NAVSHIPS 92942 0967-905-4010 Formerly 0280 420 4000

TECHNICAL MANUAL

FOR

SINGLE SIDEBAND CONVERTER

FOR

RADIO TRANSMITTING SET AN/SRT-15

Contract NObsr-71373

Item 3

F E D E R A L T E L E C O M M U N I C A T I O N L A B O R A T O R I E S

a division of International Telephone and Telegraph Corporation

500 WASHINGTON AVENUE

NUTLEY 10, NEW JERSEY

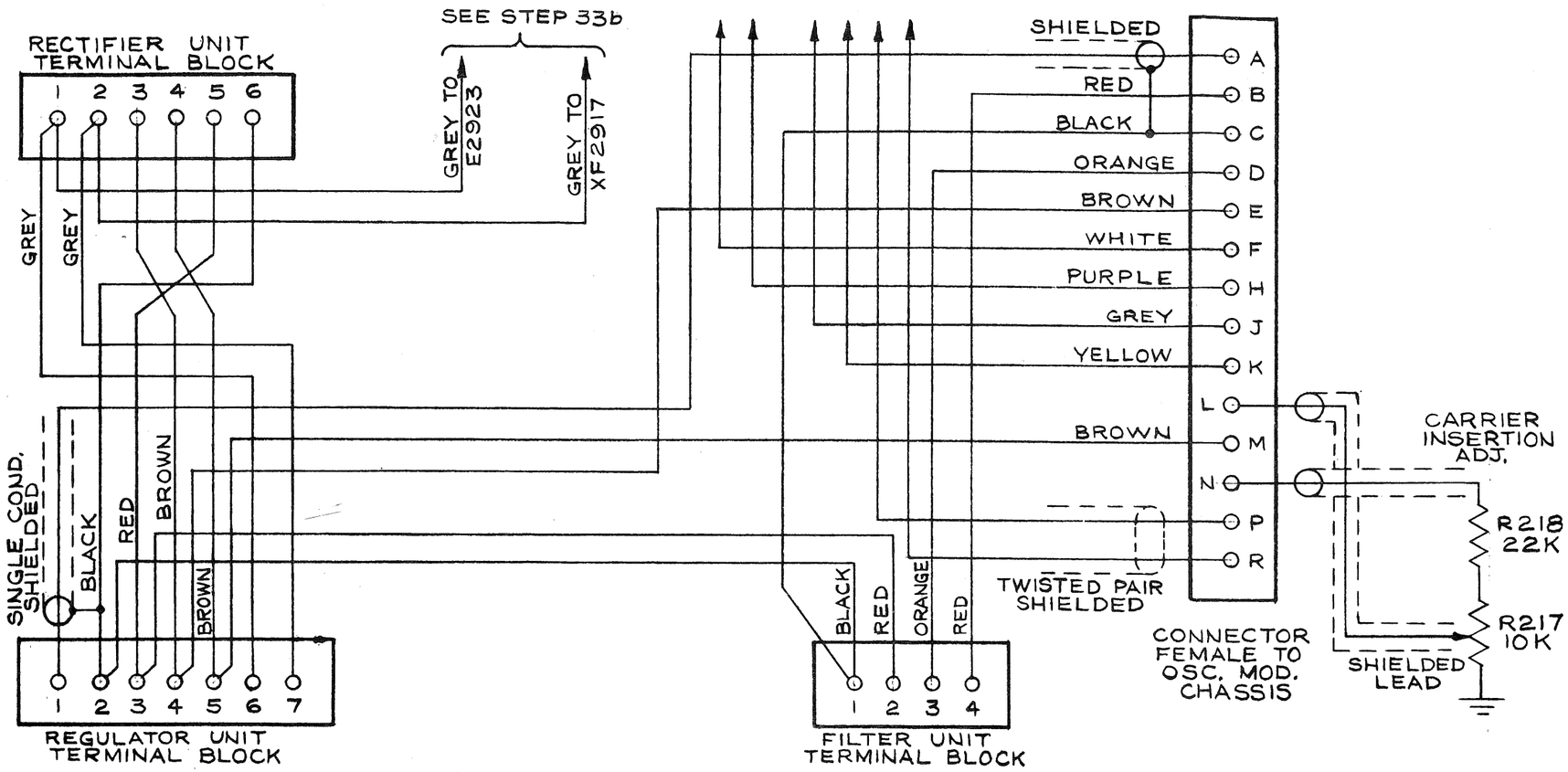
January 1958

DEPARTMENT OF THE NAVY

BUREAU OF SHIPS

WASHINGTON 25, D.C.

FIGURE FOR STEP #33



NOTES:
1. SLIP A 1 INCH PEICE OF #6 TUBEING OVER WIRE.
2. SOLDER #6 LUG TO WIRE.
3. SLIP TUBEING DOWN OVER LUG.

FIGURE 6

A	ORIGINAL ISSUE	REVISIONS		
ISS	CHGD BY & DATE	APPD BY & DATE	ECN NUMBER	
DESCRIPTION				

G6	G5	G4	G3	G2	G1	ITEM	DWG SIZE	PART NUMBER	DESCRIPTION	U OF M	SOURCE
QUANTITY PER GROUP						LIST OF MATERIAL					

UNLESS OTHERWISE SPECIFIED			
DIMENSIONS ARE IN INCHES AND EXCLUDE APPLIED FINISHES			
TOLERANCES			
BASIC DIM.	FRACTIONS	DECIMALS	ANGLES
UNDER 6	± 1/64	± .005	± 1/2°
6 TO 24 INCL.	± 1/32	± .010	
OVER 24	± 1/16	± .015	
ECCENTRICITY	T.I.R.	SURFACES	✓
COMMERCIAL TOLERANCES APPLY TO STOCK SIZES			
SCREW THREADS PER N.B.S. HANDBOOK H28			

GROUP	NEXT ASSEMBLY	FIRST USED ON
G6		
G5		
G4		
G3		
G2		
G1		

APPLICATION

MATERIAL

FINISH

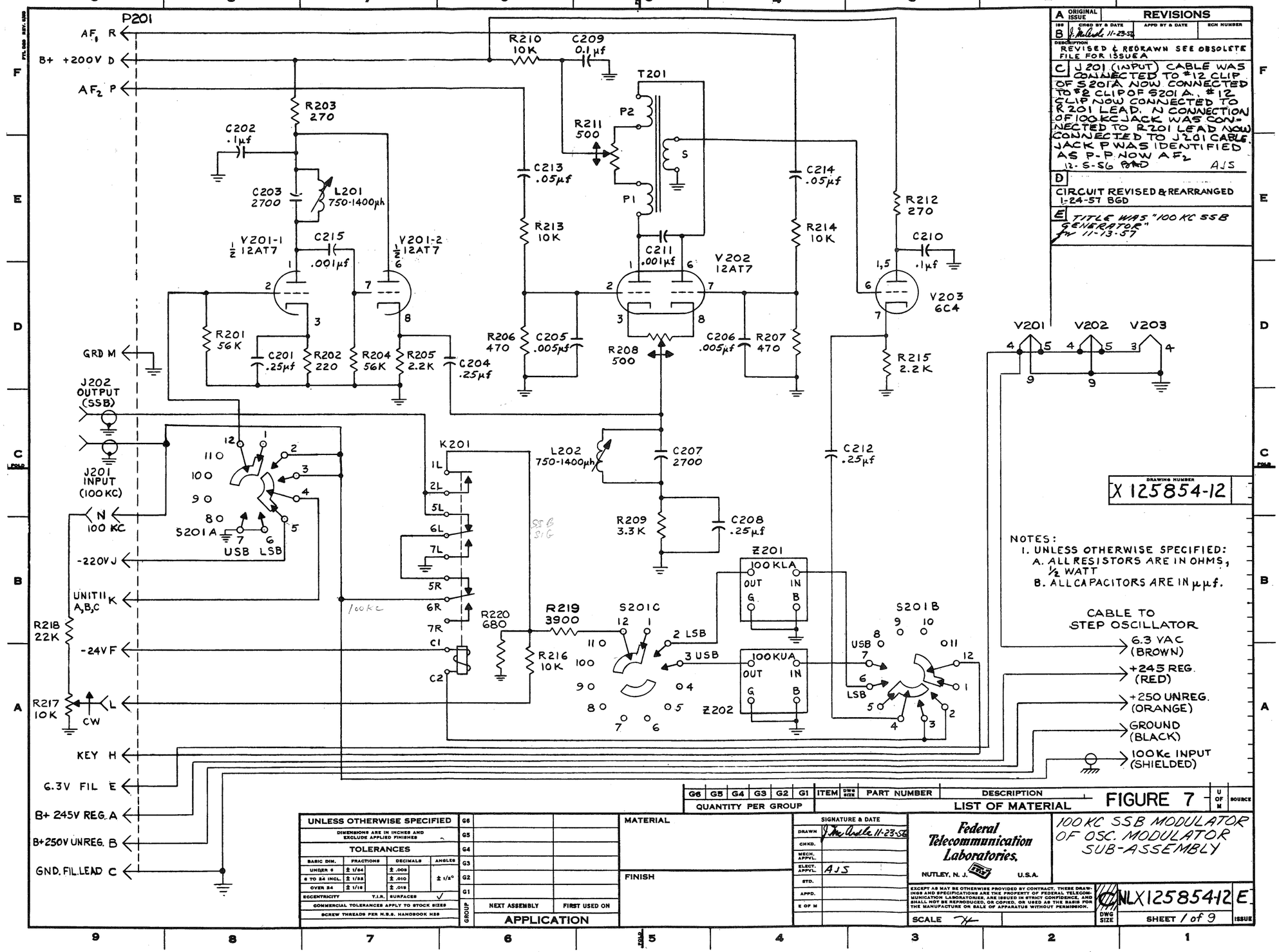
SIGNATURE & DATE	
DRAWN	J. ZUBRIS 4/10/57
CHKD.	
MECH. APPVL.	
ELECT. APPVL.	
STD.	
APPD.	
E OF M	

Federal Telecommunication Laboratories,
NUTLEY, N. J. U.S.A.

FIGURE FOR STEP #34

SCALE

DWG SIZE	SHEET	ISSUE
B		



REVISIONS			
A ORIGINAL ISSUE			
B	CHKD BY & DATE J. Mallard 11-23-56	APPD BY & DATE	ECN NUMBER
DESCRIPTION: REVISED & REDRAWN SEE OBSOLETE FILE FOR ISSUE A			
C	J201 (INPUT) CABLE WAS CONNECTED TO #12 CLIP OF S201A NOW CONNECTED TO #8 CLIP OF S201A. #12 CLIP NOW CONNECTED TO R201 LEAD. IN CONNECTION OF 100KC JACK WAS CONNECTED TO R201 LEAD NOW CONNECTED TO J201 CABLE JACK P WAS IDENTIFIED AS P-P NOW AF2 12-5-56 BGD AJS		
D	CIRCUIT REVISED & REARRANGED 1-24-57 BGD		
E	TITLE WAS "100 KC SSB GENERATOR" 11-13-57		

DRAWING NUMBER X 125854-12

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   A. ALL RESISTORS ARE IN OHMS, ½ WATT
   B. ALL CAPACITORS ARE IN µµf.

Carrier Insertion Control

G6	G5	G4	G3	G2	G1	ITEM	DWG SIZE	PART NUMBER	DESCRIPTION	U OF M	SOURCE
QUANTITY PER GROUP									LIST OF MATERIAL		

FIGURE 7

UNLESS OTHERWISE SPECIFIED			
DIMENSIONS ARE IN INCHES AND EXCLUDE APPLIED FINISHES			
TOLERANCES			
BASIC DIM.	FRACTIONS	DECIMALS	ANGLES
UNDER 6	± 1/64	± .005	± 1/2°
6 TO 24 INCL.	± 1/32	± .010	
OVER 24	± 1/16	± .015	
ECCENTRICITY	T.I.R.	SURFACES √	
COMMERCIAL TOLERANCES APPLY TO STOCK SIZES			
SCREW THREADS PER N.B.S. HANDBOOK H28			

GROUP	NEXT ASSEMBLY	FIRST USED ON
G6		
G5		
G4		
G3		
G2		
G1		
	APPLICATION	

MATERIAL

FINISH

SIGNATURE & DATE	
DRAWN	J. Mallard 11-23-56
CHKD.	
MECH. APPVL.	
ELECT. APPVL.	AJS
STD.	
APPD.	
E OF M	

Federal Telecommunication Laboratories, NUTLEY, N. J. U.S.A.

100 KC SSB MODULATOR OF OSC. MODULATOR SUB-ASSEMBLY

SCALE

DWG SIZE X NLX12585412 E

SHEET 1 of 9

ISSUE

71/72

NOTES
1. ALL RESISTORS ARE ½ WATT UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTOR VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
3. ALL CAPACITOR VALUES ARE IN μμf UNLESS OTHERWISE SPECIFIED
4. FOR VALUE OF R124 SEE E.P.L.

FIGURE 8

UNLESS OTHERWISE SPECIFIED		
ALL DIMENSIONS IN INCHES		
TOLERANCES		
BASIC DIM.	FRACTIONS	DECIMALS
UNDER 6	±1/64	±.005
6 TO 24 INCL.	±1/32	±.010
OVER 24	±1/16	±.015
ANGLES ±	ECCENTRICITY TIR.	
HOLE DIA. ±	SURFACES ✓	
COMMERCIAL TOLERANCES APPLY TO STOCK SIZES		

A ORIGINAL ISSUE
REVISIONS
B GENERAL REVISIONS 12/14/56 BAO
C CIRCUIT REVISED B Dunn 1-25-57
D C102 WAS 500V, ADDED T.P. 101 & T.P. 102, C104 WAS 200V @ZONE 7-8 E-F. ADDED CONN. TO S101A PIN 5 FROM R139, & C133 WAS 500V, R118 WAS R142 @ZONE 5-6C, C125 WAS 600V ADDED COMPONENT DESIG. Z101 @ZONE 4C, C112 WAS 400V @ZONE 2E 1KC STEPS WAS 90 TO 100KC @ZONE 1D, DELETED CONNECTION ON S101B PIN 5. EG. 7,720/52.
E TITLE WAS "OSCILLATOR" JW 11-14-57

ITEM NO.	DWG. SIZE	PART NUMBER	PART DESCRIPTION	UNIT QUANTITY PER ASSEMBLY -1	-2	-3	-4	-5	-6	-7	-8	-9	U OF M	SOURCE

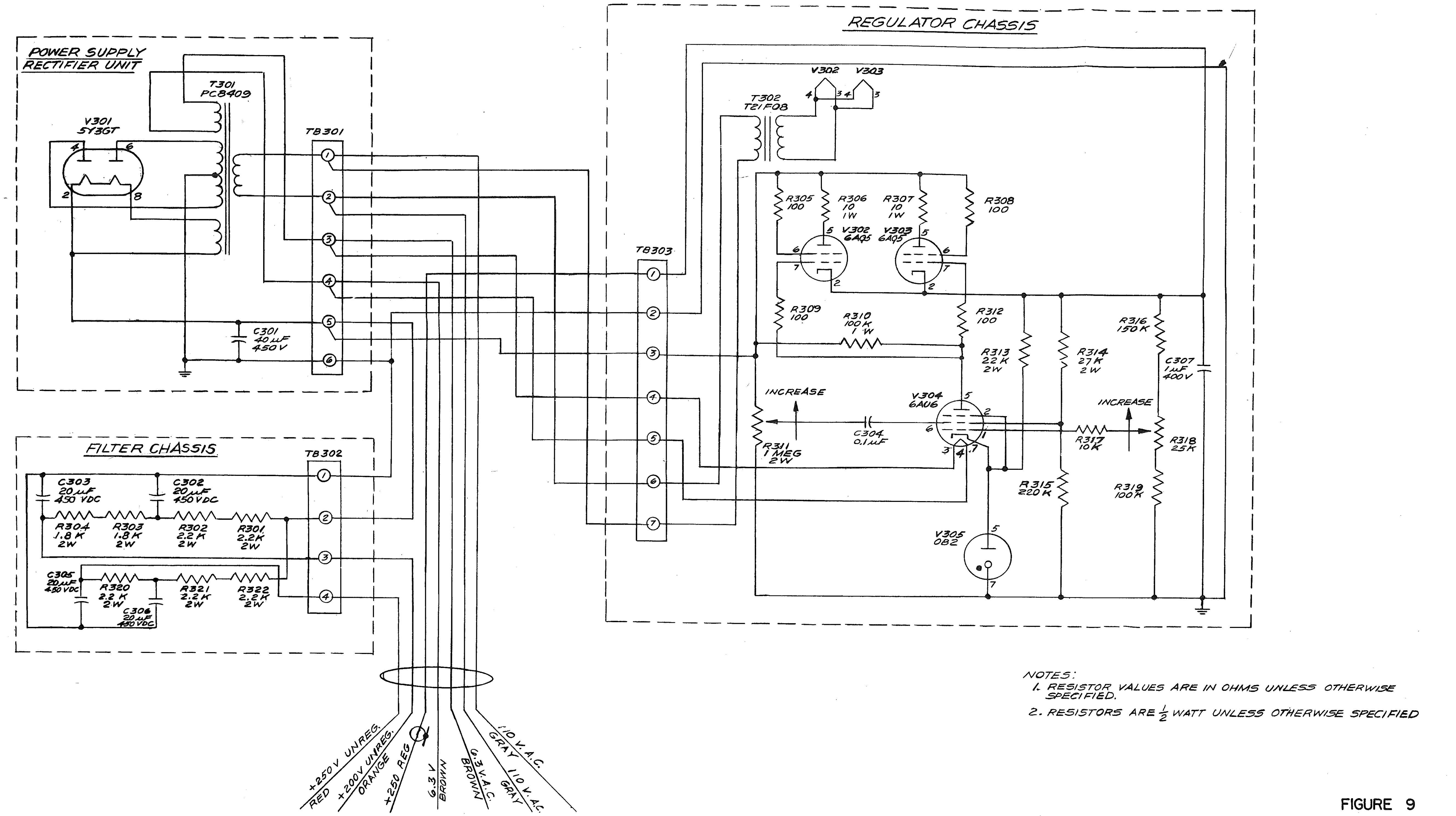
FIRST USED ON
NEXT ASSEMBLY | BILL OF MATERIAL

Federal Telecommunication Laboratories,
A DIVISION OF IT&T NUTLEY, N. J., U. S. A.

1KC STEP OSCILLATOR OF OSC. MODULATOR SUB-ASSEMBLY

MATERIAL ———
FINISH ———
SCALE ~
E OF M
SOURCE
DATE 10-26-56
DRAWN J. McARDLE
CHKD. DES.
ENG. DFS
APPD.
DWG. SIZE D
NLX125866-14
Sheet 1 of 18
ISSUE E

D NLX125866-14



NOTES:
1. RESISTOR VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
2. RESISTORS ARE ½ WATT UNLESS OTHERWISE SPECIFIED.

FIGURE 9

ITEM NO.	DWG. SIZE	PART NUMBER	PART DESCRIPTION	UNIT QUANTITY PER ASSEMBLY -1 -2 -3 -4 -5 -6 -7 -8 -9	U OF M	SOURCE

UNLESS OTHERWISE SPECIFIED		
ALL DIMENSIONS IN INCHES		
TOLERANCES		
BASIC DIM.	FRACTIONS	DECIMALS
UNDER 6	± 1/64	± .005
6 TO 24 INCL.	± 1/32	± .010
OVER 24	± 1/16	± .015
ANGLES ±	ECCENTRICITY TIR.	
HOLE DIA. ±	SURFACES ✓	
COMMERCIAL TOLERANCES APPLY TO STOCK SIZES		

REVISIONS
A ORIGINAL ISSUE
B 12-4-56 BAO REVISED & REDRAWN SEE VOID FILE FOR ISSUE A.
C VALUE OF C303, C302 & C304 CHANGED B.D. 1-25-57
D IN ZONE 5D REMOVED CONNECTION BET. R309 & R310; ADDED CONN. BET R305 & V304, R312; ADDED CONN. BET R310 & TB303-3 10-31-57
E TITLE WAS "SCHEMATIC POWER SUPPLY SINGLE SIDE BAND." 11-14-57

FIRST USED ON	
NEXT ASSEMBLY	BILL OF MATERIAL

Federal Telecommunication Laboratories, A DIVISION OF IT&T NUTLEY, N. J., U. S. A.

POWER SUPPLY SUB-ASSEMBLY

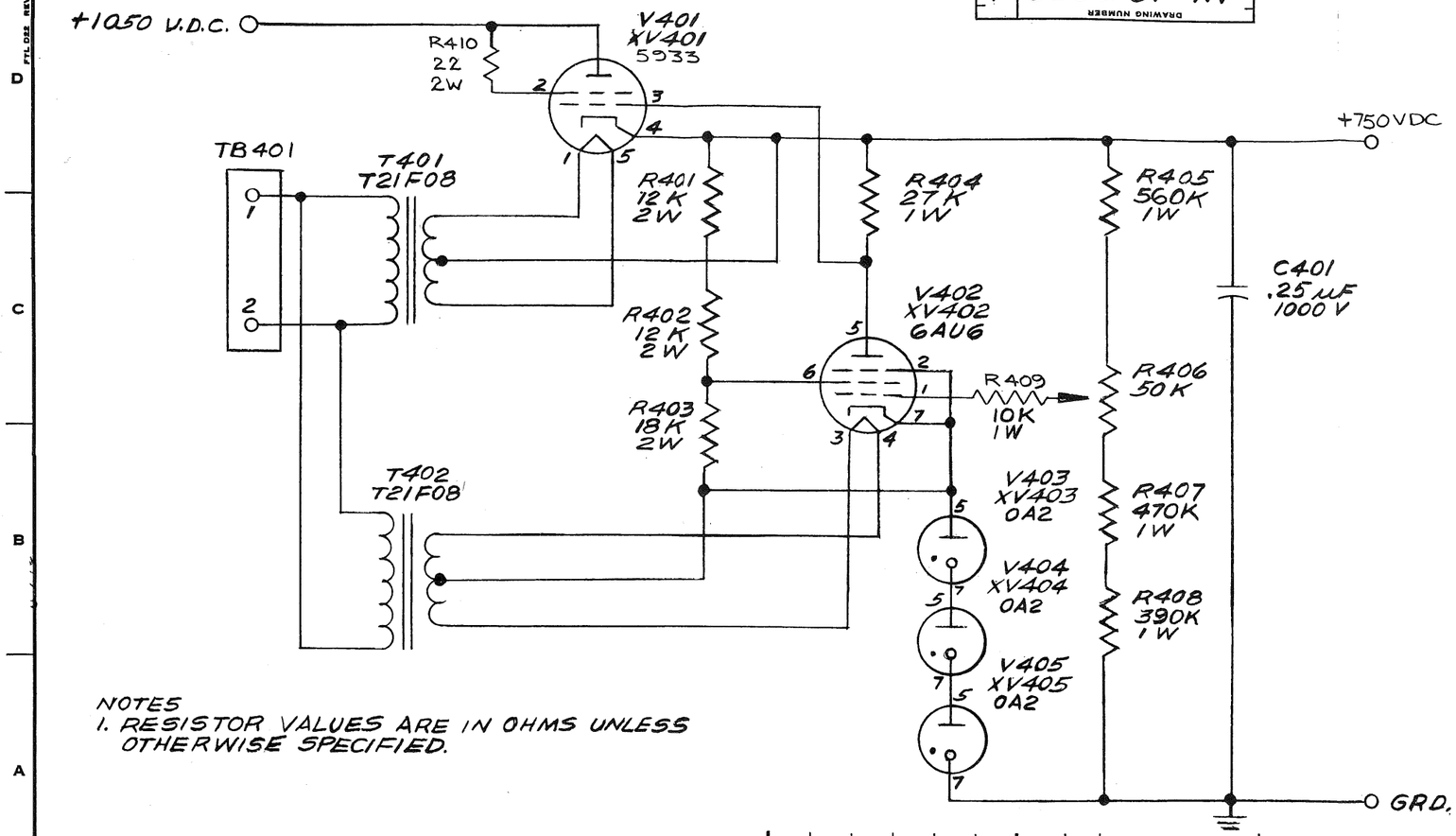
MATERIAL —
FINISH —
SCALE | E OF M | SOURCE | DATE 12-4-56
DRAWN B.Nelson | CHKD. DES. | ENG. PKS | APPD.
DWG. SIZE D NLX 125862-1 Sheet 1 of 8 ISSUE E

D NL-125862-1

101/102

DRAWING NUMBER NL-125872 A

A	ORIGINAL ISSUE	REVISIONS		
ISS	CHGD BY & DATE	APPD BY & DATE	ECN NUMBER	
B	B. Dwyer 1-24-57			
DESCRIPTION: REVISED-RES. VALUES & ADDED TB DESIG.				
C	F. Kuhlmann 10-31-57			
IN ZONE 5D ADDED R410; IN ZONE 4D TUBE TYPE DESIG FOR V401 WAS 807; IN ZONE 3C ADDED SYMBOL DESIG R409				
D	AV 11-13-57			
TITLE WAS "P.A. SCREEN REGULATOR.				



NOTES
1. RESISTOR VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.

FIGURE 10

G6	G5	G4	G3	G2	G1	ITEM	DWG SIZE	PART NUMBER	DESCRIPTION	U OF M	SOURCE
QUANTITY PER GROUP						LIST OF MATERIAL					

UNLESS OTHERWISE SPECIFIED				
DIMENSIONS ARE IN INCHES AND EXCLUDE APPLIED FINISHES				
TOLERANCES				
BASIC DIM.	FRACTIONS	DECIMALS	ANGLES	
UNDER 6	± 1/64	± .005	± 1/2°	
6 TO 24 INCL.	± 1/32	± .010		
OVER 24	± 1/16	± .015		
ECCENTRICITY T.I.R.		SURFACES	✓	
COMMERCIAL TOLERANCES APPLY TO STOCK SIZES				
SCREW THREADS PER N.B.S. HANDBOOK H28				

GROUP	NEXT ASSEMBLY	FIRST USED ON
G6		
G5		
G4		
G3		
G2		
G1		
APPLICATION		

MATERIAL: #

FINISH: #

SIGNATURE & DATE	
DRAWN	[illegible] 11/5/56
CHKD.	
MECH. APPVL.	
ELECT. APPVL.	PKS
STD.	
APPD.	
E OF M	

Federal Telecommunication Laboratories,
NUTLEY, N. J. U.S.A.

REGULATOR VOLTAGE SET

SCALE

DWG SIZE B — BNL-X125872-2 D — SHEET 1 of 6 — ISSUE

111112

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ILLUSTRATIONS

TECHNICAL MANUAL

FOR

SINGLE SIDEBAND

CONVERTER FOR RADIO TRANSMITTING SET AN/SRT-15

SECTION I - GENERAL DESCRIPTION

A. Introduction

The present AN/SRT-15 Radio Transmitter provides several communication services, but here we are only concerned with the speech modulation, which is accomplished by applying the proper audio signal level to the plate circuit of the final power amplifier. The resulting double sideband modulated carrier is a conventional AM spectrum which is the type shown in Figure 1A. The same intelligence is contained in both the upper and lower sidebands; therefore, the elimination of one subtracts nothing as far as the quantity of information that may be transmitted is concerned. The carrier may be injected at the receiving apparatus, and if properly resupplied causes practically no loss in signal fidelity. In fact for long hall communication circuits the fidelity will be considerably improved because selective fading effects will be reduced.

In transmitting the single sideband signal the output RF amplifier does not have to supply the carrier power or the unused sideband power. Thus, the same final amplifier tube can usually be made to provide about 6 db more "talk power" in single sideband operation than in AM.

Figure 1B is a single sideband spectrum. Note that only one sideband is transmitter and the carrier is suppressed to the best ability of the equipment.

Single sideband operation of the transmitter is accomplished by generating the signal at 100 KC and injecting it into unit 5 of the frequency generator. This signal is injected at the same point as the frequency shift keying

signal, hence is heterodyned to the output frequency, of radio frequency oscillator.

A linear power amplifier is required for single sideband operation rather than the Class C used for Plate Modulated AM. The conversion of the final amplifier is effected by changing the operating point of the output tube.

B. Description

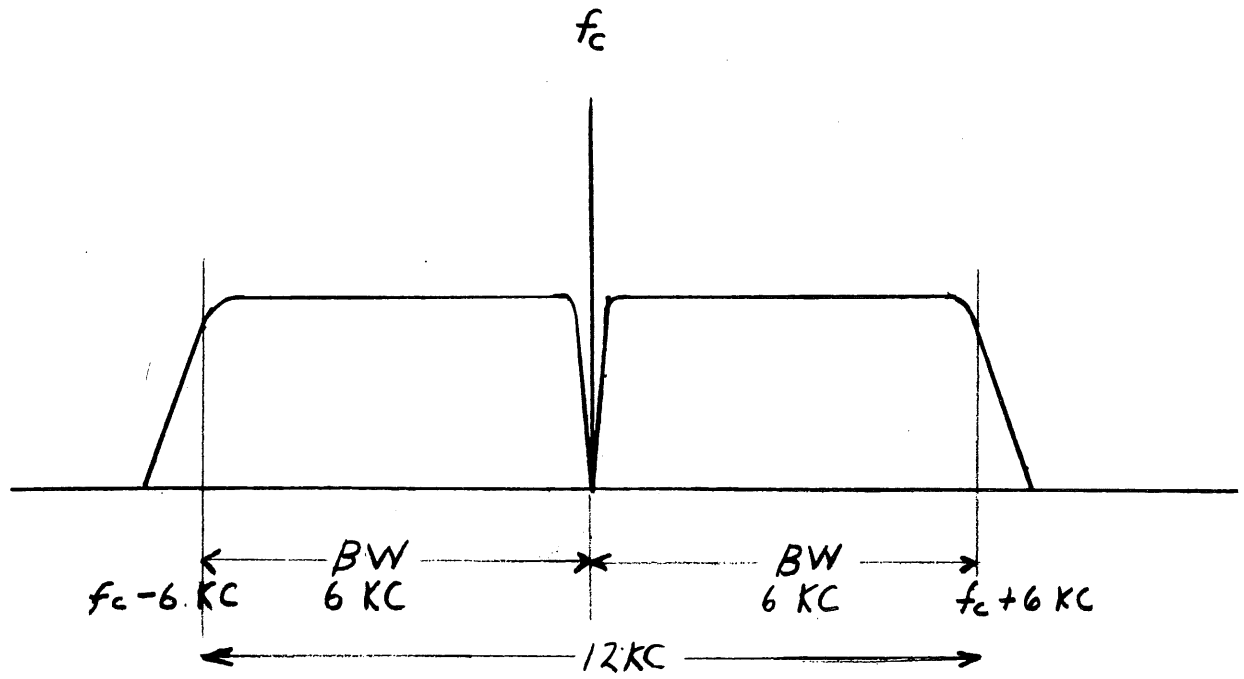
The Subassembly Oscillator-Modulator fits in the space previously occupied by the interpolation oscillator, unit 3.

The modulator section of the Subassembly Oscillator Modulator produces the single sideband signal at a carrier frequency of 100 kc. Either upper or lower sideband may be transmitted by setting a selector switch on the front panel, of the Radio Frequency Oscillator.

The interpolation oscillator, unit 3, is the only frequency generating component in the equipment that is not referenced to the crystal oscillator. In order to improve the stability of the transmitter this oscillator is replaced by a phase locked oscillator which provides 1 kc steps from 90 kc to 99 kc.

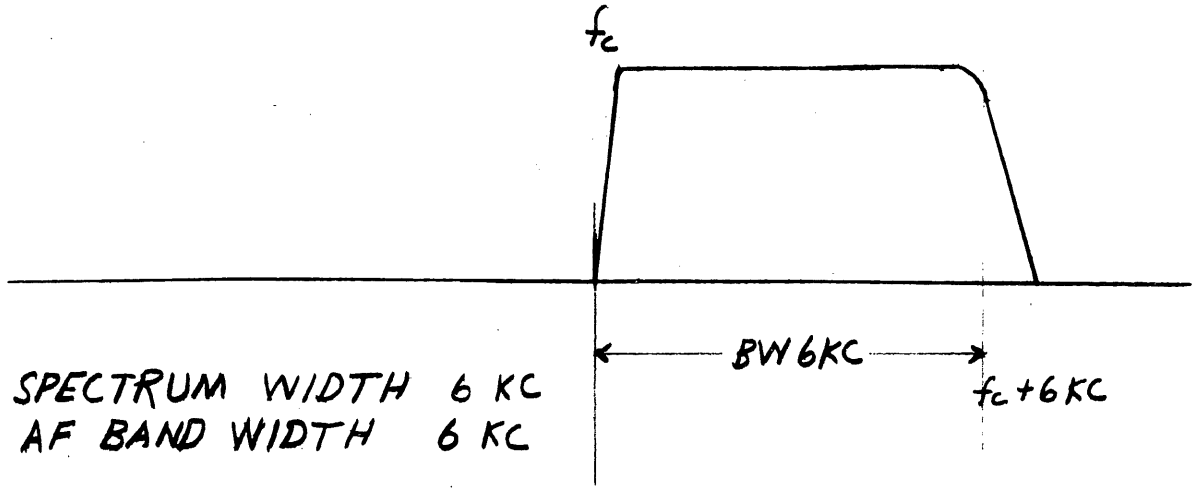
Filament and plate power for the Subassembly Oscillator Modulator are supplied by the Power Supply Subassembly composed of the following 3 units. A rectifier unit consisting of a power transformer, a 5Y3GT full wave rectifier, and a 40 MFD filter capacitor. A filter unit containing two RC filters, each filter consisting of 2 RC sections in cascade. One filter section provides 250 volts dc output, and the other section provides 200 volts dc. The third unit is an electronic regulator to stabilize the plate voltages supplied to the oscillator section

The power amplifier is converted from Class C to a Class AB linear by decreasing the bias on the control grid, and increasing the screen grid voltage to 700 volts dc. The screen grid voltage is held nearly constant by the regulator set subassembly, which receives its voltage from the medium voltage power supply.



SPECTRUM WIDTH 12 KC
AF BAND WIDTH 6 KC

PLATE MODULATED RF SPECTRUM
FIGURE 1A



SPECTRUM WIDTH 6 KC
AF BAND WIDTH 6 KC

SINGLE SIDE BAND WITH SUPPRESSED CARRIER RF SPECTRUM

FIGURE 1B

FIGURE 1

SECTION 2 - THEORY OF OPERATION

A. Subassembly Function

The function of the oscillator modulator subassembly is two fold. First it provides the single sideband signal at a carrier frequency of 100 kc, and secondly, a CW signal in 1 kc increments from 90 kc to 99 kc referenced to the transmitters master oscillator.

B. 100-kc SSB Modulator

The modulator section of the Oscillator Modulator Subassembly takes the audio signal from the Modulator Radio MD-229/SRT and converts it to a single sideband signal at a carrier frequency of 100 kc. The switch S-201 permits transmission of the upper sideband, the lower sideband, or the services employing constant amplitude carrier. Three tubes are required to perform this service V-201 amplifier cathode follower, V-202 balanced modulator, and V-203 output cathode follower.

With the selector switch S-201 in either the upper or lower sideband position, the 100 kc signal from the crystal oscillator is fed to the grid of the amplifier V-201A. The resistor R-201 returns the grid to ground; bias is developed by the cathode resistor by-pass capacitor network R-202 and C-201.

The inductor L-201 and capacitor C-203 are tuned to the frequency of the incoming signal, thus providing a high plate load impedance at 100 kc. The signal developed across the tuned circuit (L-201 and C-203) is coupled to the grid of the cathode follower (V-201B) by C-215, which is returned to ground by R-204. The output voltage is developed across the resistor R-205, and is coupled to the balanced modulator by the capacitor C-204.

The plate of V-201A and V-201B is decoupled from the supply bus by C-203 and C-202.

The 100 kc carrier signal is fed to each cathode of the twin triode V-202. The grids are maintained at ground potential at this frequency by the resistor capacitor networks R-206, C-205, and R-207, C-206. A high cathode to ground impedance is provided by the tuned circuit L-202 and C-207 across which the carrier voltage is fed.

The carrier signal applied between grids and common cathode connection causes the AC plate voltage in each triode section to be in phase. However, the flux produced by winding P_1 of T-201 is 180^o out of phase with the flux produced by P_2, with the result that nearly no 100 kc signal is produced in the secondary (S) winding. The potentiometer R-211 permits balancing of the phase angles of the plate to ground impedance so that the 100 kc component of plate current in P_1 is 180^o out of phase with that of P_2. The potentiometer in the cathode circuit (R-208) allows adjustment of plate current so that the magnitudes of the plate current are the same in each half of the primary. The capacitor C-211 tunes the primary of T-201 so that the plate to plate impedance looks resistive.

Up to this point we have considered the operation of the circuit with only the carrier applied to grid through the cathode to ground impedance, which will produce an average plate current. The audio signal is applied to the grids of V-202 in push-pull from the output of the cathode follower of the modulator Radio MD-229/SRT. Thus, a signal causing one grid to go positive will cause the other grid to go negative producing an increase in the plate current in one winding of T-201 and a decrease in plate current in the other winding at an audio rate. This audio plate current is superimposed on the 100 kc plate current with the result that two sidebands are produced. The lower sideband is the carrier signal frequency minus the audio signal, and the upper sideband is the carrier frequency plus the audio signal frequency.

The audio signal is coupled to the grids of V-202 through a dc blocking capacitor C-213, and the resistive attenuator network R-213 in series with R-206 on one grid; and C-214, R-214, and R-207 on the other.

R-209 provides dc bias for the grids of V-202 while C-208 maintains ac ground potential at the bottom of tuned circuit.

The upper and lower sideband signals generated by the modulator are coupled to the grid of the output cathode follower (V-203) by the secondary of T-201. The plate circuit is decoupled from the power supply by R-212 and C-210.

The output voltage developed across R-215 is fed to the upper or lower sideband filter through the blocking capacitor C-212 and the selector switch S-201. If the lower sideband is to be transmitted, S-201 is set in the LSB position, and filter Z-201 attenuates the upper sideband. Likewise setting the selector switch in the USB position permits transmission of the upper sideband, with the lower sideband attenuated by Z-202.

The output of either sideband filter is fed to the network R-219, R-220 and R-226. This network attenuates the output signal and provides carrier reinsertion through R-216, R-217 and R-218. The potentiometer R-217 permits the value of the reinserted carrier to be varied.

The relay K-201 couples 100 kc carrier to output J-202 when de-energized, and the output of the sideband modulator to J-202 when energized.

Placing the selector switch S-201 in the extreme counter clockwise position (Position #1) applies the 100 kc signal fed to the modulator section directly to the output through K-201.

C. 1-kc Step Oscillator Section

The oscillator section is composed of the following five circuits:

a shunt fed colpitz oscillator V-103, a reactance tube modulator V-101, a synchronized blocking tube oscillator V-104, a frequency mixer V-106, and a coincident detector V-105.

The oscillators tank circuit inductance consist of L-111 in series with L-101 through L-110, which permit adjustment at each 1 kc step. The capacitance tuning the tank coil is the parallel combination of C-112, through C-114 connected in series with the parallel combination of C-109 through C-111. Since, the total capacitance between plate and ground is approximately one-tenth of the total capacitance between the grid and ground the tank circuit is essentially tuned by the plate to ground capacity. The grid to ground capacitance acts as a voltage divider feeding about one-tenth of the voltage appearing across the tank circuit back to the grid.

The resistance network R-137 in series with R-107 provides the proper dc voltage on grid #2, which is held at ac ground potential by C-115.

Bias voltage for grid #1 is produced by grid rectification, this voltage is developed across the grid leak resistor R-138.

The capacitor C-112 functions as a dc blocking condenser for the output voltage divider R-108, R-109, and R-110. The voltage across R-110 is fed to J-102, the output jack, via Section B of S-101.

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The frequency mixer V-106 combines the oscillator output signal developed across R-109 and R-110, and the 100 kc signal fed in from the modulator section. The principle signals appearing at the plate of the mixer are the oscillator signal (f_o) the 100 kc signal (f_c) the sum frequency $f_c + f_o$ and the difference frequency $f_c - f_o$. However, the filter Z-101 rejects all but difference frequency, which is fed to grid #1 of coincident detector V-105.

Bias voltage on grid #1 of the mixer V-106 is developed by R-129 which is by-passed by C-128.

Grid #1 is returned to ground through R-136, with the 100 kc signal fed to it through the series isolating resistor R-135. The resistance network R-127 and R-128 provide the proper grid #2 voltage, here C-126 is the by-pass capacitor. The oscillator signal is fed through R-133 to grid #3 which is returned to the cathode by R-134.

The parallel combination of R-131 and R-132 provide the plate load impedance, and the correct sending end impedance for the filter Z-101. The plate circuit is decoupled from the power supply bus by R-130 and C-127.

The coincident detector V-105 compares two signals and feeds the resulting modulation to the reactance tube V-101. We have already discussed the mixer which beats down the step oscillator frequency by subtracting it from the 100 kc signal. Thus with the step oscillator set at 95 kc the signal appearing on grid #1 of V-105 will be 100 kc -95 kc or 5 kc. This 5 kc signal is then compared with a 1 kc pulse which is provided by the synchronized blocking oscillator. Both the 1 kc and the 100 kc signals are derived from the same master oscillator; therefore, only the frequency variation of the step oscillator will cause a variation in the 5 kc signal. If the 5 kc signal frequency is slightly different from the 1 kc signal, the 1 kc pulses will be amplitude modulated by a frequency which is the error between the oscillator step (set at 95 kc) and the master oscillator. This error signal is then filtered and placed on the grid of the reactance tube V-101 which corrects the frequency of the step oscillator toward zero error.

The 1 kc pulses fed on grid #3 of the coincident detector are derived from a synchronized blocking tube oscillator V-104B. The transformer

T-101 provides the feedback coupling between the grid and plate circuits. The negative pulse developed across R-117 is coupled to grid #3 of V-105 through C-133.

The capacitor C-119 and resistors R-116 and R-117 determine the repetition rate of the blocking oscillator which is adjusted to be a little longer than 1 kc with the synchronizing pulses absent. The pulses fed to the grid of V-104B have a positive polarity and a repetition frequency of 10 kc.

Assume that the oscillator has just completed a cycle of operation, thus we find the grid of V-104B cut off and the capacitor C-119 charged with the negative terminal connected to the grid through the primary of T-101. The capacitor begins to discharge exponentially through the resistors R-115 and R-116 connected across it, thus permitting the grid to rise toward cut off. The resistance across the capacitor C-119 is adjusted so that only every 10th pulses arriving at the grid has sufficient amplitude to raise it above cut off, initiating the flow of plate current through the tube. As current starts flowing through the plate circuit of V-104B a voltage is induced in the primary winding which drives the grid more positive causing the plate current to increase. This cummulative effect continues until the plate circuit reaches saturation at which time the current then begins to decrease. The decreasing current in the secondary of T-101 causes the grid voltage to decrease. During the time grid was positive it acted as a diode charging the capacitor C-119, hence when the instantaneous grid voltage falls below cut off it will be maintained at this value until the capacitor C-119 discharges sufficiently for the synchronizing pulse to initiate the next cycle of operation.

The pulse amplifier V-104A provides a positive pulse of the proper amplitude to the grid of V-104B for synchronization of the blocking tube oscillator. The 10 kc pulses from the 10 kc step generator (unit 6) of the Oscillator Radio

Frequency 0-275/SRT are fed to the grid of V-104A through the coupling capacitor C-116. The grid is maintained at zero bias by the network R-111 and R-112. The plate voltage is lowered to limit the plate current to a safe value by the decoupling network R-113, C-117 and the plate load resistor R-114.

A negative pulse arriving at the grid will decrease the plate current through V-104A, thus causing the plate to rise toward the supply bus. As the grid voltage returns toward zero the plate current will increase dropping the plate voltage to its zero bias value. The resulting positive pulse is coupled to the grid of V-104B by the blocking capacitor C-118.

Up to this point we have discussed the circuits necessary to provide signal voltages to the coincident detector and how these signals are combined to produce an error signal which corrects the step oscillator frequency. Now we shall discuss the operation of the coincidence detector and the reactance tube.

The 1 kc pulse signal developed by the synchronized blocking oscillator is coupled to the grid #3 of V-105 by C-133. The grid is held at zero dc potential by the resistor network R-147 and R-118. The step oscillator frequency (f_o) minus the 100 kc (f_c) is coupled to grid #1 through R-126 and R-124, with grid bias developed by the cathode resistor R-123 which is by-passed by C-123.

The network of R-121 and R-122 by-passed by C-122 provides the proper voltage on grid #2 of V-105.

The plate load resistor R-125 is shunted by R-146 and the switchable network of R-139 through R-145. Slight changes in the plate load resistance provide correction for the change in the dc operation point of V-101. This shift is caused by the change in the ratio of the pulse width to the sine wave period for the various steps. With the oscillator set at 95 kc as mentioned in our

earlier example the voltage on grid #1 is a 5 kc sine wave and the voltage on grid #3 is a 1 kc pulse, hence the ratio is 5 to 1. If the step oscillator is set at 99 kc then the signal on grid #1 is 100 kc - 99 kc or 1 kc and the ratio of grid #3 signal to grid #1 signal is 1 to 1. Since, V-105, is not operating on a linear portion of its plate current grid voltage characteristic the total plate current will be somewhat dependent on the total on time produced by the sine wave and the off time produced by the pulse.

The resistor R-146 is to permit re-adjustment of the plate voltage when tubes are changed.

The signal developed on the plate of V-105 is composed of positive pulses and a sine wave. As long as the 1 kc step oscillator is "locked" to the master oscillator the pulses will be superimposed on the sine wave at the same time position for each pulse, thus for the step oscillator at 95 kc and a 5 kc signal resulting on grid #1 there will be a 1 kc pulse for every 5th complete sine wave. The pulse will appear at the zero axis of each cycle as long as "locking" is maintained. Should the oscillator fall out of "lock" the pulse train will be modulated by a frequency equal to the difference between the 1 kc pulse and the amount the oscillator has drifted from its whole kc step, in this particular case 5 kc. Thus if the oscillator is 50 cycles above 5 kc a 50 cycle modulation will be produced on the pulse train and fed through the filter network to grid #1 of the reactance tube V-101. The reactance tube will thus frequency modulate the oscillator with the 50 cycle error signal. As the oscillators' frequency is swept by the error signal there will be one direction in which the frequency error will decrease. This in turn will decrease the rate at which the oscillator is swept, and locking will be reached.

The filter composed of R-148 through R-151 and C-134 through C-137 is a bridged "T" followed by a single section lo-pass rc section. The bridged "T"

filters out the 1 kc components while the lo-pass filter attenuates the higher frequencies.

Frequency modulation of the oscillator is accomplished by a capacitive type reactance tube V-101. C-102 and R-103 provide a voltage on grid #1 which is about 90° out of phase with the voltage across the tank circuit, thus the plate current appears as a reactive current in parallel with the reactive currents of C-109 and C-110. Modulating the grid with the output of coincident detector causes the frequency of the step oscillator to change by virtue of the change in reactive current through V-101.

Grid #2 is protected from drawing excessive current by R-101 which is connected in series with it and the +245 voltage bus.

The cathode of V-101 is maintained at a constant potential of 104 volts by the regulator tube V-102 and R-102. R-102 provides the minimum current through V-102. The purpose of C-104 is to put the cathode at r-f ground potential.

Power for operating the step oscillator is fed to the chassis by a cable that connects to the power input plug P-201 mounted on the modulator chassis.

D. Power Supply

The power supply for the oscillator modulator subassembly is composed of 3 units; a rectifier unit - subassembly 1, a filter chassis subassembly 2, and a regulator chassis subassembly 3.

The rectifier unit (subassembly 1) consists of transformer T-301 connected to V-301 in a conventional full wave rectifier circuit. The capacitor C-301 is the input filter capacitor of the resistance capacitance rilter sections.

The filter chassis (subassembly 2) is made up of 2 separate rc

filter sections. Network R-301, R-302, R-303, R-304, C-302 and C-303 filter out the ac ripple and supply about 200 volts dc to the modulator section. Approximately 250 volts dc unregulated is supplied to the oscillator section from the network R-320, R-321, R-322, C-305 and C-306, which filter out the ac ripple.

Regulated 245 volts dc is supplied to certain circuits of the oscillator chassis by the regulator chassis (subassembly 3). The series regulating tubes V-302, V-303 are controlled by the amplifier tube V-304.

The cathode of V-304 is maintained at 108 volts above ground by the gas diode voltage regulator V-305. The cathode current of V-304 is less than the recommended minimum current of the regulator tube; however, the additional current is provided by resistor R-313. The grid of the amplifier is coupled through R-317 to the voltage divider network R-316, R-318, R-319, which is across the output of the regulator. Adjustment of R-318 changes the output voltage of the regulator by changing the grid to cathode voltage of the amplifier, which varies the plate current. The plate current flowing through the resistor R-310 provides the grid voltage for the series regulator tubes; this voltage is coupled from the plate of V-304 to the grids of V-302, and V-303 through the isolating resistor R-304 and R-312.

Thus, an increase in the output voltage will cause the grid to ground voltage of V-304 to increase, while the cathode is maintained at a constant potential by the regulator tube V-304. The grid to cathode voltage will become less negative and produce an increase in plate current, which in turn increases the grid voltage on the series regulators V-302 and V-303. This increase in grid voltage permits the tube to pass less current thus lowering the output voltage to the proper value. The output voltage is determined by the setting of R-312.

The reverse set of actions will take place if the output voltage decreases. That is the decrease in grid to ground voltage on V-304 is seen as

an increase in the grid to cathode voltage of the amplifier V-304. The decrease in plate current, causes a corresponding decrease voltage drop across the series regulator tubes V-302 and V-303.

The amplifiers' (V-304) grid #2 dc voltage is obtained from the divider R-314 and R-315. A portion of the ac ripple voltage is coupled to grid #2 by R-311 and C-304. This voltage appears on the grid #1 of V-302 and V-303 180° out of phase with the ripple voltage on the plate, thus cancelling most of the ripple voltage in the output.

The heater power for the amplifier is obtained from the transformer (T-301) of the rectifier unit. However, a separate heater transformer (T-302) is required for V-302 and V-303 because the heaters must be held at cathode potential, this is accomplished by connecting the center top of the secondary to the 245 volt regulated bus.

E. Power Amplifier Screen Grid Regulator

The screen grid voltage of the final amplifier is held constant by the regulator set voltage. This circuit functions in the same manner as the regulator chassis, of the Power Supply Subassembly.

The series regulator tube V-401 is a type 5933, and V-402 is the dc amplifier. The cathode of the amplifier is held at a constant potential by the 3 gas regulator tubes V-403, V-404, and V-405. The required amplifier grid voltage is obtained from the divider R-405, R-406, R-407 and R-408 and coupled to the amplifier by R-409, which prevents appreciable grid current from flowing should the grid to cathode voltage become positive. The output is shunted by the capacitor C-401 which maintains a low impedance at the r-f frequencies.

The output of the amplifier stage V-402 is developed across R-404, the plate load resistor. The amplifier output is directly coupled to the grid

of the series regulator to V-401.

Voltage is supplied to grid #2 by the resistor network consisting of R-401, R-402 and R-403, which also furnishes the minimum required current for the gas diode regulators V-403, V-404 and V-405.

The resistor R-410 between plate and grid #2 of the series regulator tube prevents the circuit from oscillating.

Heater power is supplied to each tube independently by transformers T-401 and T-402. Transformer T-401 supplies the series regulator tube V-401 and T-402 furnishes heater power to the amplifier V-402.

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SECTION 3 - OPERATION

Refer to Section 4 of Instruction Manual

Radio Transmitting Sets AN/SRT-14, AN/SRT-15, AN/SRT-16

NavShips 92121 and NavShips 92121A

A. Introduction

In order to determine the changes in operating procedure let us briefly review the modifications that have been made.

First, the phone transmission is accomplished by single sideband suppressed carrier modulation at low level in the Radio Frequency Oscillator drawer, thus the services of the high level modulator are not required.

Second, the final power amplifier (PA), and the intermediate power amplifier (IPA) are operated Class AB, instead of Class C with this change the final amplifier is no longer operated at the 100 watt level, and will automatically come on in the 500 watt position.

B. Control Functions

The main change in control functions that have been made are in the Radio Frequency Oscillator drawer (refer to Figure 4-4 and 4-5, Section 4 of Instruction Book NavShips 92121 and NavShips 92121A. The 1 kc step generator has replaced the interpolation oscillator eliminating the 100 cycle steps (Knob DD), and the 10 cycle steps (Knob EE).

The area previously occupied by Knob DD has been replaced by an additional service selector switch. This switch provides transmission of CW, lower sideband, or the upper sideband. The service selector switch U located on the Low Level Radio Modulator retains all of the functions described in paragraph (6-1) of the Instruction Manual.

Carrier may be reinserted in the single sideband signal by the carrier reinsertion control located in the area previously occupied by 10 cycle step switch Knob EE. The extreme counter-clockwise position is minimum carrier level, and clockwise maximum.

The zero beat indicator is no longer used to monitor the output frequency of the interpolation oscillator; however, it still retains its monitoring function for the frequency shift oscillator when switch Z is in the proper position. The zero beat indicator may now be used to compare the transmitters' 100 kc master oscillator to an external 100 kc standard by the following procedure:

1. Put switch Z in the left hand position, which was formerly used to check the interpolation oscillator.

2. Connect the 100 kc standard source to the INT OSC test jack on the front panel of the Radio Frequency Oscillator. The zero beat indicator will now show the beat frequency between the external standard and the transmitter master oscillator.

It is not necessary to energize the 500 watt operation circuit by pushing button E located on the Radio Frequency Amplifier Front Panel, since this button has been straped out of the control circuit. Thus the transmitter will always come on in the 500 watt position.

Since, the transmitter is now operated in the 500 watt position only, the frequency range is restricted to 2 mc to 26 mc, refer to Section 4 Paragraph 1b of the Instruction Manual. The radio frequency circuits of the 0.3 mc to 0.8 mc, and 0.8 mc to 2 mc are not capable of handling the higher r-f voltages and current, therefore, DO NOT TUNE UP ON THE TWO LOW FREQUENCY BANDS.

Switch A located on the Radio Frequency Power Amplifier front panel

now functions as an on-off switch. The coaxial lead from the External Oscillator Input jack has been connected directly to the output cable from the Radio Frequency Oscillator drawer. When the test key is in the neutral position the carrier signal is available at the External Oscillator jack when operating single sideband. The purpose of this arrangement is to provide carrier for insertion to the r-f stages of the receiver if desired.

C. Tuning Procedure

1. The tuning procedure is described in Section 4 Paragraph 6 of the Instruction Manual, and should be followed for tuning up the modified transmitter. The steps and meter indications which are not identical to sub-paragraph a, Tuning to an Uncalibrated Frequency, are listed below.

2. The sideband selector switch located behind the hinged door on the Radio Frequency Oscillator (Figure 4-4) must be in the CW position for all services other than phone. When the service selector switch U, located on the Low Level Modulator (Figure 4-3), is in the phone position the switch on the RFO must set for CW during the tuning operation. Then the required sideband is selected.

3. The excitation control should be adjusted to provide 1 volt of r-f drive during tuning. Caution: The antenna current should not exceed 1.5 Amp when tuning the Antenna Tuner. The current should be reduced by decreasing the excitation.

4. Referring to paragraph 11 set the excitation to provide 1 volt drive of CW signal. To tune IPA Stage, set switch G to I_k position and tune control B for maximum indication on IPA meter. Note that the IPA grid current and PA grid current should be zero. The PA meter switch should monitor the PA I_{c2} current. The control D (Tune PA) should then be tuned for maximum (I_{c2}) screen current and maximum antenna circuit. The PA grid #2 current should not exceed 20 MA.

5. Now it will be necessary to adjust the coupler Transformer (CU-407/SRT) and the transmitter coupler CU-402/SRT for maximum antenna current and minimum standing wave ratio.

6. After completing the tuning procedure the carrier balance should be checked. This is accomplished by turning the per cent Mod. control (N) which is located on the front panel of the Low Level Radio Modulator MD-229/SRT, to the minimum position (counter-clockwise). Select the desired sideband, and then lock the test key in the on position. Now advance the excitation control until the excitation meter shows a slight deflection. Adjust R-208 and R-211 for minimum deflection of the excitation.

Repeat with the excitation control in the maximum clockwise position. Then return excitation to normal value.

SECTION 4 - MAINTENANCE

A. 1-kc Step Oscillator Section

Schematic Diagram NL-125866-14D (Figure 8).

The operation of the Oscillator Section is discussed in Section 3 C.

Troubles in this unit fall into two categories, first oscillator will not synchronize or lock, and second no output.

1. General Trouble Out of Lock:

When the oscillator will not lock with the master oscillator of the transmitter the trouble is in the frequency controlling circuit. These circuits incorporate V-101, V-102, V-104, V-105, and V-106. Assume that the oscillator is out of lock, then correction of the trouble should precede in the following manner:

a. Connect the vertical amplifier of an oscilliscope to jack J-102, (of the step oscillator) and the external horizontal input to the 100 kc master oscillator jack on the front panel of the Radio Frequency Oscillator O-275/SRT.

b. Set the 1 kc step oscillator to the 0 kc position, which is indicated by Knob CC. The output frequency should be 90 kc. Thus, if the step oscillator were locked, a 9 to 10 Lissajous pattern would appear on the scope. A rolling pattern indicates the out of lock condition.

c. Connect an RCA Voltohmyst, or any other VTVM that has the negative lead above dc ground potential, to test points TP-101 and TP-102. The negative lead is connected to TP-101, and the probe to TP-102. Caution: Test point

TP-101 is 100 volts dc above ground; therefore, care should be exercised when connecting to this point. Set meter to -dc, 15 volt scale.

d. Adjust R-146 until locking is obtained, this should occur between 7.25 and 7.75 volts dc. Tuning slug L-110 will cause this locking voltage to change, thus it may be set correct value for each position.

e. If locking cannot be obtained check the waveform at terminal 4 of T-101. (This terminal is accessible at the rear of the oscillator chassis.) A negative pulse should be present at this point.

f. Blocking oscillator output zero:

1. If the output of the blocking oscillator is zero change V-104.

2. If changing V-104 does not remedy the trouble check the dc voltages and resistance. See Table I.

3. After clearing the trouble in this stage check the synchronization of the blocking oscillator. This is accomplished by feeding the 10 kc signal, available at J-101 into the external horizontal input, and the waveform of terminal 4 of T-101 into the vertical amplifier. (This requires a "T" arrangement to allow the signal to be fed to blocking tube oscillator simultaneously.) The Lissajous pattern produced should be 10:1 since the blocking oscilltor produces pulses at a repetition frequency of 1 kc. These pulses are synchronized by the 10 kc signal from unit 6 (jack 6-c).

4. Adjust R-115 to produce a 10:1 Lissajous pattern.

5. After adjusting the blocking oscillator to the proper frequency, then set the oscilloscopes' internal sweep to 1 millisecond, for the maximum horizontal deflection. Set trigger to internal negative. Disconnect the cable at J-101, the period between pulses should lengthen slightly. If not adjust R-115 until the period between pulses is slightly longer with the synchronizing pulse absent (cable to J-101 removed) than with the synchronizing pulse present (cable connected to J-101).

g. No Synchronizing Pulse:

1. If no synchronizing pulse appears to be present on the grid of the blocking oscillator, remove V-104 and check the waveform at pin 7 of the tube socket.

2. If a pulse appears on pin 7 the trouble is in V-104A.

3. Refer to Table I for pin voltages and resistances.

4. If there is no signal at pin 7 of V-104 disconnect the cable and check for signal. Absence of signal at this point will be caused by a defective cable or trouble in Unit 6.

h. Synchronizing Pulse Not Locked:

1. The synchronizing pulse for the 1 kc blocking oscillator is derived from the 10 kc blocking oscillator in Unit 6. Therefore, it is necessary to check the blocking oscillator in Unit 6 to insure that it is synchronized with the transmitters' master oscillator.

i. No Sine Wave Output at V-105:

1. The locking signal appearing on the plate of V-105 consists of a positive pulse riding on a sine wave. We have discussed the service procedure for restoring the synchronizing pulse to grid #3 (Pin 7), now we will take up the problem of no sine wave signal present at grid #1 (Pin 1).

2. Check sine wave at Pin 1 of V-105. The frequency of the sine wave should be 10 kc, with the oscillator in the 0 kc position (the oscillator frequency is 90 kc).

j. No Output from V-106:

1. If there is no signal on Pin 1 of V-105 check Pin 7, and Pin 1 of V-106. Grid #1 (Pin 1) should have a 100 kc signal present, and Grid #3 (Pin 7) should have a 90 kc signal present.

2. If no signal present on Pin 1 check 100 kc input J-201 on modulator section. No signal at this point indicates an open cable or trouble in Unit 1 of the Radio Frequency Oscillator.

3. If the signal on Pin 7 is absent then check paragraph 6 for servicing.

4. If the signals are present on Pin 7 and Pin 1 of V-106 check Pin 5. A 10 kc sine waveform and harmonics should be present. If this is the case the trouble is in the filter Z-101 or R-126 and R-124.

5. No signal appears on Pin 5 then the trouble is in this mixer stage. If replacing V-106 does not remedy the trouble then the pin voltages and resistances should be checked against the values in Table I.

6. No signal on Pin 7, grid #3 (V-106) results from one of two troubles. Either the oscillator is not generating any output, or one of the following components are defective R-134, R-133, R-108, R-109, or C-112. The case for the oscillator not functioning is taken up in Section 2.

k. Correct Signal Output of V-105 but not locked:

1. Paragraphs f-3, f-4, g-1, g-2, g-3, and h-1 are concerned with locking the synchronizing pulse with the master oscillator. Thus, if the positive pulse and sine wave are present on the plate of V-105 but the step oscillator will not lock by adjusting R-146 the trouble is in the reactance tube circuit.

2. The ac voltage at TP-101 is a low frequency error signal, which is the difference between the actual oscillator frequency and 90 kc.

3. If no signal is present at TP-101 the trouble is in the filter network between V-105 and V-101. Check C-134 for short circuit and R-148 for open circuit.

4. If signal is present on grid #1 (Pin 1) of V-101 then V-101 may be defective.

5. If changing V-101 does not remedy trouble check pin voltages and resistances with Table I.

6. The cathode to ground voltage, Pin 7 to ground, should be 108 volts. If the voltage at this point is 0 or higher than 115 volts change V-102. Check C-104 if the voltage is 0.

2. General Trouble No Output:

a. Connect an oscilloscope to the output jack J-102 of the

step oscillator. With the 1 kc step switch in the 0 position a 90 kc sine wave should be present.

b. No Output Voltage:

1. Replace V-103.

2. Check voltage on Pin 7 of V-106, if oscillator voltage appears at this point the trouble is R-110 is shorted and/or the switch S-101B is defective.

3. If no voltage appears at J-102 check the pin voltages and resistances against the values of Table I.

3. Alignment of Oscillator:

a. Paragraphs 1-a, 1-b, and 1-d set forth the manner in which the test equipment should be connected to the oscillator.

b. Paragraphs 1-c, 1-d, and 1-e state the initial conditions and adjustments that should be made. Further, it is assumed that the oscillator is working and all that is required is to determine that all points are locking.

c. Locking may be observed by the 1:10 Lissajous pattern at the 0 kc step (90 kc output of the step oscillator).

d. Adjust R-146 until locking takes place and note this voltage it should be 7.5 volts $\pm$ 0.25 volts. Turn R-146 in the clockwise direction until the oscillator jumps out of lock. This condition will be indicated by the deflection of the meter, and a rolling of the scope pattern. Mark the position of the adjustment on the chassis, and note the value of voltage. Next turn R-146 in the counter-clockwise direction until locking is achieved. The meter should now indicate 7.5 volts and the Lissajous pattern stand still. Continue rotating the shaft of R-146 until

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the oscillator unlocks. Mark the position of the adjustment on the chassis, and note the value of voltage.

e. Set R-146 midway between the two marks on the chassis.

f. The high and low values of voltage for the oscillator unlocked should be approximately 11 volts and 5.5 volts.

g. The locking voltage may be adjusted to 7.5 volts by changing the tuning of L-110.

h. Now preceding to the next step check the locking by observing the indication of the meter. If the oscillator is locked the voltage will be about 7.5 volts; however, if the oscillator is not locked then the voltage will be about 5.5 or 11 volts.

i. At steps g and h it may be necessary to readjust R-146 slightly, as set forth in paragraph d.

B. 100-kc SSB Modulator Section

Schematic Diagram NLX125854-12 (Figure 7).

The operation of the Modulator Section is described in Section III B.

1. General Trouble No Output:

a. Check voltage at jack 1-b of Unit #1, the 100 kc input should have a value shown in the Instruction Manual (NavShips 92121 and NavShips 92121A). No voltage at this point means that no carrier signal is being fed to the modulator, thus no audio sidebands are produced.

b. If the 100 kc signal is present at this point but no output can be obtained check audio input voltage at pins R & P of P-201, then at Pins 2 and 7 of V-202.

1. No audio input at the grids (Pins 2 & 7 of the modulator) V-202 indicates trouble in the low pass filters C-213,

R-213, C-205 and C-214, R-214, R-207, C-206.

2. No audio at the input to the unit indicates a defective interconnecting cable or trouble in the Low Level Radio Modulator MD-229/SRT.

c. Carrier Input Audio Input - No Output:

1. Check ac voltage at Pin 3 and Pin 8 of V-202, See Table II. No voltage at this point indicates trouble in the amplifier and cathode follower stage V-201.

2. Check pin voltages and resistances of amplifier and cathode follower stages. See Table II for values of voltage and resistance.

3. If carrier and audio signals are present on the cathode and grids respectively of V-202 check signal voltage at Pin 6 of V-203. No signal at this point indicates trouble in the modulator circuit. Check pin voltages and resistances; see Table II for values.

4. If there is a signal voltage present on Pin 6 (grid #1) of V-203 and no output then check pin voltages and resistances of this stage and the networks which it drives.

5. Signal voltage on Pin 7 (cathode) of V-203 but no signal output indicates trouble in the filters or the output circuit consisting of S-201, R-219, R-220, and K-201.

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C. Power-Supply Subassembly

Schematic Diagram NLX125862-14. (Figure 9).

The power supply consists of subassembly #1, subassembly #2, and subassembly #3.

The operation of the power supply section is discussed in Section

Since, it is composed of 3 units they will be taken up separately starting with Rectifier Unit, Subassembly I.

1. Rectifier Unit Subassembly I:

   a. If no B supply voltage is present at terminal 5 of TB-301 the trouble is in the rectifier unit.

      1. Check voltage at terminals 1 & 2 of TB-301; this voltage should be 110 V ac. No voltage at this point indicates trouble in the power distribution system. Check F-2917 located on the front panel of the Radio Frequency Oscillator.

      2. If the 110 V ac is present on TB-301 terminals 1 & 2, but no dc output replace V-301.

      3. If no dc output after replacing V-301, or improper value check T-301 for an open winding, and C-301 for short circuit.

2. Filter Chassis Subassembly II:

   a. Voltage input at terminal 2 of TB-302 but no output.

      1. No B supply voltage at terminal 3 of TB-302. Check R-301, R-302, R-303, and R-304 for an open circuit. Check C-302 and C-303 for short circuit.

      2. No B supply voltage at terminal 4, of TB-302. Check R-320, R-321, and R-322 for an open circuit. Check C-305 and C-306 for short circuit.

   b. Voltage output but excessive ripple voltage.

      1. Excessive ripple at terminal 4 of TB-302. Check C-305 and C-306. Then check C-301 in Rectifier Unit, Sub-

assembly I.

2. Excessive ripple at terminal 2 of TB-302. Check C-302 and C-303. Then check C-301 in Rectifier Unit, Subassembly I.

3. Regulator Chassis, Subassembly III:

a. Voltage input, but no dc voltage on terminal 1 of TB-301.

1. Replace V-304. If this does not remedy the trouble replace V-302 and V-303.

2. If the replacement of these tubes does not remedy the trouble then check the pin voltage and resistance of V-302, V-303, V-304, and V-305. See Table III for pin voltage and resistance values.

b. Voltage input, voltage output, excessive ripple voltage present in the output.

1. Adjust R-311 for minimum ripple voltage. If unable to obtain 20 millivolts or less ripple replace V-304. After replacing V-304 adjust output voltage (R-318) to 245 volts dc.

2. If ripple voltage persists then replace V-302 and V-303.

3. If replacing V-304, V-302, and V-303 do not remedy trouble replace C-307.

c. Unable to adjust dc voltage to proper value (245 V dc).

1. Replace V-305, and then adjust R-318.

2. If trouble is not remedied replace V-304, then V-302, and V-303.

d. Regulator Chassis, Subassembly III:

1. When V-304 is replaced it will be necessary to check the dc voltage at terminal 3 of TB-303 to insure that

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it is 245 volts. Further, the adjustment of R-311 should be checked to insure minimum ripple in the output.

2. When replacing V-302 or V-303 the other tube should be replaced.

D. Regulator Set Voltage

Schematic Diagram NLX125872-2 (Figure 10).

The operation of the regulator set voltage is discussed in Section III D.

1. General Trouble No Output Voltage:

CAUTION: THIS UNIT CONTAINS 1000 VOLTS DC Never change tubes with transmitter on.

a. The voltage applied to the screen grid of the power amplifier may be determined by switching the voltmeter (Switch J) to the PAE_{c2} position. This voltage should be 700 V dc.

1. If the screen voltage is zero check the Medium Voltage Power Supply PP-1095/SRT. Refer Section 7 paragraph 10 of Instruction Manual NavShips 92121 and NavShips 92121A.

b. DC Input Voltage, but no DC Output Voltage:

1. Change tubes in the following order to clear trouble. First, the series regulator V-401. Second the amplifier V-402. Then change V-403, V-404, and V-405.

2. If changing the tubes does not remedy the trouble then remove fuse F-501 and F-502 from holder, this removes the primary voltage from the plate transformers. F-501 and F-502 are located on the front panel of the Medium Voltage Power Supply PP-1095/SRT. Remove the protective

cover and tubes V-401 and V-402. Turn on transmitter but do not key. Check voltage at Pins 1 and 5 of XV-401, and Pins 3 and 4 of XV-402: these voltages should be 6.3 V ac. No filament voltage indicates a faulty transformer T-401 and/or T-402.

3. If no fault is found in the filament circuit then turn off the equipment and remove the regulator from the cabinet and check the individual components

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TABLE I

VOLTAGE RESISTANCE TABLE FOR 1-KC STEP OSCILLATOR

Tube	Pin No.	DC Volts	AC Volts	Resistance
V101 6AV6	1	+100	5.3	220 k
	2	+108	0.45	70 k
	3	----	----	0
	4	----	6.0	0
	5	+240	136	50 k
	6	+220	0.24	150 k
	7	+108	0.45	70 k
V102 0B2	1	+108	0.45	70 k
	2	0	0	0
	3	NC	NC	NC
	4	0	0	
	5	+108	0.45	70 k
	6	NC	NC	NC
	7	0	0	0
V103 6AK6	1	-8.5	12.8	4.5 k
	2	0	0	0
	3	-----	0	0
	4	-----	6.0	0
	5	240	135	50 k
	6	70	0	70 k
	7	0	0	0

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TABLE I (Continued)

VOLTAGE RESISTANCE TABLE FOR 1-KC STEP OSCILLATOR

Tube	Pin No.	DC Volts	AC Volts	Resistance
V104 12AU7	1	+240	130	57 k
	2	-50	56	120 k
	3	0	0	0
	4	----	6.0	0
	5	----	6.0	0
	6	+92	5.8	120 k
	7	-0.12	0.24	45 k
	8	0	0	0
	9	------	0	0
V105 6AS6	1	0	0.38	32 k
	2	+1.7	0	450 ~
	3	----	0	0
	4	----	6.0	0
	5	98	13	110 k
	6	80	0	55 k
	7	+0.1	34	95 k
V106 6AS6	1	1.3	0.3	100 k
	2	1.75	0	220 k
	3	----	0	0
	4	----	6.0	0
	5	175	6.7	200 k
	6	65	0	100 k
	7	-0.05	1.0	50

Measurements made with RCA Voltohmyst WV 97 A. Resistance measurements made with AC and DC power removed.

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TABLE II

VOLTAGE RESISTANCE TABLE FOR SSB MODULATOR
S201 in USB Position

Tube	Pin No.	DC Volts	AC Volts	Resistance
V201 12AT7	1	+190	8	---
	2	+1.5	0.6	52 k
	3	+2.2	0	220
	4	----	6.0	0
	5	----	6.0	0
	6	+190	0.04	---
	7	0	7.0	50 k
	8	+6.8	3.2	2200
	9	0	0	0
V202 12AT7	1	+180	0.42	----
	2	0	0.1	460
	3	+5.6	2.7	3500
	4	----	6.0	0
	5	----	6.0	0
	6	+180	0.38	----
	7	0	0.1	460
	8	+5.6	2.7	3500
	9	0	0	0
V203 6C4	1	+190	0	----
	2	0	0	----
	3	----	6.0	0
	4	----	0	0
	5	+190	0	----
	6	0	0.72	2.8
	7	+8.4	0.5	2100

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TABLE II (Continued)

VOLTAGE RESISTANCE TABLE FOR SSB MODULATOR
S201 in CW Position

Tube	Pin No.	DC Volts	AC Volts	Resistance
V201 12AT7	1	+220	.03	---
	2	0	0	52 k
	3	1.6	0	220
	4	---	6.0	0
	5	---	6.0	0
	6	+220	0	---
	7	0	.01	50 k
	8	+4.4	0	2200
	9	0	0	0
V202 12AT7	1	+220	.01	----
	2	0	.08	460
	3	+4.6	0	3500
	4	----	6.0	0
	5	----	6.0	0
	6	+220	0.01	----
	7	0	0.7	460
	8	+4.6	0	3500
	9	0	0	0
V203 6C4	1	+230	0.02	----
	2	0	0	----
	3	----	6.0	0
	4	----	0	0
	5	+230	0.02	----
	6	0	0	2.8
	7	+10	0	2100

Measurements made with RCA Voltohmyst WV97A.
Resistance measurements made with ac and dc power removed.

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TABLE III

VOLTAGE RESISTANCE TABLE FOR REGULATOR CHASSIS

Tube	Pin No.	DC Voltage	Resistance
V302 6AQ5	1	+245	300 k
	2	+245	130 k
V303 6AQ5	3	+245	120 k
	4	+245	120 k
	5	+340	150 k
	6	+340	170 k
	7	+245	300 k
V304 6AU6	1	+95	10 k
	2	+105	150 k
	3	0	0
	4	0	0
	5	+245	27 k
	6	+205	12 k
	7	+105	15 k
V305 0B2	1	0	---
	2	0	---
	3	0	---
	4	0	---
	5	+105	150 k
	6	0	---
	7	0	0

Measurements made with RCA Voltohmyst WV 97A. Resistance measurements made with ac and dc power removed.

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SECTION 5 - INSTALLATION

1. Modification of Radio Frequency Oscillator O-275/SRT

1. Reference Figure 7-3, 7-32 through to 7-46 (NavShips 92121).
2. All units of the Radio Frequency Oscillator O-275/SRT are operated without modification with the exception of Units #5, 11A, 11B, 11C and 14, the main chassis. In order to facilitate the work disconnect the input cable (at the bottom rear of the drawer) and remove drawer from cabinet.
3. Unit #5: Remove Unit #5 from top mounting deck and make the following modifications:
   a. Reference Figure 7-36 (Vol. 2 NavShips 92121).
   b. Remove 3300 MMFD mica capacitor at input jack J-2153 (Jack 1-b).
   c. Replace R-2160 (150 ohm 1/2 W) resistor at input jack J-2155 (Jack 3a) with a 620 ohm 1/2 W resistor.
4. Unit 11A: Remove unit 11A from the under side of the main chassis and make the following modifications:
   a. Reference Figure 7-42 (Vol. 2 NavShips 92121).
   b. Remove 51 ohm resistor R-2626 and lead from J-2630 (Jack 9a) to pin #7 on V-2626.
   c. Solder 39 ohm 1/2 watt resistor between J-2630 and pin #7 on V-2626.
   d. Solder 10 ohm 1/2 watt resistor between pin #7 on V-2626 and ground.
   e. Replace unit and connect cables to jacks.
5. Remove Unit #6 and lay aside. No modifications are made to this unit. Then remove units 11C and 11B for modification.
6. Unit 11B: Modify Unit #11B as follows:

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a. Reference Figure 7-43 (Vol. 2 NavShips 92121).

b. Remove cover at bottom of tube sockets to gain access to components and wiring.

c. Remove filament wire stand-off at end of chassis and fold back out of the way.

d. Remove lead from input jack J-2652 (Jack 9-b) to pin 1 on V-2651.

e. Remove 51 ohm resistor from test jack 9b to key volt "feed-thru" terminal.

f. Solder 39 ohm 1/2 watt resistor between J-2652 and pin #1 of V-2651.

g. Solder 10 ohm 1/2 watt resistor between pin #1 of V-2651 and the key volt feed-through terminal.

h. Replace filament lead stand-off and cover.

7. Unit 11C: Modify Unit #11C as follows:

a. Reference Figure 7-44 (Vol. 2 NavShips 92121).

b. Remove cover plate at bottom of tube sockets to gain access to components and wiring.

c. Remove screw holding filament wire stand-off, and lay stand-off and wire back out of the way.

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d. Remove lead from input jack J-2802 (Jack 9c) to pin #1 of V-2801.

e. Remove 51 ohm resistor from 9c and key volt input "feed-thru" terminal.

f. Solder 39 ohm 1/2 watt resistor between J-2802 and pin #1 of V-2801.

g. Solder 10 ohm 1/2 watt resistor between pin #1 of V-2801 and the key volt voltage "feed-thru" terminal.

h. Replace filament lead stand-off and cover.

8. Remove side plate on which units 6, 11B and 11C were mounted to gain access to cable harness. Note, do not loosen stainless steel guide inserts.

9. Remove Unit 3 from top deck.

10. Unsolder all leads from common terminal #E2927 (white leads for key volt in of units 11A, 11B and 11C). Trace out lead going to terminal #14 of J-2917 at rear of chassis with continuity checking device. Place 1 lead of continuity checker on terminal #14 of J-2917, then pick out wire that completes the circuit. Reference Figure 7-46.

11. Reconnect remaining leads to terminal E-2927.

12. From the supply of #22 SIRF wire cut a yellow and grey wire about 5 feet long, and twist together.

13. Feed the twisted pair of step 11 through the square cutout at J-2053, down along the main cable harness, behind the shaft extension of unit 8 step switch, to E-2927.

14. Connect yellow lead to ring of E-2927.

15. Remount ring on stand-off pillar by using a "Winchester" stud terminal (Type 745) in place of the 4-40 machine screw.

16. Solder white wire traced out in step 9 (keying volt in) and grey wire of twisted pair to the stud terminal.

17. Remove test point socket and bracket assembly E-2919, and unsolder all leads and make table of color code and corresponding socket connection.

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18. Remove the frequency selection knobs behind hinged door.

19. Remove "indicator plate" from front panel.

20. Remove knob from FSK Phase Mod. Control.

21. Remove front panel, but do not remove the guide pins from the panel.

22. Remove the 100 cycle and 10 cycle, DD and EE respectively, dials and shaft bearings from unit 14.

23. Drill 2 holes 0.144 dia. (#27) in test socket bracket (E-2919) as shown in sketch for step 22.

24. Drill 2 holes 0.144 dia. (#27) in front mounting plate and mount 1-1/2" x 3/4" angle bracket with two 5/16" lg. 6-32 binder head screws.

25. Make a cable 3 feet long of the following wire schedule from the wire supplied.

    a. Brown #22 SIRI

    b. Orange #22 SIRI

    c. White #22 SIRI

    d. Purple #22 SIRI

    e. Yellow #22 SIRI

    f. Red #22 SIRI

    g. Single conductor shielded lead.

26. Pull cable from test socket back into wiring harness section, and splice extension cable on with the following schedule:

Extension Cable		Original Cable
Brown	to	Brown
Orange	to	Orange
White	to	White
Purple	to	Purple
Yellow	to	Orange with white tracer
Red	to	Brown with white tracer

Before soldering extension cable to original leads, slip 1-1/2"

lengths of vinyl sleeving over each wire.

27. Dress extension cable along main cable and bring out between shaft extensions for units 11B and 11C. Cut off excess cable and connect to test socket referring to connection table made in step 16.

28. Loosen mounting screws holding S-2996 and drop switch box down along mounting plate to permit Power Supply Rectifier unit to be installed in space previously occupied by test socket bracket (E-2919).

29. Drill 3 holes 0.196 dia. (#9) in the top deck as shown in sketch for step 29. Countersink holes in top mounting deck for #10 flat head screws. Care should be exercised in layout to insure that there is no interference between rectifier unit chassis and cam lock fastener.

30. Mount rectifier unit placing transformer to the rear and right, facing the flange front. The tube and filter capacitor will fall on the left side. Mount unit with 3 - 7/16 long #10 flat head machine screws.

31. Remove units 9 and 10 to permit mounting of Regulator and Filter chassis, on bottom of Unit 14.

32. Drill 10 holes 0.170 dia. (#18) in bottom of Unit 14 as shown in sketch for step 32. Countersink holes on bottom surface.

33. Mount Regulator and Filter units with 3/8" flat head 8-32 machine screws.

34. Make up cable connecting rectifier unit, regulator unit, filter unit, and oscillator modulator unit, as shown in the figure for step 34.

    a. The cable should be made of #22 SIRI wire that is provided

in the installation parts kit.

b. Cable to Oscillator Modulator subassembly should be long enough to permit the unit to be lifted vertically 5 inches. This will permit the unit to be removed sufficiently for adjusting the oscillator steps if it becomes necessary.

c. The grey leads from rectifier unit terminal block, terminals 1 and 2 should be twisted and lead through the wall. Then run one lead to terminal E-2923 and the other to XF-2917.

d. Twist grey wires from the rectifier unit terminal block terminals 1 and 2, to the regulator unit terminal block terminals 6 and 7.

e. Run wires that interconnect power supply units first, then remount rectifier unit.

f. Run wires that connect filter and regulator units to oscillator modulator unit through top deck at cutout for unit 3 connectors.

35. Run the shielded twisted pair - a white - and a purple wire down through the cutout for the unit 3 connector, along the main cable harness and out the back of the drawer through the cutout for the drawer input cable connector J-2916, J-2917 and J-2918. Tie this cable and wire installed in step 13 to main cable harness in 3 or 4 places.

36. Leave about 8 inches of wire hanging out beyond the point where it passes through the cutout. Install the 6 prong Jones male connector on the end of the cable, making connections as follows:

a. Grey lead of twisted pair shielded wire to terminal 1.

b. White lead of twisted pair shielded wire to terminal 2.

c. Connect terminals 3 & 4 together and solder shield to these terminals.

d. Connect purple wire to terminal #5.

e. Connect white wire to terminal #6.

37. Mount carrier insertion potentiometer assembly plate in the position previously occupied by the 10 cycle step panel bearing.

38. Dress wires together and tie making a cable. Be sure to pick up yellow and grey leads installed in steps 13 and 15.

39. Slip hood over cable and solder wires to female connector. See step 40. Be sure to slip about a 1/4 inch piece of small vinyl sleeve over each wire before soldering to the connector pin. After soldering push sleeve down over pin.

40. Connection schedule for Oscillator Modulator input cable. See figure for step 34.

a. Connect shielded wire from Regulator Unit terminal block, terminal 1 to A.

b. Connect shield and black wire to C.

c. Connect red wire from Filter Unit terminal block, terminal #4 to B.

d. Connect orange wire from Filter Unit terminal block terminal #3 to D.

e. Connect brown wire from Regulator Unit terminal block, terminal #4 to E.

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f. Connect white wire, installed in step 35 to F.

g. Connect purple wire installed in step 35 to H.

h. Connect grey wire installed in step 15 to J.

i. Connect yellow wire installed in step 13 to K.

j. Connect center conductor of shielded lead from center

terminal of carrier insertion potentiometer to L.

k. Connect brown wire from Regulator Unit terminal block, terminal #5 to M.

l. Connect remaining wire from carrier insertion potentiometer to N.

m. Connect grey lead of shielded twisted pair installed in step 35 to P.

n. Connect white lead of shielded twisted pair installed in step 35 to R.

41. Remove the guide pins for unit #3 and install shorter pins provided.

42. Remove male portion of Oldham shaft coupler from the 1 kc step switch of unit 3. After removing set screws drill shaft hole out with a 1/4 inch drill.

43. Mount this piece of the coupler on the 1 kc step switch of the oscillator unit with the red dot on the coupler lined up with the red mark on the switch shaft.

44. Mount Oscillator Modulator subassembly (line up 1 kc step switch) and lock all four captive screws. Note, if proper care has been taken in installing input cable it will not be pinched between the unit base plate and the top deck.

45. Feed coaxial cable 32" long, down through cutout in top deck (for unit 3 power connector) and out front right side.

46. Replace side plate removed in step 7.

47. Mount front panel and new indicator plate.

48. Replace knobs and mount shaft extension for side band selector switch through indicator plate. With the switch in the extreme counter-clockwise position line knob pointer up with CW mark.

49. Mount new knob on carrier insertion control.

50. Replace units 11B and 11C then unit 6.

Replace units 9 and 10, and then 8.

51. Connect input plug to Oscillator Modulator unit.

52. Connect 32" coaxial cable to jack 6C on unit 6 and to 6C on Oscillator Modulator unit.

53. Run 16" coaxial cable from J-202 on oscillator modulator to unit #5 Jack J-2153 (J-1b).

54. Run 22" coaxial cable from J-201 on oscillator modulator to unit #1 Jack J-2002 (J-1b).

55. Run 25" coaxial cable from the output jack of the oscillator section of the oscillator modulator unit to unit #5 Jack J-2155 (J-3a).

56. Replace drawer in cabinet.

57. Connect Jones 6 prong connector and fasten up under chassis with lacing cord.

B. Modification of Modulator Radio MD-229/SRT (Low Level Modulator)

1. Reference Figure 7-47 NavShips 92121.

2. Modify the function switch S-1101 in the following manner:

a. Remove white lead with yellow tracer from S-1101E, terminal 11F, and tape.

b. Remove yellow lead from S1101C, terminal 12R, and tape.

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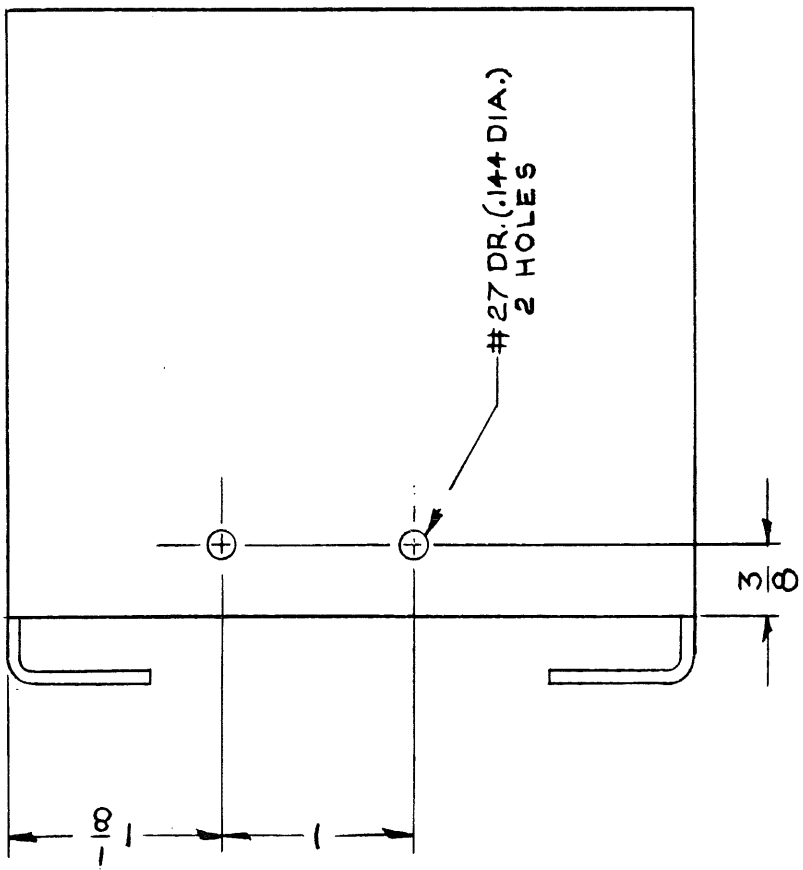
3. Slip a 3 foot length of vinyl tubing over the shielded twisted pair wire, provided in kit of installation parts. Cut wire leaving about 3 inches extending beyond one end of insulating sleeving.

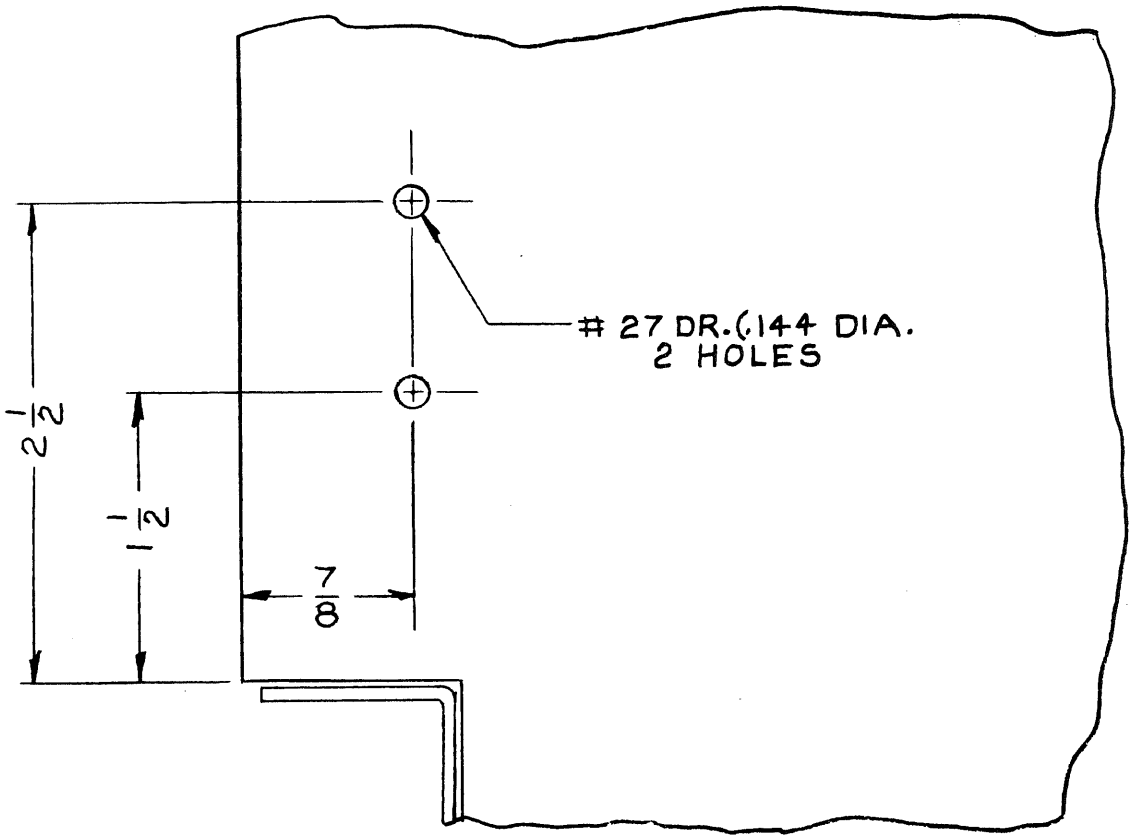
4. Remove bracket holding J-1101, J-1102, J-1103 from rear of drawer.



SKETCH FOR STEP #22
NOT TO SCALE

51/52

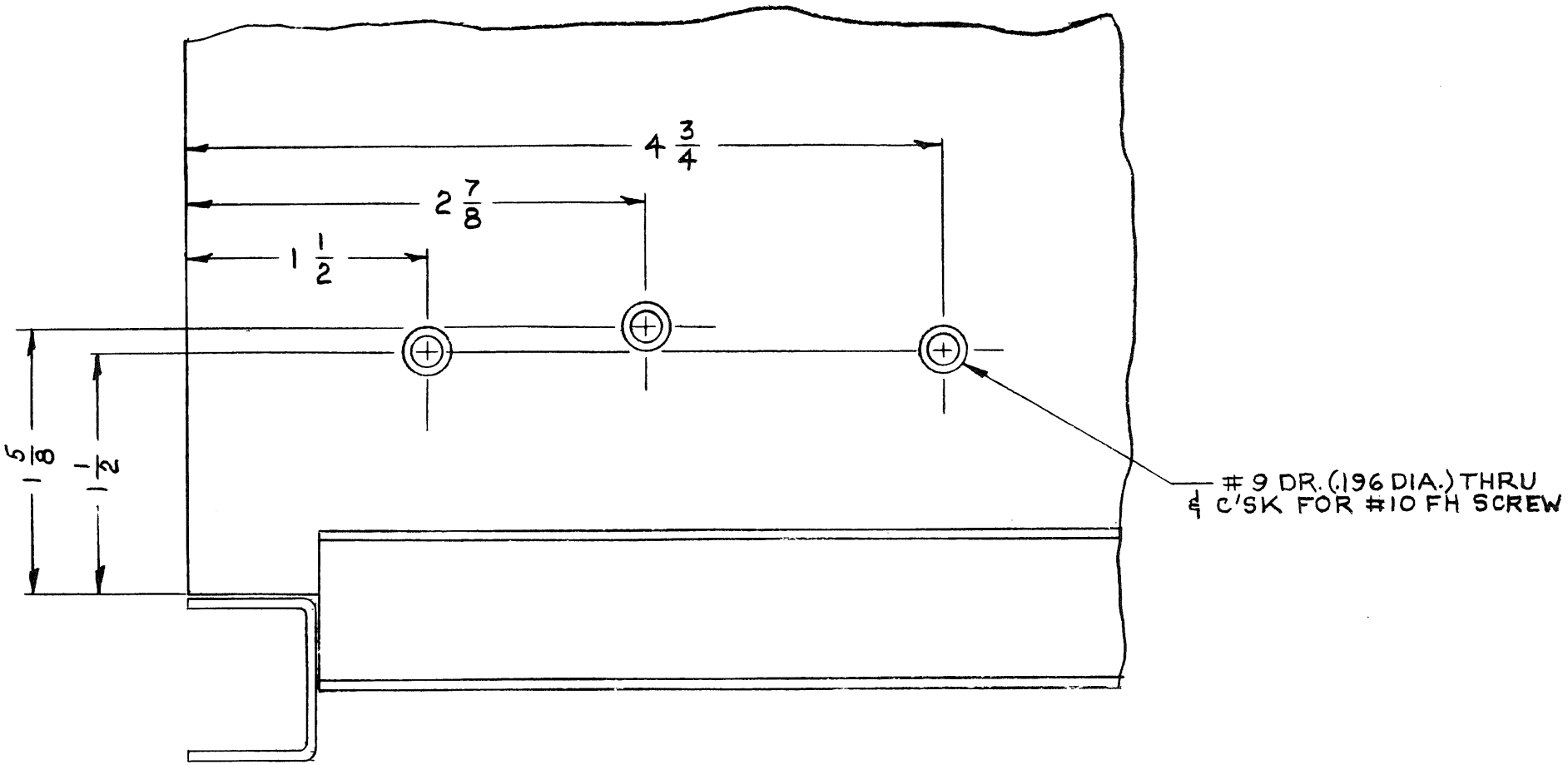
FIGURE 2



PARTIAL VIEW-REAR OF FRONT PANEL ASSEMBLY
(LOWER RIGHT HAND CORNER VIEWED FROM FRONT)
SKETCH FOR STEP #24
NOT TO SCALE

FIGURE 3

55156



PARTIAL VIEW - TOP DECK OF UNIT #14
SKETCH FOR STEP #29
NOT TO SCALE

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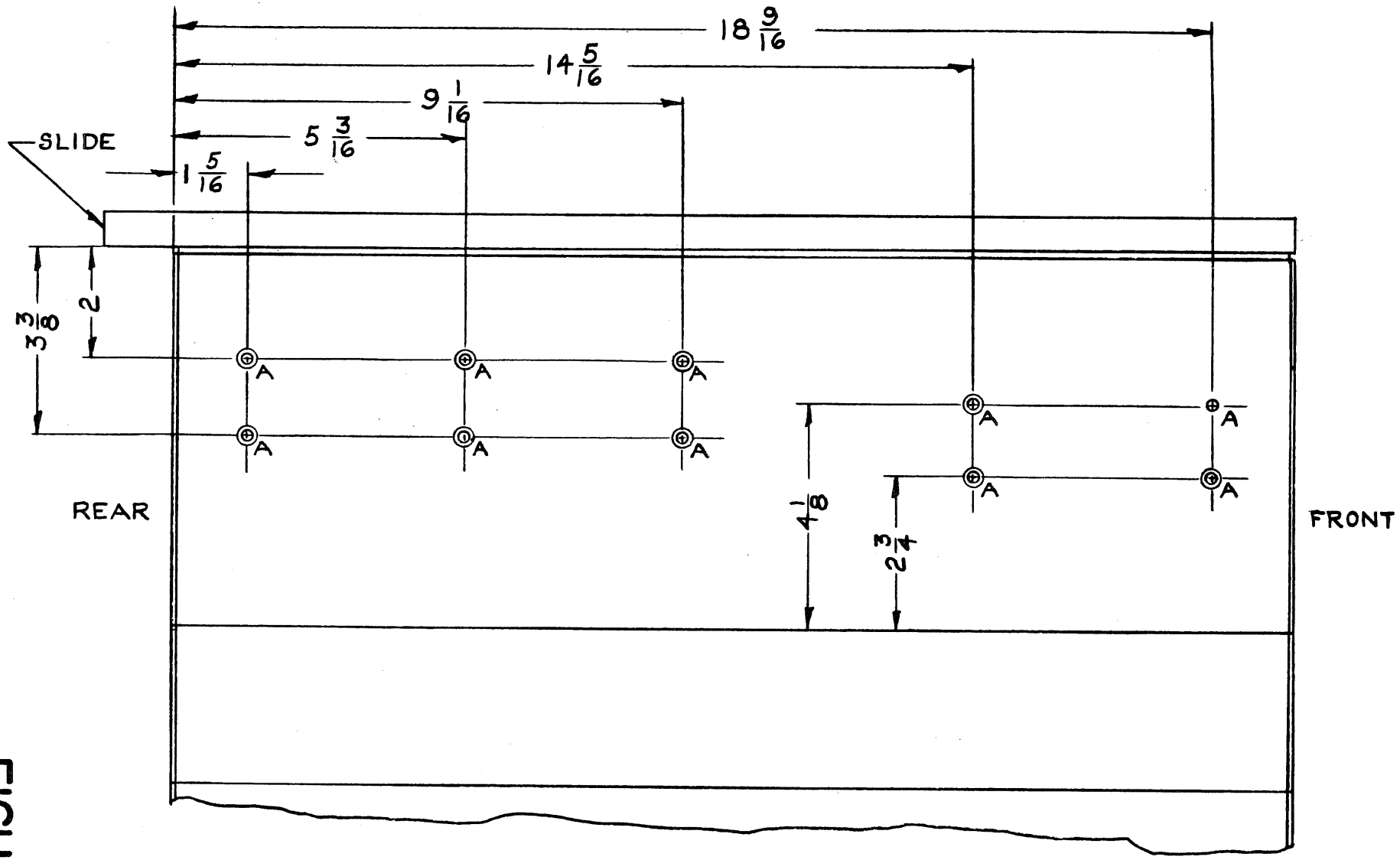

PARTIAL VIEW BOTTOM OF UNIT #14

SKETCH FOR STEP 32
NOT TO SCALE

"A" HOLES - #18 DRILL
THRU & C'SK THIS SIDE

FIGURE 5

5. Connect white wire of shielded twisted pair to terminal #13 of J-1103. Connect grey lead to terminal #14 of J-1103.

6. Slip sleeving back over exposed portion of shield.

7. Run lead through one of the grommets under J-1103, then along cable harness to R-1043 and R-1044, and tie with lacing cord in 5 or 6 places.

8. Connect grey lead to R-1043 (terminal furthest from chassis edge).

9. Connect white lead to R-1044 (terminal furthest from chassis edge).

10. Connect shield to ground lug near Z-1001.

11. Connect a purple wire (#22 SIRI) to terminal #11 of J-1103. Then connect a white wire (#22 SIRI) to terminal #16 of J-1103. Wire lengths should be at least 2-1/2 feet long.

12. Run white and purple wires through grommet under J-1103, and along main cable harness to grommet under K-1101, and tie in 3 or 4 places. Feed wires through grommet, and connect to coil terminals in the following manner:

    a. Connect purple lead to C-1019 terminal having white wires with brown tracer connected to it, this is one side of the coil.

    b. Connect white lead to the other coil terminal at relay coil.

13. Disable relay K-1104 by removing one of the leads to the coil. Tape lead.

C. Modification of Power Supply PP-1095/SRT Medium Voltage Power Supply

1. Schematic diagram Figure 7-51 (NavShips 92121).

2. Remove the drawer from the cabinet in order to make the following changes.

3. Remove connector bracket from rear of drawer.

4. Remove wire from pin 10 on J-502 and pull back through harness to gain enough slack to connect this lead to pins #8 and 16 on J-501.

5. Reassemble bracket to rear of drawer.

6. Remove the 4 mounting screws holding the relay K-502 and swing relay out to obtain access to terminal 1C. Terminal 1C of the relay coil is connected to jack J-502, terminal #3.

7. Remove black wire from coil terminal 1C and tape.

8. Cut a piece of #20 black SIRI wire about a foot long, and solder one end to coil terminal 1C.

9. Pass the other end of the wire through the grommet hole and connect to ground lug.

D. Modifications of Amplifier Radio Frequency AM-1008/SRT

1. Reference Figure 7-49 (NavShips 92121).

2. Interchange R-1348 and R-1375 (grid bias for 4-400) in the following manner:

   a. Remove white wire with brown and grey tracer, lead to resistor R-1375.

   b. Remove white wire with brown tracer, lead to potentiometer R-1348.

   c. Solder lead removed from R-1375 (white lead brown and grey tracer) to R-1348.

   d. Solder lead removed from R-1348 (white wire with brown tracer) to R-1375.

   NOTES: 1. Removal of potentiometer R-1348 is necessary to facilitate wiring.

   2. Remove enough of the white lead with brown and grey tracer (original lead to R-1375) from the harness to feed through chassis wall grommet to potentiometer.

3. Feed lead from above step through wall grommet to R-1375.

3. The grid bias on the IPA stage is made adjustable by substituting a 10K (AB type JLU 1031) potentiometer for the fixed resistor R-1342.

4. Remove resistor R-1342 (10K 2W) from resistor board.

5. Remove jumper wire between terminals 11 and 13 on resistor board. To perform this the board will have to be loosened from its mountings to gain access to the back side.

6. Mount (JLU 1031) potentiometer on bracket with adjusting screw and foot facing in same direction.

7. Remove the bracket holding resistors R-1374, R-1375, and R-1376 and fold out of the way, to permit mounting of potentiometer bracket.

8. Position potentiometer bracket on the wall to the right of E-1398 (Component Board) just above the large rubber grommet. Locate the mounting holes on a vertical line approximately 3-1/2 inches back from the front panel. The first hole 1 inch down from the top edge of the wall, and the second hole 3/4 of an inch below the first.

9. Mark and drill two holes 0.144 dia. #27, and mount bracket with 2, 3/8" #6-32 binder head machine screw, foot facing up.

10. Wire the 10K potentiometer into the bias circuit in the following manner:

    a. Refer to schematic (referenced in Step 1) so wiring may be made to produce increased bias with clockwise rotation of the shaft.

    b. Connect one outside lug of the bias pot to terminal #9 with

green #22 SIRI wire.

c. Connect center arm of the bias pot to terminal #13 with green #22 SIRI wire.

d. Connect remaining lug to terminal #10 in same manner as above.

11. Remove red leads from relay K-1304 contact 8L, connect together, and tape.

12. Run a red wire #20 SIRHV supplied in parts kit from K-1304 to rear of drawer in the following manner:

a. Pass wire through the large grommet above K-1302 and K-1304, then half way across the back of the front panel. At this point run the wire down between the screen grid choke, and the filament transformer, then to the left through the rectangular grommet hole (located 4" from the front panel on left side).

b. Run in with cable harness under L-1331, L-1329, etc. to rear of cabinet and bring up past cable connector to mounting for cylindrical spring on PA tuning shaft.

c. Cut wire leaving about 10" hanging out back of drawer.

d. Install Jones 4 prong male plug on wire connecting the screen lead to terminal #4.

e. Tie lead in a sufficient number of places to present a neat appearance.

f. Connect other end of wire to contact 8L of K-1304.

13. Install grey wire #22 SIRI from Jones connector installed in step 12d, along same route as screen supply wire to fuseholder XF-1301.

14. Connect the wire to side terminal of XF-1301. Connect the other

end to terminal 1 of the Jones plug installed in step 12d. Dress leads and tie where necessary.

15. Increase the rectangular slot 1/2 inch in the metal shield over S-1301 in order to clear terminal #4 on S-1301D.

16. Place jumper across switch S-1388 (push for 500 W).

17. Install a swamping resistor, in plate circuit of buffer amplifier V-1301. Connect a 4700 ohms 2W resistor from the collector (terminal 1R) on S-1301A rear to terminal #4 on S-1301C rear.

18. Install swamping resistor in plate circuit of IPA stage. Connect a 2000 ohm 5 watt non-inductive resistor from the collector (terminal 1R) on S-1301B rear, to terminal #4 of S-1301D rear.

19. Connect jumper wire across choke L-1343.

20. Unsolder coaxial lead from Ext. osc. input jack J-1307, to S-1305 at switch, and reconnect to center terminal of switch.

21. Install ohmite P-300 choke in the plate circuit of V-1304 (4-400A) in the following manner:

    a. Remove strap from stand-off insulator and plate cap of tube.

    b. Cut strap so that choke may be mounted close to the plate cap as possible. The solder joint between the strap and the choke must be outside the chimney. Assemble choke and strap.

    c. Cut strap to length required to connect the remaining end of the choke to the insulator, and solder strap to choke. Then reassemble.

E. Modifications of Cabinet CY-1571

1. Schematic diagram reference Figure 7-5A.

2. Install high voltage wire (white with red stripe) and ground wire (#20 black SIRI) from Regulator Set Voltage to the 1300 volt power supply in the following manner:

   a. Snake leads down cable trough on the right rear side of the cabinet from the regulator set to 1300 volt power supply cable harness.

   b. Pass both wires through the cable harness. Leave about a foot of wire extending beyond the connector.

   c. Feed black wire (ground lead) through cable clamp, and connect to pin #16 on J-612.

   d. Remove output connector (plate cap) from J-503, unsolder plate cap P-608 from yellow wire. Solder white wire with red stripe installed in steps 2a and 2b to plate cap.

   e. Pull any excess wire back at regulator set end. Dress and tie wires to medium voltage power supply cable harness at rear of cabinet.

   f. Clamp high voltage wire and ground wire to right side (looking into cabinet from the front) of regulator chassis.

   g. Solder high voltage lead to stand-off insulator on right side of chassis.

   h. Solder black wire to ground lug above cable clamp.

3. Remove lead from pin 10 on P-613 (medium voltage power supply power plug) and tape.

4. Install the wires listed below between the Modulator Radio MD-229/SRT and the Radio Frequency Oscillator O-275/SRT drawer in the following manner:

   a. Pull a shielded twisted pair through the Low Level Modulator cable harness, and lead down cable trough at right of

cabinet. Then pull through cable harness to Radio Frequency Oscillator drawer. Pull about 1 foot of wire past cable connector.

b. Install white and purple leads in the manner described above.

c. Connect white wire to terminal #16 on J-605 (modulator input cable connector).

d. Connect purple wire to terminal #11 on J-605.

e. Break open shielded twisted pair and connect white lead to terminal #13 J-605. Then connect grey lead to terminal #14 J-605.

f. Ground shield to terminals #8 and #16 on J-603 at rear of plug assembly.

g. Install 6 prong male Jones connector on 4 wires coming out of Radio Frequency Oscillator cable harness, and make the following connections:

1. Grey lead of shielded twisted pair connect to pin 1.
2. White lead of shielded twisted pair connect to pin 2.
3. Connect shield to pins 3 and 4, tie pins 3 and 4 together.
4. Connect purple to pin 5.
5. Connect white to pin 6.

F. Installation of Regulator Set, Voltage

1. Remove patch plate from rear of transmitter cabinet, save the screws.
2. Twist a pair of #20 grey plastic covered wire 8' long together to form 110 V ac input line.
3. Install this pair of wires from the patch plate hole to the RFA

drawer in the following manner.

a. Pull twisted pair (of Step 2) through RFA cable spiral.

b. Connect 1 lead to terminal #1 of Jones 4 prong male plug (supplied with installation parts), connect the other wire to terminal 1, 2, 3 of J-601. See RFA schematic Figure 7-49 (NavShips 92121).

c. Tie the remaining portion of the twisted pair to the main cabinet cable feeding the excess out the hole at the rear of the cabinet.

d. Dress leads with sufficient slack to permit connection to terminal block on screen regulator chassis before chassis is assembled to rear of cabinet.

e. Cut 2 pieces of vinyl tubing 1" long and slip over wires before applying the #6 solder lugs.

f. Connect wires to terminal block so that the lugs feed the wires toward the rear of the regulator box.

4. Cut High Voltage wire (red SIRHV #20) 15 feet long, and feed through the cable harness of the RFA drawer and connect to terminal #4 of Jones plug installed in step 3b. Then connect to the stand-off insulator on the left side (facing the transmitter cabinet from the front) of the regulator box.

5. Mount Regulator Box in space originally occupied by cover plate removed in Step 1.

6. Mount protective shield with wrap-around strap. Four #6-32 - 1/4" long binder head machine screws are provided in the installation parts kit.

SECTION 6 - ILLUSTRATIONS

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FTL E31 REV. 11/56

A ORIGINAL ISSUE	REVISIONS
ISS.	CHGD. BY & DATE
DESCRIPTION	

DRAWING NUMBER: NL-125854-12

NAME OF UNIT: 100KC SSB MODULATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	C201	Cathode Bypass V201A	CAPACITOR, fixed: paper; 0.25 uf, 200V; Aerovox #P-82	
					1	C202	Plate Decoupling V201A	CAPACITOR, fixed: paper; 0.1 uf, 400V; Aerovox #P-82	
					1	C203	Plate Tank V201A	CAPACITOR, fixed: mica; 2700uuf, ± 2%; 500V; CM30E272G, per spec. MIL-C-5A	
					1	C204	Coupling V201B to V202	Same as C201	
					1	C205	V202A Grid Bypass	CAPACITOR, fixed: paper; .005uf, 200V; Aerovox #P-82	
					1	C206	V202B Grid Bypass	Same as C205	
					1	C207	Cathode Osc. Tank V202	Same as C203	
					1	C208	Cathode Bypass V202	Same as C201	
					1	C209	Plate Decoupling V202	Same as C202	
					1	C210	Plate Decoupling V203	Same as C202	
					1	C211	Tuning T201	CAPACITOR, fixed: ceramic; tabular; 0.001 uf; Centralab part #D6-102	

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LIST, ELECTRICAL PARTS

100KC SSB MOD. OF OSC. MOD. SUB-ASSEMBLY Fig. 7

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DWG. SIZE: A

NL 125854-12

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DRAWING NUMBER: NL-125854-12

NAME OF UNIT: 100KC SSB MODULATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL-FTR PART NUMBER
					1	C212	Cathode Coupling V203	Same as C201	
					1	C213	Coupling V202A	CAPACITOR, fixed: paper; .05 uf, 200V Aerovox P-82	
					1	C214	Coupling V202B	Same as C213	
					1	C215	Couplong V2012 to V201B	Same as C211	

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LIST, ELECTRICAL PARTS

100KC SSB MOD. OF OSC. MOD. SUB-ASSEMBLY Fig. 7

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DESCRIPTION

DRAWING NUMB. NL-125854-12

NAME OF UNIT: 100KC SSB MODULATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	E201	Shield V201		SHIELD, electron tube: TS103U02 per spec. JAN-S-28A1	380002
					1	E202	Shield V202		Same as E201	
					1	E203	Shield V203		SHIELD, electron tube: TS102U02 per spec. JAN-S-28A1	380001

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LIST, ELECTRICAL PARTS

100KC SSB MOD. OF OSC. MOD. SUB-ASSEMBLY Fig. 7

DWG. SIZE A

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DRAWING NUMBER: NL-125854-12

NAME OF UNIT: 100KC SSB MODULATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	J201	100KC Input Jack		CONNECTOR, receptacle: brass, silver plated; teflon insert; BNC type # UG-1094/U	
					1	J202	SSB Signal Output Jack		Same as J201	
					1	K201	Function Relay		RELAY, armature, pile up; contact arrangement 2A2B2C; per MBCA ref. dwg.; Group 4; coil, 300 ohm dc; CP Clare #35EC	
					1	L201	V201 Plate Tank		COIL, radio frequency: 2 pie universal winding; slug tuned; 750-1400 uh	
					1	L202	V202 Cathode Tank		Same as L201	
					1	P201	DC & Signal Voltage Inputs		CONNECTOR, receptacle: male contacts; polarized; gold plated; Mycelex body; Winchester type #MRE-11P-G	

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LIST, ELECTRICAL PARTS

100KC SSB MOD. OF OSC. MOD. SUB-ASSEMBLY Fig. 7

DWG. SIZE: A

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DRAWING NUMBER: NL-125854-12

NAME OF UNIT: 100KC SSB MODULATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	R201	Grid Return V201A		RESISTOR, fixed: cpmp; 56K ohms ± 5%, 1/2W; RC20GF563J, per spec. MIL-R-11B, MS35043	504145
					1	R202	Cathode Bias V201A		RESISTOR, fixed: comp; 220 ohms ± 5%, 1/2W; RC20GF221j, per spec. MIL-R-11B, MS35043	504087
					1	R203	Plate Decoupling V201		RESISTOR, fixed: comp; 270 ohms ± 5%, 1/2W; RC20GF271J, per spec. MIL-R-11B, MS35043	504089
					1	R204	Grid Return V201B		Same as R201	
					1	R205	Cathode Bias V201B		RESISTOR, fixed: comp; 2.2K ohms ± 5%, 1/2W; RC20GF222J, per spec. MIL-R-11B, MS35043	504111
					1	R206	Grid Return V202A		RESISTOR, fixed: comp; 470 ohms ± 5%, 1/2W; RC20GF471J, per spec. MIL-R-11B, MS35043	504095
					1	R207	Grid Return V202B		Same as R206	
					1	R208	Carrier Balance V202		RESISTOR, variable: comp; 500 ohms, ± 10%, 2W; AB type #JLU-5011	
					1	R209	Cathode Bias V202		RESISTOR, fixed: comp; 3.3K ohms, ± 5%, 1/2W; RC20GF332J, per spec. MIL-R-11B, MS35043	504115
					1	R210	Plate Decoupling V202		RESISTOR, fixed: comp; 10K ohms, ± 5%, 1W; RC23GF103J, per spec. MIL-R-11B, MS35044	503814
					1	R211	Carrier Balance V202		Same as R208	

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LIST, ELECTRICAL PARTS

100KC SSB MOD OF OSC. MOD. SUB-ASSEMBLY Fig. 7

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DRAWING NUMBER: NL-125854-12

NAME OF UNIT: 100KC SSB MODULATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	R212	Plate Decoupling V203		Same as R203	
					1	R213	Grid V202A V202A		Same as R210	
					1	R214	Grid V202B		Same as R210	
					1	R215	Cathode Bias V203		Same as R205	
					1	R216	Carrier Isolation		Same as R210	
					1	R217	Carrier Insertion		RESISTOR, variable: comp; 10K ohms, ± 10%, 2W; AB type #JU-103L	
					1	R218			Not Used	
						R219	Carrier Attenuation		RESISTOR, fixed: composition; 3.9K ohms ± 10%, 1/2W; RC20GF392K, per spec. MIL-R-11 B, MS35043	
						R220	Carrier Attenuation		RESISTOR, fixed: composition; 680 ohms ± 10%, 1/2W; RC20GF681K, per spec. MIL-R-11B, MS35043	

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LIST, ELECTRICAL PARTS

100KC SSB MOD. OF OSC. MOD. SUB-ASSEMBLY Fig. 7

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DRAWING NUMBER: NL-125854-12

NAME OF UNIT: 100SSB MODULATOR OF OSCILLATOR MODULATOR SUB ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL–FTR PART NUMBER
					*	S201	Side Band Selector Sw.		SWITCH, rotary: ceramic; 5P3T in three decks; OAK MFG Co.	
					1	S201A	P/O S201		SWITCH, wafer: ceramic; 2 pole , 3 position deck; OAK MFG. Co.	
					1	S201B	P/O S201		Same as S201A	
					1	S201C	P/O S201		SWITCH, wafer: ceramic; 1 pole, 3 position deck; OAK MFG. Co.	
					1	T201	Plate Tank 100KC V202		TRANSFORMER, RADIO FREQUENCY, toroidal core; double primary 25 turns each winding; single copper conductor #34 double silk insulated wire; secondary 110 turns single copper #34 double silk insulated wire; core material, manganese, zinc Ferrite, #3C; Ferroxcube Corp. of America #203F	
					*	FOR REFERENCE ONLY				

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LIST, ELECTRICAL PARTS

100KC SSB MOD. OF OSC. MOD. SUB-ASSEMBLY Fig. 7

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DRAWING NUMBER: NL-125854-12

NAME OF UNIT: 100KC SSB MODULATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125854-12	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	V201	Amplifier	ELECTRON TUBE: twin triode; type #12At7; per spec. MIL-E-1C	700155
					1	V202	Balanced Modulator	Same as V201	
					1	V203	Amplifier	ELECTRON TUBE: triode; type # 6CL4 per spec. MIL-E-1C	700135
					1	XV201	Socket V201	SOCKET, electron tube: 9 pin miniature, TS103P01 per spec. JAN-S-28A Amend. 3	740004
					1	XV202	Socket V202	Same as XV201	
					1	XV203	Socket V203	SOCKET, electron tube: 7 pin miniature, TS102P01 per spec. JAN-S-28A Amend. 3	740002
					1	Z201	Filter Lower Side Band	FILTER, BAND PASS: audio; crystal lattice network; 13db insertion loss; 100KC band width @ 20db down; 100.300KC @ 20db down, Hycon Eastern, Inc; #KLB type 42	
					1	Z202	Filter Upper Side Band	Same as Z-201 (except upper side band KUB	

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LIST, ELECTRICAL PARTS

100KC SSB MOD. OF OSC. MOD. SUB-ASSEMBLY Fig. 7

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					4	C101	Screen Bypass V101		CAPACITOR, fixed: ceramic; .01 uf; GMV, 500vdc Central Lab #D6-103	
					2	102	Coupling V101		CAPACITOR, fixed: mica; 100 uuf; ± 10%, 300V; CM15B101K, per spec. MIL-C-5A	
					-	C103			Not Used	
					-	C104	Cathode Bypass V101		Same as C101	
					-	C105 thru C107			Not Used	
					1	C108	Coupling		CAPACITOR, fixed: paper; 0.01 uf; 400vdc 70°C Aerovox P-82	
					1	C109	Fixed Padding Grid Tank		CAPACITOR, fixed: 2400uuf ; 400vdc 70°C Aervox P-82	
					1	C110	Main Tuning Grid Tank		CAPACITOR, variable: ceramic; 7-45 uuf; Erie #N-500	
					1	C111	Fixed Padding		CAPACITOR, fixed: ceramic; 300 uuf; GMV500vdc Central Lab #D6-301	
					-	C112	Output Coupling J102		Same as C101	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14-15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
						C113	Fixed Padding Coils	CAPACITOR, fixed: mica; 0.01 uf ± 10% 500vdc; CM35B103K per spec. MIL-C-5A	
					-	C114	Fixed Padding Coils	Same as C113	
					1	C115	Screen Bypass V103	CAPACITOR, fixed: paper 0.1 uf 200vdc; 70°C Aerovox P-82	
					1	C116	Coupling V104	CAPACITOR, fixed: ceramic; 1000uuf; ± 10%, 300vdc Sprague #811-102	
					1	C117	Plate Bypass V104	CAPACITOR, fixed: paper; 0.54 uf 400vdc 70°C Aerovox P-82	
					-	C118	Coupling V104	Same as C102	
					1	C119	Grid Bypass V104	CAPACITOR, fixed: mica; 4700uuf, ± 5%, 500vdc; CM35E472J, per spec. MIL-C-5A	
						C120	Coupling V106	Same as C113	
					-	C121		NOT USED	
					2	C122	Screen Bypass V105	CAPACITOR, fixed: paper 1.0, 200vdc Sprague #78P10592S15	
					-	C123	Cathode Bypass V105	Same as C122	
					-	C124		NOT USED	

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LIST, ELECTRICAL PARTS
1KC STEP OSC. OF OSC. MOD.
SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					ref	C125	P/O Band Pass Filter Z101	SAME AS C101	
					2	C126	Screen Bypass V106	CAPACITOR, fixed: paper 0.1 uf 200vdc; 70°C Aerovox P-82	
					1	C127	Filter +250V Supply	CAPACITOR, fixed: paper; 0.1uf, 400vdc; 70°C Aerovox P-82	
					-	C128	Cathode Bypass V106	Same as C126	
					ref	C129	P/O Band Pass Filter Z101	CAPACITOR, fixed: mica; 270uuf 300v; CM15C271J, per spec. MIL-C-5A	
					ref	C130	p/O Band Pass Z101	CAPACITOR, fixed: mica; 470uuf 300v; CM15C471J, per spec. MIL-C-5A	
					ref	C131	P/O Band Pass Filter Z101	SAME AS C130	
					ref	C132	P/O Band Pass Filter Z101	SAME AS C129	
					-	C133	Coupling V105	SAME AS C116	
					1	C134	P/O 1000Kc Rejection Filter	CAPACITOR, fixed: ceramic; 0.01 uf, ± 20% 1000vdc Sprague # 10HK-S1	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMB
NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					2	C135	P/O 1Kc REjection Filter	CAPACITOR, fixed: mica; 3300uuf; ± 10%, 500vdc; CM30E332K, per spec. MIL-C-5A	
					-	C136	P/O 1Kc Rejection Filter	Same as C135	
					1	C137	P/O 1KC Rejection Filter	CAPACITOR, fixed: mica; 6800uuf; ± 10%, 500vdc; CM35E682K, per spec. MIL-C-5A	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					4	E101	Shield V101		SHIELD: electron tube; 7 pin miniature type #TS102001 per spec. JAN-S-28A Amend. 3	
					1	E102	Shield V102		SHIELD: electtron tube: 7 pin miniature type #TS102U03 per spec. JAN-S-28A Amend. 3	
						E103	Shield V103		Same as E101	
					1	E104	Shield V104		SHIELD: electron tube; 9 pin miniature type #TS102U03, per spec. JAN-S-28A Amend. 3	
						E105	Shield V105		Same as E101	
						E106	Shield V106		Same as E101	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT	NUS	EQUIPMENT
1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY	9510	AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					2	E107	Test Point	TERMINAL FEED THRU, INSULATED: teflon dielectric; conductor, brass silver plated; thru type conductor; nail head construction one end; single turret type construction opposite end; one 0.171 in diam. mtg. hole required; press fit mtg; 0.740m. lg x 3/16 in. diam. shoulder O/A; 1000v, 60cyc. Test insulation Sealectro Corp. #FT-1000	
						E108	Test Point	Same as E101	

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LIST, ELECTRICAL PARTS
1KC STEP OSC. OF OSC. MOD.
SUB-ASSEMBLY Fig. 8

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DRAWING NUMBE: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					9	L101	Grid Tuning V103	COIL, RADIO FREQUENCY, one winding single layer wound; slug tuned 20-27 uh. North Hills #1000G	
					-	L102	Grid Tuning V103	Same as L101	
					-	L103	Grid Tuning V103	Same as L101	
					-	L104	Grid Tuning V103	Same as L101	
					-	L105	Grid Tuning V103	Same as L101	
					-	L106	Grid Tuning V103	Same as L101	
					-	L107	Grid Tuning V103	Same as L101	
					-	L108	Grid Tuning V103	Same as L101	
					-	L109	Grid Tunging V103	Same as L101	
					-	L110	Grid Tuning V103	Same as L101	
					1	L111	Grid Tuning	COIL, RADIO FREQUENCY: 1.03 uh	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	L112	Grid Tuning V103	COIL, RADIO FREQUENCY, single pie universal wound 5uh inductance MILLER #954	
					ref	L113	P/O Band Pass Filter Z101	COIL, RADIO FREQUENCY: 150uh MILLER #861	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					2	J101	10KC Pulse Input	CONNECTOR, RECEPTACLE: brass, silver plated body straight type BNC tetlon insert; one round female contact; 52 ohms characteristic impedance; UG-1094/U	
					-	J102	90KC to 100KC Output	Same as J101	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMB- NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					6	R101	Screen Dropping V101	RESISTOR, fixed: comp; 100K ohms; ± 5%, 1/2W; RC20GF104J	
					3	R102	Suppressor Dropping V101	RESISTOR, fixed: comp; 22K ohms, ± 5%, 2W; RC42GF223J	
					2	R103	Parasitic Suppressor V101	RESISTOR, fixed: comp; 470 ohms ± 5% 1/2 W; RC20GF471J	
						R104 thru R106		NOT USED	
					1	R107	Screen Return V103	RESISTOR, fixed: comp; 180K ohms ± 5% 1/2 W; RC20GF184J	
					3	R108	Voltage Divider V103	RESISTOR, fixed: comp; 33K ohms, ± 5% 1W; RC32GF333J	
					1	R109	Voltage Divider V103	RESISTOR, fixed: comp; 1500 ohms ± 5%, 1/2 W; RC20GF152J	
					1	R110	Voltage Divider V103	RESISTOR, fixed: comp; 220 ohms ± 5%, 1/2 W; RC20GF221J	
					1	R111	Grid Limiting V104A	RESISTOR, fixed: comp; 10 meg ohm; ± 5%, 1/2 W; RC20GF106J	
					3	R112	Grid Return V104A	RESISTOR, fixed: comp; 47K ohms; ± 5%, 1/2 W; RC20GF473J	
					2	R113	Plate Decoupling V104	RESISTOR, fixed: comp; 4.7K ohms ± 5% 1/2 W; RC32GF472J	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X-125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					2	R114	Plate Dropping V104		RESISTOR, fixed: comp; 10K ohms; ± 5%, 2W; RC42GF103J	
					1	R115	Pulse Width Control V104B		RESISTOR, variable: comp; one section; 25K ohm ± 10%, 2W; Allen Bradley #JLU-2531	
					2	R116	Grid Return V104B		RESISTOR, fixed: comp; 120K ohms ± 5%, 1/2W; RC20GF124J	
					1	R117	Plate Decoupling V104B		RESISTOR, fixed: comp; 8.2K ohms; ± 5%, 1W; RC32GF822J	
					-	R118	Grid Return V105		Same as R101	
					-	R119 thru R120			Not used	
					1	R121	Screen Dropping V105		RESISTOR, fixed: comp; 62K ohms ± 5%, 1W; RC32GF6237J	
					1	R122	Screen Return		RESISTOR, fixed: carbon film comp; 100K ohm ± 1%, 1/2W; two axial wire leads; 1/2 in. lgx0.162m diam; Aerovox #CPSE-1/2	
					1	R123	Cathode Bias V105		Same as R103	
				*	-	R124	Grid Return V105		RESISTOR, fixed: comp; 33K ohms; ± 5%, 1/2 W; RC20GF333J (Resistance may vary)	
				*			Critical value matched		to R101 Band Pass Filter	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/ART-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					-	R125	Plate Load V105	Same as R101	
					1	R126	Suppressor V105 Grid	RESISTOR, fixed: comp; 220K ohms ± 5%, 1/2W; RC20GF224J	
					-	R127	Screen Dropping V106	Same as R108	
					-	R128	Screen Return V106	Same as R116	
					1	R129	Cathode Bias V106	RESISTOR, fixed: comp; 220K ohms; ± 5%, 1W; RC32GF224J	
					1	R130	Plate Decoupling V106	RESISTOR, fixed: comp; 6.8K ohms; ± 5%, 1W; RC32GF682J	
					1	R131	Plate Load V106	RESISTOR, fixed: carbon film comp; 28.8K ohms, ± 1%, 1W; two axial wire leads; 1/2 in. lgx0.162 in. diam; Aerovox #CPSE-1/2	
					1	R132	Plate Load V106	RESISTOR, fixed: comp; 27K ohms, ± 5%, 1/2W; RC20GF273J	
					-	R133	Voltage Divider V106	Same as R101	
					-	R134	Voltage Divider V106	Same as R101	
					-	R135	Coupling V106	Same as R114	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					-	R136	Grid Return V106		Same as R101	
					1	R137	Screen Dropping V103		RESISTOR, fixed: comp; 68K ohms, ± 5%, 1/2W; RC20GF683J	
					-	R138	Grid Return V103		Same as R113	
					1	R139	Plate Load V105		RESISTOR, fixed: carbon film comp; 82K ohms, ± 1%, 1/2W; two axial wire leads; 1/2 in. lg x 0.762 in. diam; Aerovox #CPSE-1/2	
					1	R140	Plate Load V105		RESISTOR, fixed: carbon film comp; 330K ohms, ± 1%, 1/2W; two axial wire leads; 1/2 in. lg x 0.162 in. diam; Aerovox #CPSE-1/2	
					1	R141	Plate Load V105		RESISTOR, fixed: carbon film comp; 390K ohms, ± 1%, 1/2W; two axial wire leads; 1/2 in. lg. x 0.162 in. diam; Aerovox #CPSE-1/2	
					1	R142	Plate Load V105		RESISTOR, fixed: carbon film comp; 470K ohms, ± 1%, 1/2W; two axial wire leads: 1/2 in. lg. x 0.162 in. diam; Aervox #CPSE-1/2	
					1	R143	Plate Load V105		RESISTOR, fixed: carbon film comp; 560K ohms, ± 1%, 1/2W; two axial wire leads; 1/2 in. lg. x 0.162 in. diam; Aervox # CPSE-1/2	
					1	R144	Plate Load		RESISTOR, fixed: carbon film comp; 020K ohms,± 1%, 1/2W; two axial wire leads; 1/2 in lg. x 0.162 in. diam; Aerovox #CPSE-1/2	

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LIST, ELECTRICAL PARTS
1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSC. OF OSC. MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	R145	Plate Load V105		RESISTOR, fixed: carbon film comp: 1.0 megohm ± 1%, 1/2W; two axial wire leads; 1/2 in. lg. x 0.162 in. diam; Aervox #CPSE-1/2	
					1	R146	Plate Load V105		RESISTOR, VARIABLE: comp; 1.0 meg ohm 2W, linear U taper; Allen Bradley # JLU-1051	
						R147	Voltage Dropping Grid V105		Same as R111	
					-	R148	P/O 1KC Rejection Filter		Same as R102	
					-	R149	P/O 1KC Rejection Filter		Same as R112	
					-	R150	P/O 1KC Rejection Filter		Same as R112	
					-	R151	P/O 1KC Rejection Filter		Same as R102	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD.

SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION · APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	S101	Freq. Selection	SWITCH: rotary; 4 section 12 pos. oakmfg	
					1	T101	Blocking Osc.	TRANSFORMER: pulse CBTL Dwg. AX 2145867	

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LIST, ELECTRICAL PARTS

1 KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

DWG. SIZE A

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DRAWING NUMBER: NL-12586614

NAME OF UNIT: 1 KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NLX 125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	V101		ELECTRON TUBE: pentode 7 pin miniature; type #6AU6, per spec. MIL-E-1C	
					1	V102	Voltage Regulator V101	ELECTRON TUBE: miniature glow discharge voltage regulator; type #0B2 WA per spec. MIL-E-1C	
					1	V103		ELECTRON TUBE: pentode 7 pin miniature; type 6AK6 per spec. MIL-E-1C	
					1	V104		ELECTRON TUBE: Twin triode 9 pin miniature; type #12AU7 per spec. MIL-E-1C	
					2	V105		ELECTRON TUBE: semi remote cut off pentode; 7 pin miniature; type #5725/6AS6W; glass envelope per spec. MIL-E-1C	
						V106		SAME AS V105	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD. SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125866-14

NAME OF UNIT: 1 KC STEP OSCILLATOR OF OSCILLATOR MODULATOR SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NLX 125866-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					5	XV101	Socket V101	SOCKET: electron tube; 7 pin miniature ceramic body; type #TS102C01 per spec. JAN-S-28A Amend. 3	
						XV102	Socket V102	SAME AS XV101	
						XV103	Socket V103	SAME AS XV101	
					1	XV104	Socket V104	SOCKET: electron tube; 9 pin miniature; ceramic body; type #TS103C01 per spec. JAN-S-28A Amend. 3	
						XV105	Socket V105	SAME AS XV101	
						XV106	Socket V106	SAME AS XV101	
						Z101	Band Pass	FILTER: low pass: single pie section; 30KC cut off frequency 40 db down 1 100KC characteristic impedance 14K ohms	

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LIST, ELECTRICAL PARTS

1KC STEP OSC. OF OSC. MOD SUB-ASSEMBLY Fig. 8

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DRAWING NUMBER: NL-125862-14

NAME OF UNIT: POWER SUPPLY SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-125862-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	C301	Filter Supply		CAPACITOR, fixed: electrolytic; 40uf, 450V; Cornell Dubilier # UP4045	
					1	C302	Filter +200V Unreg. Supply		CAPACITOR, fixed: electrolytic; 20uf, 450V; Cornell Dubilier #UP2045	
					1	C303	Filter + 200V Unreg. Supply		Same as C302	
					1	C304	V304 Coupling		CAPACITOR, fixed: paper, 0.1 uf, 200V; Aerovox #P-82	
					1	C305	Filter +250V Unreg. Supply		Same as C302	
					1	C306	Filter +250V Unreg. Supply		Same as C302	
					1	C307	Filter +250V Regulated		CAPACITOR, fixed: paper, 1.0 uf; 400V; Aerovox #P-82	

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LIST, ELECTRICAL PARTS

POWER SUPPLY

(SUB-ASSEMBLY FIG. 9

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REVISIONS

DRAWING NUMB: NL-125862-14

NAME OF UNIT: POWER SUPPLY SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125862-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION: APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	E302	V302 Shield	SHIELD, electron tube; TS102J03 per spec. JAN-S-28A Amedn. 3	380002
					1	E303	V303 Shield	Same as E302	
					1	E304	V304 Shield	SHIELD, electron tube; TS102J01 per spec. JAN-S-28A Amend. 3	380000
					1	E305	V305 Shield	Same as E302	

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LIST, ELECTRICAL PARTS

POWER SUPPLY

(SUB-ASSEMBLY Fig. 9)

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ISS.	CHGD. BY & DATE	DESCRIPTION
A	ORIGINAL ISSUE	RELEASED

DRAWING NUMBER: NL-125862-14

NAME OF UNIT: POWER SUPPLY SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

	NOMENCLATURE	SCHEMATIC DIAGRAM		NOMENCLATURE	SCHEMATIC DIAGRAM
G1		NL-X125862-14	G4		
G2			G5		
G3			G6		

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	R301	Filter Supply		RESISTOR, fixed: comp; 2.2k ohms ± 5% 2W; RC42GF222J, per spec. MIL-R-11B, MS35045	501121
					1	R302	Filter +200V Supply		Same as R301	
					1	R303	Filter + 200V Supply		RESISTOR, fixed: comp; 1.8K ohms ± 5%, 2W; RC42GF182J, per spec. MIL-R-11B, MS35045	501119
					1	R304	Filter +200V Supply		Same as R303	
					1	R305	V302 Screen Isolating		Resistor, fixed: comp; 100 ohms ± 5%, 1/2 W; RC20GF101J, per spec. MIL-R-11B, MS35043	504079
					1	R306	V302 Plate		RESISTOR, fixed: comp; 10 ohms ± 5%, 1W; RC32GF100J, per spec. MIL-R-11B MS35044	503742
					1	R307	V303 Plate Isolating		Same as R306	
					1	R308	V303 Screen Isolating		Same as R305	
					1	R309	V302 Grid		Same as R305	
					1	R310	V304 Plate		RESISTOR, fixed: comp; 100K ohms ± 5%, 1W; RC32GF104J, per spec. MIL-R-11B, MS35044	503838
					1	R311	Hum Level Adj.		RESISTOR, variable: comp; 1 meg ohm ± 10%, 2W AB type # JLU-1052	

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LIST, ELECTRICAL PARTS

POWER SUPPLY (SUB-ASSEMBLY Fig. 9)

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DRAWING NUMBER: NL-125862-14

NAME OF UNIT: POWER SUPPLY SUB-ASSEMBLY

NUS EQUIPMENT: 9510 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125862-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	R312	V303 Grid		Same as R305	
					1	R313	V305 Ballast		RESISTOR, fixed: comp; 22K ohm ± 5%, 2W; RC42GF223J, per spec. MIL-R-11B MS35045	501145
					1	R314	V304 Voltage Divider		RESISTOR, fixed: compl 27K ohm ± 5%, 2W; RC42GF273J, per spec. MIL-R-11B MS35045	501147
					1	R315	V304 Voltage Divider		RESISTOR, fixed: comp; 220K ohms ± 5%, 1/2 W; RC20GF224J, per spec. MIL-R-11B MS35043	504159
					1	R316	Voltage Divider		RESISTOR, fixed: comp; 150K ohm ± 5%, 1/2 W; RC20GF154J, per spec. MIL R-11B Ms35043	504155
					1	R317	V304 Grid		RESISTOR, fixed: comp; 10K ohms ± 5%, 1/2 W; RC20GF103J, per spec. MIL-R-11B, MS35043	504127
					1	R318	+250V Supply		RESISTOR, variable: comp; 25K ohms ± 10%, 2W; AB type # JLU-3018-15	
					1	R319	Voltage Divider		RESISTOR, fixed: comp; 100K ohms ± 5%, 1/2W; RC20G104J; per spec. MIL-R-11B MS35043	504151
					1	R320	Filter + 250V Supply		Same as R301	
					1	R321	Filter + 250V Supply		Same as R301	
					1	R322	Filter + 250V Supply		Same as R301	

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LIST, ELECTRICAL PARTS
POWER SUPPLY
(SUB-ASSEMBLY Fig. 9)

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DRAWING NUM: NL-125862-14

NAME OF UNIT: POWER SUPPLY SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125862-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	T301	Power Plate & Filament	TRANSFORMER, Power Step Up Step Down:117V, 60cps Sec. #1 6.3V @ 3.0 amps. Sec. #2 350.0V CT @ 90 ma. Sec. #3 5.0V @ 2. amps. Chicago Transformer Co. #PC8409	
					1	T302	Power, Filament	TRANSFORMER, Power Step Down: pri. 117vac, 60cps; sec. 6.3 vac Thordarson # T21H08	
					1	TB301	Cable Harness Termination	TERMINAL BOARD, barrier type; 6 terminals, Kulka Electric # 600-6 or equiv.	355072
					1	TB302	Cable Harness Termination	TERMINAL BOARD, barrier type; 4 terminals, Kulka Electric # 600-4 or equiv.	355070
					1	TB303	Cable Harness	TERMINAL BOARD, barrier type; 7 terminals, Kulka Electric # 600-7 or equiv.	355073

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LIST, ELECTRICAL PARTS

POWER SUPPLY

(SUB-ASSEMBLY Fig. 9)

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DRAWING NUM: NL-125862-14

NAME OF UNIT: POWER SUPPLY SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125862-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	V301	Rectifier Full Wave	ELECTRON TUBE, diode; type 5Y3GT; per spec. MIL-E-1C		700111
					1	V302	Voltage Regulator	ELECTRON TUBE, tetrode; type 6AQ5 per spec. MIL-E-1C		700121
					1	V303	Voltage Regulator	Same as V302		
					1	V304	DC Amplifier	ELECTRON TUBE, pentode; type 6AU6 per spec. MIL-E-1C		700124
					1	V305	Gas Voltage	ELECTRON TUBE, gasfilled; type OB2 per spec. MIL-E-1C		700003

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LIST, ELECTRICAL PARTS

POWER SUPPLY

(SUB-ASSEMBLY Fig. 9)

DWG. SIZE: A

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DRAWING NUMB: NL-125862-14

NAME OF UNIT: POWER SUPPLY SUB-ASSEMBLY

NUS: 9510

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125862-14	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	XV301	V301 Socket		SOCKET, electron tube, 8 pin octal; TS101P01; per spec. JAN-S-28A Amend. 3	740000
					1	XV302	V302 Socket		SOCKET, electron tube, 7 pin miniature, TS102P01; per spec. JAN-S-28A Amend. 3	740002
					1	XV303	V303 Socket		Same as XV302	
					1	XV304	V304 Socket		Same as XV302	
					1	XV305	V305 Socket		Same as XV302	

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LIST, ELECTRICAL PARTS

POWER SUPPLY

(SUB-ASSEMBLY Fig. 9)

DWG. SIZE: A

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DRAWING NUMB: NL-125872-2

NAME OF UNIT	NUS	EQUIPMENT
REGULAR VOLTAGE SET	9219	AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NLX-125872-2	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	C401	Filter, + 750V Supply	CAPACITOR, fixed: paper; 0.25 uf; ± 20%, 1000vdc; CP29A1EG254M per spec. MIL-C-25/2A	641947
					1	E402	V402 Shield	SHIELD, electron tube: TS102U01 per spec. JAN-S-28A Amend. 3	380000
					1	E403	V403 Shield	SHIELD, electron tube: TS102U03 per spec. JAN-S-28A Amend. 3	380002
					1	E404	V404 Shield	Same as E403	
					1	E405	V405 Shield	Same as E403	
					1	E406	V401 Plate Cape	CAP, plate: electron tube: James Millen #36002	

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LIST, ELECTRICAL PARTS

FIG. 10
REGULAR VOLTAGE SET

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DESCRIPTION

DRAWING NUMB: NL-125872-2

NAME OF UNIT: REGULATOR VOLTAGE SET

NUS: 9219

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125872-2	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	R401	Voltage Divider	RESISTOR, fixed: comp; 12K ohms, ± 5%, 2W; RC42GF123J, per spec. MIL-R-11B, MS35045	501139
					1	R402	Voltage Divider	Same as R401	
					1	R403	Voltage Divider	RESISTOR, fixed: comp; 18K ohms ± 5%, 2W; RC42GF183J, per spec. MIL-R-11B, MS35045	501143
					1	R404	V402 Plate Dropping	RESISTOR, fixed: comp; 27K ohms ± 5% RC32GF273J, per spec. MIL-R-11B, MS35044	503824
					1	R405	Voltage Divider	RESISTOR, fixed: comp; 560K ohms ± 5%, 1W RC32GF564J, per spec. MIL-R-11B, MS35044	504169
					1	R406	Voltage Adj. + 750V	RESISTOR, variable: comp; 50K ohms ± 10%, 2W; AB type # JLU5031	
					1	R407	Voltage Divider	RESISTOR, fixed; comp; 470K ohms ± 5%, 1W; RC32GF473J, per spec. MIL-R-11B, MS35044	504167
					1	R408	Voltage Divider	RESISTOR, fixed: comp; 390K ohms, ± 5%, 1W; RC32GF394J, per spec. MIL-R-11B, MS35044	504165
					1	R409	Current Limiting Grid V402	RESISTOR, fixed: comp; 10K ohms ± 5%, 1W; RC32GF103J, per spec. MIL-R-11B, MS35044	503814
					1	R410	Parasitc Suppressor V401	RESISTOR, fixed: comp; 22 ohms, ± 5%, 2W; RC42GF220J per spec. MIL-R-11B, MS35045	501072

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LIST, ELECTRICAL PARTS

FIG. 10

REGULATOR VOLTAGE SET

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DRAWING NUMBER: NL-125872-2

NAME OF UNIT: REGULAR VOLTAGE SET

NUS EQUIPMENT: 9219 AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125872-2	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	T401	V401 Filament Supply	TRANSFORMER, POWER, step down: Primary 117vac, 60cps; secondary 6.3v, ct@ 1.0 amp. Thordarson #T21F08	
					1	T402	V402 Filament Supply	Same as T401	
					1	TB401	117V Input	TERMINAL BOARD, barrier type, 2 terminals; Kulka Electric #600-2 or equivalent	355068

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LIST, ELECTRICAL PARTS
FIG. 10
REGULAR VOLTAGE SET

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DRAWING NUMBER: NL-125872-2

NAME OF UNIT: REGULAR VOLTAGE SET

NUS: 9219

EQUIPMENT: AN/SRT-14, 15 & 16

NOMENCLATURE	SCHEMATIC DIAGRAM	NOMENCLATURE	SCHEMATIC DIAGRAM
G1	NL-X125872-2	G4	
G2		G5	
G3		G6	

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME / TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	V401	+1050vdc Regular	ELECTRON TUBE: pentade, beam power; type #5933; per spec. MIL-E-1C	701157
					1	V402	DC Amplifier	ELECTRON TUBE: pentade, type #6AU6	700124
					1	V403	Voltage Regular	ELECTRON TUBE: miniature glow discharge voltage regular; type # 0A2	700001
					1	V404	Voltage Regular	Same as V403	
					1	V405	Voltage Regular	Same as V403	

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LIST, ELECTRICAL PARTS

FIG. 10
REGULAR VOLTAGE SET

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DRAWING NUMB: NL-125872-2

NAME OF UNIT: REGULAR VOLTAGE SET

NUS: 9210

EQUIPMENT: AN/SRT-14, 15 & 16

	NOMENCLATURE	SCHEMATIC DIAGRAM		NOMENCLATURE	SCHEMATIC DIAGRAM
G1		NL-X125872-2	G4		
G2			G5		
G3			G6		

REQ'D FOR UNIT G6	G5	G4	G3	G2	G1	CIRCUIT REFERENCE DESIGNATION	FUNCTION	PART NAME	TYPE DESIGNATION; APPLICABLE SPECIFICATION OR DESCRIPTION, MANUFACTURER'S NAME & PART NO.	FTL – FTR PART NUMBER
					1	XV401	V401 Socket		SOCKET, electron tube: steatite 5 pin w/barriers James Millen # 33005	
					1	XV402	V402 Socket		SOCKET, electron tube: 7 pin miniature, type TS102P01; per spec. JAN-S-28A Amendment 3	380000
					1	XV403	V403 Socket		Same as XV402	
					1	XV404	V404 Socket		Same as XV402	
					1	XV405	V405 Socket		Same as XV402	

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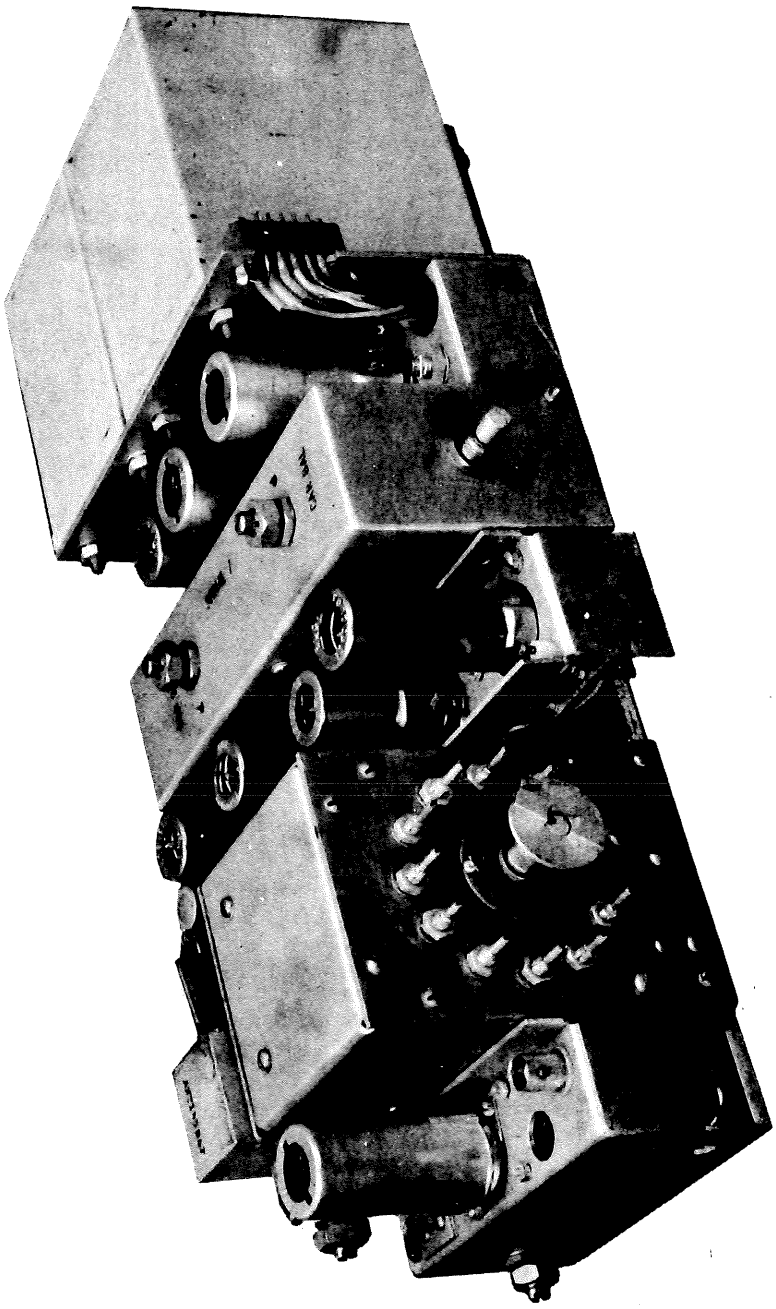
LIST, ELECTRICAL PARTS

FIG. 10

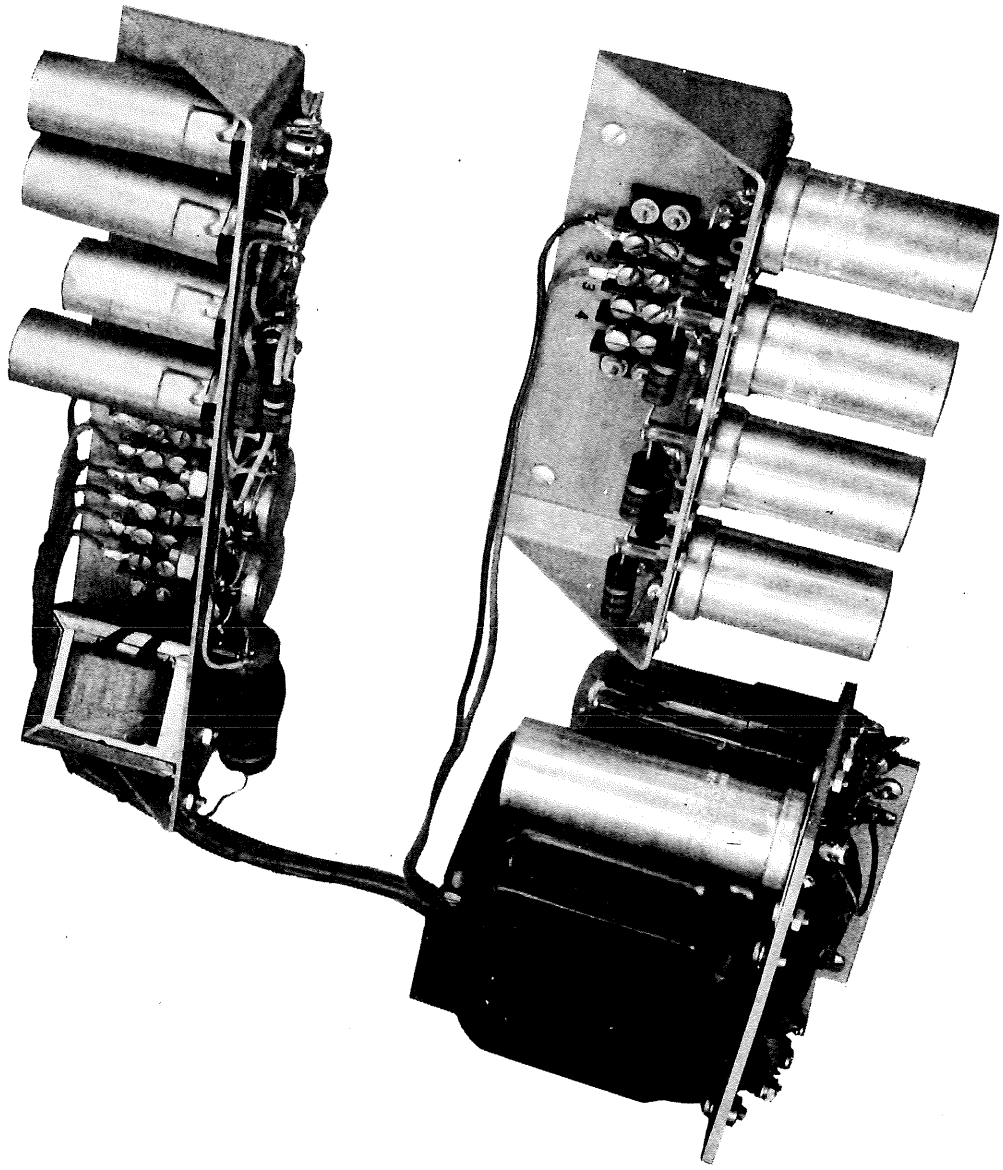
REGULAR VOLTAGE SET



OSCILLATOR MODULATOR SUBASSEMBLY

FIGURE 11

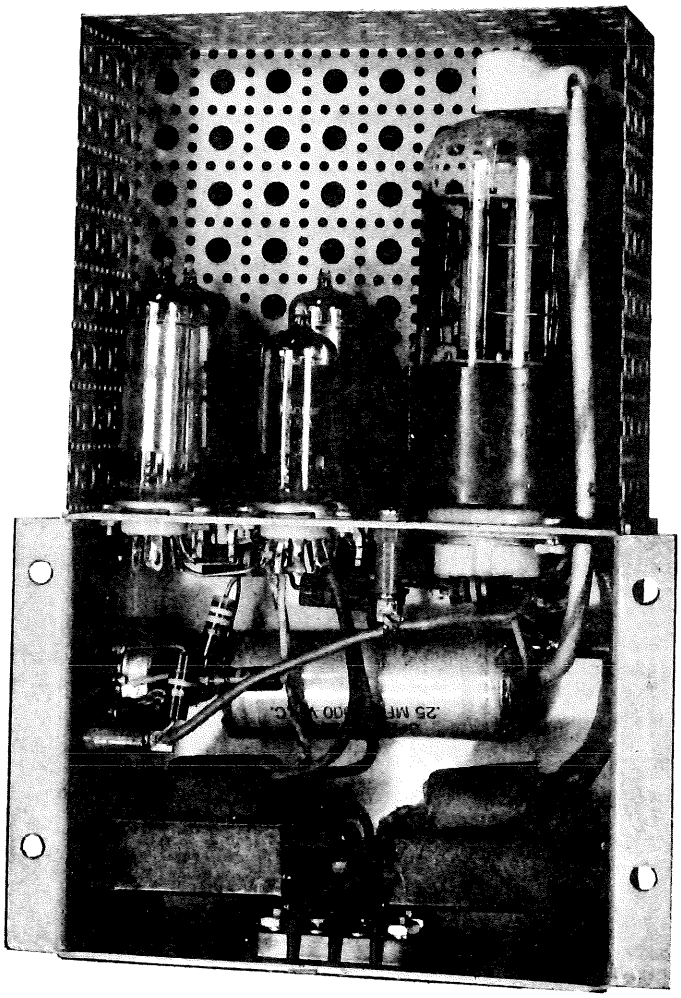
FTL 36102



POWER SUPPLY SUBASSEMBLY

FIGURE 12

FTL 36101



REGULATOR SET, VOLTAGE

FIGURE 13

FTL 36100