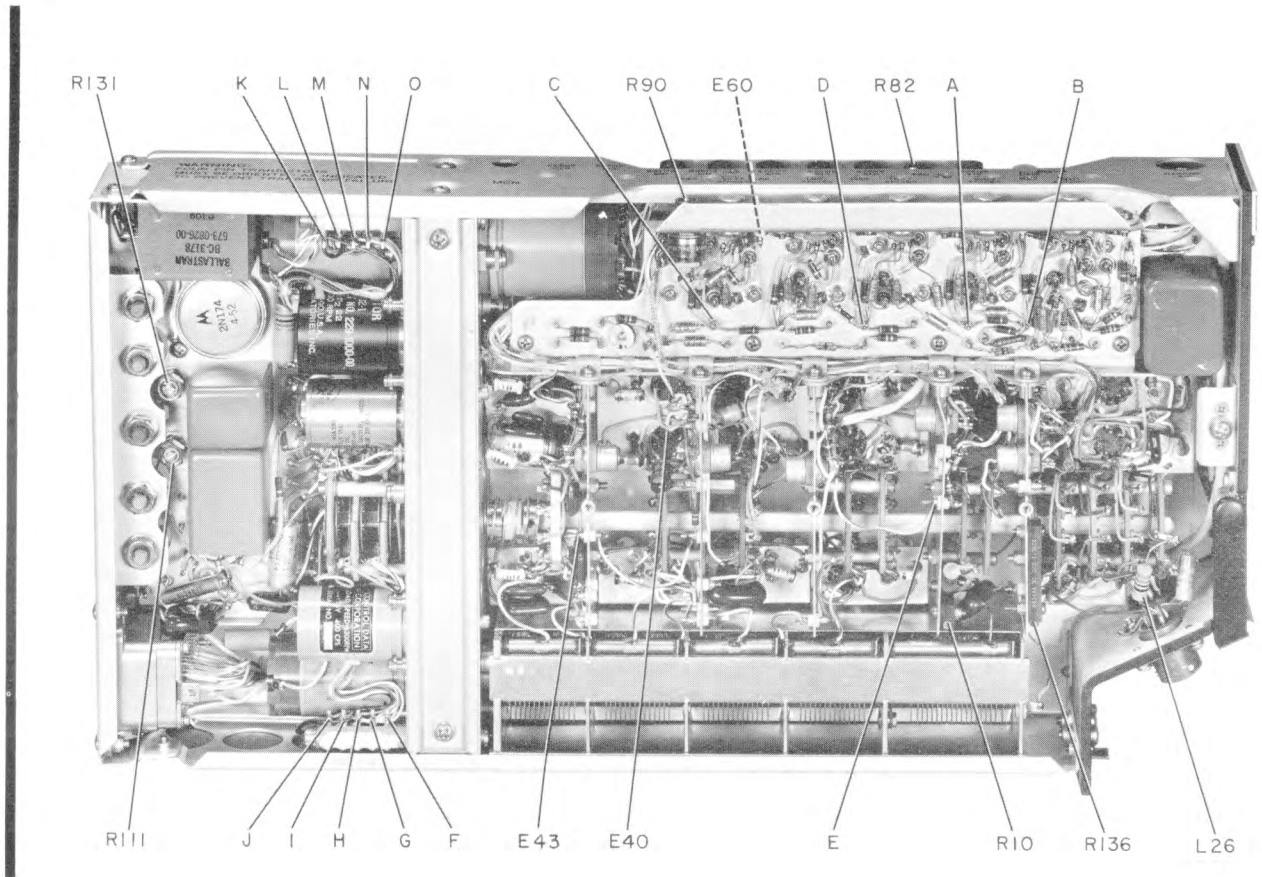
(f) Connect horizontal input of oscilloscope to point V and vertical input to point W. Observe lissajous pattern obtained.

(g) Repeat steps (b) through (f) to select a value of C82 which will provide the best circular lissajous pattern on the oscilloscope.

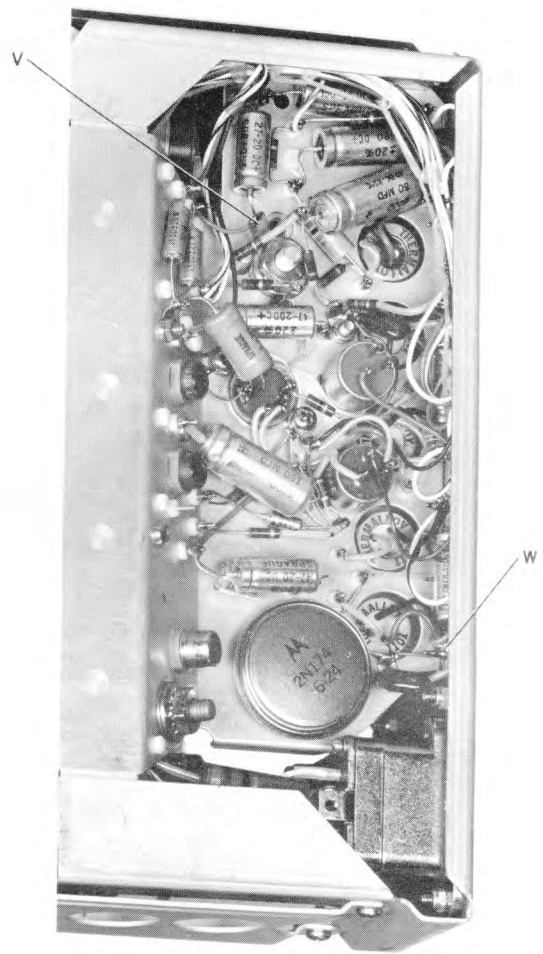
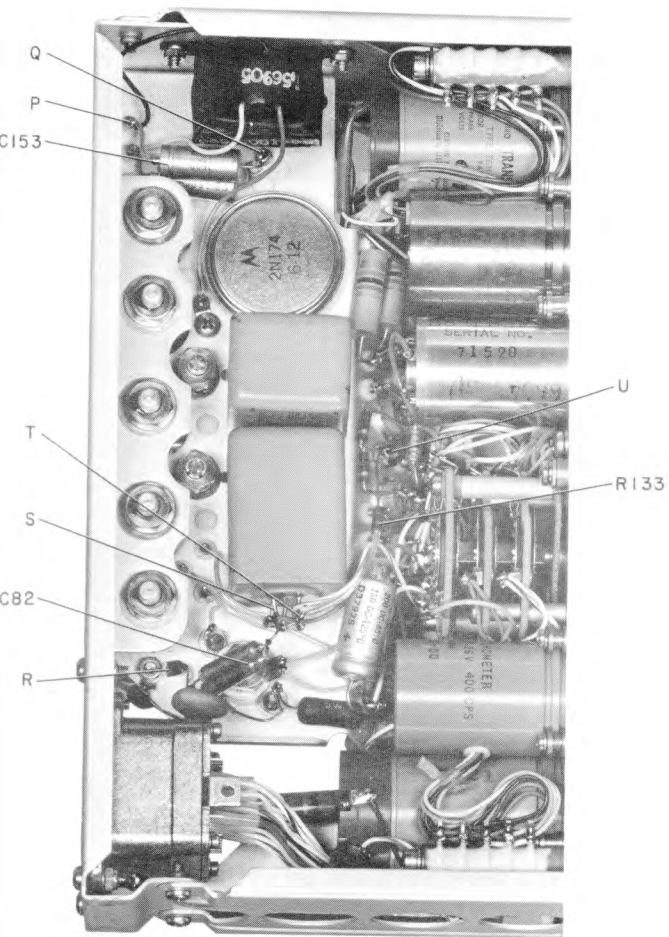
(h) Install selected value of C83.

(3) Selection of R133.

Resistor R133 is selected from a value of 1500, 1800, 2200, 2700, 3300, or 3900 ohms to obtain proper slow slew speed of loop antenna. This selection is necessary due to variations in the components of the loop servo-amplifier circuitry.



Location of Test Points and Alignment Adjustments  
Figure 811





(a) Position the equipment control as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch	LOOP OFF
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	100 KC SPECTRUM switch	OFF

- (b) Refer to figure 811. Select a value for R133 (1500, 1800, 2200, 2700, 3300, or 3900 ohms). Connect one lead to point T and the other lead to point U.
- (c) Record indication of 477U-2 Antenna Simulator.
- (d) Position 614L-8 LOOP L-R switch to first detent toward R. Record time required for 477U-2 Antenna Simulator to rotate 180 degrees clockwise.
- (e) Repeat steps (b) through (d) to select value of R133 which will provide a slow slew speed of 24 to 36 seconds for 180-degree clockwise rotation.
- (f) Install selected value of R133.

N. Operation of Self-Test Oscillator. (In 51Y-4A Collins part number 522-2587-013 only.)

(1) Position test equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8 (Collins Part Number 522-2357-024)	Mode switch CW-VOICE-TEST switch GAIN control Frequency controls	LOOP TEST Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

- (2) Connect frequency counter probe at L26 and measure output frequency of self-test oscillator.
- (3) If incorrect frequency is obtained, check crystal Y2. If signal is not present; check relay K1, transistor Q33, and transistor Q32 in that order.

(Figure 812 deleted.)



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	(A1)	Capacitor C77 was 10 uf; is changed to 3 uf.	Lowered time constant to improve filter performance.		MCN 107 and above.
4	(A1)	Capacitor C76 was 10 uf; is changed to 3 uf.	Lowered time constant to improve filter performance.		MCN 107 and above.
2	(A2)	Resistor R120 was 330 ohms; is changed to 1200 ohms.	Improved damping of loop servo motor B5.		MCN 107 through MCN 553.
2	(A2)	Resistor R132 added (6800 ohms).	Improved damping of loop servo motor B5.		MCN 107 through MCN 553.
2	(A3)	Resistor R133 added.	Added to control slow manual loop rotation speed.		MCN 107 and above.
4	(A4)	Capacitor C48 was 510 pf; is changed to 10,000 pf.	Increased if amplifier gain.		MCN 107 and above.
2	(A5)	Capacitor C97 was 18 pf; changed to 15 pf.	Improved tracking.		MCN 107 through MCN 1371.
2	(A6)	Capacitor C82 was 470,000 pf; is now selected in final test.	Corrected phase shift in tuning servo amplifier.		MCN 209 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1A of 4)

Figure 813

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SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	(A7)	Capacitor C130 added (10 pf).	Corrected phase shift in loop rf stage.	18 and 20	MCN 209 through MCN 553.
2	(A7)	Resistor R134 added (15K).			
2	(A8)	Capacitor C67 was 68 uf; changed to 47 uf.	Increased reliability.	17	MCN 213 and above.
3	(A9)	Transistor Q2 is added.	Chanted rf amplifier from single ended to push-pull.		MCN 383 and above.
3	(A10)	Capacitor C42 was 1200 pf; is changed to 620 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	(A10)	Capacitor C43 was 51 uf; is changed to 620 pf.			
3	(A10)	Capacitor C129 deleted.			
3	(A10)	Capacitor C41 was 10 (Cont)			

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1B of 4)

Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3 (Cont)	(A10) (Cont)	(Cont) pf; is changed to 15 pf.	(Cont) compensation and tracking of local oscillator.		
3	(A10)	Capacitor C39 was 120 pf; is changed to 360 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	(A10)	Capacitor C38 was 620 pf; is changed to 430 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	(A10)	Capacitor C7 was 150 pf; is changed to 100 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	(A10)	Capacitor C34 was 270 pf; is changed to 390 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	(A10)	Capacitor C35 was 130 pf; is changed to 10 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
2, 4	(A11)	Capacitor C125 was 100 uf; is changed to 1.5 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1C of 4)





51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	(A11)	Resistor R129 was 220 ohms; is changed to 2700 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Resistor R66 was 10K; is changed to 4700 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Resistor R69 was 680 ohms; is changed to 10K.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Resistor R67 was 68K; is changed to 22K.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Capacitor C79 was 10 uf; is changed to 2.2 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Diode CR12, CR13 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1D of 4)

Figure 813

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SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	(A11)	Resistor R130 was 10K; is changed to 1000 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Capacitor C140 added (15 uf).	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 580.
2, 4	(A11)	Capacitor C141 added.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Resistor R139, R140 deleted.	incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Resistor R122 was 10 ohms; is changed to 15 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Capacitor C99 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1E of 4)

Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	(A11)	Resistor R101, R119, R120, R132 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Capacitor C68 was 40 uf; is changed to 33 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 1358
2, 4	(A11)	Diode CR14 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Resistor R74 was 33 ohms; is changed to 68 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 659
2, 4	(A11)	Capacitor C130 was 10 pf; is changed to 680 pf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Coil L1 was 10,000 uh; is changed to 2000 uh.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1F of 4)

Figure 813

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SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	A11	Resistor R134 was 15K; is changed to 470 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 580
2, 4	A11	Coil L6 was 2000 uh; is changed to 1000 uh.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 580
2, 4	A11	Resistor R138 added.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Resistor R141 added (10K).	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2	A11	Resistors R76 and R77 were 22 ohms, changed to 15 ohms.	Redistribute gain in loop servo amplifier.		MCN 554 through MCN 1286.
4	A12	Capacitor C140 was 15 uf; is changed to 10 uf.	Increased gain of loop servo amplifier.		MCN 581 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1G of 4)  
Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	(A13)	Resistor R134 deleted.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	(A13)	Coil L6 deleted.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	(A13)	Capacitor C142 added.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	(A13)	Resistor R143. R144 added.	Correct level of modulation in balanced modulator.		MCN 581 and above
2	(A13)	Coil L17 was 1000 uh; is changed to 500 uh.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	(A13)	Resistor R141 was 10K; is changed to 5600 ohms.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	(A14)	Capacitor C95 was 15 pf; is changed to 10 pf.	Adjusted tracking of band 3.		MCN 582 and above.
2, 4	(A15)	Resistor R87 was 680 ohms; is changed to 1200 ohms.	Changed to silicon transistors for increased (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1H of 4)

Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4			(Cont) reliability, and changed associated components to provide correct voltages for silicon transistors.		
2, 4	(A15)	Resistor R76 was 5.1 ohms; is changed to 15 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 through MCN 1286.
2, 4	(A15)	Resistor R77 was 5.1 ohms; is changed to 15 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 through MCN 1286.
2, 4	(A15)	Capacitor C87 was 200 uf; is changed to 10 uf.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1I of 4)



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	(A15)	Resistor R88 was 120 ohms; is changed to 4700 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Resistor R79 was 3900 ohms; is changed to 4700 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Thermistor RT4 deleted.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Resistor R49 was 680 ohms; is changed to 1000 ohms.	Changed to silicon transistors for increased reliability (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1J of 4)

Figure 813

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51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4 (Cont)			(Cont) and changed associated components to provide correct voltages for silicon transistors.		
2, 4	(A15)	Resistor R125 was 270 ohms; is changed to 150 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 through MCN 1358.
2, 4	(A15)	Resistor R124 was 820 ohms; is changed to 1500 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Resistor R74 was 68 ohms; is changed to 330 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1K of 4)

Figure 813





51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4 (Cont)			(Cont) voltages for silicon transistors.		
2, 4	(A15)	Resistors R75 was 2200 ohms; is changed to 5600 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Transistor Q14 was 2N158A; is changed to 2N2270.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Transistor Q24 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1L of 4)  
Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	(A15)	Transistor Q25 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Transistor Q28 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Transistor Q29 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Transistor Q22 was 2N158A; is changed to 2N1131.	Changed to silicon transistors for increased (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1M of 4)  
Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4			(Cont) reliability, and changed associated components to provide correct voltages for silicon transistors.		
2, 4	A16	Capacitor C139 added.	Corrected phase shift in loop amplifier.	7	MCN 672 and above.
2, 4	B1	Capacitor C122: 0.1 uf is changed to 0.11 uf.	Increased reliability.	21	MCN 571 and above.
2, 4	B2	Capacitor C52: 1 uf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 687 and above.
4	B2	Capacitor C110: 520 pf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 687 and above.
4	B2	Capacitor C108: 0.1 uf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 687 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1N of 4)  
Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	(B3)	Coil L7 27 uh is changed to 39 uh.	Improved image rejection.		MCN 847 and above.
3	(B3)	Coil L8 5.6 uh is changed to 10 uh.	Improved image rejection.		MCN 847 and above.
3	(B3)	Transformer T10 terminal 4 is changed to terminal 5.	Improved image rejection.		MCN 847 and above.
3	(B3)	Capacitor C93, 10 pf is changed to 15 pf.	Improved image rejection.		MCN 847 and above.
4	(B4)	Capacitor C140: 10 uf is changed to 2.2 uf.	Increased servo-amplifier gain.		MCN 847 through MCN 1286.
3	(B5)	Capacitor C123: 1 uf is changed to C146 4 uf.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.
4	(B5)	Capacitor C147 added.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.
4	(B5)	Capacitor C83: 10 uf is changed to 0.1 uf.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.
3	(B5)	Capacitor C13: 10 uf is changed to C113 and relocated.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 10 of 4)  
Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	(B6)	Capacitor C148 added.	Removed parasitic in loop servo amplifier.		MCN 942 and above.
2	(B7)	Capacitor C149 added.	Improved ADF aural sensitivity.		MCN 942 and above.
2	(B7)	Resistor R6 220 ohms is changed to 1000 ohms.	Improved ADF aural sensitivity.		MCN 942 and above.
4	(B8)	Resistor R145 added.	Improved matching between agc amplifier and synchronous filter.		MCN 1113 and above.
3	(B9)	Capacitor C137 added.	Correct drawing.		All.
3	(B9)	Capacitor C46 added.	Correct drawing.		All.
4	(B10)	All revision information added to the schematic diagram.	This information aids users in correcting the 51Y-4 schematic to reflect both manufacturing and field revisions. This information was transferred from the (Cont)		MCN 107 to MCN 1113.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1P of 4)

Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4 (Cont)	(B10) (Cont)		(Cont) cover letter to the schematic for user's convenience.		
4	(B11)	Resistor R80, 560 ohms, is changed to 820 ohms.	Increase audio gain.		MCN 669 and above.
2	(B12)	Capacitor C144, 47 pf is changed to 82 pf.	Adjust level of modulation in balanced modulator.		MCN 581 through MCN 631.
2	(B13)	Capacitor C144, 82 pf is changed to 47 pf.	Adjust level of modulation in balanced modulator.		MCN 632 and above.
3	(B14)	Capacitor C145 added.	Reduce 400-Hz hum in audio output.		MCN 838 through MCN 851.
3	(B15)	Capacitors C145 and C123 deleted.	Capacitors C145 and C123 replaced by capacitor C146.		MCN 851 and above.
3	(B16)	Capacitor C133, 0.01 uf is changed to 0.011 uf.	Increased reliability.		MCN 939 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1Q of 4)  
Figure 813



51Y-4A

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2	C1	Changed Resolver B3 and revised B3 symbol to clarify drawing.		MCN 1172 and above.
2	C2	C97 was 15 pf; C98 was 18 pf; changed C97 and C98 to 20 pf for product improvement.		MCN 1372 and above.
2, 3, 4	C3	Added polarities to C5, C6, C73, C118, C46, C49, and C109. Added ground connections to Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, and Q21. Changed shielded wire symbols, and note 3 reference. Added gear train symbol to B5. Corrected drawing errors as follows; R97 was shown as 2.7K, R129 was referenced R67; CR4 and CR11 symbol change; C137 was not connected to wire from S1N-7. Renumbered terminals on T10; 1 was 2, 2 was 1, 3 was 5 and 5 was 3. R7 was 311, changed to 316.		All.
2, 3	C4	C2, C3, C4, C16, C17, C18, C23, C24, C25, C26, C27, C28, C36, C40 and C44 were 1.3 pf-13 pf, changed to 1.98 pf-12.40 pf to correct drawing error.		All.
2	C5	Deleted Z2, and added L32, C151, and C153 for product improvement. R125 was 150 ohms, changed to 68 ohms to provide correct voltage for silicon transistor.		MCN 1359 and above. MCN 1359 and above.
2	C6	Added lead color designation to B4, and changed B4 type for product improvement.		MCN 1355 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1R of 4)  
Figure 813



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2	(C7)	R76 and R77 were 15 ohm, changed to 22 ohm to redistribute gain in loop servo amplifier.		MCN 1287 through MCN 1359.
2, 3	(C8)	Added numbers to all rotary switch contacts to clarify drawing.		All.
2	(C9)	Added C150, 330 uf to Q28 collector to eliminate oscillations in tuning servo.		MCN 1160 and above.
3	(C10)	Q31 was 2N341, changed to 2N2405 for product improvement.		MCN 1292 and above.
3	(C11)	C35 was 10 pf, changed to 2 pf to improve tracking.		
3	(C12)	Deleted L7, 39 mh and added C152, 3900 pf to improve image rejection.		MCN 1290 and above.
4	(C13)	C76 and C77 were 3 uf, changed to 3.3 uf for product improvement.		MCN 1247 and above.
4	(C14)	C140 was 2.2 uf, changed to .47 uf to redistribute gain in loop servo amplifier.		MCN 1287 through MCN 1358.
3	(C15)	C133 was 0.011 uf, changed to 0.01 uf for product improvement.		MCN 1292 and above.
2	(D1)	C153 was 47 uf, now selected in final manufacturing test from 47 uf or 68 uf to compensate for component variation in 110-Hz oscillator circuitry.		MCN 1359 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1S of 4)  
Figure 813

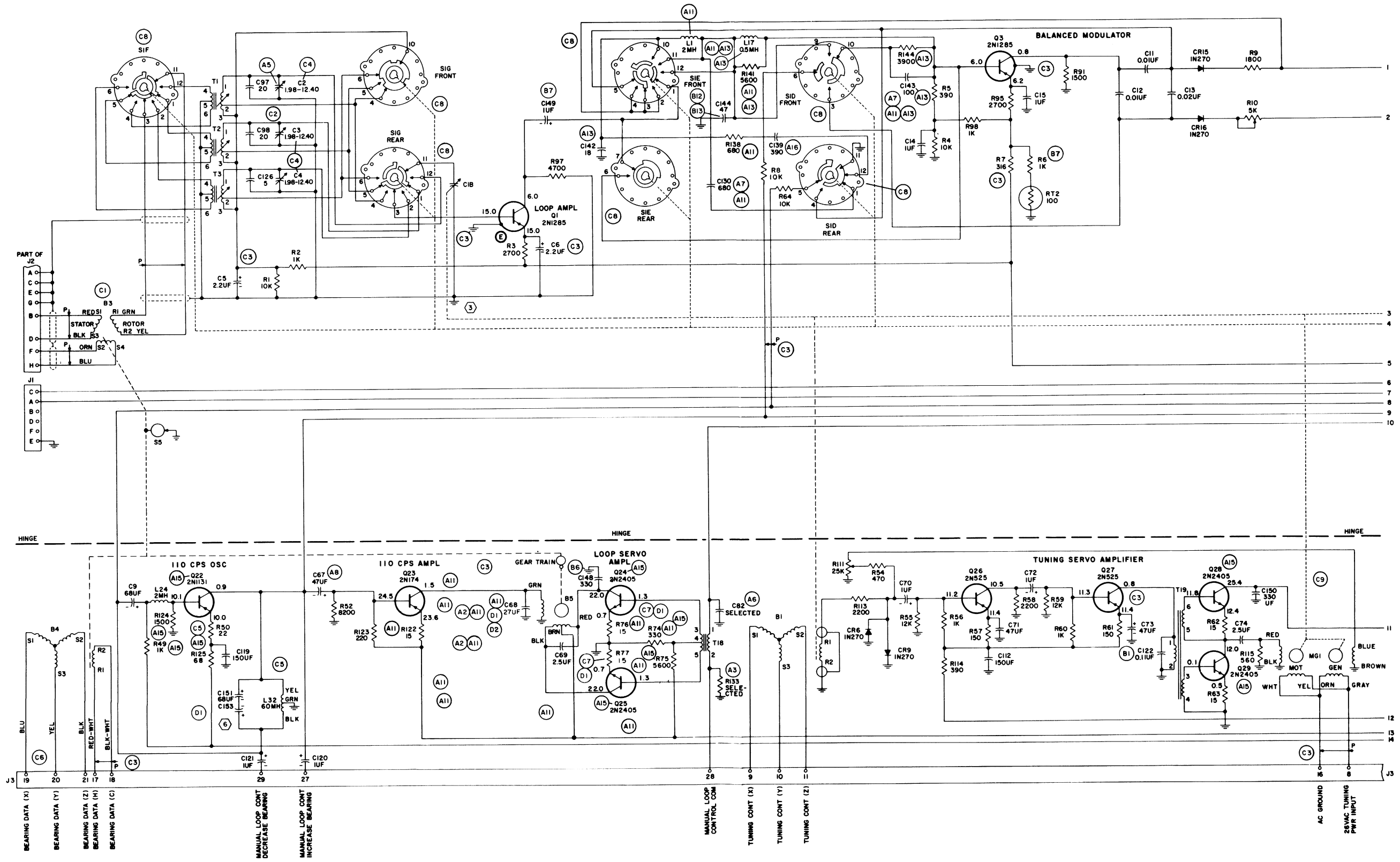




51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2	(D1)	R76 and R77 were 22 ohms, changed to 15 ohms to improve loop phasing.		MCN 1359 and above.
4	(D1)	C140 was .47 uf, changed to 2.2 uf to improve loop phasing.		MCN 1359 and above.
2	(D1)	C68 was 33 uf, changed to 22 uf to improve loop phasing.		MCN 554 through MCN 1358.
2	(D2)	C68 was 22 uf, changed to 27 uf to improve bearing speed.		MCN 1359 and above.

51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 1T of 4)  
Figure 813



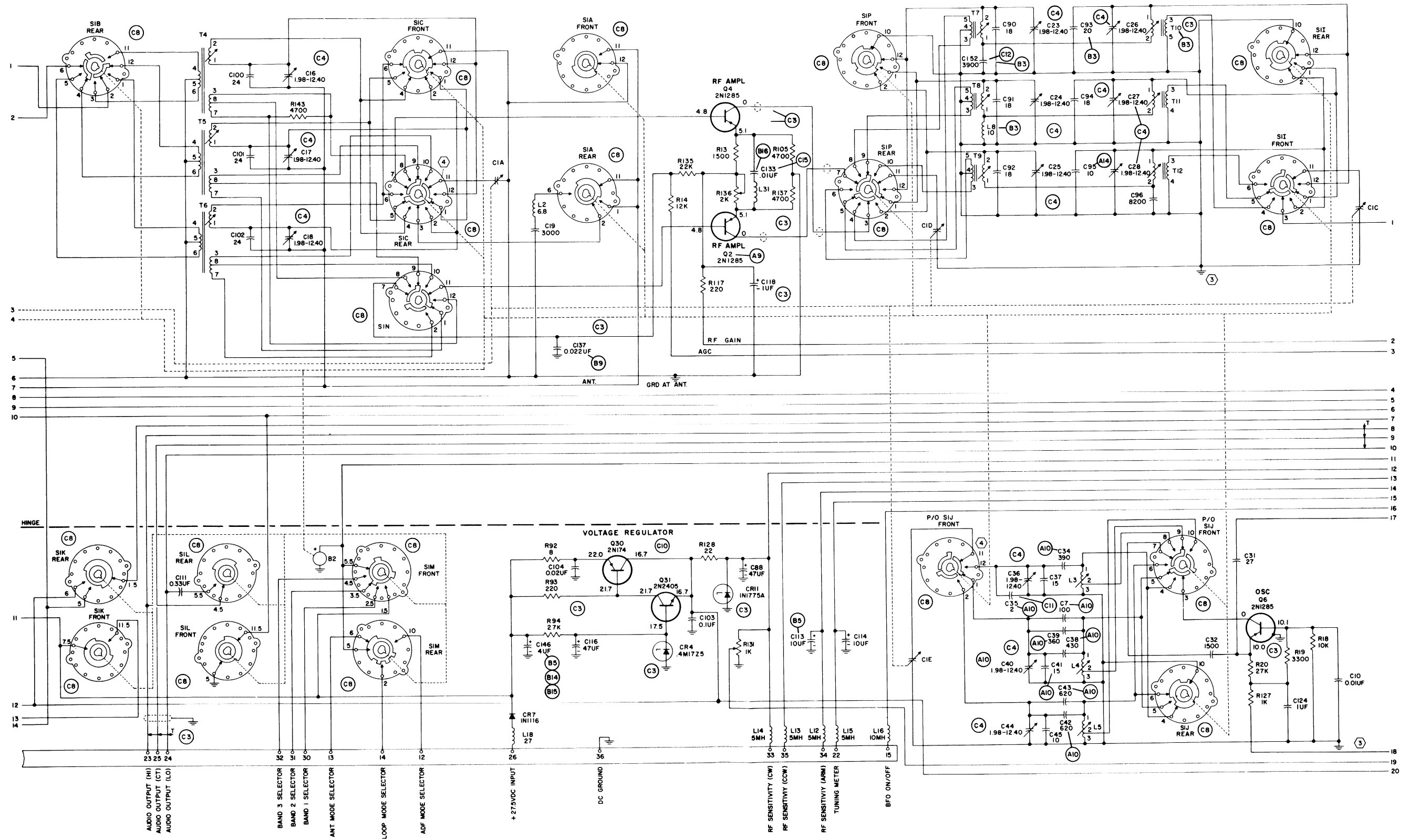
51Y-4 ADF Receiver, Through MCN 1677; Schematic Diagram (Sheet 2 of 4)

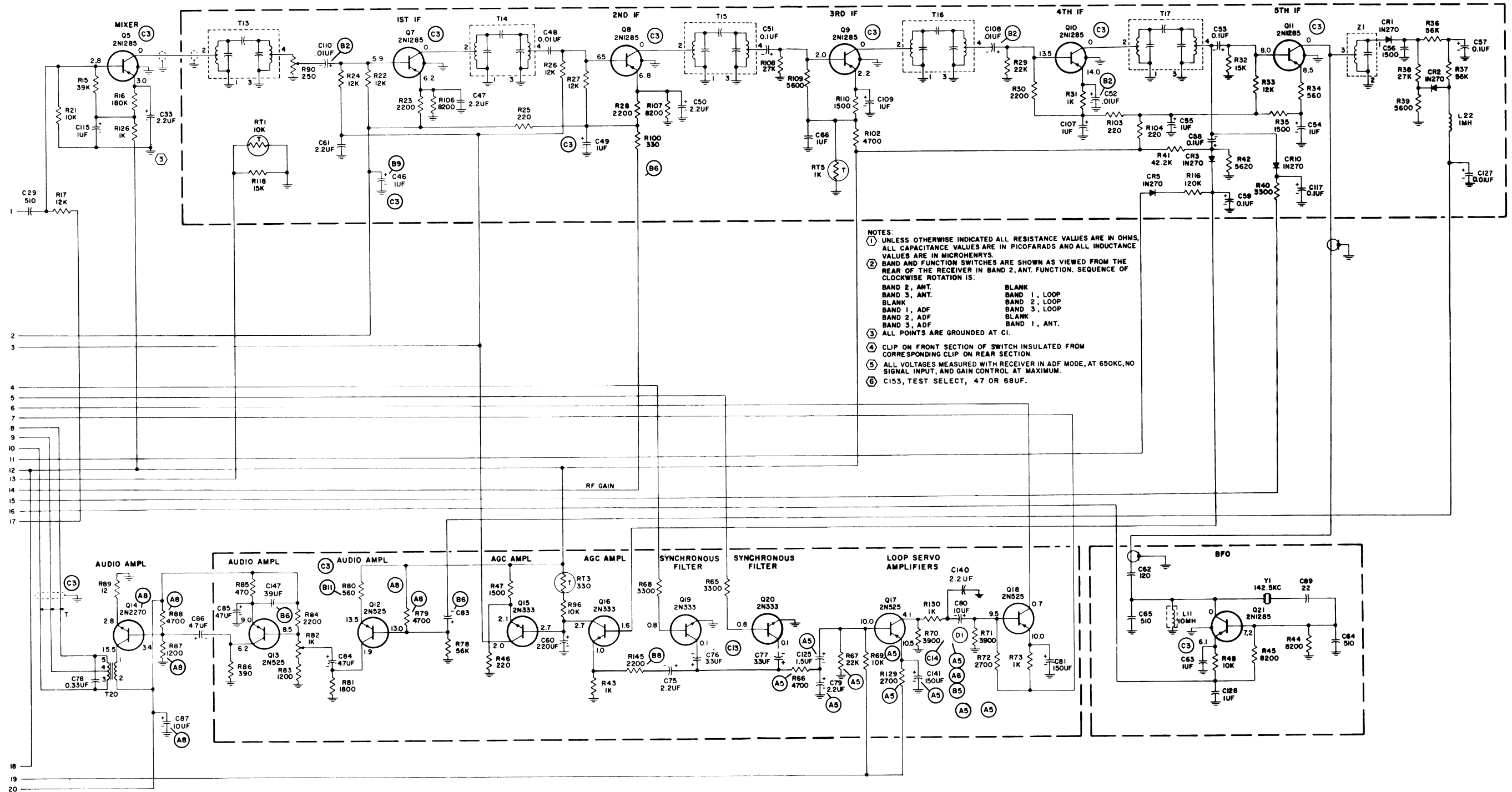
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Figure 813

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51Y-4 ADF Receiver, Through MCN 1677, Schematic Diagram (Sheet 4 of 4)



51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A1	Capacitor C151, 68 pf, is changed to a selected value.	To adjust frequency of 110-Hz oscillator.		
4	A1	Note ⑥ is changed to include C151 and increased number of select values.			
2	A2	Capacitor C166, 12 pf, is added.	Added capacity required for receiver tracking.		
2	A3	Resistor R141, 5600 ohms, is changed to 2700 ohms.	To increase percentage of modulation for improved operation at high frequencies.		
3	A4	Capacitors C167, C168 and C169, 5 pf, are added.	To improve tuning capability.		
3	A5	Resistor R165, 560 ohms, is added.	Change range of adjustment for gain of loop servo amplifier.		
3	A6	Coil L16, 10 mh, is changed to resistor R157, 68 ohms.	To reduce the amount of bfo radiation.		
4	A7	Capacitor C87, 10 uf, is changed to 68 uf.	Increased decoupling of audio from B+.		

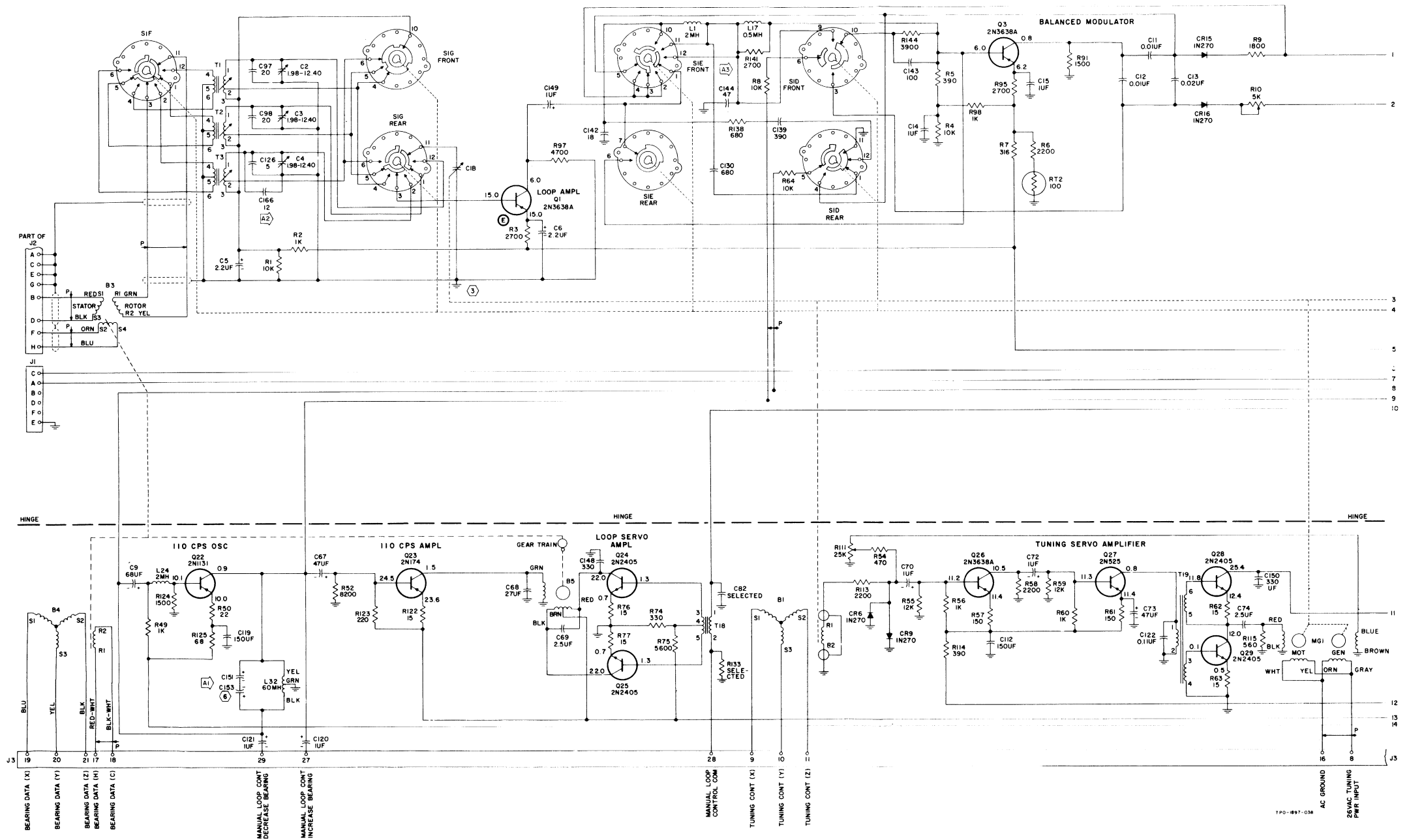
51Y-4 ADF Receiver, MCN 1688 and Above, Schematic Diagram (Sheet 1A of 4)  
Figure 813A

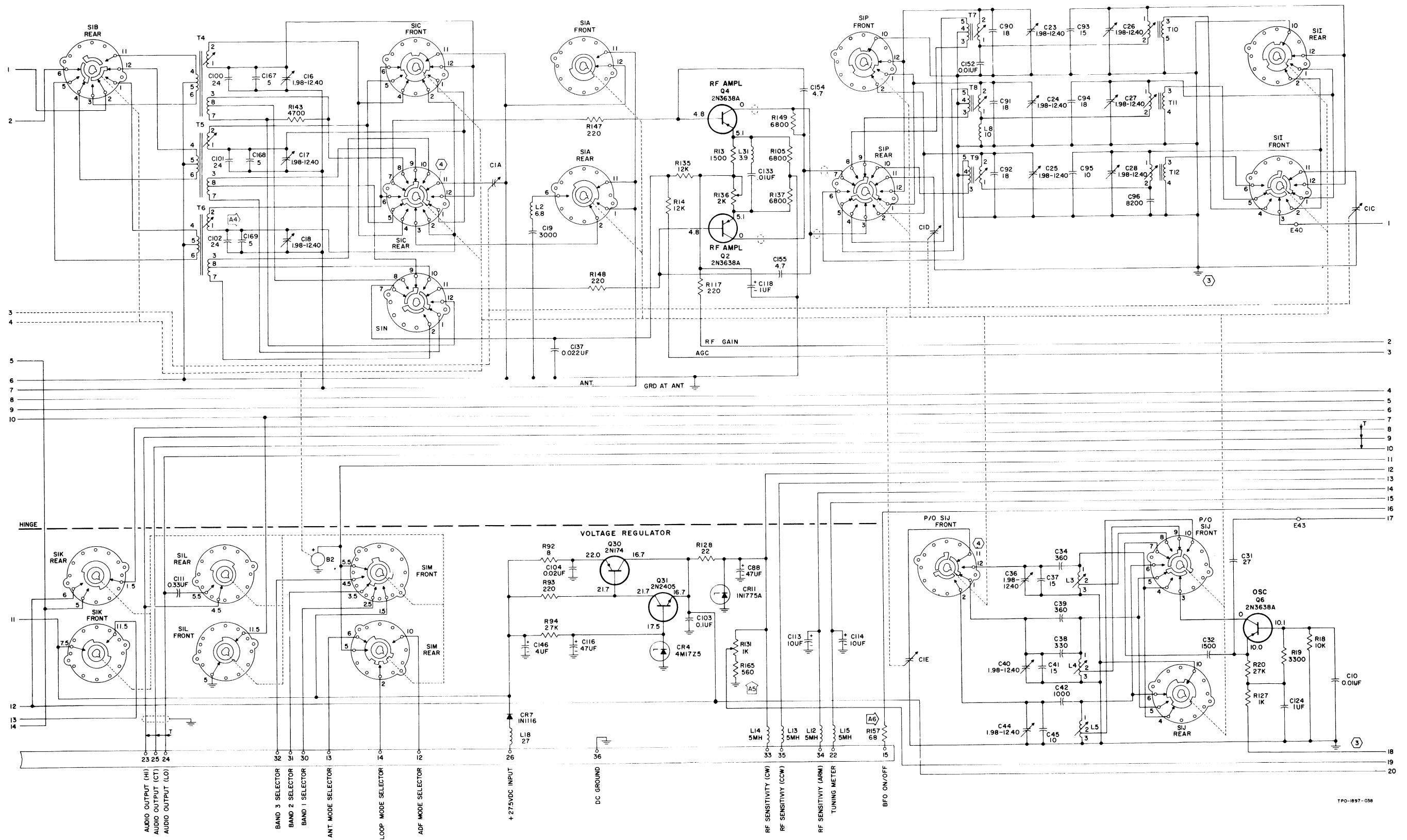


51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	A8	Capacitor C84, 4.7 uf, is changed to .33 uf.	Improve re- sponse curve of audio stages.		
4	A9	Resistor R80, 1K, is changed to 560 ohms.	Adjust overall gain of audio stages.		
4	A10	Resistor R71, 3900 ohms, is changed to 8200 ohms.	Increase dynam- ic range of signal handling capa- bility of stage.		
4	A11	Resistor R72, 2700 ohms, is changed to 4700 ohms.	Same as above.		
4	A12	Resistor R73, 1K, is changed to 680 ohms.	Same as above.		
4	A13	Resistor R130, 2700 ohms, is changed to 4700 ohms.	Reduce gain of loop servo amplifier.		
4	A14	Resistor R166, 1K, is added.	Reduce gain to eliminate high frequency oscillation.		
4	A15	Resistor R167, 1K, is added.	Same as above.		
4	A16	Resistor R40, 3300 ohms, is changed to 2700 ohms.	Change signal level to tuning meter because of new meter type.		
4	A17	Ground con- nections of C63, C64, C65, C128, L11, and R24 are changed to shield of output coax cable.	Reduce amount of bfo radiation.		

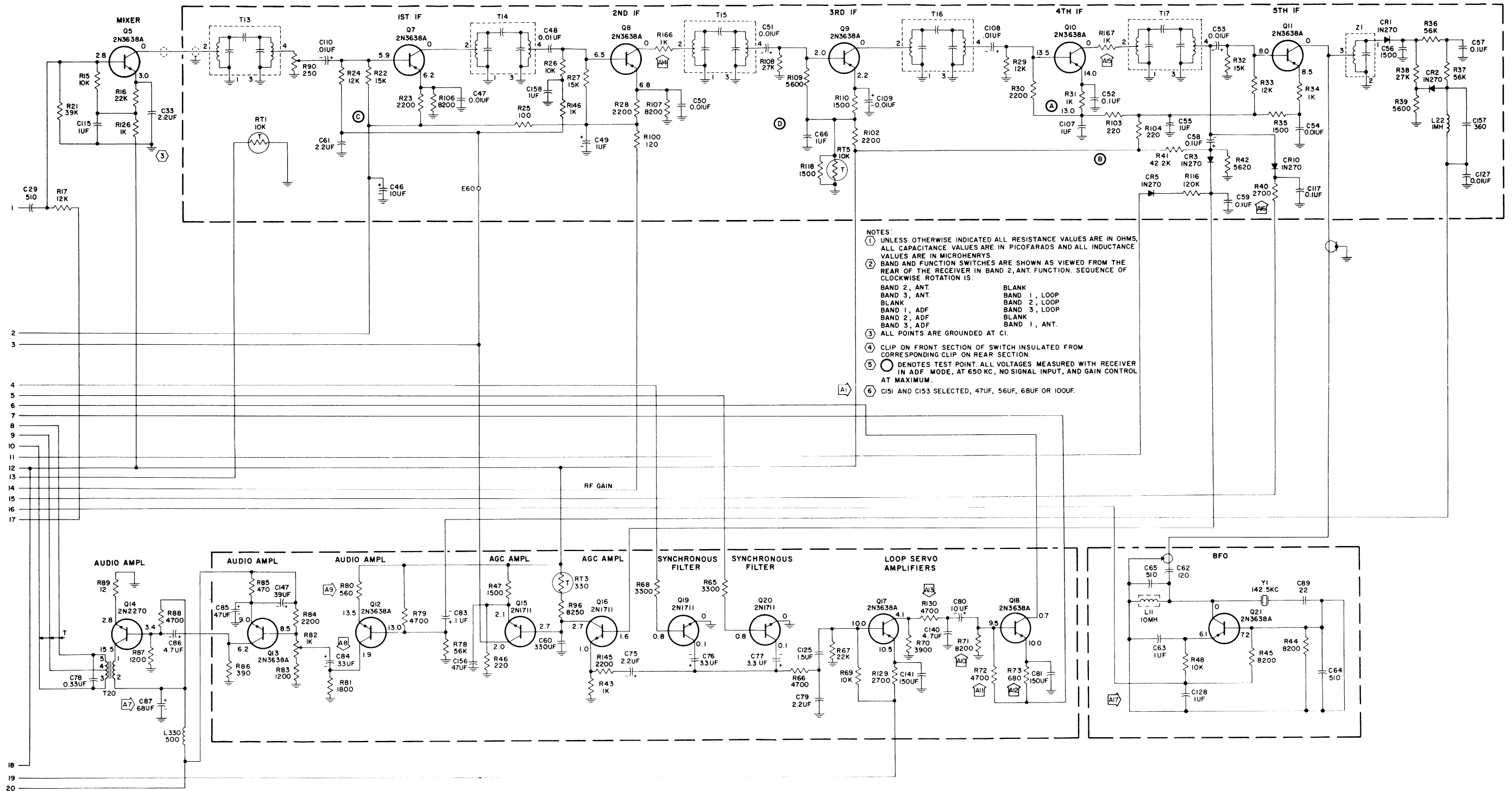
51Y-4 ADF Receiver, MCN 1688 and Above, Schematic Diagram (Sheet 1B of 4)





51Y-4 ADF Receiver, MCN 1688 and Above,  
Schematic Diagram (Sheet 3 of 4)  
Figure 813A





51Y-4 ADF Receiver, MCN 1688 and Above,  
Schematic Diagram (Sheet 4 of 4)  
Figure 813A



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	(A1)	Resistor R120 was 180; is changed to 1200.	Adjusted loop servo motor damping current.		MCN 20 through MCN 173.
3	(A2)	Capacitor C42 was 1200 pf; is changed to 620 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 164 and above.
3	(A2)	Capacitor C43 was 51 pf, is changed to 620 pf.	Same as above.		MCN 164 and above.
3	(A2)	Capacitor C129 is deleted.	Same as above.		MCN 164 and above.
3	(A2)	Capacitor C41 was 10 pf; is changed to 15 pf.	Same as above.		MCN 164 and above.
3	(A2)	Capacitor C39 was 120 pf; is changed to 360 pf.	Same as above.		MCN 164 and above.
3	(A2)	Capacitor C38 was 620 pf; is changed to 430 pf.	Same as above.		MCN 164 and above.
3	(A2)	Capacitor C7 was 150 pf; is changed to 100 pf.	Same as above.		MCN 164 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1A of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	(A2)	Capacitor C34 was 270 pf; is changed to 390 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 164 and above.
3	(A2)	Capacitor C35 was 130 pf; is changed to 10 pf.	Same as above.		MCN 164 and above.
2	(A3)	Resistor R134 was 15K; is changed to 10K.	Corrected phase shift in loop rf stage.		MCN 174 and above.
2	(A3)	Capacitor C130 was 10 pf; is changed to 270 pf.	Same as above.		MCN 174 and above.
2	(A3)	Coil L17 was 1000 uh; is changed to 500 uh.	Same as above.		MCN 174 and above.
2	(A3)	Resistor R141 is added.	Same as above.		MCN 174 and above.
2	(A4)	Resistor R139 is deleted.	Simplified network supplying damping current for winding of servo motor B5.		MCN 174 and above.
2	(A4)	Resistor R122 was 10 ohms; is changed to 15 ohms.	Same as above.		MCN 174 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1B of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	(A4)	Capacitor C99 is deleted.	Simplified network supplying damping current for winding of servo motor B5.		MCN 174 and above.
2	(A4)	Resistor R119 is deleted.	Same as above.		MCN 174 and above.
2	(A4)	Capacitor C68 was 40 uf; is changed to 33 uf.	Same as above.		MCN 174 through MCN 727.
2	(A4)	Resistor R120 is deleted.	Same as above.		MCN 174 and above.
2	(A4)	Resistor R101 is deleted.	Same as above.		MCN 174 and above.
2	(A4)	Resistor R132 is deleted.	Same as above.		MCN 174 and above.
2	(A4)	Resistor R140 is deleted.	Same as above.		MCN 174 and above.
2 and 4	(A5)	Diode CR14 is deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3).	MCN 174 and above.
2 and 4	(A5)	Resistor R74 was 33 ohms; is changed to 68 ohms.	Same as above.	Same as above.	MCN 174 through MCN 220.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1C of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	(A5)	Capacitor C125 was 100 uf; is changed to 1.5 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3).	MCN 174 and above.
2 and 4	(A5)	Resistor R129 was 2200 ohms; is changed to 2700 ohms.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Resistor R66 was 10K; is changed to 4700 ohms.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Resistor R69 was 680 ohms; is changed to 10K.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Resistor R67 was 68K ohms; is changed to 22K.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Capacitor C79 was 10 uf; is changed to 2.2 uf.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Diode CR13 is deleted.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Diode CR12 is deleted.	Same as above.	Same as above.	MCN 174 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1D of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	(A5)	Resistor R130 was 10K; is changed to 1000 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3).	MCN 174 and above.
2 and 4	(A5)	Capacitor C141 is added.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Capacitor C140 is added (15 uf).	Same as above.	Same as above.	MCN 174 through MCN 178.
4	(A6)	Capacitor C140 was 15 uf; is changed to 10 uf.	Increased gain of loop servo amplifier.		MCN 179 through MCN 354.
3	(A7)	Capacitor C95 was 15 pf; is changed to 10 pf.	Adjusted tracking of band 3.		MCN 185 and above.
2 and 4	(A8)	Resistor R49 was 680 ohms; is changed to 1000 ohms.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R125 was 270 ohms; is changed to 150 ohms.	Same as above.	27	MCN 221 through MCN 761.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1E of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	(A8)	Resistor R124 was 820 ohms; is changed to 1500 ohms.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	(A8)	Transistor Q22 was 2N158A; is changed to 2N1131.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R74 was 68 ohms; is changed to 330 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R75 was 2200 ohms; is changed to 5600 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Transistor Q24 was 2N158; is changed to 2N2405.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Transistor Q25 was 2N158A; is changed to 2N2405.	Same as above.	27	MCN 221 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1F of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	(A8)	Transistor Q29 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	(A8)	Transistor Q28 was 2N158A; is changed to 2N2405.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R76 was 5.1 ohms; is changed to 15 ohms.	Same as above.	27	MCN 221 through MCN 714.
2 and 4	(A8)	Resistor R77 was 5.1 ohms; is changed to 15 ohms.	Same as above	27	MCN 221 through MCN 714.
2 and 4	(A8)	Transistor Q14 was 2N158A; is changed to 2N2270.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R87 was 680 ohms; is changed to 1200 ohms.	Same as above.	27	MCN 221 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1G of 4)  
Figure 814





51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	(A8)	Capacitor C87 was 200 uf; is changed to 10 uf.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R88 was 120 ohms; is changed to 4700 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R79 was 3900 ohms; is changed to 4700 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	(A8)	Thermistor RT4 is deleted.	Same as above.	27	MCN 221 and above.
2	(B1)	Capacitor C122: 0.1 uf is changed to 0.11 uf.	Increased reliability.	21	MCN 173 and above.
4	(B2)	Capacitor C52: 1 uf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 234 and above.
4	(B2)	Capacitor C110: 520 pf is changed to 0.01 uf.	Same as above.	23	MCN 234 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1H of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	(B2)	Capacitor C108: 0.1 uf is changed to 0.01 uf.	Offset increased gain caused by improved transistors.	23	MCN 234 and above.
3	(B3)	Capacitor C137: 0.02 is changed to 0.022 uf.	Changed type of capacitor to increase reliability.		MCN 317 and above.
3	(B4)	Coil L7: 27 uh is changed to 39 uh.	Improved image rejection.		MCN 340 and above.
3	(B4)	Coil L8: 5.6 uh is changed to 10 uh.	Improved image rejection.		MCN 340 and above.
3	(B4)	Transformer T10: terminal 4 is changed to terminal 5.	Improved image rejection.		MCN 340 and above.
3	(B4)	Capacitor C93: 10 pf is changed to 15 pf.	Improved image rejection.		MCN 340 and above.
4	(B5)	Capacitor C140: 10 uf is changed to 2.2 uf.	Increased servo amplifier gain.		MCN 355 through MCN 714.
2 and 4	(B6)	Capacitor C123: 1 uf is changed to C146 4 uf.	Reduced 400-Hz hum in audio output.	25	MCN 344 and above.
2 and 4	(B6)	Capacitor C147 is added.	Same as above.	25	MCN 344 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet II of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	(B6)	Capacitor C83: 10 uf is changed to 0.1 uf.	Reduce 400-Hz hum in audio output.	25	MCN 344 and above.
2 and 4	(B6)	Capacitor C13: 10 uf is changed to C113 and relocated.	Same as above.		All.
2	(B7)	Capacitor C148 is added.	Removed parasitic in loop servo amplifier.		MCN 497 and above.
4	(B8)	Resistor R145 is added.	Improved matching between agc amplifier and synchronous filter.		MCN 701 and above.
4	(B9)	Capacitor C46 is added.	Corrected drawing.		All.
4	(B10)	All revision information was added to the schematic diagram.	This informa- tion aids users in correcting the 51Y-4A schematic to reflect both manufacturing and field revisions. This information was transferred from the cover letter to the schematic for user convenience.		MCN 20 to MCN 701.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1J of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	(B11)	Resistor R80 560 ohms is changed to 820 ohms.	Increase audio gain.		MCN 230 and above.
3	(B12)	Capacitor C145 was added.	Reduce 400 Hz hum in audio output.		MCN 317 through MCN 344.
3	(B13)	Capacitor C145 is deleted.	Capacitors C145 and C123 were replaced by capacitor C146.		MCN 345 and above.
3	(B14)	Capacitor C133, 0.01 is changed to 0.011 uf.	Increased reliability.		MCN 325 and above.
2	(C1)	Changed resolver B3 and revised B3 symbol to clarify drawing.			MCN 636 and above.
2	(C2)	C97 was 15 pf; C98 was 18 pf, changed C97 and C98 to 20 pf for product improvement.			MCN 777 and above.
2, 3, and 4	(C3)	<p>Added polarities to C46 and C49. Added ground connections to Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, and Q21. Changed shielded wire symbols, and note 3 reference. Added gear train symbol to B5. Corrected drawing errors as follows: R97 was shown as 2.7K, CR4 and CR11 symbol change, renumbered terminals on T10, 1 was 2, 2 was 1, 3 was 5, and 5 was 3. R7 was 311, changed to 316.</p>			All.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1K of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2 and 3	(C4)	C2, C3, C4, C16, C17, C18, C23, C24, C25, C26, C27, C28, C36, C40, and C44 were 1.3 pf-13 pf, changed to 1.98 pf-12.40 pf to correct drawing error.		All.
2	(C5)	Deleted Z2 and added L31, C151 and C153 for product improvement.		MCN 762 and above.
2	(C5)	R125 was 150 ohms; is changed to 68 ohms to provide correct voltage for silicon transistor.		MCN 762 and above.
2	(C6)	Added lead color designation, and changed B4 type for product improvement.		MCN 749 and above.
2	(C7)	R76 and R77 were 15 ohms changed to 22 ohms to redistribute gain in loop servo amplifier.		MCN 715 through MCN 761.
2 and 3	(C8)	Added numbers to all rotary switch contacts to clarify drawing.		All.
2	(C9)	Added C150, 330 uf to Q28 collector to eliminate oscillations in tuning servo.		MCN 650 and above.
3	(C10)	Q31 was 2N341, changed to 2N2405 for product improvement.		MCN 730 and above.
3	(C11)	C35 was 10 pf, changed to 2 pf to improve tracking.		
3	(C12)	Deleted L7, 39 mh and added C152, 3900 pf to improve image rejection.		MCN 718 and above.
4	(C13)	C76 and C77 were 3 uf, changed to 3.3 uf for product improvement.		MCN 715 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1L of 4)

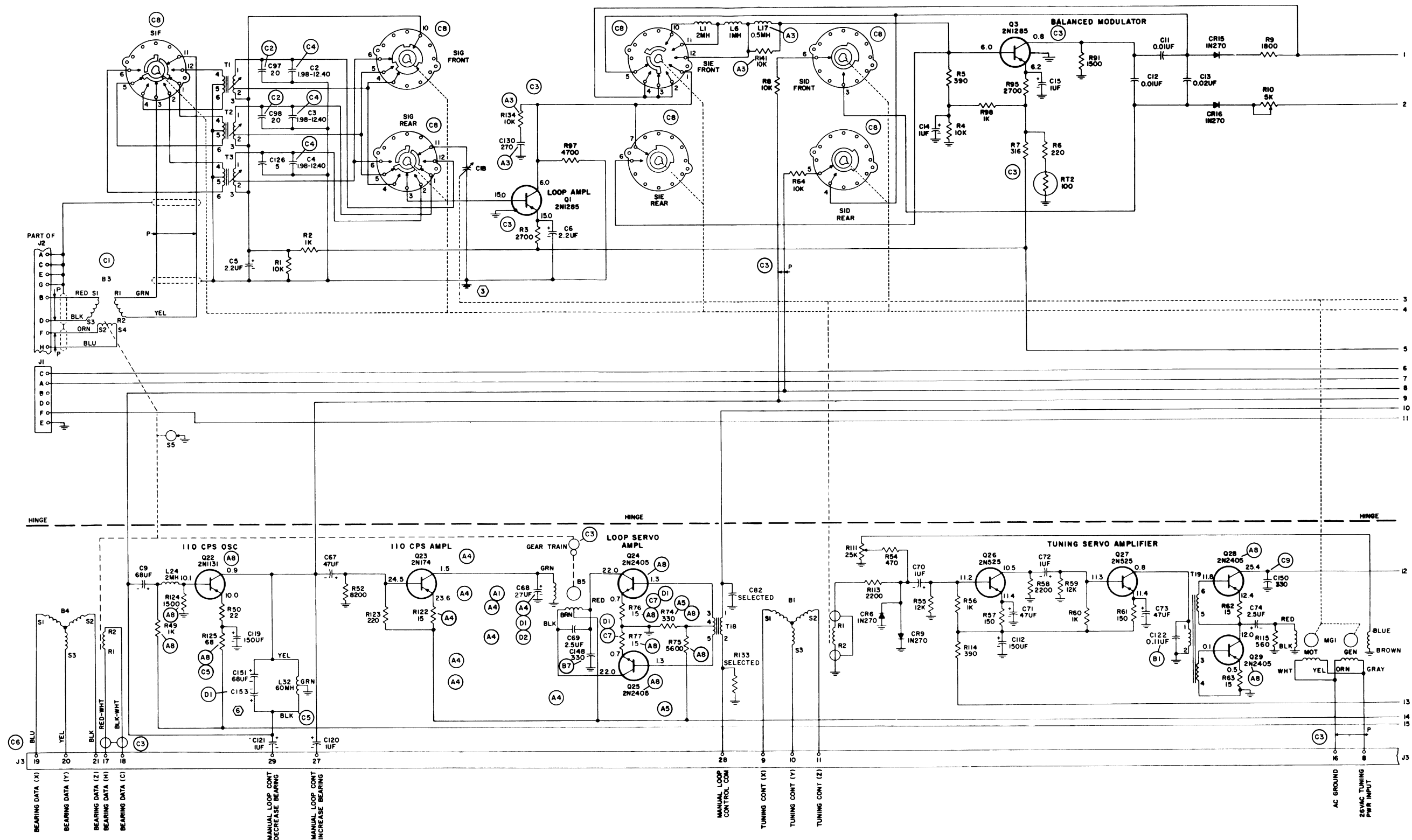
Figure 814



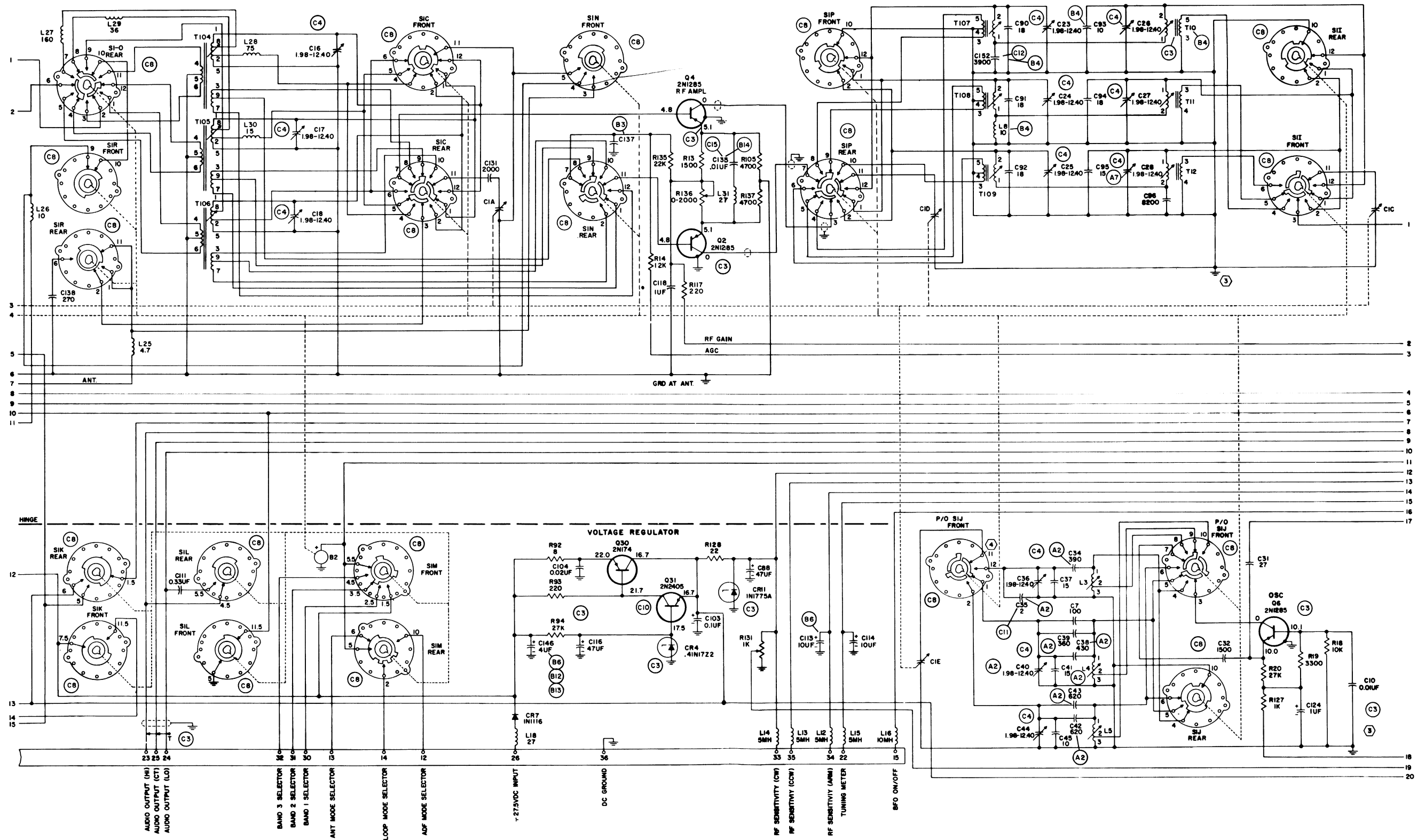
51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
4	(C14)	C140 was 2.2 uf, changed to .47 uf to redistribute gain in servo loop amplifier.		MCN 715 through MCN 727.
3	(C15)	C133 was 0.011 uf, changed to 0.01 uf for product improvement.		MCN 730 and above.
2	(D1)	C153 was 47 uf, now selected in final manufacturing test from 47 uf or 68 uf to compensate for component variations in 110 Hz oscillator circuitry.		MCN 762 and above.
2	(D1)	R76 and R77 were 22 ohms; are changed to 15 ohms to improve loop phasing.		MCN 762 and above.
4	(D1)	C140 was .47 uf; is changed to 2.2 uf to improve loop phasing.		MCN 728 through MCN 1083.
2	(D1)	C68 was 33 uf; is changed to 22 uf to improve loop phasing.		MCN 174 through MCN 727.
2	(D2)	C68 was 22 uf; is changed to 27 uf to improve bearing speed.		MCN 728 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1M of 4)  
Figure 814

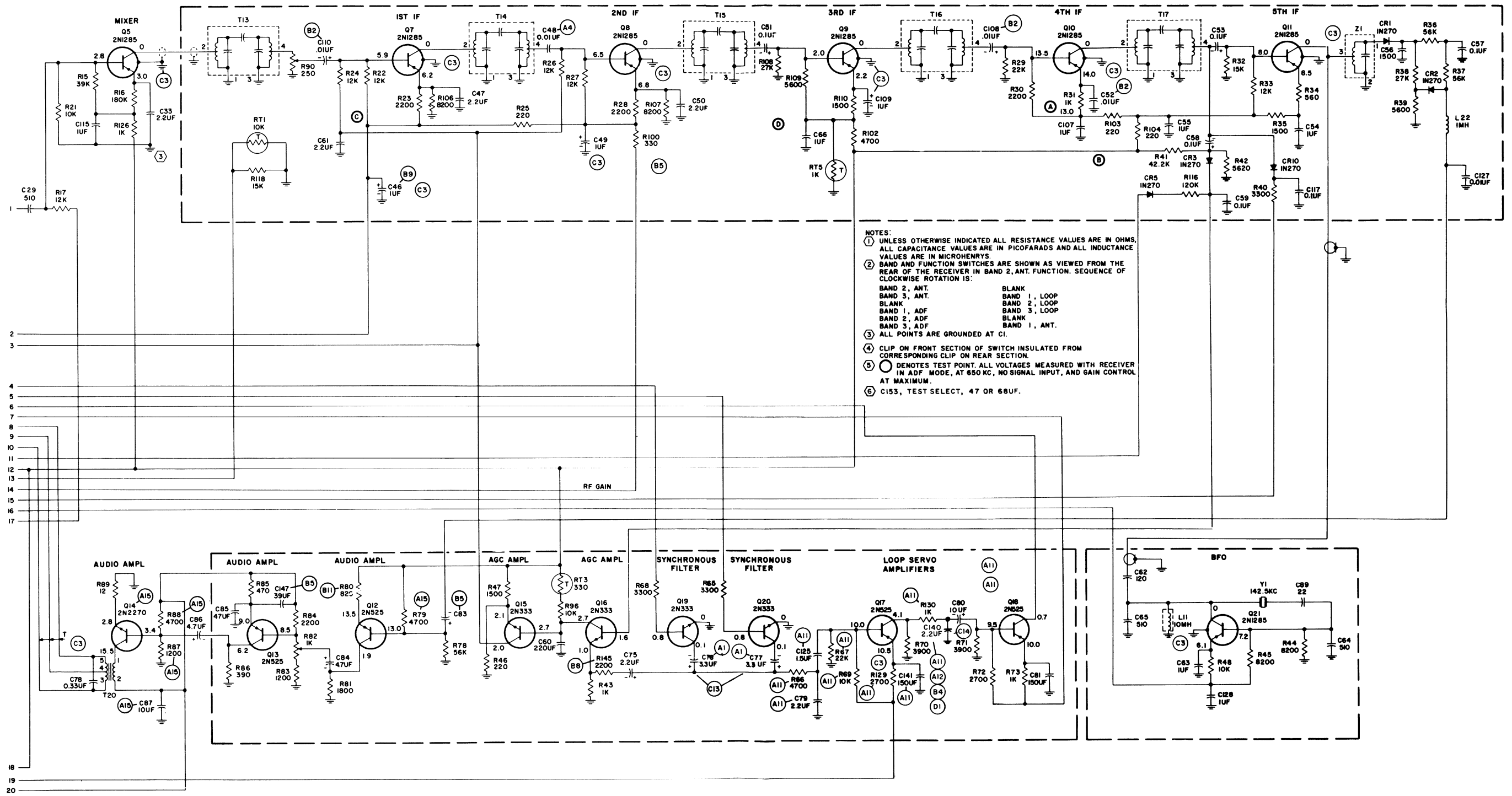


51Y-4A ADF Receiver, Through MCN 1083,  
Schematic Diagram, (Sheet 2 of 4)  
Figure 814



51Y-4A ADF Receiver, Through MCN 1083,  
Schematic Diagram (Sheet 3 of 4)  
Figure 814





NOTES:  
 (1) UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.  
 (2) BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:  
 BAND 2, ANT. BLANK  
 BAND 3, ANT. BAND 1, LOOP  
 BLANK BAND 2, LOOP  
 BAND 1, ADF BAND 3, LOOP  
 BAND 2, ADF BLANK  
 BAND 3, ADF BAND 1, ANT.  
 (3) ALL POINTS ARE GROUNDED AT G1.  
 (4) CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.  
 (5) DENOTES TEST POINT. ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650 KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.  
 (6) C153, TEST SELECT, 47 OR 68UF.

51Y-4A ADF Receiver, Through MCN 1083,  
Schematic Diagram (Sheet 4 of 4)  
Figure 814



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A1	Capacitor C151, 68 pf; is changed to a selected value.	To adjust frequency of 110-Hz oscillator		
4	A1	Note $\langle 6 \rangle$ is changed to include C151 and increased number of select values.	Explain selected values of C151 and C153.		
2	A2	Capacitor C166, 12 pf, is added.	Added capacity required for receiver tracking.		
2	A3	Circuit involving Q1, Q3, S1D, and S1E is changed.	Design change for improved operation.		
2	A4	Capacitor C150, 330 pf, is changed to 560 pf.	To eliminate high frequency oscillator in tuning of servo amplifier.		
3	A5	Capacitor C165, 12 pf, is added.	To correct high frequency inter-modulation problems.		
3	A6	Capacitor C165, 12 pf, is deleted.	Part not needed after A9 revision.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1A of 4)  
Figure 814A



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	A7	Resistor R152, 47 ohms, is changed to 68 ohms.	To correct high frequency inter-modulation problems.		
3	A8	Resistor R152, 68 ohms, is deleted.	Part not needed after A9 revision.		
3	A9	Capacitor C133, 0.01 uf, is changed to 0.1 uf. Coil L31, 27 uh, is deleted. Coils L35 and L36, 27 uh, are added. Capacitor C163, 0.1 uf, is added.	To correct high frequency inter-modulation problems.		
3	A10	Resistor R14, 12K, is changed to 10K.	To improve agc characteristics.		
3	A11	Resistor R165, 560 ohms, is added.	To change range of adjustment for gain of loop servo amplifier.		
3	A12	Capacitor C37, 10 pf, is added.	Correct drawing error.		
3	A13	Capacitor C41, 15 pf, is changed to 5 pf.	Correct drawing error.		
3	A14	Capacitor C45, 10 pf, is changed to 5 pf.	Improve tuning characteristics.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1B of 4)  
Figure 814A



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	A15	Resistor R19, 3300 ohms, is changed to 2200 ohms.	Change operating bias of Q6 for reduced collector-base capacitance.		
4	A16	Capacitor C87, 10 uf, is changed to 68 uf.	Increased decoupling of audio from B+.		
4	A17	Polarity shown for capacitor C86 is changed.	Correct drawing error.		
4	A18	Polarity for capacitor C147 is added.	Correct drawing error.		
4	A19	Capacitor C84, 4.7 uf, is changed to .33 uf.	Improve response curve of audio stages.		
4	A20	Resistor R80, 1K, is changed to 820 ohms.	Adjust overall gain of audio stages.		
4	A21	Resistor R80, 820 ohms, is changed to 1.2K.	Same as above.		
4	A22	Resistor R166, 1K, is added.	Reduce gain to eliminate high frequency oscillation.		
4	A23	Resistor R130, 2700 ohms, is changed to 4700 ohms.	Reduce gain of loop servo amplifier.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1C of 4)

Figure 814A

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51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	A24	Resistor R71, 3900 ohms, is changed to 8200 ohms.	Increase dynamic range of signal handling capability of stage.		
4	A25	Resistor R72, 2700 ohms, is changed to 4700 ohms.	Same as above.		
4	A26	Resistor R13, 1K is changed to 680 ohms.	Same as above.		
4	A27	Resistor R167, 1K, is added.	Reduce gain to eliminate high frequency oscillation.		
4	A28	Resistor R40, 3300 ohms is changed to 2700 ohms.	Change signal level to tuning meter because of new meter type.		
4	A29	Ground connections of C63, C64, C65, C128, L11, and R24 are changed to shield of output coax cable.	Reduce amount of bfo radiation.		
2	A30	Capacitor C126, 5 pf, is changed to 7 pf.	To provide better temperature control characteristics.		

51Y-4A ADF Receiver MCN 1084 and Above, Schematic Diagram (Sheet 1D of 4)  
Figure 814A



51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A31	Capacitor C126, 7 pf, is changed to 5 pf.	Combination of A2 revision and design change in transformer T3 resulting in lower capacity requirement.		
2	A32	Capacitor C13, 0.02 uf, is changed to 0.01 uf.	Reduced fabrication cost.		
3	A33	Capacitor C102, 5 pf, is added.	Improve tuning characteristics.		
3	A34	Transistor Q31 emitter symbol is changed.	Correct drawing error.		
3	A35	Capacitor C88, 47 uf, is changed to 150 uf.	Improve voltage supply filtering.		
3	A36	Coil L16, 10 mh, is replaced by resistor R157, 68 ohms.	Eliminate bfo radiation.		
3	A37	Capacitor C164, 10 uf, is added.	Reduce bfo radiation.		
3	A38	Capacitor C164, 10 uf is deleted.	Part not needed after A36 revision.		

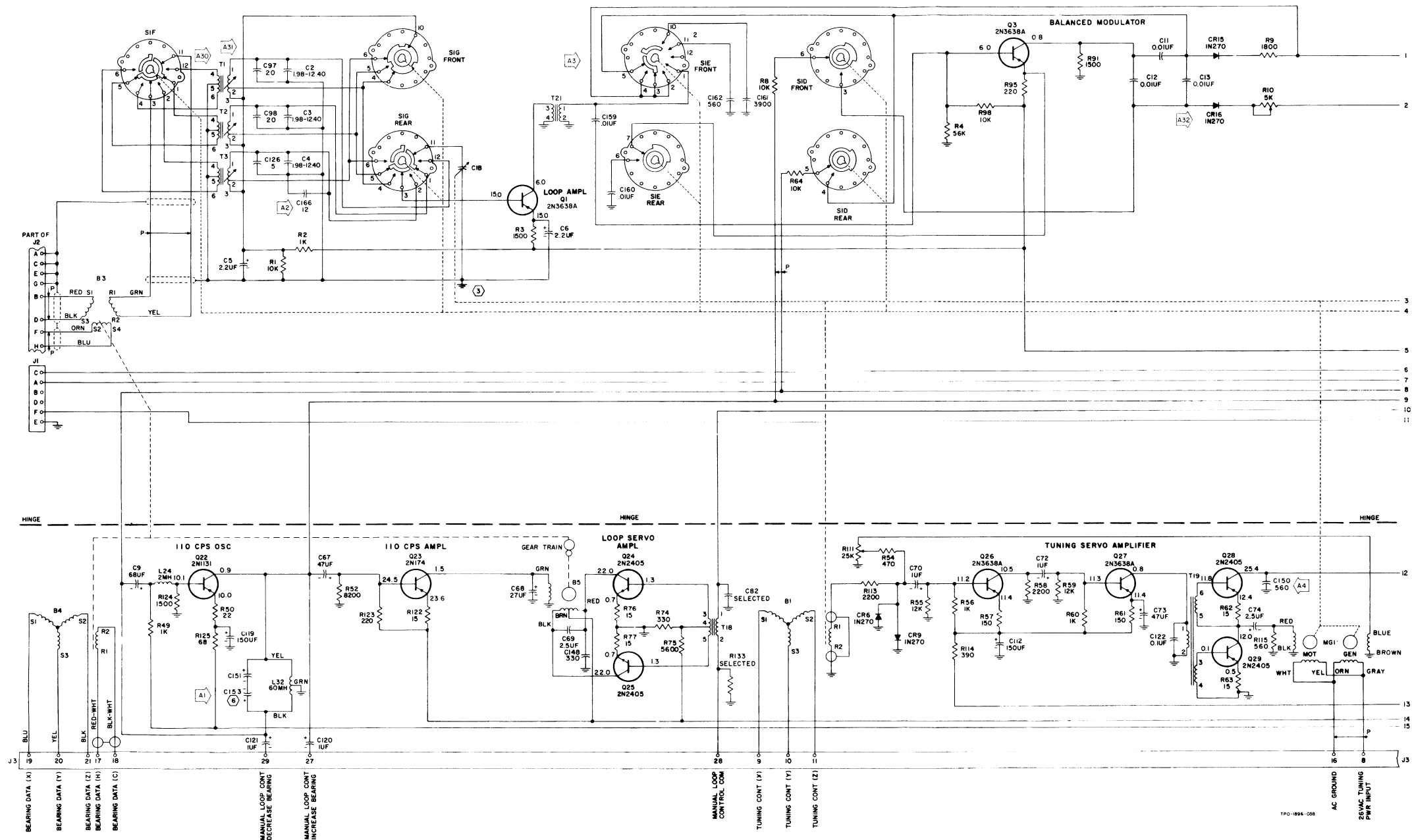
51Y-4A ADF Receiver MCN 1084 and Above, Schematic Diagram (Sheet 1E of 4)  
Figure 814A



51Y-4A ONLY

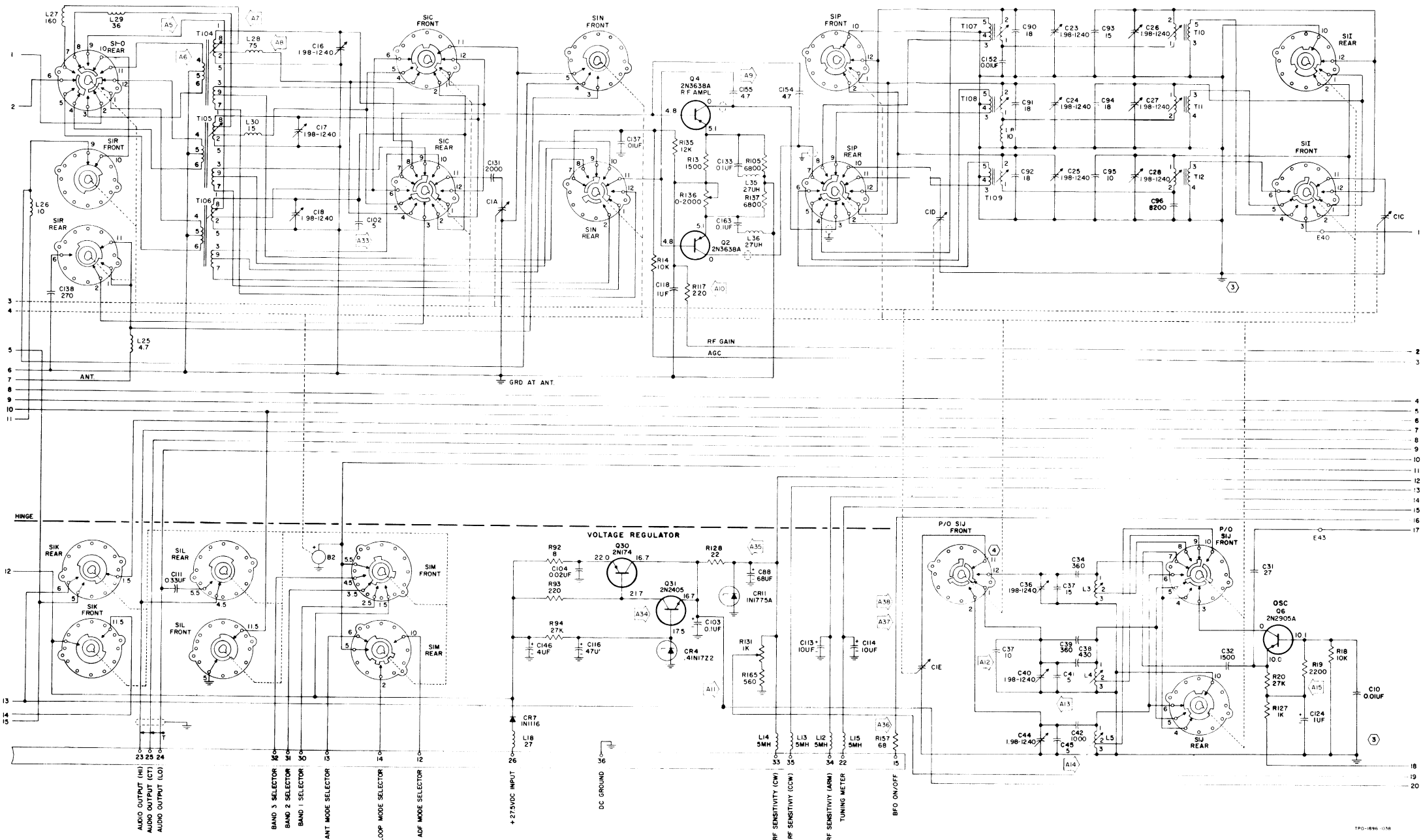
SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	A39	Capacitor C47, 001 uf is changed to 0.1 uf.	Increase gain of if. amplifier.		
	A40	Capacitor C47, 0.1 uf is changed to 0.01 uf.	Adjust gain of if. amplifier		
4	A41	Capacitor C50, 0.01 uf is changed to 0.1 uf.	Adjust gain of if. amplifier.		
4	A42	Coil L34, 10 mh, is added.	Decrease bandwidth of if. amplifier.		
4	A43	Coil L34, 10 mh, is deleted.	Component not needed after design change of if. transformers.		
4	A44	Capacitor C108, 0.01 uf, is changed to 1200 pf.	Same as A42.		
4	A45	Capacitor C108, 1200 pf. is changed to 0.01 uf.	Increase bandwidth after A43 revision.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1F of 4)  
Figure 814A

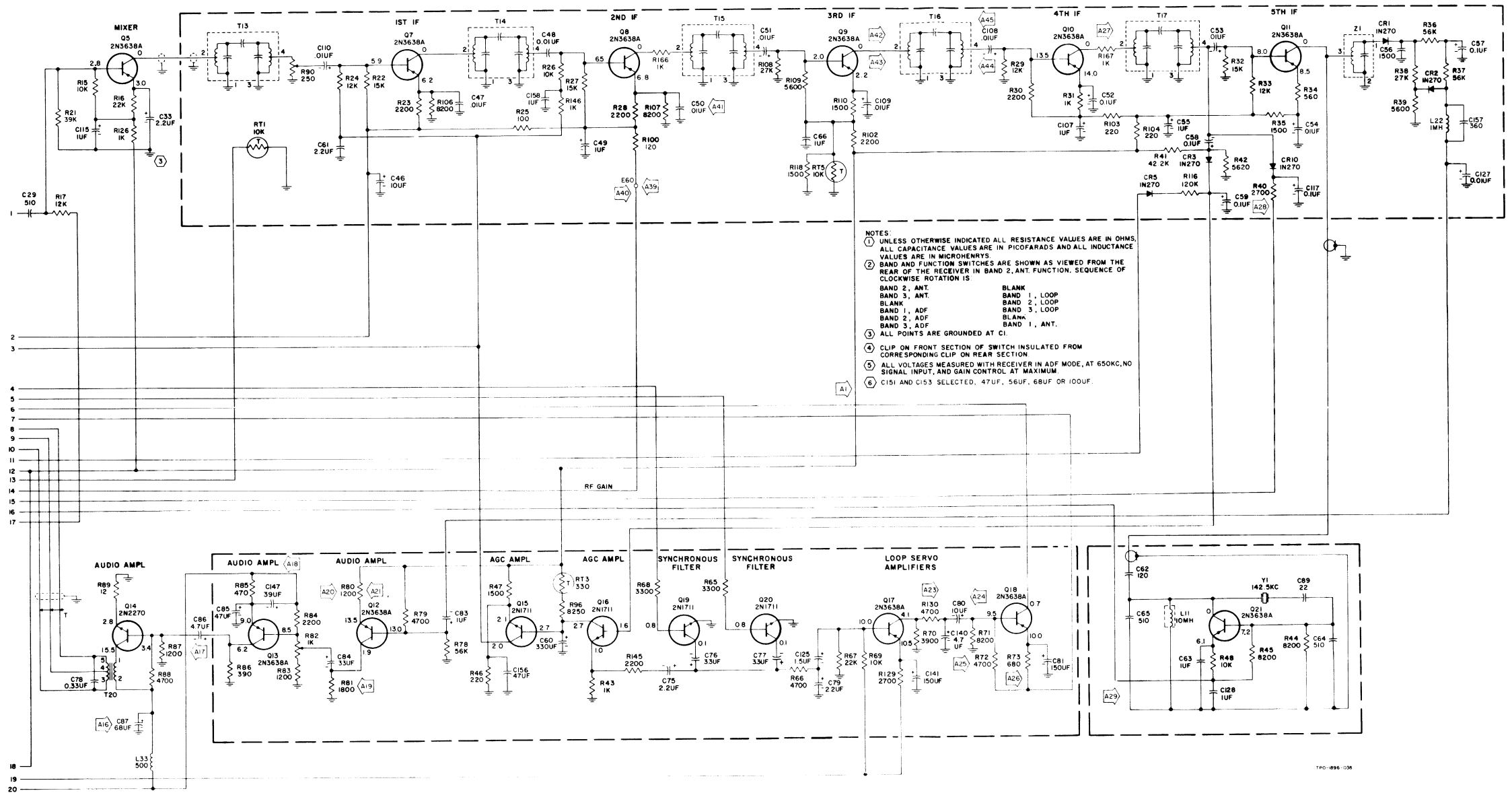


51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 2 of 4)  
Figure 814A





51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 3 of 4)  
Figure 814A



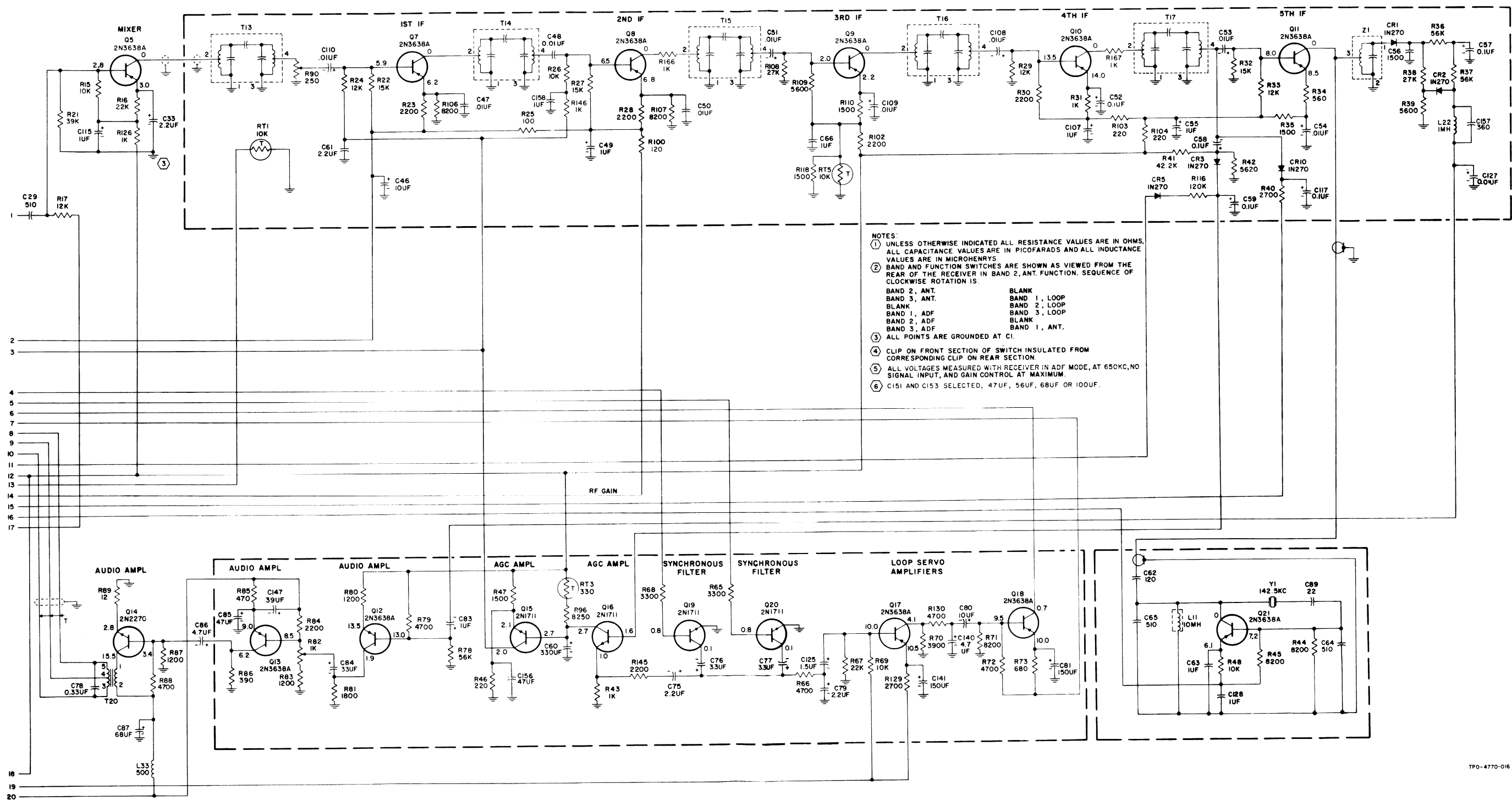
51Y-4 ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 4 of 4)  
Figure 814A



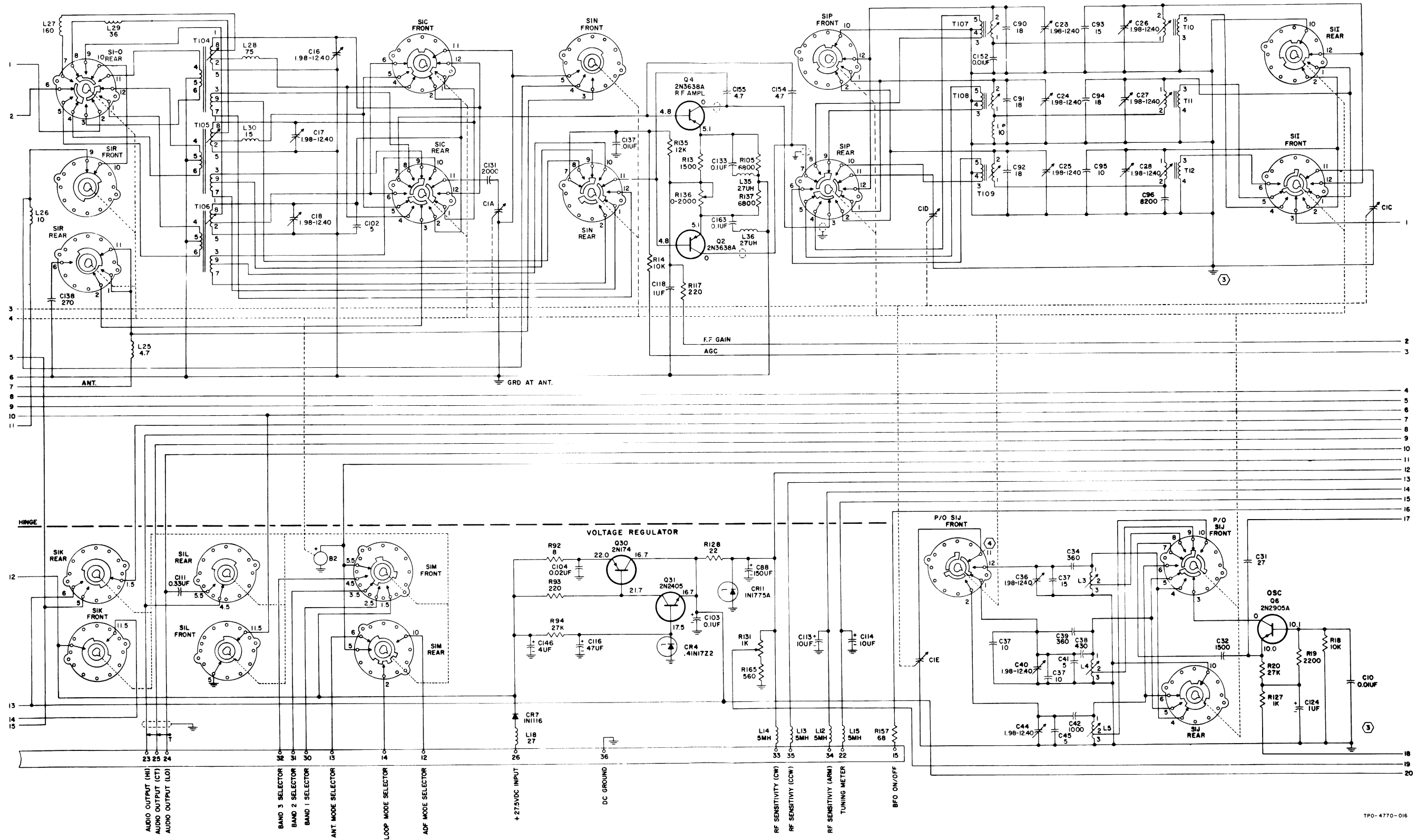
51Y-4A ONLY

PAGE	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY

51Y-4A ADF Receiver, Collins Part Number 522-2587-013,  
Schematic Diagram (Sheet 1 of 4)  
Figure 814B

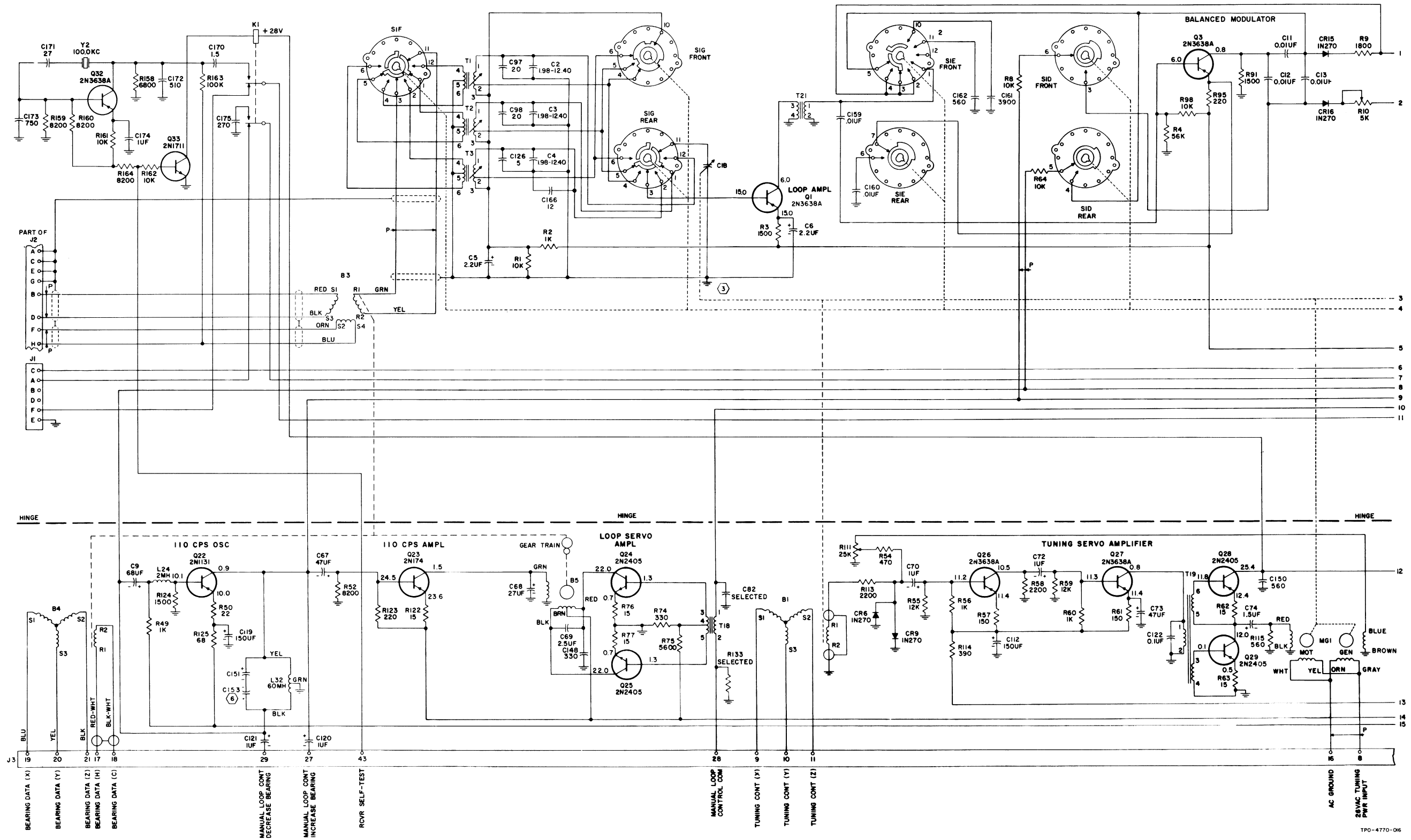


51Y-4A ADF Receiver, Collins Part Number 522-2587-013  
Schematic Diagram (Sheet 2 of 4)  
Figure 814B



51Y-4A ADF Receiver, Collins Part Number 522-2587-013,  
Schematic Diagram (Sheet 3 of 4)  
Figure 814B

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51Y-4A ADF Receiver, Collins Part Number 522-2587-013,  
Schematic Diagram (Sheet 4 of 4)  
Figure 814B

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Pages 893/894



## 51Y-4/4A ADF Receiver - Storage Instructions

### 1. GENERAL.

Included in this section are storage instructions for the 51Y-4/4A ADF Receiver. Ensure that all subassemblies are secured to the chassis, and the 51Y-4/4A is installed in the dust cover. If the 51Y-4/4A is to be stored for a prolonged period, place the 51Y-4/4A in the original shipping carton.







## 51Y-4/4A ADF Receiver - Special Tools, Fixtures, and Test Equipment

### 1. GENERAL.

Included in this section is a list of special tools, fixtures, and test equipment required for test or overhaul of the 51Y-4/4A ADF Receiver.

### 2. TEST EQUIPMENT REQUIRED.

Figure 1001 lists the equipment required to test, troubleshoot, and overhaul the 51Y-4/4A. Any substitution of test equipment must be equivalent to, or better than that which is listed.

EQUIPMENT	MANUFACTURER AND PART NUMBER
477U-2 ADF Antenna Simulator and 477V-2 ADF Test Set	Collins part number 522-2710-00  Collins part number 522-2711-00
or 477U-3 ADF Test Set only	Collins part number 522-4458-001
50-ohm test probe	See figure 801 in the trouble-shooting section of this manual.
Signal generator (2 required)	Hewlett-Packard, Model 606A.
Ac/dc vtm	Hewlett-Packard, Model 410B.
Ac vtm	Ballantine Laboratories, Model 310
477U-2 Low Capacitance Sense Antenna Adapter for use with 51Y-4A ADF Receiver	Collins part number 544-6109-004
Oscilloscope	Hewlett-Packard, model 122A
Power output meter	Daven Co., Model OP961

Table of Test Equipment Required (Sheet 1 of 2)  
Figure 1001



EQUIPMENT	MANUFACTURER AND PART NUMBER
Frequency counter	Hewlett-Packard, Model 5532A or 524C/525A
Audio oscillator	Hewlett-Packard, Model 200CD
Transistor tester	Hickok 870
Multimeter	Simpson 260
Stopwatch	Meylan 202A
Headset	Superex 17B6309
Balance fixture	Local Fabrication (see figure 513)

Table of Test Equipment Required (Sheet 2 of 2)  
Figure 1001



## 51Y -4/ 4A ADF Receiver - Illustrated Parts List

### INTRODUCTION

#### 1. GENERAL.

This Illustrated Parts List is a complete list of parts for the above equipment manufactured by Collins Radio Company (see figure 1101).

Periodically the Illustrated Parts List is revised to cover additions, deletions, or changes to the equipment. These revisions are indicated by an R placed to the left of each revised item and apply to the current revision only.

#### 2. NUMERICAL INDEX.

This index contains an alphanumerical list of all parts listed in the Group Assembly Parts List.

##### A. PART NUMBER Column.

In this column are listed part numbers for procurable parts and assemblies in the Group Assembly Parts List.

##### (1) Order of Precedence.

The order of precedence beginning at the extreme left-hand position in part number numerical arrangement is as follows:

Letters A through Z

Numerals 0 through 9 (Alphabetical O's are considered as numerical zeros.)

The order of precedence in continuing the part number arrangement in second and succeeding positions of the part number from left to right is as follows:

Space (blank column)

Diagonal (slant)/

Point (period).

Dash (-)

Letters A through Z

Numerals 0 through 9 (Alphabetical O's are considered as numerical zeros.)

##### (2) Collins Radio Company Part Numbering System.

Collins Radio Company part numbering system is comprised of a three-digit family number, a four-digit serial number, and a two- or three-digit dash number:

FAMILY NO.

XXX

SERIAL NO.

XXXX

DASH NO.

XX or XXX

## INTRODUCTION

### B. FIG. - ITEM Column.

This column lists the Group Assembly Parts List figure and item numbers assigned to the associated part numbers.

### C. TTL REQ (Total Required) Column.

Total quantity of parts or assemblies required at each location is listed in this column.

### D. AIRLINE PART NO. Column.

Intentionally left blank, for Airline use only.

## 3. SYMBOL INDEX.

The symbol index enables the user to locate, by symbol, the part number and the figure and item number of any electrical item that appears on the schematic diagram.

### A. SYMBOL Column.

This column contains an alphanumerical listing of all symbolized items. When the same symbol appears in different units or subassemblies, module symbol prefix designators are used. Where no prefix has been assigned, separate indexes will be given. Prefix designators, if required, will be found in paragraph 6.

### B. FIG. - ITEM Column.

The figure and item numbers are used to locate a part in the Group Assembly Parts List after it has been located in the Symbol Index.

### C. PART NUMBER Column.

This column contains the part number for all symbolized items.

## 4. GROUP ASSEMBLY PARTS LIST.

### A. General.

The Group Assembly Parts List consists of a breakdown of the complete unit into sub-assemblies and detailed parts. Each assembly is listed in its order of disassembly and is followed immediately by its component parts properly indented to show their relationship to the assembly.

#### (1) FIG. - ITEM Column.

Figure and item numbers key the part breakdown to the applicable illustration. Items in the parts breakdown preceded by a dash (example -1) will not be keyed on the illustration.



## INTRODUCTION

(2) PART NO. Column.

Part numbers listed are MIL part numbers, manufacturer's part numbers, or Collins part numbers. Part numbers for items which are made from raw stock, such as wire, solder, varnish, lacing cord, etc. are not listed.

(3) INDENT. Column.

Indentation is shown by codes indicating item relationship.

(4) NOMENCLATURE Column.

This column contains a description for each item listed. Reference to the next higher (NHA) is listed as the last item in the nomenclature column. If a part is purchased by Collins Radio Company from a vendor, the Federal Manufacturer's Code number is listed in this column. If this column does not include a Federal Manufacturer's Code Number, the item is either a MIL approved item, commercial item or manufactured by Collins. Where COML appears in this column, the part may be obtained commercially from various vendors. Part numbers appearing in this column are Collins assigned part numbers for that item. Proprietary items are so indicated by the letter P. Serial numbers or MCN (manufacturing control number) effectivities, where applicable, are listed in this column. Serial number effectivities are designated on the nameplate. The MCN is stamped on each module and/or chassis. Changes made from service bulletins are so indicated by SB1, SB2, etc.

(5) UNITS PER ASSY. Column.

This column contains the number of parts required for each assembly or subassembly. The letters AR denote that the selection of a part or parts should be made as required. REF refers to an assembly which is completely assembled on a preceding illustration.

(6) USAGE CODE Column.

Part variations within different models of the same equipment are indicated in the usage code column. In cases where this column has been left blank, the part listed will apply to all models of equipment covered by this publication. If usage codes are required, see paragraph 6.



INTRODUCTION

5. MANUFACTURER'S CODE AND NAME INDEX.

CODE	MANUFACTURER'S NAME AND ADDRESS	CODE	MANUFACTURER'S NAME AND ADDRESS
00853	Sangamo Electric Co. S. Carolina Div. Picken, S.C. 29671	12615	U.S. Terminals, Inc. 7504 Camargo Rd. Cincinnati, Ohio 45243
01121	Allen-Bradley Co. 1201 S. 2nd St. Milwaukee, Wis. 53204	13103	Thermalloy Co. 8717 Diplomacy Row Dallas, Tex. 75247
01526	General Electric Co. Specialty Control Dept. P.O. Box 812 Waynesboro, Va. 22980	21242	American Electronics Components Corp. P.O. Box 27087 Cincinnati, Ohio 45227
01939	Sprague Electric Co. of Wisconsin Grafton, Wis. 53024	25140	Globe Industries, Inc. 2275 Stanley Ave. Dayton, Ohio 45404
03998	Cedar Engineering Div. of Control Data Corp. Minneapolis, Minn. 55400	40920	Miniature Precision Bearings, Inc. West Lebanon Rd. Keene, N.H. 03766
04713	Motorola Semiconductor Products, Inc. 5005 E. McDowell Rd. Phoenix, Ariz. 85008	56289	Sprague Electric Co. Marshall St. North Adams, Mass. 01247
06978	Aladdin Electronics Div. of Aladdin Industries, Inc. 705 Murfreesboro Rd Nashville, Tenn. 37210	61864	United-Carr Inc. Suit 4600 Prudential Center Boston, Mass. 02199
10583	Industrial Mica Corp. 227 S. Van Brunt Englewood, N.J. 07631	70417	Amplex Div. of Chrysler Corp. Detroit, Mich. 48200
10646	Carborundum Co. Buffalo Ave. Niagara Falls, N.Y. 14302	70674	ADC Products, Inc. 6405 Cambridge St. Minneapolis, Minn. 55426
12014	Chicago Rivet and Machine Co. 950 S. 25th Ave. Bellwood, Ill. 60104	71279	Cambridge Thermionic Corp. 430 Concord Ave. Cambridge, Mass. 82138
12204	Chrysler Corp. 341 Massachusetts Ave. Detroit, Mich. 48203		



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5. MANUFACTURER'S CODE AND NAME INDEX. (Cont)

CODE	MANUFACTURER'S NAME AND ADDRESS	CODE	MANUFACTURER'S NAME AND ADDRESS
71450	Cts Corp. 1142 W. Bearsley Ave. Elkhart, Ind. 46514	77045	Sunbeam Electronics Div. John Oster Mfg. Co. Fort Lauderdale, Fla. 33300
71468	ITT. Cannon Electric, Inc. 3208 Humbolt St. Los Angeles, Calif. 90031	77147	Patton Mac Guyer Co. Edgewood Station Providence, R.I. 02905
71785	Dayton Stencil Works Mfg. Co. 113 E. Second St. Dayton, Ohio 45402	77250	Pheoll Mfg. Co. Chicago, Ill. 60600
72136	Electro Motive Mfg. Co., Inc. S. Park and John St. Willimantic, Conn. 06226	77630	TRW Electronic Components Div. Davis and Copewood Sts. Camden, N.J. 08103
72568	G.M. Laboratories, Inc. 4300 N. Knox Ave. Chicago, Ill. 60641	77820	Bendix Corp. Electrical Components Div.. Sherman Ave. Sidney, N. Y. 13838
72962	Elastic Stop Nut Corp. of America 2330 Vauxhall Rd. Union, N.J. 07083	78189	Shakeproof Div. of Illinois Tool Works, Inc. St. Charles Rd. Elgin, Ill. 60120
72982	Erie Technological Products, Inc. 644 W. 12th St. Erie, Pa. 16512	78488	Stackpole Carbon Co. St. Marys, Pa. 15857
74970	Johnson, E. F. Co. 297 Tenth Ave. S.W. Waseca, Minn. 56093	79963	Zierick Mfg. Corp. 83 Rockdale Ave. New Rochelle, N.Y. 10801
75237	Kaynar Mfg. Co. P.O. Box 3001 Fullerton, Calif. 92634	80294	Bourns, Inc. 6135 Magnolia Ave. Riverside, Calif. 92506
75378	CTS Knights, Inc. 101 E. Church St. Sandwich, Ill. 60548	81815	Communication Coil Co. 2839 N. Narragansett Ave. Chicago, Ill. 60634
76854	Oak Mfg. Co. S. Main Crystal Lake, Ill. 60014	82068	Burnell-Nytronics 10 Pelham Parkway Pelham Manor, N. Y. 10803



INTRODUCTION

5. MANUFACTURER'S CODE AND NAME INDEX. (Cont)

CODE	MANUFACTURER'S NAME AND ADDRESS	CODE	MANUFACTURER'S NAME AND ADDRESS
82142	Jeffers Electronics Div. of Speer Carbon Co. Du Bois, Pa. 15801	94105	Collins Radio Co. Information and Science Center 19700 Jamboree Rd. P.O. Box C Newport Beach, Calif. 92660
86197	Clifton Precision Products Div. Litton Precision Products, Inc. Maple at Broadway Clifton Heights, Pa. 19018	97315	Ballastran Corp. 1701 N. Calhoun St. Fort Wayne, Ind. 46808
88818	Kearfott Div. of General Precision, Inc. 1150 McBride Little Falls, N. J. 07424	98291	Sealectro Corp. 225 Hoyt Mararoneck, N.Y. 10544
91662	Elco Corp. Maryland Rd. and Computer Ave. Willow Grove, Pa. 19090	99378	Atlee Corp. 2 Lowell Ave. Winchester, Mass. 01890
91663	Armel Electronics, Inc. 1601 75th St. North Bergen, N. J. 07047	99800	Delevan Electronics Corp. 270 Quaker Rd. East Aurora, N. Y. 14052
		99934	Renbrandt, Inc. 6 Parmelee St. Boston, Mass. 02118





INTRODUCTION

6. TABLE I.

A. Usage Code.

The following codes have been assigned in this manual:

USAGE CODE	UNIT	FIGURE
A	51Y-4 522-1836-00	1101
B	51Y-4A 522-2587-00	1101
C	51Y-4A 522-2587-013	1101



INTRODUCTION

How to Use This Illustrated Parts List

1-FIND PAGE NO. IN LIST OF ILLUSTRATIONS

6-FIND PART NO. IN NUMERICAL INDEX

3-FIND PART AND ITS INDEX NO.

8-LOCATE PART ON ILLUSTRATION

The diagram illustrates the workflow for using the parts list. It shows three overlapping pages: a 'SYMBOL INDEX', a 'NUMERICAL INDEX', and a 'GROUP ASSEMBLY PARTS LIST'. A technical drawing of a component is shown with callouts 1 through 12. Arrows indicate the sequence of steps: 1. Finding the page number in the list of illustrations; 2. Turning to the page; 3. Finding the part and its index number; 4. Locating the index number on the Group Assembly Parts List; 5. Locating the symbol; 6. Finding the part number in the Numerical Index; 7. Turning to the figure and index number; 8. Locating the part on the illustration.

SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER
CR40	1107 18	1N645	R78	1108 9	R2M210R2CP
CR48	1107 19	1N645	R79	1108 7	WF1-B 21-561RCP
CR49	1107 20	1N645	R80	1108 7	WF1-B 21-561RCP
CR50	1107 21	1N645	R81	1108 7	WF1-B 21-561RCP
CR51	1107 22	1N645	R82	1108 7	WF1-B 21-561RCP
CR52	1107 23	1N645	R83	1108 7	WF1-B 21-561RCP
CR53	1107 24	1N645	R84	1108 7	WF1-B 21-561RCP
CR54	1107 25	1N645	R85	1108 7	WF1-B 21-561RCP
CR55	1107 26	1N645	R86	1108 7	WF1-B 21-561RCP
CR56	1107 27	1N645	R87	1108 7	WF1-B 21-561RCP
CR57	1107 28	1N645	R88	1108 7	WF1-B 21-561RCP
CR58	1107 29	1N645	R89	1108 7	WF1-B 21-561RCP
CR59	1107 30	1N645	R90	1108 7	WF1-B 21-561RCP
CR60	1107 31	1N645	R91	1108 7	WF1-B 21-561RCP
CR61	1107 32	1N645	R92	1108 7	WF1-B 21-561RCP
CR62	1107 33	1N645	R93	1108 7	WF1-B 21-561RCP
CR63	1107 34	1N645	R94	1108 7	WF1-B 21-561RCP
CR64	1107 35	1N645	R95	1108 7	WF1-B 21-561RCP
CR65	1107 36	1N645	R96	1108 7	WF1-B 21-561RCP
CR66	1107 37	1N645	R97	1108 7	WF1-B 21-561RCP
CR67	1107 38	1N645	R98	1108 7	WF1-B 21-561RCP
CR68	1107 39	1N645	R99	1108 7	WF1-B 21-561RCP
CR69	1107 40	1N645	R00	1108 7	WF1-B 21-561RCP
CR70	1107 41	1N645	R01	1108 7	WF1-B 21-561RCP
CR71	1107 42	1N645	R02	1108 7	WF1-B 21-561RCP
CR72	1107 43	1N645	R03	1108 7	WF1-B 21-561RCP
CR73	1107 44	1N645	R04	1108 7	WF1-B 21-561RCP
CR74	1107 45	1N645	R05	1108 7	WF1-B 21-561RCP
CR75	1107 46	1N645	R06	1108 7	WF1-B 21-561RCP
CR76	1107 47	1N645	R07	1108 7	WF1-B 21-561RCP
CR77	1107 48	1N645	R08	1108 7	WF1-B 21-561RCP
CR78	1107 49	1N645	R09	1108 7	WF1-B 21-561RCP
CR79	1107 50	1N645	R10	1108 7	WF1-B 21-561RCP
CR80	1107 51	1N645	R11	1108 7	WF1-B 21-561RCP
CR81	1107 52	1N645	R12	1108 7	WF1-B 21-561RCP
CR82	1107 53	1N645	R13	1108 7	WF1-B 21-561RCP
CR83	1107 54	1N645	R14	1108 7	WF1-B 21-561RCP
CR84	1107 55	1N645	R15	1108 7	WF1-B 21-561RCP
CR85	1107 56	1N645	R16	1108 7	WF1-B 21-561RCP
CR86	1107 57	1N645	R17	1108 7	WF1-B 21-561RCP
CR87	1107 58	1N645	R18	1108 7	WF1-B 21-561RCP
CR88	1107 59	1N645	R19	1108 7	WF1-B 21-561RCP
CR89	1107 60	1N645	R20	1108 7	WF1-B 21-561RCP
CR90	1107 61	1N645	R21	1108 7	WF1-B 21-561RCP
CR91	1107 62	1N645	R22	1108 7	WF1-B 21-561RCP
CR92	1107 63	1N645	R23	1108 7	WF1-B 21-561RCP
CR93	1107 64	1N645	R24	1108 7	WF1-B 21-561RCP
CR94	1107 65	1N645	R25	1108 7	WF1-B 21-561RCP
CR95	1107 66	1N645	R26	1108 7	WF1-B 21-561RCP
CR96	1107 67	1N645	R27	1108 7	WF1-B 21-561RCP
CR97	1107 68	1N645	R28	1108 7	WF1-B 21-561RCP
CR98	1107 69	1N645	R29	1108 7	WF1-B 21-561RCP
CR99	1107 70	1N645	R30	1108 7	WF1-B 21-561RCP
CR00	1107 71	1N645	R31	1108 7	WF1-B 21-561RCP
CR01	1107 72	1N645	R32	1108 7	WF1-B 21-561RCP
CR02	1107 73	1N645	R33	1108 7	WF1-B 21-561RCP
CR03	1107 74	1N645	R34	1108 7	WF1-B 21-561RCP
CR04	1107 75	1N645	R35	1108 7	WF1-B 21-561RCP
CR05	1107 76	1N645	R36	1108 7	WF1-B 21-561RCP
CR06	1107 77	1N645	R37	1108 7	WF1-B 21-561RCP
CR07	1107 78	1N645	R38	1108 7	WF1-B 21-561RCP
CR08	1107 79	1N645	R39	1108 7	WF1-B 21-561RCP
CR09	1107 80	1N645	R40	1108 7	WF1-B 21-561RCP
CR10	1107 81	1N645	R41	1108 7	WF1-B 21-561RCP
CR11	1107 82	1N645	R42	1108 7	WF1-B 21-561RCP
CR12	1107 83	1N645	R43	1108 7	WF1-B 21-561RCP
CR13	1107 84	1N645	R44	1108 7	WF1-B 21-561RCP
CR14	1107 85	1N645	R45	1108 7	WF1-B 21-561RCP
CR15	1107 86	1N645	R46	1108 7	WF1-B 21-561RCP
CR16	1107 87	1N645	R47	1108 7	WF1-B 21-561RCP
CR17	1107 88	1N645	R48	1108 7	WF1-B 21-561RCP
CR18	1107 89	1N645	R49	1108 7	WF1-B 21-561RCP
CR19	1107 90	1N645	R50	1108 7	WF1-B 21-561RCP
CR20	1107 91	1N645	R51	1108 7	WF1-B 21-561RCP
CR21	1107 92	1N645	R52	1108 7	WF1-B 21-561RCP
CR22	1107 93	1N645	R53	1108 7	WF1-B 21-561RCP
CR23	1107 94	1N645	R54	1108 7	WF1-B 21-561RCP
CR24	1107 95	1N645	R55	1108 7	WF1-B 21-561RCP
CR25	1107 96	1N645	R56	1108 7	WF1-B 21-561RCP
CR26	1107 97	1N645	R57	1108 7	WF1-B 21-561RCP
CR27	1107 98	1N645	R58	1108 7	WF1-B 21-561RCP
CR28	1107 99	1N645	R59	1108 7	WF1-B 21-561RCP
CR29	1107 100	1N645	R60	1108 7	WF1-B 21-561RCP

PART NUMBER	AIRLINE PART NO.	FIG. - ITEM	TTL REQ	PART NO.
2N1911		1103 213		150-0007-0
2N1911		1103 215		150-0011-0
2N1911		1103 215		150-0011-C
2N1911		1103 222		150-0011-
2N1911		1103 224		150-0011-
2N1911		1103 229		150-0011-
2N1911		1103 240		150-0011-
2N1911		1103 279		150-0012
2N1911		1103 280		150-0012
2N1911		1103 283		150-0014
2N1911		1103 287		150-0014
2N1911		1103 289		150-0014
2N1911		1103 317		150-0017
2N1911		1103 319		150-0017
2N1911		1103 321		150-0017
2N1911		1103 329		150-0017
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2N1911		1103 428		150-0017
2N1911		1103 429		150-0017
2N1911		1103 430		150-0017
2N1911		1103 431		150-0017
2N1911		1103 432		150-0017
2N1911		1103 433		150-0017



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
A12591	1104	76	1	CC32UJ361F	1110	12	1
A12598	1104	75	1	CC32UJ361F	1110	12	1
A12599	1101	55	1	CC32UJ361F	1110	12	1
A16634	1104	78	1	CC35UJ391F	1110	16	1
A16634	1104	78	1	CC35UJ391F	1110	16	1
A16634	1104	78	1	CL23CJ1R5TN3	1104	35	1
A201-5W	1111	6	1	CL24BE201UP3	1101	21	1
BC23129	1103	6	1	CL24BE201UP3	1101	21	1
BC23130	1105	1	1	CL24BE600UP3	1104	19	1
BC3178	1104	78	1	CL24BE600UP3	1104	19	1
BC3178	1104	78	1	CL26BE400UN3	1104	22	1
CC20CH050C	1108	11	1	CL26BE400UN3	1104	22	1
CC20CH050C	1108	11	1	CL26BJ2R5TN3	1104	35	1
CC20CH050D	1106	9B	1	CL26BJ2R5TN3	1104	42	1
CC20CH050D	1106	11A	1	CM05C100K03	1107	1A	1
CC20CH050D	1106	18	1	CM05C100K03	1107	6A	1
CC20CH050D	1106	18	1	CM05C120K03	1106	12A	1
CC20CH050D	1106	18A	1	CM05C180K03	1107	21A	1
CC20CH100D	1109	12	1	CM05D331K03	1104	34B	1
CC20CH100D	1109	12	1	CM05D331K03	1104	34B	1
CC20CH100D	1109	12	1	CM05D331K03	1104	44A	1
CC20CH100D	1109	12	1	CM05D331K03	1104	44A	1
CC20CH100D	1109	17	1	CM05D331K03	1104	44A	1
CC20CH100D	1109	17	1	CM05E220J03	1102	4	1
CC20CH100D	1110	10	1	CM05E270J03	1110	4	1
CC20CH120K	1108	11A	1	CM05E470J03	1107	21D	1
CC20CH150G	1108	7	1	CM05E820J03	1107	21D	1
CC20CH150G	1108	7	1	CM05F101J03	1107	21C	1
CC20CH150G	1109	12	1	CM05F101J03	1110	15	1
CC20CH150G	1109	12	1	CM05F101J03	1110	15	1
CC20CH150G	1109	17	1	CM05F121J03	1102	7	1
CC20CH150G	1109	17	1	CM05F151J03	1110	15	1
CC20CH150J	1109	17	1	CM05F151J03	1110	15	1
CC20CH150J	1109	17	1	CM05F271J03	1106	11	1
CC20CH150J	1109	17	1	CM05F271J03	1107	6A	1
CC20CH180J	1108	7	1	CM05F271J03	1110	16	1
CC20CH180J	1108	8	1	CM05F271J03	1110	16	1
CC20CH180J	1108	8	1	CM05F361J03	1105	71A	1
CC20CH180J	1109	2	1	CM05F361J03	1105	71A	1
CC20CH180J	1109	7	1	CM05F361J03	1105	71A	1
CC20CH180J	1109	10	1	CM05F361J03	1110	16	1
CC20CH180J	1109	16	1	CM05F361J03	1110	16	1
CC20CK020D	1110	17	1	CM05F361J03	1110	16	1
CC20CK020D	1110	17	1	CM05F391J03	1107	13A	1
CC20UJ100C	1110	8	1	CM05F391J03	1110	16	1
CC20UJ100C	1110	8	1	CM05F391J03	1110	16	1
CC20UJ240G	1106	12	1	CM06F102G03	1110	6	1
CC20UJ240G	1106	18	1	CM06F102G03	1110	6	1
CC30UJ131G	1110	17	1	CM06F102G03	1110	6	1
CC30UJ131G	1110	17	1	CM06F202J03	1101	58A	1
CC32CG510J	1110	13	1	CM06F302F03	1101	58A	1
CC32CG510J	1110	13	1	CM06F302F03	1106	25	1
CC32SH121G	1110	12	1				
CC32SH121G	1110	12	1				



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
CM06F302J03	1101	58A	1	F22NM107-62	1101	3	2
CM06F392J03	1107	21D	1	F22NM107-62	1101	3	2
CM06F392J03	1107	21D	1	F22NM107-62	1101	3	2
CM06F392J03	1109	1	1	F358MILL6085A	1111	71	1
CM06F392J03	1109	1	1	GA1-5MMFD201	1101	6W	1
CM06F561J03	1107	3	1	GA7-7UUFPO5PCT	1106	43	1
CM06F561J03	1107	3	1	GA7-7UUFPO5PCT	1106	43	1
CM06F681J03	1107	1A	1	GA7-7UUFPO5PCT	1106	43	1
CM07F203J03	1104	67	1	GA7-7UUFPO5PCT	1106	44	1
CM07F203J03	1104	67	1	GA7-7UUFPO5PCT	1106	44	1
CM19E431F03	1110	13	1	GA7-7UUFPO5PCT	1106	44	1
CM19E431F03	1110	13	1	GA7-7UUFPO5PCT	1106	44	1
CM19F621F03	1107	1A	1	G1473	1104	39	1
CM19F621F03	1110	6	1	G2513	1104	38	1
CR37AU100-000KC	1101	6P	1	G2522	1102	18	1
CS13BD566K	1104	77A	AR	G2522	1103	44A	1
CS13BD566K	1104	77B	AR	G2522	1103	44A	1
DM10E270J	1101	6N	1	G2522	1103	44A	1
DM10F271J	1101	6A	1	G2522	1103	45	14
DM15F511J03	1102	5	1	G2522	1104	85	14
DM15F511J03	1102	11	1	G2522	1105	79	17
DM15F511J03	1105	4	1	G2522	1106	36	1
DM15F511J03	1105	4	1	G2522	1106	39	1
DM15F511J03	1105	4	1	G2522	1106	40	8
DM15F511J03	1105	13	1	G2522	1106	41	3
DM15F511J03	1109	15	1	G2522	1107	30	1
DM15F511K03	1101	6T	1	G2522	1108	22	1
DM19E431F03	1110	13	1	G2522	1109	34	7
DM19F561F03	1110	7	1	G2522	1110	29	1
DM19F561F03	1110	7	1	G2619	1103	42	6
DM19F561F03	1110	7	1	G2619	1103	42	6
DM19F621F03	1110	6	1	G2619	1103	42	6
DM20F152J500WV	1105	72	1	G2619	1104	84	10
DM20F152J500WV	1110	5	1	G2619	1104	84A	2
DM20F822J100WV	1109	11	1	G2619	1104	84A	2
DPXB45-34P0201	1101	68	1	G2619	1104	84A	2
D153F561K0	1104	34B	1	G2619	1104	84A	2
D153F561K0	1104	34B	1	G2619	1106	38	3
D153F561K0	1104	34B	1	G2619	1106	39	1
D153F751K0	1101	6S	1	G2619	1106	39	1
EB51G5	1104	41	1	G2619	1108	21	6
EB51G5	1104	41	1	G2619	1109	33	5
EB51G5	1104	44	1	G2619	1110	28	8
EB51G5	1104	44	1	G2621	1102	17	7
EGH11G4A521	1111	162	1	G2621	1103	44	5
EGH11G4A521	1111	162	1	G2621	1103	44A	1
ETH11E4	1111	145	1	G2621	1103	44A	1
EW15A5A196	1111	52	1	G2621	1103	44B	1
EW15A5A196	1111	52	1	G2621	1104	83	22
F22NCFMA1-40	1104	82	4	G2621	1104	83A	1
F22NCFMA1-40	1105	77	3	G2621	1104	83A	1
F22NCFMA1-40	1106	34	3	G2621	1104	83A	1
F22NCFMA1-40	1107	28	3	G2621	1104	83B	1
F22NCFMA1-40	1108	20	3	G2621	1104	83B	1
F22NCFMA1-40	1109	32	5	G2621	1104	83B	1
F22NCFMA1-40	1110	27	3	G2621	1105	78	10
				G2621	1106	35	2



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
G2621	1106	36	1	MS35338-135	1104	78	4
G2621	1106	37	1	MS35338-135	1104	78	4
G2621	1107	29	13	MS35338-135	1104	78	4
IMC140	1101	18A	2	MS35338-135	1104	79	6
IMC140	1104	74A	10	MS35338-135	1105	66	2
IMC140	1104	74A	10	MS35338-135	1105	67	2
IMC140	1104	74A	10	MS35338-135	1105	68	2
K1913-06	1101	10	1	MS35338-135	1105	69	2
LT4K041	1106	8	1	MS35338-135	1105	70	2
LT4K043	1109	8	1	MS35338-135	1105	71	2
LT4K043	1109	8	1	MS35338-135	1105	74	1
LT4K044	1106	27	1	MS35338-135	1111	54	3
LT4K046	1101	5C	1	MS35338-135	1111	141	2
LT4K046	1109	8	1	MS35338-136	1101	65	2
LT4K046	1109	8	1	MS35338-136	1111	3	2
LT4K046	1109	8	1	MS35338-136	1111	21	1
LT4K048	1106	25	1	MS35338-136	1111	28	3
LT7K203	1101	34	1	MS35338-136	1111	38	1
MPF054-31	1102	3	1	MS35338-136	1111	45	3
MPF054-31	1102	3	1	MS35338-136	1111	50	1
MPF054-31	1102	3	1	MS35338-136	1111	58	4
MS16632-1012	1101	3	2	MS35338-138	1101	18A	1
MS16632-1012	1101	3	2	MS35338-138	1101	18A	1
MS20426AD4-6	1101	14A	4	MS35649-24	1101	6R	1
MS20426AD4-6	1101	15	2	MS35649-24	1106	1	2
MS35338-134	1101	6R	1	MS35649-24	1107	1	2
MS35338-134	1106	1	2	MS35649-24	1107	25	1
MS35338-134	1107	1	2	MS51053-112	1111	74	2
MS35338-134	1107	25	1	MS51053-112	1111	80	2
MS35338-134	1111	147	3	MS51053-112	1111	86	2
MS35338-134	1111	151	3	MS51053-426	1111	8	4
MS35338-134	1111	155	2	MS51957-12	1101	17	3
MS35338-134	1111	155	2	MS51957-12	1101	54	1
MS35338-134	1111	155A	2	MS51957-12	1101	55	2
MS35338-134	1111	155A	2	MS51957-12	1101	61	1
MS35338-134	1111	155A	2	MS51957-12	1101	63	1
MS35338-134	1111	159	2	MS51957-12	1104	75	2
MS35338-134	1111	164	3	MS51957-12	1104	76	1
MS35338-135	1101	6	4	MS51957-12	1104	78	3
MS35338-135	1101	6F	2	MS51957-12	1104	78	3
MS35338-135	1101	7	4	MS51957-12	1104	79	4
MS35338-135	1101	17	3	MS51957-13	1101	6	3
MS35338-135	1101	49	1	MS51957-13	1101	6	1
MS35338-135	1101	54	1	MS51957-13	1101	6F	2
MS35338-135	1101	55	2	MS51957-13	1101	7	4
MS35338-135	1101	60	1	MS51957-13	1101	36	5
MS35338-135	1101	61	1	MS51957-13	1101	37	4
MS35338-135	1101	62	1	MS51957-13	1101	48	7
MS35338-135	1101	63	1	MS51957-13	1101	60	4
MS35338-135	1101	64	1	MS51957-13	1101	61	3
MS35338-135	1102	1	2	MS51957-13	1101	61	1
MS35338-135	1103	40	4	MS51957-13	1101	62	4
MS35338-135	1104	75	2	MS51957-13	1101	63	5
MS35338-135	1104	76	2	MS51957-13	1101	63	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
MS51957-13	1101	64	4	MS90539-15	1105	73	1
MS51957-13	1103	40	4	MS90539-15	1107	3	1
MS51957-13	1104	76	1	MS90539-15	1107	3	1
MS51957-13	1104	78	3	MS90539-15	1107	24	1
MS51957-13	1104	78	3	MS90539-15	1107	24	1
MS51957-13	1104	78	3	MS90540-07	1104	29	1
MS51957-13	1104	79	4	MS90540-07	1107	2	1
MS51957-13	1105	74	1	MS90540-07	1107	2	1
MS51957-14	1111	53	3	MS90540-07	1107	3	1
MS51957-14	1111	53	3	MS90541-04	1104	46	1
MS51957-14	1111	53	3	MS90541-04	1104	47	1
MS51957-15	1101	6	1	MS90541-04	1104	48	1
MS51957-15	1101	68	4	MS90541-04	1104	59	1
MS51957-15	1111	140	2	MS90541-11	1107	2	1
MS51957-17	1111	53	3	M426	1101	6R	1
MS51957-17	1111	53	3	PT02A10-6P	1101	6	1
MS51957-18	1101	6	3	PT02A12-10P	1101	7	1
MS51957-20	1102	1	2	P313-0050-000	1101	18A	1
MS51957-26	1101	65	1	P313-0056-000	1101	18A	1
MS51957-26	1101	67	4	P313-0056-000	1104	1	1
MS51957-26	1111	2	2	P313-0056-000	1104	74A	5
MS51957-27	1101	1	1	P313-0056-000	1104	74A	5
MS51957-28	1111	27	1	P313-0056-000	1104	74A	5
MS51957-28	1111	44	1	P313-0056-000	1104	77	1
MS51957-28	1111	57	4	P313-0132-000	1101	6	1
MS51957-29	1101	9	2	P313-0132-000	1101	6F	2
MS51957-3	1107	25	1	P313-0132-000	1101	51	1
MS51957-30	1111	26	2	P313-0132-000	1101	52	1
MS51957-30	1111	43	2	P313-0132-000	1101	53	1
MS51957-34	1111	49	1	P313-0132-000	1101	54	1
MS51957-4	1111	154	2	P313-0132-000	1101	68	4
MS51957-4	1111	154	2	P313-0132-000	1103	40	4
MS51957-5	1106	1	2	P313-0132-000	1104	78	4
MS51957-5	1107	1	2	P313-0132-000	1104	78	4
MS51957-5	1111	146	3	P313-0132-000	1104	78	4
MS51957-5	1111	150	3	P313-0132-000	1104	79	6
MS51957-5	1111	158	2	P313-0132-000	1105	66	1
MS51957-5	1111	163	3	P313-0132-000	1105	67	2
MS51959-13	1101	49	1	P313-0132-000	1105	68	2
MS51959-13	1101	51	1	P313-0132-000	1105	69	2
MS51959-13	1101	52	1	P313-0132-000	1105	70	2
MS51959-13	1101	53	1	P313-0132-000	1105	71	2
MS51959-27	1101	37	4	P313-0132-000	1105	74	1
MS90538-01	1106	28	1	P313-0132-000	1106	17	2
MS90538-09	1106	26	1	P313-0132-000	1107	22	2
MS90538-17	1106	27	1	P313-0132-000	1108	9	2
MS90539-08	1101	20A	1	P313-0132-000	1110	9	2
MS90539-08	1101	20A	1	P313-0166-000	1106	20	2
MS90539-08	1101	20A	1	P313-0166-000	1106	23	4
MS90539-08	1101	20A	1	P313-0166-000	1108	13	2
MS90539-08	1107	3	1	P313-0166-000	1108	15	2
MS90539-08	1107	24	1	P313-0166-000	1108	17	2
MS90539-08	1107	24	1	P313-0166-000	1109	19	2



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
P313-0166-000	1109	21	2	RC07GF102K	1104	21	1
P313-0166-000	1109	23	2	RC07GF102K	1104	52	1
P313-0166-000	1109	25	2	RC07GF102K	1104	56	1
P313-0166-000	1109	27	2	RC07GF102K	1105	9A	1
P313-0166-000	1109	29	2	RC07GF102K	1105	9A	1
P313-0166-000	1110	20	2	RC07GF102K	1105	9A	1
P313-0166-000	1110	22	2	RC07GF102K	1105	13A	1
P313-0166-000	1110	24	2	RC07GF102K	1105	23A	1
P321-0293-000	1106	20	2	RC07GF102K	1105	26	1
P321-0293-000	1106	23	4	RC07GF102K	1105	26	1
P321-0293-000	1108	13	2	RC07GF102K	1105	49	1
P321-0293-000	1108	15	2	RC07GF102K	1105	62	1
P321-0293-000	1108	17	2	RC07GF102K	1105	63	1
P321-0293-000	1109	19	2	RC07GF102K	1107	10	1
P321-0293-000	1109	21	2	RC07GF102K	1107	15	1
P321-0293-000	1109	23	2	RC07GF102K	1107	15	1
P321-0293-000	1109	25	2	RC07GF102K	1108	4	1
P321-0293-000	1109	27	2	RC07GF103K	1101	6J	1
P321-0293-000	1109	29	2	RC07GF103K	1101	6K	1
P321-0293-000	1110	20	2	RC07GF103K	1102	9	1
P321-0293-000	1110	22	2	RC07GF103K	1103	19	1
P321-0293-000	1110	24	2	RC07GF103K	1103	19	1
P330-2285-000	1101	10	2	RC07GF103K	1103	19	1
P334-0266-000	1103	6	1	RC07GF103K	1103	19	1
P334-0266-000	1104	38	1	RC07GF103K	1103	19	1
P334-0266-000	1104	39	1	RC07GF103K	1103	34	1
P334-0266-000	1105	1	1	RC07GF103K	1103	34	1
P343-0020-000	1101	12	5	RC07GF103K	1105	10	1
P343-0021-000	1101	8	2	RC07GF103K	1105	10	1
P343-0382-000	1102	3	1	RC07GF103K	1105	10	1
P347-0005-000	1111	4	2	RC07GF103K	1106	30	1
P347-0007-000	1109	13	2	RCD7GF103K	1106	30	1
P347-0012-000	1109	14	2	RC07GF103K	1107	4	1
P347-0012-000	1110	9	2	RC07GF103K	1107	4A	1
P347-0013-000	1107	22	2	RC07GF103K	1107	5	1
P347-0013-000	1111	15	2	RC07GF103K	1107	15	1
P347-0014-000	1111	10	2	RC07GF103K	1107	15	1
P347-0015-000	1108	9	2	RC07GF103K	1107	16	1
P347-0018-000	1101	1A	1	RC07GF103K	1107	16	1
P347-0023-000	1111	154A	2	RC07GF103K	1107	24A	1
P347-0023-000	1111	154A	2	RC07GF103K	1107	24A	1
P347-0023-000	1111	154A	2	RC07GF103K	1108	5	1
P347-0045-000	1111	20	1	RC07GF103K	1109	4	1
P347-0045-000	1111	37	1	RC07GF103K	1109	4	1
P347-1269-000	1101	1A	1	RC07GF103K	1109	6	1
RC07GF100K	1104	15	1	RC07GF103K	1109	6	1
RC07GF100K	1104	15	1	RC07GF103K	1109	6	1
RC07GF101K	1105	57	1	RC07GF103K	1110	1	1
RC07GF101K	1105	57	1	RC07GF104K	1101	6U	1
RC07GF101K	1105	57	1	RC07GF121K	1101	57	1
RC07GF102K	1103	23	1	RC07GF121K	1101	57	1
RC07GF102K	1103	23	1	RC07GF121K	1105	55	1
RC07GF102K	1104	21	1	RC07GF121K	1105	55	1
RC07GF102K	1104	21	1	RC07GF121K	1105	55	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RC07GF122K	1101	20	1	RC07GF153K	1105	9	1
RC07GF122K	1101	20	1	RC07GF153K	1105	28	1
RC07GF122K	1101	20	1	RC07GF153K	1105	60	1
RC07GF122K	1103	5	1	RC07GF153K	1105	60	1
RC07GF122K	1103	12	1	RC07GF153K	1107	2A	1
RC07GF122K	1103	12	1	RC07GF153K	1107	4A	1
RC07GF122K	1103	12	1	RC07GF182K	1103	8	1
RC07GF123K	1104	9	1	RC07GF182K	1104	56A	AR
RC07GF123K	1104	50	1	RC07GF182K	1107	7B	1
RC07GF123K	1105	10	1	RC07GF182K	1107	21	1
RC07GF123K	1105	10	1	RC07GF182K	1108	2	1
RC07GF123K	1105	21	1	RC07GF184K	1109	5	1
RC07GF123K	1105	21	1	RC07GF184K	1109	5	1
RC07GF123K	1105	21	1	RC07GF221K	1103	15	1
RC07GF123K	1105	27	1	RC07GF221K	1104	12A	1
RC07GF123K	1106	2	1	RC07GF221K	1104	12A	1
RC07GF123K	1106	2	1	RC07GF221K	1104	15A	1
RC07GF123K	1106	2	1	RC07GF221K	1104	64	1
RC07GF123K	1106	30	1	RC07GF221K	1105	43	1
RC07GF123K	1109	9	1	RC07GF221K	1105	47	1
RC07GF124K	1105	52	1	RC07GF221K	1105	57	1
RC07GF150K	1104	12	1	RC07GF221K	1105	57	1
RC07GF150K	1104	12	1	RC07GF221K	1106	2A	1
RC07GF150K	1104	12	1	RC07GF221K	1106	3A	1
RC07GF150K	1104	15	1	RC07GF221K	1106	3A	1
RC07GF150K	1104	15	1	RC07GF221K	1106	29	1
RC07GF150K	1104	15	1	RC07GF221K	1107	8	1
RC07GF150K	1104	36	1	RC07GF221K	1107	8	1
RC07GF150K	1104	36	1	RC07GF221K	1107	10	1
RC07GF150K	1104	36	1	RC07GF221K	1107	10	1
RC07GF150K	1104	41	1	RC07GF222K	1103	2	1
RC07GF150K	1104	41	1	RC07GF222K	1103	2B	1
RC07GF150K	1104	41	1	RC07GF222K	1103	2B	1
RC07GF150K	1104	41	1	RC07GF222K	1103	2B	1
RC07GF150K	1104	44	1	RC07GF222K	1103	2B	1
RC07GF150K	1104	44	1	RC07GF222K	1103	18	1
RC07GF150K	1104	44	1	RC07GF222K	1103	18	1
RC07GF151K	1104	49	1	RC07GF222K	1104	4	1
RC07GF151K	1104	55	1	RC07GF222K	1104	14A	1
RC07GF152K	1103	14	1	RC07GF222K	1104	14A	1
RC07GF152K	1104	33	1	RC07GF222K	1104	53	1
RC07GF152K	1104	33	1	RC07GF222K	1104	56A	AR
RC07GF152K	1104	33	1	RC07GF222K	1105	2	1
RC07GF152K	1104	56A	AR	RC07GF222K	1105	8	1
RC07GF152K	1105	17	1	RC07GF222K	1105	48	1
RC07GF152K	1105	25	1	RC07GF222K	1105	51	1
RC07GF152K	1105	60	1	RC07GF222K	1105	51	1
RC07GF152K	1105	60	1	RC07GF222K	1105	51	1
RC07GF152K	1105	60	1	RC07GF222K	1107	10	1
RC07GF152K	1106	3	1	RC07GF222K	1110	3	1
RC07GF152K	1107	12	1	RC07GF223K	1103	26A	1
RC07GF153K	1105	3	1	RC07GF223K	1103	26A	1
RC07GF153K	1105	3	1	RC07GF223K	1103	26A	1
RC07GF153K	1105	3	1	RC07GF223K	1103	26A	1
RC07GF153K	1105	7	1	RC07GF223K	1105	21	1





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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RC07GF223K	1105	21	1	RC07GF471K	1104	10	1
RC07GF223K	1106	2	1	RC07GF471K	1107	2A	1
RC07GF223K	1106	2	1	RC07GF472K	1101	57	1
RC07GF223K	1109	5	1	RC07GF472K	1101	57	1
RC07GF223K	1109	5	1	RC07GF472K	1101	57	1
RC07GF223K	1109	5	1	RC07GF472K	1103	11	1
RC07GF272K	1103	20	1	RC07GF472K	1103	11	1
RC07GF272K	1103	20	1	RC07GF472K	1103	11	1
RC07GF272K	1103	20	1	RC07GF472K	1103	18	1
RC07GF272K	1104	56A	AR	RC07GF472K	1103	18	1
RC07GF272K	1104	63	1	RC07GF472K	1103	18	1
RC07GF272K	1105	40	1	RC07GF472K	1103	23	1
RC07GF272K	1105	40	1	RC07GF472K	1103	23	1
RC07GF272K	1105	40	1	RC07GF472K	1103	23	1
RC07GF272K	1107	8	1	RC07GF472K	1103	25	1
RC07GF272K	1107	8	1	RC07GF472K	1105	51	1
RC07GF272K	1107	24A	1	RC07GF472K	1105	51	1
RC07GF272K	1108	2	1	RC07GF472K	1106	9	1
RC07GF273K	1105	15	1	RC07GF472K	1107	7C	1
RC07GF273K	1105	36	1	RC07GF472K	1107	7C	1
RC07GF273K	1110	2	1	RC07GF472K	1108	1	1
RC07GF331K	1104	43	1	RC07GF561K	1103	12	1
RC07GF331K	1104	43	1	RC07GF561K	1103	12	1
RC07GF331K	1104	43	1	RC07GF561K	1104	32A	1
RC07GF331K	1105	55	1	RC07GF561K	1104	34	1
RC07GF331K	1105	55	1	RC07GF561K	1105	26	1
RC07GF332K	1103	27	1	RC07GF561K	1105	26	1
RC07GF332K	1103	29	1	RC07GF561K	1105	26	1
RC07GF332K	1104	56A	AR	RC07GF562K	1104	40	1
RC07GF332K	1105	40	1	RC07GF562K	1104	40	1
RC07GF332K	1105	40	1	RC07GF562K	1104	68	1
RC07GF332K	1107	4A	1	RC07GF562K	1104	68	1
RC07GF332K	1107	7C	1	RC07GF562K	1104	68	1
RC07GF391K	1103	1	1	RC07GF562K	1105	16	1
RC07GF391K	1104	54	1	RC07GF562K	1105	34	1
RC07GF391K	1107	6	1	RC07GF562K	1107	7A	1
RC07GF391K	1107	6	1	RC07GF563K	1103	10	1
RC07GF392K	1103	11	1	RC07GF563K	1105	38	1
RC07GF392K	1103	11	1	RC07GF563K	1105	39	1
RC07GF392K	1103	21	1	RC07GF563K	1107	16A	1
RC07GF392K	1103	21	1	RC07GF563K	1107	16A	1
RC07GF392K	1103	21	1	RC07GF563K	1107	21A	1
RC07GF392K	1103	32	1	RC07GF680K	1104	24	1
RC07GF392K	1103	32	1	RC07GF680K	1104	24	1
RC07GF392K	1104	56A	AR	RC07GF680K	1104	24	1
RC07GF392K	1107	21B	1	RC07GF680K	1104	43	1
RC07GF393K	1109	4	1	RC07GF680K	1104	43	1
RC07GF393K	1109	4	1	RC07GF680K	1104	45	1
RC07GF393K	1109	4	1	RC07GF680K	1106	9A	1
RC07GF393K	1109	6	1	RC07GF680K	1106	9A	1
RC07GF393K	1109	6	1	RC07GF681K	1103	12	1
RC07GF393K	1109	6	1	RC07GF681K	1103	12	1
RC07GF471K	1103	3	1	RC07GF681K	1103	12	1
				RC07GF681K	1103	26	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RC07GF681K	1103	33	1	RN60D3160F	1107	7	1
RC07GF681K	1103	33	1	RN60D4222F	1105	44	1
RC07GF681K	1104	21	1	RN60D5621F	1105	29	1
RC07GF681K	1104	21	1	RTMT12M	1101	49	1
RC07GF681K	1107	3A	1	RW69V161	1104	20	1
RC07GF682K	1101	6C	1	RW69V161	1104	20	1
RC07GF682K	1104	34A	1	RW69V181	1104	25	1
RC07GF682K	1104	34A	1	RW69V8R2	1104	66	1
RC07GF682K	1106	6	1	R3484X3-32CADPL	1109	35	2
RC07GF682K	1106	7	1	R4008X3-32CHROMATEDP	1102	16	2
RC07GF682K	1106	7A	1	SC53	1101	19	1
RC07GF682K	1106	7B	1	SC53	1101	19	1
RC07GF683K	1103	20	1	SC53	1101	66	1
RC07GF683K	1103	20	1	SC53	1101	66	1
RC07GF821K	1103	12	1	SL441-434DWHT	1101	6X	12
RC07GF821K	1103	12	1	SPL4040-2HOTTINNED	1107	25	3
RC07GF821K	1104	33	1	SPL4040-2HOTTINNED	1111	144	5
RC07GF821K	1104	33	1	SPL4040-2HOTTINNED	1111	161	5
RC07GF822K	1101	6L	1	SPL4040-2HOTTINNED	1111	161	1
RC07GF822K	1101	6Q	1	SPL4040-4HOTTINNED	1101	6	1
RC07GF822K	1101	6V	1	SPL4040-4HOTTINNED	1101	48	1
RC07GF822K	1102	2	1	SPL4040-4HOTTINNED	1101	49	1
RC07GF822K	1102	8	1	SPL4040-4HOTTINNED	1101	54	1
RC07GF822K	1103	31	1	SPL4040-4HOTTINNED	1101	55	1
RC07GF822K	1104	31	1	SPL4040-4HOTTINNED	1103	40	7
RC07GF822K	1105	6	1	SPL4040-4HOTTINNED	1104	75	1
RC07GF822K	1105	12	1	SPL4040-4HOTTINNED	1104	76	2
RC20GF150K	1104	12	1	SPL4040-4HOTTINNED	1104	79	15
RC20GF150K	1104	12	1	SPL4040-4HOTTINNED	1105	67	1
RC20GF150K	1104	36	1	SPL4040-4HOTTINNED	1105	68	2
RC20GF150K	1104	36	1	SPL4040-4HOTTINNED	1105	69	1
RC20GF220K	1104	27	1	SPL4040-4HOTTINNED	1105	70	1
RC20GF220K	1104	58	1	SPL4040-4HOTTINNED	1105	71	1
RC20GF222K	1104	68	1	SPL4040-4HOTTINNED	1105	74	3
RC20GF222K	1104	68	1	SPL4040-4HOTTINNED	1111	51	7
RC20GF271K	1104	24	1	SPL4040-4HOTTINNED	1111	51	1
RC20GF271K	1104	24	1	ST10009-4	1111	149	1
RC20GF330K	1104	43	1	S11014-4	1111	157	1
RC20GF330K	1104	43	1	S418FCHH3P15L02	1111	67	1
RC20GF681K	1101	20	1	S418FCHH3P15L02	1111	130	1
RC20GF681K	1101	20	1	S518FCHH3P15L02	1111	59	1
RC32GF120K	1101	56	1	S518FCHH3P15L02	1111	60	1
RC32GF122K	1104	25	1	S518FCHH3P15L02	1111	61	1
RC32GF122K	1104	25	1	S518FCHH3P15L02	1111	62	1
RC32GF331K	1104	25	1	S518FCHH3P15L02	1111	63	1
RN55D8251F	1103	13	1	S518FCHH3P15L02	1111	64	1
RN55D8251F	1103	13	1	S518FCHH3P15L02	1111	65	1
RN55D8251F	1103	13	1	S518FCHH3P15L02	1111	66	1
RN60D1001F	1103	16	1	S518FCHH3P15L02	1111	68	1
RN60D1002F	1103	13	1	S518FCHH3P15L02	1111	69	1
RN60D1002F	1103	13	1	S518FCHH3P15L02	1111	128	1
RN60D3160F	1107	7	1	S518FCHH3P15L02	1111	129	1
				S518FCHH3P15L02	1111	131	1
				S518FCHH3P15L02	1111	132	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
S518FCHH3P15L02	1111	133	1	05-3307-01	1102	15	1
S518FCHH3P15L02	1111	134	1	05-3307-01	1105	76	5
S518FCHH3P15L02	1111	135	1	05-3307-01	1106	33	1
S518FCHH3P15L02	1111	136	1	05-3307-01	1106	33A	1
S518FCHH3P15L02	1111	137	1	05-3307-01	1106	33A	1
S518FCHH3P15L02	1111	138	1	05-3307-01	1107	27	1
S88076	1102	3	1	05-3307-01	1108	19	1
S88076	1102	3	1	05-3307-01	1109	31	1
TGH11E4B080	1111	162A	1	05-3307-01	1110	26	1
TGH11E4B080	1111	162A	1	05-3307-51	1103	43	8
TGH11E4B080	1111	162A	1	05-3307-51	1104	81	3
T1533	1101	6H	1	05-3307-51	1106	33A	1
T957HOTTINNED	1101	62	1	05-3307-51	1106	33A	1
T957HOTTONNED	1101	68A	2	05-3307-51	1106	33A	1
X270-2	1110	19	1	1N1116	1104	65	1
X271-2	1110	21	1	1N1775A	1104	3	1
X272-2	1110	23	1	1N270	1103	23	1
X273-3	1108	16	1	1N270	1103	23	1
X274-3	1108	14	1	1N270	1104	6	1
X275-2	1108	12	1	1N270	1104	7	1
X282-2	1109	24	1	1N270	1105	35	1
X282-2	1109	24	1	1N270	1105	37	1
X283-2	1109	26	1	1N270	1105	42	1
X284-3	1109	28	1	1N270	1105	45	1
X487-2	1105	71	1	1N270	1105	54	1
X489-2	1105	66	1	1N270	1107	19	1
X489-2	1105	67	1	1N270	1107	20	1
X489-2	1105	68	1	1N457	1103	22	1
X489-2	1105	69	1	1N457	1103	22	1
X489-2	1105	70	1	1N645	1104	37	1
X638	1106	21	1	1N645	1104	37	1
X851-T107	1109	22	1	10FB1A	1111	52A	1
X851-T107	1109	22	1	10FB1A	1111	52A	1
X851-T107	1109	24	1	10FB1A	1111	52A	1
X851-T107	1109	24	1	100-206-2	1101	6P	1
X851-T107	1109	24	1	100-206-2	1102	16	1
X852	1109	20	1	109D106X0050C2	1103	28	1
X852	1109	20	1	109D106X0050C2	1103	30	1
X853	1109	18	1	109D305X9075C2	1103	28	1
X853	1109	18	1	109D305X9075C2	1103	28	1
X854	1106	24	1	109D305X9075C2	1103	30	1
X856	1106	19	1	109D305X9075C2	1103	30	1
X891	1106	19	1	1101	1101	18A	1
X892	1106	21	1	1101	1101	18A	1
X893	1106	24	1	1101	1101	18A	1
0004-7202S	1102	15	1	1101	1104	74A	5
0004-7202S	1103	43	8	1101	1104	74A	5
0004-7202S	1104	81	3	1101	1104	74A	5
0004-7202S	1105	76	5	1101A	1101	18A	1
0004-7202S	1106	33A	2	1101A	1101	18A	1
0004-7202S	1107	27	1	1101A	1104	74A	5
0004-7202S	1108	19	1	1101A	1104	74A	5
0004-7202S	1109	31	1	150D103X0035A2	1105	4	1
0004-7202S	1110	26	1	150D103X0035A2	1105	4	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
150D103X0035A2	1105	13	1	150D105X0035A2	1105	58	1
150D103X0035A2	1105	13	1	150D105X0035A2	1105	58	1
150D103X0035A2	1105	22	1	150D105X0035A2	1105	64	1
150D103X0035A2	1105	22	1	150D105X0035A2	1105	65	1
150D103X0035A2	1105	23	1	150D105X0035A2	1106	4	1
150D103X0035A2	1105	23	1	150D105X0035A2	1107	4A	1
150D103X0035A2	1105	32	1	150D105X0035A2	1107	9	1
150D103X0035A2	1105	32	1	150D105X0035A2	1107	17	1
150D103X0035A2	1110	14	1	150D105X0035A2	1107	17	1
150D103X0035A2	1110	14	1	150D106X0020B2	1101	21	1
150D104X0035A2	1103	9	1	150D106X0020B2	1101	21	1
150D104X0035A2	1103	9	1	150D106X0020B2	1103	21	1
150D104X0035A2	1104	13	1	150D106X0020B2	1103	21	1
150D104X0035A2	1104	13	1	150D106X0020B2	1103	24	1
150D104X0035A2	1105	18	1	150D106X0020B2	1103	33A	1
150D104X0035A2	1105	18	1	150D106X0020B2	1103	33A	1
150D104X0035A2	1105	22	1	150D106X0020B2	1104	16	1
150D104X0035A2	1105	22	1	150D106X0020B2	1104	17	1
150D104X0035A2	1105	23	1	150D106X0020B2	1105	58	1
150D104X0035A2	1105	23	1	150D106X0020B2	1105	58	1
150D104X0035A2	1105	23	1	150D106X0020B2	1105	58	1
150D104X0035A2	1105	23	1	150D106X0020B2	1105	58	1
150D104X0035A2	1105	23	1	150D107X0010R2	1103	39	1
150D104X0035A2	1105	23	1	150D107X0010R2	1103	39	1
150D104X0035A2	1105	30	1	150D107X0010R2	1104	77A	AR
150D104X0035A2	1105	31	1	150D107X0010R2	1104	77B	AR
150D104X0035A2	1105	31	1	150D155X0020A2	1103	16A	1
150D104X0035A2	1105	33	1	150D155X0020A2	1103	16A	1
150D104X0035A2	1105	41	1	150D155X0020A2	1103	16A	1
150D104X0035A2	1105	50	1	150D155X0020A2	1103	16A	1
150D105X0035A2	1101	6D	1	150D156X0020B2	1103	33A	1
150D105X0035A2	1102	6	1	150D156X0020B2	1103	33A	1
150D105X0035A2	1102	10	1	150D157X0015S2	1103	35	1
150D105X0035A2	1103	9	1	150D157X0015S2	1103	35	1
150D105X0035A2	1103	9	1	150D157X0015S2	1103	35	1
150D105X0035A2	1103	9	1	150D157X0015S2	1103	39	1
150D105X0035A2	1103	9	1	150D157X0015S2	1103	39	1
150D105X0035A2	1103	9	1	150D157X0015S2	1103	39	1
150D105X0035A2	1104	8	1	150D157X0015S2	1103	39	1
150D105X0035A2	1104	30	1	150D157X0015S2	1103	39	1
150D105X0035A2	1104	32	1	150D157X0015S2	1103	39	1
150D105X0035A2	1104	51	1	150D157X0015S2	1103	39	1
150D105X0035A2	1104	61	1	150D157X0015S2	1104	11	1
150D105X0035A2	1104	61	1	150D157X0015S2	1104	11	1
150D105X0035A2	1104	61	1	150D157X0015S2	1104	23	1
150D105X0035A2	1105	14	1	150D157X0015S2	1104	23	1
150D105X0035A2	1105	19	1	150D157X0015S2	1104	23	1
150D105X0035A2	1105	19	1	150D157X0015S2	1104	23	1
150D105X0035A2	1105	19	1	150D157X0015S2	1104	23	1
150D105X0035A2	1105	20	1	150D157X0015S2	1104	23	1
150D105X0035A2	1105	23	1	150D157X0015S2	1106	31	1
150D105X0035A2	1105	23	1	150D223X0035A2	1106	31	1
150D105X0035A2	1105	23	1	150D223X0035A2	1106	31	1
150D105X0035A2	1105	24	1	150D223X0035A2	1106	31	1
150D105X0035A2	1105	24	1	150D223X0035A2	1106	31	1
150D105X0035A2	1105	24	1	150D225X0020A2	1103	17	1
150D105X0035A2	1105	46	1	150D225X0020A2	1103	33A	1
150D105X0035A2	1105	56	1	150D225X0020A2	1103	33A	1
150D105X0035A2	1105	57A	1	150D225X0020A2	1103	33A	1
150D105X0035A2	1105	57A	1	150D225X0020A2	1105	5	1
150D105X0035A2	1105	57A	1				



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
150D225X0020A2	1105	5	1	150D476X0020R2	1104	62	1
150D225X0020A2	1105	11	1	150D476X0020R2	1104	62	1
150D225X0020A2	1105	11	1	150D476X0020R2	1104	62	1
150D225X0020A2	1105	59	1	150D476X0020R2	1104	77A	AR
150D225X0020A2	1107	9	1	150D476X0020R2	1104	77B	AR
150D225X0020A2	1108	3	1	150D476X0035S2	1104	28	1
150D225X0020A2	1108	6	1	150D476X0035S2	1104	28	1
150D225X0020A2	1109	3	1	150D686X0015R2	1101	21	1
150D225X0035B2	1103	21A	1	150D686X0015R2	1101	21	1
150D225X0035B2	1103	21A	1	150D686X0015R2	1101	21	1
150D225X0035B2	1103	21A	1	150D686X0015R2	1104	26	1
150D226X0035R2	1104	20	1	150D686X0015R2	1104	77A	AR
150D226X0035R2	1104	20	1	150D686X0015R2	1104	77B	AR
150D227X0010S2	1103	36	1	150D686X0020S2	1104	2	1
150D227X0010S2	1103	36	1	150D686X0020S2	1104	26	1
150D227X0010S2	1103	36	1	150D686X0020S2	1104	26	1
150D276X9020R2	1104	20	1	150D686X0020S2	1104	26	1
150D276X9020R2	1104	20	1	150D686X0020S2	1104	26	1
150D276X9020R2	1104	20	1	150D686X0020S2	1104	28	1
150D334X0035A2	1101	19	1	151D113X0035W2	1106	5	1
150D334X0035A2	1101	66	1	151D113X0035W2	1106	5	1
150D334X0035A2	1103	7	1	151D114X0035W2	1104	13	1
150D335X0015A2	1103	28	1	151D114X0035W2	1104	13	1
150D335X0015A2	1103	28	1	151D115X0035X2	1104	69	AR
150D335X0015A2	1103	28	1	151D115X0035X2	1104	69	AR
150D335X0015A2	1103	30	1	151D115X0035X2	1104	69	AR
150D335X0015A2	1103	30	1	151D164X0035W2	1104	69	AR
150D335X0015A2	1103	30	1	151D164X0035W2	1104	69	AR
150D335X0015A2	1103	30	1	151D164X0035W2	1104	69	AR
150D337X0006S2	1103	36	1	151D164X0035W2	1104	69	AR
150D337X0006S2	1103	36	1	151D344X0035W2	1104	69	AR
150D337X0006S2	1103	36	1	151D504X0035W2	1104	69	AR
150D337X0006S2	1103	36	1	151D754X0035X2	1104	69	AR
150D396X9010B2	1103	2A	1	1537-48	1106	3A	1
150D396X9010B2	1103	2A	1	1537-48	1106	3B	1
150D396X9010B2	1103	2A	1	1594-3	1111	23	5
150D474X0035A2	1104	6A	1	1594-3	1111	40	5
150D474X0035A2	1104	6A	1	1810-00	1104	1	1
150D475X0010A2	1101	58	1	1810-00	1104	65	1
150D475X0010A2	1103	33A	1	1810-00	1104	77	1
150D475X0010A2	1103	33A	1	189-6-8	1106	20	1
150D475X0010A2	1103	33A	1	189-6-8	1106	22	1
150D476X0006B2	1103	14A	1	189-6-8	1106	23	1
150D476X0006B2	1103	14A	1	189-6-8	1108	13	1
150D476X0006B2	1103	14A	1	189-6-8	1108	15	1
150D476X0006B2	1103	14A	1	189-6-8	1108	17	1
150D476X0020R2	1103	4	1	189-6-8	1109	19	1
150D476X0020R2	1104	2	1	189-6-8	1109	21	2
150D476X0020R2	1104	2	1	189-6-8	1109	23	1
150D476X0020R2	1104	5	1	189-6-8	1109	25	1
150D476X0020R2	1104	5	1	189-6-8	1109	27	1
150D476X0020R2	1104	14	1	189-6-8	1109	29	1
150D476X0020R2	1104	14	1	189-6-8	1110	20	1
150D476X0020R2	1104	14	1	189-6-8	1110	22	1
150D476X0020R2	1104	14	1	189-6-8	1110	24	1
150D476X0020R2	1104	14	1	1914-05-00-2480	1103	6	1
150D476X0020R2	1104	62	1	1914-05-00-2480	1104	38	1
150D476X0020R2	1104	62	1				



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
1914-05-00-2480	1104	39	1	192P10392	1110	14	1
1914-05-00-2480	1105	1	1	192P10492	1104	13	1
192P10392	1105	4	1	192P10492	1104	13	1
192P10392	1105	4	1	192P10492	1104	13	1
192P10392	1105	4	1	2N1131	1104	74	1
192P10392	1105	5	1	2N1131	1104	74	1
192P10392	1105	5	1	2N1131	1104	74	1
192P10392	1105	5	1	2N1285	1101	22	1
192P10392	1105	11	1	2N1285	1101	22	1
192P10392	1105	11	1	2N1285	1101	38	1
192P10392	1105	11	1	2N1285	1101	38	1
192P10392	1105	13	1	2N1285	1101	39	1
192P10392	1105	13	1	2N1285	1101	39	1
192P10392	1105	13	1	2N1285	1101	40	1
192P10392	1105	18	1	2N1285	1101	40	1
192P10392	1105	18	1	2N1285	1101	41	1
192P10392	1105	18	1	2N1285	1101	41	1
192P10392	1105	19	1	2N1285	1101	42	1
192P10392	1105	19	1	2N1285	1101	42	1
192P10392	1105	19	1	2N1285	1101	43	1
192P10392	1105	22	1	2N1285	1101	43	1
192P10392	1105	22	1	2N1285	1101	43A	1
192P10392	1105	22	1	2N1285	1101	43A	1
192P10392	1105	23	1	2N1285	1101	44	1
192P10392	1105	23	1	2N1285	1101	44	1
192P10392	1105	24	1	2N1285	1101	45	1
192P10392	1105	24	1	2N1285	1101	45	1
192P10392	1105	24	1	2N1285	1101	46	1
192P10392	1105	31	1	2N1285	1101	46	1
192P10392	1105	31	1	2N1285	1101	47	1
192P10392	1105	31	1	2N1285	1101	47	1
192P10392	1105	32	1	2N158A	1101	18	1
192P10392	1105	32	1	2N158A	1101	18	1
192P10392	1105	32	1	2N158A	1104	70	1
192P10392	1106	5	1	2N158A	1104	70	1
192P10392	1106	5	1	2N158A	1104	71	1
192P10392	1106	5	1	2N158A	1104	71	1
192P10392	1106	8	1	2N158A	1104	72	1
192P10392	1106	31A	1	2N158A	1104	72	1
192P10392	1107	6C	1	2N158A	1104	73	1
192P10392	1107	6C	1	2N158A	1104	73	1
192P10392	1107	13	1	2N158A	1104	74	1
192P10392	1107	13	1	2N158A	1104	74	1
192P10392	1107	14	1	2N158A	1104	74	1
192P10392	1107	14	1	2N1711	1101	6G	1
192P10392	1107	14	1	2N1711	1101	25	1
192P10392	1107	18	1	2N1711	1101	25	1
192P10392	1107	18	1	2N1711	1101	25	1
192P10392	1107	24A	1	2N1711	1101	26	1
192P10392	1107	24A	1	2N1711	1101	26	1
192P10392	1109	1	1	2N1711	1101	26	1
192P10392	1109	1	1	2N1711	1101	29	1
192P10392	1109	1	1	2N1711	1101	29	1
192P10392	1110	14	1	2N1711	1101	29	1
192P10392	1110	14	1	2N1711	1101	30	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
2N1711	1101	30	1	2N3638A	1101	32	1
2N1711	1101	30	1	2N3638A	1101	32	1
2N174	1104	1	1	2N3638A	1101	32	1
2N174	1104	77	1	2N3638A	1101	38	1
2N2270	1101	18	1	2N3638A	1101	38	1
2N2270	1101	18	1	2N3638A	1101	38	1
2N2270	1101	18	1	2N3638A	1101	38	1
2N2405	1101	33	1	2N3638A	1101	39	1
2N2405	1101	33	1	2N3638A	1101	39	1
2N2405	1101	33	1	2N3638A	1101	39	1
2N2405	1104	70	1	2N3638A	1101	40	1
2N2405	1104	70	1	2N3638A	1101	40	1
2N2405	1104	70	1	2N3638A	1101	40	1
2N2405	1104	70	1	2N3638A	1101	40	1
2N2405	1104	71	1	2N3638A	1101	41	1
2N2405	1104	71	1	2N3638A	1101	41	1
2N2405	1104	71	1	2N3638A	1101	41	1
2N2405	1104	71	1	2N3638A	1101	41	1
2N2405	1104	71	1	2N3638A	1101	41	1
2N2405	1104	71	1	2N3638A	1101	42	1
2N2405	1104	72	1	2N3638A	1101	42	1
2N2405	1104	72	1	2N3638A	1101	42	1
2N2405	1104	72	1	2N3638A	1101	42	1
2N2405	1104	72	1	2N3638A	1101	42	1
2N2405	1104	72	1	2N3638A	1101	43	1
2N2405	1104	73	1	2N3638A	1101	43	1
2N2405	1104	73	1	2N3638A	1101	43	1
2N2405	1104	73	1	2N3638A	1101	43	1
2N2405	1104	73	1	2N3638A	1101	43	1
2N2905A	1101	47	1	2N3638A	1101	43A	1
2N2905A	1101	47	1	2N3638A	1101	43A	1
2N2905A	1101	47	1	2N3638A	1101	43A	1
2N333	1101	25	1	2N3638A	1101	44	1
2N333	1101	25	1	2N3638A	1101	44	1
2N333	1101	25	1	2N3638A	1101	44	1
2N333	1101	26	1	2N3638A	1101	44	1
2N333	1101	26	1	2N3638A	1101	45	1
2N333	1101	26	1	2N3638A	1101	45	1
2N333	1101	26	1	2N3638A	1101	45	1
2N333	1101	29	1	2N3638A	1101	45	1
2N333	1101	29	1	2N3638A	1101	46	1
2N333	1101	29	1	2N3638A	1101	46	1
2N333	1101	30	1	2N3638A	1101	46	1
2N333	1101	30	1	2N3638A	1101	46	1
2N341	1101	33	1	2N3638A	1101	46	1
2N341	1101	33	1	2N525	1101	23	1
2N341	1101	33	1	2N525	1101	23	1
2N3638A	1101	6M	1	2N525	1101	23	1
2N3638A	1101	22	1	2N525	1101	24	1
2N3638A	1101	22	1	2N525	1101	24	1
2N3638A	1101	22	1	2N525	1101	24	1
2N3638A	1101	22	1	2N525	1101	27	1
2N3638A	1101	22	1	2N525	1101	27	1
2N3638A	1101	23	1	2N525	1101	27	1
2N3638A	1101	23	1	2N525	1101	28	1
2N3638A	1101	23	1	2N525	1101	28	1
2N3638A	1101	23	1	2N525	1101	28	1
2N3638A	1101	23	1	2N525	1101	28	1
2N3638A	1101	24	1	2N525	1101	31	1
2N3638A	1101	24	1	2N525	1101	31	1
2N3638A	1101	24	1	2N525	1101	31	1
2N3638A	1101	24	1	2N525	1101	32	1
2N3638A	1101	24	1	2N525	1101	32	1
2N3638A	1101	24	1	2N525	1101	32	1
2N3638A	1101	27	1	224L1-202	1106	1	1
2N3638A	1101	27	1	224L1-502	1107	1	1
2N3638A	1101	27	1	232067F	1106	15	1
2N3638A	1101	28	1	232068F	1109	14	1
2N3638A	1101	28	1	232666F	1106	14	1
2N3638A	1101	28	1	232666F	1106	14	1
2N3638A	1101	28	1	232666F	1106	15	1
2N3638A	1101	31	1	232667F	1106	15	1
2N3638A	1101	31	1	232667F	1106	13	1
2N3638A	1101	31	1	235401F	1106	16	1
2N3638A	1101	31	1	235402FC	1110	9	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
235431F	1106	13	1	310-0059-000	1104	74A	5
235432F	1106	14	1	310-0060-000	1101	18A	1
235433F	1107	23	1	310-0060-000	1101	18A	1
235434F	1108	9	1	310-0060-000	1104	1	1
235436F	1108	10	1	310-0060-000	1104	65	1
235437F	1107	22	1	310-0060-000	1104	74A	5
235437F	1107	22	1	310-0060-000	1104	74A	5
235438F	1109	13	1	310-0060-000	1104	77	1
235796K	1111	13	1	310-0278-000	1101	51	1
235797K	1111	9	1	310-0278-000	1101	52	1
235798K	1111	14	1	310-0278-000	1101	53	1
237946F	1107	22	1	310-0278-000	1101	68	4
289-2197-000	1102	12	1	310-0278-000	1106	17	2
3SBC1016A2	1101	6F	1	310-0278-000	1107	22	2
301-000P3K0-100D	1110	8	1	310-0278-000	1108	9	2
301-000P3K0-100D	1110	8	1	310-0278-000	1110	9	2
301-000P3K0-100D	1110	8	1	310-0278-000	1111	5	2
301-000P3K0-100D	1110	11	1	310-0278-000	1111	53A	3
301-000P3K0-100D	1110	11	1	310-3340-000	1111	53A	3
301-000R3A0-150J	1110	17	1	310-6340-000	1111	53A	3
301-000R3A0-200J	1108	8	1	310-6340-000	1111	53A	3
301-000R3A0-200J	1108	8	1	324-1691-020	1101	65	1
301-000R3A0-200J	1108	8	1	33C2	1107	18	1
301-000R3A0-200J	1108	8	1	33C2	1107	18	1
301-000R3A0-240J	1106	10	1	33C41	1104	57	1
301-000R3A0-240J	1108	7	1	330-3677-000	1101	1	2
301-000R3A0-240J	1108	7	1	335-0022-000	1111	31	2
301-000R3A0-509C	1110	10	1	347-0315-000	1106	17	2
301-000R3A0-509C	1110	10	1	4M17Z5	1104	60	1
301-000R3K0-200J	1108	8	1	4007-4HOTTINNED	1101	6B	2
301-000R3K0-200J	1108	8	1	4021	1104	1	1
301N3300-85DEGC20PF	1108	7	1	4021	1104	65	1
301N3300-85DEGC20PF	1108	7	1	4021	1104	77	1
301N3300-85DEGC20PF	1108	7	1	41A144	1111	153A	1
301N3300-85DEGC20PF	1108	7	1	41A330	1111	153	1
301N3300-85DEGC20PF	1108	7	1	416H17	1105	61	1
301N4200-85DEGC5PF	1108	11	1	416H17	1105	61	1
301N4200-85DEGC5PF	1108	11	1	422-04-22-034-113	1101	53	1
301N4200-85DEGC5PF	1108	11	1	4412-13-36	1101	5B	1
301N4200-85DEGC5PF	1110	11	1	4422-11-117	1109	1	1
302-0638-020	1101	3	4	4422-11-117	1109	1	1
302-0638-020	1101	3	4	4422-9-36	1109	1	1
302-0638-020	1101	3	4	4422-9-36	1109	1	1
309-0118-000	1111	167	1	4422-9-36	1109	1	1
310-0044-000	1111	156A	2	48186BRSBLKN	1101	11	1
310-0044-000	1111	156A	2	502-1515-002	1111	142	2
310-0044-000	1111	156A	2	506-5906-003	1104	76	2
310-0046-000	1111	22	1	5133-25C	1111	104	1
310-0046-000	1111	29	2	522-1836-00	1101	0	1
310-0046-000	1111	39	1	522-2587-00	1101	0	1
310-0046-000	1111	46	2	522-2587-013	1101	0	1
310-0059-000	1101	18A	1	540-9037-003	1109	13	2
310-0059-000	1104	74A	5	541-1243-003	1104	74A	10
310-0059-000	1104	74A	5	541-1243-003	1104	74A	10
310-0059-000	1104	74A	5	541-1244-003	1104	1	1





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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
541-1244-003	1104	77	1	548-9539-003	1104	74A	5
541-1245-003	1104	74A	5	548-9539-003	1104	74A	5
541-1245-003	1104	74A	5	548-9539-003	1104	74A	5
541-5178-002	1101	8	2	548-9549-003	1104	1	1
541-5966-002	1107	22	4	548-9549-003	1104	77	1
541-5966-002	1111	17	2	548-9550-003	1104	74A	5
541-5968-002	1110	9	2	548-9550-003	1104	74A	5
541-5968-002	1111	18	2	549-3514-002	1101	2	1
541-5970-002	1106	17	8	549-3905-002	1101	3	2
541-5970-002	1108	9	4	549-3905-002	1101	3	2
541-5972-002	1109	14	2	549-3906-002	1101	3	1
541-5977-002	1101	6	3	549-3906-002	1101	3	1
541-5995-002	1111	12	2	549-3907-002	1101	3	1
542-1348-002	1104	74A	5	549-3907-002	1101	3	1
542-1348-002	1104	74A	5	549-3908-002	1101	14	1
542-4160-002	1111	148	3	549-3908-002	1101	14	1
542-4160-002	1111	160	2	549-3909-003	1101	4	1
542-4160-002	1111	165	3	549-3914-003	1101	5	1
542-4177-002	1111	77	1	549-3914-003	1101	5	1
542-4177-002	1111	83	1	549-3919-003	1101	13	1
542-4177-002	1111	89	1	549-3927-003	1101	9	1
542-5313-002	1104	1	1	549-3934-004	1101	3	1
542-5313-002	1104	77	1	549-3934-004	1101	3	1
542-6624-002	1111	32	1	549-4081-00	1101		1
544-3541-002	1111	152	3	549-4082-00	1101		1
545-7529-003	1106	20	2	549-4084-002	1111	76	1
545-7529-003	1106	23	4	549-4084-002	1111	82	1
545-7529-003	1108	13	2	549-4085-002	1111	120	1
545-7529-003	1108	15	2	549-4086-002	1111	119	1
545-7529-003	1108	17	2	549-4087-002	1111	95	1
545-7529-003	1109	19	2	549-4087-002	1111	98	1
545-7529-003	1109	21	2	549-4088-002	1111	94	1
545-7529-003	1109	23	2	549-4089-002	1111	126	1
545-7529-003	1109	25	2	549-4090-002	1111	125	1
545-7529-003	1109	27	2	549-4091-002	1111	117	1
545-7529-003	1109	29	2	549-4092-002	1111	116	1
545-7529-003	1110	20	2	549-4093-002	1111	111	1
545-7529-003	1110	22	2	549-4093-002	1111	114	1
545-7529-003	1110	24	2	549-4094-002	1111	110	1
545-7533-003	1101	1	1	549-4095-002	1111	113	1
546-8145-002	1111	34	2	549-4096-002	1111	108	1
548-3954-002	1101	1	1	549-4097-002	1111	107	1
548-7673-003	1106	32	1	549-4098-002	1111	105	1
548-7674-003	1101	17	1	549-4099-002	1111	106	1
548-7676-004	1106	42	1	549-4100-002	1111	103	1
548-7677-005	1101	63	1	549-4101-002	1111	101	1
548-7677-005	1109	0	REF	549-4102-002	1111	100	1
548-7678-005	1101	60	1	549-4103-002	1111	97	1
548-7678-005	1106	0	REF	549-4104-002	1111	92	1
548-7693-003	1101	1A	1	549-4105-002	1111	91	1
548-7694-003	1101	2	1	549-4106-002	1111	88	1
548-7764-004	1101	61	1	549-4107-002	1111	75	1
548-7764-004	1107	0	REF	549-4107-002	1111	81	1
548-9539-003	1101	18A	1	549-4107-002	1111	87	1



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
549-4108-002	1111	156	2	549-4151-003	1111	19	1
549-4108-002	1111	156	2	549-4151-003	1111	36	1
549-4109-002	1111	55	3	549-4152-003	1111	127	1
549-4109-002	1111	55	3	549-4155-004	1111	72	1
549-4110-002	1111	139	1	549-4156-004	1111	70	1
549-4111-002	1111	56	1	549-4157-004	1111	168	1
549-4112-002	1111	48	1	549-4158-004	1111	166	1
549-4113-002	1111	30	2	549-4159-004	1101	16	1
549-4113-002	1111	47	2	549-4161-004	1110	30	1
549-4114-003	1111	1	1	549-4163-004	1109	36	1
549-4115-002	1102	1	2	549-4164-004	1109	35	1
549-4117-002	1101	59	1	549-4166-004	1108	23	1
549-4118-002	1111	7	1	549-4168-004	1107	31	1
549-4120-002	1111	24	1	549-4171-004	1101	1	1
549-4120-002	1111	41	1	549-4172-004	1101	64	1
549-4121-002	1111	143	2	549-4172-004	1110	0	REF
549-4122-002	1101	52	1	549-4174-004	1101	62	1
549-4122-002	1101	60	1	549-4174-004	1108	0	REF
549-4122-002	1101	61	1	549-4174-005	1101	62	1
549-4122-002	1101	62	1	549-4174-005	1108	0	REF
549-4122-002	1101	63	1	549-4175-004	1101	61	1
549-4122-002	1101	64	1	549-4175-004	1107	0	REF
549-4123-003	1111	73	1	549-4177-004	1101	35	1
549-4123-003	1111	79	1	549-4177-004	1102	0	REF
549-4124-002	1111	85	1	549-4180-004	1104	80	1
549-4125-002	1111	123	1	549-4182-005	1101	69	1
549-4126-002	1111	122	1	549-4183-005	1105	80	1
549-4127-002	1102	1	2	549-4184-005	1105	75	1
549-4128-003	1111	78	1	549-4185-005	1103	46	1
549-4128-003	1111	84	1	549-4186-005	1103	41	1
549-4129-003	1111	121	1	549-4187-005	1101	67	1
549-4130-003	1111	96	1	549-4187-005	1111	0	REF
549-4130-003	1111	124	1	549-4188-005	1101	48	1
549-4131-003	1111	102	1	549-4188-005	1105	0	REF
549-4132-003	1111	112	1	549-4188-006	1101	48	1
549-4132-003	1111	118	1	549-4188-006	1105	0	REF
549-4133-003	1111	115	1	549-4189-005	1101	36	1
549-4134-003	1111	109	1	549-4189-005	1103	0	REF
549-4135-003	1111	99	1	549-4190-005	1101	37	1
549-4136-003	1111	93	1	549-4190-005	1104	0	REF
549-4137-003	1111	33	1	549-4193-005	1104	86	1
549-4138-003	1111	35	1	549-6602-002	1101	50	1
549-4139-003	1111	90	1	549-6603-002	1101	51	1
549-4140-003	1111	25	1	55C30	1104	67	1
549-4140-003	1111	42	1	55C30	1104	67	1
549-4141-003	1101	12	1	55C30	1104	67	1
549-4142-003	1102	19	1	55C32A2	1107	13	1
549-4143-003	1102	14	1	55C32A2	1107	13	1
549-4145-003	1110	25	1	55C32A2	1107	14	1
549-4147-003	1108	18	2	55C32A2	1107	14	1
549-4148-003	1107	26	1	553-2329-003	1101	1A	1
549-4148-004	1107	26	1	553-9420-003	1111	78A	1
549-4150-003	1101	15	1	553-9420-003	1111	78A	1
549-4150-003	1101	15	1				



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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.	PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
554-3948-001	1101	3	1	761-0356-001	1104	74A	5
554-3948-001	1101	3	1	761-5187-001	1101	5A	2
554-3948-001	1101	3	1	761-5187-001	1101	5A	2
554-3955-001	1101	15	1	761-5187-001	1101	5A	2
554-3955-001	1101	15	1	761-5188-001	1101	5	1
554-3955-001	1101	15	1	761-5188-001	1101	5	1
554-4706-004	1109	30	1	761-5188-001	1101	5	1
554-5564-003	1106	32	1	761-5189-001	1101	14A	2
554-5565-004	1101	17	1	761-5189-001	1101	14A	2
554-5566-005	1101	60	1	761-5189-001	1101	14A	2
554-5566-005	1106	0	REF	761-5190-001	1101	3	2
600D157G015DD4	1103	35	1	761-5190-001	1101	3	2
600D157G015DD4	1103	35	1	761-5190-001	1101	3	2
600D157G015DD4	1103	39	1	761-5190-001	1111	55A	3
600D157G015DD4	1103	39	1	763-2532-001	1111	55A	3
600D157G015DD4	1104	2	1	763-2532-001	1111	55A	3
600D157G015DD4	1104	2	1	763-5762-001	1111	78B	1
600D157G015DD4	1104	2	1	763-5762-001	1111	78B	1
600D157G015DD4	1104	11	1	763-5762-001	1111	78B	1
600D157G015DD4	1104	11	1	763-8453-001	1101	6Y	1
600D157G015DD4	1104	11	1	763-8455-001	1101	6E	1
600D157G015DD4	1104	23	1	763F28	1105	53	1
600D157G015DD4	1104	23	1	763F28	1105	53	1
600D227G007DD4	1103	36	1	763F28	1105	53	1
600D227G007DD4	1103	36	1	763F28	1105	61	1
600D405F200KD4	1104	64A	1	763F28	1105	61	1
600D405F200KD4	1104	64A	1	763F28	1105	61	1
600D405F200KD4	1104	64A	1	763F89	1103	37	1
600D476G030KD4	1104	2	1	763F93	1107	11	1
600D476G030KD4	1104	2	1	763F93	1107	11	1
600D476G030KD4	1104	5	1	800416	1101	65	1
600D476G030KD4	1104	5	1	805-014X5V0103Z	1106	5	1
600D476G030KD4	1104	14	1	805-014X5V0103Z	1106	5	1
600D476G030KD4	1104	14	1	855-502X5V0203Z	1106	31	1
600D476G030KD4	1104	28	1	855-502X5V0203Z	1106	31	1
600D476G030KD4	1104	28	1	8942	1106	17	2
600D476G030KD4	1104	62	1	8942	1107	22	2
600D476G030KD4	1104	62	1	8942	1108	9	2
600D476G030KD4	1104	28	1	8942	1109	13	6
600D506G040DD4	1104	28	1	8942	1109	14	2
6229-70-02	1111	149	1	8942	1110	9	4
65-136	1107	6B	1	8942	1111	11	6
665-054-262A	1111	157	1	8942	1111	16	2
665-55-84-1	1111	149	1	997F17	1103	38	1
68-1660-26	1101	10	2	997F17	1103	38	1
7RS900-3A	1111	145	1	997F17	1105	53	1
761-0356-001	1101	18A	1	997F17	1105	53	1
761-0356-001	1101	18A	1				
761-0356-001	1104	74A	5				



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SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER
B1	1111 145	ETH11E4	C11	1107 13	192P10392
B1	1111 145	7RS900-3A	C11	1107 13	55C32A2
B2	1111 153	41A330	C11	1107 13	55C32A2
B2	1111 153A	41A144	C12	1107 14	192P10392
B3	1111 52	EWC15A5A196	C12	1107 14	192P10392
B3	1111 52	EWC15A5A196	C12	1107 14	55C32A2
B3	1111 52A	10FB1A	C12	1107 14	55C32A2
B3	1111 52A	10FB1A	C13	1107 18	192P10392
B3	1111 52A	10FB1A	C13	1107 18	192P10392
B4	1111 162	EGH11G4A521	C13	1107 18	33C2
B4	1111 162	EGH11G4A521	C13	1107 18	33C2
B4	1111 162A	TGH11E4B080	C14	1107 17	150D105X0035A2
B4	1111 162A	TGH11E4B080	C14	1107 17	150D105X0035A2
B4	1111 162A	TGH11E4B080	C15	1107 9	150D105X0035A2
B4	1111 162A	TGH11E4B080	C15	1107 9	150D225X0020A2
B5	1111 157	S11014-4	C16	1106 23	189-6-8
B5	1111 157	665-054-262A	C17	1106 22	189-6-8
CR1	1105 35	1N270	C18	1106 20	189-6-8
CR2	1105 37	1N270	C19	1106 25	CM06F302F03
CR3	1105 45	1N270	C23	1109 23	189-6-8
CR4	1104 60	4M17Z5	C24	1109 21	189-6-8
CR5	1105 54	1N270	C25	1109 19	189-6-8
CR6	1104 6	1N270	C26	1109 25	189-6-8
CR7	1104 65	1N1116	C27	1109 27	189-6-8
CR9	1104 7	1N270	C28	1109 29	189-6-8
CR10	1105 42	1N270	C29	1109 15	DM15F511J03
CR11	1104 3	1N1775A	C31	1110 4	CM05E270J03
CR12	1103 23	1N270	C32	1110 5	DM20F152J500WV
CR12	1103 23	1N270	C33	1109 3	150D225X0020A2
CR13	1103 22	1N457	C34	1110 16	CC35UJ391F
CR13	1103 22	1N457	C34	1110 16	CC35UJ391F
CR14	1104 37	1N645	C34	1110 16	CM05F271J03
CR14	1104 37	1N645	C34	1110 16	CM05F271J03
CR15	1107 19	1N270	C34	1110 16	CM05F361J03
CR16	1107 20	1N270	C34	1110 16	CM05F361J03
C1	1101 65	800416	C34	1110 16	CM05F361J03
C2	1108 17	189-6-8	C34	1110 16	CM05F361J03
C3	1108 15	189-6-8	C34	1110 16	CM05F391J03
C4	1108 13	189-6-8	C34	1110 16	CM05F391J03
C5	1108 6	150D225X0020A2	C34	1110 16	CM05F391J03
C6	1108 3	150D225X0020A2	C35	1110 17	CC20CK020D
C7	1110 15	CM05F101J03	C35	1110 17	CC20CK020D
C7	1110 15	CM05F101J03	C35	1110 17	CC30UJ131G
C7	1110 15	CM05F151J03	C35	1110 17	CC30UJ131G
C7	1110 15	CM05F151J03	C35	1110 17	301-000R3A0-150J
C9	1104 26	150D686X0015R2	C36	1110 20	189-6-8
C9	1104 26	150D686X0020S2	C37	1110 10	CC20CH100D
C9	1104 26	150D686X0020S2	C38	1110 13	CM19E431F03
C9	1104 26	150D686X0020S2	C38	1110 13	CM19E431F03
C10	1110 14	150D103X0035A2	C38	1110 13	DM19E431F03
C10	1110 14	150D103X0035A2	C39	1110 12	CC32SH121G
C10	1110 14	192P10392	C39	1110 12	CC32SH121G
C10	1110 14	192P10392	C39	1110 12	CC32UJ361F
C10	1110 14	192P10392	C39	1110 12	CC32UJ361F
C10	1110 14	192P10392	C39	1110 12	CC32UJ361F
C11	1107 13	192P10392	C40	1110 22	189-6-8



SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER	
C41	1110	11	301-000P3K0-100D	C53	1105 31	150D104X0035A2
C41	1110	11	301-000P3K0-100D	C53	1105 31	192P10392
C41	1110	11	301N4200-85DEGC5PFPORM	C53	1105 31	192P10392
C42	1110	6	CM06F102G03	C53	1105 31	192P10392
C42	1110	6	CM06F102G03	C54	1105 24	150D105X0035A2
C42	1110	6	CM06F102G03	C54	1105 24	150D105X0035A2
C42	1110	6	CM19F621F03	C54	1105 24	192P10392
C42	1110	6	DM19F621F03	C54	1105 24	192P10392
C43	1110	7	DM19F561F03	C54	1105 24	192P10392
C43	1110	7	DM19F561F03	C55	1105 46	150D105X0035A2
C43	1110	13	CC32CG510J	C56	1105 72	DM20F152J500WV
C43	1110	13	CC32CG510J	C57	1105 33	150D104X0035A2
C44	1110	24	189-6-8	C58	1105 30	150D104X0035A2
C45	1110	8	CC20UJ100C	C58	1105 31	150D104X0035A2
C45	1110	8	CC20UJ100C	C59	1105 50	150D104X0035A2
C45	1110	8	301-000P3K0-100D	C60	1103 36	150D227X0010S2
C45	1110	8	301-000P3K0-100D	C60	1103 36	150D227X0010S2
C45	1110	8	301-000P3K0-100D	C60	1103 36	150D337X0006S2
C46	1105	58	150D105X0035A2	C60	1103 36	150D337X0006S2
C46	1105	58	150D105X0035A2	C60	1103 36	150D337X0006S2
C46	1105	58	150D106X0020B2	C60	1103 36	600D227G007DD4
C46	1105	58	150D106X0020B2	C60	1103 36	600D227G007DD4
C46	1105	58	150D106X0020B2	C61	1105 59	150D225X0020A2
C47	1105	5	150D225X0020A2	C62	1102 7	CM05F121J03
C47	1105	5	150D225X0020A2	C63	1102 6	150D105X0035A2
C47	1105	5	192P10392	C64	1102 11	DM15F511J03
C47	1105	5	192P10392	C65	1102 5	DM15F511J03
C47	1105	5	192P10392	C66	1105 14	150D105X0035A2
C48	1105	13	DM15F511J03	C67	1104 28	150D476X0035S2
C48	1105	13	150D103X0035A2	C67	1104 28	150D476X0035S2
C48	1105	13	150D103X0035A2	C67	1104 28	150D686X0020S2
C48	1105	13	192P10392	C67	1104 28	600D476G030KD4
C48	1105	13	192P10392	C67	1104 28	600D476G030KD4
C48	1105	13	192P10392	C67	1104 28	600D506G040DD4
C49	1105	56	150D105X0035A2	C68	1104 20	150D226X0035R2
C50	1105	11	150D225X0020A2	C68	1104 20	150D226X0035R2
C50	1105	11	150D225X0020A2	C68	1104 20	150D276X9020R2
C50	1105	11	192P10392	C68	1104 20	150D276X9020R2
C50	1105	11	192P10392	C68	1104 20	150D276X9020R2
C50	1105	11	192P10392	C68	1104 20	150D276X9020R2
C51	1105	18	150D104X0035A2	C68	1104 22	CL26BE400UN3
C51	1105	18	150D104X0035A2	C68	1104 22	CL26BE400UN3
C51	1105	18	192P10392	C69	1104 42	CL26BJ2R5TN3
C51	1105	18	192P10392	C70	1104 8	150D105X0035A2
C51	1105	18	192P10392	C71	1104 5	150D476X0020R2
C51	1105	18	192P10392	C71	1104 5	150D476X0020R2
C52	1105	23	150D103X0035A2	C71	1104 5	600D476G030KD4
C52	1105	23	150D103X0035A2	C71	1104 5	600D476G030KD4
C52	1105	23	150D104X0035A2	C72	1104 51	150D105X0035A2
C52	1105	23	150D104X0035A2	C73	1104 14	150D476X0020R2
C52	1105	23	150D104X0035A2	C73	1104 14	150D476X0020R2
C52	1105	23	150D104X0035A2	C73	1104 14	150D476X0020R2
C52	1105	23	150D105X0035A2	C73	1104 14	150D476X0020R2
C52	1105	23	150D105X0035A2	C73	1104 14	150D476X0020R2
C52	1105	23	192P10392	C73	1104 14	150D476X0020R2
C52	1105	23	192P10392	C73	1104 14	600D476G030KD4



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SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER
C73	1104 14	600D476G030KD4	C87	1101 21	150D686X0015R2
C74	1104 35	CL23CJ1R5TN3	C88	1104 2	150D476X0020R2
C74	1104 35	CL26BJ2R5TN3	C88	1104 2	150D476X0020R2
C75	1103 17	150D225X0020A2	C88	1104 2	150D686X0020S2
C76	1103 30	109D106X0050C2	C88	1104 2	600D157G015DD4
C76	1103 30	109D305X9075C2	C88	1104 2	600D157G015DD4
C76	1103 30	109D305X9075C2	C88	1104 2	600D157G015DD4
C76	1103 30	150D335X0015A2	C88	1104 2	600D476G030KD4
C76	1103 30	150D335X0015A2	C88	1104 2	600D476G030KD4
C76	1103 30	150D335X0015A2	C89	1102 4	CM05E220J03
C77	1103 28	109D106X0050C2	C90	1109 2	CC20CH180J
C77	1103 28	109D305X9075C2	C91	1109 7	CC20CH180J
C77	1103 28	109D305X9075C2	C92	1109 10	CC20CH180J
C77	1103 28	150D335X0015A2	C93	1109 17	CC20CH100D
C77	1103 28	150D335X0015A2	C93	1109 17	CC20CH100D
C77	1103 28	150D335X0015A2	C93	1109 17	CC20CH150G
C78	1101 19	SC53	C93	1109 17	CC20CH150G
C78	1101 19	SC53	C93	1109 17	CC20CH150J
C78	1101 19	150D334X0035A2	C93	1109 17	CC20CH150J
C79	1103 21	150D106X0020B2	C93	1109 17	CC20CH150J
C79	1103 21	150D106X0020B2	C94	1109 16	CC20CH180J
C79	1103 21A	150D225X0035B2	C95	1109 12	CC20CH100D
C79	1103 21A	150D225X0035B2	C95	1109 12	CC20CH100D
C79	1103 21A	150D225X0035B2	C95	1109 12	CC20CH100D
C80	1103 24	150D106X0020B2	C95	1109 12	CC20CH100D
C81	1103 35	150D157X0015S2	C95	1109 12	CC20CH150G
C81	1103 35	150D157X0015S2	C95	1109 12	CC20CH150G
C81	1103 35	150D157X0015S2	C95	1109 12	CC20CH150G
C81	1103 35	600D157G015DD4	C96	1109 11	DM20F822J100WV
C81	1103 35	600D157G015DD4	C97	1108 7	CC20CH150G
C82	1104 69	151D115X0035X2	C97	1108 7	CC20CH150G
C82	1104 69	151D115X0035X2	C97	1108 7	CC20CH180J
C82	1104 69	151D164X0035W2	C97	1108 7	301-000R3A0-240J
C82	1104 69	151D164X0035W2	C97	1108 7	301-000R3A0-240J
C82	1104 69	151D164X0035W2	C97	1108 7	301N3300-85DEGC20PFPOR
C82	1104 69	151D164X0035W2	C97	1108 7	301N3300-85DEGC20PFPOR
C82	1104 69	151D344X0035W2	C97	1108 7	301N3300-85DEGC20PFPOR
C82	1104 69	151D504X0035W2	C97	1108 7	301N3300-85DEGC20PFPOR
C82	1104 69	151D754X0035X2	C97	1108 7	301N3300-85DEGC20PFPOR
C83	1103 9	150D104X0035A2	C98	1108 8	CC20CH180J
C83	1103 9	150D104X0035A2	C98	1108 8	CC20CH180J
C83	1103 9	150D105X0035A2	C98	1108 8	301-000R3K0-200J
C83	1103 9	150D105X0035A2	C98	1108 8	301-000R3A0-200J
C83	1103 9	150D105X0035A2	C98	1108 8	301-000R3K0-200J
C83	1103 9	150D105X0035A2	C98	1108 8	301-000R3A0-200J
C83	1103 9	150D105X0035A2	C98	1108 8	301-000R3A0-200J
C84	1103 7	150D334X0035A2	C99	1104 19	CL24BE600UP3
C85	1103 4	150D476X0020R2	C99	1104 19	CL24BE600UP3
C86	1101 58	150D475X0010A2	C100	1106 10	301-000R3A0-240J
C87	1101 21	CL24BE201UP3	C101	1106 12	CC20UJ240G
C87	1101 21	CL24BE201UP3	C102	1106 18	CC20CH050D
C87	1101 21	150D106X0020B2	C102	1106 18	CC20CH050D
C87	1101 21	150D106X0020B2	C102	1106 18	CC20UJ240G
C87	1101 21	150D686X0015R2	C103	1104 57	33C41
C87	1101 21	150D686X0015R2	C104	1104 67	CM07F203J03



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SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER
C104	1104	67	CM07F203J03		
C104	1104	67	55C30		
C104	1104	67	55C30		
C104	1104	67	55C30		
C107	1105	20	150D105X0035A2		
C108	1105	22	150D103X0035A2		
C108	1105	22	150D103X0035A2		
C108	1105	22	150D104X0035A2		
C108	1105	22	150D104X0035A2		
C108	1105	22	192P10392		
C108	1105	22	192P10392		
C108	1105	22	192P10392		
C109	1105	19	150D105X0035A2		
C109	1105	19	150D105X0035A2		
C109	1105	19	192P10392		
C109	1105	19	192P10392		
C109	1105	19	192P10392		
C110	1105	4	DM15F511J03		
C110	1105	4	DM15F511J03		
C110	1105	4	150D103X0035A2		
C110	1105	4	150D103X0035A2		
C110	1105	4	192P10392		
C110	1105	4	192P10392		
C110	1105	4	192P10392		
C110	1107	6C	192P10392		
C111	1101	66	SC53		
C111	1101	66	SC53		
C111	1101	66	150D334X0035A2		
C112	1104	11	150D157X0015S2		
C112	1104	11	150D157X0015S2		
C112	1104	11	600D157G015DD4		
C112	1104	11	600D157G015DD4		
C112	1104	11	600D157G015DD4		
C113	1104	17	150D106X0020B2		
C114	1104	16	150D106X0020B2		
C115	1105	64	150D105X0035A2		
C116	1104	62	150D476X0020R2		
C116	1104	62	150D476X0020R2		
C116	1104	62	150D476X0020R2		
C116	1104	62	150D476X0020R2		
C116	1104	62	150D476X0020R2		
C116	1104	62	600D476G030KD4		
C116	1104	62	600D476G030KD4		
C117	1105	41	150D104X0035A2		
C118	1106	4	150D105X0035A2		
C119	1104	23	150D157X0015S2		
C119	1104	23	150D157X0015S2		
C119	1104	23	150D157X0015S2		
C119	1104	23	150D157X0015S2		
C119	1104	23	150D157X0015S2		
C119	1104	23	600D157G015DD4		
C119	1104	23	600D157G015DD4		
C120	1104	32	150D105X0035A2		
C121	1104	30	150D105X0035A2		
C122	1104	13	150D104X0035A2		
C122	1104	13	150D104X0035A2		
C122	1104	13	151D114X0035W2		
C122	1104	13	151D114X0035W2		
C122	1104	13	192P10492		
C122	1104	13	192P10492		
C122	1104	13	192P10492		
C123	1104	61	150D105X0035A2		
C123	1104	61	150D105X0035A2		
C124	1105	65	150D105X0035A2		
C125	1103	16A	150D155X0020A2		
C125	1103	16A	150D155X0020A2		
C125	1103	16A	150D155X0020A2		
C125	1103	39	150D107X0010R2		
C125	1103	39	150D107X0010R2		
C126	1108	11	CC20CH050C		
C126	1108	11	CC20CH050C		
C126	1108	11	301N4200-85DEGC5PFPORM		
C126	1108	11	301N4200-85DEGC5PFPORM		
C126	1108	11	301N4200-85DEGC5PFPORM		
C127	1105	32	150D103X0035A2		
C127	1105	32	150D103X0035A2		
C127	1105	32	192P10392		
C127	1105	32	192P10392		
C127	1105	32	192P10392		
C128	1102	10	150D105X0035A2		
C129	1110	10	301-000R3A0-509C		
C129	1110	10	301-000R3A0-509C		
C130	1107	1A	CM05C100K03		
C130	1107	1A	CM06F681J03		
C130	1107	6A	CM05C100K03		
C130	1107	6A	CM05F271J03		
C131	1101	58A	CM06F202J03		
C131	1101	58A	CM06F302F03		
C131	1101	58A	CM06F302J03		
C133	1106	5	151D113X0035W2		
C133	1106	5	151D113X0035W2		
C133	1106	5	192P10392		
C133	1106	5	192P10392		
C133	1106	5	192P10392		
C133	1106	5	805-014X5V0103Z		
C133	1106	5	805-014X5V0103Z		
C137	1106	31	150D223X0035A2		
C137	1106	31	150D223X0035A2		
C137	1106	31	150D223X0035A2		
C137	1106	31	150D223X0035A2		
C137	1106	31	855-502X5V0203Z		
C137	1106	31	855-502X5V0203Z		
C137	1106	31A	192P10392		
C138	1106	11	CM05F271J03		
C139	1107	13A	CM05F391J03		
C140	1103	33A	150D106X0020B2		
C140	1103	33A	150D106X0020B2		
C140	1103	33A	150D156X0020B2		



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SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER		
C140	1103	33A	150D156X0020B2	C156	1103	14A	150D476X0006B2
C140	1103	33A	150D225X0020A2	C156	1103	14A	150D476X0006B2
C140	1103	33A	150D225X0020A2	C156	1103	14A	150D476X0006B2
C140	1103	33A	150D475X0010A2	C157	1105	71A	CM05F361J03
C140	1103	33A	150D475X0010A2	C157	1105	71A	CM05F361J03
C140	1103	33A	150D475X0010A2	C157	1105	71A	CM05F361J03
C141	1103	39	150D157X0015S2	C158	1105	57A	150D105X0035A2
C141	1103	39	150D157X0015S2	C158	1105	57A	150D105X0035A2
C141	1103	39	150D157X0015S2	C158	1105	57A	150D105X0035A2
C141	1103	39	150D157X0015S2	C159	1107	6C	192P10392
C141	1103	39	600D157G015DD4	C160	1107	24A	192P10392
C141	1103	39	600D157G015DD4	C160	1107	24A	192P10392
C141	1103	39	600D157G015DD4	C161	1107	21D	CM06F392J03
C142	1107	21A	CM05C180K03	C161	1107	21D	CM06F392J03
C143	1107	21C	CM05F101J03	C162	1107	3	CM06F561J03
C144	1107	21D	CM05E470J03	C162	1107	3	CM06F561J03
C144	1107	21D	CM05E820J03	C163	1106	8	192P10392
C145	1104	6A	150D474X0035A2	C165	1106	12A	CM05C120K03
C145	1104	6A	150D474X0035A2	C166	1108	11A	CC20CH120K
C146	1104	64A	600D405F200KD4	C167	1106	9B	CC20CH050D
C146	1104	64A	600D405F200KD4	C168	1106	11A	CC20CH050D
C146	1104	64A	600D405F200KD4	C169	1106	18A	CC20CH050D
C147	1103	2A	150D396X9010B2	C170	1101	6W	GA1-5MMFD201
C147	1103	2A	150D396X9010B2	C171	1101	6N	DM10E270J
C147	1103	2A	150D396X9010B2	C172	1101	6T	DM15F511K03
C148	1104	44A	CM05D331K03	C173	1101	6S	D153F751K0
C148	1104	44A	CM05D331K03	C174	1101	6D	150D105X0035A2
C148	1104	44A	CM05D331K03	C175	1101	6A	DM10F271J
C149	1107	4A	150D105X0035A2	J1	1101	6	PT02A10-6P
C150	1104	34B	CM05D331K03	J2	1101	7	PT02A12-10P
C150	1104	34B	CM05D331K03	J3	1101	68	DPXB45-34P0201
C150	1104	34B	D153F561K0	K1	1101	6F	3SBC1016A2
C150	1104	34B	D153F561K0	L1	1107	2	MS90540-07
C150	1104	34B	D153F561K0	L1	1107	2	MS90540-07
C151	1104	77A	CS138D566K	L1	1107	2	MS90541-11
C151	1104	77A	150D107X0010R2	L2	1106	27	LT4K044
C151	1104	77A	150D476X0020R2	L3	1110	19	X270-2
C151	1104	77A	150D686X0015R2	L4	1110	21	X271-2
C152	1109	1	CM06F392J03	L5	1110	23	X272-2
C152	1109	1	CM06F392J03	L6	1107	3	MS90539-08
C152	1109	1	192P10392	L6	1107	3	MS90539-15
C152	1109	1	192P10392	L6	1107	3	MS90539-15
C152	1109	1	192P10392	L6	1107	3	MS90540-07
C153	1104	77B	CS138D566K	L7	1109	1	4422-11-117
C153	1104	77B	150D107X0010R2	L7	1109	1	4422-11-117
C153	1104	77B	150D476X0020R2	L7	1109	1	4422-9-36
C153	1104	77B	150D686X0015R2	L7	1109	1	4422-9-36
C154	1106	43	GA7-7UUFPORM5PCT	L8	1109	8	LT4K043
C154	1106	43	GA7-7UUFPORM5PCT	L8	1109	8	LT4K043
C154	1106	43	GA7-7UUFPORM5PCT	L8	1109	8	LT4K046
C155	1106	44	GA7-7UUFPORM5PCT	L8	1109	8	LT4K046
C155	1106	44	GA7-7UUFPORM5PCT	L8	1109	8	LT4K046
C155	1106	44	GA7-7UUFPORM5PCT				





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SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER
L8	1109	8	LT4K046	Q4	1101 43 2N3638A
L11	1102	3	MPF054-31	Q5	1101 46 2N1285
L11	1102	3	MPF054-31	Q5	1101 46 2N1285
L11	1102	3	S88076	Q5	1101 46 2N3638A
L11	1102	3	S88076	Q5	1101 46 2N3638A
L12	1104	47	MS90541-04	Q5	1101 46 2N3638A
L13	1104	48	MS90541-04	Q6	1101 47 2N1285
L14	1104	59	MS90541-04	Q6	1101 47 2N1285
L15	1104	46	MS90541-04	Q6	1101 47 2N2905A
L17	1107	24	MS90539-08	Q6	1101 47 2N2905A
L17	1107	24	MS90539-08	Q6	1101 47 2N2905A
L17	1107	24	MS90539-15	Q7	1101 38 2N1285
L17	1107	24	MS90539-15	Q7	1101 38 2N1285
L18	1101	34	LT7K203	Q7	1101 38 2N3638A
L22	1105	73	MS90539-15	Q7	1101 38 2N3638A
L24	1104	29	MS90540-07	Q7	1101 38 2N3638A
L25	1101	5B	4412-13-36	Q8	1101 39 2N1285
L26	1101	5C	LT4K046	Q8	1101 39 2N1285
L27	1106	27	MS90538-17	Q8	1101 39 2N3638A
L28	1106	26	MS90538-09	Q8	1101 39 2N3638A
L29	1106	28	MS90538-01	Q8	1101 39 2N3638A
L30	1106	25	LT4K048	Q9	1101 40 2N1285
L31	1106	8	LT4K041	Q9	1101 40 2N1285
L32	1104	78	A16634	Q9	1101 40 2N3638A
L32	1104	78	A16634	Q9	1101 40 2N3638A
L32	1104	78	A16634	Q9	1101 40 2N3638A
L33	1101	20A	MS90539-08	Q10	1101 41 2N1285
L33	1101	20A	MS90539-08	Q10	1101 41 2N1285
L33	1101	20A	MS90539-08	Q10	1101 41 2N3638A
L35	1106	3A	1537-48	Q10	1101 41 2N3638A
L36	1106	3B	1537-48	Q10	1101 41 2N3638A
MG1	1111	149	ST10009-4	Q11	1101 42 2N1285
MG1	1111	149	6229-70-02	Q11	1101 42 2N1285
MG1	1111	149	665-55-84-1	Q11	1101 42 2N3638A
Q1	1101	45	2N1285	Q11	1101 42 2N3638A
Q1	1101	45	2N1285	Q11	1101 42 2N3638A
Q1	1101	45	2N3638A	Q11	1101 42 2N3638A
Q1	1101	45	2N3638A	Q12	1101 24 2N3638A
Q1	1101	45	2N3638A	Q12	1101 24 2N3638A
Q1	1101	45	2N3638A	Q12	1101 24 2N3638A
Q2	1101	43A	2N1285	Q12	1101 24 2N525
Q2	1101	43A	2N1285	Q12	1101 24 2N525
Q2	1101	43A	2N3638A	Q13	1101 23 2N3638A
Q2	1101	43A	2N3638A	Q13	1101 23 2N3638A
Q2	1101	43A	2N3638A	Q13	1101 23 2N3638A
Q2	1101	43A	2N3638A	Q13	1101 23 2N525
Q3	1101	44	2N1285	Q13	1101 23 2N525
Q3	1101	44	2N1285	Q14	1101 18 2N158A
Q3	1101	44	2N3638A	Q14	1101 18 2N158A
Q3	1101	44	2N3638A	Q14	1101 18 2N2270
Q3	1101	44	2N3638A	Q14	1101 18 2N2270
Q4	1101	43	2N1285	Q14	1101 18 2N2270
Q4	1101	43	2N1285	Q15	1101 25 2N1711
Q4	1101	43	2N3638A	Q15	1101 25 2N1711
Q4	1101	43	2N3638A	Q15	1101 25 2N1711



SYMBOL INDEX

SYMBOL	FIG. - ITEM		PART NUMBER	SYMBOL	FIG. - ITEM		PART NUMBER
Q15	1101	25	2N333	Q27	1101	31	2N3638A
Q15	1101	25	2N333	Q27	1101	31	2N3638A
Q16	1101	26	2N1711	Q27	1101	31	2N525
Q16	1101	26	2N1711	Q27	1101	31	2N525
Q16	1101	26	2N1711	Q28	1104	73	2N158A
Q16	1101	26	2N333	Q28	1104	73	2N158A
Q16	1101	26	2N333	Q28	1104	73	2N2405
Q17	1101	27	2N3638A	Q28	1104	73	2N2405
Q17	1101	27	2N3638A	Q29	1104	72	2N158A
Q17	1101	27	2N3638A	Q29	1104	72	2N158A
Q17	1101	27	2N525	Q29	1104	72	2N2405
Q17	1101	27	2N525	Q29	1104	72	2N2405
Q18	1101	28	2N3638A	Q29	1104	72	2N2405
Q18	1101	28	2N3638A	Q30	1104	1	2N174
Q18	1101	28	2N3638A	Q31	1101	33	2N2405
Q18	1101	28	2N525	Q31	1101	33	2N2405
Q18	1101	28	2N525	Q31	1101	33	2N2405
Q19	1101	29	2N1711	Q31	1101	33	2N341
Q19	1101	29	2N1711	Q31	1101	33	2N341
Q19	1101	29	2N1711	Q31	1101	33	2N341
Q19	1101	29	2N333	Q32	1101	6M	2N3638A
Q19	1101	29	2N333	Q33	1101	6G	2N1711
Q20	1101	30	2N1711	RT1	1105	61	416H17
Q20	1101	30	2N1711	RT1	1105	61	416H17
Q20	1101	30	2N1711	RT1	1105	61	763F28
Q20	1101	30	2N333	RT1	1105	61	763F28
Q20	1101	30	2N333	RT1	1105	61	763F28
Q21	1101	22	2N1285	RT2	1107	11	763F93
Q21	1101	22	2N1285	RT2	1107	11	763F93
Q21	1101	22	2N3638A	RT3	1103	37	763F89
Q21	1101	22	2N3638A	RT4	1103	38	997F17
Q21	1101	22	2N3638A	RT4	1103	38	997F17
Q22	1104	74	2N1131	RT5	1105	53	763F28
Q22	1104	74	2N1131	RT5	1105	53	763F28
Q22	1104	74	2N1131	RT5	1105	53	763F28
Q22	1104	74	2N158A	RT5	1105	53	763F28
Q22	1104	74	2N158A	RT5	1105	53	997F17
Q23	1104	77	2N174	RT5	1105	53	997F17
Q24	1104	70	2N158A	R1	1108	5	RC07GF103K
Q24	1104	70	2N158A	R2	1108	4	RC07GF102K
Q24	1104	70	2N2405	R3	1108	2	RC07GF182K
Q24	1104	70	2N2405	R3	1108	2	RC07GF272K
Q24	1104	70	2N2405	R4	1107	16	RC07GF103K
Q25	1104	71	2N158A	R4	1107	16	RC07GF103K
Q25	1104	71	2N158A	R4	1107	16A	RC07GF563K
Q25	1104	71	2N2405	R4	1107	16A	RC07GF563K
Q25	1104	71	2N2405	R5	1107	6	RC07GF391K
Q25	1104	71	2N2405	R5	1107	6	RC07GF391K
Q26	1101	32	2N3638A	R6	1107	10	RC07GF102K
Q26	1101	32	2N3638A	R6	1107	10	RC07GF221K
Q26	1101	32	2N3638A	R6	1107	10	RC07GF221K
Q26	1101	32	2N525	R6	1107	10	RC07GF222K
Q26	1101	32	2N525	R7	1107	7	RN60D3160F
Q27	1101	31	2N3638A	R7	1107	7	RN60D3160F



SYMBOL INDEX

SYMBOL	FIG. - ITEM		PART NUMBER	SYMBOL	FIG. - ITEM		PART NUMBER
R8	1107	4	RC07GF103K	R34	1105	26	RC07GF561K
R9	1107	21	RC07GF182K	R34	1105	26	RC07GF561K
R10	1107	1	224L1-502	R35	1105	25	RC07GF152K
R13	1106	3	RC07GF152K	R36	1105	38	RC07GF563K
R14	1106	30	RC07GF103K	R37	1105	39	RC07GF563K
R14	1106	30	RC07GF103K	R38	1105	36	RC07GF273K
R14	1106	30	RC07GF123K	R39	1105	34	RC07GF562K
R15	1109	6	RC07GF103K	R40	1105	40	RC07GF272K
R15	1109	6	RC07GF103K	R40	1105	40	RC07GF272K
R15	1109	6	RC07GF103K	R40	1105	40	RC07GF272K
R15	1109	6	RC07GF393K	R40	1105	40	RC07GF332K
R15	1109	6	RC07GF393K	R40	1105	40	RC07GF332K
R16	1109	5	RC07GF184K	R41	1105	44	RN60D4222F
R16	1109	5	RC07GF184K	R42	1105	29	RN60D5621F
R16	1109	5	RC07GF223K	R43	1103	16	RN60D1001F
R16	1109	5	RC07GF223K	R44	1102	2	RC07GF822K
R16	1109	5	RC07GF223K	R45	1102	8	RC07GF822K
R17	1109	9	RC07GF123K	R46	1103	15	RC07GF221K
R18	1110	1	RC07GF103K	R47	1103	14	RC07GF152K
R19	1110	3	RC07GF222K	R48	1102	9	RC07GF103K
R20	1110	2	RC07GF273K	R49	1104	21	RC07GF102K
R21	1109	4	RC07GF103K	R49	1104	21	RC07GF102K
R21	1109	4	RC07GF103K	R49	1104	21	RC07GF102K
R21	1109	4	RC07GF393K	R49	1104	21	RC07GF681K
R21	1109	4	RC07GF393K	R49	1104	21	RC07GF681K
R21	1109	4	RC07GF393K	R50	1104	27	RC20GF220K
R22	1105	3	RC07GF153K	R52	1104	31	RC07GF822K
R22	1105	3	RC07GF153K	R54	1104	10	RC07GF471K
R23	1105	2	RC07GF222K	R55	1104	9	RC07GF123K
R24	1105	7	RC07GF153K	R56	1104	56	RC07GF102K
R25	1105	57	RC07GF101K	R57	1104	55	RC07GF151K
R25	1105	57	RC07GF101K	R58	1104	53	RC07GF222K
R25	1105	57	RC07GF101K	R59	1104	50	RC07GF123K
R25	1105	57	RC07GF221K	R60	1104	52	RC07GF102K
R25	1105	57	RC07GF221K	R61	1104	49	RC07GF151K
R26	1105	10	RC07GF103K	R62	1104	36	RC07GF150K
R26	1105	10	RC07GF103K	R62	1104	36	RC07GF150K
R26	1105	10	RC07GF103K	R62	1104	36	RC07GF150K
R26	1105	10	RC07GF123K	R62	1104	36	RC20GF150K
R26	1105	10	RC07GF123K	R62	1104	36	RC20GF150K
R27	1105	9	RC07GF153K	R63	1104	12	RC07GF150K
R28	1105	8	RC07GF222K	R63	1104	12	RC07GF150K
R29	1105	21	RC07GF123K	R63	1104	12	RC07GF150K
R29	1105	21	RC07GF123K	R63	1104	12	RC20GF150K
R29	1105	21	RC07GF123K	R63	1104	12	RC20GF150K
R29	1105	21	RC07GF223K	R64	1107	5	RC07GF103K
R29	1105	21	RC07GF223K	R65	1103	27	RC07GF332K
R30	1105	48	RC07GF222K	R66	1103	18	RC07GF472K
R31	1105	49	RC07GF102K	R66	1103	18	RC07GF472K
R32	1105	28	RC07GF153K	R66	1103	18	RC07GF472K
R33	1105	27	RC07GF123K	R66	1103	19	RC07GF103K
R34	1105	26	RC07GF102K	R66	1103	19	RC07GF103K
R34	1105	26	RC07GF102K	R67	1103	20	RC07GF683K
R34	1105	26	RC07GF561K	R67	1103	20	RC07GF683K



SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER	
R67	1103	26A	RC07GF223K	R80	1103 12	RC07GF821K
R67	1103	26A	RC07GF223K	R80	1103 12	RC07GF821K
R67	1103	26A	RC07GF223K	R81	1103 8	RC07GF182K
R68	1103	29	RC07GF332K	R82	1103 6	BC23129
R69	1103	19	RC07GF103K	R83	1103 5	RC07GF122K
R69	1103	19	RC07GF103K	R84	1103 2	RC07GF222K
R69	1103	19	RC07GF103K	R85	1103 3	RC07GF471K
R69	1103	33	RC07GF681K	R86	1103 1	RC07GF391K
R69	1103	33	RC07GF681K	R87	1101 20	RC07GF122K
R70	1103	21	RC07GF392K	R87	1101 20	RC07GF122K
R70	1103	21	RC07GF392K	R87	1101 20	RC07GF122K
R70	1103	21	RC07GF392K	R87	1101 20	RC20GF681K
R70	1103	32	RC07GF392K	R87	1101 20	RC20GF681K
R70	1103	32	RC07GF392K	R88	1101 57	RC07GF121K
R71	1103	31	RC07GF822K	R88	1101 57	RC07GF121K
R72	1103	25	RC07GF472K	R88	1101 57	RC07GF472K
R73	1103	26	RC07GF681K	R88	1101 57	RC07GF472K
R74	1104	43	RC07GF331K	R88	1101 57	RC07GF472K
R74	1104	43	RC07GF331K	R89	1101 56	RC32GF120K
R74	1104	43	RC07GF331K	R90	1105 1	BC23130
R74	1104	43	RC07GF680K	R91	1107 12	RC07GF152K
R74	1104	43	RC07GF680K	R92	1104 66	RW69V8R2
R74	1104	43	RC20GF330K	R93	1104 64	RC07GF221K
R74	1104	43	RC20GF330K	R94	1104 63	RC07GF272K
R75	1104	68	RC07GF562K	R95	1107 8	RC07GF221K
R75	1104	68	RC07GF562K	R95	1107 8	RC07GF221K
R75	1104	68	RC07GF562K	R95	1107 8	RC07GF272K
R75	1104	68	RC20GF222K	R95	1107 8	RC07GF272K
R75	1104	68	RC20GF222K	R96	1103 13	RN55D8251F
R76	1104	44	EB51G5	R96	1103 13	RN55D8251F
R76	1104	44	EB51G5	R96	1103 13	RN55D8251F
R76	1104	44	RC07GF150K	R96	1103 13	RN60D1002F
R76	1104	44	RC07GF150K	R96	1103 13	RN60D1002F
R76	1104	44	RC07GF150K	R97	1107 7C	RC07GF472K
R77	1104	41	EB51G5	R97	1107 7C	RC07GF472K
R77	1104	41	EB51G5	R97	1108 1	RC07GF472K
R77	1104	41	RC07GF150K	R98	1107 15	RC07GF102K
R77	1104	41	RC07GF150K	R98	1107 15	RC07GF102K
R77	1104	41	RC07GF150K	R98	1107 15	RC07GF103K
R78	1103	10	RC07GF563K	R98	1107 15	RC07GF103K
R79	1103	11	RC07GF392K	R100	1105 55	RC07GF121K
R79	1103	11	RC07GF392K	R100	1105 55	RC07GF121K
R79	1103	11	RC07GF472K	R100	1105 55	RC07GF121K
R79	1103	11	RC07GF472K	R100	1105 55	RC07GF331K
R79	1103	11	RC07GF472K	R100	1105 55	RC07GF331K
R80	1103	12	RC07GF122K	R101	1104 40	RC07GF562K
R80	1103	12	RC07GF122K	R101	1104 40	RC07GF562K
R80	1103	12	RC07GF122K	R102	1105 51	RC07GF222K
R80	1103	12	RC07GF561K	R102	1105 51	RC07GF222K
R80	1103	12	RC07GF561K	R102	1105 51	RC07GF222K
R80	1103	12	RC07GF561K	R102	1105 51	RC07GF472K
R80	1103	12	RC07GF681K	R102	1105 51	RC07GF472K
R80	1103	12	RC07GF681K			



SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER		
R103	1105	47	RC07GF221K	R130	1103	23	RC07GF472K
R104	1105	43	RC07GF221K	R130	1103	23	RC07GF472K
R105	1106	6	RC07GF682K	R130	1103	34	RC07GF103K
R106	1105	6	RC07GF822K	R130	1103	23	RC07GF472K
R107	1105	12	RC07GF822K	R131	1104	38	G2513
R108	1105	15	RC07GF273K	R132	1104	34A	RC07GF682K
R109	1105	16	RC07GF562K	R132	1104	34A	RC07GF682K
R110	1105	17	RC07GF152K	R133	1104	56A	RC07GF152K
R111	1104	39	G1473	R133	1104	56A	RC07GF182K
R113	1104	4	RC07GF222K	R133	1104	56A	RC07GF222K
R114	1104	54	RC07GF391K	R133	1104	56A	RC07GF272K
R115	1104	34	RC07GF561K	R133	1104	56A	RC07GF332K
R116	1105	52	RC07GF124K	R133	1104	56A	RC07GF392K
R117	1106	29	RC07GF221K	R134	1107	2A	RC07GF153K
R118	1105	60	RC07GF152K	R134	1107	2A	RC07GF471K
R118	1105	60	RC07GF152K	R134	1107	4A	RC07GF103K
R118	1105	60	RC07GF152K	R134	1107	4A	RC07GF153K
R118	1105	60	RC07GF153K	R134	1107	4A	RC07GF332K
R118	1105	60	RC07GF153K	R135	1106	2	RC07GF123K
R119	1104	20	RW69V161	R135	1106	2	RC07GF123K
R119	1104	20	RW69V161	R135	1106	2	RC07GF223K
R120	1104	25	RC32GF122K	R135	1106	2	RC07GF223K
R120	1104	25	RC32GF122K	R136	1106	1	224L1-202
R120	1104	25	RC32GF331K	R137	1106	7	RC07GF682K
R120	1104	25	RW69V181	R137	1106	7B	RC07GF682K
R122	1104	15	RC07GF100K	R138	1107	3A	RC07GF681K
R122	1104	15	RC07GF100K	R139	1104	12A	RC07GF221K
R122	1104	15	RC07GF150K	R139	1104	12A	RC07GF221K
R122	1104	15	RC07GF150K	R140	1104	14A	RC07GF222K
R122	1104	15	RC07GF150K	R140	1104	14A	RC07GF222K
R123	1104	15A	RC07GF221K	R141	1107	24A	RC07GF103K
R124	1104	33	RC07GF152K	R141	1107	24A	RC07GF103K
R124	1104	33	RC07GF152K	R141	1107	24A	RC07GF272K
R124	1104	33	RC07GF152K	R143	1106	9	RC07GF472K
R124	1104	33	RC07GF821K	R144	1107	21B	RC07GF392K
R124	1104	33	RC07GF821K	R145	1103	2B	RC07GF222K
R125	1104	24	RC07GF680K	R145	1103	2B	RC07GF222K
R125	1104	24	RC07GF680K	R145	1103	2B	RC07GF222K
R125	1104	24	RC07GF680K	R146	1105	9A	RC07GF102K
R125	1104	24	RC20GF271K	R146	1105	9A	RC07GF102K
R125	1104	24	RC20GF271K	R146	1105	9A	RC07GF102K
R126	1105	62	RC07GF102K	R147	1106	2A	RC07GF221K
R127	1105	63	RC07GF102K	R148	1106	3A	RC07GF221K
R128	1104	58	RC20GF220K	R148	1106	3A	RC07GF221K
R129	1103	18	RC07GF222K	R149	1106	7A	RC07GF682K
R129	1103	18	RC07GF222K	R150	1107	7A	RC07GF562K
R129	1103	20	RC07GF272K	R151	1107	7B	RC07GF182K
R129	1103	20	RC07GF272K	R152	1106	9A	RC07GF680K
R129	1103	20	RC07GF272K	R152	1106	9A	RC07GF680K
R130	1103	23	RC07GF102K	R153	1107	7C	RC07GF332K
R130	1103	23	RC07GF102K	R154	1107	21A	RC07GF563K
R130	1103	34	RC07GF103K	R154	1107	21A	RC07GF563K

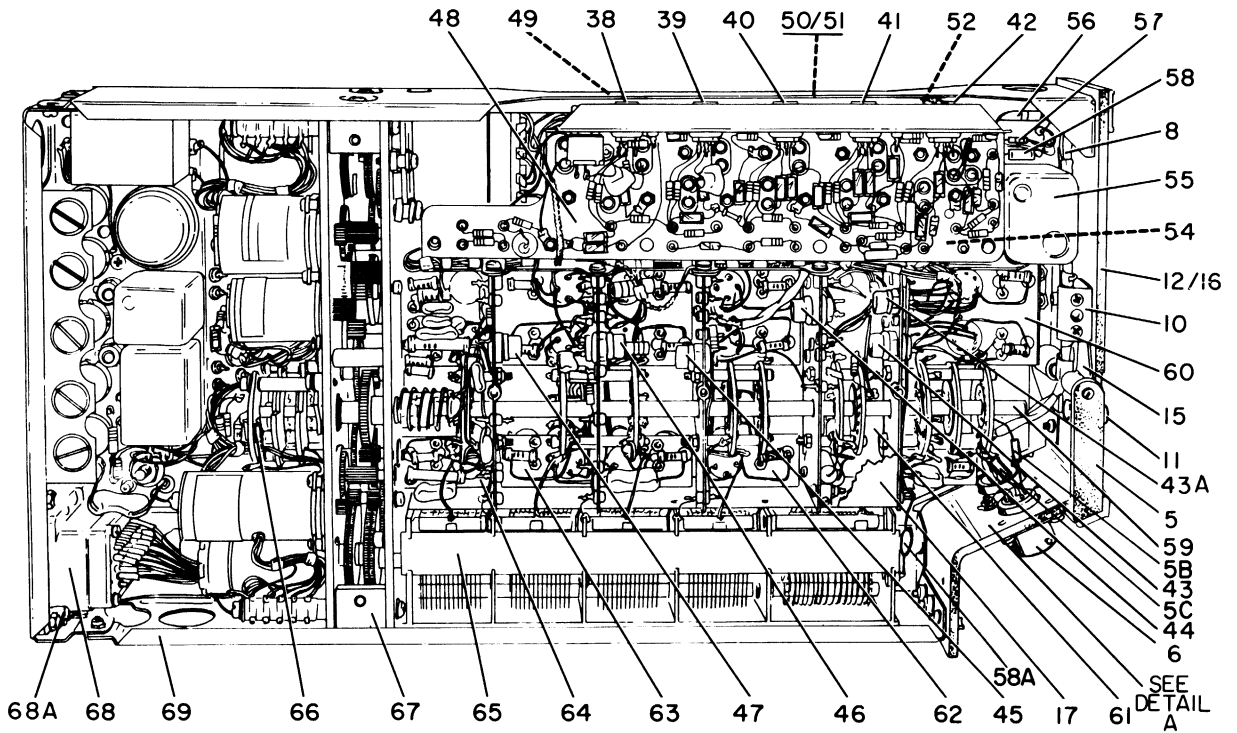
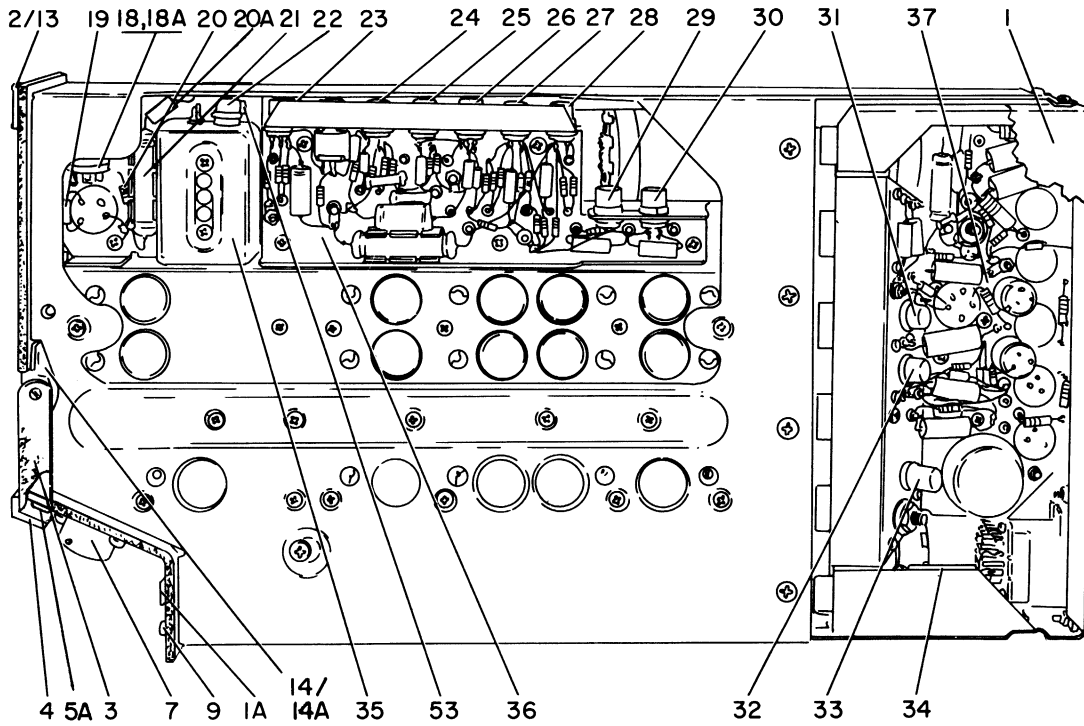


SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER
R157	1104 45	RC07GF680K	T10	1109 24	X282-2
R158	1101 6C	RC07GF682K	T10	1109 24	X282-2
R159	1101 6Q	RC07GF822K	T10	1109 24	X851-T107
R160	1101 6L	RC07GF822K	T10	1109 24	X851-T107
R161	1101 6K	RC07GF103K	T10	1109 24	X851-T107
R162	1101 6J	RC07GF103K	T11	1109 26	X283-2
R163	1101 6U	RC07GF104K	T12	1109 28	X284-3
R164	1101 6V	RC07GF822K	T13	1105 66	X489-2
R165	1104 32A	RC07GF561K	T14	1105 67	X489-2
R166	1105 13A	RC07GF102K	T15	1105 68	X489-2
R167	1105 23A	RC07GF102K	T16	1105 69	X489-2
S1A	1106 13	235431F	T17	1105 70	X489-2
S1B	1106 14	235432F	T18	1104 75	A12598
S1C	1106 16	235401F	T19	1104 76	A12591
S1D	1107 22	235437F	T20	1101 55	A12599
S1D	1107 22	235437F	T21	1107 6B	65-136
S1D	1107 22	237946F	T104	1106 24	X854
S1E	1107 23	235433F	T105	1106 19	X856
S1F	1108 9	235434F	T106	1106 21	X638
S1G	1108 10	235436F	T107	1109 22	X851-T107
S1I	1109 13	235438F	T108	1109 20	X852
S1J	1110 9	235402FC	T109	1109 18	X853
S1K	1111 14	235798K	XQ1	1108 19	05-3307-01
S1L	1111 13	235796K	XQ2	1106 33	05-3307-01
S1M	1111 9	235797K	XQ3	1107 27	05-3307-01
S1N	1106 14	232666F	XQ4	1106 33A	05-3307-01
S1N	1106 15	232666F	XQ4	1106 33A	05-3307-01
S1O	1106 15	232067F	XQ4	1106 33A	05-3307-51
S1P	1109 14	232068F	XQ4	1106 33A	05-3307-51
S1R	1106 13	232667F	XQ4	1106 33A	05-3307-51
T1	1108 16	X273-3	XQ5	1109 31	05-3307-01
T2	1108 14	X274-3	XQ6	1110 26	05-3307-01
T3	1108 12	X275-2	XQ7-XQ11	1105 76	05-3307-01
T4	1106 24	X893	XQ12,XQ13	1103 43	05-3307-51
T5	1106 21	X892	XQ21	1102 15	05-3307-01
T6	1106 19	X891	XQ26,XQ27	1104 81	05-3307-51
T7	1109 22	X851-T107	Y1	1102 12	289-2197-000
T8	1109 20	X852	Y2	1101 6P	CR37AU100-000KC
T9	1109 18	X853	Z1	1105 71	X487-2
			Z2	1104 78	BC3178
			Z2	1104 78	BC3178



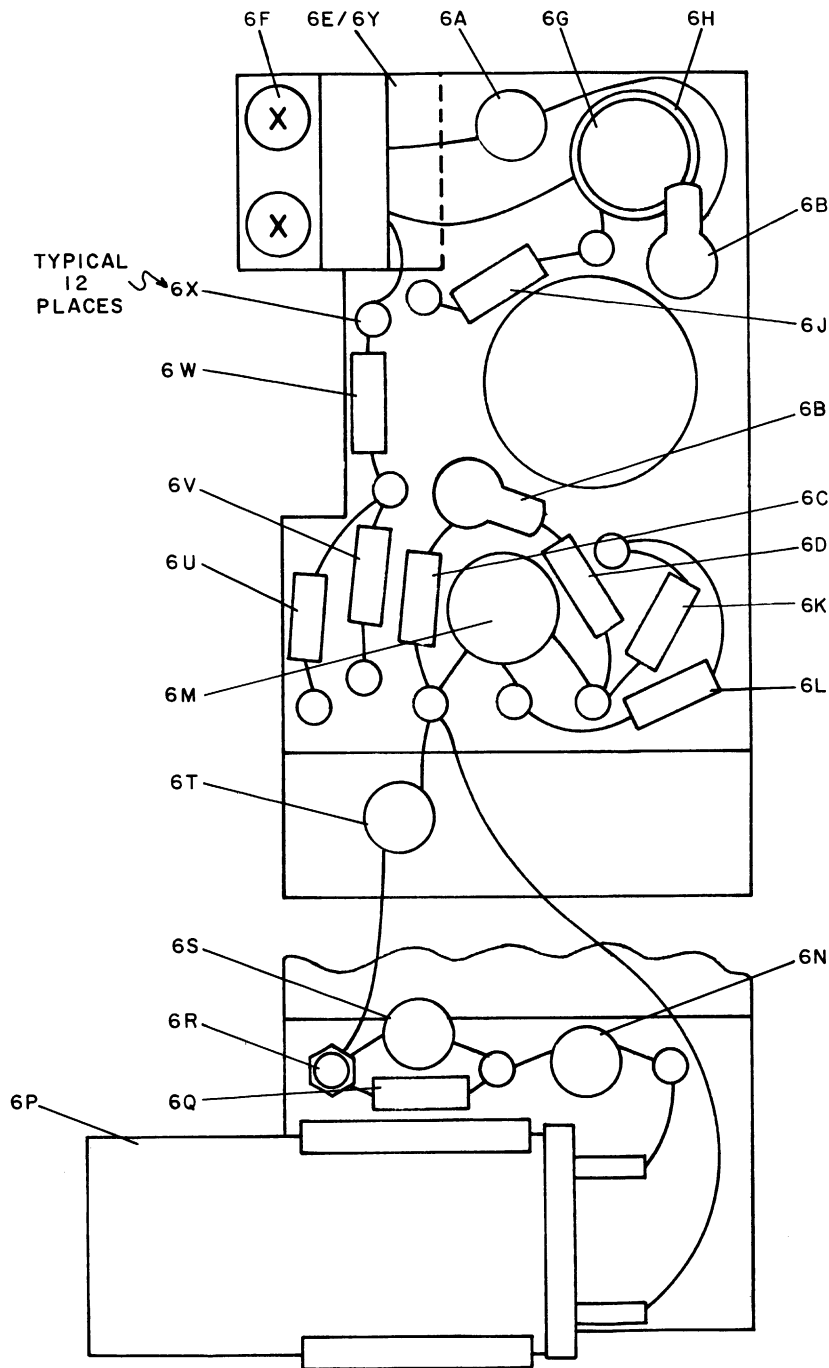
GROUP ASSEMBLY PARTS LIST



51Y-4/4A ADF Radio Receiver (Sheet 1 of 2)  
Figure 1101



GROUP ASSEMBLY PARTS LIST



(SELF TEST OSCILLATOR UNIT)  
DETAIL A

51Y-4/4A ADF Radio Receiver  
"Detail A" (Sheet 2 of 2)  
Figure 1101





GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
	1101 - 0	522-1836-00	1 51Y-4 ADF RADIO RECEIVER	1	A
	1101 - 0	522-2587-00	1 51Y-4A ADF RADIO RECEIVER	1	B
R	1101 - 0	522-2587-013	1 51Y-4A ADF RADIO RECEIVER	1	C
	1	549-4171-004	2 CASE, RCVR	1	
		330-3677-000	2 SCREW, ASSEMBLED WASHER, SST, PAN HD, 6-32 X 5/16 COML AP	2	
		MS51957-27	2 SCREW, MACH., SST, PAN HD, 6-32 X 5/16 343-0168-000 AP	1	
		545-7533-003	2 WASHER AP	1	
		548-3954-002	2 INSULATOR AP	1	
	1A	553-2329-003	2 PLATE, IDENT EFF MCN 107	1	A
R	1A	548-7693-003	2 PLATE, IDENT	1	B,C
		P347-1269-00	2 SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-1269-000 AP	1	
		P347-0018-00	2 SCREW, MACH., SST, FIL H, 2-56 X 3/16 77250 347-0018-000 AP	1	
	2	549-3514-002	2 STRIP, IDENT	1	A
R	2	548-7694-003	2 STRIP, IDENT	1	B,C
	3	549-3934-004	2 HANDLE ASSY EFF THRU MCN 809	1	A
	3	554-3948-001	2 HANDLE ASSY EFF MCN 810	1	A
	3	549-3934-004	2 HANDLE ASSY EFF THRU MCN 299	1	B
	3	554-3948-001	2 HANDLE ASSY EFF MCN 300	1	B
R	3	554-3948-001	2 HANDLE ASSY	1	C
		MS16632-1012	2 RING 340-0112-000 EFF MCN 221 THRU 809 ONLY SB22 AP	2	A
		MS16632-1012	2 RING 340-0112-000 EFF THRU MCN 299 ONLY SB22 AP	2	B
		549-3905-002	2 PIN, STR, HDLS EFF THRU MCN 809 AP	2	A
		761-5190-001	2 PIN, HINGE EFF MCN 810 SB22 AP	2	A
		549-3905-002	2 PIN, STR, HDLS EFF THRU MCN 299 AP	2	B
		761-5190-001	2 PIN, HINGE EFF MCN 300 AP	2	B
R		761-5190-001	2 PIN, HINGE AP	2	C
		549-3906-002	2 SPRING, HELICAL, TORSION EFF THRU MCN 809 ONLY AP	1	A
		549-3906-002	2 SPRING, HELICAL, TORSION EFF THRU MCN 299 ONLY AP	1	B
		549-3907-002	2 SPRING, HELICAL, TORSION EFF THRU MCN 809 ONLY AP	1	A
		549-3907-002	2 SPRING, HELICAL, TORSION EFF THRU MCN 299 ONLY AP	1	B
		302-0638-020	2 WASHER, NM, RUB., 0.195 ID, 0.375 OD COML EFF MCN 810 AP	4	A
		302-0638-020	2 WASHER, NM, RUB., 0.195 ID, 0.375 OD COML EFF MCN 300 AP	4	B
R		302-0638-020	2 WASHER, NM, RUB., 0.195 ID, 0.375 OD COML AP	4	C
		F22NM107-62	2 NUT, SELF-LKG, HEX., CAD. PL STL, 6-32 72962 333-1069-000 EFF MCN 810 AP	2	A
		F22NM107-62	2 NUT, SELF-LKG, HEX., CAD. PL STL, 6-32 72962 333-1069-000 EFF MCN 300 AP	2	B



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FIG. ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1101	F22NM107-62	2	NUT, SELF-LKG, HEX., CAD. PL STL, 6-32 72962 333-1069-000 AP	2	C
	4 549-3909-003	3	GRIP BAR	1	
	5 549-3914-003	3	STRAP, HANDLE EFF THRU MCN 809	1	A
	5 761-5188-001	3	STRAP, HANDLE EFF MCN 810	1	A
	5 549-3914-003	3	STRAP, HANDLE EFF THRU MCN 299	1	B
	5 761-5188-001	3	STRAP, HANDLE EFF MCN 300	1	B
R	5 761-5188-001	3	STRAP, HANDLE	1	C
	5A 761-5187-001	2	BUMPER, RUB. EFF MCN 810	2	A
	5A 761-5187-001	2	BUMPER, RUB. EFF MCN 300	2	B
R	5A 761-5187-001	2	BUMPER, RUB.	2	C
R	5B 4412-13-36	2	COIL, RF, 4.70 UH 82142 L25	1	B,C
			240-0160-000		
R	5C LT4K046	2	COIL, RF, 10 UH 240-0149-000 L26	1	B,C
	6 PT02A10-6P	2	CONNECTOR 77820 371-2016-000 J1	1	
R	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	3	A,B
R	MS51957-15	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 343-0135-000 AP	1	A,B
R	MS51957-18	2	SCREW, MACH., SST, PAN HD, 4-40 X 5/8 343-0138-000 AP	3	C
R	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	1	C
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	4	
R	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	A,B
R	541-5977-002	2	SPACER, SLV AP	3	C
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	1	
R	6A DM10F271J	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 72136 912-3909-000	1	C
R	6B 4007-4HOTTIN NED	2	TERMINAL 77147 304-0015-000	2	C
R	6C RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	1	C
R	6D 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	1	C
R	6E 763-8455-001	2	SELF TEST OSC	1	C
R	6F 3SBC1016A2	3	RELAY 01526 974-0479-010	1	C
R	P313-0132-000	3	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	C
R	MS35338-135	3	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	C
R	MS51957-13	3	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	2	C
R	6G 2N1711	3	TRANSISTOR 352-0400-000	1	C
R	6H T1533	3	HOLDER 98291 352-9509-000	1	C
R	6J RC07GF103K	3	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	1	C
R	6K RC07GF103K	3	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	1	C
R	6L RC07GF822K	3	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	1	C



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1101	6M 2N3638A	3	TRANSISTOR 352-0636-020	1	C
R	6N DM10E270J	3	CAPACITOR, FXD, 27 PF 5%, 500 VDCW 72136 912-3844-000	1	C
R	6P CR37AU100-00 OKC	3	XTAL UNIT, QTZ, 100 RHZ 290-8794-000	1	C
R	100-206-2	3	CLIP 99378 139-2370-000 AP	1	C
R	6Q RC07GF822K	3	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	1	C
R	6R M426	3	TERMINAL 21242 306-2204-000	1	C
R	MS35649-24	3	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP	1	C
R	MS35338-134	3	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	1	C
R	6S D153F751K0	3	CAPACITOR, FXD, 750 PF 10%, 300 VDCW 00853 912-4124-040	1	C
R	6T DM15F511K03	3	CAPACITOR, FXD, 510 PF 10%, 500 VDCW 72136 912-2868-000	1	C
R	6U RC07GF104K	3	RESISTOR, FXD, 0.1 MEG 10%, 1/4 W 745-0821-000	1	C
R	6V RC07GF822K	3	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	1	C
R	6W GA1-5MMFD201	3	CAPACITOR, FXD, 1.5 PF 20%, 500 VDCW 78488 913-0389-000	1	C
R	6X SL441-434DWH T	3	TERMINAL 12615 306-2222-100	12	C
R	6Y 763-8453-001	3	TERMINAL BOARD	1	C
	549-4082-00	2	WIRING HARNESS	1	
	7 PT02A12-10P	3	CONNECTOR 77820 371-2055-000	1	J2
	MS51957-13	3	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	4	
	MS35338-135	3	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	4	
	8 541-5178-002	3	BUTTON, CABLE	2	
	P343-0021-00 O	3	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 77250 COML AP	2	
	9 549-3927-003	2	HOOK, HOLD DOWN	1	
	MS51957-29	2	SCREW, MACH., SST, PAN HD, 6-32 X 7/16 343-0170-000 AP	2	
	10 K1913-06	2	NUT, SELF-LKG, PLATE, CAD. PL STL, 6-32 75237 334-1033-000	1	
	P330-2285-00 O	2	SCREW, MACH., SST, FH, 2-56 X 1/4 77250 330-2285-000 AP	2	
	68-1660-26	2	NUT, SELF-LKG, HEX., AL, 2-56 72962 333-0604-000 AP	2	
	11 48186BRSBLKN IPL	2	BUTTON 61864 308-4000-000	1	
	12 549-4141-003	2	PANEL, FRONT	1	
	P343-0020-00 O	2	SCREW, MACH., SST, PAN HD, 4-40 X 5/16 77250 343-0020-000 AP	5	
	13 549-3919-003	3	TRIM STRIP	1	
	14 549-3908-002	3	STRAP, RETAINING EFF THRU MCN 809	1	A
	14 549-3908-002	3	STRAP, RETAINING EFF THRU MCN 299	1	B



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101	14A 761-5189-001	3	BLOCK, HINGE EFF MCN 810	2	A
	14A 761-5189-001	3	BLOCK, HINGE EFF MCN 300	2	B
R	14A 761-5189-001	3	BLOCK, HINGE	2	C
	MS20426AD4-6	3	RIVET, SOLID, AL, 1/8 DIA X 0.375 LG SHK 305-1375-000 AP	4	
	15 549-4150-003	3	BRACKET, ANGLE EFF THRU MCN 809	1	A
	15 554-3955-001	3	BRACKET, ANGLE EFF MCN 810	1	A
	15 549-4150-003	3	BRACKET, ANGLE EFF THRU MCN 299	1	B
	15 554-3955-001	3	BRACKET, ANGLE EFF MCN 300	1	B
R	15 554-3955-001	3	BRACKET, ANGLE	1	C
	MS20426AD4-6	3	RIVET, SOLID, AL, 1/8 DIA X 0.375 LG SHK 305-1375-000 AP	2	
	16 549-4159-004	3	PANEL, FRONT	1	
R	17 554-5565-004	2	COVER, SHLD	1	A
R	17 548-7674-003	2	COVER, SHLD	1	B,C
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	3	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	3	
	18 2N158A	2	TRANSISTOR 14805 352-0041-000 Q14 EFF THRU MCN 659	1	A
	18 2N2270	2	TRANSISTOR 352-0430-000 EFF Q14 MCN 660 SB27	1	A
	18 2N158A	2	TRANSISTOR 14805 352-0041-000 Q14 EFF THRU MCN 220	1	B
	18 2N2270	2	TRANSISTOR 352-0430-000 EFF Q14 MCN 221 SB27	1	B
R	18 2N2270	2	TRANSISTOR 352-0430-000 Q14	1	C
	18A 1101A	2	MOUNTING 13103 352-9814-000 EFF MCN 660 THRU 1200 SB27	1	A
	18A 1101	2	MOUNTING 13103 352-9813-000 EFF MCN 1201	1	A
	18A 1101A	2	MOUNTING 13103 352-9814-000 EFF MCN 221 THRU 692 SB27	1	B
	18A 1101	2	MOUNTING 13103 352-9813-000 EFF MCN 693	1	B
R	18A 1101	2	MOUNTING 13103 352-9813-000	1	C
R	P313-0056-00	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 SB27 AP	1	A
R	P313-0050-00	2	NUT, PLAIN, HEX., NI PL BRS, 2-56 77250 P313-0050-000 AP	1	B,C
	MS35338-138	2	WASHER, LOCK, SST, 0.194 ID, 0.337 OD 310-0284-000 EFF THRU MCN 198 ONLY AP	1	A
R	MS35338-138	2	WASHER, LOCK, SST, 0.194 ID, 0.337 OD 310-0284-000 AP	1	B,C
	IMC140	2	INSULATOR 10583 302-0410-000 SB27 AP	2	
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML EFF THRU MCN 198 AP	1	A
R	310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML EFF MCN 199 AP	1	A



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1101	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP	1	B,C
	548-9539-003	2	WASHER SB27 AP	1	
	761-0356-001	2	SLEEVE, SPACING EFF MCN 199 AP	1	A
R	761-0356-001	2	SLEEVE, SPACING AP	1	B,C
	19 150D334X0035 A2	2	CAPACITOR, FXD, 0.33 UF 20%, 35 VDCW 56289 184-7406-000 EFF THRU MCN 570	1	A
	19 SC53	2	CAPACITOR, FXD, 0.33 UF 20%, 50 VDCW 56289 913-5532-000 EFF MCN 571 SB21	1	A
R	19 SC53	2	CAPACITOR, FXD, 0.33 UF 20%, 50 VDCW 56289 913-5532-000 SB21	1	B,C
	20 RC20GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/2 W 745-1345-000 EFF THRU MCN 659	1	A
	20 RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 660 SB27	1	A
	20 RC20GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/2 W 745-1345-000 EFF THRU MCN 220	1	B
	20 RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 221 SB27	1	B
R	20 RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000	1	C
R	20A MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 2307	1	A
R	20A MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 1861	1	B
	20A MS90539-08	2	COIL, RF, 500 UH 240-2533-000	1	C
	21 CL24BE201UP3	2	CAPACITOR, FXD, 200 UF P30M15%, 15 VDCW 184-7039-000 EFF THRU MCN 659	1	A
R	21 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 660 THRU 2306 SB27	1	A
R	21 150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 EFF MCN 2307	1	A
	21 CL24BE201UP3	2	CAPACITOR, FXD, 200 UF P30M15%, 15 VDCW 184-7039-000 EFF THRU MCN 220	1	B
R	21 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 221 THRU 1860 SB27	1	B
R	21 150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 EFF MCN 1861	1	B
R	21 150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000	1	C
	22 2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1687	1	A
	22 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	1	A
	22 2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1038	1	B



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101	22 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q21	1	B
R	22 2N3638A	2	1039 TRANSISTOR 352-0636-020 Q21	1	C
	23 2N525	2	TRANSISTOR 352-0094-000 EFF Q13	1	A
	23 2N3638A	2	THRU MCN 1687 TRANSISTOR 352-0636-020 EFF MCN Q13	1	A
	23 2N525	2	1688 TRANSISTOR 352-0094-000 EFF Q13	1	B
	23 2N3638A	2	THRU MCN 1083 TRANSISTOR 352-0636-020 EFF MCN Q13	1	B
R	23 2N3638A	2	1084 TRANSISTOR 352-0636-020 Q13	1	C
	24 2N525	2	TRANSISTOR 352-0094-000 EFF Q12	1	A
	24 2N3638A	2	THRU MCN 1687 TRANSISTOR 352-0636-020 EFF MCN Q12	1	A
	24 2N525	2	1688 TRANSISTOR 352-0094-000 EFF Q12	1	B
	24 2N3638A	2	THRU MCN 1083 TRANSISTOR 352-0636-020 EFF MCN Q12	1	B
R	24 2N3638A	2	1084 TRANSISTOR 352-0636-020 Q12	1	C
	25 2N333	2	TRANSISTOR 352-0064-000 EFF Q15	1	A
	25 2N1711	2	THRU MCN 1687 TRANSISTOR 352-0400-000 EFF MCN Q15	1	A
	25 2N333	2	1688 TRANSISTOR 352-0064-000 EFF Q15	1	B
	25 2N1711	2	THRU MCN 1083 TRANSISTOR 352-0400-000 EFF MCN Q15	1	B
R	25 2N1711	2	1084 TRANSISTOR 352-0400-000 Q15	1	C
	26 2N333	2	TRANSISTOR 352-0064-000 EFF Q16	1	A
	26 2N1711	2	THRU MCN 1687 TRANSISTOR 352-0400-000 EFF MCN Q16	1	A
	26 2N333	2	1688 TRANSISTOR 352-0064-000 EFF Q16	1	B
	26 2N1711	2	THRU MCN 1083 TRANSISTOR 352-0400-000 EFF MCN Q16	1	B
R	26 2N1711	2	1084 TRANSISTOR 352-0400-000 Q16	1	C
	27 2N525	2	TRANSISTOR 352-0094-000 EFF Q17	1	A
	27 2N3638A	2	THRU MCN 1687 TRANSISTOR 352-0636-020 EFF MCN Q17	1	A
	27 2N525	2	1688 TRANSISTOR 352-0094-000 EFF Q17	1	B
	27 2N3638A	2	THRU MCN 1083 TRANSISTOR 352-0636-020 EFF MCN Q17	1	B
	27 2N3638A	2	1084 TRANSISTOR 352-0636-020 Q17	1	C
	28 2N525	2	TRANSISTOR 352-0094-000 EFF Q18	1	A
	28 2N3638A	2	THRU MCN 1687 TRANSISTOR 352-0636-020 EFF MCN Q18	1	A
	28 2N525	2	1688 TRANSISTOR 352-0094-000 EFF Q18	1	B
			THRU MCN 1083		



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE				UNITS PER ASSY.	USAGE CODE
1101	28 2N3638A	2	TRANSISTOR	352-0636-020	EFF MCN	Q18	1	B
				1084				
R	28 2N3638A	2	TRANSISTOR	352-0636-020		Q18	1	C
	29 2N333	2	TRANSISTOR	352-0064-000	EFF	Q19	1	A
				THRU MCN 1687				
	29 2N1711	2	TRANSISTOR	352-0400-000	EFF MCN	Q19	1	A
				1688				
	29 2N333	2	TRANSISTOR	352-0064-000	EFF	Q19	1	B
				THRU MCN 1083				
	29 2N1711	2	TRANSISTOR	352-0400-000	EFF MCN	Q19	1	B
				1084				
R	29 2N1711	2	TRANSISTOR	352-0400-000		Q19	1	C
	30 2N333	2	TRANSISTOR	352-0064-000	EFF	Q20	1	A
				THRU MCN 1687				
	30 2N1711	2	TRANSISTOR	352-0400-000	EFF MCN	Q20	1	A
				1688				
	30 2N333	2	TRANSISTOR	352-0064-000	EFF	Q20	1	B
				THRU MCN 1083				
	30 2N1711	2	TRANSISTOR	352-0400-000	EFF MCN	Q20	1	B
				1084				
R	30 2N1711	2	TRANSISTOR	352-0400-000		Q20	1	C
	31 2N525	2	TRANSISTOR	352-0094-000	EFF	Q27	1	A
				THRU MCN 1687				
	31 2N3638A	2	TRANSISTOR	352-0636-020	EFF MCN	Q27	1	A
				1688				
	31 2N525	2	TRANSISTOR	352-0094-000	EFF	Q27	1	B
				THRU MCN 1083				
	31 2N3638A	2	TRANSISTOR	352-0636-020	EFF MCN	Q27	1	B
				1084				
R	31 2N3638A	2	TRANSISTOR	352-0636-020		Q27	1	C
	32 2N525	2	TRANSISTOR	352-0094-000	EFF	Q26	1	A
				THRU MCN 1687				
	32 2N3638A	2	TRANSISTOR	352-0636-020	EFF MCN	Q26	1	A
				1688				
	32 2N525	2	TRANSISTOR	352-0094-000	EFF	Q26	1	B
				THRU MCN 1083				
	32 2N3638A	2	TRANSISTOR	352-0636-020	EFF MCN	Q26	1	B
				1084				
R	32 2N3638A	2	TRANSISTOR	352-0636-020		Q26	1	C
	33 2N341	2	TRANSISTOR	352-0153-000	EFF	Q31	1	A
				THRU MCN 1288				
	33 2N2405	2	TRANSISTOR	352-0479-000	EFF MCN	Q31	1	A
				1289				
	33 2N341	2	TRANSISTOR	352-0153-000	EFF	Q31	1	B
				THRU MCN 729				
	33 2N2405	2	TRANSISTOR	352-0479-000	EFF MCN	Q31	1	B
				730				
R	33 2N2405	2	TRANSISTOR	352-0479-000		Q31	1	C
	34 LT7K203	2	COIL, RF, 27 UH	240-0187-000		L18	1	
	35 549-4177-004	2	OSCILLATOR	SEE FIG. 1102-0			1	
	36 549-4189-005	2	AMPLIFIER, AF	SEE FIG. 1103-0			1	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X				1	
			1/4 343-0133-000	AP			5	



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE				UNITS PER ASSY.	USAGE CODE
1101	37	549-4190-005	2	AMPLIFIER, ELECTRONIC CONTROL			1	
				SEE FIG. 1104-0				
		MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP			4	
		MS51959-27	2	SCREW, MACH., SST, FH, 6-32 X 5/16 342-0061-000 AP			4	
	38	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q7	1	A
				THRU MCN 1687				
	38	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q7	1	A
				1688				
	38	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q7	1	B
				THRU MCN 1083				
	38	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q7	1	B
				1084				
R	38	2N3638A	2	TRANSISTOR 352-0636-020		Q7	1	C
	39	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q8	1	A
				THRU MCN 1687				
	39	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q8	1	A
				1688				
	39	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q8	1	B
				THRU MCN 1083				
	39	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q8	1	B
				1084				
R	39	2N3638A	2	TRANSISTOR 352-0636-020		Q8	1	C
	40	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q9	1	A
				THRU MCN 1687				
	40	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q9	1	A
				1688				
	40	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q9	1	B
				THRU MCN 1083				
	40	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q9	1	B
				1084				
R	40	2N3638A	2	TRANSISTOR 352-0636-020		Q9	1	C
	41	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q10	1	A
				THRU MCN 1687				
	41	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q10	1	A
				1688				
	41	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q10	1	B
				THRU MCN 1083				
	41	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q10	1	B
				1084				
R	41	2N3638A	2	TRANSISTOR 352-0636-020		Q10	1	C
	42	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q11	1	A
				THRU MCN 1687				
	42	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q11	1	A
				1688				
	42	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q11	1	B
				THRU MCN 1083				
	42	2N3638A	2	TRANSISTOR 352-0636-020	EFF MCN	Q11	1	B
				1084				
R	42	2N3638A	2	TRANSISTOR 352-0636-020		Q11	1	C
	43	2N1285	2	TRANSISTOR 352-0243-000	EFF	Q4	1	A
				THRU MCN 1687				





GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101	43 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q4 1688	1	A
	43 2N1285	2	TRANSISTOR 352-0243-000 EFF Q4 THRU MCN 1083	1	B
	43 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q4 1084	1	B
R	43 2N3638A	2	TRANSISTOR 352-0636-020 Q4	1	C
	43A 2N1285	2	TRANSISTOR 352-0243-000 EFF Q2 THRU MCN 1687	1	A
	43A 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q2 1688	1	A
	43A 2N1285	2	TRANSISTOR 352-0243-000 EFF Q2 THRU MCN 1083	1	B
	43A 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q2 1084	1	B
R	43A 2N3638A	2	TRANSISTOR 352-0636-020 Q2	1	C
	44 2N1285	2	TRANSISTOR 352-0243-000 EFF Q3 THRU MCN 1687	1	A
	44 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q3 1688	1	A
	44 2N1285	2	TRANSISTOR 352-0243-000 EFF Q3 THRU MCN 1083	1	B
	44 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q3 1084	1	B
R	44 2N3638A	2	TRANSISTOR 352-0636-020 Q3	1	C
	45 2N1285	2	TRANSISTOR 352-0243-000 EFF Q1 THRU MCN 1687	1	A
	45 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q1 1688	1	A
	45 2N1285	2	TRANSISTOR 352-0243-000 EFF Q1 THRU MCN 1083	1	B
	45 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q1 1084	1	B
R	45 2N3638A	2	TRANSISTOR 352-0636-020 Q1	1	C
	46 2N1285	2	TRANSISTOR 352-0243-000 EFF Q5 THRU MCN 1687	1	A
	46 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q5 1688	1	A
	46 2N1285	2	TRANSISTOR 352-0243-000 EFF Q5 THRU MCN 1083	1	B
	46 2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q5 1084	1	B
R	46 2N3638A	2	TRANSISTOR 352-0636-020 Q5	1	C
	47 2N1285	2	TRANSISTOR 352-0243-000 EFF Q6 THRU MCN 1687	1	A
	47 2N2905A	2	TRANSISTOR 352-0550-000 EFF MCN Q6 1688	1	A
	47 2N1285	2	TRANSISTOR 352-0243-000 EFF Q6 THRU MCN 1084	1	B
	47 2N2905A	2	TRANSISTOR 352-0550-000 EFF MCN Q6 1085	1	B
R	47 2N2905A	2	TRANSISTOR 352-0550-000 Q6	1	C
R	48 549-4188-005	2	AMPLIFIER, IF SEE FIG. 1105-0	1	A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1101	48	549-4188-006	2 AMPLIFIER, IF SEE FIG. 1105-0	1	B,C
		MS51957-13	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	7	
R		SPL4040-4HOT	2 TERMINAL 77147 304-0332-000 AP	1	
		TINNED			
	49	RTMT12M	2 TERMINAL 91663 306-0976-000	1	
		MS51959-13	2 SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP	1	
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	1	
R		SPL4040-4HOT	2 TERMINAL 77147 304-0332-000 AP	1	
		TINNED			
	50	549-6602-002	2 STRAP, RETAINING	1	
	51	549-6603-002	2 CONDUIT, METAL, RIGID	1	
		MS51959-13	2 SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP FOR 50 AND 51	1	
R		P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250	1	
		O	313-0132-000 AP FOR 50 AND 51		
R		310-0278-000	2 WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP FOR 50 AND 51	1	
	52	549-4122-002	2 STRAP, RETAINING	1	
		MS51959-13	2 SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP	1	
R		P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250	1	
		O	313-0132-000 AP		
R		310-0278-000	2 WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	1	
	53	422-04-22-03	2 STRAP 71785 139-0647-000	1	
		4-113			
		MS51959-13	2 SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP	1	
R		P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250	1	
		O	313-0132-000 AP		
R		310-0278-000	2 WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	1	
R	54	SPL4040-4HOT	2 TERMINAL 77147 304-0332-000	1	
		TINNED			
		MS51957-12	2 SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	1	
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	1	
		P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250	1	
		O	313-0132-000 AP		
	55	A12599	2 TRANSFORMER 70674 677-0117-000	1	T20
		MS51957-12	2 SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	2	
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
R		SPL4040-4HOT	2 TERMINAL 77147 304-0332-000 AP	1	
		TINNED			
	56	RC32GF120K	2 RESISTOR, FXD, 12 OHMS 10%, 1 W	1	R89
			745-3272-000 SB27		
	57	RC07GF121K	2 RESISTOR, FXD, 120 OHMS 10%, 1/4 W	1	R88
			745-0716-000 EFF THRU MCN 659		A



51Y-4/4A ADF RECEIVER

OVERHAUL MANUAL (523-0755938, REVISION 4)

TEMPORARY REVISION NO. 34-34-1-1

Insert opposite page 1148

Subject: Add changes to incorporate modifications per Service Bulletin No. 32.

Delete items 42, and replace with the following:

<u>FIG. - ITEM</u>	<u>PART NO.</u>	<u>NOMENCLATURE</u>	<u>UNITS PER ASSY.</u>
1103-42	2619	Terminal V12615 306-0324-000 E188-193	6





GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101	57	RC07GF472K	2 RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 660 SB27	R88	1 A
	57	RC07GF121K	2 RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 EFF THRU MCN 220	R88	1 B
	57	RC07GF472K	2 RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 221 SB27	R88	1 B
R	57	RC07GF472K	2 RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R88	1 C
	58	150D475X0010 A2	2 CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000	C86	1
	58A	CM06F202J03	2 CAPACITOR, FXD, 2000 PF 5%, 500 VDCW 912-3022-000 EFF THRU MCN 142	C131	1 B
	58A	CM06F302J03	2 CAPACITOR, FXD, 3000 PF 5%, 500 VDCW 912-3037-000 EFF MCN 143	C131	1 B
R	58A	CM06F302F03	2 CAPACITOR, FXD, 3000 PF 5%, 500 VDCW 912-3037-000	C131	1 C
	59	549-4117-002	2 SHAFT, STR		1
R	60	554-5566-005	2 AMPLIFIER, RF SEE FIG. 1106-0		1 A
R	60	548-7678-005	2 AMPLIFIER, RF SEE FIG. 1106-0		1 B,C
		MS51957-13	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1
		549-4122-002	2 STRAP, RETAINING AP		1
R	61	549-4175-004	2 MODULATOR, BALANCED SEE FIG. 1107-0		1 A
R	61	548-7764-004	2 MODULATOR, BALANCED SEE FIG. 1107-0		1 B,C
		MS51957-13	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		3
R		MS51957-13	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		1 A
R		MS51957-12	2 SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP		1 B,C
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1
		549-4122-002	2 STRAP, RETAINING AP		1
R	62	549-4174-004	2 AMPLIFIER, RF SEE FIG. 1108-0		1 A
R	62	549-4174-005	2 AMPLIFIER, RF SEE FIG. 1108-0		1 B,C
		MS51957-13	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1
		T957HOTTINNE D	2 TERMINAL, 79963 304-0045-000 AP		1
		549-4122-002	2 STRAP, RETAINING AP		1
	63	548-7677-005	2 MIXER STAGE, FREQ SEE FIG. 1109-0		1
		MS51957-13	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		5



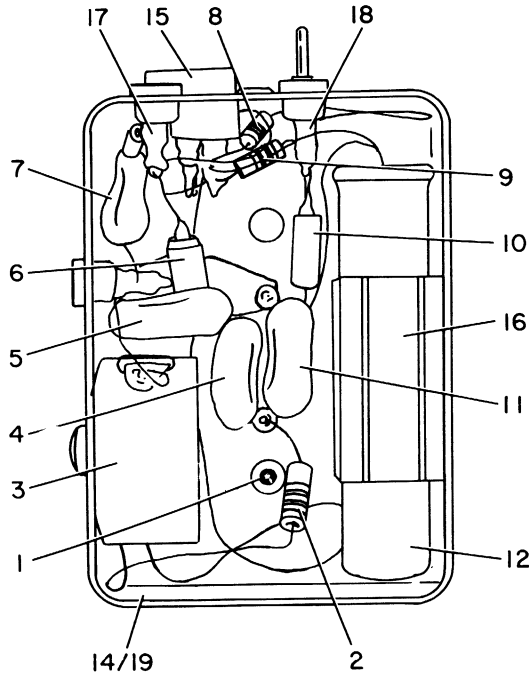
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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1101	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	1	A
R	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	1	B,C
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	1	
R	549-4122-002	2	STRAP, RETAINING AP	1	
64	549-4172-004	2	OSCILLATOR, RF SEE FIG. 1110-0	1	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	1	
	549-4122-002	2	STRAP, RETAINING AP	1	
65	800416	2	CAPACITOR, VAR, 5 SECT. 77630 921-0020-000	1	C1
	324-1691-020	2	SCREW, CAP, SCH, STL, 6-32 X 3/8 COML AP	1	
	MS51957-26	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/4 343-0167-000 AP	1	
	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	2	
66	150D334X0035 A2	2	CAPACITOR, FXD, 0.33 UF 20%, 35 VDCW 56289 184-7406-000 EFF THRU MCN 570	1	A C111
66	SC53	2	CAPACITOR, FXD, 0.33 UF 20%, 50 VDCW 56289 913-5532-000 EFF MCN 571 SB21	1	A C111
R	66	2	CAPACITOR, FXD, 0.33 UF 20%, 50 VDCW 56289 913-5532-000 SB21	1	B,C C111
	67	2	GEARCASE, MOTOR SEE FIG. 1111-0	1	
	MS51957-26	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/4 343-0167-000 AP	4	
	549-4081-00	2	WIRING HARNESS	1	
68	DPXB45-34P02 01	3	CONNECTOR 71468 370-5200-000	1	J3
R	P313-0132-00 0	3	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	4	
R	310-0278-000	3	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	4	
	MS51957-15	3	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 343-0135-000 AP	4	
68A	T957HOTTONNE D	2	TERMINAL 79963 304-0045-000 AP	2	
69	549-4182-005	2	CHASSIS	1	



GROUP ASSEMBLY PARTS LIST



Oscillator  
Figure 1102

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1102 - 0	549-4177-004	1	OSCILLATOR SEE FIG. 1101-35 FOR NHA	REF	
1	549-4127-002	2	SLEEVE, SCR CAPTIVATING	2	
	MS51957-20	2	SCREW, MACH., SST, PAN HD, 4-40 X 7/8 343-0140-000 AP	2	
	549-4115-002	2	SPACER, SLV AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
2	RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	1	R44
3	S88076	2	COIL, RF, 10 MH 82068	1	L11 A
			240-1959-000 EFF THRU MCN 1245		
3	MPF054-31	2	COIL, RF, 10 MH 95105	1	L11 A
			240-1788-000 EFF MCN 1246		
3	S88076	2	COIL, RF, 10 MH 82068	1	L11 B
			240-1959-000 EFF THRU MCN 714		



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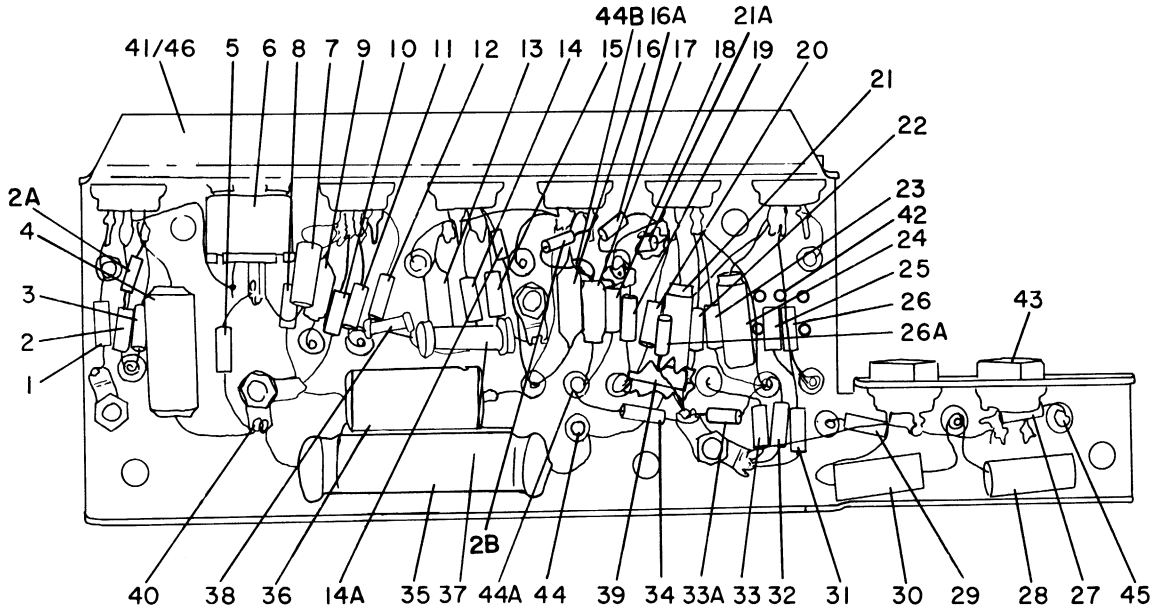
GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1102	3 MPF054-31	2	COIL, RF 10 MH 95105 240-1788-000 EFF MCN 715	L11	1 B
R	3 MPF054-31	2	COIL, RF 10 MH 95105 240-1788-000		1 C
	P343-0382-00 O	2	SCREW, MACH., NI PL BRS, PAN HD, 3-48 X 3/16 77250 343-0382-000 AP		1
	4 CM05E220J03	2	CAPACITOR, FXD, 22 PF 5%, 500 VDCW 912-2768-000	C89	1
	5 DM15F511J03	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000	C65	1
	6 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C63	1
	7 CM05F121J03	2	CAPACITOR, FXD, 120 PF 5%, 500 VDCW 912-2822-000	C62	1
	8 RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R45	1
	9 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R48	1
	10 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C128	1
	11 DM15F511J03	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000	C64	1
R	12 289-2197-000	2	XTAL UNIT, QTZ, 142.500 KHZ 75378	Y1	1
	13	1	DELETED		
	14 549-4143-003	2	CAN, SHLD		1
	15 05-3307-01	3	SOCKET 91662 352-9902-000	XQ21	1
	0004-7202S	3	RETAINER 91662 352-9904-000 AP		1
	16 100-206-2	3	CLIP 99378 139-2370-000		1
	R4008X3-32CH ROMATEDP	3	RIVET, TUBULAR, AL, 0.089 D1A X 3/32 LG SHK 12014 305-0169-000 AP		2
R	17 G2621	3	TERMINAL 21242 306-1100-000		7
	18 G2522	3	TERMINAL 12615 306-0323-000		1
	19 549-4142-003	3	CAN, SHLD		1
1103	0 549-4189-005	1	AMPLIFIER, AF SEE FIG. 1101-36 FOR NHA		REF
	1 RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000	R86	1
	2 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R84	1
	2A 150D396X9010 B2	2	CAPACITOR, FXD, 39 UF 10%, 10 VDCW 56289 184-7650-000 EFF MCN 851 SB25	C147	1 A
	2A 150D396X9010 B2	2	CAPACITOR, FXD, 39 UF 10%, 10 VDCW 56289 184-7650-000 EFF MCN 344 SB25	C147	1 B
R	2A 150D396X9010 B2	2	CAPACITOR, FXD, 39 UF 10%, 10 VDCW 56289 184-7650-000	C147	1 C





GROUP ASSEMBLY PARTS LIST



AF Amplifier  
Figure 1103

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1103	2B RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1056	R145	1 A
	2B RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 515	R145	1 B
R	2B RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R145	1 C
	3 RC07GF471K	2	RESISTOR, FXD, 470 OHMS 10%, 1/4 W 745-0737-000	R85	1
	4 150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000	C85	1
	5 RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000	R83	1
	6 BC23129	2	RESISTOR, VAR, 1000 OHMS 20%, 1/2 W 71450 380-1670-000	R82	1
	P334-0266-00 O	2	NUT, PLAIN, HEX., NI PL BRS, 1/4-32 77250 334-0266-000 AP		1
	1914-05-00-2 480	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP		1



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1103	7 150D334X0035	2	CAPACITOR, FXD, 0.33 UF 20%, 35 VDCW 56289 184-7406-000	C84	1
	A2				
	8 RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000	R81	1
	9 150D105X0035	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 850	C83	1 A
	A2				
R	9 150D104X0035	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 851 THRU 3299 SB25	C83	1 A
	A2				
R	9 150D105X0035	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF MCN 3300	C83	1 A
	A2				
	9 150D105X0035	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 364	C83	1 B
	A2				
R	9 150D104X0035	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 365 THRU 4726 SB25	C83	1 B
	A2				
R	9 150D105X0035	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF MCN 4727	C83	1 B
	A2				
R	9 150D105X0035	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C83	1 C
	A2				
	10 RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000	R78	1
	11 RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 659	R79	1 A
	11 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 660	R79	1 A
	11 RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 220	R79	1 B
	11 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 221	R79	1 B
	11 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R79	1 C
	12 RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 668	R80	1 A
	12 RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 669 THRU 1687	R80	1 A
R	12 RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF MCN 1688 THRU 3299	R80	1 A
R	12 RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 3300	R80	1 A
	12 RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 229	R80	1 B
	12 RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 230 THRU 1083	R80	1 B
R	12 RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF MCN 1688 THRU 4726	R80	1 B
R	12 RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 4727	R80	1 B



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1103	12 RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000	R80	1 C
	13 RN60D1002F	2	RESISTOR, FXD, 10,000 OHMS 1%, 1/4 W 705-6644-000 EFF THRU MCN 1687	R96	1 A
	13 RN55D8251F	2	RESISTOR, FXD, 8250 OHMS 1%, 1/8 W 705-1040-000 EFF MCN 1688	R96	1 A
	13 RN60D1002F	2	RESISTOR, FXD, 10,000 OHMS 1%, 1/4 W 705-6644-000 EFF THRU MCN 1083	R96	1 B
	13 RN55D8251F	2	RESISTOR, FXD, 8250 OHMS 1%, 1/8 W 705-1040-000 EFF MCN 1084	R96	1 B
R	13 RN55D8251F	2	RESISTOR, FXD, 8250 OHMS 1%, 1/8 W 705-1040-000	R96	1 C
	14 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R47	1
	14A 150D476X0006 B2	2	CAPACITOR, FXD, 47 UF 20%, 6 VDCW 56289 184-7401-000 EFF MCN 1688	C156	1 A
	14A 150D476X0006 B2	2	CAPACITOR, FXD, 47 UF 20%, 6 VDCW 56289 184-7401-000 EFF MCN 1085	C156	1 B
R	14A 150D476X0006 B2	2	CAPACITOR, FXD, 47 UF 20%, 6 VDCW 56289 184-7401-000	C156	1 C
	15 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R46	1
	16 RN60D1001F	2	RESISTOR, FXD, 1000 OHMS 1%, 1/4 W 705-6596-000	R43	1
	16A 150D155X0020 A2	2	CAPACITOR, FXD, 1.5 UF 20%, 20 VDCW 56289 184-7658-000 EFF MCN 554 SB20	C125	1 A
	16A 150D155X0020 A2	2	CAPACITOR, FXD, 1.5 UF 20%, 20 VDCW 56289 184-7658-000 EFF MCN 174 SB20	C125	1 B
R	16A 150D155X0020 A2	2	CAPACITOR, FXD, 1.5 UF 20%, 20 VDCW 56289 184-7658-000	C125	1 C
	17 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C75	1
R	18 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 553 SB20	R129	1 A
	18 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 554 SB20	R66	1 A
R	18 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 173 SB20	R129	1 B
	18 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 174 SB20	R66	1 B
R	18 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R66	1 C
R	19 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 553 SB20	R66	1 A
	19 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 554 SB20	R69	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1103	19 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 173 SB20	R66	1 B
	19 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 174 SB20	R69	1 B
R	19 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R69	1 C
R	20 RC07GF683K	2	RESISTOR, FXD, 68,000 OHMS 10%, 1/4 W 745-0815-000 EFF THRU MCN 553 SB20	R67	1 A
	20 RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 554 SB20	R129	1 A
R	20 RC07GF683K	2	RESISTOR, FXD, 68,000 OHMS 10%, 1/4 W 745-0815-000 EFF THRU MCN 173 SB20	R67	1 B
	20 RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 174 SB20	R129	1 B
R	20 RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000	R129	1 C
R	21 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF THRU MCN 553 SB20	C79	1 A
	21 RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 554 SB20	R70	1 A
R	21 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF THRU MCN 173 SB20	C79	1 B
	21 RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 174 SB20	R70	1 B
R	21 RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000	R70	1 C
	21A 150D225X0035 B2	2	CAPACITOR, FXD, 2.2 UF 20%, 35 VDCW 56289 184-7397-000 EFF MCN 554 SB20	C79	1 A
	21A 150D225X0035 B2	2	CAPACITOR, FXD, 2.2 UF 20%, 35 VDCW 56289 184-7397-000 EFF MCN 174 SB20	C79	1 B
R	21A 150D225X0035 B2	2	CAPACITOR, FXD, 2.2 UF 20%, 35 VDCW 56289 184-7397-000	C79	1 C
R	22 1N457	2	SEMICONV DEVICE 353-0204-000 EFF THRU MCN 553 ONLY SB20	CR13	1 A
R	22 1N457	2	SEMICONV DEVICE 353-0204-000 EFF THRU MCN 173 ONLY SB20	CR13	1 B
R	23 1N270	2	SEMICONV DEVICE 353-2018-000 EFF THRU MCN 553 ONLY SB20	CR12	1 A
R	23 1N270	2	SEMICONV DEVICE 353-2018-000 EFF THRU MCN 173 ONLY SB20	CR12	1 B
	23 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 554 THRU 1687 SB20	R130	1 A



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1103	23 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 1688	R130	1 A
	23 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 174 THRU 1084 SB20	R130	1 B
	23 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 1085	R130	1 B
R	23 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R130	1 C
	24 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000	C80	1
R	25 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R72	1
R	26 RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000	R73	1
	26A RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 554 SB20	R67	1 A
	26A RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 174 SB20	R67	1 B
R	26A RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000	R67	1 C
	27 RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000	R65	1
	28 109D106X0050 C2	2	CAPACITOR, FXD, 10 UF 20%, 50 VDCW 56289 184-7785-000 EFF THRU MCN 106	C77	1 A
	28 109D305X9075 C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF MCN 107 THRU 1246	C77	1 A
	28 150D335X0015 A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 1247	C77	1 A
	28 109D305X9075 C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF THRU MCN 714	C77	1 B
	28 150D335X0015 A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 715	C77	1 B
R	28 150D335X0015 A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000	C77	1 C
	29 RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000	R68	1
	30 109D106X0050 C2	2	CAPACITOR, FXD, 10 UF 20%, 50 VDCW 56289 184-7785-000 EFF THRU MCN 106	C76	1 A
	30 109D305X9075 C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF MCN 107 THRU 1246	C76	1 A
	30 150D335X0015 A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 1247	C76	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1103	30 109D305X9075 C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF THRU MCN 714	C76	1 B
	30 150D335X0015 A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 715	C76	1 B
R	30 150D335X0015 A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000	C76	1 C
R	31 RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R71	1
R	32 RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 553 SB20	R70	1 A
R	32 RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 173 SB20	R70	1 B
R	33 RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 553 ONLY SB20	R69	1 A
R	33 RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 173 ONLY SB20	R69	1 B
	33A 150D156X0020 B2	2	CAPACITOR, FXD, 15 UF 20%, 20 VDCW 56289 184-7371-000 EFF MCN 554 THRU 580	C140	1 A
	33A 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 581 THRU 827	C140	1 A
	33A 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF MCN 828 THRU 1286 SB20	C140	1 A
	33A 150D475X0010 A2	2	CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000 EFF MCN 1287	C140	1 A
	33A 150D156X0020 B2	2	CAPACITOR, FXD, 15 UF 20%, 20 VDCW 56289 184-7371-000 EFF MCN 174 THRU 178	C140	1 B
	33A 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 179 THRU 354	C140	1 B
	33A 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF MCN 355 THRU 714 SB20	C140	1 B
	33A 150D475X0010 A2	2	CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000 EFF MCN 715	C140	1 B
R	33A 150D475X0010 A2	2	CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000	C140	1 C
R	34 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 553 ONLY SB20	R130	1 A
R	34 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 173 ONLY SB20	R130	1 B

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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1103	35 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF THRU MCN 1687	C81	1 A
	35 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1688	C81	1 A
	35 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF THRU MCN 1084	C81	1 B
	35 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1085	C81	1 B
R	35 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000	C81	1 C
	36 150D227X0010 S2	2	CAPACITOR, FXD, 220 UF 20%, 10 VDCW 56289 184-7419-000 EFF THRU MCN 1246	C60	1 A
	36 600D227G007D D4	2	CAPACITOR, FXD, 220 UF P50M10%, 5 VDCW 56289 183-1277-070 EFF MCN 1247 THRU 1687	C60	1 A
	36 150D227X0010 S2	2	CAPACITOR, FXD, 220 UF 20%, 10 VDCW 56289 184-7419-000 EFF THRU MCN 714	C60	1 B
	36 600D227G007D L4	2	CAPACITOR, FXD, 220 UF P50M10%, 5 VDCW 56289 183-1277-070 EFF MCN 715 THRU 1084	C60	1 B
	36 150D337X0006 S2	2	CAPACITOR, FXD, 330 UF 20%, 6 VDCW 56289 184-7647-000 EFF MCN 1688	C60	1 A
	36 150D337X0006 S2	2	CAPACITOR, FXD, 330 UF 20%, 6 VDCW 56289 184-7647-000 EFF MCN 1085	C60	1 B
R	36 150D337X0006 S2	2	CAPACITOR, FXD, 330 UF 20%, 6 VDCW 56289 184-7647-000	C60	1 C
	37 763F89	2	RESISTOR, THRM, 330 OHMS 10%, 1 W 10646 714-1714-000	RT3	1
	38 997F17	2	RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 659 ONLY	RT4	1 A
	38 997F17	2	RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 220 ONLY	RT4	1 B
R	39 150D107X0010 R2	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000 EFF THRU MCN 553 SB20	C125	1 A
	39 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 554 THRU 1246 SB20	C141	1 A
	39 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 1247 THRU 1687	C141	1 A
	39 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1688	C141	1 A



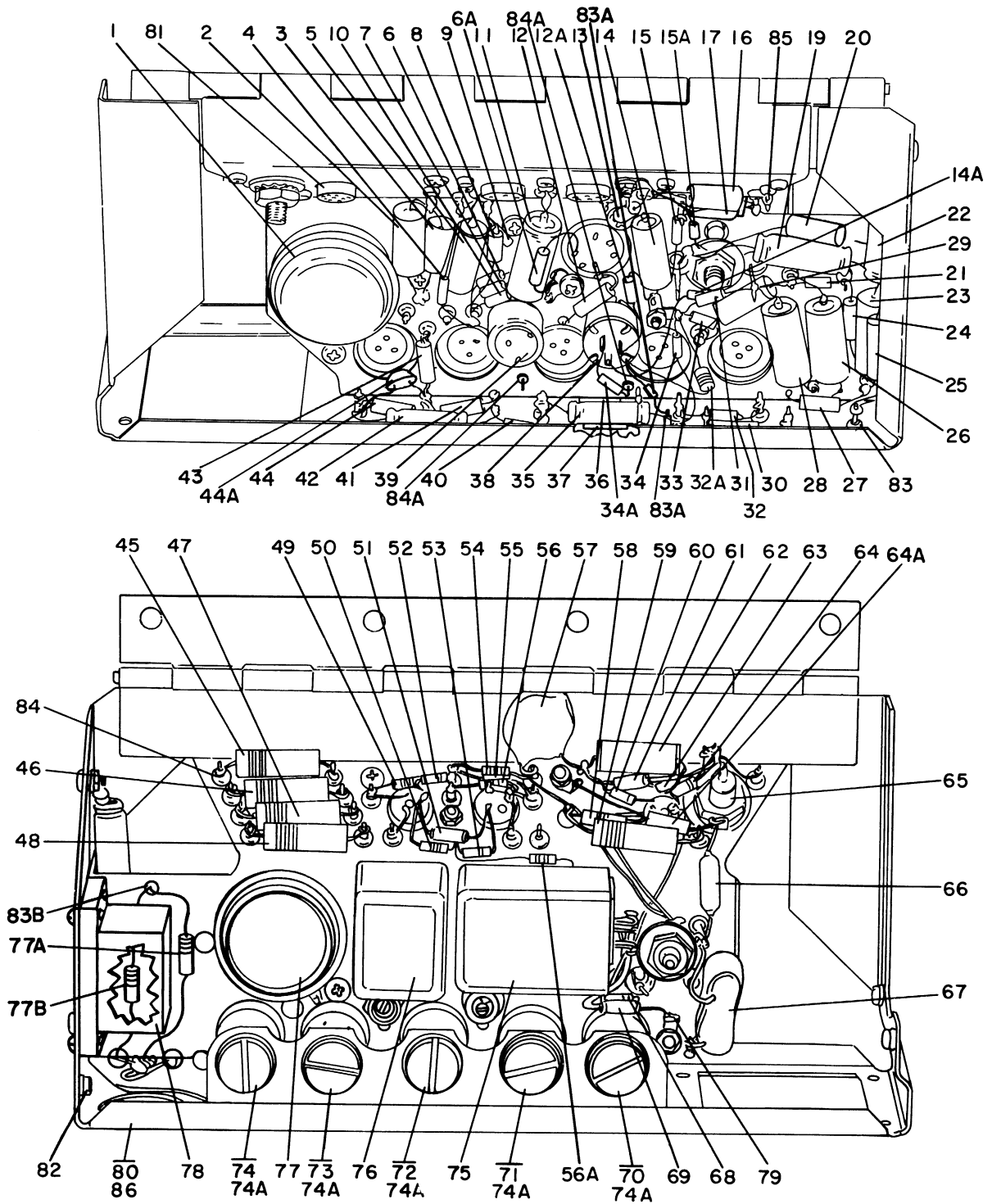
GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1103	39 150D107X0010	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000 EFF THRU MCN 173 SB20	1	B
	R2				
	39 150D157X0015	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 174 THRU 714 SB20	1	B
	S2				
	39 600D157G015D	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 715 THRU 1084	1	B
	D4				
	39 150D157X0015	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1085	1	B
	S2				
R	39 150D157X0015	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000	1	C
R	40 SPL4040-4HOT	2	TERMINAL 77147 304-0332-000 TINNED	7	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	4	
	P313-0132-00	2	NUT, PLAIN, HEX., SST, 4-40 77250 O 313-0132-000 AP	4	
	41 549-4186-005	2	TERMINAL BOARD	1	
	42 G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 1172 SB 32	6	A
	42 G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 636 SB 32	6	B
R	42 G2619	3	TERMINAL 21242 306-0324-000 SB 32	6	C
	43 05-3307-51	3	SOCKET 91662 352-9903-000	8	
			XQ12,XQ13 XQ15-XQ20		
	0004-7202S	3	RETAINER 91662 352-9904-000 AP	8	
	44 G2621	3	TERMINAL 21242 306-1100-000	5	
	44A G2621	3	TERMINAL 21242 306-1100-000 EFF THRU MCN 553	1	A
	44A G2621	3	TERMINAL 21242 306-1100-000 EFF THRU MCN 173	1	B
	44A G2522	3	TERMINAL 12615 306-0323-000 EFF MCN 554 SB20	1	A
	44A G2522	3	TERMINAL 12615 306-0323-000 EFF MCN 174 SB20	1	B
R	44A G2522	3	TERMINAL 12615 306-0323-000	1	C
R	44B G2621	3	TERMINAL 21242 306-1100-000	1	
R	45 G2522	3	TERMINAL 12615 306-0323-000	14	
	46 549-4185-005	3	TERMINAL BOARD	1	





GROUP ASSEMBLY PARTS LIST



Electronic Control Amplifier  
Figure 1104



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104 - 0	549-4190-005	1	AMPLIFIER, ELECTRONIC CONTROL SEE FIG. 1101-37 FOR NHA	REF	
	1 2N174	2	TRANSISTOR 352-0127-000 Q30	1	
	P313-0056-000	2	NUT, PLAIN, HEX., NI PL BRS, 10-32	1	
	0 77250 313-0056-000 AP				
	1810-00	2	WASHER, LOCK, PH BRZ, 0.204 ID, 0.406 OD 78189 373-7040-000 AP	1	
	4021	2	TERMINAL 77147 304-8000-000 AP	1	
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP	1	
R	542-5313-002	2	INSULATOR, DISK AP	1	
	541-1244-003	2	WASHER AP	1	
	548-9549-003	2	WASHER AP	1	
	2 150D476X0020	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW C88	1	A
	R2		56289 184-7664-000 EFF THRU MCN 1358		
	2 600D476G030K	2	CAPACITOR, FXD, 47 UF P75M10%, 30 C88	1	A
	D4		VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687		
R	2 600D157G015D	2	CAPACITOR, FXD, 150 UF P75M10%, 15 C88	1	A
	D4		VDCW 56289 183-1277-130 EFF MCN 1688		
	2 150D476X0020	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW C88	1	B
	R2		56289 184-7664-000 EFF THRU MCN 761		
	2 600D476G030K	2	CAPACITOR, FXD, 47 UF P75M10%, 30 C88	1	B
	D4		VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083		
R	2 150D686X0020	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW C88	1	B
	S2		56289 184-7665-000 EFF MCN 1084 THRU 4699		
R	2 600D157G015D	2	CAPACITOR, FXD, 150 UF P50M10%, 15 C88	1	B
	D4		VDCW 56289 183-1277-130 EFF MCN 4700		
R	2 600D157G015D	2	CAPACITOR, FXD, 150 UF P50M10%, 15 C88	1	C
	D4		VDCW 56289 183-1277-130 EFF		
	3 1N1775A	2	SEMICONV DEVICE 353-6012-000 CR11	1	
	4 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 R113	1	
			W 745-0761-000		
	5 150D476X0020	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW C71	1	A
	R2		56289 184-7664-000 EFF THRU MCN 1358		
	5 600D476G030K	2	CAPACITOR, FXD, 47 UF P75M10%, 30 C71	1	A
	D4		VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687		
	5 150D476X0020	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW C71	1	B
	R2		56289 184-7664-000 EFF THRU MCN 761		
	5 600D476G030K	2	CAPACITOR, FXD, 47 UF P75M10%, 30 C71	1	B
	D4		VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083		
	6 1N270	2	SEMICONV DEVICE 353-2018-000 CR6	1	
6A	150D474X0035	2	CAPACITOR, FXD, 0.47 UF 20%, 35 C145	1	A
	A2		VDCW 56289 184-7399-000 EFF MCN 838 THRU 851		

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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	6A 150D474X0035 A2	2	CAPACITOR, FXD, 0.47 UF 20%, 35 VDCW 56289 184-7399-000 EFF MCN 317 THRU 344	C145 1	B
	7 1N270	2	SEMICOND DEVICE 353-2018-000	CR9 1	
	8 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C70 1	
	9 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	R55 1	
	10 RC07GF471K	2	RESISTOR, FXD, 470 OHMS 10%, 1/4 W 745-0737-000	R54 1	
	11 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 1358	C112 1	A
	11 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 184-1277-030 EFF MCN 1359	C112 1	A
	11 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 727	C112 1	B
	11 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 184-1277-030 EFF MCN 728	C112 1	B
R	11 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130	C112 1	C
	12 RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 659	R63 1	A
	12 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 660	R63 1	A
	12 RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 220	R63 1	B
	12 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 221	R63 1	B
R	12 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	R63 1	C
	12A RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 553 ONLY SB20	R139 1	A
	12A RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 173 ONLY SB20	R139 1	B
	13 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 676	C122 1	A
	13 151D114X0035 W2	2	CAPACITOR, FXD, 0.11 UF 20%, 35 VDCW 56289 184-8250-000 EFF MCN 677 THRU 1358 SB21	C122 1	A
	13 192P10492	2	CAPACITOR, FXD, 0.1 UF 10%, 200 VDCW 56289 933-1039-050 EFF MCN 1359	C122 1	A
	13 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 229	C122 1	B
	13 151D114X0035 W2	2	CAPACITOR, FXD, 0.11 UF 20%, 35 VDCW 56289 184-8250-000 EFF MCN 230 THRU 761 SB21	C122 1	B



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	13	192P10492	2 CAPACITOR, FXD, 0.1 UF 10%, 200 VDCW 56289 933-1039-050 EFF MCN 762	1	B
R	13	192P10492	2 CAPACITOR, FXD, 0.1 UF 10%, 200 VDCW 56289 933-1039-050	1	C
	14	150D476X0020 R2	2 CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 1358	1	A
	14	600D476G030K D4	2 CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687	1	A
	14	150D476X0020 R2	2 CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 1688	1	A
	14	150D476X0020 R2	2 CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 761	1	B
	14	600D476G030K D4	2 CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083	1	B
	14	150D476X0020 R2	2 CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF MCN 1084	1	C
R	14	150D476X0020 R2	2 CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000	1	C
R	14A	RC07GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 553 ONLY SB20	1	A
R	14A	RC07GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 173 ONLY SB20	1	B
R	15	RC07GF100K	2 RESISTOR, FXD, 10 OHMS 10%, 1/4 W 745-0677-000 EFF THRU MCN 553 SB20	1	A
	15	RC07GF150K	2 RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 554 SB20	1	A
R	15	RC07GF100K	2 RESISTOR, FXD, 10 OHMS 10%, 1/4 W 745-0677-000 EFF THRU MCN 173 SB20	1	B
	15	RC07GF150K	2 RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 174 SB20	1	B
R	15	RC07GF150K	2 RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	1	C
	15A	RC07GF221K	2 RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	1	R123
	16	150D106X0020 B2	2 CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000	1	C114
	17	150D106X0020 B2	2 CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 1085	1	C113
	18		1 DELETED		
R	19	CL24BE600UP3	2 CAPACITOR, FXD, 60 UF P50M15%, 15 VDCW 184-7038-000 EFF THRU MCN 553 ONLY SB20	1	A
R	19	CL24BE600UP3	2 CAPACITOR, FXD, 60 UF P50M15%, 15 VDCW 184-7038-000 EFF THRU MCN 173 ONLY SB20	1	B



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1104 20	RW69V161	2	RESISTOR, FXD, 160 OHMS 5%, 3 W 747-5344-000 EFF THRU MCN 553 SB20	R119	1 A
	20 150D226X0035 R2	2	CAPACITOR, FXD, 22 UF 20%, 35 VDCW 56289 184-7695-000 EFF MCN 554 THRU 1358	C68	1 A
	20 150D276X9020 R2	2	CAPACITOR, FXD, 27 UF 10%, 20 VDCW 56289 184-9063-260 EFF MCN 1359	C68	1 A
R 20	RW69V161	2	RESISTOR, FXD, 160 OHMS 5%, 3 W 747-5344-000 EFF THRU MCN 173 SB20	R119	1 B
	20 150D276X9020 R2	2	CAPACITOR, FXD, 27 UF 10%, 20 VDCW 56289 184-9063-000 EFF MCN 174 THRU 727 SB20	C68	1 B
	20 150D226X0035 R2	2	CAPACITOR, FXD, 22 UF 20%, 35 VDCW 56289 184-7695-000 EFF MCN 728	C68	1 B
R 20	150D276X9020 R2	2	CAPACITOR, FXD, 27 UF 10%, 20 VDCW 56289 184-9063-260	C68	1 C
	21 RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 659	R49	1 A
	21 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 660 SB27	R49	1 A
	21 RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 220	R49	1 B
	21 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 221 SB27	R49	1 B
R 21	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R49	1 C
R 22	CL26BE400UN3	2	CAPACITOR, FXD, 40 UF P75M15%, 15 VDCW 184-7053-000 EFF THRU MCN 553 ONLY SB20	C68	1 A
R 22	CL26BE400UN3	2	CAPACITOR, FXD, 40 UF P75M15%, 15 VDCW 184-7053-000 EFF THRU MCN 173 ONLY SB20	C68	1 A
	23 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 1358	C119	1 A
	23 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 1359 THRU 1687	C119	1 A
	23 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1688	C119	1 A
	23 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 727	C119	1 B
	23 600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 728 THRU 1083	C119	1 B
	23 150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1084	C119	1 B
R 23	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000	C119	1 C



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	24 RC20GF271K	2	RESISTOR, FXD, 270 OHMS 10%, 1/2 W 745-1328-000 EFF THRU MCN 659	R125	1 A
	24 RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 660 SB27	R125	1 A
	24 RC20GF271K	2	RESISTOR, FXD, 270 OHMS 10%, 1/2 W 745-1328-000 EFF THRU MCN 220	R125	1 B
	24 RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 221 SB27	R125	1 B
R	24 RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000	R125	1 C
	25 RC32GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1 W 745-3331-000 EFF THRU MCN 106	R120	1 A
	25 RC32GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1 W 745-3356-000 EFF MCN 107 THRU 553 ONLY SB20	R120	1 A
	25 RW69V181	2	RESISTOR, FXD, 180 OHMS 5%, 3 W 745-5345-000 EFF THRU MCN 19	R120	1 B
	25 RC32GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1 W 745-3356-000 EFF MCN 20 THRU 173 ONLY SB20	R120	1 B
R	26 150D686X0020 S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000	C9	1 A
R	26 150D686X0020 S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000 EFF THRU MCN 4699	C9	1 B
R	26 150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 EFF MCN 4700	C9	1 B
R	26 150D686X0020 S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000	C9	1 C
	27 RC20GF220K	2	RESISTOR, FXD, 22 OHMS 10%, 1/2 W 745-1282-000	R50	1
	28 150D686X0020 S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000 EFF THRU MCN 212	C67	1 A
	28 150D476X0035 S2	2	CAPACITOR, FXD, 47 UF 20%, 35 VDCW 56289 184-7411-000 EFF MCN 213 THRU 1358 SB17	C67	1 A
R	28 600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 1359	C67	1 A
	28 150D476X0035 S2	2	CAPACITOR, FXD, 47 UF 20%, 3K VDCW 56289 184-7411-000 EFF THRU MCN 761	C67	1 B
	28 600D506G040D D4	2	CAPACITOR, FXD, 50 UF P75M10%, 40 VDCW 56289 183-1277-280 EFF MCN 762	C67	1 B
R	28 600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230	C67	1 C
	29 MS90540-07	2	COIL, RF, 2000 UH 240-2547-000	L24	1
	30 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C121	1
	31 RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R52	1
	32 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C120	1



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1104	32A RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000	R165	1
	33 RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 659	R124	1 A
	33 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 660 SB27	R124	1 A
	33 RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 220	R124	1 B
	33 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 221 SB27	R124	1 B
R	33 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R124	1 C
	34 RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000	R115	1
	34A RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000 EFF MCN 107 THRU 553 ONLY SB20	R132	1 A
	34A RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000 EFF THRU MCN 173 ONLY SB20	R132	1 B
R	34B CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 1159 THRU 3299	C150	1 A
R	34B D153F561K0	2	CAPACITOR, FXD, 560 PF 10%, 300 VDCW 00853 912-4124-010 EFF MCN 3300	C150	1 A
R	34B CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 647 THRU 4726	C150	1 B
R	34B D153F561K0	2	CAPACITOR, FXD, 560 PF 10%, 300 VDCW 00853 912-4124-010 EFF MCN 4727	C150	1 B
R	34B D153F561K0	2	CAPACITOR, FXD, 560 PF 10%, 300 VDCW 00853 912-4124-010	C150	1 C
R	35 CL26BJ2R5TN3	2	CAPACITOR, FXD, 2.5 UF 20%, 50 VDCW 184-7153-000 EFF THRU MCN 2921	C74	1
R	35 CL23CJ1R5TN3	2	CAPACITOR, FXD, 1.5 UF P75M15%, 50 VDCW 184-7316-000 EFF MCN 2922	C74	1
	36 RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 659	R62	1 A
	36 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 660	R62	1 A
	36 RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 220	R62	1 B
	36 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 221	R62	1 B
R	36 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	R62	1 C
R	37 1N645	2	SEMICONV DEVICE 353-2607-000 EFF THRU MCN 553 ONLY SB20	CR14	1 A
R	37 1N645	2	SEMICONV DEVICE 353-2607-000 EFF THRU MCN 173 ONLY SB20	CR14	1 B



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104 38	G2513	2	RESISTOR, VAR, 1000 OHMS 20%, 1/2 W 01121 380-1659-000	R131	1
	P334-0266-00	2	NUT, PLAIN, HEX., NI PL BR5, 1/4-32 77250 334-0266-000 AP		1
	1914-05-00-2	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP		1
	480				
	39 G1473	2	RESISTOR, VAR, 25,000 OHMS 20%, 1/2 W 01121 380-1651-000	R111	1
	P334-0266-00	2	NUT, PLAIN, HEX., NI PL BR5, 1/4-32 77250 334-0266-000 AP		1
	1914-05-00-2	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP		1
	480				
R	40 RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF THRU MCN 553 ONLY SB20	R101	1 A
R	40 RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF THRU MCN 173 ONLY SB20	R101	1 B
R	41 EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 553 SB20	R77	1 A
	41 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 554 SB20 AND SB27	R77	1 A
R	41 EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 173 SB20	R77	1 B
	41 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 174 SB20 AND SB27	R77	1 B
R	41 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	R77	1 C
	42 CL26BJ2R5TN3	2	CAPACITOR, FXD, 2.5 UF 20%, 50 VDCW 184-7153-000	C69	1
R	43 RC20GF330K	2	RESISTOR, FXD, 33 OHMS 10%, 1/2 W 745-1289-000 EFF THRU MCN 553 SB20	R74	1 A
	43 RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 554 THRU 659 SB20	R74	1 A
	43 RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF MCN 660 SB27	R74	1 A
	43 RC20GF330K	2	RESISTOR, FXD, 33 OHMS 10%, 1/2 W 745-1289-000 EFF THRU MCN 173	R74	1 B
	43 RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 174 THRU 220 SB20	R74	1 B
	43 RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF MCN 221 SB27	R74	1 B
R	43 RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000	R74	1 C
R	44 EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 553 SB20	R76	1 A





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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	44 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 554 SB20 AND SB27	R76	1 A
R	44 EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 173 SB20	R76	1 B
	44 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 174 SB20 AND SB27	R76	1 B
R	44 RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	R76	1 C
	44A CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 925 SB29	C148	1 A
	44A CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 490 SB29	C148	1 B
R	44A CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000	C148	1 C
R	45 RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000	R157	1
	46 MS90541-04	2	COIL, RF, 5000 UH 240-2557-000	L15	1
	47 MS90541-04	2	COIL, RF, 5000 UH 240-2557-000	L12	1
	48 MS90541-04	2	COIL, RF, 5000 UH 240-2557-000	L13	1
	49 RC07GF151K	2	RESISTOR, FXD, 150 OHMS 10%, 1/4 W 745-0719-000	R61	1
	50 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	R59	1
	51 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C72	1
	52 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R60	1
	53 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R58	1
	54 RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000	R114	1
	55 RC07GF151K	2	RESISTOR, FXD, 150 OHMS 10%, 1/4 W 745-0719-000	R57	1
	56 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R56	1
	56A RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 SB20	R133	AR
	56A RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000 SB20	R133	AR
	56A RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 SB20	R133	AR
	56A RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 SB20	R133	AR
	56A RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 SB20	R133	AR
	56A RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 SB20	R133	AR
	57 33C41	2	CAPACITOR, FXD, 0.1 UF P80M20%, 50 VDCW 56289 913-3886-000	C103	1



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104 58	RC20GF220K	2	RESISTOR, FXD, 22 OHMS 10%, 1/2 W 745-1282-000	R128	1
59	MS90541-04	2	COIL, RF, 5000 UH 240-2557-000	L14	1
60	4M17Z5	2	SEMICONV DEVICE 04713 353-3232-000	CR4	1
61	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 850 ONLY	C123	1 A
61	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 343 ONLY	C123	1 B
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 1358	C116	1 A
62	600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687	C116	1 A
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF MCN 1688	C116	1 A
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 761	C116	1 B
62	600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083	C116	1 B
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF MCN 1084	C116	1 B
R 62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000	C116	1 C
63	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000	R94	1
64	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R93	1
64A	600D405F200K D4	2	CAPACITOR, FXD, 4 UF P75M10%, 200 VDCW 56289 183-2335-000 EFF MCN 851 SB25	C146	1 A
64A	600D405F200K D4	2	CAPACITOR, FXD, 4 UF P75M10%, 200 VDCW 56289 183-2335-000 EFF MCN 344 SB25	C146	1 B
R 64A	600D405F200K D4	2	CAPACITOR, FXD, 4 UF P75M10%, 200 VDCW 56289 183-2335-000	C146	1 C
65	1N1116 1810-00	2	SEMICONV DEVICE 353-1611-000	CR7	1
	310-0060-000	2	WASHER, LOCK, PH BRZ, 0.204 ID, 0.406 OD 78189 373-7040-000 AP		1
	4021	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP		1
66	RW69V8R2	2	TERMINAL 77147 304-8000-000 AP		1
66		2	RESISTOR, FXD, 8.2 OHMS 5%, 3 W 747-5318-000	R92	1
67	CM07F203J03	2	CAPACITOR, FXD, 20,000 PF 5%, 500 VDCW 912-2747-000 EFF THRU MCN 1358	C104	1 A
67	55C30	2	CAPACITOR, FXD, 0.025 UF P80M20%, 500 VDCW 01939 913-3154-000 EFF MCN 1359	C104	1 A



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	67	CM07F203J03	2 CAPACITOR, FXD, 20,000 PF 5%, 500 VDCW 912-2747-000 EFF THRU MCN 761	C104	1 B
	67	55C30	2 CAPACITOR, FXD, 0.025 UF P80M20%, 500 VDCW 01939 913-3154-000 EFF MCN 762	C104	1 B
R	67	55C30	2 CAPACITOR, FXD, 0.025 UF P80M20%, 500 VDCW 01939 913-3154-000	C104	1 C
	68	RC20GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/2 W 745-1366-000 EFF THRU MCN 659	R75	1 A
	68	RC07GF562K	2 RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF MCN 660 SB27	R75	1 A
	68	RC20GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/2 W 745-1366-000 EFF THRU MCN 220	R75	1 B
	68	RC07GF562K	2 RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF MCN 221 SB27	R75	1 B
R	68	RC07GF562K	2 RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000	R75	1 C
	69	151D344X0035 W2	2 CAPACITOR, FXD, 0.34 UF 20%, 35 VDCW 56289 184-8263-000 SB20 AND SB21	C82	AR
	69	151D504X0035 W2	2 CAPACITOR, FXD, 0.50 UF 20%, 35 VDCW 56289 184-8264-000 SB20 AND SB-21	C82	AR
	69	151D754X0035 X2	2 CAPACITOR, FXD, 0.75 UF 20%, 35 VDCW 56289 184-8265-000 SB20 AND SB21	C82	AR
	69	151D115X0035 X2	2 CAPACITOR, FXD, 1.1 UF 20%, 35 VDCW 56289 184-8266-000 EFF THRU MCN 1687 SB20 AND SB21	C82	AR A
	69	151D164X0035 W2	2 CAPACITOR, FXD, 0.116 UF 20%, 35 VDCW 56289 184-8261-000 EFF MCN 1688	C82	AR A
	69	151D115X0035 X2	2 CAPACITOR, FXD, 1.1 UF 20%, 35 VDCW 56289 184-8266-000 EFF THRU MCN 1083	C82	AR B
	69	151D164X0035 W2	2 CAPACITOR, FXD, 0.116 UF 20%, 35 VDCW 56289 184-8261-000 EFF MCN 1084	C82	AR B
R	69	151D164X0035 W2	2 CAPACITOR, FXD, 0.116 UF 20%, 35 VDCW 56289 184-8261-000	C82	AR C
	70	2N158A	2 TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q24	1 A
	70	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN 660 SB27	Q24	1 A
	70	2N158A	2 TRANSISTOR 14805 352-0041-000 EFF THRU MCN 220	Q24	1 B
	70	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN 221 SB27	Q24	1 B
R	70	2N2405	2 TRANSISTOR 352-0479-000	Q24	1 C
	71	2N158A	2 TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q25	1 A
	71	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN 660 SB27	Q25	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	71	2N158A	2 TRANSISTOR 14805 352-0041-000 Q25 EFF THRU MCN 220	1	B
	71	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN Q25 221 SB27	1	B
R	71	2N2405	2 TRANSISTOR 352-0479-000 Q25	1	C
	72	2N158A	2 TRANSISTOR 14805 352-0041-000 Q29 EFF THRU MCN 659	1	A
	72	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN Q29 660 SB27	1	A
	72	2N158A	2 TRANSISTOR 14805 352-0041-000 Q29 EFF THRU MCN 220	1	B
	72	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN Q29 221 SB27	1	B
R	72	2N2405	2 TRANSISTOR 352-0479-000 Q29	1	C
	73	2N158A	2 TRANSISTOR 14805 352-0041-000 Q28 EFF THRU MCN 659	1	A
	73	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN Q28 660 SB27	1	A
	73	2N158A	2 TRANSISTOR 14805 352-0041-000 Q28 EFF THRU MCN 220	1	B
	73	2N2405	2 TRANSISTOR 352-0479-000 EFF MCN Q28 221 SB27	1	B
R	73	2N2405	2 TRANSISTOR 352-0479-000 Q28	1	C
	74	2N158A	2 TRANSISTOR 14805 352-0041-000 Q22 EFF THRU MCN 659	1	A
	74	2N1131	2 TRANSISTOR 352-0219-000 EFF Q22 MCN 660 SB27	1	A
	74	2N158A	2 TRANSISTOR 14805 352-0041-000 Q22 EFF THRU MCN 220	1	B
	74	2N1131	2 TRANSISTOR 352-0219-000 EFF Q22 MCN 221 SB27	1	B
R	74	2N1131	2 TRANSISTOR 352-0219-000 Q22	1	C
	74A	1101A	2 MOUNTING 13103 352-9814-000 5 EFF MCN 660 THRU 1286 SB27	5	A
	74A	1101	2 MOUNTING 13103 352-9813-000 5 EFF MCN 1287	5	A
	74A	1101A	2 MOUNTING 13103 352-9814-000 5 EFF MCN 221 THRU 714 SB27	5	B
	74A	1101	2 MOUNTING 13103 352-9813-000 5 EFF MCN 715	5	B
R	74A	1101	2 MOUNTING 13103 352-9813-000 5	5	C
	542-1348-002		2 SCREW, EXTERNALLY RELIEVED BODY 5 EFF THRU MCN 659 AP FOR 70 THRU 74A	5	A
	P313-0056-000		2 NUT, PLAIN, HEX., NI PL BR5, 10-32 5 77250 313-0056-000 EFF MCN 660 SB27 AP FOR 70 THRU 74A	5	A
	761-0356-001		2 SLEEVE, SPACING EFF MCN 660 THRU 5 850 SB27 AP FOR 70 THRU 74A	5	A
	541-1243-003		2 WASHER EFF THRU MCN 659 AP FOR 10 70 THRU 74A	10	A
	IMC140		2 INSULATOR 10583 302-0410-000 10 EFF MCN 660 SB27 AP FOR 70 THRU 74A	10	A
	541-1245-003		2 WASHER EFF THRU MCN 659 AP FOR 5 70 THRU 74A	5	A



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	548-9539-003	2	WASHER EFF MCN 660 SB27 AP FOR 70 THRU 74A	5	A
	548-9550-003	2	WASHER EFF THRU MCN 659 AP FOR 70 THRU 74A	5	A
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML EFF MCN 660 THRU 673 AP FOR 70 THRU 74A	5	A
	310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML EFF MCN 674 SB27 AP FOR 70 THRU 74A	5	A
	542-1348-002	2	SCREW, EXTERNALLY RELIEVED BODY EFF THRU MCN 220 AP FOR 70 THRU 74A	5	B
	P313-0056-00 O	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 EFF MCN 221 SB27 AP FOR 70 THRU 74A	5	B
R	P313-0056-00 O	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 AP FOR 70 THRU 74A	5	C
	761-0356-001	2	SLEEVE, SPACING EFF MCN 221 THRU 343 SB27 AP FOR 70 THRU 74A	5	B
	541-1243-003	2	WASHER EFF THRU MCN 220 AP FOR 70 THRU 74A	10	B
	IMC140	2	INSULATOR 10583 302-0410-000 EFF MCN 221 SB27 AP FOR 70 THRU 74A	10	B
R	IMC140	2	INSULATOR 10583 302-0410-000 AP FOR 70 THRU 74A	10	C
	541-1245-003	2	WASHER EFF THRU MCN 220 AP FOR 70 THRU 74A	5	B
	548-9539-003	2	WASHER EFF MCN 221 SB27 AP FOR 70 THRU 74A	5	B
R	548-9539-003	2	WASHER AP FOR 70 THRU 74A	5	C
	548-9550-003	2	WASHER EFF THRU MCN 220 AP FOR 70 THRU 74A	5	B
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML EFF MCN 221 THRU 239 AP FOR 70 THRU 74A	5	B
	310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML EFF MCN 240 SB27 AP FOR 70 THRU 74A	5	B
R	310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML AP FOR 70 THRU 74A	5	C
75	A12598	2	TRANSFORMER 70674 677-9013-000	1	T18
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
76	A12591	2	TRANSFORMER 70674 677-9016-000	1	T19
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	1	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	1	
	506-5906-003	2	WASHER AP	2	



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
R	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	2	
	77 2N174	2	TRANSISTOR 352-0127-000 Q23	1	
	P313-0056-00	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 AP	1	
	1810-00	2	WASHER, LOCK, PH BRZ, 0.204 ID, 0.406 OD 78189 373-7040-000 AP	1	
	4021	2	TERMINAL 77147 304-8000-000 AP	1	
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP	1	
R	542-5313-002	2	INSULATOR, DISK AP	1	
	541-1244-003	2	WASHER AP	1	
	548-9549-003	2	WASHER AP	1	
R	77A 150D476X0020	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 C151	AR	
R	77A 150D686X0015	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 C151	AR	
R	77A CS13BD566K	2	CAPACITOR, FXD, 56 UF 10%, 15 VDCW 184-6161-000 C151	AR	
R	77A 150D107X0010	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000 C151	AR	
R	77B 150D476X0020	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 C153	AR	
R	77B 150D686X0015	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 C153	AR	
R	77B CS13BD566K	2	CAPACITOR, FXD, 56 UF 10%, 15 VDCW 184-6161-000 C153	AR	
R	77B 150D107X0010	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000 C153	AR	
	78 BC3178	2	TRANSFORMER 97315 673-0826-000 EFF THRU MCN 1358 Z2	1	A
	78 A16634	2	REACTOR 70674 668-0081-010 EFF MCN 1359 L32	1	A
	78 BC3178	2	TRANSFORMER 97315 673-0826-000 EFF THRU MCN 761 Z2	1	B
	78 A16634	2	REACTOR 70674 668-0081-010 EFF MCN 762 L32	1	B
R	78 A16634	2	REACTOR 70674 668-0081-010 L32	1	C
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 EFF THRU MCN 1212 AP	3	A
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 EFF THRU MCN 727 AP	3	B
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 EFF MCN 1213 AP	3	A
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 EFF MCN 728 AP	3	B
R	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	3	C

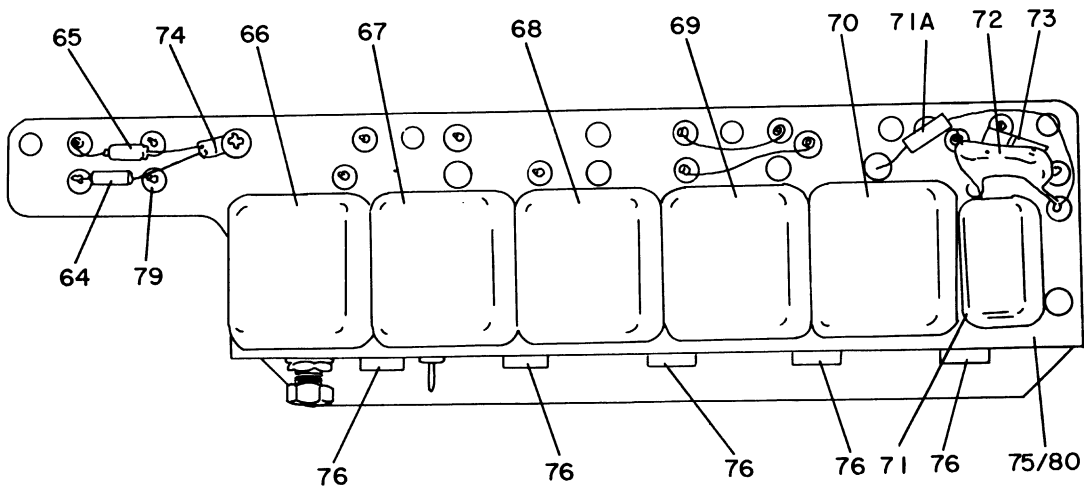
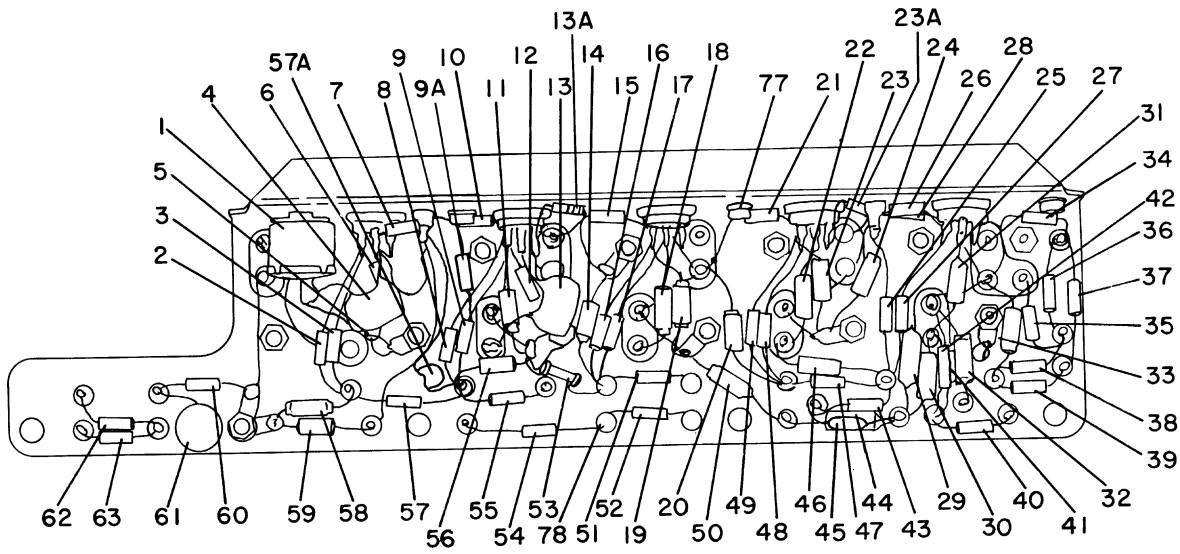


GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 EFF MCN 1213 AP	4	A
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 EFF MCN 728 AP	4	B
R	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	4	C
	P313-0132-00 O	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 EFF MCN 1213 AP	4	A
	P313-0132-00 O	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 EFF MCN 728 AP	4	B
R	P313-0132-00 O	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000	4	C
R	79 SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000	15	
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	4	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	6	
	P313-0132-00 O	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	6	
80	549-4180-004	2	CHASSIS, ELECTRICAL EQUIP.	1	
81	05-3307-51	3	SOCKET 91662 352-9903-000	3	
	0004-7202S	3	RETAINER 91662 352-9904-000 AP	3	
82	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000	4	
R	83 G2621	3	TERMINAL 21242 306-1100-000	22	
	83A G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 660 SB27	1	A
	83A G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 221 SB27	1	B
R	83A G2621	3	TERMINAL 21242 306-1100-000	1	C
	83B G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 1213	1	A
	83B G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 728	1	B
R	83B G2621	3	TERMINAL 21242 306-1100-000	1	C
	84 G2619	3	TERMINAL 21242 306-0324-000	10	
	84A G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 660 SB27	2	A
	84A G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 221 SB27	2	B
R	84A G2619	3	TERMINAL 21242 306-0324-000	2	C
	85 G2522	3	TERMINAL 12615 306-0323-000	14	
86	549-4193-005	3	CHASSIS, ELECTRICAL EQUIP.	1	



GROUP ASSEMBLY PARTS LIST



IF. Amplifier  
Figure 1105





GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1105 - 0	549-4188-005	1	AMPLIFIER, IF SEE FIG. 1101-48 FOR NHA	REF	A
R 1105 - 0	549-4188-006	1	AMPLIFIER, IF SEE FIG. 1101-48 FOR NHA	REF	B,C
	1 BC23130	2	RESISTOR, VAR, 250 OHMS 20%, 1/2 W 71450 380-1671-000	1	
	P334-0266-00	2	NUT, PLAIN, HEX., NI PL BRZ, 1/4-32 77250 334-0266-000 AP	1	
	1914-05-00-2	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP	1	
	2 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	1	
R	3 RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF MCN 2266	1	A
R	3 RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF MCN 2033	1	B
R	3 RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	1	C
	4 DM15F511J03	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000 EFF THRU MCN 686	1	A
	4 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 687 THRU 1207 SB23	1	A
	4 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208	1	A
	4 DM15F511J03	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000 EFF THRU MCN 233	1	B
	4 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 234 THRU 692 SB23	1	B
	4 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693	1	B
R	4 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	1	C
	5 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1687	1	A
	5 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	1	A
	5 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1084	1	B
	5 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	1	B
R	5 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	1	C
	6 RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	1	
	7 RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	1	



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105	8 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R28	1
	9 RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	R27	1
	9A RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 1688	R146	1 A
	9A RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 1085	R146	1 B
R	9A RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R146	1 C
	10 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF THRU MCN 1687	R26	1 A
	10 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1688	R26	1 A
	10 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF THRU MCN 1084	R26	1 B
	10 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1085	R26	1 B
R	10 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R26	1 C
	11 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1687	C50	1 A
	11 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF 1688	C50	1 A
	11 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1084	C50	1 B
	11 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C50	1 B
R	11 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C50	1 C
	12 RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R107	1
	13 DM15F511J03	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000 EFF THRU MCN 106	C48	1
	13 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 107 THRU 1207	C48	1 A
	13 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208	C48	1 A
	13 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 692	C48	1 B
	13 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693	C48	1 B
R	13 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C48	1 C



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1105	13A RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R166	1
	14 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C66	1
	15 RC07GF273K	2	RESISTOR, FXD, 27,000 OHMS 10%, 1/4 W 745-0800-000	R108	1
R	16 RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000	R109	1 A
	17 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R110	1
	18 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 1687	C51	1 A
	18 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	C51	1 A
	18 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 1084	C51	1 B
	18 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C51	1 B
R	18 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C51	1 C
	19 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1687	C109	1 A
	19 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	C109	1 A
	19 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1084	C109	1 B
	19 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C109	1 B
R	19 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C109	1 C
	20 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C107	1
	21 RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1687	R29	1 A
	21 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1688	R29	1 A
	21 RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1084	R29	1 B
	21 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1085	R29	1 B
R	21 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	R29	1 C
	22 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 686	C108	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105	22 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 687 THRU 1207	C108	1 A
	22 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208	C108	1 A
	22 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 233	C108	1 B
	22 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 234 THRU 692 SB23	C108	1 B
	22 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 692	C108	1 B
R	22 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C108	1 C
	23 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 686	C52	1 A
	23 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 687 THRU 1207 SB23	C52	1 A
	23 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208 THRU 1687	C52	1 A
	23 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 1688	C52	1 B
	23 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 233	C52	1 B
	23 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 234 THRU 692 SB23	C52	1 B
	23 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693 THRU 1084	C52	1 B
	23 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 1085	C52	1 C
R	23A RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R167	1
	24 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1687	C54	1 A
	24 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	C54	1 A
	24 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1084	C54	1 B
	24 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C54	1 B



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1105	24 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	1	C
	25 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	1	
R	26 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF THRU MCN 3299	1	A
R	26 RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 3300	1	A
R	26 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF THRU MCN 4726	1	B
R	26 RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 4727	1	B
R	26 RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000	1	C
	27 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	1	
	28 RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	1	
	29 RN60D5621F	2	RESISTOR, FXD, 5620 OHMS 1%, 1/4 W 705-6632-000	1	
	30 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000	1	
	31 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 1687	1	A
	31 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	1	A
	31 150D104X0035 A2	1	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 .184-7408-000 EFF THRU MCN 1084	1	B
	31 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	1	B
R	31 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	1	C
	32 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 1207	1	A
	32 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208	1	A
	32 150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN.692	1	B
	32 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693	1	B
R	32 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	1	C
	33 150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000	1	
	34 RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000	1	



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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105	35	1N270	2 SEMICOND DEVICE 353-2018-000	CR1	1
	36	RC07GF273K	2 RESISTOR, FXD, 27,000 OHMS 10%, 1/4 W 745-0800-000	R38	1
	37	1N270	2 SEMICOND DEVICE 353-2018-000	CR2	1
	38	RC07GF563K	2 RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000	R36	1
	39	RC07GF563K	2 RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000	R37	1
R	40	RC07GF332K	2 RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF THRU MCN 2131	R40	1 A
R	40	RC07GF272K	2 RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 2132	R40	1 A
R	40	RC07GF332K	2 RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF THRU MCN 1806	R40	1 B
R	40	RC07GF272K	2 RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 1807	R40	1 C
	41	150D104X0035 A2	2 CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000	C117	1
	42	1N270	2 SEMICOND DEVICE 353-2018-000	CR10	1
	43	RC07GF221K	2 RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R104	1
	44	RN60D4222F	2 RESISTOR, FXD, 42,200 OHMS 1%, 1/4 W 705-6674-000	R41	1
	45	1N270	2 SEMICOND DEVICE 353-2018-000	CR3	1
	46	150D105X0035 A2	2 CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C55	1
	47	RC07GF221K	2 RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R103	1
	48	RC07GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R30	1
	49	RC07GF102K	2 RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R31	1
	50	150D104X0035 A2	2 CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000	C59	1
	51	RC07GF472K	2 RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 1687	R102	1 A
	51	RC07GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1688	R102	1 A
	51	RC07GF472K	2 RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 1083	R102	1 B
	51	RC07GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1084	R102	1 B
R	51	RC07GF222K	2 RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R102	1 C
	52	RC07GF124K	2 RESISTOR, FXD, 0.12 MEG 10%, 1/4 W 745-0824-000	R116	1
	53	997F17	2 RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 1687	RT5	1 A



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105	53 763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1688	RT5	1 A
	53 997F17	2	RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 1083	RT5	1 B
	53 763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1084	RT5	1 B
R	53 763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000	RT5	1 C
	54 1N270	2	SEMICONV DEVICE 353-2018-000	CR5	1
	55 RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF THRU MCN 1687	R100	1 A
	55 RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 EFF MCN 1688	R100	1 A
	55 RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF THRU MCN 1084	R100	1 B
	55 RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 EFF MCN 1085	R100	1 B
R	55 RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000	R100	1 C
	56 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C49	1
	57 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 1687	R25	1 A
	57 RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000 EFF MCN 1688	R25	1 A
	57 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 1084	R25	1 B
	57 RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000 EFF MCN 1085	R25	1 B
R	57 RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000	R25	1 C
	57A 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF MCN 1688	C158	1 A
	57A 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF MCN 1085	C158	1 B
R	57A 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C158	1 C
	58 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1687	C46	1 A
	58 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 1688	C46	1 A
	58 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1084	C46	1 B
	58 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 1085	C46	1 B
R	58 150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000	C46	1 C
	59 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C61	1



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105	60	RC07GF153K	2 RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF THRU MCN 1687	R118	1 A
	60	RC07GF152K	2 RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 1688	R118	1 A
	60	RC07GF153K	2 RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF THRU MCN 1083	R118	1 B
	60	RC07GF152K	2 RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 1084	R118	1 B
R	60	RC07GF152K	2 RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R118	1 C
	61	416H17	2 RESISTOR, THRM, 10,000 OHMS 10%, 0.7 W 10646 714-1566-000 EFF THRU MCN 1687	RT1	1 A
	61	763F28	2 RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1688	RT1	1 A
	61	416H17	2 RESISTOR, THRM, 10,000 OHMS 10%, 0.7 W 10646 714-1566-000 EFF THRU MCN 1083	RT1	1 B
	61	763F28	2 RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1084	RT1	1 B
R	61	763F28	2 RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000	RT1	1 C
	62	RC07GF102K	2 RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R126	1
	63	RC07GF102K	2 RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R127	1
	64	150D105X0035 A2	2 CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C115	1
	65	150D105X0035 A2	2 CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C124	1
	66	X489-2	2 TRANSFORMER 81815 278-0711-000	T13	1
		P313-0132-00 O	2 NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		1
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2
	67	X489-2	2 TRANSFORMER 81815 278-0711-000	T14	1
		P313-0132-00 O	2 NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		2
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2
		SPL4040-4HOT TINNED	2 TERMINAL 77147 304-0332-000 AP		1
	68	X489-2	2 TRANSFORMER 81815 278-0711-000	T15	1
		P313-0132-00 O	2 NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		2
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2
		SPL4040-4HOT TINNED	2 TERMINAL 77147 304-0332-000 AP		2



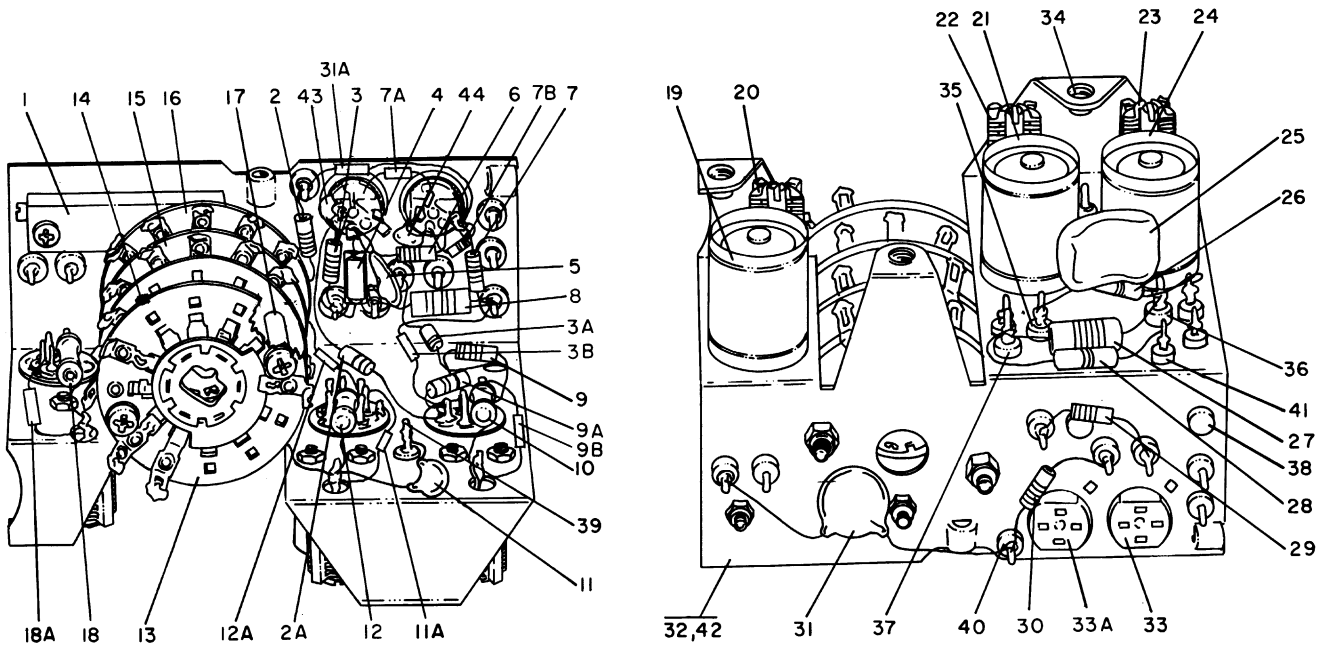


GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE	
1105	69	X489-2	2 TRANSFORMER 81815 278-0711-000	T16	1	
		P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250		2	
		O	313-0132-000 AP			
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2	
		SPL4040-4HOT	2 TERMINAL 77147 304-0332-000 AP		1	
	TINNED					
	70	X489-2	2 TRANSFORMER 81815 278-0711-000	T17	1	
		P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250		2	
		O	313-0132-000 AP			
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2	
		SPL4040-4HOT	2 TERMINAL 77147 304-0332-000 AP		1	
	TINNED					
	71	X487-2	2 TRANSFORMER 81815 278-0712-000	Z1	1	
		P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250		2	
		O	313-0132-000 AP			
		MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2	
		SPL4040-4HOT	2 TERMINAL 77147 304-0332-000 AP		1	
	TINNED					
	71A	CM05F361J03	2 CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EFF MCN 1688	C157	1	A
	71A	CM05F361J03	2 CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EFF MCN 1085	C157	1	B
R	71A	CM05F361J03	2 CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000	C157	1	C
72	DM20F152J500	2 CAPACITOR, FXD, 1500 PF 5%, 500 VDCW 72136 912-3327-000	C56	1		
	WV					
73	MS90539-15	2 COIL, RF, 1000 UH 240-2540-000	L22	1		
74	SPL4040-4HOT	2 TERMINAL 77147 304-0332-000		3		
	TINNED					
	MS51957-13	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		1		
	MS35338-135	2 WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1		
	P313-0132-00	2 NUT, PLAIN, HEX., SST, 4-40 77250		1		
O	313-0132-000 AP					
75	549-4184-005	2 TERMINAL BOARD		1		
76	05-3307-01	3 SOCKET 91662 352-9902-000	XQ7-XQ11	5		
	0004-72025	3 RETAINER 91662 352-9904-000 AP		5		
77	F22NCFMA1-40	3 NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000		3		
78	G2621	3 TERMINAL 21242 306-1100-000		10		
79	G2522	3 TERMINAL 12615 306-0323-000		17		
80	549-4183-005	3 TERMINAL BOARD		1		



GROUP ASSEMBLY PARTS LIST



RF Amplifier  
Figure 1106

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1106 - 0	548-7678-005	1	AMPLIFIER, RF SEE FIG. 1101-60	REF	B,C
R 1106 - 0	554-5566-005	1	AMPLIFIER, RF SEE FIG. 1101-60 FOR NHA	REF	A
	1 224L1-202	2	RESISTOR, VAR, 2000 OHMS 5%, 1/2 W R136	1	
R	MS35649-24	2	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP	2	
	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP	2	
R	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	2	
	2 RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1687 R135	1	A
	2 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1688 R135	1	A
	2 RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1084 R135	1	B



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1106	2 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1085	R135	1 B
R	2 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	R135	1 C
R	2A RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF MCN 1845	R147	1 A
	3 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R13	1
R	3A RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF MCN 1845	R148	1 A
R	3A 1537-48	2	COIL, RF, 27 UH 99800 240-2502-000	L35	1 B,C
R	3B 1537-48	2	COIL, RF, 27 UH 99800 240-2502-000	L36	1 B,C
	4 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C118	1
	5 805-014X5V01 03Z	2	CAPACITOR, FXD, 0.01 UF P80M20%, 100 VDCW 72982 913-3680-000 EFF THRU MCN 938	C133	1 A
	5 151D113X0035 W2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-8255-000 EFF MCN 939 THRU 1204	C133	1 A
	5 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1205	C133	1 A
	5 805-014X5V01 03Z	2	CAPACITOR, FXD, 0.01 UF P80M20%, 100 VDCW 72982 913-3680-000 EFF THRU MCN 324	C133	1 B
	5 151D113X0035 W2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-8255-000 EFF MCN 325 THRU 692	C133	1 B
	5 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693	C133	1 B
R	5 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C133	1 C
	6 RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	R105	1
R	7 RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	R137	1 A
R	7A RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000 EFF MCN 1845	R149	1 A
R	7B RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	R137	1 B,C
R	8 LT4K041	2	COIL, RF, 3.9 UH 240-0144-000	L31	1 A
R	8 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C163	1 B,C
	9 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 1687 ONLY	R143	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1106	9A RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 1494	R152	1 B
R	9A RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000	R152	1 C
R	9B CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000	C167	1 A
R	10 301-000R3A0- 240J	2	CAPACITOR, FXD, 24 PF 5%, 500 VDCW 72982 913-4614-000	C100	1 A
R	11 CM05F271J03	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000	C138	1 B,C
R	11A CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000	C168	1 A
R	12 CC20UJ240G	2	CAPACITOR, FXD, 24 PF 2%, 500 VDCW 916-0435-000	C101	1 A
R	12A CM05C120K03	2	CAPACITOR, FXD, 12 PF 10%, 500 VDCW 912-2757-000	C165	1 B,C
R	13 235431F	2	SWITCH SECTION 76854 269-2515-000	S1A	1 A
R	13 232667F	2	SWITCH SECTION 76854 269-2475-000	S1R	1 B,C
R	14 235432F	2	SWITCH SECTION 76854 269-2516-000	S1B	1 A
R	14 232666F	2	SWITCH SECTION 76854 269-2463-000	S1N	1 B,C
R	15 232666F	2	SWITCH SECTION 76854 269-2463-000	S1N	1 A
R	15 232067F	2	SWITCH SECTION 76854 269-2461-000	S10	1 B,C
R	16 235401F	2	SWITCH SECTION 76854 269-2517-000	S1C	1
R	17 541-5970-002 P313-0132-00 0 8942	2	SPACER, SLV NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP FOR 13 THRU 17		8 2
R	347-0315-000	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP FOR 13 THRU 17		2
R	310-0278-000	2	SCREW, MACH., CAD. PL STL, FIL H, 4-40 X 2 COML AP FOR 13 THRU 17		2
R	18 CC20UJ240G	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP FOR 13 THRU 17		2
R	18 CC20CH050D	2	CAPACITOR, FXD, 24 PF 2%, 500 VDCW 916-0435-000	C102	1 A
R	18 CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000 EFF MCN 2099	C102	1 B
R	18 CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000	C102	1 C
R	18A CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000	C169	1 A
R	19 X891	2	TRANSFORMER 81815 278-1858-000	T6	1 A
R	19 X856	2	TRANSFORMER 81815 278-1843-000	T105	1 B,C
R	20 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C18	1
	P313-0166-00 0	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP		2



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1106	545-7529-003	2	WASHER AP	2	
	P321-0293-00	2	SCREW, MACH., NI PL BRS, SLOT.	2	
	0		FIL H, 0-80 X 5/16 77250 321-0293-000 AP		
R	21 X892	2	TRANSFORMER 81815 278-1859-000	1	A
	21 X638	2	TRANSFORMER 81815 278-1824-000	1	B,C
	22 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970	1	
			922-0565-000		
	23 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970	1	
			922-0565-000		
	P313-0166-00	2	NUT, PLAIN, HEX., NI PL BRS, 0-80	4	
	0		77250 313-0166-000 AP FOR 22 AND 23		
	545-7529-003	2	WASHER AP FOR 22 AND 23	4	
	P321-0293-00	2	SCREW, MACH., NI PL BRS, SLOT.	4	
	0		FIL H, 0-80 X 5/16 77250 321-0293-000 AP FOR 22 AND 23		
R	24 X893	2	TRANSFORMER 81815 278-1860-000	1	A
R	24 X854	2	TRANSFORMER 81815 278-1844-000	1	B,C
R	25 CM06F302F03	2	CAPACITOR, FXD, 3000 PF 5%, 500 VDCW 912-3037-000	1	A
R	25 LT4K048	2	COIL, RF, 15 UH 240-0151-000	1	B,C
R	26 MS90538-09	2	COIL, RF, 75 UH 240-2513-000	1	B,C
R	27 LT4K044	2	COIL, RF, 6.8 UH 240-0147-000	1	A
R	27 MS90538-17	2	COIL, RF, 160 UH 240-2521-000	1	B,C
R	28 MS90538-01	2	COIL, RF, 36 UH 240-2505-000	1	B,C
	29 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	1	
	30 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF THRU MCN 1980	1	A
R	30 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1981	1	A
R	30 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	1	B,C
	31 855-502X5V02	2	CAPACITOR, FXD, 0.02 UF P80M20%, 100 VDCW 72982 913-3678-000	1	A
	03Z		EFF THRU MCN 873		
	31 150D223X0035	2	CAPACITOR, FXD, 0.022 UF 20%, 35 VDCW 56289 184-7673-000 EFF MCN 874 THRU 1305	1	A
	A2				
R	31 150D223X0035	2	CAPACITOR, FXD, 0.022 UF 20%, 35 VDCW 56289 184-7673-000 EFF MCN 1845	1	A
	31 855-502X5V02	2	CAPACITOR, FXD, 0.02 UF P80M20%, 100 VDCW 72982 913-3678-000	1	B
	03Z		EFF THRU MCN 316		
	31 150D223X0035	2	CAPACITOR, FXD, 0.022 UF 20%, 35 VDCW 56289 184-7673-000 EFF MCN 317	1	B
	A2				

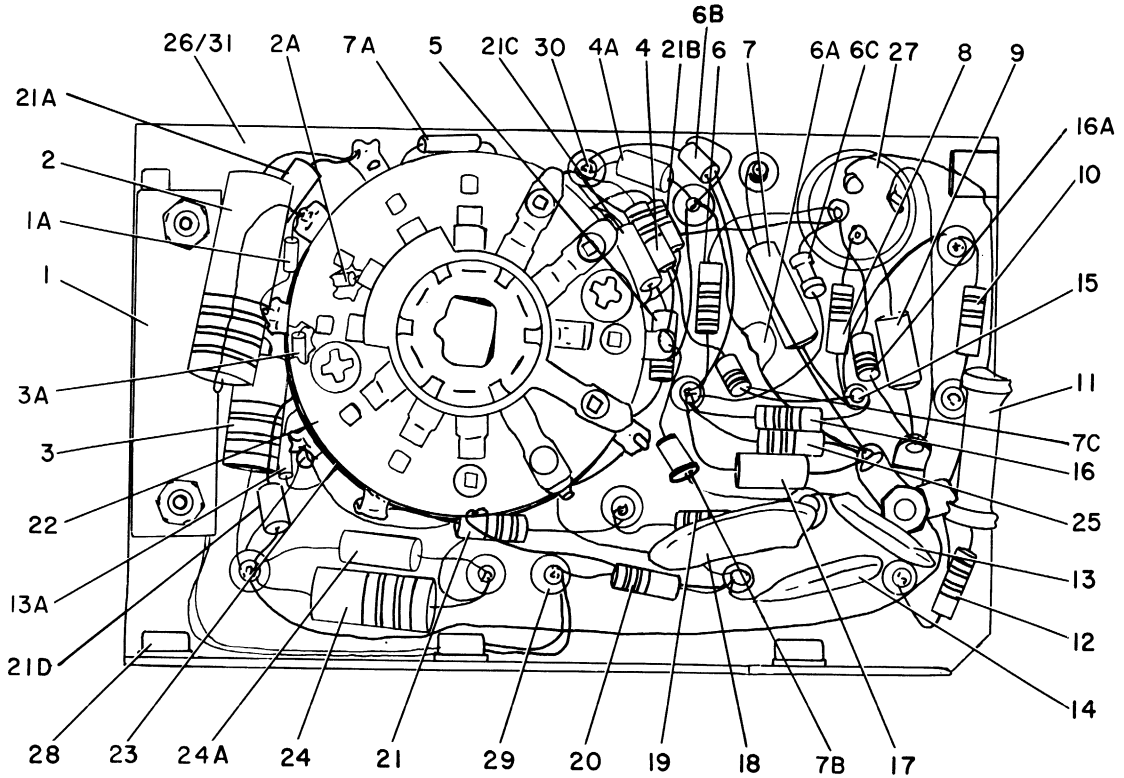


GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1106	31A 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	1	B,C
R	32 554-5564-003	2	SHIELD, AMPL	1	A
R	32 548-7673-003	2	SHIELD, AMPL	1	B,C
	33 05-3307-01	3	SOCKET 91662 352-9902-000	1	
	33A 05-3307-01	3	SOCKET 91662 352-9902-000 EFF THRU MCN 1687	1	A
	33A 05-3307-51	3	SOCKET 91662 352-9903-000 EFF MCN 1688	1	A
	33A 05-3307-01	3	SOCKET 91662 352-9902-000 EFF THRU MCN 1083	1	B
	33A 05-3307-51	3	SOCKET 91662 352-9903-000 EFF MCN 1084	1	B
R	33A 05-3307-51	3	SOCKET 352-9903-000	1	C
	0004-7202S	3	RETAINER 91662 352-9904-000 AP FOR 33 AND 33A	2	
	34 F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000	3	
	35 G2621	3	TERMINAL 21242 306-1100-000	2	
R	36 G2621	3	TERMINAL 21242 306-1100-000	1	A
R	36 G2522	3	TERMINAL 12615 306-0323-000	1	B,C
R	37 G2621	3	TERMINAL 21242 306-1100-000	1	B,C
	38 G2619	3	TERMINAL 21242 306-0324-000	3	
R	39 G2522	3	TERMINAL 12615 306-0323-000	1	A
R	39 G2619	3	TERMINAL 21242 306-0324-000	1	B,C
	40 G2522	3	TERMINAL 12615 306-0323-000	8	
R	41 G2522	3	TERMINAL 12615 306-0323-000	3	B,C
	42 548-7676-004	3	SHIELD, AMPL	1	
	43 GA7-7UUF0RM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1688	1	A
	43 GA7-7UUF0RM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1085	1	B
R	43 GA7-7UUF0RM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000	1	C
	44 GA7-7UUF0RM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1688	1	A
	44 GA7-7UUF0RM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1085	1	B
R	44 GA7-7UUF0RM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000	1	C



GROUP ASSEMBLY PARTS LIST



Balanced Modulator  
Figure 1107

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1107 - 0	549-4175-004	1	MODULATOR, BALANCED SEE FIG. 1101-61 FOR NHA	REF	A
R 1107 - 0	548-7764-00	1	MODULATOR, BALANCED SEE FIG. 1101-61 FOR NHA	REF	B,C
	1 224L1-502	2	RESISTOR, VAR, 5000 OHMS 5%, 1/2 W R10 80294 381-1287-000	1	
R	MS35649-24	2	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP	2	
	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP	2	
R	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	2	
	1A CM05C100K03	2	CAPACITOR, FXD, 10 PF 10%, 500 C130 VDCW 912-2757-000 EFF MCN 209 THRU 553	1	A
	1A CM06F681J03	2	CAPACITOR, FXD, 680 PF 5%, 500 C130 VDCW 912-2989-000 EFF MCN 554	1	A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1107	2 MS90541-11	2	COIL, RF, 10,000 UH 240-2564-000 EFF THRU MCN 553	LI	1 A
	2 MS90540-07	2	COIL, RF, 2000 UH 240-2547-000 EFF MCN 554	L1	1 A
R	2 MS90540-07	2	COIL, RF, 2000 UH 240-2547-000 EFF THRU MCN 3052	L1	1 B
	2A RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF MCN 209 THRU 553	R134	1 A
	2A RC07GF471K	2	RESISTOR, FXD, 470 OHMS 10%, 1/4 W 745-0737-000 EFF MCN 554 THRU 580 ONLY	R134	1 A
	3 MS90540-07	2	COIL, RF, 2000 UH 240-2547-000 EFF THRU MCN 553	L6	1 A
	3 MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF MCN 554 THRU 580 ONLY	L6	1 A
	3 MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF THRU MCN 1083	L6	1 B
R	3 MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 1084 THRU 3052	L6	1 B
R	3 CM06F561J03	2	CAPACITOR, FXD, 560 PF 5%, 500 VDCW 912-2983-000 EFF MCN 3053	C162	1 B
R	3 CM06F561J03	2	CAPACITOR, FXD, 560 PF 5%, 500 VDCW 912-2983-000	C162	1 C
	3A RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF MCN 554	R138	1 A
	4 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 SB20	R8	1
	4A 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF MCN 925 SB28	C149	1 A
	4A RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF THRU MCN 173	R134	1 B
	4A RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 174 THRU 1083 SB20	R134	1 B
R	4A RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF MCN 1084 THRU 3052	R134	1 B
	5 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 SB20	R64	1
R	6 RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000	R5	1 A
R	6 RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000 EFF THRU MCN 3052	R5	1 B
	6A CM05C100K03	2	CAPACITOR, FXD, 10 PF 10%, 500 VDCW 912-2754-000 EFF THRU MCN 173	C130	1 B





GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1107	6A CM05F271J03	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000 EFF MCN 174 THRU 3052	C130	1 B
R	6B 65-136	2	TRANSFORMER 06978 278-2097-010 EFF MCN 3053	T21	1 B
	6C 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C110	1 B
R	6C 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C159	1 C
R	7 RN60D3160F	2	RESISTOR, FXD, 316 OHMS 1%, 1/4 W 705-6572-000	R7	1 A
R	7 RN60D3160F	2	RESISTOR, FXD, 316 OHMS 1%, 1/4 W 705-6572-000 EFF THRU MCN 3052	R7	1 B
R	7A RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF MCN 1494 THRU 3052	R150	1 B
R	7B RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000 EFF MCN 1494 THRU 3052	R151	1 B
R	7C RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 2564	R97	1 A
R	7C RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF MCN 1548 THRU 3052	R153	1 B
R	8 RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000	R95	1 A
R	8 RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF THRU MCN 3052	R95	1 B
R	8 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF MCN 3053	R95	1 B
R	8 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R95	1 C
R	9 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C15	1 A
R	9 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 3052	C15	1 B
	10 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 924	R6	1 A
	10 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 925 THRU 1687 3B28	R6	1 A
	10 RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1688	R6	1 A
R	10 RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 3052	R6	1 B
R	11 763F93	2	RESISTOR, THRM, 100 OHMS 10%, 1 W 10646 714-1730-000	RT2	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1107	11 763F93	2	RESISTOR, THRM, 100 OHMS 10%, 1 W 10646 714-1730-000 EFF THRU MCN 3052	RT2	1 B
	12 RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R91	1
R	13 55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000	C11	1 A
R	13 55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000	C11	1 B
R	13 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C11	1 B
R	13 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C11	1 C
R	13A CM05F391J03	2	CAPACITOR, FXD, 390 PF 5%, 500 VDCW 912-2858-000	C139	1 A
R	14 55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000	C12	1 A
R	14 55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000	C12	1 B
R	14 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C12	1 B
R	14 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C12	1 C
R	15 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R98	1 A
R	15 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF THRU MCN 3052	R98	1 B
R	15 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 3053	R98	1 B
R	15 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R98	1 C
R	16 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R4	1 A
R	16 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 3052	R4	1 B
R	16A RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000 EFF MCN 3053	R4	1 B
R	16A RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000	R4	1 C
R	17 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C14	1 A
R	17 150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 3052	C14	1 B
R	18 33C2	2	CAPACITOR, FXD, 0.02 UF P100M20% 500 VDCW 01939 913-2142-000	C13	1 A
R	18 33C2	2	CAPACITOR, FXD, 0.02 UF P100M20% 500 VDCW 01939 913-2142-000 EFF THRU MCN 3052	C13	1 B



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1107	18 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C13	1 B
R	18 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C13	1 C
	19 1N270	2	SEMICONV DEVICE 353-2018-000	CR15	1
	20 1N270	2	SEMICONV DEVICE 353-2018-000	CR16	1
	21 RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000	R9	1
R	21A CM05C180K03	2	CAPACITOR, FXD, 18 PF 10%, 500 VDCW 912-2763-000 EFF MCN 581 THRU 2235	C142	1 A
R	21A RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000 EFF MCN 2236	R154	1 A
	21B RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 581	R144	1 A
	21C CM05F101J03	2	CAPACITOR, FXD, 100 PF 5%, 500 VDCW 912-2816-000 EFF MCN 581	C143	1 A
	21D CM05E470J03	2	CAPACITOR, FXD, 47 PF 5%, 500 VDCW 912-2792-000 EFF MCN 581 THRU 631	C144	1 A
	21D CM05E820J03	2	CAPACITOR, FXD, 82 PF 5%, 500 VDCW 912-2810-000 EFF MCN 632	C144	1 A
R	21D CM06F392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000 EFF MCN 3053	C161	1 B
R	21D CM06F392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000	C161	1 C
	22 235437F	2	SWITCH SECTION 76854 269-2523-000 EFF THRU MCN 553	S1D	1 A
	22 237946F	2	SWITCH SECTION 76854 269-2554-000 EFF MCN 554 SB20	S1D	1 A
R	22 235437F	2	SWITCH SECTION 76854 269-2523-000	S1D	1 B,C
	P347-0013-00 0	2	SCREW, MACH., SST, FIL H, 4-40 X 7/8 77250 347-0013-000 AP		2
	541-5966-002 8942	2	SPACER, SLV AP		4
		2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		2
R	P313-0132-00 0	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		2
R	310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP		2
	23 235433F	2	SWITCH SECTION 76854 269-2518-000	S1E	1
	24 MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF THRU MCN 580	L17	1 A



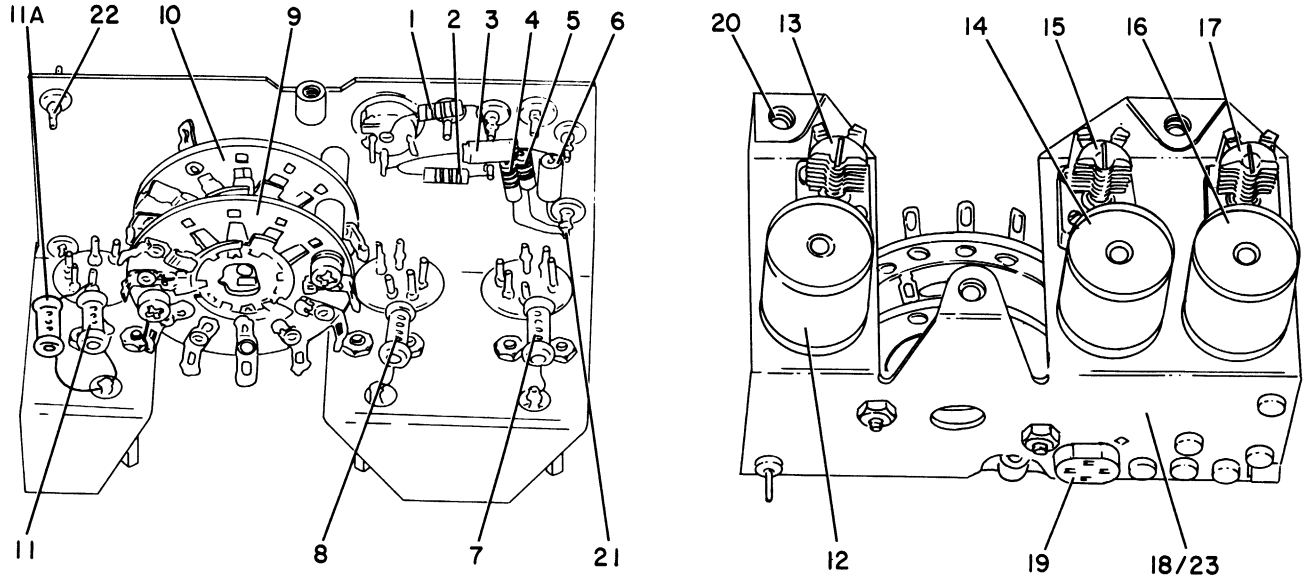
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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1107	24 MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 581	L17	1 A
	24 MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF THRU MCN 173	L17	1 B
R	24 MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 174 THRU 3052 SB20	L17	1 B
	24A RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 554 THRU 580 SB20	R141	1 A
R	24A RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 581	R141	1 A
R	24A RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 174 THRU 3052 SB20	R141	1 B
R	24A 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C160	1 B
R	24A 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C160	1 C
	25 SPL4040-2HOT TINNED	2	TERMINAL 77147 304-0331-000		3
	MS35649-24	2	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP		1
	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP		1
	MS51957-3	2	SCREW, MACH., SST, PAN HD, 2-56 X 1/4 343-0124-000 AP		1
R	26 549-4148-003	2	SHIELD, MODULATOR		1 A
R	26 549-4148-004	2	SHIELD, MODULATOR		1 B,C
	27 05-3307-01	3	SOCKET 91662 352-9902-000	XQ3	1
	0004-7202S	3	RETAINER 91662 352-9904-000 AP		1
	28 F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000		3
	29 G2621	3	TERMINAL 21242 306-1100-000		13
	30 G2522	3	TERMINAL 12615 306-0323-000		1
	31 549-4168-004	3	SHIELD, MODULATOR		1
R 1108 - 0	549-4174-004	1	AMPLIFIER, RF SEE FIG. 1101-62 FOR NHA		REF A
R 1108 - 0	549-4174-005	1	AMPLIFIER, RF SEE FIG. 1101-62 FOR NHA		REF B,C
R	1 RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 2563	R97	1 A
R	2 RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000	R3	1 A
R	2 RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000	R3	1 B,C



GROUP ASSEMBLY PARTS LIST



RF Amplifier  
Figure 1108

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1108	3 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C6	1
	4 RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R2	1
	5 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R1	1
	6 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C5	1
	7 CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 EFF THRU MCN 106	C97	1 A
	7 CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 107 THRU 1356	C97	1 A
R	7 301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 1357 THRU 2131	C97	1 A
R	7 301-000R3A0-240J	2	CAPACITOR, FXD, 24 PF 5%, 500 VDCW 72982 913-4614-000 EFF MCN 2132 THRU 2298	C97	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1108	7 301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 2299	C97	1 A
	7 CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 107 THRU 759	C97	1 B
R	7 301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 760 THRU 1866	C97	1 B
R	7 301-000R3A0- 240J	2	CAPACITOR, FXD, 24 PF 5%, 500 VDCW 72982 913-4614-000 EFF MCN 1867 THRU 2268	C97	1 B
R	7 301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 2269	C97	1 B
R	7 301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010	C97	1 C
	8 CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 EFF THRU MCN 1356	C98	1 A
	8 301-000R3K0- 200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4616-000 EFF MCN 1357 THRU 2676	C98	1 A
R	8 301-000R3A0- 200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4615-000 EFF MCN 2677	C98	1 A
	8 CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 EFF THRU MCN 759	C98	1 B
R	8 301-000R3K0- 200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4616-000 EFF MCN 760 THRU 3132	C98	1 B
R	8 301-000R3A0- 200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4615-000 EFF MCN 3133	C98	1 B
R	8 301-000R3A0- 200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4615-000	C98	1 C
	9 235434F	2	SWITCH SECTION 76854 269-2519-000	S1F	1
	P347-0015-00 O	2	SCREW, MACH., SST, FIL H, 4-40 X 1-1/8 77250 347-0015-000 AP		2
	541-5970-002 8942	2	SPACER, SLV AP		4
		2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		2
R	P313-0132-00 O	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		2
R	310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP		2
	10 235436F	2	SWITCH SECTION 76854 269-2521-000	S1G	1
	11 CC20CH050C	2	CAPACITOR, FXD, 5 PF 1/4 PF, 500 VDCW 916-0117-000 EFF THRU MCN 1356	C126	1 A
	11 301N4200-85D EGC5PFPORM2 5PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020 EFF MCN 1357	C126	1 A
	11 CC20CH050C	2	CAPACITOR, FXD, 5 PF 1/4 PF, 500 VDCW 916-0117-000 EFF THRU MCN 759	C126	1 B



51Y-4/4A ADF RECEIVER

OVERHAUL MANUAL (523-0755938, REVISION 4)

TEMPORARY REVISION NO. 34-34-1-1

Insert opposite page 1198

Subject: Add changes to incorporate modifications per Service Bulletin No. 32

Delete items 52, 52A, 53, 53A and 55, and replace with the following changes:

<u>FIG. - ITEM</u>	<u>PART NO.</u>	<u>NOMENCLATURE</u>	<u>UNITS PER ASSY.</u>
1111-52A	10FB1A	RESOLVER SCOTT 229-7027-010 B3	1
1111-53	MS51957-13	SCREW 343-0133-000	3
1111-55	777-0901-001	CLAMP, RESOLVER	3





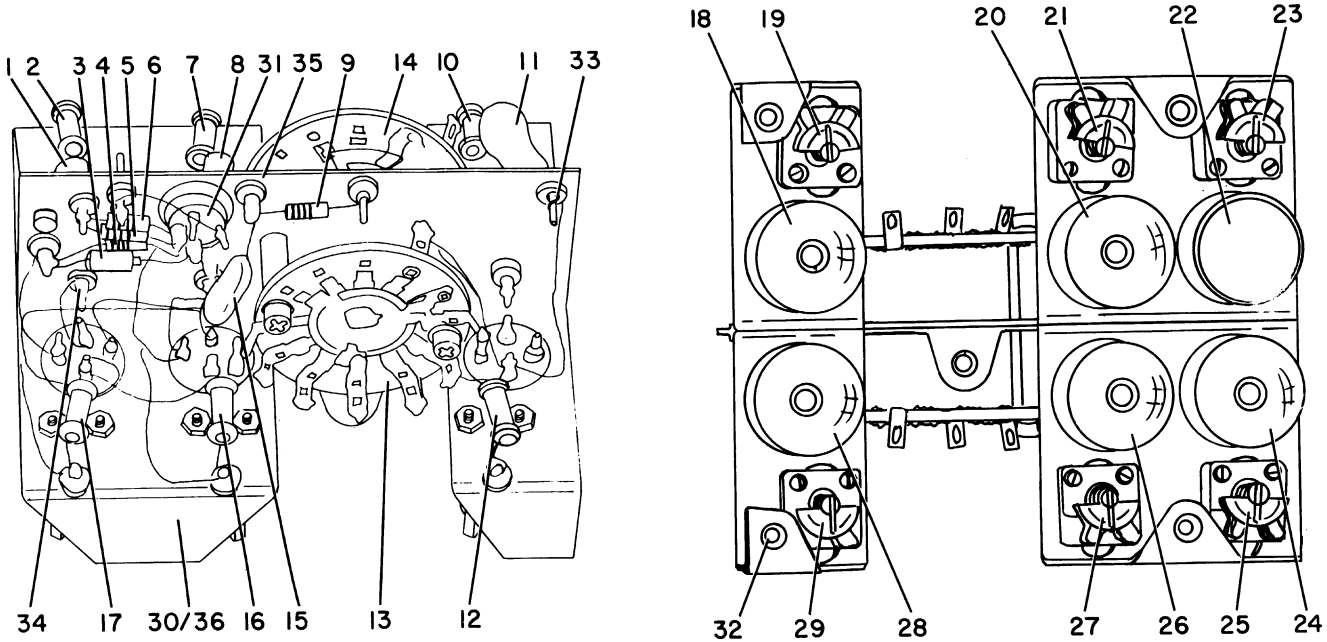


GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1108	11 301N4200-85D	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500		
	EGC5PFPORM-2		VDCW 72982 913-1097-020 EFF	1	B
	5PF		MCN 760		
R	11 301N4200-85D	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500		
	EGC5PFPORM-2		VDCW 72982 913-1097-020	1	C
	5PF				
R	11A CC20CH120K	2	CAPACITOR, FXD, 12 PF 10%, 500		
			VDCW 916-0142-000	1	
	12 X275-2	2	TRANSFORMER 81815 278-0731-000		
	13 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF,		
			850 PEAK VOLTAGE 74970	1	
			922-0565-000		
	P313-0166-00	2	NUT, PLAIN, HEX., NI PL BRS, 0-80		
	O		77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP		
	P321-0293-00	2	SCREW, MACH., NI PL BRS, SLOT.		
	O		FIL H, 0-80 X 5/16 77250	2	
			321-0293-000 AP	2	
	14 X274-3	2	TRANSFORMER 81815 278-0710-000		
	15 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF,		
			850 PEAK VOLTAGE 74970	1	
			922-0565-000		
	P313-0166-00	2	NUT, PLAIN, HEX., NI PL BRS, 0-80		
	O		77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP		
	P321-0293-00	2	SCREW, MACH., NI PL BRS, SLOT.		
	O		FIL H, 0-80 X 5/16 77250	2	
			321-0293-000 AP	2	
	16 X273-3	2	TRANSFORMER 81815 278-0732-000		
	17 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF,		
			850 PEAK VOLTAGE 74970	1	
			922-0565-000		
	P313-0166-00	2	NUT, PLAIN, HEX., NI PL BRS, 0-80		
	O		77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP		
	P321-0293-00	2	SCREW, MACH., NI PL BRS, SLOT.		
	O		FIL H, 0-80 X 5/16 77250	2	
			321-0293-000 AP	2	
	18 549-4147-003	2	SHIELD, AMPL		
	19 05-3307-01	3	SOCKET 91662 352-9902-000		
	0004-7202S	3	RETAINER 91662 352-9904-000 AP	XQ1	
	20 F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL		
			STL, 4-40 72962 333-0839-000	1	
				3	
	21 G2619	3	TERMINAL 21242 306-0324-000		
	22 G2522	3	TERMINAL 12615 306-0323-000	6	
	23 549-4166-004	3	SHIELD, AMPL	1	
				1	



GROUP ASSEMBLY PARTS LIST



Frequency Mixer Stage  
Figure 1109

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1109 - 0	548-7677-005	1	MIXER STAGE, FREQ SEE FIG. 1101-63 FOR NHA	REF	
1	4422-9-36	2	COIL, RF, 27 UH 82142 240-0169-000 EFF THRU MCN 339	L7 1	A
1	4422-11-117	2	COIL, RF, 39 UH 82142 240-0171-000 EFF MCN 340 THRU 1289	L7 1	A
1	CM06F392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000 EFF MCN 1290 THRU 1687	C152 1	A
1	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	C152 1	A
1	4422-9-36	2	COIL, RF, 27 UH 82142 240-0169-000 EFF THRU MCN 346	L7 1	B
1	4422-11-117	2	COIL, RF, 39 UH 82142 240-0171-000 EFF MCN 347 THRU 717	L7 1	B



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1109	1 CM06F392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000 EFF MCN 718 THRU 1084	C152	1 B
	1 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C152	1 B
R	1 192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C152	1 C
	2 CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000	C90	1
	3 150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C33	1
	4 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 1687	R21	1 A
	4 RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF MCN 1688	R21	1 A
	4 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 1084	R21	1 B
	4 RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF MCN 1085	R21	1 B
R	4 RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000	R21	1 C
	5 RC07GF184K	2	RESISTOR, FXD, 0.18 MEG 10%, 1/4 W 745-0830-000 EFF MCN 1687	R16	1 A
	5 RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 1688	R16	1 A
	5 RC07GF184K	2	RESISTOR, FXD, 0.18 MEG 10%, 1/4 W 745-0830-000 EFF THRU MCN 1084	R16	1 B
	5 RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 1085	R16	1 B
R	5 RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000	R16	1 C
	6 RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF MCN 1687	R15	1 A
	6 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1688	R15	1 A
	6 RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF THRU MCN 1084	R15	1 B
	6 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1085	R15	1 B
R	6 RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R15	1 C
	7 CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000	C91	1
	8 LT4K043	2	COIL, RF, 5.6 UH 240-0146-000 EFF THRU MCN 339	L8	1 A
	8 LT4K046	2	COIL, RF, 10 UH 240-0149-000 EFF MCN 340	L8	1 A
	8 LT4K043	2	COIL, RF, 5.6 UH 240-0146-000 EFF THRU MCN 846	L8	1 B
	8 LT4K046	2	COIL, RF, 10 UH 240-0149-000 EFF MCN 847	L8	1 B



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1109	8 LT4K046	2	COIL, RF, 10 UH 240-0149-000	L8	1 C
	9 RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	R17	1
	10 CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000	C92	1
R	11 DM20F822J100 WV	2	CAPACITOR, FXD, 8200 PF 5%, 100 VDCW 72136 912-3758-000	C96	1
	12 CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF THRU MCN 581	C95	1 A
R	12 CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF MCN 582 THRU 1084	C95	1 A
R	12 CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF MCN 1085	C95	1 A
	12 CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF THRU MCN 1084	C95	1 B
R	12 CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF MCN 1085	C95	1 B
R	12 CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000	C95	1 C
	13 235438F	2	SWITCH SECTION 76854	S1I	1
	P347-0007-00 O	2	SCREW, MACH., SST, FIL H, 4-40 X 5/16 77250 347-0007-000 AP		2
	8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		6
	540-9037-003	2	POST, ELECTRICAL-MECHANICAL EQUIP. AP		2
	14 232068F	2	SWITCH SECTION 76854	S1P	1
	P347-0012-00 O	2	SCREW, MACH., SST, FIL H, 4-40 X 3/8 77250 347-0012-000 AP		2
	8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		2
	541-5972-002	2	SPACER, SLV AP		2
	15 DM15F511J03	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000	C29	1
	16 CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000	C94	1
	17 CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF THRU MCN 339	C93	1 A
	17 CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 340 THRU 1687	C93	1 A
	17 CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000 EFF MCN 1688	C93	1 A
	17 CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF THRU MCN 846	C93	1 B
	17 CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 847 THRU 1084	C93	1 B
	17 CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000 EFF MCN 1085	C93	1 B



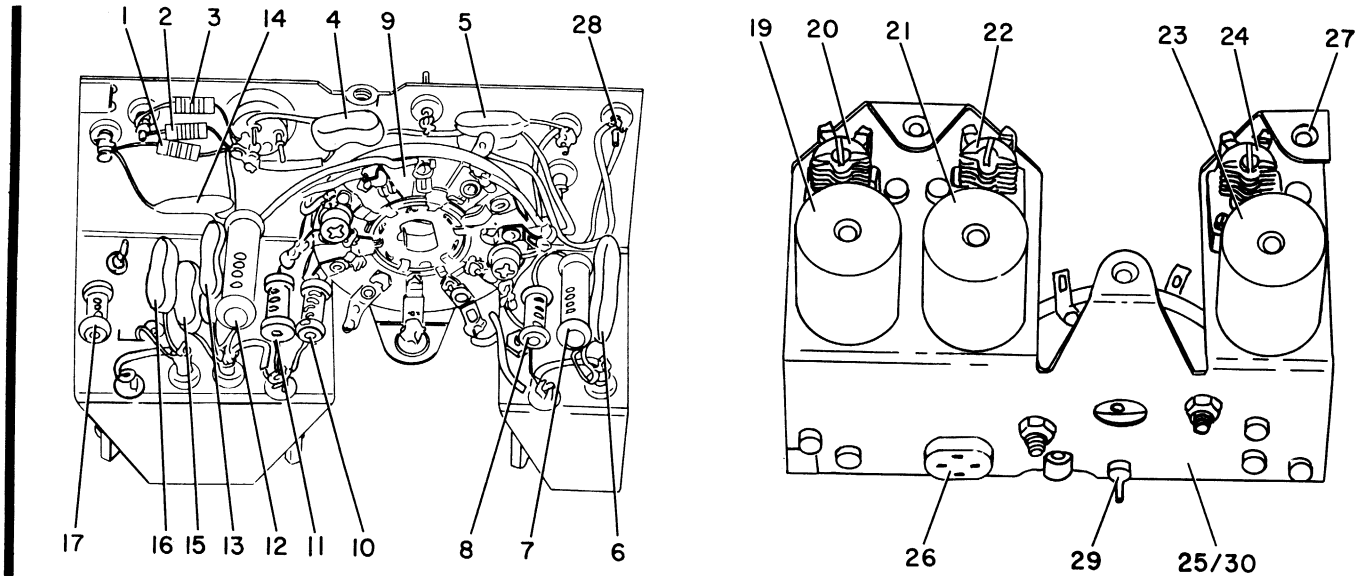
GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1109	17	CC20CH150J	2 CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000	1	C
R	18	X853	2 TRANSFORMER 81815 278-1840-000	1	A
R	18	X853	2 TRANSFORMER 81815 278-1840-000	1	B,C
	19	189-6-8	2 CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	1	
		P313-0166-00 O	2 NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2 WASHER AP	2	
		P321-0293-00 O	2 SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
R	20	X852	2 TRANSFORMER 81815 278-1841-000	1	A
R	20	X852	2 TRANSFORMER 81815 278-1841-000	1	B,C
	21	189-6-8	2 CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	2	
		P313-0166-00 O	2 NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2 WASHER AP	2	
		P321-0293-00 O	2 SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
R	22	X851-T107	2 TRANSFORMER 81815 278-1839-000	1	A
R	22	X851-T107	2 TRANSFORMER 81815 278-1839-000	1	B,C
	23	189-6-8	2 CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	1	
		P313-0166-00 O	2 NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2 WASHER AP	2	
		P321-0293-00 O	2 SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
	24	X282-2	2 TRANSFORMER 81815 278-0745-000 EFF THRU MCN 339	1	A
	24	X851-T107	2 TRANSFORMER 81815 278-1839-000 EFF MCN 340	1	A
	24	X282-2	2 TRANSFORMER 81815 278-0745-000 EFF THRU MCN 846	1	B
	24	X851-T107	2 TRANSFORMER 81815 278-1839-000 EFF MCN 847	1	B
R	24	X851-T107	2 TRANSFORMER 81815 278-1839-000	1	C
	25	189-6-8	2 CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	1	
		P313-0166-00 O	2 NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2 WASHER AP	2	
		P321-0293-00 O	2 SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
	26	X283-2	2 TRANSFORMER 81815 278-0746-000	1	





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RF Oscillator  
Figure 1110

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1110 R	6	CM06F102G03	2 CAPACITOR, FXD, 1000 PF 2%, 500 VDCW 912-3000-000 EFF MCN 1085	C42	1 B
	6	CM06F102G03	2 CAPACITOR, FXD, 1000 PF 2%, 500 VDCW 912-3000-000	C42	1 C
	7	DM19F561F03	2 CAPACITOR, FXD, 560 PF 1%, 500 VDCW 72136 912-2981-000 EFF MCN 547 THRU 1687 ONLY	C43	1 A
	7	DM19F561F03	2 CAPACITOR, FXD, 560 PF 1%, 500 VDCW 72136 912-2981-000 EFF MCN 164 THRU 1084 ONLY	C43	1 B
	8	CC20UJ100C	2 CAPACITOR, FXD, 10 PF 1/4 PF, 500 VDCW 916-0412-000 EFF THRU MCN 546	C45	1 A
	8	301-000P3K0- 100D	2 CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF MCN 547	C45	1 A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1110	8 CC20UJ100C	2	CAPACITOR, FXD, 10 PF 1/4 PF, 500 VDCW 916-0412-000 EFF THRU MCN 163	1	B
	8 301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF MCN 164	1	B
R	8 301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000	1	C
	9 235402FC	2	SWITCH SECTION 76854 269-2527-000	1	
R	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	
	8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP	4	
R	310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	2	
	541-5968-002	2	SPACER, SLV AP	2	
	P347-0012-000	2	SCREW, MACH., SST, FIL H, 4-40 X 3/8 77250 347-0012-000 AP	2	
	10 301-000R3A0-509C	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-4612-000 EFF THRU MCN 546 ONLY	1	A
	10 301-000R3A0-509C	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-4612-000 EFF THRU MCN 163 ONLY	1	B
R	10 CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000	1	
	11 301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF THRU MCN 546 ONLY	1	A
	11 301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF THRU MCN 163 ONLY	1	B
R	11 301N4200-85D E8C5PFPORM-2 5PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020	1	
	12 CC32SH121G	2	CAPACITOR, FXD, 120 PF 20%, 500 VDCW 916-7322-000 EFF THRU MCN 546	1	A
	12 CC32UJ361F	2	CAPACITOR, FXD, 360 PF 1%, 500 VDCW 916-7367-000 EFF MCN 547	1	A
	12 CC32SH121G	2	CAPACITOR, FXD, 120 PF 20%, 500 VDCW 916-7322-000 EFF THRU MCN 163	1	B
	12 CC32UJ361F	2	CAPACITOR, FXD, 360 PF 1%, 500 VDCW 916-7367-000 EFF MCN 164	1	B
R	12 CC32UJ361F	2	CAPACITOR, FXD, 360 PF 1%, 500 VDCW 916-7367-000	1	C
	13 CC32CG510J	2	CAPACITOR, FXD, 51 PF 5%, 500 VDCW 916-7271-000 EFF THRU MCN 546	1	A
	13 DM19E431F03	2	CAPACITOR, FXD, 430 PF 1%, 500 VDCW 72136 912-2969-000 EFF MCN 547	1	A
	13 CC32CG510J	2	CAPACITOR, FXD, 51 PF 5%, 500 VDCW 916-7271-000 EFF THRU MCN 163	1	B





GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1110	13	CM19E431F03	2 CAPACITOR, FXD, 430 PF 1%, 500 VDCW 72136 912-2969-000 EFF MCN 164	C38	1 B
R	13	CM19E431F03	2 CAPACITOR, FXD, 430 PF 1%, 500 VDCW 72136 912-2969-000	C38	1 C
	14	150D103X0035 A2	2 CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 1204	C10	1 A
	14	192P10392	2 CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1205	C10	1 A
	14	150D103X0035 A2	2 CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 692	C10	1 B
	14	192P10392	2 CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693	C10	1 B
R	14	192P10392	2 CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C10	1 C
	15	CM05F151J03	2 CAPACITOR, FXD, 150 PF 5%, 500 VDCW 912-2828-000 EFF THRU MCN 546	C7	1 A
	15	CM05F101J03	2 CAPACITOR, FXD, 100 PF 5%, 500 VDCW 912-2816-000 EFF MCN 547 THRU 1687 ONLY	C7	1 A
	15	CM05F151J03	2 CAPACITOR, FXD, 150 PF 5%, 500 VDCW 912-2828-000 EFF THRU MCN 163	C7	1 B
	15	CM05F101J03	2 CAPACITOR, FXD, 100 PF 5%, 500 VDCW 912-2816-000 EFF MCN 164 THRU 1084 ONLY	C7	1 B
	16	CM05F271J03	2 CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000 EFF THRU MCN 546	C34	1 A
	16	CC35UJ391F	2 CAPACITOR, FXD, 390 PF 1%, 500 VDCW 916-5241-000 EFF MCN 547 THRU 899	C34	1 A
	16	CM05F391J03	2 CAPACITOR, FXD, 390 PF 5%, 500 VDCW 912-2858-000 EFF MCN 900 THRU 1687	C34	1 A
	16	CM05F361J03	2 CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EFF MCN 1688	C34	1 A
	16	CM05F271J03	2 CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000 EFF THRU MCN 163	C34	1 B
	16	CC35UJ391F	2 CAPACITOR, FXD, 390 PF 1%, 500 VDCW 916-5241-000 EFF MCN 164 THRU 324	C34	1 B
	16	CM05F391J03	2 CAPACITOR, FXD, 390 PF 5%, 500 VDCW 912-2858-000 EFF MCN 325 THRU 1084	C34	1 B
	16	CM05F361J03	2 CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EFF MCN 1085	C34	1 B
R	16	CM05F361J03	2 CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000	C34	1 C



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101	17 CC30UJ131G	2	CAPACITOR, FXD, 130 PF 2%, 500 VDCW 916-4996-000 EFF THRU MCN 546	C35	1 A
	17 CC20CK020D	2	CAPACITOR, FXD, 2 PF 1/2 PF, 500 VDCW 916-0076-000 EFF MCN 547 THRU 1689	C35	1 A
	17 CC30UJ131G	2	CAPACITOR, FXD, 130 PF 2%, 500 VDCW 916-4996-000 EFF THRU MCN 163	C35	1 B
	17 CC20CK020D	2	CAPACITOR, FXD, 2 PF 1/2 PF, 500 VDCW 916-0076-000 EFF MCN 164 THRU 1085	C35	1 B
R	17 301-000R3A0-150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 72982 913-4613-000	C35	1
	18	1	DELETED		
	19 X270-2	2	COIL ASSY, RF 81815 278-1807-000	L3	1
	20 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C36	1
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP		2
	545-7529-003	2	WASHER AP		2
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP		2
	21 X271-2	2	COIL ASSY, RF 81815 278-1806-000	L4	1
	22 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C40	1
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP		2
	545-7529-003	2	WASHER AP		2
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP		2
	23 X272-2	2	COIL ASSY, RF 81815 278-1805-000	L5	1
	24 189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C44	1
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP		2
	545-7529-003	2	WASHER AP		2
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP		2
	25 549-4145-003	2	SHIELD, OSC		1
	26 05-3307-01	3	SOCKET 91662 352-9902-000	XQ6	1
	0004-72025	3	RETAINER 91662 352-9904-000 AP		1
	27 F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000		3
	28 G2619	3	TERMINAL 21242 306-0324-000		8
	29 G2522	3	TERMINAL 12615 306-0323-000		1
	30 549-4161-004	3	SHIELD, OSC		1



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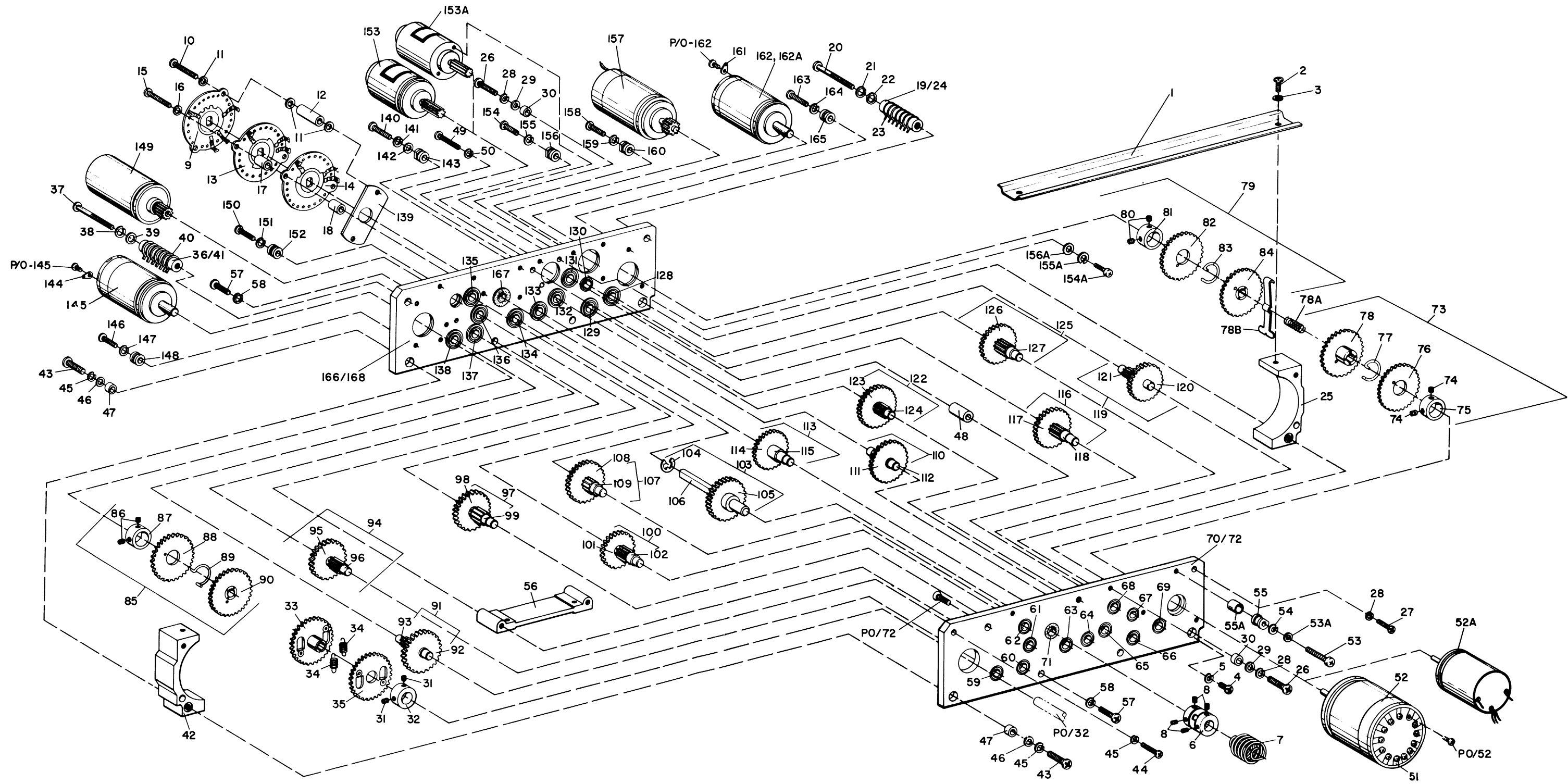


Figure 1111. Motor Gearcase



GROUP ASSEMBLY PARTS LIST

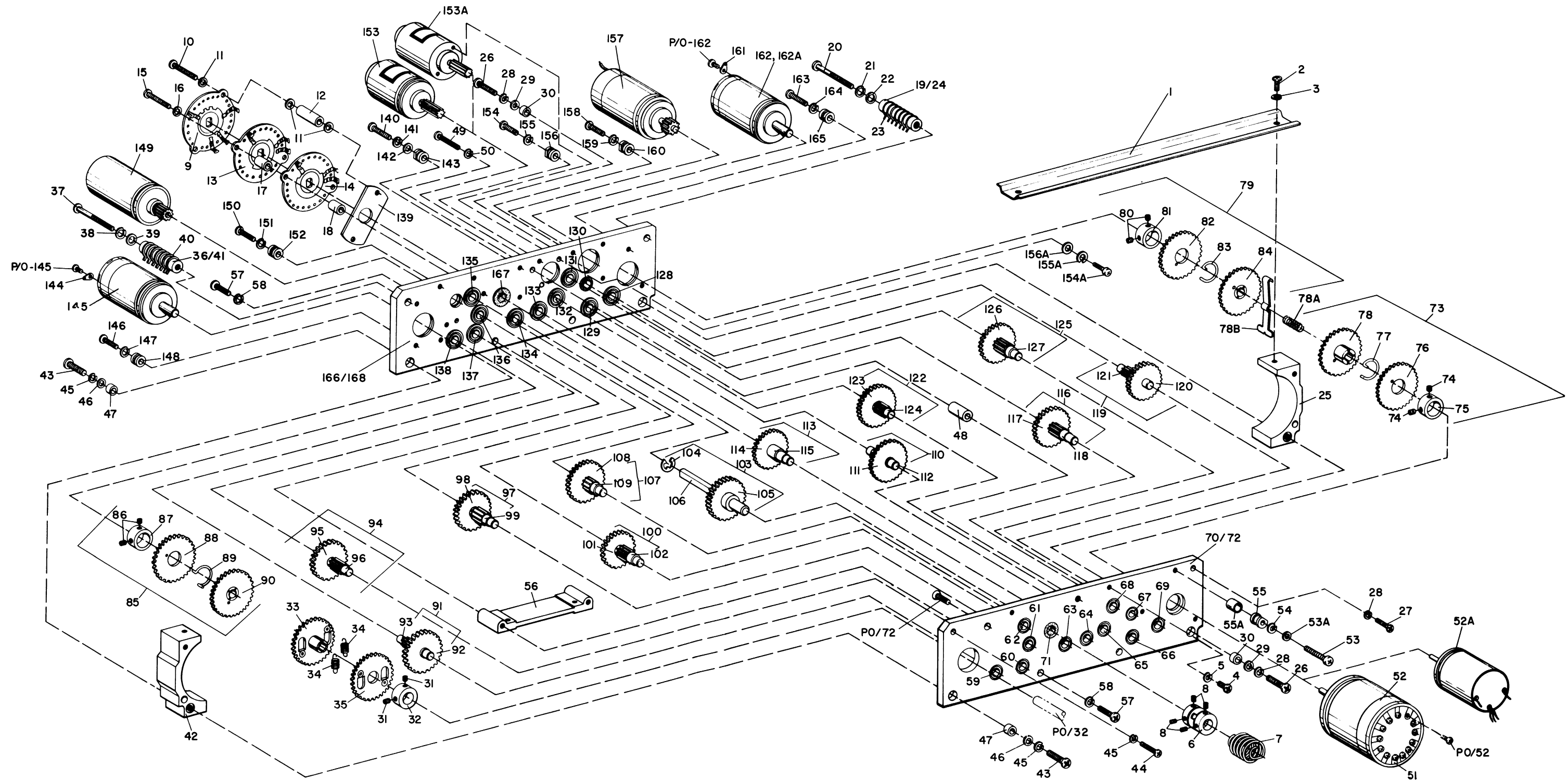


Figure 1111. Motor Gearcase



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111 - 0	549-4187-005	1	GEARCASE, MOTOR SEE FIG. 1101-67 FOR NHA	REF	
	1 549-4114-003	2	COVER, GEARSHAFT	1	
	2 MS51957-26	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/4 343-0167-000 AP	2	
	3 MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	2	
	4 P347-0005-00 O	2	SCREW, MACH., SST, FIL H, 4-40 X 3/16 77250 347-0005-000	2	
	5 310-3340-000	2	WASHER, LOCK, SST, 0.125 ID, 0.187 OD COML	2	
	6 A201-5W	2	COUPLING 99934 015-0514-000	1	
	7 549-4118-002	2	SPRING, HELICAL, EXTENSION AP	1	
	8 MS51053-426	2	SETSCREW, CAD. PL STL, 6-32 X 1/8 335-0003-000 AP	4	
	9 235797K	2	SWITCH SECTION 76854 269-2525-000	1	SIM
	10 P347-0014-00 O	2	SCREW, MACH., SST, FIL H, 4-40 X 1 77250 347-0014-000 AP	2	
	11 8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP	6	
	12 541-5995-002	2	SPACER, SLV AP	2	
	13 235796K	2	SWITCH SECTION 76854 269-2522-000	1	SIL
	14 235798K	2	SWITCH SECTION 76854 269-2526-000	1	S1K
	15 P347-0013-00 O	2	SCREW, MACH., SST, FIL H, 4-40 X 7/8 77250 347-0013-000 AP FOR 13 AND 14	2	
	16 8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP FOR 13 AND 14	2	
	17 541-5966-002	2	SPACER, SLV AP FOR 13 AND 14	2	
	18 541-5968-002	2	SPACER, SLV AP FOR 13 AND 14	2	
	19 549-4151-003	2	POST, MULTI-TERMINAL	1	
	20 P347-0045-00 O	2	SCREW, MACH., SST, FIL H, 6-32 X 1-1/2 77250 347-0045-000 AP	1	
	21 MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	1	
	22 310-0046-000	2	WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	1	
	23 1594-3	3	TERMINAL 71279 306-0212-000	5	
	24 549-4120-002	3	INSULATOR, SLV	1	
	25 549-4140-003	2	HOUSING, GEARCASE	1	
	26 MS51957-30	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/2 343-0171-000 AP	2	
	27 MS51957-28	2	SCREW, MACH., SST, PAN HD, 6-32 X 3/8 343-0169-000 AP	1	
	28 MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	3	
	29 310-0046-000	2	WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	2	
	30 549-4113-002	2	DOWEL, TUBULAR AP	2	
	31 335-0022-000	2	SETSCREW, SST, 6-40 X 1/8 COML AP	2	



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111	32	542-6624-002	2 COLLAR	1	
	33	549-4137-003	2 GEAR, SPUR, 84 TEETH	1	
	34	546-8145-002	2 SPRING, EXTENSION	2	
	35	549-4138-003	2 GEAR, SPUR, 84 TEETH	1	
	36	549-4151-003	2 POST, MULTI-TERMINAL	1	
	37	P347-0045-000	2 SCREW, MACH., SST, FIL H, 6-32 X 1-1/2 77250 347-0045-000 AP	1	
	38	MS35338-136	2 WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	1	
	39	310-0046-000	2 WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	1	
	40	1594-3	3 TERMINAL 71279 306-0212-000	5	
	41	549-4120-002	3 INSULATOR, SLV	1	
	42	549-4140-003	2 HOUSING, GEARCASE	1	
	43	MS51957-30	2 SCREW, MACH., SST, PAN HD, 6-32 X 1/2 343-0171-000 AP	2	
	44	MS51957-28	2 SCREW, MACH., SST, PAN HD, 6-32 X 3/8 343-0169-000 AP	1	
	45	MS35338-136	2 WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	3	
	46	310-0046-000	2 WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	2	
	47	549-4113-002	2 DOWEL, TUBULAR AP	2	
	48	549-4112-002	2 SPACER, SLV	1	
	49	MS51957-34	2 SCREW, MACH., SST, PAN HD, 6-32 X 1 343-0176-000 AP	1	
	50	MS35338-136	2 WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	1	
	51	SPL4040-4HOT TINNED	2 TERMINAL 77147 304-0332-000 EFF THRU MCN 1204 ONLY	7	A
	51	SPL4040-4HOT TINNED	2 TERMINAL 77147 304-0332-000 EFF THRU MCN 692 ONLY	1	B
	52	EWC15A5A196	2 SYNCHRO, 86197 229-6000-000 EFF B3 THRU MCN 1204	1	A
	52	EWC15A5A196	2 SYNCHRO, 86197 229-6000-000 EFF B3 THRU MCN 692	1	B
	52A	10FB1A	2 RESOLVER SCOTT, INC., B3 229-7027-010 EFF MCN 1205 SB 32	1	A
	52A	10FB1A	2 RESOLVER SCOTT, INC., B3 229-7027-010 EFF MCN 693 SB 32	1	B
R	52A	10FB1A	2 RESOLVER SCOTT, INC., B3 229-7027-010 SB 32	1	C
	53	MS51957-17	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/2 343-0137-000 EFF THRU MCN 1204 AP	3	A
	53	MS51957-14	2 SCREW, MACH., SST, PAN HD, 4-40 X 5/16 343-0134-000 EFF MCN 1205 SB 32 AP	3	A
	53	MS51957-17	2 SCREW, MACH., SST, PAN HD, 4-40 X 1/2 343-0137-000 EFF THRU MCN 692 AP	3	B
	53	MS51957-14	2 SCREW, MACH., SST, PAN HD, 4-40 X SB 32 5/16 343-0134-000 EFF MCN 693 AP	3	B
R	53	MS51957-14	2 SCREW, MACH., SST, PAN HD, 4-40 X 5/16 343-0134-000 AP SB 32	3	C



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111	53A 310-6340-000	2	WASHER, FLAT, SST, 0.125 ID, 0.281 OD COML EFF MCN 1205 AP	3	A
	53A 310-6340-000	2	WASHER, FLAT, SST, 0.125 ID, 0.281 OD COML EFF MCN 693 AP	3	B
	53A 310-6340-000	2	WASHER, FLAT, SST, 0.125 ID, 0.281 OD COML AP	3	C
	54 MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	3	
	55 549-4109-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 1204 AP	3	A
	55 549-4109-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 692 AP	3	B
	55 777-0901-001	2	CLAMP, RESOLVER EFF MCN 1205 AP SB 32	3	A
	55 777-0901-001	2	CLAMP, RESOLVER EFF MCN 693 AP SB 32	3	B
	55 777-0901-001	2	CLAMP, RESOLVER	3	C
	55A 763-2532-001	2	SPACER EFF MCN 1205 AP	3	A
	55A 763-2532-001	2	SPACER EFF MCN 693 AP	3	B
R	55A 763-2532-001	2	SPACER AP	3	C
	56 549-4111-002	2	SIDE PLATE, GEARCASE	1	
	57 MS51957-28	2	SCREW, MACH., SST, PAN HD, 6-32 X 3/8 343-0169-000 AP	4	
	58 MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	4	
	59 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	60 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	61 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	62 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	63 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	64 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	65 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	66 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	67 S418FCHH3P15 L02	2	BEARING 40920 309-1518-000	1	
	68 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	69 S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	70 549-4156-004	2	PLATE, GEAR	1	
	71 F358MILL6085 A	3	BEARING 70417 309-0116-000	1	
	72 549-4155-004	3	PLATE, GEAR	1	
	73 549-4123-003	2	GEAR ASSY, SPUR	1	
	74 MS51053-112	3	SETSCREW, CAD. PL STL, 4-40 X 1/8 328-0371-000	2	
	75 549-4107-002	3	COLLAR, GEAR	1	
	76 549-4084-002	3	GEAR, SPUR, 95 TEETH	1	
	77 542-4177-002	3	SPRING, LOAD	1	
	78 549-4128-003	3	GEAR, SPUR, 95 TEETH	1	
	78A 553-9420-003	2	SPRING, HELICAL, COMPRESSION EFF THRU MCN 1204	1	A



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111	78A 553-9420-003	2	SPRING, HELICAL, COMPRESSION EFF THRU MCN 692	1	B
	78B 763-5762-001	2	CONTACT, ELECTRICAL EFF MCN 1205	1	A
	78B 763-5762-001	2	CONTACT, ELECTRICAL EFF MCN 693	1	F
	78B 763-5762-001	2	CONTACT, ELECTRICAL	1	C
R	79 549-4123-003	2	GEAR ASSY, SPUR	1	
	80 MS51053-112	3	SETSCREW, CAD. PL STL, 4-40 X 1/8 328-0371-000	2	
	81 549-4107-002	3	COLLAR, GEAR	1	
	82 549-4084-002	3	GEAR, SPUR, 95 TEETH	1	
	83 542-4177-002	3	SPRING, LOAD	1	
	84 549-4128-003	3	GEAR, SPUR, 95 TEETH	1	
	85 549-4124-002	2	GEAR ASSY, SPUR	1	
	86 MS51053-112	3	SETSCREW, CAD. PL STL, 4-40 X 1/8 328-0371-000	2	
	87 549-4107-002	3	COLLAR, GEAR	1	
	88 549-4106-002	3	GEAR, SPUR, 84 TEETH	1	
	89 542-4177-002	3	SPRING, LOAD	1	
	90 549-4139-003	3	GEAR, SPUR, 84 TEETH	1	
	91 549-4105-002	2	GEARSHAFT, SPUR	1	
	92 549-4104-002	3	GEAR, SPUR, 80 TEETH	1	
	93 549-4136-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	94 549-4088-002	2	GEARSHAFT, SPUR	1	
	95 549-4087-002	3	GEAR, SPUR, 65 TEETH	1	
	96 549-4130-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	97 549-4103-002	2	GEARSHAFT, SPUR	1	
	98 549-4087-002	3	GEAR, SPUR, 65 TEETH	1	
	99 549-4135-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	100 549-4102-002	2	GEARSHAFT, SPUR	1	
	101 549-4101-002	3	GEAR, SPUR, 50 TEETH	1	
	102 549-4131-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	103 549-4100-002	2	GEARSHAFT, SPUR	1	
	104 5133-25C	2	RING 79136 340-0254-000 AP	1	
	105 549-4098-002	3	GEAR, SPUR, 48 TEETH	1	
	106 549-4099-002	3	SHAFT, STR	1	
	107 549-4097-002	2	GEARSHAFT, SPUR	1	
	108 549-4096-002	3	GEAR, SPUR, 64 TEETH	1	
	109 549-4134-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	110 549-4094-002	2	GEARSHAFT, SPUR	1	
	111 549-4093-002	3	GEAR, SPUR, 60 TEETH	1	
	112 549-4132-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	113 549-4095-002	2	GEARSHAFT, SPUR	1	
	114 549-4093-002	3	GEAR, SPUR, 60 TEETH	1	
	115 549-4133-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	116 549-4092-002	2	GEARSHAFT, SPUR	1	
	117 549-4091-002	3	GEAR, SPUR, 49 TEETH	1	
	118 549-4132-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	119 549-4086-002	2	GEARSHAFT, SPUR	1	
	120 549-4085-002	3	GEAR, SPUR, 70 TEETH	1	
	121 549-4129-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	122 549-4126-002	2	GEARSHAFT, SPUR	1	
	123 549-4125-002	3	GEAR, SPUR, 61 TEETH	1	
	124 549-4130-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	125 549-4090-002	2	GEARSHAFT, SPUR	1	
	126 549-4089-002	3	GEAR, SPUR, 60 TEETH	1	





GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE			UNITS PER ASSY.	USAGE CODE
1111 127	549-4152-003	3	GEARSHAFT, SPUR, 21 TEETH			1	
128	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
129	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
130	S418FCHH3P15 L02	2	BEARING 40920	309-1518-000		1	
131	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
132	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
133	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
134	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
135	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
136	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
137	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
138	S518FCHH3P15 L02	2	BEARING 40920	309-1519-000		1	
139	549-4110-002	2	PLATE, SWITCH MTG			1	
140	MS51957-15	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 343-0135-000 AP			2	
141	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP			2	
142	502-1515-002	2	WASHER AP			2	
143	549-4121-002	2	CLAMP, RIM CLENCHING AP			2	
144	SPL4040-2HOT TINNED	2	TERMINAL 77147	304-0331-000		5	
145	ETH11E4	2	SYNCHRO 86197	229-5003-000	B1	1	
145	7RS900-3A	2	SYNCHRO 88818	229-5004-000	B1	1	
146	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP			3	
147	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP			3	
148	542-4160-002	2	CLAMP, RIM AP			3	
149	665-55-84-1	2	MOTOR 72568	229-2004-000	MG1	1	
149	ST10009-4	2	MOTOR 03998	229-2005-000	MG1	1	
149	6229-70-02	2	MOTOR 77045	229-2042-010	MG1	1	
150	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP			3	
151	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP			3	
152	544-3541-002	2	CLAMP, RIM AP			3	
153	41A330	2	MOTOR 25140	230-0390-000	B2	1	
153A	41A144	2	MOTOR 25140	230-0257-000	B2	1	
154	MS51957-4	2	SCREW, MACH., SST, PAN HD, 2-56 X 5/16 343-0125-000 EFF THRU MCN 1359 AP			2	A



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GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111	154 MS51957-4	2	SCREW, MACH., SST, PAN HD, 2-56 X 5/16 343-0125-000 EFF THRU MCN 761 AP	2	B
	154A P347-0023-00 O	2	SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-0023-000 EFF MCN 1359 AP	2	A
	154A P347-0023-00 O	2	SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-0023-000 EFF MCN 762 AP	2	B
R	154A P347-0023-00 O	2	SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-0023-000 AP	2	C
	155 MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF THRU MCN 1431 AP	2	A
	155 MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF THRU MCN 799 AP	2	B
	155A MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF MCN 1432 AP	2	A
	155A MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF MCN 800 AP	2	B
R	155A MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	2	C
	156 549-4108-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 1358 ONLY AP	2	A
	156 549-4108-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 761 ONLY AP	2	B
	156A 310-0044-000	2	WASHER, FLAT, SST, 0.093 ID, 0.250 OD COML EFF MCN 1359 AP	2	A
	156A 310-0044-000	2	WASHER, FLAT, SST, 0.093 ID, 0.250 OD COML EFF MCN 762 AP	2	B
R	156A 310-0044-000	2	WASHER, FLAT, SST, 0.093 ID, 0.250 OD COML AP	2	C
	157 665-054-262A	2	MOTOR 72568 229-1000-000 B5	1	
	157 S11014-4	2	MOTOR 03998 229-1001-000 EFF MCN 1444 B5	1	
	158 MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP	2	
	159 MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	2	
	160 542-4160-002	2	CLAMP, RIM AP	2	
	161 SPL4040-2HOT TINNED	2	TERMINAL 77147 304-0331-000 EFF THRU MCN 1212	5	A
	161 SPL4040-2HOT TINNED	2	TERMINAL 77147 304-0331-000 EFF THRU MCN 727	1	B
	162 EGH11G4A521	2	SYNCHRO 86197 229-3003-000 EFF THRU MCN 1212 B4	1	A
	162 EGH11G4A521	2	SYNCHRO 86197 229-3003-000 EFF THRU MCN 727 B4	1	B
	162A TGH11E4B080	2	SYNCHRO 86197 229-3045-010 EFF MCN 1213 B4	1	A



GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111	162A TGH11E4B080	2	SYNCHRO 86197 229-3045-010 EFF MCN 728	B4	1 B
K	162A TGH11E4B080	2	SYNCHRO 86197 229-3045-010	B4	1
	163 MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP		3 C
	164 MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP		3
	165 542-4160-002	2	CLAMP, RIM AP		3
	166 549-4158-004	2	PLATE, GEAR		1
	167 309-0118-000	3	BEARING, SLV 12204		1
168 549-4157-004	3	PLATE, GEAR		1	

