NAVSHIPS 93483.42(A) *(Non-Registered)*

MAINTENANCE STANDARDS BOOK

for

RADIO TRANSMITTING SETS
AN/WRT - 1
AND AN/WRT - 1A

SERIAL NO.__________

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS

Approved: 9 July 1964

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Summary Page	Original		
Title Page	Original		
ii to xi	Original		
1-0 to 1-32	Original		
2-1 to 2-26	Original		

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RADIO TRANSMITTING SETS AN/WRT-1, -1A
NAVSHIPS 93483.42(A)

REFERENCE STANDARDS
SUMMARY

Model ______________

Serial No. ______________

Installed In ______________
Ship or Station

After the equipment has been brought up to optimum performance and the standards accomplished, record on this summary sheet the test indications which have been entered in this book. Forward this summary sheet to Chief, Bureau of Ships, Navy Department, Washington 25, D. C.

Step No.	Ref. Std.
Section A	
1	________ V AC
1.1	________ V AC
1.2	________ V AC
Section B	
1	________ V DC
1.1	________ V DC
1.2	________ V DC
1.3	________ V DC
2	________ V DC
Section C	
1	________ cps
2	________ cps
3	________ V
	________ V_1
	________ t
4 (a)	________ cps
(b)	________ cps
4.1	________ V AC
Section C (Cont'd)	
5	________ V AC
6	________ db
6.1	________ db
7	________ V AC
8 (a)	________ cps
(b)	________ cps
Section D	
1	________ V DC
2	________ V DC
3	________ V DC
4	________ MA
5	________ MA
6	________ MA
7 (a)	________ MA
(b)	________ MA
(c)	________ MA
(d)	________ MA
(e)	________ MA
8	________
9	________ watts
Section D (Cont'd)	
10	________ V DC
11	________ MA
12	________ MA
13	________ MA
14 (a)	________ MA
(b)	________ MA
(c)	________ MA
(d)	________ MA
(e)	________ MA
15	________
16	________ watts
17	________ MA
18	________ MA
19	________ MA
20 (a)	________ MA
(b)	________ MA
(c)	________ MA
(d)	________ MA
(e)	________ MA
21	________
22	________ watts
23	________ MA
Section D (Cont'd)	
24	________ MA
25	________ MA
26(a)	________ MA
(b)	________ MA
(c)	________ MA
(d)	________ MA
(e)	________ MA
27	________
28	________ watts
Section E	
1	________ % MOD
2 (a) $F_o \pm$	________ cps
(b) $F_o +$	________ cps
(c) $F_o -$	________ cps
3	________ V
	________ $T_R = T_D$
4 (a)	________ V
	________ $T_R = T_D$
(b)	________ V
	________ $T_R = T_D$
5	________ % MOD
5.1(a)	________ V
(b)	________ V

List all field changes which have been accomplished on this equipment ______________

____

____

Signature ______________ Title-Position ______________ Date ______________

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

EFFECT OF FIELD CHANGES

(Field changes considered in preparation of this book: None)

FIELD CHANGE	PAGE NUMBER	CHANGE IN EFFECT	TESTS AFFECTED	IF FIELD CHANGE IS NOT ACCOMPLISHED

INTRODUCTION

Note.-- If a ship cannot obtain a copy of the Maintenance Standards Book at the time of installation or major overhaul, and the Industrial activity has a library copy on hand, the library copy shall be used to accomplish the required measurements and locally reproduced summary sheets may be used to record the results. When this procedure is followed, a copy of the required Maintenance Standards Book shall be requisitioned for the ship, and a completed summary sheet shall be provided the ship (in addition to the copy for the Bureau of Ships) together with written instructions to record the reference standards in the proper locations in the book, and to insert the summary sheet at the front of the book as the official record of accomplishment.

General

This Maintenance Standards Book is to be assigned permanently to the specific installation of Radio Transmitting Set AN/WRT-1A indicated on the Cover and Title Page.

The tests prescribed herein provide a systematic and efficient method for checking and performing routine preventive maintenance on the above equipment. This book contains specific test procedures which, when accomplished on the above equipment when it is operating properly, will provide a series of reference standards representing proper performance of the specified equipment. It also contains a series of periodic maintenance check-off procedures which, when performed as directed, will detect areas of subnormal performance Comparison of preventive-maintenance results with the reference standards, and proper analysis and correction of any abnormal results, will serve to avert impending equipment failure.

The book is divided into two parts: Part I--Tests for Establishing Reference Standards, and Part II--Preventive Maintenance Check-Off. Part I contains a block diagram subdivided into functional sections, a lists of tests which, when performed and recorded, will provide the reference standards for the assigned equipment, and the procedures and illustrations necessary for accomplishing certain of these tests. Collectively, these reference standards indicate the equipment capability. Part II contains a series of preventive-maintenance tests and procedures (with necessary instructions, illustrations, and charts) arranged by time periods. When properly performed, these tests and procedures indicate the performance of individual circuits and also provide for systematic preventive maintenance of the equipment. All procedures designated by step numbers enclosed in stars(1 , 2 , etc) are referred to in the Performance Standards Sheet for this equipment. The performance standard sheet for this equipment is contained in NAVSHIPS 93000.

The test equipments and times required to perform the tests are listed on page ix

Part I--Tests for Establishing Reference Standards

The maintenance standards tests are given in the "List of Maintenance Standards Procedures" on page 1-1. These tests are divided into functional sections which agree with the functional sections of the block diagram on page 1-0. The procedures and illustrations for performing each step are located through Part I and Part II, and are referred to in the list.

Part II--Preventive Maintenance Check-Off

Part II of the book contains test procedures in table form (procedure table), to be performed by the maintenance technician or operator; these procedures are scheduled for regular periods (daily, weekly, etc). Accompanying each step or group of steps is a two-year check-off chart.

Those tests that are designated "O.M." may be performed as part of the Operational Maintenance Program by operating personnel. At the top of each procedure table is a list of operating conditions and control settings which apply to the entire table unless noted otherwise in the procedures of a given step.

The step numbers of the procedures correspond to the "step" numbers on the accompanying illustrations. Arrows leading from a given "step" number on the illustration graphically present certain basic information given in the associated step of the procedure table, as follows: The point where the test equipment is to be connected, and the "indicator" from which the test is to be taken.

Instructions

Upon receipt of this book, record in ink, in the space provided on both the cover and the title page, the serial number, and if applicable, the model number of the equipment to which this book is assigned.

Enter field changes that have been made to the equipment that alter any of the steps of the book on page v. The steps affected must be changed, in ink, on the applicable pages, so as to provide maintenance (or operating) personnel with an accurate method for testing the equipment. The entries should be followed by the initials of the person who made the field change, or, if unknown, by the initials of the person making the entry.

Establish the Reference Standards upon receipt of this book, and re-establish them after equipment overhaul. Prior to establishing the initial reference standards, the equipment shall first be checked to insure that the equipment is operating within its design capabilities. After it has been ascertained that the equipment is operating properly, the prescribed tests listed in Part I (page 1-1) shall be made, and the results recorded in ink in the spaces provided in the procedure tables for the appropriate steps. Care must be taken to follow the instructions given for each maintenance standard so that the reference standard obtained provides for a valid comparison when the preventive-maintenance values are subsequently compared with it.

Upon completion and entry of the reference standards, these standards are to be transcribed onto the Reference Standards Summary Sheet contained in the front of the book. This page should be completely filled out, signed, and dated, and then forwarded to the Chief, Bureau of Ships, Washington 25, D.C.

After the maintenance standards tests have been completed and the results properly entered, the book is to be used to augment the preventive-maintenance schedule. Each day, except when in port, the daily checks shall be accomplished; each week the weekly checks shall be accomplished; etc.

Upon completing each test as prescribed in the procedure tables, the results should be entered and properly dated in the check-off chart accompanying the instructions. These entries are of prime importance, for they indicate whether or not the equipment is performing at maximum efficiency. Comparison of a given indication with indications previously obtained, and with the initial reference standard, will quickly reveal any significant change. It is expected that the readings will show nominal variances from time to time. This does not necessarily mean that the equipment is operating improperly. If, however, a particular step produces an indication which varies progressively each time the check is made, it indicates improper operation or impending failure, and corrective measures should be taken.

IN-PORT PROCEDURES: The equipment should not be energized daily for the sole purpose of making daily checks. The equipment should, however, be energized at least twice a week, and at least two days before getting underway. Enter "IN PORT" in the check-off chart as appropriate.

FIELD CHANGES: Any information concerning field changes that are made on the equipment subsequent to the publishing of the reference standards must be entered on page v by the person making the field change; this entry should be followed with his initials, in the space provided. If the field change should require a change in any of the steps in this book, correct the book in accordance with instructions in the applicable temporary correction or permanent change. When the affected step is a maintenance standard, a new reference standard should be obtained and entered. Whenever this book is completed and a new book is obtained for a second two-year period, all field changes entered in this book shall be transcribed in the replacement book.

REORDER NOTICE: Upon completion of the second year third-quarterly check, order a new copy of this book for the next two-year period in accordance with instructions contained in Index of Forms and Publications, Cognizance Symbol "I" (NAVSANDA PUBLICATION 2002). The end of third quarter may be construed to mean the ninth month, 36 week, etc.

TEST EQUIPMENT (OR EQUIVALENT) TO BE USED

TEST EQUIPMENT	PART I - SECTION						PART II - PERIOD				
	A	B	C	D	E		D	W	M	Q	S-A
Multimeter AN/PSM-4 Series	X	X							X		
Electronic Multimeter AN/USM-116 Series			X		X					X	
Electronic Counter Hewlett-Packard Model 524 Series with Model 525 Series Plug-in Units			X		X					X	
Frequency Standard AN/URQ-9 Series			X							X	
Oscilloscope AN/USM-105			X		X					X	X
Audio Oscillator AN/URM-127 Series					X					X	
Carrier Frequency Voltmeter Sierra Model 124A			X								X
Electrical Dummy Load DA-91/( ) Series					X					X	
Battery BA-234/U					X					X	
Coaxial Cable, RG-8/U, 10-foot Length					X					X	
Coaxial Cable Fitting UG-573/U					X					X	
Coaxial Cable Fitting UG-21B/U					X					X	
Coaxial Cable Fitting UG-28A/U					X					X	
Coaxial Cable Fitting UG-57B/U					X					X	
MB T-adapter, Automatic Metal Products Type RF0735			X		X					X	
MB to BCN Adapter, Automatic Metal Products Type RF0756			X		X						X
Boehme Vari-speed Keyer, Type 66M with dot-cycle commutator					X					X	

SPECIAL PROCEDURES AND ADJUSTMENTS

No special procedures and adjustments are required. All necessary procedures and adjustments needed in performing the various Maintenance Standards Part II steps are included with each step. For additional procedure and adjustment information, refer to Technical Manual for Radio Transmitting Set AN/WRT-1, NAVSHIPS 93483.

WARNING

Voltages over 300 volts shall be measured as follows:

1 - Deenergize the equipment, shorting terminals to be measured to ground to discharge any capcitors connected to these terminals.

2 - Connect meter to terminals to be measured, using a meter range higher than the expected voltage.

3 - Energize the equipment and read the meter WITHOUT TOUCHING IT while the power is on.

4 - Deenergize the equipment, and short terminals to ground before disconnecting meter.

Notes

1 - MAKE SURE YOU ARE NOT GROUNDED whenever using measuring equipment or adjusting major equipments. For example: hand rails, exposed metal decks, or equipment frames.

2 - Ground case of test equipment whenever possible and before starting measurements where test equipment must be held or adjusted during the measurements.

3 - DO NOT FORGET that high voltages may be present across terminals that are normally low voltage. Be careful even when measuring low voltages.

SAFETY NOTICE

The attention of officers and operating personnel is directed to Chapter 18 of the Bureau of Ships Manual or superseding instructions on the subject of Radio-Safety precautions to be observed.

While every practicable safety precaution has been incorporated in this equipment, the following rules must be strictly observed:

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe all safety regulations. Do not change tubes or make adjustments inside equipment with high voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors. To avoid casualties always remove power and ground circuits prior to touching them.

DON'T SERVICE OR ADJUST ALONE

Under no circumstance should any person reach within the enclosure for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

DON'T TAMPER WITH INTERLOCKS

Do not depend upon door switches or interlocks for protection but always shut down motor generators or other power equipment. Under no circumstances should any access gate, door or safety interlock switch be removed, short circuited, or tampered with in any way, by other than authorized maintenance personnel, nor should reliance be placed upon the interlock switches for removing voltages from the equipment.

RESUSCITATION

AN APPROVED POSTER ILLUSTRATING THE RULES FOR RESUSCITATION BY AN AUTHORIZED METHOD SHALL BE PROMINENTLY DISPLAYED IN EACH RADIO, RADAR OR SONAR ENCLOSURE. POSTERS MAY BE OBTAINED UPON REQUEST TO THE BUREAU OF MEDICINE AND SURGERY.

ESTIMATED TIME REQUIRED TO PERFORM POMSEE

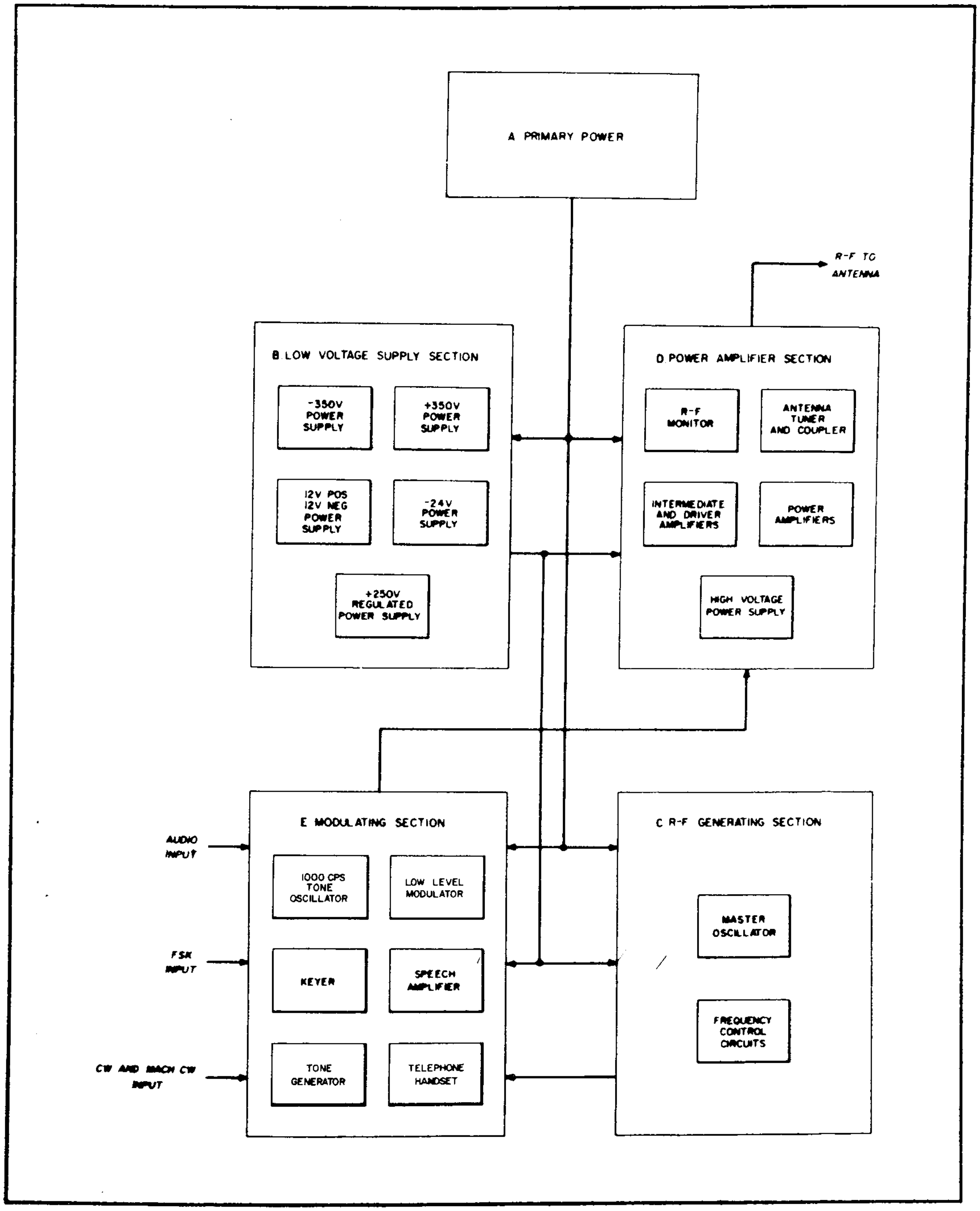
PART I

SECTION	TIME REQUIRED
A	15 min
B	30 min
C	2 hrs
D	30 min
E	2 hrs
TOTAL	5 hrs 15 min

PART II

PERIODIC CHECKS	EST. TIME REQUIRED
Daily	10 min
Weekly	15 min
Monthly	1 hr 45 min
Quarterly	2 hrs
Semi-Annual	30 min
TOTAL REQ'D Per Quarter	20 hrs 15 min
Avr per Day	13.6 min

PART I - TEST PROCEDURES AND MAINTENANCE REFERENCES, BLOCK DIAGRAM



Functional Sections

A - Primary Power
B - Low Voltage Power Supply
C - R-F Generating
D - Power Amplifier
E - Modulating

LIST OF MAINTENANCE STANDARDS PROCEDURES

The tests listed below are the maintenance standards tests for the AN/WRT-1A equipment. Information regarding the intent and accomplishment of these tests is given on page vi. The tests are subdivided by functional group; each group is designated by a letter (A, B, C, etc.) which agrees with the letter identifications on the block diagram, page 1-0. In addition to the subdivision by group, the tests are listed in a suggested sequence for performing the tests; deviation from the listed order will in no way affect the result or utility of the reference standard, unless otherwise noted. The test equipment required for performing the maintenance standards tests for each section is listed on page ix.

SECTION	STEP	ACTION REQUIRED	REFER TO		
			PERIOD	STEP	PAGE
A PRIMARY POWER	1	Record a-c supply voltage to low voltage rectifiers, AM 2198A/WRT-1	M	1	2-15
	1.1	Record a-c input voltage to low voltage rectifiers, AM 2198A/WRT-1	M	1.1	2-15
	1.2	Record a-c control bus voltage	W	1	2-11
B LOW VOLTAGE SUPPLY SECTION	1	Record d-c voltage of 12V supply AM-2198A/WRT-1	M	2	2-17
	1.1	Record d-c voltage of 24V supply AM-2198A/WRT-1	M	2.1	2-17
	1.2	Record d-c voltage of -350V supply AM-2198A/WRT-1	M	2.2	2-17
	1.3	Record d-c voltage of 350V supply AM-2198A/WRT-1	M	2.3	2-17
	2	Record d-c voltage of 250V regulated supply in O-621/WRT-1	M	3.0	2-17
C R-F GENERATING SECTION	1	Record frequency of 1 mc Oscillator - C2861/WRT-1	Q	1	2-19
	2	Record frequency of 100 kc Mixer - C2861/WRT-1	Q	2	2-19
	3	Record wave form of 100 kc pulse to mixers - C2861/WRT-1	SA	1	2-25
	4	Record frequency of r-f input to modulating section O-621/WRT-1	Q	5	2-19
	4.1	Record amplitude of r-f sample input to modulating section O-621/WRT-1	Q	5.1	2-19
	5	Record amplitude of r-f sample input to r-f mixers O-621/WRT-1	Q	6	2-19
	6	Record unwanted side band rejection in C-2861/WRT-1 at 1475 kc	SA	2	2-25

LIST OF MAINTENANCE STANDARDS PROCEDURES (cont)

SECTION	STEP	ACTION REQUIRED	REFER TO		
			PERIOD	STEP	PAGE
	6.1	Record unwanted side band rejection in C-2861/WRT-1 at 0375 kc	SA	2.1	2-25
	7	Record amplitude of interpolation oscillator - output - C-2861/WRT-1	Q	3	2-19
	8	Record frequency of Interpolation Oscillator output - C-2861/WRT-1	Q	4	2-19
		NOTE: All readings on Panel Meters of AM 2197/WRT-1			
D POWER AMPLIFIER SECTION	1	Record high voltage output (300 kc-100W)	W	4	2-11
	2	Record PA grid bias voltage	W	2	2-11
	3	Record PA screen voltage	W	3	2-11
	4	Record 2nd IF amp cathode current	W	5	2-11
	5	Record Driver cathode current	W	6	2-11
	6	Record total PA grid current	W	7	2-11
	7	Record individual & total PA cathode currents	W	8	2-12
	8	Record standing wave ratio (100W)	D	1	2-1
	9	Record power output (100W)	D	2	2-1
	10	Record high voltage output (300 kc-500W)	W	9	2-12
	11	Record 2nd IF amp cathode current	*	11	1-17
	12	Record Driver cathode current	*	12	1-17
	13	Record total PA grid current	W	10	2-12
	14	Record individual & Total PA cathode	W	11	2-12
	15	Record standing wave ratio (500W)	D	3	2-1
	16	Record power output (500W)	D	4	2-1
	17	Record 2nd IF amp cathode current (1500 kc	*	17	1-19
	18	Record Driver cathode current (same as Step 5)	*	18	1-19
	19	Record total PA grid current (same as step 6)	*	19	1-19
	20	Record individual & total PA cathode currents (same as step 7)	*	20	1-21
	21	Record standing wave ratio (Same as Step 8)	*	21	1-21

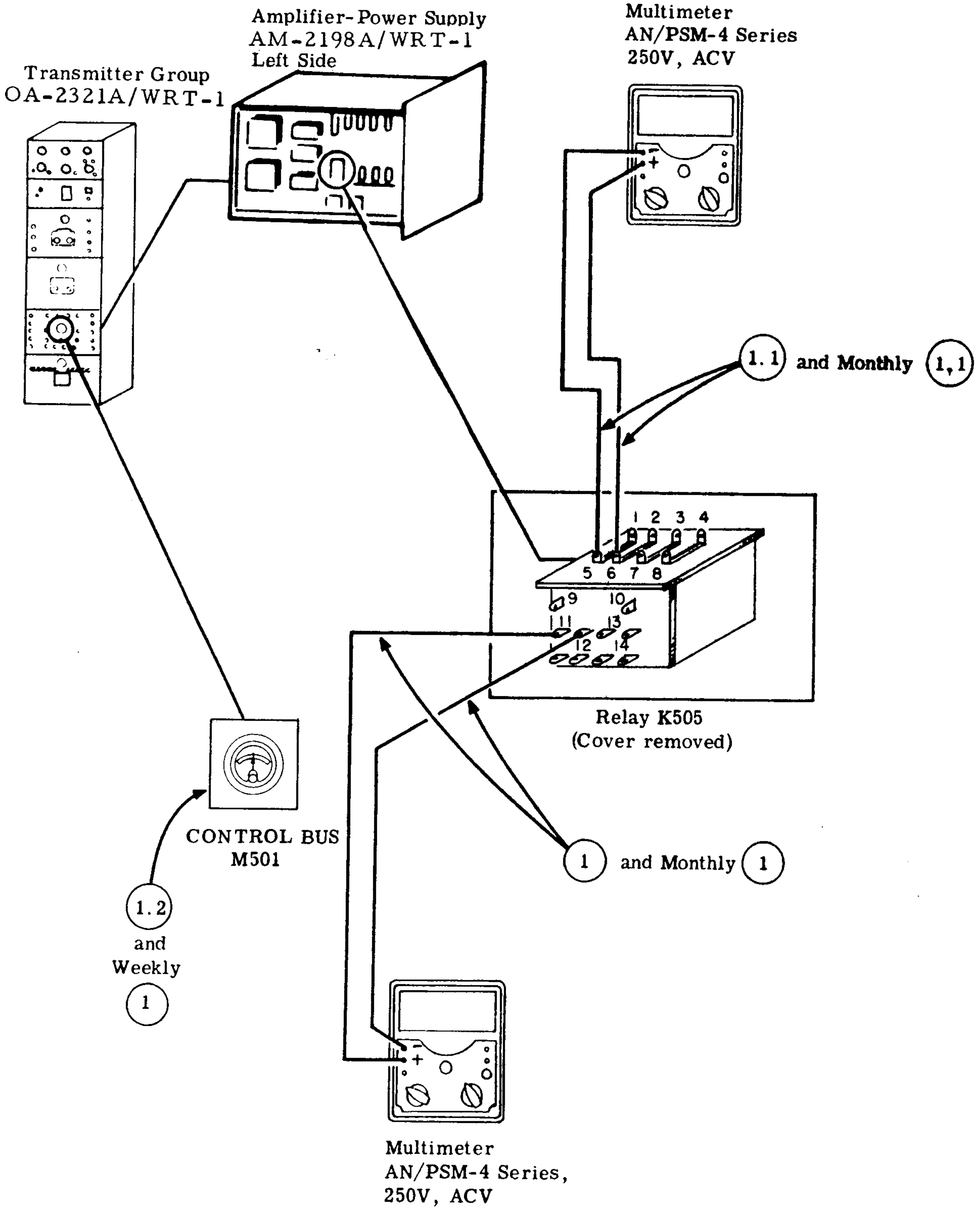
LIST OF MAINTENANCE STANDARDS PROCEDURES (cont)

SECTION	STEP	ACTION REQUIRED	REFER TO		
			PERIOD	STEP	PAGE
	22	Record power output (Same as Step 9)	*	22	1-21
	23	Record 2 IF cathode current (1500 kc-500W)	*	23	1-21
	24	Record Driver cathode current (Same as Step 5)	*	25	1-21
	25	Record total PA grid current (Same as Step 6)	*	25	1-21
	26	Record individual & total PA cathode currents (Same as Step 7)	*	26	1-23
	27	Record standing wave ratio (Same as Step 8)	*	27	1-23
	28	Record power output (Same as Step 9)	*	28	1-23
E MODULATING SECTION	1	Record % Modulation (700 kc - 500W)	Q	7	2-21
	2	Record FSK frequency shift	Q	8	2-21
	3	Record CW output wave form	Q	9	2-21
	4	Record MACH CW output wave forms	Q	10	2-22
	5	Record % Modulation using Tone Generator	Q	11	2-23
	5.1	Record MOD CW wave form	Q	11.1	2-23
GENERAL	-	Record air pressure - Tuner TN-345/WRT-1	D	5	2-3
	-	Record air pressure - Coupler CU-760/WRT-1	D	6	2-3
	-	Clean air filter. Clean and visually inspect all units.	M	4	2-17

*Non-scheduled test; pertinent instructions, illustrations, and space for recording maintenance standards are located in the applicable section of Part I of this book.

Maint. Stds.
Performed by ____________________
Approved by ____________________
Title-Position ____________________
Activity ____________________
Date ____________________

PRIMARY POWER



PRIMARY POWER

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): OFF
FILAMENT POWER switch (S502): OFF

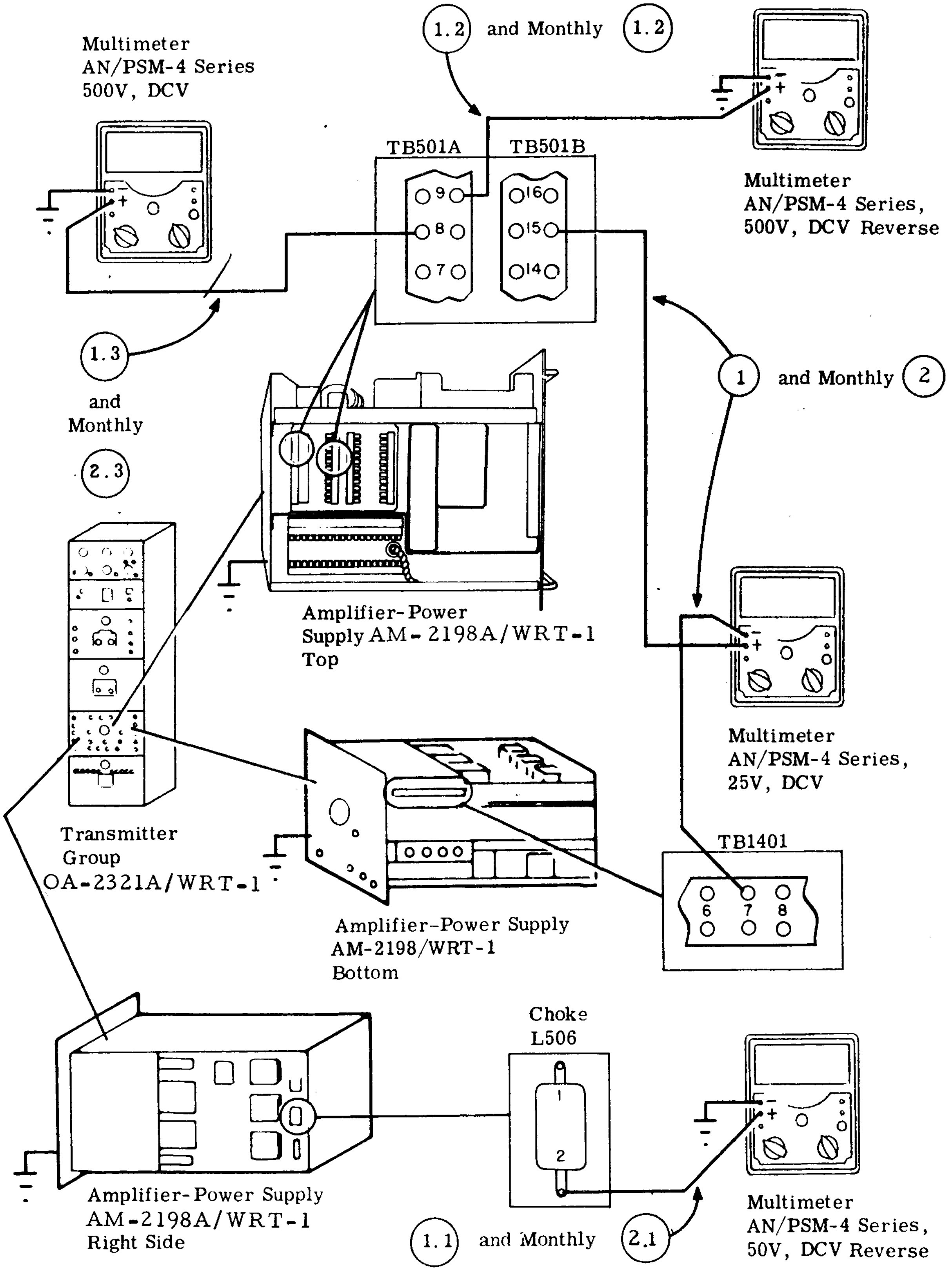
Test Equipment Required:

Multimeter AN/PSM-4 Series, or equivalent

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Record a-c voltage input to low voltage rectifiers and to control bus contained in Amplifier-Power Supply AM-2198A/WRT-1.	Observe precautions for measuring 300 volts or more - see page x. Remove safety cover from K505. Set range selector of Multimeter AN/PSM-4 Series, or equivalent, at 250 V. Connect one test probe to pin 11 of K505; connect the other test probe to pin 12 of K505. Place EMERGENCY STOP switch (S201): ON	Multimeter AN/PSM-4 Series, or equivalent.	205 V AC (216 to 224)
(1.1)		Place EMERGENCY STOP switch (S201): OFF. Observe precautions for measuring 300 volts or more - see page x. Connect one test probe of Multimeter AN/PSM-4 Series, or equivalent, to pin 5 of K505; connect the other test probe to pin 6 of K505. Place EMERGENCY STOP switch (S201): ON; FILAMENT POWER switch (S502): ON. Engage cabinet interlock. Wait thirty seconds for time delay to operate. Press PLATE POWER ON switch (S503).	Multimeter AN/PSM-4 Series, or equivalent.	205 V AC (216 to 224)
(1.2)		Read control bus voltage.	CONTROL BUS meter (M501).	115 V AC (113 to 117)

Steps ① thru (1.3)

LOW VOLTAGE POWER SUPPLY



LOW VOLTAGE POWER SUPPLY

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
REMOTE LOCAL switch (S507): LOCAL
EMISSION SELECTOR switch (S508): AM
POWER SELECTOR switch (S510): ADJ

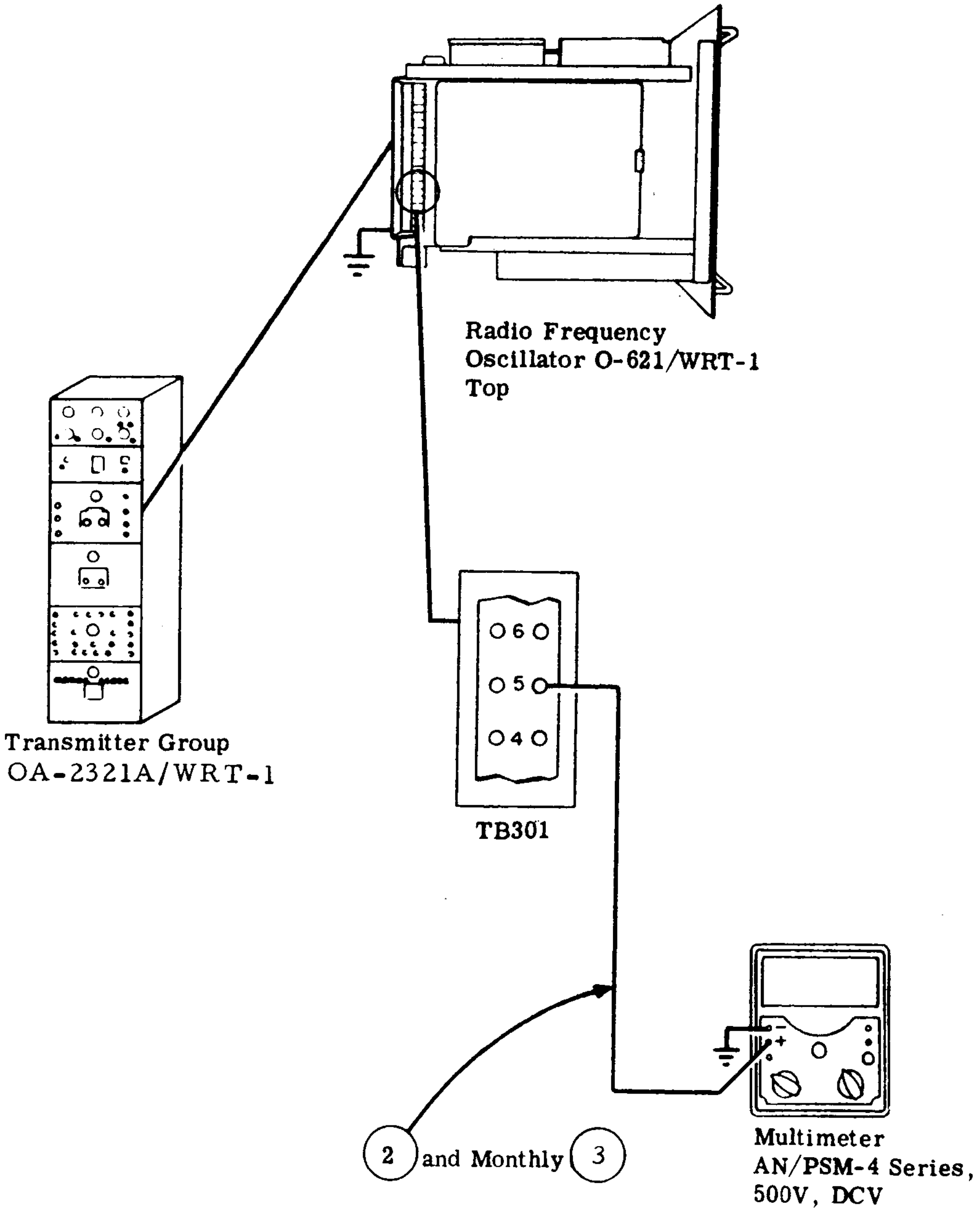
Test Equipment Required:

Multimeter AN/PSM-4 Series, or equivalent

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Record outputs of d-c power supplies contained in Amplifier-Power Supply AM-2198A/WRT-1.	Set range selector of Multimeter AN/PSM-4 Series, or equivalent, at 25 V. Connect positive test probe to terminal 15 of TB501B; connect negative test probe to terminal 7 of TB1401.	Multimeter AN/PSM-4 Series, or equivalent.	14 V DC (10 to 14)
(1.1)		Set range selector of Multimeter AN/PSM-4 Series, or equivalent, at 50 V. Set function switch at DCV REVERSE. Connect positive test probe to terminal 2 of L506; connect negative test probe to chassis ground.	Multimeter AN/PSM-4 Series, or equivalent.	-245 V DC (-20 to -28)
(1.2)		Set range selector of Multimeter AN/PSM-4 Series, or equivalent, at 500 V. Set function switch at DCV REVERSE. Observe precautions for measuring 300 volts or more-see page x. Connect positive test probe to terminal 9 of TB501A; connect negative test probe to chassis ground. Engage cabinet interlock. Press PLATE POWER ON switch (S503).	Multimeter AN/PSM-4 Series, or equivalent.	-360 V DC (-315 to -385)
(1.3)		Press PLATE POWER OFF switch (S504). Observe precautions for measuring 300 volts or more - see page x. Connect positive test probe to terminal 8 of TB501A; connect negative test probe to chassis ground. Press PLATE POWER ON switch (S503).	Multimeter AN/PSM-4 Series, or equivalent.	350 V DC (315 to 385)

Step ②

LOW VOLTAGE POWER SUPPLY



LOW VOLTAGE POWER SUPPLY

Operating Conditions and Control Settings:

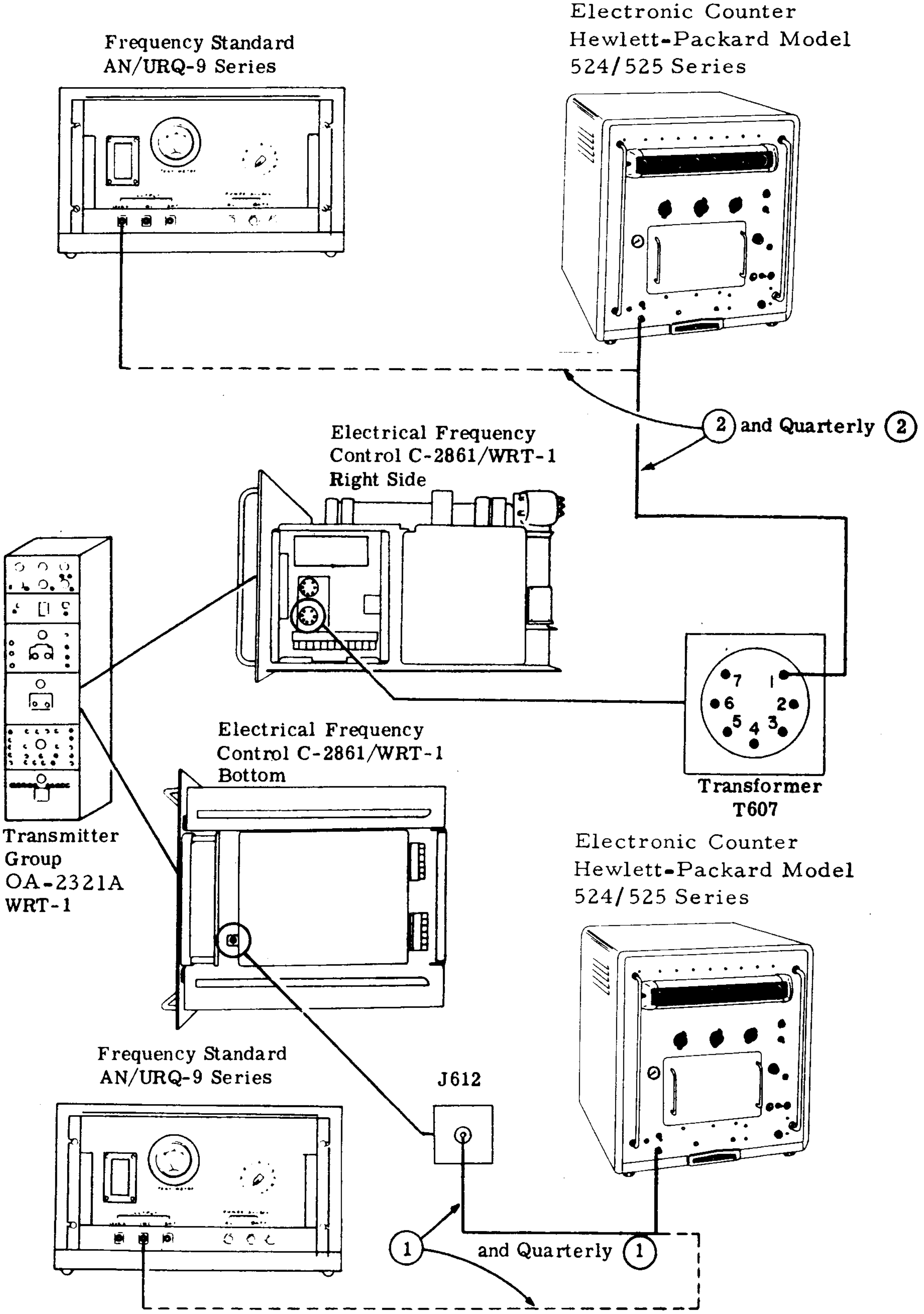
EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
REMOTE LOCAL switch (S507): LOCAL
EMISSION SELECTOR switch (S508): AM
POWER SELECTOR switch (S510): ADJ

Test Equipment Required:

Multimeter AN/PSM-4 Series, or equivalent.

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
②	Record output of +250-volt regulator contained in Radio Frequency Oscillator O-621/WRT-1.	Set range selector of Multimeter AN/PSM-4 Series, or equivalent, at 500 V. Connect positive test probe to terminal 5 of TB301; connect negative test probe to chassis ground. Engage cabinet interlock. Press PLATE POWER ON switch (S503).	Multimeter AN/PSM-4 Series, or equivalent.	250 V DC (250)

RF GENERATING



RF GENERATING

Test Equipment Required:
Electronic Counter Hewlett-Packard Model 524/525 Series
Frequency Standard AN/URQ-9 Series, or equivalent
Multimeter AN/USM-116 Series or equivalent
Oscilloscope TN/USM-105 Series, or equivalent
MB T-adapter, Automatic Metal Products Corp. type RF 0735
MB to BNC adapter, Automatic Metal Products Corp. type RF 0756

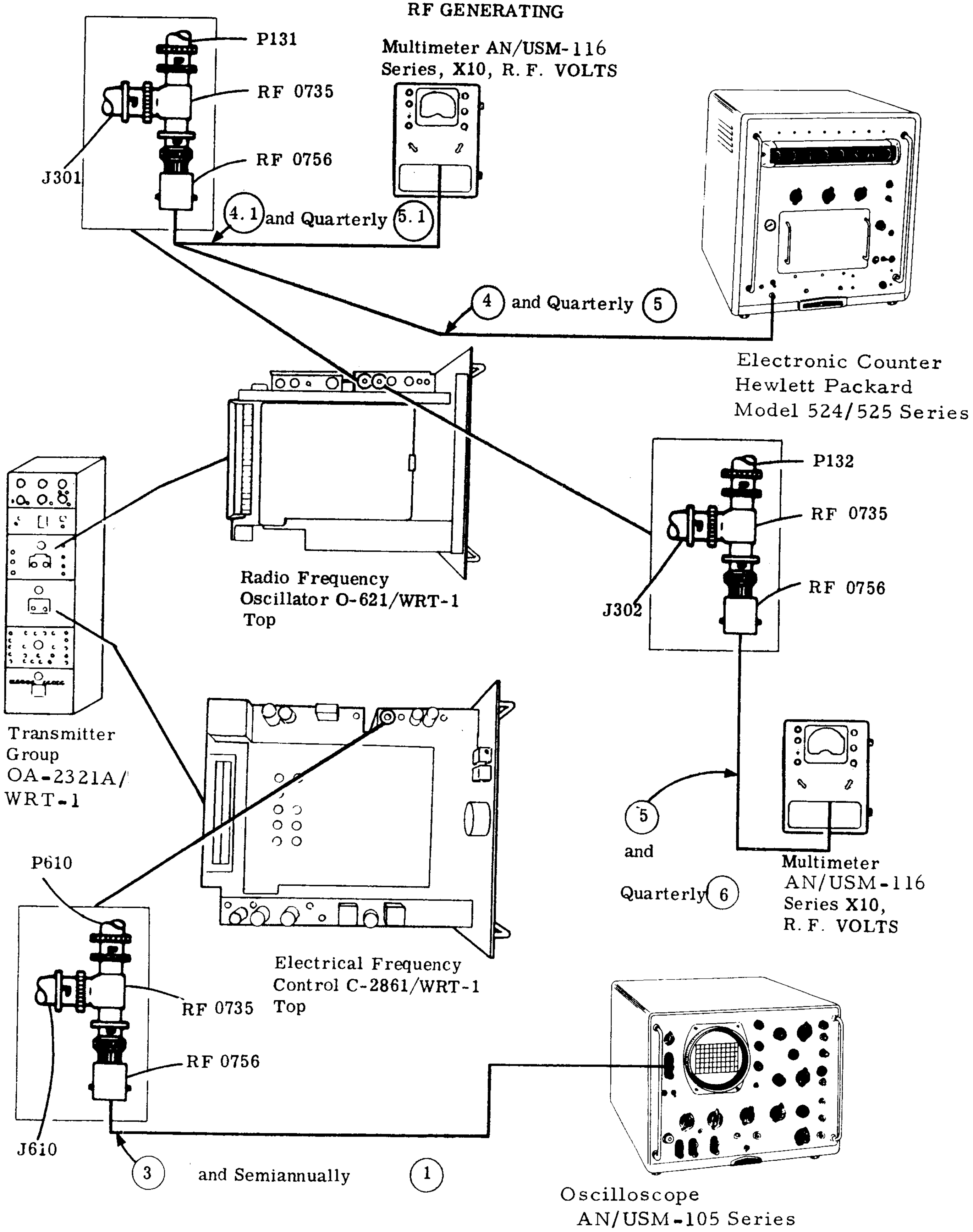
Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
POWER SELECTOR switch (S510): ADJ

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Measure one-Mc oscillator frequency	Press PLATE POWER ON switch (S503). Energize Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent and Frequency Standard AN/URQ-9 Series, or equivalent. Leave test equipment and transmitter energized for at least three hours prior to making measurements. Connect 1 MC output of frequency standard to input of electronic counter and ensure that counter indicates 1 MC. Remove frequency standard input and connect output of J612 to input electronic counter using adapter RF 0756. Engage cabinet interlock. Press PLATE POWER ON switch (S503).	Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent.	1,000,000 cps (1,000,000 ±1)
②	Measure 100-kc mixer frequency.	Press PLATE POWER OFF switch (S504). Connect 100 kc output of Frequency Standard AN/URQ-9 Series, or equivalent, to input of Electronic Counter Hewlett-Packard Model 524/525, or equivalent and ensure that counter indicates 100 kc. Remove frequency standard input and connect input of electronic counter between pin 1 of transformer T607 and chassis ground. Press PLATE POWER ON switch (S503).	Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent.	100,000 cps (100,000 ±0.1)

Steps ③ thru ⑤

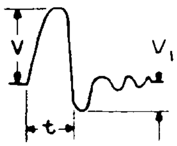
RF GENERATING



RF GENERATING

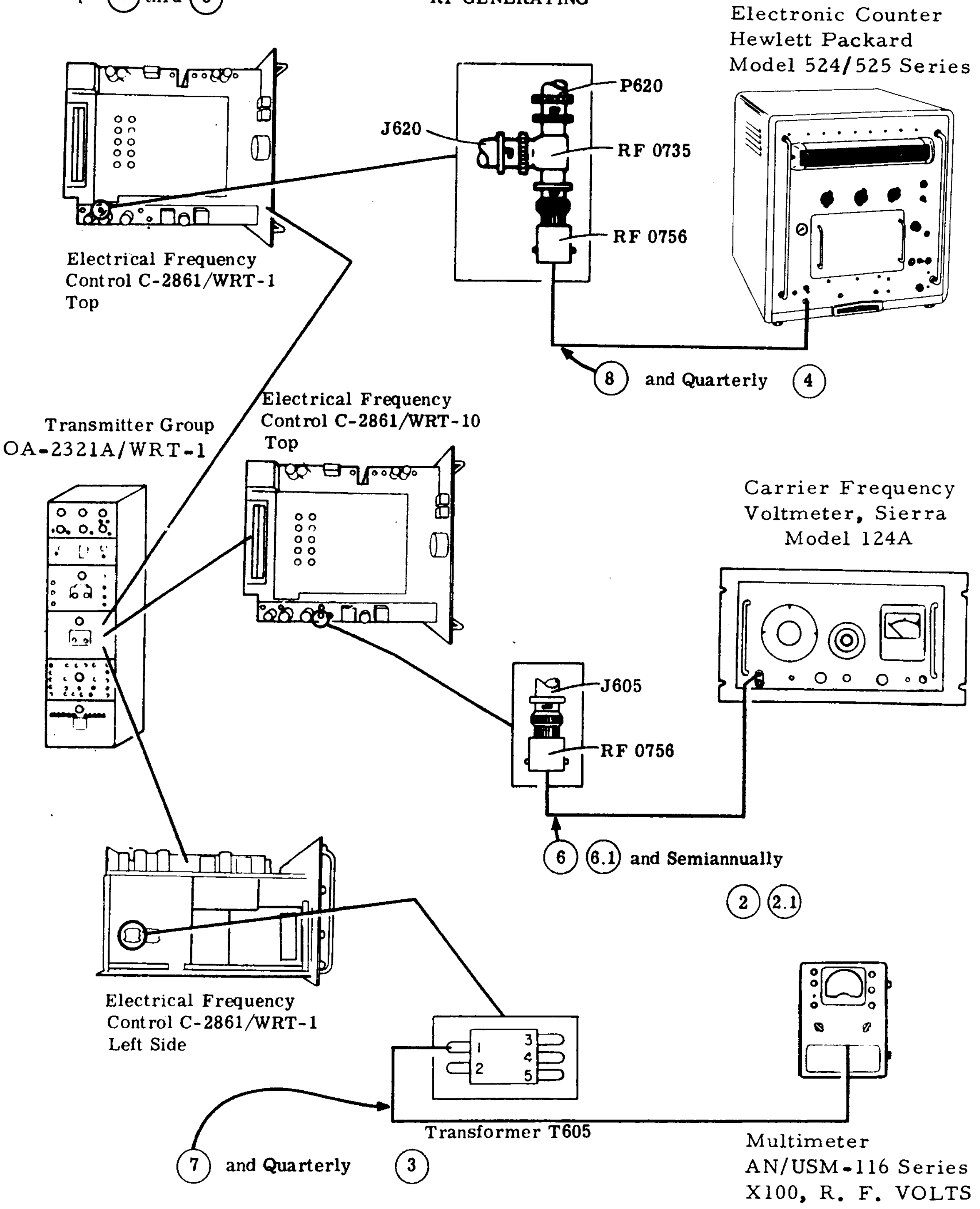
Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
POWER SELECTOR switch (S510): ADJ

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
③	Observe and record 100-kc pulse input to i-f mixers.	Press PLATE POWER OFF switch (S504). Connect tee-adapter RF0735 between J610 and P610. Connect adapter RF 0756 to open end of tee. Connect vertical input of Oscilloscope AN/USM-105 Series, or equivalent, between center conductor of adapter and chassis ground. Press PLATE POWER ON switch (S503).	Oscilloscope AN/USM-105 Series, or equivalent.	45 V 8 V_1 .6 µS t  (40 to 55) V (10 Max.) V_1 (max 1.0µs)t
④	Measure amplitude of r-f input to modulating functional section.	Connect tee-adapter RF0735 between J301 and P131. Connect adapter RF 0756 to open end of tee. Connect input of Electronic Counter Model 524/525, or equivalent, between center conductor of adapter and chassis ground. Engage cabinet interlock. Press PLATE POWER ON switch (S503). (a) Set TUNING Ⓒ and Ⓓ controls for output frequency of 300 kc. ~~(b) Set~~ TUNING Ⓒ and Ⓓ controls for output frequency of 1500 kc.	Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent	(a) 299,991 cps (300,000 ± 100) (b) 1,499,981 cps (1,500,000 ± 100)
(4.1)		Remove Electronic Counter. Set Multimeter AN/USM-116 Series, or equivalent, to measure 10 volts r-f. Connect r-f probe to center conductor of adapter RF 0756; connect probe ground to chassis ground.	Multimeter AN/USM-116 Series, or equivalent.	1.8 V AC (1.8 to 3.2)
⑤	Measure frequency and amplitude of r-f sample input to i-f mixers.	Connect tee-adapter RF0735 between J302 and P132. Connect adapter RF0756 to open end of tee. Repeat procedure of Step (4.1).	Multimeter AN/USM-116 Series, or equivalent.	1.3 V AC (1.2 to 2.2)

Steps ⑥ thru ⑧

RF GENERATING



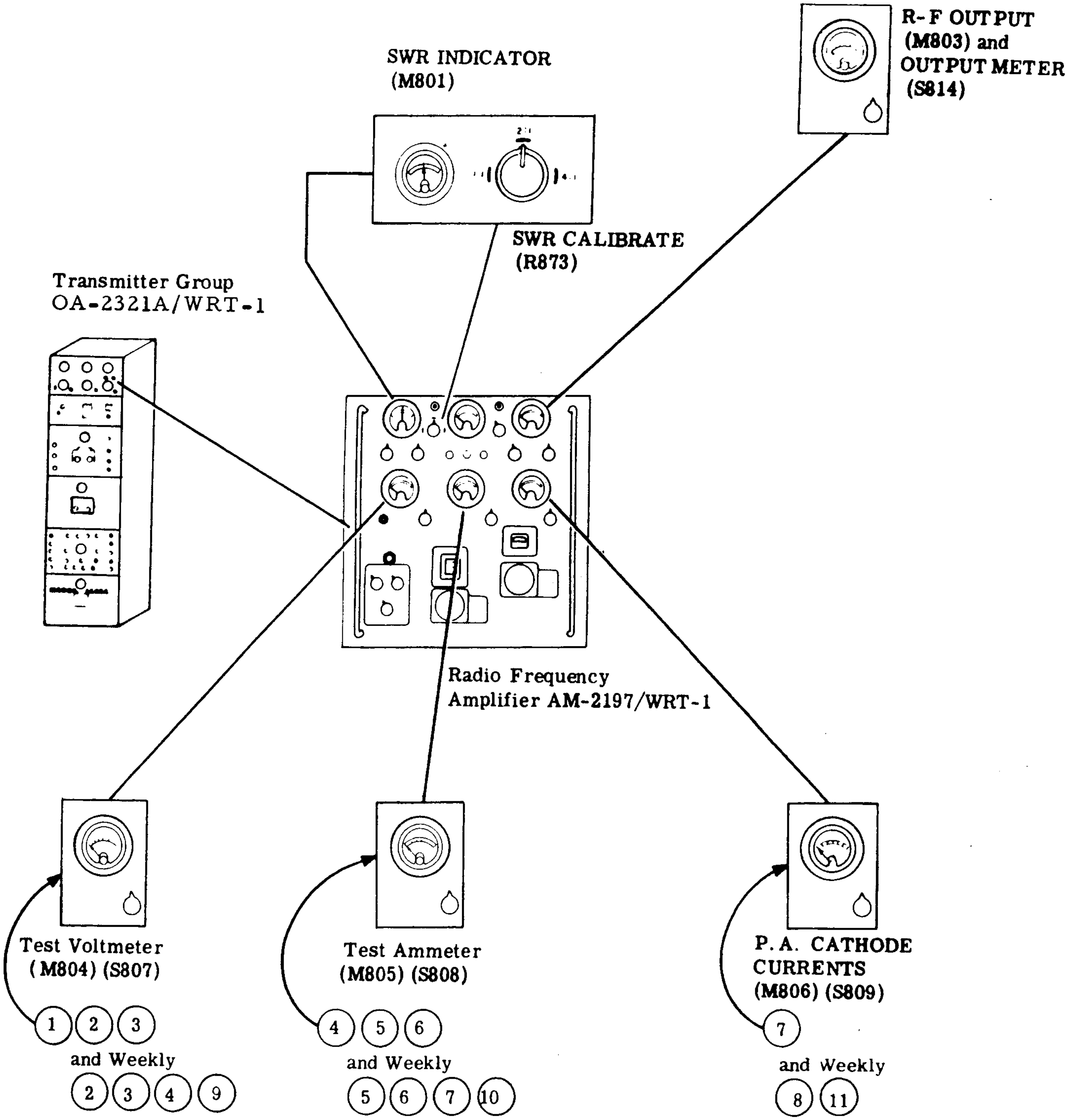
RF GENERATING

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
POWER SELECTOR switch (S510): ADJ
TUNING Ⓐ and Ⓑ controls: 65.0 kc

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑥	Measure unwanted sideband rejection of i-f mixers.	Connect adapter RF 0756 to J605. Connect input of Carrier Frequency Voltmeter, Sierra Model 101 or equivalent, between center conductor of adapter and chassis ground. Set meter for frequency of 75 kc. Engage cabinet interlock. Press PLATE POWER ON switch (S503). Set TUNING Ⓒ and Ⓓ controls for master oscillator frequency of 1475 kc. Set attenuator on voltmeter so that meter indicates 0 db. Set TUNING Ⓐ and Ⓑ controls for 45.0 kc. Record voltmeter reading.	Carrier Frequency Voltmeter, Sierra Model 124A, or equivalent	-30 db (-20)
(6.1)		Repeat Step ⑥ with TUNING Ⓒ and Ⓓ controls set for master oscillator frequency of 0375 kc.	Carrier Frequency Voltmeter, Sierra Model 124A, or equivalent.	-30 db (-20)
⑦	Measure amplitude of interpolation oscillator output.	Press PLATE POWER OFF switch (S504) Set Multimeter AN/USM-116, or equivalent, to measure 100 volts r-f. Connect r-f probe to pin 1 of transformer T605; connect probe ground to chassis ground. Set TUNING Ⓐ and Ⓑ controls for 50.0 kc. Press PLATE POWER ON switch (S503).	Multimeter AN/USM-116 Series, or equivalent.	[illegible] V AC (14 to 16)
⑧	Measure frequency of interpolation oscillator.	Press PLATE POWER OFF switch (S504). Connect tee-adapter RF 0735 between J620 and P620. Connect adapter RF 7056 to open end of tee. Connect input of Electronic Counter Model 524 or equivalent, between center conductor of adapter and chassis ground. Press PLATE POWER ON switch (S503). (a) Record frequency. (b) Set TUNING Ⓐ and Ⓑ controls for 100.0 kc. Record frequency.	Electronic Counter Hewlett-Packard Model 524/525, or equivalent.	(a) [illegible] cps (50,000 ±5) (b) 99,997 cps (100,000 ±5)

POWER AMPLIFIER



POWER AMPLIFIER

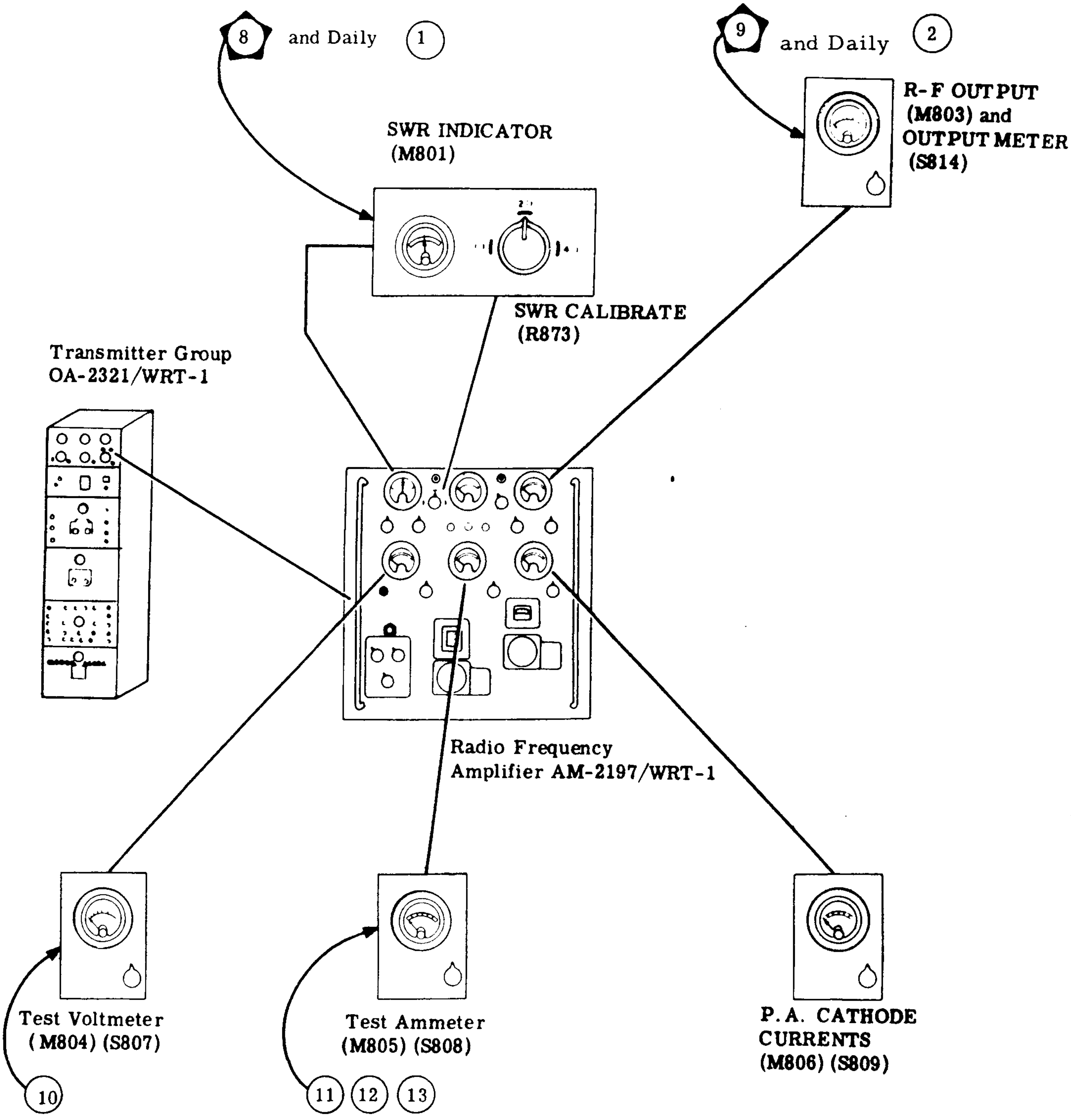
Operating Conditions and Control Settings:	Test Equipment Required:
EMERGENCY STOP switch (S201): ON FILAMENT POWER switch (S502): ON	None

(Refer to paragraph 3-2b of instruction manual for tuning procedure.)

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Record high voltage power supply output.	Tune transmitter for 100-watt CW operation at an operating frequency of 300 kilocycles. Place TEST VOLTMETER switch (S807): PLATE SUPPLY (1.5 KV); CARRIER TEST KEY (S811): ON.	TEST VOLTMETER (M804).	1250 V DC (1300 to 1425)
②	Record power amplifier grid bias voltage.	Place TEST VOLTMETER switch (S807): GRID BIAS (60 V).	TEST VOLTMETER (M804)	55 V DC (55 to 61)
③	Record power amplifier screen grid voltage.	Place TEST VOLTMETER switch (S807): SCREEN SUPPLY (600 V).	TEST VOLTMETER (M804)	400 V DC (350 to 400)
④	Record second imtermediate amplifier cathode current.	Place TEST AMMETER switch (S808): 2ND IA CATHODE (80MA).	TEST AMMETER (M805).	40 MA (40 to 50)
⑤	Record driver cathode current.	Place TEST AMMETER switch (S808): DRIVER CATHODE (200 MA).	TEST AMMETER (M805).	185 MA (160 to 190)
⑥	Record total power amplifier grid current.	Place TEST AMMETER switch (S808): TOTAL P.A. GRIDS (20MA).	TEST AMMETER (M805).	0 MA (0)
⑦	Record individual power amplifier cathode currents and total power amplifier cathode current.	Place P.A. CATHODE CURRENTS switch (S809): (a) 1, (b) 2, (c) 3, (d) 4, (e) TOTAL (1.5A).	P.A. CATHODE CURRENTS meter (M806).	(a) 85 MA (80 to 115) (b) 85 MA (80 to 115) (c) 110 MA (80 to 115) (d) 90 MA (80 to 115) (e) 370 MA (320 to 460)

Steps 8 thru ③

POWER AMPLIFIER



POWER AMPLIFIER

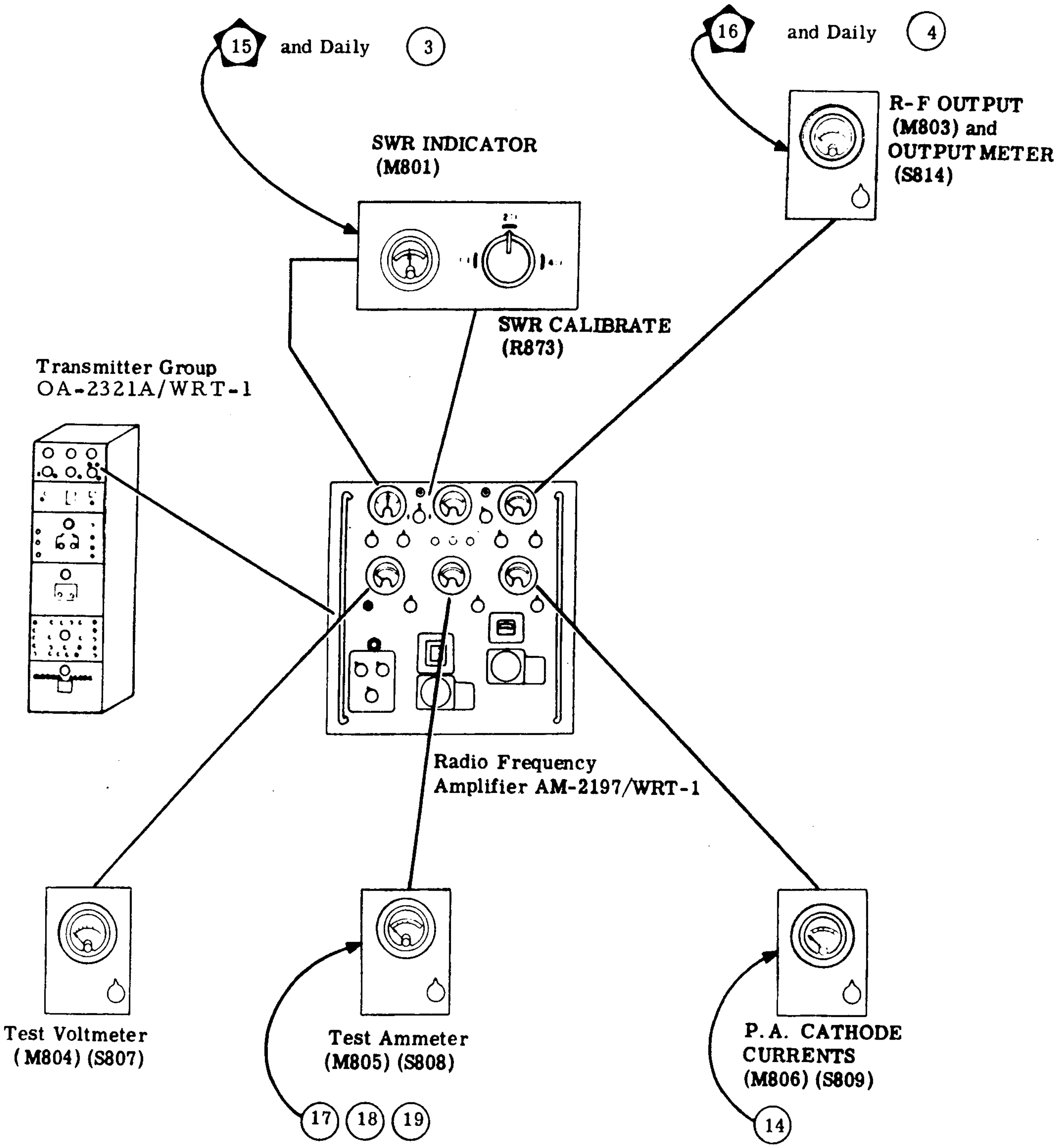
Operating Conditions and Control Settings:

Continue from step ⑦.

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑧	Record standing wave ratio. (VSWR)	Press SLOW READ SWR Ⓛ switch (S805) and alternately press POSITION CONTROL UP Ⓙ switch (S803) and POSITION CONTROL DOWN Ⓚ switch (S808) for most leftward indication on SWR INDICATOR meter (M801). Rotate SWR CALIBRATE control (R873) for zero indication on SWR INDICATOR meter (M801).	SWR CALIBRATE control (R873).	1:1 (4:1 Max.)
⑨	Record power output. (P)	Place OUTPUT METER switch (S814): R-F OUTPUT.	R-F OUTPUT meter (M803).	100 watts (90 to 110)
⑩	Record high voltage power supply output.	Place POWER SELECTOR switch (S510): 500 W; TEST VOLTMETER switch (S807): PLATE SUPPLY (1.5 KV). If necessary, reset DRIVE ADJUST control (R812) for an indication of 500 watts or R-F OUTPUT meter (M803).	TEST VOLTMETER (M804).	1250 V DC (1250 to 1390)
⑪	Record second intermediate amplifier cathode current.	Same as step ④.	TEST AMMETER (M805).	38 MA (40 to 50)
⑫	Record driver cathode current.	Same as Step ⑤.	TEST AMMETER (M805).	185 MA (160 to 190)
⑬	Record total power amplifier grid current.	Same as step ⑥.	TEST AMMETER (M805).	0 MA (0)

Steps ⑭ thru ⑲

POWER AMPLIFIER



POWER AMPLIFIER

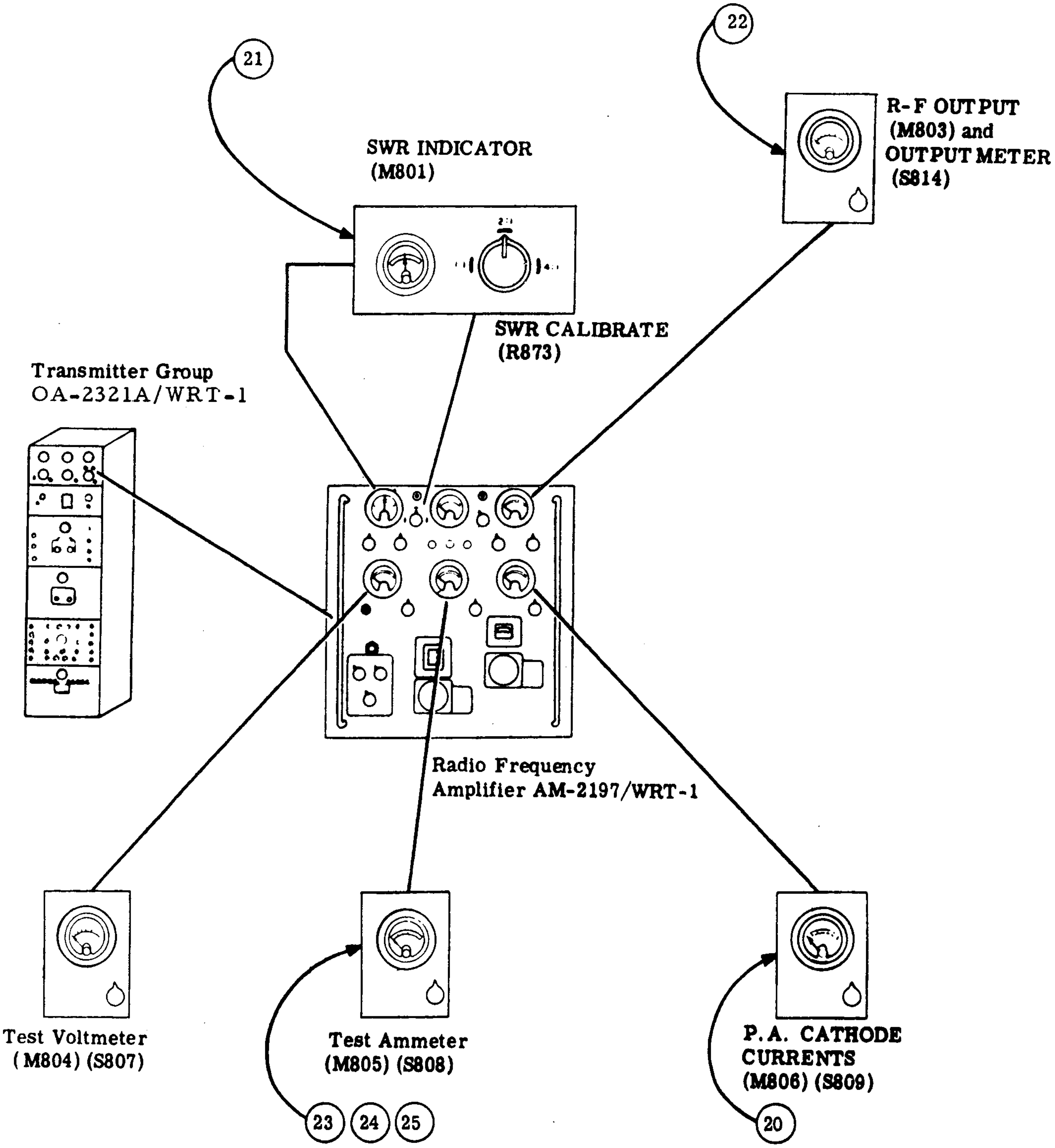
Operating Conditions and Control Settings:

Continue from Step ⑬.

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑭	Record individual power amplifier cathode currents and total power amplifier cathode current.	Same as Step ⑦.	P.A. CATHODE CURRENTS meter (M806).	(a) 210 MA (190 to 225) (b) 210 MA (190 to 225) (c) 200 MA (190 to 225) (d) 190 MA (190 to 225) (e) 800 MA (760 to 900)
15	Record standing wave ratio. (VSWR)	Same as Step 8.	SWR CALIBRATE control (R873).	1 1 (4:1 Max.)
16	Record power output. (P)	Same as Step 9.	R-F OUTPUT meter (M803).	500 watts (490 to 510)
⑰	Record second intermediate amplifier cathode current.	Tune transmitter for 100-watt CW operation at an operating frequency of 1500 kilocycles. Place TEST AMMETER switch (S808): 2ND IA CATHODE (80 MA); CARRIER TEST KEY (S811): ON.	TEST AMMETER (M805).	40 MA (40 to 50)
⑱	Record driver cathode current.	Same as Step ⑤	TEST AMMETER (M805).	180 MA (160 to 190)
⑲	Record total power amplifier grid current.	Same as Step ⑥.	TEST AMMETER (M805).	0 MA (0)

Steps ⑳ thru ㉕

POWER AMPLIFIER

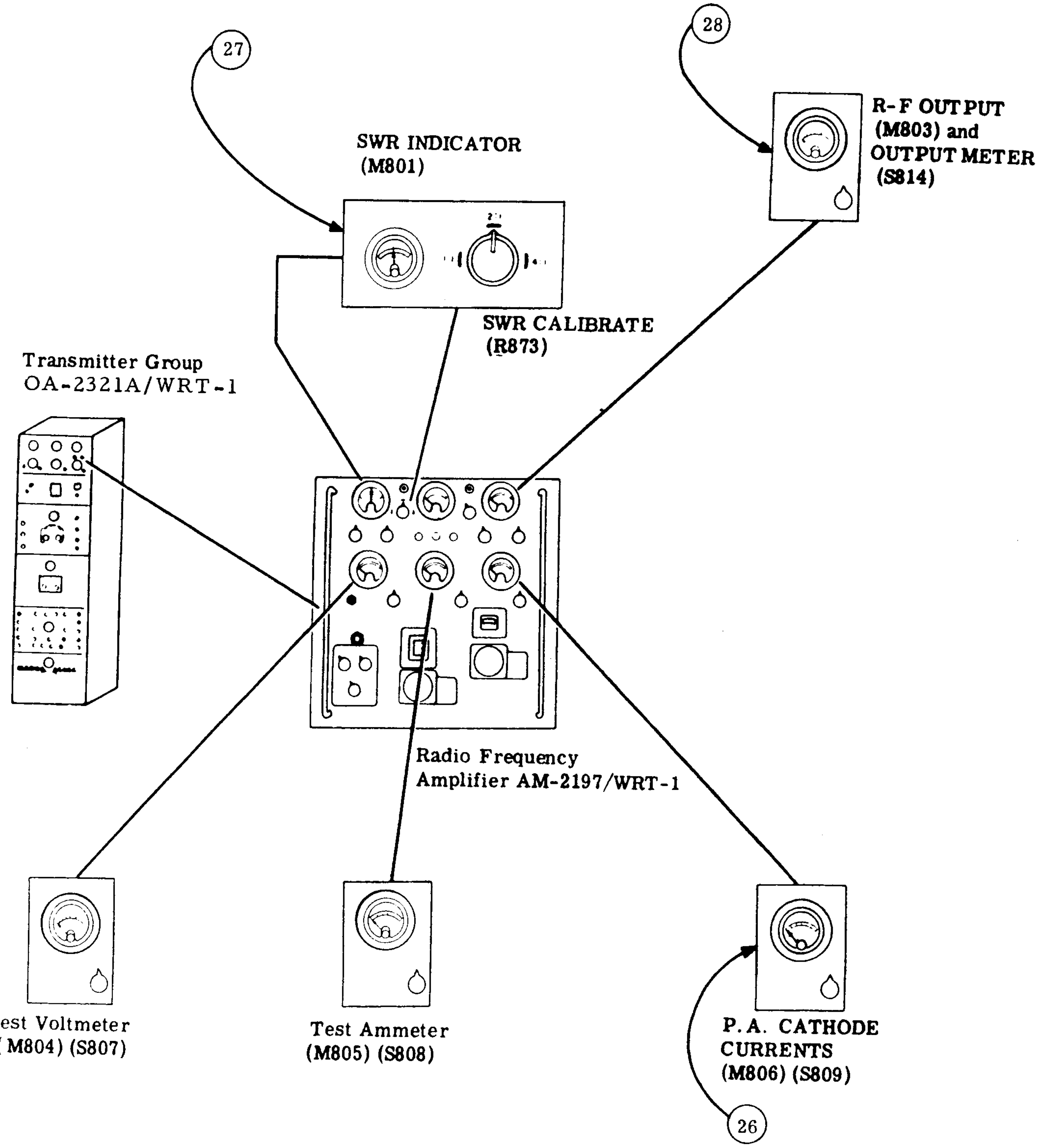


Operating Conditions and Control Settings:

Continue from Step ⑲ .

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑳	Record individual power amplifier cathode currents and total power amplifier cathode current.	Same as Step ⑦.	P. A. CATHODE CURRENTS meter (M806). 32[illegible]	(a) 85 MA (80 to 115) (b) [illegible] MA (80 to 115) (c) 110 MA (80 to 115) (d) [illegible] MA (80 to 115) (e) 3[illegible] MA ~~(190 to 225)~~
㉑	Record standing wave ratio. (VSWR)	Same as Step 8.	SWR CALIBRATE control (R873).	1.1 (4:1 Max.)
㉒	Record power output,(P)	Same as Step 9.	R-F OUTPUT meter (M803).	1[illegible] watts (90 to 110)
㉓	Record second intermediate amplifier cathode current.	Place POWER SELECTOR switch (S510): 500 W; TEST AMMETER switch (S808): 2ND IA CATHODE (80 MA). If necessary, reset DRIVE ADJUST control (R812) for an indication of 500 watts or R-F OUTPUT meter (M803).	TEST AMMETER (M805).	40 MA (40 to 50)
㉔	Record driver cathode current.	Same as Step ⑤.	TEST AMMETER (M805).	180 MA (160 to 190)
㉕	Record total power amplifier grid current.	Same as Step ⑥.	TEST AMMETER (M805).	0 MA (0)

POWER AMPLIFIER



POWER AMPLIFIER

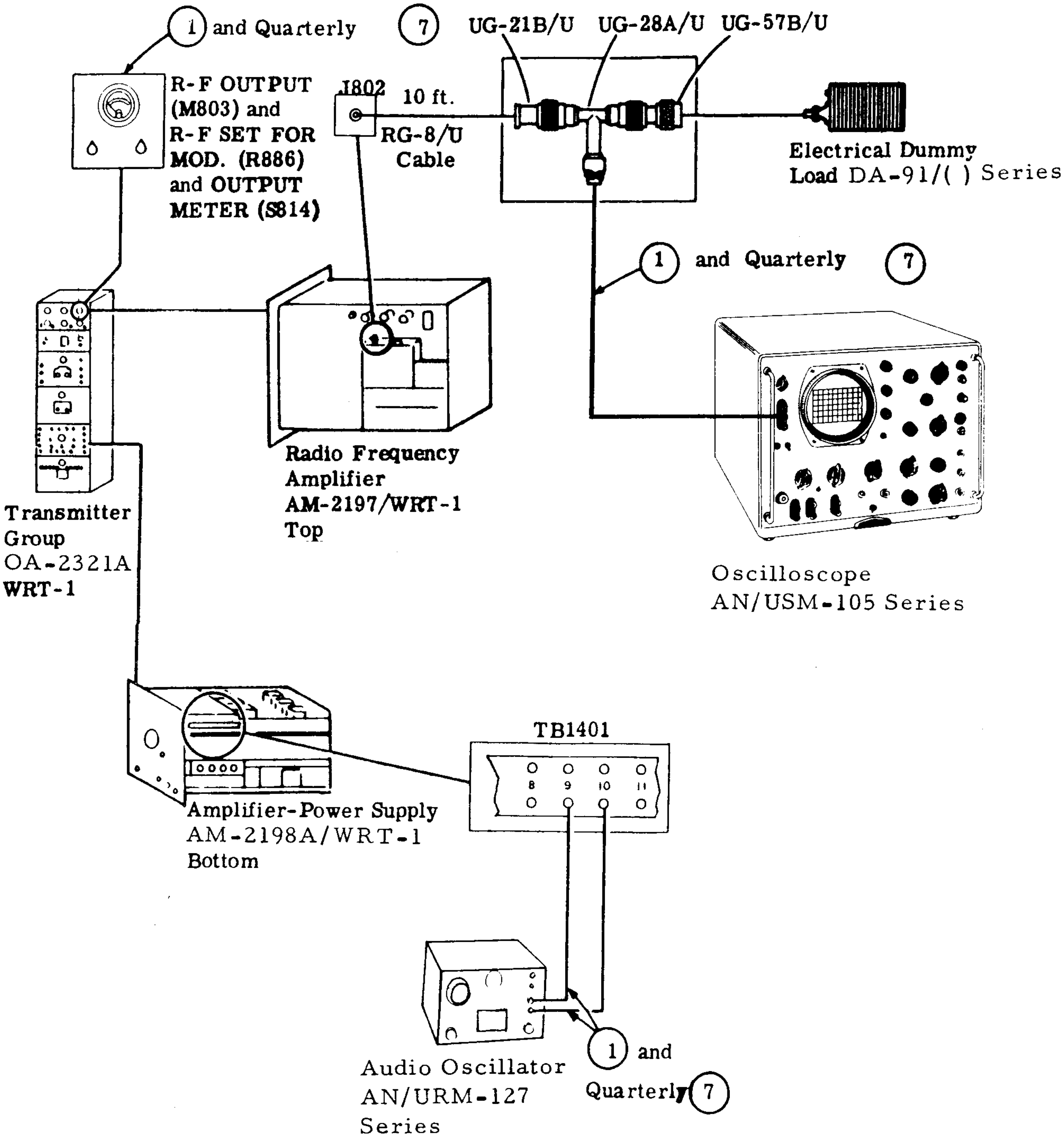
Operating Conditions and Control Settings:

Continue from Step ㉕ .

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE
NO.	ACTION REQUIRED			
㉖	Record individual power amplifier cathode currents and total power amplifier catnode current.	Same as Step ⑦.	P.A. CATHODE CURRENTS meter (M806).	(a) 210 MA (190 to 225) (b) 215 MA (190 to 225) (c) 190 MA (190 to 225) (d) 180 MA (190 to 225) (e) 800 MA (760 to 900)
㉗	Record standing wave ratio. (VSWR)	Same as Step 8.	SWR CALIBRATE control (R873).	1:1 (4:1 Max.)
㉘	Record power output. (P)	Same as Step 9.	R-F OUTPUT meter (M803).	500 watts (490 to 510)

Step ①

MODULATING



MODULATING

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): OFF
FILAMENT POWER switch (S502): OFF

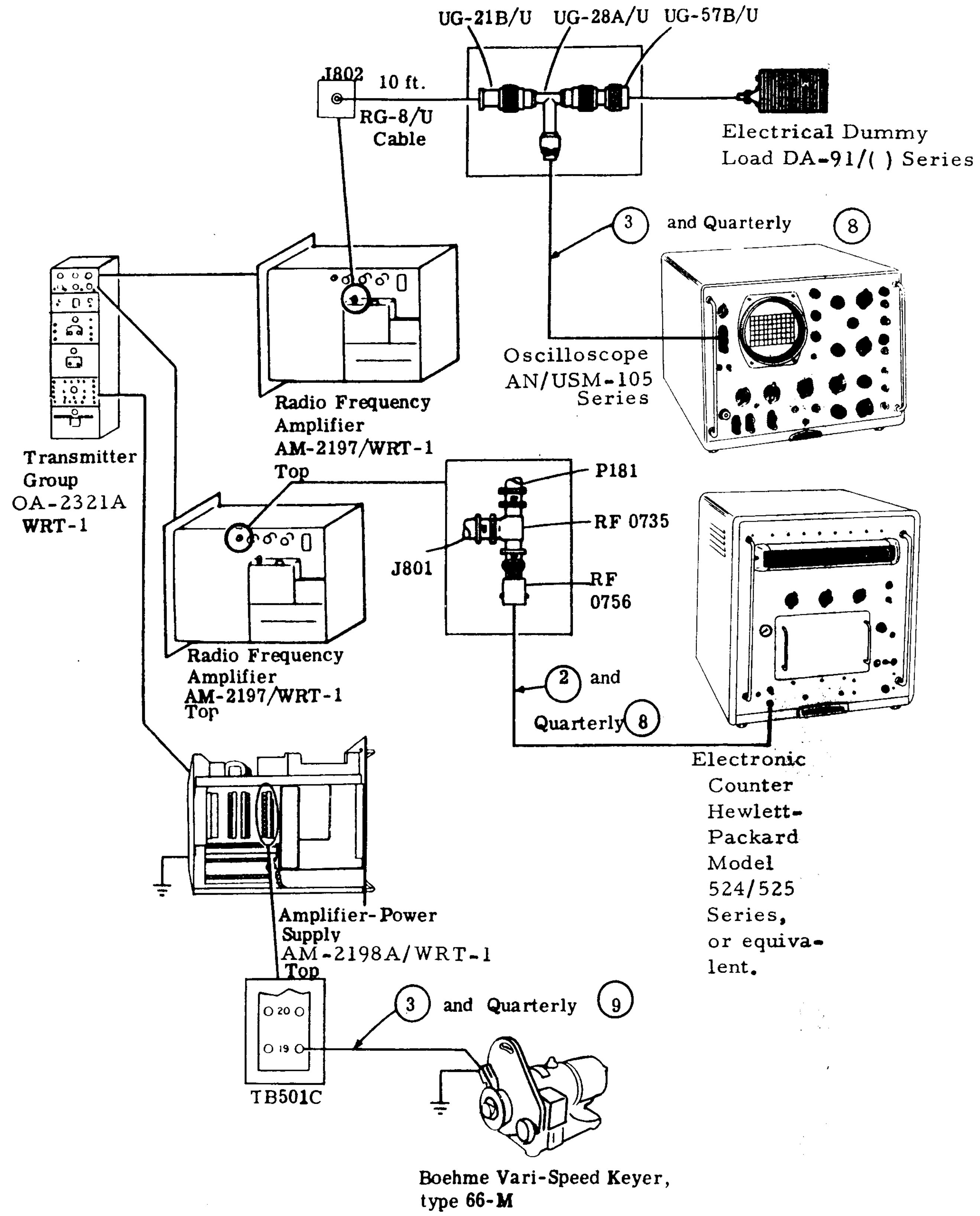
Test Equipment Required:

- Multimeter AN/USM-116 Series, or equivalent
- Electrical Dummy Load DA-91/( ) Series, or equivalent
- Oscilloscope AN/USM-105 Series, or equivalent
- Audio Oscillator AN/URM-127 Series, or equivalent
- Electronic Counter Hewlett Packard Modem 524/525 Series, or equivalent
- Boehme Vari-Speed Keyer, type 66-M, or equivalent
- Battery BA-234/U, or equivalent
- Coaxial Cable, RG-8/U, 10 ft length
- Coaxial Cable Fittings:
  - UG-573/U
  - UG-28A/U
  - UG-21/U
  - UG-57B/U

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Measure and observe AM modulation characteristics.	Withdraw Power Supply PP-2222/WRT from cabinet to allow shorting plunger S202 to operate. Observe precautions for measuring 300 volts or more - see page x. Remove P182 from J802. Prepare a 10-ft. length of RG-8/U cable with a UG-573/U plug and a UG-21B/U plug. Connect UG-573/U plug to J802. Connect UG-21B/U plug to Electrical Dummy Load DA-91/U Series, or equivalent, using tee-adapter UG-28A/U and adapter UG-57B/U. Connect vertical input of Oscilloscope AN/USM-105, or equivalent, between center conductor and ground of tee-adapter open arm. Connect output of Audio Oscillator AN/URM-127 Series, or equivalent to terminals 9 and 10 of TB1401. Leave audio oscillator deenergized. Secure Power Supply PP-2222/WRT in cabinet and engage all cabinet interlocks. Tune transmitter for 500-watt CW operation at an operating frequency of 700 kilocycles. Set EMISSION SELECTOR switch (S508): AM. Using DRIVE ADJUST control (R812), reduce drive until output power is approximately 125 watts. Place CLIPPING switch (S1401): OUT; AGC OR INPUT LEVEL control (R1401): AGC ON; SQUELCH LEVEL control (R1431): 0. Energize audio oscillator and, using Multimeter AN/USM-116 Series, equivalent, adjust output of oscillator for 1.5 volts rms at 1000 cps. Advance MODULATION LEVEL control (R1451) until oscilloscope pattern indicates 100 per cent modulation. Hold OUTPUT METER switch (S814) in R-F SET position and adjust R-F SET FOR MOD control (R886) until indicator of R-F OUTPUT meter (M803) reaches R-F SET marking. Place OUTPUT METER switch (S814): % MOD. Proceed to step ② without changing test set-up.	R-F OUTPUT meter (M803).	______ %MOD (95 to 100)

Steps ② thru ③

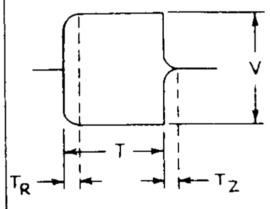
MODULATING



MODULATING

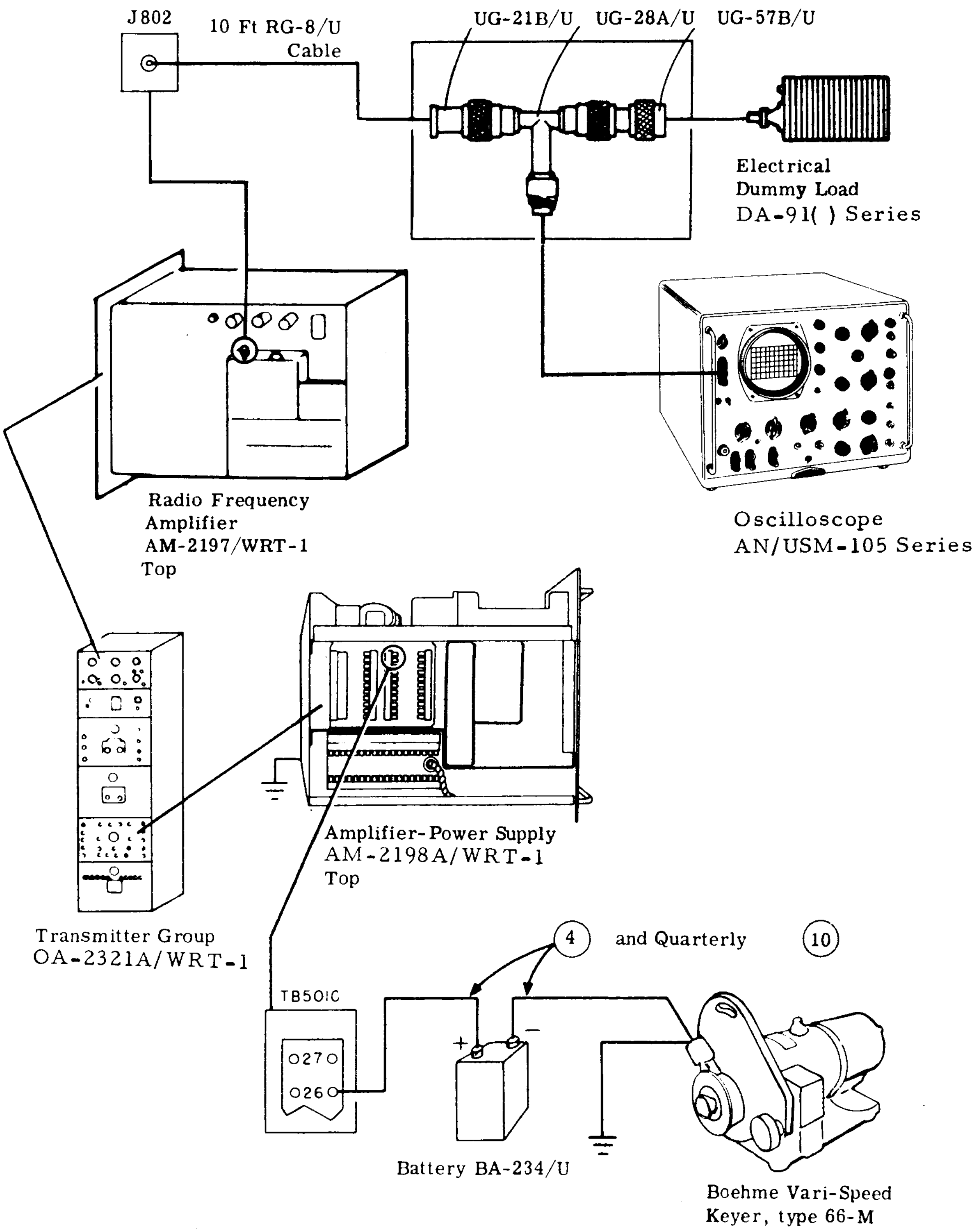
Operating Conditions and Control Settings:

Continue from Step ①.

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
②	Measure FSK frequency shift.	Remove Audio Oscillator AN/URM-127 Series, or equivalent. Connect T-adapter RF 0735 between J801 and P181. Connect adapter RF 0756 to open end of T. Connect input of Electronic Counter Hewlett Packard Model 524/525 Series, or equivalent, between center conductor of adapter and chassis ground. Place EMISSION SELECTOR switch (S508): CW; CARRIER TEST KEY (S811): ON. Measure carrier frequency; call this frequency F_o. (a) Place CARRIER TEST KEY (S811): OFF; EMISSION SELECTOR switch (S508): FSK; FSK TEST switch (S308): MARK; SHIFT Ⓔ control (R461): 0. (b) Place SHIFT Ⓔ control (R461): 850, (c) Place FSK TEST switch (S308): SPACE. Proceed to step ③ without changing test set-up.	Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent.	(a) $F_o \pm$ ______ cps ($F_o \pm$ 5 cps) (b) $F_o +$ ______ cps ($F_o +$ 382 to 468 cps) (c) $F_o -$ ______ cps (F_o -382 to 468 cps)
③	Observe and record CW output waveform.	Remove Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent. Place EMISSION SELECTOR switch (S508): CW; CARRIER TEST KEY (S811): ON. Observe peak-to-peak amplitude of r-f carrier on Oscilloscope AN/USM-105 Series, or equivalent; Call this voltage E_o. Place CARRIER TEST KEY (S811): OFF. Connect contacts of Boehme Vari-Speed Keyer, type 66-M, or equivalent, to terminal 19 of TB510C and to chassis ground. Select keyer speed of 40 wpm. Set LOCAL REMOTE switch (S507): REMOTE; 6 WIRE REMOTE 2 WIRE REMOTE switch (S509): 6 WIRE REMOTE. Proceed to step ④ without changing test set-up.	Oscilloscope AN/USM-105 Series, or equivalent.	______ V ______ $T_R = T_D$  ($E_o \pm 10\%$) V (10% T Max.) $T_R = T_D$ With dot cycle commutator, on-off periods equal.

Step ④

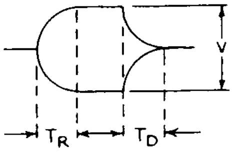
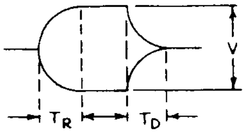
MODULATING



MODULATING

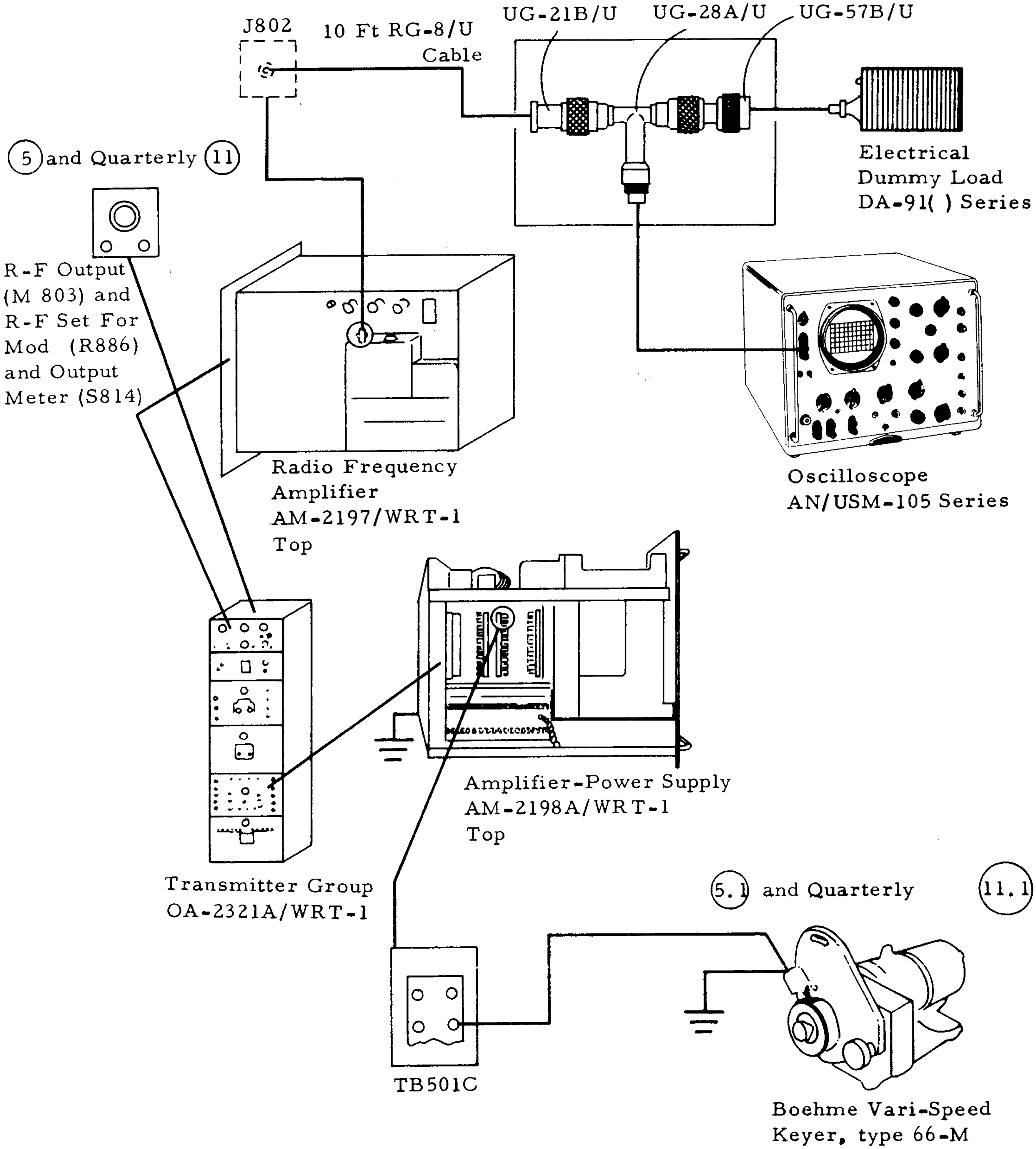
Operating Conditions and Control Settings:

Continue from Step③.

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION			
④	Observe and record MACH CW output waveforms.	Place EMISSION SELECTOR switch (S508): MACH CW; WAVE SHAPING switch (S450): 200 wpm. Connect contacts of Boehme Vari-Speed Keyer, type 66-M, or equivalent in series with negative terminal of Battery BA-234/U and chassis ground. Connect positive terminal of battery to terminal 26 of TB501C. (a) Select keyer speed of 200 wpm. (b) Select keyer speed of 400 wpm. Place WAVE SHAPING switch (S450): 400 wpm.	Oscilloscope AN/USM-105 Series, or equivalent.	(a) __________ V ________ $T_R = T_D$  (E_o ± 10%) V (200 to 3500 μs) $T_R = T_D$ With dot cycle commutator, on-off periods equal. (b) __________ V ________ $T_R = T_D$  (E_o ± 10%) V (100 to 2000 μs) $T_R = T_D$ With dot-cycle commutator, on-off periods, equal.

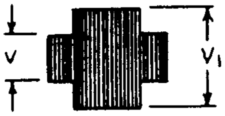
Step ⑤

MODULATING



MODULATING

Continue from Step 4

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑤	Observe and record MOD CW output.	Remove Battery BA-234/U and connect contacts of Boehme Vari-Speed Keyer, type 66-M, or equivalent to chassis ground and terminal 26 of TB501C. Stop keyer with contacts closed. Place EMISSION SELECTOR switch (S508); MOD CW: Place CARRIER TEST KEY: ON. Adjust TONE OUTPUT (R550) to obtain 95 to 100% modulation.	R-F OUTPUT Meter (M803)	_______% MOD (95 to 100)
(5.1)	Observe MOD CW waveform while keying.	With CARRIER TEST KEY: ON. open contacts of Boehme Vari-Speed Keyer and observe peak-to-peak amplitude of r-f carrier on oscilloscope. Call this voltage E_o. Start the Boehme Keyer, or equivalent at a slow speed of 8 to 10 WPM and observe the envelop on the oscilloscope. (a) Read voltage V from oscilloscope scale. (b) Read voltage V_1 from oscilloscope scale.	Oscilloscope AN/USM-105 Series, or equivalent	(a)________V (b)________V_1  (E_o 10%) V $\frac{V_1-V}{V}$ x 100 % MOD Keyer with equal on and off periods.

PART II - PREVENTIVE MAINTENANCE CHECK-OFF

Operating Conditions and Control Settings.	Test Equipment Required:
EMERGENCY STOP switch (S201): ON FILAMENT POWER switch (S502): ON Tune transmitter for 100-watt CW operation at assigned station frequency.	None

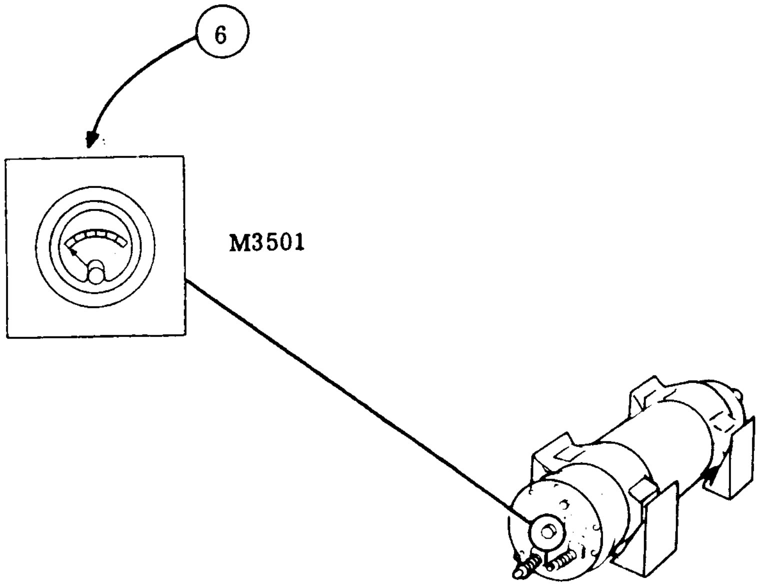
STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
① OM	Record standing wave ratio. (VSWR)	Perform Step 8 of Section D (Page 1-17).	SWR CALIBRATE control (R873).	________ (4:1 Max.)
② OM	Record power output. (P)	Perform Step 9 of Section D (Page 1-17).	R-F OUTPUT meter (M803).	________ watts (90 to 110)
③ OM	Record standing wave ratio. (VSWR)	Set POWER SELECTOR switch (S510): 500 W. Perform Step 15 of Section D (Page 1-19).	SWR CALIBRATE control (R873).	________ (4:1 Max.)
④ OM	Record power output. (P)	Perform Steps 16 of Section D (Page 1-19).	R-F OUTPUT meter (M803).	________ watts (490 to 510)

Note

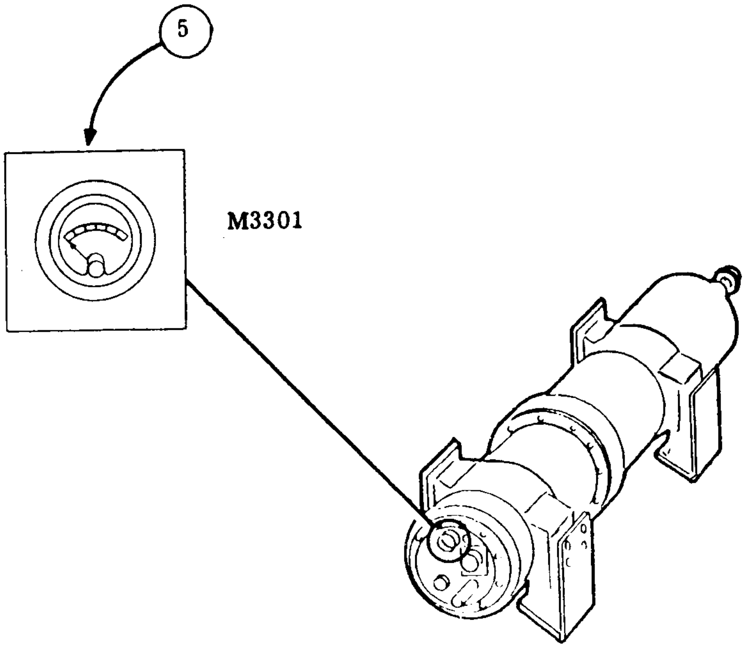
IN PORT PROCEDURES: The equipment should not be energized daily for the sole purpose of making daily checks. The equipment should, however, be energized at least twice a week and at least two days before getting underway. Enter "IN PORT" in the blanks as appropriate.

OM: Operational Maintenance

Steps ⑤ and ⑥



Antenna Coupler
CU-760/WRT-1



Radio Frequency Tuner
TN-345/WRT-1

Operating Conditions and Control Settings:

Normal operation or equipment deenergized.

Test Equipment Required:

None

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑤ OM	Record tuner air pressure.	Read pressure gauge.	Pressure Gauge (M3301).	________ PSI (17 to 20)
⑥ OM	Record coupler air pressure.	Read pressure gauge.	Pressure Gauge (M3501).	________ PSI (17 to 20)

OM: Operational Maintenance

Steps ① thru ⑥

Time Schedule: Record and Initial

Time Required: 10 Minutes

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Part II - Dail

Steps ① thru ⑥

Time Schedule: Record and Initial

Time Required: 10 Minute

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Steps ① thru ⑥

Time Schedule: Record and Initial

Time Required: 10 Minutes

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Steps ① thru ⑥

Time Required: 10 Minutes

Time Schedule: Record and Initial

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Steps ① thru ⑥

Time Schedule: Record and Initial

Time Required: 10 Minutes

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Steps ① thru (

Time Schedule: Record and Initial

Time Required: 10 Minute

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Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
Tune transmitter for 100-watt CW operation
at assigned station frequency.

Test Equipment Required:

None

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
① OM	Record a-c input voltage to control bus contained in Amplifier-Power Supply AM-2198/WRT-1.	Perform Step (1.2) of Section A (Page 1-3).	CONTROL BUS meter (M501).	______ V AC (113 to 117)
② OM	Record power amplifier grid bias voltage.	For appropriate figure, refer to Section D, Step ② (Page 1 14). Place CARRIER TEST KEY (S811): ON; TEST VOLTMETER switch (S807): GRID BIAS (60 V).	TEST VOLTMETER (M804).	______ V DC (55 to 61)
③ OM	Record power amplifier screen grid voltage.	For appropriate figure, refer to Section D, Step ③ (Page 1-14). Place TEST VOLTMETER switch (S807): SCREEN SUPPLY (600 V).	TEST VOLTMETER (M804).	______ V DC (350 to 400)
④ OM	Record high voltage power supply output.	For appropriate figure, refer to Section D, Step ① (Page 1-14). Place TEST VOLTMETER switch (S807): PLATE SUPPLY (1.5 KV)	TEST VOLTMETER (M804).	______ V DC (1300 to 1425)
⑤ OM	Record second intermediate amplifier cathode current.	Perform Step ④ of Section D (Page 1-15).	TEST AMMETER (M805).	______ MA (40 to 50)
⑥ OM	Record driver cathode current.	Perform Step ⑤ of Section D (Page 1-15).	TEST AMMETER (M805).	______ MA (160 to 190)
⑦ OM	Record total power amplifier grid current.	Perform Step ⑥ of Section D (Page 1-15).	TEST AMMETER (M805)	______ MA (0)

OM: Operational Maintenance

Steps ⑧ thru ⑪

Operating Conditions and Control Settings:

Continue from Step ⑦.

Test Equipment Required:

None

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑧ OM	Record individual power amplifier cathode currents and total power amplifier cathode current.	Perform Step ⑦ of Section D (Page 1-15).	P.A. CATHODE CURRENTS meter (M806).	(a)________ MA (80 to 115) (b)________ MA (80 to 115) (c)________ MA (80 to 115) (d)________ MA (80 to 115) (e)________ MA (320 to 460)
⑨ OM	Record high voltage power supply output.	Place **POWER SELECTOR** switch (S510): 500 W; **TEST VOLTMETER** switch (S807): **PLATE SUPPLY** (1.5 KV). For appropriate figure, refer to Section D, Step ① (Page 1-14).	TEST VOLTMETER (M804).	________ V DC (1250 to 1390)
⑩ OM	Record total power amplifier grid current.	Same as Step ⑦.	TEST AMMETER (M805).	________ MA (0)
⑪ OM	Record individual power amplifier cathode currents and total power amplifier cathode current.	Same as Step ⑧.	P.A. CATHODE CURRENTS meter (M806).	(a)________ MA (190 to 225) (b)________ MA (190 to 225) (c)________ MA (190 to 225) (d)________ MA (190 to 225) (e)________ MA (760 to 900)

OM: Operational Maintenance

Part II - Weekly

Steps ① thru ⑪

Time Required: 15 Minutes

Time Schedule: Record and Initial

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Part II - Weekly

Steps ① thru ⑪

Time Schedule: Record and Initial

Time Required: 15 Minutes

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Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): OFF
FILAMENT POWER switch (S502): OFF

Test Equipment Required:

Multimeter AN/PSM-4 Series, or equivalent

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Record a-c voltage input to low voltage rectifiers contained in Amplifier-Power Supply AM-2198A/WRT-1	Perform Step ① of Section A (Page 1-3).	Multimeter AN/PSM-4 Series, or equivalent.	______ V AC (216 to 224)
(1.1)		Perform Step (1.1) of Section A (Page 1-3).	Multimeter AN/PSM-4 Series, or equivalent.	______ V AC (216 to 224)

Time Schedule: Record and Initial

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Time Required: 15 Minutes

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Steps ② thru ④

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
REMOTE LOCAL switch (S507): LOCAL
EMISSION SELECTOR switch (S508): AM
POWER SELECTOR switch (S510): ADJ

Test Equipment Required:

Multimeter AN/PSM-4 Series, or equivalent

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
②	Record outputs of d-c power supplies contained in Amplifier-Power Supply AM-2198A/WRT-1.	Perform Step ① of Section B (Page 1-5).	Multimeter AN/PSM-4 Series, or equivalent.	________ V DC (10 to 14)
(2.1)		Perform Step (1.1) of Section B (Page 1-5).	Multimeter AN/PSM-4 Series, or equivalent.	________ V DC (-20 to -28)
(2.2)		Perform Step (1.2) of Section B (Page 1-5).	Multimeter AN/PSM-4 Series, or equivalent.	________ V DC (-315 to -385)
(2.3)		Perform Step (1.3) of Section B (Page 1-5).	Multimeter AN/PSM-4 Series, or equivalent.	________ V DC (315 to 385)
③	Record output of +250-volt regulator contained in Radio Frequency Oscillator O-621/WRT-1.	Perform Step ② of Section B (Page 1-7).	Multimeter AN/PSM-4 Series, or equivalent.	________ V DC (250)
④	Clean air filter. Clean and visually examine all units.	Deenergize Radio Transmitting Set AN/WRT-1A. Discharge all high voltage points to ground. Clean cabinet interior and interior of each unit drawer with a vacuum cleaner. While cleaning inspect for broken or loose connections, signs of moisture, leaking capacitors or transformers, damage caused by excessive heat, and corroded or pitted relay contacts. Clean air filter element.		

Steps ② thru ④

Time Schedule: Record and Initial

Time Required: 1.5 Hours

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Steps ① thru ⑥

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
POWER SELECTOR switch (S510): ADJ

Test Equipment Required:

Electronic Counter Hewlett-Packard Model 524/525, or equivalent
Frequency Standard AN/URQ-9 Series, or equivalent
Multimeter AN/USM-34 Series, or equivalent
MB tee-adapter, Automatic Metal Products Corp. type RF 0735
MB to BNC adapter, Automatic Metal Products Corp. type RF 0756

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Measure one-Mc oscillator frequency.	Perform Step ① of Section C (Page 1-11).	Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent.	________ cps (1,000,000 ±1)
②	Measure 100-kc mixer frequency.	Perform Step ② of Section C (Page 1-11).		________ cps (100,000 ±0.1)
③	Measure amplitude of interpolation oscillator output.	Perform Step ⑦ of Section C (Page 1-15).	Multimeter AN/USM-116 Series, or equivalent.	________ V AC (14 to 16)
④	Measure frequency of interpolation oscillator.	Perform Step ⑧ of Section C (Page 1-15).	Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent.	(a)________cps (50,000 ± 5) (b)________cps (100,000 ± 5)
⑤	Measure frequency and amplitude of r-f sample input to i-f mixers.	Perform Step ④ of Section C (Page 1-13).		(a)________cps (300,000 ± 100) (b)________cps (1,500,000 ± 100)
(5.1)		Perform Step (4.1) of Section C(Page 1-13)	Multimeter AN/USM-116 Series, or equivalent.	________ V AC (1.8 to 3.2)
⑥	Measure amplitude of r-f input to modulating functional section.	Perform Step ⑤ of Section C (Page 1-13).		________ V AC (1.2 to 2.2)

Steps ① thru ⑥

Time Schedule: Record and Initial

Time Required: 2 Hours

Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial
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Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial
19								

Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial
19								

Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial
19								

Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial
19								

Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial
19								

Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial

REORDER NOTICE

Upon completion of the third quarterly check of the second year, order a new copy of this book for the next two-year period from the nearest Forms and Publications Supply Point.

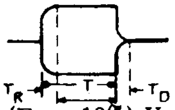
Quarter and Year	①	②	③	④	⑤	(5.1)	⑥	Initial

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): OFF
FILAMENT POWER switch (S202): OFF

Test Equipment Required:

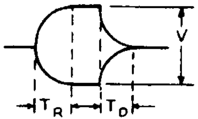
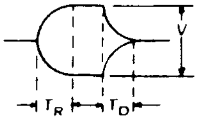
Multimeter AN/USM-116 Series, or equivalent
Electrical Dummy Load DA-91( ) Series, or equivalent
Oscilloscope AN/USM-105 Series, or equivalent
Audio Oscillator Equipment AN/URM-127 Series, or equivalent
Electronic Counter Hewlett Packard Model 524/525 series, or equivalent
Boehme Vari-Speed Keyer, type 66-M, or equivalent
Battery, BA-234/U, or equivalent
Coaxial Cable, RG-8/U, 10 ft. length
Coaxial Cable Fittings:
UG-573/U UG-28A/U
UG-21B/U UG-57B/U

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑦	Measure and observe AM modulation characteristics.	Perform Step ① of Section E(Page 1-27).	R-F OUTPUT meter (M803).	______% MOD (95 to 100)
⑧	Measure FSK frequency shift.	Perform Step ② of Section E(Page 1-29).	Electronic Counter Hewlett-Packard Model 524/525 Series, or equivalent.	(a) $F_o \pm$ ______ cps ($F_o \pm 5$ cps) (b) $F_o +$ ______ cps (F_o +382 to 468 cps) (c) $F_o -$ ______ cps (F_o -382 to 468 cps)
⑨	Observe and record CW output waveform.	Perform Step ③ of Section E(Page 1-29).	Oscilloscope AN/USM-105 Series, or equivalent.	______ V ______ $T_R = T_D$  $(E_O - 10\%)$ V (10% T Max.) $T_R = T_D$ On-off periods equal.

Step ⑩

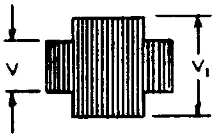
Operating Conditions and Control Settings:

FILAMENT POWER switch (S502): ON
EMISSION SELECTOR switch (S508): CW
CARRIER TEST KEY (S811): OFF
LOCAL REMOTE switch (S507): REMOTE
6 WIRE REMOTE 2 WIRE REMOTE switch (S509): 6 WIRE REMOTE

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑩	Observe and record MACH CW output waveforms.	Perform Step ④ of Section E (Page 1-29).	Oscilloscope AN/USM-105 Series, or equivalent.	(a) __________ V __________ $T_R=T_D$  (E_O ± 10%) V (200 to 3500 μs) $T_R=T_D$ With dot-cycle commutator, on-off periods equal. (b) __________ V __________ $T_R=T_D$  (E_O ± 10%) V (100 to 2000 μs) $T_R=T_D$ With dot-cycle commutator, on-off periods equal.

Step 11 and 11.1

Operating Conditions and Control Settings:
FILAMENT POWER switch (S502): ON
EMISSION SELECTOR switch (S508): CW
CARRIER TEST KEY (S811): OFF
LOCAL REMOTE switch (S507): REMOTE
6 WIRE REMOTE 2 WIRE REMOTE switch (S509): 6 WIRE REMOTE

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
⑪	Observe and record MOD CW output	Perform Step 5 of Section E (page 1-31)	R-F OUTPUT Meter (M803)	______% MOD
(11.1)	Observe MOD CW waveform while keying.	Perform Step 5.1 of Section E (page 1-31)	Oscilloscope TS-239A/ UP Series or equivalent	(a)________V (b)________V_1  (E_o 10%) V) $\frac{V_1 - V}{V} \times 100$ % MOD Keyer with equal on and off periods.

Time Schedule: Record and Initial

Time Required: 2-1/4 hours

Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

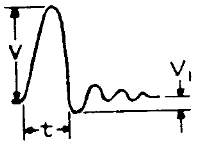
Quarter and Year	⑦	⑧			⑨	⑩		⑪	(11.1)		Initial
		(a)	(b)	(c)		(a)	(b)		(a)	(b)	

Steps ① thru (2.1)

Operating Conditions and Control Settings:

EMERGENCY STOP switch (S201): ON
FILAMENT POWER switch (S502): ON
POWER SELECTOR switch (S510): ADJ
TUNING Ⓐ and Ⓑ controls: 65.0 kc

Test Equipment Required:
Oscilloscope AN/USM-105 Series, or equivalent
Carrier Frequency Voltmeter, Sierra Model 124A, or equivalent
MB tee-adapter, Automatic Metal Products Corp. type RF 0735
MB to BNC adapter, Automatic Metal Products Corp. type RF 0756

STEP		PRELIMINARY ACTION	READ INDICATION ON	REFERENCE STD.
NO.	ACTION REQUIRED			
①	Observe and record 100-kc pulse input to i-f mixers.	Perform Step ③ of Section C (Page 1-11).	Oscilloscope AN/USM-105 Series, or equivalent.	______ V ______ V_1 ______ t  (40 to 55) V (10 Max.) V_1 (max 1.0 μs)t
②	Measure unwanted sideband rejection of i-f mixers.	Perform Step ⑥ of Section C (Page 1-13).	Carrier Frequency Voltmeter, Sierra Model 124A or equivalent.	______ db (-20)
(2.1)		Perform Step (6.1) of Section C (Page 1-13).	Carrier Frequency Voltmeter, Sierra Model 124A or equivalent.	______ db (-20)

Time Schedule: Record and Initial

Time Required: 30 Minutes

Step	19	Initial	19	Initial	19	Initial	19	Initial
①								
②								
(2.1)								

TEMPORARY CORRECTION T-5 TO TECHNICAL MANUAL FOR RADIO TRANSMITTING SET AN/WRT-1 NAVSHIPS 93433(A)

This temporary correction is in effect upon receipt. Therefore correct the manual immediately.

This temporary correction revises the technical manual to reflect errors found after publication of the original manual, Change 1 and Change 2. When these corrections are accomplished, the corrected manual will apply to all sets of Radio Transmitting Set AN/WRT-1.

Make the following pen and ink corrections. Insert the temporary correction in the technical manual immediately under the front cover preceding Change 2.

PAGE	PARA. AND LINE OR FIGURE	ACTION
4-19 ✓	Figure 4-11 Upper left	Change resistor R484, 1K to R449, 120. Add resistor R484, 820 between L622 and point P. ✓ Disconnect capacitor C708 and resistor R710 from point P and connect them to junction of L622 and R484.
5-47	Figure 5-32 Zone 14C	Interchange the following: P134 and P135, ✓ J450 and J451, ✓ R484, and R449. ✓ Change the value of R484 from 1K to 820. ✓
6-8	Para 6-2d(5)(a) Step 9	Delete entire step and insert "The voltage at J609 should be 0. 5 volts rms or greater". ✓
6-39	Figure 6-27 Zone 1C	Change the heavy signal path from P135 through R449 to P134 through R484. ✓
6-93	Figure 6-54	Change wire G from "93 OHM COAX 327C705H05" to "RG-195/U". ✓ Change wire H from "RE-174/U" to "RG-174/U".

Correction Completed CWC

check

TEMPORARY CORRECTION T-4 to TECHNICAL MANUAL FOR RADIO TRANSMITTING SET AN/WRT-1 NAVSHIPS 93483(A)

This temporary correction revises the manual to reflect the equipment changes made by Field Change 6-AN/WRT-1. The purpose of this field change is to improve the lock-in performance at exact 100 kc points. The field change applies to Sets serials 142 through 307.

When this change is included in the manual, the manual shall cover the equipment as though Field Change 6-AN/WRT-1 has been accomplished.

Maintenance Support Activities shall make this correction in the technical manual immediately after Field Change 6-AN/WRT-1 has been accomplished.

Holders of equipment accompanied by technical manuals shall not make this correction in the manual until accomplishment of the field change.

Make the following pen-and-ink corrections. Insert this temporary correction in the technical manual immediately after front cover and preceding T-3.

1. On figure 6-28A, Electrical Frequency Control C-2861/WRT-1, Schematic Diagram, Sets serials 142 and up, change the value of R720 and R721 from 220 ohms to 2.2K. Change the value of R605 and R606 from 200 ohms to 820 ohms. In the area 2C just above terminals 9, 10, 11, and 12 of TB602A draw in two reverse polarized diodes between term 9 and 10 and two reverse polarized diodes between terminals 11 and 12 as shown in figure 1 of this temporary correction. These four diodes should be enclosed in a dashed rectangle labeled E665 to denote the diode mounting boards. The diodes should be labeled type IN457 and assigned symbols CR627, CR628, CR629, and CR630 as shown in figure 1 of this temporary correction.

2. On figure 6-46A, Electrical Frequency Control C-2861/WRT-1, Frequency Comparator, Wiring Diagram, Sets 142 and up, in the upper right hand section add the diode board E665 with diodes CR627, CR628, CR629, and CR630 as shown in figure 2 of this temporary correction.

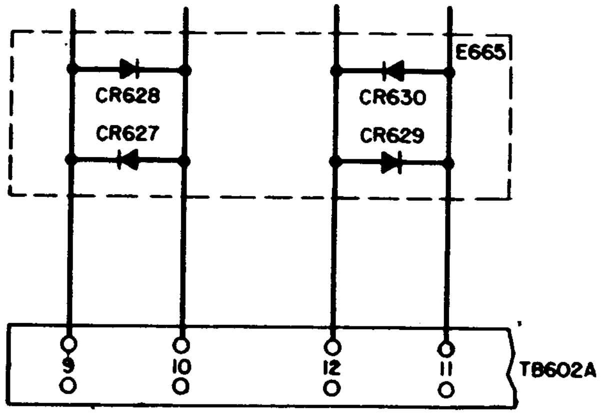


Figure 1. Correction to Figure 6-28A

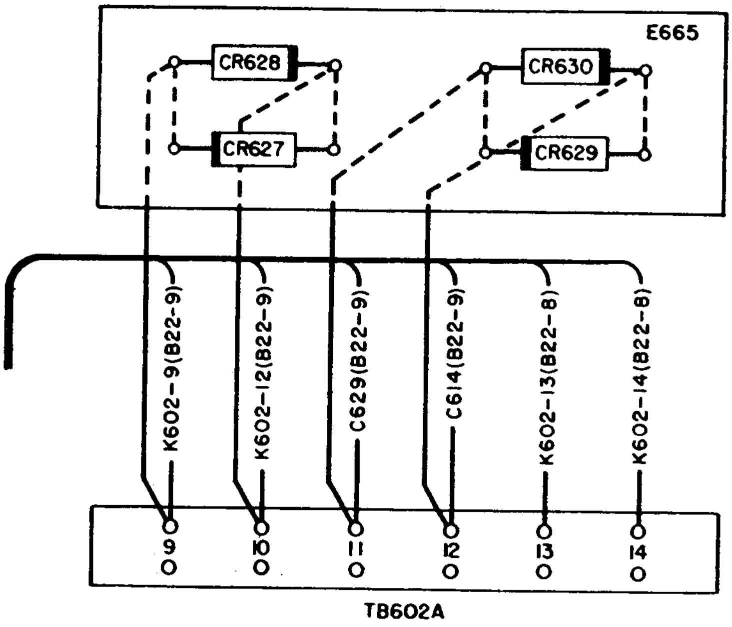


Figure 2. Correction on Figure 6-46A

TEMPORARY CORRECTION T-2 to TECHNICAL MANUAL FOR RADIO TRANSMITTING SET AN/WRT-1 NAVSHIPS 93483(A)

This temporary correction revises the manual to reflect the equipment changes made by Field Change 2-AN/WRT-1. The purpose of this Field Change is to permit connection in antenna circuit of inductor L1 in Antenna Coupler CU-760/WRT-1, when POWER SELECTOR switch is in the 500W position. The field change applies to sets serials 1 through 100 and 102.

When this change is included in the manual, the manual shall cover the equipment as though Field Change 2-AN/WRT-1 had been accomplished on the equipment. This correction does not supersede any other corrections or changes.

Maintenance Support Activities shall make this correction in the technical manual immediately after Field Change 2-AN/WRT-1 has been accomplished.

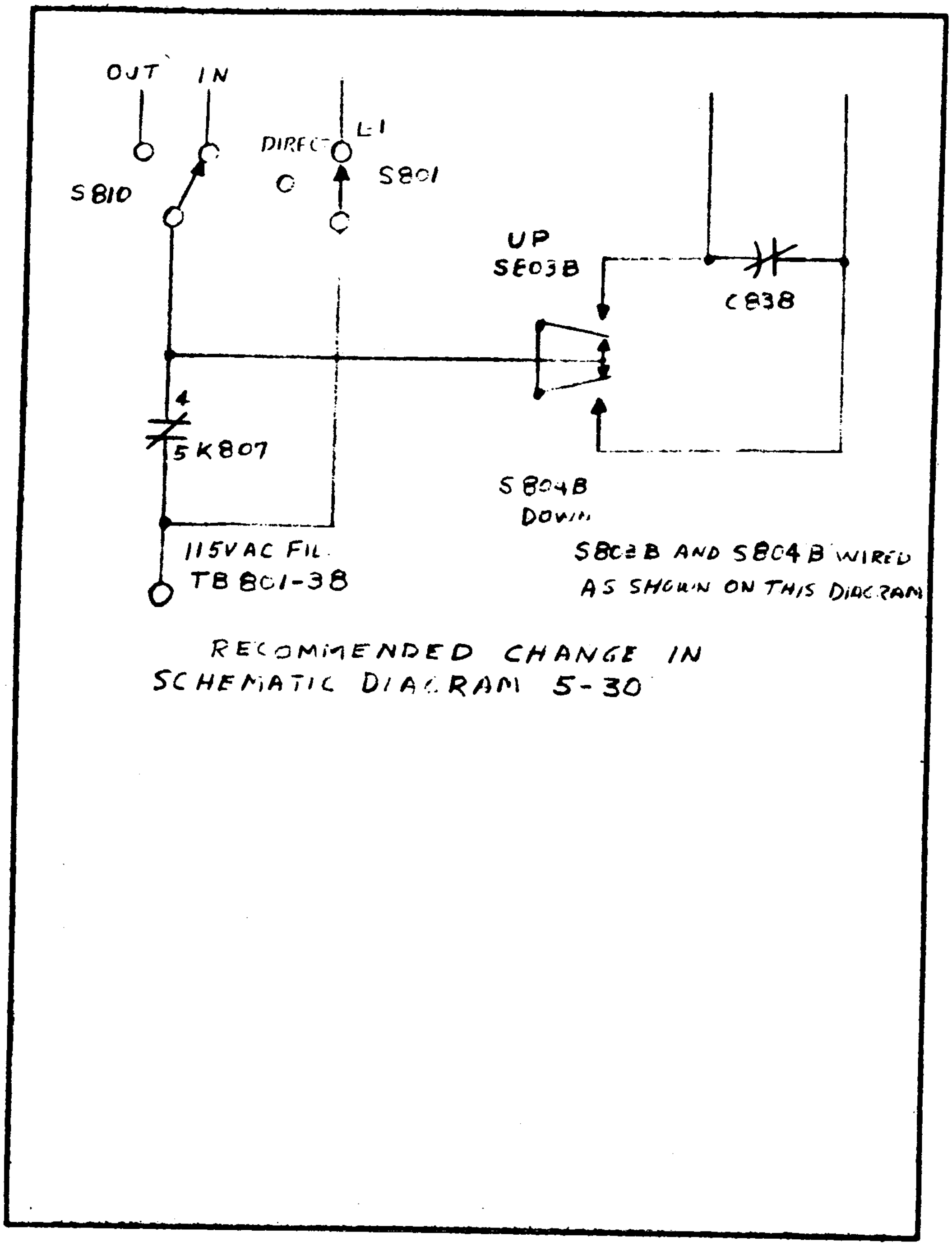
Holders of equipment accompanied by technical manuals shall not make this correction in the manual until accomplishment of the field change.

Make the following pen-and-ink corrections. Insert this temporary correction in the technical manual immediately after the front cover.

1. On figure 5-30, Primary Power Distribution Diagrams make corrections in accordance with figure 1 of this temporary correction.

2. On figure 6-26, Radio Frequency Amplifier AM-2197/WRT-1, Schematic Diagram, make corrections in accordance with figure 2 of this temporary correction.

3. On figure 6-35, AM-2197/WRT-1, Power Amplifier Wiring Diagram, make corrections in accordance with figure 3 of this temporary correction.



S803B AND S804B WIRED AS SHOWN ON THIS DIAGRAM

RECOMMENDED CHANGE IN SCHEMATIC DIAGRAM 5-30

Figur 1

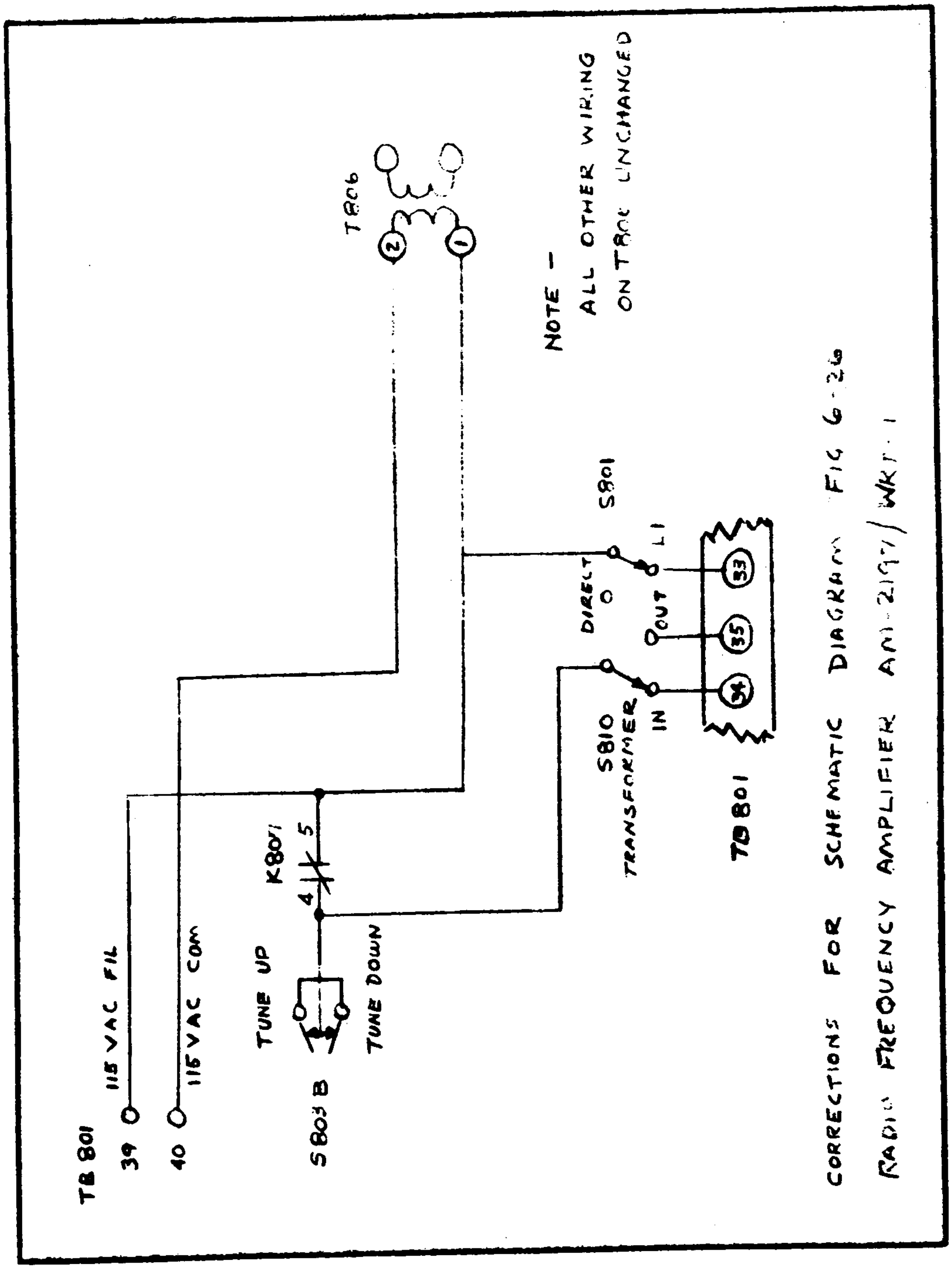

TB 801
39
40
115 VAC FIL
115 VAC COM
TUNE UP
TUNE DOWN
S803 B
K801
4
5
TR806
2
1
NOTE –
ALL OTHER WIRING
ON TR806 UNCHANGED
S801
DIRECT
O
L1
OUT
IN
S810
TRANSFORMER
33
35
34
TB801
CORRECTIONS FOR SCHEMATIC DIAGRAM FIG 6-26
RADIO FREQUENCY AMPLIFIER AM-2197/WRT-1

Figure 2

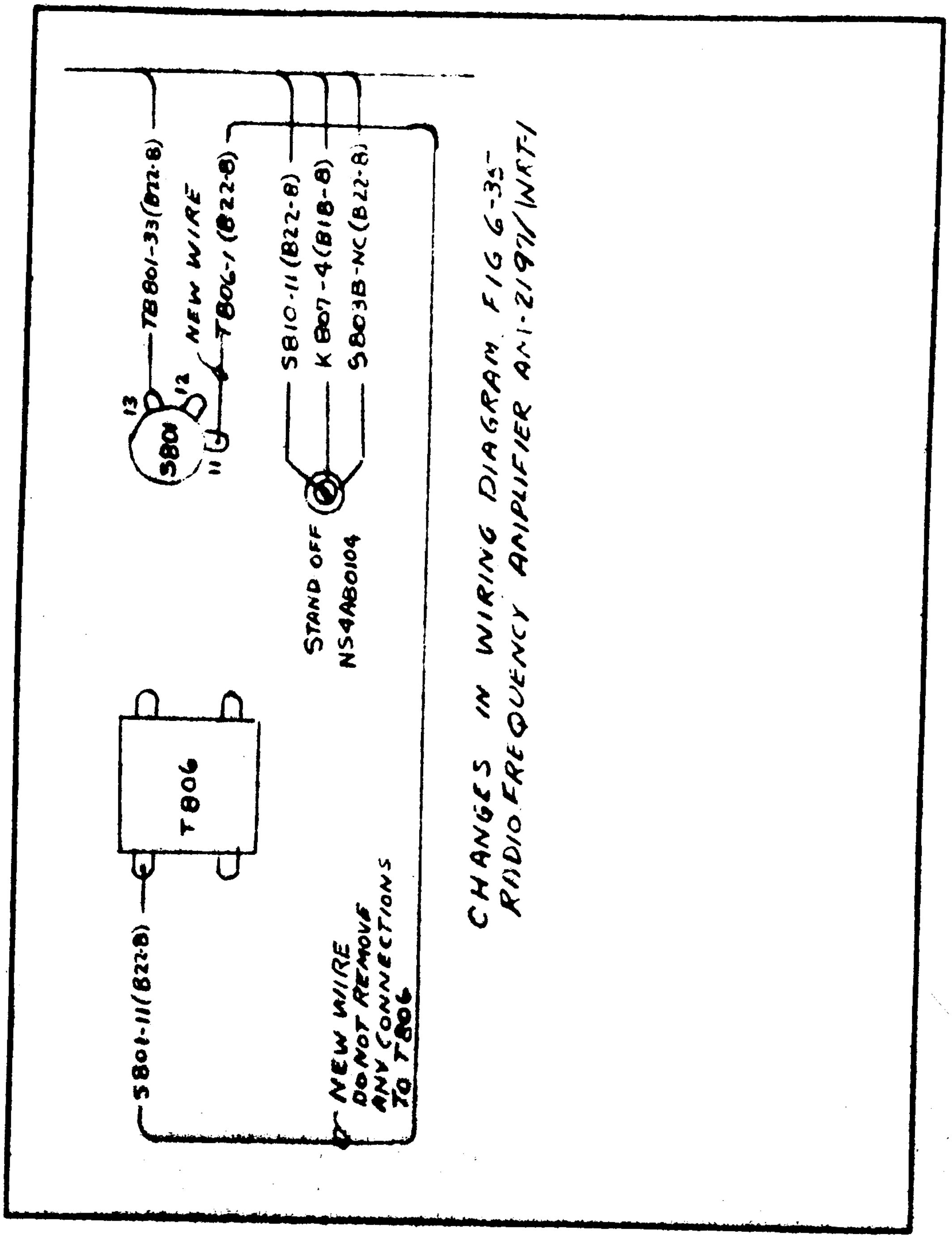

TB801-33(B22-8)
NEW WIRE
TB806-1 (B22-8)
13
12
11
S801
S810-11 (B22-8)
K807-4 (B18-8)
S803B-NC (B22-8)
STAND OFF
NS4AB0104
TB06
S801-11 (B22-8)
NEW WIRE
DO NOT REMOVE
ANY CONNECTIONS
TO TB06
CHANGES IN WIRING DIAGRAM FIG 6-35
RADIO FREQUENCY AMPLIFIER AM-2197/WRT-1

Figure 3

TEMPORARY CORRECTION T-1 to TECHNICAL MANUAL FOR RADIO TRANSMITTING SET AN/WRT-1 NAVSHIPS 93483(A)

This temporary correction revises the manual to reflect the equipment changes made by Field change 1-AN/WRT-1. The purpose of this field change is to relocate R737 and R738 outside of the oven and thus, prevent overheating of the oven due to the power dissipated by these components. The field change applies to sets serials 1 through 137.

When this change is included in the manual, the manual shall cover the equipment as though Field Change 1-AN/WRT-1 had been accomplished on the equipment. This correction does not supersede any other corrections or changes.

Maintenance Support Activities shall make this correction in the technical manual immediately after Field Change 1-AN/WRT-1 has been accomplished.

Holders of Equipment accompanied by technical manuals shall not make this correction in the manual, until accomplishment of the field change.

Make the following pen-and-ink corrections. Insert this temporary correction in the technical manual immediately after the front cover and preceding T-2.

1. On figure 6-43, Electrical Frequency Control C-2861/WRT-1, Switch and Capacitor Assembly, Wiring Diagram, make pen and ink corrections as shown in figure 1 of this temporary correction.

2. On figure 6-48, Electrical Frequency Control C-2861/WRT-1, Interconnecting Diagram, make pen and ink corrections as shown in figure 2 of this temporary correction.

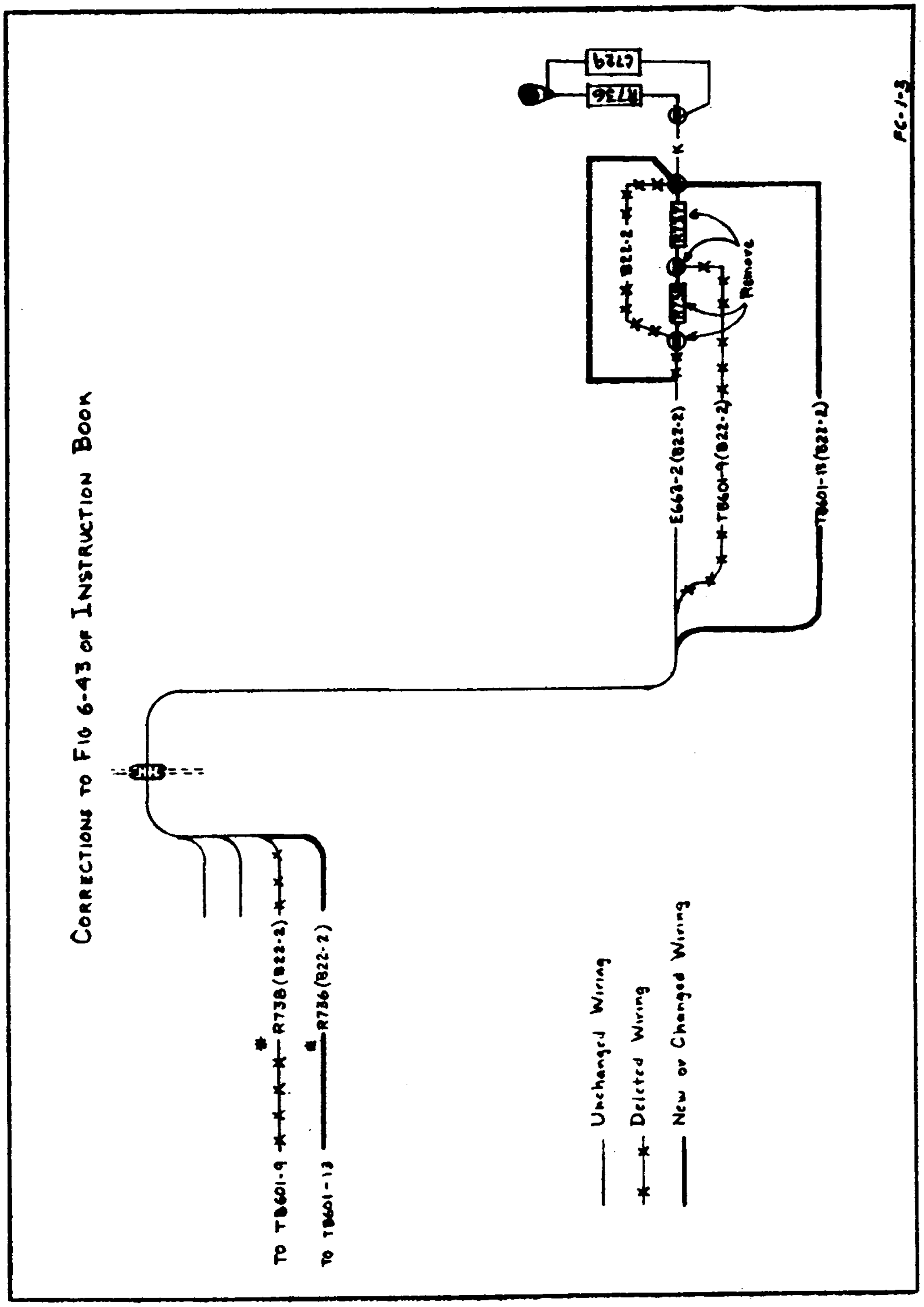

Corrections to Fig 6-43 of Instruction Book
TO TB601-9
R738 (B22-2)
TO TB601-13
R736 (B22-2)
Unchanged Wiring
Deleted Wiring
New or Changed Wiring
E663-2 (B22-2)
TB601-9 (B22-2)
TB601-13 (B22-2)
B22-2
Remove
R736
C729
K
PC-1-3

Figure 1

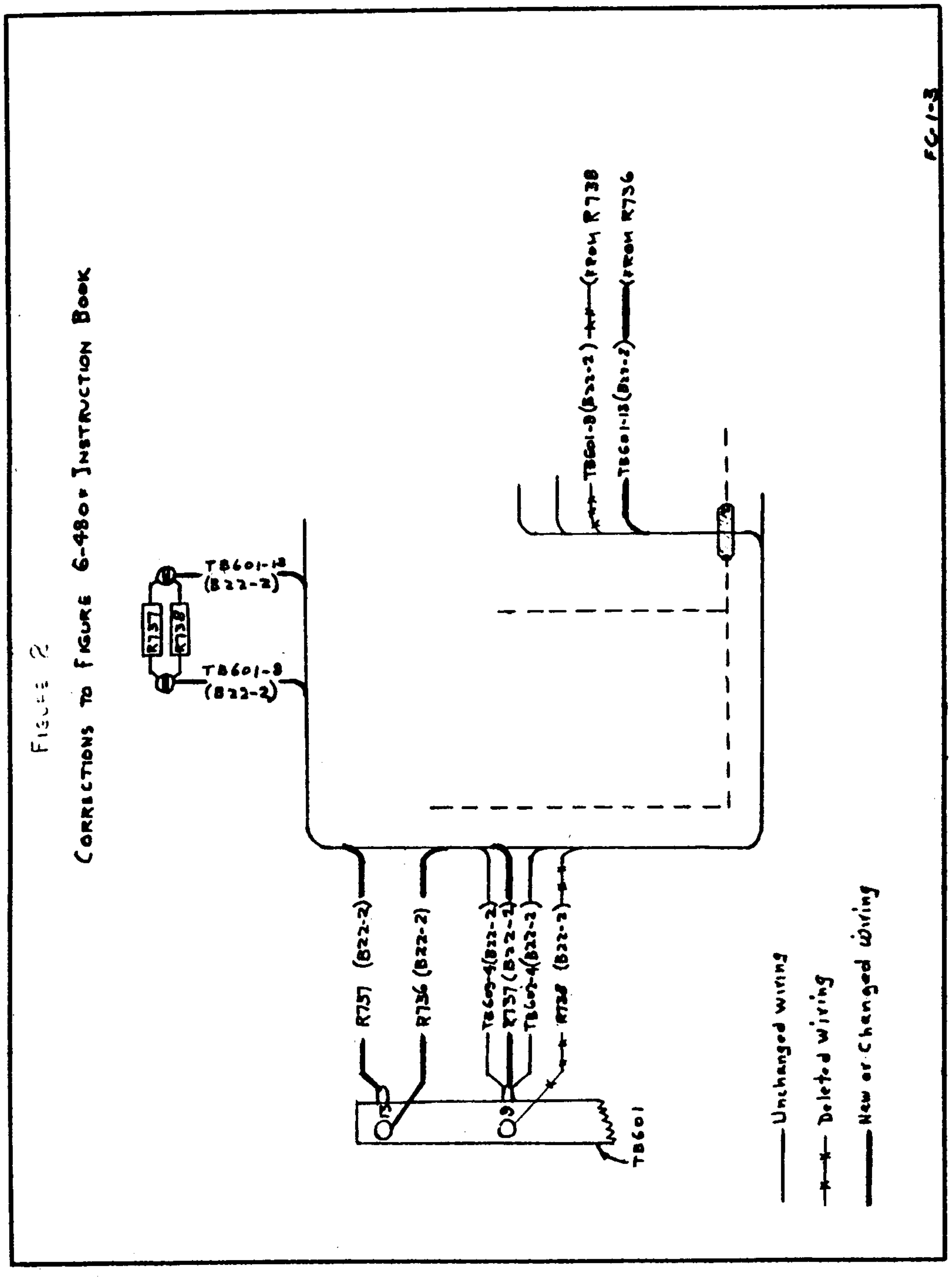


FIGURE 2

CORRECTIONS TO FIGURE 6-48 OF INSTRUCTION BOOK

Figure 2

CHANGE 1 TO TECHNICAL MANUAL FOR RADIO TRANSMITTING SET AN/WRT-1 NAVSHIPS 93483(A)

This permanent change revises the technical manual to reflect the changes made in the equipment and the errors found after publication of the original manual.

Maintenance Support Activities shall insert this change in the technical manual immediately upon receipt. When this change is included in the manual, the manual shall cover the equipment with all the changes made up to the date of this instruction sheet.

1. Remove superseded pages and insert revised pages as indicated below:

Page	*Remove*	*Insert*
T.P./ii	Orig/Orig	Ch. 1/Ch. 1
vii/viii	Orig/Orig	Ch. 1/Ch. 1
ix/x	Orig/Orig	Ch. 1/Ch. 1
xA/xB	-/-	Ch. 1/Ch. 1
xi/1-0	Orig/Orig	Ch. 1/Orig
1-5/1-6	Orig/Orig	Ch. 1/Ch. 1
2-17/2-18	Orig/Orig	Ch. 1/Ch. 1
4-7/4-8	Orig/Orig	Ch. 1/Ch. 1
4-9/4-10	Orig/Orig	Ch. 1/Ch. 1
4-10A/4-10B	-/-	Ch. 1/Ch. 1
4-11/4-12	Orig/Orig	Ch. 1/Ch. 1
4-23/4-24	Orig/Orig	Ch. 1/Ch. 1
4-25/4-26	Orig/Orig	Ch. 1/Orig
4-27/4-28	Orig/Orig	Ch. 1/Ch. 1
4-29/4-30	Orig/Orig	Ch. 1/Ch. 1
4-30A/4-30B	-/-	Ch. 1/Ch. 1
4-31/4-32	Orig/Orig	Ch. 1/Ch. 1
4-33/4-34	Orig/Orig	Ch. 1/Ch. 1
4-37/4-38	Orig/Orig	Ch. 1/Ch. 1
4-39/4-40	Orig/Orig	Ch. 1/Ch. 1
4-40A/4-40B	-/-	Ch. 1/Ch. 1
4-43/4-44	Orig/Orig	Ch. 1/Ch. 1
4-45/4-46	Orig/Orig	Ch. 1/Ch. 1
5-5/5-6	Orig/Orig	Ch. 1/Orig
5-41/5-42	Orig/Orig	Ch. 1/Ch. 1
5-43/5-44	Orig/Orig	Ch. 1/Ch. 1
5-45/5-46	Orig/Orig	Ch. 1/Ch. 1
5-49/5-50	Orig/Orig	Ch. 1/Ch. 1
5-51/5-52	Orig/Orig	Ch. 1/Ch. 1
6-7/6-8	Orig/Orig	Ch. 1/Ch. 1
6-15/6-16	Orig/Orig	Orig/Ch. 1
6-17/6-18	Orig/Orig	Ch. 1/Ch. 1
6-18A/6-18B	-/-	Ch. 1/Ch. 1
6-37/6-38	Orig/Orig	Ch. 1/Ch. 1
6-39/6-40	Orig/Orig	Ch. 1/Ch. 1
6-41/6-42	Orig/Orig	Ch. 1/Ch. 1
6-42A/6-42B	-/-	Ch. 1/Ch. 1
6-43/6-44	Orig/Orig	Ch. 1/Ch. 1
6-44A/6-44B	-/-	Ch. 1/Ch. 1
6-53/6-54	Orig/Orig	Ch. 1/Ch. 1
6-54A/6-54B	-/-	Ch. 1/Ch. 1
6-55/6-56	Orig/Orig	Ch. 1/Ch. 1
6-57/6-58	Orig/Orig	Ch. 1/Ch. 1
6-58A/6-58B	-/-	Ch. 1/Ch. 1
6-63/6-64	Orig/Orig	Ch. 1/Ch. 1
6-64A/6-64B	-/-	Ch. 1/Ch. 1
6-69/6-70	Orig/Orig	Ch. 1/Ch. 1
6-75/6-76	Orig/Orig	Ch. 1/Ch. 1
6-78A/6-78B	-/-	Ch. 1/Ch. 1
6-79/6-80	Orig/Orig	Ch. 1/Ch. 1
6-83/6-84	Orig/Orig	Ch. 1/Ch. 1
6-84A/6-84B	-/-	Ch. 1/Ch. 1
6-85/6-86	Orig/Orig	Ch. 1/Ch. 1
6-86A/6-86B	-/-	Ch. 1/Ch. 1
7-0A/7-0H	-/-	Ch. 1/Ch. 1
i-1/i-2	Orig/Orig	Ch. 1/Ch. 1
i-3/i-4	Orig/Orig	Ch. 1/Ch. 1

2. Make the following pen-and-ink corrections and write "Ch. 1" adjacent to the pen-and-ink correction.

First Issued In	*Page No.*	*Ch. In Effort*	*Col'm or Fig.*	*Line or Location*	*Action*
Ch. 1	2-4	Orig	Para 2-4a	Step 7	Delete Step 7.
Ch. 1	2-6	Orig	Para 2-4c(2)	Step 3	Change "volts" to "bolts".
Ch. 1	4-5	Orig	Para 4-2b(1)a	6	Change "6-25" to "6-27".
Ch. 1	4-6	Orig	4-3	V301	Change "6AJ6WA" to "6AU6WA".
Ch. 1	4-13	Orig	Para 4-2b (5)(a)	5	Change "6-26" to "6-28".
Ch. 1	4-14	Orig	Para 4-2b(6)(a)	6	Change "6-26" to "6-28".
Ch. 1	4-15	Orig	4-9	Upper Right	Change value of R664 from "3.9K" to "39K".
Ch. 1	4-16	Orig	Para 4-2b(6)(d)	Top Line	Change "C569" to "C659".
Ch. 1	4-16	Orig	Para 4-2b(6)(f)	6	Change "6-26" to "6-28".
Ch. 1	4-18	Orig	Para 4-2b(8)(a)	5	Change "6-26" to "6-28".
Ch. 1	4-22	Orig	Para 4-3a(3)	21	Change "R511" to "R811".
Ch. 1	4-22	Orig	Para 4-3a(7)	5	Before "As shown in figure 4-12" insert "For sets serials 1 to 141,".
Ch. 1	4-35	Orig	Para 4-4b(4)(a)	6	Change "6-24" to "6-26".
Ch. 1	4-41	Orig	Para 4-4b(7)(d)3	8	Change "(23 degrees F)" to "(230 degrees F)".
Ch. 1	4-41	Orig	Para 4-4b(8)(a)	2	Change "6-55" to "6-32". Delete "at the end of section 6".
Ch. 1	5-4	Orig	Step 8	PRELIM. ACTION	Change "TB801" to "TB808".
Ch. 1	5-4	Orig	Step 8	NEXT STEP	Should read "TB801-37 and 38, TB105-7 and TB501-4".
Ch. 1	5-11	Orig	Para 5-4c(4)	12	Change "1200" to "1400".
Ch. 1	5-17	Orig	5-7	TB801A-1	Change "V-380" to "V+380".
Ch. 1	5-21	Orig	5-9	TB1401-13	Change "R0" to "R∞".
Ch. 1	5-36	Orig	5-24	Title	After "Gear Box" add, "Sets Serials 1 to 141".
Ch. 1	5-37	Orig	5-25	Title	After "Gear Box" add, "Sets Serials 1 to 141".
Ch. 1	6-9	Orig	Para 6-2d(6)	3	Delete step 2.
Ch. 1	6-11	Orig	6-9	Lower Right	Change "R332" to "R352".
Ch. 1	6-13	Orig	Para 6-2e(5)	Step 3	Change "R332" to "R352" in two places.
Ch. 1	6-14	Orig	Para 6-2f(3)	3	Change "6-11" to "6-12".
Ch. 1	6-61	Orig	6-38	NOTES:	Delete NOTE 1.
Ch. 1	6-65	Orig	6-40	NOTES:	Delete NOTE 1.
Ch. 1	6-71	Orig	6-43	NOTES:	Delete NOTE 1.
Ch. 1	6-73	Orig	6-44	NOTE:	Delete "FOR GENERAL WIRING NOTES SEE 375A319".

First Issued In	*Page No.*	*Ch. In Effort*	*Col'm or Fig.*	*Line or Location*	*Action*
Ch. 1	6-77	Orig	6-46	NOTE:	Delete "FOR WIRING CODE AND INTRUCTIONS SEE 375A319".
Ch. 1	6-77	Orig	6-46	Title	After "WIRING DIAGRAM" add, "Sets Serials 1 to 141".
Ch. 1	6-81	Orig	6-48	NOTES:	Delete NOTE 1.
Ch. 1	6-81	Orig	6-48	Upper Right	At S605 near left terminal add "C"; near right terminal add "NC".
Ch. 1	7-5	Orig	NAME AND DESCRIPTION	Opposite 201-299	After POWER SUPPLY: Add Navy Type PP-2222/WRT-1.
Ch. 1	7-6	Orig	NAME AND DESCRIPTION	Opposite K201	After "Dwg" change "342C037H02" to "135A686G03".
Ch. 1	7-9	Orig	NOTES	Opposite C320 and C321	Insert "1".
Ch. 1	7-10	Orig	REFERENCE DESIGNATION	C373	Change "C373" to "C375".
Ch. 1	7-11	Orig	NOTES	Opposite E303	Insert "1".
Ch. 1	7-13	Orig	NAME AND DESCRIPTION	Opposite L302	Change "110 µh" to "1100 µh".
Ch. 1	7-14	Orig	REFERENCE DESIGNATION and	Last three Lines	Delete "MP330 thru MP399".
Ch. 1	7-14	Orig	NAME AND DESCRIPTION	Last Line	Delete "Not Used".
Ch. 1	7-15	Orig	NAME AND DESCRIPTION	Opposite R346	Change "470,000" to "330,000" and "RC32GF474K" to "RC32GF334K".
Ch. 1	7-16	Orig	REFERENCE DESIGNATION and	4th, 5th, & 6th line from bottom	Delete "R388 and R399".
Ch. 1	7-16	Orig	NAME AND DESCRIPTION	Sixth line from bottom	Delete "Not Used".
Ch. 1	7-16	Orig	NAME AND DESCRIPTION	Third line from bottom	Change "54B6853H01" to "54B6853H02".
Ch. 1	7-19	Orig	REFERENCE DESIGNATION	17th, 18th, & 19th line from bottom.	Delete "E459 thru E499".
Ch. 1	7-19	Orig	REFERENCE DESIGNATION	6th, 7th, & 8th line from bottom	Delete "R401 thru R449".
Ch. 1	7-19	Orig	NAME AND DESCRIPTION	7th & 12th line from bottom	Delete "Not Used".
Ch. 1	7-20	Orig	NAME AND DESCRIPTION	Opposite R471	Add "Same as R346".
Ch. 1	7-25	Orig	NAME AND DESCRIPTION	Opposite L501	Change "378A140G01" to "150A715H01".
Ch. 1	7-26	Orig	NOTES	Opposite Q502	Insert "1".

First Issued In	*Page No.*	*Ch. In Effort*	*Col'm or Fig.*	*Line or Location*	*Action*
Ch. 1	7-27	Orig	REFERENCE DESIGNATION	4th line from bottom	Change "S511" to "S512".
Ch. 1	7-28	Orig	REFERENCE DESIGNATION	4th line from bottom	Delete "XS506".
Ch. 1	7-28	Orig	NAME AND DESCRIPTION	2nd & 3rd line from bottom	Delete second and third line from bottom.
Ch. 1	7-28	Orig	LOCATING FUNCTION	Bottom line	Delete "For Switch S506 Fig. 6-49".
Ch. 1	7-29	Orig	NOTES	Opposite C615, C616, C617, C618, and C631	Insert "1".
Ch. 1	7-30	Orig	NAME AND DESCRIPTION	Opposite C656	Delete "Same as C303".
Ch. 1	7-33	Orig	NAME AND DESCRIPTION	Opposite E601 thru E603	Delete "Not Used".
Ch. 1	7-33	Orig	NOTES	Opposite E605, E606, E607, E608, E609	Insert "1".
Ch. 1	7-33	Orig	REFERENCE DESIGNATION	9th line from bottom	Change "E616" to "E622".
Ch. 1	7-36	Orig	NOTES	Opposite M603	Insert "1".
Ch. 1	7-37	Orig	NOTES	Opposite MP610 thru MP627, MP632 & MP634 thru MP643	Insert "1".
Ch. 1	7-38	Orig	NOTES	Opposite MP644 thru MP657	Insert "1".
Ch. 1	7-39	Orig	NOTES	Opposite MP685 MP686, MP687 MP695	Insert "1".
Ch. 1	7-40	Orig	REFERENCE DESIGNATION	R601 thru R607	Change to "R603 and R604".
Ch. 1	7-40	Orig	NOTES	Opposite R613, R614, and R615	Insert "1".
Ch. 1	7-41	Orig	NOTES	Opposite R628 and R631	Insert "1".
Ch. 1	7-42	Orig	NOTES	Opposite R668	Insert "1".
Ch. 1	7-43	Orig	NAME AND DESCRIPTION	Opposite S601	Delete "Solid" and "Alloy" after "silver" insert "plated w/gold".
Ch. 1	7-43	Orig	NAME AND DESCRIPTION	Opposite S605	Change "AN3234-1" to "MS25253-1" and delete "spec MIL-S-6743".
Ch. 1	7-44	Orig	NOTES	Opposite T612 and T613	Insert "1".
Ch. 1	7-46	Orig	NOTES	Opposite MP701 thru MP706 and	Insert "1".
Ch. 1	7-46	Orig	NOTES	MP710 thru MP714	Insert "1".

First Issued In	*Page No.*	*Ch. In Effort*	*Col'm or Fig.*	*Line or Location*	*Action*
Ch. 1	7-47	Orig	NOTES	Opposite MP716 and MP730	Insert "1".
Ch. 1	7-47	Orig	REFERENCE DESIGNATION	16th, 17th, and 18th line from top	Delete "MP731 thru MP799".
Ch. 1	7-47	Orig	NAME AND DESCRIPTION	Opposite MP731 thru MP799	Delete "Not Used".
Ch. 1	7-47	Orig	NAME AND DESCRIPTION	Opposite R711	Add "Same as R387".
Ch. 1	7-48	Orig	NAME AND DESCRIPTION	Opposite R724	Add "Same as R388".
Ch. 1	7-49	Orig	NAME AND DESCRIPTION	Opposite C818	Change "54B3096" to "342C782H01".
Ch. 1	7-49	Orig	LOCATING FUNCTION	Second line from bottom	Change "M806" to "M804".
Ch. 1	7-50	Orig	NOTES	Opposite C834 & C835	Insert "1".
Ch. 1	7-50	Orig	NAME AND DESCRIPTION	Opposite C844	Delete entire description and add "Same as C833".
Ch. 1	7-50	Orig	LOCATING FUNCTION	Opposite C846	Change "M804" to "M806".
Ch. 1	7-51	Orig	NOTES	Opposite C862, C863, CR809, CR812, & CR815	Insert "1".
Ch. 1	7-52	Orig	REFERENCE DESIGNATION	Second line from top	Change "CR819" to "CR822".
Ch. 1	7-52	Orig	NAME AND DESCRIPTION	Opposite E810	Change "337C090G01" to "337C091G02".
Ch. 1	7-53	Orig	NOTES	Opposite J802	Insert "1".
Ch. 1	7-54	Orig	NAME AND DESCRIPTION	Opposite L815	Change "$^{15}/_{16}$ in. lg" to "±10%" "form; cotter pin lug terminals" to "core w/molded lead ends" and R100S (10MH)" to "R100-10".
Ch. 1	7-55	Orig	NOTES	Opposite M804, M805, and M806	Insert "1".
Ch. 1	7-57	Orig	NOTES	Opposite Q801 & Q802	Insert "1".
Ch. 1	7-58	Orig	NAME AND DESCRIPTION	Opposite R816	Change "RC42GF473K" to "RC42G103K".
Ch. 1	7-58	Orig	NAME AND DESCRIPTION	Opposite R817	Delete "Same as R467".
Ch. 1	7-59	Orig	REFERENCE DESIGNATION	Line 15 & 12 from bottom	Delete "R858" and "R861".
Ch. 1	7-59	Orig	REFERENCE DESIGNATION	Opposite R858	Delete "Not Used".
Ch. 1	7-59	Orig	NAME AND DESCRIPTION	Opposite R861	Delete entire description.

First Issued In	*Page No.*	*Ch. In Effort*	*Col'm or Fig.*	*Line or Location*	*Action*
Ch. 1	7-59	Orig	LOCATING FUNCTION	Opposite R861	Delete "cathode Bias V801 Fig. 6-34".
Ch. 1	7-60	Orig	NAME AND DESCRIPTION	Opposite R877	Change "1100" to "910" and "RC42GF112J" to "RC42GF911J".
Ch. 1	7-60	Orig	REFERENCE DESIGNATION	10th line from top	Delete "R882".
Ch. 1	7-60	Orig	NAME AND DESCRIPTION	Opposite R882	Delete entire description.
Ch. 1	7-60	Orig	LOCATING FUNCTION	Opposite R882	Delete "RF Modulator Bypass Fig. 6-34".
Ch. 1	7-60	Orig	NOTES	Opposite R892, R894, R895, & RT801	Insert "1".
Ch. 1	7-63	Orig	NAME AND DESCRIPTION	Opposite MP904 thru MP999	Delete "Not Used".
Ch. 1	7-64	Orig	NOTES	Opposite R906 thru R910	Insert "1".
Ch. 1	7-64	Orig	REFERENCE DESIGNATION	Line 19, 20, 21, and 22	Delete "R925, R926 thru R999".
Ch. 1	7-64	Orig	NAME AND DESCRIPTION	Opposite R925	Delete entire description.
Ch. 1	7-64	Orig	NAME AND DESCRIPTION	Opposite R926 thru R999	Delete "NOT USED".
Ch. 1	7-64	Orig	LOCATING FUNCTION	Opposite R925	Delete "Emitter Current Limiting Q801 Fig. 6-36".
Ch. 1	7-65	Orig	REFERENCE DESIGNATION	Last three lines in the 1100 series	Delete "MP1126 thru MP1199".
Ch. 1	7-65	Orig	LOCATING FUNCTION	Opposite C1401, C1402, & C1403A	Change "V451" to "V1401".
Ch. 1	7-65	Orig	LOCATING FUNCTION	Opposite C1403B	Change "V542" to "V1402".
Ch. 1	7-65	Orig	LOCATING FUNCTION	Opposite C1405	Change "V543" to "V1403".
Ch. 1	7-66	Orig	LOCATING FUNCTION	Through the entire column	Change "V541" to "V1401", "V542" to "V1402", "V543" to "V1403" and "V544" to "V1404".
Ch. 1	7-66	Orig	NAME AND DESCRIPTION	Opposite C1421	Delete entire description and insert "Not Used".
Ch. 1	7-66	Orig	REFERENCE DESIGNATION	11th line from bottom	Change "C1426" to "C1428".
Ch. 1	7-66	Orig	REFERENCE DESIGNATION	4th line from bottom	Change "CR1505" to "CR1405".
Ch. 1	7-66	Orig	REFERENCE DESIGNATION	Third line from bottom	Change "CR1406" to "CR1407".
Ch. 1	7-67	Orig	REFERENCE DESIGNATION	17th, 18th, & 19th line from top	Delete "E1417 thru E1499".

First Issued In	*Page No.*	*Ch. In Effort*	*Col'm or Fig.*	*Line or Location*	*Action*
Ch. 1	7-67	Orig	NAME AND DESCRIPTION	Opposite E1417 thru E1499	Delete "Not Used".
Ch. 1	7-67	Orig	LOCATING FUNCTION	Opposite R1403, R1404, R1405	Change "V541" to "V1401".
Ch. 1	7-67	Orig	NAME AND DESCRIPTION	Opposite R1406	Change "22000" to "15000" and "RC32GF223K" to "RC32GF153K".
Ch. 1	7-67	Orig	REFERENCE DESIGNATION	Last Line	Delete "R1408".
Ch. 1	7-67	Orig	NAME AND DESCRIPTION	Last Line	Delete "Same as R669".
Ch. 1	7-67	Orig	LOCATING FUNCTION	Last four lines	Delete last four lines.
Ch. 1	7-68	Orig	LOCATING FUNCTION	Through the entire column	Change "V542" to "V1402", "V543" to "V1403", and "V544" to "V1404".
Ch. 1	7-68	Orig	NAME AND DESCRIPTION	Opposite R1411	Delete "Same as R886" and insert "Not Used".
Ch. 1	7-68	Orig	NAME AND DESCRIPTION	Opposite R1430	Change "R701" to "R1408".
Ch. 1	7-68	Orig	REFERENCE DESIGNATION	6th line from bottom	Delete "R1440".
Ch. 1	7-68	Orig	NAME AND DESCRIPTION	Opposite R1440	Delete "Same as R358".
Ch. 1	7-68	Orig	LOCATING FUNCTION	Opposite R1440	Delete "Phase Shift V544A Fig. 6-50".
Ch. 1	7-68	Orig	NAME AND DESCRIPTION	Opposite R1442	Delete "Same as R754".
Ch. 1	7-69	Orig	LOCATING FUNCTION	First two lines	Change "V544" to "V1404".
Ch. 1	7-78	Orig	CODE NO.	Second line from bottom	Change "90687" to "96881".

3. Destroy superseded pages after the complete manual has been checked against the "List of Effective Pages".
4. Insert this Instruction Sheet just behind the front cover.
5. Make appropriate entry on Correction Page.

CHANGE 2 **INSTRUCTION SHEET**

CHANGE 2 TO TECHNICAL MANUAL FOR RADIO TRANSMITTING SET AN/WRT-1 NAVSHIPS 93483(A)

This permanent change revises the technical manual to reflect errors described in Temporary Corrections T1, T2 and T3, equipment changes and errors found after publication of the original manual and Change 1.

Maintenance Support Activities shall insert this change in the technical manual immediately upon receipt. When this change is included in the manual, the manual shall cover the equipment with all the changes made up to the date of this instruction sheet.

1. Remove superseded pages and insert revised pages as indicated below:

Page	*Remove*	*Insert*	*Page*	*Remove*	*Insert*
T.P./ii	Ch/1/Ch.1	Ch. 2/Ch. 2	6-35/6-36	Orig/Orig	Orig/Ch. 2
vii/viii	Ch. 1/Ch. 1	Ch. 1/Ch. 2	6-36A/6-36B	-/-	Ch. 2/Ch. 2
ix/x	Ch. 1/Ch. 1	Ch. 2/Ch. 2	6-37/6-38	Ch. 1/Ch. 1	Ch. 2/Ch. 2
xA/xB	Ch. 1/Ch. 1	Ch. 2/Ch. 2	6-39/6-40	Ch. 1/Ch. 1	Ch. 2/Ch. 2
xi/1-0	Ch. 1/Orig	Ch. 2/Orig	6-42A/6-42B	Ch. 1/Ch. 1	Ch. 2/Ch. 2
1-1/1-2	Orig/Orig	Ch. 2/Ch. 2	6-44A/6-44B	Ch. 1/Ch. 1	Ch. 2/Ch. 2
1-2A/1-2B	-/-	Ch. 2/Ch. 2	6-45/6-46	Orig/Orig	Ch. 2/Ch. 2
1-5/1-6	Ch. 1/Ch. 1	Ch. 2/Ch. 2	6-55/6-56	Ch. 1/Ch. 1	Ch. 2/Ch. 2
2-1/2-2	Orig/Orig	Ch. 2/Orig	6-56A/6-56B	-/-	Ch. 2/Ch. 2
2-5/2-6	Orig/Orig	Ch. 2/Ch. 2	6-64A/6-64B	Ch. 1/Ch. 1	Ch. 2/Ch. 2
2-16A/2-16B	-/-	Ch. 2/Ch. 2	6-71/6-72	Orig/Orig	Ch. 2/Ch. 2
4-9/4-10	Ch. 1/Ch. 1	Ch 1/Ch. 2	6-78A/6-78B	Ch. 1/Ch. 1	Ch. 2/Ch. 2
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5-39/5-40	Orig/Orig	Orig/Ch. 2	6-84A/6-84B	Ch. 1/Ch. 1	Ch. 2/Ch. 2
5-41/5-42	Ch. 1/Ch. 1	Ch. 2/Ch. 2	6-84C/6-84D	-/-	Ch. 2/Ch. 2
5-43/5-44	Ch. 1/Ch. 1	Ch. 2/Ch. 2	6-86A/6-86B	Ch. 1/Ch. 1	Ch. 2/Ch. 2
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2. No pen-and-ink corrections are necessary.
3. Destroy superseded pages after the complete manual has been checked against the "List of Effective Pages".
4. Insert this Instruction Sheet just behind the front cover immediately above the Instruction Sheet of Change 1.
5. Make appropriate entry on Correction Page.

NAVSHIPS 93483(A)

(Non-Registered)

TECHNICAL MANUAL

for

RADIO TRANSMITTING SETS AN/WRT-1 and AN/WRT-1A

WESTINGHOUSE ELECTRIC CORPORATION
ELECTRONICS DIVISION FRIENDSHIP PLANT
P. O. Box 1897 Baltimore 3, Maryland

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS

Contract: NObsr 75360
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NObsr 89197

Approved by BuShips: 11 April 1960
Change 3: 6 April 1964

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DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
Code 240N-100

From: Chief, Bureau of Ships
To: All Activities concerned with the Installation, Operation, and Maintenance of the Subject Equipment

Subj: Technical Manual for Radio Transmitting Set AN/WRT-1, NAVSHIPS 93483(A)

1. This is the Technical Manual for the subject equipment and is in effect upon receipt. It supersedes NAVSHIPS 93483. Upon receipt hereof, NAVSHIPS 93483 shall be destroyed by burning.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

4. Errors found in this publication (other than obvious typographical errors), which have not been corrected by means of Temporary Corrections or Permanent Changes should be reported. Such report should include the complete title of the publication and the publication number (short title); identify the page and line or figure and location of the error; and be forwarded to the Electronics Publications Section of the Bureau of Ships.

5. All Navy requests for NAVSHIPS electronics publications listed in the current issue of NAVSANDA Publication 2002 "Requisitioning Guide and Index of Forms and Publications", Cognizance Symbol I, or in a subsequent issue of the Electronics Information Bulletin should be directed to the appropriate Forms and Publications Supply Point.

R. K. JAMES
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	FIELD CHANGE NO.	SIGNATURE
Technical Manual Correction		EIB608	

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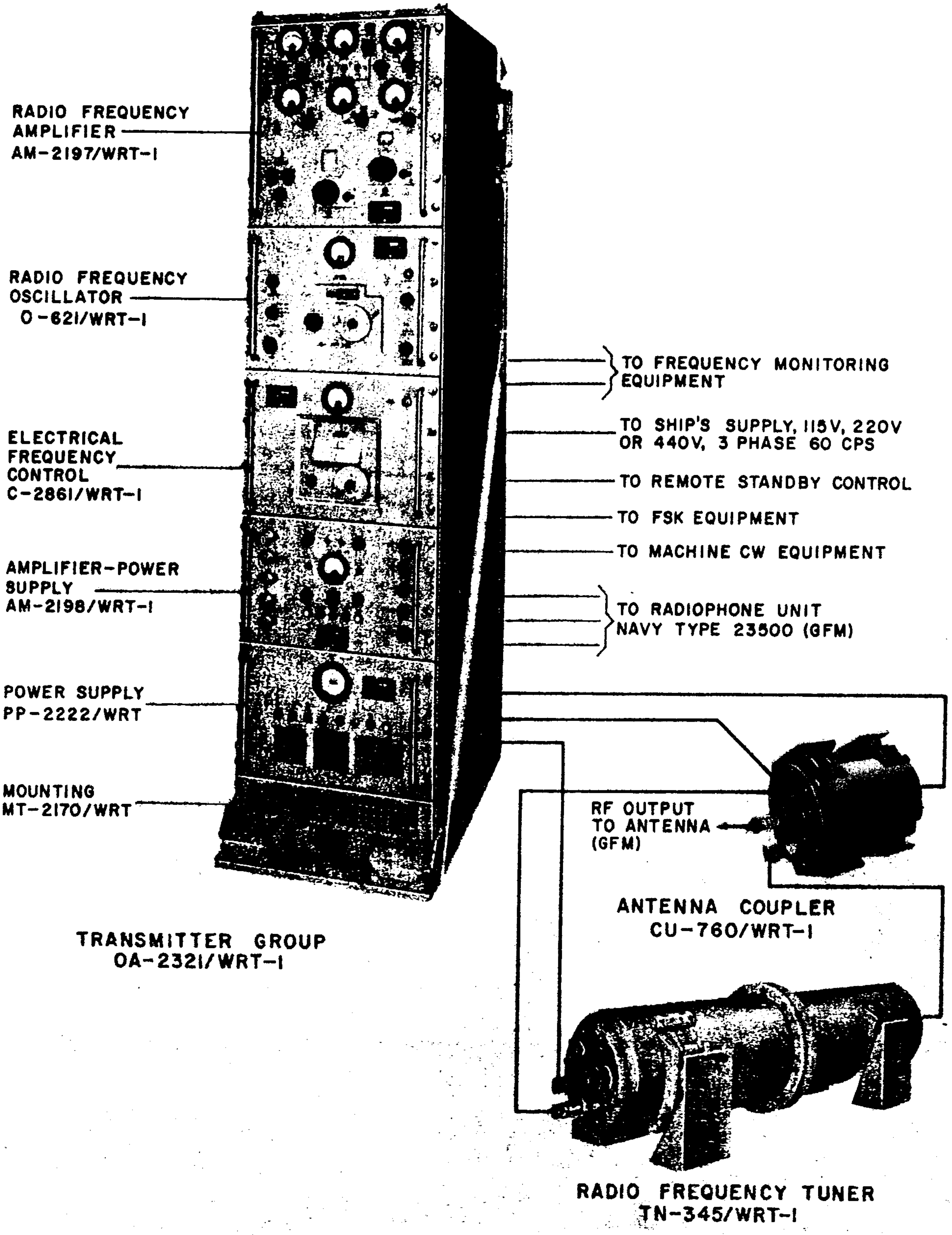


Figure 1-1. Radio Transmitting Set AN/WRT-1, Relationship f Units

SECTION 1

GENERAL INFORMATION

Note

References and illustrations have been changed throughout the book only to the extent needed for clarity. Unless otherwise stated references to Mounting MT-2170/WRT applies equally to MT-2170A/WRT.

1-1. SCOPE.

a. This technical manual covers the description, operation and maintenance of Radio Transmitting Set AN/WRT-1. Figure 1-1 is an illustration showing an overall view of the equipment described in this manual. Instructions for government-furnished equipment (GFM) to be used with Radio Transmitting Set AN/WRT-1 are not covered in this manual.

1-2. FUNCTIONAL DESCRIPTION.

a. GENERAL.—Radio Transmitting Set AN/WRT-1 is a communication equipment designed to be installed aboard surface vessels. The transmitter is continuously tunable through the frequency range of 300 kc to 1500 kc and is capable of supplying a nominal peak power output of at least 500 watts into a 50-ohm resistive load with a voltage standing wave ratio (VSWR) of less than 4 to 1. Radio Transmitting Set AN/WRT-1 provides the following types of emission: machine-cw, cw, frequency-shift keyed teletype, and amplitude-modulated speech. The set as shown in Figure 1-1 consists of Transmitter Group OA-2321/WRT-1, Radio Frequency Tuner TN-345/WRT-1, Antenna Coupler CU-760/WRT-1, and Mounting MT-2170/WRT.

b. TRANSMITTER GROUP OA-2321/WRT-1.

(1) Transmitter Group OA-2321/WRT-1 consists of Electrical Equipment Cabinet CY-2607/WRT-1 which houses the following drawer type units. Radio Frequency Amplifier AM-2197/WRT-1, Radio Frequency Oscillator O-621/WRT-1, Electrical Frequency Control C-2861/WRT-1, Amplifier-Power Supply AM-2198/WRT-1 and Power Supply PP-2222/WRT. The maximum overall dimensions including knobs, handles and front panel projections are 72 inches in height, 21½ inches in width and 29-5/16 inches in depth. The drawers containing these units are mounted on a roller mechanism for ease of withdrawal from the cabinet. Each drawer is provided with stops and appropriate locking devices to limit the outward travel on its track, and to prevent movement of the drawers due to roll or pitch of the ship. After withdrawal to its fullest extent, each drawer, with the exception of Power Supply PP-2222/WRT, may be rotated about its longitudinal horizontal axis, to a maximum of 180 degrees in either direction. Provisions are made for locking the drawers in the 45 degree position. Interlocks are provided at each drawer to remove all d-c and a-c potentials, in excess of 150 volts (except the line input power) when one or more of the drawers are withdrawn.

(2) For cooling, the equipment is provided with a fan, having a reusable filter. The blower, installed at the base of Electrical Equipment Cabinet CY-2607/WRT, circulates air upward through the drawers and out through the exhaust openings at the top of the cabinet. The transmitter may be operated from a three-phase 60 cps ship's supply of 115 volts, 220 volts, or 440 volts.

(3) Transmitter Group OA-2321/WRT-1 is coupled to an antenna through Antenna Coupler CU-760/WRT-1 and Radio Frequency Tuner TN-345/WRT-1. The circuitry for the operation and control of Antenna Coupler CU-760/WRT-1 and Radio Frequency Tuner TN-345/WRT-1 is included in Transmitter Group OA-2321/WRT-1. Provision is made for a total of 2 audio inputs. A front panel handset jack is furnished for local phone operation of the equipment. Remote phone and/or handkey operation is also possible through interconnection to a remote Radiophone Unit Navy Type 23500 (or equivalent government-furnished equipment). Provision is also made for interconnection to government-furnished teletype and telegraphy equipment and to a remote standby control. An internal dummy load is provided for use in tuning the transmitter. (An antenna transfer relay located in Antenna Control C-1670/U (GFM), permits the same antenna to be shared by the transmitter and receiver.) A general description of each drawer is given in paragraphs (4) through (7) of this section.

(4) Radio Frequency Amplifier AM-2197/WRT-1, is the first drawer from the top of the cabinet. The unit contains the intermediate amplifiers, driver amplifier and power amplifiers necessary to raise the r-f output of Radio Frequency Oscillator O-621/WRT-1 to a peak power level of 500 watts when connected into a 50-ohm resistive load. A modulating amplifier, preceding the intermediate amplifiers, provides amplitude modulation in radiophone operation. The tuning and coupling controls of the power amplifier as well as the controls and indicators for remote operation of Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 are mounted on the front panel of Radio Frequency Amplifier AM-2197/WRT-1. Radio Frequency Amplifier AM-2197/WRT-1 also contains a dummy load with the necessary switching relays, a reflectometer, a modulation monitor, and indicators for monitoring supply voltages, operating currents, r-f output and standing wave ratio. The power amplifiers are maintained at a safe operating temperature by a blower mounted in this drawer. Tuning of Radio Frequency Amplifier AM-2197/WRT-1 is accomplished through a tuning and coupling mechanism gear train.

(5) Radio Frequency Oscillator O-621/WRT-1 is the second drawer from the top of the cabinet and contains an oven and three sub-chassis: the master oscillator, the keying circuits and the +250-volt d-c regulator. The master oscillator is continuously tunable from 300 to 1500 kc, through 12 bands of 100 kc each. The operating frequency of Radio Transmitting Set AN/WRT-1 is set by means of controls located on the front panel of Radio Frequency Oscillator O-621/WRT-1, and is indicated directly by a counter also located on the front panel. The carrier frequency is stabilized by control circuits located in Electrical Frequency Control C-2861/WRT-1. A jack located on the front panel permits checking the carrier frequency with frequency monitoring equipment. The keying circuits contain a cw (on-off) keying amplifier, a frequency shift keyer and wave shaping circuits. The frequency shift keying and cw keyer circuits may be adjusted by means of controls located on the front panel of this unit. The +250-volt regulator provides a regulated plate supply voltage to the other units of Radio Transmitting Set AN/WRT-1.

(6) Electrical Frequency Control C-2861/WRT-1 is the third drawer from the top of the cabinet and contains a frequency comparator chassis, an oven for maintaining the frequency-determining components at the proper operating temperature, a feedback amplifier chassis and a 100 kc amplifier chassis. The circuits of Electrical Frequency Control C-2861/WRT-1 impart overall accuracy and stability to the master oscillator by comparing its output with the output of a stable low-frequency interpolation oscillator. The last 100.00 kc of the desired master oscillator frequency are set by rotating the timing controls on the front panel of the unit until the desired frequency is indicated by the front panel drum-type indicator. Frequency settings are shown directly and no calibration charts are needed.

(7) Amplifier-Power Supply AM-2198/WRT-1 is the fourth drawer from the top of the cabinet and contains the low voltage power supplies, the transmitter control circuitry and the speech amplifier. With the exception of the high voltage for the power amplifiers all of the d-c voltages are developed in Amplifier-Power Supply AM-2198/WRT-1. Protective relays are provided to disable the low voltage rectifiers in case an overload occurs. Branch circuit fuses are provided at the front panel of Amplifier-Power Supply AM-2198/WRT-1 for the power supply circuits. The front panel of Amplifier-Power Supply AM-2198/WRT-1 contains the controls for selecting the type of emission, tune or adjust condition, power level, local or remote operation as well as the controls for energizing the filament and plate power circuits. The speech amplifier chassis provides for the amplification and clipping of the audio input during phone operation. Front panel controls are also provided for modulation level, clipping, sidetone level and input level or AGC. A front panel jack is provided for a local phone connection.

(8) Power Supply PP-2222/WRT is the bottom drawer and contains the high voltage transformers, the high voltage rectifiers, and the high voltage control relays. Plate voltage for Radio Frequency Amplifier AM-2197/WRT-1 is supplied from the rectifiers in Power Supply PP-2222/WRT. Movable links are provided to connect the primary windings of each transformer for 115, 220 or 440-volt three-phase primary input power. An elapsed time meter is mounted on the front panel of Power Supply PP-2222/WRT to indicate operating hours. An emergency stop switch is also provided on the front panel to disconnect all power to the circuits of the transmitter in case of an emergency. Overload control circuits disable the high voltage power supply automatically in case of an overload.

c. RADIO FREQUENCY TUNER TN-345/WRT-1. —Radio Frequency Tuner TN-345/WRT-1 enables Transmitter Group OA-2321/WRT-1 to deliver the maximum power, to a fixed antenna, at a minimum standing wave ratio, for any frequency within the range of 300 kc to 1500 kc. Maximum power at a minimum standing wave ratio, is delivered when the antenna appears as a purely resistive load. Since the antenna dimensions are fixed, the impedance presented to the transmitter will vary with frequency. Radio Frequency Tuner TN-345/WRT-1 effectively changes the antenna impedance by inserting or removing inductance in series with the antenna. Radio Frequency Tuner TN-345/WRT-1 is contained in a shock mounted, pressurized cylinder which houses the electrical and mechanical parts of the unit. One connector for control circuits and one r-f input connector together with a pressure gauge, relief valve, and a valve for pressurizing the equipment are mounted at one end of the cylinder. The r-f output connection is mounted at the other end.

d. ANTENNA COUPLER CU-760/WRT-1.—Antenna Coupler CU-760/WRT-1 provides an additional inductance that may be inserted in the antenna circuit. Thus, Antenna Coupler CU-760/WRT-1 extends the range of impedances that can be matched by Radio Frequency Tuner TN-345/WRT-1. Antenna Coupler CU-760/WRT-1 is housed in a shock mounted, pressurized cylinder which houses the electrical and mechanical parts of this unit. All r-f connections together with a pressure gauge, relief valve, and valve for attaching the pressurizing equipment are located at one end of the cylinder.

e. MOUNTING MT-2170/WRT.—Mounting MT-2170/WRT is provided to support and protect Transmitter Group OA-2321/WRT-1 from excessive shocks and vibrations. Mounting MT-2170/WRT consists of a frame and stainless steel springs to be assembled at the installation site.

1-3. FACTORY AND FIELD CHANGES.

The field changes listed in Table 1-0 have been incorporated in this manual. For the serial numbers not listed in Table 1-0, the changes have been incorporated at the factory.

TABLE 1-0. RADIO TRANSMITTING SET AN/WRT-1, FIELD AND FACTORY CHANGES

FIELD CHANGE NUMBER	FIELD CHANGE TITLE AND PURPOSE	SERIAL NUMBER OF EQUIPMENT AFFECTED	FIELD CHANGE ACCOMPLISHED IF:
1-AN/WRT-1	Relocating resistors R737 and R738 outside of oven. Prevent overheating of oven.	Radio sets 1 through 137.	In Electrical Frequency Control C-2861/WRT-1, resistors R737 and R738 are outside of oven.
2-AN/WRT-1	Permit connection of inductor L1 in Antenna Coupler CU-760/WRT-1, when POWER SELECTOR switch is in 500W position.	Radio sets 1 through 100 and 102.	In Radio Frequency Amplifier AM-2197/WRT-1, COUPLER ANTENNA switch S801 connected to relay K807B-5.
3-AN/WRT-1	Disable action of relay K508. Eliminating of transient in final amplifier.	Radio sets 1 through 141.	In Radio Frequency Amplifier AM-2197/WRT-1, a wire jumper has been added between terminals TB801-1 and TB801-2.

1-4. QUICK REFERENCE DATA.

a. FREQUENCY RANGE.—Radio Transmitting Set AN/WRT-1 provides complete frequency coverage over the frequency range of 300 kc to 1500 kc.

b. FREQUENCY CONTROL.—Frequency Control in Radio Transmitting Set AN/WRT-1 is accomplished by phase-comparison circuits in conjunction with an interpolation oscillator.

c. TYPES OF EMISSION.—Radio Transmitting Set AN/WRT-1 is capable of operation with the following types of emission: machine-cw, cw, frequency-shift keyed teletype, and amplitude-modulated speech.

d. CW CHARACTERISTICS.

(1) When connected to a machine-cw (on-off) keyer, Radio Transmitting Set AN/WRT-1 is capable of operating on a d-c keying voltage (negative side grounded) of 30 volts ± 1.5 to 135 volts ± 6.75, at the rate of 600 words per minute.

(2) Radio Transmitting Set AN/WRT-1 may be hand-keyed at keying speeds up to a maximum of 30 words per minute.

(3) Wave-shaping circuits are provided for adjusting the rise and decay time of the output pulse for machine-cw keying, teletype and multiple operation over the range of 100 to 5000 microseconds.

e. FSK CHARACTERISTICS.

(1) When operating directly from a teletypewriter, Radio Transmitting Set AN/WRT-1 is capable of accepting neutral keying signals from 0 to 30 ± 1.5 volts d-c up to + 135 ± 6.75 volts d-c at the rate of 60 words per minute.

(2) The frequency shift deviation is adjustable up to ± 500 cps from the carrier frequency.

(3) Phase-modulation circuits are provided, having a sweep rate of 200 cps with a maximum displacement at the transmitter output of zero to one radian (approximately 60 degrees).

f. PHONE CHARACTERISTICS.

(1) Radio Transmitting Set AN/WRT-1 is capable of 100 percent modulation, when operating with a carbon microphone, Navy type H-51/U. The equipment may be modulated from a 600-ohm audio input circuit at a six milliwatt (0.006 watts) level.

(2) The modulator circuits include AGC features which operate to maintain a constant amplifier output level for variations of input levels from −25 to +5 db (reference zero db = 0.006 watts). Under these conditions modulation is adjustable over the range of 10 to 100 percent.

(3) A squelch circuit is included to reduce the amplifier output to zero when the input level falls below a normal minimum. The minimum level is adjustable between −25 and +2 db.

(4) A peak-limiting clipper circuit is incorporated to remove excessive positive and negative audio amplitude peaks. Clipping is adjustable from zero to −20 db of input level.

(5) The audio response of Radio Transmitting Set AN/WRT-1 (exclusive of the microphone) is flat within two db from 30 to 3500 cps when measured at an output of an r-f detector. Attenuation is not less than 40 db at 100 and 5000 cps.

(6) Audio-frequency distortion in Radio Transmitting Set AN/WRT-1 is less than five percent at 95 percent modulation at any frequency from 300 to 3500 cps, with the clipper circuit out.

g. POWER OUTPUT.

(1) Radio Transmitting Set AN/WRT-1 is capable of supplying a nominal maximum power output, for all types of emission, except AM of 500 watts average when connected to a 50-ohm resistive load having a standing-wave ratio of less than 4:1. For AM the nominal peak power output is 500 watts.

(2) Radio Transmitting Set AN/WRT-1 is capable of continuous full-load operation under any ambient temperature condition from zero to 50 degrees C (32°F to 122°F) and any relative humidity up to 95 percent, or any combination thereof.

h. FREQUENCY STABILITY.

(1) Radio Transmitting Set AN/WRT-1 has a frequency stability of 30 cps + 1.5 cps per megacycle when operating at normal line voltage and frequency in an ambient temperature range of 25 to 35 degrees C (77 to 95 degrees F) and any relative humidity of 40 to 90 percent over a 24-hour period.

i. POWER SUPPLY.

(1) Radio Transmitting Set AN/WRT-1 is capable of taking power from a three-phase 60-cps (± 5%) power source of 115 volts, 220 volts or 440 volts (± 10%). The voltage, current, power in kw and kva for various operating conditions are as follows:

OPERATING CONDITIONS	A-C LINE VOLTAGE	LINE CURRENT*			POWER KW	KVA
		L1	L2	L3		
†Normal Off	220	0.1	0.75	0.75	0.19	0.17
Standby—100 Watts	220	0.0	4.7	4.7	1.0	1.03
Operate—100 Watts	220	—	—	—	—	—

†Only oven heaters energized.
*For 115-volt a-c ship's supply, multiply current values by 2.
For 440-volt a-c ship's supply, divide current values by 2.

PERATING CONDITIONS	A-C LINE VOLTAGE	LINE CURRENT*			POWER KW	KVA
		L1	L2	L3		
CW	220	1.0	5.2	5.2	1.26	1.37
Phone	220	1.0	5.0	5.0	1.10	1.33
FSK	220	1.0	5.2	5.2	1.26	1.37
Standby—500 Watts	220	1.0	5.0	5.0	1.10	1.33
Operate—500 Watts	220	—	—	—	—	—
CW	220	2.8	6.9	6.6	2.07	2.1
Phone	220	1.9	5.7	5.5	1.57	1.65
FSK	220	2.8	6.9	6.6	2.07	2.1

*For 115-volt a-c ship's supply, multiply current values by 2.
For 440-volt a-c ship's supply, divide current values by 2.

j. HEAT DISSIPATION.

(1) Heat dissipation at 100 watt operation is 1.16 kw.

(2) Heat dissipation at 500 watt operation is 1.52 kw.

1-5. EQUIPMENT LISTS.

Radio Transmitting Set AN/WRT-1 consists of the major units listed in Table 1-1. Equipment and publications required but not supplied are itemized in Table 1-2. Shipping data is given in Table 1-3. The electron tube and transistor complement is listed in Table 1-4.

1-6. EQUIPMENT SIMILARITIES.

Power Supply PP-2222/WRT and Mounting MT-2170/WRT in Radio Transmitting Set AN/WRT-1 may be interchanged with Power Supply PP-2222/WRT and Mounting MT-2170/WRT, respectively, in Radio Transmitting Set AN/WRT-2.

TABLE 1-1. RADIO TRANSMITTING SET AN/WRT-1 EQUIPMENT SUPPLIED

QTY. PER EQUIP.	NOMENCLATURE		**OVERALL DIMENSIONS			**VOLUME	**WEIGHT
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	Radio Transmitting Set, Consisting of:	AN/WRT-1					
1	Transmitter Group	OA-2321/WRT-1	72	21	29½	26.25	1030
1	Radio Frequency Tuner	TN-345/WRT-1	13⅜	48⅞	$16\frac{15}{16}$	6.75	120
1	Antenna Coupler	CU-760/WRT-1	13⅜	22½	$16\frac{15}{16}$	3.25	80
1	Connector P101	MS/3106B-32-7P	*				
1	Connector P102		*				

**Unless otherwise stated, dimensions are in inches, volume in cubic feet, and weight in pounds.
*Has relative negligible dimensions and weight.

TABLE 1-1. RADIO TRANSMITTING SET AN/WRT-1 EQUIPMENT SUPPLIED—Concluded

QTY. PER EQUIP.	NOMENCLATURE		**OVERALL DIMENSIONS			**VOLUME	**WEIGHT
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	Connector P103	UG-943/U	*				
1	Connector P104	UG-943A/U	*				
1	Connector P3301	AN/3106E-32-8S	*				
1	Connector P3501	AN/3106E-24-28S	*				
1	Mounting	MT-2170/WRT	0	0	0	0	0
1	Mounting	MT-2170A/WRT Serials 231 and up	0	0	0	0	0
	Maintenance Parts Kit						
2	Instruction Books		12	9	1	0.07	3

**Unless otherwise stated, dimensions are in inches, volume in cubic feet, and weight in pounds.
*Has relative negligible dimensions and weight.
0Packed disassembled in a separate case.

TABLE 1-2. RADIO TRANSMITTING SET AN/WRT-1 EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED

QTY. PER EQUIP.	NOMENCLATURE		REQUIRED USE	REQUIRED CHARACTERISTICS
	NAME	DESIGNATION		
1	Antenna		R-F Radiation	
1	Radiophone Unit	23500 or Equivalent	Remote radio telephone control operation.	To meet requirements of MIL-C-946.
1	Telegraph Key	26012	Telegraphy Transmission.	Suitable for use with Radiophone Unit 23500 or Equivalent.
1	Machine Telegraphy Equipment		Machine CW Transmission.	Neutral keying 0 to 30 − 135 volts, 20,000 ohms termination to ground.
1	Teletypewriter and auxiliary Equipment		FSK Operation.	Neutral keying 60 ma. 2000 ohms or 20 ma. 6000 ohms to ground.
1	Handset (carbon)	H-J1/U	For local Voice Transmission.	35 ohms carbon microphone, 600 ohms earphone push to talk.

In addition to the items listed in Table 1-2 the following bulk cables are required:
RG-10/U, MSCA-19, MHFA 7, TTHFWA, RG-17/U

TABLE 1-3. RADIO TRANSMITTING SET AN/WRT-1 SHIPPING DATA

QTY. PER EQUIP.	NOMENCLATURE		**OVERALL DIMENSIONS			**VOLUME	**WEIGHT
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	Transmitter Group	OA-2321/WRT-1	28	85	40	55	1130
1	Radio Frequency Tuner	TN-345/WRT-1	21	54	19	12.4	196
1	Antenna Coupler	CU-760/WRT-1	21	28	19	6.5	120
3	Mounting	MT-2170/WRT	31½	22	5	2.3	90
			21	18½	5	1.1	52
			61	5¾	3½	0.6	38
3	Mounting	MT-2170A/WRT Serials 231 and up	32	21	4	2.5	76
			21	15	5	1.2	44
			64	4	4	0.7	34
	Equipment Spares		18½	13½	13¼	1.65	

**Unless otherwise noted, dimensions are in inches, volume in cubic feet and weight in pounds. Equipment crated and ready for shipment.

TABLE 1-4. RADIO TRANSMITTING SET AN/WRT-1 ELECTRON TUBE AND TRANSISTOR COMPLEMENT

UNIT	NUMBER OF TUBES AND TRANSISTORS OF TYPES INDICATED													
	6AU6WA	12AT7WA	5651WA	6080WA	3B28	OA2WA	5933WA	4X150A	2N95	2N384	2N119	2N117	2N335	TOTAL
Power Supply PP-2222/WRT					6									6
Radio Frequency Amplifier AM-2197/WRT-1	2			1			1	4			1	Δ1		10
Radio Frequency Oscillator 0-621/WRT-1	2	3	1	1		2	1							12
Electrical Frequency Control C-2861/WRT-1	3	5								3				11
Amplifier-Power Supply AM-2198A/WRT-1		4							*1				2	2
Amplifier-Power Supply AM-2198/WRT-1		4							*1					5
Total Number of Each Type	7	16	1	2	6	2	2	4	*2	3	1	Δ1	2	

*Replaced by Transistor 2N1330 on sets serials 142 and up.
ΔUsed in sets serials 1 to 141 only.

SECTION 2
INSTALLATION

2-1. UNPACKING AND HANDLING.

a. Radio Transmitting Set AN/WRT-1 consists of Transmitter Group OA-2321/WRT-1, Radio Frequency Tuner TN-345/WRT-1, Antenna Coupler CU-760/WRT-1, Mounting MT-2170/WRT, and the boxes containing accessories and equipment spare parts. Transmitter Group OA-2321/WRT-1 consists of Electrical Equipment Cabinet CY-2607/WRT-1 which houses five drawers. The five drawers, from top to bottom are: Radio Frequency Amplifier AM-2197/WRT-1, Radio Frequency Oscillator O-621/WRT-1, Electrical Frequency Control C-2861/WRT-1, Amplifier-Power Supply AM-2198/WRT-1 and Power Supply PP-2222/WRT. Transmitter Group OA-2321/WRT-1 is shipped, completely assembled, in a packing case lined with moisture-proof barriers. Electrical Equipment Cabinet CY-2607/WRT-1 is strapped to a cradle which forms the bottom of the packing case. Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 are completely assembled at the factory and shipped in a separate case. Mounting MT-2170/WRT is packed, disassembled, in a separate case. Extreme care must be exercised while handling and unpacking the equipment to prevent damage.

CAUTION

DO NOT LEAVE TRANSMITTER GROUP OA-2175/WRT-1 IN AN UPRIGHT POSITION WITHOUT STEADYING SUPPORT, WHEN IT IS NOT RESTING ON MOUNTING MT-2170/WRT. WHEN LIFTING TRANSMITTER GROUP OA-2175/WRT-1 INTO AN UPRIGHT POSITION, SEPARATE THE SHOCK MOUNTS FROM THE CRADLE, LEAVING THE CRADLE STRAPPED TO THE UNIT. HOIST THE UNIT TO AN UPRIGHT POSITION BEFORE REMOVING THE CRADLE.

Hoists used in moving the equipment should be equipped with a sling. No special tools are required for opening the packing cases. A hammer, nail bar, a ten inch adjustable wrench, a pair of shears, and a large screwdriver are all the tools needed for opening the packing case. The protective packing should not be removed from controls, meters or other parts until the unit is secured and connected.

2-2. POWER REQUIREMENTS AND DISTRIBUTION.

a. Radio Transmitter Set AN/WRT-1 may be operated from a ship's three-phase 60-cps (± 5%) supply of 115 volts, 220 volts or 440 volts (± 10%). The primary power source must be capable of supplying a minimum of 2.7 kva.

b. Power distribution to the units f Radio Transmitting Set AN/WRT-1 is shown in the primary power distribution diagram, figure 5-29. As shown in figure 5-29, the primary winding of transformer T501, located in Amplifier-Power Supply AM-2198/WRT-1, as well as the primary windings of transformers T201, T202 and T203, located in Power Supply PP-2222/WRT, must be connected according to the ship's supply voltage.

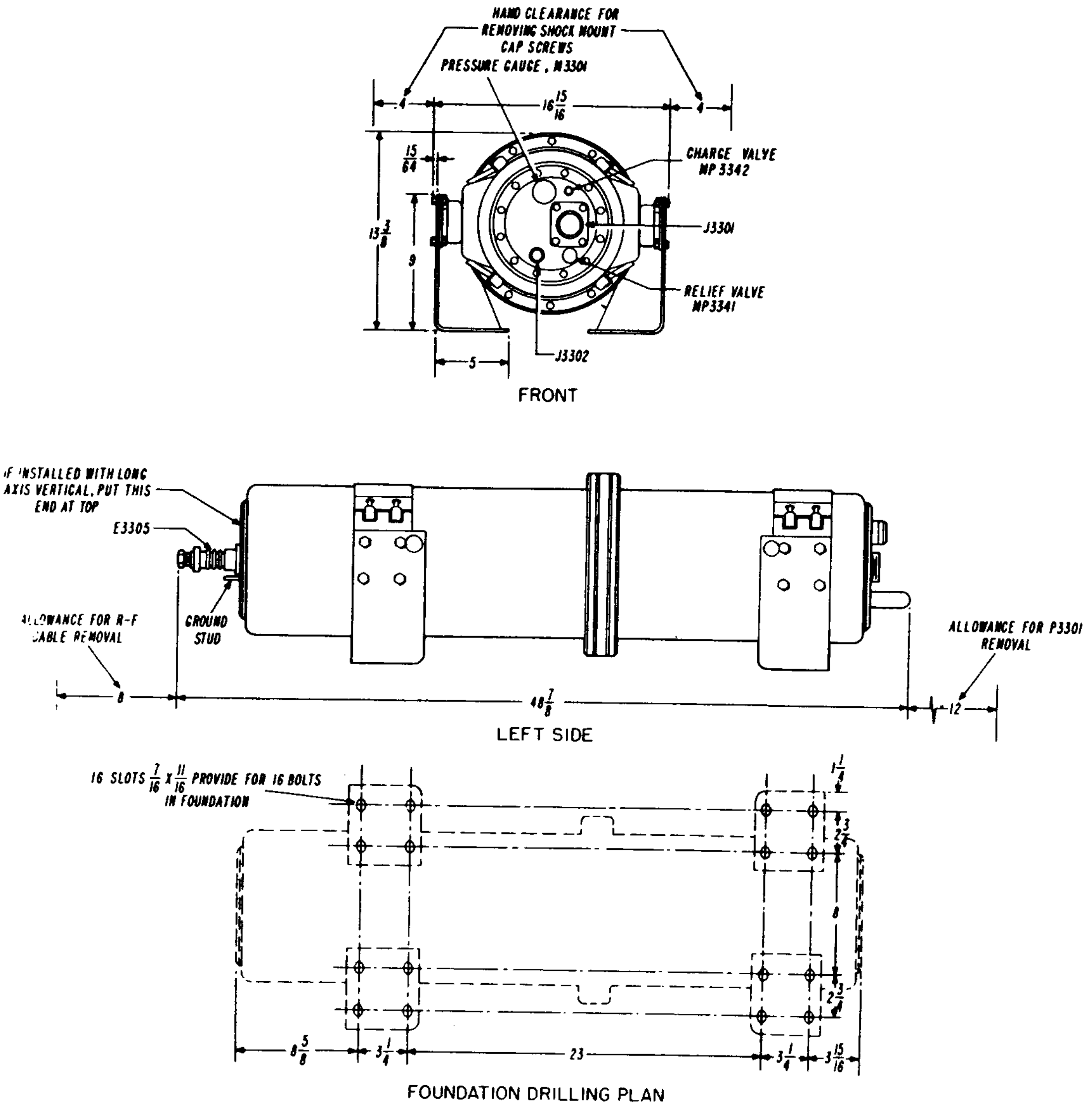
Note

For information on the installation of government-furnished equipment used in connection with Radio Transmitting Set AN/WRT-1, refer to the instruction book pertaining to that equipment.

2-3. INSTALLATION LAYOUT.

a. Figure 2-9 or 2-9A shows Transmitter Group OA-2321/WRT-1 installed on Mounting MT-2170/WRT or MT-2170A/WRT. In selecting the location for this equipment in the radio room, reference should be made to figure 2-9 or 2-9A, to determine the space required. The space requirements also include ventilation considerations, clearance for removal and servicing of each drawer, shockmount deflection and cable bends.

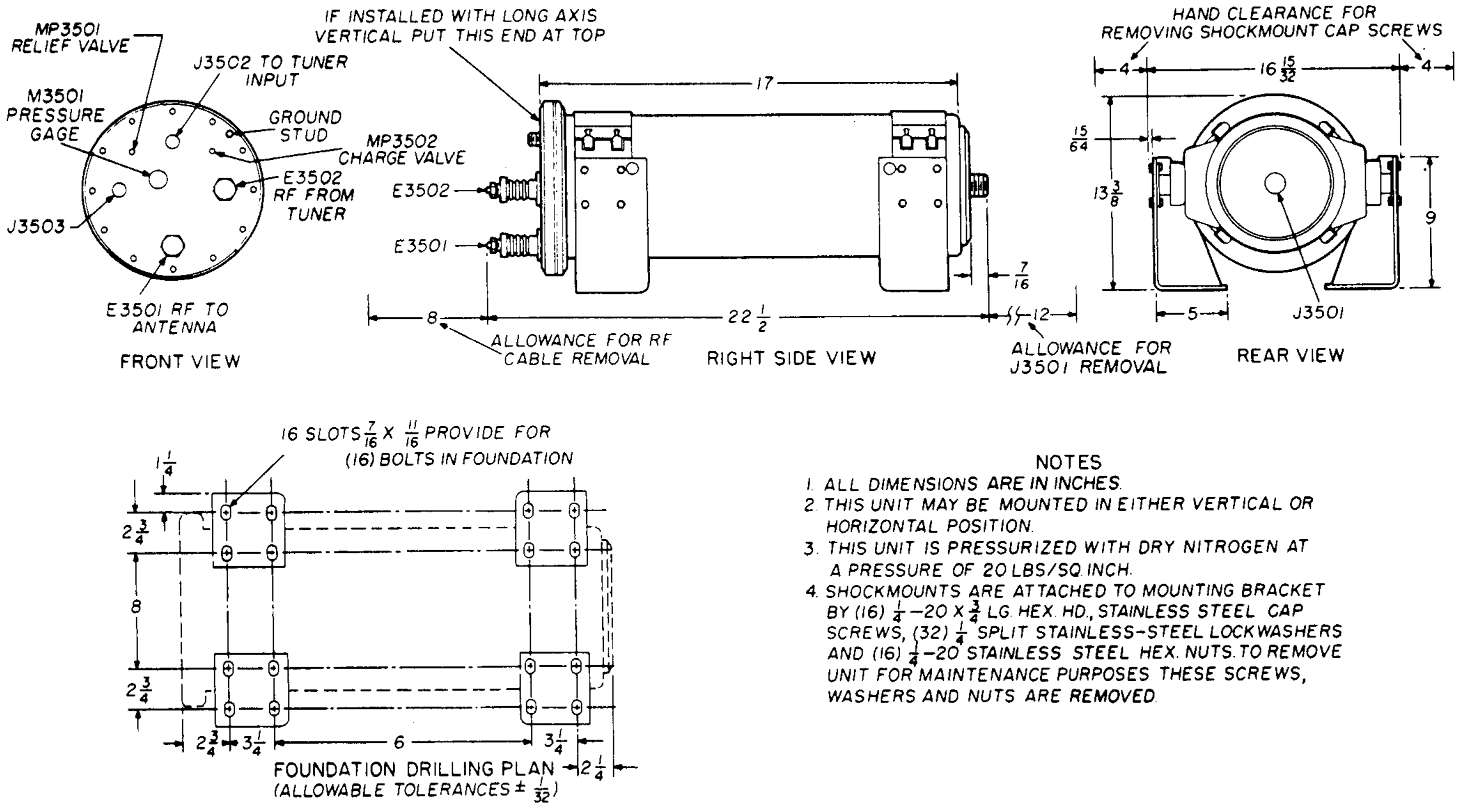
b. Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 should be mounted as close as possible to the Antenna. They may be mounted outdoors upon the superstructure, close to the antenna. Figure 2-1 is an outlin drawing of Radio Frequency Tuner TN-345/WRT-1. Figure 2-2 is an outline drawing of Antenna Coupler CU-760/WRT-1. Location of Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 is restricted primarily by limitations on the length of cables connecting the units to the antenna and to Transmitter Group OA-2321/WRT-1. Thus, the total length of the r-f cable used between the output of Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 should not exceed five feet. Likewise the two control cables connecting Radio Frequency Tuner TN-345/WRT-1 to Transmitter Group OA-2321/WRT-1 should not exceed 450 feet. After taking these limitations into consideration select a suitable place where Radio Frequency Tuner TN-345/WRT-1 may be installed in a horizontal or vertical plane. In either case the pressurizing valve and the pressure gauge on Radio Frequency Tuner TN-345/WRT-1 must be accessible at all times.



NOTES

1. THIS UNIT MAY BE MOUNTED IN EITHER VERTICAL OR HORIZONTAL POSITION.
2. THIS UNIT IS PRESSURIZED WITH DRY NITROGEN AT A PRESSURE OF 20 LBS/SQ INCH.
3. SHOCK MOUNTS ARE ATTACHED TO MOUNTING BRACKET BY (16) 1/4—20X3/4 LG HEX. HD., STEEL, CAD PLATE CAP SCREWS, (32) 1/4 SPLIT, STAINLESS STEEL LOCKWASHERS AND (16) 1/4—20 STEEL, CAD PLATE HEX. NUTS. TO REMOVE UNIT FOR MAINTENANCE PURPOSES REMOVE THESE SCREWS, WASHERS AND NUTS.
4. ALL DIMENSIONS ARE IN INCHES.

Figure 2-1. Radi Frequency Tuner TN-345/WRT-1, Outline Drawing



NOTES

1. ALL DIMENSIONS ARE IN INCHES.
2. THIS UNIT MAY BE MOUNTED IN EITHER VERTICAL OR HORIZONTAL POSITION.
3. THIS UNIT IS PRESSURIZED WITH DRY NITROGEN AT A PRESSURE OF 20 LBS/SQ INCH.
4. SHOCKMOUNTS ARE ATTACHED TO MOUNTING BRACKET BY (16) $\frac{1}{4}$–20 X $\frac{3}{4}$ LG. HEX. HD., STAINLESS STEEL CAP SCREWS, (32) $\frac{1}{4}$ SPLIT STAINLESS-STEEL LOCKWASHERS AND (16) $\frac{1}{4}$–20 STAINLESS STEEL HEX. NUTS. TO REMOVE UNIT FOR MAINTENANCE PURPOSES THESE SCREWS, WASHERS AND NUTS ARE REMOVED.

Figure 2-2. Antenna Coupler CU-760/WRT-1, Outline Drawing

2-4. INSTALLATION REQUIREMENTS.

a. INSTALLATION POINTERS—The installation of Radio Transmitter Set AN/WRT-1 requires the installation of three major units: Transmitter Group OA-2321/WRT-1 and Mounting MT-2170/WRT, Radio Frequency Tuner TN-345/WRT-1, and Antenna Coupler CU-760/WRT-1. All of these units with the exception of Mounting MT-2170/WRT have been completely assembled at the factory. Mounting MT-2170/WRT is shipped disassembled, in a separate case, and must be assembled and installed prior to transmitter installation, as described in paragraph 2-4*c.* (1) of this section. Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 are to be used only for installation on surface vessels. The procedure which follows outlines the steps required prior to the actual installation of Radio Transmitting Set AN/WRT-1. Electrical Equipment Cabinet CY-2607/WRT-1 may be lowered through a circular hatch 30 inches in diameter if necessary. Under such a condition the drawers containing the five major units of Transmitter Group OA-2321/WRT-1, the Power Supply PP-2222/WRT roller tracks and the rear section of Electrical Equipment Cabinet CY-2607/WRT-1 must be removed as described in steps 1 through 11. If Transmitter Group OA-2321/WRT-1 may be transported directly to its final location, steps 3 and 5 through 9 may be eliminated.

Step 1. Pull out the top drawer, containing Radio Frequency Amplifier AM-2197/WRT-1 to its extreme limit of travel.

Step 2. Disconnect all wiring to the chassis and remove the four bolts holding the chassis to the mounting plate portion of the chassis support bearing. (The bolts are accessible from the rear of the mounting plate.) Lift and pull out the chassis. Push the interconnection cabling out through the rear of the chassis.

Step 3. Repeat steps one and two for the removal of the second, third and fourth drawers.

Step 4. Pull out the bottom drawer containing Power Supply PP-2222/WRT to its extreme limit of travel. Disconnect all wires and remove the six bolts holding the chassis to the sliding tracks. Remove the drawer.

Step 5. Remove the nine screws holding each of the two tracks for Power Supply PP-2222/WRT, to the cabinet frame and remove the tracks. (Four of the set screws are located above the rail and five screws are located below the track.)

Step 6. Disconnect the rear section of the cabinet by removing the two top bolts and the 40 nut and bolt assemblies holding the rear section in place.

Step 7. Lower all the component parts of Transmitter Group OA-2321/WRT-1 through the 25-inch hatch.

Step 8. Transport all the components to a point near the final location.

Step 9. Reassemble Transmitter Group OA-2321/WRT-1 at its final location by reversing steps one, two, three and six. Do not install Power Supply PP-2222/WRT and Radio Frequency Amplifier AM-2197/WRT-1 at this time.

Step 10. Locate the terminal junction box at the bottom rear of Electrical Equipment Cabinet CY-2607/WRT-1.

Step 11. Detach the terminal junction box from the stud bars mounted on the cabinet by removing the eight nuts holding it to the stud bars. When final installation makes the terminal junction box inaccessible from the rear remove the junction box and the stud bars by removing the eight nuts which hold the stud bars to the cabinet, from the inside of the cabinet.

Step 12. Refer to figure 2-3 and disconnect terminal boards TB101A and TB101B mounted in the terminal junction box.

Step 13. Remove protective cover from TB102 and disconnect the three leads.

Note

The external cables may be brought into Electrical Equipment Cabinet CY-2607/WRT-1 either through the rear or through the bottom of the terminal junction box, preferably through the rear. The distribution and size of cable entrance holes should be determined in accordance with the size of cables shown on the interconnection diagram figure 2-10. Allow sufficient slack in the cables to compensate for transmitter deflection. Stuffing tubes cannot be used.

Step 14. Drill all the necessary holes for the entrance of external cables into the junction box.

Step 15. Move the junction box to its approximate installed position and insert all interconnecting wires and cables to associated units through the holes drilled in Step 14.

Step 16. Refer to the interconnection diagram, figure 2-10, and determine what cables are needed. Determine the exact distance from Radio Frequency Tuner TN-345/WRT-1 and from Antenna Coupler CU-760/WRT-1 to Transmitter Group OA-2321/WRT-1 and to the antenna. Determine and obtain the exact length of each cable. (Cables to be supplied by installing activity).

Step 17. Place the cables in their final position and introduce one end of each cable through the holes drilled in step 14.

Step 18. Using connectors P101, P3301, P3302, P3501, P3305, and P3506, fabricate the multi-conductor and coaxial cables required by the interconnection diagram of figure 2-10. Cable fabrication should follow the instructions contained in the paragraph below, (2-4. *b.*).

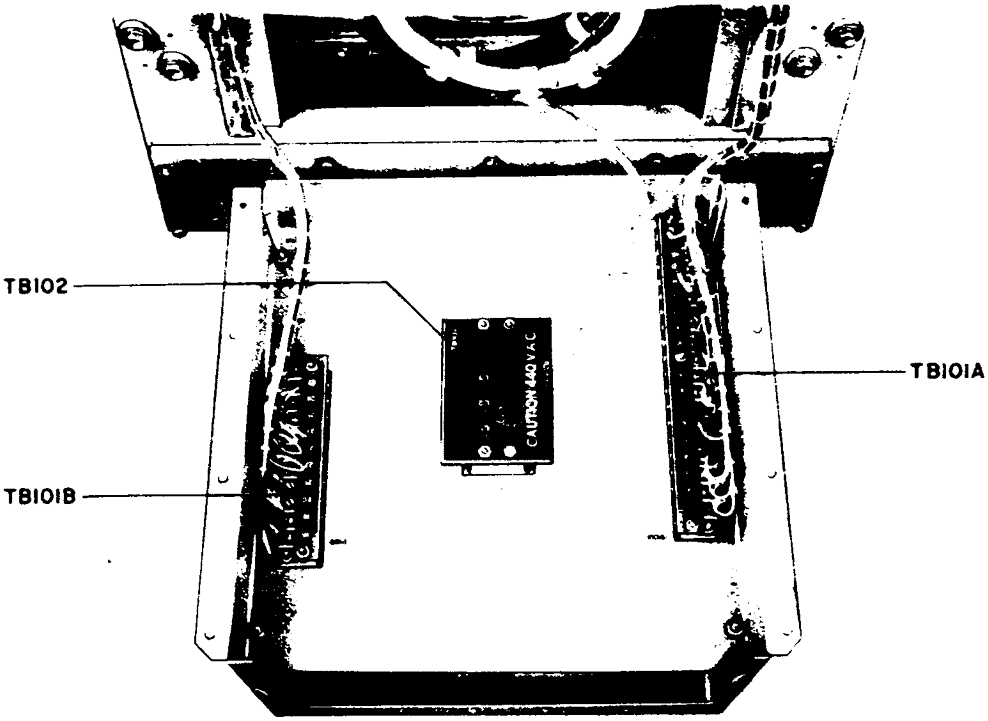


Figure 2-3. Electrical Equipment Cabinet CY-2607/WRT-1, Terminal Junction Box

b. CABLE ASSEMBLY

(1) The fabrication of multi-conductor and coaxial cables to connectors should follow the procedures in Electronic Installation Practices Manual, NAVSHIPS 900171, chapters 5 and 10. Also reference should be made to Armed Services Index of R.F. Transmission Lines and Fittings, NAVSHIPS 900-102B. *When determining cable lengths allowance should be made for sufficient slack in cable runs to prevent damage from shock or vibrations.* All cable runs should be kept as short as possible to prevent excessive voltage drop and noise pick-up in cabling. Some of the interconnecting cables to Transmitter Group OA-2321/WRT-1 are connected directly to terminal boards in the junction box at the rear of Electrical Equipment Cabinet CY-2607/WRT-1. To prepare this type of multiconductor cable for termination, proceed as follows:

Step 1. Determine the maximum radius to which the conductors are to be fanned out by measuring the distance from the cable to the remotest terminals on terminal boards TB101A and TB101B.

Step 2. Cut away the neoprene jacket (and armor) to the fanning radius plus approximately three-quarters of an inch.

Step 3. Cut away the cloth jacket enclosing each conductor and dielectric for a distance of approximately three inches from the end of the conductor.

Step 4. If a metallic braid exists between the dielectric and cloth jacket, comb the braid as far back as the jacket. Twist the strands of the braid into a round conductor and terminate it in a solder lug. If there is an insufficient number of ground terminals for individually connecting each lug, solder two of the conductors to a common lug. Cut back about one inch of exposed conductor, being careful not to nick the inner conductor. Terminate the inner conductor with a solder lug.

c. INSTALLATION SEQUENCE

(1) TRANSMITTER GROUP OA-2321/WRT-1 and MOUNTING MT-2170/WRT or MOUNTING MT-2170A/WRT. To install Transmitter Group OA-2321/WRT-1 and Mounting MT-2170/WRT or Mounting MT-2170A/WRT refer to figure 2-9 or 2-9A and proceed as follows:

Note

Allow a minimum of ½ inch clearance on all sides, back, and top of Electrical Equipment Cabinet CY-2607/WRT-1 for shock mount deflection.

Step 1. Refer to figure 2-9 for Mounting MT-2170/WRT or to figure 2-9A for Mounting MT-2170A/WRT and install the equipment as recommended.

Note

Do not weld the mounting to the deck or bulkhead.

Step 2. Check and make sure the lockout has been disengaged and that the transmitter is freely supported by the shock mounts.

Step 3. Remove all protective packing from all controls and meters on the front panels of Transmitter Group OA-2321/WRT-1.

(2) RADIO FREQUENCY TUNER TN-345/WRT-1 and ANTENNA COUPLER CU-760/WRT-1. Figure 2-1 is an outline drawing of Radio Frequency Tuner TN-345/WRT-1 and figure 2-2 is an outline of Antenna Coupler CU-760/WRT-1. Reference should be made to these drawings in the installation procedure described in the following steps. Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 may be installed in a horizontal or vertical position. In either case the pressurizing valve and pressure meter on each unit must be accessible at all times. After selecting the site, as described in paragraph 2-3 of this section, transport Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 to the installation site and proceed in the following manner:

Step 1. Taking into consideration the limitations described in paragraph 2-3 refer to figure 2-1 and 2-2 and draw an outline first of Radio Frequency Tuner TN-345/WRT-1 and then of Antenna Coupler CU-760/WRT-1 on the deck or bulkhead. Mark the location of each hole to be drilled.

Step 2. Drill and tap sixteen (16) ½-inch holes at the places marked in step 1, for both equipments.

Step 3. Using the thirty-two (32) bolts supplied with the equipment, first secure Radio Frequency Tuner TN-345/WRT-1 and then secure Antenna Coupler CU-760/WRT-1 to the deck or bulkhead.

Step 4. Attach one end of the grounding strap, supplied with each equipment, to the ground stud shown in figure 2-1 and 2-2. Connect the other end of the strap to a clean unpainted portion of the superstructure.

(*a*) After Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 are installed, each equipment must be pressurized. For this purpose the following equipment and materials are required: One (1) bottle No. 3 of pre-purified nitrogen (or equivalent), a single stage regulator (No. 10 for use with pre-purified nitrogen), and 30 feet of number 9587 air hose ¼-inch inside diameter and ⅝-inch outside diameter (Shrader and Son, Brooklyn 17, N. Y.). The hose must be fitted with a Shrader No.

5495 air chuck (for ¼-inch inside-diameter hose) on one end and a Shrader No. 7643 female coupling on the other end. After obtaining these materials, refer to figure 2-4 and proceed in the following manner:

Step 1. Check Radio Frequency Tuner TN-345/WRT-1 and make sure there are no loose connections, nuts, bolts, etc.

Step 2. Refer to figure 2-4, and open relief valve MP3341.

Step 3. Attach the regulator to the nitrogen bottle and adjust it to 25 psi.

Step 4. Connect the female coupling, attached to No. 9587 hose, to the regulator coupling.

Step 5. Refer to figure 2-4 and connect air chuck (attached to the other end of No. 9587 hose) to pressurizing Valve MP3342.

Step 6. Flush Radio Frequency Tuner TN-345/WRT-1 for 30 seconds at 25 psi. (This step purges the tuner of air.)

Step 7. Remove the air chuck from pressurizing valve MP3342.

Step 8. Close relief valve MP3341.

Step 9. Reconnect the air chuck to pressurizing valve MP3342.

Step 10. Observe the pressure reading on pressure gauge M3301.

Step 11. When pressure gauge M3301 indicates 25 psi, remove the air chuck from the pressurizing valve.

Step 12. Release nitrogen through relief valve MP3341 until pressure gauge M3301 indicates 20 psi.

Step 13. Close relief valve MP3341.

Step 14. Check Radio Frequency Tuner TN-345/WRT-1 for leakage by observing pressure gauge M3301. If leakage is noted, inform maintenance personnel.

Step 15. Check Antenna Coupler CU-760/WRT-1 and make sure there are no loose connections, nuts, bolts, etc.

Step 16. Refer to figure 2-5 and open relief valve MP3501.

Step 17. Attach the regulator to the nitrogen bottle and adjust it to 25 psi.

Step 18. Connect the female coupling, attached to No. 9587 hose to the regulator coupling.

Step 19. Refer to figure 2-5 and connect the air chuck (attached to the other end of No. 9587 hose) to pressurizing valve MP3502.

Step 20. Flush Antenna Coupler CU-760/WRT-1 for 30 seconds at 25 psi. (This step purges the coupler of air.)

Step 21. Remove the air chuck from pressurizing valve MP3502.

Step 22. Close relief valve MP3501.

Step 23. Reconnect the air chuck to pressurizing valve MP3502.

Step 24. Observe the pressure reading on pressure gauge M3501.

Step 25. When pressure gauge M3501 indicates 25 psi; remove the air chuck from the pressurizing valve.

Step 26. Release nitrogen through relief valve MP3501 until pressure gauge M3501 indicates 20 psi.

Step 27. Close relief valve MP3501.

Step 28. Check Antenna Coupler CU-760/WRT-1 for leakage by observing pressure gauge M3501. If leakage is noted inform maintenance personnel.

CAUTION

BEFORE MAKING INTERCONNECTIONS, MAKE SURE THAT EMERGENCY STOP SWITCH S201 ON THE FRONT PANEL OF POWER SUPPLY PP-2222/WRT IS IN ITS OFF POSITION.

d. INTERCONNECTION.

(1) Figure 2-10 at the end of this section is an interconnection diagram showing the cables which connect Transmitter Group OA-2321/WRT-1 to the units that work in conjunction with this equipment.

(2) Cable clamps should be used at all locations where there is undue strain on the connections. Interconnecting cables should be enclosed in a conduit whenever practical. Reference should be made to the Electronic Installation Practices Manual, NAVSHIPS 900171, chapter 9 for general interconnection instructions. After cable connector and the multi-conductor cables have been fabricated as directed in paragraph 2-4b in this section, refer to the interconnection diagram, figure 2-10, and proceed in the following manner:

Step 1. Refer to figure 2-3 and reconnect terminal boards TB101A and TB101B to the junction box.

Step 2. Refer to figure 2-8 and attach the fanning strip portion of the incoming cable to the corresponding terminals on TB101A and TB101B.

Step 3. Connect the three power supply leads to TB102.

Step 4. Refer to the wiring diagram of Electrical Equipment Cabinet CY-2607/WRT-1, figure 6-34, and check to see if all wires and cables between all drawers (excluding the top and bottom drawer) are reconnected.

Step 5. Attach Power Supply PP-2222/WRT to its sliding tracks in Electrical Equipment Cabinet CY-2607/WRT-1 and reconnect all wires. Also reinstall Radio Frequency Amplifier AM-2197/WRT-1 and remove the block, which has been installed at the factory, to protect the vacuum capacitor during shipment.

Step 6. Reconnect all wiring to the chassis and push the drawer back into the cabinet.

Step 7. Attach the junction box to Electrical Equipment Cabinet CY-2607/WRT-1, and reconnect all internal wiring to the terminal junction box.

Step 8. Connect the interconnecting cable plugs P101, P102, P103, and P104 to the respective jacks. These jacks are located at the rear of Electrical Equipment Cabinet CY-2607/WRT-1 just above the junction box as shown in figure 2-9.

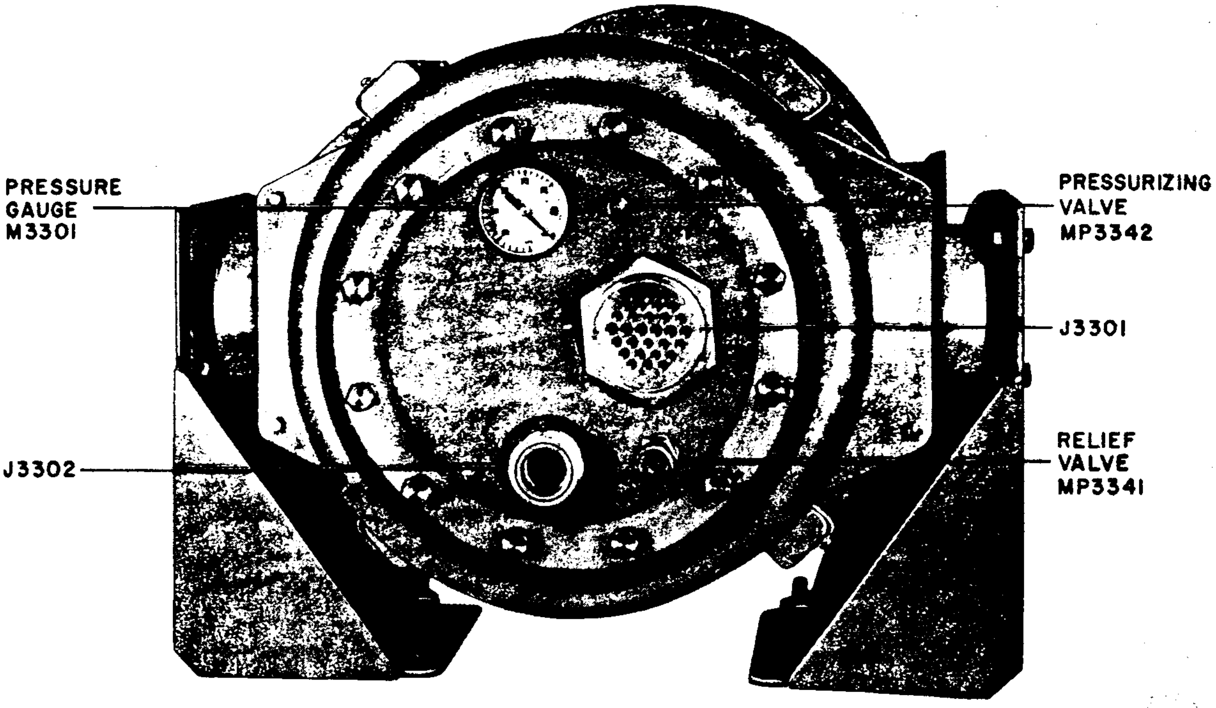


Figure 2-4. Radio Frequency Tuner TN-345/WRT-1, Pressurizing Adjustments

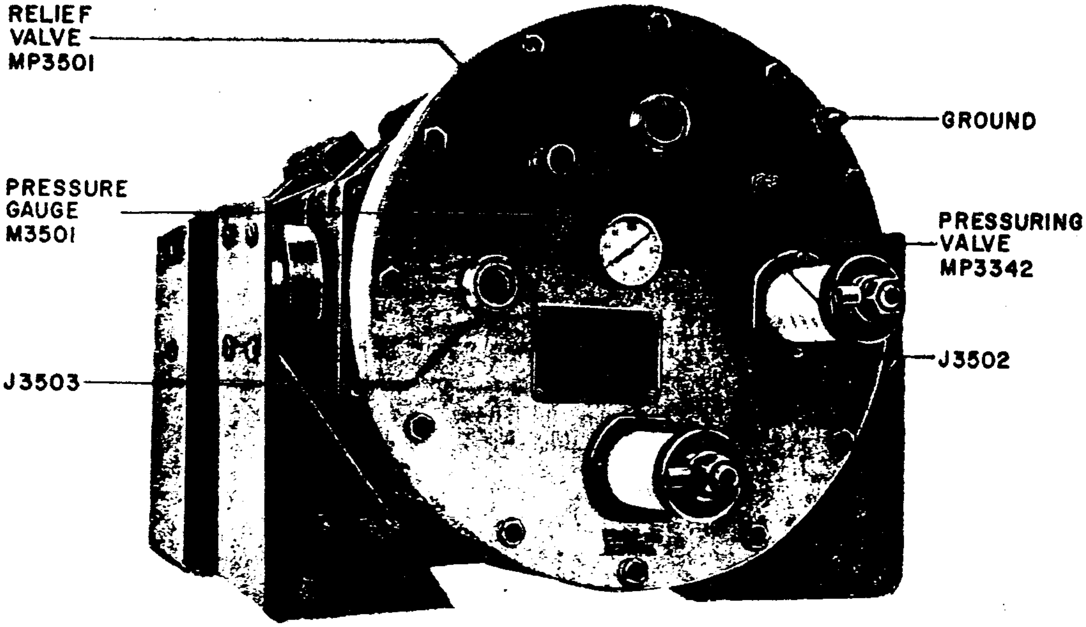


Figure 2-5. Antenna Coupler CU-760/WRT-1, Pressurizing Adjustments

2-5. INSPECTION AND ADJUSTMENTS.

a. GENERAL INSPECTION. — Before inspecting the equipment of Radio Transmitting Set AN/WRT-1 make sure that EMERGENCY STOP switch on the front panel of Power Supply PP-2222/WRT is in the OFF position. Then make a visual inspection of all the units of Radio Transmitting Set AN/WRT-1 as follows:

Step 1. Inspect all incoming and outgoing lines for proper terminal placement and secure conditions.

Step 2. Examine all terminal boards for signs of solder or other foreign material that could cause shorts.

Step 3. Check cables and make sure they are in their proper receptacles.

Step 4. Examine all external switches and controls for signs of damage. Make sure all indicating meters and controls have no broken glass covers or any other signs of damage.

Step 5. Check all indicator lamps and make sure they are intact.

Step 6. Check all tubes for signs of damage, for proper location, and for secure seating in the sockets.

Step 7. Open each drawer to its full length of travel and then close it. There must be no undue binding or sticking.

Step 8. Close all five drawers and secure them.

b. LINE FUSES AND PRIMARY POWER TERMINATIONS. — Radio Transmitting Set AN/WRT-1 may be operated from either a 115-volt, a 220-volt or a 440-volt, 3-phase, 60 cps power supply. Primary power connections and line fuses must therefore be adjusted accordingly. To perform the adjustments proceed as follows:

Step 1. Pull out Amplifier-Power Supply AM-2198/WRT-1 (fourth drawer from top).

Step 2. On the front panel of the drawer observe the current values for fuses F501, 115v-5A; F502, 115v-3A; F503, 115v-5A; F504, 24v-4A and F505, 12v-2A.

Step 3. Check to make sure that the value of the fuses corresponds to the values noted in step 2. If fuses are missing select from the set of fuses supplied with the equipment, five fuses with the values noted in step 2 and proceed with step 4.

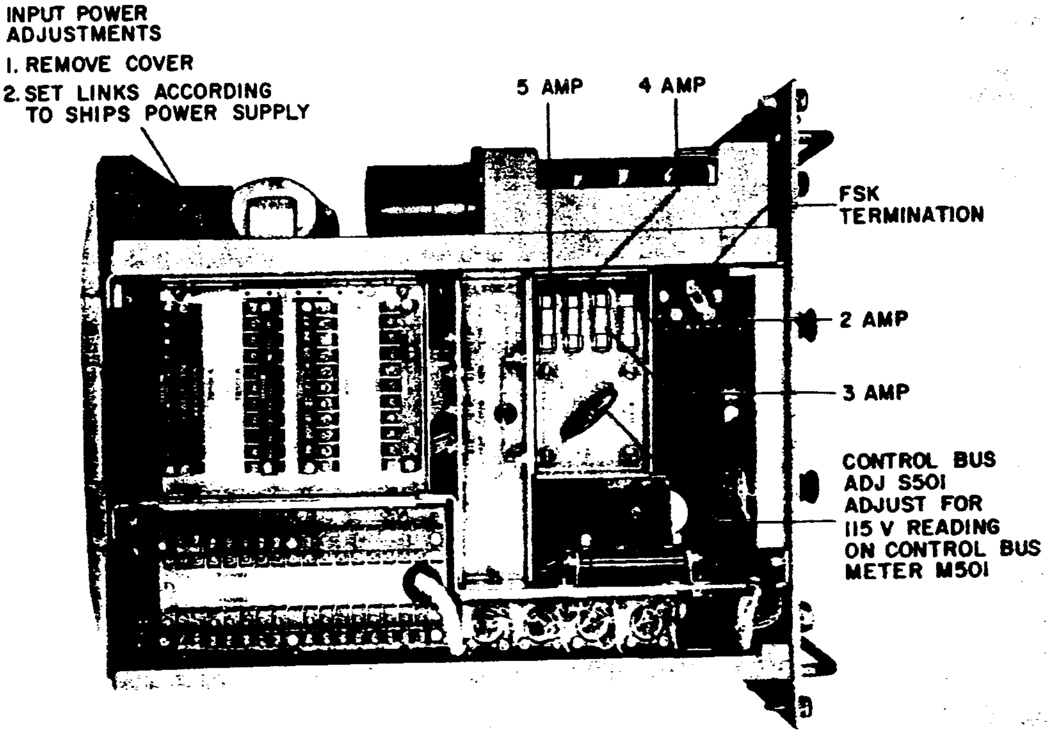
Step 4. Insert the five fuses in the proper fuse holders on the back of the front panel according to the values shown on the front panel.

Step 5. Refer to figure 2-6 and from the fuses supplied with the equipment insert the four spare fuses according to the values stamped next to each fuse clip on top of Amplifier-Power Supply AM-2198/WRT-1.

Step 6. Determine the ship's supply voltage.

Step 7. Refer to figure 2-6 and on the righthand side of the drawer locate the cover board stamped CAUTION 440 VAC INPUT POWER ADJUSTMENTS.

Step 8. Remove the top board by loosening the two screws and expose terminal board E506.



Figur 2-6. Amplifier-Power Supply AM-2198/WRT-1, Electrical Adjustments and Spare Fuse Locations

Step 9. On E506 connect the link in the manner indicated by the voltage stenciled between the terminals and according to the particular supply voltage.

Step 10. Replace the cover board and tighten the screws.

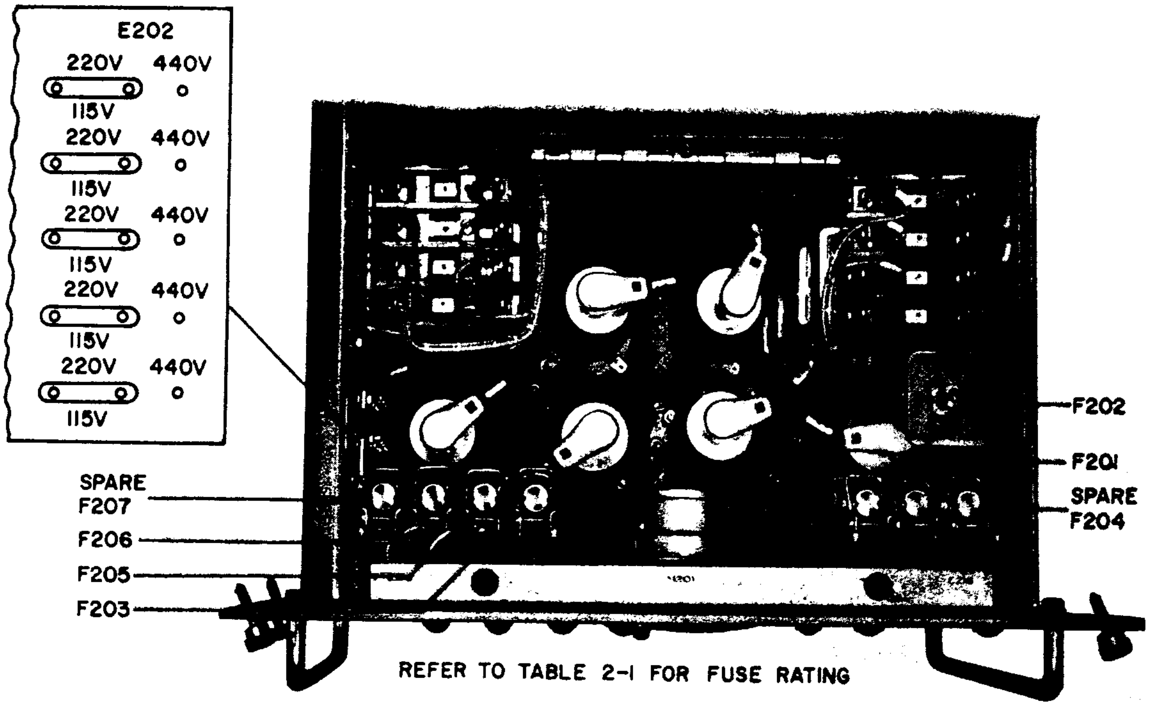
Step 11. Push the drawer back into the cabinet.

Step 12. Pull out Power Supply PP-2222/WRT.

Step 13. Refer to Table 2-1 and figure 2-7 and determine the fuse rating for fuses F201, F202, F203, F205 and F206, as dictated by the ship's supply voltage.

TABLE 2-1. FUSE CURRENT RATING VERSUS LINE VOLTAGE

FUSE SYMBOL	LINE VOLTAGE		
	115 V	220 V	440 V
F201	12 A	6 A	3 A
F202	12 A	6 A	3 A
F203	12 A	6 A	3 A
F205	20 A	10 A	5 A
F206	20 A	10 A	5 A



REFER TO TABLE 2-I FOR FUSE RATING

Figure 2-7. Power Supply PP-2222/WRT, Power Input Adjustments and Fuse Locations

Step 14. From the set of fuses supplied with the equipment select the seven line fuses (five active and two spares) of the rating deetrmined from Table 2-1.

Step 15. Insert the seven fuses in the proper fuse clips located on the back of the front panel of Power Supply PP-2222/WRT as shown in figure 2-7.

Note

> The fuse warning indicating lamp circuit must also be set according to the ship's supply voltage. The adjustment for the indicating lamp circuit is located on board E202. E202 is mounted on the left side of Power Supply PP-2222/WRT near the front of the drawer as shown in figure 2-7.

Step 16. Refer to figure 2-7 and locate the link connections on board E202 according to the ship's supply.

Step 17. Refer to figure 2-7 and locate interconnection board E201 on top of Power Supply PP-2222/WRT toward the rear of the drawer.

Step 18. Connect the links on E201 as shown in figures 2-8, 5-29, and 6-31 according to the voltage supplied. Link positions are stenciled on the board for each of the three possible supply voltages.

Step 19. Push the drawer containing Power Supply PP-2222/WRT back into the cabinet to its extreme limit of travel.

c. OPERATIONAL TESTS AND ADJUSTMENTS. —After performing all steps described in paragraph 2-4, 2-5*a*, and 2-5*b*, certain operational tests and adjustments must be performed before the equipment is turned over to the operating personnel. These tests and adjustments, described in the following paragraphs, must also be performed after the equipment has been repaired or has been out of service for an extended period of time. If the performance of Radio Transmitting Set AN/WRT-1 is other than that described in the following paragraphs maintenance personnel should be informed.

Step 1. Refer to figures 3-1 through 3-5 and set the controls on the front panels of Radio Transmitting Set AN/WRT-1 as listed in Table 2-2.

Step 2. Energize the three-phase line to Radio Transmitting Set AN/WRT-1.

Step 3. On Power Supply PP-2222/WRT place EMERGENCY STOP switch S201 in the ON position.

Step 4. Observe OVEN HEATERS lamp DS301 located on the front panel of Radio Frequency Oscillator 0-621/WRT-1 and OVEN HEATERS lamp DS601 located on the front panel of Electrical Frequency Control C-2861/WRT-1. Both lamps should be glowing.

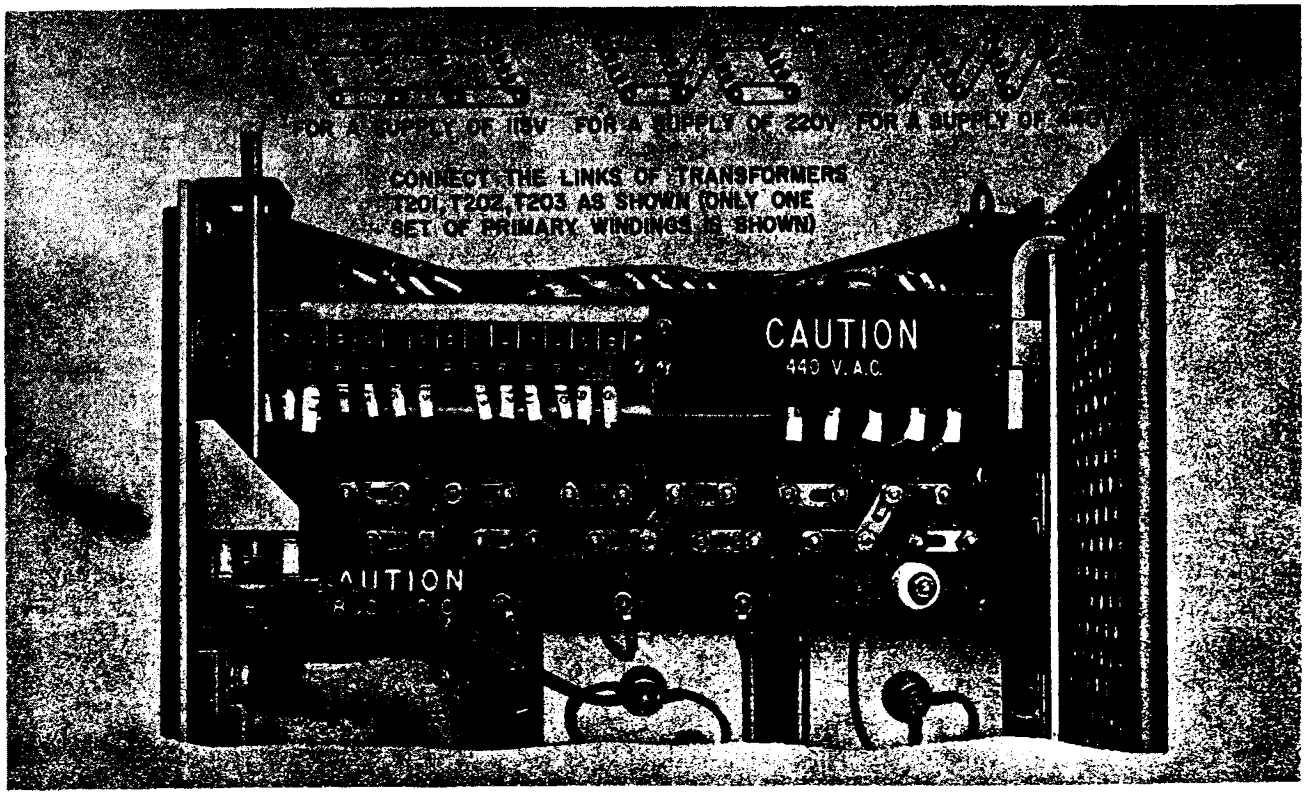


Figure 2-8. Power Supply PP-2222/WRT, Power Input Connections

TABLE 2-2. OPERATIONAL TESTS CONTROL SETTINGS

CONTROL NAME	SYMBOL	CONTROL LOCATION	CONTROL POSITION
EMERGENCY STOP	S201	Power Supply PP-2222/WRT	OFF
FILAMENT POWER	S502	Amplifier-Power Supply AM-2198/WRT-1	OFF
POWER SELECTOR	S510		ADJ
EMISSION SELECTOR	S508		CW
REMOTE-LOCAL	S507		LOCAL
6 WIRE REMOTE-2 WIRE REMOTE	S509		6 WIRE
OVEN	S604	Electrical Frequency-Control C-2861/WRT-1 (inside rear)	ON
OVEN HEAT	S304	Radio Frequency Oscillator O-621/WRT-1 (inside rear)	ON
FSK TEST	S308	Radio Frequency Oscillator O-621/WRT-1	LINE
CARRIER TEST KEY	S811	Radio Frequency Amplifier AM-2197/WRT-1	OFF
TUNER CONTROL	S806		TUNER IN

Step 5. On the front panel of Amplifier-Power Supply AM-2198/WRT-1 place FILAMENT POWER switch S502 in the ON position. FILAMENT POWER ON indicator lamp DS502 should be glowing.

Step 6. Check the operation of the interlock switches for each of the five drawers by withdrawing and closing each drawer. As each drawer is withdrawn, DOOR INT indicating lamp DS501, on the front panel of Amplifier-Power Supply AM-2198/WRT, should cease to glow. However, when the drawer is pushed back into Electrical Equipment Cabinet CY-2607/WRT-1, DOOR INT indicating lamp DS501 should glow. Also check the operation of the interlock switches manually by pulling the interlock actuating bolt to the test (pulled out) position. Observe DOOR INT indicating lamp DS501. DS501 should be glowing while the actuating bolt is in test position.

Step 7. On the front panel of Amplifier-Power Supply AM-2198/WRT-1 observe CONTROL BUS meter M501. The meter should indicate 115 volts. If meter M501 indicates more or less than 115 volts, proceed to step 8. If the meter indicates 115 volts omit steps 8, 9, 10 and 11.

Step 8. Pull out the drawer containing Amplifier-Power Supply AM-2198/WRT-1 and place the interlock actuating bolt in the test (pulled out) position.

Step 9. On top of the drawer locate CONTROL BUS switch S501. (See figure 2-7.)

Step 10. If meter M501 indicates more than 115 volts, place switch S501 in the next lower position until meter M501 indicates 115 volts. If M501 indicates less than 115 volts, place switch S501 in the next higher position until M501 indicates 115 volts or the nearest indication to 115 volts.

Step 11. Push the drawer containing Amplifier-Power Supply AM-2198/WRT-1 back into the cabinet.

Step 12. Check the settings of +350 V OL ADJ potentiometer R502 and that of −350 V OL ADJ potentiometer R504 as outlined in paragraph 6-2*c*(4) in section 6 of this manual.

Step 13. Check the setting of +250 V DC ADJ potentiometer R332 as outlined in paragraph 6-2*c* in section 6 of this manual.

Step 14. Refer to paragraph 6-2*b* in section 6 of this manual, and check the adjustment of HV RECT OVERLOAD ADJ potentiometer R218.

Step 15. Refer to paragraph 6-2*f*(3) in section 6 of this manual and check the adjustment of PA OVLD potentiometer R840.

Step 16. Check the settings of SWR OVLD ADJ B potentiometer R895 and SWR OVLD ADJ A potentiometer R909 as outlined in paragraph 6-2*f*(6) in section 6 of this manual. During the checks in steps 14, 15, and 16 observe that HV OVERLOAD indicator DS208 and HV OVERLOAD PUSH TO RESET Indicator DS801 glow when any circuit is tripped. Also check to verify that HV OVERLOAD PUSH TO RESET switch S812, L. V. RECT OVLD RESET switch S505, and OVERLOAD RESET switch S203, reset the circuit and extinguish the overload indicators.

Step 17. On Radio Frequency Amplifier AM-2197/WRT-1 disconnect P182 from J802 and attach tee-adapter UG-566/U to J802. Connect Electrical Dummy Load DA-91/U (or equivalent) to the other end of the tee-adapter using a 10-foot length of RG-8/U coaxial cable.

Step 18. Refer to Section 3 (Operators Section) and tune Transmitter Group OA-2321/WRT-1 for CW emission at an output frequency of 300 kc.

Step 19. Place POWER SELECTOR switch S510 on Amplifier-Power Supply AM-2198/WRT-1 in the 500 W position.

Step 20. Place TEST VOLTMETER switch S807 in the SCREEN SUPPLY (600V) position. TEST VOLTMETER M804 should indicate 315 to 385 volts.

Step 21. Place TEST VOLTMETER switch S807 in the PLATE SUPPLY (1.5KV) position. TEST VOLTMETER M804 should indicate 1200 to 1250 volts.

Step 22. Place TEST AMMETER switch S808 in the TOTAL P.A. GRIDS (20MA) position. TEST AMMETER M805 should indicate zero.

Step 23. Place TEST AMMETER switch S808 in the DRIVER CATHODE (200 MA) position. TEST AMMETER M805 should indicate approximateely 120-140 ma.

Step 24. Place TEST AMMETER switch S808 in the *2nd* IA CATHODE position. TEST AMMETER M805 should indicate 35 ma.

Step 25. Place P.A. CATHODE CURRENTS switch S807 first in the 1, then in the 2, and 3, and the 4 position. In each position P.A. CATHODE CURRENTS meter M806 should indicate 180 to 220 ma.

Step 26. Place P.A. CATHODE CURRENTS switch S809 in the TOTAL position.

Step 27. Adjust DRIVE ADJUST potentiometer R812 until P.A. CATHODE CURRENTS meter M806 indicates between 750 and 820 ma.

Step 28. Place POWER SELECTOR switch S510 on Amplifier Power Supply AM-2197/WRT-1 in the 100 W position.

Step 29. Place TEST VOLTMETER switch in the GRID BIAS (60 V) position.

Step 30. TEST VOLTMETER M804 should indicate −50V.

Step 31. Place TEST VOLTMETER switch S807 in the PLATE SUPPLY (1.5 KV) position. TEST VOLTMETER M804 should indicate ~~550~~ 1200 to ~~650~~ 1425 volts. ELB 608

Step 32. Place TEST AMMETER switch S808 in the TOTAL P.A. GRIDS position. TEST AMMETER M805 should indicate zero.

Step 33. Place TEST AMMETER switch S808 in the DRIVER CATHODE (200) position. TEST AMMETER M805 should indicate 120 to 140 ma.

Step 34. Place TEST AMMETER switch S808 in the 2nd IA CATHODE position. TEST AMMETER M805 should indicate 30 to 40 ma.

Step 35. Place P.A. CATHODE CURRENTS switch S809 first in the 1 then in the 2, 3, and 4 positions. In each position P.A. CATHODE CURRENTS meter M806 should indicate between 110 and 150 ma.

Step 36. Place P.A. CATHODE CURRENTS switch S809 in the TOTAL position.

Step 37. CATHODE CURRENTS meter M806 should indicate between 450 and 550 ma.

Step 38. Repeat steps 19 through 37 with an output frequency of 500 kc.

Step 39. Repeat steps 19 through 37 with an output frequency of 1000 kc.

Step 40. Repeat steps 19 through 37 with an output frequency of 1500 kc.

Step 41. Refer to section 3 of this manual and tune Radio Transmitting Set AN/WRT-1 for an output frequency of 300 kc.

Step 42. Place EMISSION SELECTOR switch S508 in the FSK position.

Step 43. Set SHIFT (E) control R461 to 850 cycles.

Step 44. Place FSK TEST switch S308 in the SPACE position.

Step 45. Place POWER SELECTOR S510 control in the 500 W position.

Step 46. Adjust DRIVE ADJUST control R812 for a reading of 500 watts on R-F OUTPUT METER M803.

Step 47. Repeat steps 20 through 40.

Step 48. Place FSK TEST switch in MARK position.

Step 49. Repeat steps 20 through 40.

Step 50. Place EMISSION SELECTOR switch in AM position.

Step 51. Tune the transmitter for an output frequency of 300 kc at 500 watts.

Step 52. Connect Audio Oscillator Equipment, Navy Model LAJ Series or equivalent between terminals 9 and 10 on TB101 and insert a 1.5-volt rms, 1000 cycle signal.

Step 53. Place OUTPUT METER switch S814 in the R-F OUTPUT position and adjust DRIVE ADJUST control R812 for a reading of 187 watts on R-F OUTPUT meter M803 at approximately 100 per cent modulation as read on the R-F OUTPUT meter M803 when OUTPUT METER switch is in the %MOD position.

Step 54. Repeat steps 20 through 27, except that in 100-watt operation power should be adjusted for 37 watts at 100 percent modulation.

Step 55. Refer to section 3 of this manual and tune the transmitter for an output frequency of 700 kc with EMISSION SELECTOR switch in the CW position.

Step 56. On Radio Frequency Oscillator O-621/WRT-1 place WAVE SHAPING switch S450 in the 400 WPM position.

Step 57. Connect Keying Simulator, Boechme Vari-Speed Keyer, Type 66-M or equivalent to terminals 5 and 6 on TB101.

Step 58. Place the probe of Oscilloscope TS-239A/UP series (or equivalent) to the open end of the tee-adapter connected to J802 in step 17.

Step 59. Key the transmitter first at 15 wpm and then at 40 wpm and in each case observe the waveform on the oscilloscope. The waveform should be as shown at "A" in figure 5-34 at J802.

Step 60. Place EMISSION SELECTOR switch S508 in the MACH CW position.

Step 61. Place WAVE SHAPING switch in the 200 WPM position.

Step 62. Connect a mechanical keyer, capable of supplying 0-45V, between terminals 18 and 19 on TB101.

Step 63. Key the transmitter at 200 WPM and observe on oscilloscope TS-239A/UP. The waveform should be as shown on "B" in figure 5-34 at J802.

Step 64. Repeat step 63 with the WAVESHAPING switch in the 400 WPM position and the transmitter keyed at 400 WPM. Waveform should be the same as in step 63, except that TR equals 100-2000 microseconds and TD equals 100-2000 microseconds.

Step 65. Refer to section 3 and tune transmitter for CW emission with an output frequency of 700 kc.

Step 66. Connect a keyed signal with an output of 0 to 45 volts peak to TB106-16 and 17.

Step 67. Place WAVESHAPING switch S540 in the FSK position.

Step 68. Set SHIFT Control Ⓔ to zero cycles.

Step 69. Place FSK TEST switch S308 in the LINE position.

Step 70. Connect Frequency Meter AN/TSM-9 at J802 and record output frequency under CW emission.

Step 71. Place EMISSION SELECTOR switch in the FSK position.

Step 72. Record frequency registered by Frequency Meter AN/TSM-9. It should be within ±5 cycles of the CW frequency.

Step 73. Place FSK TEST switch S308 first in the MARK and then in the SPACE position. In each case the frequency registered by Frequency Meter AN/TSM-9 should be within ±5 cycles of the CW frequency.

Step 74. Rotate SHIFT control Ⓔ (R461) to 850 cycles.

Step 75. Place FSK TEST switch in the SPACE position and record frequency registered by Frequency Meter AN/TSM-9. The frequency should now be between 382 cycles and 468 cycles below that measured in step 73.

Step 76. Place FSK TEST switch in the MARK position and record the frequency. The frequency should now be between 382 and 468 cycles above the frequency recorded in step 73.

Step 77. Repeat steps 75 and 76 with SHIFT control Ⓔ set at 200 cycles. Frequency meter AN/TSM-9 should register between 90 and 110 cycles below the frequency recorded in step 73, when FSK TEST switch is in SPACE position, and between 90 to 110 cycles above the frequency recorded in step 73 when FSK TEST switch is in the MARK position.

Step 78. Disconnect Electrical Dummy Load DA-91/U connected in step 17, Oscilloscope TS-239A/UP connected in step 58, and all other test equipment.

Step 79. Remove tee-adapter UG-566/U from J802 and reconnect P182 to J802.

Step 80. Push all the drawers into the cabinet and tighten fasteners on each drawer.

d. INTERFERENCE REDUCTION. — Transmitter Group OA-2321/WRT-1 has been completely shielded, both externally and internally. If the installation of Radio Transmitting Set AN/WRT-1 is completed according to instruction, no objectionable interference should be evident in the equipment. Noise interferance may be encountered from a poor coaxial cable connection. To reduce noise interference, check all coaxial connections and tighten any other poor connection.

2-6. PREPARATION FOR RESHIPMENT.

a. DISASSEMBLY. — If Radio Transmitting Set AN/WRT-1 is to be shipped to another location disassemble the equipment by reversing the installation instructions.

b. PACKING. — When Radio Transmitting Set AN/WRT-1 is to be packed for reshipment it should be packed in accordance with the procedure used for shipment of delicate electronic equipment. In the event a qualified packaging and packing facility is not available, the following steps should be taken:

(1) Secure the equipment firmly to prevent movement during shipping.

(2) Wrap each unit with waterproof paper and secure the edges of the paper with waterproof tape.

(3) Cushion all projections.

(4) Set the units in a properly dimensioned box.

(5) Use corrugated board where necessary to prevent movement or chafing.

(6) Crate and secure the box.

(7) Secure the crate with strap-iron bands in accordance with good shipping practice.

(8) Mark the box and crate indicating top, bottom, and face.

SECTION 3

OPERATOR'S SECTION

3-1. FUNCTIONAL OPERATION.

a. Radio Transmitting Set AN/WRT-1 is a communication equipment designed for installation aboard surface vessels. The equipment consists of Transmitter Group OA-2321/WRT-1, Mounting MT-2170/WRT, Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1. Transmitter Group OA-2321/WRT-1 consists of the following units: Electrical Equipment Cabinet CY-2607/WRT-1, Power Supply PP-2222/WRT, Amplifier-Power Supply AM-2198/WRT-1, Radio Frequency Oscillator O-621/WRT-1, Electrical Frequency Control C-2861/WRT-1 and Radio Frequency Amplifier AM-2197/WRT-1. The latter five units are drawer type chassis. Transmitter Group OA-2321/WRT-1 can be operated at nominal peak power levels of either 100 or 500 watts and is continuously tunable over the frequency range of 300 to 1500 kc and has the following emission capabilities; telephone, FSK(neutral) teletype at 60 wpm, and machine telegraphy at 600 wpm.

b. Transmitter Group OA-2321/WRT-1, controls Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1, which must be located at a point near the remote antenna. Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 are capable of satisfactory continuous operation when used in conjunction with a 35 foot Navy Type C-66047 antenna or with a single wire antenna and ground system having a length of between 60 and 130 feet and being at least 40 feet high.

c. Transmitter Group OA-2321/WRT-1 is designed to work also in conjunction with the following government furnished equipment.

(1) Antenna Control unit Navy Type C-1670/U
(2) Radiophone Unit 23500, or equivalent
(3) Telegraph Key 26012
(4) Handset (carbon) H-51/U

d. The operation of Radio Transmitting Set AN/WRT-1 is accomplished through the use of controls located on the front panels of the five drawer-type units of Transmitter Group OA-2321/WRT-1. The five drawers are mounted in Electrical Equipment Cabinet CY-2607/WRT-1 in the following order, from top to bottom: Radio Frequency Amplifier AM-2197/WRT-1, Radio Frequency Oscillator O-621/WRT-1, Electrical Frequency Control C-2861/WRT-1, Amplifier-Power Supply AM-2198/WRT-1 and Power Supply PP-2222/WRT. Routine operating adjustments may be made from the front panel controls, which are convenient to operating personnel.

e. Transmitter Group OA-2321/WRT-1 incorporates a stabilizer (Electrical Frequency Control C-2861/WRT-1) to hold a master oscillator precisely on frequency. When tuning the transmitter to the desired frequency the following important factors should be kept in mind: the master oscillator frequency must first be set up approximately, then the stabilizing frequency precisely tuned, and finally the master oscillator must be retuned slightly until the stabilizer locks up the frequency control system. The lock-up of the frequency control system is evidenced by the absence of hunting on the FREQUENCY ZERO ADJUST meter, located on the front panel of Radio Frequency Oscillator O-621/WRT-1, as the master oscillator is tuned through the lock-up range of Electrical Frequency Control C-2861/WRT-1.

3-2. OPERATING PROCEDURE.

a. DESCRIPTION OF CONTROLS.—The function of the controls and indicators used in the operation of Radio Transmitting Set AN/WRT-1 is described in the following paragraphs. The controls are classified according to the drawers on which they are located.

(1) POWER SUPPLY PP-2222/WRT.

(*a*) The Power Supply PP-2222/WRT controls and indicators are located on the front panel of this unit and are shown in figure 3-1.

1. EMERGENCY STOP. This switch functions as the master line switch for all primary power to Radio Transmitting Set AN/WRT-1.

2. OVERLOAD RESET. This pushbutton-type switch is one of the three OVERLOAD RESET switches of Transmitter Group OA-2321/WRT-1. The switch permits the operator to reset the high or low voltage overload protective circuits after an overload has occurred.

3. H.V. RECT LINE BLOWN FUSE IND F201, F202 and F203. These lamps function as blown fuse indicators for the three-phase lines that supply power to the high voltage transformers in Power Supply PP-2222/WRT.

4. L.V. RECT FIL LINE BLOWN FUSE IND F205 and F206. These lamps function as blown fuse indicators for the line that supplies all single-phase power to the various circuits in Radio Transmitting Set AN/WRT-1.

5. H.V. ON. This indicator lamp glows when the high voltage supply is delivering voltage.

6. H.V. OVERLOAD. This indicator lamp glows whenever the high voltage supply overload circuit is tripped by an unbalance in the power amplifier cathode currents, by an excessive SWR, or by a high voltage current overload.

7. OPERATING HOURS. This meter indicates the total number of hours that the transmitter has been in operation with plate voltage applied to the final amplifier stage.

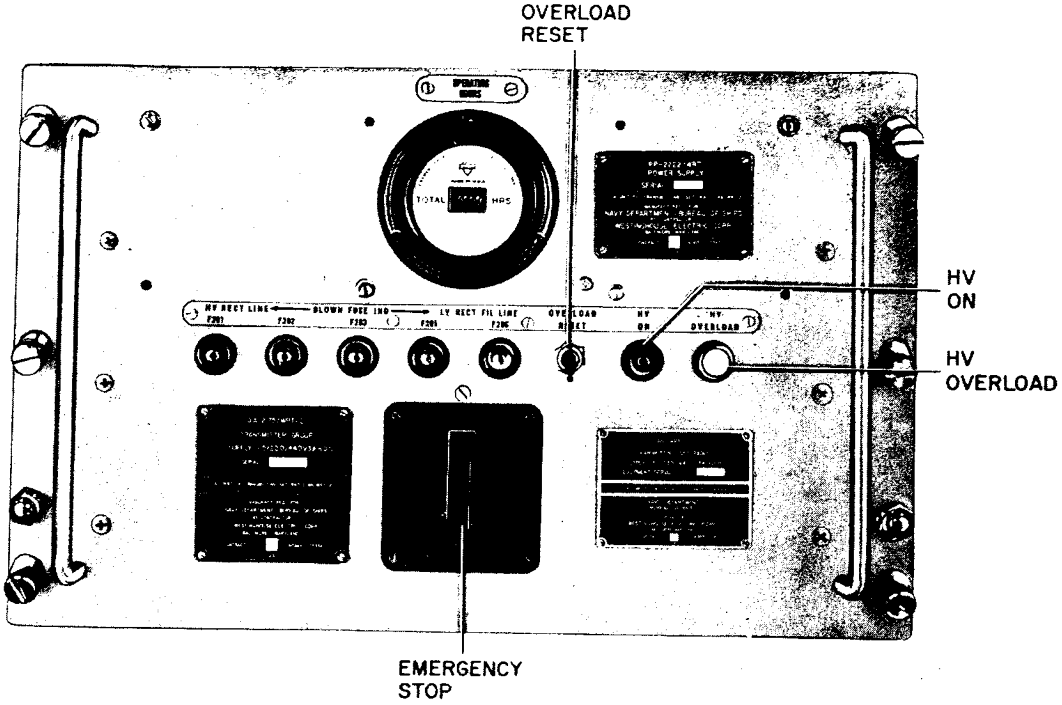


Figure 3-1. Power Supply PP-2222/WRT, Controls Location

(2) AMPLIFIER POWER SUPPLY AM-2198/WRT-1.

(*a*) The controls and indicators of Amplifier-Power Supply AM-2198/WRT-1 described in the following paragraphs are located on the front panel of this unit and are shown in figure 3-2.

1. PLATE POWER ON-OFF. These switches control the application of plate power to the transmitter circuits.

2. FILAMENT POWER ON-OFF. This switch controls the application of filament power to all tubes and is interlocked with a time delay circuit to prevent simultaneous application of plate and filament voltages.

3. POWER SELECTOR. This switch has four positions: ADJ, TUNE, 100 W and 500 W. The ADJ position is used when setting-up the transmitter on the assigned frequency. The TUNE position is used when tuning up the transmitter into a dummy load. The 100 W or 500 W position is used to select the plate voltage applied to the power amplifiers and thus, at the same time, select the transmitter output power desired.

4. EMISSION SELECTOR. This switch has four positions: MACH CW, FSK, CW and AM. On Amplifier-Power Supply AM-2198A/WRT-1, an additional MOD CW position is provided. The setting of this switch selects the appropriate signal and control paths for the selected type of emission.

5. LOCAL-REMOTE. This switch transfers the point of transmitter control to the remote radiophone unit when remote CW, FSK or telephone operation is required.

6. L.V. RECT OVLD RESET. This switch is one of three identical overload reset switches in the transmitter, which permit the operator to reset the high or low voltage overload protective circuits.

7. 6 WIRE REMOTE-2 WIRE REMOTE. This switch is used in conjunction with the LOCAL-REMOTE switch. The 6 WIRE REMOTE position provides for operation of the transmitter by remote radiophone unit. 2 WIRE REMOTE position provides for operation of the transmitter from a remote MCW or FSK position.

8. MODULATION LEVEL. This potentiometer controls the output level of the speech amplifier. Under normal operating conditions this control is set to produce 100 percent modulation.

9. SIDETONE LEVEL. This control serves as a master gain control for the sidetone signal to the local and to the remote handsets.

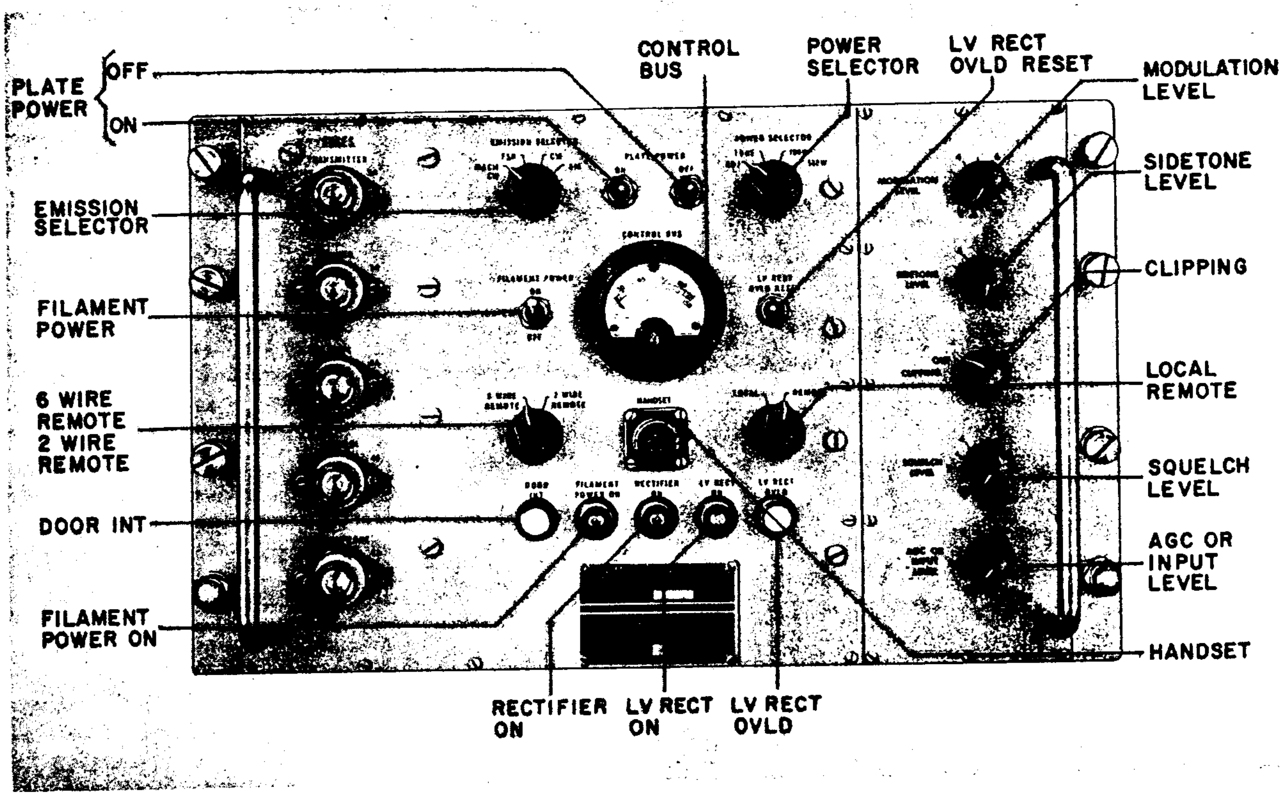


Figure 3-2. Amplifier-Power Supply AM-2198/WRT-1, Controls Location

10. CLIPPING. This switch when in the IN position serves to energize the speech clipping circuits in the speech amplifier. In the OUT position, the audio is not clipped.

11. SQUELCH LEVEL. This potentiometer controls the level at which the squelch circuits function.

12. AGC OR INPUT LEVEL. This control consists of a potentiometer and a switch. The potentiometer serves as an input level control for the speech amplifier. When the control is in the full clockwise position (AGC ON) the switch closes the automatic gain control circuit in the speech amplifier and the output level is automatically controlled.

13. HANDSET. This panel jack provides connections for a push-to-talk handset for phone operation at the transmitter cabinet.

14. CONTROL BUS. This meter indicates the 115-volt a-c input voltage to the filament and control circuits of Radio Transmitting Set AN/WRT-1.

15. DOOR INT. This indicator lamp lights when all five drawers and two tuner interlocks are closed.

16. FILAMENT POWER ON. This indicator lamp lights when FILAMENT POWER switch is placed in the ON position, to indicate the application of filament power.

17. RECTIFIER ON. This indicator lamp lights when PLATE POWER ON switch is pressed and indicates that the +350 V and −350 V power supplies are energized.

18. L.V. RECT OVLD. This indicator lamp lights when either the +350 volt or −350 volt power supplies are overloaded.

19. TRANSMITTER 115V 5A. This fuse is a 115V, 5 amp fuse which protects the 115 volt transmitter filament and control bus.

20. TUNER 115V 3A. This fuse is a 115V, 3 amp fuse which protects the 115V a c line to Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1.

21. OVEN 115V 5A. This fuse is a 115V, 5 amp fuse which protects the 115V a-c line to the oven heaters in Radio Frequency Oscillator O-621/WRT-1 and Electrical Frequency Control C-2861/WRT-1.

22. CONTROL 24V 4A. This fuse is a 24V, 4 amp fuse which protects the 24 volt d-c control bus.

23. RADIOPHONE 12V 2A. This fuse is a 12V 2A fuse which protects the 12 volt d-c microphone circuits.

(3) RADIO FREQUENCY OSCILLATOR O-621/WRT-1.

(*a*) The controls, and indicators of Radio Frequency Oscillator O-621/WRT-1, described in the following paragraphs, are located on the front panel of this unit, and are shown in figure 3-3.

1. TUNING Ⓒ. This control positions the two lefthand digits on the counter and simultaneously selects 100 kc range steps on the range selector switch (S301) in the master oscillator. The two digits change from 03 to 14 as the knob is rotated from fully counterclockwise to the extreme clockwise position.

2. TUNING Ⓓ This control positions the master oscillator tuning capacitor (C319) which varies the frequency between the 100 kc range steps selected by TUNING Ⓒ control. Simultaneously, the three righthand digits of the counter are positioned. The five digits on the counter read frequency directly, from 0300.0 kc to 1499.9 kc by manipulation of TUNING Ⓒ and TUNING Ⓓ controls. TUNING Ⓓ control is provided with a vernier adjustment, which ranges between +500 cps and −500 cps each. The correct frequency is read when the vernier reading is added or subtracted from the counter indication.

3. WAVESHAPING. This four-position switch is used to decrease the rise time of the keying pulses. The setting is dictated by the type of operation as indicated on the front panel.

4. PHASE MODULATION. This control, when in the ON position, applies phase modulation to the carrier during FSK operation to minimize signal fading.

5. OVEN HEATERS. This indicator lamp, when glowing, indicates application of power to the oven heaters.

6. FSK TEST. This three position switch is used to connect the FSK line to the transmitter, when placed in its LINE position and to simulate a mark or space input when placed in MARK or SPACE positions.

7. AUDIO OUT FREQ. METER. If frequency monitoring equipment (GFM) is connected to the terminal board at the rear of the cabinet the audio beat note from the monitoring equipment will be available at this front panel jack.

8. DEVIATION CALIBRATE. This control is used to vary the FSK input to the master oscillator and thereby minimize the transient indications on DEVIATION CALIBRATE ZERO ADJUST meter, located on the front panel of Electrical Frequency Control C-2861/WRT-1. This adjustment ensures equal frequency shifts in the master oscillator and interpolation oscillator when frequency shift keying is used.

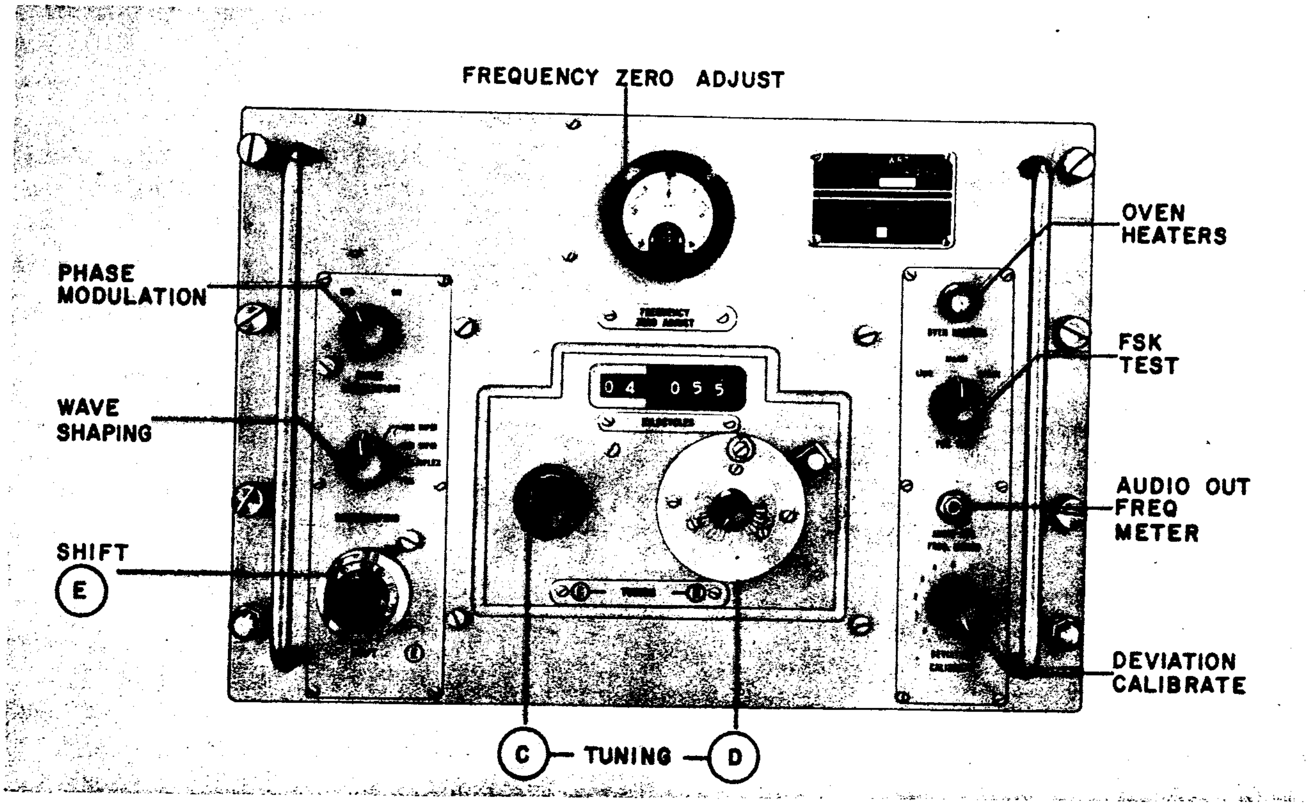


Figure 3-3. Radio Frequency Oscillator O-621/WRT-1, Controls Location

9. FREQUENCY ZERO ADJUST. This meter is used to zero the oscillator tuning after the last 100 kc portion of the assigned operating frequency is set on the front panel of Electrical Frequency Control C-2861/WRT-1.

(4) ELECTRICAL FREQUENCY CONTROL C-2861/WRT-1.

(*a*) The controls and indicators of Electrical Frequency Control C-2861/WRT-1, described in the following paragraphs, are located on the front panel of this unit and are shown in figure 3-4.

1. TUNING Ⓐ. This control rotates the range selector switch (S601) in the interpolation oscillator to select 10 kc range steps and simultaneously positions the lefthand digit that appears on the front panel counters. The lefthand digit on the lower counter changes from arabic numeral 1 through 4 as the knob is rotated clockwise. Further clockwise rotation activates shutters which cover up the lower counter and uncover the top counter on which the lefthand digit changes from 5 through 9.

2. TUNING Ⓑ. This control positions the interpolation oscilator tuning capacitor (C662) which varies the oscillator frequency between the 10 kc range steps selected by TUNING Ⓐ control. Simultaneously, the three righthand digits on the uncovered counter are positioned. The four counter digits indicate frequency directly from 00.01 to 99.99 kc by manipulating the TUNING Ⓐ and Ⓑ controls. TUNING Ⓑ control is provided with a vernier adjustment which ranges between +50 cps and −50 cps. This range is divided into 10 divisions of 5 cps each. The correct frequency is read when the vernier reading is added or subtracted from the counter indication.

3. DEVIATION CALIBRATE ZERO ADJUST. This meter detects the transient output of the phase detector initiated by momentary differences between the interpolation oscillator frequency and the intermediate frequency. In FSK operation, the meter indication may be only minimized by varying DEVIATION CALIBRATE control, on the front panel of Radio Frequency Oscillator O-621/WRT-1.

4. OVEN HEATERS. This indicator lamp, when glowing, indicates application of power to the oven heaters.

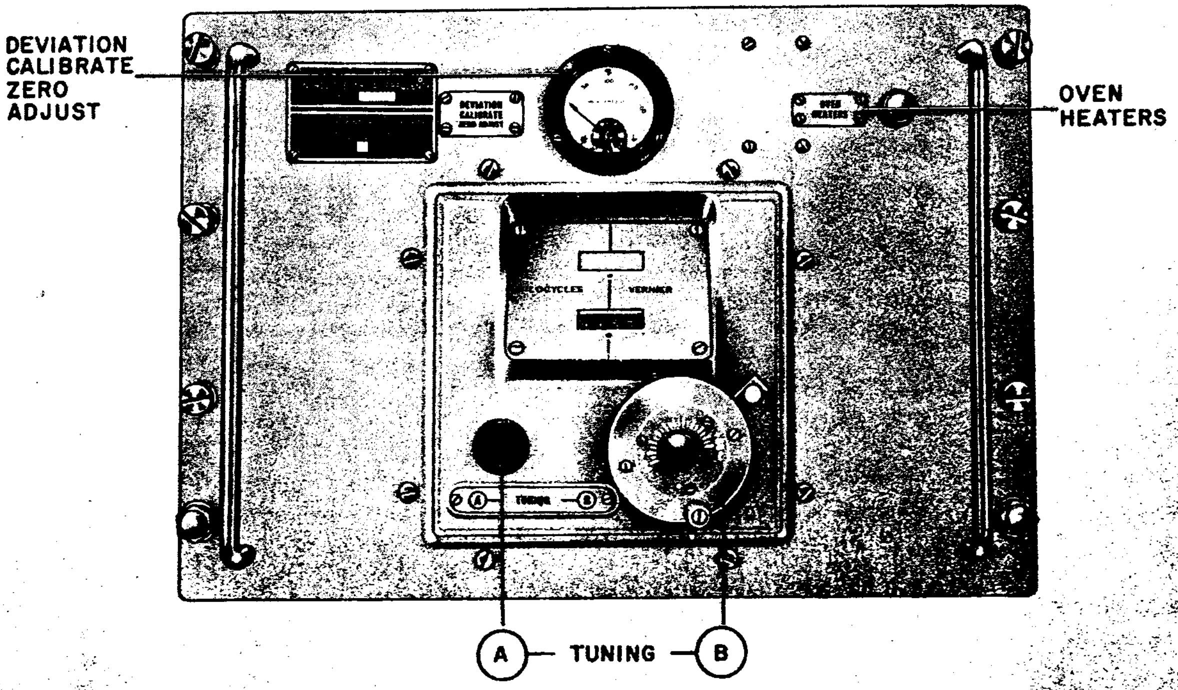


Figure 3-4. Electrical Frequency Control C-2861/WRT-1, Controls Location

(5) RADIO FREQUENCY AMPLIFIER AM-2197/WRT-1.

(*a*) The controls and indicators of Radio Frequency Amplifier AM-2197/WRT-1, described in the following paragraphs, are located on the front panel of this unit and are shown in figure 3-5.

1. TUNING Ⓕ. This control is used to tune the plate tank circuit of the power amplifier to resonance, at the assigned operating frequency, as indicated on the dial above the control knob. The control also maintains a relatively constant degree of coupling as determined by the COUPLING Ⓖ control, for any frequency in the band.

2. COUPLING Ⓖ. This control is used to vary the amount of r-f energy coupled from the power amplifier plate tank circuit into the antenna and simultaneously maintain tank circuit resonance.

3. TEST VOLTMETER. This meter indicates the various supply voltages to the power amplifier tubes as selected by the TEST VOLTMETER switch.

4. TEST VOLTMETER. This three position selector switch enables measurement of the power amplifier GRID BIAS (60V), SCREEN SUPPLY (600V) and PLATE SUPPLY (1.5 KV) voltages.

5. TEST AMMETER. This meter indicates the cathode current of the driver and *2nd* intermediate amplifiers plus the total grid current of the power amplifiers.

6. TEST AMMETER. This three position switch selects pertinent circuit currents, as designated on the front panel, for measurement by the TEST AMMETER. The three positions of the switch are: *2nd* IA CATHODE (80MA), DRIVER CATHODE (200MA) and TOTAL P.A. GRIDS (20MA).

7. P.A. CATHODE CURRENTS. This meter indicates the value of individual power amplifier cathode currents as well as their total value.

8. P.A. CATHODE CURRENTS. This five position switch selects the cathode current circuits measured by the P.A. CATHODE CURRENTS meter. When in positions 1, 2, 3, or 4 the meter indicates the cathode current of the respective individual tubes, and when in the TOTAL (1.5A) position the meter indicates the total value of the power amplifier cathode currents.

9. CARRIER TEST KEY. This ON-OFF, momentary ON, switch is used to turn on the transmitter carrier under test conditions.

10. POSITION CONTROL UP Ⓙ, DOWN Ⓚ, SLOW READ SWR Ⓛ. These momentary-contact pushbutton switches energize the drive motor in Radio Frequency Tuner TN-345/WRT-1 (or equivalent) and de-energize the clutch brake. The UP Ⓙ button permits the motor to drive the sliding short and coupling coil mechanism up the main coil towards the output end (shortening the length of the variable line in series with the antenna). The function of the DOWN Ⓚ button is similar to that of the UP Ⓙ button except that the direction of motor drive is reversed. The SLOW READ SWR Ⓛ button allows the drive-motor governor to limit the motor speed when the UP Ⓙ or DOWN Ⓚ buttons are pressed and at the same time energizes the SWR circuits.

11. POSITION INDICATOR. This indicator is a 0-100 microammeter with an arbitrary calibration (0-100) which corresponds to the travel of the sliding short and coupler coil mechanism in the tuner. An indication of 100 corresponds to the minimum amount of main coil in the circuit.

12. TRANSFORMER. This two-position switch controls the insertion of the impedance matching transformer in the tuner. When TRANSFORMER control is in the IN position the transformer is connected to insert a 9:1 impedance step up. With the control in OUT position the transformer is bypassed.

13. COUPLER ANTENNA Ⓗ. This two position switch controls the amount of fixed inductance inserted in series with the antenna by Antenna Coupler CU-760/WRT-1. When COUPLER ANTENNA Ⓗ is in the L1 position the amount of fixed inductance inserted is increased. When the control is in the DIRECT position, all fixed inductance in the coupler is bypassed.

14. TUNER CONTROL. This three-position switch controls the insertion of the tuning elements in the tuner and coupler circuits, while the POSITION CONTROL switches and COUPLER ANTENNA Ⓗ switch set-up the tuning conditions. When this control is in the TUNER IN position, all selected tuning elements are permanently connected in series with the antenna. When this control is in the AUTOMATIC position, the selected elements are automatically connected in series while transmitting and bypassed while receiving. When this control is in the BYPASS position the antenna is connected directly to the transmitter.

15. TUNER IN. This indicator lamp glows whenever the selected tuner and/or coupler tuning elements are connected in series with the antenna.

16. CARRIER ON. This indicator lamp glows whenever the transmitter carrier is on.

17. R-F OUTPUT. This meter indicates the average transmitter power output in watts and percent audio modulation as selected by the OUTPUT METER switch.

18. OUTPUT METER. This three-position switch selects the circuit to be monitored by the R-F OUTPUT meter. When the OUTPUT METER switch is in the R-F SET position, the R-F OUTPUT meter is connected to R-F SET FOR MOD potentiometer (R887) to permit calibration of the a-m monitor circuits. When the OUTPUT METER switch is in the %MOD position, R-F OUTPUT meter measures the

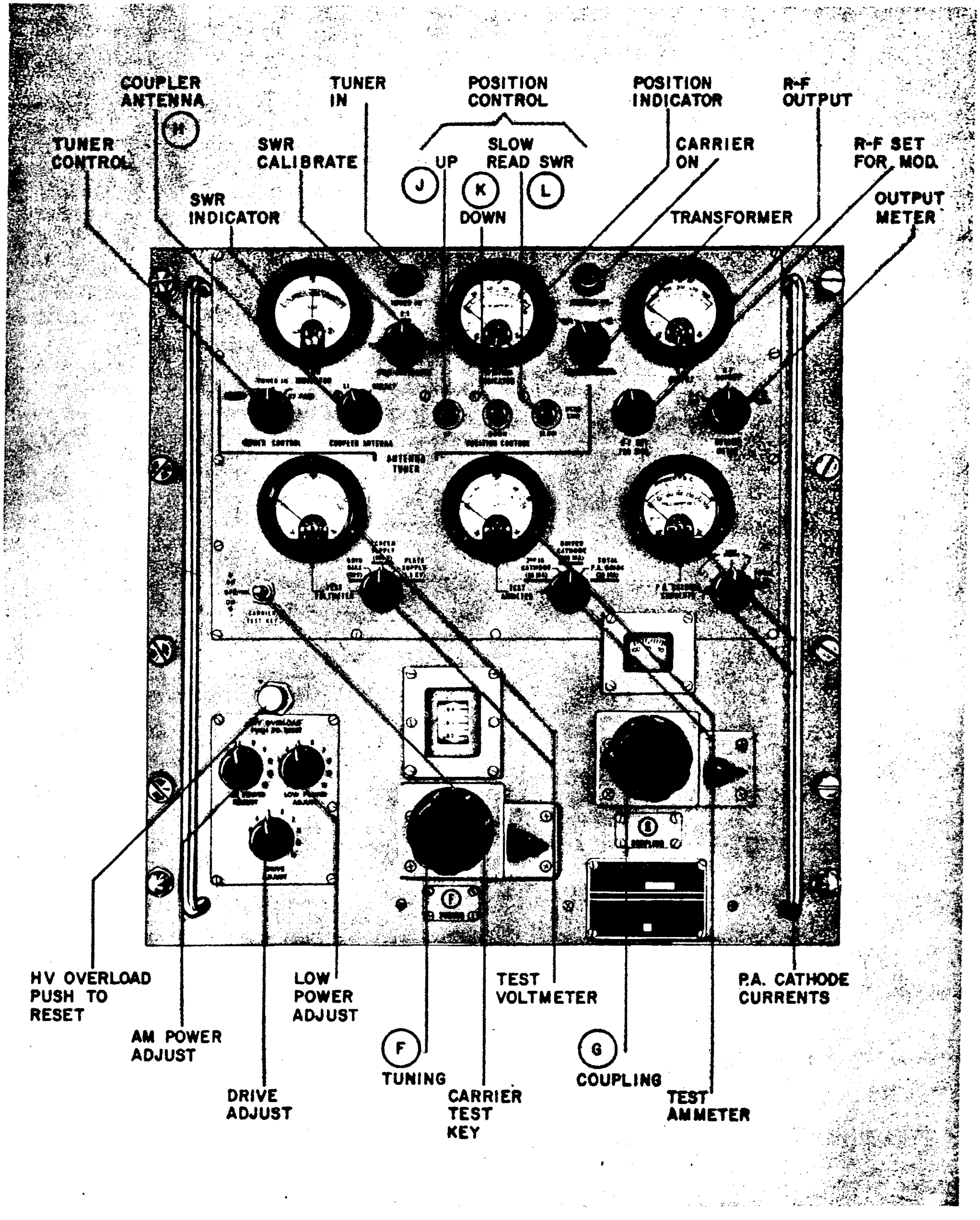


Figure 3-5. Radio Frequency Amplifier AM-2197/WRT-1, Controls Locati n

percentage of amplitude modulation of the r-f carrier. When the OUTPUT METER switch is placed in the R-F OUTPUT position the OUTPUT METER measures the average output power of the transmitter.

19. R-F SET FOR MOD. adjustment. This potentiometer control serves to adjust the r-f carrier level applied to the a-m monitoring circuit, for calibration.

20. SWR CALIBRATE adjustment. This potentiometer controls the amount of incident voltage input, necessary to balance the reflected voltage input into the reflectometer circuit, as indicated on SWR INDICATOR meter. SWR INDICATOR meter must be nulled before the true SWR can be read on the calibrated dial.

21. SWR INDICATOR. This meter serves as a null indicator for the reflectometer circuit. To energize this circuit SLOW READ SWR Ⓛ pushbutton must be pressed.

22. H.V. OVERLOAD PUSH TO RESET switch and indicator. This reset switch is one of three switches on Transmitter Group OA-2321/WRT-1 which permit the operator to reset the high or low voltage protective circuits. The indicator lamp lights when the high voltage supply overload circuit is tripped by an unbalance in the power amplifier cathode currents, by a high-voltage current overload or by an excessive SWR.

23. DRIVE ADJUST. This potentiometer controls the maximum amount of r-f drive input to the drive control circuits which include LOW POWER ADJUST and AM POWER ADJUST.

24. AM POWER ADJUST. This potentiometer sets the amount of r-f drive in phone operation for a fixed setting of the DRIVE ADJUST potentiometer.

25. LOW POWER ADJUST. This potentiometer serves to set the r-f drive in 100-watt operation. In 500-watt operation DRIVE ADJUST control must be set before LOW POWER ADJUST can be set.

b. SEQUENCE OF OPERATION.

(1) INITIAL SETTING OF CONTROLS.

(*a*) Before Radio Transmitting Set AN/WRT-1 is operated, the oven heaters in Radio Frequency Oscillator O-621/WRT-1 and in Electrical Frequency Control C-2861/WRT-1 should be energized for at least six hours. To insure that the ovens are always at operating temperature, leave EMERGENCY STOP switch, on the front panel of Power Supply PP-2222/WRT, OVEN HEAT switch S304, inside, at the rear of Radio Frequency Oscillator O-621/WRT-1 and OVEN switch S604, inside, at the rear of Electrical Frequency Control C-2861/WRT-1 in the ON position. To start up the transmitter for any type of emission refer to figures 3-1 through 3-5 and preset the controls in the following manner:

CONTROL NAME	UNIT LOCATION	FREQUENCY	POSITION
FILAMENT POWER	Amplifier-Power Supply AM-2198/WRT-1		ON
POWER SELECTOR			ADJ
LOCAL REMOTE			LOCAL
PLATE POWER ON			Press
EMERGENCY STOP	Power Supply PP-2222/WRT		ON
OVEN	Electrical Frequency Control C-2861/WRT-1 (inside drawer, rear right)		ON
CARRIER TEST KEY	Radio Frequency Amplifier AM-2197/WRT-1		OFF
P.A. CATHODE CURRENTS			TOTAL
TUNER CONTROL			Tuner In R-F
OUTPUT METER			OUTPUT
COUPLER ANTENNA Ⓗ		300 to 450 kc	L1
		450 to 1500 kc	DIRECT
FSK TEST	Radio Frequency Oscillator O-621/WRT-1		LINE
OVEN HEAT (inside drawer, rear right)			ON
PHASE MODULATION			OFF

(*b*) After the controls have been preset as outlined in paragraph 3-2*b*(1)(*a*) allow the transmitter tubes to warm-up for 30 seconds before proceeding.

(2) CW OPERATION. To set up the equipment for CW operation proceed as follows:

Step 1. Place EMISSION SELECTOR switch in the CW position.

Step 2. Press PLATE POWER ON switch.

Step 3. Using TUNING Ⓐ and TUNING Ⓑ controls, on Electrical Frequency Control C-2861/WRT-1, set the tens, hundreds, thousands and ten thousands digits of the assigned operating frequency. Thus, assume that an operating frequency of 1,355,000 cps has been selected. The ten thousands digit in this case is 5 and TUNING Ⓐ control should be rotated in the clockwise direction until 5 appears in the extreme left window of the upper counter. TUNING Ⓑ control sets the remaining digits shown in the counter windows. Thus, in this case, the thousands, hundreds and tens digits are, respectively 5, 0, 0. TUNING Ⓑ control should be rotated in the clockwise direction until these three digits appear at the counter windows.

Note

> If the assigned frequency is a multiple of 10,000 cycles, set the vernier dial in the center of TUNING Ⓑ control to ± 10 cycles as required. The vernier adjustment is necessary because the counter on Electrical Frequency Control C-2861/WRT-1 cannot be set to an exact multiple of 10,000 cycles. However, it can be set to within 10 cycles of that multiple. To increase transmitter frequency when operating in the 50-100 kc region, the control is moved clockwise. When operating in the 0-50 kc region, the control is moved counterclockwise. Always return the vernier dial to zero before setting up a new assigned frequency.

Step 4. Using TUNING Ⓒ and TUNING Ⓓ controls, located on the front panel of Radio Frequency Oscillator O-621/WRT-1, set up the assigned frequency

Step 5. Readjust TUNING Ⓓ control until FREQUENCY ZERO ADJUST meter indicates zero. Lock TUNING Ⓓ control in this position.

Step 6. Using TUNING Ⓕ control located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1, set up the assigned frequency in the window above TUNING Ⓕ control.

Step 7. Set COUPLING Ⓖ control for an indication of approximately 50 on the coupling counter.

Step 8. Place POWER SELECTOR switch in the TUNE position.

Step 9. On Radio Frequency Amplifier AM-2197/WRT-1, place P.A. CATHODE CURRENTS switch in the TOTAL (1.5A) position, CARRIER TEST KEY in ON (locked) position and OUTPUT METER in the R-F OUTPUT position. Readjust TUNING Ⓕ control for the minimum reading on P.A. CATHODE CURRENTS meter, which coincides with the maximum reading on the R-F OUTPUT meter. Lock TUNING Ⓕ control in this position and place DRIVE ADJUST control to about mid-position.

Step 10. Place POWER SELECTOR switch in the 100 W position.

Note

> If the standing-wave-ratio (SWR) exceeds 4:1 SWR alarm relays may trip, opening the high voltage circuit. Press HV OVERLOAD PUSH TO RESET button located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1, to restore plate power.

Step 11. Alternately press POSITION CONTROL UP Ⓙ and DOWN Ⓚ buttons for a maximum indication on R-F OUTPUT meter.

Step 12. Press SLOW READ SWR Ⓛ button and alternately press POSITION CONTROL UP Ⓙ button and POSITION CONTROL DOWN Ⓚ button for most leftward indication on SWR INDICATOR scale. Rotate SWR CALIBRATE control to keep SWR INDICATOR needle from going off scale. When the antenna is properly tuned, the SWR ratio should be less than 4:1.

Step 13. Recheck the tuning of COUPLING Ⓖ control for maximum indication on the R-F OUTPUT meter and lock COUPLING Ⓖ control in this position.

Step 14. Recheck the TUNING Ⓕ control for a maximum indication on the R-F OUTPUT meter and lock TUNING Ⓕ control in this position. Set DRIVE ADJUST for an indication of 100 watts on the R-F OUTPUT meter.

Step 15. If 500-watt output is desired, place POWER SELECTOR switch in the 500 W position. If necessary, reset the DRIVE ADJUST control for an indication of 500 watts on R-F OUTPUT meter. The indication on P.A. CATHODE CURRENTS meter should not exceed 0.9 amperes.

Step 16. Place CARRIER TEST KEY in the OFF position.

Step 17. Place LOCAL-REMOTE switch in the REMOTE position. Radio Transmitting Set AN/WRT-1 is now set up for remote CW operation. When a standby condition (PA plate voltage off) is desired press the PLATE POWER OFF button on Amplifier-Power Supply AM-2198/WRT-1.

Step 18. To operate Radio Transmitting Set from the remote station (Remote Radiophone Unit Type 23500) press PLATE POWER ON switch and key the transmitter with the remote telegraph key. To return the transmitter to standby after completing a message, press PLATE POWER OFF switch.

Step 19. If it is desired to operate on a new assigned frequency with CW operation, place LOCAL-REMOTE switch in the LOCAL position. Place POWER SELECTOR switch in the TUNE position and repeat steps 3 through 19 using the new assigned frequency.

Step 20. Should the equipment ever be used for break-in CW operation, place TUNER CONTROL switch on the front panel of Radio Frequency Amplifier AM-2197/WRT-1, in the AUTOMATIC position.

(3) TELEPHONE OPERATION.

(*a*) AM. For phone emission the transmitter is tuned-up in CW operation and then switched to AM operation. To set up the transmitter for AM operation proceed as follows:

Step 1. Refer to paragraph 3-2*b*(2) and perform steps 1 through 17.

Step 2. Press PLATE POWER OFF switch and place EMISSION SELECTOR control in the AM position. The transmitter is now in standby, and ready for local 100 or 500 watt phone emission.

Step 3. To operate the transmitter from the local position plug in Handset and press PLATE POWER ON switch. Press the push to talk button on the Handset and, on Amplifier-Power Supply AM-2198/WRT-1, adjust MODULATION LEVEL, SIDETONE LEVEL, CLIPPING, SQUELCH LEVEL, and AGC OR INPUT LEVEL controls for the desired modulation characteristics. The SQUELCH LEVEL control should be advanced to cut out the background noise.

Step 4. On Radio Frequency Amplifier AM-2197/WRT-1, place OUTPUT METER switch in the R-F SET position and rotate R-F SET FOR MOD. control until R-F OUTPUT meter deflects to the R-F SET scale marker. Place OUTPUT METER switch in the %MOD position and, on Amplifier-Power Supply AM-2198/WRT-1, adjust MODULATION LEVEL control for the desired percent modulation as indicated on the R-F OUTPUT meter.

Step 5. To return the transmitter to standby after completion of message, press PLATE POWER OFF switch.

Step 6. If telephone operation is desired at the remote station, place LOCAL-REMOTE switch in the REMOTE position and 2 WIRE-6 WIRE in 6 WIRE position. Press PLATE POWER ON switch and the push to talk button, on the remote handset. It should be noted that when LOCAL-REMOTE switch is in REMOTE position, the transmitter carrier can be controlled by the remote push-to-talk button. After completion of message, press PLATE POWER OFF button on Amplifier-Power Supply AM-2198/WRT-1.

Step 7. If it is necessary to operate on a new assigned frequency with phone operation, place POWER SELECTOR switch in the ADJ position and repeat steps 1 through 6 using the new assigned frequency.

(4) MACHINE CW OPERATION.—In machine-cw operation the transmitter is tuned in the same manner as for cw operation. To set up the transmitter for machine cw operation proceed as follows:

Step 1. Refer to paragraph 3-2*b*(2) of this section and perform steps 1 through 17.

Step 2. On Radio Frequency Oscillator O-621/WRT-1 place WAVE SHAPING switch in the position dictated by the keying speed to be used.

Step 3. Place EMISSION SELECTOR switch in the MACH CW position. The transmitter is now ready for machine CW operation. If the machine CW operator is not ready to transmit, and if a standby-operate switch is not provided at the machine cw position, press PLATE POWER OFF switch until the operator is ready to transmit. When the operator is ready to transmit press PLATE POWER ON switch.

Step 4. If it is desired to operate on a newly assigned frequency with machine cw operation, place POWER SELECTOR switch in the ADJ position and repeat steps 1 through 3 using the newly assigned frequency.

(5) FSK OPERATION.—In FSK operation the transmitter is tuned in the same manner as for CW operation. To set up the transmitter for FSK operation proceed as follows:

Step 1. Refer to paragraph 3-2*b*(2) of this section and perform steps 1 through 6.

Step 2. On Radio Frequency Oscillator O-621/WRT-1 unlock SHIFT Ⓔ potentiometer and set the desired total frequency shift on the calibrated dial. Secure the dial lock.

Step 3. Place EMISSION SELECTOR switch in the FSK position and FSK TEST switch in LINE position.

Step 4. Put an endless RYRY test tape on the teletypewriter and key the transmitter. On Electrical Frequency Control C-2861/WRT-1 observe the indication on DEVIATION CALIBRATE ZERO ADJUST meter and vary DEVIATION CALIBRATE potentiometer for a minimum indication on DEVIATION CALIBRATE ZERO ADJUST meter. The adjustment of DEVIATION CALIBRATE potentiometer should also be performed during FSK transmission in order to ensure that the frequency of the master Oscillator and that of the interpolation Oscillator are shifted by the same amount.

Step 5. Place EMISSION SELECTOR, switch in the CW position and perform steps 7 through 17 of paragraph 3-2*b*(2) in this section.

Step 6. On Radio Frequency Oscillator O-621/WRT-1, place WAVE SHAPING switch in the FSK position. If communication conditions are such that objectionable fading occurs, place PHASE MODULATION switch in the ON position.

Step 7. Place EMISSION SELECTOR switch in the FSK position.

Step 8. If it is desired to operate on a newly assigned frequency with FSK operation place POWER SELECTOR switch in the ADJ position and repeat steps 1 through 7 for FSK operation, using the newly assigned frequency.

(6) MODULATED CW OPERATION.—Modulated CW operation is only provided on Radio Transmitting Set AN/WRT-1A. To set up the transmitter for MOD CW operation proceed as follows:

Step 1. Place EMISSION SELECTOR switch in the MOD CW position.

Step 2. Refer to paragraph 3-2*b*(2) of this section and perform steps 1 through 20.

(7) SHUTDOWN PROCEDURE.

(*a*) NORMAL SHUTDOWN.—Normal shutdown is defined as a condition whereby all power to the transmitter is turned off except the power to the oven heaters in Radio Frequency Oscillator O-621/WRT-1 and Electrical Frequency Control C-2861/WRT-1. Under normal shutdown, Radio Transmitting Set AN/WRT-1 can be put into operation in approximately 30 seconds. To shut down the transmitter, press PLATE POWER OFF switch and place FILAMENT POWER switch in the OFF position. OVEN HEATERS on the front panels of Radio Frequency Oscillator O-621/WRT-1 and Electrical Frequency Control C-2861/WRT-1 will continue to cycle on and off.

(*b*) EMERGENCY SHUTDOWN. — Emergency shutdown is defined as a condition whereby all power to the transmitter is turned off.

Note

Under this type of shutdown, the transmitter cannot be put into normal service without a warm-up period of approximately six hours, if the prescribed frequency accuracy is to be obtained.

This type of shutdown is used in an emergency or when the transmitter is to be out of service for an extended period of time. To shut down the transmitter under these conditions, place EMERGENCY STOP switch in the OFF position.

3-3. SUMMARY OF OPERATION.

a. After the operator is familiar with the functions and location of the operating controls and the operating procedures described in paragraph 3-3, operation of Radio Transmitting Set AN/WRT-1 should become a matter of routine. Figure 3-6 is provided as a summary of operation check list. For each type of operation the applicable steps are marked with an X in the TYPE OF EMISSION column. The setting of controls and the first 24 steps must be performed for any type of emission. Then the steps must be performed in the sequence indicated by the X signs in the TYPE OF EMISSION column, as shown in figure 3-6.

3-4. EMERGENCY OPERATION.

a. OTHER THAN NORMAL.

(1) Conditions may exist when due to an overload in the circuits, the high voltage overload relay will trip. When such a condition occurs, reduce DRIVE ADJUST control on Radio Frequency Amplifier AM-2197/WRT-1, to zero and press one of the following overload switches: H.V. OVERLOAD PUSH TO RESET switch, on Radio Frequency Amplifier AM-2197/WRT-1. OVERLOAD RESET switch, on Power Supply PP-2222/WRT or LV OVLD RECT RESET switch on Amplifier Power Supply AM-2198/WRT-1. If after pressing the overload switches, the overload relay still opens, maintenance personnel should be called immediately to determine the circuits at fault as described in Section 5 of this manual.

(2) If a failure occurs in Electrical Frequency Control C-2861/WRT-1, the frequency stability of Radio Transmitting Set AN/WRT-1 will be impaired but, in an emergency, continued operation is still possible by performing the following steps:

Step 1. Pull out the drawer containing Electrical Frequency Control C-2861/WRT-1 and disconnect plugs P162 and P163 from jacks J614 and J615, located on the righthand side of the drawer.

Step 2. Repeat Part II in figure 3-6 but omit steps 1 and 3.

(3) If a failure occurs in Radio Frequency Tuner TN-345/WRT-1 it may be bypassed by placing TUNER CONTROL switch, on Radio Frequency Amplifier AM-2197/WRT-1, in the BYPASS position.

(4) In an emergency, Radio Transmitting Set AN/WRT-1 may be shut down by placing the EMERGENCY STOP switch in the OFF position. Under this type of shutdown, all power to the transmitter is turned off and all indicator lamps will cease to glow.

Note

After an emergency shutdown the transmitter cannot be put into normal service without a warm-up period of approximately six hours.

b. JAMMING.—No controls are provided on Radio Transmitting Set AN/WRT-1 for reducing the effects of jamming.

3-5. OPERATOR'S MAINTENANCE.—The maintenance that may be performed by the operator of Radio Transmitting Set AN/WRT-1 should be limited to those checks and adjustments which can be accomplished by means of the front panel controls and indicators as described in paragraph 3-5*a*. However, in case of emergency, the emergency maintenance described in paragraph 3-5*b* may be undertaken by the operator. Any further tests, checks, adjustments or replacements must be done by maintenance personnel as outlined in Section 6 of this manual.

a. OPERATING CHECKS AND ADJUSTMENTS.

(1) Specific operating checks and adjustments for each type of emission are covered in paragraph 3-2*b*. A list of general routine operating checks is provided in the following steps.

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OPERATING INSTRUCTIONS
RADIO TRANSMITTING SET AN/WRT-1 AND AN/WRT-1A

These instructions are not intended to replace instruction books, but to provide ready reference to standard operating procedures. Read your instruction book.

I. STARTING THE EQUIPMENT NORMALLY

To start Radio Transmitting Set AN/WRT-1 for any type of emission set the controls as indicated in the accompanying table.

Note

FOR BEST FREQUENCY STABILITY, THE OVEN SWITCHES SHOULD BE IN THE ON POSITION FOR AT LEAST SIX HOURS BEFORE OPERATING THE TRANSMITTER.

CONTROL NAME	LOCATION	FREQUENCY	POSITION
EMERGENCY STOP	Power Supply PP-2222/WRT		ON
FILAMENT POWER	Amplifier-Power Supply AM-2198/WRT-1		ON
POWER SELECTOR	Amplifier-Power Supply AM-2198/WRT-1		ADJ
EMISSION SELECTOR	Amplifier-Power Supply AM-2198/WRT-1		CW
PLATE POWER ON	Amplifier-Power Supply AM-2198/WRT-1		Press
LOCAL-REMOTE	Amplifier-Power Supply AM-2198/WRT-1		LOCAL
FSK TEST	Radio Frequency Oscillator O-621/WRT-1		LINE
OVEN HEAT	Radio Frequency Oscillator O-621/WRT-1 (inside rear)		ON
OVEN	Electrical Frequency Control C-2861/WRT-1 (inside rear)		ON
CARRIER TEST KEY	Radio Frequency Amplifier AM-2197/WRT-1		OFF
P.A. CATHODE CURRENTS			TOTAL (1.5A)
TUNER CONTROL			TUNER IN
COUPLER ANTENNA Ⓗ		300 to 450 kc 450 to 150 kc	L1 DIRECT
TRANSFORMER		300 to 600 kc 600 to 1500 kc	IN OUT

II. OPERATING ADJUSTMENTS

STEP 1 Set TUNING Ⓐ and TUNING Ⓑ controls (on Electrical Frequency Control C-2861/WRT-1) to the tens, hundreds, thousands and ten thousands digits of the assigned operating frequency.

STEP 2 Set TUNING Ⓒ and TUNING Ⓓ controls (on Radio Frequency Oscillator O-621/WRT-1) for the assigned frequency.

STEP 3 Readjust TUNING Ⓓ control for zero indication on the FREQUENCY ZERO ADJUST meter. For CW, MACH CW and AM emission omit steps 4 through 7.

Chart 1 (of 4)

Figure 3-6. Summary of Operating Procedures, Sheet 1 f 4

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STEP 4 Set SHIFT Ⓔ control on Radio Frequency Oscillator O-621/WRT-1 to the desired deviation.

STEP 5 Place EMISSION SELECTOR switch in the FSK position.

STEP 6 Run an endless RYRY test tape and minimize the indication on the DEVIATION CALIBRATE ZERO ADJUST meter (on Electrical Frequency Control C-2861/WRT-1) by varying the DEVIATION CALIBRATE potentiometer(on Radio Frequency Oscillator O-621/WRT-1).

STEP 7 Place EMISSION SELECTOR switch in the CW position.

STEP 8 Set TUNING Ⓕ control (on Radio Frequency Amplifier AM-2197/WRT-1) to the assigned frequency and COUPLING Ⓖ control to 50.

STEP 9 Place POWER SELECTOR switch in the TUNE position.

CAUTION

TO AVOID DAMAGE TO INTERNAL DUMMY LOAD, DO NOT ALLOW R-F OUTPUT METER INDICATION TO EXCEED 100 WATTS WHEN POWER SELECTOR IS IN TUNE POSITION.

STEP 10 Place CARRIER TEST KEY in the ON (locked) position.

STEP 11 Readjust TUNING Ⓕ control for a maximum indication on R-F OUTPUT meter and adjust DRIVE ADJUST control (on Radio Frequency Amplifier AM-2197/WRT-1) for a reading of not more than 100 watts on R-F OUTPUT meter.

STEP 12 Place POWER SELECTOR switch in the 100 W position.

STEP 13 On Radio Frequency Amplifier AM-2197/WRT-1 adjust COUPLER ANTENNA Ⓗ and alternately press POSITION CONTROL UP Ⓙ and POSITION CONTROL DOWN Ⓚ pushbuttons for a maximum indication on the R-F OUTPUT meter.

STEP 14 Check the setting of TUNING Ⓕ and COUPLING Ⓖ control for maximum indication on R-F OUTPUT meter.

STEP 15 Set DRIVE ADJUST control for an indication of 100 watts on the R-F OUTPUT meter.

STEP 16 On Radio Frequency Amplifier AM-2197/WRT-1 press SLOW READ SWR Ⓛ switch and alternately press POSITION CONTROL UP Ⓙ and POSITION CONTROL DOWN Ⓚ switches for a most leftward indication on SWR INDICATOR scale. Rotate SWR CALIBRATE potentiometer to keep SWR INDICATOR needle from going off scale. When the antenna is properly tuned, the SWR ratio should be less than 4:1.

STEP 17 Adjust TUNING Ⓕ and COUPLING Ⓖ controls for peak indication on R-F OUTPUT meter.

STEP 18 For 500-watt output place POWER SELECTOR control in the 500 W position.

CAUTION

TOTAL P.A. CATHODE CURRENT MUST NOT EXCEED 0.9 AMPS FOR 500-WATT OPERATION.

STEP 19 Check output on R-F OUTPUT meter (on Radio Frequency Amplifier AM-2197/WRT-1) and if necessary reset DRIVE ADJUST control for 500-watt reading on R-F OUTPUT meter. Adjust TUNING Ⓕ and COUPLING Ⓖ control until a reading of 500 watts is obtained on the R-F OUTPUT meter. The TUNING Ⓕ control should always be adjusted for maximum power reading on R-F OUTPUT meter and must always be the last control adjusted.

STEP 20 Place CARRIER TEST KEY in the OFF position.

STEP 21 Refer to the following table and choose the type of emission desired. Read down the TYPE OF EMISSION column and perform the steps indicated by an X. The front panels on which the controls are located are indicated in the LOCATED ON THE FRONT PANEL OF column.

Chart 2 (of 4)

Figure 3-6. Summary of Operating Procedures (Sheet 2 of 4)

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DIRECTION TO OPERATOR	LOCATED ON THE FRONT PANEL OF	TYPE OF EMISSION				
		CW	AM	MACH CW	FSK	MOD CW
1. For remote operation, place LOCAL-REMOTE switch in the REMOTE position and 6 WIRE REMOTE-2 WIRE REMOTE control in the 6 WIRE REMOTE position.	AM-2198/WRT-1	X	X	X		X
2. For FSK operation from a remote station, place LOCAL-REMOTE control in REMOTE position and 6 WIRE REMOTE-2 WIRE REMOTE in 2 WIRE REMOTE.	AM-2198/WRT-1				X	
3. Place EMISSION SELECTOR switch in the MACH CW position.	AM-2198/WRT-1			X		
3A. Place EMISSION SELECTOR switch in the MOD CW position.						X
4. Set WAVESHAPING to the position dictated by the keying speed.	O-621/WRT-1			X	X	
5. Place EMISSION SELECTOR switch in the FSK position.					X	
6. For local standby operation press PLATE POWER OFF switch.	AM-2198/WRT-1	X	X	X	X	X
7. Place EMISSION SELECTOR switch in the AM position.	AM-2198/WRT-1		X			
8. Place CARRIER TEST KEY ON. Decrease setting of AM POWER ADJUST control until R-F OUTPUT METER indicates approximately 125 watts.	AM-2197/WRT-1		X			
9. Place OUTPUT METER switch in the R-F SET position and rotate R-F SET FOR MOD control until R-F OUTPUT meter deflects to the R-F SET scale marker. Place CARRIER TEST KEY OFF.	AM-2197/WRT-1		X			
10. Place OUTPUT METER switch in % MOD position. If AGC circuit is to be operative, rotate AGC OR INPUT LEVEL control fully clockwise on AGC ON position. Press push to talk button on local handset and, while speaking at normal level, adjust MODULATION LEVEL, control until R-F OUTPUT meter indicates approximately 100 per cent modulation on voice peaks.	AM-2197/WRT-1 and AM-2198/WRT-1		X			
11. If clipping action is desired, place CLIPPING control at IN position. Press push to talk button on local handset and while speaking at normal level, adjust MODULATION LEVEL control for 100 per cent if necessary.	AM-2198/WRT-1		X			
12. To change frequency or type of emission, place POWER SELECTOR switch in the ADJ position. LOCAL-REMOTE switch in LOCAL position and repeat all steps.	AM-2198/WRT-1	X	X	X	X	X
13. If break-in CW operation is desired, place TUNER CONTROL in the AUTOMATIC position.	AM-2197/WRT-1	X				X

Chart 3 (of 4)

Figure 3-6. Summary of Operating Procedures, Sheet 3 of 4

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III. STOPPING THE EQUIPMENT

To shut down Radio Transmitting Set AN/WRT-1 press PLATE POWER OFF switch and place FILAMENT POWER switch in the OFF position. Both controls are located on Amplifier-Power Supply AM-2198/WRT-1. When the Transmitter is to be shut down for an extended period of time, place EMERGENCY STOP switch (on Power Supply PP-2222/WRT) in the OFF position.

IV. EMERGENCY OPERATION

Failure in Electrical Frequency Control C-2861/WRT-1 indicated by continuous sweeping of the FREQUENCY ZERO ADJUST meter on Radio Frequency Oscillator O-621/WRT-1. The frequency stability of Radio Transmitting Set AN/WRT-1 is impaired but continued operation is still possible by performing the following steps:

STEP 1 Pull out the drawer containing Electrical Frequency Control C-2861/WRT-1 and disconnect plugs P162 and P163 from jack J614 and J615, respectively. These jacks and plugs are located on the righthand side of the drawer.

STEP 2 Repeat Part II of this operating chart but omit steps 1 and 3.

If a failure occurs in Radio Frequency Tuner TN-345/WRT-1 or Antenna Coupler CU-760/WRT-1 they may be bypassed by placing the TUNER CONTROL switch on Radio Frequency Amplifier AM-2197/WRT-1 in the BYPASS position.

Chart 4 (of 4)

Figure 3-6. Summary f Operating Proc dures (Sheet 4 of 4)

Step 1. Place EMERGENCY STOP switches in the ON position.

Step 2. Place FILAMENT POWER switch in the ON position.

Step 3. Observe FILAMENT POWER ON lamp. It should be lighted.

Note

> All Indicator Lamp assemblies in Radio Transmitting Set AN/WRT-1 feature screw-on lenses and bayonet base lamps. To replace a lamp unscrew the lens cap, press the lamp inward, give a one quarter turn counterclockwise, and withdraw the lamp. Replace with a new lamp by reversing the above procedure.

Step 4. If the lamp does not glow, replace it with a new lamp.

Step 5. Observe DOOR INT. lamp. Lamp should glow when all drawers are properly closed.

Step 6. If the lamp does not glow, replace it with a new one.

Step 7. Observe OPERATING HOURS meter. The meter should be counting. If the meter does not count, inform maintenance personnel.

Step 8. Observe OVEN HEATER indicator lamp on Radio Frequency Oscillator O-621/WRT-1 and on Electrical Frequency Control C-2861/WRT-1. Both indicators should be glowing intermittently.

Step 9. If the indicators do not glow, check the lamps and the OVENS fuse.

Step 10. Check the operation of frame and power amplifier blowers. Their operation is audible.

Step 11. Place TEST VOLTMETER switch in SCREEN SUPPLY (600V) position. The TEST VOLTMETER should indicate 350V for all types of emission.

Step 12. Place TEST VOLTMETER switch in PLATE SUPPLY (1.5KV) position and EMISSION SELECTOR in AM position.

Step 13. Place POWER SELECTOR switch in 100 W position. The TEST VOLTMETER should indicate 600V.

Step 14. Place POWER SELECTOR switch in 500 W position. The TEST VOLTMETER should indicate 1250V.

Step 15. Place the TEST VOLTMETER switch in the GRID BIAS (200V) position. The TEST VOLTMETER should indicate −50 volts.

Step 16. Place the TEST AMMETER switch in the DRIVER CATHODE (200MA) position. The TEST AMMETER should indicate 180 to 240 ma under key down conditions.

Step 17. Place the TEST AMMETER switch in the TOTAL P.A. GRIDS (20MA) position. The TEST AMMETER should indicate 0 ma.

Step 18. Place the POWER SELECTOR switch in the 100 W position. The TEST AMMETER should indicate 0 ma.

Step 19. Place the P.A. CATHODE CURRENTS switch in the 1, 2, 3, or 4 position. The P.A. CATHODE CURRENTS meter should indicate approximately 125 ma for any one of these positions if 100 watts is being delivered.

Step 20. Place the P.A. CATHODE CURRENTS switch in the TOTAL (1.5A) position. The P.A. CATHODE CURRENTS meter should indicate approximately 500 ma for 100 watts output.

Step 21. Observe the FREQUENCY ZERO ADJUST meter. It should indicate zero.

b. EMERGENCY MAINTENANCE.

(1) GENERAL.

(*a*) Many situations could arise during an emergency that are beyond the scope of this book. However, certain common situations may arise which are often quickly remedied. The operator should make himself familiar with the equipment so as to be able to recognize the symptoms which might indicate tube, fuse or indicator lamp failures.

WARNING

> SOME OF THE PROCEDURES IN THIS SECTION REQUIRE THAT FILAMENT POWER TO THE LOW VOLTAGE CIRCUITS BE APPLIED WHILE A DRAWER IS WITHDRAWN. IN ORDER TO PREVENT THE APPLICATION OF POWER TO THE HIGH VOLTAGE CIRCUITS WHILE A DRAWER IS WITHDRAWN, DO NOT ACTUATE THE INTERLOCK SWITCHES.

(*b*) Most of the emergency maintenance outlined in this section requires that one of the drawers be withdrawn from Electrical Equipment Cabinet CY-2607/WRT-1 to the servicing position. To withdraw any of the four top drawers release the fasteners on the front panel and withdraw the drawer to its extreme travel. The drawer automatically locks in this position. To rotate the drawer to a more convenient servicing position, pull the locking plunger at the upper left of the drawer mounting and rotate the drawer to the desired position. The drawer locks in eight positions approximately 45 degrees apart. The drawer above and below should be secured in the frame before attempting to rotate the drawer to be serviced. To return any of the four top drawers into the frame, first rotate the drawer to the upright locked position. Lift the drawer upward to release the locking mechanism. Slide the drawer back into Electrical Equipment Cabinet CY-2607/WRT-1, and secure the fasteners.

(*c*) To withdraw the bottom drawer, Power Supply PP-2222/WRT, from the cabinet, release the fasteners on the front panel and withdraw the drawer to its extreme travel. The drawer automatically locks in this position. Since all parts in Power Supply PP-2222/WRT are accessible from the top no provision is made for rotating the drawer. To return the bottom drawer into Electrical Equipment Cabinet CY-2607/WRT-1, release the locking mechanism at the right rear of the drawer and at the same time slide the drawer back into the cabinet. Secure the fasteners on the front panel.

(2) REPLACEMENT OF FUSES.

(*a*) Transmitter Group OA-2331/WRT-1 contains ten operating fuses. Five of these fuses are located in Power Supply PP-2222/WRT and five in Amplifier Power Supply AM-2198/WRT-1. Since Transmitter Group OA-2321/WRT-1 may be operated from a ship's three phase 60 cps supply of 115, 220 or 440 volts the equipment is provided with line fuses for all of these supplies. Table 3-1 gives the symbols and ratings of all the line fuses in Power Supply PP-2222/WRT. Refer to table 3-1 whenever replacement of fuses is necessary.

WARNING

VOLTAGES AS HIGH AS 440 VOLTS APPEAR ACROSS THE FUSE CLIPS IN AMPLIFIER-POWER SUPPLY AM-2198/WRT-1. BEFORE ATTEMPTING FUSE REPLACEMENT, TURN OFF EMERGENCY STOP SWITCH AND ANY EXTERNAL CIRCUIT BREAKER.

CAUTION

THE RATING OF THE FUSES USED IN POWER SUPPLY PP-2222/WRT DEPENDS ON WHETHER THE EQUIPMENT IS BEING OPERATED FROM A 115 VOLT, 220 VOLT, OR 440 VOLT SOURCE. BE SURE TO USE THE CORRECT REPLACEMENT AND SEE THAT THE SPARE FUSES ARE OF THE CORRECT RATING FOR THE POWER SOURCE USED. REFER TO FUSE REPLACEMENT DATA IN TABLE 3-1.

(*b*) The five active fuses and the two spare fuses in Power Supply PP-2222/WRT are mounted on the back of the front panel with spring clips. If a lamp glows replace the associated fuse.

(*c*) Figure 3-7 is an illustration showing the location of fuses and indicator lamps on the front panel of Radio Transmitting Set AN/WRT-1. As shown in figure 3-7 the five active fuses in Amplifier Power Supply AM-2198/WRT-1 are located on the front panel of this drawer. Failure of one of these fuses is indicated by a red button protruding from the front of the fuse. To replace the fuse unscrew the transparent cap and insert the new fuse from the spare fuse holder located inside, on top of the drawer containing Amplifier-Power Supply AM-2198/WRT-1. When inserting the new fuse be sure to locate the indicating end of the fuse so that it is visible through the transparent cap. Replace the transparent cap and insert a new fuse of same rating in the spare fuse holder.

(3) REPLACEMENT OF TUBES.

(*a*) In emergencies it may be necessary for operating personnel to replace defective tubes. A glass tube may be considered defective if the heater does not glow, a tube may also be checked by substitution if test equipment is not available. The tubes in Transmitter Group OA-2321/WRT-1 may be located from figure 3-8. Reference symbols are stenciled adjacent to each tube in the equipment.

WARNING

DANGEROUS VOLTAGES EXIST IN THE EQUIPMENT WHEN POWER IS ON. MAKE SURE THAT POWER IS OFF COM-

TABLE 3-1. FUSE REPLACEMENT DATA

FUSE SYMBOL	LINE VOLTAGE				LOCATION	INDICATION OF FUSE FAILURE	PROTECTED CIRCUIT
	440V	220V	115V				
	FUSE RATING						
	AMPERES			VOLTS			
F201	3	6	12	500	Back of the front panel of Power Supply PP-2222/WRT	F201—H. V. RECT. F202—LINE BLOWN F203—IND lamp glows. F205—L. V. RECT. F206—FIL LINE BLOWN FUSE IND lamp glows.	High Voltage Rectifier Plate Transformers Low Voltage Power Supply Transformer
F202	3	6	12	500			
F203	3	6	12	500			
F205	5	10	20	500			
F206	5	10	20	500			
F501		5		115	Front panel of Amplifier Power Supply A9-2198/WRT-1	Transmitter F501 Tuner P502 Oven F503 Control F504 Radio phone F505 Red Fuse button projects	Transmitter filament 115V Tuner 115V Oven −24V Control 12V Radio-phone
F502		3		115			
F503		5		115			
F504		4		24			
F505		2		12			

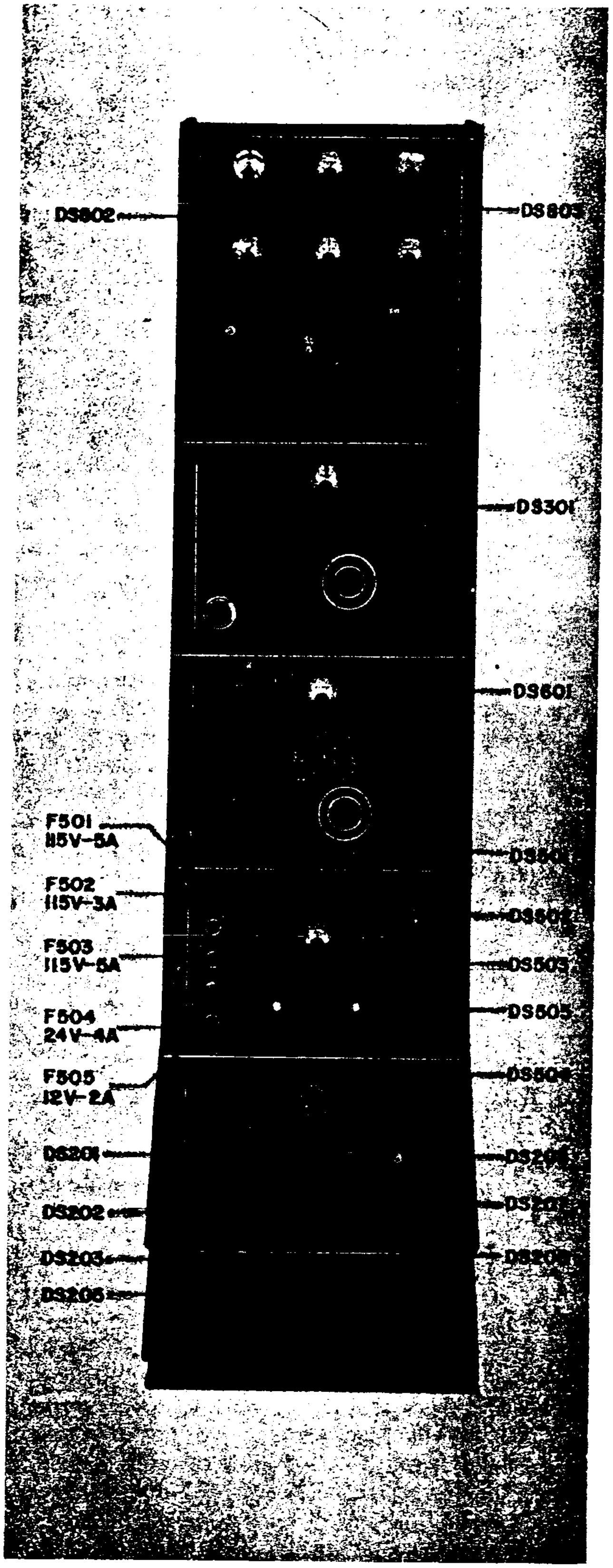


Figure 3-7. Transmitter Group OA-2321/WRT-1, Location of Fuses and Indicator Lamps on the Front Panel

PLETELY BY PLACING THE EMERGENCY STOP SWITCH IN THE OFF POSITION BEFORE STARTING TO REPLACE ANY TUBE. DO NOT REPLACE ANY TUBES THAT HAVE A CAP CONNECTION AT THE TOP OF THE GLASS ENVELOPE SUCH AS POWER AMPLIFIER TUBES V804, V805, V806 AND V807, UNTIL THE CAPS OR ANODE CONNECTIONS HAVE BEEN GROUNDED FOR APPROXIMATELY ONE MINUTE BY MEANS OF A DISCHARGE STICK. THESE TUBE ELEMENTS ARE CONNECTED TO CAPACITORS THAT ARE NORMALLY CHARGED TO DANGEROUS VOLTAGES.

(*b*) The tubes can be observed with their filaments energized by placing FILAMENT POWER switch in the ON position and by withdrawing the respective drawer from Electrical Equipment Cabinet CY-2607/WRT-1.

(*c*) All tubes can be observed from the top of the drawer except the power amplifier tubes in Radio Frequency Amplifier AM-2198/WRT-1. Power amplifier tubes V804 through V807 shown in figure 3-8 are mounted in a compartment located at the top of the drawer in the center. To expose the tubes for removal, release the six cover fasteners holding the compartment cover plate and remove the tubes. When replacing the tube compartment cover, make sure that it is locked securely in place with all six fasteners.

(d) Some of the tubes in Transmitter Group OA-2321/WRT-1 are secured in their sockets with conventional tube clamps. Pull the clamp tab out to release it. Then pull the tube straight out of the socket. When replacing tubes be sure that the guide pin key on the case is aligned with the key way in the center of the socket. Push the tube all the way down in the socket and then tighten the clamp by pushing the clamp tab to the left. When replacing a miniature tube, be sure that the tube pins are correctly aligned with the socket before pressing the tube straight in to avoid breaking off the pins. To remove one of the power amplifier tubes refer to figure 3-8 and remove the binding head screw and gently work it loose from the socket until it can be pulled straight out. If a new tube is to be installed, loosen the tube clamp on the old tube and remove the tube clamp from around the tube.

(*e*) Insert the new tube into the socket, being sure that the tube guide pin is aligned with the socket keyway. Be careful not to bend or otherwise damage any of the socket spring fingers contacting the screen grid terminal surface of the tube. After the tube is pressed all the way down into the socket, place the tube clamp around the anode contacting surface of the tube. Rotate the tube clamp with the hole in the clamp tab 13 aligned with the hole in the bar terminal assembly. Secure the tab to the bar terminal with the screw previously removed. Tighten the tube clamp until it is snug.

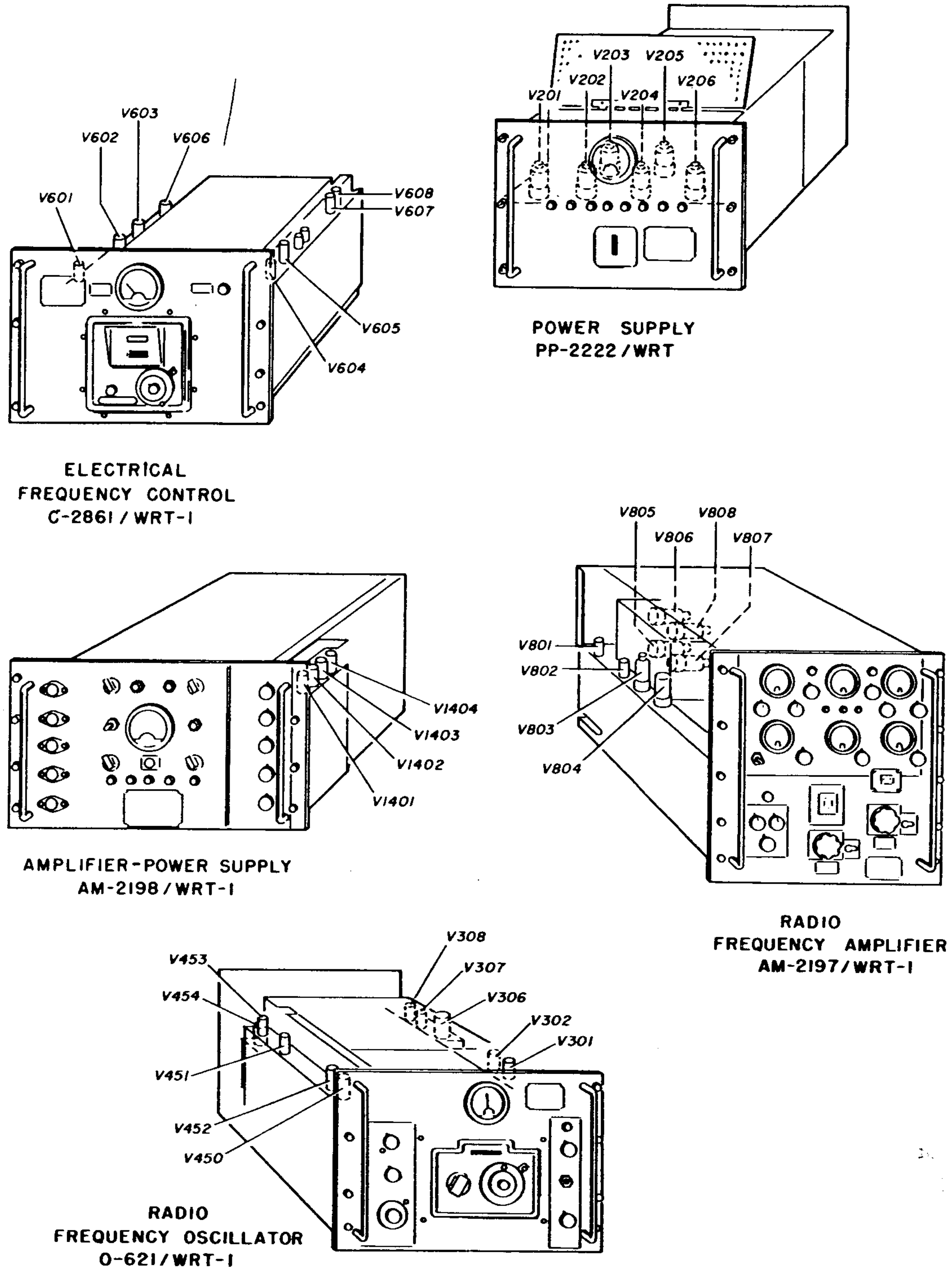


Figure 3-8. Transmitter Group OA-2321/WRT-1, Location of Tubes

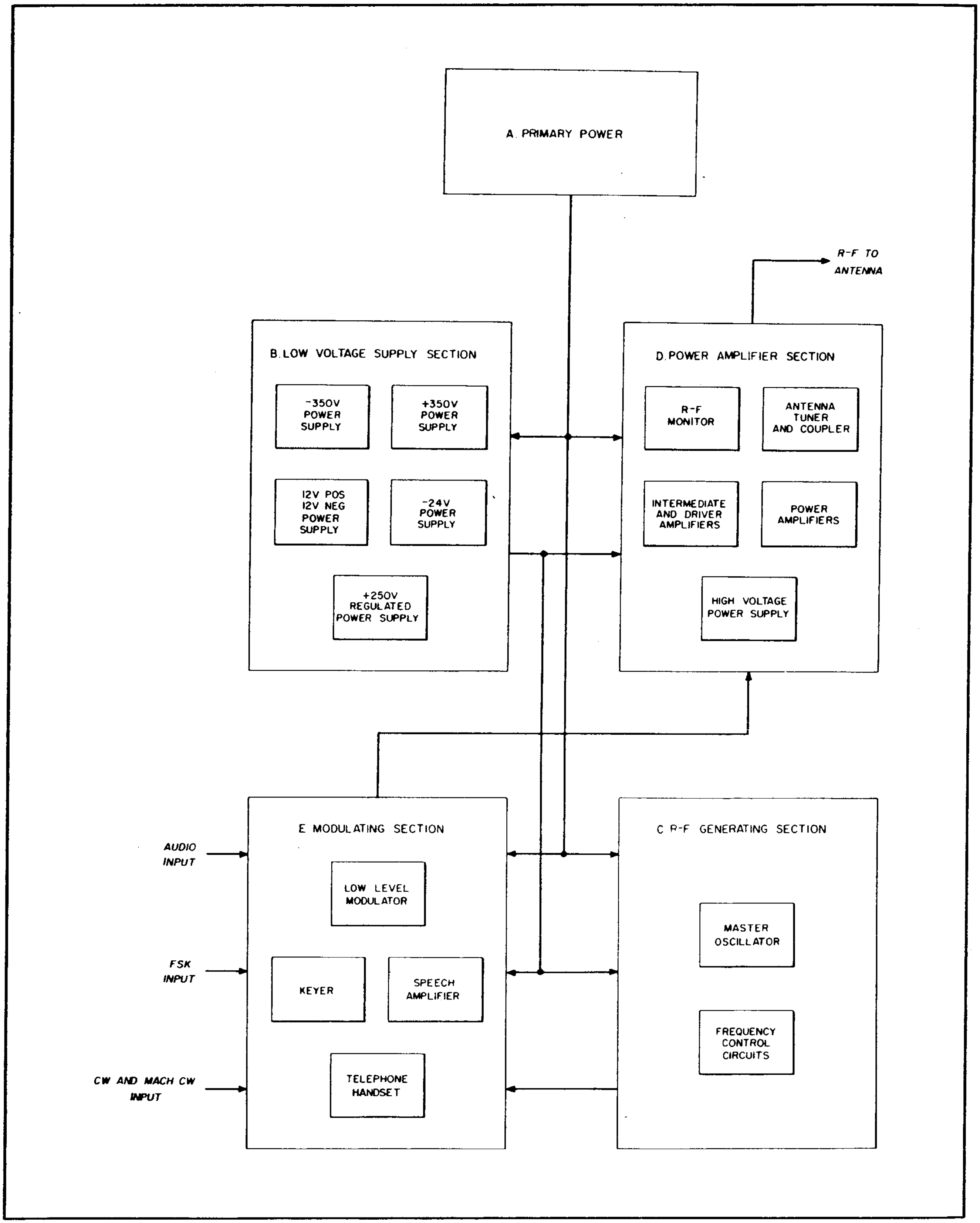


Figure 4-1. Radio Transmitting Set AN/WRT-1, Overall Functional Block Diagram

SECTION 4

PRINCIPLES OF OPERATION

4-1. OVERALL FUNCTIONAL DESCRIPTION.

a. Radio Transmitting Set AN/WRT-1 is a communication equipment designed for installation aboard surface vessels. The output frequency of the transmitter is tunable over the range of 0.3 to 1.5 Mc, and a nominal output power of 500 watts (high power) or 100 watts (low power) is developed for application to the antenna tuning circuits. Radio Transmitting Set AN/WRT-1 has the following emission capabilities: On-off carrier keying by handkey (CW); frequency shift keying (FSK); standard AM telephony (AM); and on-off carrier keying by automatic keyer (MACH CW). Radio Transmitting Set AN/WRT-1A, has an additional MOD CW type emission.

b. Figure 4-1 is a functional block diagram of Radio Transmitting Set AN/WRT-1. The set consists of the following functional sections: the primary power functional section, the low voltage power supply functional section, the r-f generating functional section, the modulating functional section, and the power amplifier functional section.

c. The primary power functional section contains the circuits necessary for distribution of a-c power to all d-c voltage supply transformers, all blowers and filament transformers, and all a-c control relays. The primary power input circuits are adjustable to permit application of three phase ship supply voltage of 115, 220, or 440 volts a-c, 60 cycles.

d. The low voltage supply functional section contains the circuits which supply all d-c voltages, except the power amplifier plate voltage, to Radio Transmitting Set AN/WRT-1. As shown in figure 4-1, the following power supplies are contained in the low voltage functional section: +350 volts d-c unregulated, −350 volts d-c unregulated, +250 volts d-c regulated, −24 volts d-c, and 12 volts POS and NEG. The +350-volt and −350-volt supplies are used for the plate and bias voltages for the electron tubes in the transmitter. The +250-volt regulated supply is used for the critical circuits of the master oscillator and frequency control in the r-f generating functional section. The −24-volt supply is used for the d-c control circuits of the transmitter. The 12-volt POS and NEG supply is used for the microphone and speech input circuits of the transmitter.

e. As shown in figure 4-1, the r-f generating functional section contains the master oscillator which generates the low level r-f carrier signal. No frequency multiplication is employed. A sample of the master oscillator output is applied to the frequency control circuits, the function of which is to stabilize the master oscillator frequency at the assigned value. A sample of the master oscillator output is mixed with crystal-controlled harmonics of 100 kc for the production of low frequency (50 to 100 kc) comparison sidebands. The sidebands are compared in a phase detector with the output of a highly stable interpolation oscillator. A drift in the master oscillator frequency causes the phase detector to generate a d-c correction signal. The correction signal is applied to a saturable reactor control element in the master oscillator grid circuit and thus provides automatic frequency control. Under normal operating conditions the transmitter has a frequency stability of 30 cps ± 1.5 cycles per megacycle.

f. As shown in figure 4-1, the output of the master oscillator is applied to the modulating functional section. During AM emission, the audio input to the transmitter is amplified by the circuits of the speech amplifier and applied to the low level modulator. The output of the master oscillator is also applied to the low level modulator and the output which results is an amplitude-modulated carrier. The speech amplifier circuits contain AGC control provisions, as well as squelch and positive and negative clipping circuits. The squelch circuit reduces background noise to zero when the voice circuits are idle, and the clipping circuits make possible a higher average level of audio drive to the modulator without significantly affecting speech intelligibility. During the handkeyed CW operation, only the output of the master oscillator is applied to the low level modulator. Carrier keying is accomplished by a bias keying relay which follows the operation of the handkey. When the key is up, the bias keying relay is deenergized and negative cutoff bias is applied to the grids of the power amplifiers and to the grids of the two intermediate power amplifiers. When the key is down, the keying relay is energized, and the cutoff bias is removed. During MACH CW operation, the cutoff bias is removed from the power amplifiers and the two intermediate amplifiers are keyed by the output of an electron tube keyer. The electronic keyer has a 600 WPM capability, an impedance of 22,000 ohms, and will accept neutral d-c keying voltage of +35 to +135 volts in magnitude. During FSK operation, a d-c output from the electronic keyer is applied to a saturable reactor or control element in the master oscillator grid circuit and the frequency is shifted up for a *mark* and down for a *space.* Two keyer input impedance are available for the teletypewriter loop: 6000 ohms, and 2000 ohms. Phase modulation circuits are provided to combat the effects of multipath fading. A variable waveshaping filter is incorporated in the input of the electronic tube keyer so that key clicks due to abrupt voltages may be eliminated.

g. The power amplifier functional section accepts the output of the modulating functional section and raises the signal to the desired output power level. High voltage for the plates of the power amplifiers is developed by a three-phase bridge rectifier. Monitor circuits sample the antenna feeder line voltage and current and provide indication of r-f output power, voltage standing wave ratio, and percentage modulation. Antenna to feeder line impedance matching is accomplished by a tuner unit and a coupler unit mounted near the antenna location.

4-2. R-F GENERATING FUNCTIONAL SECTION.

a. GENERAL OPERATION.

(1) The r-f generating functional section performs two major functions: Creation of the low level r-f carrier and stabilization of the carrier frequency. A master oscillator with frequency variable over the range of 300 to 1500 kilocycles generates the fundamental r-f carrier signal. The frequency control circuits receive a sample of the master oscillator output and compare it with a stable interpolation oscillator output. If the master oscillator frequency starts to deviate from the assigned value, the comparison circuit generates a correction voltage. The correction signal is applied to a saturable reactor in the master oscillator grid circuit and the oscillator frequency is brought back to the proper value. Under normal operating conditions the transmitter has a stability of 30 cps ± 1.5 cycles per megacycle. A block diagram of the r-f generating functional section is shown in figure 4-2.

(2) As shown in figure 4-2, the frequency-determining elements of master oscillator V301 are contained in a temperature-controlled oven. Band switch S301 (TUNING Ⓒ control, located on the front panel of Radio Frequency Oscillator O-621/WRT-1) has twelve positions; each position selects a 100-kc frequency band within the total frequency range of 300 to 1500 kc. The master oscillator frequency may be varied within each band in 100-cycle steps, by means of TUNING Ⓓ control. The a-c winding of saturable reactor L314 forms a part of the grid circuit of the master oscillator. Two d-c bias windings control the inductance of the a-c winding of L314 and thus control the carrier frequency. As shown in figure 4-2, one winding of L314 receives bias from the FSK keying circuits; the other winding receives a bias from the frequency stabilization circuits. The output of master oscillator V301 is coupled to two output amplifiers, V302A and V302B. The output of V302A is applied to the low level modulator, V801, in the modulating functional section; the output of V302B is applied to phase-splitting filter FL603.

(3) The output of FL603 consists of two sine waves 90 degrees apart in phase. One output is applied to the i-f mixer consisting of transformers T612 and T602, and diodes CR601 and CR602. The second output is applied to the i-f mixer consisting of transformers T613 and T603 and diodes CR603 and CR604. As shown in figure 4-2, harmonics of a 100-kc crystal-stabilized signal are also applied to the two i-f mixers. The outputs of the i-f mixers consist of difference frequency components (hereinafter referred to as sidebands).

(4) In order to study the nature of the sideband signals generated by the mixers, consider the case where the master oscillator frequency is 460 kc. When the r-f sample is heterodyned with a 400-kc harmonic of the crystal oscillator, a sideband of 60 kc is produced. When 460 kc is mixed with the 500-kc harmonic, a sideband of 40 kc is produced. In each mixer output there are 40-kc and 60-kc sidebands. The phase difference between the two 60-kc signals is 90 degrees; the phase difference between the two 40-kc signals is also 90 degrees. If the 40 and 60-kc outputs of one mixer are considered as a reference, the 40-kc signal from the second mixer lags by 90 degrees and the 60-kc signal leads by 90 degrees. Note that the 60-kc signal resulted when the crystal harmonic frequency was lower than the r-f sample frequency, and the 40-kc signal resulted when the crystal harmonic frequency was higher than the r-f sample frequency. The frequency relationships account for the reversal of phase relationships. The 40-kc and 60-kc signal outputs of the mixers are applied to two r-c phase shift networks. After being shifted in phase in the two networks, the signals are applied to the grid of the first I-f amplifier V601A. The phase shift is such that the total phase shift of the two 40-kc signals is 180 degrees and they cancel at the grid of V601A. On the other hand, the phase shift of the two 60-kc signals is zero degrees and the amplitudes add at the grid of V601A.

(5) As a second example of the operation of the mixers and phase shift network, consider the case where the master oscillator frequency is 440 kc. The two sidebands of interest are again 40-kc and 60-kc. Note that in this case the 60-kc signal is the result of a crystal harmonic frequency higher than the r-f sample frequency. The phase relationships of the two mixer outputs are now reversed and, since the r-c phase shift network is unchanged, the 40-kc sidebands are shifted in phase to add and the 60-kc sidebands are shifted in phase to cancel. For comparison with the interpolation oscillator output, however, the sideband frequencies must be limited to the range of 50 to 100 kc. Therefore, when the last 10-kc digits of the master oscillator frequency are in the range of 0 to 50-kc, the output of i-f mixer transformer T602 is reversed by mechanical means and the sideband phase relationships are maintained the same as in the first example. A relay, which is energized by the interpolation oscillator bandswitch (TUNING Ⓐ control, located on the front panel of Electrical Frequency Control C-2861/WRT-1) when the last 10-kc digits of the master oscillator frequency are less than 50-kc, controls the output switching.

(6) As shown in figure 4-2, the acceptable sideband signal is passed through five cascaded amplifiers: V601A, V601B, V602A, V602B, and V603A. Bandpass filters between the first and second i-f amplifiers and

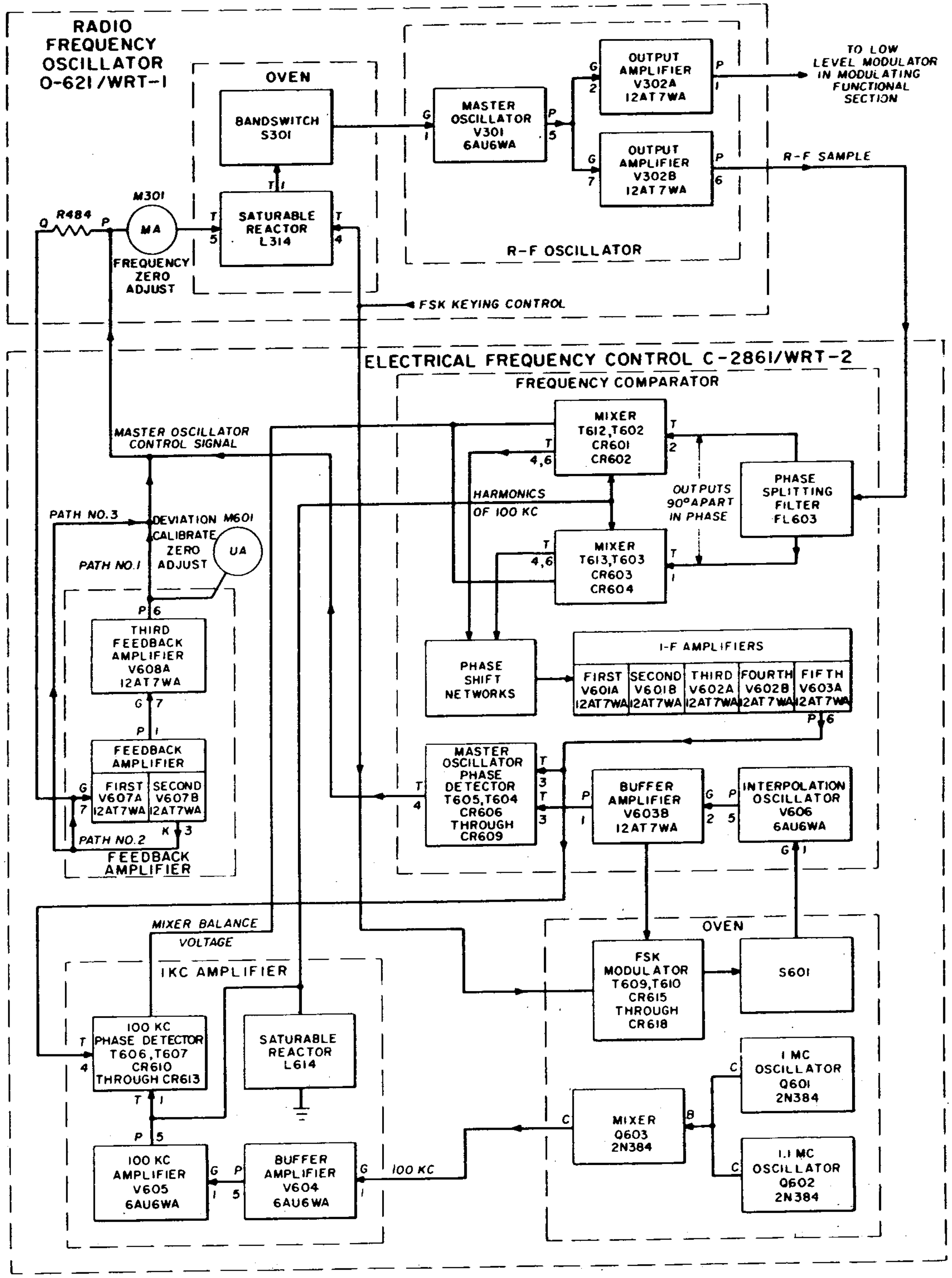


Figure 4-2. R-F Generating Section, Functional Block Diagram

between the second and third i-f amplifiers limit the response of the i-f amplifier strip to the frequency range of 50 to 100 kc. The plate output of the fifth i-f amplifier is applied to the master oscillator phase detector and a cathode output is applied to the 100-kc phase detector.

(7) Since the i-f passband will accept the 100-kc fundamental, it is necessary that the i-f mixers be extremely well balanced. Aging of circuit components and ambient temperature variations, however, inevitably introduce some imbalance; therefore an automatic balancing circuit is provided to null the unwanted 100-kc signal. The 100-kc signal output of one mixer is 90 degrees out of phase with the output of the other mixer. A sample of the i-f frequency is taken from the cathode of V603A and applied to two phase detectors consisting of transformers T606 and T607, and diodes CR610 through CR613. As shown in figure 4-2, a 100-kc reference signal is also applied to the phase detectors. The phase of the reference signal to one detector is shifted 90 degrees. A d-c correction bias is developed by the phase detectors whenever the i-f output contains the unwanted 100-kc signal. The phase of the i-f output indicates which mixer is unbalanced and the corrective bias is applied to that mixer.

(8) As shown in figure 4-2, the 100-kc reference signal is obtained by mixing the outputs of 1-Mc oscillator Q601 and 1.1-Mc oscillator Q602. A tuned filter in the output of mixer Q603 selects the difference of the oscillator frequencies (100 kc) for application to buffer amplifier V604 and 100-kc amplifier V605. The output of V605 is applied to the 100-kc phase detectors and to saturable reactor L614. When the core of L614 saturates, a narrow voltage pulse is developed. The voltage pulses, which are rich in harmonics, are applied through an r-c differentiating network to the i-f mixers.

(9) As shown in figure 4-2, the bias output of the master oscillator phase detector is used to control the frequency of the master oscillator. The inputs to the phase detector are the i-f signal from V603A and the signal from interpolation oscillator V606 and buffer amplifier V603B. When the two signals are exactly 90 degrees out of phase, no correction voltage is applied to the bias winding of saturable reactor L314. When a phase difference occurs due to a drift in the master oscillator frequency, a correction signal of proper polarity is applied to L314 to return the master oscillator to the assigned frequency. FREQUENCY ZERO ADJUST meter M301 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1) indicates the relative magnitude and polarity of the correction signal. The interpolation oscillator, V606, covers the frequency range of 50 to 100-kc in five bands. The bands are selected by TUNING Ⓐ control (located on the front panel of Electrical Frequency Control C-1261/WRT-1) and tuning within each band is accomplished with TUNING Ⓑ control (same location). Bandswitch S601 and the frequency-determining components of V606 are contained in a temperature-controlled oven. The frequency counter on the front panel of Electrical Frequency Control C-2861/WRT-1 has two windows. When the last 10-kc digits of the assigned operating frequency are within the range of 50 to 100-kc, TUNING Ⓐ and TUNING Ⓑ controls are used to set up the digits in the upper window of the frequency counter and in this case the counter reading also indicates the actual frequency of the interpolation oscillator. When the last 10-kc digits of the assigned operating frequency are within the range of 0 to 50-kc, TUNING Ⓐ and TUNING Ⓑ controls are used to set up the digits in the lower window of the frequency counter and in this case the actual frequency of the interpolation oscillator is 100 kc minus the reading on the lower counter. Interpolation oscillator bandswitch S601 has ten positions, but the first and last, second and eight, and so on, are tied together. As explained in paragraph 4-2*a*(5) above, when in the 0 to 50-kc range, bandswitch S601 energizes a relay which reverses the output leads of i-f mixer transformer T602. Thus the range of the interpolation oscillator frequency need be no greater than 50 to 100-kc.

(10) As shown in figure 4-2, an output from buffer amplifier V603B is applied to the FSK modulator consisting of transformers T609 and T610, and diodes CR615 through CR610. During FSK operation, d-c bias signals from the keyer in Radio Frequency Oscillator O-621/WRT-1 unbalance the modulator and its output is applied in the grid circuit of the interpolation oscillator. The modulator output has the effect of inserting or removing reactance so that the frequency of the interpolation oscillator is shifted in synchronism with the frequency shift of the i-f comparison sideband. During all other types of emission, there is no output from the FSK modulator.

(11) The d-c control voltage from the master oscillator phase detector has i-f and harmonic ripple content which is removed by a 10-kc low-pass filter. The filter is inserted between the phase detector and saturable reactor L314. However spurious signals as low as 30 cycles may still be present. One of the functions of feedback amplifiers V607A, V607B, and V608A is to remove such signals. A spurious signal appearing at the output of the low-pass filter is applied through resistor R484 (see figure 4-2) to grid 7 of V607A. The signal is amplified by V607B and V608A and the output of V608A is returned through feedback path number one to oppose the original signal (negative feedback). Thus, the net spurious signal voltage appearing across R484 is reduced to a negligible value. The d-c control voltage is not affected by the feedback path because the amplifiers do not pass d-c. If the master oscillator should suddenly change frequency (due to shock, for example) the transient voltage is coupled through the feedback amplifiers. When the change in

voltage exceeds the normal spurious signal level, V608A saturates, and feedback path number one becomes ineffective until the master oscillator frequency is stabilized. DEVIATION CALIBRATE ZERO ADJUST meter M601 measures the spurious signal level in feedback path number one. Feedback path number two (refer to figure 4-2) is a secondary degenerative feedback path within the major loop and its function is to maintain the overall a-c loop gain at a reasonably constant level.

(12) Feedback path number three provides an automatic searching function for initial lock in of the master oscillator. The feedback is positive (regenerative) and is effective only at extremely low frequencies. When the master oscillator is locked in, point P (refer to figure 4-2) is essentially at ground potential for feedback path number three and thus it has no effect on the a-c control loop. However, with the master oscillator unlocked, the impedance at point P for feedback path number three rises to a level sufficiently high that a positive feedback voltage is developed and stages V607A and V607B oscillate at approximately 2 cycles, thereby sweeping the frequency of the master oscillator until it generates the proper frequency and locks in.

b. DETAILED OPERATION.

(1) MASTER OSCILLATOR.

(*a*) The circuits described below are located in an oven unit and on a subchassis contained in Radio Frequency Oscillator O-621/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-3. For further detail refer to the schematic diagram in figure 6-25.

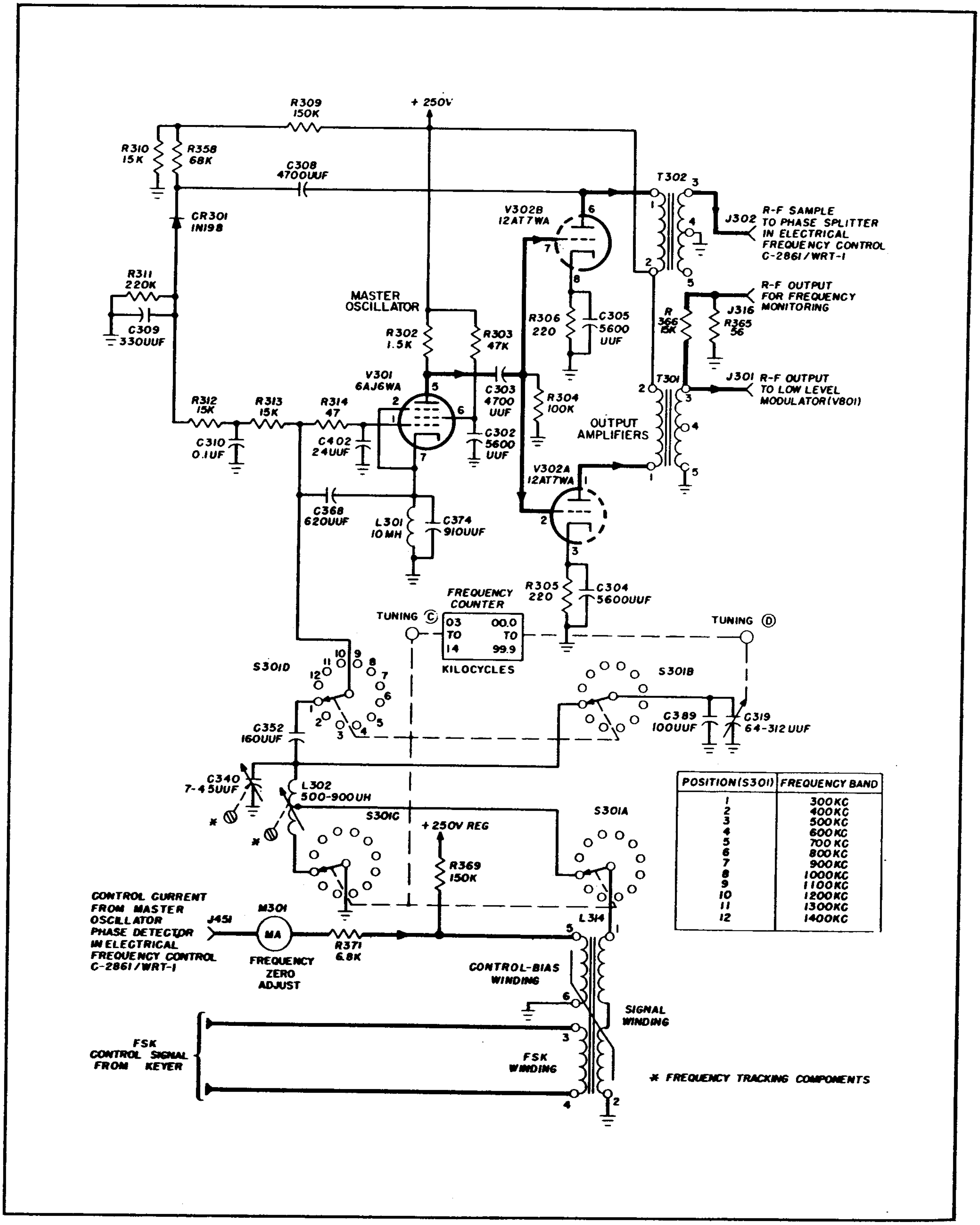
(*b*) The master oscillator generates the transmitter carrier frequency. A frequency range of 0.3 to 1.5 Mc is obtained by bandswitching in 100-kc steps. The master oscillator is a Clapp circuit with amplitude stabilization for increased frequency stability. On all bands, the a-c winding of a saturable reactor is connected as part of the frequency-determining tank circuit of the oscillator. The reactor has two control winding. One winding receives a d-c control signal from the frequency control circuits whenever the master oscillator begins to drift from the assigned frequency. The second winding receives a d-c control signal during FSK operation and the master oscillator frequency is shifted up for a *mark* and down for a *space* signal.

(*c*) For simplicity, only the frequency-determining elements associated with position one of TUNING Ⓒ bandswitch S301 are shown in figure 4-3. The position of S301 determines the band of operation of the master oscillator V301. The frequency-determining elements of band one are capacitors C340, C389, and C319, and coil L302 and the a-c or signal winding of saturable reactor L314. Master oscillator V301 is a Clapp oscillator, a modification of the Colpitts type. As shown in figure 4-3, inductor L301 provides a d-c ground for the cathode of V301. R-f voltage developed across capacitor C374 is coupled to the grid tank circuit through capacitors C368 and C352 to sustain oscillations. The tank circuit is coupled to the grid of V301 through resistor R314. Tuning within each 100-kc band is accomplished with TUNING Ⓓ control which varies the capacitance of C319. Inductor L302 and capacitor C340 are adjustable for frequency tracking during alignment. A frequency counter on the front panel of Radio Frequency Oscillator O-621/WRT-1 indicates directly the frequency to which the master oscillator circuit is tuned. TUNING Ⓒ control selects the first two digits (03 to 14) and TUNING Ⓓ control selects the next three digits (00.0 to 99.0) of the desired operating frequency.

(*d*) The plate output of V301 is coupled through C303 and developed across resistor R304 for application to the grids of buffer output amplifiers V302B and V302A. The output of V302B is coupled through transformer T302 and applied to the phase-splitting filter in Electrical Frequency Control C-2861/WRT-1 where it is utilized in the generation of comparison sidebands. The output of V302A is coupled through transformer T301 and developed across load resistors R366 and R365. The r-f sample voltage appearing across the load resistors is applied to the low level modulator, V801, in Radio Frequency Amplifier AM-2197/WRT-1. Jack J316 provides an r-f output of lower level for frequency-monitoring equipment.

(*e*) As shown in figure 4-3, the plate output of V302B is coupled through capacitor C308 to diode CR301. Normally the diode is reverse-biased by the negative voltage drop across resistor R310. However, when the negative-going plate output of V302B exceeds the bias level, CR301 conducts and a voltage negative with respect to ground is developed across resistor R311. The negative voltage is applied to the grid of the master oscillator through a filter network consisting of resistors R312 and R313, and capacitor C310. The level of bias voltage is directly related to the signal level at the plate of V302B. Thus the master oscillator always operates without drawing grid current, which improves the frequency stability and reduces the harmonic content of the output signal.

(*f*) As shown in figure 4-3, the signal winding of saturable reactor L314 shunts a portion of inductor L302. A variation in the inductance of the signal winding causes a variation in the output frequency of the master oscillator. If the master oscillator starts to drift in frequency, a d-c voltage of proper polarity and magnitude from the master oscillator phase detector in Electrical Frequency Control C-2861/WRT-1 is applied through FREQUENCY ZERO ADJUST meter M301 and resistor R371 to terminal 5 of the control bias winding of L314. The control signal causes the inductance of the signal winding to change and the master oscillator returns to the proper frequency. During FSK operation, an FSK control voltage from the keyer in



POSITION(S301)	FREQUENCY BAND
1	300KC
2	400KC
3	500KC
4	600KC
5	700KC
6	800KC
7	900KC
8	1000KC
9	1100KC
10	1200KC
11	1300KC
12	1400KC

Figure 4-3. Master Oscillator, Simplified Schematic Diagram

Radio Frequency Oscillator O-621/WRT-1 is impressed across termnials 6 and 4 of L314. The FSK control voltage increases and decreases the inductance of the signal winding at the keying rate; hence, the frequency of the master oscillator increases and decreases at the keying rate. A similar bias control signal is applied to the interpolation oscillator in the Electrical Frequency Control C-2861/WRT-1 so that the frequency stabilization circuits will follow the changing master oscillator frequency and not develop a false correction signal to inhibit the FSK operation.

(*g*) Capacitors C368 and C374, cathode choke L301, saturable reactor L314, and all of the frequency-determining elements selected by band switch S301 are mounted in a temperature-controlled oven. The oven heaters and associated circuits are shown in the complete schematic diagram, figure 6-27. Power of 115 volts, 60 cycles is applied to the oven heater circuits through OVEN HEAT switch S304. When the oven is cold, relay K301 is energized through resistor R367. The closing of contacts K301B energizes OVEN HEATERS lamp DS301 and heaters HR301 through HR306. When the oven reaches operating temperature, mercury thermostat S306 shorts out the coil of K301A. Thus, K301 is deenergized, OVEN HEATERS lamp DS301 is extinguished, and power is removed from the heaters until S306 opens due to oven cooling. The cycle is then repeated. The oven temperature is maintained at approximately 60 degrees C (140 degrees F), and it is regulated to within 1.0 degree C. Bimetallic disk S307 is an excessive-temperature protection device.

(2) MASTER OSCILLATOR GEAR TRAIN.

(*a*) TUNING Ⓒ.—The 100-kc band, within which the master oscillator is to be tuned, is selected by the TUNING Ⓒ control. Rotation of this control knob is transmitted by means of chain MP321 to sprockets MP317 and MP319 as shown in figure 4-4. Sprocket MP319 transfers this rotation through bevel gears MP326 and MP327 to band switch S301. Switch S301 selects the electronic circuitry to be used in conjunction with tuning capacitor C319. Each position of switch S301 provides successively the circuit components necessary to enable capacitor C319 to tune through any 100-kc wide band from 3 through 14. At the same time that switch S301 is rotated by sprocket MP319, sprocket MP317 rotates bevel gears MP316 and MP313 and the two left hand dials of counter M302. The two left hand dials therefore indicate the tuning range of the master oscillator in hundreds and thousands of kilocycles.

(*b*) TUNING Ⓓ.—The exact frequency to which the master oscillator is tuned is determined by capacitor C319. Rotation of the TUNING Ⓓ control is transmitted directly to the worm and wheel reduction which is part of capacitor C319. This worm and wheel provides a 20:1 reduction in rotation speed which facilitates tuning. Since capacitor C319 requires only 180 degrees of rotation, a ten turn stop assembly on the input shaft (working through a 20:1 reduction) limits

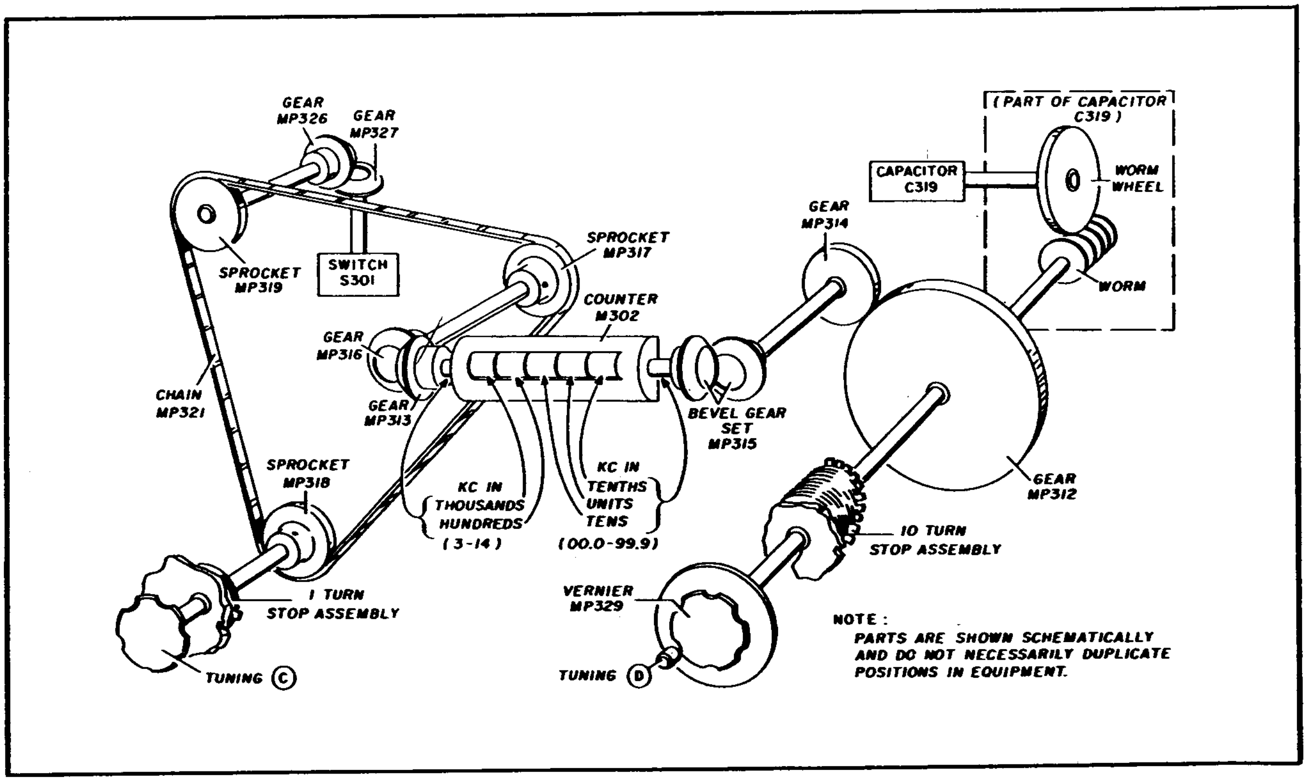


Figure 4-4. Master Oscillator and Frequency Counter Gear Train, Simplified Schematic Diagram

capacitor C319 to approximately 180 degrees. Vernier MP329 provides an additional speed reduction to permit very close tuning. Gears MP312 and MP314 rotate the three righthand dials of counter M302 through bevel gear set MP315. These three dials indicate the exact frequency of the master oscillator within the band selected by TUNING Ⓒ. The dials read from 00.0 kilocycles to 99.0 kilocycles.

(3) PHASE SPLITTING FILTER, I-F MIXER, AND 100-KC DETECTOR CIRCUITS.

(*a*) The circuits described below are located on the 100-kc amplifier and frequency comparator subchassis, contained in Electrical Frequency Control C-2861/WRT-1. Simplified schematic diagrams of the circuits are shown as follows: sets serials 1 to 141, figure 4-5; sets serials 142 and up, figure 4-5A. For further detail see schematic diagrams in figure 6-28 or figure 6-28A.

(*b*) The purpose of the circuits under discussion is to generate low frequency comparison sidebands by mixing a sample of the master oscillator output with crystal-stabilized harmonics of 100-kc. The r-f sample is fed into a phase-splitting filter, the output of which consists of two sine waves 90 degrees apart in phase. One sinusoidal output is applied to a symmetrical diode mixer; the second output is applied to an identical mixer stage. Simultaneously with the application of the sinusoidal waves, a harmonic-rich 100-kc negative voltage spike is applied symmetrically to each mixer. The mixer outputs consist of difference frequency components in the range of 0- to 100-kc. A composite phase shift network combines the mixer outputs and its characteristics are such that only difference frequencies or sidebands in the frequency range of 50 to 100-kc are passed to the i-f amplifiers. The sideband signals are then compared with the interpolation oscillator output for the development of the master oscillator correction control voltage. Unless each mixer is perfectly balanced the 100-kc fundamental will be present as a spurious output of the mixers. Automatic balancing circuits are provided which develop appropriate correction voltages to balance the mixers whenever the spurious signal appears in the output of the i-f amplifiers. The voltage spike which is applied to the mixers for sideband generation is developed by applying a crystal-stabilized 100-kc sine wave to the non-linear impedance of a ferrite core saturable reactor.

(*c*) As shown in figure 4-5 or figure 4-5A, a sample of the master oscillator output is applied to transformer T1 of phase splitting filter FL603. The secondary output of T1 is coupled to two phase shift networks. The networks are so designed that throughout the frequency range of 0.3 to 1.5 Mc the r-f output at terminal 3 of the filter leads the output at terminal 2 by a phase angle of 90 degrees.

1. In sets serials 1 to 141 (figure 4-5), the phase-shifted outputs of the filter are applied to two identical i-f mixers through T612 and T613. The mixer consisting of transformers T612 and T602, and diodes CR601 and CR602 will be referred to as mixer number one. The other circuit, consisting of transformers T613 and T603, and diodes CR603 and CR604, will be referred to as mixer number two.

2. In sets serials 142 and up (figure 4-5A), the phase-shifted outputs of filter FL603 are applied to two i-f mixers through coupling capacitors C609 and C610. The mixer consisting of capacitor C609, diodes CR601 and CR602, and transformer T602 will be called mixer number one. The other circuit, consisting of capacitor C610, diodes CR603 and CR604, and transformer T603 will be called mixer number two.

(*d*) The mixers generate difference frequency components which are then compared in phase with the stable interpolation oscillator frequency. The rectifying properties of the mixer diodes are utilized to provide the mixing action.

1. For sets serials 1 to 141 (figure 4-5), a positive d-c bias is applied through resistor R732 to terminal 2 of transformer T602. Diodes CR601 and CR602 of mixer number one are thus reversed-biased and the presence of the r-f sample voltage in the secondary of T612 does not cause either diode to conduct. Simultaneously with the application of the r-f sample voltage, negative voltage spikes are applied to the cathodes of the mixer diodes through capacitors C615 and C616. The voltage spikes occur at a frequency of 100-kc and, being highly distorted waveforms, are rich in harmonics of the fundamental frequency. During the time that the negative spikes are applied to the mixer diodes, one or the other of the diodes conducts, depending upon the instantaneous polarity of the r-f sample voltage at the secondary of T612. The non-linear rectifying properties of the diodes produce pulses of current in the primary of T602 which consist of components with frequencies that are the difference of the r-f sample frequency and the various harmonics of 100-kc. The operation of mixer number two is identical to that of mixer number one.

2. For sets serials 142 and up (figure 4-5A), a positive d-c bias is applied through resistor R732 to terminal 2 of transformer T602. Mixer diodes CR601 and CR602 are thus reverse-biased. The r-f sample voltage appearing at terminal 2 of filter FL603 does not cause diode CR601 to conduct. Simultaneously with the application of the r-f sample voltage, negative voltage spikes are applied to mixer diodes CR601 and CR602. The voltage spikes occur at a frequency of 100-kc and, being highly distorted waveforms, are rich in harmonics of the fundamental frequency. During the time the negative spikes are applied to the mixer diodes, diode CR601 conducts. The non-linear rectifying properties of the diode produce pulses of current in the primary of T602 which consist of components with frequencies that are the difference of the r-f sample frequency and the various harmonics of 100-kc. The operation of mixer number two is identical to that of mixer number one.

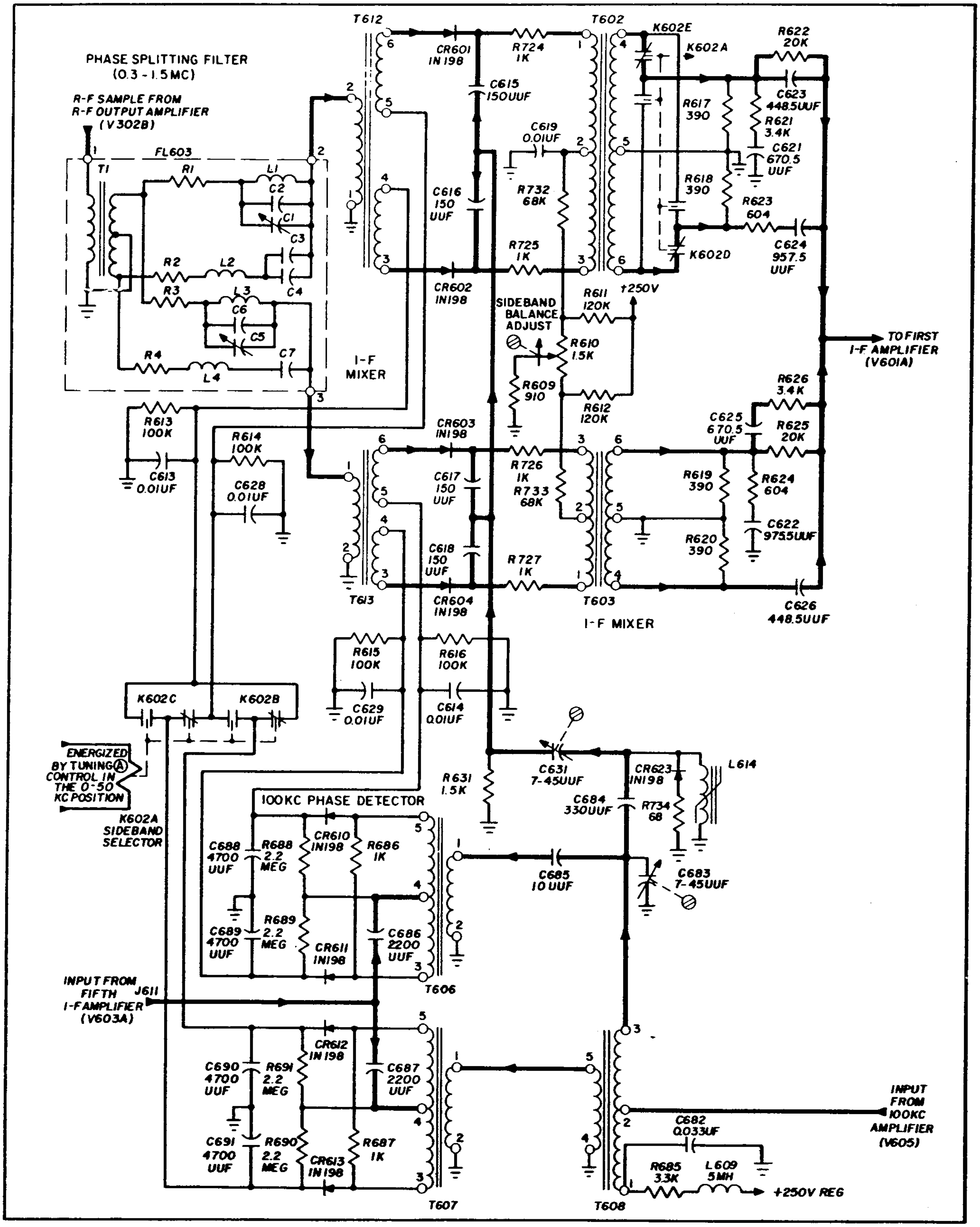


Figure 4-5. Phase Splitting Filter, I-F Mixer, and 100-Kc Detector Circuits, Simplified Schematic Diagram, Sets Serials 1 to 141

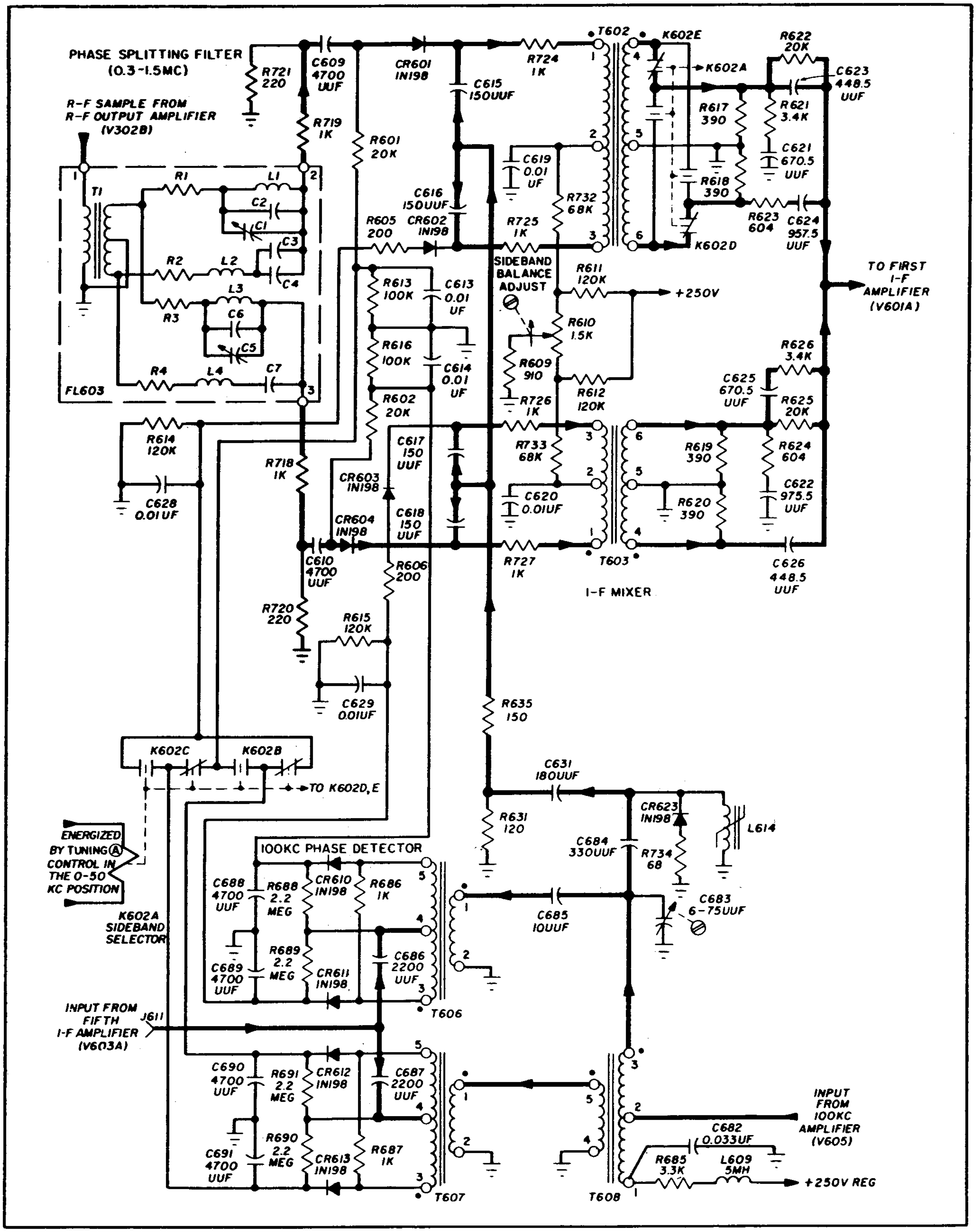


Figure 4-5A. Phase Splitting Filter, I-F Mixer, and 100-kc Detector Circuits, Simplified Schematic Diagram, Sets Serials 142 and up

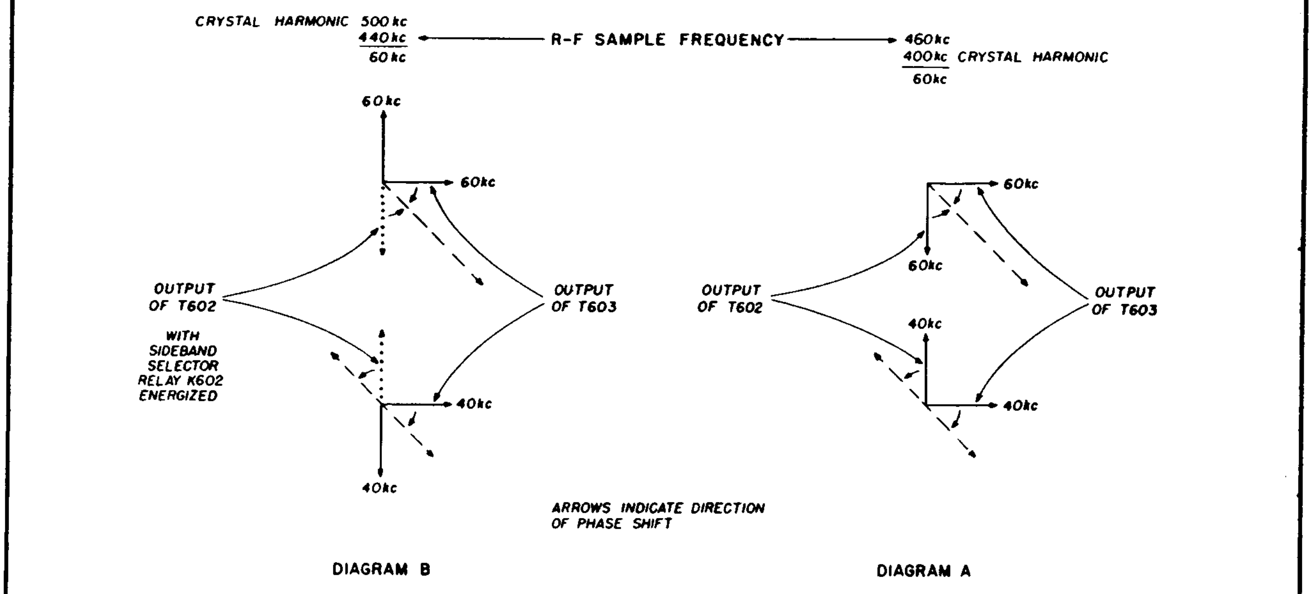


Figure 4-6. I-F Mixer Output Vector Diagrams

(*e*) The load for T602 consists of resistors R617 and R618; the load for T603 consists of resistors R619 and R620. The setting of SIDEBAND BALANCE ADJUST potentiometer R610 determines the amplitude relationship of the mixer outputs. As the potentiometer is moved to either side of its center position, the reverse bias on one set of mixer diodes changes (increases or decreases) with respect to the reverse bias on the other set and the magnitudes of the currents in the primaries of T602 and T603 change correspondingly. The outputs of T602 and T603 pass through a composite phase shift network and are combined at the grid of the first i-f amplifier V601A. The phase shift network in the output circuit of mixer number one consists of capacitors C621, C623, and C624, and resistors R621, R622, and R623; the phase shift network in the output circuit of mixer number two consists of capacitors C622, C625, and C626, and resistors R624, R625, and R626. However, since the two networks are connected together at the grid of V601A, a composite network is formed and each network provides some of the reactive phase shift for the other. The characteristics of the composite phase shift network are such that frequency components in the range of 0 to 50-kc appear 180 degrees out of phase at the grid of V601A while components in the range of 50 to 100-kc appear in phase. To understand the rather complex operation involved, refer to figure 4-6 where vector diagrams are drawn to illustrate the mixer-phase shift operation for two different examples of r-f sample frequency. The solid line vectors in the diagrams represent the mixer outputs before they are passed through the composite phase shift network; the dashed line vectors represent the outputs appearing at the grid of V601A. In Diagram A, the r-f sample frequency is 460 kc and the 40-kc output of T602 leads the 40-kc output of T603 by 90 degrees while the 60-kc output of T602 lags the 60-kc output of T603. After passing through the composite phase shift network, the signals are shifted in phase in the manner shown so that the 60-kc signals add at the grid of V601A and the 40-kc signals cancel if their amplitudes are equal. In the case illustrated by diagram B, the r-f sample frequency is 440 kc. The 60-kc signal now results from the mixing of the r-f sample and a harmonic of higher frequency and the solid line vectors of diagram B show that the phase relationships of the 40-kc and 60-kc signals are reversed. If the mixer output circuits remained unchanged from the previous case, the 40-kc signals would add at the grid of V601A and the 60-kc signals would cancel. For comparison with the interpolation oscillator frequency, however, the signal at the grid of V601A must be in the range of 50 to 100-kc. When the last 10-kc digits of the operating frequency lie between the extremes of 0 and 50-kc, sideband selector relay K602 is energized and the output of mixer number one reversed in phase by contacts K602D and K602E. The dotted line vectors of diagram B indicate the outputs of mixer number one with K602 energized, and, as in the case of the first example, the 40-kc signal components cancel and the 60-kc components add at the grid of V601A. SIDEBAND BALANCE ADJUST potentiometer R610 is provided for adjusting the output levels of the two mixers for most effective cancellation of the unwanted signals. The operation of the switch which energizes relay K602 is described in paragraph 4-2*b*(7)(*c*) below.

(*f*) As shown in figure 4-5 or figure 4-5A, the 100-kc pulses are applied symmetrically to each mixer and under ideal conditions the 100-kc signal current in each half of the mixer output transformer windings is identical in magnitude, creating no net flux linkage. The ideal condition, however, never exists and there is always some leakage of the 100-kc fundamental frequency. Two 100-kc phase detector circuits are provided which automatically develop corrective bias for application to the mixer diodes when a 100-kc signal appears in the i-f amplifier output.

(*g*) In order that the 100-kc balancing circuits may operate properly, two pieces of information are necessary. First, the mixer at fault must be determined and, secondly, the polarity of the unbalanced current within each mixer must be determined in order that the corrective bias may be applied to the proper diode. To determine which mixer is producing the unwanted 100-kc signal, a sample of the last i-f amplifier output is compared in the two 100-kc detectors with two reference signals. The reference signals are related to the 100-kc mixer input signal by phase differences of 0 and

90 degrees. The zero phase reference is applied to T607 and the 90 degree reference is applied to T606 (refer to figure 4-5). The output of the fifth i-f amplifier, V603A, is applied symmetrically to both 100-kc detectors through capacitors C686 and C687. A zero phase shift 100-kc i-f signal will cause the detector consisting of T607, diodes CR602 and CR613, resistors R613 and R614, and capacitors C613 and C628 to become unbalanced. A 180 degree phase shift i-f signal will also cause an unbalanced output, but in such a case, the output will be of opposite polarity. A 90 degree phase shift 100-kc i-f signal will produce no net output from the same detector, and no net output is produced when a 270 degree i-f signal is present. The second 100-kc detector consisting of T606, diodes CR610 and CR611, resistors R615 and R616, and capacitors C614 and C629 responds to 100-kc i-f signals with phase shifts of 90 and 270 degrees. Thus when mixer number one is unbalanced, the d-c output voltage developed by detector diodes CR602 and CR613 becomes unbalanced and one diode of mixer number one conducts more current than the other. The 100-kc detector diodes CR610 and CR611 operate in a similar fashion to balance mixer number two when a zero phase shift 100-kc signal appears in the i-f amplifier output. The polarity of the mixer output voltage determines which diode in the mixer receives the greater forward bias. For example, if the 100-kc signal current in the primary of T602 is greater through terminal 1 than through terminal 2, the corrective bias developed by the 100-kc detector is such as to increase the positive voltage across R613 which in turn decreases the forward resistance of CR602. Relay contacts K602C and K602B interchange the bias connections to the diodes of mixer number one when the output voltage polarity of T602 is reversed on the 0- to 50-kc band of operation.

(*b*) The 100-kc negative voltage spikes applied to the two i-f mixers are developed from a crystal-stabilized 100-kc sinusoidal voltage. As shown in figure 4-5 or figure 4-5A, the sinusoidal output of the 100-kc amplifier is developed across terminals 1 and 2 of T608. Adjustment of capacitor C683 tunes the primary of T608 for maximum output. The signal at the secondary of T608 serves as a reference for one of the 100-kc detectors as described in the paragraph above. The signal appearing by autotransformer action at terminal 3 of T608 is applied through C685 as a reference for the second 100-kc detector and through C684 at saturable reactor L614. As the r-f voltage increases in the positive direction, the impedance of L614 remains fairly constant until the current reaches a level sufficiently high to saturate the ferrite core. The impedance of L614 then drops sharply and the voltage developed drops to a low value. The negative-going cycle of r-f voltage is bypassed to ground by diode CR623. An r-c differentiating network consisting of capacitor C631 and resistor R631 converts the steep trailing edge of the voltage pulse across L614 into a negative spike which is applied symmetrically to both i-f mixers. In sets serials 1 to 141, capacitor C631 is adjusted during alignment for maximum mixer output.

(4) CRYSTAL OSCILLATORS, MIXER, BUFFER AMPLIFIER, AND 100-KC AMPLIFIER.

(*a*) The circuits described below are located in an oven and on a subchassis contained in Electrical Frequency Control C-2861/WRT-1. A simplified schematic of the circuits is shown in figure 4-7. For further detail refer to the schematic diagram of figure 6-28.

(*b*) The 100-kc voltage spikes which are applied to the i-f mixers for sideband generation are derived from the combined output of two crystal-controlled oscillators. The output of a 1.0-Mc crystal oscillator and the output of a 1.1-Mc crystal oscillator are combined in a transistor mixer. The non-linear properties of the mixer produce a difference frequency output of 100-kc which is selected by a tuned filter and then applied through a buffer stage and amplifier stage to the pulse generating circuit.

(*c*) As shown in figure 4-7, the two crystal oscillators are identical in configuration and are Clapp circuits, a variation of the Colpitts type. Since the operation of the two oscillator circuits is identical, only the 1.0-Mc circuit will be discussed. Crystal Y601 is the primary frequency-determining element of the 1.0-Mc oscillator. Capacitor C674 is provided for calibrating the output frequency of the oscillator with an external frequency standard. The adjustment is made through an access hole in the inner top cover of the oven which contains the unit. Capacitor C719 provides a path for the r-f emitter current of Q601 and capacitor C718 provides the positive feedback between emitter and base necessary to sustain oscillations. The emitter d-c current path is through r-f choke L612 and resistor R741; resistors R740 and R739 establish d-c collector to base and emitter to base bias. Zener diode CR624 maintains a d-c potential of approximately five volts between the collector of Q601 and the lower end of choke L612 and thus provides the low voltage for the transistor bias network.

(*d*) As shown in figure 4-7, the output of the 1.0-Mc oscillator is coupled through resistor R742, capacitor C726 and resistor R750 to the base of the mixer, Q603. The output of the 1.1-Mc oscillator is coupled through resistor R747, capacitor C727, and resistor R751 to the mixer base. Adjustment of the frequency of the 1.1-Mc oscillator is provided by capacitor C675 which is varied by means of 1.1 MC XTAL OSC LOG dial mounted on the exterior of the oven. During frequency alignment the 1.0-Mc oscillator output is first calibrated and then the logging dial is adjusted until the mixer output is 100-kc. The mixer, Q603, is biased for non-linear operation and tuned filter FL604 selects the difference frequency component in the collector output current for application to buffer amplifier V604. Filter FL604 has a frequency response of 100-kc ± 100 cycles.

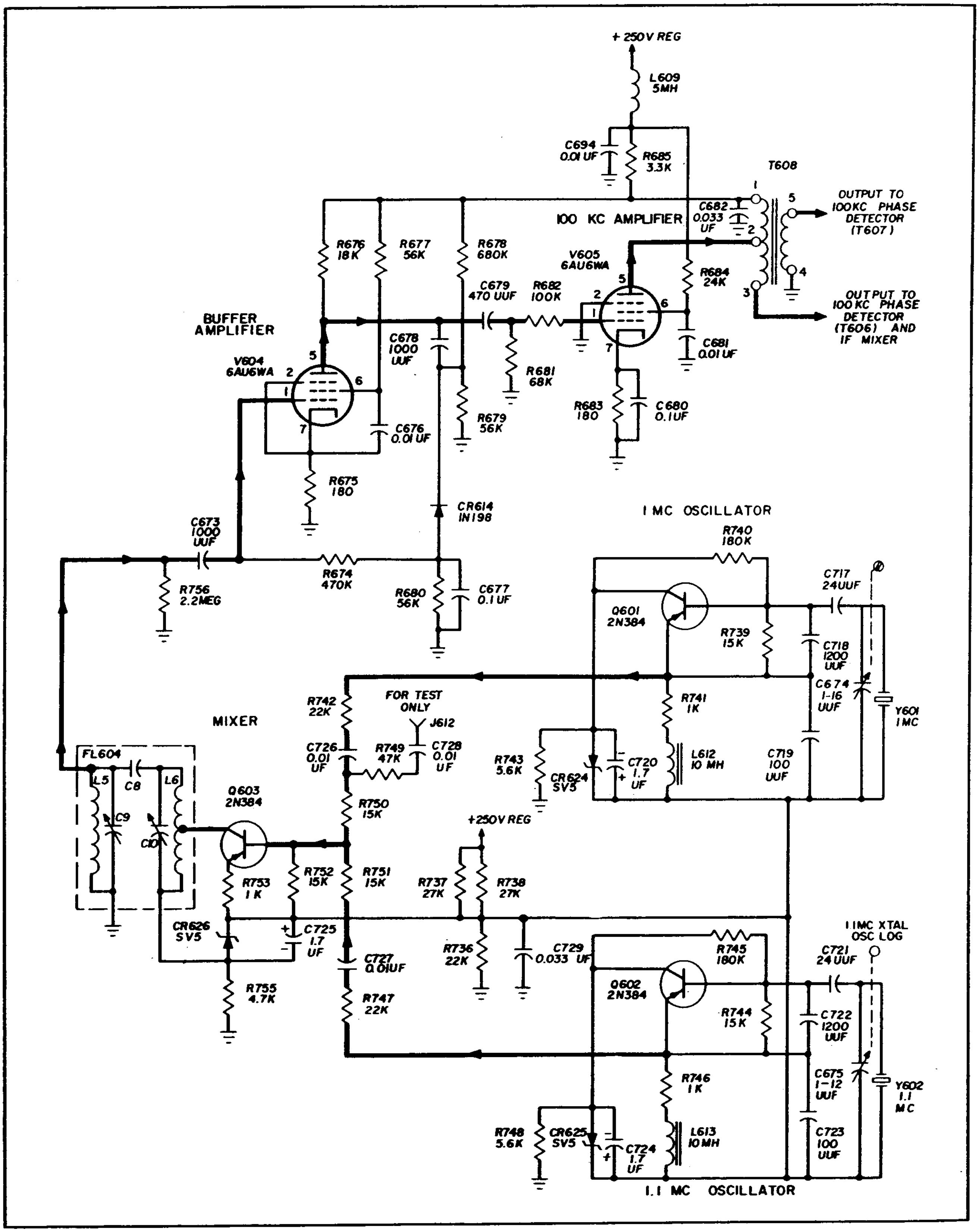


Figure 4-7. Crystal Oscillators, Mixer, Buffer Amplifier, and 100-Kc Amplifier Circuits, Simplified Schematic Diagram

(*e*) As shown in figure 4-7, the 100-kc mixer output is developed across resistor R756 and coupled through capacitor C673 to the grid of buffer amplifier V604. The signal at the plate of V604 is coupled through capacitor C679 to the grid of the 100-kc amplifier, V605. Amplitude stabilization of the output of the buffer amplifier is provided by the rectifier consisting of diode CR614 and capacitor C677 and resistor R680. When the negative-going excursion of the plate signal coupled through capacitor C678 exceeds the reverse bias developed across resistor R679, diode CR614 conducts and a negative d-c voltage is applied to the grid of the buffer amplifier through resistor R674.

(*f*) The plate signal current of the 100-kc amplifier develops a voltage across terminals 1 and 2 of transformer T608. The voltage induced in the secondary is applied to T607 of the 100-kc phase detector. Due to autotransformer action, a voltage approximately 1.7 times greater than that across terminals 1 and 2 appears at terminal 3 of T608. The autotransformer output is applied to T606 of the second 100-kc phase detector and to the ferrite core saturable reactor which creates the voltage spikes for the i-f mixer.

(5) I-F AMPLIFIERS.

(*a*) The circuits described below are located on a subchassis contained in Electrical Frequency Control C-2861/WRT-1. A simplified schematic of the circuits is shown in figure 4-8. For further detail refer to the schematic diagram of figure 6-26.

(*b*) The i-f amplifier circuits consist of five cascaded r-c coupled amplifiers which raise the level of the i-f mixer output to a value suitable for application to the master oscillator phase detector. Bandpass filters inserted in the output of the first two amplifiers limit the response to frequencies in the range of 50 to 100-kc. An automatic gain control voltage is applied to the first and second i-f amplifiers. In addition to the output for the master oscillator phase detector, a sample of the i-f output frequency is applied to the 100-kc detectors.

(*c*) As shown in figure 4-8, the output of the i-f mixers is coupled through capacitor C627 to the grid of the first i-f amplifier, V601A. The plate output of V601A is developed across resistor R629 and the reactive components of bandpass filter FL601. The filtered output of V601A is coupled through capacitor C639 to the grid of the second i-f amplifier V601B. After filtering by FL602 the output of V601B is coupled to the grid of the third i-f amplifier, V602A, through capacitor C643. A test jack J605, is provided for monitoring the grid input of V602A; resistors R628 and R668 isolate the test circuit. Resistor R640 is common to both the grid and cathode circuit of V602A and thus provides negative feedback to improve the linearity of the stage. The output of V602A is developed across resistor R637 and coupled through capacitor C645 to the grid of the fourth i-f amplifier V602B. Resistor R645 provides negative feedback for the fourth i-f amplifier stage. The output of V602B is developed across resistor R642 and coupled through capacitor

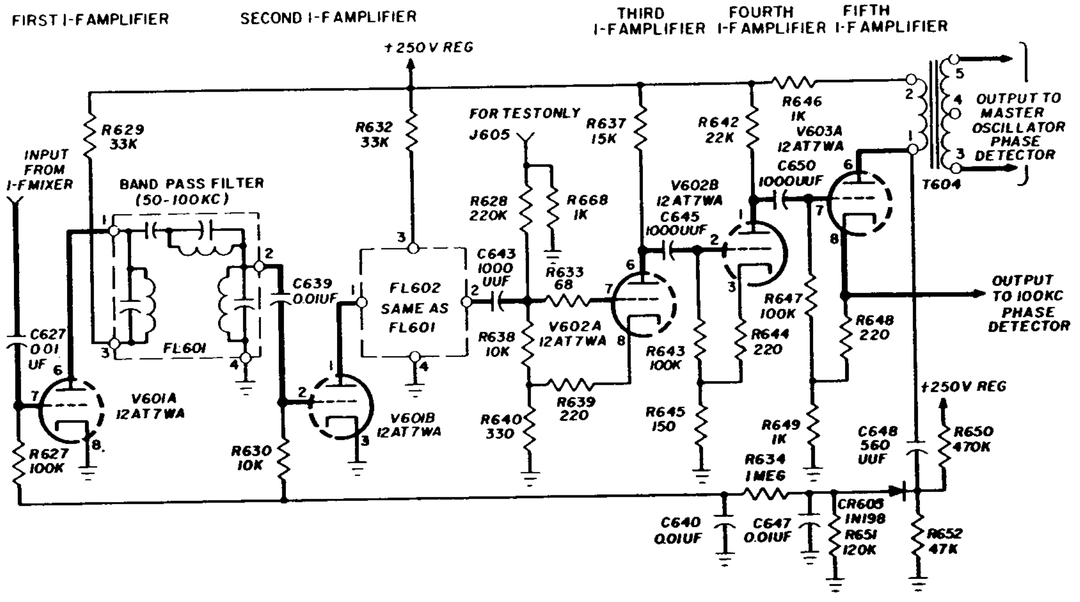


Figure 4-8. I-F Amplifier Circuits, Simplified Schematic Diagram

C650 to the grid of the fifth i-f amplifier, V603A. The output of V603A is developed across the primary winding of transformer T604 and the signal induced in the secondary winding is applied to the master oscillator phase detector. Resistor R649 provides negative feedback for the fifth i-f amplifier stage. The signal developed across resistors R648 and R649 is conducted through a coaxial cable to the 100-kc amplifier subchassis where it is applied to the 100-kc detector circuits.

(*d*) Automatic gain control of V601A and V601B is accomplished by applying a negative d-c voltage proportional to the output signal level to the grids of the two tubes. As shown in figure 4-8, the AGC rectifier, diode CR605, is normally biased to cutoff by the positive drop across resistor R652. The a-c signal at the plate of V603A is coupled to the cathode of CR605 through capacitor C648. When the negative-going portion of the a-c signal exceeds the reverse bias level, the diode conducts. The pulses of current through the diode are filtered by capacitor C647 and a negative d-c voltage is developed across resistor R651. After additional filtering by resistor R634 and C640, the negative AGC control voltage is applied to the grids of V601A and V601B through, respectively, resistor R627 and resistor R630.

(6) MASTER OSCILLATOR PHASE DETECTOR, INTERPOLATION OSCILLATOR, AND FSK MODULATOR.

(*a*) The circuits described below are located in an oven and on a subchassis contained in Electrical Frequency Control C-2861/WRT-1. A simplified schematic diagram of the circuits is shown on figure 4-9. For further detail refer to the schematic diagram of figure 6-26.

(*b*) The interpolation oscillator generates a signal which is variable over the range of 50 to 100 kc. Th output of the oscillator is compared with the i-f amplifier output in a phase detector circuit. If the master oscillator drifts in frequency, the phase relationship between the i-f and interpolation oscillator signals changes, and a d-c voltage is developed in the phase detector output. The d-c correction voltage is applied to a saturable reactor which is one of the frequency-determining elements in the grid circuit of the master oscillator. The polarity of the phase detector output is determined by the direction of frequency drift and the magnitude is a function of the amount of drift. During FSK operation the frequency of the interpolation oscillator is changed simultaneously with the master oscillator frequency in order that the phase detector will not develop a voltage output which would inhibit the operation. The change in frequency of the interpolation oscillator is achieved by the operation of a reactance modulator. FSK keying voltage and a sample of the interpolation oscillator signal are applied to the reactance modulator. The output voltage of the modulator is coupled back to the oscillator grid and the phase of the voltage (leading or lagging) has the effect of inserting capacitance or inductance, thus changing the interpolation oscillator frequency.

(*c*) As shown in figure 4-9, the interpolation oscillator, V606, is a modification of the Colpitts type of circuit. To simlify the analysis, only the frequency-determining components associated with positions 0 and 9 of bandswitch S601 are shown. TUNING Ⓐ control (located on the front panel of Electrical Frequency Control C-2861/WRT-1 operates the bandswitch and sets the first kilocycle digit on the frequency counter on the front panel. The frequency-determining components shown are for the 90 to 100-kc band; they consist of coil L619 and capacitors C667, C715, C672, C710 and C662. Capacitors C715 and C672, and coil L619 are adjustable for tracking purposes during alignment. TUNING Ⓑ control (located on the front panel of Electrical Frequency Control C-2861/WRT-1) varies the capacitance of C662 for band tuning and simultaneously sets the last three digits on the frequency counter. The counter has two windows and when the 10-kc digits of the desired carrier frequency are in the range of 0 to 49.9 the lower window of the counter is uncovered; when the 10-kc digits are in the range of 50 to 99.9-kc, the upper window of the counter is uncovered. To simplify the transmitter tuning procedure, the TUNING Ⓐ and TUNING Ⓑ control are set so that the 10-kc digits of the desired operating frequency appear on the counter. The interpolation oscillator frequency, however, has a range of only 50 to 100 kc. The reading of the frequency counter and the frequency of the interpolation oscillator are identical only when the last 10-kc digits of the operating frequency are in the range of 50 to 99.9 kc. As shown in figure 4-8, bandswitch positions 0 and 9 select identical frequency-determining components; positions 1 and 8, 2 and 7, 3 and 6, and 4 and 5 are also in each case identical. The interpolation oscillator frequencies versus the readings of the counter dials may be determined from the following table.

COUNTER READING		FREQUENCY OF INTERPOLATION OSCILLATOR
Lower Window	Upper Window	
00.01- 9.99		99.99-90.01 kc
10.01-19.99		89.99-80.01 kc
20.01-29.99		79.99-70.01 kc
30.01-39.99		69.99-60.01 kc
40.01-49.99		59.99-50.01 kc
	50.01-59.99	50.01-59.99 kc
	60.01-69.99	60.01-69.99 kc
	70.01-79.99	70.01-79.99 kc
	80.01-89.99	80.01-89.99 kc
	90.01-99.99	90.01-99.99 kc

Since mechanical limitations make it difficult to set the last two digits of the operating frequency exactly with the counter, a vernier control is provided on the TUNING B control shaft; the vernier in effect provides fine tuning of capacitor C662 and can vary the desired frequency setting by ±50 cycles.

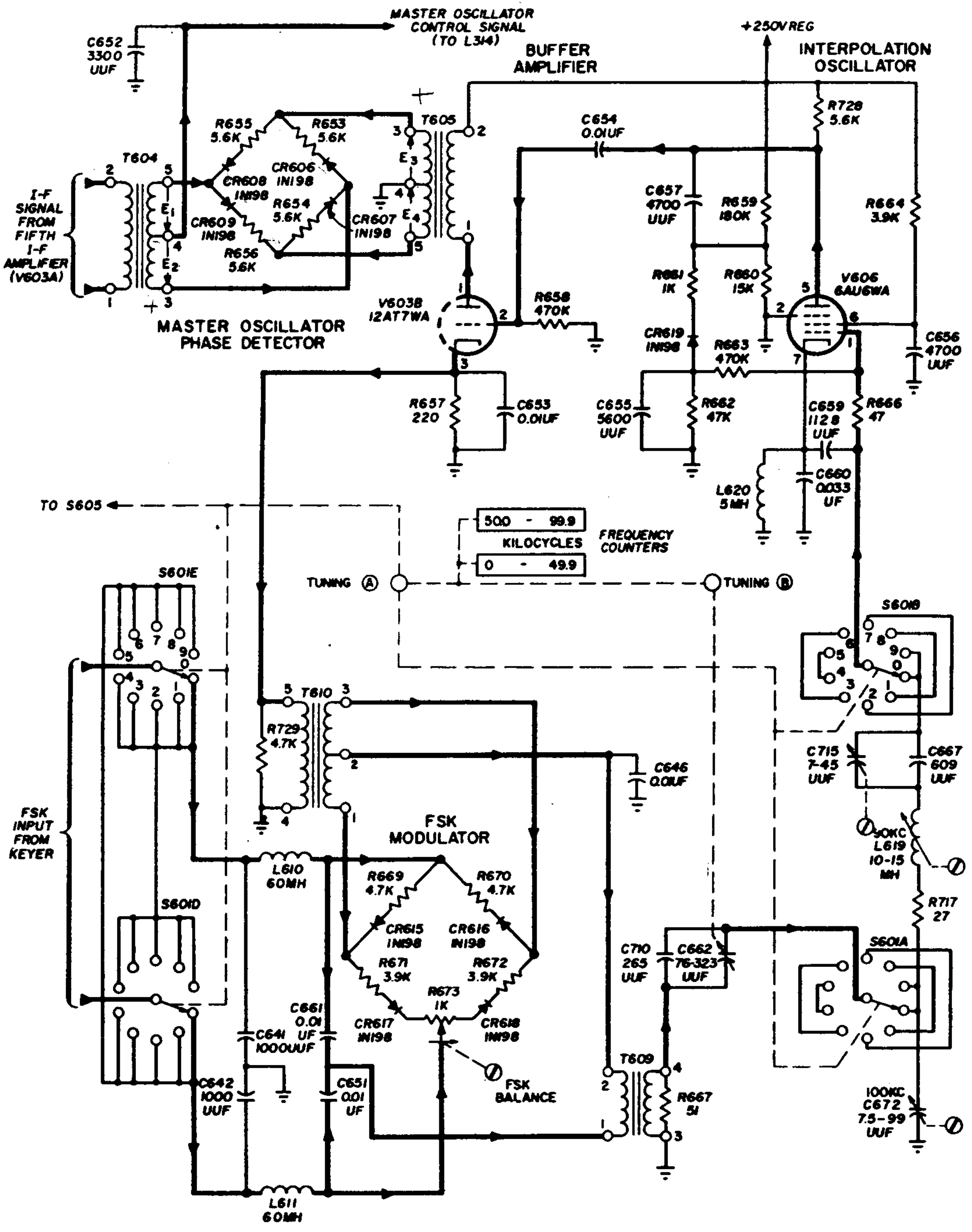


Figure 4-9. Master Oscillator Phase Detector, Interpolation Oscillator, and FSK Modulator, Simplified Schematic Diagram

(*d*) Capacitor C569 (refer to figure 4-9) provides the necessary positive feedback path for sustaining oscillations in the resonant grid circuit of the interpolation oscillator, V606. The cathode r-f current path is through capacitor C660; choke L620 provides a d-c current path. The r-f signal developed across resistor R728 is coupled to the grid of buffer amplifier V603B through capacitor C654. The buffer amplifier isolates the oscillator from the loading effects of the master oscillator phase detector and the reactance modulator.

(*e*) An automatic bias control circuit is provided for the interpolation oscillator stage in order that the tube may be kept from drawing grid current. Harmonic generation and frequency instability are thus reduced. As shown in figure 4-9, diode CR619 is normally biased to cutoff by the positive d-c voltage drop across resistor R660. The plate output of V606 is coupled to the cathode of CR619 through capacitor C657 and when the negative-going portion of the a-c signal exceeds the reverse bias on the diode, it conducts. The pulses of current are filtered by capacitor C655, and a negative d-c voltage proportional to the oscillator output is developed across load resistor R662. The negative bias is applied through resistor R663 to the grid of V606.

(*f*) Capacitors C659 and C660, cathode choke L620, all of the frequency-determining elements selected by bandswitch S601 and the reactance modulator circuits are mounted on a temperature-controlled oven. The oven heater and associated circuits are shown in the complete schematic diagram, figure 6-26. Power of 115 volts, 60 cycles is applied to the oven heater circuits through OVEN HEAT switch S604. When the oven is cold, relay K601 is energized through resistor R608. The closing of contacts K601B energizes OVEN HEATERS lamp DS601 and oven heaters HR601 through HR606. When the oven reaches operating temperature, mercury thermostat S602 shorts out the coil of K601. Thus, K601 is deenergized, OVEN HEATERS lamp DS601 is extinguished, and power is removed from the heaters until S602 opens due to oven cooling. The cycle is then repeated. The oven temperature is maintained at approximately 60 degrees C (140 degrees F), and it is regulated to within 1.0 degrees C. Bimetallic disk S603 is an excessive-temperature protection device.

(*g*) As shown in figure 4-9, the output of the fifth i-f amplifier and the output of the buffer amplifier are applied to the master oscillator phase detector through, respectively, transformers T604 and T605. The d-c output of the phase detector appears across capacitor C652 and is applied through a coaxial cable to the feedback amplifier chassis. After passing through a 10-kc low-pass filter, the control voltage is subjected to the action of the feedback amplifier circuits and then passes through another coaxial cable to the saturable reactor in the master oscillator circuit. When the i-f and interpolation oscillator signals are in phase, the voltage across C652 is 2.0 to 3.0 volts positive with respect to ground; when the signals are 90 degrees apart in phase, the voltage across C652 is approximately zero; and when the signals are 180 degrees apart in phase the voltage across C652 is 2.0 to 3.0 volts negative with respect to ground.

(*h*) To understand the operation of the diode bridge phase detector, assume first the case where i-f and interpolation oscillator are in phase. In such a case, during one half of the a-c voltage cycle terminal 3 of T605 will be positive with respect to terminal 5, and terminal 3 of T604 will be positive with respect to terminal 5. The secondary voltage of T605 causes diodes CR608 and CR609 to conduct; the secondary voltage of T604 causes diodes CR606 and CR608 to conduct. To add clarity to the discussion, the various voltages at the transformer secondaries will be designated as follows: E_1—voltage from center tap to terminal 5 of T604—center tap positive; E_2—voltage from center tap to terminal 3 of T604—center tap negative; E_3—voltage from center tap to terminal 3 of T605—center tap negative; and E_4—voltage from center tap to terminal 5 of T605—center tap positive. (These arbitrary voltage designations are indicated on the simplified schematic of figure 4-9.) Voltage E_1 is in series with E_3 through resistor R655 and diode CR608. Voltage E_2 is in series with E_4 through resistors R653, R655, and R656 and diodes CR606, CR608, and CR609. Capacitor C652 is bridged between the center taps of the two transformers, and the current path of least resistance determines the net charge on the capacitor. In the present example, voltages E_1 and E_3 are in series with the path of least resistance and therefore capacitor C652 will have a charge positive with respect to ground. During the next half cycle of a-c voltage, the polarities of E_1, E_2, E_3, and E_4 are reversed. Voltages E_2 and E_4 are now in series with the low resistance path consisting of resistor R654 and diode CR607 and the positive charge on C652 is maintained.

(*i*) From the preceding discussion, it should now be apparent that the diode bridge functions as a phase-sensitive switch. When the i-f and interpolation oscillator inputs are in phase, diodes CR608 and CR607 alternately conduct the most current and a positive charge is developed on C652. When the inputs are 180 degrees out of phase, diodes CR609 and CR606 alternately conduct the most current and a negative charge is developed on C652. When the inputs are 90 degrees out of phase, diode CR608 will provide the low resistance path during one quarter of the cycle. During the second quarter-cycle, diode CR609 will provide the low resistance path. Diodes CR607 and CR606 alternately function in a similar manner during the following half cycle. The symmetrical behavior of the bridge thus permits no net charge per cycle to be developed on C652.

(*j*) As mentioned previously, during FSK operation the interpolation oscillator frequency must be shifted in synchronism with the master oscillator in order that the phase detector will not produce an inhibiting correction voltage. Frequency shifting of the interpolation oscillator is accomplished by the output of the FSK modulator. As shown in figure 4-9, the FSK modulator utilizes a diode bridge very similar to that used in the phase detector discussed in the previous paragraph. As in the previous case, the bridge serves in effect as a switch. A sample of the interpolation oscillator output is developed across terminals 3 and 1 of transformer T610 and applied to two corners of the bridge. The d-c FSK keying voltage passes through switch wafers S601E and S601D, is filtered by low-pass filters consisting of chokes L610 and L611 and capacitors C641 and C642, and then is applied to the other two corners of the bridge. The modulator output transformer, T609, is connected to the center tap of T610 and to the junction of d-c isolation capacitors C661 and C651.

(*k*) To understand the operation of the FSK modulator, consider first the case when no FSK input is present. Assume for the moment that the secondary voltage of T610 is such that terminal one is positive with respect to terminal three. Diodes CR617 and CR618 will conduct due to the foreward bias and the secondary voltage of T610 will be dropped across resistors R671 and R672 and FSK BALANCE potentiometer R673. If the potentiometer is adjusted until the potential at its arm is equal to the potential at the centertap of T610, no a-c current will pass through the primary of output transformer T609. During the succeeding half-cycle of input, terminal three of T610 will be positive with respect to terminal one and diodes CR615 and CR616 will conduct due to forward bias. The junction of resistors R669 and R670 will be at the same a-c potential as the centertap of T610 and therefore no a-c current will pass through the primary of T609. Assume now that a d-c FSK input is applied with a polarity such that the center contact of S601E is positive with respect to the center contact of S601D. (For the example chosen, the transmitter would be sending a *space* signal, the master oscillator frequency having been reduced by the control voltage applied to the FSK winding of the master oscillator saturable reactor.) Capacitors C661 and C651 charge, dividing the d-c voltage equally between them. Now, when terminal one of T610 is positive with respect to terminal three, the d-c voltage across capacitor C651 is placed in series with output transformer T609 and current passes through its primary from terminal one to terminal two. On the succeeding half-cycle of a-c input, the d-c voltage across capacitor C661 is switched in series with the output transformer and the current through T609 reverses direction. The current through T609 is 90 degrees out of phase with the current through the frequency-determining elements of the interpolation oscillator and its magnitude depends upon the magnitude of the FSK keying voltage. The feedback voltage developed across resistor R667 shifts the total phase of the interpolation oscillator grid current so that it appears as if additional reactance had been inserted in the grid circuit. In the present example, the phase shift would be such as to cause the frequency of the interpolation oscillator to increase. A *mark* signal from the FSK keyer reverses the polarity of the d-c voltage at the center contacts of S601E and S601D. As a consequence, the phase of the current through T609 changes 180 degrees with respect to that produced in the previous example and the total phase shift of the interpolation oscillator grid voltage is such as to decrease the frequency of oscillation.

(*l*) In the discussion of paragraph 4-2*b*(6)(*e*), it was pointed out that the i-f signal from the mixers was obtained by using the difference frequency developed when the harmonic of 100-kc was greater than the r-f sample frequency if the last 10-kc digits of the latter were in the range of 0 to 50-kc. When the last 10-kc digits of the r-f sample were in the range of 50 to 100-kc, the difference frequency used for the i-f was that developed by the r-f sample and a 100-kc harmonic of lower frequency. In order to prevent a correction signal from being applied to the master oscillator, the interpolation oscillator must decrease in frequency when the i-f decreases and must increase in frequency when the i-f increases. To accomplish this over the entire 0 to 100-kc band, the polarity of the FSK signal is reversed on the appropriate bands by switch sections S601E and S601D when the nature of the i-f signal changes. (Refer to figure 4-9.) Sideband selector switch S605 is closed until the moving contact of S601 reaches position 5 and thus sideband selector relay K602 is energized while S601 is in positions 1 through 4.

(7) INTERPOLATION OSCILLATOR GEAR TRAIN.

(*a*) Figure 4-10 is a simplified schematic diagram of the gear train used to vary the interpolation oscillator frequency. This variation is accomplished by changing the settings of switch S601 and capacitor C662. At the same time that these settings are being varied, the gear train drives counter M603 to provide a continuous indication of the interpolation oscillator frequency.

(*b*) TUNING Ⓑ control and its vernier control E627 are directly coupled to tuning capacitor C662 which is located in the temperature controlled oven. The tuning capacitor assembly C662 includes a 20:1 speed reduction worm and wheel which are not considered as part of the gear train. The setting of capacitor C662 is indicated in kilocycles on the dials of counter M603. Rotation of TUNING Ⓑ control is transferred through spur gears MP618, MP617, MP616, MP615, and MP614 to bevel gears MP626 and MP625. Bevel gear MP625 rotates spur gear MP613 which drives counter gears MP611 and MP612. It should be noted that the dials in the upper and lower counters rotate in opposite direction for a given direction of TUNING

GEAR SYMBOL		PITCH	PITCH DIAMETER	NO OF TEETH
MP605A	MITER GEAR SET	32	.750	24
MP605B				
MP610	GENEVA DRIVER	16	.9375	15
MP611	SPUR	64	500	32
MP612			.500	32
MP613			1 .000	64
MP614			.5938	38
MP615			1 .7187	110
MP616			2 .7813	178
MP617			1 .7187	110
MP618			1 7187	110
MP619			.7500	48
MP620			.7500	48
MP621			.7500	48
MP622		16	1 500	24
MP623	MITER GEAR	32	.9375	30
MP624				
MP625				
MP626				
MP627	BEVEL	48	1 3750	66
MP628	IDLER SPROCKET	$\frac{3}{16}$ INCH	901	15
MP629	SPROCKET		.902	15
MP630			1 .199	20
MP631			1 .793	30
MP632	CHAIN		$\frac{5}{32}$ WIDE	90 PITCHES
MP687	GENEVA POSITIONER	16	.9375	15
MP695	BEVEL	48	1 .3750	66

NOTES
1. REMOVE 14 TEETH
2. COMPONENTS ARE SHOWN SCHEMATICALLY & DO NOT NECESSARILY DUPLICATE PHYSICAL POSITIONS.
3. ALL DIMENSIONS ARE IN INCHES.

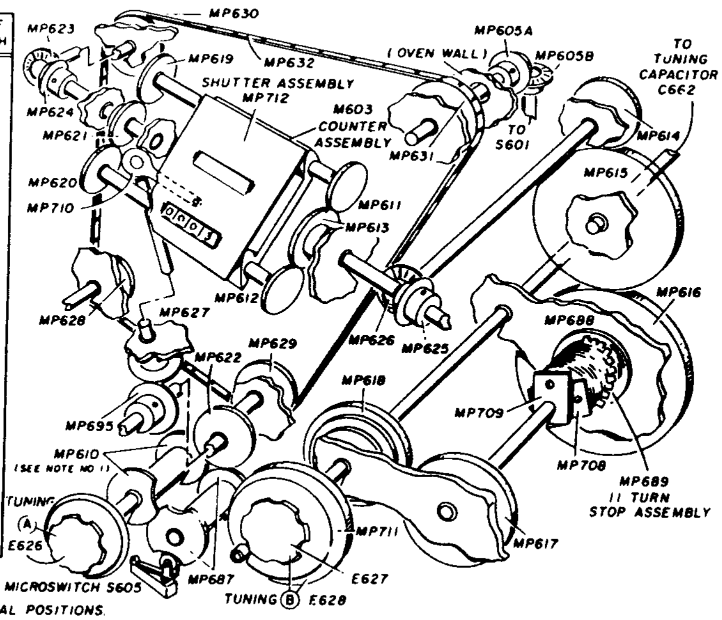


Figure 4-10. Interpolation Oscillator Gear Train, Simplified Schematic Diagram

Ⓑ control. Clockwise rotation of TUNING Ⓑ control decreases frequency when in the range where the lower set of dials is in use but increases frequency when in the upper dial range. Counter gears MP611 and MP612 drive the three right hand dials of both the upper and lower sections. This provides frequency indication from 0.01 kilocycles to 9.99 kilocycles. Stop assembly MP689 limits the rotation of capacitor C662 to approximately one-half turn since it connects through a 20:1 reduction on C662.

(*c*) TUNING Ⓐ controls bandswitch S601 and shutter assembly MP712. Rotation of TUNING Ⓐ knob E626 is coupled through sprocket MP629, chain MP632, sprocket MP631 and bevel gear set MP605A and MP605B to switch S601. An indication of the rotary switch setting appears as the lefthand dial reading on the counter M603. The applicable counter dials are rotated from TUNING Ⓐ knob E626 through sprocket MP629, chain MP632 and sprocket MP630. Sprocket MP630 drives bevel gears MP623 and MP624 which drive counter gears MP619, MP620 and MP621. As the lefthand dial of the counter moves above the "4" digit, the single tooth on Geneva Driver MP610 engages the gears of Geneva Positioner MP687. This turns spur gear MP622 and bevel gears MP695 and MP627. This movement is directly coupled to shutter arm MP710 which shifts the opening in shutter assembly MP712 to a position in front of the upper set of dials. Rotation of TUNING Ⓐ knob can be continued until the upper dial shows "9" as the left hand digit. Further rotation of E626 is prohibited by a stop on the shaft of sprocket MP631. Simultaneously with the changing of the counter assembly shutter, a second detent on Geneva Positioner MP687 acutates microswitch S605 to energize sideband selector relay K302.

(8) FEEDBACK AMPLIFIERS.

(*a*) The circuits described below are located on a subchassis contained in Electrical Frequency Control C-2861/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-11. For further detail refer to the complete schematic diagram of figure 6-26.

(*b*) The feedback amplifier circuits have three functions which are associated with three feedback loops. The loop consisting of the three amplifiers and feedback path number one is provided to eliminate the spurious signal content of the master oscillator control voltage. The loop consisting of the first two amplifiers and feedback path number two is provided to limit the rate of change of the master oscillator frequency in response to a change in control voltage. The loop consisting of the first two amplifiers and feedback path number three is effective only during initial lock on of the master oscillator; the loop provides a low frequency sweep voltage which causes the master oscillator to hunt for the correct frequency.

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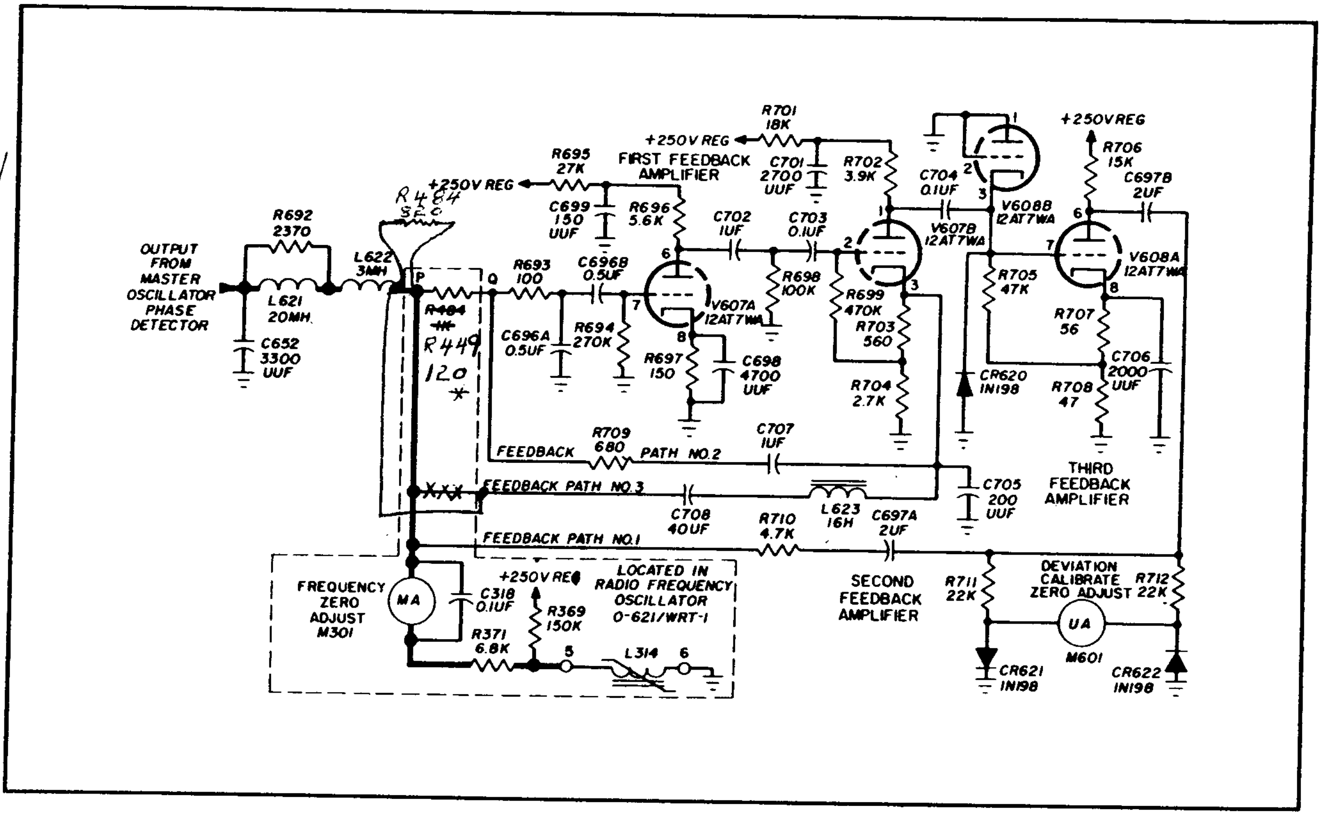

Figure 4-11. Feedback Amplifier, Simplified Schematic Diagram

(*c*) The d-c control voltage from the master oscillator phase detector has the i-f ripple voltage and harmonics thereof removed by the 10-kc low-pass filter consisting of capacitor C652, resistor R692, and inductors L621 and L622. (Refer to figure 4-11.) Spurious signals with frequencies as low as 30 cycles may still be present however. A spurious signal appearing at the output of the filter (point P) is coupled through resistor R484 to point Q. The spurious signal appearing across C696A is coupled through C696B to the grid of the first feedback amplifier V607A. Capacitor C696A in the grid circuit of V607A and capacitor C699 and resistor R695 in the plate circuit limit the high frequency response of the amplifier. The spurious signal voltage developed at the plate of V607A is coupled to the grid of V607B through a phase shift network consisting of capacitors C702 and C703, and resistors R698 and R699. High frequency compensation in the plate circuit of V607B is accomplished by the network consisting of capacitor C701 and resistor R701. Degenerative feedback for the stage is provided by cathode resistor R704. The spurious signal voltage developed at the plate of V607B is coupled through capacitor C704 to the grid of V608A. As shown in figure 4-11, V608B is connected as a diode between the grid of V608A and ground. The purpose of the diode is explained below in paragraph 4-2*b*(8)(*e*). Cathode resistor R708 provides degenerative feedback for V608A. The plate output of the third feedback amplifier is coupled through capacitor C697A and C697B and resistor R710 to point P. The output to point P opposes the original signal, which causes the effective input impedance at point P to be very low for spurious signals. Therefore spurious signals do not appear across the control winding of saturable reactor L314. The d-c control loop is not affected by the a-c feedback loop since the amplifiers do not pass d-c.

(*d*) As shown in figure 4-11, DEVIATION CALIBRATE ZERO ADJUST METER M601 is connected between feedback path number one and ground. Since the feedback signal voltage is always proportional to the input spurious signal voltage, M601 effectively measures the low frequency spurious output of the master oscillator phase detector. During positive half-cycles of the output signal, diode CR621 conducts and the current path for the meter is through resistor R712 with R711 serving as a shunt. During the negative half-cycle, diode CR622 conducts and the current path for the meter is through R711 with R712 serving as the shunt. When initially setting up the transmitter for FSK operation, the deviation between the i-f frequency shift and the interpolation oscillator frequency shift must be adjusted to a minimum. The adjustment is made with DEVIATION CALIBRATE control R341 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1) and DEVIATION CALIBRATE

ZERO ADJUST meter M601. The magnitude of FSK control voltage to the master oscillator control reactor is adjusted with respect to the voltage applied to the interpolation oscillator reactance modulator until the spurious output indicated by M601 is a minimum.

(*e*) If the master oscillator should suddenly change frequency, due to a transient in line voltage for example, the d-c control signal from the phase detector rapidly changes value. The effectiveness of feedback path number one is limited during the occurrence of the transient by V608B, which is connected as a diode, and by diode CR620. A large negative signal at the plate of V607B causes the diodes to conduct and capacitor C704 discharges quickly. When the plate of V607B rises again, the capacitor charging current through R705 causes V608A to saturate. Thus the response of the feedback loop is limited allowing the change in control voltage to appear across the control winding of L314.

(*f*) As shown in figure 4-11, feedback path number two is a degenerative path which couples the voltage at the cathode of V607B through capacitor C707 and resistor R709 to the grid of V607A. The feedback loop has the effect of placing a capacitance of approximately 40 microfarads across the input of the a-c control loop. Any sudden change in the output of the master oscillator phase detector is delayed by the charging of the capacitance and thus the correction voltage developed across the control winding of L314 builds up slowly to return the master oscillator to its proper frequency.

(*g*) Feedback path number three is regenerative and permits the a-c loop composed of amplifiers V607A and V607B to oscillate at approximately two cycles when the master oscillator is not locked on to the correct frequency. The feedback signal developed across the cathode resistors, R703 and R704, of V607B is coupled back through capacitor C708 and choke L623 to point P. When the control system is not locked on, the input impedance at point P is approximately 2500 ohms, and sufficient positive feedback voltage is coupled to the grid of V607A to cause the loop to oscillate. The a-c current passing through the control winding of saturable reactor L314 causes the master oscillator to sweep across a limited frequency range. When the master oscillator reaches the correct frequency, the impedance at point P decreases to a level so low that oscillations are no longer sustained.

4-3. MODULATING FUNCTIONAL SECTION.

a. GENERAL OPERATION.

(1) The modulating functional section adds intelligence to the r-f energy of the r-f generating functional section. In telephone operation (AM) speech signals are applied to a low level modulator and the amplitude of the r-f carrier becomes a function of the amplitude of the speech input. In frequency-shift keying operation (FSK), d-c signals from a teletypewriter control the frequency of the r-f carrier, shifting the frequency down for a *space* and up for a *mark*. In machine cw operation (MACH CW), d-c keying signals from the keying loop control the operation of an electron-tube keyer, the output of which supplies keying bias to two driver amplifiers in the power amplifier functional section. In hand keyed cw operation (CW), a transistor bias-keying stage controls both the driver amplifiers and power amplifier bias. For submarine installations break-in handkeyed cw operation is possible if Antenna Control CU-1670/U (government-furnished equipment) is used. A block diagram of the modulating functional section is shown in figure 4-12.

(2) As shown in figure 4-12, speech signals from a telephone handset or from Radiophone Unit 23500 are coupled through input transformer T1401 and high pass filter FL1401 to the plate of the AGC control tube, V1401A. Filter FL1401 attenuates all signals of frequency less than 300 cycles. When the AGC OR INPUT LEVEL control R1401 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) is rotated fully clockwise to the AGC ON position, the plate resistance of the AGC control amplifier varies inversely with the average level of the audio input and thus the average level of the voltage applied to the grid of the first audio amplifier, V1401B, remains essentially constant. The output of V1401B is coupled to AGC amplifier V1402B and second audio amplifier V1402A. Two functions are performed by the AGC amplifier: The output to the AGC rectifier is used to control AGC control tube V1401A as mentioned above; the output also develops a voltage which disables squelch oscillator V1404A. After amplification by second audio amplifier V1402A, the audio signal is coupled through MODULATION LEVEL potentiometer R1451 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) to the grid of audio output amplifier V1403A. When CLIPPING switch S1401 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) is placed in the IN position, the output voltage of V1402A increases and the clipper circuit operates to remove positive and negative signal peaks. Audio output amplifier V1403A supplies the audio drive for low level modulator V801. The output of V1403A is coupled through low pass filter FL1402 to sidetone amplifier V1403B and low level modulator V801. Filter FL1402 attenuates all signals of frequency greater than 3500 cycles. The output of sidetone amplifier V1403B is coupled through output transformer T1402 to the telephone handset or to Radiophone Unit 23500 for monitoring purposes. When the audio input falls below a predetermined level, squelch circuits are activated and a cutoff bias is applied to the grid of second audio amplifier V1402A. As mentioned in the discussion above, the normal output of AGC amplifier V1402B disables squelch oscillator V1404A. The audio signal level necessary to disable the squelch is determined by the setting of SQUELCH LEVEL control R1431 (located on the front panel of Amplifier-Power

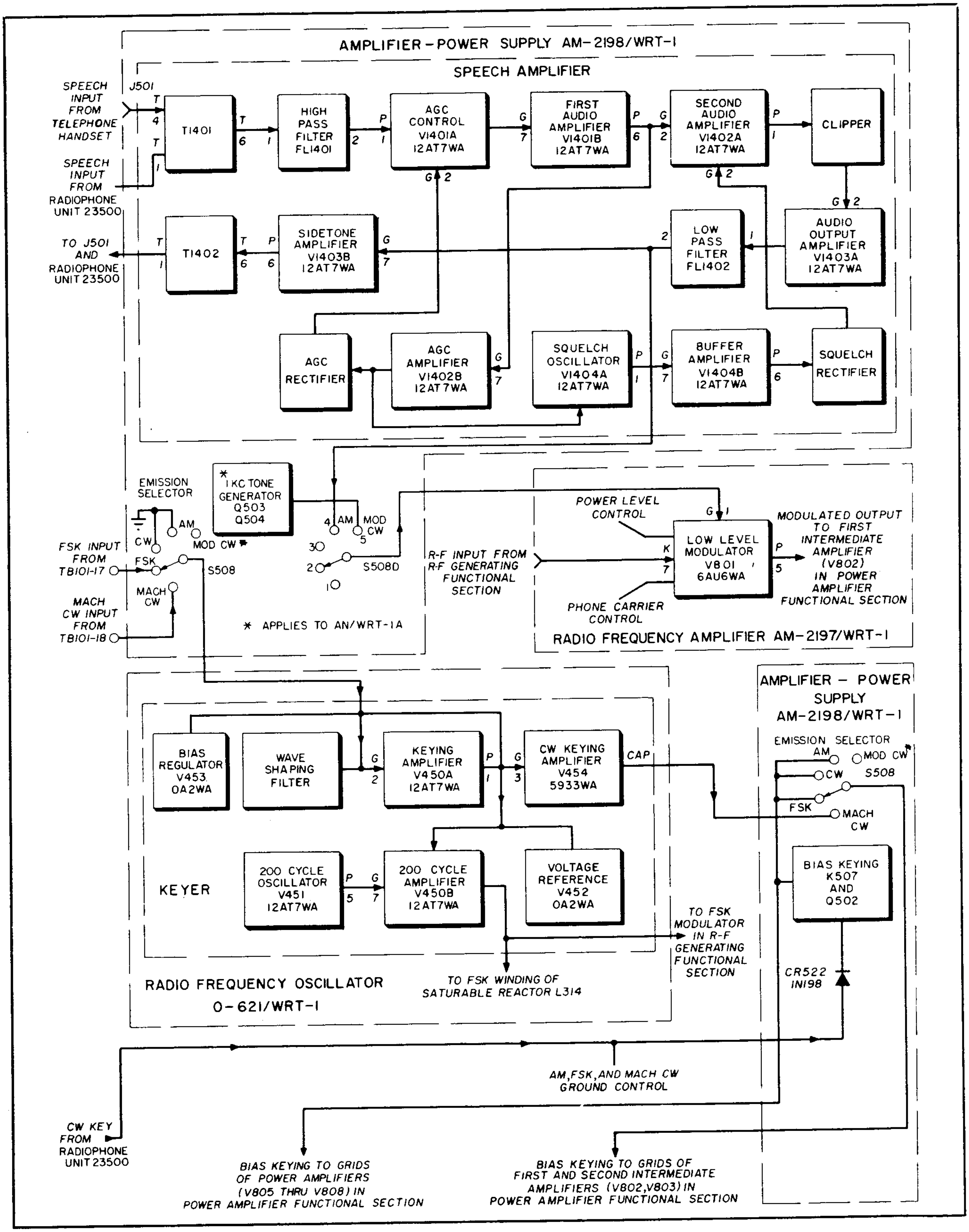

Figure 4-12. Modulating Section, Functional Block Diagram

Supply AM-2198/WRT-1). When the audio signal level decreases below the preset level, squelch oscillator V1404A begins to function and its output is applied to buffer amplifier A1404B. The output of V1404B is coupled to the squelch rectifier where a negative bias voltage is developed that cuts off second audio amplifier V1402A. When the SQUELCH LEVEL control is rotated fully clockwise to the OFF position, the output of buffer amplifier V1404B is grounded.

(3) As shown in figure 4-12, an r-f carrier from the r-f generating section is applied to the cathode of low level modulator V801. During either MACH CW, CW, or FSK operation, V801 functions as a cathode-driven amplifier. During AM operation, audio signals are applied to the grid of V801 and a transformer is connected in the cathode circuit. The voltage of the secondary winding of the cathode transformer opposes the plate output voltage as the audio signal goes positive; when the audio signal goes negative, the plate output falls to a low level and the secondary voltage of the cathode transformer becomes the effective output. Thus the r-f energy is modulated in accordance with the instantaneous polarity of the audio signal: The carrier envelope decreases in amplitude as the audio signal increases; the envelope increases in amplitude as the audio signal decreases. The output of the low level modulator is applied directly to the grid of the first intermediate amplifier in the power amplifier functional section. DRIVE ADJUST control R812 and LOW POWER ADJUST control R811 (located on the front panel of Radio-Frequency Amplifier AM-2197/WRT-1) provide control of the level of r-f input to V801—the latter control functions only during 100-watt operation. During AM operation, AM POWER ADJUST control R810 (located on the front panel of Radio-Frequency Amplifier AM-2197/WRT-1) is placed in the r-f input circuit and is used to limit the drive in order that audio signal peaks do not overdrive the power amplifiers.

(4) As shown in figure 4-12, d-c keying signals from a teletypewriter are developed across FSK termination E502 and applied through EMISSION SELECTOR switch S508 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) to the grid of keying amplifier V450A. Two input terminations may be selected: A 2000-ohm or 60-ma loop and a 6000-ohm or 20-ma loop. For MACH CW operation keying signals from an automatic code transmitter are applied through the same wafer of S508 to the keying amplifier. The input resistance of the MACH CW line is fixed at 22,000 ohms. During AM and CW operation, the input to V450A is grounded. The rise-time of the keying waveform applied to V450A is controlled by the setting of WAVE SHAPING switch S450 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1). The switch has four positions: FSK, MULTIPLEX, 200 WPM, and 400 WPM.

(5) For MACH CW operation the output of keying amplifier V450A is directed through the contacts of keying selector relay K302 to the grid of CW keying amplifier V454. The output of V454 is applied through a wafer of EMISSION SELECTOR switch S508 (see figure 4-12) to the grids of the first and second intermediate power amplifiers in the power amplifier functional section. When the MACH CW loop is open, a high negative bias is applied to cut off the two drivers; when the loop is closed, the bias is removed. Bias keying relay K507 is energized during MACH CW operation to reduce the grid bias on the power amplifiers and thereby place them in a conducting state.

(6) For FSK operation keying selector relay K302 is energized and the output of keying amplifier V450A controls the bias on one winding of a saturable reactor located in the grid circuit of the master oscillator. When a *mark* signal is on the line the polarity of the bias signal to the saturable reactor is such as to decrease its inductance; thus the frequency of the master oscillator is increased. When a *space* signal is on the line, the polarity of the bias signal is reversed and the frequency of the master oscillator decreases. The amount of frequency separation between the *mark* and *space* signals is determined by the setting of SHIFT Ⓔ control R641 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1). The control bias signal is also applied to a reactance modulator in the r-f generating functional section in order that the frequency control oscillator may follow the changes in the master oscillator frequency. When PHASE MODULATION switch S451 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1) is placed in the ON position, plate voltage is applied to 200 cycle oscillator V451. The output of the oscillator buffer amplifier, V450B, is applied in series with the d-c control signal to the saturable reactor; thus the bias level (*mark* or *space*) fluctuates about the SHIFT Ⓔ control setting at a 200-cycle rate. The phase modulation feature is included to overcome the effects of phase cancellation at the receiver antenna. (See paragraph 4-3*b*(3)(*e*) below for a more detailed discussion.) Bias regulator tube V453 provides a stable bias supply for both the keying amplifier and the CW keying amplifier. Voltage reference tube V452 provides a stable reference point for the *mark* and *space* d-c shift bias applied to the master oscillator saturable reactor.

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(7) For types of emission other than MACH CW, bias keying to the driver and power amplifier stages in the power amplifier functional section is achieved by the operation of a keying relay in Amplifier-Power Supply AM-2198/WRT-1. As shown in figure 4-12, during FSK and AM operation, ground is applied to the anode of keying diode CR522, causing transistor Q502 to conduct and bias keying relay K507 to apply a ground to the driver grids through EMISSION SELECTOR switch S508. At the same time, the grid bias of the power amplifiers is reduced to the nominal

operating value. During handkeyed CW operation the remote key is applied directly to CR522 and the bias keying stage follows the operation of the handkey. On sets serials 142 and up during normal operation, ground is applied directly to bias keying relay K507 and Q502 is bypassed. Q502 is used only when switch S511, shown in figure 4-16, is in the parallel keying position. For submarine installations Antenna Control C-1670/U (GFM) may be used to provide break-in operation. In such a case the driver and power amplifier stages are keyed by a relay in the control unit and bias keying relay K507 in the transmitter is inoperative.

(8) On Radio Transmitting Set AN/WRT-1A, a 1000 cycle tone generator has been added to facilitate a means of providing a continuous tone modulated signal which can be monitored by an approaching aircraft within the vicinity of a surface vessel. Referring to figure 4-12, placing the EMISSION SELECTOR switch to the MOD CW position activates the 1000 cycle tone generator. The impulses produced by transistor Q503 are used to excite a tank circuit in the collector circuit of Q503. The oscillation in the tank circuit are sustained by a regenerative feedback, which enables

transistor Q503 to conduct at the proper interval. These oscillations resonating in the tank circuit are directly coupled through a potentiometer to the base of transistor Q504. The amplitude of the output signal can be varied by adjusting the potentiometer R550. The resulting amplified signal is induced across the primary and secondary windings of transformer T504 and applied to the Radio Frequency Amplifier AM-2197/WRT-1.

b. DETAILED OPERATION.

(1) FIRST AND SECOND AUDIO AMPLIFIERS, AGC, SQUELCH, AND CLIPPER CIRCUITS.

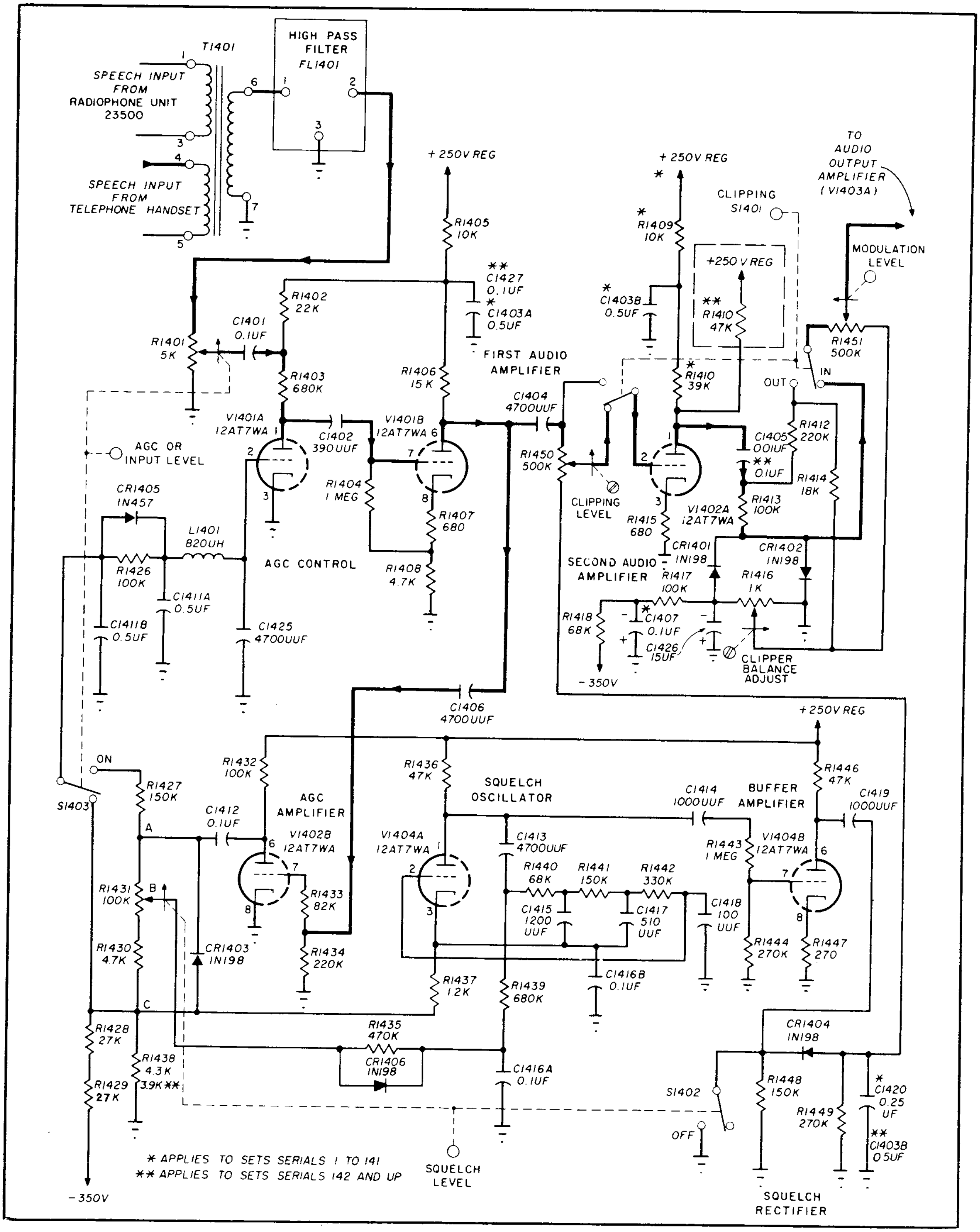
(*a*) The circuits described below are located on a single subchassis contained in Amplifier-Power Supply AM-2198/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-13. For further detail refer to the schematic diagram of figure 6-27.

(*b*) The speech signals originating from remote Radiophone Unit 23500 or the telephone handset are coupled through a high pass filter to the AGC control tube. When the AGC circuit is in operation, the AGC control tube functions as a variable resistance, the magnitude of which is a function of the audio input level. Thus the input to the first audio amplifier is maintained at a constant level despite the fluctuations in the average level of the speech input. The audio signal undergoes amplification in the first and second audio amplifiers. When the clipper circuit is in operation, the positive and negative voltage peaks of the output of the second audio amplifier are clipped before the signal is applied to the final stage of amplification. A portion of the output of the first audio amplifier is diverted to the AGC amplifier, the output of which is applied to the AGC rectifier. The voltage developed by the AGC rectifier controls the plate resistance of the AGC control tube and disables the squelch oscillator. Until disabled by the AGC rectifier, the squelch oscillator runs freely, and if the SQUELCH LEVEL control is not in the off position, a negative voltage is developed by the squelch rectifier. The squelch voltage is applied to the grid of the second audio amplifier and is sufficiently large to cut off the tube.

(*c*) As shown in figure 4-13, speech input transformer T1401 has two primary windings. One winding is connected to Radiophone Unit 23500 through REMOTE LOCAL switch S507; the second winding is connected to HANDSET jack J501 and to the negative side of the 12-volt supply. When the push-to-talk switch on the telephone handset is operated the input circuit is completed through the microphone element to the positive side of the 12-volt supply. Audio signal current in the primary of T1401 induces a voltage in the secondary winding which is applied through high pass filter FL1401 to terminating potentiometer R1401. The design of the filter is such that audio signals of frequency less than 300 cycles are greatly attenuated.

(*d*) Until the AGC OR INPUT LEVEL control (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) is rotated fully clockwise to the AGC ON position, AGC control tube V1401A remains cut off by the voltage drop across resistor R1438. The audio voltage appearing at the arm of potentiometer R1401 is coupled through capacitor C1401, resistor R1403, and capacitor C1402 to the grid of the first audio amplifier V1401B. The amplified plate signal of V1401B is coupled through capacitor C1404 and CLIPPING LEVEL potentiometer R1450 to the grid of second audio amplifier C1402A. The plate output of the first audio amplifier is also coupled through capacitor C1406 to the grid of AGC amplifier V1402B. The output of AGC amplifier V1402B is coupled through capacitor C1412 to a negative clamping circuit consisting of diode CR1403, resistor R1430, and SQUELCH LEVEL potentiometer R1431. Audio signals appearing at point A (refer to figure 4-13) are clamped to the negative voltage level determined by the d-c voltage drop across resistor R1438. When AGC OR INPUT LEVEL control R1401 is rotated fully clockwise to the AGC ON position, the audio signal appearing at point A is applied to diode CR1405. Capacitor C1411B remains charged at the level of the d-c clamping voltage but diode CR1405 conducts during positive audio voltage peaks and, consequently, capacitor C1411A discharges, decreasing the negative voltage applied to the grid of AGC control tube V1401A. Thus the negative voltage appearing across capacitor C1411A is a function of the magnitude of the average level of the audio input signal. Choke L1401 and capacitor C1425 filter the rectifier output. Should the average level of the audio signal increase, the output of the AGC amplifier increases and a less negative bias is applied to the control tube, decreasing its plate resistance. The opposite effect occurs when the average level of the audio signal decreases. Thus the input to V1401B is maintained at a constant level despite variations in the average signal level at input transformer T1401.

(e) A squelch circuit is also provided and when in use acts to reduce the output of second audio amplifier V1402A to zero if the audio input falls below a preset level. As shown in figure 4-13, the cathode of r-c oscillator V1404A is returned to d-c ground through resistor R1438 and the grid is returned to d-c ground through R1431, R1430 and R1438. With no output from the AGC amplifier there is no d-c voltage drop across R1431 and R1430 and the r-c oscillator stage oscillates at a frequency of approximately 1000 cycles. The plate output of buffer amplifier V1404B is coupled through capacitor C1419 to the squelch rectifier consisting of diode CR1404, load resistor R1449, and filter C1420. The filtered negative d-c voltage developed across R1449 cuts off second audio amplifier tube V1402A. When an audio signal is applied to the grid of the AGC amplifier, pulses of current through potentiometer R1431 and resistor R1430 cause point B to become positive with respect to point C. Therefore,



* APPLIES TO SETS SERIALS 1 TO 141
** APPLIES TO SETS SERIALS 142 AND UP

Figure 4-13. First and Second Audio Amplifier, AGC, Squelch, and Clipper Circuit, Simplified Schematic Diagram as the audio voltage level increases, the grid of V1404A is driven positive with respect to its cathode and, when the tube saturates, oscillations cease and the cutoff bias is removed from the second audio amplifier. The setting of SQUELCH LEVEL control R1431 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) determines the level of audio input necessary to disable the squelch oscillator. When the control is rotated to the fully counterclockwise position the output of buffer amplifier V1404B is grounded and the squelch rectifier is inoperative.

(*f*) Provision is made for positive and negative peak clipping of the output of second audio amplifier V1402A. As shown in figure 4-13, the clipping function is controlled by the position of CLIPPING switch S1401 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1). Clipping diodes CR1401 and CR1402 are equally biased in the reverse direction by the setting of CLIPPER BALANCE ADJUST potentiometer R1416. The plate output of V1402A is coupled through capacitor C7405 and developed across load resistors R1413, R1412, and R1414. MODULATION LEVEL potentiometer R1451 is shunted across the clipping diodes when CLIPPING switch S1401 is placed in the IN position. Positive signal peaks which exceed the reverse bias on CR1402 clamp the top of potentiometer R1451 close to ground potential and negative signal peaks which exceed the reverse bias on CR1401 clamp the same point to a negative potential approximately equal to half the voltage drop across potentiometer R1416. The setting of CLIPPING LEVEL potentiometer R1450 determines the output signal level of V1402A and thus establishes the amount of clipping. When CLIPPING switch S1401 is placed in the OUT position, the grid voltage for V1402A is obtained directly from the top of potentiometer R1450, and potentiometer R1451 is shunted directly across resistor R1414 so that the clipping diodes are no longer effective. The amount of voltage applied to the grid of audio output amplifier V1403A is adjustable by means of MODULATION LEVEL control R1451 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1).

(2) AUDIO OUTPUT AMPLIFIER, SIDETONE AMPLIFIER, AND LOW LEVEL MODULATOR.

(*a*) The audio output amplifier and sidetone amplifier circuits are located on a single subchassis contained in Amplifier-Power Supply AM-2198/WRT-1. The low level modulator circuits are contained in Radio Frequency Amplifier AM-2197/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-14. For further detail refer to the schematic diagrams of figures 6-26 and 6-29.

(*b*) The clipped or unclipped speech signals from the second audio amplifier are amplified by the audio output amplifier and passed through a low pass filter to the sidetone amplifier and the low level modulator. A monitor signal is returned from the sidetone amplifier to the speech input equipment. During AM

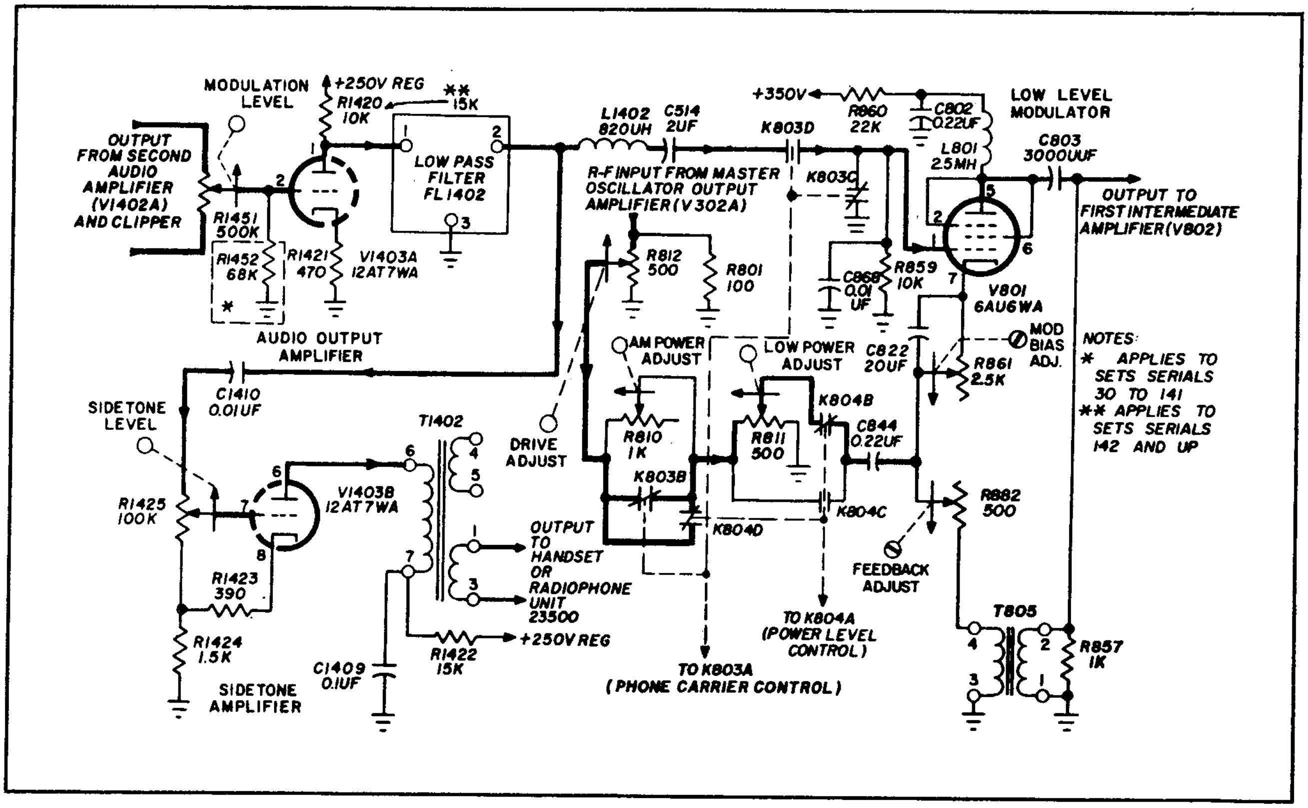


Figure 4-14. Audio Output Amplifier, Sidetone Amplifier, and Low Level Modulator, Simplified Schematic Diagram

operation, the audio and r-f signals are applied simultaneously to the low level modulator and the output is a modulated carrier wave. For all other types of emission, the low level modulator functions as a cathode-driven r-f amplifier.

(*c*) As shown in figure 4-14, the amplified signal appearing at the plate of audio output amplifier V1403A is coupled through low pass filter FL402, choke L1402, and capacitor C514 to terminating resistor R859 (Assume for the moment that phone carrier relay K803 is energized). The design of FL1402 is such that signals with frequency higher than 3500 cycles are greatly attenuated. Choke L1402 and capacitor C1421 act as an r-f filter to prevent stray r-f signals from passing back into the speech amplifier circuits.

(*d*) The filtered output of V1403A is also coupled through capacitor C1410 to sidetone amplifier V1403B. The setting of SIDETONE LEVEL control R1425 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) controls the output level of the stage. The signal voltage induced in the secondary winding of T1402 is applied directly to the telephone handset through jack J501 or through LOCAL REMOTE switch S507 to Radiophone Unit 23500.

(*e*) As shown in figure 4-14, the r-f carrier from the master oscillator output amplifier is introduced across the parallel combination of resistor R801 and DRIVE ADJUST potentiometer R812 (the control is located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1). For all types of emission except AM, phone carrier control relay K803 is deenergized and the relay contacts are as shown in figure 4-14. During 100W operation, or when tuning or adjusting, power level control relay K804 is also deenergized and the relay contacts are as shown in figure 4-14. In such a case, the r-f drive voltage is coupled from the arm of LOW POWER ADJUST potentiometer R811 through capacitor C844 to the cathode of V801. During 500W operation, relay K804 is energized and the LOW POWER ADJUST potentiometer is bypassed by contacts K804C. For all types of operation except AM, low level modulation V801 functions essentially as a cathode driven amplifier. A portion of the r-f cathode drive is coupled into the secondary of transformer T805 and the voltage developed across resistor R857 appears at the grid of V802 180° out of phase with the normal plate output of the tube.

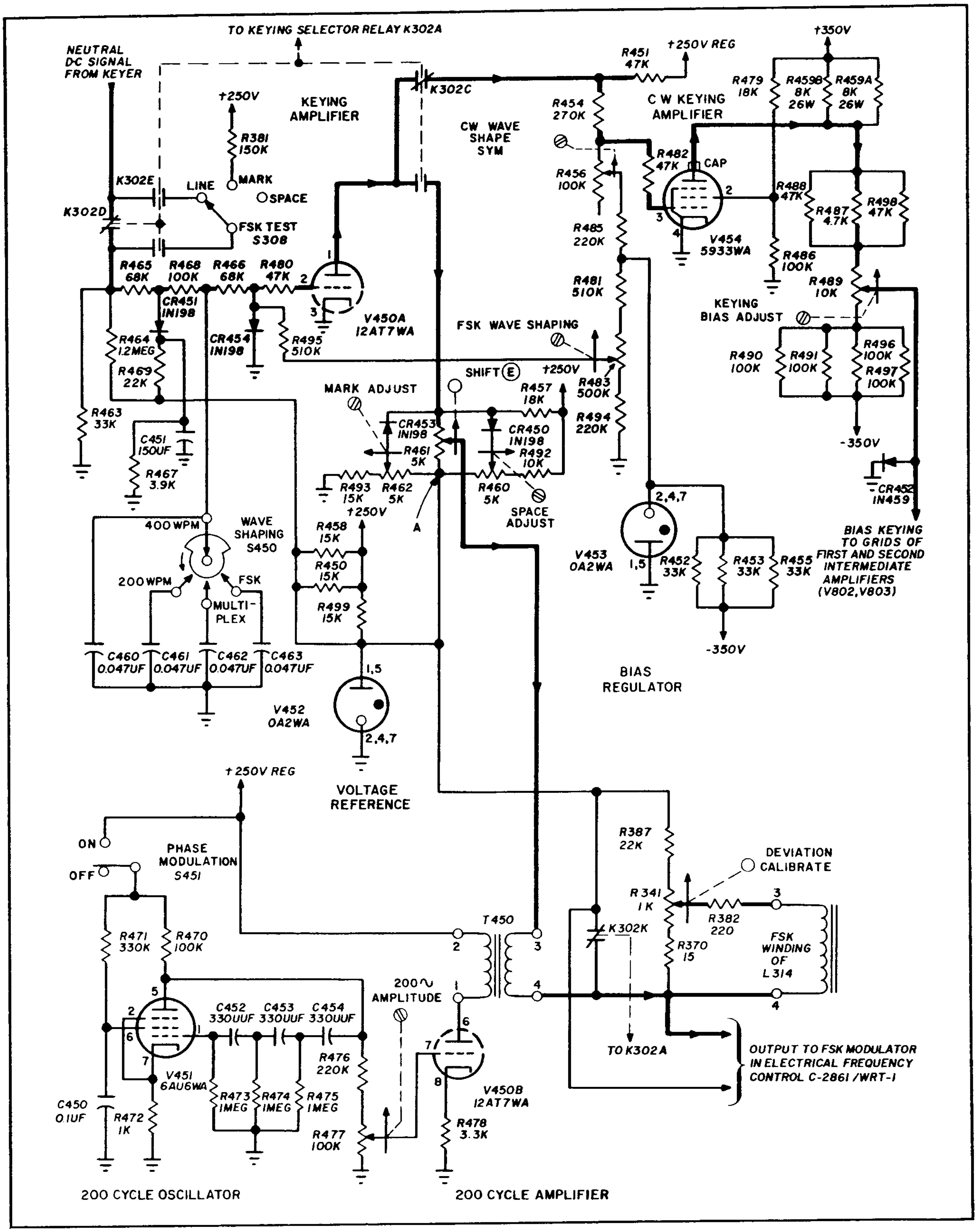
(*f*) During AM operation, phone carrier control relay K803 in energized and contacts K803C open thereby removing the ground from the control grid of the tube. At the same time contacts K803B open and AM POWER ADJUST potentiometer R810 is placed in series with the cathode drive circuit (500W operating only). The modulator tube, V801, is operated on the curved portion of its transconductance curve so that its gain becomes a function of the audio signal voltage developed across resistor R859. If the stage were operated without feedback transformer T805, a modulated r-f output would appear at the plate of V801, but the level would not reach 100 percent. When the carrier signal coupled through T805 is added to the modulated plate output the troughs of the modulation envelope are reduced to zero amplitude and thus 100 percent modulation is obtained. AM POWER ADJUST potentiometer R810 is provided in order that the peak r-f output to the first driver stage may be limited. The r-f voltage to the grid of the first driver V802 on modulation peaks is twice that which normally is present during CW or FSK emission. Therefore, to prevent overdriving V802, the r-f voltage must be reduced by half, which reduces the power to one-fourth.

(3) KEYER CIRCUITS.

(*a*) The keyer circuits are located on a single subchassis contained in Radio Frequency Oscillator O-621/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-15. For further detail refer to the schematic diagram of figure 6-25.

(*b*) Neutral d-c keying voltages from either a teletype loop (FSK operation) or an automatic code transmitter (MACH CW) are applied to the grid of the keying amplifier. A wave-shaping filter in the grid circuit provides for adjustment of the voltage waveform for minimum key click. During MACH CW operation, the keying amplifier drives the CW keying amplifier and its output is applied directly to the grids of the first and second intermediate amplifiers in the power amplifier functional section. During FSK operation, the output of the keying amplifier is applied to a network which includes two reference diodes. The operation of the reference diodes in conjunction with the keying amplifier produces negative and positive polarities of d-c voltage corresponding to *mark* and *space* input signals. The d-c voltage is supplied to a control winding of the saturable reactor which forms a part of the tank circuit of the master oscillator. Since the inductance of the a-c winding of the reactor depends upon the magnitude and polarity of the d-c voltage applied, the master oscillator shifts frequency in accordance with the *mark-space* information. In order to prevent the frequency control circuit from generating an inhibiting correction signal, a portion of the voltage applied to the saturable reactor control winding is also applied to circuits in Electrical Frequency Control C-2861/WRT-1 to shift the frequency of the interpolation oscillator simultaneously with the shifting of the master oscillator frequency. A phase modulation feature is available during FSK operation to combat the effects of multi-path fading. When the phase modulation circuit is functioning, a 200 cycle a-c voltage is superimposed on the d-c voltage to the saturable reactor control winding. As a consequence, the *mark* and *space* frequencies are varied about the normal shift setting at a 200 cycle rate.

(*c*) In order to simplify the analysis, only MACH CW operation will be discussed in this paragraph. A terminating resistor of 22,000 ohms is pro-



Figur 4-15. Keyer Circuits, Simplified Schematic Diagram

vided for the MACH CW loop (R530—see figure 6-27). Keying voltages across the loop termination are coupled through wafer 508C of the EMISSION SELECTOR switch (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1) to resistor R463. As shown in figure 4-15, resistors R465 and R468 in conjunction with wave-shaping capacitors C460 through C463 form an r-c input filter for the grid of V450A. Abrupt voltage changes across R463 appear at the grid of C450A with rounded leading and trailing edges due to the finite charge and discharge time of the capacitors. The amount of waveform slope is determined by the setting of WAVE SHAPING switch S450 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1); clockwise rotation of the switch increases the capacitance and thus decreases the waveform slope for lower keying speeds. Diode CR451 is reverse-biased by the positive voltage drop across resistor R467 and when the positive keying voltage across R463 exceeds the reverse bias, clipping occurs so that the maximum input to the grid of V450A is independent of variations in the input loop voltage. Negative cutoff bias for V450A is applied to the top of diode CR454 from the arm of FSK WAVE SHAPING potentiometer R483. Diode CR454 conducts when the keying voltage exceeds the bias level and thus prevents application of positive voltage to the grid of V450A. The output of the keying amplifier is d-c coupled to the grid of cw keying amplifier V454 through resistors R454 and R482. As shown in figure 4-15, the plate resistor of V450A (R451), resistors R454, R485, and potentiometer R456 are connected between the +250-volt supply and −150-volt output of regulator tube V453. The grid of V454 is attached to the junction of R454 and potentiometer R456 and when the keying amplifier is not conducting (key up) the grid of V454 is positive and the tube conducts heavily. The negative voltage drop across plate load resistors R459A and R459B causes the arm of KEYING BIAS ADJUST potentiometer R489 to go negative with respect to ground. The high negative bias is coupled from the anode of diode CR452 to the grids of the first and second intermediate amplifiers, V802 and V803; the tubes are cut off, and there is no r-f output from the transmitter. When keying amplifier V450A conducts (key down), the negative voltage drop across plate resistor R451 causes the grid of V454 to fall to a negative bias level and the tube ceases conduction. As V454 cuts off, the voltage at the arm of KEYING BIAS ADJUST potentiometer R489 rises in the positive direction until diode CR452 conducts. The grids of the intermediate amplifiers are then effectively clamped to ground and r-f energy is passed on to the power amplifiers. The keying bias level is determined by the setting of KEYING BIAS ADJUST potentiometer R489. CW WAVE SHAPE SYM potentiometer R456 in the grid circuit of V454 adjusts the tube bias point and thus controls the duration of the keying waveform.

(*d*) During FSK operation, keying selector relay K302 is energized and, as shown in figure 4-15, the output of keying amplifier V450A is diverted to the FSK circuits through the normally open contacts of K302C. The teletypewriter loop can have either of two terminations—2000 or 6000 ohms—depending upon the position of the shorting strap on FSK TERMINATION board E502 located in Amplifier-Power Supply AM-2198/WRT-1 (see figure 6-27). Positive d-c voltages developed across the terminating resistors key amplifier V450A as described in the paragraph above. The input line is shunted through FSK TEST switch S308 (located on the front of Radio Frequency Oscillator O-621/WRT-1) by normally open relay contacts K302D and K302E. FSK WAVE SHAPING potentiometer R483 is provided to adjust the bias point of V450A and thus vary the duration of the output keying waveform. To understand the operation of the FSK circuits, refer to figure 4-14 and locate point A. When V450A is not conducting (*space* input), diode CR450 is conducting and the voltage appearing across SHIFT Ⓔ potentiometer R461 is positive with respect to point A and its magnitude is determined by the setting of SPACE ADJUST potentiometer R460. When V450A is conducting (*mark* input) the negative voltage drop across resistor R457 biases diode CR450 to cutoff and diode CR453 conducts. The voltage appearing across SHIFT Ⓔ potentiometer R461 is now negative with respect to point A and its magnitude is determined by the setting of MARK ADJUST potentiometer R462. As shown in figure 4-15, the arm of R461 is connected through the secondary of T450 to the junction of resistor R370 and pin 4 of the FSK winding of saturable reactor L314. Point A is connected to the top of R387. Thus a portion of the positive and negative alternations of d-c voltage appearing across the SHIFT Ⓔ potentiometer is applied across resistors R387, R370, and DEVIATION CALIBRATE potentiometer R341. When the arm of R461 is positive with respect to point A (*space* input), pin 4 of the FSK winding of L314 is positive with respect to pin 3 and the inductance of the a-c winding in the master oscillator grid circuit increases, decreasing the frequency of the master oscillator. When the arm of R461 is negative with respect to point A (*mark* input) the bias on L314 is reversed and the master oscillator frequency is increased. The magnitude of frequency shift is determined by the setting of SHIFT Ⓔ potentiometer R461 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1). As shown in figure 4-15, the bias across R461 is also coupled to the FSK modulator in Electrical Frequency Control C-2861/WRT-1. The frequency of the interpolation oscillator must be shifted as the master oscillator frequency is shifted to prevent the frequency control circuits from generating a large error correction signal.

DEVIATION CALIBRATE potentiometer R341 (the control is located on the front panel of Radio Frequency Oscillator O-621/WRT-1) is provided for adjusting the bias level to L314 with respect to that to the interpolation oscillator reactance modulator so that the i-f mixer sideband frequency and the interpolation oscillator frequency will shift by the same amount.

(*e*) The signals arriving at a receiver often arrive by different paths and with different phase relationships. For any given frequency, fluctuations in the ionosphere may cause two signals arriving by different paths to cancel in phase for a period of time and the communication link is broken. Since the phase relationship of two signals traveling independent paths depends on their frequency, if the frequency is varied slowly about its mean value the possibility of signal fading is greatly reduced. As shown in figure 4-15, when PHASE MODULATION switch S451 (located on the front panel of Radio Frequency Oscillator O-621/WRT-1) is placed in the ON position, the 200 cycle r-c oscillator, V451, is activated and the output of buffer amplifier V450B is added in series with the FSK control bias. Adding a sinusoidal voltage to the d-c bias causes the inductance of the a-c winding of saturable reactor L314 to vary above and below the value due to the d-c shift. Therefore the master oscillator frequency varies about the *mark* (or *space*) frequency at a 200-cycle rate. By adjusting the setting of 200 ∼ AMPLITUDE potentiometer R477, the master oscillator frequency deviation can be increased to plus and minus 100 cycles.

(4) BIAS KEYING AND CONTROL CIRCUITS.

(*a*) The principal control circuits utilized during handkeyed CW operation are shown in the simplified schematic diagram of figure 4-16. For CW operation, the power amplifiers as well as the two intermediate amplifiers are keyed by the bias keying stage in Amplifier-Power Supply AM-2198/WRT-1. This is in contrast to MACH CW operation (discussed above) in which only the two intermediate amplifiers are keyed.

(*b*) For sets serials 1 to 141 as shown in figure 4-16, bias keying relay K507 is the emitter load for bias keying stage Q502. The emitter circuit is kept open by contacts K505E until relay K505 is energized and primary power is applied to the +350 and −350-volt rectifiers. Until the anode of diode CR522 is grounded by depression of the CW handkey, transistor Q502 is unable to conduct due to the negative base voltage applied through the voltage divider consisting of resistors R505, R506, and R507. When the anode of the diode is grounded, the diode conducts, the base potential of Q502 drops to a small negative value, and the emitter current rises to a level sufficiently high to energize the bias keying relay, K507. Diode CR521 and ADJUST LOCAL KEY RELAY potentiometer R527 provide a shunt path for suppressing the transient voltage which is induced in the relay coil when the emitter current is switched off. The potentiometer is used to adjust the dropout time of the relay.

(*c*) For sets serials 142 and up (figure 4-16), during normal operation bias keying stage Q502 is bypassed by switch S511. Keying relay K507A is energized directly by depression and grounding of the CW handkey. Diode CR521 and ADJUST LOCAL KEY RELAY potentiometer R527 provide a shunt path for suppressing the transient voltage induced in the relay coil when the CW handkey is released. The potentiometer adjusts the dropout time of the relay. Switch S511 is an internal adjustment and should be placed in the PARALLEL KEYING position only if multikeying of more than one transmitter is desired.

(*d*) As shown in figure 4-16, a −350-volt divider network in Radio Frequency Amplifier AM-2198/WRT-1 provides bias for the power amplifiers and for the two intermediate amplifiers. The divider network consists of resistors R855, R854, R875, R885, R876, R511, R512, and R513. When bias keying relay K507 is deenergized, point B in figure 4-16 is sufficiently negative with respect to ground to keep the power amplifiers cut off. The negative potential at point A is applied through EMISSION SELECTOR switch S508A to the grids of the two intermediate amplifiers and they too are cut off. When bias keying relay K507 is energized, contacts K507B close, point A goes to ground potential and point B becomes less negative by approximately 40 volts. Contacts K507C close and break in follower relay K509 is energized. The closing of contacts K509B energizes carrier suppress delay open relay K508, and the closing of contacts K509C energizes the CARRIER ON indicator lamp. The bias keying relay and the break in follower relay follow the operation of the CW handkey. The carrier suppress delay open relay, however, has enough drop out delay to remain energized during normal key up intervals between code characters.

(*e*) As shown in figure 4-16, the remote CW key which actuates the bias keying stage is applied through EMISSION SELECTOR switch S508 and through contacts K204B of the H.V. run relay to the armature of antenna dummy load relay K806. The contacts of K806 are as shown in figure 4-16 when POWER SELECTOR switch S510 is in either the 100W or 500W position. During 100W or 500W operation the keying path to the anode of CR522 is completed through TUNER CONTROL switch S806 and the keying interlock in Antenna Coupler CU-760/WRT-1. The key interlock is provided so that there will be no possibility for r-f power to be applied to the contacts of tuner switching relay K3501 during the BYPASS or TUNER IN switching operation. The key interlock relay contacts are shown in figure 4-16 as they would appear when TUNER

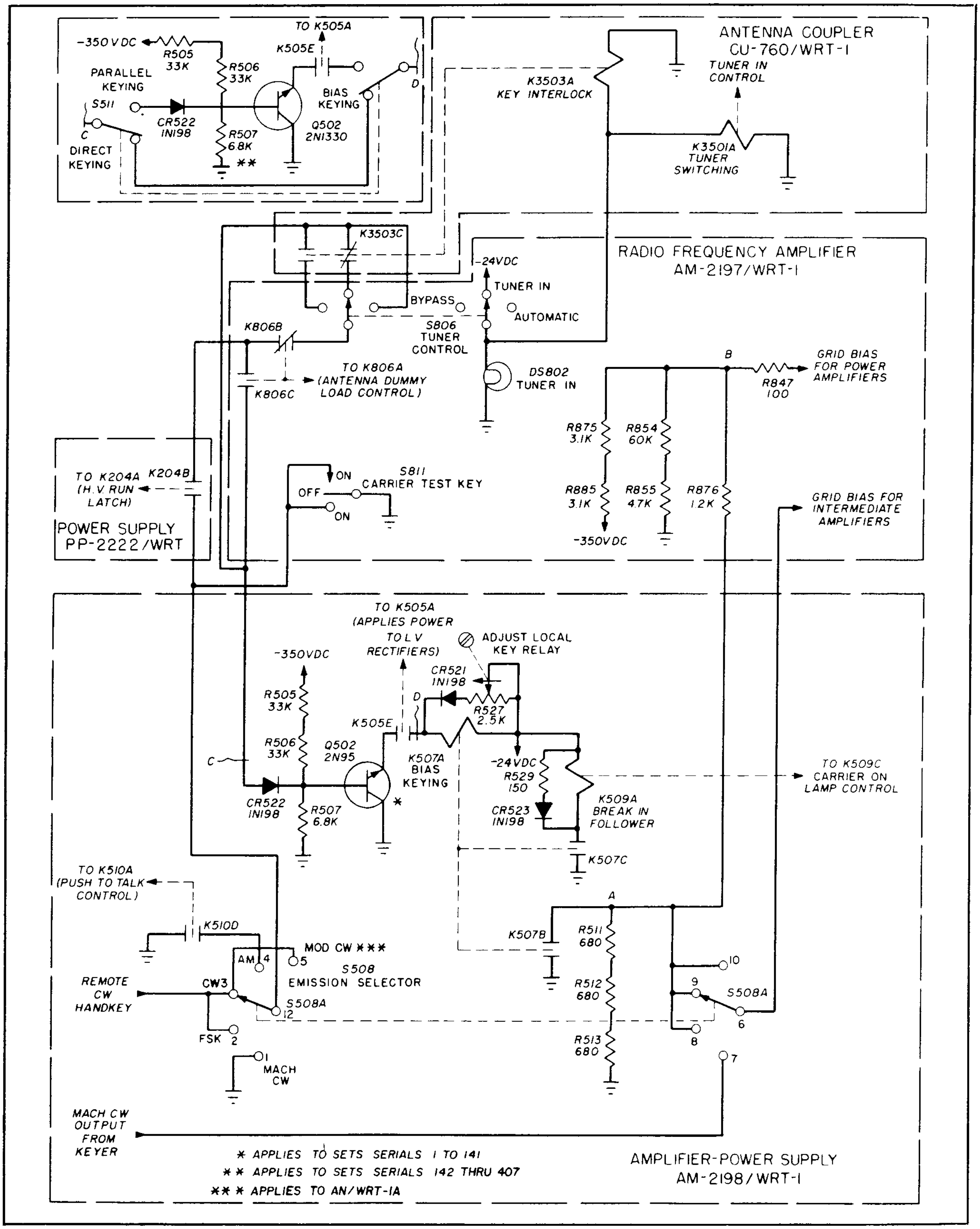


Figure 4-16. Bias Keying and Control Circuits, Simplified Schematic Diagram

CONTROL switch S806 is in the TUNER IN position. In such a case, the keying path is through contacts K3503C to diode CR522. When POWER SELECTOR switch S510 is placed in the TUNE or ADJ position, antenna dummy load relay K806 is energized, and a local keying line is established through contact K806C.

(*f*) As shown in figure 4-16, during AM operation, bias keying relay K507 is energized when contacts K510D of the push-to-talk relay are closed. The push-to-talk relay is energized by the handset push-to-talk button. During MACH CW operation, the bias keying relay is energized by the grounded contacts of EMISSION SELECTOR switch S508. During FSK operation, the bias, keying relay is energized through the remote CW position.

(5) 1000 CYCLE TONE GENERATOR. The 1000 cycle tone generator is activated by placing the EMISSION SELECTOR switch S508 to the MOD CW position. A schematic of this 1000 cycle tone generator is shown on figure 6-49B.

(*a*) The application of a negative 24 volts across a resistor divider network R552 and R554, energizes the 1000 cycle oscillator into operation. Transistor Q503 operated in the Class C region conducts and produces a low level oscillatory pulse. This oscillatory pulse exictes a tank circuit consisting of L507, C515 and C516. The tank circuit is inductively tuned to 1000 cycles, therefore, this L-C combination determines the fundamental frequency of operation. Capacitors C515 and C516 form a voltage divider and also isolate the dc voltage from the tank circuit. Since the oscillation in the tank circuit would cease due to the resistance encountered, the pulsation requires additional re-enforcement at selected intervals to sustain oscillation. The feedback voltage developed across capacitor C2 is directly coupled through a swamping resistor R547 to the emitter of Q503. The swamping resistor attenuates the sharp regenerative pulses that are feedback through the closed loop to enable transistor Q503.

(*b*) To reduce the effects of temperature, resistor R548 and R549 are utilized to stabilize and develop the bias for the 1000 cycle oscillator. A variable resistor R550 adjusts the output voltage obtained from the tank circuit. A tone modulated signal, coupled through capacitor C517 to the base of class A amplifier Q504, is kept at an optimum level to prevent driving the amplifier into a region of non-linear operation. Capacitor C517 placed in series with the arm of variable resistor R550 functions as a dc blocking capacitor. DC voltages applied to the tank circuit are kept at a minimum, thus preventing a damping of the oscillatory signal.

(*c*) Tone amplifier Q504 transfers an amplified signal to transformer T504. Transformer T504 provides an impedance match and isolates the tone amplifier output from other external circuit. Since the dc resistance of the transformer T504 is small, resistor R553 provides the necessary isolation between input and output circuit of transistor Q504. Any undesirable signal appearing at the collector of Q504 is shunted through capacitor C518 to the power supply. The step-up voltage induced across the primary and secondary winding of transformer T504 is available to modulate Radio Frequency Amplifier AM-2197/WRT-1.

4-4. POWER AMPLIFIER FUNCTIONAL SECTION.

a. GENERAL OPERATION

(1) The power amplifier functional section accepts the modulated r-f carrier from the low level modulator in the modulating functional section and raises the signal power to a 100-watt or 500-watt level for application to the transmitting antenna. A block diagram of the power amplifier functional section is shown in figure 4-17.

(2) As shown in figure 4-17, the output of the low level modulator, V801, is applied to the grid of the first intermediate amplifier, V802. After amplification by V802, the signal is applied to the second intermediate amplifier, V803. The two intermediate power amplifiers are keyed by the application or removal of grid bias. The keying is accomplished by control circuitry in Amplifier-Power Supply AM-2198/WRT-1. The two amplifier stages operate Class A for minimum distortion.

(3) Driver amplifier V804 supplies the grid drive for power amplifiers V805 through V808. Two of the power amplifier tubes are connected in parallel in each half of a push-pull circuit. During 100W and 500W operation, +1250 volts d-c is applied to the plates of V805 through V808 from the H.V. power supply consisting of rectifiers V201 through V206. When the POWER SELECTOR switch is in the TUNE position, the plate voltage is reduced to +600 volts for sets serials 1 through 141, and +800 volts for sets serials 142 and up. The power amplifiers are keyed by reduction of the level of grid bias voltage. The keying is accomplished by control circuitry in Amplifier-Power Supply AM-2198/WRT-1. Tuning of the power amplifier plate circuit over the frequency range of 0.3 to 1.5 Mc is accomplished with TUNING Ⓕ control. Coupling of the power amplifier plate circuit to the antenna feeder line is accomplished with TUNING Ⓖ control. (The two controls are located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1.)

(4) A reflectometer circuit samples the output voltage and current of the power amplifiers and provides for measurement of the power output, voltage standing wave ratio (VSWR), and percentage of modulation. A protective overload relay is included in the reflectometer to disable the high voltage supply when the VSWR becomes greater than 4:1.

(5) As shown in figure 4-17, Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1 are inserted in the r-f transmission line near the transmitting antenna. The function of the two units is to match the impedance of the fixed transmitting antenna to the 50-ohm coaxial feeder line throughout the entire frequency range of 0.3 to 1.5 Mc. Antenna Coupler CU-760/WRT-1 contains a coil

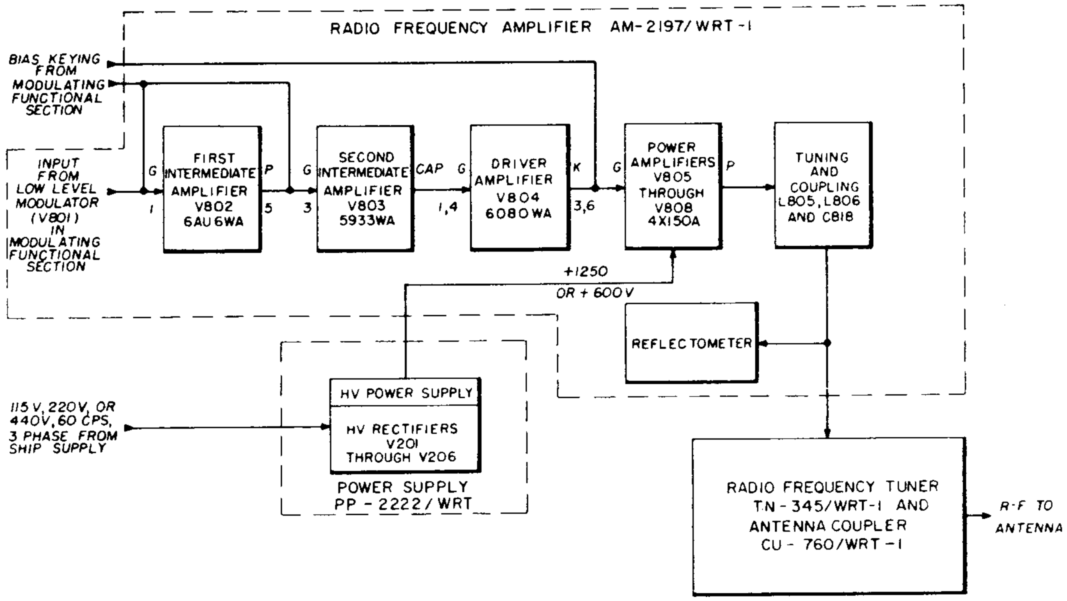


Figure 4-17. Power Amplifier Section, Functional Block Diagram

which may be inserted in series with the antenna to increase its effectice electrical length. Antenna Tuner TN-345/WRT-1 contains a motor-driven tuning coil in series with the antenna and a matching auto transformer which may be inserted in parallel with the motor-driven coil. A control relay in Antenna Coupler CU-760/WRT-1 provides a bypass for both units so that the r-f output of the power amplifiers may be connected directly to the antenna. All controls necessary for operating the remotely located tuner and coupler are located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1.

b. DETAILED OPERATION

(1) INTERMEDIATE AND DRIVER AMPLIFIERS

(*a*) The circuits described below are located on a subchassis contained in Radio Frequency Amplifier AM-2197/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-18. For further detail refer to the complete schematic diagram of figure 6-26.

(*b*) The first intermediate amplifier receives the modulated r-f signal from the low level modulator, and, after amplification, the signal is applied to the second intermediate amplifier. The two stages operate in Class A for minimum distortion. A twin triode driver stage receives the output of the second intermediate amplifier and develops the signal level necessary to drive the power amplifiers.

(*c*) As shown in figure 4-18, the output of the low level modulator V801 is coupled to the grid of the first intermediate amplifier, V802, through capacitor C843. The plate load for V802 consists of resistor R817 and coil L804. Coil L814 and capacitor C809 decouple the r-f signal from the +350-volt supply. The voltage developed at the plate of V802 is applied to the grid of second intermediate amplifier V803 through capacitor C808. Coil L808 is the plate load for V803; coil L812 and capacitor C804 form an r-f decoupling network for the power supply. Resistor R845 and the r-f filter composed of choke L807 and capacitor C830 provide a d-c voltage proportional to the cathode current of V803 for TEST AMMETER M805. During MACH CW operation, keying bias from the CW keying amplifier in Radio Frequency Oscillator O-621/WRT-1 is applied to terminal 6 of TB801 and thus to the grid of the first intermediate amplifier through the network consisting of resistors R828, R884, and R883; keying bias for the second intermediate amplifier is applied through resistor R820. During handkeyed CW operation, the keying bias is controlled by a keying relay in Amplifier Power Supply AM-2198/WRT-1. The keying relay follows the operation of the CW key. Thus, when the key is up, a negative voltage is applied to the grids of V802 and V803 and they cease conducting. When the key is down, the negative bias is removed. During FSK and AM emission, terminal 6 of TB801 is maintained at ground potential and V802 and V803 operate as self-biased amplifiers.

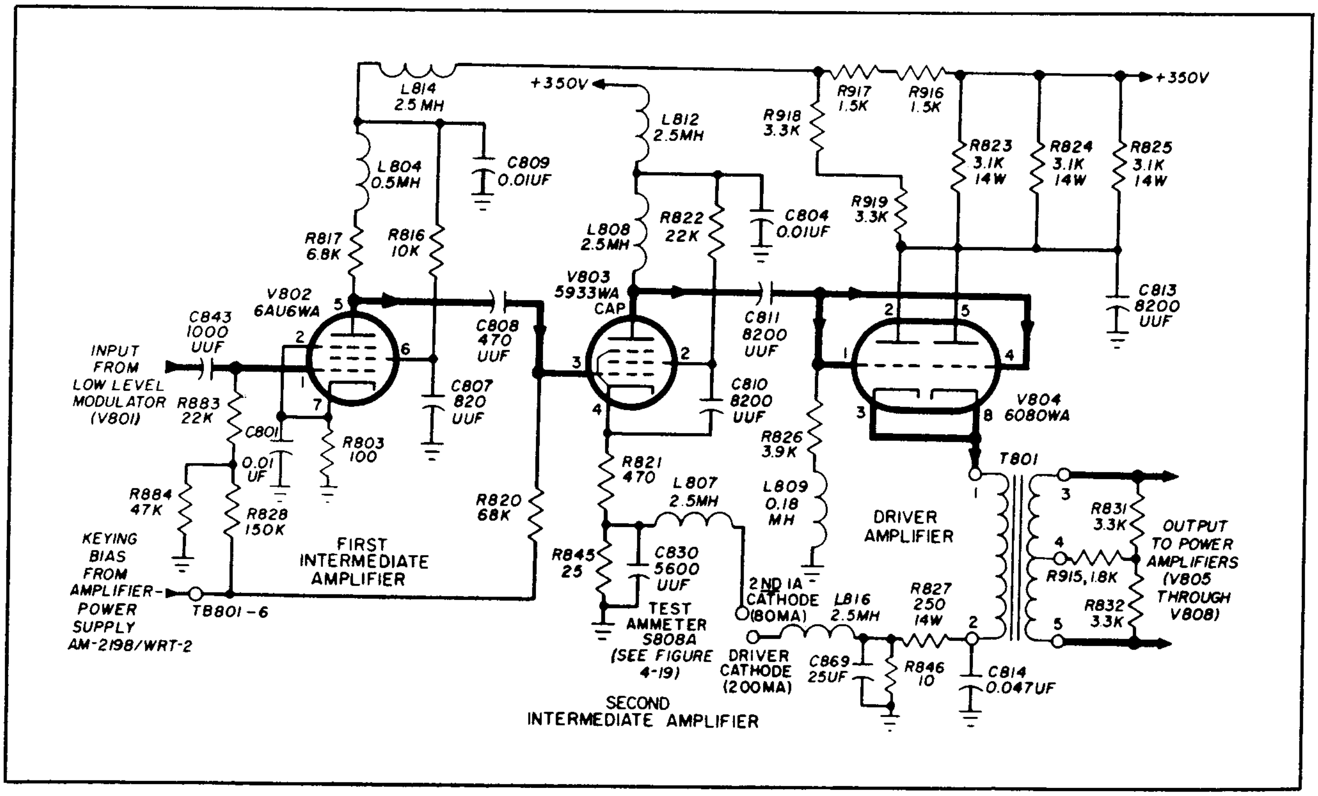


Figure 4-18. Intermediate and Driver Amplifiers, Simplified Schematic Diagram

(*d*) As shown in figure 4-18, the output of V803 is coupled through capacitor C811 to grids 1 and 4 of V804, the driver amplifier. Coil L809 in the grid circuit of V804 provides shunt peaking to reduce high frequency signal attenuation due to interelectrode capacitance. The driver amplifier operates essentially as a cathode follower, presenting a low source impedance to the grids of the power amplifiers for minimum distortion. Resistor R846 and the r-f filter composed of choke L816 and capacitor C814 provide a d-c voltage proportional to the cathode current of V803 for TEST AMMETER M805.

(2) POWER AMPLIFIER CIRCUITS

(*a*) The circuits described below are located in Radio Frequency Amplifier AM-2197/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-19. For further detail refer to the complete schematic diagram of figure 6-26.

(*b*) The power amplifiers receive the r-f signal from the driver amplifier and boost it to the final power operating level. A tuning control is provided for maintaining the tank circuit resonance over the operating frequency range and a coupling control is provided for matching the output impedance of the power amplifiers to the impedance of the antenna feeder line. An overload protection circuit operates to remove the plate voltage and bias voltages when any of the four power amplifier tubes starts to conduct an excessive amount of current.

(*c*) As shown in figure 4-19, the output of the driver amplifier, V804, is coupled through transformer T801 to the power amplifier grids. Capacitor C815 provides an r-f ground for the center tap of the secondary of T801, and thus the two sets of parallel tubes (V805, V806, and V807, V808) are driven in push-pull. The power amplifier resonant tank circuit consists of variable vacuum-dielectric capacitor C818 and slug-tuned coil L806. The center tap of L806 is maintained at r-f ground potential by capacitor C837 and thus the r-f voltage coupled to the antenna circuits through capacitor C836 is the r-f voltage which appears across the upper half of L806. The plate current of V807 and V808 passes through the lower winding of L806 and the autotransformer action of L806 induces a voltage in the upper half of the coil which is in phase with the voltage due to V805 and V806. TUNING Ⓕ control (located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1) varies the setting of capacitor C818 and coils L805 and L806 for resonance in the plate circuit of the power amplifiers. COUPLING Ⓖ control (same location) varies the setting of L805 and L806 for coupling maximum power to the antenna circuits. The mechanical aspects of the tuning head are discussed in paragraph 4-4*b*(3) below.

(*d*) As shown in figure 4-19, fixed grid bias for the Class AB_2 power amplifiers is obtained from the −350-volt d-c supply through a divider network consisting of resistors R885, R875, R876, R854, R855, and resistors R511 through R513, the latter resistors being located in Amplifier-Power Supply AM-2198/WRT-1. (See figure 4-16). The voltage appearing at the junction of R875 and R876 is applied through R847 to the center tap of T801. Since R847 is in series with the bias supply output, the voltage across it is directly proportional to the total grid current of the power amplifiers. When TEST AMMETER switch S808 is placed in the TOTAL P.A. GRIDS (20MA) position. TEST AMMETER M805 measures the magnitude of the voltage drop across R847. During AM, FSK, and MACH CW position, the junction of resistors R876 and R511 is maintained at ground potential by closed contacts of the keying relay in Amplifier-Power Supply AM-2198/WRT-1. The bias voltage appearing at the junction of R875 and R876 during such operation is approximately 40 volts less than when the junction of R876 and R511 is not grounded. During handkeyed CW operation, the bias voltage for the power amplifiers follows the operation of the keying relay. When the key is up, the tubes are cut off and no r-f energy is radiated from the antenna.

(*e*) As shown in figure 4-19, resistors R854 and R855 form a voltage divider network for the purpose of monitoring the condition of the −350-volt bias supply with TEST VOLTMETER M804 when TEST VOLTMETER switch S807 is placed in the GRID BIAS (60V) position. Resistors R905, R852 and R853 form a voltage divider for measuring the condition of the +350-volt screen supply with M804 when TEST VOLTMETER switch S807 is in the SCREEN SUPPLY (600V) position. Resistors R849 through R851 form a voltage divider for measuring the condition of the high voltage supply with M804 when TEST VOLTMETER switch S807 is placed in the PLATE SUPPLY (1.5KV) position. P. A. CATHODE CURRENTS switch S809 is used in conjunction with P. A. CATHODE CURRENTS meter M806 to measure the individual and total cathode current of tubes V805 through V808. The individual cathode currents are directly proportional to the voltage drops across the individual cathode resistors, R835 through R838. The total cathode current is directly proportional to the voltage drop across the common cathode resistor, R839. The meters and switches mentioned above are all located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1.

(*f*) Power amplifiers V805 through V808 are protected from overloads by P.A. overload relay K801. The relay is effectively connected to the cathodes of the power amplifiers by diodes CR801 through CR804. When all of the tubes are drawing an identical amount of cathode current, identical voltage drops appear across cathode resistors R835 through R838. Since the cathode diodes are forward-biased by the cathode resistor voltage drops, the voltage appears across K801A and the P.A. overload adjust potentiometer, R840. However, should any tube assume more than its

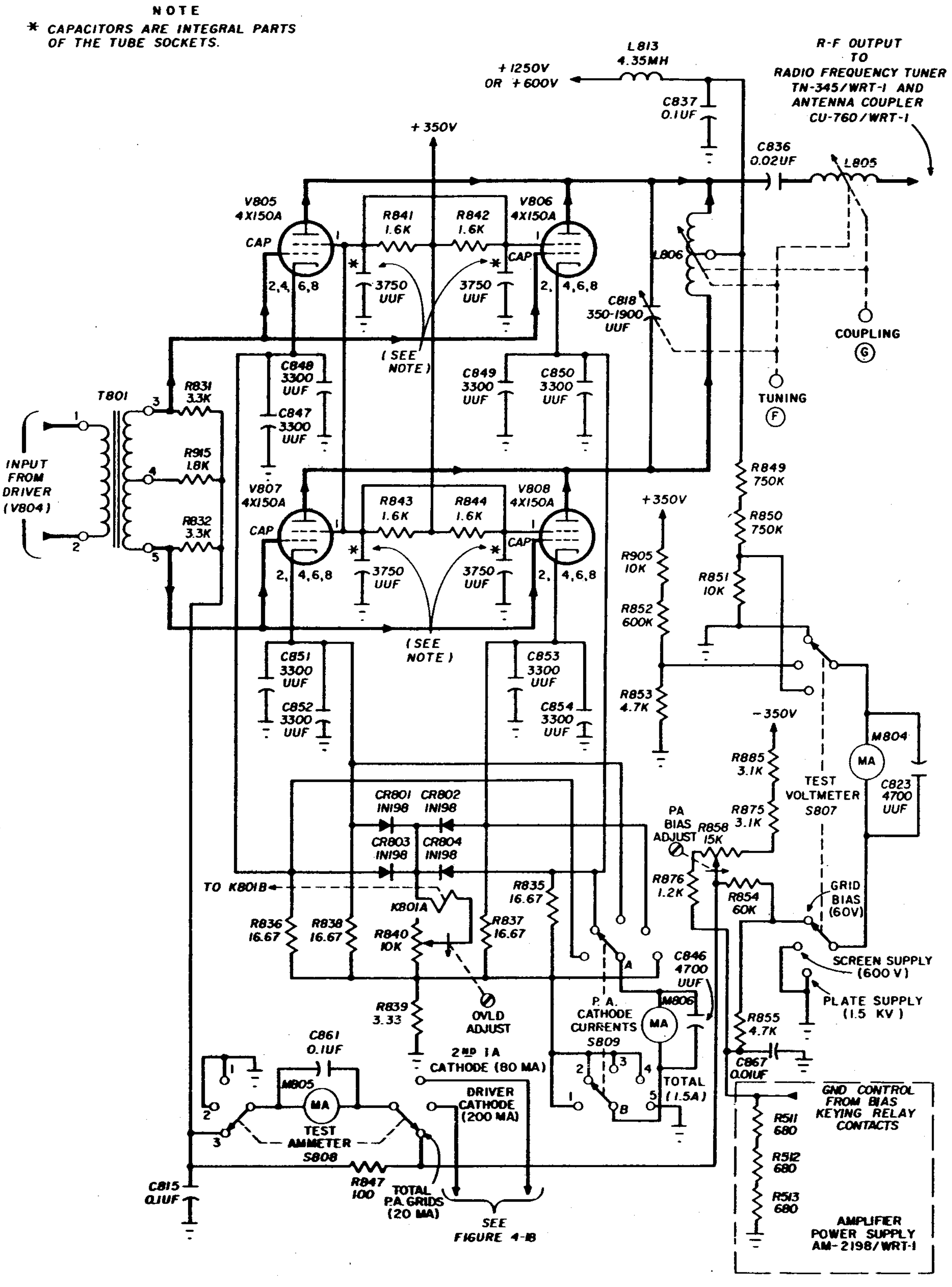


Figure 4-19. Power Amplifier Circuits, Simplified Schematic Diagram

nominal share of the load current, the voltage across its cathode resistor rises, and the remaining cathode diodes are reverse-biased. Thus the voltage applied across K801 is determined by the amplifier which draws the most cathode current. When the current becomes excessive, K801 is energized and contacts K801B close, causing H.V. OVERLOAD lamp DS801 to glow. The closing of contacts K801B also initiates a sequence of control events (described below in paragraph 4-4*b*(5)(c)) which results in the removal of the primary power input to the H.V. rectifiers.

(3) TUNING AND COUPLING MECHANISM, GEAR TRAIN.

(*a*) The tuning and coupling mechanism shown in figure 4-20 varies the settings of capacitor C818 and two coils L805 and L806. As a result, maximum power may be coupled to the antenna, at the same time maintaining resonance in the plate circuit of the power amplifiers throughout the frequency range of Radio Transmitting Set AN/WRT-1. A schematic diagram of the gear train for the tuning and coupling mechanism is shown in figure 4-20.

(*b*) The TUNING Ⓕ knob transmits motion to tuning capacitor C818, movable coupling slug L805B and movable tuning slug L806B. The position of the knob is indicated on a graduated tape, MP917, which is driven through gears MP902, MP901, MP893, MP894 and toothed drum. Motion is transmitted to tuning capacitor C818 through worm MP821, worm wheel MP854 and miter gears MP846 and MP847 in the tuning head gear housing; then through a splined shaft to the capacitor mechanism composed of the capacitor drive cam, rack assembly, sprockets MP803 and MP802, chain MP801 and a swivel. The capacitor drive cam transforms the linearly reduced rotation of TUNING Ⓕ knob to a non-linear motion, which, when combined with the movement of L805B and L806B, adjusts the tuning elements to a frequency coincident with the frequency readings on the graduated tuning tape MP917. Movable tuning slug L805B is driven from the TUNING Ⓕ knob through worm MP821, worm wheel MP854, helical pinion MP855, and helical and bevel gear assembly MP850. Gear assembly MP850 is an integral part of the tuning coil differential assembly. However, the differential merely reverses the rotation of TUNING Ⓕ knob, and transmits it in a linear manner to the coil drive cam. The nonlinear motion developed by the cam is transmitted through rack assembly MP915, gear assembly MP872 and rack MP918 to the movable ferrite core of L806. The tuning core is enclosed in tuning coil L806 which is mounted above the tuning head gear housing. The rotation of the TUNING Ⓕ knob is limited to the extremities of the tuning range by a stop assembly shown in figure 4-20. In a similar manner, the movable coupling core for coil L805 is driven from the TUNING Ⓕ knob through gears MP821, MP854, MP856, MP849, the differential assembly, coil drive cam, rack assembly MP912, gear assembly MP873 and rack MP923.

(*c*) The COUPLING Ⓖ knob transmits motion to the movable ferrite cores for L805 and L806. The position of the knob is indicated on dial E927, which is driven through spur gears MP892, MP898, MP899 and MP891, all of which are mounted on the front of the tuning head gear housing. Rotation of the COUPLING Ⓖ knob is passed into the gear housing through helical gears MP822 and MP876. Connected on the same shaft as gear MP876 is spur gear MP889 which drives L806 drive cam through gears MP883 and MP890. Attached to gear MP890 is L806 drive cam which converts the linear rotation of the COUPLING Ⓖ knob into nonlinear motion. This motion is transmitted through rack assembly MP911 to gear segment MP896, the differential assembly, coil drive cam, and through the previously described gear train to the movable ferrite core in coil L806. Similarly, the linear rotation of the COUPLING Ⓖ knob is converted into non-linear motion to the movable ferrite core for coil L805 through worm MP848, gear segment MP853, its differential assembly and the coil drive cam for coil L805.

(*d*) When the TUNING Ⓕ knob is set to any frequency within its range, the combination of cams, differentials and gear trains will permit the COUPLING Ⓖ knob to adjust for maximum antenna power without additional resonance adjustments.

(4) R-F MONITORING CIRCUITS

(*a*) The r-f monitor circuit is located on a subchassis contained in Radio Frequency Amplifier AM-2197/WRT-1. A simplified schematic diagram of the circuits is shown in figure 4-21. For further detail refer to the complete schematic diagram of figure 6-24.

(*b*) The r-f monitor circuit consists of an amplitude modulation monitor, a reflectometer, and an excessive standing wave ratio protection circuit. The AM monitor permits the operator to measure directly the modulation percentage for any value between zero and 100 per cent. The reflectometer performs two functions: (1) It provides a means for measuring the voltage standing wave ratio (VSWR) on the antenna feeder line, and (2) it provides a means for measuring the r-f power output of the final amplifiers. The standing wave ratio protection circuit energizes an overload relay when the VSWR becomes greater than 4:1 due to improper tuning or other faults. Operation of the overload relay removes the plate voltage from the final amplifiers and deenergizes the +350 and −350-volt power supplies.

(*c*) As shown in figure 4-21, the r-f sample for the AM monitor circuits is obtained from the antenna

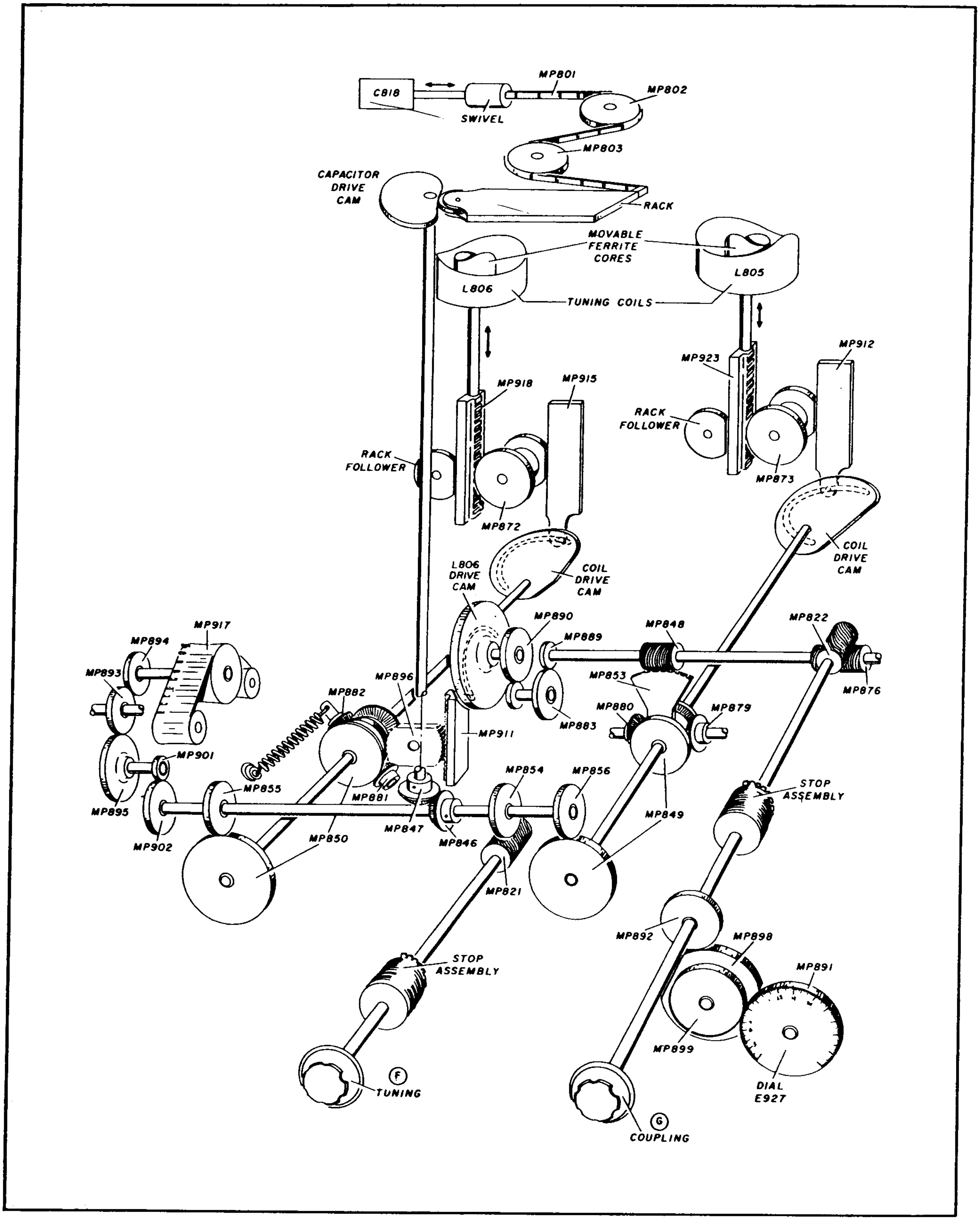


Figure 4-20. Tuning and Coupling Mechanism, Simplified Schematic Diagram

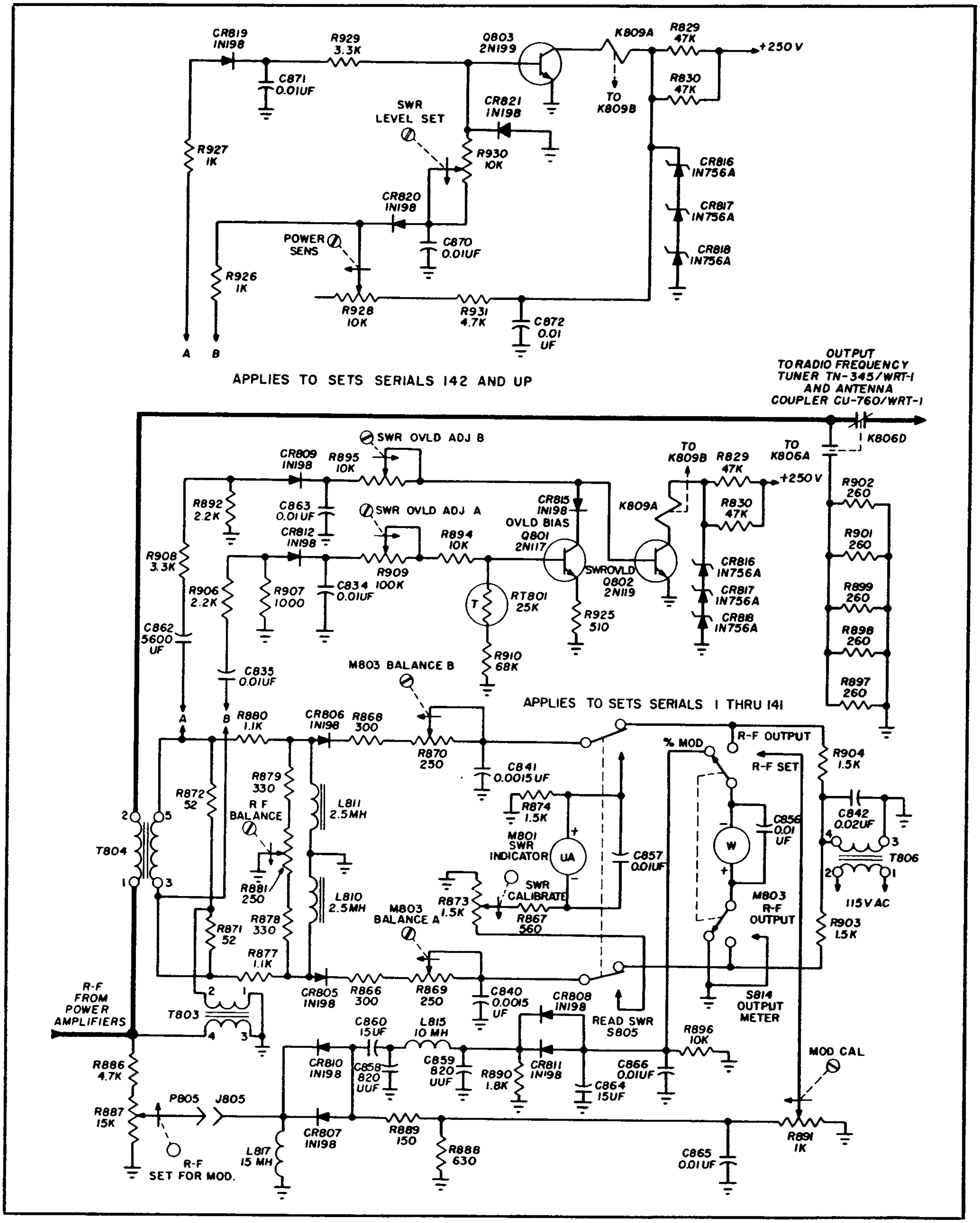


Figure 4-21. R-F Monitoring Circuits, Simplified Schematic Diagram

line through resistor R886 and R-F SET FOR MOD. potentiometer R887. The r-f voltage developed across inductor L817 is rectified by diodes CR810 and CR807. A d-c voltage is developed across load resistors R889 and R888 which is proportional to the average level of the r-f voltage. A pi-section filter, consisting of capacitors C858 and C859 and choke L815, filters out the r-f components of the rectified voltage but passes the audio components. The audio signal developed across resistor R890 is rectified by diodes CR808 and CR811 and a d-c voltage proportional to the average level of the audio modulating voltage is developed across resistor R896 and is filtered by capacitors C864 and C866. When OUTPUT METER switch S814 is placed in the % MOD position, the d-c voltage across R896 is applied to R-F OUTPUT meter M803. Before making a modulation percentage reading, the meter is first calibrated by holding S814 in the R-F SET position and adjusting R-F SET FOR MOD. potentiometer R887 until the meter needle deflects to the R-F SET marker. (The meter, switch, and potentiometer control are located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1.) As shown in figure 4-21, the voltage appearing at the R-F SET contact of S814 is a sample of the d-c output of the r-f detector. Thus the modulation percentage measurement is a comparison of r-f and audio voltage levels. MOD CAL potentiometer R891 is a screwdriver adjustment with which to set the correct relationship between voltages when a known percentage of modulation is applied to the r-f carrier.

(*d*) The output of the detectors in the reflectometer circuit depends upon the phase relationship between the voltage and current output of the power amplifiers. When the antenna is matched to the impedance of the transmission line and the final amplifiers are properly tuned, there is zero phase difference between line current and voltage. As the degree of mismatching increases, the magnitude of phase difference between line voltage and current increases. As shown in figure 4-21, two transformers T803 and T804, provide the inputs for the reflectometer. The voltage induced in the secondary of T803 is in phase with the power amplifier output voltage; the voltage induced in the secondary winding of T804 is in phase with the output current. Two diode detector circuits which are balanced with respect to load resistors R871 and R872 provide the d-c output voltages for SWR indication and r-f power indication. When the line voltage and current are in phase, the voltage at the secondary of T803 is the same polarity and magnitude as the voltage appearing across R871 and adds in series with it. Thus, during periods when the r-f voltage across resistor R878 and R-F BALANCE potentiometer R881 is positive with respect to ground, diode CR805 conducts and a d-c voltage is developed across resistor R903. The voltage at the secondary of T803 opposes the voltage appearing across R872 and, consequently, when the line voltage and current are in phase, diode CR806 does not conduct and no d-c voltage is developed across resistor R904. When READ SWR switch S805 is in the position shown in figure 4-21, 17 volts a-c is applied from terminal 4 of the secondary of T806 to the cathode of each detector diode. This bias voltage causes the diodes to operate as square law detectors, the d-c output being proportional to the square of the input voltage. Since power is proportional to the square of the voltage, the reflectometer normally operates as a power detector. When the line current and voltage differ in phase, diode CR806 begins to produce an output. Since R-F OUTPUT meter M803 is connected across resistors R903 and R904 for power measurements, the meter reading declines when CR806 begins to conduct. M803 BALANCE A and M803 BALANCE B potentiometers, R869 and R868, are provided for calibrating the meter scale. R-F BALANCE potentiometer R881 is used to balance the inputs to the two detector diodes. Chokes L810 and L811 provide low impedance return paths for the a-c bias.

(*e*) When SLOW READ SWR switch S805 is depressed, the a-c line is removed from diodes CR805 and CR806 and they become simple voltage detectors. The d-c output of the diodes is developed across resistor R874 and SWR CALIBRATE potentiometer R873. Meter M801 is a center scale meter and the difference between the voltage appearing at the arm of R873 and the voltage appearing at the tap of R874 determines the direction of deflection. The SWR CALIBRATE control has panel markings of 1:1, 2:1 and 4:1. If the actual standing wave ratio is, for instance, 2:1, then when the control pointer is moved to that position on the panel, the voltages applied to M801 are balanced and it indicates zero. If the degree of mismatch increases, the voltage across R874 becomes greater and the meter deflects to the right on the red scale; if the mismatch decreases, the voltage at the arm of R873 becomes greater, and the meter deflects to the left on the green scale. SWR INDICATOR M801, SWR CALIBRATE control R873, and SLOW READ SWR switch S805 are located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1. Additional contacts on the SLOW READ SWR switch actuates the tuner motor speed reduction mechanism as described below in paragraph 4-4*b*(6).

(*f*) To avoid possible equipment damage, in sets serials 1 to 141, an SWR alarm circuit is provided to remove the high voltage from the power amplifier when the standing wave ratio becomes excessive. When there is a phase difference between the feeder line current and voltage, a voltage exists across resistor R892. As shown in figure 4-21, diode CR809, filter capacitor C863, potentiometer R895 and the collector resistance of Q801 provide positive d-c base-to-emitter bias for transistor Q802. The voltage across R892 increases as the antenna feeder line standing wave ratio increases, and when the ratio becomes greater than 4:1, the collector current of

Q802 is sufficiently large to energize relay K809. R895 determines the amount of voltage across R892 necessary to energize the overload relay. When contact K809B closes, H.V. OVERLOAD lamp DS801 lights and the sequence of control events described below in paragraph 4-4*b*(5)(*c*) takes place. Transistor Q801 is provided in order that the overload circuit may still function properly at low power levels. The collector resistance of Q801 is a function of base-to-emitter bias developed across resistors R910 and RT801. When operating at low power levels, the base bias of Q801 decreases and therefore its collector resistance increases. At the same time the voltage across R892 has decreased but the base bias of Q802 does not decrease substantially due to the increased collector resistance of Q801. Thus an excessive standing wave ratio will still cause relay K809 to energize even when the power output level is reduced. The setting of SWR OVLD ADJ A potentiometer R909 determines the amount of bias applied to Q801.

(*g*) To avoid possible equipment damage in sets serials 142 and up, a SWR alarm circuit removes the high voltage from the power amplifier when the standing wave ratio becomes excessive. When there is a phase difference between feeder line current and voltage, there is an increase in the potential voltage at the base of Q803. As shown in figure 4-21, when the SWR ratio becomes greater than 4:1, Q803 conducts, energizing overload relay K809A. Contact K809B closes, H.V. OVERLOAD lamp DS801 lights and the sequence of events described below in paragraph 4-4*b*(5)(*c*) takes place. SWR LEVEL SET R930 determines the amount of base to emitter bias of Q803 developed by a phase difference in line voltage and current, thereby setting the SWR level at which relay K809A is energized. POWER SENS R928 adjusts the reverse bias on diode CR820.

(*h*) As shown in figure 4-21, a dummy load consisting of resistors R897 through R902 is provided for loading the power amplifiers during tuning and adjustment. When POWER SELECTOR switch S510, located on the front panel of Amplifier-Power Supply AM-2198/WRT-1, is placed in the TUNE or ADJ positions relay K806 is energized and the feeder line to Antenna Coupler CU-760/WRT-1 is disconnected by relay contacts K806D.

(5) H.V. RECTIFIERS

(*a*) The high voltage for the plates of the power amplifier tubes is supplied by a delta-wye three-phase bridge rectifier circuit located in Power Supply PP-2222/WRT. A complete schematic diagram of the high voltage rectifier is shown in figure 6-30. The high voltage rectifiers provide a +1250-volt output for 500-watt operation and a +600-volt output for 100-watt operation.

(*b*) As shown in figure 6-30, three-phase power of either 115, 220, or 440 volts, 60 cycles, is applied through EMERGENCY STOP switch S201 and line fuses F201, F202, and F203 to the delta-connected primaries of T201, T202, and T203. The application of primary power is controlled by contacts K203C through K203E of H.V. start relay K203 and by contacts K204 through K204E of H.V. run relay K204. In the sequence of control operations, K203 is energized first and contacts K203B then energize K204. OPERATING HOURS meter M201 is provided for indicating the total number of hours elapsed during application of power from the ship supply. The value of ship supply voltage determines the line fuse ratings, the connections to H.V. RECT. LINE BLOWN FUSE IND. DS201 through DS203, and the connections of the primary windings of T201, T202, and T203. The notes and tabulated data in figure 6-30 adequately explain the connections and fuse ratings needed for each of the various values of ship supply voltage.

(*c*) As shown in figure 6-30, when POWER SELECTOR SWITCH S510 is in the TUNE (low power) position, terminal 10 of the secondaries of T201, T202, and T203 becomes the common point of the wye configuration when contacts K201D and K201E of low power relay K201 are closed. For 100 watt and 500 watt operation, high power relay K202 is energized and terminal 11 becomes the common point for the secondary windings. The phase voltage for low power operation is approximately 266 volts a-c while that for high power operation is approximately 545 volts. Xenon-filled gas rectifiers V201 through V206 are connected in a three-phase bridge configuration. Filament voltage is supplied by transformer T204. Choke L201 and capacitors C201 and C202 form an L-section or choke input filter. The cathodes of V201, V203, and V204 provide the positive output voltage, and the plates of V202, V205, and V206 are grounded through H.V. overload relay K206 and H.V. RECT. OVERLOAD ADJ rheostat R218 to provide a d-c return path. The setting of R218 determines the amount of current shunted around the relay coil, and thus determines the overload tripping point. When H.V. overload relay K206 is energized contacts K206B close, energizing H.V. overload auxiliary relay K207 and H.V. OVERLOAD indicator lamp DS208. Contacts K207B close, providing a self-latching ground return for relay K207 through LV RECT OVLD RESET switch S505, OVERLOAD RESET switch S203, and PUSH TO RESET switch S812. (Refer to the low voltage supply functional section schematic diagram of figure 5-31.) Contacts K207C open deenergizing H.V. start relay K203. Contacts K203C, D and F open, and the three-phase input to the primaries of T201, T202, and T203 is disconnected. Momentary depression of any one of the three reset switches will cause H.V. overload auxiliary relay K207 to be deenergized. The control sequence then reverses and input power is applied once more to T201, T202, and T203. The spring-loaded plunger shorting switch, S202, is provided as a safety measure to discharge filter capacitors

C201 and C202 when the Power Supply PP-2222/WRT unit drawer is withdrawn from the cabinet.

(*d*) To simplify the discussion of the bridge rectifier operation, three distinct instants of time during one half cycle of the a-c voltage across the secondary of T201 will be considered. In the first case, assume that the voltage across the secondary of T201 is zero, having just passed through its negative cycle. The voltage across the secondary of T202 will be negative and increasing toward a negative maximum and the voltage across the secondary of T203 will be positive, of the same magnitude, but decreasing toward zero. For such a condition, rectifiers V203 and V206 will be conducting. The second instant of time considered is when the voltage across the secondary of T203 has declined to zero. In this case, the voltage across the secondary of T202 is negative and rising toward zero and the voltage across the secondary of T201 is positive, of the same magnitude, but increasing toward a positive maximum. For such a condition, rectifiers V201 and V206 will be conducting. The third instant of time considered is when the voltage across the secondary of T202 has declined to zero. In this case the voltage across the secondary of T203 is negative and increasing to a negative maximum, while the voltage across the secondary of T201 is positive and decreasing toward zero. For such a condition, rectifiers V201 and V205 are conducting. During the time that the voltage across the secondary of T201 is negative, rectifiers V204, V202, V203, and V205 conduct. Thus there are 6 pulses of rectifier current during the time interval of one cycle of primary input which makes the ripple frequency of the H.V. rectifiers 360 cycles.

(6) ANTENNA TUNER

(*a*) A schematic diagram of Radio Frequency Tuner TN-345/WRT-1 is shown in figure 6-31. All electrical and mechanical components of the tuner are contained in a shock-mounted, pressurized cylinder filled with nitrogen at a pressure of 20 psi. A pressure gauge, a relief valve, and a valve for attaching pressurizing equipment are mounted on the front plate of the cylinder.

(*b*) Radio Frequency Tuner TN-345/WRT-1 is provided in order that the power amplifier may deliver maximum power at minimum standing wave ratio (SWR) to a fixed antenna for any frequency within the range of operation of Transmitter Group OA-2321/WRT-1. Maximum power is transferred and minimum SWR exist when the antenna appears as a purely resistive 50-ohm load. As the frequency of operation is varied, the resistance component of the antenna impedance changes in magnitude, and the reactive component changes both in magnitude and in character. The process of tuning the antenna consists of inserting opposing reactance in series with the antenna to obtain a resonant condition.

(*c*) As shown in figure 6-31, servo motor B3301 is the mechanical element which provides control of the antenna tuning coil L3302. When either POSITION CONTROL UP Ⓙ switch S803 or POSITION CONTROL DOWN Ⓚ switch S804 (located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1) is pressed, a-c voltage is applied to the windings of B3301. The rotary output of the drive motor is transmitted through a two-speed drive and a system of gears to a grounded shorting ring which encircles tuning coil L3302. (See paragraph 4-4*b*(7) below for a detailed discussion of the mechanical aspects of Radio Frequency Tuner TN-345/WRT-1.) As the shorting ring is driven along the length of the tuning coil, the inductance placed in series with the antenna is varied. Coil L3301, which consists of only one turn of wire, couples the r-f energy from the transmitter to L3302. The single-turn coil rides on the shorting ring but is insulated from it. The extremes of travel of the shorting ring assembly are limited by the operation of microswitches S3303 (top limit) and S3304 (bottom limit). When either one of the microswitches is actuated, limit control relay K3301 is energized and normally-closed contacts K3301B and K3301C open the input lines to motor B3301. After the initial tuning adjustment has been made with the up and down controls, a more critical adjustment may be obtained by running the drive motor at a reduced speed. Speed reduction is accomplished by depression of POSITION CONTROL SLOW Ⓛ switch S805 (located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1). When the switch is pressed, −24 volts d-c is applied to magnet coil L3304 in the two-speed drive assembly and the speed of the drive motor output shaft is reduced by a factor of 8.4. The relative position of the shorting ring assembly is indicated by POSITION INDICATOR meter M802 (located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1). As shown in figure 6-31, the arm of potentiometer R3301 is driven by the tuning motor through a system of gears. The indicating meter is connected in a bridge circuit, two arms of which are formed by potentiometer R3301 (refer now to the Radio Frequency Amplifier schematic, figure 6-27). MAX ADJUST potentiometer R833 and ZERO ADJUST potentiometer R834 are provided for initial calibration of the meter.

(*d*) As explained in paragraph (*b*) above, the resistive component of the antenna impedance varies with frequency. At the low frequency end of th transmitter operating range the antenna resistance becomes so low that an impedance transformation must be made if rated output power is to be transferred to the antenna. Autotransformer T3301 provides an impedance transformation ratio of 9 to 1. If, for example, the antenna resistance at a particular frequency is only four ohms, the reflected resistance at the end of the r-f feeder line from the transmitter will be 36 ohms.

As shown in figure 6-31, autotransformer T3301 is selected by the operation of rotary switch S3301 which is driven by electromagnetic actuator B3303. When TRANSFORMER switch S810 is placed in the IN position (the switch is located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1), homing wafer S3307 of the electromagnetic actuator turns to position 2, at which point the a-c voltage is removed from rectifier CR3301. Rotary switch wafer S3301-B is rotated by the actuator to position 3. When TRANSFORMER switch S810 is placed in the OUT position, the homing wafer and rotary switch move to the positions shown in figure 6-31.

(*e*) High temperature regions in Radio Frequency Tuner TN-345/WRT-1 are cooled by forced-air ventilation from blower B3302. When the blower fails to operate properly, centrifugal air interlock switch S3306 opens. Opening of the interlock circuit causes the +350-volt and −350-volt power supplies to

be deenergized and causes the removal of the power amplifier plate voltage. Thermal interlock switch S3305 opens, accomplishing the same result, if the internal temperature of the tuner rises above 110 degrees C (23 degrees F).

(7) TUNER GEAR TRAIN.

(*a*) Figure 4-22 is a simplified schematic diagram of the tuner gear train. As shown in figure 4-22, the r-f section of Radio Frequency Tuner TN-345/WRT-1 consists of L3302 which is adjustable by means of a sliding short, and a coupling loop (L3301) which feeds the unshorted section. The coupling loop is fixed to the sliding short support plate and is fed from a slide wire contact. The control section of the r-f tuner consists of the necessary gears, switches and motors for the operation of the unit.

(*b*) The inside surface of the cylindrical shell housing covering the coil provides the outer conductor for the adjustable coil. Coil L3302, consists of a 5.65 inch diameter fiberglass tube wound with .064 inch diameter silver plated copper wire for a total length of 16 inches. The initial 12 inch is wound at a pitch of 10 turns per inch, with the remaining four inches wound at a pitch of five turns per inch.

(*c*) The sliding short consists of a circular support plate completely encircling the main coil, and carrying a corrugated band of silver alloy with bosses contacting the main coil about every half inch around the circumference. The outer edge of the circular plate carries button-type housing contact fingers E3301 and E3302 which slide on the inside of the housing. Guide shoes extend from the plate to insure alignment with the axis of the main coil, particularly under shock conditions. Single-turn coupling coil L3301 is formed of 0.140-inch silver plated copper wire. It is secured to the plate and extends toward the unshorted part of the coil supported by insulators E3306 and E3307. Also mounted on the plate are the sliding contacts to a feed wire which extends along the total length of the main coil.

(*d*) The sliding short and coupling coil are driven by a servo-type, two-phase, 115-volt, 60-cycle motor B3301 (see figure 4-22). The motor is equipped with a two-speed drive which provides fine tuning at reduced speed. With nominal load, the motor speed is about 1500 r.p.m. Referring to the two-speed drive shown in figure 4-22, operation is as follows:

1. High Speed—In high speed operation, rotation of the input shaft is applied to the clutch plate. With the clutch solenoid deenergized, the clutch return springs hold the clutch housing against the clutch plate and rotation is transferred directly to the clutch housing. The clutch housing is pinned to the output shaft in such a manner that the housing will slide a small amount axially and yet it transfers rotation to the output shaft. This is accomplished by means of a pin that is fitted into a tight hole in the housing and passes through a larger hole in the output shaft. Thus, the input shaft rotation is transferred to the output shaft with no reduction in speed.

2. *Low Speed*—In low speed drive, rotation is still applied to the high speed shaft and thus to the clutch plate. In low speed operation, however, the clutch solenoid is energized and the clutch housing is pulsed to the left, away from the clutch plate. Rotation cannot be transferred from the clutch plate to the clutch housing. The low speed drive balls roll on the high speed input shaft and the outer race which is part of the clutch solenoid. Because of the ratio of diameter of the input shaft to the outer race, the speed of the low speed drive balls is reduced approximately 8.4 to 1. Pins extend into the path of the low speed sleeve so that the low speed sleeve is carried around with the balls. With the clutch housing held against the low speed sleeve by the clutch solenoid the input shaft is moved slightly to the left. This brings low speed driving balls against the back-up plate which starts them up the input shaft radius at A and thus presses them against the outer race. This establishes a positive drive and the output shaft speed is reduced in a ratio of 8.4 to 1 to provide low speed operation. A worm wheel and worm MP3309 and MP3311 (figure 4-22) follows the two-speed drive providing a 100:1 step-down ratio to spur gears MP3304, MP3305, MP3306 and MP3307 which drive sliding racks MP3339 and MP3340 attached to the sliding short and coupling coil L3301. Limit switches control drive motor B3301 at the limits of travel of the sliding short along main coil, L3302.

3. Blower motor B3302, which is equipped with ducts, provides circulation within the r-f tuner. The blower motor is equipped with a centrifugal switch which deenergizes Radio Transmitting Set AN/WRT-1 in the event of blower failure. A thermal cutout switch performs the same function in the event of excessive temperature within the unit. The thermal cutout is set to trip above 110 degrees C (23 degrees F).

(8) ANTENNA COUPLER.

(*a*) A schematic diagram of Antenna Coupler CU-760/WRT-1 is shown in figure 6-55 at the end of section 6. All electrical and mechanical components of the tuner are contained in a shock-mounted, pressurized cylinder filled with nitrogen at a pressure of 20 psi. A pressure gauge, a relief valve, and a valve for attaching pressurizing equipment are mounted on the front plate of the cylinder.

(*b*) Antenna Coupler CU-760/WRT-1 provides additional inductance for resonating the antenna at the low end of the frequency range of Radio Transmitting Set AN/WRT-1. The series inductance added by the main tuning coil in Radio Frequency Tuner TN-345/WRT-1 is insufficient at the lower frequencies where the antenna exhibits a large component of capacitive reactance. The coupler contains an r-f coil which may be switched in series with the main tuning coil of the tuner by means of a vacuum switching relay.

NOTE:
COMPONENTS ARE SHOWN SCHEMATICALLY AND DO NOT NECESSARILY DUPLICATE PHYSICAL POSITIONS.

GEAR SYMBOL	PITCH	PITCH DIAMETER	NO. OF TEETH
MP3304	20	1.200	24
MP3305	20	1.200	24
MP3306	20	.900	18
MP3307	20	.900	18
MP3308	32	.438	FOUR THREAD
MP3309	32	3.125	100
MP3310	32	1.250	40
MP3311	32	.438	SINGLE THREAD
MP3339	20	∞	120
MP3340	20	∞	120

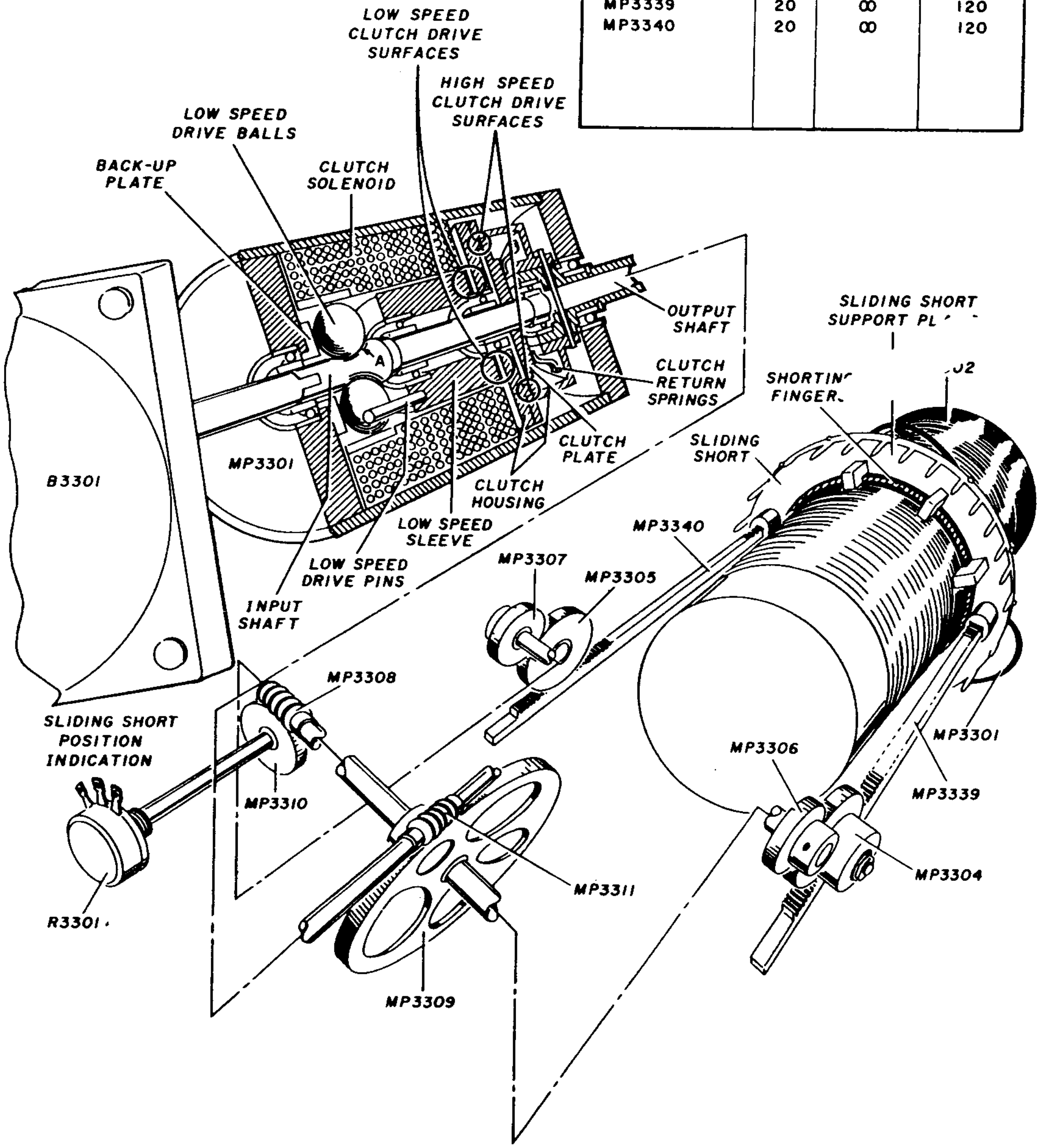


Figure 4-22. Tuner Gear Train, Simplified Schematic Diagram

A second vacuum relay provides bypass switching so that the r-f energy from the transmitter may pass directly to the antenna.

(*c*) The contacts of the vacuum tuner switching relay, K3501, are shown in figure 6-32 as they appear when TUNER CONTROL switch S806 (located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1) is put in the BYPASS position. When the TUNER CONTROL switch is placed in the TUNER IN position, relay K3501 is energized and, approximately 50 milliseconds later, key interlock relay K3503 operates. The time lag in the operation of K3503 is provided so that the transmitter keying circuits will not function until after the contacts of K3501 have switched over. Insertion of r-f coil L3501 in series with the antenna is accomplished by L1 switching relay K3502 and L1 control relay K3504. When COUPLER ANTENNA Ⓗ switch S801 (located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1) is placed in the L1 position relay K3504 is energized. The closure of contacts K3504B completes the −24-volt d-c circuit to vacuum relay K3502.

(*d*) High temperature regions in Antenna Coupler CU-760/WRT-1 are cooled by forced air ventilation from blower B3501. When the blower fails to operate properly, centrifugal air interlock switch S3501 opens. Opening of the interlock circuit causes the +350-volt and −350-volt power supplies to be deenergized and causes the removal of the power amplifier plate voltage.

4-5. LOW VOLTAGE SUPPLY FUNCTIONAL SECTION.

a. GENERAL OPERATION.

(1) The low voltage supply functional section provides all of the unregulated and regulated d-c voltages (excluding the power amplifier plate voltage) which are needed for proper operation of Radio Transmitting Set AN/WRT-1. A functional block diagram of the low voltage supply section is shown in figure 4-23.

(2) As shown in figure 4-23, the circuits of the +350, −350, −24, and 12-volt power supplies are located in the drawer containing Amplifier-Power Supply AM-2198/WRT-1. The circuits of the +250-volt regulator are located in the drawer containing Radio Frequency Oscillator O-621/WRT-1.

(3) The primary power input of 115, 220, or 440 volts a-c (determined by the ship supply) is applied to the primary winding of transformer T501 as shown in figure 4-23. The output of T501 is applied to the primary of T503 through FILAMENT POWER switch S502 (located on the front panel of Amplifier-Power Supply AM-2198/WRT-1). The output of T501 is also applied to the primary of T502. The +350 and

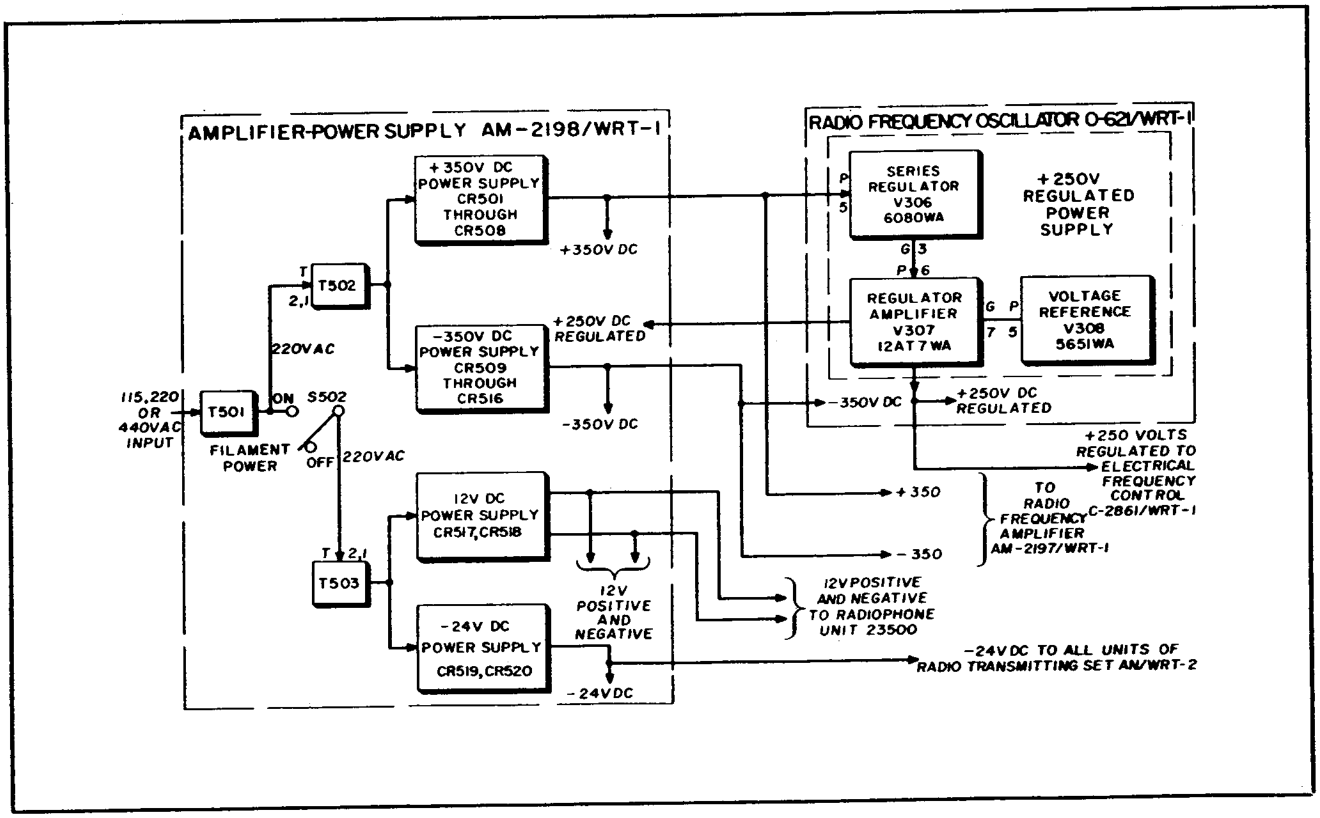


Figure 4-23. Low Voltage Power Supply, Functional Block Diagram

−350-volt supplies consist of diode bridge rectifiers and the output voltage of the supplies are distributed as indicated in figure 4-23. An electron-tube regulator consisting of V306, V307, and V308, receives an input from the +350-volt supply and provides a regulated output of +250-volts which is distributed as indicated in figure 4-23. The −24-volt supply consists of two diodes in a full-wave configuration and the output voltage is distributed to all units of Radio Transmitting Set AN/WRT-1 for application to control relays and indicating lamps. The 12-volt supply is a full-wave diode rectifier with an ungrounded output and is used exclusively for the microphone circuit of the telephone handset or remote Radiophone Unit 23500.

b. DETAILED OPERATION. Figure 5-31 is a functional schematic diagram of the low voltage supply functional section. Reference to that figure should be made throughout the discussion which follows.

(1) +350-VOLT D-C POWER SUPPLY.

(*a*) As shown in figure 5-31, the a-c voltage appearing at terminals 5 and 6 of transformer T502 is applied across a diode bridge rectifier consisting of diodes CR501 through CR508 and resistors R531 through R538. The output of the diode bridge is filtered by chokes L550 and L502 and by capacitors C502, C503, and C504. The ripple current due to the charging and discharging of the filter capacitors flows through overload relay K501 and +350V OL ADJ potentiometer R502. As the load on the rectifier increases, the magnitude of the ripple current increases. The setting of R502 determines the magnitude of ripple current necessary to energize the relay.

(*b*) When K501 is energized, contacts K501B close, thereby energizing overload auxiliary relay K506 and L V RECT OVLD indicator lamp DS505. Contacts K506B close, providing a self-latched ground return for relay K506 through L V RECT OVLD RESET switch S505, OVERLOAD RESET switch S203, and PUSH TO RESET switch S812. Contacts K506C open (refer now to the primary power distribution diagram, figure 5-32) thereby extinguishing L.V. RECT ON lamp DS504 and deenergizing L.V. rectifier relay K505. Contacts K505A and K505B open and the primary power input to T502 is disconnected. Contacts K505E open, opening the emitter circuit of Q502 and thus rendering the bias keying stage inoperative. Contacts K505D open and either low power relay K201 or high power relay K202 is deenergized, depending on the setting of POWER SELECTOR switch S510. When either K201 or K202 is deenergized, H.V. start relay K203, H.V. run relay K204, and H.V. ON lamp DS207 are deenergized by the opening of either contacts K201B or K202C. The opening of contacts K203C, D, and E, disconnects the three-phase primary input to the high voltage rectifier transformers, T201, T202, and T203. The opening of contacts K204B disconnects the remote CW keying line and CARRIER TEST KEY S811 is also rendered ineffective.

(*c*) After an overload has occurred, if any one of the three reset buttons is momentarily depressed, overload auxiliary relay K506 will be deenergized. Then the reverse sequence of control functions described above occurs and input power to T502 and the high voltage rectifiers is reestablished. The output of the +350-volt rectifier is applied to circuits in Radio Frequency Oscillator O-621/WRT-1 and in Radio Frequency Amplifier AM-2197/WRT-1.

(2) −350-VOLT D-C POWER SUPPLY.

(*a*) As shown in figure 5-31, the a-c voltage appearing across termials 3 and 4 of T502 is applied across a diode bridge rectifier consisting of diodes CR509 through CR516 and resistors R539 through R546. The output of the diode bridge is filtered by chokes L503 and L504 and by capacitors C506 and C507. The ripple current due to the charging and discharging of the filter capacitors flows through overload relay K502 and −350V OL ADJ potentiometer R504. As the load on the rectifier increases, the magnitude of the ripple current increases. The setting of R504 determines the magnitude of ripple current necessary to energize the relay.

(*b*) When K502 is energized, contacts K502B close and the sequence of control events which takes place is identical to those described above in the discussion of the +350-volt supply. The output of the −350-volt rectifier is applied to circuits in Radio Frequency Oscillator O-621/WRT-1 and in Radio Frequency Amplifier AM-2197/WRT-1.

(3) −24-VOLT D-C SUPPLY.

(*a*) As shown in figure 5-31, the a-c voltage appearing at terminals 9 and 11 of transformer T503 is applied to a full-wave rectifier consisting of diodes CR520 and CR519. The rectifier output is filtered by choke L506 and capacitor C508. The filtered output is applied to the circuits of Amplifier-Power Supply AM-2198/WRT-1. The unfiltered output developed across resistor R515 is applied to the control circuits of the other units of Radio Transmitting Set AN/WRT-1. CONTROL fuse F504 protects the power supply against overloads.

(4) 12-VOLT D-C POWER SUPPLY.

(*a*) As shown in figure 5-31, the a-c voltage appearing at terminals 8 and 6 of transformer T503 is applied to a full-wave rectifier consisting of diodes CR517 and CR518. The output is filtered by choke L505 and capacitors C509 and C510. The positive side of the rectifier output is applied through EMISSION SELECTOR switch S508 and the push-to-talk switch of telephone handset to one side of the push-to-talk relay, K510. The negative side of the rectifier output is applied to the opposite end of K510. An additional filter network consisting of resistor R517 and capacitor C511 isolates the speech input transformer, T1401, and the microphone circuit of the handset.

(5) +250-VOLT REGULATED POWER SUPPLY.

(*a*) As shown in figure 5-31, the unregulated output of the +350-volt supply is applied to the plates of series regulator V306, and the regulated +250-volt d-c appears at cathode 3 for distribution to all units of Radio Transmitting Set AN/WRT-1 except Power Supply PP-2222/WRT and Radio Frequency Amplifier AM-2197/WRT-1.

(*b*) Voltage reference tube V308 establishes a reference potential of approximately +87 volts d-c at grid 7 of regulator amplifier V307. The +250 volts d-c is developed across resistors R354 and R356 in parallel R353, R355, and R351 and 250V DC ADJUST potentiometer R352. The potential at cathode 8 of V307 is determined by the setting of R352. Plate 6 of V307 is directly connected to grid 2, and grids 1 and 4 of series regulator V306 are connected directly to plate 1 of V307.

(*c*) In order to describe the circuit operation, assume that the unregulated voltage increases or the load voltage decreases. Under either condition, the potential at the cathodes of V306 tends to increase. The voltage at cathode 8 of V307 increases approximately by 35 per cent of the increase at the cathodes of V306. Plate 6 and grid 2 of V307 also rise in potential, which increases the voltage drop across resistor R346. The decrease in potential at grids 1 and 4 of V306 causes its cathodes to return to their original potential. Should the unregulated voltage decrease or the load current increase, the circuit functions in an opposite manner.

4-6. PRIMARY POWER DISTRIBUTION.

a. In the discussion which follows, reference will be made to the primary power distribution diagram, figure 5-30. As shown in figure 5-30, three-phase, 60-cycle primary power of 115, 220, or 440 volts from the ship supply is applied through fuses F201, F202, and F203 to the H.V. rectifiers, and single-phase 60-cycle power is applied through fuses F205 and F206 to all filament supplies, ovens, blowers, and a-c operated control circuits of Radio Transmitting Set AN/WRT-1. The fuse current ratings versus line voltage ratings are shown in tabular form in figure 5-30.

b. Single-phase a-c voltage is applied to control autotransformer T501. The link on terminal board E506 is set during initial installation to correspond to the ship supply voltage. Voltage from the autotransformer taps of T501 is applied through CONTROL BUS ADJ. switch wafers S501B to the primary of T502 and to the primary of T503 through FILAMENT POWER switch S502. Transformers T502 and T503 provide input voltage for the low voltage rectifiers and filament power for the speech amplifier subchassis in Amplifier-Power Supply AM-2198/WRT-1. Voltage from the tapped secondary of transformer T501 is applied through CONTROL BUS ADJ switch wafer S501A and through TRANSMITTER fuse F501 to the a-c distribution bus shown in figure 5-32. CONTROL BUS meter M501 indicates the value of the output voltage at the secondary of T501. Voltage is also applied through OVEN fuse F503 to the oven circuits of Electrical Frequency Control C-2861/WRT-1 and Radio Frequency Oscillator O-621/WRT-1. The application of oven power is controlled by OVEN switch S604 and OVEN HEAT switch S304. Voltage is also applied thruogh TUNER fuse F502 and the distribution line is carried to Radio Frequency Tuner TN-345/WRT-1 and to Antenna Coupler CU-760/WRT-1; however, the fused output is not used in any active circuit.

c. The sequence of control functions necessary to prepare Radio Transmitting Set AN/WRT-1 for operation will now be traced. As shown in figure 5-30, when FILAMENT POWER switch S502 is placed in the ON position, primary power is applied immediately to the −24-volt d-c and 12-volt d-c rectifiers and filament power is applied to the speech amplifiers. Voltage is also applied to FILAMENT POWER ON lamp DS502, the thermal element of filament time delay switch S506, the primary of the H.V. rectifier filament transformer T204, cabinet blower B101, filament transformer T611 in Electrical Frequency Control C-2861/WRT-1, and blower B801 and the reflectometer bias transformer, T806, in Radio Frequency Amplifier AM-2197/WRT-1. Voltage is also applied to blower B3302, to drive motor B3301, and to electromagnetic actuator B3303 rectifier, CR3301, in Radio Frequency Tuner TN-345/WRT-1. Voltage is also applied to blower motor B3501 in Antenna Coupler CU-760/WRT-1. After all blower motors are functioning properly, DOOR INT lamp DS501 and door interlocy relay K503 are energized by the closing of air interlocks S3501 and S3306, provided all unit drawers are secure so that drawer interlock switches S101 through S105 are closed. Contacts K503C close, applying a-c voltage to pin 5 of filament time delay switch S506. Contacts K503B close (refer to the low voltage supply functional section schematic diagram, figure 5-31), energizing H.V. ground auxiliary delay close relay K102 which in turn energizes H.V. ground relay K101 so that the safety ground is removed from the output of the H.V. rectifier. The operation of P.A. blower B801 closes P.A. air flow interlock S813, thereby energizing air flow interlock relay K805. Contacts K805B close and primary power is applied to the power amplifier filament transformer, T802.

d. Thirty seconds after application of a-c voltage to the thermal element in filament time delay switch S506, the contacts of the time delay close. Momentary depression of PLATE POWER ON switch S503 energizes RECTIFIER ON lamp DS503 and rectifier power control relay K504. Contacts K504B close, providing a self-latch to the a-c bus for K504. Contacts K504D close, thereby energizing L.V. RECT ON lamp DS504 and L.V. rectifier relay K505. Contacts K505B and C close and primary power is applied to T502, the +350-

volt and −350-v lt d-c rectifier input transformer. Contacts K505F close and the emitter circuit of bias keying transistor, Q502, is closed through bias keying relay K507 (see low voltage supply functional section schematic diagram, figure 5-33). Contacts K505D also close and a-c voltage is applied to the rotating contact of POWER SELECTOR switch S510 through P.A. thermal cutout switches S815 through S818 and through 6 WIRE REMOTE-2 WIRE REMOTE switch S509. If POWER SELECTOR switch S510 is in the TUNE position, low power relay K201 is energized. Contacts K201D and E close, connecting together terminals 10 of the secondaries of T201, T202, and T203. K201C opens to prevent high power relay K202 from being energized and contacts K201B close, thereby energizing H.V. start relay K203. Contacts K203C, D and E close, applying three-phase primary power through resistors R201, R202, and R203 to the H.V. rectifier transformers. Contacts K203B close and H.V. ON lamp DS207 and H.V. run relay K204 are energized. Contacts K204C, D, and E close, shorting out resistors R201, R202, and R203. Contacts K204B close, completing the bias keying path to the armature of antenna dummy load relay K806 (see paragraph 4-3*b*(4), above for a discussion of the keying circuits).

e. When POWER SELECTOR switch S510 is placed in the 100W or 500W position, low power relay K201 is deenergized, contacts K201C close, and high power relay K202 is energized. Contacts K202D and E connect terminals 11 of H.V. transformers T201, T202, and T203 together. The H.V. start and H.V. run relays are then energized in sequence as explained in the preceding paragraph.

f. As shown in figure 5-30, if PLATE POWER OFF switch, S504, is momentarily depressed, a short is placed around rectifier power control relay K504. Contacts K504B and D open, and L.V. RECT ON lamp DS504 and L.V. rectifier relay K505 are deenergized. The sequence of control events described above is thus reversed and the +350 and −350-volt d-c and H.V. rectifiers are disabled.

SECTION 5

TROUBLE-SHOOTING

5-1. GENERAL.

a. This section presents trouble-shooting procedures for Radio Transmitting Set AN/WRT-1 in two general steps: overall trouble-shooting, whereby a fault is localized to a functional section and trouble-shooting for each functional section, whereby a fault is localized to a particular circuit. As an additional aid to the technician a list of typical troubles together with the probable cause is provided to facilitate rapid location of faults. The fault in some cases may be in a drawer (unit) but in some cases it affects several drawers (units) which are part of a single functional section of Radio Transmitting Set AN/WRT-1. The functional sections are: the primary power distribution circuits, the low voltage power supply section, the r-f generating section, the modulating section, and the power amplifier section.

b. The most practical method of locating troubles in a system is to use an overall performance test based on the starting procedure, which is essentially the procedure outlined in Table 5-3, the overall trouble-shooting chart. This chart gives a cause and effect precedure aimed at localizing the trouble to one functional section. The last column in Table 5-3 refers to one of the functional section trouble-shooting charts, and in some cases shows the corrective action without further reference, in case an abnormal condition is encountered during any step in the procedure.

c. In order to facilitate trouble-shooting of Radio Transmitting Set AN/WRT-1 a system of test points has been established. The location of the test points in the circuit is shown on the functional schematic diagram of the respective section. The psysical location of these test points is shown in photographs. The test points fall into three categories: major, secondary, and minor. Each category can be identified as follows:

(1) Major test points are represented by an encircled arabic numeral enclosed in a star, e.g. ①. Major test points identify locations for checking overall functions, inputs and outputs of major units and major assemblies.

(2) Secondary test points are represented by an encircled capital letter, e.g., Ⓐ. Secondary test points identify locations for isolating faults within a functional section, or major assembly.

(3) Minor test points are represented by an encircled capital letter with an arabic numeral subscript, e.g., Ⓐ$_1$. The encircled capital letter with a numerical subscript denotes pertinent test points within a particular stage or circuit.

(4) This instruction book does not describe the methods of locating troubles in the equipment to be supplied by the installing activity. For information concerning these units, see the appropriate instruction books supplied with the respective equipment.

WARNING

BEFORE MEASURING VOLTAGES GREATER THAN 300 VOLTS WITH EXTERNAL TEST EQUIPMENT READ THE FOLLOWING PARAGRAPH.

d. Voltage greater than 300 volts shall be measured as follows:

(1) Deenergize the equipment. Place a momentary ground across terminals, from which voltage measurements are to be taken, to discharge any capacitors connected to these terminals. High voltage capacitors should be discharged with the grounding stick provided with the equipment. Where neither terminal of a capacitor is grounded, short the terminals to each other.

(2) Connect a meter to the terminals to be measured. Use a range higher than the voltage expected at these terminals.

(3) Without touching the meter or test leads, energize the equipment and read the meter.

(4) Deenergize the equipment.

e. In addition to the foregoing, observe the following precautions:

(1) Make sure you are not grounded while adjusting the equipment or while using measuring devices.

(2) In general, use only one hand when servicing live equipment.

(3) If the meter must be held or adjusted while voltage is applied, ground the case of the meter, before starting measurements; do not touch live equipment or personnel working on live equipment while you are holding the meter. Some moving-vane type meters should not be grounded and therefore should not be held during measurements.

(4) Do not forget that high voltage might be present across terminals that are normally at low voltage due to equipment breakdown. Therefore, be careful even when measuring low voltage.

f. The five functional schematic diagrams of Radio Transmitting Set AN/WRT-1 are located at the end of this section to aid in tracing the circuits at fault when trouble-shooting. Thus, figure 5-30 is a functional schematic diagram of the primary power distribution section; figure 5-31 is a functional schematic diagram of the low voltage section; figure 5-32 is a functional sche-

TABLE 5-1. RECOMMENDED TEST EQUIPMENT

EQUIPMENT	SYMBOL	REMARKS
Multimeter	AN/USM-34 Series (or equivalent)	
Multimeter	AN/PSM-4 Series (or equivalent)	
Oscilloscope	TS-239A/UP Series (or equivalent)	
Frequency Meter	AN/USM-29 Series (or equivalent)	
Electrical Dummy Load	DA-91/U	
Tube Tester	TV-3/U Series (or equivalent)	
Audio Oscillator Equipment	Navy Model LAJ Series (or equivalent)	
T-adapter	UG-566/U	
MB-T-Adapter	Automatic Metal Products Corp. Type RF 0735	
MB to BNC Adapter	Type RF 0756	
Square Wave Generator	TS-583/U	

matic diagram of the r-f generating section; figure 5-33 is a functional schematic diagram of the modulating section and figure 5-34 is a functional schematic diagram of the power amplifier function section.

5-2. TEST EQUIPMENT AND SPECIAL TOOLS.

a. No special tools are required for trouble-shooting Radio Transmitting Set AN/WRT-1. The recommended equipment for trouble-shooting is listed in Table 5-1.

5-3. OVERALL TROUBLE-SHOOTING.

a. PRELIMINARY CHECKS.

(1) Improper operation of Radio Transmitting Set AN/WRT-1 can often be isolated to a single unit by visual inspection. Thus, often the causes of malfunction may be attributed to such items as open interlocks, wrong control settings, open tube filaments, etc. Visual inspection of Radio Transmitting Set AN/WRT-1 should be made as follows:

(*a*) Open each drawer and check to see if all interconnecting cables and all wires are securely fastened to terminals.

(*b*) Check all cables and wiring for signs of charring and breaks.

(*c*) Observe that all tubes are firmly sitting in their sockets.

(*d*) Observe all front panels for apparent damage to controls and meters.

(*e*) Push all drawers into the cabinet and make sure they are closed to the limit of their travel.

(2) Before attempting any trouble-shooting procedure, obtain all possible information from the person who operated the equipment at the time the trouble appeared. Such information may prove valuable in locating the fault without going through unnecessary steps. The operator's answer to the following questions will always aid in tracing the trouble to a particular circuit:

(*a*) On what frequency was the equipment operating?

(*b*) On what type of emission was the equipment operating?

(*c*) At what power level was the equipment operating?

b. CONTROL SETTINGS.

(1) If a preliminary check does not isolate the trouble, a more thorough check of the system is necessary, as outlined in Table 5-3. Before beginning the check, refer to figure 3-1 through figure 3-5 and set the controls of Radio Transmitting Set AN/WRT-2 as outlined in Table 5-2.

TABLE 5-2. PRELIMINARY CONTROL SETTINGS

CONTROL NAME	UNIT LOCATION	POSITION
EMERGENCY STOP (S201)	Power Supply PP-2222/WRT	OFF
FILAMENT POWER (S502)	Amplifier-Power Supply AM-2198/WRT-1	OFF
POWER SELECTOR (S510)		ADJ
EMISSION SELECTOR (S508)		CW
LOCAL-REMOTE (S509)		LOCAL
OVEN HEAT (S304)	Radio Frequency Oscillator O-621/WRT-1	ON
FSK TEST (S308)		LINE
OVEN (S604)	Electrical Frequency Control C-2861/WRT-1	ON
CARRIER TEST KEY (S811)	Radio Frequency Amplifier AM-2197/WRT-1	OFF
TUNER CONTROL (S806)		TUNER IN

c. SYSTEM TROUBLE-SHOOTING.

(1) Observation of indicating lights and meter indications can isolate troubles to a definite circuit of Radio Transmitting Set AN/WRT-1. The method of system trouble-shooting is outlined in Table 5-3. To avoid unnecessary repetition throughout the table note that the series numbers of controls are related to the various units as follows: Controls in the 100 series are located on Electrical Equipment Cabinet CY-2607/WRT-1; Controls in the 200 series are located on Power Supply PP-2222/WRT; controls in the 300 and 400 series are located on Radio Frequency Oscillator O-621/WRT-1; controls in the 500 and 1400 series are located on Amplifier-Power Supply AM-2198/WRT-1; controls in the 600 and 700 series are located on Electrical Frequency Control C-2861/WRT-1; controls in the 800 and 900 series are located on Radio Frequency Amplifier AM-2197/WRT-1; controls in the 3300 series are located on Radio Frequency Tuner TN-345/WRT-1; controls in the 3500 series are located on Antenna Coupler CU-760/WRT-1. When using Table 5-3 note the instructions given in the NORMAL INDICATION column for each step. If the indication is normal proceed to the next step. If indication is not normal follow the instructions given in the NEXT STEP column.

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT. DO NOT TOUCH ANY EXPOSED TERMINALS, TUBE CAPS OR CONNECTIONS WHEN INTERLOCKS ARE OPERATED MANUALLY WITH EQUIPMENT EXPOSED.

TABLE 5-3. RADIO TRANSMITTING SET AN/WRT-1 SYSTEM TROUBLE-SHOOTING CHART

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	Place EMERGENCY STOP switch (S201) in the ON position.	H. V. RECT LINE BLOWN FUSE IND lamps F201, F202, F203 and L. V. RECT FIL LINE lamps F205, F206, should not be lighted.	Replace the fuse corresponding to the blown fuse indicator lamp that glows.
		OVEN HEATERS lamp (DS301) should be lighted.	Check OVEN fuse (F503). If fuse is good refer to Table 5-4 to locate fault.
		OVEN HEATERS lamp (DS601) should be lighted.	Check OVEN fuse (F503). If the fuse is good refer to Tabl 5-4 to locate fault.

TABLE 5-3. RADIO TRANSMITTING SET AN/WRT-1 SYSTEM TROUBLE-SHOOTING CHART—Continued

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
2	Place FILAMENT POWER switch (S502) in the ON position.	FILAMENT POWER ON indicator lamp (DS502) should be lighted.	Check TRANSMITTER fuse (F501). If fuse is good refer to Table 5-4 to locate fault.
3	Check operation of the interlock switches for each of the five drawers by withdrawing and closing each drawer separately.	As each drawer is withdrawn DOOR INT indicating lamp DS501 should cease to glow and glow when the drawer is pushed back into the cabinet.	Check interlock switches S101, S102, S103, S104, and S105.
4	Observe CONTROL BUS meter (M501).	CONTROL BUS meter should indicate 115 volts ±4%.	Set CONTROL BUS switch (S501), (located on top side of Amplifier Power Supply AM-2198/WRT-1 toward the front of the drawer) until CONTROL BUS meter (M501) indicates 115 volts ±4%.
5	Pull out drawer containing Power Supply PP-2222/WRT and engage the interlock switch.	Cabinet blower B101 located at the bottom of Electrical Equipment Cabinet CY-2607/WRT-1 should be operating.	Using Multimeter AN/PSM-4 check for 115V input across terminals 1 and 2 on TB107. If 115 volts is present and blower does not operate refer to Section 6 of this handbook for repair of blower.
6	Pull out drawer containing Radio Frequency Amplifier AM-2197/WRT-1 and engage drawer interlock switch.	R. F. Amplifier blower B801 should be operating.	Check continuity between TB801-1, and 2 and TB501-3 and 4. Refer to Section 6 and check blower B801.
7	Connect Multimeter AN/PSM-4 across terminals 6 and 7 on terminal board TB105 and set it on its 250V scale.	Multimeter should indicate 115 volts.	Check interconnecting cable between Radio Frequency Tuner TN-345/WRT-1 and Transmitter Group OA-2321/WRT-1. Refer to Table 5-4 to locate fault.
8	Connect Multimeter AN/PSM-4 across terminals 1 and 2 of terminal board TB801.	Multimeter should indicate 115 volts.	Check interconnection between terminal boards TB801-1 and 2, TB105-7 and TB501-3 and 4. Refer to Table 5-4 to locate fault.
9	Connect Multimeter AN/PSM-4 across terminals 8 and 11 on terminal board TB202.	Multimeter should indicate 115 volts.	Check interconnection between terminal boards TB202-8 and 11, TB105-6 and 7 and TB501-3 and 4 and refer to Table 5-4 to locate fault.
10	Connect Multimeter AN/PSM-4 between ground and terminal 5 of TB301 and set it on its 500 volt DC scale.	Multimeter should indicate exactly +250 volts.	Refer to Table 5-5 to locate fault.

TABLE 5-3. RADIO TRANSMITTING SET AN/WRT-1 SYSTEM TROUBLE-SHOOTING CHART—Continued

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
11	Connect Multimeter between ground and terminal 15 on TB105.	Multimeter should indicate exactly +250 volts.	Check interconnection between TB301-5 and TB105-15.
12	Connect Multimeter between ground and terminal 33 on TB501.	Multimeter should indicate exactly +250 volts.	Refer to Table 5-5 to locate fault.
13	Connect Multimeter AN/PSM-4 between ground and terminal 9 on TB601.	Multimeter should indicate exactly +250 volts.	Refer to Table 5-5 to locate fault.
14	Connect Multimeter AN/PSM-4 between ground and terminal 8 of TB601 and set it on its 40 volt scale.	Multimeter should indicate −24 volts.	Refer to Table 5-5 to locate fault.
15	Connect Multimeter AN/PSM-4 between ground and terminal 18 on TB501.	Multimeter should indicate −24 volts.	Refer to Table 5-5 to locate trouble.
16	Connect Multimeter AN/PSM-4 between ground and terminal 11 on TB105.	Multimeter should indicate −24 volts.	Check interconnection between TB501-18 and TB105-11.
17	Connect Multimeter AN/PSM-4 between ground and terminal 43 on TB801.	Multimeter should indicate −24 volts.	Check interconnection between TB105-11 and TB801-43. Refer to Table 5-6 to locate fault.
18	Connect Multimeter AN/PSM-4 between ground and terminal 6 on TB301.	Multimeter should indicate −24 volts.	Check interconnection between TB301-6 and TB105-11. Refer to Table 5-7 to locate fault.
19	Connect Multimeter AN/PSM-4 between ground and terminal 18 on TB202.	Multimeter should indicate −24 volts.	Check interconnection between TB202-18 and TB105-11.
20	Connect Multimeter AN/PSM-4 between ground and terminal 8 in TB501 and set it on its 400 volt scale.	Multimeter should indicate +350 volts.	Refer to Table 5-5 to locate fault.
21	Connect Multimeter AN/PSM-4 between ground and terminal 9 on TB501.	Multimeter should indicate −350 volts.	Refer to Table 5-5 to locate fault.
22	Connect Multimeter AN/PSM-4 between ground and terminal 17 on TB105.	Multimeter should indicate +350 volts.	Check interconnection between TB501-8 and TB105-17.
23	Connect Multimeter AN/PSM-4 between ground and terminal 1 on TB801.	Multimeter should indicate +350 volts.	Check interconnections between TB105-17 and TB801-1.

TABLE 5-3. RADIO TRANSMITTING SET AN/WRT-1 SYSTEM TROUBLE-SHOOTING CHART—Continued

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
24	Connect Multimeter AN/PSM-4 between ground and terminal 4 of TB301.	Multimeter should indicate +350 volts.	Check interconnection between TB301-4 and TB105-17. Refer to Table 5-6 to locate fault.
25	Connect Multimeter AN/PSM-4 between ground and terminal 4 on TB801.	Multimeter should indicate −350 volts.	Check interconnections between TB801-4 and TB501-9. Refer to Table 5-6 to locate fault.
26	Using TUNING C and TUNING D controls on Radio Frequency Oscillator O-621/WRT-1, setup the assigned operating frequency. Adjust TUNING D control until FREQUENCY ZERO ADJUST meter (M301) indicates zero.	FREQUENCY ZERO ADJUST meter (M301) should indicate zero.	Refer to Table 5-7 to locate fault.
27	Using Frequency Meter AN/USM-29 series (or equivalent) check frequency output at P616 in Electrical Frequency Control C-2861/WRT-1.	Frequency Meter AN/USM-29 series (or equivalent) should indicate 100 kc.	Refer to Table 5-8 to locate fault.
28	Using same equipment as in Step 27, check r-f output at J301 in Radio Frequency Oscillator O-621/WRT-1.	Frequency Meter should indicate the assigned frequency.	Refer to Table 5-8 to locate fault.
29	Place OUTPUT METER switch (S814) in the R-F OUTPUT position; TEST AMMETER switch (S805) in the TOTAL P. A. GRIDS position and P. A. CATHODE CURRENTS switch (S806) in the TOTAL position. Place CARRIER TEST KEY (S811) in the ON position. Adjust TUNING F for a maximum reading on TEST AMMETER (M805). Lock TUNING F in this position. Rotate DRIVE ADJUST control (R812) fully counterclockwise and place POWER SELECTOR switch (S510) in the TUNE position.	P. A. CATHODE CURRENTS meter (M809) should indicate between 115 and 135 ma.	Refer to Table 5-6 to locate fault.

TABLE 5-3. RADIO TRANSMITTING SET AN/WRT-1 SYSTEM TROUBLE-SHOOTING CHART—Continued

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
30	Rotate DRIVE ADJUST control (R812) to about mid position. Adjust COUPLING Ⓖ control for a maximum indication on R-F OUTPUT meter (M803). Place POWER SELECTOR control (S510) in the 100 W position. Refer to Section 3 of this technical Manual and set COUPLER ANTENNA Ⓗ control (S801) as shown in the Table of paragraph 3-2b(1)(a). COUPLING Ⓖ control for maximum r-f output indication on R-F OUTPUT meter (M803). Press POSITION CONTROL SLOW Ⓛ switch (S805) and position SWR CALIBRATE potentiometer (R846) to zero SWR INDICATOR (M801).	The indication on the graduated scale of SWR CALIBRATE potentiometer (R873) should be less than 4:1.	Refer to Table 5-6 to locate fault.
31	Recheck the setting of the TUNING Ⓕ control for maximum indication on R-F OUTPUT meter (M803). Set DRIVE ADJUST control (R812) for a reading of 100 watts on R-F OUTPUT meter (M803).	R-F OUTPUT meter should indicate 100 watts.	Refer to Table 5-6 to locate fault.
32	Observe P. A. CATHODE CURRENTS meter (M806).	Indication on P. A. CATHODE CURRENTS meter (M806) should not exceed 525 ma.	Refer to Table 5-6 to locate fault.
33	Place POWER SELECTOR control (S510) in the 500W position and repeat steps 30 through 32.	Same as in steps 30 through 32 except that in step 31 R-F OUTPUT meter (M803) should indicate 500 watts and in step 32 indication on P. A. CATHODE CURRENTS meter (M806) should not exceed 825 ma.	Refer to Table 5-6 to locate fault.

TABLE 5-3. RADIO TRANSMITTING SET AN/WRT-1 SYSTEM TROUBLE-SHOOTING CHART—Concluded

STEP	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
34	Place CARRIER TEST KEY (S811) in the ON position and OUTPUT METER switch (S814) in the R-F SET position.	The indicator on R-F OUTPUT meter (M803) should deflect to the extreme right of the meter on R-F SET scale marker, when R-F SET FOR MOD. control (R886) is adjusted.	Refer to Table 5-6 to locate fault.
35	Place CARRIER TEST KEY in the OFF position and OUTPUT METER switch (S814) in the % MOD position. Talk at normal speech level into the Handset and adjust MODULATION LEVEL control (R1451) until R-F OUTPUT meter (M805) indicates 90 to 100%.	R-F OUTPUT meter (M805) should indicate between 90 and 100% modulation on peaks of speech input.	Refer to Table 5-7 to locate fault.

5-4. FUNCTIONAL SECTION TROUBLE-SHOOTING.

a. GENERAL.—For trouble-shooting considerations, Radio Transmitting Set AN/WRT-1 is divided into five functional sections. They are the primary power distribution section, the low voltage power supply section, the power amplifier section, the modulating section, and the r-f generating section. Malfunction in any functional section prevents operation of the system as a whole.

b. PRIMARY POWER FUNCTIONAL SECTION.—The primary power circuits of Radio Transmitting Set AN/WRT-1 are shown in the primary distribution diagram, figure 5-30 at the end of this section. As shown in figure 5-30 the primary power circuits furnish all the a-c power required for the proper operation of Radio Transmitting Set AN/WRT-1. Indication of the presence of trouble in the primary power circuits would be the lack of power in any unit of Radio Transmitting Set AN/WRT-1. Trouble in the primary power circuits may be traced to blown fuses, defective transformers and relays, or broken interconnecting cables or wires.

(1) PRELIMINARY CHECK.—It is possible that inoperative power circuits may be due to lack of power from the ship's supply, loose or broken cable between the source and TB102 or between the primary power section and the transmitter subassemblies, blown fuses or improperly set controls. A preliminary check of such causes should be made before proceeding to more involved trouble-shooting steps.

(2) TEST EQUIPMENT AND SPECIAL TOOLS.—No special tools are required for making the functional check of the primary power circuits of Radio Transmitting Set AN/WRT-1. The only test equipment required is Multimeter AN/PSM-4 (or equivalent) for making continuity checks.

(3) CONTROL SETTINGS.—Before making the functional check of the primary power section, as shown in Table 5-4, the controls on the front panel of the various drawers of Radio Transmitting Set AN/WRT-1 should be positioned as shown in Table 5-2.

(4) TROUBLE-SHOOTING CHART. — Table 5-4, the primary power functional section trouble-shooting chart, provides a procedure for locating troubles in the primary power cicuit section. Indicating lamps located on the font panels of the drawers provide much of the information needed to isolate non-functioning circuits. Reference should be made to the primary power distribution diagram, figure 5-30, and to the figures indicated in the test point column for quick location of all the test points. All controls and relays in the 100 series are located on Electrical Equipment Cabinet CY-2607/WRT-1, those in the 200 series on Power Supply PP-2222/WRT, those in the 300 and 400 series in Radio Frequency Oscillator O-621/WRT-1, those in the 500 and 1400 series, in Amplifier-Power Supply AM-2198/WRT-1, those in the 600 and 700 series in Electrical Frequency Control C-2861/WRT-1, those in the 800 and 900 series, Radio Frequency Amplifier AM-2197/WRT-1, those in the 3300 series in Radio Frequency Tuner TN-345/WRT-1, and those in the 3500 series in Antenna Coupler CU-760/WRT-1. When using Tabl 5-4 note the instructions given in the NORMAL INDICATION column, for each step. If indication is normal proceed to next step. If indication is not normal follow the instructions given in the NEXT STEP column.

TABLE 5-4. RADIO TRANSMITTING SET AN/WRT-1 PRIMARY POWER FUNCTIONAL SECTION, TROUBLE-SHOOTING CHART

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	1 Figures 5-1 and 5-30	Place EMERGENCY STOP switch (S201) in the ON position and CONTROL BUS switch S501, inside, on top of drawer, in the 115V position.	CONTROL BUS meter (M501) should indicate 115 volts ±4%.	If indication is normal proceed with next step. If no indication check power input at TB501-1 and 2.
	Ⓐ Figures 5-1 and 5-30		OVEN HEATERS lamp (DS301) should glow.	Refer to figure 5-30 and check continuity between TB301-1 and 2 and TB501-3 and 5. Check relay K301.
	Ⓑ Figures 5-1 and 5-30		OVEN HEATERS lamp (DS601) should glow.	Refer to figure 5-30 and check continuity between TB601-2, 3, and TB501-3, 5. Check relay K601.
2	2 Figures 5-1 and 5-30	Place FILAMENT POWER switch (S502) in the ON position.	FILAMENT POWER ON indicating lamp (DS502) should glow.	Check TRANSMITTER fuse F501 and FILAMENT POWER ON indicating lamp DS502.
	Ⓒ Figures 5-1 and 5-30		DOOR INT (DS501) should glow.	Check drawer interlock switches S101 through S105. Check tuner and coupler air interlocks.
3	Ⓓ Figures 5-2 and 5-30	Pull out drawer containing Power Supply PP-2222/WRT and observe cabinet blower B101.	Cabinet blower B101 should be operating.	Check continuity between TB107-1, 2 and TB501-3, 4. If power is present at TB107, refer to Section 6 and check blower B101.
4	Ⓔ Figures 5-1 and 5-30	Press PLATE POWER ON switch (S503).	RECTIFIER ON indicator lamp (DS503) should glow.	Check rectifier power control relay K504.
5	3 Figures 5-1 and 5-30	Observe L. V. RECT ON lamp (DS504).	L. V. RECT ON indicator lamp (DS504) should be glowing.	Check door int. relay K503 and filament time delay switch S506. Also check overload auxiliary relay K506 in low voltage section.
6	4 Figures 5-1 and 5-30	Place POWER SELECTOR switch (S510) in the 100W position.	H. V. ON indicating lamp DS207 should be glowing.	Check blower B801, air interlock switch S805, air flow interlock relay K805, low power relay K201 and L. V. start relay K203.

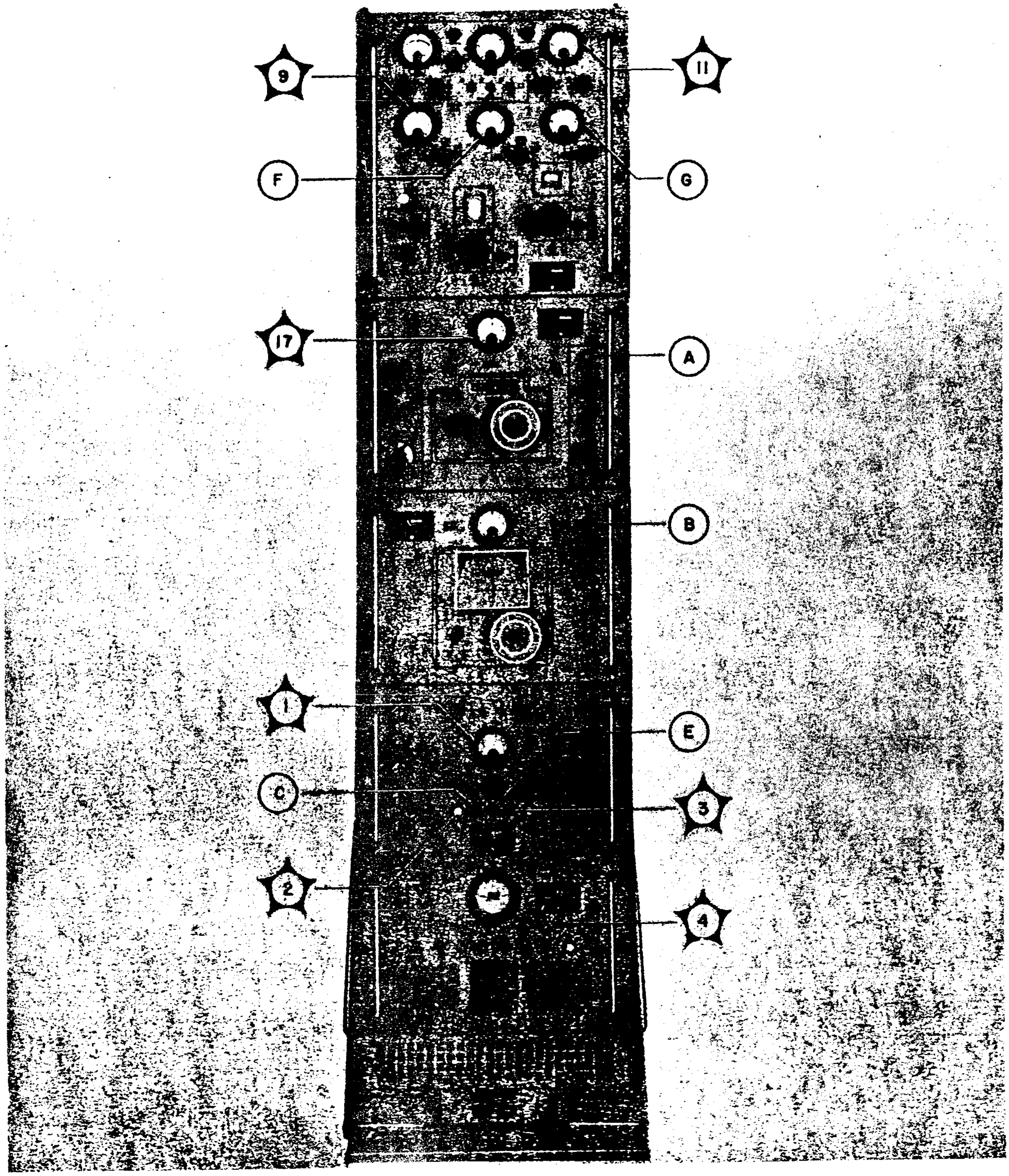


Figure 5-1. Transmitter Group [illegible]/WRT-1, Location of Test Points on the Front Panels

TABLE 5-4. RADIO TRANSMITTING SET AN/WRT-1 PRIMARY POWER FUNCTIONAL SECTION, TROUBLE-SHOOTING CHART—Concluded

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
7	④ Figures 5-1 and 5-30	Place POWER SELECTOR switch (S510) in the 500W position.	H. V. ON indicating lamp (DS207) should be glowing.	Check high power relay, K202, L. V. start relay K203, and H. V. run relay K204 and overload auxiliary relay K207 in low voltage section.

c. LOW VOLTAGE POWER SUPPLY, FUNCTIONAL SECTION. The low voltage power supply circuits of Radio Transmitting Set AN/WRT-1 are shown in the functional schematic diagram of the low voltage power supply section, figure 5-31. As shown in figure 5-31, the low voltage power supply circuits furnish all the d-c power required for the proper operation of Radio Transmitting Set AN/WRT-1. The low voltage power supply circuits include the plus and minus 350-volt power supplies, the positive and negative 12-volt power supply and the −24-volt power supply, all located in the drawer containing Amplifier-Power Supply AM-2198/WRT-1, the +250-volt regulator, located in the drawer containing Radio Frequency Oscillator O-621/WRT-1, together with the associated relays and control switches. Indication of trouble in the low voltage functional section would be lack of power to the bias and plate circuits or to the d-c control circuits of Radio Transmitting Set AN/WRT-1. Trouble in the low voltage power supply circuits can usually be traced to inoperative relays, broken or poor switch connections, defective diodes (or tubes in the 250-volt regulator) and loose or broken interconnections.

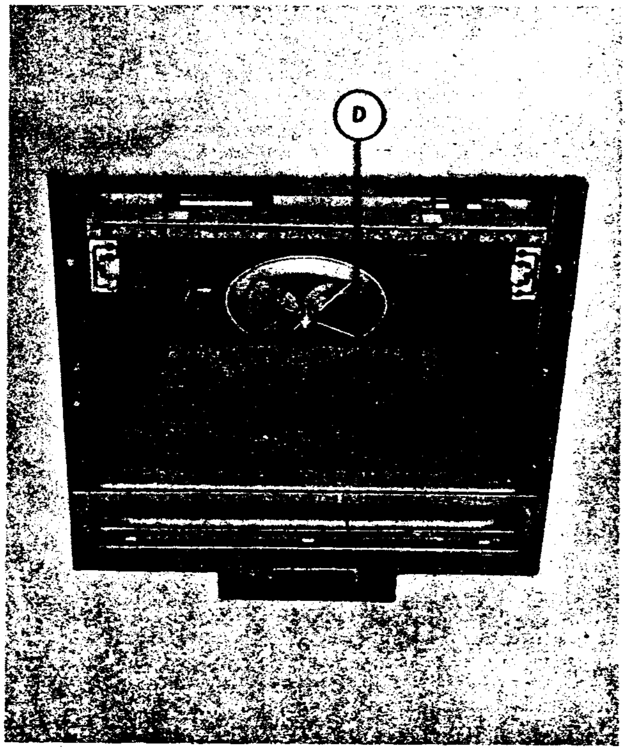


Figure 5-2. Electrical Equipment Cabinet CY-2607/WRT-1, Location of Test Points

(1) PRELIMINARY CHECK.—It is possible that inoperative low voltage power supply circuits may be attributed to improperly set controls and loose or broken connections between the circuits of the low voltage power supply section. As a preliminary check see that all controls are set properly and that there are no loose or broken connections.

(2) TEST EQUIPMENT AND SPECIAL TOOLS.—No special tools are required for making the functional check of the low voltage power supply circuits of Radio Transmitting set AN/WRT-1. The only test equipment required is Multimeter AN/PSM-4 series (or equivalent) which should be used whenever necessary to make continuity checks on various components of the low voltage power supply circuits.

(3) CONTROL SETTING.—Before making the functional check of the low voltage power supply circuits set EMERGENCY STOP switch (S201) and FILAMENT POWER ON switch (S502) in the ON position and press PLATE POWER ON switch (S503).

(4) TROUBLE-SHOOTING CHART. — Table 5-5, the low voltage power supply functional section trouble-shooting chart, provides a procedure for locating troubles in the low voltage power supply circuits. Reference should be made to figure 5-31, the functional schematic diagram of the low voltage power supply section, and to the figures shown in the test point column, which show the location of test points. All controls and relays in the 100 series are located on Electrical Equipment Cabinet CY-2607/WRT-1, those in the 200 series on Power Supply PP-2222/WRT, those in the 500 and 1200 series in Amplifier-Power Supply AM-2198/WRT-1, those in the 600 and 700 series in Electrical Frequency Control C-2861/WRT-1, those in the 800 and 900 series in Radio Frequency Amplifier AM-2197/WRT-1, those in the 3300 series in Radio Frequency Tuner TN-345/WRT-1, and those in the 3500 series in Antenna Coupler CU-760/WRT-1. When using Table 5-5 note the instructions given in the NORMAL INDICATION column for each step. If indication is normal proceed to next step. If indication is not normal follow the instructions given in the NEXT STEP column.

TABLE 5-5. RADIO TRANSMITTING SET AN/WRT-1 LOW VOLTAGE POWER SUPPLY FUNCTIONAL SECTION, TROUBLE-SHOOTING CHART

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	5 Figures 5-3 and 5-31	Connect Multimeter AN/PSM-4 between ground and terminal 18 on TB501 and set it on its 40 V scale.	Multimeter should indicate −24 volts.	Check CONTROL fuse (F504). If fuse is intact, check diodes CR519 and CR520.
2	6 Figures 5-4 and 5-31	Connect Multimeter across capacitor C508.	Multimeter should indicate −24 volts.	Check choke L506 and CONTROL fuse F504.
3	7 Figures 5-4 and 5-31	Connect Multimeter AN/PSM-4 across capacitor C511 and set it on its 20-volt scale.	Multimeter should indicate 12 volts.	Check RADIOPHONE fuse (F505). If fuse is intact check diodes CR517 and CR518.
4	8 Figures 5-3 and 5-31	Connect Multimeter AN/PSM-4 between ground and terminal 9 on TB501 and set it on its 400-volt scale.	Multimeter should indicate −350 volts.	Check circuit associated with −350-volt rectifier.

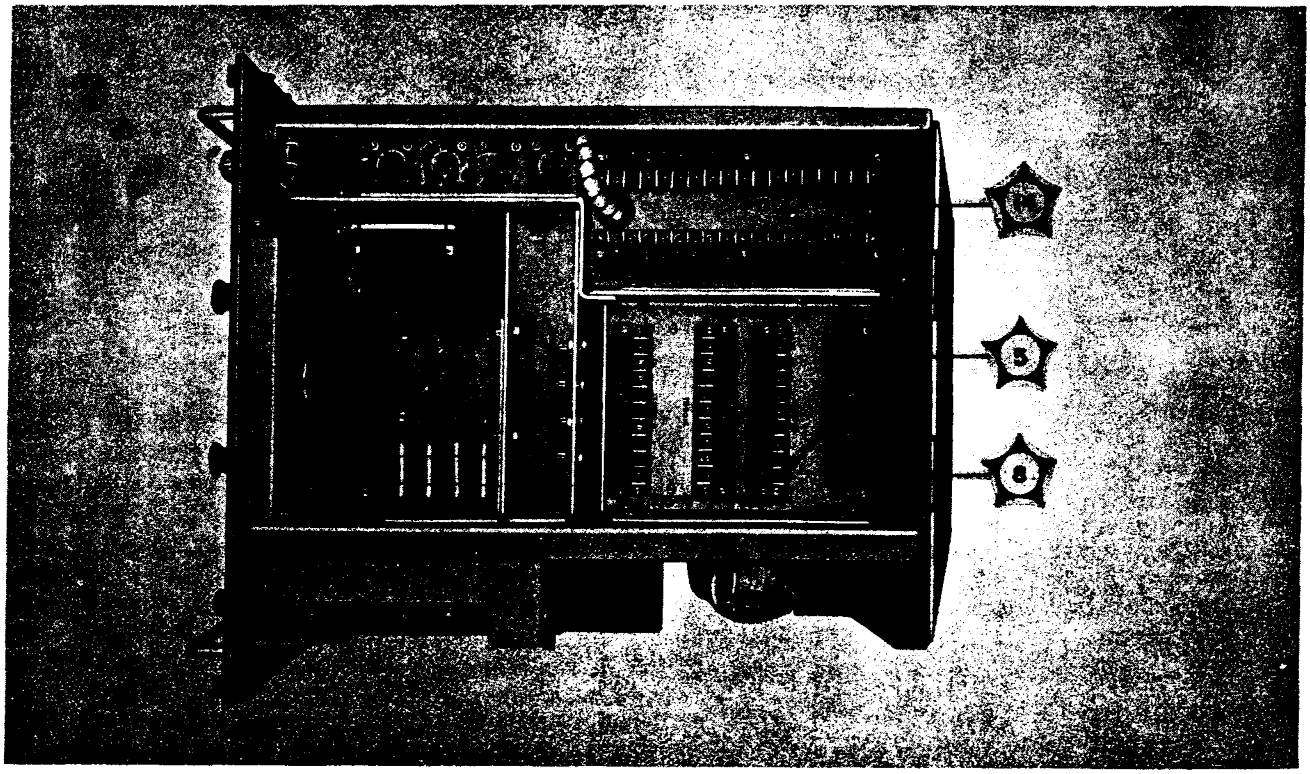


Figure 5-3. Amplifier-Power Supply AM-2198/WRT-1, Location of Test Points on Top

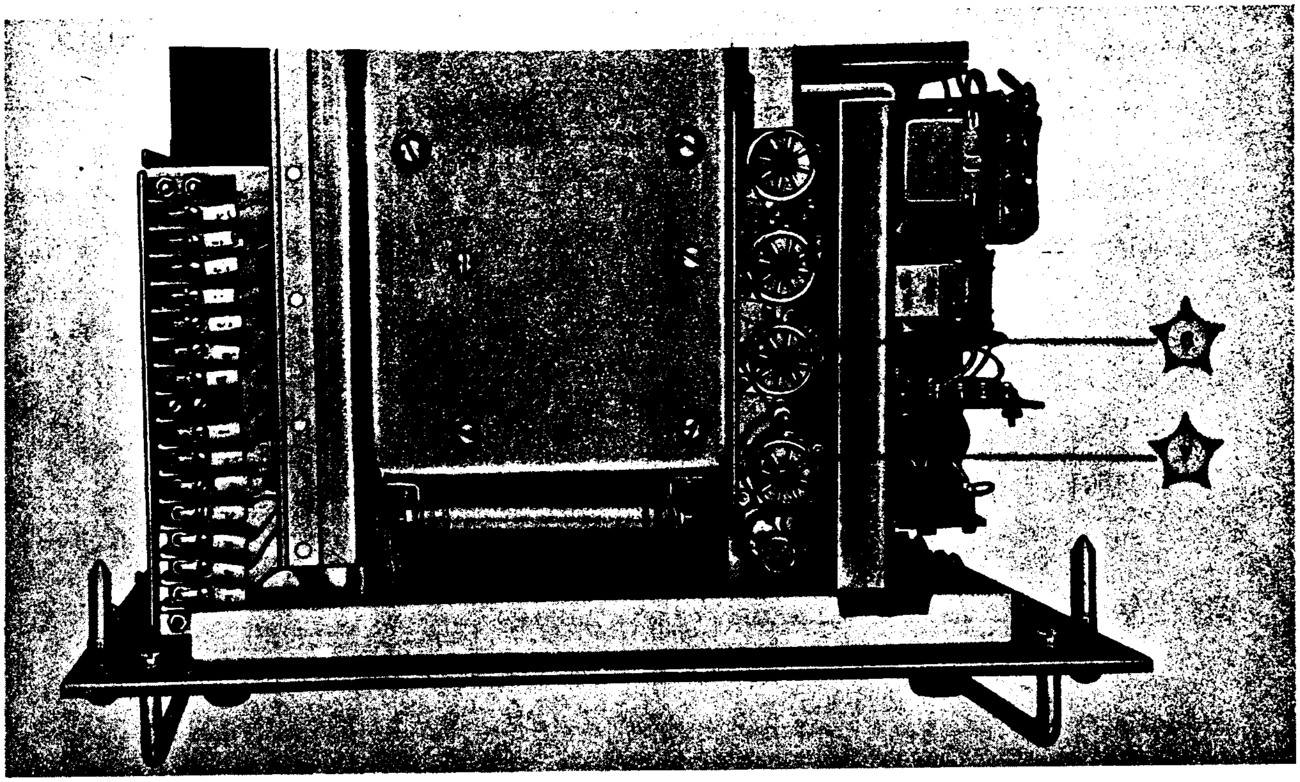


Figure 5-4. Amplifier-Power Supply AM-2198/WRT-1, Bottom View, Location of Test Points

TABLE 5-5. RADIO TRANSMITTING SET AN/WRT-1 LOW VOLTAGE POWER SUPPLY FUNCTIONAL SECTION, TROUBLE-SHOOTING CHART—Concluded

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
5	9 Figures 5-1 and 5-31	Place TEST VOLTMETER control S807 in the (600V) position.	TEST VOLTMETER M804 should indicate +350 volts.	Check continuity between TB801-1 and TB501-8. If voltage is present at TB501-8 check circuit associated with +350-volt rectifier.
6	10 Figures 5-5 and 5-31	Connect Multimeter AN/PSM-4 between ground and terminal 5 on TB301 and set it on its 400-volt scale.	Multimeter should indicate exactly +250 volts.	Refer to figure 5-6 and make voltage and resistance measurements of circuitry associated with tubes V306, V307 and V308.

d. POWER AMPLIFIER FUNCTIONAL SECTION.—Figure 5-34 is a functional schematic diagram of the power amplifier circuits. As shown in figure 5-34, the power amplifier circuits include the high voltage rectifiers located in Power Supply PP-2222/WRT, the i-f amplifier circuits, the power amplifier circuits, the monitoring circuits, all located in Radio-Frequency Amplifier AM-2197/WRT-1. The circuits of Radio Frequency Tuner TN-345/WRT-1 and thus of Antenna Coupler CU-760/WRT-1 are also part of the power amplifier functional section. Indication of trouble in the power amplifier functional sectional section could be transmission failure when indications show all other functional sections to be operating properly.

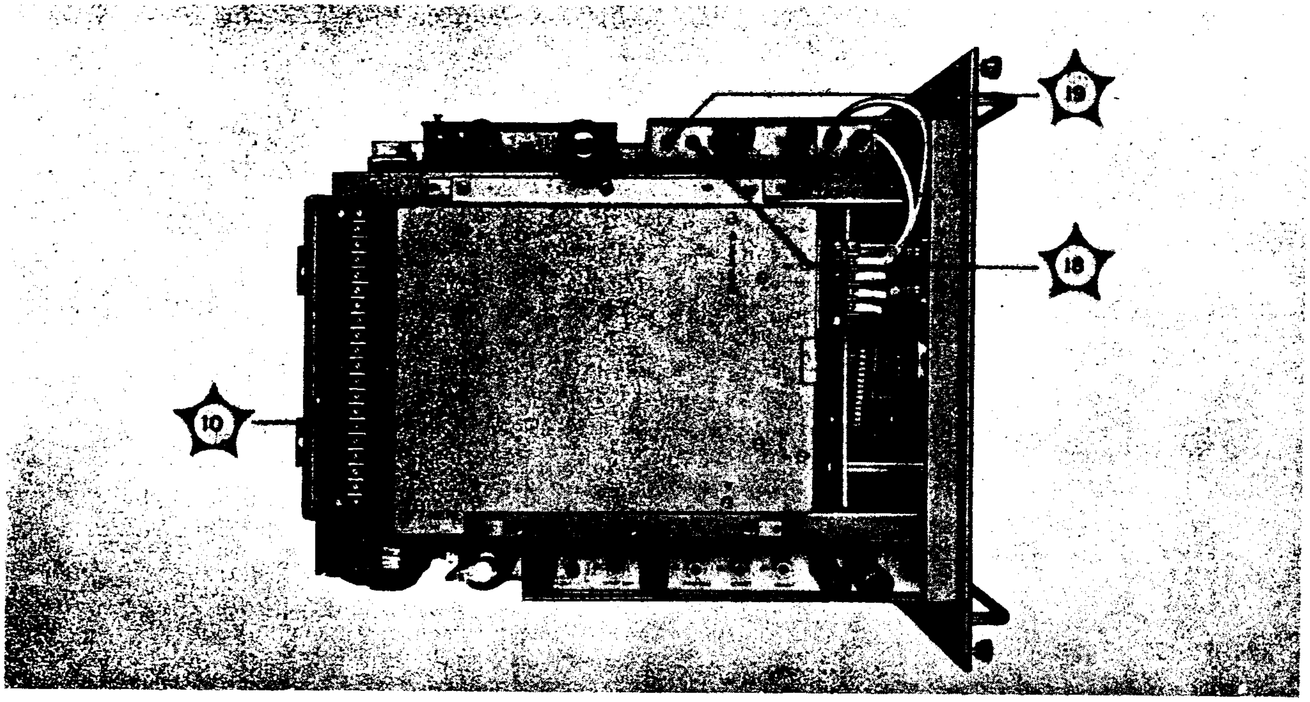


Figure 5-5. Radio Frequency Oscillator O-621/WRT-1, Top View, Location of Test Points

(1) PRELIMINARY CHECK. — Examine the control settings on the front panels of all the units of Radio Transmitting Set AN/WRT-1. Examine all tubes for inoperative filaments. Refer to figure 2-10 and check the interconnecting cables between Transmitter Group OA-2321/WRT-1, Radio Frequency Tuner TN-345/WRT-1, and Antenna Coupler CU-760/WRT-1 for breaks or irregularities that would interfere with transmission. All drawers should be tightly closed for normal operation.

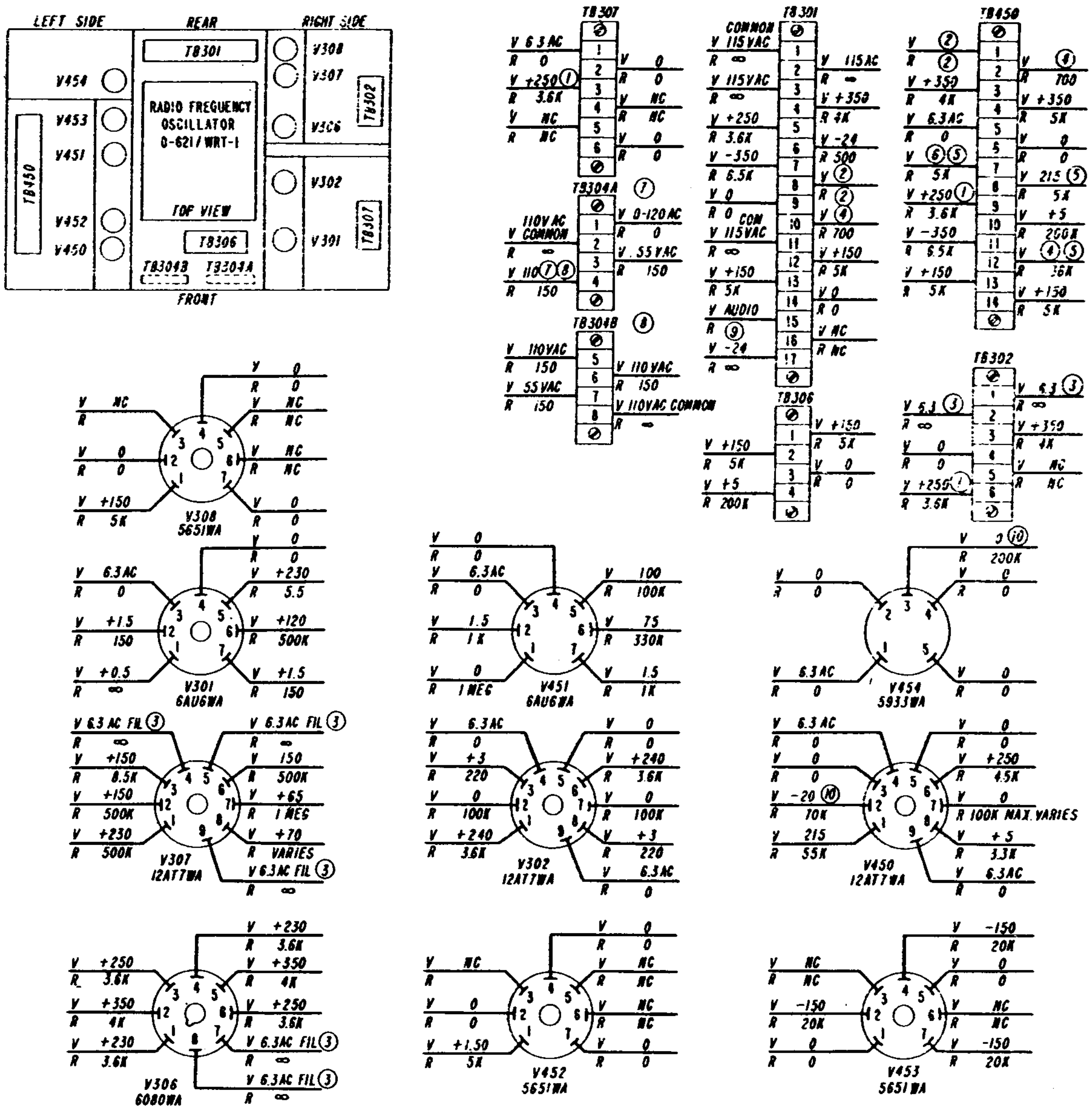
(2) TEST EQUIPMENT AND SPECIAL TOOLS.—The test equipment required for a functional check of the power amplifier section consists of: Multimeter AN/USM-34 Series or equivalent, and T-adapter UG-566/U. No other special tools are required.

(3) CONTROL SETTINGS. — Before starting the functional check on the power amplifier section refer to Section 3 of this handbook and tune the transmitter as directed in step 1 of Table 5-6, the power amplifier functional section trouble-shooting chart.

(4) TROUBLE-SHOOTING CHART. — Table 5-6 provides a procedure for locating troubles in the power amplifier functional section. Meters located on the front panel of Radio Frequency Amplifier AM-2197/WRT-1 provide the main source for isolating the trouble to the circuits in the power amplifier functional section. Reference should be made to the functional schematic diagram of the power amplifier functional section, figure 5-34, and to the figures in the TEST POINT column for the location of test points. All controls and relays in the 100 series are located on Electrical Equipment Cabinet CY-2607/WRT-1, those in the 200 series on Power Supply PP-2222/WRT, those in the 300 and 400 series in Radio Frequency Oscillator O-621/WRT-1, those in the 500 and 1400 series in Amplifier-Power Supply AM-2198/WRT-1, those in the 600 and 700 series Electrical Frequency Control C-2861/WRT-1, those in the 800 and 900 series in Radio Frequency Amplifier AM-2197/WRT-1, those in the 3300 series in Radio Frequency Tuner TN-345/WRT-1 and those in the 3500 series in Antenna Coupler CU-760/WRT-1. When using Table 5-6 note the instructions given in the NORMAL INDICATION column for each step. If indication is normal proceed to next step. If indication is not normal follow the instruction given in the NEXT STEP column.

WARNING

THIS UNIT CONTAINS HIGH VOLTAGE CIRCUITS, READ PARAGRAPH 5-1*d* AND *e*. OF THIS SECTION BEFORE MAKING ANY MEASUREMENTS.



CONDITIONS

Ⓐ ALL VOLTAGE MEASUREMENTS WERE MADE WITH EQUIPMENT IN NORMAL OPERATING CONDITION.

Ⓑ ALL RESISTANCE MEASUREMENTS MADE WITH EQUIPMENT CONNECTED FOR NORMAL OPERATION BUT DE-ENERGIZED.

Ⓒ ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.

Ⓓ ALL VOLTAGES ARE DC UNLESS OTHERWISE STATED.

NOTES

ENCIRCLED NUMBERS INDICATE NUMBER OF NOTE TO WHICH REFERENCE IS MADE.

① ADJUSTABLE WITH R352.

② DEPENDENT ON INPUT KEYING VOLTAGE SIGNAL AND TERMINATION SHOULD VARY BETWEEN +30 AND +130 VOLT SQUARE WAVE WHEN KEYED.

③ REGULATOR FILAMENTS FLOATING WITH RESPECT TO GROUND.

④ CW KEYING VOLTAGE ONLY

⑤ CHANGES FROM CW TO FSK OPERATION.

⑥ FSK ONLY.

⑦ DEPENDENT ON OVEN THERMOSTAT TERMINALS 2 AND 4 ARE 110 VOLT COMMON.

⑧ COMMON SIDE OF METER ON EITHER TERMINAL 2 OR 3.

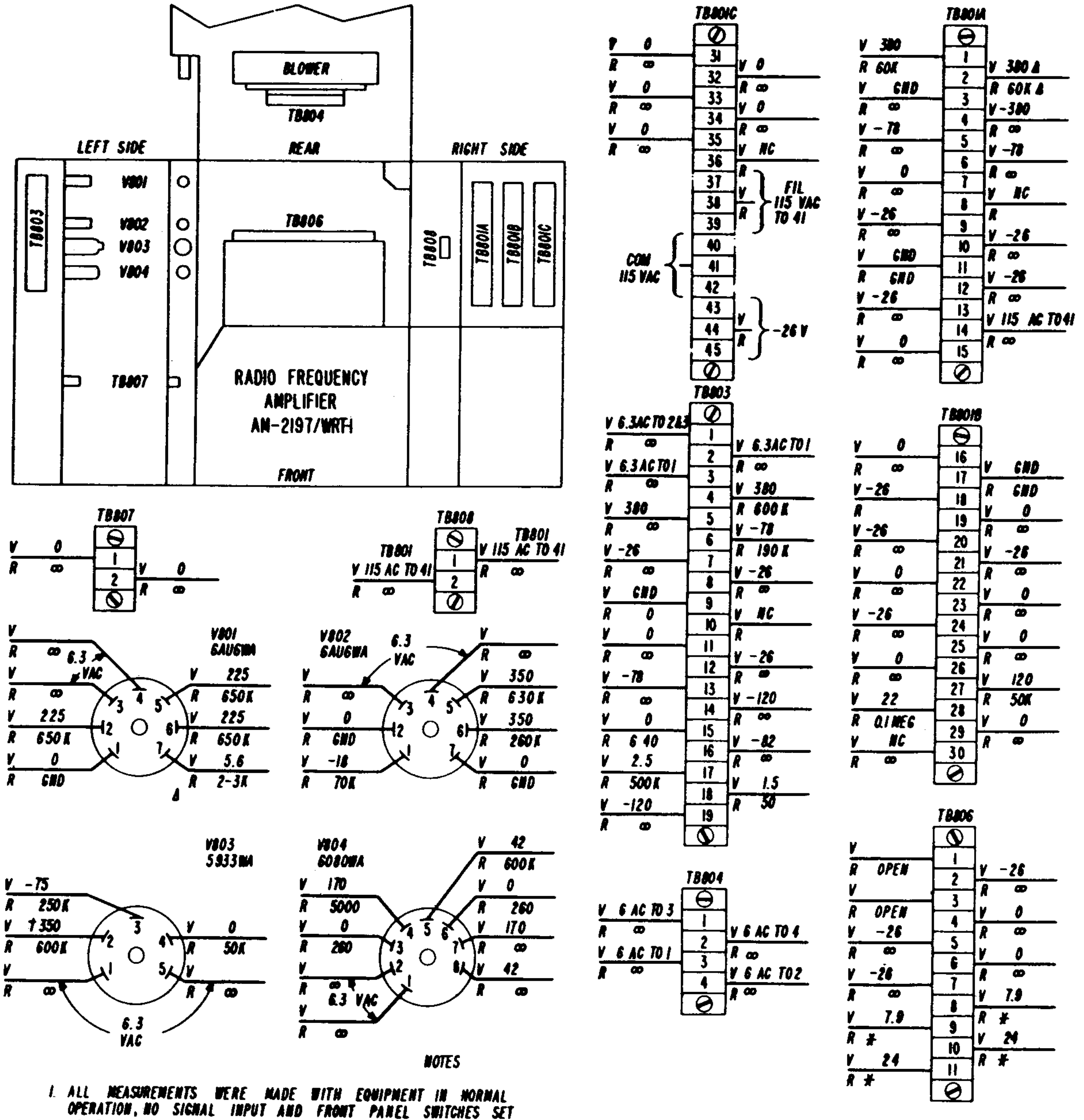
⑨ DETERMINED BY TERMINATING EQUIPMENT.

⑩ DEPENDENT ON KEYING VOLTS

Figure 5-6. Radio Frequency Oscillat r O-621/WRT-1, Voltage and Resistance Measurements

TABLE 5-6. RADIO TRANSMITTING SET AN/WRT-1 POWER AMPLIFIER FUNCTIONAL SECTION TROUBLE-SHOOTING CHART

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	11 Figures 5-1 and 5-34	Refer to Section 3 and tune transmitter for CW emission with POWER SELECTOR SWITCH (S510) in TUNE position at an output frequency of 1.5 Mc. Place OUTPUT METER switch S814 in the R-F OUTPUT position.	R-F OUTPUT meter (M803) should indicate 100 watts.	Check all reflectometer circuits. If still not normal proceed to step 3.
2	11 Figures 5-1 and 5-31	Place POWER SELECTOR switches (S510) in the 100W position and tune transmitter for 100 watts output. Place OUTPUT METER switch (S814) in the R-F OUTPUT position and adjust P. A. output for a reading of 100 watts on R-F OUTPUT meter (M803).	R-F OUTPUT meter (M803) should indicate 100 watts.	If P. A. output cannot be adjusted for a reading of 100 watts on meter M803 check line to and circuits of Radio Frequency Tuner TN-345/WRT-1 and Antenna Coupler CU-760/WRT-1.
3	12 Figures 5-7 and 5-34	Pull out the drawer containing Radio Frequency Amplifier AM-2197/WRT-1 and engage drawer interlock switch. Connect Oscilloscope TS-239A/UP Series (or equivalent) between ground and capacitor C843. Place CARRIER TEST KEY (S811) in the ON position. Refer to section 3 of this Manual and tune the transmitter for an output frequency of 1.5 Mc with POWER SELECTOR switch (S510) in the TUNE position. Set DRIVE ADJUST control (R812) fully clockwise.	Oscilloscope should display an unmodulated r-f waveform.	If indication is normal proceed to next step. If indication is abnormal refer to the modulating section trouble-shooting chart, table 5-7, to locate fault.
4	Ⓕ Figures 5-1 and 5-34	Place TEST AMMETER switch (S808) in the DRIVER CATHODE (200MA) position.	TEST AMMETER (M805) should indicate 130 ma.	If indication is normal proceed to step 6. If indication is abnormal proceed to next step.
5	Ⓕ Figures 5-1 and 5-34	Place TEST AMMETER switch (S808) in the 2ND IA (80MA) position.	TEST AMMETER (M805) should indicate between 33 and 37 ma.	If indication is normal check tube V804. Refer to figure 5-7 and make voltage and resistance measurements of circuitry associated with tube V804. If indication is abnormal check tubes V802 and V803. Refer to figure 5-7 and make voltage and resistance measurements of circuitry associated with tubes V802 and V803.



NOTES

1. ALL MEASUREMENTS WERE MADE WITH EQUIPMENT IN NORMAL OPERATION, NO SIGNAL INPUT AND FRONT PANEL SWITCHES SET AS FOLLOWS:

EMISSION SELECTOR	CW	COUPLER ANTENNA SWITCH	DIRECT
2 WIRE 6 WIRE REMOTE	6 WIRE REMOTE	TEST KEY	OFF
POWER SELECTOR	ADJUST	TUNER CONTROL SWITCH	TUNER IN
LOCAL REMOTE	LOCAL	TRANSFORMER	IN
FILAMENT POWER	ON		
PLATE POWER	ON		

2. ALL RESISTANCE MEASUREMENTS MADE WITH EQUIPMENT CONNECTED AS ABOVE AND INPUT POWER OFF. ALL EXTERNAL LEADS WERE DETACHED FROM TERMINALS.
3. ALL MEASUREMENTS WERE MADE TO GROUND UNLESS OTHERWISE SPECIFIED.
4. ALL RESISTANCE MEASUREMENTS ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
5. * DO NOT MAKE RESISTANCE MEASUREMENTS (TRANSISTOR).
6. NC INDICATES NO CONNECTION.
7. ALL VOLTAGE MEASUREMENTS ARE DC, UNLESS OTHERWISE SPECIFIED.
8. Δ DEPENDS ON SETTING OF MOD BIAS ADJUST R861 AND FEEDBACK ADJUST R882.
9. Δ SETS 142 AND UP V=0, R=∞

Figure 5-7. Radio Frequency Amplifier AM-2197/WRT-1, Voltage and Resistance Measurement

TABLE 5-6. RADIO TRANSMITTING SET AN/WRT-1 POWER AMPLIFIER FUNCTIONAL SECTION TROUBLE-SHOOTING CHART—Concluded

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
6	Ⓖ Figures 5-1 and 5-34	Place CATHODE CURRENTS switch (S809) in TOTAL (1.5A) position and POWER SELECTOR switch (S510) in the 500 W position.	CATHODE CURRENTS meter (M806) should indicate between 480 and 520 ma.	If indication is over 525 ma. check relay K801 and adjustment of P. A. OVERLOAD ADJUST potentiometer R840. If indication is under 525 ma proceed with the next step.
7	Ⓖ Figures 5-1 and 5-34	Place CATHODE CURRENTS switch (S809) first in 1 then in 2, 3 and 4 position.	In each position CATHODE CURRENTS meter (M806) should indicate between 115 and 130 ma.	If indication on one of the settings is abnormal check the respective tube. Position 1 corresponds to V805, 2 to V806, 3 to V807 and 4 to V808. If one of the tubes is defective replace the tube. If tubes are not defective proceed with next step.
8	9 Figures 5-1 and 5-34	Place TEST VOLTMETER switch (S807) in the PLATE SUPPLY (1.5 kv) position.	TEST VOLTMETER (M804) should indicate between 550 and 650 V.	Check H. V. rectifier tubes V201 through V206.

e. MODULATING FUNCTIONAL SECTION.—Figure 5-33 is a functional schematic diagram of the modulating section. As shown in figure 5-33 the modulating functional section includes: the keyer circuits, the 200-cycle oscillator and the 200-cycle amplifier, located in Radio Frequency Oscillator O-621/WRT-1; the speech amplifier chassis and the bias keying circuits, located in Amplifier-Power Supply AM-2198/WRT-1; and the low level modulator, located in Radio Frequency Amplifier AM-2197/WRT-1. Indication of trouble in the modulating functional section could be no r-f drive to the r-f amplifier. Trouble in the modulating functional section can usually be traced quickly to one of the circuits in the modulating section, if it is known in what position the EMISSION SELECTOR switch (S508) was when the trouble occurred, and also in what frequency range the transmitter was operating.

(1) PRELIMINARY CHECK. — Examine the control settings on the front panel of Amplifier-Power Supply AM-2198/WRT-1 and on the front panel of Radio Frequency Oscillator O-621/WRT-1. Refer to figure 5-33 and examine all the tubes, in the modulating functional section for inoperative filaments. Check interconnections for broken wires or loose connections. Make sure all drawers are tightly closed.

(2) TEST EQUIPMENT AND SPECIAL TOOLS.—The test equipment required for a functional check of the modulating functional section consists of Multimeter AN/USM-34 Series (or equivalent). Oscilloscope TS-239A/UP and T-adapter UG-566/U. No other special tools are required.

(3) CONTROL SETTINGS.—Before starting a functional check on the modulating functional section, preset the controls in the following manner:

EMERGENCY STOP	(S201)	in the	ON position
FILAMENT POWER	(S502)	in the	ON position
POWER SELECTOR	(S510)	in the	ADJ position
LOCAL-REMOTE	(S507)	in the	LOCAL position
FSK TEST	(S308)	in the	LINE position
OVEN	(S604)	in the	ON position
OVEN HEAT	(S304)	in the	ON position
CARRIER TEST KEY	(S811)	in the	ON position
EMISSION SELECTOR	(S508)	in the	CW position

(4) TROUBLE-SHOOTING CHART. Table 5-7 provides a procedure for locating troubles in the modulating functional section. During this trouble-shooting procedure reference should be made to figure 5-33 and to the figures in the TEST POINT column for the location of the test points in the modulating functional section. All controls and relays in the 100 series are located on Electrical Equipment Cabinet CY-2607/WRT-1, those in the 200 series on Power Supply PP-2222/WRT, those in the 300 and 400 series in Radio Frequency Oscillator O-621/WRT-1, those in the 500 and 1400 series in Amplifier-Power Supply AM-2198/WRT-1, those in the 600 and 700 series in Electrical Frequency Control C-2861/WRT-1, those in the 800 and 900 series in Radio Frequency Amplifier AM-2197/WRT-1, those in the 3300 series in Radio Frequency Tuner TN-345/WRT-1 and those in the 3500 series in Antenna Coupler CU-760/WRT-1. When using Table 5-7, note the instruction given in the NORMAL INDICATION column for each step. If indication is normal proceed to next step. If indication is not normal follow the instructions given in the NEXT STEP column.

TABLE 5-7. RADIO TRANSMITTING SET AN/WRT-1 MODULATING FUNCTIONAL SECTION TROUBLE-SHOOTING CHART

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	⑫ Figure 5-8 and 5-33	Connect Oscilloscope TS-239A/UP between ground and capacitor C843. Refer to section 3 and tune transmitter for CW operation.	Oscilloscope should display an unmodulated r-f waveform.	If indication is normal proceed to step 3. If indication is not normal proceed with next step.

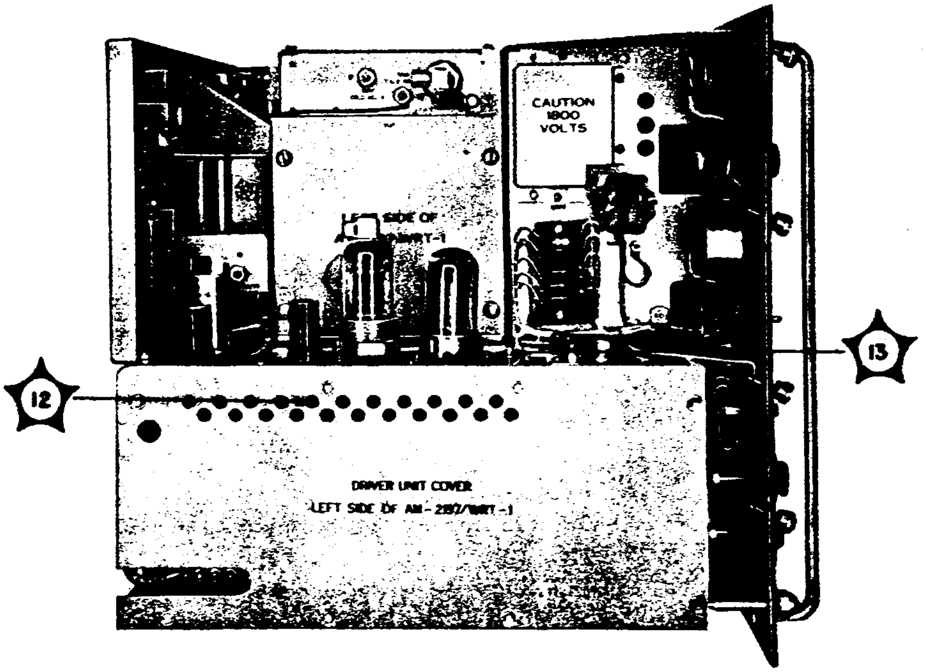
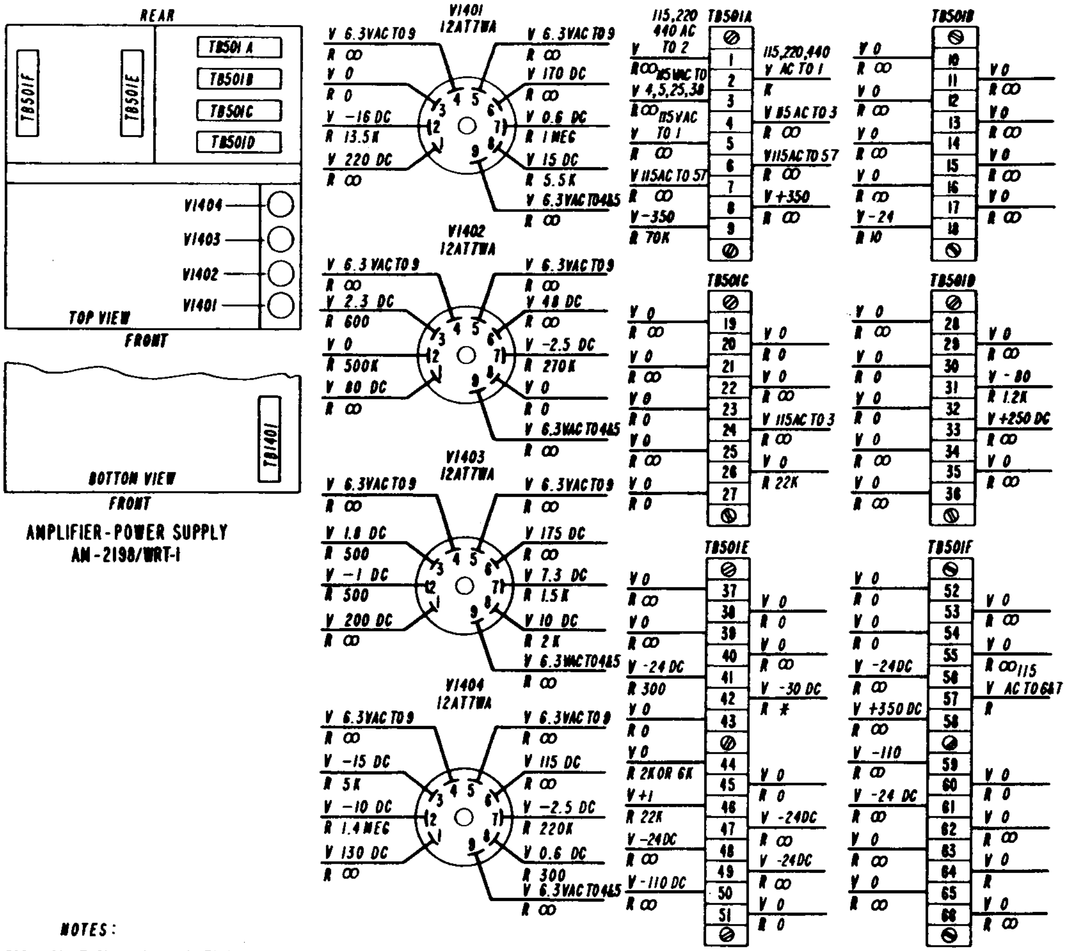


Figure 5-8. Radio Frequency Amplifier AM-2197/WRT-1, Left Side View, Location of Test Points

TABLE 5-7. RADIO TRANSMITTING SET AN/WRT-1 MODULATING FUNCTIONAL SECTION TROUBLE-SHOOTING CHART—Continued

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
2	13 Figure 5-8 and 5-33	Using adapter RF0735 connect Oscilloscope AN/USM-24 between ground and J801.	Oscilloscope should display an unmodulated r-f waveform.	If indication is normal check tube V801. Refer to figure 5-7 and make voltage and resistance measurements of circuitry associated with V801. If indication is not normal refer to the r-f generating functional section trouble-shooting chart Table 5-8.
3	14 Figure 5-3 and 5-33	Connect Audio Oscillator Equipment Navy Model LAJ-2 Series, or equivalent, between terminals 28 and 29 on TB501. Set the RANGE CONTROL in the X100 position and the frequency to 10. Connect Oscilloscope TS-239A/UP between ground and terminal 55 of TB501.	Oscilloscope should display a sine wave of 1000 cps.	If indication is normal check interconnection between TB501-55 and TB801-17. If indication is not normal check tubes V1401, V1402 and V1403. Refer to figure 5-9 and make voltage and resistance measurements of circuitry associated with tubes V1401, V1402 and V1403.
4	14 Figure 5-11 and 5-33	With the Oscilloscope connected as in step 3 place CLIPPING switch S1401 in the IN position. Slowly increase the amplitude of the audio signal and observe the display on the oscilloscope.	Oscilloscope should display a sine wave with the peaks clipped as the amplitude of the audio signal is increased.	Check CLIPPING switch C1401 and the setting of CLIPPING BALANCE ADJUST potentiometer R1416.
5	Ⓗ Figure 5-10 and 5-33	Set SQUELCH LEVEL control to about mid position. Connect Multimeter AN/USM-34 Series (or equivalent) to the junction of R1449 and crystal diode CR1404 and first decrease the amplitude of the audio signal to zero and then slowly increase it.	Multimeter AN/USM-34 Series (or equivalent) should indicate a negative voltage when the amplitude of the audio signal is decreased to zero. As the amplitude is increased the indication on the Multimeter should drop toward zero.	Check tube V1404. Refer to figure 5-9 and make voltage and resistance measurements of the circuitry associated with V1404.
6	15 Figure 5-11 and 5-33	Remove cover from left side of drawer and connect Square Wave Generator TS-583/U Series (or equivalent) between ground and terminal 1 on TB450. Place the sync switch of the Square Wave Generator on EXT. Connect the output of Audio Oscil-	The positive half-cycle of the output should be equal in duration to the negative half-cycle.	Check setting of FSK WAVESHAPING control R483 and check tubes V450, V451 and V452. Refer to figure 5-6 and make voltage and resistance measurements of circuitry associated with tubes V450, V451, and V452.



NOTES:

FOR V1401 THRU V1404 AND TB1401
1. ALL POTS ON FRONT PANEL FROM SPEECH AMPLIFIER FULL COUNTERCLOCKWISE.
2. CLIPPING SWITCH-OUT
3. VOLTAGE MEASURMENTS TAKEN WITH POWER ON SET BUT NO INPUT SIGNAL.
4. ALL VOLTAGE AND RESISTANCES MEASURED TO GROUND UNLESS OTHERWISE NOTED.
5. ALL EXTERNAL CONNECTIONS REMOVED FROM TB1401 WHEN TAKING RESISTANCE MEASURMENTS.

FOR TB501A THRU TB501F-ALL MEASUREMENTS MADE WITH EQUIPMENT IN NORMAL OPERATION, NO SIGNAL INPUT.
1. SWITCH POSITIONS
   POWER SELECTOR SWITCH — ADJ. POSITION   FILAMENT POWER -ON
   2 WIRE — 6 WIRE REMOTE — 6 WIRE POSITION   PLATE POWER -ON
   REMOTE - LOCAL — LOCAL POSITION
   EMISSION SELECTOR — MCW POSITION
2. NOTES 1,2,3 AND 4 FROM ABOVE ALSO APPLY.
3. ALL EXTERNAL CONNECTIONS REMOVED FROM TB501 WHEN TAKING RESISTANCE MEASURMENTS.
4. UNLESS OTHERWISE SPECIFIED ALL D-C VOLTAGES ARE POSITIVE.
5. ✱ DO NOT TAKE RESISTANCE MEASUREMENTS (TRANSISTORS).

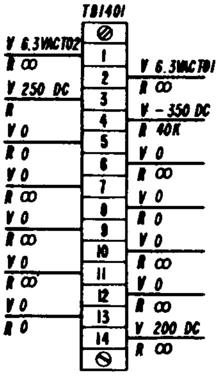


Figure 5-9. Amplifier-Pow r Supply AM-2198/WRT-1, V ltage and Resistance Measur ments

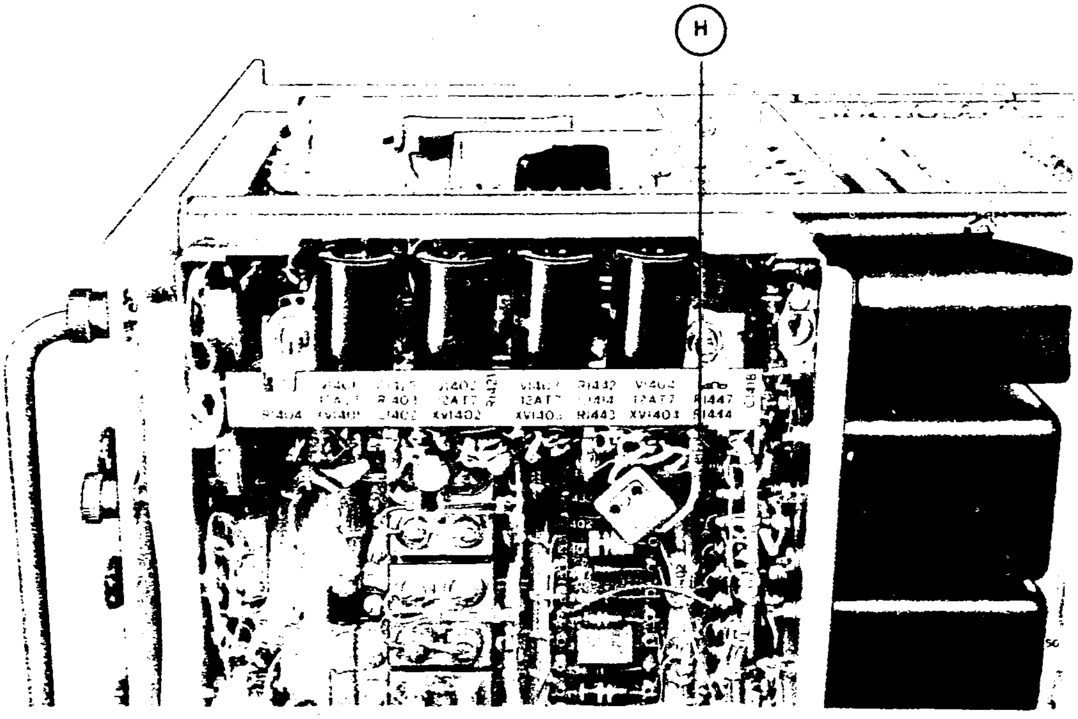


Figure 5-10. Amplifier-Power Supply AM-2198/WRT-1, Right Side, Location of Test Point

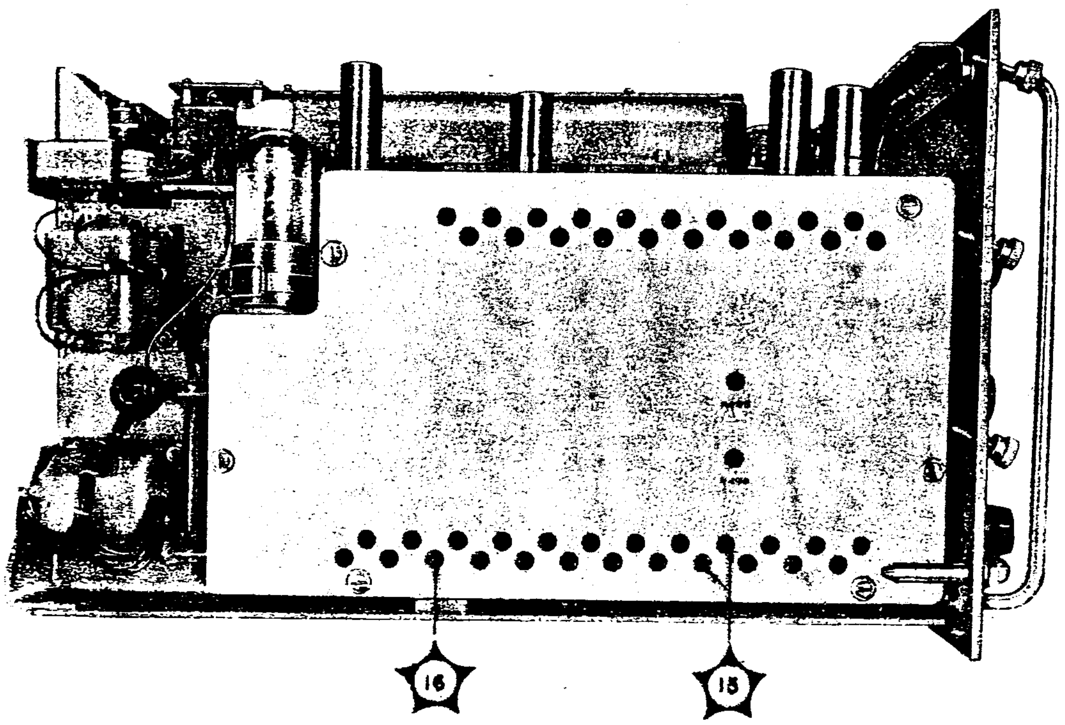


Figure 5-11. Radio Frequency Oscillator O-621/WRT-1, Left Side, Location of Test Points

TABLE 5-7. RADIO TRANSMITTING SET AN/WRT-1 MODULATING FUNCTIONAL SECTION TROUBLE-SHOOTING CHART—Concluded

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
6 (Cont.)		lator Equipment Navy Model LAJ-2 Series, or equivalent to the input of the square wave generator. Set the output frequency of the Audio Oscillator to 30 cycles. Place EMISSION SELECTOR switch S508 and WAVE-SHAPING switch S450 in the FSK position. Connect vertical input of Oscilloscope TS-239A between terminals 13 and 14 on TB450.		
7	16 Figure 5-11 and 5-33	Connect Multimeter AN/USM-34 Series (or equivalent) between ground and terminal 2 on TB450. Place a jumper between terminals 7 and 12 TB450. Set Multimeter on its 100V d-c scale.	Multimeter should indicate at least 90 volts.	Check tube V454. Refer to figure 5-6 and make voltage and resistance measurement of circuitry associated with tube V454.
8	14 Figure 5-33	Set EMISSION SELECTOR switch to MOD CW. Connect Oscilloscope TS-239A/UP between ground and terminal 55 of TB501.	Oscilloscope should display a sine wave of 1000 cps.	If indication is not normal check transistor Q503 and Q504.

f. R-F GENERATING FUNCTIONAL SECTION. Figure 5-32 is a functional schematic diagram of the r-f generating functional section. As shown in figure 5-32 the r-f generating functional section consists of the r-f oscillator circuits, located in Radio Frequency Oscillator O-621/WRT-1, and all the circuits in Electrical Frequency Control C-2861/WRT-1. Indication of trouble in the r-f generating functional section could be no output to the power amplifier functional section. Trouble in the r-f generating functional section can usually be traced to the individual circuits, by observing the meters and indicators on the front panel of Radio Frequency Oscillator O-621/WRT-1 and Electrical Frequency Control C-2861/WRT-1.

(1) PRELIMINARY CHECK. Examine all tubes for inoperative filaments. Check interconnection for broken wires or loose connections. Make sure all drawers are tightly closed.

(2) TEST EQUIPMENT AND SPECIAL TOOLS. The test equipment required for a functional check of the r-f generating functional section, consists of Multimeter AN/USM-34 Series (or equivalent), Oscilloscope TS-239A/UP Series (or equivalent) and Frequency Meter AN/USM-29 Series (or equivalent). Adapters type RF 0735 and RF 0756 are also necessary.

(3) CONTROL SETTINGS. Before starting a functional check of the r-f generating functional section preset the controls in the following manner.

EMERGENCY STOP	(S201)	in the	ON position
FILAMENT POWER	(S502)	in the	ON position
POWER SELECTOR	(S510)	in the	ADJ position
LOCAL-REMOTE	(S507)	in the	LOCAL position
FSK TEST	(S308)	in the	LINE position
OVEN	(S604)	in the	ON position
OVEN HEAT	(S304)	in the	ON position
CARRIER TEST KEY	(S811)	in the	OFF position
EMISSION SELECTOR	(S508)	in the	CW position
PLATE POWER ON	(S503)	Press	

(4) TROUBLE-SHOOTING CHART.—Table 5-8 provides a procedure for locating troubles in the r-f generating functional section. DEVIATION CALIBRATE ZERO ADJUST meter M601, located on the front panel of Electrical Frequency Control C-2861/WRT-1 and FREQUENCY ZERO ADJUST meter M301, located on the front panel of Radio Frequency Oscillator O-621/WRT-1, provide indications for isolating the trouble to certain circuits in the r-f

generating functional section. During this trouble-shooting procedure reference should be made to figure 5-32 and to the figures called out in the TEST POINT column of Table 5-8 which show the location of the test points in the r-f generating functional section. Before starting the trouble-shooting procedure the oven heaters in Radio Frequency Oscillator O-621/WRT-1 and in Electrical Frequency Control C-2861/WRT-1 should be energized for at least six hours. All controls and relays in the 100 series are located on Electrical Equipment Cabinet CY-2607/WRT-1, those in the 200 series on Power Supply PP-2222/WRT, those in the 300 and 400 series in the Radio Frequency Oscillator O-621/WRT-1, those in the 500 and 1400 series in Amplifier-Power Supply AM-2198/WRT-1, those in the 700 series in Electrical Frequency Control C-2861/WRT-1, those in the 800 and 900 series in Radio Frequency Amplifier AM-2197/WRT-1, those in the 3300 series in Radio Frequency Tuner TN-345/WRT-1, and those in the 3500 series in Antenna Coupler CU-760/WRT-1. When using Table 5-8 note the instructions given in the NORMAL INDICATION column, for each step. If indication is normal proceed to next step. If indication is not normal follow the instructions given in the NEXT STEP column.

TABLE 5-8. RADIO TRANSMITTING SET AN/WRT-1 R-F GENERATING FUNCTIONAL SECTION TROUBLE-SHOOTING CHART

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
1	17 Figure 5-1 and 5-32	Refer to Section 3 and tune Radio Transmitting Set AN/WRT-1 for an output frequency of 1.5 Mc, and observe FREQUENCY ZERO ADJUST meter M301.	FREQUENCY ZERO ADJUST meter M301 should indicate zero.	If FREQUENCY ZERO meter M301 does not sweep as the master oscillator is tuned check feedback amplifier tubes V607 and V608. Refer to figure 5-14 and make voltage and resistance measurements of circuitry associated with V607 and V608. If meter M301 sweeps proceed with next step.
2	18 Figure 5-5 and 5-32	Using adapters RF735 and RF0756 connect Multimeter AN/USM-34 Series (or equivalent) between J302 and P132.	Multimeter AN/USM-34 should indicate between 1 and 2 volts.	If indication is normal proceed to next step. If indication is abnormal check tubes V301 and V302. Refer to figure 5-6 and make voltage and resistance measurements of circuitry associated with V301 and V302.
3	19 Figure 5-5 and 5-32	Using Adapters RF735 and RF0756 connect Multimeter AN/USM-34 Series (or equivalent) between J301 and P131.	Multimeter AN/USM-34 should indicate between 2.5 and 3.7 volts.	If indication is normal proceed to next step. If indication is abnormal check transformer T301.
4	20 Figure 5-12 and 5-32	Using Adapters RF735 and RF0756 connect Frequency Meter AN/USM-29 Series (or equivalent) to J609.	Frequency Meter should indicate 100 kc.	If indication is normal proceed with step 6. If indication is not normal remove oven covers and check circuitry of 1 MC crystal on E661, 1.1 MC crystal on E662 and that of mixer E663.

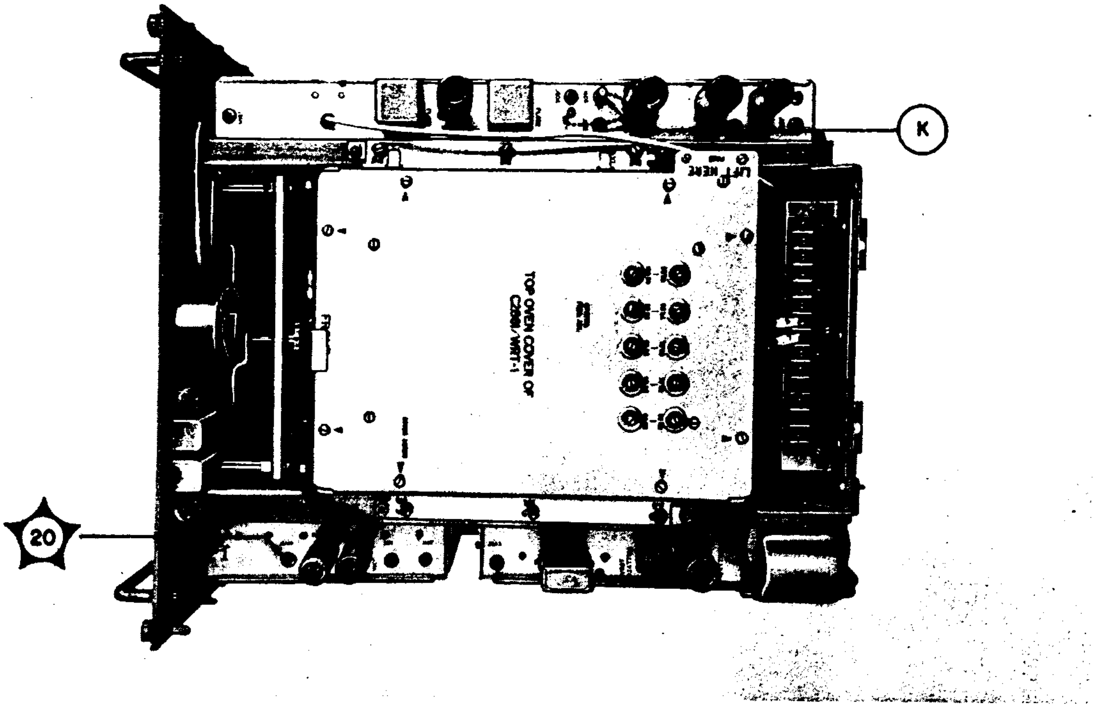


Figure 5-12. Electrical Frequency Control C-2861/WRT-1, Location of Test Points n T p

TABLE 5-8. RADIO TRANSMITTING SET AN/WRT-1 R-F GENERATING FUNCTIONAL SECTION TROUBLE-SHOOTING CHART—Continued

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
5	Ⓘ Figure 5-13 and 5-32	Connect Multimeter AN/USM-34 between ground and terminal 1 of transformer T605.	Multimeter should indicate 15 volts.	If indication is normal proceed with next step. If indication is not normal check tubes V603, and V606. Refer to figure 5-14 and make voltage and resistance measurements of circuitry associated with V603 and V606.
6	Ⓙ Figure 5-13 and 5-32	Connect Multimeter AN/USM-34 Series (or equivalent) between ground and terminal 1 of transformer T604.	Multimeter should indicate 20 volts.	If indication is normal check master oscillator phase detector. If indication is not normal proceed with next step.

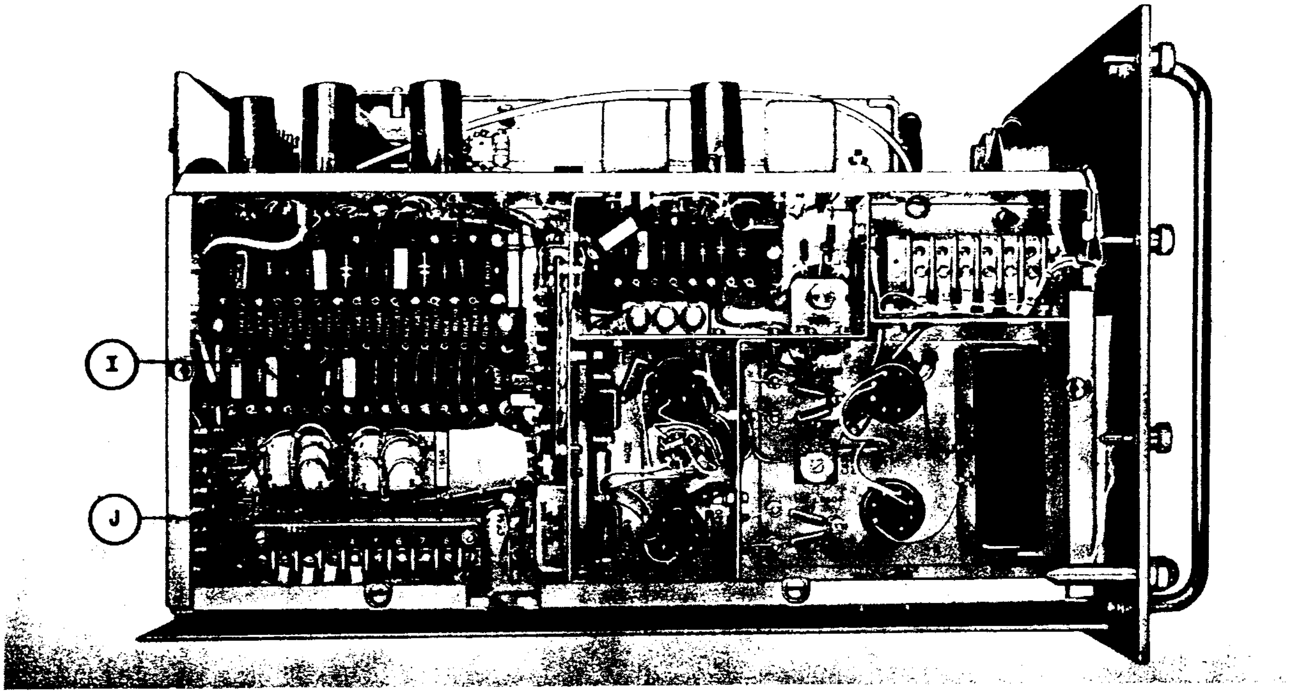
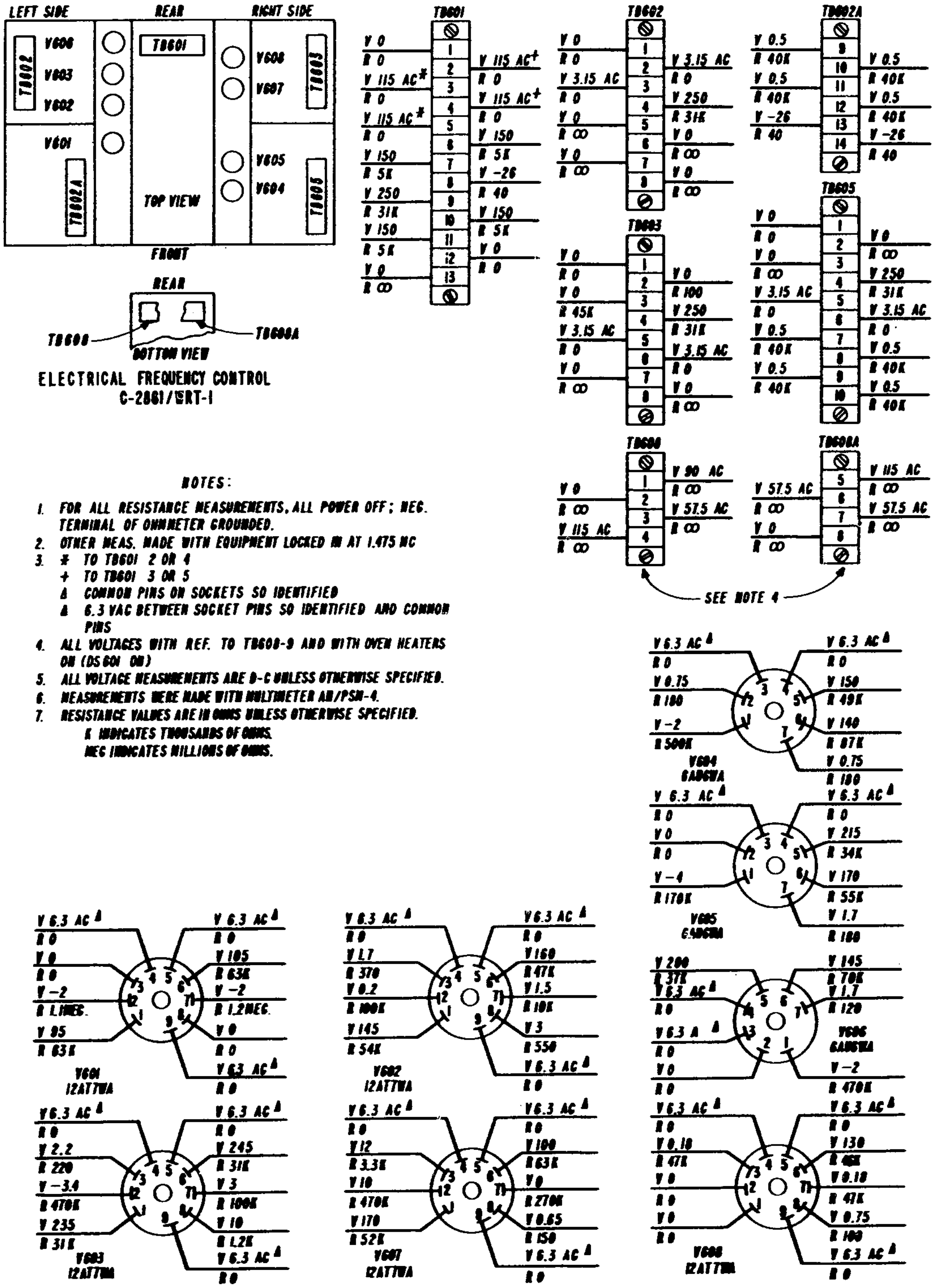


Figure 5-13. Electrical Frequency Control C-2861/WRT-1, Left Side, Location of Test Points

TABLE 5-8. RADIO TRANSMITTING SET AN/WRT-1 R-F GENERATING FUNCTIONAL SECTION TROUBLE-SHOOTING CHART—Concluded

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
7	Ⓚ Figure 5-12 and 5-32	Connect Multimeter AN/USM-34 Series (or equivalent) between ground and J605.	Multimeter should indicate 14 volts.	If indication is normal check tubes V602 and V603. Refer to figure 5-14 and make voltage and resistance measurements of circuitry associated with V602 and V603. If indication is not normal check tube V601. Refer to figure 5-14 and make voltage and resistance measurements of circuitry associated with V601. Check the mixer circuits and th circuits of the 100 kc detector.

5-5. TYPICAL TROUBLES.—Table 5-9 lists a number of faults which may occur often enough to warrant their classification as typical troubles. The troubles are listed in the order of their expected frequency in order to save time in trouble-shooting. When using the table, the symptoms should be noted, the nature of the trouble determined and the fault identified. Tables 5-4 through 5-8 show procedures for locating less obvious troubles.



NOTES:

1. FOR ALL RESISTANCE MEASUREMENTS, ALL POWER OFF; NEG. TERMINAL OF OHMMETER GROUNDED.
2. OTHER MEAS. MADE WITH EQUIPMENT LOCKED IN AT 1.475 MC
3. * TO TB601 2 OR 4
   + TO TB601 3 OR 5
   ▲ COMMON PINS ON SOCKETS SO IDENTIFIED
   ▲ 6.3 VAC BETWEEN SOCKET PINS SO IDENTIFIED AND COMMON PINS
4. ALL VOLTAGES WITH REF. TO TB608-9 AND WITH OVEN HEATERS ON (DS601 ON)
5. ALL VOLTAGE MEASUREMENTS ARE D-C UNLESS OTHERWISE SPECIFIED.
6. MEASUREMENTS WERE MADE WITH MULTIMETER AN/PSM-4.
7. RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
   K INDICATES THOUSANDS OF OHMS.
   MEG INDICATES MILLIONS OF OHMS.

Figure 5-14. Electrical Frequency Control C-2861/WRT-1, Voltage and Resistance Measurements

TABLE 5-9. RADIO TRANSMITTING SET AN/WRT-1, TYPICAL TROUBLES

TROUBLE	NATURE OF TROUBLE	SYMPTOM
One or more HV RECT BLOWN FUSE IND lamps F201, F202, F203 or LV RECT FIL LINE BLOWN FUSE IND F205, F206 glow when EMERGENCY STOP switch is in the ON position.	One of the fuses F201, F202, F203, F205 or F206 is burned out.	No transmitter output.
Low output voltage from the power rectifiers.	Rectifier tubes V201 thru V206 weak or defective.	Transmitter output cannot be brought to required output power reading on R-F OUTPUT meter M803.
Low or high voltage overload relay trips and cannot be reset.	Short in interconnecting wires or defective components.	H. V. OVERLOAD lamp DS208 or LV RECT OVLD lamp DS505 glow constantly.
CARRIER ON light DS803 does not glow when EMISSION SELECTOR switch is in the AM position.	Radiophone fuse F505 burned out.	No transmitter output.
Transmitter operates normally for all types of emission except machine cw.	CW keying amplifier V454, in keyer chassis, defective.	No machine CW output.
RECTIFIER ON light DS503 lights when PLATE POWER ON switch S503 is pressed but LV RECT ON light DS504 fails to glow.	Filament time delay switch S506 defective.	No transmitter output.

NOTES

1 ALL VOLTAGE MEASUREMENTS WERE MADE WITH EQUIPMENT IN NORMAL OPERATION, NO SIGNAL INPUT, AND FRONT PANEL SWITCHES SET AS FOLLOWS

EMISSION SELECTOR	OFF
2 WIRE 6WIRE REMOTE	6 WIRE REMOTE
POWER SELECTOR	ADJ
LOCAL REMOTE	LOCAL
FILAMENT POWER	ON
PLATE POWER	ON

ALL USB AND LSB LEVEL POTENTIOMETERS ON THE FRONT PANEL SET IN THE FULLY COUNTERCLOCKWISE POSITION.

2 ALL RESISTANCE MEASUREMENTS WERE MADE WITH EQUIPMENT CONNECTED AS ABOVE AND INPUT POWER OFF ALL EXTERNAL LEADS WERE DETACHED FROM TERMINALS.

3 ALL MEASUREMENTS WERE MADE TO GROUND UNLESS OTHERWISE SPECIFIED.

4 ALL VOLTAGE MEASUREMENTS ARE D-C UNLESS OTHERWISE INDICATED

5 ALL RESISTANCE MEASUREMENTS ARE IN OHMS UNLESS OTHERWISE INDICATED

6. "NC" INDICATES NO CONNECTION

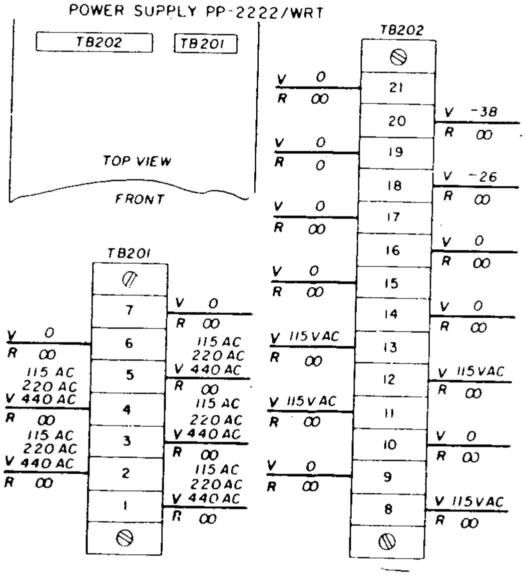
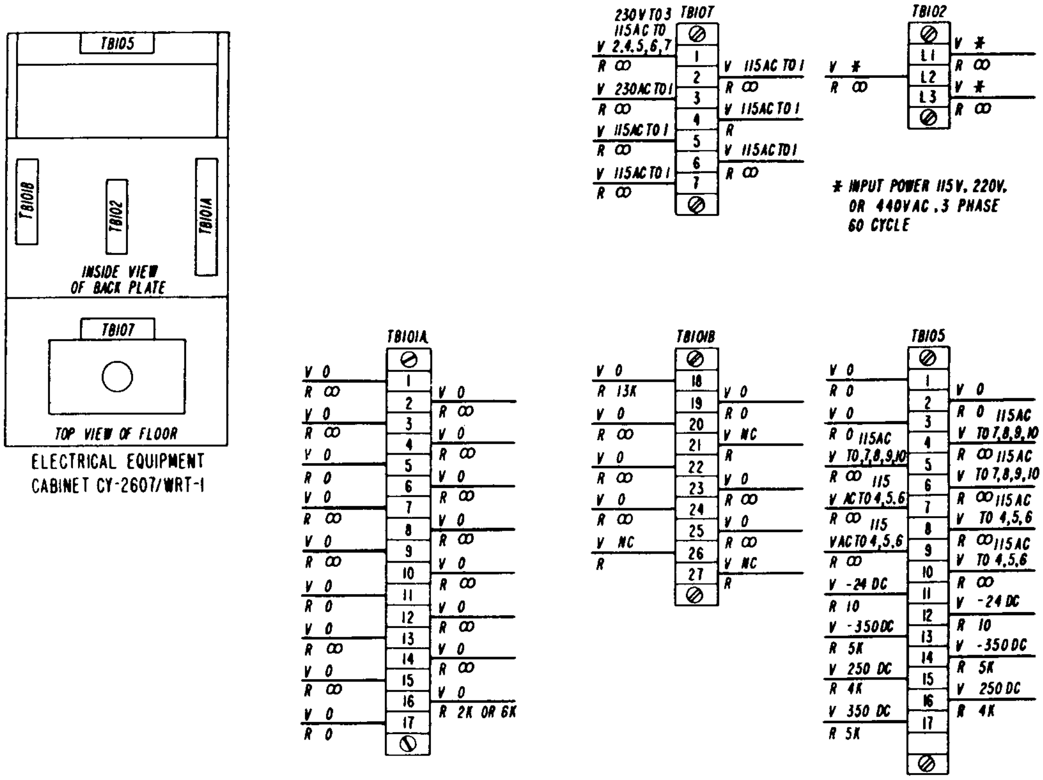


Figure 5-15. Power Supply PP-2222/WRT Voltage and Resistance Measurements



NOTES:

1. VOLTAGE MEASURMENTS TAKEN WITH POWER ON SET BUT NO INPUT SIGNAL.
2. RESISTANCE MEASURMENTS TAKEN WITH ALL UNITS IN SET AND SET READY FOR OPERATION.
3. INPUT POWER LEADS REMOVED FROM TB102 WHEN TAKING RESISTANCE MEASURMENTS.
4. ALL VOLTAGES AND RESISTANCES MEASURED TO GROUND UNLESS OTHERWISE NOTED.
5. UNLESS OTHERWISE INDICATED ALL D-C VOLTAGES ARE POSITIVE.
6. NC INDICATES NO CONNECTION.
7. SWITCH POSITIONS ON AMPLIFIER POWER SUPPLY.

POWER SELECTOR SWITCH — ADJ. POSITION	FILAMENT POWER ON POSITION
2 WIRE-6 WIRE REMOTE-6 WIRE POSITION	PLATE POWER ON POSITION
REMOTE — LOCAL — LOCAL POSITION.	MODULATION LEVEL SIDETONE LEVEL SQUELCH LEVEL } EXTREME COUNTERCLOCKWISE POSITION
EMISSION SELECTOR — MCW POSITION.	
AGC OR INPUT LEVEL	EXTREME COUNTERCLOCKWISE POSITION
CLIPPING	OUT

Figure 5-16. Electrical Equipment Cabinet CY-2607/WRT-1 Voltage and Resistance Measurements

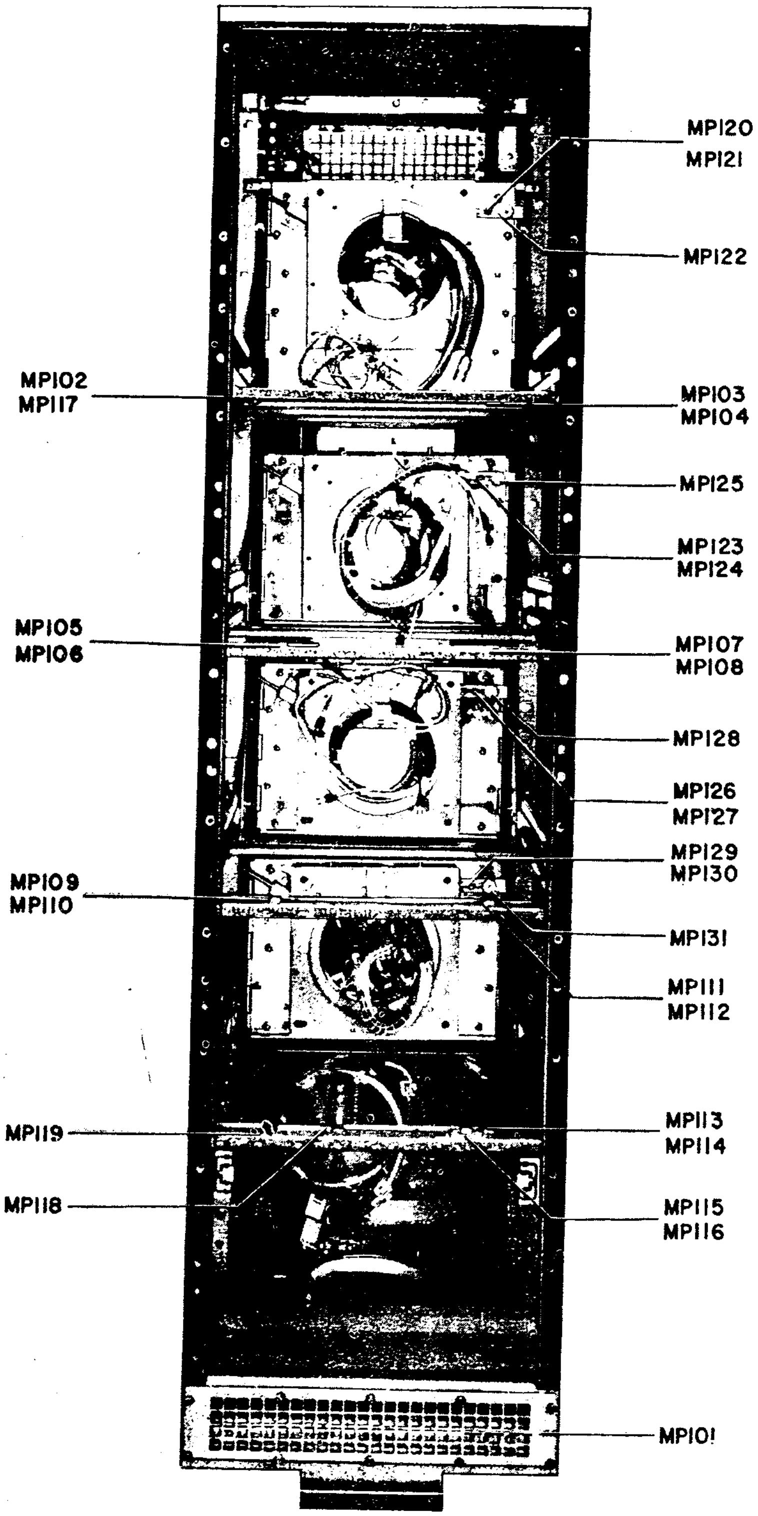


Figure 5-17. Electrical Equipment Cabinet CY-2607/WRT-1 Replaceable, Mechanical Parts

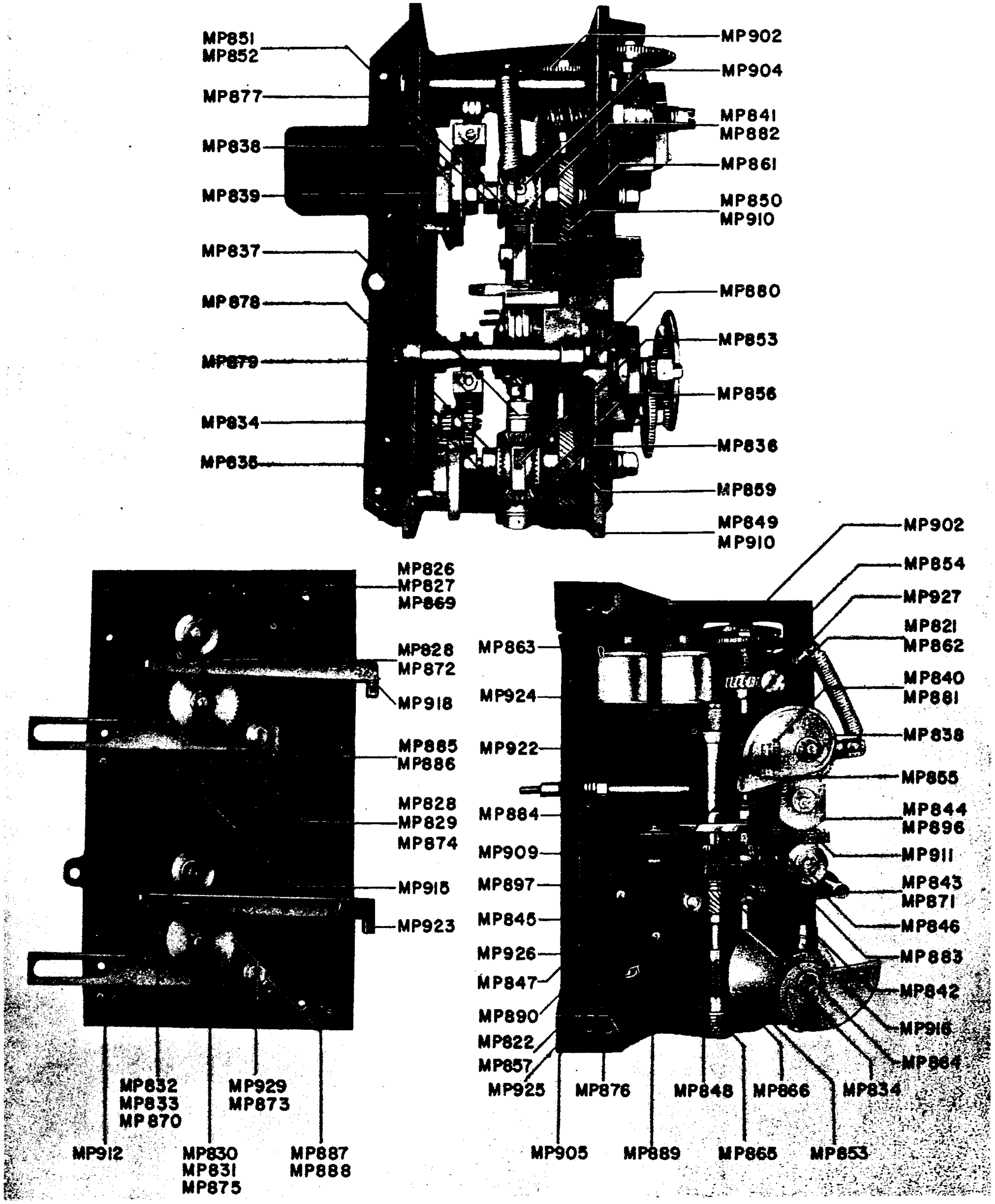


Figure 5-18. Radio Frequency Amplifier AM-2197/WRT-1, Tuning and Coupling Mechanism, Location of Internal Parts

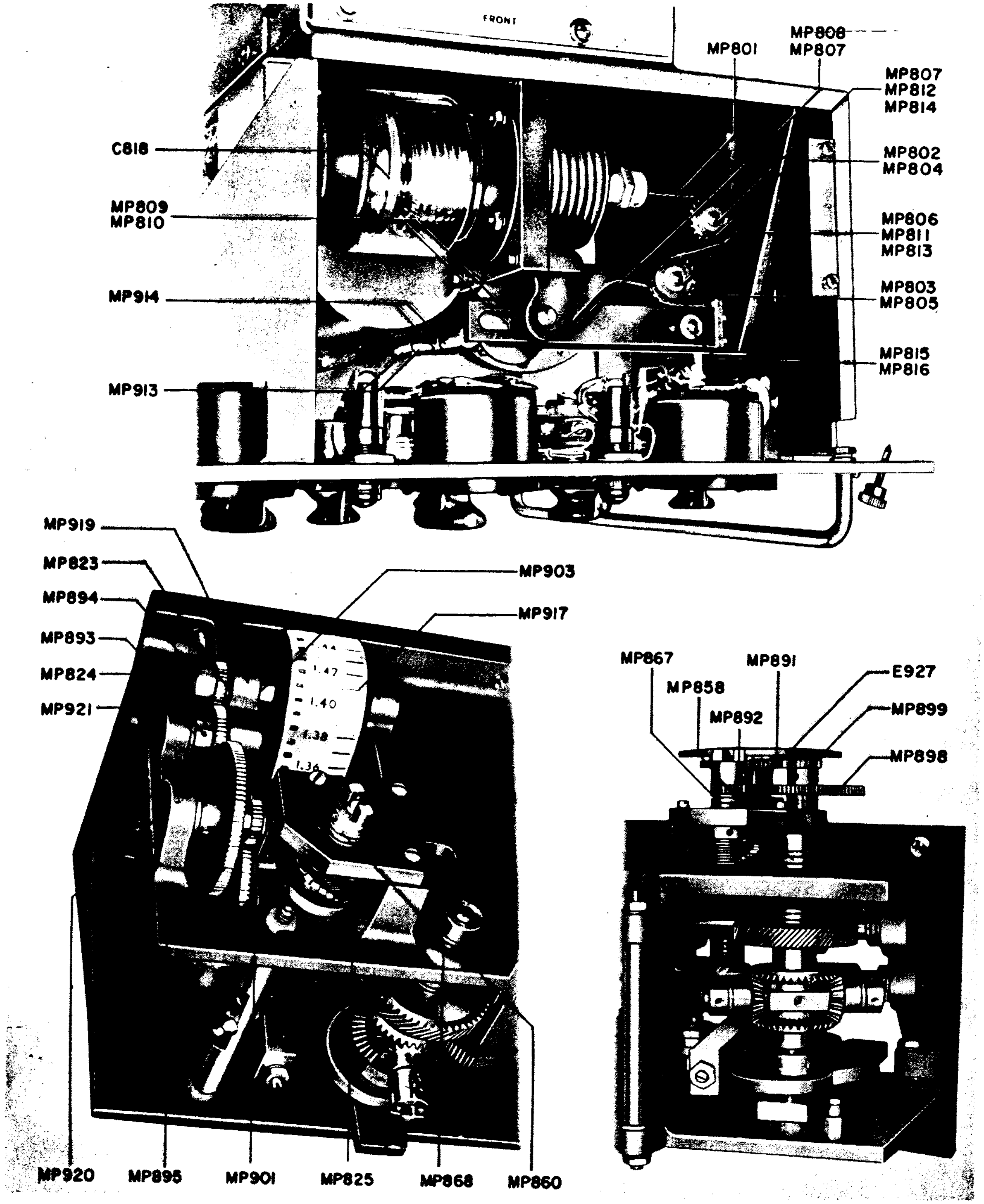


Figure 5-19. Radio Frequency Amplifier AM-2197/WRT-1, Tuning and Coupling Mechanism, Location of Dial Drive and Capacitor Drive Parts

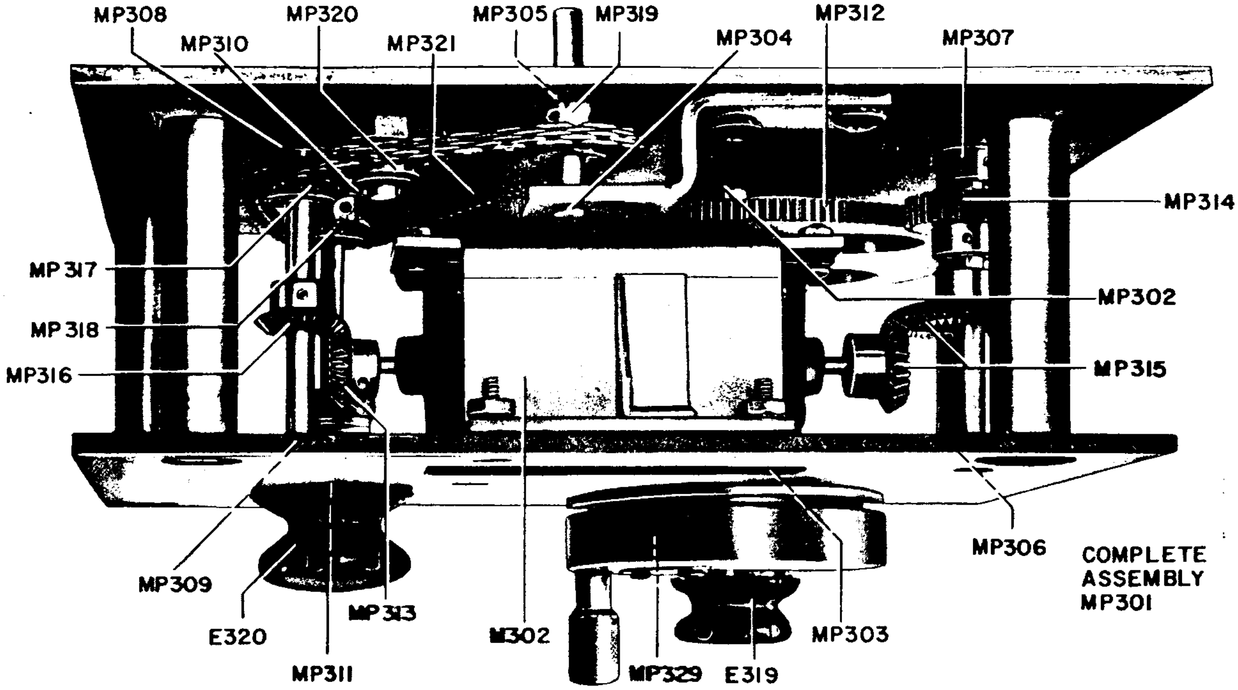


Figure 5-20. Radio Frequency Oscillator O-621/WRT-1, Master Oscillator Gear Train, Location of Parts

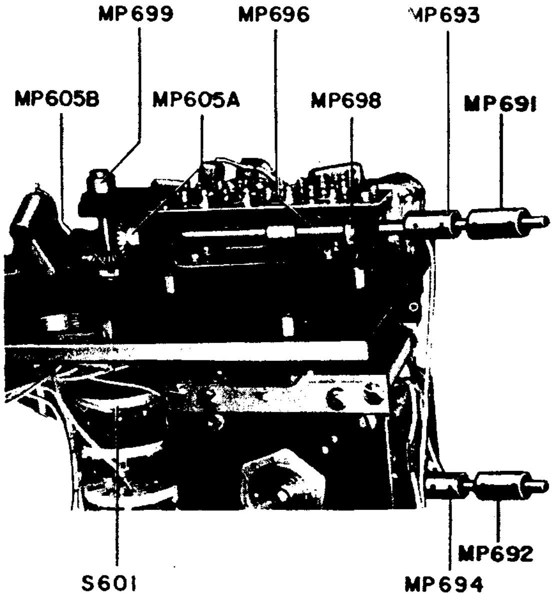


Figure 5-21. Electrical Frequency Control C-2861/WRT-1, Interpolation Oscillator Gear Train, Location of Parts in Oven

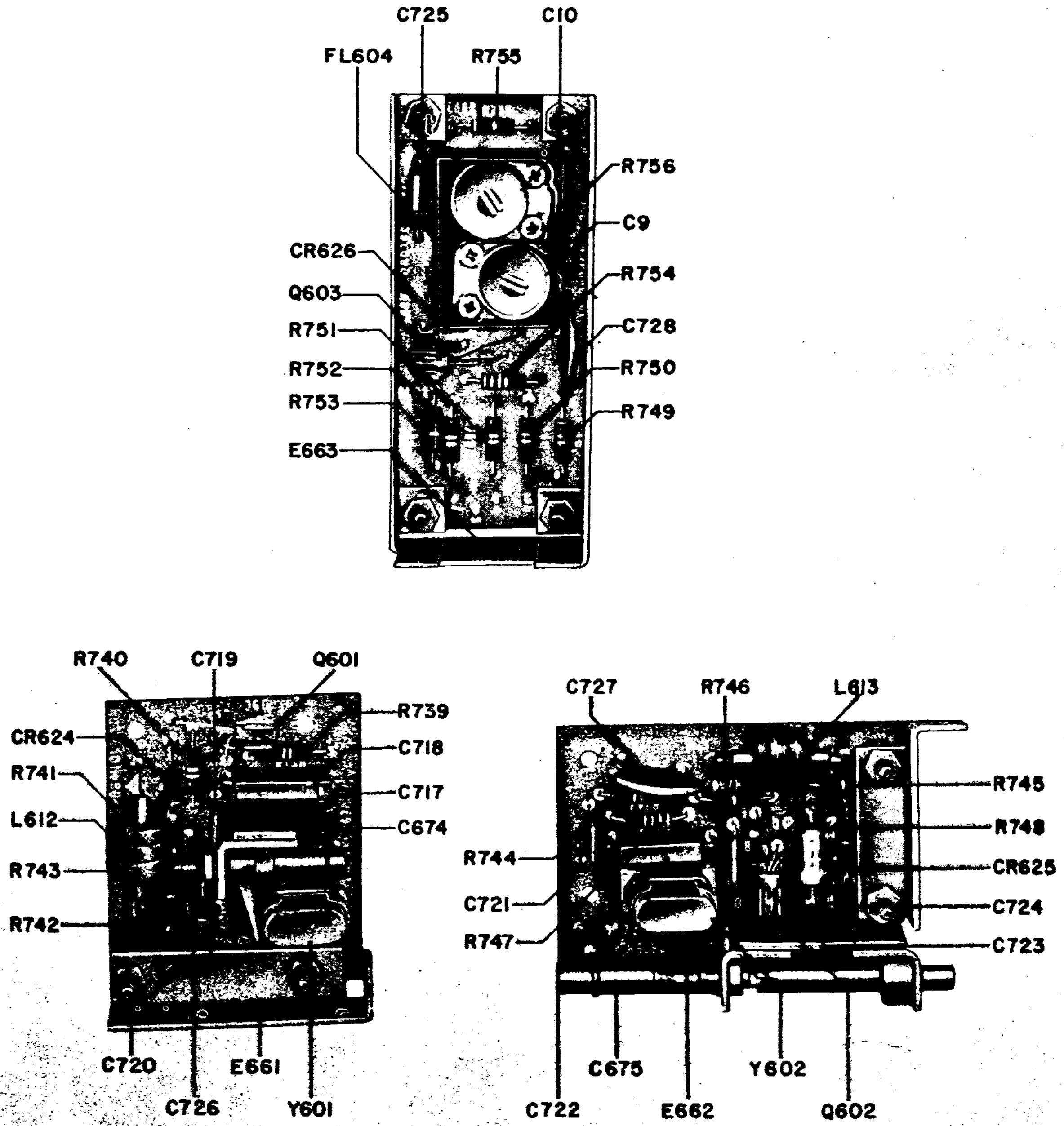


Figure 5-22. Electrical Frequency Control C-2861/WRT-1, Location of Parts on Printed Board—E661, E662, E663

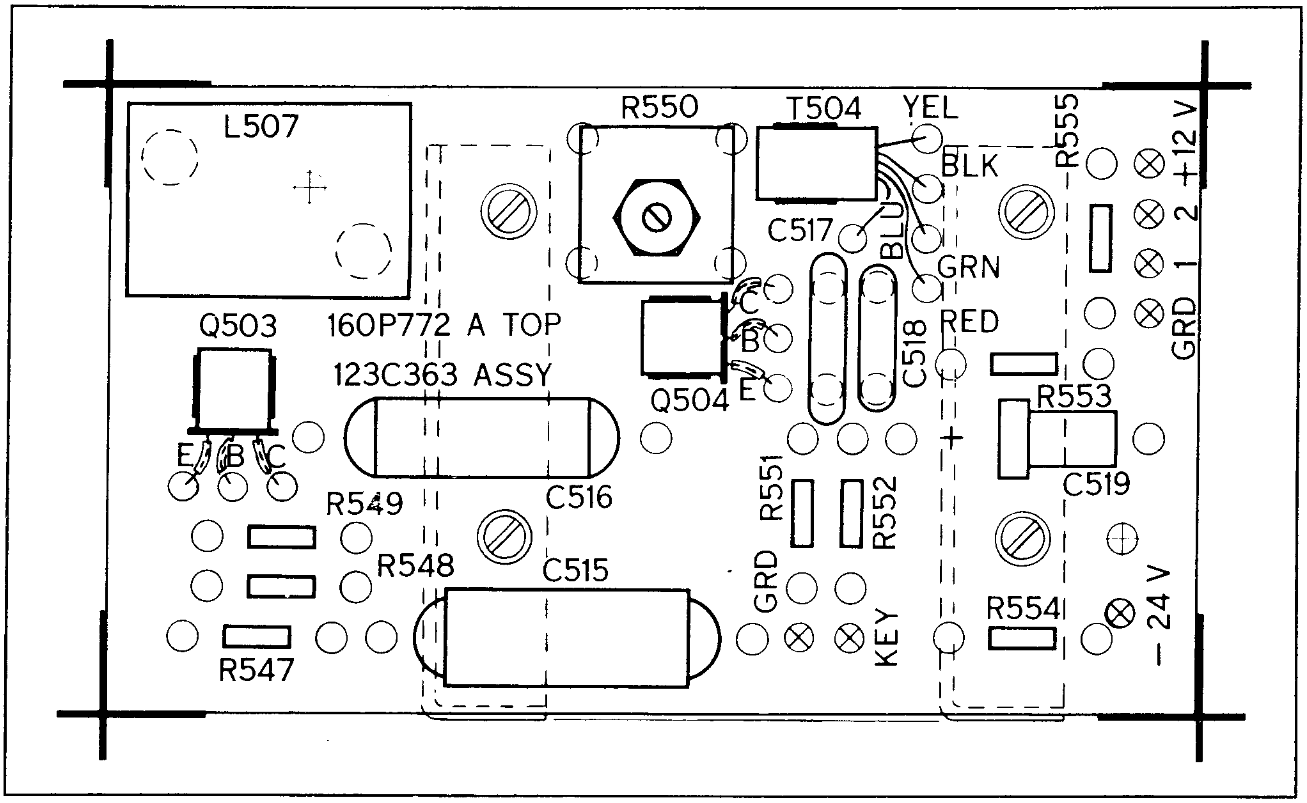


Figure 5-22A. 1000 Cycle Tone Generator, Location of Parts on Printed Board—E525

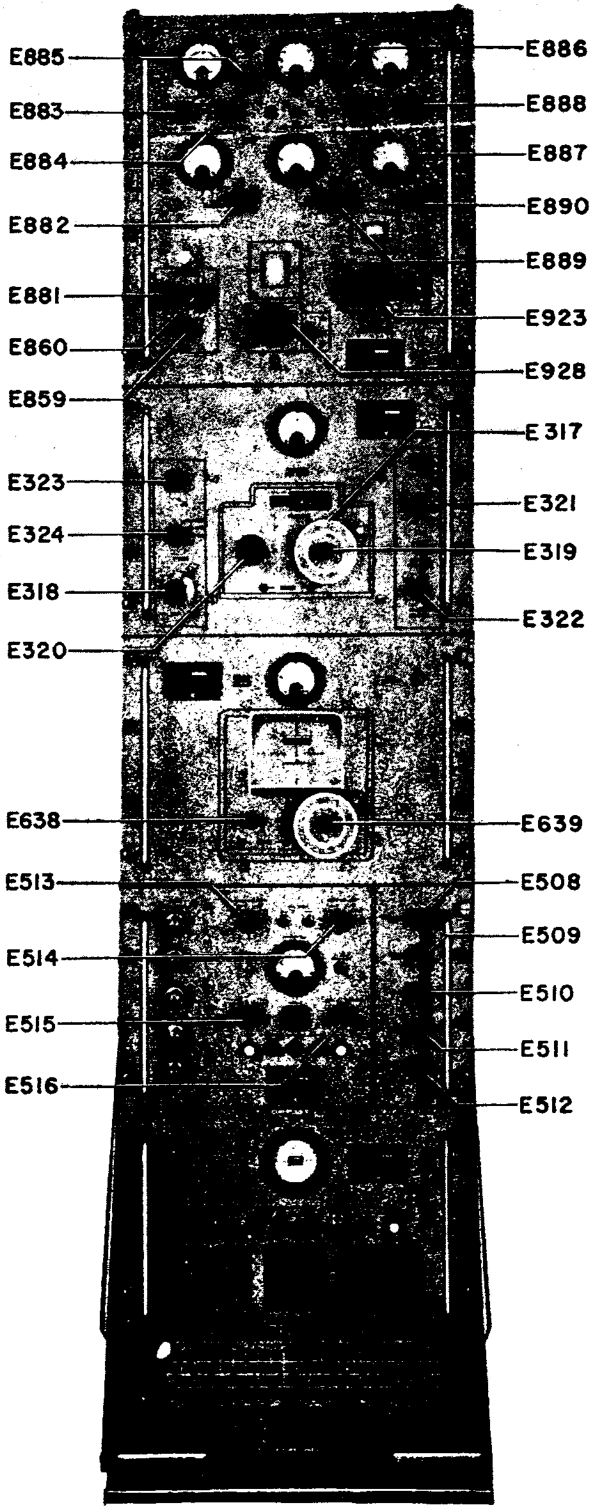


Figure 5-23. Transmitter Group OA-2321/WRT-1, Locati n f Parts n Front Panel

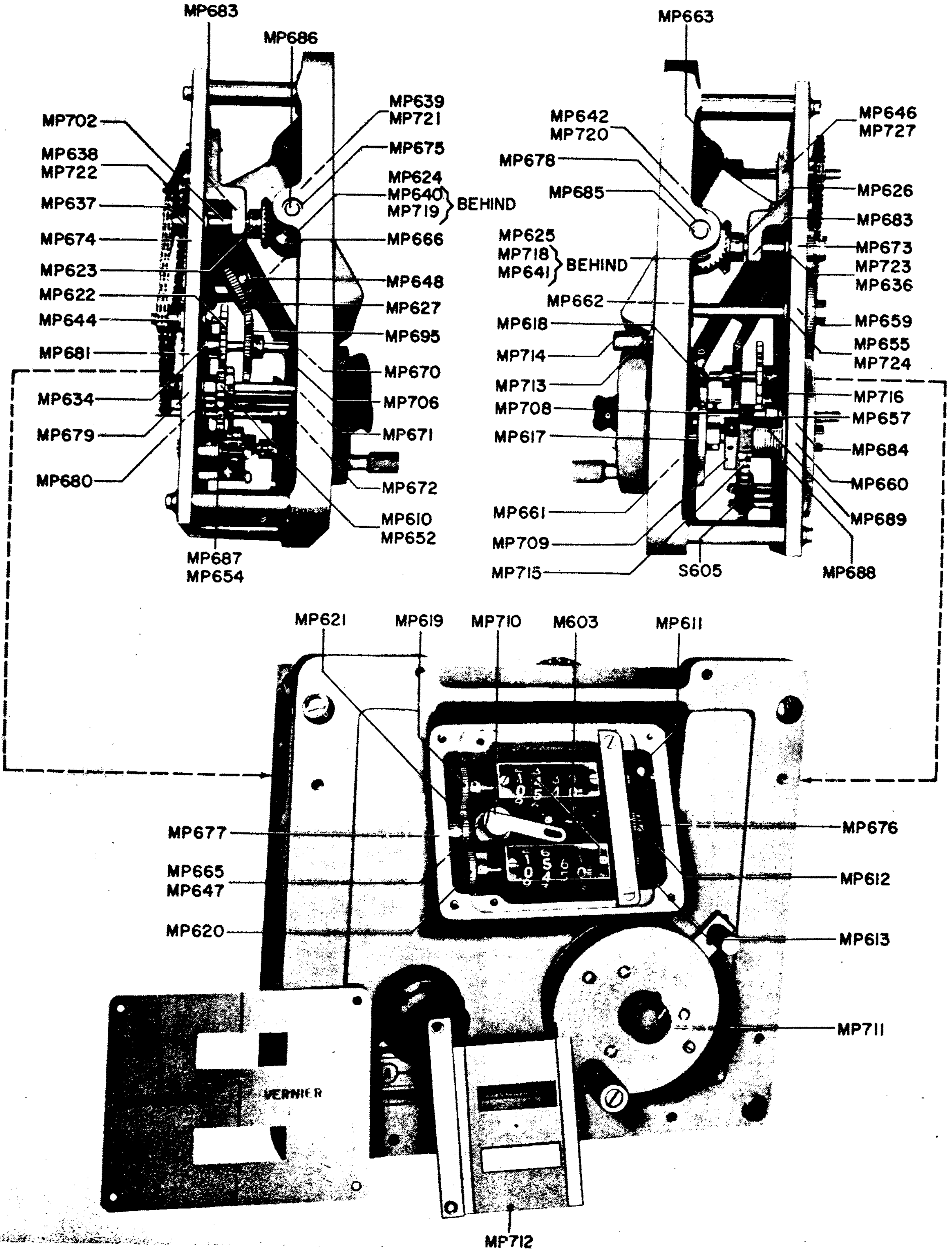


Figure 5-24. Electrical Frequency Control C-2861/WRT-1, Location of Parts in Gear B x

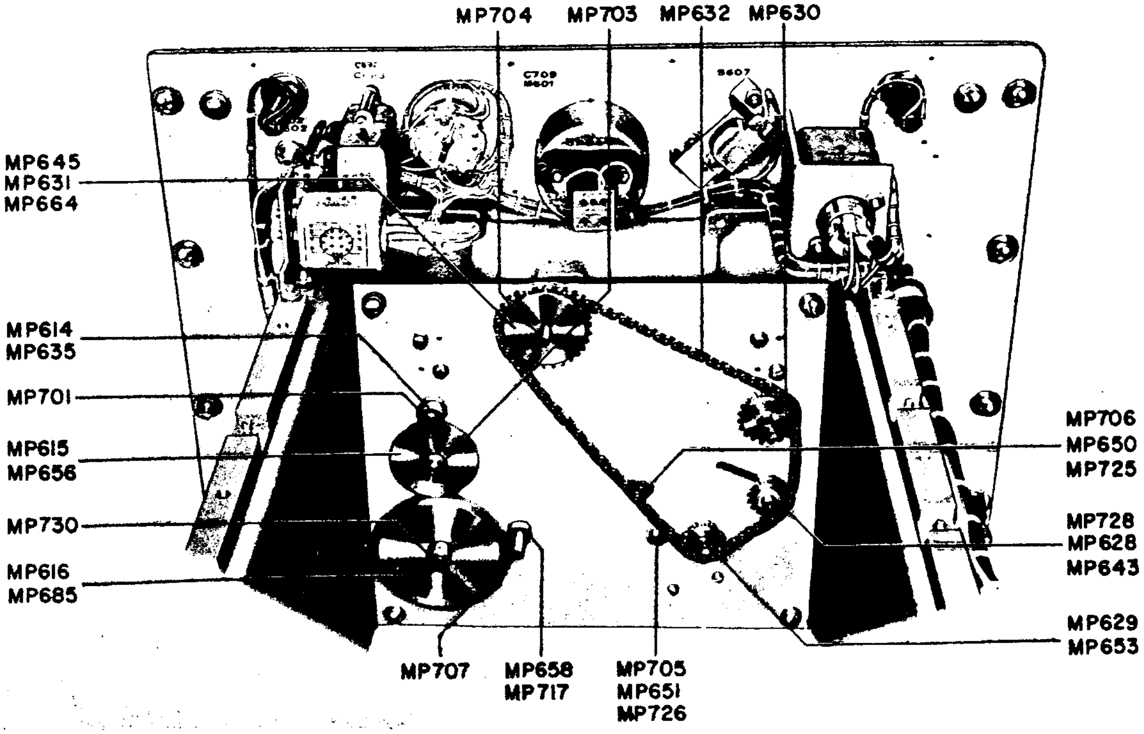


Figure 5-25. Electrical Frequency Control C-2861/WRT-1, Location of Parts on Back Plate of Gear Box

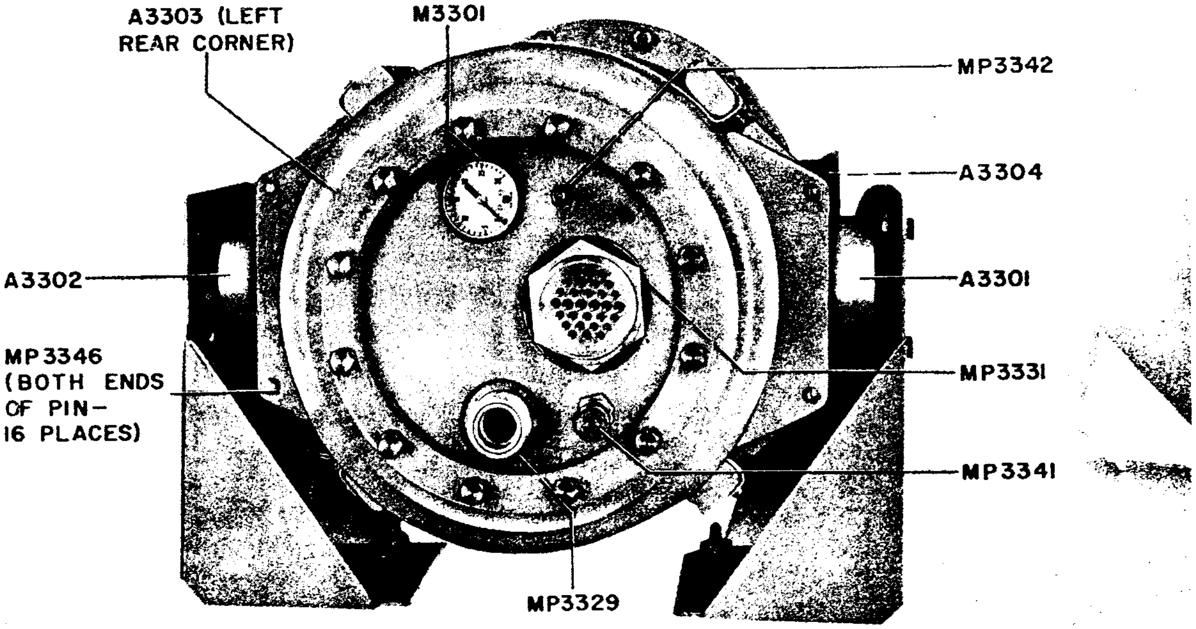


Figure 5-26. Radio Frequency Tuner TN-345/WRT-1, Location of External Mechanical Parts

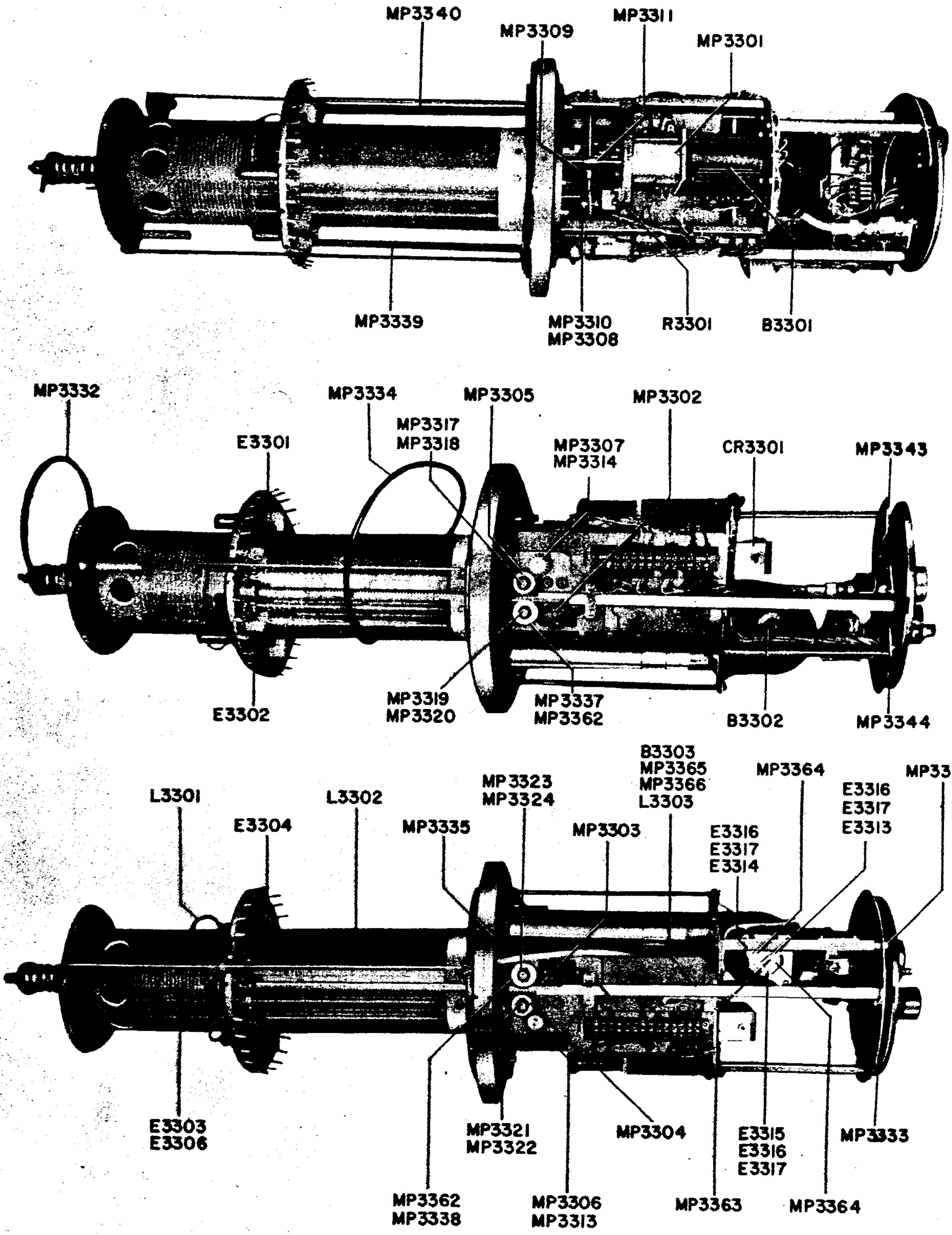


Figure 5-27. Radi Frequency Tuner TN-345/WRT-1, Location of Internal Mechanical Parts

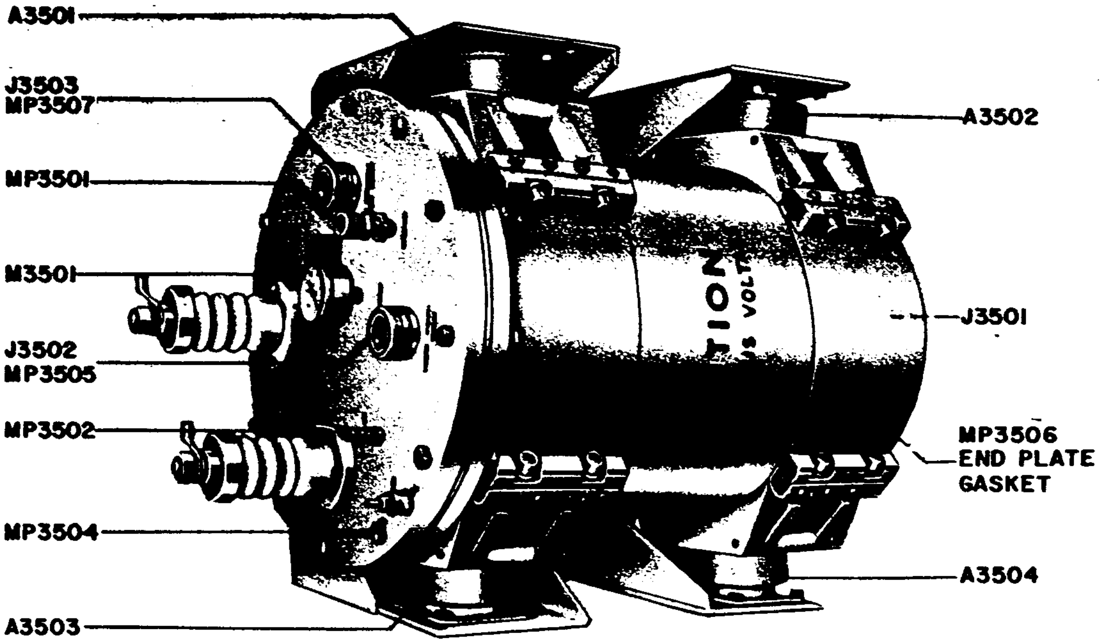


Figure 5-28. Antenna Coupler CU-760/WRT-1, Location of Mechanical Parts

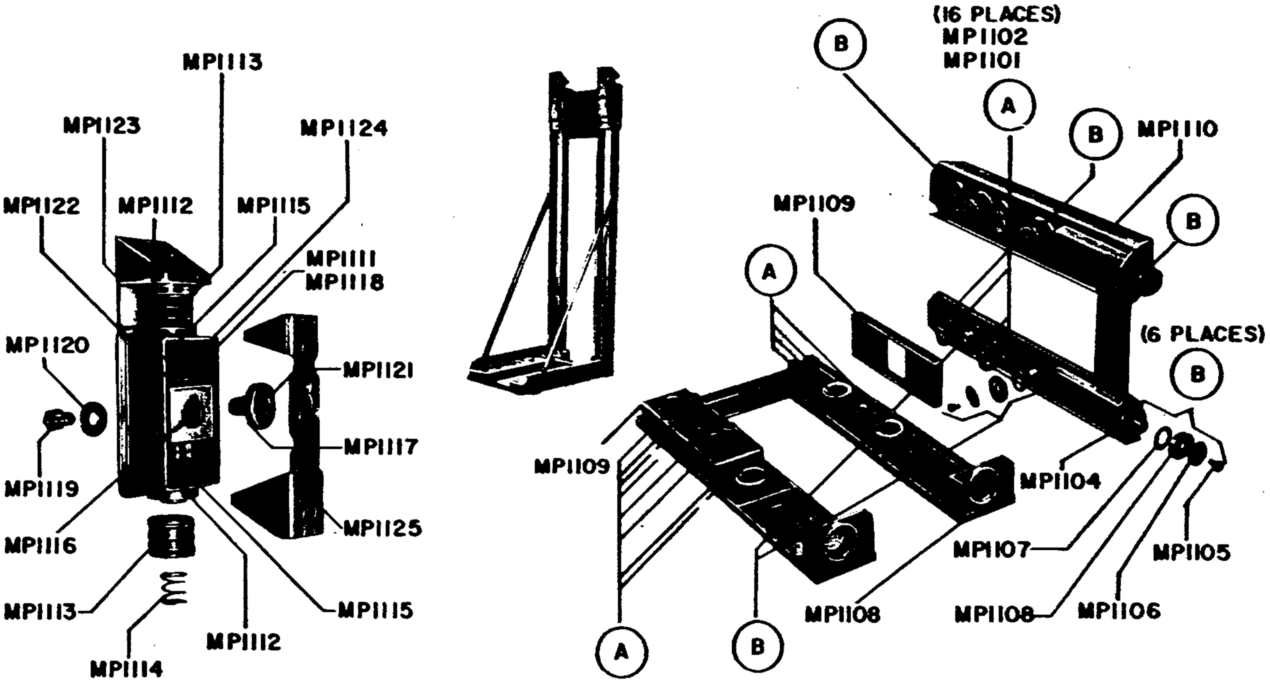


Figure 5-29. Mounting MT-2170/WRT, Location of Parts

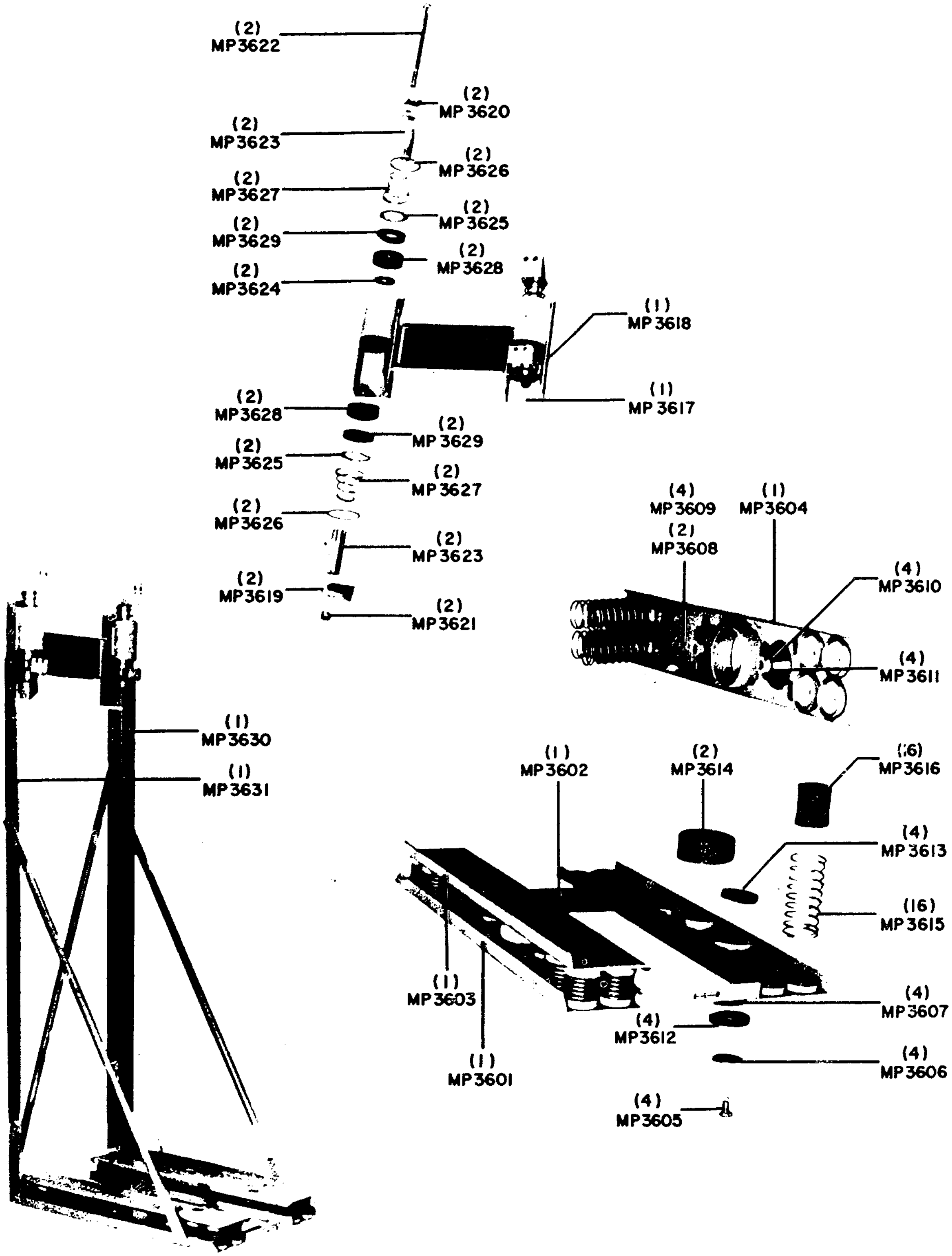


Figure 5-29A. Mounting MT-2170A/WRT, Location of Parts

SECTION 6

REPAIR

6-1. FAILURE REPORT.

"Report each failure of the equipment, whether caused by a defective part, wear, improper operation, or an external cause. Use ELECTRONIC FAILURE REPORT form DD787. Each pad of the forms includes full instructions for filling out the forms and forwarding them to the Bureau of Ships. However, the importance of providing complete information cannot be emphasized too much. Be sure that you include the model designation and serial number of the equipment (from the equipment identification plate), the type number and serial number of the major unit (from the major unit identification plate), and the type number and reference designation of the particular defective part (from the technical manual). Describe the cause of the failure completely, continuing on the back of the form if necessary. Do not substitute brevity for clarity. And remember—there are two sides to the failure report—

YOUR SIDE	BUREAU SIDE
1. Every FAILURE REPORT is a boost for you:	1. The Bureau of Ships uses the information to:
2. It helps make your job easier.	2. Improve future equipment.
3. In insures available replacements.	3. Order replacements for stock.
4. It gives you a chance to pass your knowledge to every man on the team.	4. Prepare field changes.
	5. Publish maintenance data.

Always keep a supply of failure report forms on board. You can get them from the nearest Forms and Publications Supply Distribution Point.

6-2. TUNING AND ADJUSTMENT.

a. GENERAL.—The following paragraphs give a step by step procedure for making the adjustments which will produce optimum performance of Radio Transmitting Set AN/WRT-1. Included are the necessary preliminary control settings, the test set-up, and the instructions for performing the adjustments. The location of electrical adjustments are shown in appropriate figures, which have been located as close to the procedure as possible. An efficient method for checking Radio Transmitting Set AN/WRT-1 and for performing routine preventive maintenance is given in the Maintenance Standards Book for Radio Transmitting Set AN/WRT-1, NAVSHIPS 93483.42. This book contains a series of maintenance standard test procedures which provide indications representing top performance of the equipment, and a series of maintenance check-off procedures which, when performed as directed, will detect impending failures before they occur. Reference to the Maintenance Standards Book for Radio Transmitting Set AN/WRT-1, NAVSHIPS 93483.42, will be helpful in the maintenance of this equipment.

WARNING

BEFORE MEASURING VOLTAGES GREATER THAN 300 VOLTS WITH EXTERNAL TEST EQUIPMENT READ PARAGRAPH 5-1*d* IN SECTION 5 OF THIS MANUAL.

b. POWER SUPPLY PP-2222/WRT.—The only adjustment in Power Supply PP-2222/WRT is HV RECT OVERLOAD ADJ potentiometer R218. The step by step outline of the procedure for adjusting R218 is given below.

(1) TEST EQUIPMENT AND SPECIAL TOOLS.—The test equipment required for making the adjustments in the Power Supply PP-2222/WRT consists of:

Battery BA-206/U (or equivalent)
Potentiometer, 25 watts, 10 ohms
Multimeter AN/PSM-4 series (or equivalent)

(2) HIGH VOLTAGE RECTIFIER OVERLOAD ADJUSTMENT.

Step 1. Make sure that EMERGENCY STOP switch S201 (located on the front panel of Power Supply PP-2222/WRT) is in the OFF position. Release the six fasteners on the front panel and withdraw the chassis until it clicks into its locked position. Remove the four quick disconnect screw-type fasteners holding the front top cover plate. Remove the six quick-disconnect screw-type fasteners holding the rear top cover plate and then remove the plate. Lift up the hinged front cover plate, exposing the rectifier tubes to view.

Step 2. Connect the positive terminal of Battery BA-206/U (or equivalent) to terminal 19 of TB202. Connect the negative terminal of the battery to the arm of a 10-ohm, 25-watt potentiometer, and then connect one end of the potentiometer to the negative terminal of Multimeter AN/PSM-4 Series(or equivalent). Connect the +10A terminal of the multimeter to the top of insulated standoff E211.

Step 3. Set up another Multimeter AN/PSM-4 Series (or equivalent) on its 1000-ohm range, and connect the leads between terminals 10 and 19 of TB202. Note the resistance indication of the meter.

Step 4. Refer to figure 6-1 and rotate HV RECT. OVERLOAD ADJ. control R218 fully clockwise.

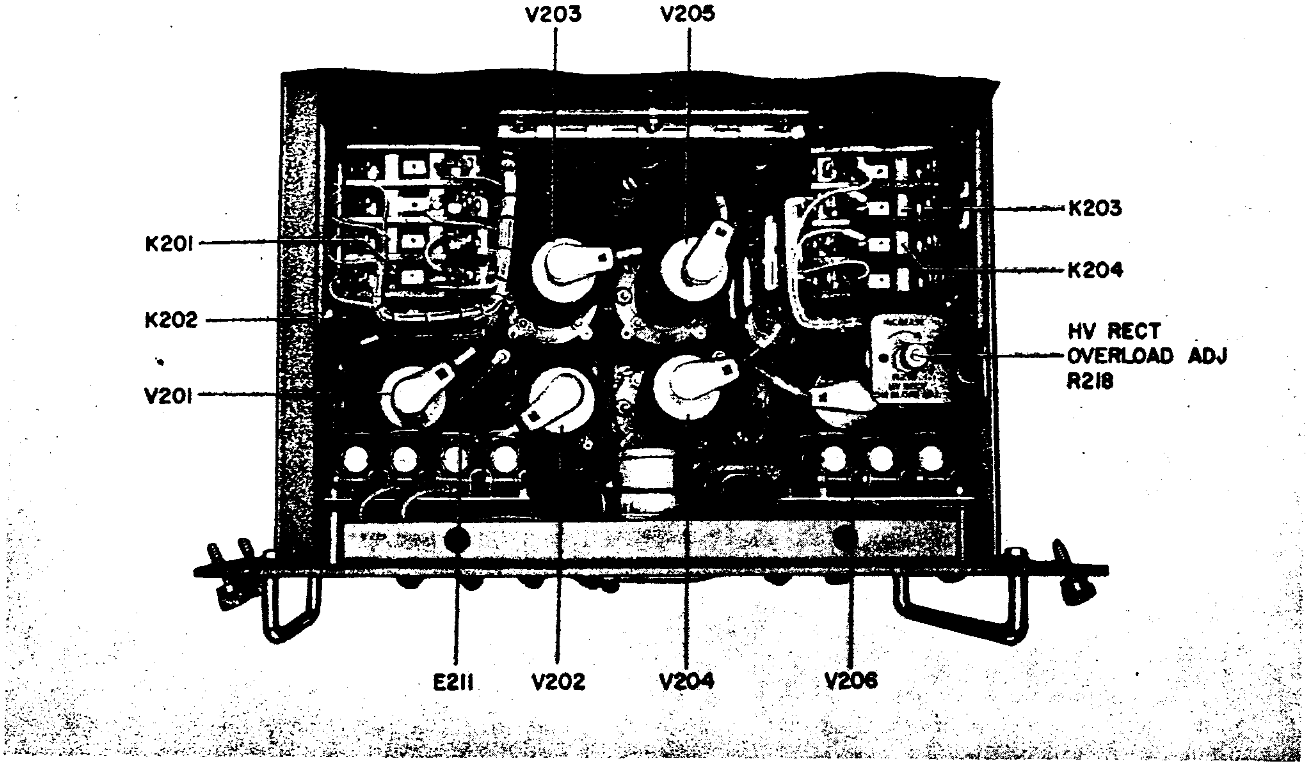


Figure 6-1. Power Supply PP-2222/WRT, Electrical Adjustments and Location of Tubes

Position the test potentiometer until Multimeter AN/PSM-4 Series (or equivalent) indicates 1.0 amperes.

Step 5. Slowly rotate the HV RECT. OVERLOAD ADJ. control R218 clockwise, and at the same time position the test potentiometer so that the current stays at 1.0 ampere, until relay K206 energizes. Multimeter AN/PSM-4 Series (or equivalent) indicates zero ohms when K206 energizes.

Step 6. Rotate the test potentiometer for maximum resistance and note that K206 is deenergized. Gradually decrease the resistance until Multimeter AN/PSM-4 Series (or equivalent) indicates 1.0 ampere. Overload relay K206 should energize at that point. If necessary, readjust R218 slightly.

Step 7. Repeat step 5 until K206 energizes with a current of 1.0 ampere.

Step 8. Remove all test equipment, replace all cover plates, and slide Power Supply PP-2222/WRT back into the cabinet.

c. AMPLIFIER-POWER SUPPLY AM-2198/WRT-1.—The electrical adjustments to be made in the Amplifier-Power Supply AM-2198/WRT-1 are: adjustment of the +350-volt and −350-volt d-c power supply overload relays, adjustment of the bias keying relay, and adjustment of the clipping level and clipped balance in the speech amplifier.

(1) TEST EQUIPMENT AND SPECIAL TOOLS.—The test equipment required for making the adjustments in the Amplifier-Power Supply AM-2198/WRT-1 consists of:

Multimeter AN/USM-34 Series (or equivalent).
Keying Simulator, Boehme Vari-speed Keyer, type 66-M (or equivalent).
Rheostat, 200 watts, ~~3500~~ ohms.
Audio Oscillator Equipment Navy Model LAJ Series (or equivalent).
Oscilloscope TS-239A/UP Series (or equivalent).

(2) CONTROL SETTINGS.—Before proceeding to make the adjustments in the Amplifier-Power Supply AM-2198/WRT-1, set the controls on the front panels of Transmitter Group OA-2321/WRT-1 in the following manner:

CONTROL	LOCATION	SETTING
EMERGENCY STOP	Front panel, Power Supply PP-2222/WRT	ON
PLATE POWER OFF (S504), ON (S503)	Front panel, Amplifier-Power Supply AM-2198/WRT-1	Press OFF

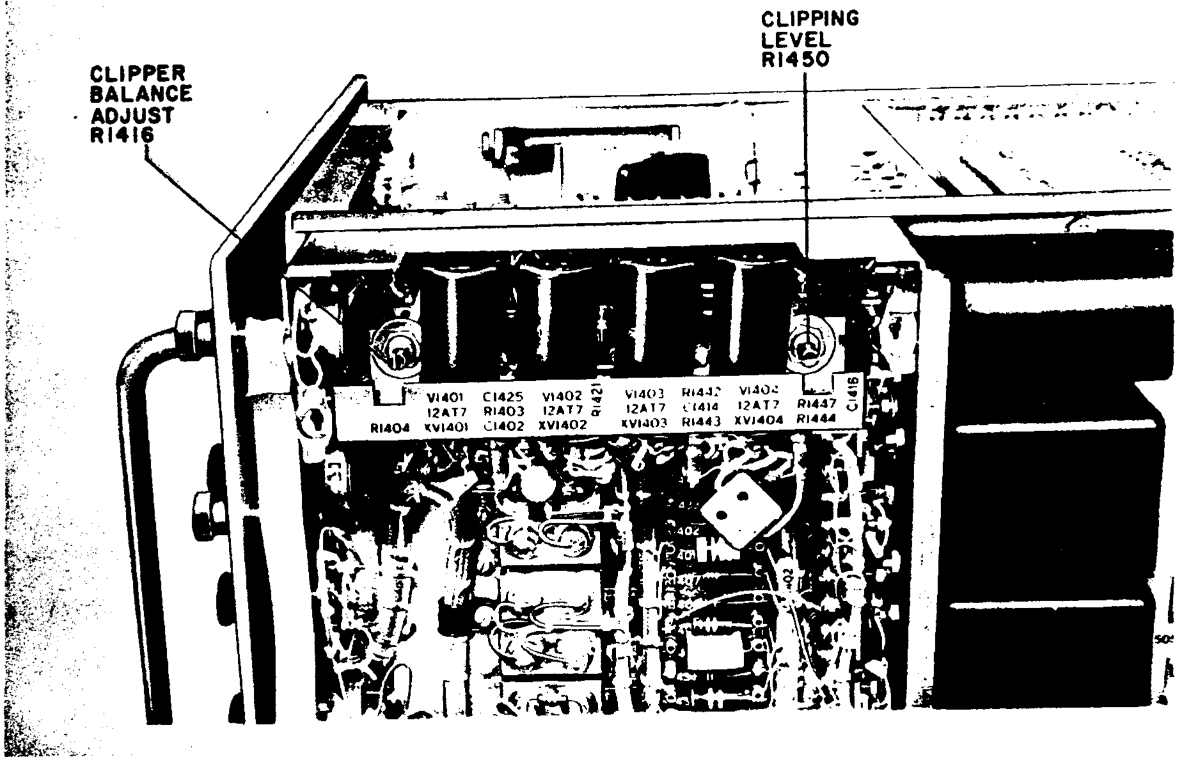


Figure 6-2. Amplifier-Power Supply AM-2198/WRT-1, Righthand Side Electrical Adjustments

CONTROL	LOCATION	SETTING
FILAMENT POWER (S502)	Front panel, Amplifier-Power Supply AM-2198/WRT-1	ON
EMISSION SELECTOR (S508)	Front panel, Amplifier-Power Supply AM-2198/WRT-1	FSK
POWER SELECTOR (S510)	Front panel, Amplifier-Power Supply AM-2198/WRT-1	ADJ
FSK TEST (S308)	Front panel, Radio Frequency Oscillator O-621/WRT-1	SPACE

(3) PRELIMINARY TEST SET-UP.—No special test set-up is needed for making the various electrical adjustments in Amplifier-Power Supply AM-2198/WRT-1. Pull out the unit drawer to its extreme limit of travel. Engage the interlock switch.

(4) +350-VOLT AND −350-VOLT OVERLOAD RELAY ADJUSTMENTS.

Step 1. Locate terminal board TB501A on top of the drawer. Remove the safety cover and then remove all external leads from terminals 8 and 9. Using Multimeter AN/USM-34 Series (or equivalent), set the resistance of the 3500-ohm, 200-watt rheostat at 3200 ohms. Connect the 3200-ohm resistance between terminal 9 of TB501A and ground.

Step 2. Connect Multimeter AN/USM-34 Series (or equivalent) to the terminal of C507 at which the black lead is attached. Set the meter to measure ohms and adjust −350 V OL ADJ potentiometer R504 (figure 6-2) until a reading of approximately 130 ohms is obtained. Remove the meter.

Step 3. Press PLATE POWER ON switch (S504) and adjust K502 ADJUST potentiometer R504 in the counterclockwise direction until L. V. RECT OVLD light (DS505) glows. Make a slight clockwise readjustment of R504. Press the PLATE POWER ON and PLATE POWER OFF switches several times, readjusting R504 if necessary until the overload relay will just remain closed as the plate power is turned on and off.

Step 4. Lock −350 V OL ADJ in the final position. Press PLATE POWER OFF switch (S504). Remove the rheostat from ground and terminal 9 of TB501A.

Step 5. Using Multimeter AN/USM-34 Series (or equivalent), set the resistance of the 3500-ohm, 200-watt rheostat at 650 ohms. Connect the 650-ohm resistance between terminals 8 of TB501A and ground.

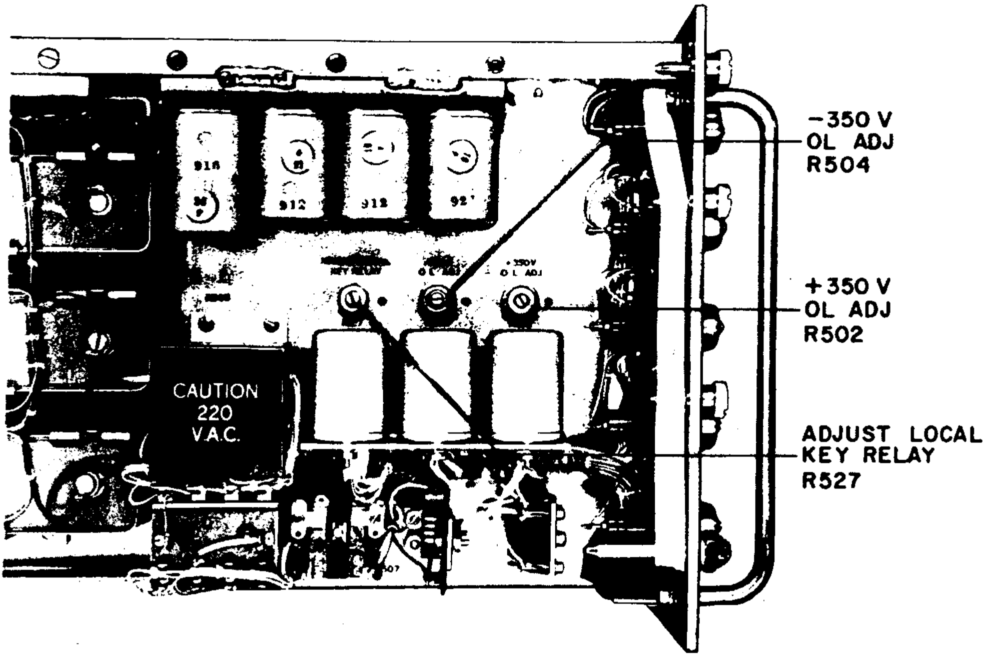


Figure 6-3. Amplifier-Power Supply AM-2198/WRT-1, Lefthand Side Electrical Adjustment

Step 6. Connect Multimeter AN/USM-34 series (or equivalent) to the terminal of C504 at which the black lead is attached. Set the meter to measure ohms and adjust +350 V OL ADJ potentiometer R502 (figure 6-2) until a reading of approximately 6 ohms is obtained. Remove the meter.

Step 7. Press PLATE POWER ON switch (S504) and adjust +350 V OL ADJ potentiometer R502 in the counterclockwise direction until L. V. RECT OVLD light (DS505) glows. Make a slight clockwise adjustment of R502. Press the PLATE POWER OFF and PLATE POWER ON switches several times, readjusting R502 if necessary until the overload relay will just remain closed as the plate power is turned on and off.

Step 8. Lock +350 V OL ADJ in the final position. Press PLATE POWER OFF switch (S504). Remove the rheostat from ground and terminal 8 of TB501A. Replace all external leads to terminals 8 and 9 of TB501A, and then replace the safety cover on the terminal strip.

(5) ADJUSTMENT OF THE BIAS KEYING RELAY.

Step 1. Set EMISSION SELECTOR switch (S508) on the CW position. Connect the vertical input of Oscilloscope TS-239A/UP Series (or equivalent) between terminal 31 of TB501E and ground.

Step 2. Connect the Boehme Vari-speed Keyer, type 66-M (or equivalent), between terminal 42 of TB501E and ground. Select a commutator for a series of dot pulses and adjust the motor speed for a keying rate of approximately 12 words per minute.

Step 3. Press PLATE POWER ON switch (S503). Observe the keying voltage waveform. Refer to figure 6-2 and adjust ADJUST LOCAL KEY RELAY potentiometer R527 until the on and off periods of the waveform are equal.

Step 4. Lock ADJUST LOCAL KEY RELAY potentiometer in the final position. Press PLATE POWER OFF switch (S504). Remove all test equipment.

(6) CLIPPER BALANCE ADJUST AND CLIPPING LEVEL ADJUSTMENT.—CLIPPING LEVEL potentiometer R1450 and CLIPPER BALANCE ADJUST potentiometer R1416 are located in the speech amplifier chassis as shown in figure 6-3. In order to make these adjustments proceed as follows:

Step 1. Pull out the drawer containing Amplifier-Power Supply AM-2198/WRT-1 and locate the speech amplifier chassis mounted on the righthand side of the drawer.

Step 2. Connect Audio Oscillator Equipment Navy Model LAJ Series (or equivalent) between terminals 9 and 10 on TB1401.

Step 3. Set the Audio Oscillator for an output of 1 volt rms at 1000 cps.

Step 4. On the front panel of Amplifier-Power Supply AM-2198/WRT-1 rotate AGC or INPUT LEVEL control to its AGC ON position.

Step 5. Engage the drawer interlock.

Step 6. Place CLIPPING switch S1401 in the IN position, POWER SELECTOR switch S510 in the ADJ position, and press PLATE POWER ON switch.

Step 7. Refer to figure 6-3 and connect Multimeter AM/PSM-4 between ground and the junction of CLIPPER BALANCE ADJUST potentiometer R1416 and resistor R1417. Record the d-c voltage.

Step 8. Connect Multimeter AN/PSM-4 between ground and the arm of CLIPPER BALANCE ADJUST potentiometer R1416. Adjust R1416 until the Multimeter registers half of the total voltage recorded in step 7. Lock R1416 in this position and record the reading.

Step 9. CLIPPING LEVEL potentiometer R1450 is adjusted in accordance with the clipping level desired. The equipment is shipped with a clipping level of 20 db; that is, if the input to the clipper diodes is 10 volts, the output is clipped to one volt. The clipping level is adjustable from 0 to 20 db. If 20 db of clipping is desired, placed the selector switch on Multimeter AN/PSM-4 in its OUTPUT position and measure the a-c voltage at plate 1 of V1402A. Rotate CLIPPING LEVEL potentiometer R1450 until the voltage registered by Multimeter AN/PSM-4 is 7.07 times the a-c voltage at the arm of CLIPPING BALANCE ADJUST potentiometer R1416 that was measured and recorded in step 8. Lock CLIPPING LEVEL potentiometer R1450 in this position. If another clipping level is desired refer to the following table for the proper setting of CLIPPING LEVEL potentiometer R1450:

DESIRED CLIPPING LEVEL (db)	*A-C VOLTAGE AT PLATE 1 OF V1402A	DESIRED CLIPPING LEVEL	*A-C VOLTAGE AT PLATE 1 OF V1402A
0	.707 x V	12.5	2.98 x V
2.5	.944 x V	15.0	3.97 x V
5.0	1.26 x V	17.5	5.30 x V
7.5	1.68 x V	20.0	7.07 x V
10.0	2.24 x V		

*V is the d-c voltage at the arm of CLIPPER BALANCE ADJUST potentiometer R1416 as measured in step 8.

d. ELECTRICAL FREQUENCY CONTROL C-2861/WRT-1.—The electrical adjustments in the circuits of Electrical Frequency Control C-2861/WRT-1 include tuning the tank circuit elements in the interpolation oscillator for proper tracking with the counter reading, tuning the 1 Mc and 1.1 Mc oscillators and 100-kc mixer circuits, and adjusting the sideband balance in the frequency comparator.

(1) TEST EQUIPMENT AND SPECIAL TOOLS.—In order to perform the adjustment in Electrical Frequency Control C-2861/WRT-1, the following test equipment is required: Frequency Meter AN/TSM-9 Series, or equivalent, Carrier Frequency Voltmeter, Sierra Model 101, or equivalent, Multimeter AN/USM-34 Series, or equivalent, Frequency Standard AN/URQ-9 Series, or equivalent, Frequency Meter AN/USM-29 Series, or equivalent, MB T-adapter Automatic Metal Products Corp. Type RF 0735, and MB to BNC adapter Automatic Metal Products Corp. Type RF 0756.

(2) CONTROL SETTINGS.—Before proceeding to perform the adjustments in Electrical Frequency Control C-2861/WRT-1, preset the controls on the front panel of Transmitter Group OA-2321/WRT-1 in the following manner:

CONTROL	LOCATION	SETTING
EMERGENCY STOP	Power Supply PP-2222/WRT	ON
FILAMENT POWER	Amplifier-Power Supply AM-2198/WRT-1	ON
POWER SELECTOR	Amplifier-Power Supply AM-2198/WRT-1	ADJ
LOCAL REMOTE	Amplifier-Power Supply AM-2198/WRT-1	LOCAL
EMISSION SELECTOR	Amplifier-Power Supply AM-2198/WRT-1	CW
OVEN HEAT (S304) (inside, rear right side)	Radio Frequency Oscillator O-621/WRT-1	ON
OVEN (S604) (inside, rear right side)	Electrical Frequency Control C-2861/WRT-1	ON

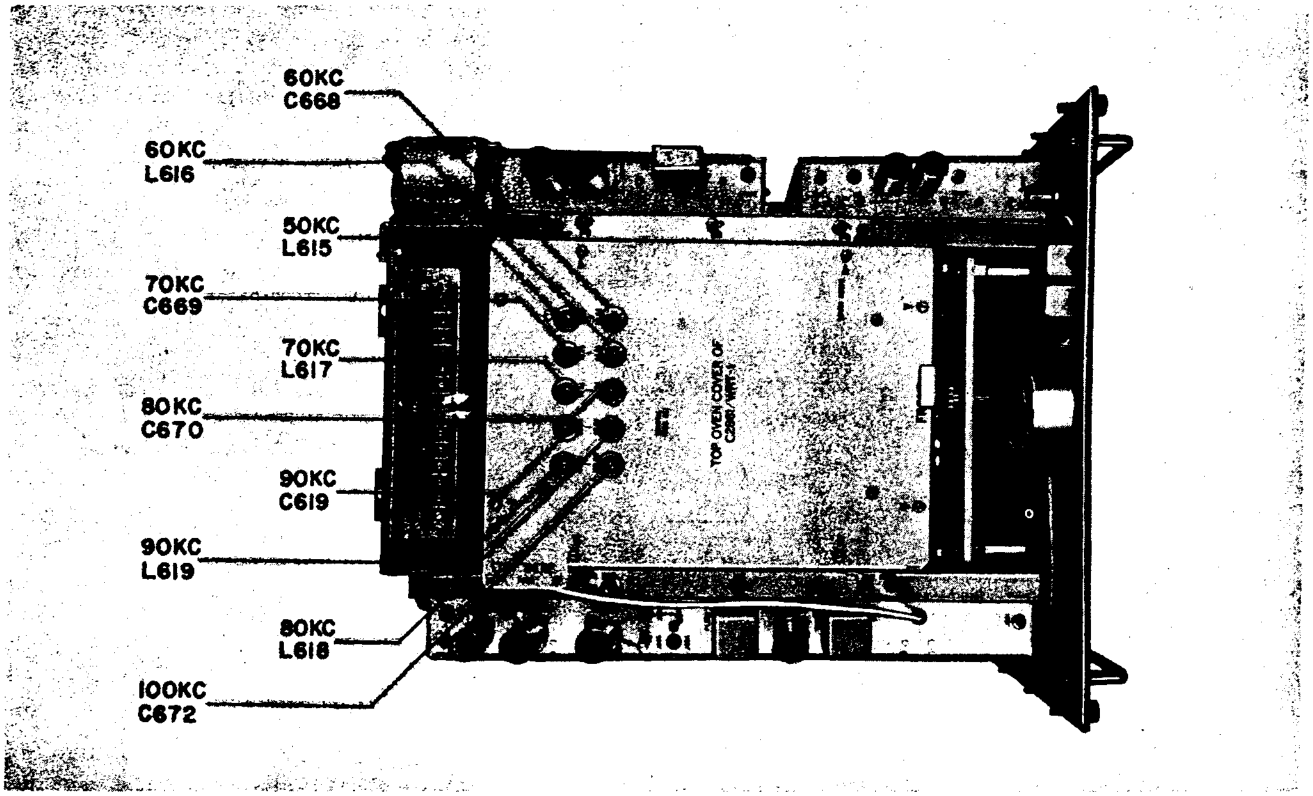


Figure 6-4. Electrical Frequency Control C-2861/WRT-1, Oven Top View, Electrical Adjustments

(3) INTERPOLATION OSCILLATOR ADJUSTMENTS.

(*a*) The adjustments to be made on the interpolation oscillator can be divided into two parts: those required after TUNING Ⓑ capacitor C662 has been replaced and those required to make the interpolation oscillator frequency track with the counter reading. If the main tuning capacitor C662 has been replaced or its position relative to the tuning mechanism is shifted, the entire procedure given in this paragraph must be performed. If only the end points of each band require adjustments in order to make the frequency track with the counter, only the steps in paragraph 6-2*d*(3)(*c*) must be performed.

(*b*) To perform the tracking adjustments of the interpolation oscillator, first make sure that the EMISSION SELECTOR switch S508 on Amplifier-Power Supply AM-2198/WRT-1 is not in the FSK position. Then proceed as follows:

Step 1. Remove the oven covers as directed in paragraph 6-3*f*(2).

Step 2. Using adapters RF 0735 and RF 0756 connect Frequency Meter AN/TSM-9 Series (or equivalent) between J620 and P620. Engage the drawer interlock.

Step 3. Adjust TUNING Ⓐ and TUNING Ⓑ control until the upper counter indicates 70.010 kc. Set the vernier dial to zero. Connect a jumper between terminals 3 and 4 of transformer T609 and note the frequency reading on Frequency Meter AN/TSM-9.

Step 4. Remove the jumper and adjust potentiometer R673 until Frequency Meter AN/TSM-9 indicates the same frequency as in step 3.

Step 5. Repeat steps 3 and 4 until the frequency is the same with terminals 3 and 4 (of transformer T609) shorted and with the jumper removed.

Step 6. With TUNING Ⓐ and TUNING Ⓑ controls set so that the upper counter indicates 70.010 kc., refer to figure 6-4 and adjust 70-kc coil L617 until Frequency Meter AN/TSM-9 indicates 70.010 kc.

Step 7. Rotate TUNING Ⓑ control to 79.990 kc without changing the setting of TUNING Ⓐ control. Note the frequency on Frequency Meter AN/TSM-9. If the frequency is not exactly 79.990 kc., refer to figure 6-4 and adjust 80-kc capacitor C670 until the same error is obtained in the opposite direction (for example if the frequency registered first by AN/TSM-9 was 80.150 kc, adjust C670 until AN/TSM-9 indicates 79.850 kc).

Step 8. Retune TUNING Ⓑ control until the upper counter reads 70.010 kc and adjust 70-kc coil L617 until Frequency Meter AN/TSM-9 indicates 70.010 kc.

Step 9. Repeat steps 7 and 8 until the error is within plus or minus five cycles.

Step 10. Rotate TUNING B control until the upper counter indicates 75.000 kc. If Frequency Meter AN/TSM-9 does not indicate precisely 75.000 kc, adjust padding capacitor C713 until the error is doubled. (For example, if the actual frequency was 75.100 kc., adjust capacitor C713 until Frequency Meter AN/TSM-9 indicates 75.200 kc).

Step 11. Repeat steps 7 through 10 until the end points are within plus or minus one cycle, and the mid point is within plus or minus 20 cycles of the correct frequency.

Step 12. Using a procedure similar to steps 7 through 11 refer to figure 6-4 and adjust the coils and capacitors as indicated in the following table:

BAND	LOW FREQUENCY ADJUSTMENT	HIGH FREQUENCY ADJUSTMENT	PADDER ADJUSTMENT
50-60 kc	50 kc coil L615 for 50.010 kc	60 kc capacitor C668 for 59.990 kc	NONE
60-70 kc	60 kc coil L616 for 60.010 kc	70 kc capacitor C669 for 69.990 kc	C712 for 6500 kc
70-80 kc	70 kc coil L617 for 70.010 kc	80 kc capacitor C670 for 69.990 kc	C713 for 7500 kc
80-90 kc	80 kc coil L618 for 80.010 kc	90 kc capacitor C671 for 69.990 kc	C714 for 8500 kc
90-100 kc	90 kc coil L619 for 90.010 kc	100 kc capacitor C672 for 69.990 kc	C715 for 9500 kc

Step 13. Replace oven covers and perform the steps in the following paragraph.

(*c*) The procedure given in the following steps covers the calibration of the end points of the interpolation oscillator. This procedure must be used whenever the interpolation oscillator has been repaired or when a tracking error is observed at the end points of the bands. Before making these adjustments, the oven heaters should be energized for at least six hours and the filament and plate voltages should be applied for at least one-half hour. After these conditions have been met, proceed as follows:

Step 1. Using adapters RF 0735 and RF 0756 connect Frequency Meter AN/TSM-9 between J620 and P620 and ground.

Step 2. Using a procedure similar to that outlined in steps 7 and 8 of paragraph 6-2*d*(3) (b), set the end points for the five bands as indicated in the following table:

BAND	LOW FREQUENCY ADJUSTMENT	HIGH FREQUENCY ADJUSTMENT
50 to 60 kc	50 kc coil L615 for 50.010 kc	60 kc capacitor C688 for 59.990 kc
60 to 70 kc	60 kc coil L616 for 60.010 kc	70 kc capacitor C669 for 69.990 kc
70 to 80 kc	70 kc coil L617 for 70.010 kc	80 kc capacitor C670 for 79.990 kc
80 to 90 kc	80 kc coil L618 for 80.010 kc	90 kc capacitor C671 for 89.990 kc
90 to 100 kc	90 kc coil L619 for 90.010 kc	100 kc capacitor C672 for 99.990 kc

Step 3. Repeat step 2 until the end points are within plus or minus ten cycles, and the mid point is within plus or minus 20 cycles of the correct frequency.

Step 4. Remove Frequency Meter AN/TSM-9 and the adapters from J620-P620 and reconnect J620 to P620.

(4) FREQUENCY COMPARATOR ADJUSTMENTS.—The only adjustments to be made in the frequency comparator are the adjustment of the SIDEBAND BALANCE ADJUST potentiometer R610 and (in sets serials 1 to 141) the adjustment of C631. Before proceeding to make these adjustments, make sure the controls on the front panel of Transmitter Group OA-2321/WRT-1 have been set as shown in paragraph 6-2d(2) then proceed as follows:

Step 1. Connect Carrier Frequency Voltmeter Sierra Model 101 (or equivalent) to J605.

Step 2. Disconnect P162 from J614, P163 from J615, P611 and the leads from terminals 9 through 12 on TB602A.

Step 3. Press PLATE POWER ON switch S503 on the front panel of Amplifier-Power Supply AM-2198/WRT-1.

Step 4. Refer to section 3 of this manual and set the controls on the front panel of Radio Frequency Oscillator O-621/WRT-1 for an output frequency of 1.475 mc.

Step 5. On Electrical Frequency Control C-2861/WRT-1 set TUNING A control to the 50-60 kc band.

Step 6. Set Carrier Frequency Voltmeter Sierra Model 101 (or equivalent) to 75 kc.

Step 7. For sets serials 1 to 141, refer to figure 6-5 and adjust capacitor C631 for a maximum reading on Carrier Frequency Voltmeter Sierra Model 101 (or equivalent). Note this value, which will be used as a reference level.

Step 7A. For sets serials 142 and up, read Carrier

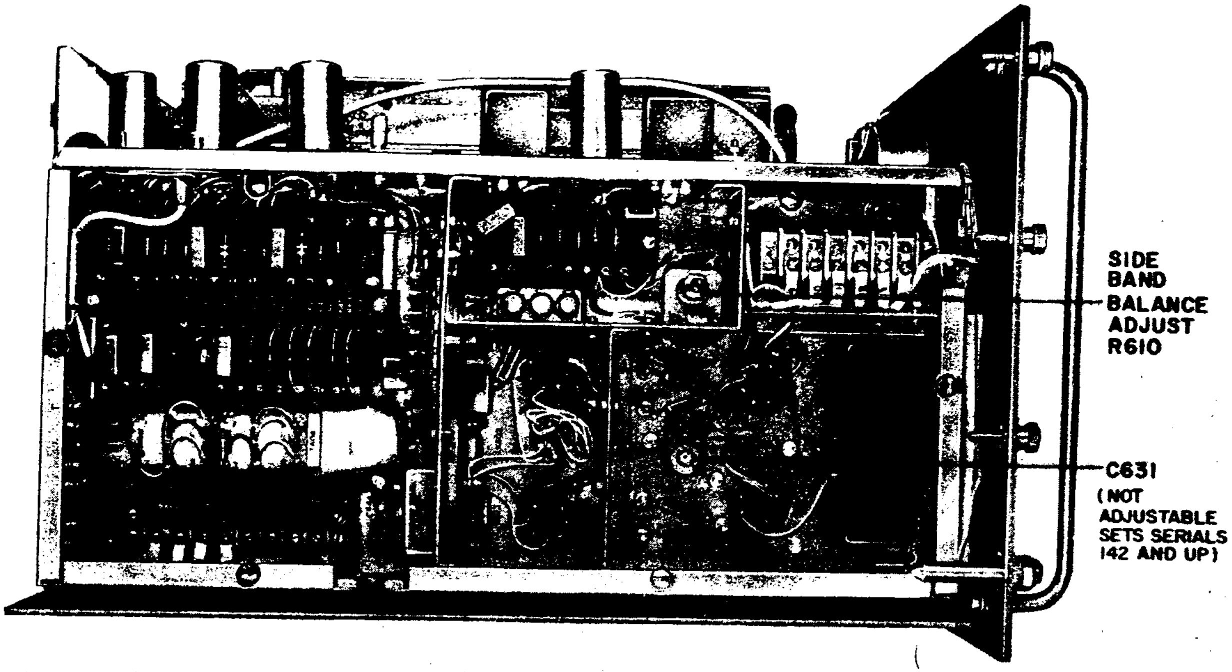


Figure 6-5. Electrical Frequency Control C-2861/WRT-1, Left Side View, Electrical Adjustment

Frequency Voltmeter Sierra Model 101 (or equivalent). This value will be used as a reference level.

Step 8. Set TUNING Ⓐ control to the 40-50 kc band.

Step 9. Refer to figure 6-5, and adjust SIDEBAND BALANCE ADJUST potentiometer R610 for a minimum reading on Carrier Frequency Voltmeter Sierra Model 101. This reading must be at least 20 db below the reference level.

Step 10. Reconnect P162 to J614, P163 to J615, P611 and the leads to terminals 9 through 12 on TB602. Disconnect Carrier Frequency Voltmeter Sierra Model 101 (or equivalent) from J605.

(5) CRYSTAL OSCILLATOR AND MIXER CIRCUITS.

(*a*) The adjustments to be made in the one-megacycle oscillator require the removal of the outer and inner oven covers. The equipment should be energized for at least three hours before making this test. After removing both the outer and inner covers of the oven proceed in the following manner:

Step 1. Refer to figure 6-6 and locate assembly board E661. Note that the symbols of all components are clearly marked on the board next to each component.

Step 2. Connect the one-Mc output of Frequency Standard AN/URQ-9 Series, or equivalent, to the input of Frequency Meter AN/USM-29 Series, or equivalent. Adjust the frequency meter dials for a zero beat. Remove the frequency standard input.

Step 3. Using adapter RF 0756, connect the output of jack J612 to the input of the frequency meter.

Step 4. Adjust capacitor C674 until a zero beat is obtained on the meter of the frequency meter.

Step 5. Remove the connection to jack J612. Connect the 100-kc output of Frequency Standard AN/URQ-9 Series, or equivalent, to the input of Frequency Meter AN/USM-29 Series, or equivalent. Adjust the frequency meter dials for a zero beat. Remove the frequency standard.

Step 6. Using adapters RF 0735 and RF 0756, connect the output of jack J609 to the input of the frequency meter.

Step 7. Adjust capacitor C675 with the aid of the 1.1 Mc XTAL OSC LOG dial until a zero beat is obtained on the meter of the frequency meter.

Step 8. Remove Frequency Meter AN/USM-29. Connect the r-f probe of Multimeter AN/USM-34 to the adapter at J609. Set the multimeter on its 10-volt scale.

Step 9. Adjust capacitors C9 and C10 in FL604 for a maximum reading on Multimeter AN/USM-34. The maximum voltage should ~~be approximately~~ 2.6 ±0.3 volts. The voltage at J609 should be at least 0.5 volts RMS or Greater

Step 10. Disconnect all test equipment and replace the oven covers.

(6) ADJUSTMENT OF CAPACITOR C683.

Step 1. Disengage the drawer interlock and con-

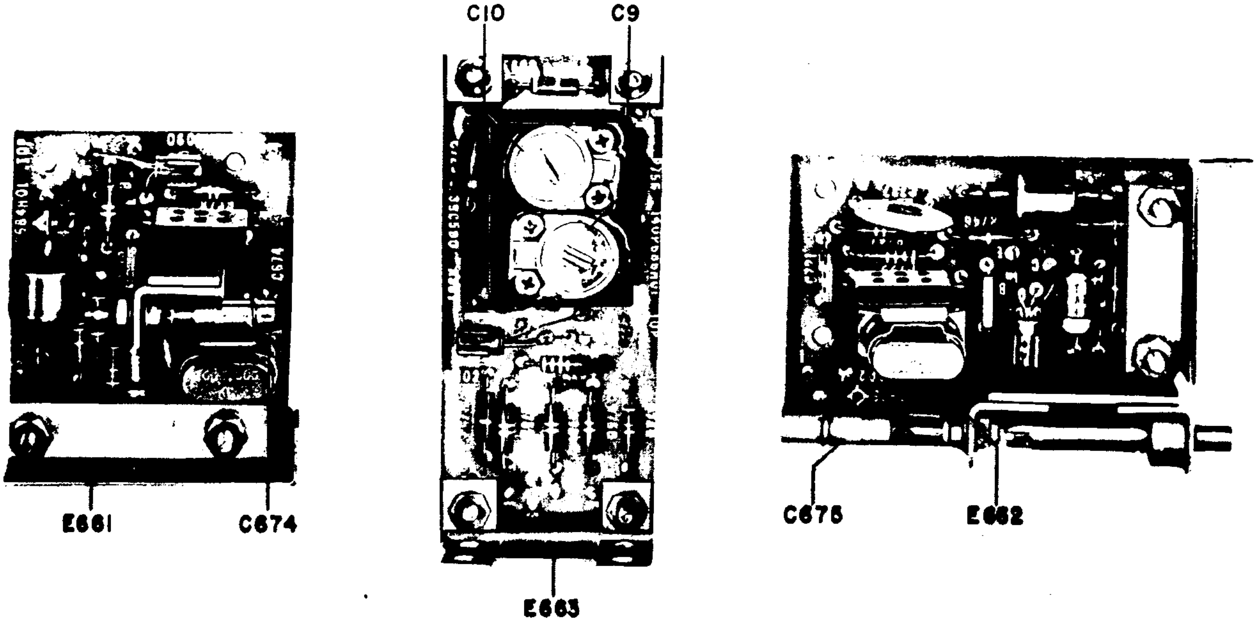


Figure 6-6. Electrical Frequency Control C-2861/WRT-1, Electrical Adjustments on Printed Boards E661, E662, E663

nect Multimeter AN/USM-34 Series (or equivalent) to terminal 1 of T606.

Step 2. Disconnect jack J611 from plug P611 and engage the drawer interlock.

Step 3. Refer to figure 6-7, and adjust capacitor C683 for a maximum indication on Multimeter AN/USM-34 Series (or equivalent).

Step 4. Disconnect Multimeter AN/USM-34 from terminal 1 of T606 and reconnect P611 to J611.

e. RADIO FREQUENCY OSCILLATOR O-621/WRT-1.—The electrical adjustments required in Radio Frequency Oscillator consist of tuning the tank circuit elements in the master oscillator for proper tracking with the counter reading, adjustments in the keyer units, and the adjustment for setting the voltage regulator to an output of +250 volts d-c.

(1) TEST EQUIPMENT AND SPECIAL TOOLS.—The test equipment required for making the adjustments on Radio Frequency Oscillator O-621/WRT-1 consists of:

Multimeter AN/USM-34 Series (or equivalent)
Frequency Meter AN/USM-29 Series
  (or equivalent)
MB-T-Adapter, Automatic Metal Products
  Type RF 0735
MB to BNC Adapter, Automatic Metal
  Products Type RF 0756
Square Wave Generator TS-583/U Series
  (or equivalent)
Oscilloscope TS-239A/UP Series (or equivalent)

(2) CONTROL SETTINGS.—Before proceeding to make the adjustments on the master oscillator, the oven heaters should be energized for at least six hours. This is accomplished by placing EMERGENCY STOP switch S201, on the front panel of Power Supply PP-2222/WRT, and OVEN HEAT switch S304 and OVEN switch S604 (located inside the drawer containing Radio Frequency Oscillator O-621/WRT-1 and Electrical Frequency Control C-2861/WRT-1) in the ON position. Thirty minutes before starting to make the adjustments, place FILAMENT POWER switch S502 in the ON position and press PLATE POWER ON switch S503. Switches S502 and S503 are located on the front panel of Amplifier-Power Supply AM-2198/WRT-1. After these conditions have been met place POWER SELECTOR switch S510 in the ADJ position, LOCAL-REMOTE switch S507 in the LOCAL position and EMISSION SELECTOR switch S508 in the CW position. All these controls are located on Amplifier-Power Supply AM-2198/WRT-1.

(3) MASTER OSCILLATOR ADJUSTMENTS.

(*a*) The required electrical adjustments of the master oscillator consist of making the oscillator frequency track with the calibrated tuning dial located

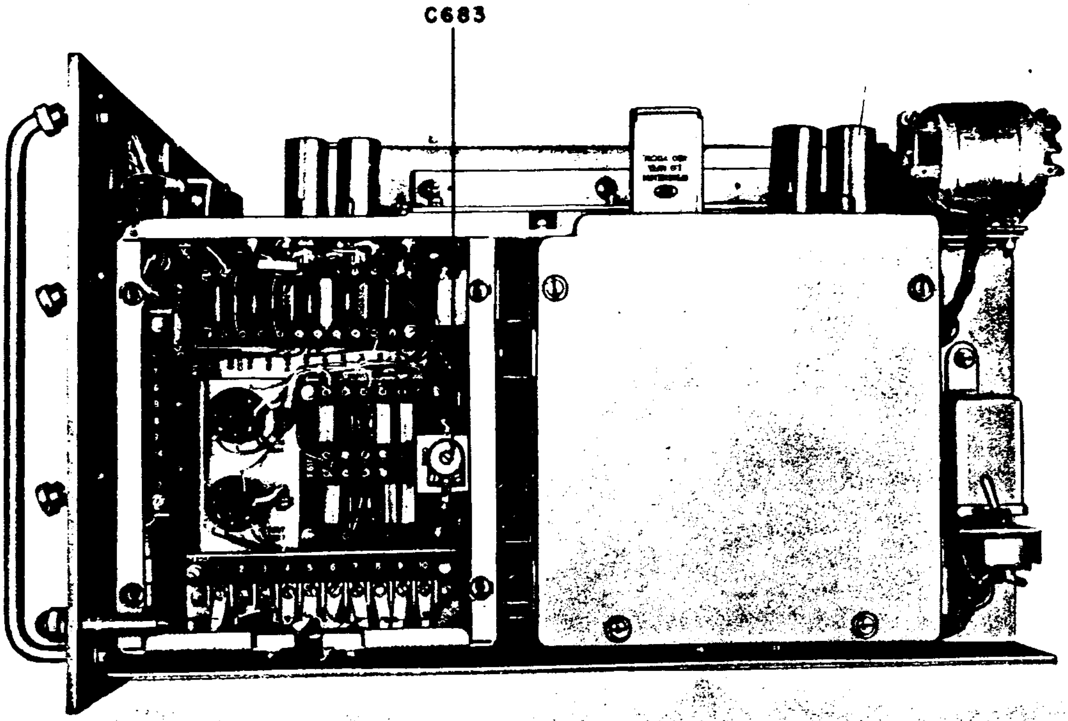


Figure 6-7. Electrical Frequency Control C-2861/WRT-1, Right Side View, Electrical Adjustments

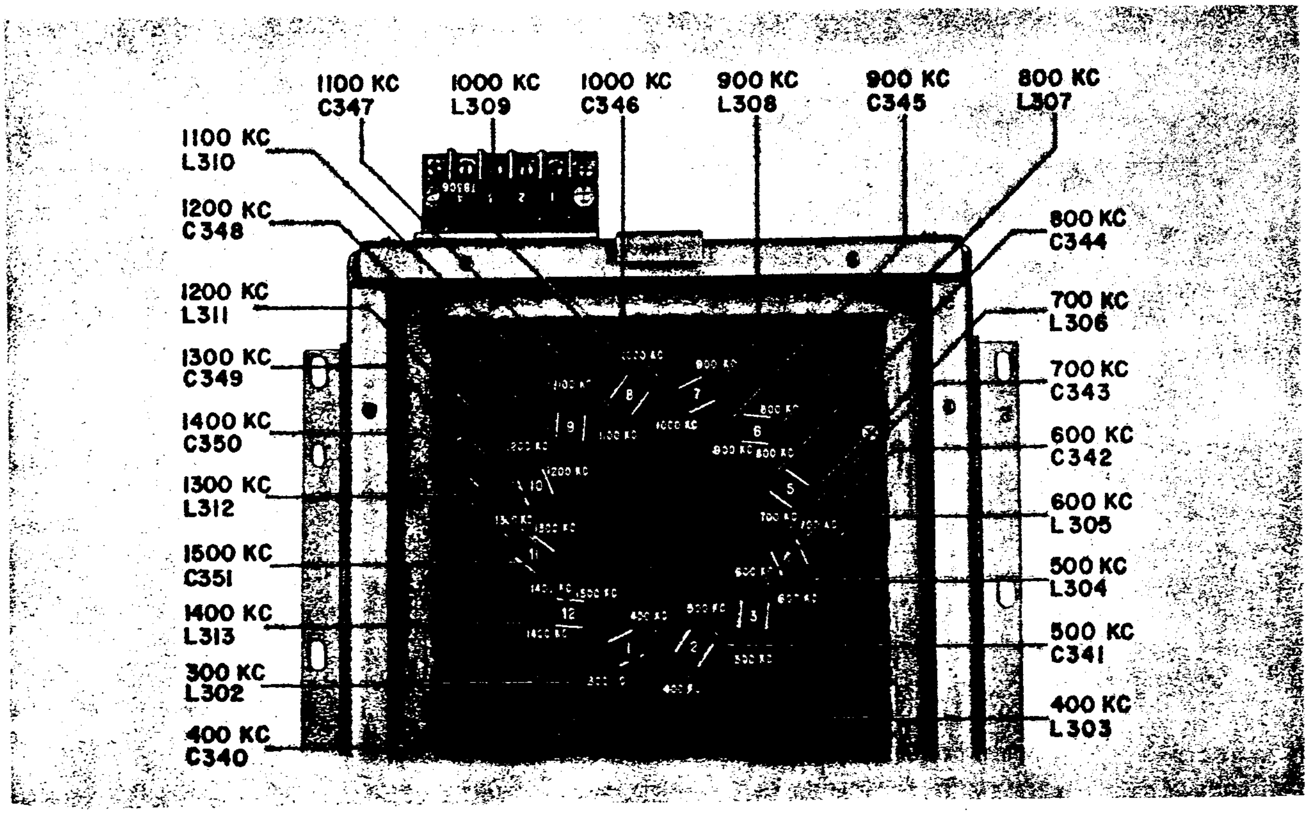


Figure 6-8. Radi Frequency Oscillat r O-621/WRT-1, Oven Top View, Electrical Adjustments

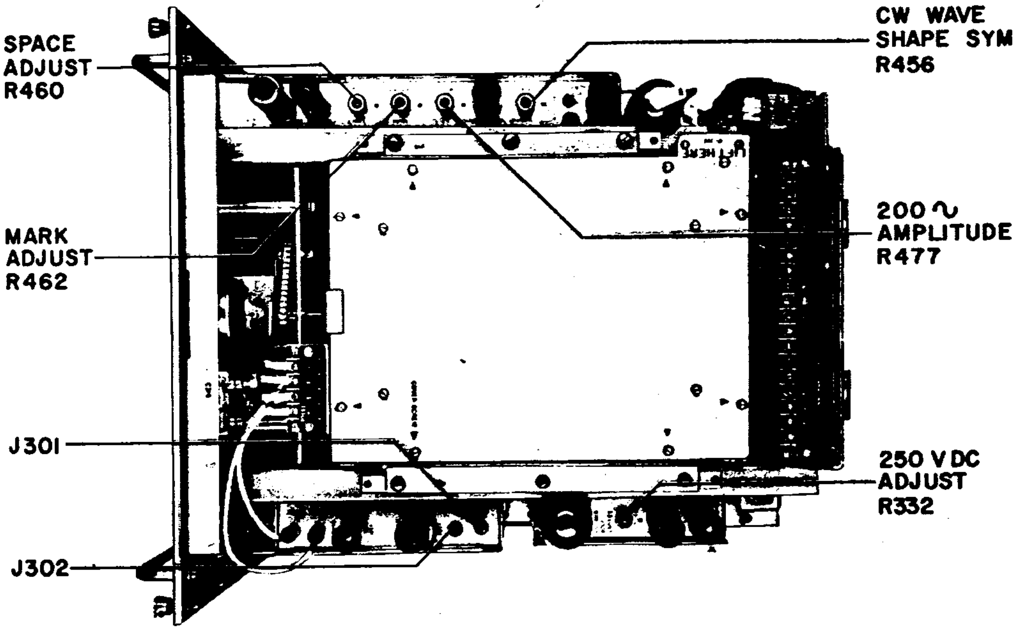


Figure 6-9. Radio Frequency Oscillator O-621/WRT-1, Top View, Electrical Adjustments

on the front panel of Radio Frequency Oscillator O-621/WRT-1. These adjustments must be made whenever a frequency-determining element is replaced including the main tuning capacitor C319. When making the master oscillator tracking adjustments refer to figure 6-8 and proceed as follows:

Step 1. Pull out the drawer containing Radio Frequency Oscillator O-621/WRT-1 to its extreme limit of travel. Engage the interlock switch and remove the top cover of the oven. Refer to figure 6-8 and note that all tracking adjustments can be reached through the special holes provided in the inner oven cover.

Step 2. Refer to figure 6-9 and connect Frequency Meter AN/TSM-9 to J301.

Step 3. Set TUNING Ⓒ control to 03.

Step 4. Set TUNING Ⓓ control to 000.

Step 5. On top of the oven adjust L302 (300 kc on the 300-400 kc band) until Frequency Meter AN/TSM-9 reads 300,000 cps ± 100 cps.

Step 6. Set TUNING Ⓓ control to 999.

Step 7. Adjust C340 (400 kc on the 300-400 kc band) until Frequency Meter AN/TSM-9 reads 399,900 cps ± 100 cps.

Step 8. Repeat steps 3 through 7 until both ends of the band are at the designated frequencies ± 100 cps.

Step 9. Using the procedure outlined in steps 3 through 8 set the remaining bands listed in the following table:

Note

Replace the outer cover of the oven, after each adjustment, so that the oven temperature can be maintained at a constant temperature.

BAND RANGE	LOW FREQUENCY ADJUSTMENT	HIGH FREQUENCY ADJUSTMENT
300- 400 kc	300 kc coil L302	400 kc capacitor C340
400- 500 kc	400 kc coil L303	500 kc capacitor C341
500- 600 kc	500 kc coil L304	600 kc capacitor C342
600- 700 kc	600 kc coil L305	700 kc capacitor C343
700- 800 kc	700 kc coil L306	800 kc capacitor C344

BAND RANGE	LOW FREQUENCY ADJUSTMENT	HIGH FREQUENCY ADJUSTMENT
800- 900 kc	800 kc coil L307	900 kc capacitor C345
900-1000 kc	900 kc coil L308	1000 kc capacitor C346
1000-1100 kc	1000 kc coil L309	1100 kc capacitor C347
1100-1200 kc	1100 kc coil L310	1200 kc capacitor C348
1200-1300 kc	1200 kc coil L311	1300 kc capacitor C349
1300-1400 kc	1300 kc coil L312	1400 kc capacitor C350
1400-1500 kc	1400 kc coil L313	1500 kc capacitor C351

Step 10. Replace the cover on the oven and disconnect all test equipment.

(4) KEYER ADJUSTMENTS.—The following six potentiometers must be adjusted in the keyer chassis: 200 ∼ AMPLITUDE potentiometer R477; CW WAVE SHAPE SYM potentiometer R456; FSK WAVE SHAPING potentiometer R483; SPACE ADJUST potentiometer R460; MARK ADJUST potentiometer R462; and KEYING BIAS ADJUST potentiometer R489. In order to make these adjustments set the controls on the front panel of Radio Transmitting Set AN/WRT-1 as indicated in paragraph 6-2*e*(2) and proceed as follows:

Step 1. Place PHASE MODULATION switch S451 in the OFF position.

Step 2. Set SHIFT Ⓔ control R461 to 1000 cps (fully clockwise).

Step 3. Connect Multimeter AN/USM-34 Series (or equivalent) between ground and terminal 14 on TB450 and set it on its 200-volt d-c scale.

Step 4. Place EMISSION SELECTOR switch S508 in the FSK position, and FSK TEST switch S308 in the MARK position.

Step 5. Refer to figure 6-9 and adjust MARK Control R462 for a reading of +125 volts d-c on the multimeter.

Step 6. Place FSK TEST switch S308 in the SPACE position.

Step 7. Refer to figure 6-9 and adjust SPACE ADJUST control R460 for a reading of +165 volts d-c on the multimeter and then remove the multimeter.

Step 8. Remove the cover from the left side of the drawer and connect Square Wave Generator TS-583/U Series (or equivalent) between ground and terminal 1 on TB450. Place the sync switch of the square wave generator on EXT. Connect the output of Audio Oscillator Equipment, Navy Model LAJ-2 Series, or equivalent, to the input of the square wave generator. Set the output frequency of the audio oscillator at 30 cycles.

Step 9. Connect the vertical input of Oscilloscope TS-239A/UP Series (or equivalent) across terminals 13 and 14 on TB450.

Note

These terminals are approximately 150 volts above chassis potential. Do not use oscilloscope with one terminal grounded for this test.

Step 10. Place WAVE SHAPING switch S450 in the FSK position.

Step 11. Refer to figure 6-10 and adjust FSK WAVE SHAPING control R483 until the positive half-cycle of the output is equal in duration to the negative half-cycle.

Note

A slight readjustment of SPACE ADJUST potentiometer R460 and/or of MARK ADJUST potentiometer R462 may be necessary in this step. A minimum peak to peak voltage of 25 volts with equal duration (16 ms each for 30 cps) must be obtained.

Step 12. Place PHASE MODULATION switch S451 in the ON position.

Step 13. Place FSK TEST switch S308 in the SPACE position.

Step 14. Refer to figure 6-9 and adjust 200 ∼ AMPLITUDE potentiometer R477 until the amplitude of the sine wave on Oscilloscope TS-239A/UP is a minimum of 3 volts.

Step 15. Connect a jumper between terminals 8 and 12 on TB450.

Step 16. Place FSK TEST switch S308 in the MARK postion.

Step 17. Connect Multimeter AN/USM-34 between ground and terminal 2 on TB450 and set it on its 10-volt d-c scale.

Step 18. Refer to figure 6-10 and adjust KEYING BIAS ADJUST potentiometer R489 until the output goes slightly positive

Note

Crystal diode CR452 clamps the output voltage near zero volts d-c. Adjust potentiometer R489 from a negative voltage to the point where positive clamping action is obtained.

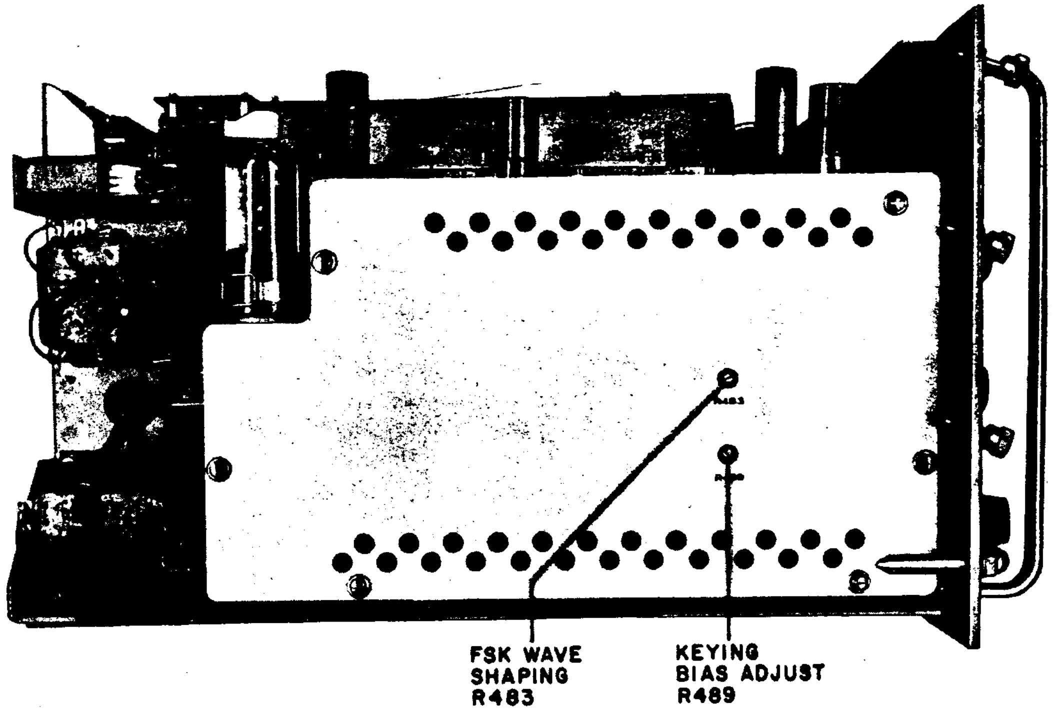


Figure 6-10. Radio Frequency Oscillator O-621/WRT-1, Lefthand Side, Electrical Adjustm nts

Step 19. Place FSK TEST switch S308 in the SPACE position and disconnect multimeter from TB450-2.

Step 20. Connect Square Wave Generator TS-583/U Series or equivalent between ground and terminal 1 on TB450 and Oscilloscope TS-239A/UP Series between ground and terminal 2 on TB450. Use Audio Oscillator Equipment Navy Model LAJ-2 Series, or equivalent, to sync the square wave generator output at 30 cycles (see step 8).

Step 21. Adjust CW WAVE SHAPE SYM potentiometer R456 until the positive half cycle appearing on the oscilloscope is equal in duration to the negative half cycle.

Step 22. Repeat steps 16, 17 and 18. Disconnect all test equipment and replace left side cover.

(5) +250 VDC REGULATOR ADJUSTMENT. —There is only one adjustment to be made in the +250 VDC regulator chassis. To make this adjustment place EMERGENCY STOP switch S201 and FILAMENT POWER switch S502 in the ON position and proceed as follows:

Step 1. Connect Multimeter AN/PSM-4 Series (or equivalent) between terminals 6 and 4 of TB302 and set it on its 400-volt d-c range.

Step 2. Press PLATE POWER ON switch S503.

Step 3. Refer to figure 6-9 and unlock the 250 VDC ADJUST potentiometer R332. Adjust R332 until Multimeter AN/PSM-4 indicates exactly 250 volts. Lock the potentiometer.

Step 4. Press PLATE POWER OFF switch S503. Remove Multimeter AN/PSM-4 and slide Radio Frequency Oscillator O-621/WRT-1 back into the cabinet.

f. RADIO FREQUENCY AMPLIFIER AM-2197/WRT-1.—The electrical adjustments in Radio Frequency Amplifier AM-2197/WRT-1 consist of setting the P.A. overload current, calibrating the low level modulator and r-f monitor circuit, and adjusting the tuning elements of the P.A. for proper tracking with the dial readings.

(1) TEST EQUIPMENT AND SPECIAL TOOLS. —The test equipment required for making the adjustments in Radio Frequency Amplifier AM-2197/WRT-1 consist of:

Multimeter AN/USM-34 Series (or equivalent).
Oscilloscope TS-239A/UP Series (or equivalent).
Electrical Dummy Load DA-91/U Series.
T-adapter, UG-569/U.
2 connectors, UG-573/U.
8 feet RG-8/U cable.
Capacitance and Impedance Bridge Navy Type 60007 (or equivalent).
Four—470 $\mu\mu$f capacitors.
Two—500 $\mu\mu$f capacitors.

WARNING

PLATE VOLTAGE AS HIGH AS 1250 VOLTS DC IS PRESENT IN RADIO FREQUENCY AMPLIFIER AM-2197/WRT-1. EXTREME CAUTION SHOULD BE EXERCISED WHEN WORKING WITH THIS UNIT.

(2) CONTROL SETTINGS.—Before proceeding to make the adjustments in Radio Frequency Amplifier AM-2197/WRT-1, set the controls on the front panels of Transmitter Group OA-2321/WRT-2, in the following manner:

CONTROL	LOCATION	SETTING
EMERGENCY STOP	Power Supply PP-2222/WRT	ON
EMISSION SELECTOR (S508)	Amplifier-Power Supply AM-2198/WRT-1	CW
FILAMENT POWER (S502)	Amplifier-Power Supply AM-2198/WRT-1	ON
LOCAL-REMOTE (S507)	Amplifier-Power Supply AM-2198/WRT-1	LOCAL
PLATE POWER ON (S503)	Amplifier-Power Supply AM-2198/WRT-1	PRESS
POWER SELECTOR (S510)	Amplifier-Power Supply AM-2198/WRT-1	ADJ
CARRIER TEST KEY (S811)	Radio Frequency Amplifier AM-2197/WRT-1	OFF
OUTPUT METER (S814)	Radio Frequency Amplifier AM-2197/WRT-1	R-F OUTPUT
P. A. CATHODE CURRENTS (S809)	Radio Frequency Amplifier AM-2197/WRT-1	TOTAL
TEST AMMETER (S808)	Radio Frequency Amplifier AM-2197/WRT-1	TOTAL P. A. GRIDS (70MA)
FSK TEST (S308)	Radio Frequency Oscillator O-621/WRT-1	LINE

(3) PRELIMINARY TEST SET-UP.—Pull out the unit drawer containing Radio Frequency Amplifier AM-2197/WRT-1. Refer to figure 6-11, and locate r-f output jack J802. Remove P182 and connect Electrical Dummy Load DA-91/W Series (or equivalent) to J802. Use T-adapter UG-569/U at J802 and connect the dummy load to the T-adapter using an 8 foot length of RG-8/U cable. Do not remove any subassembly cover plates from the unit except when it is necessary to gain access to components or test points mentioned in the adjustment procedure. Engage the drawer interlock.

WARNING

DANGEROUS VOLTAGES ARE PRESENT IN THE FINAL AMPLIFIER CIRCUIT. WITH THE EXCEPTION OF SCREWDRIVER ADJUSTMENTS, NO ADJUSTMENTS OR CONNECTIONS SHOULD BE ATTEMPTED UNTIL THE HIGH VOLTAGE POWER SUPPLY HAS BEEN TURNED OFF AND ALL CAPACITORS DISCHARGED.

(4) POWER AMPLIFIER OVERLOAD ADJUSTMENT.

Step 1. Refer to Section 3 of this manual and tune Radio Transmitting Set AN/WRT-1 for a frequency of 300 kc, CW emission.

Step 2. Place POWER SELECTOR switch S510 in the 500W position.

Step 3. Place P.A. CATHODE CURRENTS switch S809 successively in its 1, 2, 3, and 4 positions and note the individual cathode currents of the power amplifier tubes on P.A. CATHODE CURRENTS meter M806.

Step 4. Leave P.A. CATHODE CURRENT switch S809 in the position where M806 indicates the highest individual tube current.

Step 5. Using TUNING Ⓕ control, detune the P.A. until CATHODE CURRENTS meter M806 indicates 240 ma.

Step 6. Refer to figure 6-12 and slowly rotate P.A. OVERLOAD ADJUST potentiometer R840 clockwise until H.V. OVERLOAD PUSH TO RESET lamp DS801 glows.

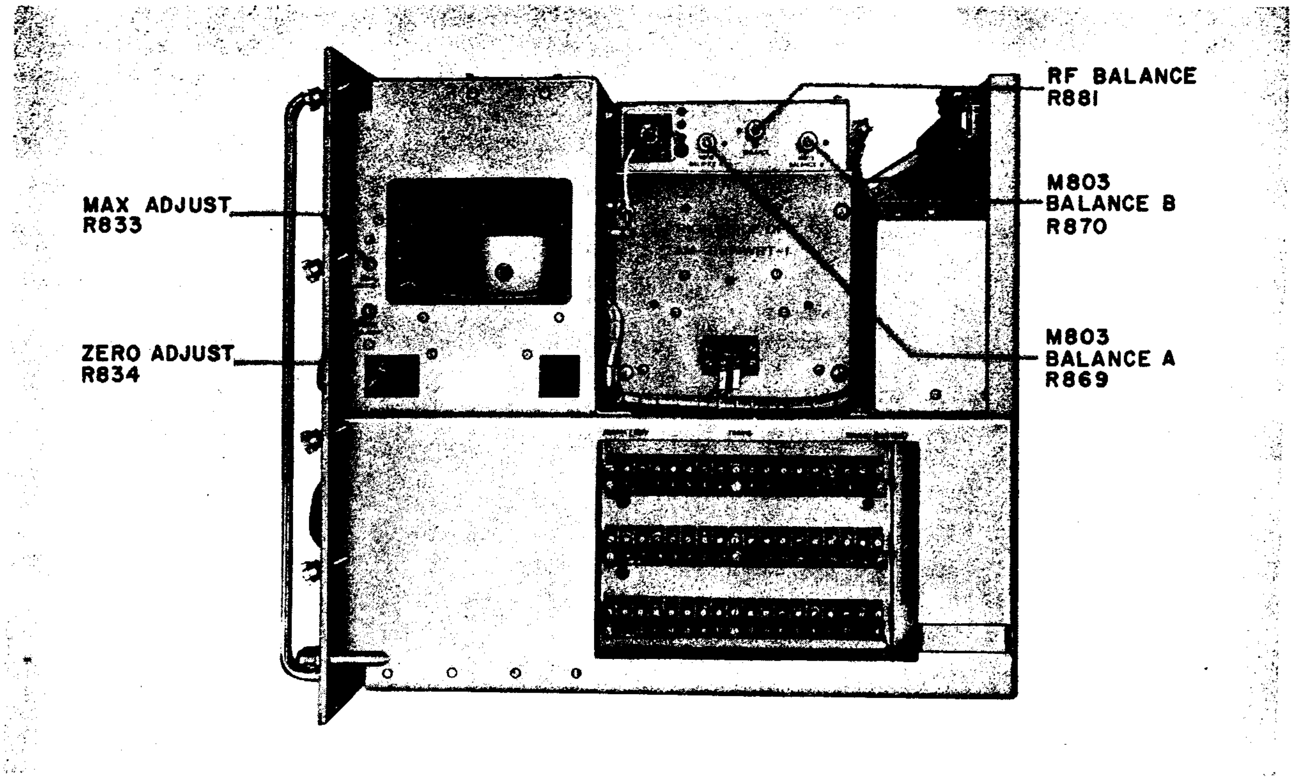


Figure 6-11. Radio Frequency Amplifier AM-2197/WRT-1, Right Side, Electrical Adjustments

Step 7. Lock P.A. OVERLOAD ADJUST potentiometer R840 in this position.

Step 8. Press H.V. OVERLOAD PUSH TO RESET control S812 to remove the overload indication.

Step 9. Disconnect all test equipment including the dummy load and reconnect J802 to P182.

Step 10. Push the drawer back into the cabinet.

(5) R-F MONITOR ADJUSTMENTS.—To calibrate the r-f monitor circuit proceed in the following manner:

Step 1. Tune transmitter for 500-watt CW operation at an operating frequency of 1.0 Mc. Place CARRIER TEST KEY S811 OFF. Place EMISSION SELECTOR switch S510 on ADJ.

Step 2. Pull out the drawer containing Radio Frequency Amplifier AM-2197/WRT-1 and disconnect plug P182 from J802. Remove K809 from its socket.

Step 3. Obtain an eight-foot length of RG-8/U cable terminated at both ends with UG-573/U connectors and attach one end to J802. Connect the probe of Multimeter AN/USM-34 to the center conductor at the other end of RG-8/U cable. Do not place any other load on this cable. Preset R881, R869 and R870 to approximately mid-position.

Step 4. Place OUTPUT METER switch S814 in the R-F OUTPUT position.

Step 5. Refer to figure 6-11 and adjust M803 BALANCE B potentiometer R870 for a zero indication on R-F OUTPUT meter M803.

Step 6. Rotate DRIVE ADJUST potentiometer R812 fully counterclockwise and place POWER SELECTOR switch S510 in the 100W position. Place CARRIER TEST KEY on.

Step 7. Slowly rotate DRIVE ADJUST control clockwise until Multimeter AN/USM-24 indicates 170 volts.

Step 8. Refer to figure 6-12 and adjust R-F BALANCE potentiometer R881 for a zero indication on R-F OUTPUT meter M803.

Step 9. Press PLATE POWER OFF switch S504.

Step 10. Remove Multimeter AN/USM-34 Series (or equivalent) from the end of RG-8/U cable. Replace K809 in its socket.

Step 11. Attach T-adapter UG-569/U to Electrical Frequency Dummy Load DA-91/U Series (or equivalent), and connect the RG-8/U cable to the T-adapter. Connect the r-f probe of Multimeter AN/USM-34 to the open end of the T-adapter.

Step 12. Rotate DRIVE ADJUST control R812 fully counterclockwise.

Step 13. Press PLATE POWER ON switch S503 and place POWER SELECTOR switch S510 in the 500W position.

Step 14. Slowly rotate DRIVE ADJUST control R812 clockwise until Multimeter ME-25/U indicates 144 volts.

Step 15. Refer to figure 6-11 and adjust M803 BALANCE A R869 and BALANCE B R870 potenti-

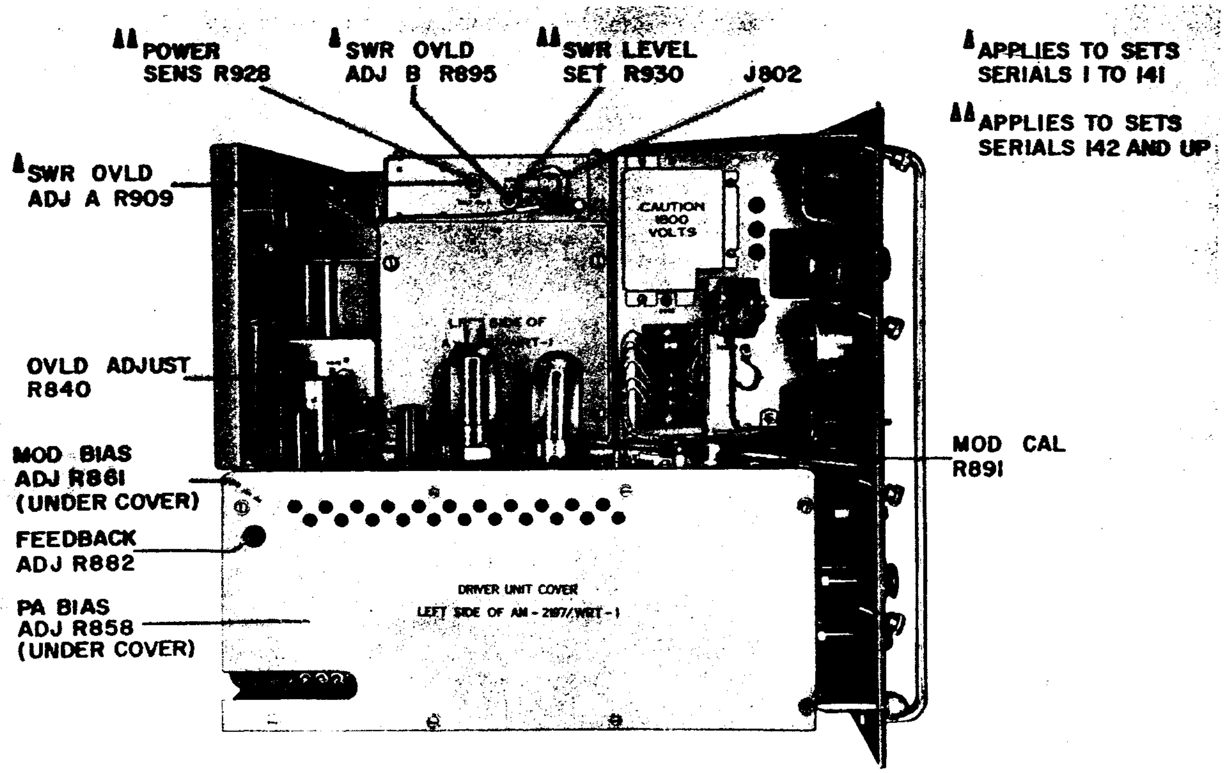


Figure 6-12. Radio Frequency Amplifier AM-2197/WRT-1, Left Side, Electrical Adjustments

ometers equal amounts in the same direction until R-F OUTPUT meter M803 indicates 400 watts.

Step 16. Place POWER SELECTOR switch S510 in the ADJ position.

Step 17. Adjust M803 BALANCE Ⓑ potentiometer R870 until R-F OUTPUT meter M803 indicates zero.

Step 18. Repeat steps 13 through 17 until no further adjustments are necessary and then lock R869 and R870 in this position.

Step 19. Set EMISSION SELECTOR switch S510 to AM; CARRIER TEST KEY S811 on; and POWER SELECTOR switch S510 to 100W.

Step 20. On the front panel, rotate AM POWER ADJUST control R887 until R-F OUTPUT meter M803 indicates 100 watts.

Step 21. Connect Audio Oscillator Equipment, Navy Model LAJ Series (or equivalent) to terminal 16 of TB801. Remove Multimeter AN/USM-34 Series (or equivalent) from T-adapter UG-569/U and in its stead connect the vertical input of Oscilloscope TS-239A/U Series (or equivalent).

Step 22. Set the frequency of the audio oscillator at 1000 cps and adjust oscilloscope to view modulated r-f waveform.

Step 23. Adjust audio input so that the oscilloscope indicates 90 per cent modulation.

Step 24. Place OUTPUT METER switch S814 in the R-F SET position.

Step 25. Rotate R-F SET FOR MOD. control R887 until R-F OUTPUT meter M803 is deflected to R-F SET scale marker on M803.

Step 26. Place OUTPUT METER switch S814 in the % MOD position.

Step 27. Rotate MOD. CAL. control R891 until R-F OUTPUT meter M803 indicates 90 per cent (on the lower scale of M803). Lock R891 in this position.

Step 28. Press PLATE POWER OFF switch S504 and remove all test equipment. Reconnect P182 to J802.

(6) DRIVER ADJUSTMENTS. When making the driver adjustments pull out Radio Frequency Amplifier AM-2197/WRT-1 and proceed as follows:

Step 1. Using an eight-foot length of RG-8/U cable, terminated at both ends with UG-573/U connectors, connect a Electrical Dummy Load DA-91/U Series (or equivalent) to J802.

Step 2. Remove the left side cover to the driver unit on the r-f amplifier. Connect the r-f probe of Multimeter AN/USM-34 Series (or equivalent) to the connection from transformer T801 terminal 3 on printed board E832. Connect the ground lead of the multimeter to the chassis.

Step 3. Tune the transmitter to 1500 kc as directed in steps 1 through 9 of paragraph 3-2*b*(2).

Step 4. Leave CARRIER TEST KEY switch S811 in the ON (locked) position. Place POWER SELECTOR switch S510 in the 500W position.

Step 5. Place the TEST VOLTMETER M804

switch in the GRID BIAS position. Set PA BIAS ADJ potentiometer R858 so that TEST VOLTMETER M804 reads −58 volts.

Step 6. Set MOD BIAS ADJ potentiometer R861 to ¾ of the maximum clockwise position. Set FEEDBACK ADJ potentiometer R882 to its mid-position.

Step 7. Rotate DRIVE ADJUST (front panel r-f amplifier) until the multimeter reads 38 to 40 volts.

Step 8. Put the EMISSION SELECTOR in the AM position. Rotate AM POWER ADJUST (front panel r-f amplifier) so that the multimeter reads 22 to 24 volts.

Step 9. Press PLATE POWER OFF. Remove Low Level Modulator tube V801. Press PLATE POWER ON. Set FEEDBACK ADJ potentiometer R882 so that the multimeter reads 10 to 12 volts.

Step 10. Press PLATE POWER OFF. Insert V801. Press PLATE POWER ON. Put the EMISSION SELECTOR switch in the CW position. Repeat steps 7, 8, and 9 until the multimeter reads 10 to 12 volts when V801 is removed in step 9.

Step 11. Remove all test equipment. Replace the side cover on the driver chassis and reconnect P182 to J802.

(7) SWR OVERLOAD ADJUSTMENTS.

(*a*) When making the SWR overload adjustments for sets serials 1 through 141, proceed in the following manner:

Step 1. Tune the transmitter for a frequency of 1.0 MC, CW 500-watt operation. Place POWER SELECTOR switch S510 in the ADJ position. Rotate DRIVE ADJ control fully counterclockwise.

Step 2. Pull out Radio Frequency Amplifier AM-2197/WRT-1. Connect five 50 ohm 100 watt non-inductive resistors in series. Connect one end of the resistor line to J802 and the other end to the transmitter chassis.

WARNING

DANGEROUS R-F VOLTAGES WILL BE PRESENT IN THE DUMMY LOAD ASSEMBLED IN STEP 2 WHEN POWER SELECTOR SWITCH IS IN THE 100W OR 500W POSITION.

Step 3. Refer to figure 6-12 and rotate SWR OVLD ADJ A potentiometer, R909, fully clockwise and SWR OVLD ADJ B potentiometer, R895, fully counterclockwise.

Step 4. Set COUPLING Ⓖ control to 00 and CATHODE CURRENTS switch S809 in the TOTAL position.

Step 5. Place POWER SELECTOR switch S510 in the 500 W position. Place CARRIER TEST KEY in the ON (locked) position. Rotate DRIVE ADJUST control R812 clockwise until R-F OUTPUT meter M803 indicates approximately 100 watts, when OUTPUT meter switch S814 is in the R-F OUTPUT position. (If H. V. OVERLOAD light DS801 glows during this adjustment, rotate SWR OVLD ADJ A potentiometer R909 one quarter turn counterclockwise, press H. V. OVERLOAD PUSH TO RESET button S812 and continue.)

Step 6. Adjust TUNING Ⓡ control for a maximum indication on OUTPUT meter M803.

Step 7. Rotate DRIVE ADJUST control R812 until OUTPUT meter M803 indicates 500 watts.

Step 8. Rotate SWR OVLD ADJ B potentiometer R895 slowly clockwise until H. V. OVERLOAD lamp DS801 glows. Leave R895 in this position.

Step 9. Rotate DRIVE ADJUST control R812 fully counterclockwise. Press H. V. OVERLOAD PUSH TO RESET switch S812 to clear the overload.

Step 10. Adjust DRIVE ADJUST control R812 until R-F OUTPUT meter M803 indicates 300 watts.

Step 11. Rotate SWR OVLD ADJ A potentiometer R909 until H. V. OVERLOAD lamp DS801 glows.

Step 12. Rotate DRIVE ADJUST control R812 fully counterclockwise and press H. V. OVERLOAD PUSH TO RESET switch S812.

Step 13. Rotate DRIVE ADJUST control R812 until H.V. OVERLOAD lamp DS801 glows.

Step 14. Rotate DRIVE ADJUST R812 one division clockwise and press PUSH TO RESET switch S812 releasing it quickly. (Overload should reset and trip immediately). Rotate DRIVE ADJUST control R812 one more division clockwise and press PUSH TO RESET switch S812 again. Continue this process until a point is reached where overload does not trip and H. V. OVERLOAD lamp DS801 does not glow. When this point is reached rotate SWR OVLD ADJ A poteniometer R909 counterclockwise until H. V. OVERLOAD lamp DS801 glows. Rotate SWR OVLD ADJ B potentiometer fully counterclockwise and press PUSH TO RESET switch S812.

Step 15. Adjust DRIVE ADJUST control R812 until R-F OUTPUT meter indicates 500 watts.

Step 16. Repeat steps 8 through 13 until the overload will not reset at any setting of DRIVE ADJUST control R812. Lock SWR OVLD ADJ A, R909 and SWR OVLD ADJ B, R895, in this position.

Step 17. Rotate DRIVE ADJUST control fully counterclockwise and press PUSH TO RESET switch S812. Place POWER SELECTOR switch S510 in the ADJ position. Turn CARRIER TEST KEY OFF.

Step 18. Disconnect the dummy load, reconnect J802 to P182 and close the drawer.

(*b*) When making the SWR overload adjustments for sets serials 142 and up, proceed in the following manner:

Step 1. Tune the transmitter for a frequency of 1.0 MC, CW 500-watt operation. Place POWER SELECTOR switch S510 in the ADJ position. Rotate DRIVE ADJUST fully counterclockwise.

Step 2. Pull out Radio Frequency Amplifier AM-2197/WRT-1. Connect five 50 ohm 100 watt non-inductive resistors in series. Connect one end of the resistor line to J802 and the other end to the transmitter chassis.

WARNING

DANGEROUS R-F VOLTAGES WILL BE PRESENT IN THE DUMMY LOAD ASSEMBLED IN STEP 2 WHEN POWER SELECTOR SWITCH IS IN THE 100W OR 500W POSITION.

Step 3. Refer to figure 6-12 and rotate POWER SENS potentiometer R928 fully clockwise. Rotate SWR LEVEL SET potentiometer R930 fully counterclockwise.

Step 4. Set COUPLING Ⓖ control to 00. Set CATHODE CURRENTS switch S809 in the TOTAL position.

Step 5. Place POWER SELECTOR switch S510 in the 500W position. Place CARRIER TEST KEY in the ON (locked) position. Rotate DRIVE ADJUST CONTROL until R-F OUTPUT meter M803 indicates approximately 100 watts when OUTPUT meter switch S814 is in the R-F OUTPUT position.

Step 6. Adjust TUNING Ⓕ control for a maximum indication on R-F OUTPUT meter M803.

Step 7. Rotate DRIVE ADJUST control R812 until R-F OUTPUT meter M803 indicates 400 watts.

Step 8. Rotate SWR LEVEL SET potentiometer R930 clockwise until HV OVERLOAD light DS801 glows.

Step 9. Rotate DRIVE ADJUST control R812 fully counterclockwise. Press HV OVERLOAD PUSH TO RESET switch S812.

Step 10. Rotate DRIVE ADJUST control R812 until R-F OUTPUT meter M803 indicates 100 watts. Rotate POWER SENS potentiometer R928 counterclockwise until HV OVERLOAD lamp DS801 glows.

Step 11. Rotate DRIVE ADJUST control fully counterclockwise. Turn CARRIER TEST KEY OFF. Press PUSH TO RESET switch S812. Place POWER SELECTOR switch S510 in the ADJ position.

Step 12. Disconnect the dummy load and reconnect J802 to P182. Close the drawer.

(8) TRACKING ADJUSTMENTS. — When making the tracking adjustments on Radio Frequency Amplifier AM-2197/WRT-1 pull out the top drawer and proceed in the following manner.

Step 1. Set TUNING Ⓕ control to 300 kc and COUPLING Ⓖ control to 100. Remove strap which goes to transformer T804 in the reflectometer chassis. DO NOT APPLY POWER TO THE EQUIPMENT.

Step 2. Remove both leads to tuning capacitor C818 and the output lead from coupling coil L805. DO NOT GROUND.

Step 3. Connect four 470 μ μ f capacitors in parallel and measure their combined capacitance with Capacitance and Impedance Bridge Navy Type 60007 (or equivalent). If necessary replace one or more of the 470 μ μ f capacitors with a 500 μ μ f capacitor so that the combined capacitance is 1900 ±10 μ μ f. Connect this assembly to the leads removed from capacitor C818.

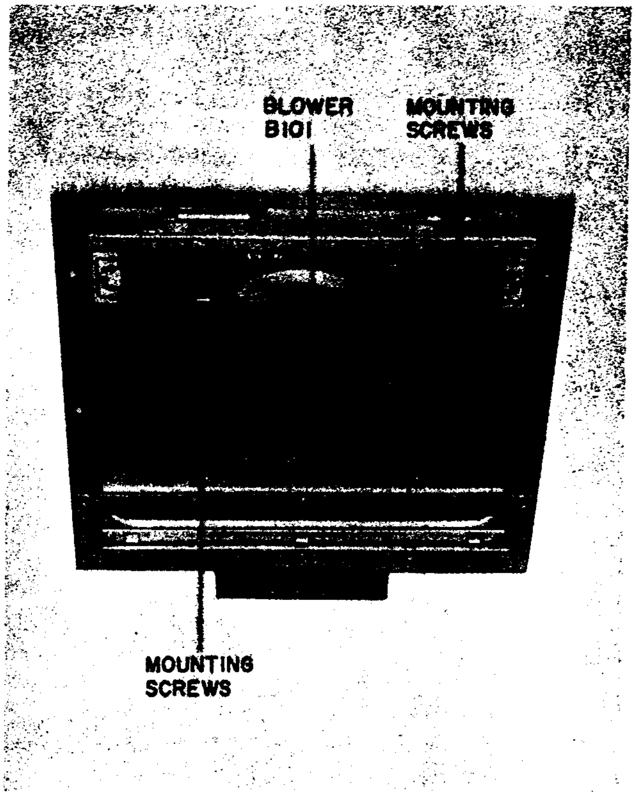


Figure 6-13. Electrical Equipment Cabinet CY-2607/WRT-1, Blower Replacement

Step 4. Loop two turns of the output test lead of Signal Generator Ferris Model 16C (or equivalent) around the lead to the test capacitor. Do not make a direct connection.

Step 5. Connect the r-f probe of Multimeter AN/USM-34 Series (or equivalent) from one side of the test capacitor to ground and set the meter on its 0-1-volt r-f range.

Step 6. With maximum output from the signal generator, vary the frequency between 100 kc and 200 kc until a peak response is observed on the multimeter. Leave signal generator set at the frequency at which peak response was observed.

Step 7. Disconnect the test capacitor (do not discard it since it will be used later). Reconnect capacitor C818 and, again, loop two turns of the test lead from the signal generator around one of the leads to C818. Connect the r-f probe of Multimeter AN/USM-34 to one side of tuning capacitor C818.

Step 8. Loosen the setscrews in the turnbuckle adjustment for C818 and rotate the turnbuckle until the multimeter again indicates a maximum. Tuning capacitor C818 is now adjusted for a capacitance of 1900 μ μ f ±10 μ μ f.

Step 9. Set the frequency of Signal Generator Ferris Model 16C (or equivalent) to 138.2 kc. The signal generator must be calibrated so that the output frequency is within 500 cycles of 138.2 kc.

Step 10. Loosen the setscrew in the tuning coil rack for L806 and rotate the slug until the multimeter indicates a maximum. Tighten the setscrew in this position.

Step 11. Set COUPLING Ⓖ control to 00. Temporarily ground the lead between capacitor C836 and coupling coil L805. (Capacitor C836 is located between L805 and L806, just below C818. Connect the 1900 $\mu \mu$ f test capacitor assembly between ground and the terminal on L805 that is not connected to C836. Connect the r-f probe of Multimeter AN/USM-34 Series (or equivalent) also to this terminal.

Step 12. Adjust the signal generator for a frequency of 264.7 kc ± 500 cps. Loop two turns of the test lead from the signal generator around the lead connected to the test capacitor assembly.

Step 13. Loosen the set screw in the tuning coil rack for L805 until the multimeter indicates a maximum.

Step 14. Remove Signal Generator Ferris Model 16C (or equivalent) and the test capacitor assembly. Remove the ground attached in step 11. Remove connector P804 from J804 and temporarily jumper the center conductor of P804 to the terminal on L805 that is not connected to C836. Connect the r-f probe of Multimeter ME-25/U Series (or equivalent) to the jumper. Reconnect lead of L805 removed in step 2 and strap to T804, removed in step 1.

Step 15. Set-up Signal Generator Ferris Model 16C (or equivalent) for an output frequency of 1.5 mc. Loop two turns of the test lead from the signal generator around the lead between L806 and L836. Do not make a direct connection.

Step 16. Set TUNING Ⓕ dial to 1.5 mc and set COUPLING Ⓖ dial to 50.

Step 17. Adjust the turn buckle on capacitor C818 until the multimeter indicates a maximum and tighten the setscrews in the turnbuckle.

6-3. REMOVAL, ADJUSTMENT, REPAIR AND REASSEMBLY OF PARTS AND SUBASSEMBLIES.

a. GENERAL.—The following paragraphs outline the procedures for the removal, repair, reassembly and adjustment of those parts and subassemblies contained in Radio Transmitting Set AN/WRT-1 that require unusual or difficult servicing techniques. Those mechanical sections which require only conventional methods and procedures have been omitted. The gear drive assemblies discussed in the following paragraphs are precision assemblies and should be treated in such a manner as to avoid damaging impacts. No lubrication is required either as a part of or as a result of part replacement. All bearings which require lubrication are oil impregnated or oil filled. Be sure to read all notes before performing any of the procedures outlined.

b. ELECTRICAL EQUIPMENT CABINET CY-2607/WRT-1.—The only subassembly or part of the Electrical Equipment Cabinet CY-2607/WRT-1 that involves any unusual disassembly or removal procedures is the blower, B101. To remove this subassembly proceed as follows:

Step 1. Release the thumb screws at the sides of Power Supply PP-2222/WRT and withdraw this drawer against the stops. Disconnect the input terminals on TB202 at the back of the chassis.

Step 2. Carefully support the weight of the chassis to take the load from the slide rails and remove the screws which secure the chassis to the slide rails. Move the chassis away from the cabinet far enough to gain access to the interior of the cabinet.

Step 3. Refer to figure 6-13 and remove the screws which secure the blower mounting plate in position.

Step 4. Disconnect the blower leads at TB107 and remove the blower and plate assembly.

Step 5. Remove the blower from its mounting plate.

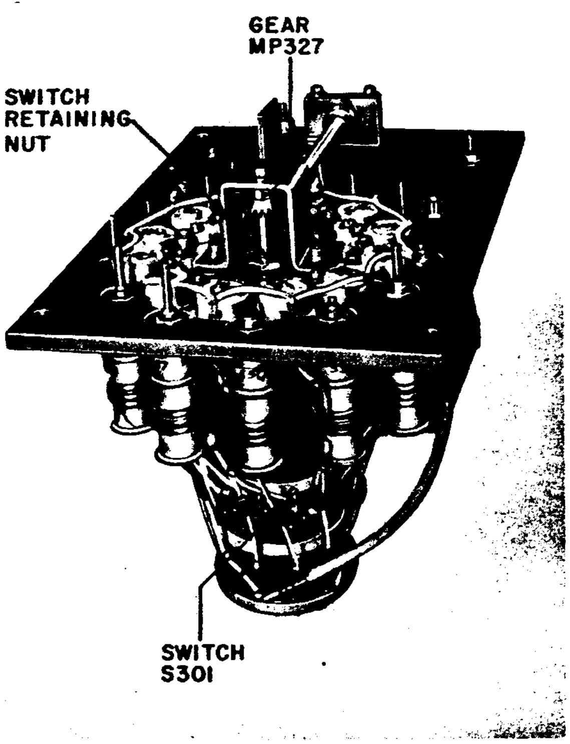


Figure 6-14. Radio Frequency Oscillator O-621/WRT-1, Replacement of Switch S301

Step 6. Replace blower B101 by following steps 1 through 5 in reverse order.

c. POWER SUPPLY PP-2222/WRT.—The only removal or disassembly procedures involved in servicing this chassis are normal electronic servicing procedures.

d. AMPLIFIER-POWER SUPPLY AM-2198/WRT-1. —The only removal or disassembly procedures involved in servicing this chassis are normal electronic servicing procedures.

e. RADIO FREQUENCY OSCILLATOR O-621/WRT-1.

WARNING

BEFORE SERVICING THE RF OSCILLATOR, PLACE EMERGENCY STOP SWITCH S201 ON THE FRONT PANEL OF THE POWER SUPPLY IN THE OFF POSITION.

(1) REMOVAL OF RADIO FREQUENCY OSCILLATOR O-621/WRT-1.—To prepare the RF Oscillator for servicing, release the six fasteners on the front panel, and withdraw the chassis to its extreme limit of travel. The foul weather latch on the right-hand side should be engaged. Pull the locking plunger at the rear of the oscillator chassis, and rotate the chassis to a position most convenient for servicing the part involved. All procedures outlined in this paragraph may be accomplished with the chassis attached to the console. If it is necessary to remove the oscillator chassis from the console, disconnect all wiring to the chassis. Next, remove the four bolts holding the chassis to the mounting plate portion of the chassis support bearing. The bolts are accessible from the rear of the mounting plate. Lift and remove the chassis. To reinstall the oscillator chassis, attach it to its mounting plate; then rotate the chassis to its locking mechanism and slide it back into the console.

(2) REMOVAL OF OVEN PARTS.—Replaceable parts in the oven of the RF Oscillator are mounted in two sections, one of which is accessible from the top of the oscillator chassis, and the other from the bottom of the chassis. To service the parts in the top section of the oven, remove the eight screws from the outer cover, and lift the cover from the end indicated. The inner cover may be lifted out after its four retaining screws are removed. The lower section covers are removed in a similar manner. The component parts of the oven may then be serviced.

(*a*) TUNING CAPACITOR C319.—To remove Tuning Capacitor C319, proceed as follows:

Step 1. Remove the shaft coupling inside the oven. Use caution when removing the pin to avoid damaging the shaft on the coupling.

Step 2. Mark and remove the wiring to capacitor C319.

Step 3. Remove the capacitor mounting screws and then remove the capacitor.

(*b*) SWITCH S301.—To remove switch S301, proceed as follows:

Step 1. Remove the coupling to capacitor C319.

Step 2. Remove the coupling to the gearing for switch S319.

Step 3. Remove the screws from the angles which extend along each side of the oven assembly. Mark and disconnect all leads to the oven and then remove it.

Step 4. Remove the four screws (one near each corner) from the inner deck which supports switch S301 and capacitor C319 and remove the inner subassembly.

Step 5. Refer to figure 6-14 and remove the pin from gear MP327.

Step 6. Mark and remove all leads at switch S301. Remove the nut from the threaded shaft bushing and withdraw the switch from the back of the subassembly. Lift out the gear MP327 and the switch retaining nut and lockwasher.

(*c*) REPLACEMENT OF SWITCH S301 OR CAPACITOR C319.—To replace the parts removed in the preceding paragraphs (*a*) and (*b*), reverse the removal procedure. Before pinning the couplings to capacitor C319 and switch S301, align these parts as directed in paragraph 6-3*e*(7). For electrical alignm nt refer to paragraph 6-2*e*. Replace the oven covers making sure that all connections are properly mated.

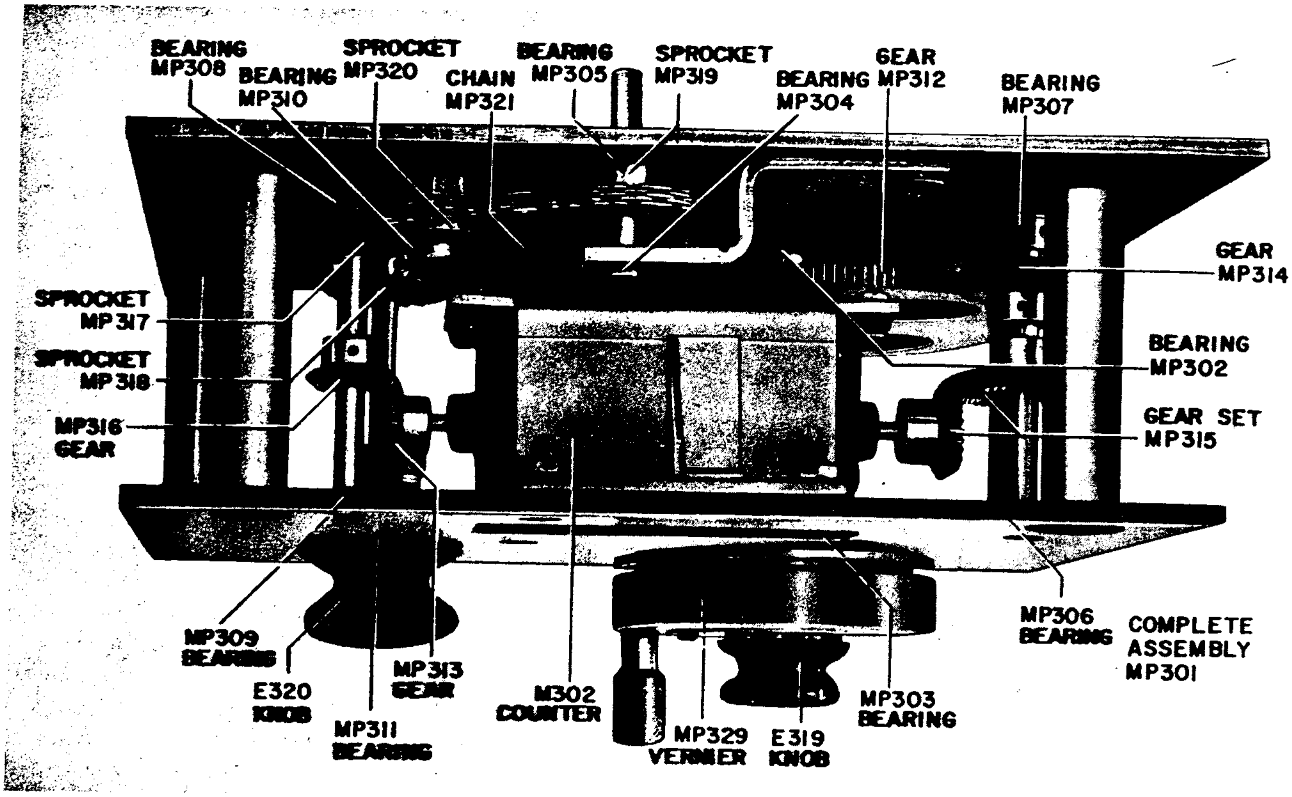


Figure 6-15. Radio Frequency Oscillator O-621/WRT-1, Master Oscillator Gear Train Disassembly

(3) R-F OSCILLATOR SUBCHASSIS.—To service the inside of the keying circuit subchassis, remove the cover from the left side of the oscillator chassis. The internal parts of the master oscillator subchassis may be serviced after the cover on the front right side of the r-f oscillator chassis is removed. The internal parts of the regulator subchassis may be serviced after the cover on the rear right side of the r-f oscillator chassis is removed. All electrical parts on these three subchassis are easily replaced and require no further instruction.

(4) GEAR TRAIN REMOVAL.—To remove the mechanism from the r-f oscillator chassis, first loosen the setscrews in the two slide couplings, MP324 and MP325, and slide the couplings toward the oven. Remove TUNING Ⓒ knob E320 and TUNING Ⓓ vernier knob E319 at the front panel. See figure 6-15. Remove the two screws in the face of TUNING Ⓓ knob MP329 and lift off the assembly. Remove the four truss head screws from the front panel of the chassis. Disconnect all interconnecting wiring and remove the oven assembly. Shift the tuning mechanism gear box away from the front panel, and lower the mechanism from the r-f oscillator chassis.

(5) GEAR TRAIN DISASSEMBLY.—The procedure for disassembling the gear train mechanism, figure 6-15, is not complicated and requires no detailed explanation.

(6) GEAR TRAIN REASSEMBLY.—To reassemble the tuning mechanism refer to figure 6-15 and proceed as follows:

Note

In the following procedure, all parts to be pinned are considered as replacement parts. It should be possible to pin all original mating parts through the original pinning holes as each adjustment is completed. All replacement gears, sprockets and collars which are to be fixed to their shafts, should be temporarily attached with setscrews. The parts should not be pinned until so instructed in the following steps. When a shaft section is assembled, adjust the gears, sprockets and collars by means of their setscrews so that there is from 0.001 to 0.002 inches end play in the shaft. Adjust the miter gears to mesh properly on the pitch circle with minimum backlash without binding. To pin the part to its shaft use the pre-drilling hole in the hub or collar as a pilot, and drill through the specified diameter hole. Make sure that the assembly is supported from the rear when the hole is drilled. Insert the spring pin through the hole.

Step 1. Attach counter M302 to the front of the gear housing by means of four screws, nuts and lockwashers. Position the counter so that the three-digit group and vernier are on the right side of the front panel.

Step 2. Attach the matched bevel gear (P/O MP315) and bevel gear MP313 to the right and left end shafts respectively of counter M302.

Step 3. Slide vernier and shaft assembly, MP303, into hollow TUNING Ⓓ shaft assembly MP329 and align the mating pinning holes. Pin the two shafts and secure the two assemblies with two screws, lockwashers and washers at the front-panel end of the assembly.

Step 4. Refer to figure 6-16 and insert the TUNING Ⓓ shaft assembly through the front cover of the gear box. Slide the bushing assembly over the shaft, and match the bushing pin and cover hole. Slide the 11 stop washers, special stop washer, adjustable stop collar and lock collar over the shaft. Temporarily secure the lock collar with a setscrew. If the stop collar is not being replaced, pin the lock collar to the shaft through the original hole without shimming.

Step 5. Place spur gear MP312 on TUNING Ⓓ shaft and pin it in place.

Step 6. Install the locking mechanism for the TUNING Ⓓ shaft assembly; then adjust the clearance between the adjustment screw and the surface of the tuning shaft flange to 0.003 inch and lock this setting with the hexagonal nut provided.

Step 7. Place sprocket chain MP321 around sprocket MP319; and assemble sprocket MP319, the sprocket shaft, retaining ring, washer and sprocket mounting bracket to the rear cover of the gear box as shown in figure 6-15.

Step 8. Assemble the remaining shafts, gears and sprockets. Do not pin the counter half of matched miter gears MP315 or miter gear MP313. Join the two halves of the gear housing together.

(7) GEAR TRAIN ADJUSTMENT.—To adjust the tuning mechanism, refer to figure 6-15 and proceed as follows:

Step 1. If the original lock collar and stop collar are being used, turn TUNING Ⓓ shaft to its clockwise limit. Turn the righthand shaft of counter M302 until the last three digits are above 999 but not exposing 000. Mesh the associated miter gear (P/O MP315) and pin in this position. Turn TUNING Ⓓ shaft to its counterclockwise limit. The last three digits of counter M302 should indicate below 000 without exposing 999.

Step 2. If the lock collar or stop collar in TUNING Ⓓ shaft is being replaced, loosen the setscrew in the lock collar and temporarily tighten the set screw in the counter half of matched miter gears MP315. Place a 0.002 inch thick shim between the collar and the adjacent stop washer. Adjust the stop assembly so that the right hand three digits of counter M302 indicate below 000 without exposing 999 and indicate above 999 without exposing 000 at the counterclockwise and clockwise limits respectively of TUNING Ⓓ shaft. Tighten the setscrew on the lock collar and permanently pin the counter half of matched miter gears MP315. Drill a 5/64 inch diameter hole for the pin. Use a 0.094 inch diameter pin.

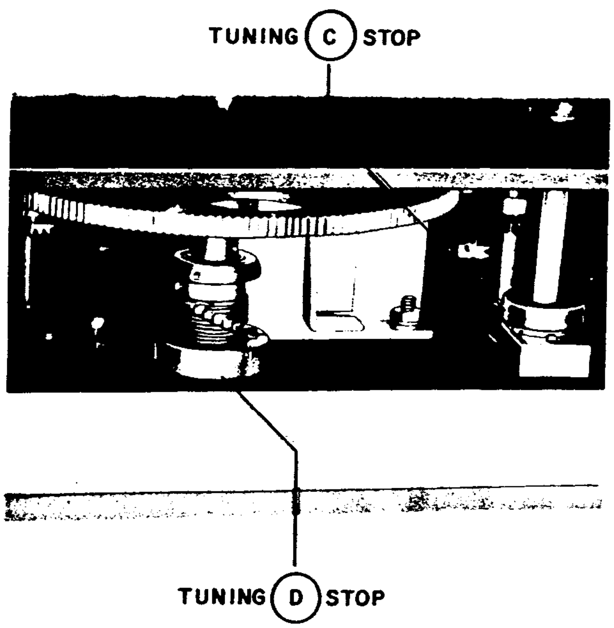


Figure 6-16. Radio Frequency Oscillator O-621/WRT-1, Stop Assemblies

Step 3. If the collar on the TUNING Ⓒ shaft is being replaced, loosen the setscrew in the collar and temporarily pin miter gear MP313. Place a 0.002 inch thick shim between the collar and first stop washer. Adjust the collar so that it will stop the left two digits of counter M301 below 03 (low end) and above 14 (high end) with equal over-travel at both ends. Tighten the setscrew in the collar and permanently pin miter gear MP313. Drill a 5/64 inch diameter hole for the pin. Use a 0.094 inch diameter pin.

Step 4. If the collar on TUNING Ⓒ shaft is not being replaced, permanently pin the collar through the original holes. Adjust the pinning angle of miter gear MP313 so that the left two digits of counter M302 indicate below 03 and above 14 with equal over travel at either end when TUNING Ⓒ shaft is turned from its counterclockwise to its clockwise limit.

Step 5. Check that all instructions given in the note at the beginning of paragraph 6-3*e*(6) have been adhered to; then pin all remaining collars, gears and sprockets. After pinning the collar on TUNING Ⓒ

or TUNING Ⓓ shafts, remove the 0.002 with thick shim. The remainder of the parts require 3/32 inch diameter pin holes.

(8) INSTALLATION OF GEAR TRAIN MECHANISM.—To install the gear train mechanism in the r-f oscillator chassis, reverse the procedure outlined in paragraph 6-3*e*(4); then proceed as follows:

Step 1. Remove the covers from the bottom of the oven. Loosen the setscrews in sliding coupling MP324 and rotate the shaft to rotary band switch S301 to the position in which L302 is connected in the circuit. Set the TUNING Ⓒ knob to 03 on the left two digits of counter M302. Tighten the setscrews in coupling MP324.

Step 2. Loosen the setscrews in sliding coupling MP325. Turn the rotor of tuning capacitor C319 until the rotor plates are at an angle of 90° ±1° to the stator plates.

Step 3. Maintaining the position of capacitor C319, rotate TUNING Ⓓ knob MP329 until counter M302 reads 500 on the three righthand digits. Tighten the setscrews in sliding coupling MP325. Replace the oven covers.

f. ELECTRICAL FREQUENCY CONTROL C-2861/WRT-1.

WARNING

BEFORE SERVICING ELECTRICAL FREQUENCY CONTROL C-2861/WRT-1, PLACE EMERGENCY STOP SWITCH S201 ON THE FRONT PANEL OF POWER SUPPLY PP-2222/WRT IN THE OFF POSITION.

(1) GENERAL.—The only parts of the Electrical Frequency Control C-2861/WRT-1 which require any unusual disassembly or servicing procedures are the oven and the gear assembly components. Disassembly is illustrated in figures 6-17 through 6-19. All other components may be handled by standard methods and techniques. The Electrical Frequency Control C-2861/WRT-1 is prepared for servicing by withdrawing the chassis from the console. Release the six captive fasteners on the front panel and withdraw the chassis to the limit of travel. Engage the foul weather latch on the upper righthand corner. Pull the locking plunger at the rear of the chassis, and rotate the chassis to a position convenient for servicing the part or assembly involved. All procedures outlined in this paragraph may be accomplished with the chassis attached to the console.

If it is necessary to remove the chassis from the console, identify and disconnect all wiring to the chassis. Remove the four bolts which attach the chassis to the mounting plate portion of the chassis support bearing. The bolts are accessible from the rear of the mounting plate. Lift and remove the chassis. To reinstall the chassis, set the bosses on the back of the chassis onto the two pins on the mounting plate and bolt the chassis to the mounting plate. Reconnect all wiring. Release the foul weather latch and slide the chassis into the console. Secure the chassis by replacing six captive screws on the sides of the front panel.

(2) REMOVAL OF OVEN PARTS.—Capacitor C622, and board E662, located in the oven of Electrical Frequency Control C-2861/WRT-1 may be replaced without removing the interpolation oscillator assembly from the oven. Remove top and bottom outer covers and the top and bottom inner covers of the oven to gain access to the interior by backing out the attaching screws of the respective covers. The outer covers must be removed carefully so that the insulating material will not be disturbed. It is necessary that the assembly be taken out of the oven for the replacement of switch S601. When the assembly must be removed, the oven should be removed from the chassis to facilitate the removal and servicing operations.

(*a*) TUNING CAPACITOR C662.—To remove capacitor C662, proceed as follows:

Step 1. Remove the shaft coupling inside of the oven. Use caution when removing the pin to avoid damaging the shaft on the coupling.

Step 2. Remove the wiring from the capacitor.

Step 3. Remove the capacitor mounting screws.

(*b*) BOARD E662.—To remove board E662, proceed as follows:

Step 1. Set 1.1 MC XTAL OSC LOG dial E664 to "000".

Step 2. Carefully loosen the setscrews from the coupling on capacitor C675 and slide the coupling free from the capacitor.

Step 3. Identify and disconnect all leads to the board E662.

Step 4. Remove the four mounting screws and take out board E662.

(*c*) SWITCH S601.—To remove switch S601, proceed as follows:

Step 1. Identify and disconnect all leads to the oven assembly.

Step 2. Set 1.1 MC XTAL OSC LOG dial E664 to "000" and remove the coupling for capacitor C675.

Step 3. Remove the coupling for capacitor C662.

Step 4. Remove the coupling for the gearing to switch S601.

Step 5. Remove the six screws which secure the oven assembly mounting brackets to the top of the chassis. Remove the oven.

Step 6. Remove the three machine screws which secure the switch and capacitor subassembly in place in the oven. Remove the subassembly.

Step 7. Identify, mark and disconnect all wiring to switch S601.

Step 8. Refer to figure 6-17 and unpin collar Ⓐ from switch S601. Remove the collar.

Step 9. Remove terminal board E615. Electrical connections need not be unsoldered, but extreme

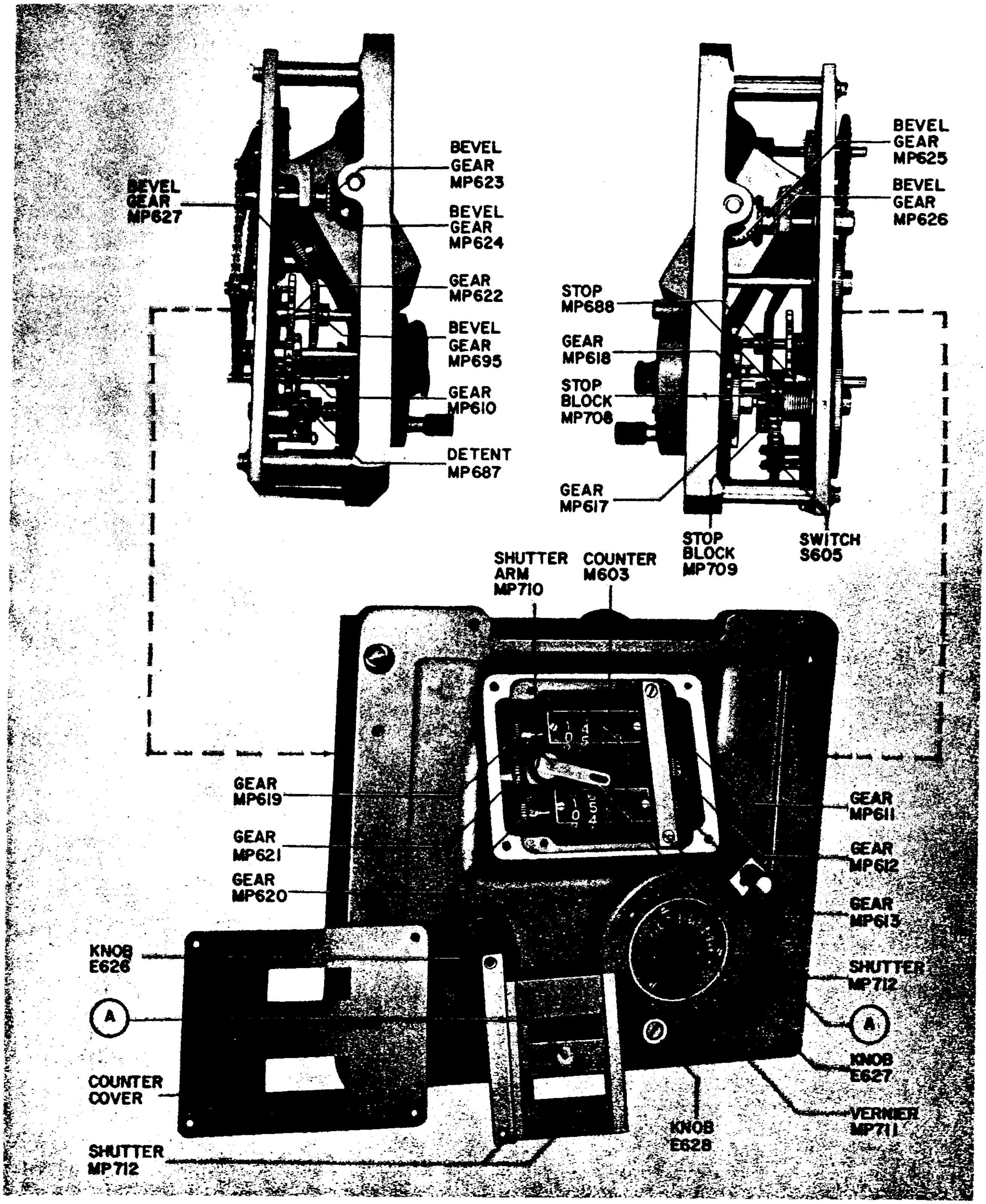


Figure 6-19. Electrical Frequency Control C-2861/WRT-1, Replacement of Gear Box Parts

Note

In the following adjustment procedure, all parts to be pinned are treated as replacement parts. It should be possible to pin all original mating parts through the original pinning holes as each adjustment is completed. All replacement gears, sprockets and collars which are to be fixed to their shafts, should be temporarily secured with set screws. Do not pin the parts until instructed to do so in paragraph 6-3.*f*.(6). When a shaft has been installed, adjust the gear, sprocket or collars adjoining the front and back plates to provide 0.001 to 0.002 inches end play in the shaft. Adjust the bevel gears for prcper mesh with minimum back lash but without binding. Be sure that all mating spur gears are fully meshed. To pin a part to its shaft, use the pre-drilled hole in the hub or collar as a pilot and drill completely through with the specified diameter drill. Be sure that the assembly is properly supported during drilling and that the shaft or part being drilled cannot rotate. Remove all burrs and metal chips and install the pin.

(6) GEAR DRIVE ADJUSTMENT.—To adjust the gear assembly, refer to figures 6-18 and 6-19 and proceed as follows:

Step 1. Remove the counter assembly cover and the shutter to expose the gears in the counter housing. Loosen the setscrews of gears MP619 and MP620, and move the gears on the shaft toward the counters to disengage the teeth of gear MP621.

Step 2. Set the left dial of the upper counter and of the lower counter to 4 by turning the gear shafts. Turn TUNING Ⓐ control knob until the shutter moves to the down position to read the lower counter.

Step 3. Position the Geneva drive MP610 and the Geneva positioner MP687 so that the roller of microswitch S605 is riding in the lower detent of gear MP687, and the single tooth of gear MP610 is just engaging the teeth of gear MP687.

Step 4. Move gears MP619 and MP620 to engage gear MP621 without changing the setting of the left dial of each counter. Tighten the setscrews of gears MP610 and MP620.

Step 5. Rotate TUNING Ⓐ clockwise. Clockwise rotation of TUNING Ⓐ control knob should now shift the shutter to the upper position and the left dial of the upper counter to 5.

Step 6. Sprocket MP631 should be positioned to limit the overtravel of the stop on the shaft of MP631 as the left dial on each counter travels from 0 on the bottom to 9 on the top.

Step 7. Loosen the setscrews of gears MP611 and MP612, and move the gears on the shaft toward the counters to disengage gear MP613.

Step 8. Set the three righthand dials of the upper counter at 001 and the three righthand dials of the lower counter at 999.

Step 9. Rotate TUNING Ⓑ control knob counterclockwise until the stop on gear MP618 limits the turning of the knob.

Step 10. Move gears MP611 and MP612 to engage gear MP613 without disturbing the setting of the dials. Tighten the setscrews in gears MP611 and MP612.

Step 11. Replace the shutter assembly. Be sure that the pin on the shutter properly engages the slot in the shutter area (see figure 6-19 A). Replace the counter cover.

Step 12. Adjust the setting of idler sprocket MP628 so that the chain moves freely on all sprockets without binding.

Step 13. Check that all instructions given in the note at the beginning of paragraph 6-3*f*(6) have been fulfilled. Pin all collars, gears and sprockets. All parts to be pinned require 3/32-inch pin holes. Pins in shafts of gear MP618 and sprocket MP631 should be pressed in with 1/4-inch projecting.

(7) GEAR DRIVE REPLACEMENT.—Reinstall the gear drive assembly in the chassis by reversing the procedure of paragraph 6-3*f*(3). Replace the oven in the chassis, and proceed as follows:

Step 1. Check the couplings to the shafts of rotary switch S601 and capacitor C662 and be sure they are loose. Ascertain that the shaft of capacitor C675 is in the full counterclockwise position and that the XTAL OSC LOG counter is at the "000" setting.

Step 2. Tighten the set screws of the counter shaft coupling.

Step 3. Rotate the shaft of rotary band switch S601 to place the wiper in the position directly connected to capacitor C667. Turn the TUNING Ⓐ knob until the left dial of the lower counter is at the 0 reading. With this orientation of the shafts maintained, couple the shafts and tighten the set screws.

Step 4. Turn the shaft of capacitor C662 so that the rotor plates are at precisely 90° with the stator plates. To set the plates to 90°, turn the rotor so that the longest half of the plates is unmeshed and open approximately 90°. Place a steel scale against the capacitor sidebar facing the flat edges of the rotor and set the rotor so that the distance between the side bar and the flat edges is 1-15/32 inches. Turn TUNING Ⓑ control knob until the three righthand dials of the lower counter read 500. Rotate TUNING Ⓐ control knob until the left hand dial of the lower counter reads 2. With the reading maintained on the lower counter, couple the shaft of C662 to the shaft from the counter, and tighten the set screws.

Step 5. Replace the covers on the top and bottom of the oven and reinstall the chassis in the console.

caution must be exercised so that the connected components will not be disturbed.

Step 10. Withdraw the four screws from the mounting block of the shaft to the gear assembly, and remove the mounting block. Complete disassembly of the shaft and gear from the block may be accomplished if required.

Step 11. Remove the gear MP605 from the switch shaft after driving out the roll pin.

Step 12. Remove the nut from the threaded portion of the switch shaft, and remove the switch.

(*d*) REPLACEMENT OF OVEN PARTS.—To replace the parts removed in the preceding paragraph (*a*), (b) and (*c*), reverse the procedure given in the appropriate paragraph. The gear box must be realigned as described in paragraph 6-3.*f*(6). For electrical realignment, refer to the applicable subparagraph of paragraph 6-2.*e*.

(3) GEAR DRIVE REMOVAL.—The gear drive assembly of Electrical Frequency Control C-2861/WRT-1 is removed with the oven out of the chassis. Identify, mark and remove all connections to the oven. Remove the three screws from each mounting angle for the oven assembly. Disconnect couplings MP691 and MP692 from the gear box and slide the oven slightly toward the back of the chassis and then lift it out of the chassis. Remove the eight screws which attach the gear drive assembly to the front panel of chassis. Shift the gear assembly toward the rear of the chassis and remove it.

(4) GEAR DRIVE DISASSEMBLY.—To disassemble the gear assembly, refer to figures 6-18 and 6-19 and proceed as follows:

CAUTION

THIS UNIT CONTAINS PRECISION PARTS. A GEAR OR BEARING WHICH DROPS FROM A WORK SURFACE TO THE STEEL DECK CAN BE RENDERED USELESS. FOREIGN MATTER CAN ALSO RUIN A BEARING. PROVISION SHOULD BE MADE FOR PROPER STORAGE OF ALL PARTS WHICH MUST BE REMOVED.

Step 1. Remove microswitch S605 by withdrawing the two mounting screws from the back cover of the gear housing. See figure 6-18.

Step 2. Loosen the nut on the stud of sprocket idler MP628 and slide the idler in the slot in the back cover to release chain MP633. Remove chain MP632. Remove idler sprocket MP628 if necessary.

Step 3. Drive the roll pins out of sprockets MP629, MP630 and MP631 and remove the sprockets and bearings.

Step 4. Note the relative positions of spur gears MP614, MP615 and MP616, carefully remove the roll pins from the respective gear hubs and remove the gears and bearings.

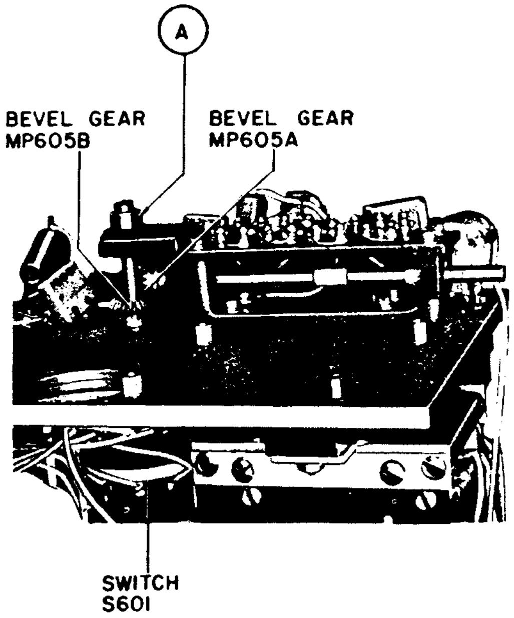


Figure 6-17. Electrical Frequency Control C-2861/WRT-1, Replacement of Switch S601

Step 5. Remove the retaining ring from the shaft of gear MP615, and take out the shaft. The retaining ring is located on the inside of the rear cover of the housing.

Step 6. Withdraw the pin from the collar on the shaft to capacitor C662 and remove the collar and bearing.

Step 7. Remove the retaining rings and bearings from the shafts mounting gear MP622 Geneva positioner MP687.

Step 8. Remove the retaining rings from the shafts of gears MP623 and MP626, and the stop roll pin from the shaft of gear MP623. The retaining rings are located on the inside of the rear cover.

Step 9. Remove the control knob E626 and the vernier knob E627 from the front panel. Withdraw the two screws in the face of control MP711 and lift off the knob assembly.

Step 10. Lay the gear housing on the front cover being careful to provide support so that the protruding shafts will not be damaged. Take out the four screws, lockwashers and washers connecting the gear assembly rear housing cover to the housing spacers. Remove the rear cover.

Step 11. Remove gears MP623 and MP626 and the mounting shafts from the associated shaft support assemblies attached to the rear cover of the housing. Disassemble the gears. The shaft supports may be removed from the rear cover as required.

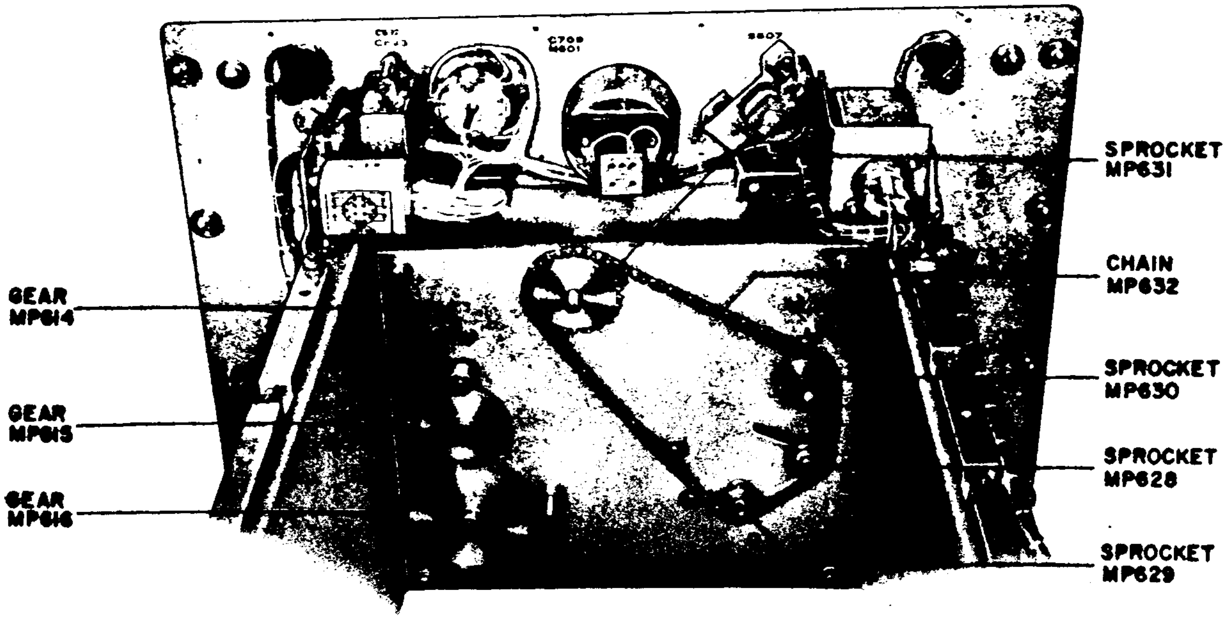


Figure 6-18. Electrical Frequency Control C-2861/WRT-1, Interpolation Oscillator Gear Train, Replacement of Parts on Gear Box Back Plate

Step 12. Remove the shaft of sprocket MP631 from the rear cover.

Step 13. Remove the bearing, the stop plate and the eleven stop washers from the stop assembly on the shaft of gear MP617. Note the relative positions of the washers as removed.

Step 14. Remove the shaft mounting gear MP617 and the stop assembly collars and disassemble.

Step 15. Remove the Geneva positioner MP687 and disassemble the gear from the shaft.

Step 16. Remove the control shaft which mounts Geneva drive MP610 and disassemble Geneva drive MP610.

Step 17. Slide gear MP695 toward the front of the shaft to unmesh the teeth of gears MP627 and MP695. Carefully drive the roll pin out of gear MP627, and remove gear MP627.

Step 18. Remove the assembly of gears MP622 and MP695, and disassemble.

Step 19. Check the gears not yet removed from the assembly, and remove all pins from gears and collars and the stop pin from the shaft or gear MP618. Remove all retaining rings.

Step 20. Carefully turn the assembly so that the front is accessible. Provide support for the assembly to avoid damage to unremoved parts.

Step 21. Withdraw the counter assembly cover attaching screws, and remove the cover.

Step 22. Remove the shutter guides and the shutter MP712.

Step 23. Remove the shutter arm MP710 and shaft from the housing.

Step 24. Take out the four screws, lockwashers and washers which attach the counter assembly M603 to the housing, and carefully remove the counter. Disassemble the counter assembly only as required.

Step 25. Remove the pins from gear MP613 and MP621. Support the front housing cover on edge and remove the shafts from the rear of the housing. This must be carefully accomplished to avoid damage to the collars and gears which are not pinned but still on the shafts.

Step 26. Remove the vernier MP711 and shaft assembly. Disassemble as required.

Step 27. Withdraw the four screws from the vernier mounting flange. Remove the vernier lock rest, the vernier mounting flange and gear MP618.

Step 28. Disassemble the remainder of parts from the gear assembly.

(5) GEAR DRIVE REASSEMBLY.—To reassemble the gear drive assembly, read the following note and then reverse the disassembly procedure outlined in paragraph 6-3.*f*.(4).

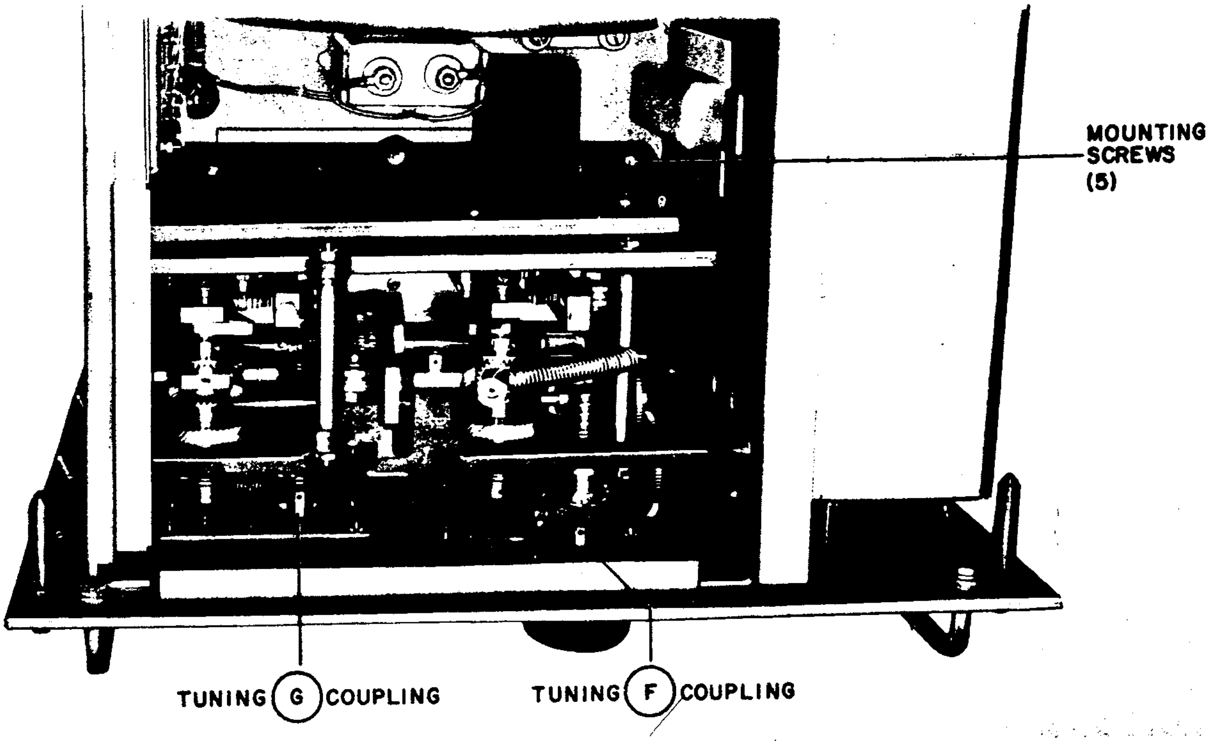


Figure 6-20. Radio Frequency Amplifier AM-2197/WRT-1, Removal of Tuning and Coupling Gear Train

g. RADIO FREQUENCY AMPLIFIER AM-2197/WRT-1.

WARNING

BEFORE SERVICING THE RADIO FREQUENCY AMPLIFIER AM-2197/WRT-1, PLACE EMERGENCY STOP SWITCH S201 ON THE FRONT PANEL OF POWER SUPPLY PP-2222/WRT IN THE OFF POSITION.

(1) GENERAL.—To prepare the r-f amplifier for servicing, release the eight fasteners on the front panel and withdraw the chassis to its extreme of travel. Engage the foul-weather latch on the upper righthand side. Pull the locking plunger at the rear of the amplifier chassis, and rotate the chassis to a position most convenient for servicing the part involved. All procedures outlined in this paragraph may be accomplished with the chassis attached to the console.

If it is necessary to remove the amplifier chassis from the console, disconnect all wiring to the chassis. Then remove the four bolts holding the chassis to the mounting plate portion of the chassis support bearing. The bolts are accessible from the rear of the mounting plate. Then lift and remove the chassis. The interconnecting cable must be pushed through the rear as the chassis is withdrawn. To reinstall the amplifier chassis, attach it to its mounting plate; then rotate the chassis to its upright position. Release its locking mechanism, and slide it back into the console.

(2) R-F AMPLIFIER SUBCHASSIS.—To service the driver unit subchassis, remove the cover from the left side of the amplifier chassis. All parts in this subchassis are easily removed and require no outlined disassembly procedure. The remainder of the electrical subchassis are easily located and readily disassembled.

(3) BLOWER ASSEMBLY.—To remove the blower assembly from the bottom of the amplifier chassis, first disconnect all electrical leads at TB804. Then remove the four screws and nuts from the blower mounting bracket and the two screws and nuts from the motor bracket. The assembly can then be lifted from the amplifier chassis.

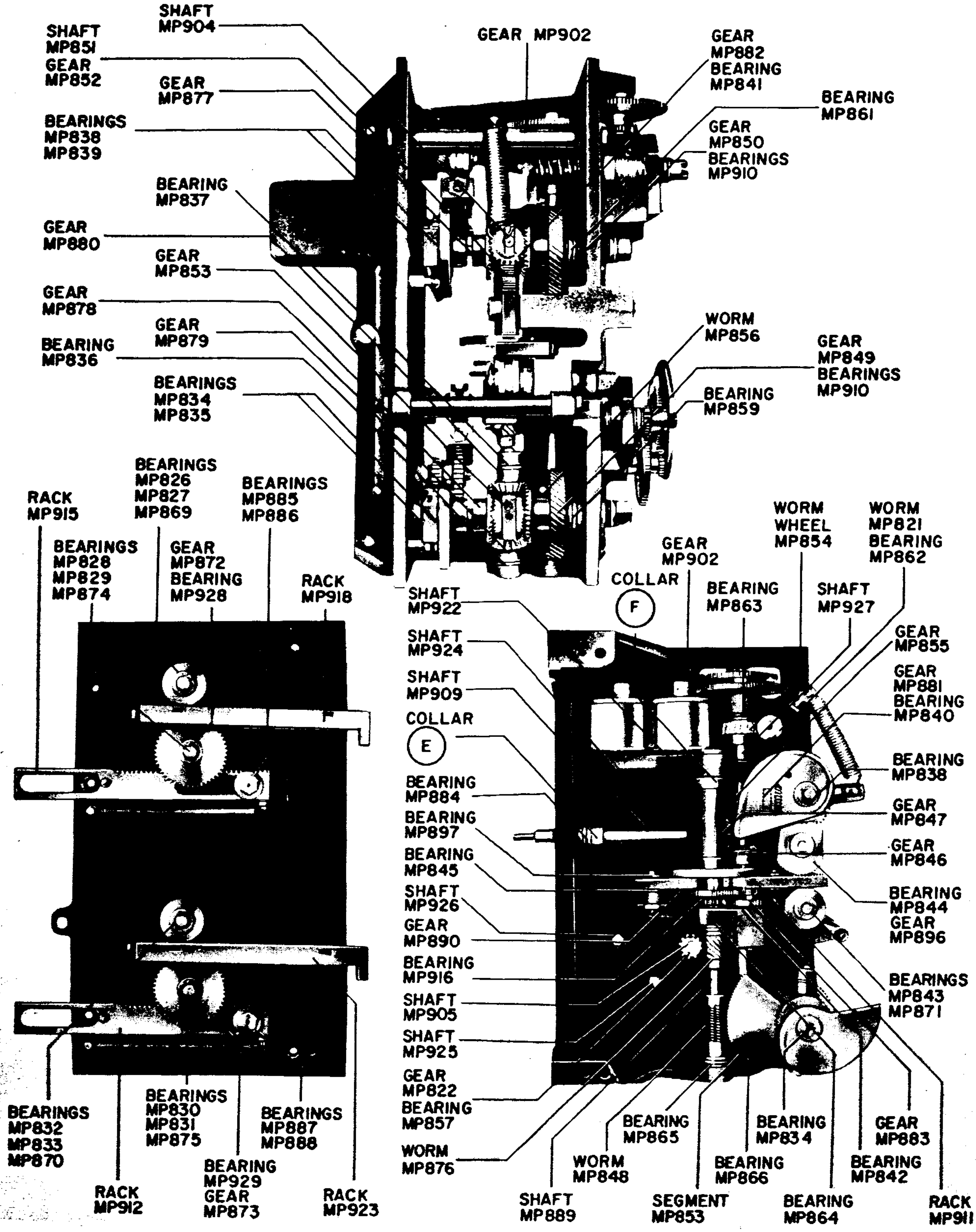
(4) TUNING AND COUPLING GEAR TRAIN REMOVAL.—To remove the tuning head and capacitor gear mechanisms from the amplifier chassis, proceed as follows:

Step 1. Set the TUNING (F) dial on the front panel of the front panel of the amplifier chassis to .30 MEGACYCLES.

Step 2. Loosen the two setscrews in the spline shaft to the tuning capacitor gear mechanism. The shaft is shown in figure 6-20.

Step 3. Refer to figure 6-20 and remove the capacitor cover plate. Disconnect the lead to capacitor C818.

Step 4. Remove the four bolts from the capacitor gear mechanism mounting plate, figure 6-20, and care-



Figur 6-21. Radio Frequency Amplifier AM-2197/WRT-1, Tuning and Coupling Mechanism, Disassembly of Internal Parts in Gear Train

fully lift the mechanism from the amplifier chassis.

Step 5. Support the tuning-head gear mechanism and remove the five mounting bolts holding the mechanism to the amplifier-chassis. The bolts are accessible from the top of the chassis. Take extreme care not to damage movable ferrite cores L805 and L806B which are still attached to the gear mechanism. Shift the mechanism away from the front panel to disengage the TUNING Ⓕ and COUPLING Ⓖ shafts. Lift the gear mechanism from the amplifier chassis.

(5) TUNING AND COUPLING GEAR TRAIN DISASSEMBLY.—To disassemble the tuning-head gear mechanism, refer to figure 6-21 and proceed as follows:

Step 1. Remove the elastic stop nut and retaining ring from each of the rack follower posts.

Step 2. Slide the follower posts from the gear housing; and remove the two rack followers, coil racks MP918 and MP923, and coil slugs L805B and L806B.

Step 3. Remove all anti-backlash springs (not illustrated) from the tuning head gear mechanism.

Step 4. Remove one nut and lockwasher at the rear from each of the four studs joining the two halves of the gear box housing.

Step 5. Lay the gear housing on its front (dial side), and carefully separate the two housing halves. Take care that the differential assemblies and associated thrust bearings and washers do not fall from their assembled positions.

Step 6. Remove the thrust bearings and washers from the two differential shafts.

Step 7. Remove the two coil drive cams and the differential gears shown in figure 6-21.

CAUTION

WHEN PINS ARE BEING DRIVEN OUT OF GEAR AND SHAFT ASSEMBLIES, MAKE SURE THAT THE SHAFT IS SUPPORTED.

Step 8. Refer to figure 6-22 and remove the retaining pin from the tuning dial gear MP891 and remove the gear and dial E927. Remove the pins from gears MP899 and MP898 and remove the gears.

Step 9. Remove gear MP892 and the thrust bearing MP867 from the associated shaft. Remove the pin from stop collar Ⓐ. Remove retainer plate Ⓑ. Remove gear MP822 (figure 6-16), bearing MP857 and collar Ⓐ and its stop washers. Remove collar Ⓒ and bearing MP868. Remove the pin from collar Ⓓ.

Step 10. Turn shaft and worm assembly MP821 until it is free of worm wheel MP854. Then withdraw assembly MP821 from the back of the gear housing. Remove bearing MP862.

Step 11. Remove the pins from gears MP854, MP855, MP846, MP856, and MP902.

Step 12. Secure a drive pin with a diameter slightly smaller than that of the shaft described in step 12. Placing the drive pin against the lefthand end of the shaft, gently tap it from the gear housing, collecting each part as it clears the shaft. Be sure that none of the parts bind during removal.

Step 13. Remove the pin from collar Ⓔ (figure 6-21) and from gear MP847. Remove shaft MP909 and remove miter gear MP847, collar Ⓔ and bearing MP884.

CAUTION

WHEN THE PIN IS REMOVED FROM THE COLLAR IN STEP 14, TAKE CARE NOT TO EXERT PRESSURE ON THE OPPOSITE END OF THE SHAFT, SINCE IT IS SUPPORTED SOLELY BY A PRECISION BEARING AND THE SHAFT OF GEAR 0853.

Step 14. Remove the pin from the L806 drive cam and then remove the one from gear MP890. Remove the pin from the collar Ⓕ on the same shaft as the L806 drive cam. Remove the retaining ring from the opposite side of the web. Remove the cam, collar Ⓕ and shaft.

Step 15. Remove the two shoulder studs from rack assembly MP911 and carefully slip the rack assembly from the gear box housing.

Step 16. Remove the pin from gear MP822.

Step 17. Remove shaft MP905, collar Ⓓ and its stopwashers and thrust bearing MP857 from the casting.

Step 18. Remove the pins from gears MP848 and MP876. Using a drive pin, gently tap and remove shaft and gear assembly MP889 from the right-hand side of the gear housing. Collect each part as it clears the shaft.

Step 19. Remove all remaining parts in the tuning head gear mechanism.

(6) TUNING AND COUPLING GEAR TRAIN ASSEMBLY.—To reassemble the tuning head gear mechanism, refer to figures 6-21 and 6-22 and proceed as follows:

Note

In the following procedure, all parts to be pinned are treated as replacement parts. It should be possible to pin all original mating parts through the original pinning holes as each adjustment is completed. All replacement spur, helical and worm gears, and collars which are to be fixed to their shafts, should be temporarily attached with setscrews. When any shaft section has been assembled adjust the gears and collars by means of the setscrews so that there is from 0.001 to 0.002 inches end play in the shaft. Adjust all bevel and miter gears, including the two differential assemblies, to mesh properly on the pitch circle with minimum backlash without binding. To

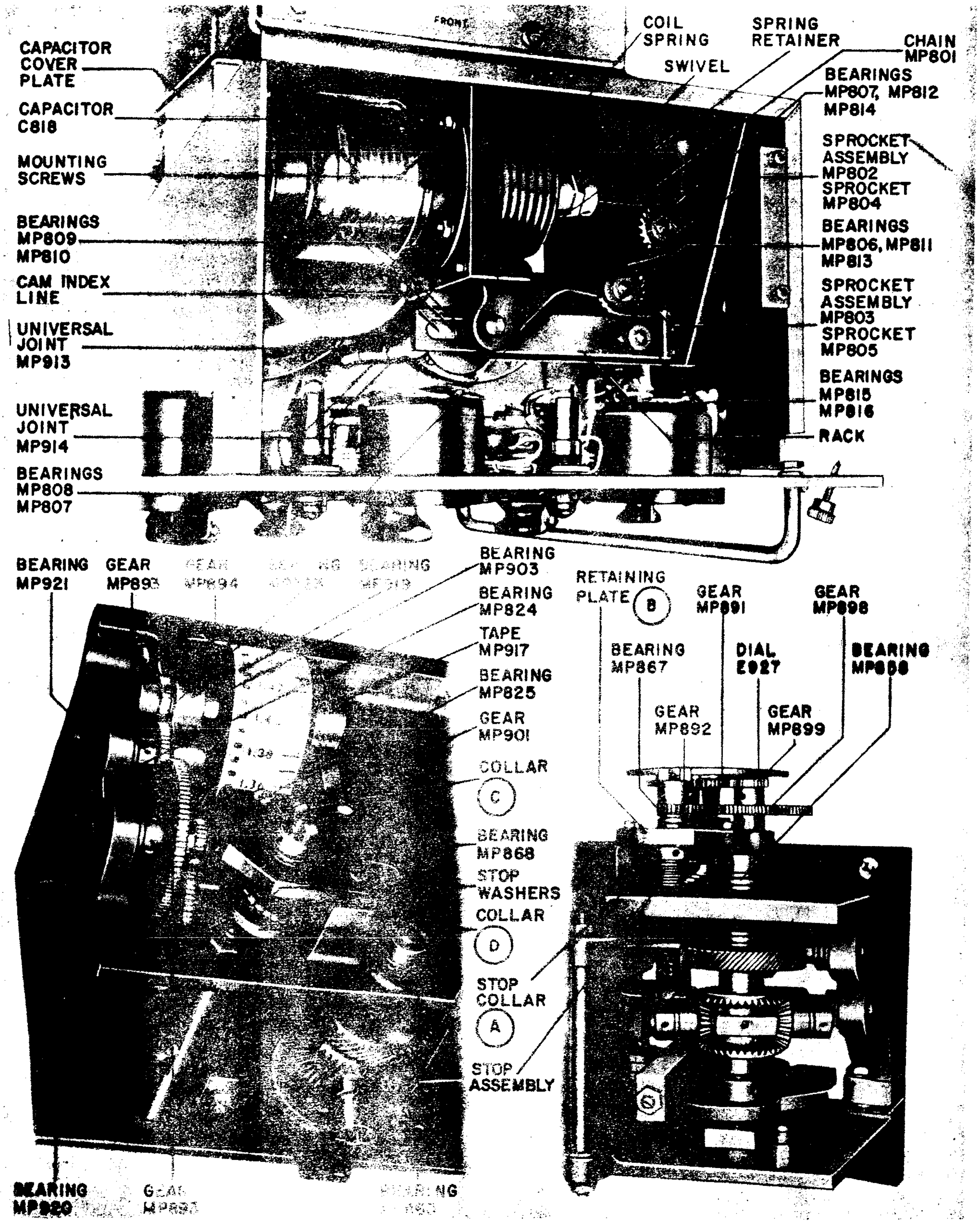


Figure 6-2 [illegible] AM-2197/WRT-1 [illegible] Tuning and Coupling Mechanism, [illegible] Internal Parts and Capacitor Drive pin the gear or collar to its shaft, use the predrilled hole in the hub or collar as a pilot, and drill through the specified diameter hole. Make sure that the assembly is supported from the rear when the hole is drilled. Then insert the spring pin through the hole. Do not pin the gear or collar to its shaft until so instructed in the following steps.

Step 1. Replace gear MP822, shaft MP905 and bearing MP857. Replace the stop assembly on shaft MP905 and tighten the setscrew in collar Ⓐ. Replace the retaining plate Ⓑ. Replace thrust bearing MP867 and gear MP892. Drill and pin the gears and collar.

Step 2. Assemble gears MP898 and MP899, and the gear MP891 and dial E927. Secure the gears and collar with setscrews and then drill and pin them.

Step 3. Assemble rack assemblies MP912 and MP915 to the rear panel of the gear housing. Each assembly is composed of two shoulder screws, two bearing washers and two elastic stop nuts.

Step 4. Slide gear assemblies MP872 and MP873, thrust washers, and retaining rings on their respective shafts on the rear panel.

Step 5. Slide shaft-pinion assembly MP889 through the cast flange in the center of the housing front panel. Place the thrust bearing MP864, worm MP876, worm MP848, and second thrust bearing MP865 onto the shaft as it is inserted through the center cast flange and into the cast flange on the right side of the housing. Temporarily secure the gears with setscrews.

Step 6. Slide the shaft MP905 for gear MP822 through the front housing and install thrust bearing MP857 and gear MP822. Assemble the stop collar, end stop washer, ten stop washers, and the retainer plate on the shaft as shown in figure 6-22. Make sure that the tabs on the stop washers face toward the front panel of the housing and that gear MP822 mates with gear MP876. Insert a 0.002 inch thick shim between any two stop washers. Secure the stop washer housing and tighten the setscrew in the end stop washer. Remove the shim. Replace bearing MP867 and gear MP892.

Step 7. Place gear MP898 and gear MP899 on the section of the shaft protruding through the gear housing front panel as shown in figure 6-22. Make sure gears MP892 and MP898 mesh. Then replace gear MP891 and dial E927 with setscrews.

Step 8. Install gear assembly MP883 through the miniature precision bearings in the center cast flange of the gear housing, and secure it with the retaining ring.

Step 9. Slide the shaft for the L806 drive cam through the left flange of the gear housing, and place the collar Ⓕ on the shaft.

Step 10. Place gear MP890 on the shaft as shown in figure 6-21.

Step 11. Carefully press the precision bearing MP916 into the hub of the gear-shift assembly MP889.

Step 12. Insert the end of the L806 drive cam shaft into the bearing installed in step 11.

Step 13. Pin collar Ⓕ through the original hole and replace the retainer ring on the end of the shaft.

Step 14. Pin the L806 drive cam to its shaft using a drilled 3/32 inch diameter pin hole. Pin gear MP890.

Step 15. Slide the remaining long shaft MP927 into the lefthand flange of the front panel. Refer to figure 6-21 and place the thrust bearing assembly MP863, and worm wheel MP854 over the shaft before it is inserted into the second flange.

Step 16. After passing the shaft through the second flange, slip gear MP855 and bevel gear MP846 before passing the shaft through the third flange. Place gear MP856 and bearing MP866 on the end of the shaft before inserting the shaft into the fourth and last flange.

Step 17. Place the oilite thrust bearing and gear MP902 over the section of the shaft protruding from the lefthand flange.

Step 18. Temporarily tighten the setscrews in the gears and collars assembled in steps 15 through 17.

Step 19. Install the capacitor shaft through the two mounting flanges on the gear housing. Install the thrust bearing MP884, collar Ⓔ and miter gear MP847 on the shaft and secure with setscrews.

Step 20. Slide shaft and worm assembly MP821 through a thrust bearing MP862 and into the rear of the gear housing front panel until it contacts worm wheel MP854. Turn the shaft and gear into mesh with the worm wheel.

Step 21. Assemble collar Ⓓ and the stop washers on the shaft as shown in figure 6-19 and then replace the retaining plate.

Step 22. Replace bearing MP868 and collar Ⓒ. Replace the remaining tape drive gears and bearings as shown in figure 6-22.

Step 23. Lay the front panel of the gear housing on its front surface being careful not to damage the dial surface. Slip the two differential shafts into the bearing inserts in the front panel.

Step 24. Assemble the thrust bearings, helical and bevel gear assemblies MP849 and MP850, coupling segment and shaft assemblies MP853 and MP852, bevel gears MP877 anr MP878, the two coil drive cams and the thrust bearings on the differential shafts as shown in figure 6-21. Temporarily secure all parts where setscrews are available.

Step 25. Assemble bevel gear pinions MP879, MP880, MP881 and MP882, and the thrust washers and collars on segment and shaft coupling assemblies MP853 and MP852, figure 6-21. Pin the pinions to their respective shafts using 3/32 inch diameter pin holes.

Step 26. Set racks MP915 and MP912 at the extremes of travel opposite that shown in figure 6-21. With rack MP915 disengaged from gear MP872, set the L-shaped end of rack MP918 two and nine thirty-seconds inches from the adjacent edge of the casting (in the direction of travel). Mesh rack MP915 with gear MP872 and be sure that this setting is not disturbed until step 30 has been performed.

Step 27. Disengage rack MP912 from gear MP873 and set the L-shaped end of rack MP923 two and one sixteenth inches from the adjacent edge of the casting (in the direction of travel). Mesh rack MP912 with gear MP873 and be sure that this setting is not disturbed until step 30 has been performed.

Step 28. Join the two halves of the tuning and coupling gear train and secure them.

Step 29. Set COUPLING Ⓖ to "O" and set the L806 drive cam so that the pin is 3/32 inch from the inner end of its groove. Pin gears MP876 and MP890.

Step 30. Reset COUPLING Ⓖ to "50" and set rack MP911, idler MP896 and segments MP853 and MP851 on center. Lock these parts in this position and drill and pin them. Pin worm MP848.

Step 31. Set COUPLING Ⓖ to "O" and adjust collar Ⓐ (figure 6-22) to stop the dial at "O". Secure the collar with a setscrew and then drill and pin it.

Step 32. Set TUNING Ⓕ to 0.30 MC and then set COUPLING Ⓖ at 100.

Step 33. Set the coil drive cam for L806 so that the rack pin is 3/32 inch from the inner end of the groove. Drill and pin the cam.

Step 34. Set the COUPLING Ⓖ to "O" and leave the TUNING Ⓕ at 0.30 MC.

Step 35. Set the coil drive cam for L805 so that the rack pin is 3/32 inch from the inner end of the groove. Drill and pin the cam.

Step 36. Set the collar Ⓓ on TUNING Ⓕ shaft so that the stop assembly prevents counter-clockwise rotation of the shaft when the dial tape reads 0.30 MC. Drill and pin the collar.

Step 37. Replace the ferrite cores for L805 and L806 and screw them completely into their respective racks.

Step 38. Replace all anti-backlash springs.

(7) TUNING AND COUPLING UNIT REPLACEMENT.—To replace the tuning and coupling unit in the amplifier chassis, reverse the procedure outlined in paragraph 6-3*g*(4), then proceed as follows:

Step 1. Remove the cover plate from the front left side of the amplifier chassis.

Step 2. Loosen the two setscrews in the tuning shaft universal joint MP914 to the tuning capacitor gear mechanism. See figure 6-20.

Step 3. Maintaining the setting of the TUNING Ⓕ knob at 0.30 mc, rotate the capacitor drive cam until the scribe mark on the cam is parallel to the side of the capacitor rack. Then tighten the setscrews in the universal joint.

Step 4. Rotate the COUPLING Ⓖ knob to read 50 on dial E927. Turn the TUNING Ⓕ knob to its extreme counterclockwise position (approximately 0.30 mc). Loosen the setscrew in the coupling between tuning coil rack MP918 and the shaft of movable tuning slug L806B. Manually turn the tuning slug into coil housing L806A until the tuning slug is approximately 1/16 inch away from the top of the coil housing. The slug may be turned all the way into the coil housing then backed off 1/16 inch. Tighten the setscrew between rack MP918 and the shaft of tuning slug L806B.

Step 5. Rotate the COUPLING Ⓖ knob to read "O" on dial E927. Retain the TUNING Ⓖ knob in its 0.30 MC position. Loosen the setscrew in the coupling between coupling coil rack MP923 and the shaft of movable coupling slug L805B, and adjust the tuning slug as in step 4.

(8) TUNING AND COUPLING UNIT ALIGNMENT.—To align the tuning and coupling unit, refer to paragraph 6-2*f*(7).

b. RADIO FREQUENCY TUNER TN-345/WRT-1.

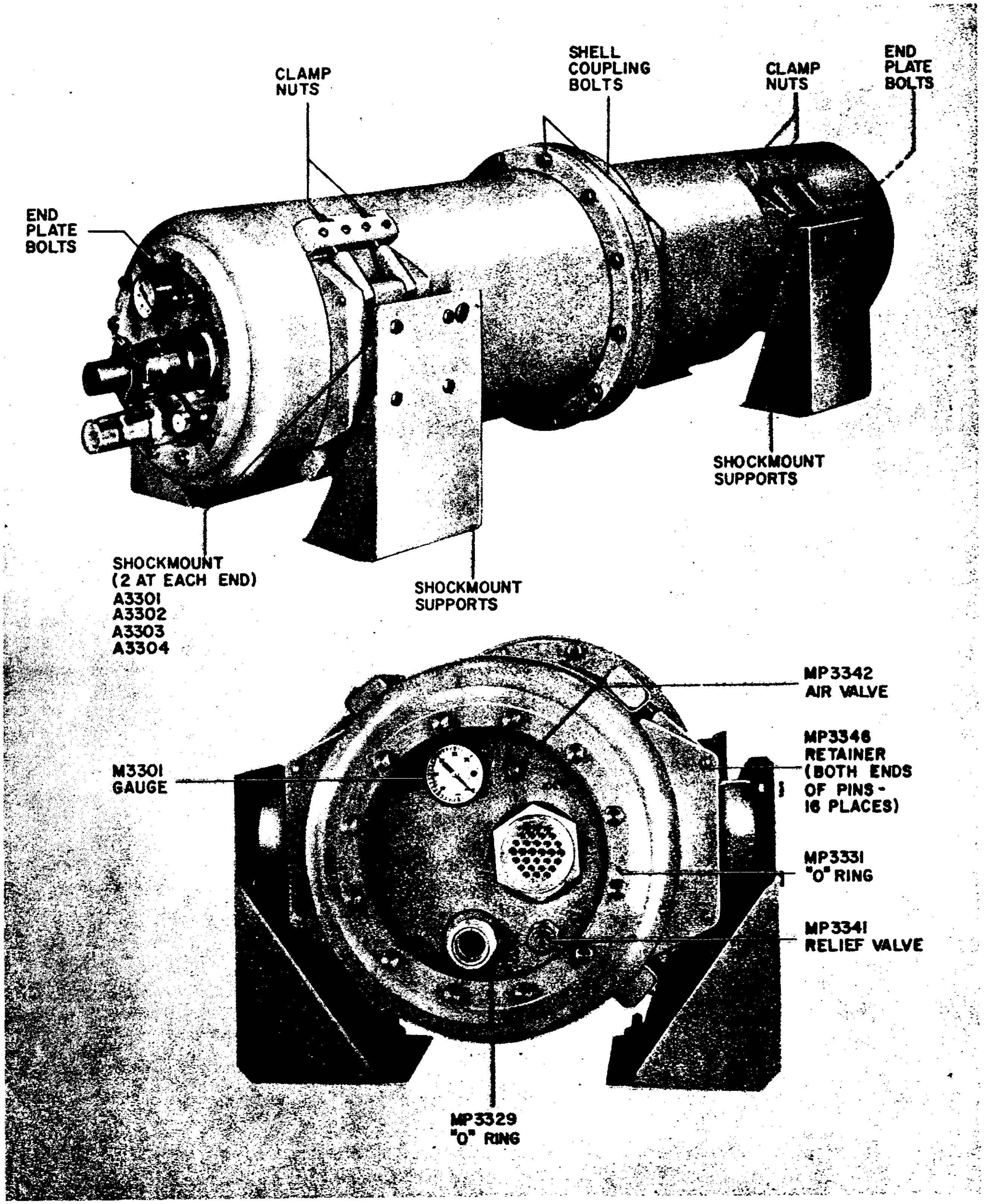
(1) GENERAL.— The first step in disassembly of the r-f tuner is to remove it from the permanently mounted shockmount supports so that the case may be removed. It is mandatory that the inside of the r-f tuner be kept clean and absolutely free from any moisture. In order to perform maintenance properly the unit must be taken to a clean, enclosed work area. If the motor and control circuitry is operative, depress DOWN switch S804 on Radio Frequency Amplifier AM-2197/WRT-1 until POSITION INDICATOR M802 indicates zero. If these circuits are inoperative, the position of the shorting disc in the tuner assembly will have to be set manually as directed in the appropriate paragraph. Remove the grounding strap and all interconnection cabling.

CAUTION

THE R-F TUNER WEIGHS APPROXIMATELY 135 POUNDS. BLOCK THE UNIT AS CAREFULLY AS POSSIBLE BEFORE REMOVING THE SHOCKMOUNT BOLTS.

Remove the four bolts which secure each shockmount to its support. Remove the r-f tuner from the supports. Do not dent the case or strike the receptacles, valves, etc., which protrude from the ends of the case. Refer to figures 6-23 and 6-24 during removal and disassembly.

(2) REMOVAL OF R-F TUNER FROM CASE. —To remove the r-f tuner from its case, refer to figure 6-23 and proceed as follows:



Figur 6-23. Radio Frequency Tuner TN-345/WRT-1, Removal of Case

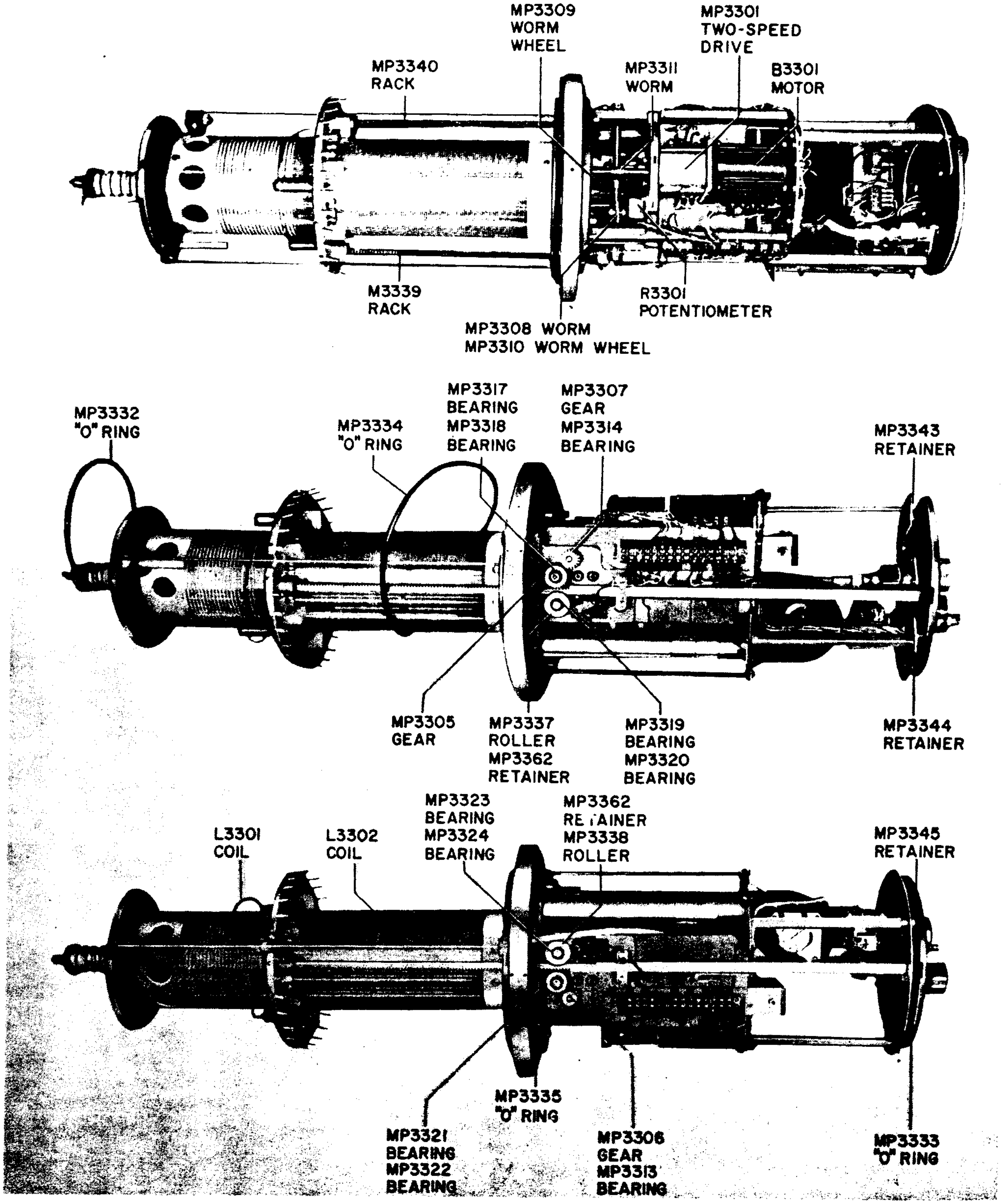


Figure 6-24. Radio Frequency Tuner TN-345/WRT-1, Replacement of Internal Parts

Step 1. Discharge the dry nitrogen from the unit by removing the cap from the tank valve MP3342 and depressing the valve stem to release the gas. Discharge gas until gauge M3301 indicates zero pounds pressure.

Step 2. Remove the hex head bolts from both end plates and from the center coupling flanges.

Note

If the motor or control circuitry was inoperative and the position of the sliding short could not be set to zero electrically as directed in the preceding paragraph, proceed as follows: Remove the case half next to the pressure gauge end of the r-f tuner. Refer to figure 6-24 and rotate worm MP3311 until racks MP3339 and MP3340 press against the end plate which mounts the pressure gauge. Proceed with step 3.

Step 3. Carefully withdraw the case halves axially. Withdraw them as nearly along the axis of the tuner as possible. Block the tuner assembly so that it cannot roll and keep it blocked during disassembly and assembly.

(3) DISASSEMBLY OF R-F TUNER.—The majority of parts in the r-f tuner require no special procedures or techniques for replacement. The unit should be kept clean and dry during all servicing. The racks MP3339 and MP3340, and their driving gears are identical on opposite sides of the r-f tuner so only one side will be discussed. To disassemble the r-f tuner, refer to figure 6-24 and proceed as follows:

(*a*) MOTOR B3301.—Remove motor B3301 in the following steps:

Step 1. Identify and disconnect the motor leads at the side of the motor. Disconnect the two leads on the two-speed drive circuit attached to the motor.

Step 2. Remove the setscrews in the output shaft of the two-speed drive at worm MP3311.

Step 3. Remove the mounting screws in the plate at the end of motor B3301 opposite the two-speed drive and the two screws in the back mounting flange of the motor B3301. Work the plate away from the drive motor as far as necessary to slip the drive motor B3301 and the two-speed drive MP3301 out of the r-f tuner.

Step 4. Remove the two-speed drive unit, MP3301, by removing the four screws which secure it to the motor, B3301.

(*b*) GEARS MP3306 OR MP3307.—To remove either of these gears, remove the setscrew and pin from the gear and pull the gear from its shaft. Only one of the gears should be removed at a time to avoid upsetting the mechanical relationship between the driving shaft and the racks. If this relationship is disturbed the setting of position potentiometer R3301 will not longer be accurate.

(*c*) GEARS MP3304 OR MP3305.—To remove either of these gears, remove the nut, lockwasher and plain washer from the face of the gear. Pull the gear and its bearings from the stud. Remove the bearings and the separating spacer from the gear. Remove only one gear at a time and replace it before removing the opposite one.

(*d*) ROLLERS MP3337 OR MP3338.—To remove either of these rollers, remove the nut, lockwasher and plain washer from the face of the roller. Press the stud through the roller and lift the roller from its counterbore in the mounting plate. Lift the edge of the roller which is away from the rack to get the inner flange away from the rack.

(*e*) WORM WHEEL MP3309.—To remove this worm wheel, first remove the mounting screws for both the two-speed drive MP3301 and the motor B3301. Remove the pin form worm wheel MP3309. Remove gears MP3306 and MP3307 by removing the setscrew and pin from each and pulling them from the shaft. Carefully block the motor and two-speed assembly away from the axial center line of the tuner just enough to permit the worm wheel MP3309 to slip side ways under the worm MP3311. Push the shaft of worm wheel MP3309 out of the tuner toward the side where potentiometer R3301 is mounted.

(4) REASSEMBLY OF R-F TUNER.—All replaceable parts and sub-assemblies of the r-f tuner are reassembled in reverse order from the disassembly procedure outlined in the preceding paragraphs. If the setting of potentiometer R3301 has been disturbed with respect to the position of racks MP3339 and MP3340, the potentiometer must be reset. Connect an ohmmeter across terminals 4 and 5 of TB3302. Rotate the worm MP3311 until the sliding short is centered on coil LL3302. Loosen the mounting unit for potentiometer R3301 and rotate the potentiometer until the meter indicates 5000 ohms. Tighten the mounting nut. When replacing the case halves, every seal ring must be checked to be certain that they are properly seated and that there is no foreign material on them to permit a gas leak. Pressurize the r-f tuner after reassembly as directed in paragraph 2-4*c*(2) in Section 2.

i. ANTENNA COUPLER CU-760/WRT-1.—Disassembly of the Antenna Coupler CU-760/WRT-1 is relatively simple and involves no difficult procedures.

CAUTION

REDUCE INTERNAL PRESSURE BY REMOVING THE COVER FROM VALVE MP3502 AND DEPRESSING THE CENTER STEM UNTIL GAGE MP3501 INDICATES ZERO PRESSURE.

Remove the row of bolts arranged in a circle at the end of the coupler unit opposite the pressure gage. Remove the row of bolts around the rim of the end with the gage and then carefully pull the coupler unit from its case. Reassembly is accomplished by reversing this procedure. Be sure that the gaskets are properly

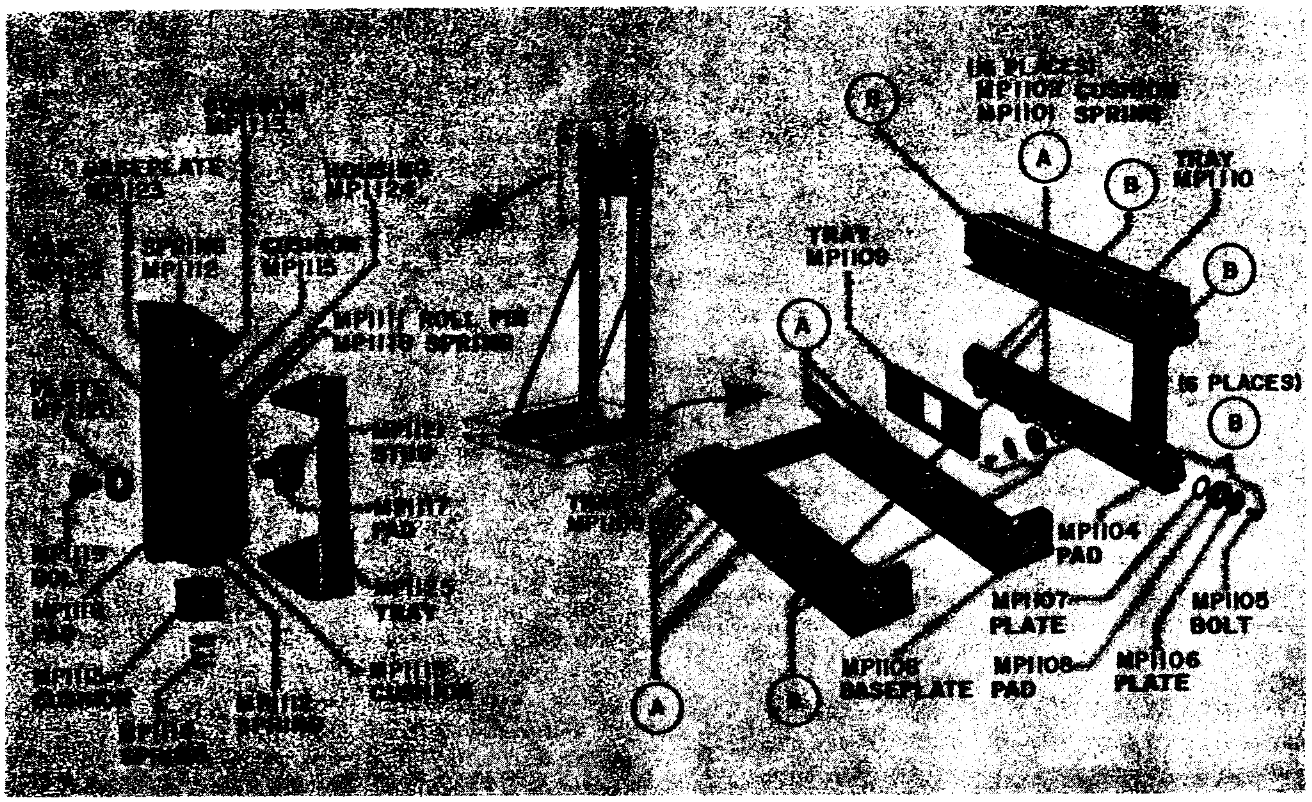


Figure 6-25. Mounting MT-2170/WRT, Replacement of Parts

seated at both ends. Pressurize in accordance with paragraph 2-4*c*(2).

j. Mounting MT-2170/WRT.—Disassembly and assembly of Mounting MT-2170/WRT requires no special instructions. Remove Radio Set AN/WRT-1 and anchor it securely before attempting to service the mounting. Refer to figure 6-25 for Mounting MT-2170/WRT or to figure 6-25A for Mounting MT-2170A/WRT when assembling or disassembling the mounting

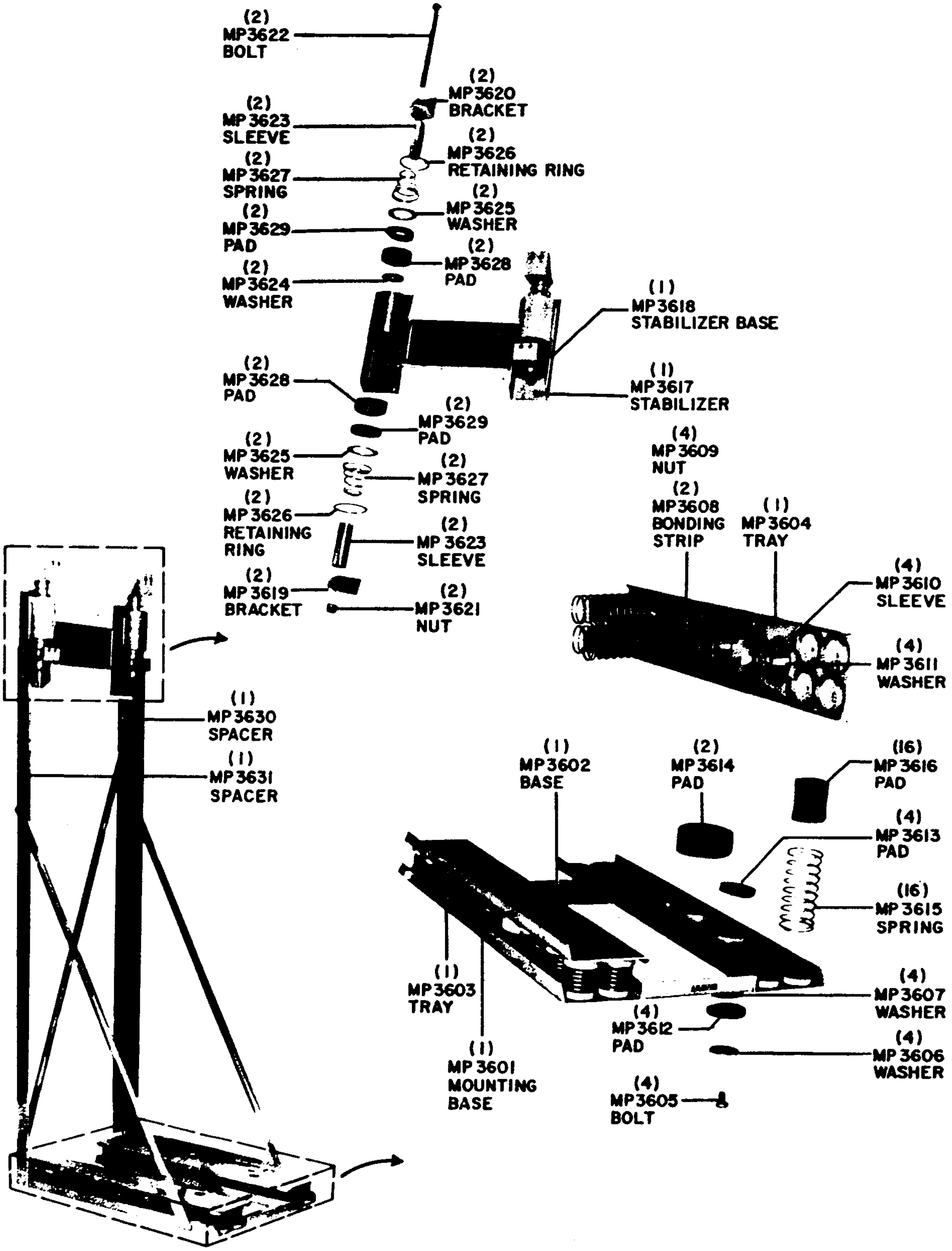


Figure 6-25A. Mounting MT-2170A/WRT, Replacement of Parts

SECTION 7-A
SUPPLEMENTARY PARTS LIST

7-0. SCOPE OF PARTS LIST CHANGES.

a. The stock numbers and support information that appear in this section have been revised. The Allowance Parts List (APL) issued by the Electronics Supply Office includes Federal Stock Numbers and Source Maintenance and Recoverability Codes. Therefore, reference shall be made to the APL for this information. The APL, rather than this publication, shall govern if there is any conflict between stock numbers and support information.

b. The numbers in the NOTES column in Tables 7-1 and 7-1A refer to the following additional information:

1—Used only in AN/WRT-1 equipments with serial numbers 1 through 141.

2—Used only in AN/WRT-1 equipments with serial numbers 142 and up.

3—Used only in AN/WRT-1 equipments with serial numbers 297 and up.

4—Used only in AN/WRT-1A equipments with serial numbers A1 to A27.

c. Parts with no numbers in the NOTES column are used on all sets.

d. The parts list section has been corrected by means of the following supplementary table. Always refer to the appropriate supplementary table for a given item first, as it completely supersedes any corresponding listing in the basic table. If no information is shown for a given item, then refer to the basic table for the required information.

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST

POWER SUPPLY PP-2222/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
T201ALT.A	2	TRANSFORMER, POWER, STEP-UP OPEN FRAME: 4 primary windings ea 110 v, 60 cycles, single phase, 1 secondary winding 803 v tapped at 373 v and 545 v, 2100 v max insulation, air cooled, impregnated, mfr 89661 dwg 376A501H01.	HV Rectifier Plate Fig. 6-51
T202ALT.A	2	Same as T201ALT.A.	HV Rectifier Plate Fig. 6-51
T203ALT.A	2	Same as T201ALT.A.	HV Rectifier Plate Fig. 6-51

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

C320ALT.A	2	CAPACITOR FIXED DIELECTRIC: 2 μf ±10%, 600 vdc; CP54B1EF205K, Spec MIL-C-25.	Plus 250-volt Supply Filter Fig. 6-39A
E303ALT.A	2	BOARD, MOUNTING: 24 solder stud terminals, mfr 89661, dwg 341C924G02.	Resistor Mtg. in Regulator Fig. 6-39A
E310		SHIELD, ELECTRON TUBE: Heat dissipating, SO967, Spec MIL-S-19786.	Tube Shield for V302 Fig. 6-41
E311		SHIELD, ELECTRON TUBE: 1¾ in. h, 0.810 in. dia, mfr 91662, type 120V-P35.	Tube Shield for V308 Fig. 6-39
E312		Same as E310.	Tube Shield for V307 Fig. 6-39
E313		SHIELD, ELECTRON TUBE: Heat dissipating, SO762, spec MIL-S-19786.	Tube Shield for V301 Fig. 6-31
J301		CONNECTOR, RECEPTACLE, ELECTRICAL: Kel-F insulator, silver plated brass body, straight type, mfr 74868 type 48925.	RF Output T301 Fig. 6-41
J302		Same as J301.	RF Output T302 Fig. 6-41
J303		Not Used.	
J304		CONNECTOR, RECEPTACLE, ELECTRICAL: Kel-F insulator, silver plated brass body, straight type, mfr 74868, type 44575.	Oscillator Tank Fig. 6-38
MP330		RETAINER, ELECTRON TUBE: 1.625 in. d closed, 0.88 in. w, mfr 07344, type 926H-5.	Clamp for V306 Fig. 6-39
MP331		RETAINER, ELECTRON TUBE: 1.593 in. dia, 0.8125 in. w, w/o holding spurs, mfr 07344, type 926H-13.	Clamp for V454 Fig. 6-40
MP332 thru MP399		Not Used.	

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R347		RESISTOR, FIXED, COMPOSITION: 220,000 ohms ±10%, 1 w, RC32GF224K, spec MIL-R-11.	Plate Load V307B Fig. 6-39
R387		RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, ½ w, RC20GF223K, spec MIL-R-11.	FSK Reactor Input Divider Fig. 6-42
R388		RESISTOR, FIXED, COMPOSITION: 1000 ohms ±5% ½ watt, RC20GF102J, spec MIL-R-11.	Series Grid V306 Fig. 6-39
R389		Same as R388.	Series Grid Fig. 6-39
R390 thru R399		Not Used.	
XK301		SOCKET, ELECTRON TUBE: 8 contacts, miniature, beryllium copper, silver plated contacts w/shock shield base, TS101P02, spec MIL-S-12883.	For K301 Fig. 6-42
CR454ALT.A	3	SEMICONDUCTOR DEVICE, DIODE: Silicon, 125 v max reverse working, 150 v zener breakdown; mfr 28959, type 1N458. Used on unit 297 and up.	Voltage Reference Diode for V450A Fig. 6-40
E459		SHIELD, ELECTRON TUBE: 2¼ in. h, 0.810 in. dia, mfr 91662, type 149V-P35.	Tube Shield for V452 Fig. 6-40
E460		Same as E459.	Tube Shield for V453 Fig. 6-40
E461		Same as E310.	Tube Shield for V450 Fig. 6-40
E462		Same as E313.	Tube Shield for V451 Fig. 6-40
E463 thru E499		Not Used.	
R401 thru R448		Not Used.	
R449		RESISTOR, FIXED COMPOSITION: 120 ohms ±10%, ½ w, RC20GF121K, spec MIL-R-11.	Frequency Control Termination Fig. 6-40
R467		RESISTOR, FIXED, COMPOSITION: 3900 ohms ±10%, 2 w, RC42GF392K spec MIL-R-11.	Bias CR451 Fig. 6-40
R483		RESISTOR, VARIABLE: 500,000 ohms ±10%, 2 w, RV4LAYSA-504A, spec MIL-R-94.	FSK Wave Shaping
R484		RESISTOR, FIXED, COMPOSITION: 820 ohms ±10%, ½ w, RC20GF821K, spec MIL-R-11.	Frequency Control Termination Fig. 6-40

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

CR501ALT.A	2	SEMICONDUCTOR DEVICE, DIODE: 600 v peak inverse, 350 to 600 ma at 150 deg C, type 1N547, spec MIL-E-1.	Plus 350 V Rectifier Fig. 6-49
CR502ALT.A	2	Same as CR501ALT.A.	Plus 350 V Rectifier Fig. 6-49
CR503ALT.A	2	Same as CR501ALT.A.	Plus 350 V Rectifier Fig. 6-49
CR504ALT.A	2	Same as CR501ALT.A.	Plus 350 V Rectifier Fig. 6-49
CR505ALT.A	2	Same as CR501ALT.A.	Plus 350 V Rectifier Fig. 6-49
CR506ALT.A	2	Same as CR501ALT.A.	Plus 350 V Rectifier Fig. 6-49
CR507ALT.A	2	Same as CR501ALT.A.	Plus 350 V Rectifier Fig. 6-49
CR508ALT.A	2	Same as CR501ALT.A.	Plus 350 V Rectifier Fig. 6-49
CR509ALT.A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 6-49

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
CR510ALT.A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 6-49
CR511ALT.A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 6-49
CR512ALT.A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 6-49
CR513ALT.A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 5-49
CR514ALT-A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 6-49
CR515ALT.A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 6-49
CR516ALT.A	2	Same as CR501ALT.A.	Minus 350 V Rectifier Fig. 6-49
K508	3	Delete.	
Q502ALT.A	2	TRANSITOR: Power, 3 amp, 20 watt, 45v, mfr 08792, type 2N1330.	Switching Transistor Fig. 6-49A
S504ALT.A	2	SWITCH, PUSH: Momentary action, 30 v dc, 3 amp, red button, mfr 74059, type 2PB8.	Plate Power Off Fig. 6-49
S511	2	SWITCH, TOGGLE: Double pole, 3 position, 125 V AC, 25 amp, ST52N, spec MIL-S-21195.	Multikeying Selector Fig. 6-49A
XF501ALT.A	2	FUSE HOLDER: 20 amp, 250 v, brass terminals; FHL17G, spec MIL-F-19207.	For F501 Fig. 6-49
XF502ALT.A	2	Same as XF501ALT.A.	For F502 Fig. 6-49
XF503ALT.A	2	Same as XF501ALT.A.	For F503 Fig. 6-49
XF504ALT.A	2	FUSE HOLDER: Brass terminals plastic body FHL18G, spec MIL-F-19207.	For F504 Fig. 6-49
XF505ALT.A	2	FUSE HOLDER: Indicating, 14 v, mfr 71400, type HRT-W.	For F505 Fig. 6-49
XS506		SOCKET, ELECTRON TUBE: 7 contacts miniature no missing contact, plastic body provisions for mtg layout type electron type shield, T.S102P01, JAN-S-28, Same as XV301.	For Switch S506 Fig. 6-49

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

C609	2	CAPACITOR, FIXED CERAMIC DIELECTRIC: 4700 μμf ±20%, 500 v dc, working; CK62AW472M, spec MIL-C-11015.	I-F Mixer Coupling Fig. 6-46A
C610	2	Same as C609.	I-F Mixer Coupling Fig. 6-46A
C611		Not Used.	
C612		Not Used.	
C615ALT.A	2	CAPACITOR, FIXED, MICA DIELECTRIC: 150 μμf ±5%, 500 v dc, working; CM15C151J, spec MIL-C-5.	Pulse Coupling Fig. 6-46A
C616ALT.A	2	Same as C615ALT.A.	Pulse Coupling Fig. 6-46A
C617ALT.A	2	Same as C615ALT.A.	Pulse Coupling Fig. 6-46A
C618ALT.A	2	Same as C615ALT.A.	Pulse Coupling Fig. 6-46A
C631ALT.A	2	CAPACITOR, FIXED, MICA DIELECTRIC: 180 μμf ±5%, 500 v dc, working; CM15C181J, spec MIL-C-5.	Pulse Shaping Fig. 6-46A
C656		CAPACITOR, FIXED MICA DIELECTRIC: 4700 μμf ±10%, 500 v dc, working; CM35B472K, spec MIL-C-5. Same as C303.	Screen Bypass V606 Fig. 6-46
C683ALT.A	2	CAPACITOR, VARIABLE, AIR DIELECTRIC: 75 μμf, 600 v ac working, CT1C075, JAN-C-92.	Plate Circuit Tuning Fig. 6-47
C684ALT.A	2	CAPACITOR, FIXED, MICA DIELECTRIC: 300 μμf ±2%, 1000 v dc working, mfr 72136, type VCM20D331G.	Coupling T608 Fig. 6-47
C685ALT.A	2	CAPACITOR, FIXED, MICA DIELECTRIC: 10 μμf ±10%, 1000 v dc working, mfr 72136, type VCM20C100K.	Coupling T606 Fig. 6-47
C694ALT.A	2	Same as C613.	B plus Decoupling Fig. 6-47

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E601	2	BOARD, COMPONENT MOUNTING: C/O micarta board and 37 stud type terminals; mfr 89661, dwg 346C132G01.	Component Mounting and Insulation Fig. 6-46A
E602		SHIELD, ELECTRON TUBE: Heat dissipating, SO967, spec MIL-S-19786. Same as E310.	Tube Shield for V601 Fig. 6-46
E603		Same as E602.	Tube Shield for V602 Fig. 6-46
E604ALT.A	2	BOARD, COMPONENT MOUNTING: c/o micarta board and 24 stud type terminals; mfr 89661, dwg 346C170G01.	Component Mounting and Insulation Fig. 6-46
E605ALT.A	2	BOARD, COMPONENT MOUNTING: c/o micarta board and 16 stud type terminals; mfr 89661, dwg 239B480G01.	Component Mounting and Insulation Fig. 6-46
E606ALT.A	2	BOARD, COMPONENT MOUNTING: c/o micarta board and 26 solder stud terminals; mfr 89661, dwg 346C102G01.	Component Mounting and Insulation Fig. 6-46
E607ALT.A	2	BOARD, COMPONENT MOUNTING: c/o micarta board and 26 stud type terminals; mfr 89661, dwg 346C103G01.	Component Mounting and Insulation Fig. 6-46
E608ALT.A	2	BOARD, COMPONENT MOUNTING: c/o micarta board and 16 stud type terminals; mfr 89661, dwg 346C104G01.	Component Mounting and Insulation Fig. 6-46
E609ALT.A	2	BOARD, COMPONENT MOUNTING: c/o micarta board and 16 stud type terminals; mfr 89661, dwg 346C105G01.	Component Mounting and Insulation Fig. 6-46
E616		SHIELD, ELECTRON TUBE: Heat dissipating; SO762, spec MIL-S-19786.	Tube Shield for V604 Fig. 6-47
E617		Same as E616.	Tube Shield for V605 Fig. 6-47
E618		Same as E616.	Tube Shield for V606 Fig. 6-46
E619		Same as E602.	Tube Shield for V607 Fig. 6-45
E620		Same as E602.	Tube Shield for V608 Fig. 6-45
E621		Same as E602.	Tube Shield for V603 Fig. 6-46
M603	2	COUNTER, ROTATING: Fixed mounting eight wheels numbered 0-9 CW rotation; mfr 89661, dwg 346C199H01.	Frequency Interpretation Fig. 5-24
R601	2	RESISTOR, FIXED, COMPOSITION: 20,000 ohms ±5%, ½ watt, RC20GF203J, spec MIL-R-11.	Phase Detector Load Fig. 6-46A
R602	2	Same as R601.	Phase Detector Load Fig. 6-46A
R605	2	RESISTOR, FIXED, COMPOSITION: 200 ohms ±5%, ½ watt, RC20GF201J, spec MIL-R-11.	Phase Detector Load Fig. 6-46A
R606	2	Same as R605.	Phase Detector Load Fig. 6-46A
R607		Not Used.	
R613ALT.A	2	RESISTOR, FIXED, COMPOSITION: 100,000 ohms ±5%, ½ watt, RC20GF104J, spec MIL-R-11.	Phase Detector Load Fig. 6-46A
R614ALT.A	2	RESISTOR, FIXED, COMPOSITION: 120,000 ohms ±5%, ½ watt, RC20GF124J, spec MIL-R-11.	Phase Detector Load Fig. 6-46A
R615ALT.A	2	Same as R614ALT.A.	Phase Detector Load Fig. 6-46A
R616		Same as R613ALT.A.	Phase Detector Load Fig. 6-46
R631ALT.A	2	RESISTOR, FIXED, COMPOSITION: 120 ohms ±10%, ½ watt, RC20GF121K, spec MIL-R-11. Same as R449.	Pulse Shaping Fig. 6-46A
R635	2	RESISTOR, FIXED, COMPOSITION: 150 ohms ±10%, ½ watt, RC20GF151K, spec MIL-R-11.	Pulse Shaping Fig. 6-46A
MP731	2	HOUSING ASSEMBLY: Mfr 89661, dwg 490D566G01.	Gearing Housing Fig. 5-24

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP732	2	CAM, CONTROL: Brass, 1.125 in. dia, 0.375 in. w over-all, 0.250 in. dia bore, mfr 89661, dwg 346C195H01.	Actuates S605 Fig. 5-24
MP733	2	PLATE, STOP: Stainless steel, 1.594 in. lg, 1.38 in. w over-all, 0.063 thk, mfr 89661, dwg 239B578H01.	Prevents Rotation Fig. 5-24
MP734	2	FLANGE, VERNIER MOUNTING: Brass, 3.0 in. dia, 0.156 in. w, mfr 89661, dwg 337C199H01.	Vernier Mounting Fig. 5-24
MP735	2	VERNIER AND SHAFT ASSEMBLY: c/o vernier, shaft, pin and retaining ring, mfr 89661, dwg 239B572G01.	Fine Tuning Dial Fig. 5-24
MP736	2	CRANK, HAND: c/o dial, knob, crank and associated hardware, mfr 89661, dwg 337C015G02.	
MP737	2	PIN, STRAIGHT, HEADED, BRASS: 1.41 in. lg, 0.375 in. by 0.53 in. lg head, 0.190 in. dia body, mfr 89661, dwg 239B574H01.	Retain Parts Fig. 5-24
MP738	2	WINDOW, OBSERVATION: 2 in. lg, 1.78 in. w, plastic, mfr 89661, dwg 239B573H01.	Gear Box Inspection Fig. 5-24
MP739	2	Same as MP738.	Gear Box Inspection Fig. 5-24
MP740	2	WASHER, PLAIN, SPECIAL: Stainless steel, 0.375 in. od, 0.2031 in. id, 0.0312 in. thk, passivated, mfr 89661, dwg 330C858A13-D2402.	Thrust Washer Fig. 5-24
MP741	2	SPACER, STEPPED: Stainless steel, 2.063 in. lg, 0.500 in. dia over-all, mfr 89661, dwg 232B154H01.	
MP742	2	Same as MP741.	
MP743	2	Same as MP741.	
MP744	2	Same as MP741.	
MP745	2	WASHER, THRUST-ALUMINUM: 0.1562 in. lg, 0.250 od, 0.125 id, mfr 89661, dwg 7710128-5.	Thrust Bearing Fig. 5-24
MP746	2	Same as MP745.	Thrust Bearing Fig. 5-24
MP747	2	Same as MP745.	Thrust Bearing Fig. 5-24
MP748	2	Same as MP745.	
MP749	2	WASHER, THRUST: 0.500 in. od, 0.265 in. id, 0.040 in. thk, mfr 89661, dwg 237B329H01.	Thrust Bearing Fig. 5-24
MP750	2	CHAIN ROLLER: 82 pitches, 3/16 in. pitch, 5/32 in. w, stainless steel, mfr 89661, dwg 152A046H08.	Drive Chain Fig. 5-24
MP751	2	Same as MP716.	Retain Parts Fig. 5-24
MP752	2	Same as MP716.	Retain Parts Fig. 5-24
MP753	2	Same as MP716.	Retain Parts Fig. 5-24
MP754	2	RING, RETAINING: External, steel cadmium plated; MS16624-1025, spec MIL-R-21248.	Attach Gearing Fig. 5-24
MP755	2	Same as MP754.	Attach Gearing Fig. 5-24
MP756	2	PIN, SPRING: Corrosion resistant steel, 0.500 in. lg, 0.094 in. nominal dia; MS171496.	Retain Parts Fig. 5-24
MP757	2	Same as MP756.	Retain Parts Fig. 5-24
MP758	2	Same as MP756.	Retain Parts Fig. 5-24
MP759	2	Same as MP756.	Retain Parts Fig. 5-24
MP760	2	Same as MP756.	Retain Parts Fig. 5-24
MP761	2	Same as MP756.	Retain Parts Fig. 5-24
MP762	2	Same as MP756.	Retain Parts Fig. 5-2-
MP763	2	Same as MP756.	Retain Parts Fig. 5-24
MP764	2	Same as MP756.	Retain Parts Fig. 5-24
MP765	2	Same as MP756.	Retain Parts Fig. 5-24
MP766	2	Same as MP756.	Retain Parts Fig. 5-24
MP767	2	Same as MP756.	Retain Parts Fig. 5-24
MP768	2	Same as MP756.	Retain Parts Fig. 5-24
MP769	2	Same as MP756.	Retain Parts Fig. 5-24
MP770	2	Same as MP756.	Retain Parts Fig. 5-24
MP771	2	Same as MP756.	Retain Parts Fig. 5-24
MP772	2	Same as MP756.	Retain Parts Fig. 5-24
MP773	2	Same as MP756.	Retain Parts Fig. 5-24
MP774	2	Same as MP756.	Retain Parts Fig. 5-24

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP775	2	Same as MP756.	Retain Parts Fig. 5-24
MP775	2	Same as MP756.	Retain Parts Fig. 5-24
MP776	2	Same as MP756.	Retain Parts Fig. 5-24
MP777	2	Same as MP756.	Retain Parts Fig. 5-24
MP778	2	Same as MP756.	Retain Parts Fig. 5-24
MP779	2	Same as MP756.	Retain Parts Fig. 5-24
MP780	2	PIN, STRAIGHT, HEADLESS: Stainless steel, 0.31 in. lg, 0.1247 in. dia; mfr 89661, dwg 233B307H04.	Retain Parts Fig. 5-24
MP781	2	PIN, SPRING: Corrosion resistant steel, 0.312 in. lg, 0.094 in. nominal dia; MS171493.	Retain Parts Fig. 5-24
MP782	2	GEAR, BEVEL: Brass, 42 teeth, 48 pitch 20 deg pressure angle, 0.875 pitch dia; mfr 89661, dwg 239B562H01.	Bevel Drive Fig. 5-24
MP783	2	Same as MP782.	Bevel Drive Fig. 5-24
MP784	2	GEAR, BEVEL: Brass, 28 teeth, 48 pitch 20 deg pressure angle, 0.5833 pitch dia; mfr 89661, dwg 239B563H01.	Bevel Drive Fig. 5-24
MP785	2	Same as MP784.	Bevel Drive Fig. 5-24
MP786	2	GEAR, SPUR: Brass, 36 teeth, 48 pitch, 20 deg pressure angle, 0.750 pitch dia; mfr 89661, dwg 239B551H01.	Drive Gear Fig. 5-24
MP787	2	GEAR, SPUR: Brass, 84 teeth, 48 pitch, 20 deg pressure angle, 1.750 in. pitch dia; mfr 89661, dwg 239B547H01.	Drive Gear Fig. 5-24
MP788	2	GEAR, SPUR: Brass, 42 teeth, 48 pitch, 20 deg pressure angle, 0.875 in. pitch dia; mfr 89661, dwg 239B546H01.	Drive Gear Fig. 5-24
MP789	2	GEAR, BEVEL: Brass, 24 teeth, 48 pitch, 20 deg pressure angle, 0.500 in. pitch dia; mfr 89661, dwg 239B560H01.	Bevel Drive Fig. 5-24
MP790	2	GEAR, SPUR: Stainless steel, 75 teeth, 48 pitch, 20 deg pressure angle, 1.562 in. pitch dia; mfr 89661, dwg 346C182H01.	Drive Gear Fig. 5-24
MP791	2	GEAR, SPUR: Stainless steel, 75 teeth, 48 pitch, 20 deg pressure angle, 1.5625 in. pitch dia; mfr 89661, dwg 239B550H01.	Drive Gear Fig. 5-24
MP792	2	GEAR AND SHAFT ASSEMBLY: c/o gear, shaft, and spring pin, mfr 89661, dwg 239B568G01.	Transfer Motion Fig. 5-24
MP793	2	SHAFT: Stainless steel, 2.31 in. lg, 0.249 in. dia; mfr 89661, dwg 232B144H03.	Transfer Motion Fig. 5-24
MP794	2	SHAFT: Stainless steel, 2.56 in. lg, 0.249 in. dia; mfr 89661, dwg 232B144H04.	Transfer Motion Fig. 5-24
MP795	2	SHAFT: Stainless Steel, 3 in. lg, 0.249 in. dia; mfr 89661, dwg 225B325H05.	Transfer Motion Fig. 4-25
MP796	2	Same as MP795.	Transfer Motion Fig. 5-24
MP797	2	SHAFT: Stainless steel, 3.03 in. lg, 0.249 in. dia; mfr 89661, dwg 239B575H01.	Transfer Motion Fig. 5-24
MP798	2	STUD, IDLER: Stainless steel, 1.25 in. lg, 0.500 in. across flats, mfr 89661, dwg 232B143H01.	Idler Shaft Fig. 5-24
MP799	2	WASHER, THRUST: Brass, 0.375 in. od, 0.129 in. id; mfr 89661, dwg 236B208H01.	Thrust Bearing Fig. 5-24

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

C815		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 100 v dc working, CP05A1EF104K, spec MIL-C-25.	Grid Bypass V805 thru V808 Fig. 6-34
C833		CAPACITOR, FIXED PAPER DIELECTRIC: 150,000 μμf ±10%, 400 v dc working, CP05A1KE154K, spec MIL-C-25.	
C848ALT.A	2	CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 100 v dc working, CP05A1EB104K, spec MIL-C-25.	Cathode Bypass V805 Fig. 6-35
C849		Same as C847.	Cathode Bypass V806 Fig. 6-35
C850		Same as C847. Used on unit serial 1 thru 141.	Cathode Bypass V806 Fig. 6-35
C850ALT.A	2	Same as C848ALT.A.	Cathode Bypass V806 Fig. 6-35
C852ALT.A	2	Same as C848ALT.A.	Cathode Bypass V807 Fig. 6-35

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Concluded

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C854ALT.A	2	Same as C848ALT.A. Used in unit serial 142 and up.	Cathode Bypass V808 Fig. 6-35
C870	2	Same as C801.	SWR Overload RF Bypass Fig. 6-36A
C871	2	Same as C801.	RF Bypass CR819 Fig. 6-36A
C872	2	Same as C801	DC Coupling Fig. 6-36A
CR805ALT.A	2	SEMICONDUCTOR DEVICE, DIODE: Germanium, 80 v inverse working, 1N933, spec MIL-S-19500/117.	Directional Coupler Fig. 6-36
CR806ALT.A	2	Same as CR805ALT.A.	Directional Coupler Fig. 6-36
CR819	2	Same as CR801	RF Detector SWR Overload Fig. 6-36A
CR820	2	Same as CR801.	RF Detector SWR Overload Fig. 6-36A
CR821	2	Same as CR801.	Base Limiter Q803 Fig. 6-36A
E801		SHIELD, ELECTRON TUBE, HEAT DISSIPATING: 7 pins, 1¾ in. lg, 0.810 in. dia., SO762, spec MIL-S-19786. Same as E0313.	Shield for V801 Fig. 6-34
E807		Not Used.	
E808	2	BOARD, COMPONENT MOUNTING: 1.75 in. lg, 1.75 in. w, 0.125 in. thk, mfr 89661, dwg 346C207G02.	Q803 Mounting Fig. 6-36A
E809		Not Used.	
E810	1	BOARD, COMPONENT MOUNTING: Micarta board 7 solder stud terminals, 2 clamps mfr 89661, dwg 337C091G02.	Q801 and Q802 Mounting Fig. 6-36
E826	2	BOARD, COMPONENT MOUNTING: C/O board and 8 stud terminals; mfr 89661, dwg 243B085G02.	Component Mtg. Fig. 6-35A
J803	2	CONNECTOR, RECEPTACLE, ELECTRICAL: Weather proof, quick disconnect, 1500 v peak, UG569A/U, spec MS35325.	
L818	2	COIL, RADIO FREQUENCY: 5 ohms ±10%, 100 μh ±10%, 200 ma, mfr 42498, type R33-100.	Cathode Choke V807 Fig. 6-35A
L819	2	Same as L818.	Cathode Choke V808 Fig. 6-35A.
L820	2	Same as L818.	Cathode Choke V805 Fig. 6-35A
L821	2	Same as L818.	Cathode Choke V806 Fig. 6-35A
L822 thru L899		Not Used.	
M804ALT.A	2	AMMETER: 1.0 ma deflection, 0-600 v scale, mfr 89661, dwg 342C657H04.	P.A. Test Ammeter Fig. 6-35
M805ALT.A	2	VOLTMETER: 2.0 v deflection, 0-20 ma and 0-80 ma scale, mfr 89661, dwg 342C657H05.	Driver Test Voltmeter Fig. 6-35
M806ALT.A	2	VOLTMETER: 5.0 v deflection, 0-1.5 amp and 0-300 ma scale, mfr 89661, dwg 342C657H06.	P.A. Cathode Current Fig. 6-35
MP904		RETAINER, ELECTRON TUBE: 1.625 in. id closed, 0.88 in. w, mfr 07344, type 926H-5. Same as MP330.	Clamp for V804 Fig. 6-34
MP905		RETAINER, ELECTRON TUBE: 1.593 in. dia clamp, 0.8125 in. w, w/o holding spurs, mfr 07344, type 926H-13. Same as MP331.	Clamp for V803 Fig. 6-34
MP906 thru MP999		Not Used.	
Q803	2	Same as Q802.	SWR Overload Fig. 6-36A
R858		RESISTOR, VARIABLE: Wire wound, power type, 2500 ohms ±10%, no electrical off positions, RF101SA252KK, spec MIL-R-22.	P.A. Bias Adjust Fig. 6-34
R861		RESISTOR, VARIABLE: 2500 ohms ±10%, ½ watt, RV6LAYSA252A, spec MIL-R-94.	Mod Bias Adjust Fig. 6-34
R882		RESISTOR, VARIABLE, COMPOSITION: 500 ohms ±10%, ½ w, RV6LAYSA501A, MIL-R-94.	Feedback Adjust Fig. 6-34

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R925	1	Same as R867.	Emmitter Current Limiting, Q801 Fig. 6-36
R926	2	Same as R857.	Voltage Divider Input, CR820 Fig. 6-36A
R927	2	Same as R857.	Divider Input Fig. 6-36A
R928	2	Same as R834.	Power Sensitivity Adjust Fig. 6-36A
R929	2	Same as R908.	Divider Input Q803 Fig. 6-36A
R930	2	Same as R834.	SWR Level Set Adjust Fig. 6-36A
R931	2	Same as R853.	Voltage Divider Input CR820 Fig. 6-36A
R932 thru R999		Not Used.	

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

C1401ALT.A	2	CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 400 dc working, CP05A1KE104K, spec MIL-C-25.	DC Blocking V1401A Fig. 6-50
C1405ALT.A	2	Same as C1401ALT.A.	DC Blocking V1403A Fig. 6-50
C1412ALT.A	2	Same as C1401ALT.A.	DC Blocking V1401A Fig. 6-50A
C1426		CAPACITOR, FIXED, ELECTROLYTIC: 15 μf −15 plus 50%, 15 v dc working, CL44BE150TP1, spec MIL-C-3965.	Audio Decoupling Fig. 6-50
C1427	2	Same as C1401ALT.A.	Decoupling V1401B Fig. 6-50A
E1417	2	BOARD, COMPONENT MOUNTING: Micarta board, 26 stud terminals, mfr 89661, dwg 346C215G02.	Component Mtg in Speech Amplifier Fig. 6-50A
E1418	2	BOARD, COMPONENT MOUNTING: Micarta board, 26 stud terminals, mfr 89661, dwg 346C210G02.	Component Mtg in Speech Amplifier Fig. 6-50A
E1419	2	BOARD, COMPONENT MOUNTING: Micarta board, 26 stud terminals, mfr 89661, dwg 346C069G02.	Component Mtg in Speech Amplifier Fig. 6-50A
E1420	2	BOARD, COMPONENT MOUNTING: Micarta board, 13 stud terminals, mfr 89661, dwg 346C217G02.	Component Mtg in Speech Amplifier Fig. 6-50A
E1421		SHIELD, ELECTRON TUBE: Heat dissipating, SO967, spec MIL-S-19786. Same as E310.	Tube Shield for V1401 Fig. 6-50
E1422		Same as E1417.	Tube Shield for V1402 Fig. 6-50
E1423		Same as E1417.	Tube Shield for V1403 Fig. 6-50
E1424		Same as E1417.	Tube Shield for V1404 Fig. 6-50
E1425 thru E1499		Not Used.	
R1408		RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, ½ watt, RC20GF472K, spec MIL-R-11. Same as R669.	Cathode V1401B Fig. 6-50
R1410ALT.A.	2	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 2 w, RC42GF473K, spec MIL-R-11.	Plate V1402A Fig. 6-50
R1414		RESISTOR, FIXED, COMPOSITION: 18,000 ohms ±10%, ½ watt, RC20GF183K, spec MIL-R-11. Same as R701.	Clipper Balance Fig. 6-50

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R1416ALT.A	2	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms ±10%, 2 w, RV4LAYSA102A, spec MIL-R-94. Same as R891.	Clipper Balance Adjust Fig. 6-50
R1419		RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, 2 w, RC42GF472K, spec MIL-R-11. Same as R886.	Plate Decoupling V1403 Fig. 6-50
R1420ALT.A	2	RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, 2 w, RC42GF153K, spec MIL-R-11. Same as R351.	Plate V1403A Fig. 6-50
R1422ALT.A	2	RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, 1 w, RC32GF682K, spec MIL-R-11.	Plate Decoupling V1403B Fig. 6-50
R1424ALT.A	2	RESISTOR, FIXED, COMPOSITION: 1500 ohms ±10%, 1 w, RC32GF152K, spec MIL-R-11.	Cathode V1403B Fig. 6-50
R1435ALT.A	2	RESISTOR, FIXED, COMPOSITION: 470,000 ohms ±10%, ½ w, RC20GF474K, spec MIL-R-11. Same as R495.	Grid Decoupling V1404A Fig. 6-50
R1438ALT.A	2	RESISTOR, FIXED, COMPOSITION: 3,900 ohms ±10%, ½ watt, RC20GF392K, spec MIL-R-11.	AGC Level Fig. 6-50
R1440		RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, ½ watt, RC20GF683K, MIL-R-11. Same as R358.	Phase Shift V1404 Fig. 6-50
R1445		RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, 2 w, RC42GF682K, spec MIL-R-11. Same as R817.	Plate Decoupling V1404 Fig. 6-50
R1450ALT.A	2	RESISTOR, VARIABLE, COMPOSITION: 500,000 ohms ±10%, 2 w, RV4LAYSA504A, spec MIL-R-94. Same as R483.	Clipping Level Adjust Fig. 6-50
R1452	1	Same as R1440.	Grid V1403A Fig. 6-50
TB1401ALT.A	2	TERMINAL BOARD: Barrier type, 14 double screw type terminals, phenolic board, mfr 89661, dwg 239B597G01.	Wire Termination Fig. 6-49

MOUNTING, VIBRATION AND SHOCK MT-2170A/WRT (Set Serials 231 and up)

MP3601		BASE, MOUNTING: C/O base, 2 tray assemblies, 16 springs, 16 cushions, 6 pads and necessary mounting hardware, mfr 51116, dwg W970-3SA1.	Supports Shockmounts Fig. 5-29A
MP3602		BASE SUBASSEMBLY: Steel, mfr 51116, dwg R15832-1.	Supports Shockmounts Fig. 5-29A
MP3603		TRAY SUBASSEMBLY: C/O steel tray and inserts, mfr 51116, dwg R15838-1.	Supports Shockmounts Fig. 5-29A
MP3604		TRAY SUBASSEMBLY: C/O steel tray and inserts, mfr 51116, dwg R15838-1.	Supports Shockmounts Fig. 5-29A
MP3605		BOLT: Steel, ½-13 thds hexagon head, 0.73 in. across flats, 0.75 in. lg, cadmium plated, mfr 51116 type H1157-21. Same as MP1105.	Retains Parts Fig. 5-29A
MP3606		WASHER, FLAT: Stainless steel, 2.06 in. od, 0.516 in. id, 0.188 in. thk, mfr 51116, dwg STD 1306-267. Same as MP1106.	Thrust Washer Fig. 5-29A
MP3607		WASHER, FLAT: Stainless steel, 2.06 in. od, 1.172 in. id, 0.062 in. thk, mfr 51116 dwg STD 1306-269. Same as MP1107.	Thrust Washer Fig. 5-29A
MP3608		STRIP, BRONZE: Phosphor bronze cadmium plated, mfr 51116, dwg STD 1447-9.	Bonding Strip Fig. 5-29A
MP3609		NUT, PLAIN, HEXAGON: Cadmium plated brass, 6-32 thd, mfr 51116.	Retains Parts Fig. 5-29A
MP3610		SLEEVE, SPACER: Steel, 1.10 in. id, 1.55 in. od, 0.82 in. lg, mfr 51116 dwg R15418-3.	Mounting Spacer Fig. 5-29A
MP3611		WASHER, FLAT: Stainless steel, 2.88 in. od, 1.188 in. id, 0.022 in. thk, mfr 51116, dwg STD 1306-212.	Thrust Washer Fig. 5-29A
MP3612		PAD, SHOCKMOUNT: Stainless steel knitted wire, 2.438 in. od, 1.215 in. id, 0.50 in. thk, mfr 51116, dwg MP797.	Shockmount and Damping Fig. 5-29A
MP3613		PAD, SHOCKMOUNT: Stainless steel knitted wire, 2.875 in. od, 1.250 in. id, 0.33 in. thk, mfr 51116, dwg MP798.	Shockmount and Damping Fig. 5-29A
MP3614		PAD, SHOCKMOUNT: Stainless steel knitted wire, 3.812 in. od, 3.344 in. id, 1.594 in. thk, mfr 51116, dwg MP796.	Shockmount and Damping Fig. 5-29A
MP3615		SPRING, HELICAL, COMPRESSION: 0.135 in. dia. stainless steel wire, 5.20 in. free height, 2.22 in. od, mfr 51116, dwg S222.	Shockmount Fig. 5-29A

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

MOUNTING, VIBRATION AND SHOCK MT-2170A/WRT (Set Serials 231 and up)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP3616		PAD, SHOCKMOUNT: Stainless steel knitted wire, 1.870 in. od, 2.879 in. h, mfr 51116, dwg MC793.	Shockmount and Damping Fig. 5-29A
MP3617		STABILIZER: C/O base, frame, 8 pads, 4 springs and necessary mounting hardware, mfr 51116, dwg W970-3SA2.	Stabilizes Radio Equipment Fig. 5-29A
MP3618		BASE, MOUNTING: C/O base and riveted frame assembly, mfr 51116, dwg R15840-1.	Shockmount Support Fig. 5-29A
MP3619		BRACKET, MOUNTING: C/O bracket and inserts, mfr 51116, dwg R15747-1.	Secures Frame Fig. 5-29A
MP3620		BRACKET, MOUNTING: C/O bracket and inserts, mfr 51116, dwg R15841-1.	Secures Frame Fig. 5-29A
MP3621		NUT, SELF-LOCKING, HEXAGON: Steel, cadmium plated, ⅝-11 thds, mfr 51116 type H1024-18.	Retains Parts Fig. 5-29A
MP3622		BOLT: Steel, cadmium plated, hexagon head, ⅝-11 thds, 10 in. lg, mfr 51116, type H1157-36.	Retains Parts Fig. 5-29A
MP3623		SLEEVE, SPACER: Steel, 1.50 in. od, 0.650 in. id, 4.109 in. lg, cadmium plated, mfr 51116, dwg STD 1566-108.	Mounting Spacer
MP3624		WASHER, FLAT: Steel, 2.38 in. od, 0.656 in. id, 0.125 in. thk, cadmium plated, mfr 51116, dwg STD 1306-248.	Thrust Washer Fig. 5-29A
MP3625		WASHER, FLAT: Steel, 3.176 in. od, 2.188 in. id, 0.125 in. thk, cadmium plated, mfr 51116, dwg STD 1306-246.	Thrust Washer Fig. 5-29A
MP3626		RING, RETAINING: Spring steel, mfr 51116, type H1226-2.	Retains Parts Fig. 5-29A
MP3627		SPRING, HELICAL, COMPRESSION: Conical, 0.135 in. dia. stainless steel wire, 2.75 in. h, 2.969 in. od one end, 1.562 in. od one end, mfr 51116, dwg S223.	Shockmount Fig. 5-29A
MP3628		PAD, SHOCKMOUNT: Stainless steel knitted wire, 3.125 in. od, 1.438 in. id, 1.0 in. thk, mfr 51116, dwg MP794.	Shockmount and Damping Fig. 5-29A
MP3629		PAD, SHOCKMOUNT: Stainless steel knitted wire, 3.094 in. od, 1.719 in. id, 0.50 in. thk, mfr 51116, dwg MP799.	Shockmount and Damping Fig. 5-29A
MP3630		ANGLE SUBASSEMBLY: Steel, mfr 51116, dwg R15752-1.	Upright Spacer Fig. 5-29A
MP3631		ANGLE SUBASSEMBLY: Steel, mfr 51116, dwg R15752-2.	Upright Spacer Fig. 5-29A

AMPLIFIER-POWER SUPPLY AM-2198A/WRT-1

C515	4	CAPACITOR, FIXED, PAPER DIELECTRIC: 0.1uuf ±10%, 100 vdc working, CP09A1KB104K3, Spec MIL-C-25.	Feedback Fig. 6-29B
C516	4	CAPACITOR, FIXED, PAPER DIELECTRIC: 0.022uuf ±10%, 200 vdc working CP09A1KC223K3, Spec MIL-C-25.	Oscillator tank ckt. Fig. 6-29B
C517	4	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 0.01uuf ±10%, 500 vdc working CK63AW103M, Spec MIL-C-11015.	D C Blocking Fig. 6-29B
C518	4	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 0.0068uuf ±10%, 600 vdc working. CK62AW682M, spec MIL-C-11015.	High Frequency Bypass Fig. 6-29B
C519		CAPACITOR, FIXED, ELECTROLYTIC, TANTALUM: 8uf −15%, +50%, 30 vdc working. CL44BH080MP3, spec MIL-C-3965.	Decoupling Fig. 6-29B
E525	4	GENERATOR, TONE, 1000 CYCLE: c/o printed circuit and various electrical and mechanical components to perform a specific function, mfr 89661, dwg. 123C363G01.	Generates A1000 cycle Signal. Fig. 6-29B
E526	4	BOARD, PRINTED CIRCUIT: MICARTA BOARD, Eyelets, Electrical clip, mfr 89661, dwg. 123C363G03.	Mounting of Electrical Components. Fig. 6-29B
L507	4	INDICATOR, VARIABLE: Minimum heneries 0.5, maximum heneries 5.0, mfr 80223, type HVC7, dwg. 788C789.	Oscillator Tank Fig. 6-29B
Q503	4	TRANSISTOR: NPN, Junction contact type, hermatically sealed, 3 wire lead, type USN2N335.	1 kc Oscillator Fig. 6-29B.
Q504	4	Same as Q503.	Amplifier Fig. 6-29B

SUPPLEMENTARY TABLE 7-1A. RADIO TRANSMITTING SET AN/WRT-1, SUPPLEMENTARY MAINTENANCE PARTS LIST—Continued

AMLIFIER-POWER SUPPLY AM-2198A/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R547	4	RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%, ¼W, RC07GF681K, spec MIL-R-11.	Swamping Resistor Fig. 6-29B
R548	4	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, ±10%, ¼W, RC07GF103K, spec MIL-R-11.	Bias for Q503 Fig. 6-29B
R549		RESISTOR, FIXED, COMPOSITION: 15,000 ohms, ±10%, ¼W, RC07GF153K, spec MIL-R-11.	Bias for Q503 Fig. 6-29B
R550	4	RESISTOR, VARIABLE, WIREWOUND: 5000 ohms, ±10%, ½W, RV6LAYSA502A, spec MIL-R-94.	Tone Output Adjust Fig. 6-29B
R551	4	RESISTOR, FIXED, COMPOSITION: 100 ohms, ±10%, ¼W, RC07GF101K, spec MIL-R-11.	Stablization Fig. 6-29B
R552	4	RESISTOR, FIXED, COMPOSITION: 4700 ohms, ±10%, ¼W, RC07GF472K, spec MIL-R-11.	Voltage divider Fig. 6-29B
R553	4	RESISTOR, FIXED, COMPOSITION: 82,000 ohms, ±10%, ¼W, RC07GF823K, spec MIL-R-11.	Impedance Matching Fig. 6-29B
R554	4	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, ±10%, ¼W, RC07GF332K, spec MIL-R-11.	Voltage Divider Fig. 6-29B
R555	4	RESISTOR, FIXED, COMPOSITION: 180 ohms, ±10%, ¼W, RC07GF181K, spec MIL-R-11.	Voltage Dropping Fig. 6-29B
S508	4	SWITCH, ROTARY: 5 position, 8 pole, mfr 89661, dwg 331C128H01.	Emission selector Fig. 6-29B
T504	4	TRANSFORMER, AUDIO FREQUENCY: Primary 10,000 and 12,500 ohms secondaries, 500ct and 600ct ohms, mfr 80223, type Do-T9, dwg. 335C864H01.	Output Transformer Fig. 6-29B

SECTION 7

PARTS LIST

7-1. INTRODUCTION.

Reference designations (previously referred to as circuit symbols, reference symbols, etc.) have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams and the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, amplifier, electron tubes, etc. The number differentiates between parts of the same generic group. Parts of the same first major unit are numbered from 1 to 199; parts of the second 201 to 299, etc. Two consecutive series of numbers have been assigned to major units in which there are more than 100 parts of the same generic group. Sockets associated with a particular plug-in device, such as an electron tube or a fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for fuse F201 is designated XF201.

7-2. MAINTENANCE PARTS LIST.

Table 7-1 lists all major units and their maintenance parts. The parts of each major unit are grouped together. Column 1 lists the reference series of each major unit, followed by the reference designations of the various parts in alphabetical and numerical order. Column 2 refers to the explanatory notes. Column 3 gives the name and describes the various parts. Complete information is given for all key parts (parts differing from any part previously listed in this table) and subkey parts (parts identical with a key part but appearing for the first time for a major unit). The name and description are omitted for other parts. However, reference is made to the key part or subkey part for the data. Column 4 indicates how the part is used and gives its functional location in the equipment. It also includes the figure number of the pictorial illustration on which the part is identified.

7-3. STOCK NUMBER IDENTIFICATION AND LIST OF PARTS SUPPLIED.

Stock Number Identification Tables (SNIT) issued by the Electronics Supply Office include Federal Stock Numbers and Source Maintenance and Recoverability Codes. Therefore, reference shall be made to the SNIT for this information.

7-4. STOCK NUMBER CROSS REFERENCE.

Only federal stock numbers have been assigned to the parts in Radio Transmitting Set AN/WRT-2.

7-5. LIST OF MANUFACTURERS.

Table 7-2 lists manufacturers of parts used in Radio Transmitting Set AN/WRT-1. The first column lists the code number of the manufacturer, the second column lists the name of the manufacturer and the third lists the address of the manufacturer.

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST

CABINET, ELECTRICAL EQUIPMENT CY-2607/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
101-199		CABINET, ELECTRICAL EQUIPMENT: Gray steel, floor mounted; cutouts provided for five drawers, 24½ in. lg, 18 in. w, 71¼ in. h. overall dimensions, mfr 89661, dwg 232B117.	Frame, Housing the Five Drawer Type Units of Transmitting Set AN/WRT-1
B101		FAN, AXIAL: 115 v, 50-60 cps, 320 cfm at 3400 rpm, mfr 89661, dwg 335C711H01.	Frame Blower Fig. 6-33
B102 thru B199		Not Used.	
C101		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 µf +20%, −10%, 600 v dc working, CP54B1EF105V, spec MIL-C-25.	Blower Motor Capacitor Fig. 6-33
C102		CAPACITOR, FIXED, ELECTROLYTIC: 40 µf −15%, +50%, 30 v dc working, CL44BH400TP, spec MIL-C-3965.	Time Delay for K102 Fig. 6-33

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CABINET, ELECTRICAL EQUIPMENT CY-2607/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C103		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 µf ±10%, 600 v dc working, CP53B1EF105K, spec MIL-C-25.	Coupler Starting Motor Capacitor
C104		Same as C103.	Inner Starting Motor Capacitor
C105 thru C199		Not Used.	
CP101 thru CP103		Not Used.	
CP104		ADAPTER: Female type, 50 ohm impedance, weatherproof, UG635/U, MS35331.	Mates with CP114 Fig. 6-33
CP105 thru CP113		Not Used.	
CP114		ADAPTER: Radio frequency cable, bulkhead type, one male and one female contact, pressurized, mfr 74868, type 47200.	Standard Frequency Input (1MC) Fig. 6-33
CP115 thru CP199		Not Used.	
E101		INSULATOR, STANDOFF: Melamine insulator, tin coated brass terminal, mfr 81312, type 775.	Standoff Fig. 6-33
E102		Same a E101.	Standoff Fig. 6-33
E103 thru E199		Not Used.	
FL101		FILTER, RADIO INTERFERENCE: 20 amp, 440 v ac, 40 db attenuation from 0.2 to 150 mc, hermetically sealed, 4 mtg holes, 6 stud type terminals, mfr 82376, type AF1232.	Line Filter Fig. 6-33
FL102 thru FL199		Not Used.	
J101		CONNECTOR, RECEPTACLE, ELECTRICAL: Polarized straight box type, solid shell, socket contacts rated 22 amp, MS3102A-32-7S.	Antenna Tuning Interconnection Fig. 6-33
J102		CONNECTOR, RECEPTACLE, ELECTRICAL: Polarized straight box type, solid shell, 14 socket contacts rated 22 amp, MS3102A-20-27S.	Antenna Coupler Fig. 6-33
J103		CONNECTOR, RECEPTACLE, ELECTRICAL: 50 ohms impedance, 1500 v, UG570/U, REB49190.	RF Output Tack
J104 thru J199		Not Used.	
K101		RELAY, ARMATURE: 24 v dc coil, 3.5 w nom power, screw type terminals mfr 35344, type 1407MX24VDC.	H.V. Ground Relay Fig. 6-33
K102		RELAY, ARMATURE: SPDT, 5 amp, 28 v dc, 115 v ac, 2 amp, 1000 ohms coil resistance ±10%, 14 ma operating, hermetically sealed, mfr 78277, type 41J01000G.	Line Delay for K101 Fig. 6-33
K103 thru K199		Not Used.	
MP101		CLEANER ELEMENT: Air impingement type, aluminum, anodized, non-replaceable element, mfr 89661, dwg 54B2490.	Air Cleaner Element
MP102		BEARING, PLAIN: Flanged, 0.12 in. id, 0.1885 in. od, ¼ in. lg, mfr 89856, type F101-1.	Mounting Track Bearing Fig. 5-17
MP103		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP104		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP105		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP106		Same as MP102.	Mounting Track Bearing Fig. 5-17

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CABINET, ELECTRICAL EQUIPMENT CY-2607/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP107		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP108		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP109		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP110		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP111		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP112		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP113		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP114		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP115		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP116		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP117		Same as MP102.	Mounting Track Bearing Fig. 5-17
MP118		BEARING, PLAIN, FLANGED: Mfr 89856, type F206.	Mounting Track Bearing Fig. 5-17
MP119		Same as MP118.	Mounting Track Bearing Fig. 5-17
MP120		BEARING, THRUST: 0.203 in. id, 0.4375 in. od, $\frac{1}{16}$ in. thk, mfr 89856, type T401.	Latch Bearing Fig. 5-17
MP121		Same as MP120.	Latch Bearing Fig. 5-17
MP122		Same as MP120.	Latch Bearing Fig. 5-17
MP123		Same as MP120.	Latch Bearing Fig. 5-17
MP124		Same as MP120.	Latch Bearing Fig. 5-17
MP125		Same as MP120.	Latch Bearing Fig. 5-17
MP126		Same as MP120.	Latch Bearing Fig. 5-17
MP127		Same as MP120.	Latch Bearing Fig. 5-17
MP128		Same as MP120.	Latch Bearing Fig. 5-17
MP129		Same as MP120.	Latch Bearing Fig. 5-17
MP130		Same as MP120.	Latch Bearing Fig. 5-17
MP131		Same as MP120.	Latch Bearing Fig. 5-17
MP132		BEARING: Chassis support, mfr 89661, dwg 230B898.	Mounting Track Bearing
MP133		Same as MP132.	Mounting Track Bearing
MP134		BEARING: Chassis support, mfr 89661, dwg 230B743.	Mounting Track Bearing
MP135		BEARING: Chassis support, mfr 89661, dwg 230B897.	Mounting Track Bearing
MP136 thru MP199		Not Used.	
P101		CONNECTOR, PLUG, ELECTRICAL: Straight, 35 male contacts, $2\frac{13}{32}$ in. lg, $2\frac{7}{32}$ in. od overall, MS3106B32-7P.	Mates With J101 Fig. 2-10
P102		CONNECTOR, PLUG, ELECTRICAL: Straight, 14 male contacts, $2\frac{5}{32}$ in. lg, $1\frac{15}{32}$ in. od overall, MS3106B20-27P.	Mates With J102 Fig. 2-10
P103		CONNECTOR, PLUG, ELECTRICAL: C type connector, 50 ohm impedance, weatherproof, UG943A/U, REB49195.	Mates With J103 Fig. 2-10
P104		Same as P103.	Mates With CP104 Fig. 2-10
P105 thru P113		Not Used.	
P114		CONNECTOR, PLUG, ELECTRICAL: Silver plated, with jacket clamp, for 0.090 to 0.110 in. od cable, mfr 74868, type 48825.	Mates With J114 Fig. 6-33

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CABINET, ELECTRICAL EQUIPMENT CY-2607/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
P115 thru P130		Not Used.	
P131		CONNECTOR, PLUG, ELECTRICAL: Silver plated, with jacket clamp, $\frac{3}{4}$ in. by $\frac{25}{32}$ in. L shape, mfr 74868, type 48800.	Mates With J301 Fig. 6-33
P132		Same as P131.	Mates With J302 Fig. 6-33
P133		Same as P131.	Mates With J316 Fig. 6-33
P134		CONNECTOR, PLUG, ELECTRICAL: Silver plated, with jacket clamp, $\frac{3}{4}$ in. L shape, mfr 74868, type 44550.	Mates With J450 Fig. 6-33
P135		Same as P134.	Mates With J451 Fig. 6-33
P136 thru P160		Not Used.	
P161		Same as P131.	Mates With J601 Fig. 6-33
P162		Same as P134.	Mates With J614 Fig. 6-33
P163		Same as P134.	Mates With J615 Fig. 6-33
P164 thru P180		Not Used.	
P181		Same as P114.	Mates with J801 Fig. 6-33
P182		CONNECTOR, PLUG, ELECTRICAL: One male contact, silver plated, bayonet latch, 0.437 max, 5 amp, UG573A/U.	Mates with J802 Fig. 6-33
P183 thru P199		Not Used.	
S101		SWITCH, SENSITIVE: SPDT normally opened and closed, 250 v max, 5 amps, mfr 96306, type 2AC6.	Drawer Interlock Fig. 6-33
S102		Same as S101.	Drawer Interlock Fig. 6-33
S103		Same as S101.	Drawer Interlock Fig. 6-33
S104		Same as S101.	Drawer Interlock Fig. 6-33
S105		Same as S101.	Drawer Interlock Fig. 6-33
S106 thru S199		Not Used.	
TB101		TERMINAL BOARD ASSEMBLY: C/O two terminal boards, one 10 terminal board and one 17 terminal board. Listed for reference only.	Trunk Terminal Board Fig. 6-33
TB101A		TERMINAL BOARD: Mica filled phenolic board, 17 double screw type terminals, barrier type, mfr 89661, dwg 233B360G01.	Power Distribution Terminal Board
TB101B		TERMINAL BOARD: Mica phenolic, 10 double screw type terminals, barrier type, mfr 71785, type 10-141D.	Wire Termination
TB102		TERMINAL BOARD: Plastic, brass connector strips, 4 terminals, $3\frac{7}{8}$ in. lg, $1\frac{5}{16}$ in. w, mfr 71785, type 4-150D.	Input Power Terminal Board Fig. 6-33
TB103		Not Used.	
TB104		Not Used.	
TB105		Same as TB101A.	Voltage Distribution Terminal Board Fig. 6-33
TB106		Not Used.	
TB107		TERMINAL BOARD: Mica filled phenolic barrier type, 7 double screw type terminals, mfr 71785, type 7-140.	Wiring Interconnection Fig. 6-33

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CABINET, ELECTRICAL EQUIPMENT CY-2607/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
TB108 thru TB199		Not Used.	
XK101		Not Used.	
XK102		SOCKET, ELECTRON TUBE: 8 contact, regularly spaced 45 deg. apart on 0.687 in. dia pin circle, TS101P01, JAN-S-28A.	For K102 Fig. 6-33
XK103 thru XK199		Not Used.	

POWER SUPPLY PP-2222/WRT

201-299		POWER SUPPLY: Full wave rectification, 1250 v, 1.2 amp or 800 v, 1.2 amp dc output. 115 v, 220 v or 440 v ac, 60 cycles, 3 phase operating power requirements. 22 in. lg, 17½ in. w, 10¾ in. h overall dimensions, mfr 89661, dwg 55C2370.	Supplies Plate Power for the RF Amplifier
C201		CAPACITOR, FIXED, PAPER DIELECTRIC: 1.5 µf ±10%, 2000 v dc working, CP70E1FJ156K, spec MIL-C-25.	+1250 V DC Filter Fig. 6-51
C202		Same as C201.	+1250 V DC Filter Fig. 6-51
C203		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 4700 µµf +100 −20%, 500 v dc working, CK62Y4727, spec MIL-C-11015.	RF Bypass for DS207 Fig. 6-51
C204		Same as C203.	RF Bypass for DS208 Fig. 6-51
C205 thru C299		Not Used.	
DS201		LAMP, GLOW: Neon gas, 1/25 w at 105 to 125 v, 1/10 w at 210 to 250 v, 100,000 ohm external resistance required, NE51, spec MIL-L-15098.	High Voltage Rectifier Line Indicator Fig. 6-51
DS202		Same as DS201.	High Voltage Rectifier Line Indicator Fig. 6-51
DS203		Same as DS201.	High Voltage Rectifier Line Indicator Fig. 6-51
DS204		Same as DS201.	Low Voltage Rectifier Filament Line Indicator Fig. 6-51
DS205		Same as DS201.	Low Voltage Rectifier Filament Line Indicator Fig. 6-51
DS206		Not Used.	
DS207		LAMP, INCANDESCENT: Single contact, miniature bayonet base, 28 v, MIL type MS15571-6.	High Voltage On Indicator Fig. 6-51
DS208		Same as DS207.	High Voltage Overload Indicator Fig. 6-51
DS209 thru DS299		Not Used.	
E201		TERMINAL BOARD: 24 stud terminals, 1 feedthru insulator, mfr 89661, dwg 59A1778.	Common Terminal Board for HV Transformers Fig. 6-51
E202		TERMINAL BOARD: C/O resistor and terminals, 6 in. lg, 3¾ in. w, mfr 89661, dwg 329C135.	Resistor Mounting Board Fig. 6-51
E203		Not Used.	
E204		CLIP, ELECTRICAL: Spring phosphor bronze, hot tinned, designed to fit over $\frac{9}{16}$ in. dia. plate contact, mfr 76487, type 36001.	Plate Cap for V201 Fig. 6-51
E205		Same as E204.	Plate Cap for V202 Fig. 6-51

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

POWER SUPPLY PP-2222/WRT

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E206		Same as E204.	Plate Cap for V203 Fig. 6-51
E207		Same as E204.	Plate Cap for V204 Fig. 6-51
E208		Same as E204.	Plate Cap for V205 Fig. 6-51
E209		Same as E204.	Plate Cap for V206 Fig. 6-51
E210		INSULATOR, STANDOFF: Ceramic, grade L-5, white, glazed finish, no voltage rating, JAN type NS5W0208, spec JAN-I-8.	Termination E204 Fig. 6-51
E211		Same as E210.	Termination E205 Fig. 6-51
E212		Same as E210.	Termination E206 Fig. 6-51
E213		Same as E210.	Termination E207 Fig. 6-51
E214		Same as E210.	Termination E208 Fig. 6-51
E215		Same as E210.	Termination E209 Fig. 6-51
E216		INSULATOR, STANDOFF: Ceramic, grade L-3, white, glazed finish, no voltage rating, JAN type NS3W0104, spec JAN-I-8.	Insulator for S202
E217		INSULATOR ASSEMBLY: C/O two steatite insulators. Listed for reference only.	Component Mounting Fig. 6-51
E217A		INSULATOR, STANDOFF: Ceramic, grade L-5, white, glazed finish, no voltage rating, hole in center for mtg, JAN type NS5W4101, spec JAN-I-8.	Standoff
E217B		INSULATOR, STANDOFF: Ceramic, grade L-5, white, glazed finish, no voltage rating, JAN type NS5W4201, spec JAN-I-8.	Standoff
E218		BOARD, MOUNTING: For fuses F201, F202, mfr 89661, dwg 337C103H01.	Fuse Mounting Board
E219		BOARD, MOUNTING: For fuses F203, F205, F206, mfr 89661, dwg 337C105H01.	Fuse Mounting Board
E220		Same as E216.	Standoff
E221 thru E299		Not Used.	
F201		FUSE, CARTRIDGE: 6 amp, 250 v, F15G6R00B, spec MIL-F-15160.	Input Power Line Fuse Fig. 6-51
F202		Same as F201.	Input Power Line Fuse Fig. 6-51
F203		Same as F201.	Input Power Line Fuse Fig. 6-51
F204		Same as F201. Listed for reference only.	Spare
F205		FUSE, CARTRIDGE: 10 amp, 250 v, F15G10R0B, spec MIL-F-15160.	Low Voltage Rectifier and Filament Fig. 6-51
F206		Same as F205.	Low Voltage Rectifier and Filament Fig. 6-51
F207		Same as F205. Listed for reference only.	Spare
F208 thru F299		Not Used.	
K201		RELAY, ARMATURE: 4 contact, 3 normally open, 1 normally closed, mfr 89661, dwg 342C037H02.	Low Power Relay Fig. 6-51
K202		Same as K201.	High Power Relay Fig. 6-51
K203		RELAY, ARMATURE: 4 normally open contacts, 110 v, 60 cycles, mfr 89661, dwg 342C037H01.	HV Start Relay Fig. 6-51
K204		Same as K203.	HV Run Relay Fig. 6-51
K205		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

POWER SUPPLY PP-2222/WRT

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
K206		RELAY, ARMATURE: 4 pdt, signal break 6.0 v dc, 214 ma, mfr 70309, type SKHX663.	+1250 V DC Overload Relay Fig. 6-51
K207		RELAY, ARMATURE: 4 pdt, signal break, 24 v dc, 57 ma, mfr 70309, type SKHX664.	Overload Lock Out Relay Fig. 6-51
K208 thru K299		Not Used.	
L201		REACTOR: Fixed inductance type, 1 coil 0.4 henry min, 1.25 amp dc, 4.4 ohm ±15%, dc resistance, 3.2 kv rms test, mfr 89661, dwg 52C2176-1-1.	+1250 V Filter Fig. 6-51
L202 thru L299		Not Used.	
M201		METER, TIME TOTALIZING: Electric calibrated in hrs, 9999.9 hrs. max. reading, 0.1 hr smallest increment, black numerals, white background, synchronous type motor, 115 v ac, 60 cycles, mfr 14907, type 59S6.	Filament Hours Meter Fig. 6-51
M202 thru M299		Not Used.	
R201		RESISTOR, FIXED, WIREWOUND: 16 ohms ±5%, 38 w, RW35G160, spec MIL-R-26.	Step Start Resistor Fig. 6-51
R202		Same as R201.	Step Start Resistor Fig. 6-51
R203		Same as R201.	Step Start Resistor Fig. 6-51
R204		Not Used.	
R205		RESISTOR, FIXED, COMPOSITION: 100,000 ohms ±10%, ½ w, RC20GF104K, spec MIL-R-11.	Series Resistor for DS201 Fig. 6-51
R206		Same as R205.	Series Resistor for DS202 Fig. 6-51
R207		Same as R205.	Series Resistor for DS203 Fig. 6-51
R208		Same as R205.	Series Resistor for DS204 Fig. 6-51
R209		Same as R205.	Series Resistor for DS205 Fig. 6-51
R210 thru R216		Not Used.	
R217		RESISTOR, FIXED, WIREWOUND: 2500 ohms ±5%, 10 w, RW31G252, spec MIL-R-26.	Series Resistor for DS207 Fig. 6-51
R218		RESISTOR, VARIABLE, WIREWOUND: 10 ohms ±10%, 25 w, RP101SD100KK, spec MIL-R-22.	HV Overload Trip Adjust Fig. 6-51
R219		RESISTOR, FIXED, COMPOSITION: 220,000 ohms ±10%, 2 w, RC42GF224K, spec MIL-R-11.	Blown Fuse Bleeder Fig. 6-51
R220		Same as R219.	Blown Fuse Bleeder Fig. 6-51
R221		Same as R219.	Blown Fuse Bleeder Fig. 6-51
R222		Same as R219.	Blown Fuse Bleeder Fig. 6-51
R223 thru R299		Not Used.	
S201		SWITCH, TOGGLE: 3 pst, 250 v ac nom max, 10 amp, 125 v ac, 20 amp, lever type handle and mtg ears, mfr 04009, type 81393W.	Emergency Stop Fig. 6-51
S202		SUBASSEMBLY, SWITCHING: C/O bracket mtg base, screw type plunger, voltage connection, grounding strap, shorting bar and associated hardware, mfr 89661, dwg 54B2526.	+1250 V DC Grounding Fig. 6-51
S203		SWITCH, PUSH: Momentary action, rated 30 v dc, 3 amp inductive, mfr 74059, type 2PB2.	Overload Reset Switch Fig. 6-51

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

POWER SUPPLY PP-2222/WRT

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
S204 thru S299		Not Used.	
T201		TRANSFORMER, POWER, STEP-UP: Open frame, 4 primary windings, ea 110 v, 50 to 60 cycles, single phase, 1 secondary winding, 550 v, 0.9 amp, tapped at 355 v, 3000 v max insulation, air-cooled, impregnated, mfr 89661, dwg 52C2174-1-1.	HV Rectifier Plate Fig. 6-51
T202		Same as T201.	HV Rectifier Plate Fig. 6-51
T203		Same as T201.	HV Rectifier Plate Fig. 6-51
T204		TRANSFORMER, POWER, STEPDOWN: Open frame, 1 primary winding 115 v, 60 cycles ±5%, single phase, 1 secondary 15 amp, No. 2, 3, 4 secondaries 5 amp, mfr 89661, dwg 52C2175-1-1.	HV Rectifier Filament Fig. 6-51
T205 thru T299		Not Used.	
TB201		TERMINAL BOARD: Barrier type, 7 double screw type terminals, mfr 71785, type 7-150D.	Wire Termination Fig. 6-51
TB202		TERMINAL BOARD: Barrier type, 14 double screw type terminals, mfr 71785, type 14-141D.	Wire Termination Fig. 6-51
TB203 thru TB299		Not Used.	
V201		ELECTRON TUBE: Glass envelope, halfwave gas rectifier, 3B28, spec MIL-E-1.	+1250 V DC Rectifier Fig. 3-8
V202		Same as V201.	+1250 V DC Rectifier Fig. 3-8
V203		Same as V201.	+1250 V DC Rectifier Fig. 3-8
V204		Same as V201.	+1250 V DC Rectifier Fig. 3-8
V205		Same as V201.	+1250 V DC Rectifier Fig. 3-8
V206		Same as V201.	+1250 V DC Rectifier Fig. 3-8
V207 thru V299		Not Used.	
XDS201		LIGHT, INDICATOR: 125 v integral resistor, accommodates T-3¼ lamp, yellow lens, LH64BY2, spec MIL-L-3661.	For DS201 Fig. 6-51
XDS202		Same as XDS201.	For DS202 Fig. 6-51
XDS203		Same as XDS201.	For DS203 Fig. 6-51
XDS204		Same as XDS201.	For DS204 Fig. 6-51
XDS205		Same as XDS201.	For DS205 Fig. 6-51
XDS206		Not Used.	
XDS207		LIGHT, INDICATOR: 28 v accommodates T-3¼ lamp, plain red lens, LH62BR2, spec MIL-L-3661.	For DS206 Fig. 6-51
XDS208		LIGHT, INDICATOR: 28 v, accommodates T-3¼ lamp, plain white lens, LH62PW2, spec MIL-L-3661.	For DS207 Fig. 6-51
XDS209 thru XDS299		Not Used.	
XF201		FUSEHOLDER: Phosphor bronze material, mfr 89811, type 9-16CL.	For F201 Fig. 6-51
XF202		Same as XF201.	For F202 Fig. 6-51
XF203		Same as XF201.	For F203 Fig. 6-51
XF204		Same as XF201.	For F204 Fig. 6-51
XF205		Same as XF201.	For F205 Fig. 6-51
XF206		Same as XF201.	For F206 Fig. 6-51
XF2 7		Same as XF201.	For F207 Fig. 6-51
XF208 thru XF299		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

POWER SUPPLY PP-2222/WRT

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
XV201		SOCKET, ELECTRON TUBE: 4 contacts, porcelain base, aluminum body, no provision for mtg tube shield, mfr 74970, type 123-210.	For V201 Fig. 6-51
XV202		Same as XV201.	For V202 Fig. 6-51
XV203		Same as XV201.	For V203 Fig. 6-51
XV204		Same as XV201.	For V204 Fig. 6-51
XV205		Same as XV201.	For V205 Fig. 6-51
XV206		Same as XV201.	For V206 Fig. 6-51
XV207 thru XV299		Not Used.	

OSCILLATOR, RADIO FREQUENCY 0-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
301-399		OSCILLATOR, RADIO FREQUENCY: 12 bands, 300 kc to 1.5 mc frequency range, 115 v, 60 cycles, 3 phase ac and −24v/350v/−350v dc operating power requirements, 25$\frac{5}{16}$ in. lg, 17$\frac{1}{2}$ in. w, 12$\frac{1}{4}$ in. h overall dimensions. Drawer rotates approx. 171 deg. in either direction, mfr 89661, dwg 55C2371.	Provides the RF Carrier and Voice Modulation for Transmitting Set AN/WRT-1.
C301		CAPACITOR, FIXED, MICA DIELECTRIC: 5600 μμf ±10%, 500 v dc working, CM35B562K, spec MIL-C-5.	Plate Decoupling V301 Fig. 6-41
C302		Same as C301.	Screen Bypass V301 Fig. 6-41
C303		CAPACITOR, FIXED, MICA DIELECTRIC: 4700 μμf ±10%, 500 v dc working, CM35B472K, spec MIL-C-5.	Grid Coupling V302A Fig. 6-41
C304		Same as C301.	Cathode Bypass V302A Fig. 6-41
C305		Same as C301.	Cathode Bypass V302B Fig. 6-41
C306		Same as C301.	Plate Decoupling Fig. 6-41
C307		Same as C301.	Plate Decoupling V302B Fig. 6-41
C308		Same as C303.	Coupling from Plate V302A Fig. 6-41
C309		CAPACITOR, FIXED, MICA DIELECTRIC: 330 μμf ±10%, 500 v dc working, CM20B331K, spec MIL-C-5.	AGC Filter Fig. 6-41
C310		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 600 v dc working, CP05A1EF104K, spec MIL-C-25.	AGC Filter Fig. 6-41
C311 thru C316		Not Used.	
C317		Same as C310.	Cathode Bypass V307 Fig. 6-39
C318		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 1000 v dc working, CP53B1EG104K, spec MIL-C-25.	Meter Bypass for M301 Fig. 6-42
C319		CAPACITOR, VARIABLE, AIR DIELECTRIC: 10.0 μμf min, 248.75 μμf max, shaft adjustment, 180 deg. ccw rotation viewed from shaft end, steatite insulation, mfr 89661, dwg 220B774-1-1.	Oscillator Main Tuning Fig. 6-38
C320		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 μf ±10%, 400 v dc working, CP05A1KE105K, spec MIL-C-25.	+250 Volt Supply Filter Fig. 6-39
C321		Same as C320.	+250 Volt Supply Filter Fig. 6-39
C322		CAPACITOR, FIXED, PAPER DIELECTRIC: 15,000 μμf ±10%, 200 v dc working, CP05A1KC153K, spec MIL-C-25.	Grid RF Filter, V307 Fig. 6-39
C323 thru C339		Not Used.	
C340		CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 7 to 45 μμf, 500 v dc working, CV11D450, spec MIL-C-81.	Trimmer for Band 1 Fig. 6-38

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATIN FUNCTION
C341		Same as C340.	Trimmer for Band 2 Fig. 6-38
C342		Same as C340.	Trimmer for Band 3 Fig. 6-38
C343		Same as C340.	Trimmer for Band 4 Fig. 6-38
C344		Same as C340.	Trimmer for Band 5 Fig. 6-38
C345		Same as C340.	Trimmer for Band 6 Fig. 6-38
C346		Same as C340.	Trimmer for Band 7 Fig. 6-38
C347		Same as C340.	Trimmer for Band 8 Fig. 6-38
C348		Same as C340.	Trimmer for Band 9 Fig. 6-38
C349		Same as C340.	Trimmer for Band 10 Fig. 6-38
C350		Same as C340.	Trimmer for Band 11 Fig. 6-38
C351		Same as C340.	Trimmer for Band 12 Fig. 6-38
C352		CAPACITOR, FIXED, GLASS DIELECTRIC: 160 μμf ±2%, 300 v dc working, CY10C161G, spec MIL-C-11272.	Tank Circuit Coupling Fig. 6-38
C353		CAPACITOR, FIXED, GLASS DIELECTRIC: 130 μμf ±2%, 300 v dc working, CY10C131G, spec MIL-C-11272.	Tank Circuit Coupling Fig. 6-38
C354		Same as C353.	Tank Circuit Coupling Fig. 6-38
C355		Same as C353.	Tank Circuit Coupling Fig. 6-38
C356		Same as C353.	Tank Circuit Coupling Fig. 6-38
C357		Same as C353.	Tank Circuit Coupling Fig. 6-38
C358		Same as C353.	Tank Circuit Coupling Fig. 6-38
C359		Same as C353.	Tank Circuit Coupling Fig. 6-38
C360		Same as C353.	Tank Circuit Coupling Fig. 6-38
C361		Same as C353.	Tank Circuit Coupling Fig. 6-38
C362		Same as C353.	Tank Circuit Fig. 6-38
C363		Same as C353.	Tank Circuit Fig. 6-38
C364 thru C367		Not Used.	
C368		CAPACITOR, FIXED, GLASS DIELECTRIC: 620 μμf ±2%, 300 v dc working, CY15C621G, spec MIL-C-11272.	Cathode-Grid Coupling Fig. 6-38
C369 thru C373		Not Used.	
C374		CAPACITOR, FIXED, GLASS DIELECTRIC: 910 μμf ±2%, 300 v dc working, CY15C911G, spec MIL-C-11272.	Cathode-Ground Coupling V301 Fig. 6-38
C373		Not Used.	
C376		CAPACITOR, FIXED, GLASS DIELECTRIC: 2160 μμf ±1%, 500 v dc, mfr 89661, dwg 335C813H28.	Fixed Padder Band 2 Fig. 6-38
C377		CAPACITOR, FIXED, GLASS DIELECTRIC: 1160 μμf ±1%, 300 v dc, mfr 89661, dwg 335C813H27.	Fixed Padder Band 3 Fig. 6-38
C378		CAPACITOR, FIXED, GLASS DIELECTRIC: 824 μμf ±1%, 300 v dc, mfr 89661, dwg 335C813H26.	Fixed Padder Band 4 Fig. 6-38

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATION FUNCTION
C379		CAPACITOR, FIXED, GLASS DIELECTRIC: 648 μμf ±1%, 300 v dc, mfr 89661, dwg 335C813H25.	Fixed Padder Band 5 Fig. 6-38
C380		CAPACITOR, FIXED, GLASS DIELECTRIC: 541 μμf ±1%, 300 v dc, mfr 89661, dwg 335C813H24.	Fixed Padder Band 6 Fig. 6-38
C381		CAPACITOR, FIXED, GLASS DIELECTRIC: 467 μμf ±1%, 500 v dc, mfr 89661, dwg 335C813H23.	Fixed Padder Band 7 Fig. 6-38
C382		CAPACITOR, FIXED, GLASS DIELECTRIC: 414 μμf ±1%, 500 v dc, mfr 89661, dwg 335C813H22.	Fixed Padder Band 8 Fig. 6-38
C383		CAPACITOR, FIXED, GLASS DIELECTRIC: 376 μμf ±1%, 500 v dc, mfr 89661, dwg 335C813H21.	Fixed Padder Band 9 Fig. 6-38
C384		CAPACITOR, FIXED, GLASS DIELECTRIC: 340 μμf ±1%, 500 v dc, mfr 89661, dwg 335C813H20.	Fixed Padder Band 10 Fig. 6-38
C385		CAPACITOR, FIXED, GLASS DIELECTRIC: 315 μμf ±1%, 500 v dc, mfr 89661, dwg 335C813H19.	Fixed Padder Band 11 Fig. 6-38
C386		CAPACITOR, FIXED, GLASS DIELECTRIC: 292 μμf ±1%, 300 v dc, mfr 89661, dwg 335C813H18.	Fixed Padder Band 12 Fig. 6-38
C387		Same as C310.	Ripple Feedback Capacitor Fig. 6-39
C388		Not Used.	
C389		CAPACITOR, FIXED, GLASS DIELECTRIC: 100 μμf ±2%, 300 v dc working, CY10C101G, spec MIL-C-11272.	Fixed Trimmer for C319 Fig. 6-38
C390		CAPACITOR, FIXED, GLASS DIELECTRIC: 47 μμf ±5%, 300 v dc working, CY10C470J, spec MIL-C-11272.	Fixed Trimmer Band 2 Fig. 6-38
C391		CAPACITOR, FIXED, GLASS DIELECTRIC: 75 μμf ±2%, 300 v dc working, CY10C750G, spec MIL-C-11272.	Fixed Trimmer Band 3 Fig. 6-38
C392		Same as C391.	Fixed Trimmer Band 4 Fig. 6-38
C393		CAPACITOR, FIXED, GLASS DIELECTRIC: 91 μμf ±2%, 300 v dc working, CY10C910G, spec MIL-C-11272.	Fixed Trimmer Band 5 Fig. 6-38
C394		Same as C393.	Fixed Trimmer Band 6 Fig. 6-38
C395		CAPACITOR, FIXED, GLASS DIELECTRIC: 110 μμf ±5%, 300 v dc working, CY10C111J, spec MIL-C-11272.	Fixed Trimmer Band 7 Fig. 6-38
C396		Same as C395.	Fixed Trimmer Band 8 Fig. 6-38
C397		Same as C353.	Fixed Trimmer Band 9 Fig. 6-38
C398		Same as C353.	Fixed Trimmer Band 10 Fig. 6-38
C399		Same as C353.	Fixed Trimmer Band 11 Fig. 6-38
		Cont. See C401.	
CR301		SEMICONDUCTOR DEVICE, DIODE: 100 v peak inverse voltage, 5.0 ma min forward current at 25 deg. C temp, 1N198, spec MIL-E-1.	AGC Rectifier Fig. 6-41
CR302 thru CR399		Not Used.	
		Cont. See CR450.	
DS301		LAMP, GLOW: Neon gas, 1/25 w at 105 to 125 v, 1/10 w, at 210 to 250 v, 100,000 ohms external resistance required, mfr 89661, type NE51. Same as DS201.	AGC Oven Heater Rectifier Indication Fig. 6-42
DS302 thru DS399		Not Used.	
E301		BOARD, MOUNTING: 26 solder stud terminals, mfr 89661, dwg 236B161.	Component Mtg Oscillator Subchassis Fig. 6-41
E302		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 227B020H01.	Resistor Mtg in Regulator Subshassis Fig. 6-41
E303		BOARD, MOUNTING: 26 solder stud terminals, mfr 89661, dwg 236B160.	Resistor Mtg in Regulator Subchassis Fig. 6-39

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATIN FUNCTION
E304 thru E307		Not Used.	
E308		BOARD, RESISTOR: 8 solder stud terminals, 2¾ in. lg, 1¼ w, mfr 89661, dwg 55C6815H01.	Mtg for R370, R371 Fig. 6-42
E309		INSULATOR, STANDOFF: Melamine insulator, tin coated brass terminal, mfr 81312, type 775. Same as E101.	Standoff
E310 thru E314		Not Used.	
E315		Same as E309.	Standoff
E316		Same as E309.	Standoff
E317		KNOB: Crank operated, brass, 3 in. dia, mfr 89661, dwg 54B3071H01.	Control Knob Fig. 5-23
E318		DIAL, CONTROL: Black nylon knob, primary dial calibrated 0 to 99, secondary dial calibrated 0 to 15, mfr 89661, dwg 327C866H01.	Control Knob Fig. 5-23
E319		KNOB: Black phenolic w/pointer, ¾ in. dia knob, 1³⁄₁₆ in. dia skirt, accommodates ¼ in. dia shaft, mfr 88635, type VIZG.	Control Knob Fig. 5-23
E320		KNOB: Black phenolic, 1⅞ in. dia knob, 1½ in. dia skirt, accommodates ¼ in. dia shaft, mfr 88635, type VIZE.	Control Knob Fig. 5-23
E321		KNOB: Black phenolic w/pointer, 1 in. dia knob, 1¹⁄₁₆ in. dia skirt, accommodates ¼ in. shaft, mfr 88635, type VIZA.	Control Knob Fig. 5-23
E322		Same as E321.	Control Knob Fig. 5-23
E323		Same as E321.	Control Knob Fig. 5-23
E324		Same as E321.	Control Knob Fig. 5-23
E325		INSULATOR, STANDOFF: Molded melamine body, tin plated brass terminal, tapped hole one end ⁵⁄₁₆ in. lg, mfr 81312, type 756.	Wiring Tie Point in Oscillator Subchassis
E326		Same as E325.	Wiring Tie Point in Oscillator Subchassis
E327		INSULATOR, STANDOFF: Molded melamine body, tin plated brass terminal, tapped hole one end, ²³⁄₃₂ in. lg, mfr 81312, type 753.	Wiring Tie Point in Regulator Subchassis
E328		Same as E327.	Wiring Tie Point in Regulator Subchassis
E329		Same as E325.	Wiring Tie Point in Regulator Subchassis
E330		Same as E309.	Wiring Tie Point in Regulator Subchassis
E331 thru E399		Not Used.	
		Cont. See E450.	
HR301		HEATING ELEMENT, ELECTRICAL: 4 in. w, 4½ in. lg, 230 ohms, 57.5 v, mfr 89661, dwg 150A574H01.	Oven Heater Fig. 6-37
HR302		Same as HR301.	Oven Heater Fig. 6-37
HR303		Same as HR301.	Oven Heater Fig. 6-37
HR304		Same as HR301.	Oven Heater Fig. 6-37
HR305		Same as HR301.	Oven Heater Fig. 6-37
HR306		Same as HR301.	Oven Heater Fig. 6-37
HR307 thru HR399		Not Used.	
J301		CONNECTOR, RECEPTACLE, ELECTRICAL: KEL-F insulator, silver plated brass body, straight type, mfr 74868, type 44575.	RF Output T301 Fig. 6-41
J302		Same as J301.	RF Output T302 Fig. 6-41
J303		Not Used.	
J304		Same as J301.	Oscillator Tank Fig. 6-38

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
J305		CONNECTOR, RECEPTACLE, ELECTRICAL: Type MB receptacle, mfr 74868, type 46025.	Oscillator Tank Top Fig. 6-38
J306		Not Used.	
J307		Same as J305.	Oscillator Grid V301 Fig. 6-41
J308		Same as J305.	Oscillator Cathode V301 Fig. 6-41
J309		Not Used.	
J310		CONNECTOR, RECEPTACLE, ELECTRICAL: Telephone type, tip and sleeve contact, bushing mounted JJ033, spec MIL-J-641.	Audio Frequency Heater Fig. 6-42
J311 thru J313		Not Used.	
J314		CONNECTOR, RECEPTACLE, ELECTRICAL: Female contacts, low-loss plastic body, straight shape, mfr 08484, type EC3150.	Top Cover Wiring Fig. 6-42
J315		Same as J314.	Bottom Cover Wiring Fig. 6-42
J316		CONNECTOR, RECEPTACLE, ELECTRICAL: 1 round male contact, straight type, solid shell, panel mounted, mfr 91577, type 2914.	RF Output T301 Fig. 6-41
J317 thru J399		Not Used.	
		Cont. See J450.	
K301		RELAY, ARMATURE: 5000 ohms ±10%, coil, contacts rated 5 amp 28 v dc, silver contacts, hermetically sealed, mfr 78277, type 41J02Z5000ACG.	Oven Heater Fig. 6-42
K302		RELAY, ARMATURE: 4 pdt, 28 v dc coil, contacts rated 3 amp, mfr 77523, type 22310-1.	FSK Relay Fig. 6-42
K303 thru K399		Not Used.	
L301		COIL, RADIO FREQUENCY: 10 mh, 0.125 amp dc, 100 kc frequency, mfr 89661, dwg 375A501G01.	Cathode Choke V301 Fig. 6-38
L302		COIL, RADIO FREQUENCY: 3 pies, 750 μh to 110 μh, q of 120 at 350 kc, mfr 89661, dwg 55C4700-1-5.	Oscillator Tank Band 1 Fig. 6-38
L303		COIL, RADIO FREQUENCY: 3 pies, 400 μh to 600 μh, q of 120 at 450 kc, mfr 89661, dwg 55C4700-1-8.	Oscillator Tank Band 2 Fig. 6-38
L304		COIL, RADIO FREQUENCY: 3 pies, 280 μh to 400 μh, q of 120 at 550 kc, mfr 89661, dwg 55C4700-1-11.	Oscillator Tank Band 3 Fig. 6-38
L306		COIL, RADIO FREQUENCY: 3 pies, 200 μh to 300 μh, q of 120 at 650 kc, mfr 89661, dwg 55C4700-1-14.	Oscillator Tank Band 4 Fig. 6-38
L306		COIL, RADIO FREQUENCY: 3 pies, 115 μh to 175 μh, q of 120 at 750 kc, mfr 89661, dwg 55C4700-1-17.	Oscillator Tank Band 5 Fig. 6-38
L307		COIL, RADIO FREQUENCY: 3 pies, 105 μh to 155 μh, q of 120 at 850 kc, mfr 89661, dwg 55C4700-1-20.	Oscillator Tank Band 6 Fig. 6-38
L308		COIL, RADIO FREQUENCY: 3 pies, 88 μh to 125 μh, q of 120 at 950 kc, mfr 89661, dwg 55C4700-1-23.	Oscillator Tank Band 7 Fig. 6-38
L309		COIL, RADIO FREQUENCY: 3 pies, 75 μh to 110 μh, q of 120 at 1.05 mc, mfr 89661, dwg 55C4700-1-26.	Oscillator Tank Band 8 Fig. 6-38
L310		COIL, RADIO FREQUENCY: 3 pies, 70 μh to 100 μh, q of 120 at 1.115 mc, mfr 89661, dwg 55C4700-1-29.	Oscillator Tank Band 9 Fig. 6-38
L311		COIL, RADIO FREQUENCY: 3 pies, 65 μh to 95 μh, q of 120 at 1.25 mc, mfr 89661, dwg 55C4700-1-32.	Oscillator Tank Band 10 Fig. 6-38
L312		COIL, RADIO FREQUENCY: 3 pies, 50 μh to 75 μh, q of 120 at 1.35 mc, mfr 89661, dwg 55C4700-1-35.	Oscillator Tand Band 11 Fig. 6-38
L313		COIL, RADIO FREQUENCY: 3 pies, 47.5 μh to 72.5 μh, q of 120 at 1.45 mc, mfr 89661, dwg 55C4700-1-38.	Oscillator Tank Band 12 Fig. 6-38
L314		SATURABLE REACTOR: 3 windings, two w/24.6 ohms dcr, 2.45 madc, third winding 0.840 ohms dcr, mfr 89961, dwg 152A717H01.	Frequency Shift Control Fig. 6-38
L315 thru L399		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continu d

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
M301		AMMETER: Milliampere scale 1-0-1, white face, ruggedized, MR26W1U1DCMAR, spec MIL-M-10304.	Frequency Zero Adjust Fig. 6-42
M302		COUNTER: Rotating shaft both ends, 5 wheels, 0 to 9 top going, mfr 89661, dwg 54B3252H01.	Frequency Indication
M303 thru M399		Not Used.	
MP301		GEARING ASSEMBLY: Chain and sprocket driven, shafts located front and rear, mfr 89661, dwg 59A1836H01.	Frequency Setting
MP302		BEARING, SLEEVE: Oilite bronze, 0.502 in. id, 0.627 in., 5/16 in. lg, 3/4 in. flange dia, mfr 70901, type FF636-3.	Shaft Retainer and Bearing
MP303		BEARING, PLAIN, FLANGED: Oilite bronze, 0.6265 in. id, 0.7525 in. od, 1/4 in. lg, mfr 89661, dwg 223B168H02.	Shaft Retainer and Bearing
MP304		BEARING, SLEEVE: Oilite bronze, 0.252 in. id, 0.3775 in. od, 1/4 in. lg, 15/32 in. flange dia, mfr 70901, type FF312.	Shaft Retainer and Bearing
MP305		Same as MP304.	Shaft Retainer and Bearing
MP306		Same as MP304.	Shaft Retainer and Bearing
MP307		Same as MP304.	Shaft Retainer and Bearing
MP308		Same as MP304.	Shaft Retainer and Bearing
MP309		Same as MP304.	Shaft Retainer and Bearing
MP310		Same as MP304.	Shaft Retainer and Bearing
MP311		Same as MP304.	Shaft Retainer and Bearing
MP312		GEAR, SPUR: 36 pitch, 20 deg. pressure angle, 178 teeth, 4.944 in. pitch dia, mfr 89661, dwg 54B3152H01.	Drive Gear
MP313		GEAR, BEVEL: 20 deg. pressure angle 32 pitch, 24 teeth, 0.750 in. pitch dia, mfr 89661, dwg 55C6153H01.	Bevel Drive
MP314		GEAR, SPUR: 36 pitch, 20 deg. pressure angle, 38 teeth, 1.055 in. pitch dia, mfr 89661, dwg 55C4691H01.	Drive Gear
MP315		GEAR, BEVEL: (Pair) both gears 20 deg. pressure angle, 32 pitch, one gear 24 teeth, 3/4 in. pitch dia., other gear 48 teeth, 1 1/2 in. pitch dia., mfr 89661, dwg 55C4669H01.	Bevel Drive
MP316		GEAR, BEVEL: 20 deg. pressure angle, 32 pitch, 24 teeth, 0.750 in. pitch dia., mfr 89661, dwg 55C4670H01.	Bevel Drive
MP317		SPROCKET WHEEL: 15 teeth, 5/8 in. dia less teeth, 13/32 in. w incl hub, mfr 89661, dwg 7424442-1.	Drive Sprocket
MP318		Same as MP317.	Drive Sprocket
MP319		SPROCKET WHEEL: 18 teeth, 1.080 in. pitch dia, for 3/16 pitch, 5/32 w, side flange silent shain, mfr 89661, dwg 55C4695H01.	Drive Sprocket
MP320		SPROCKET WHEEL: 15 teeth, 5/8 in. dia less teeth, 1/4 in. w, mfr 89661, dwg 7424443G1.	Drive Sprocket
MP321		CHAIN, ROLLER: 76 pitches, 3/16 pitch by 7/32 w, stainless steel, mfr 89661, dwg 55C2371-2-30.	Drive Chain
MP322		BEARING, SLEEVE: Oilite bronze, 0.255 in. id, 0.500 in. od, mfr 70901, type TT504.	Thrust Bearing
MP323		Same as MP322.	Thrust Bearing
MP324		COUPLING, SHAFT, FLEXIABLE: Brass nickel plated hub, 0.251 in. bore both ends, mfr 99934, type A201.5.	Shaft Coupling
MP325		Same as MP324.	Shaft Coupling
MP326		GEAR, BEVEL: 20 deg. pressure angle blank hub, 24 teeth, 0.750 in. pitch dia, mfr 89661, dwg 328C029H17.	Bevel Drive
MP327		Same as MP326.	Bevel Drive
MP328		Same as MP322.	Thrust Bearing
MP329		CLUTCH, FRICTION: 4 5/8 in. lg, 2 11/16 in. dia, mfr 89661, dwg 55C4781.	Prevents Over-Travel
MP330 thru MP399		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
P301 thru P303		Not Used.	
P304		CONNECTOR, PLUG, ELECTRICAL: Silver plated, with jacket clamp, ¾ in. by ¾ in. L shape, mfr 74868, type 44550. Same as P134.	Oscillator Tank Fig. 6-42
P305		Same as P304.	Oscillator Tank Top Fig. 6-42
P306		Not Used.	
P307		CONNECTOR, PLUG, ELECTRICAL: Silver plated, with jacket clamp, for 0.120 to 0.145 in. od cable, mfr 74868, type 44525.	Mates with J307 Fig. 6-42
P308		Same as P307.	Mates with J308 Fig. 6-42
P309		Not Used.	
P310		PLUG, TELEPHONE: Tip, ring and sleeve connection, black plastic shell, regular finger length, 0.207 in. dia finger, PJO-68, spec MIL-P-642.	Test Jack
P311 thru P313		Not Used.	
P314		CONNECTOR, PLUG, ELECTRICAL: Solid pin contacts, low-loss plastic body, straight shape, mfr 89661, dwg 378A127G01.	Mates with J314 Fig. 6-37
P314		CONNECTOR, PLUG, ELECTRICAL: Solid pin type contacts, low-loss plastic body, straight shape, mfr 08484, type EC3149.	Mates with J315 Fig. 6-37
P316 thru P399		Not Used.	
R301		RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, ½ w, RC20GF102K, spec MIL-R-11.	Plate Decoupling V301 Fig. 6-41
R302		RESISTOR, FIXED, COMPOSITION: 1500 ohms ±10%, ½ w, RC20GF152K, spec MIL-R-11.	Plate Load V301 Fig. 6-41
R303		RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 2 w, RC42GF473K, spec MIL-R-11.	Screen Dropping V301 Fig. 6-41
R304		Same as R205.	Grid Return V302 Fig. 6-41
R305		RESISTOR, FIXED, COMPOSITION: 220 ohms ±10%, ½ w, RC20GF221K, spec MIL-R-11.	Cathode Bias V302A Fig. 6-41
R306		Same as R305.	Cathode Bias V302B Fig. 6-41
R307		Same as R301.	Plate Decoupling V302A Fig. 6-41
R308		Same as R301.	Plate Decoupling V302B Fig. 6-41
R309		RESISTOR, FIXED, COMPOSITION: 150,000 ohms ±10%, 1 w, RC32GF154K, spec MIL-R-11.	AGC Bias Divider Fig. 6-41
R310		RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, ½ w, RC20GF153K, spec MIL-R-11.	AGC Bias Divider Fig. 6-41
R311		RESISTOR, FIXED, COMPOSITION: 220,000 ohms ±10%, ½ w, RC20GF224K, spec MIL-R-11.	AGC Filter Fig. 6-41
R312		Same as R310.	AGC Filter Fig. 6-41
R313		Same as R310.	AGC Filter Fig. 6-41
R314		RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%, ½ w, RC20GF470K, spec MIL-R-11.	Parasitic Suppressor V301 Fig. 6-41
R315 thru R340		Not Used.	
R341		RESISTOR, VARIABLE: 1000 ohms ±10%, 2 w, RV4NAYSD102A, spec MIL-R-94.	Deviation Calibrate Fig. 6-42
R342 thru R345		Not Used.	
R346		RESISTOR, FIXED, COMPOSITION: 470,000 ohms ±10%, 1 w, RC32GF474K, spec MIL-R-11.	Plate Load V307A Fig. 6-39

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R347		Same as R346.	Plate Load V307B Fig. 6-39
R348		RESISTOR, FIXED, COMPOSITION: 1 meg ±10%, ½ w, RC20GF105K, spec MIL-R-11.	Series Grid V307B Fig. 6-39
R349		RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%, 2 w, RC42GF470K, spec MIL-R-11.	Cathode Equalizing V306B Fig. 6-39
R350		Same as R349.	Cathode Equalizing V306A Fig. 6-39
R351		RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, 2 w, RC42GF153K, spec MIL-R-11.	Cathode Divider V307B Fig. 6-39
R352		RESISTOR, VARIABLE: 25,000 ohms ±10%, 2 w, RV4LAYSD-253A, spec MIL-R-94.	250 V Adjust Fig. 6-39
R353		RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, 2 w, RC42GF223K, spec MIL-R-11.	Cathode Divider V307A Fig. 6-39
R354		Same as R353.	Cathode Divider V307A Fig. 6-39
R355		RESISTOR, FIXED, COMPOSITION: 33,000 ohms ±10%, 2 w, RC42GF333K, spec MIL-R-11.	Cathode Divider V307A Fig. 6-39
R356		Same as R355.	Cathode Divider V307A Fig. 6-39
R357		RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 2 w, RC42GF683K, spec MIL-R-11.	Series Dropping V308 Fig. 6-39
R358		RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, ½ w, RC20GF683K, spec MIL-R-11.	AGC Load Fig. 6-41
R359 thru R364		Not Used.	
R365		RESISTOR, FIXED, COMPOSITION: 56 ohms ±10%, ½ w, RC20GF560K, spec MIL-R-11.	Termination J316 Fig. 6-41
R366		Same as R310.	Attenuator J311 Fig. 6-41
R367		RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 2 w, RC42GF103K, spec MIL-R-11.	Current Limiting S306 Fig. 6-42
R368		Not Used.	
R369		RESISTOR, FIXED, COMPOSITION: 150,000 ohms ±10%, 2 w, RC42GF154K, spec MIL-R-11.	L314 Bias Voltage Divider Fig. 6-42
R370		RESISTOR, FIXED, COMPOSITION: 15 ohms ±10%, ½ w, RC20GF150K, spec MIL-R-11.	FSK Keying Output Fig. 6-42
R371		RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, ½ w, RC20GF682K, spec MIL-R-11.	Series M301 Fig. 6-42
R372		RESISTOR, FIXED, WIREWOUND: 2000 ohms ±5%, 17 w, RW32V202, spec MIL-R-26.	Plate Loading V306 Fig. 6-39
R373 thru R380		Not Used.	
R381		Same as R369.	Mark Test Dropping Fig. 6-42
R382		Same as R305.	Reactor Series Limiting Fig. 6-42
R383 thru R386		Not Used.	
R387		Same as R304.	FSK Reactor Input Divider Fig. 6-42
R388 thru R399		Not Used. Cont. See R450.	
S301		SWITCH, ROTARY: 4 pole, 12 positions, 5 sections, shorting type contacts, mfr 89661, dwg 54B6853H01.	Oscillator Band Fig. 6-38
S302		Not Used.	
S303		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
S304		SWITCH, TOGGLE: SPST, rated 15 amp at 125 v ac, phenolic body, 2 solder lug terminals, ST42A, JAN-S-23.	Oven Input Fig. 6-42
S305		Not Used.	
S306		SWITCH, THERMOSTATIC: 65 ±0.05 deg. C operating temperature, 2 terminals, mercury in glass, mfr 48620, type 28807.	Oven Temp Control Fig. 6-37
S307		SWITCH, THERMOSTATIC: 170 deg. F operating temperature, contacts close on temperature fall, hermetically sealed, mfr 89661, dwg 335C788H01.	Oven Temp Control Fig. 6-37
S308		SWITCH, ROTARY: 1 section, 4 position, 2 stops, non-shorting type contacts, solid silver alloy contact and rotors, mfr 89661, dwg 231B746H01.	FSK Test Fig. 6-42
S309 thru S399		Not Used. Cont. See S450.	
T301		TRANSFORMER, RADIO FREQUENCY: 1 primary 300 kc to 1.5 mc, 1 secondary 0.128 ohms center tapped 300 v dc working, mfr 89661, dwg 152A645H01.	Output Transformer, V302A Fig. 6-41
T302		Same as T301.	RF Output Fig. 6-41
T303		Not Used.	
T304		TRANSFORMER, FILAMENT: 1 primary 1500 v, 60 cycles test, mfr 89661, dwg 52C2189-1-1.	Filament Fig. 6-42
T305		TRANSFORMER, POWER, STEPDOWN: Primary 115 v, 50/60 cycles, single phase, 1 secondary winding, 6.3 v at 3.0 amps, mfr 89661, dwg 52C2140-1-1.	Filament Fig. 6-42
T306 thru T399		Not Used. Cont. See T450.	
TB301		TERMINAL BOARD: Barrier type, 17 double screw type terminals, mfr 89661, dwg 55C6213H01.	Wire Termination in Oscillator Subchassis Fig. 6-42
TB302		TERMINAL BOARD: Barrier type, 6 double screw type terminals, mfr 71785, type 6-141D.	Wire Termination Fig. 6-42
TB303		Not Used.	
TB304		TERMINAL BOARD: Barrier type, 4 double screw type terminals, mfr 71785, type 4-141D.	Wire Termination in Oven Subchassis Fig. 6-42
TB305		Not Used.	
TB306		Same as TB304.	Wire Termination L314 Fig. 6-38
TB307		Same as TB302.	Wire Termination in RF Subchassis Fig. 6-42
TB308 thru TB399		Not Used. Cont. See TB450.	
V301		ELECTRON TUBE: Glass envelope, sharp-cutoff pentode, 6AU6WA, spec MIL-E-1B.	Capacitor Oscillator Fig. 3-8
V302		ELECTRON TUBE: Miniature twin triode, receiving, 12AT7WA, spec MIL-E-1.	Fig. 3-8
V302A		Part of V302. Listed for reference only.	Output Amplifier
V302B		Part of V302. Listed for reference only.	Output Amplifier
V303 thru V305		Not Used.	
V306		ELECTRON TUBE: Receiving, twin-triode 6080WA, spec MIL-E-1.	+25 V Series Regulator Fig. 3-8
V307		Same as V302.	Fig. 3-8
V307A		Part of V307. Listed for reference only.	Output Amplifier
V307B		Part of V307. Listed for reference only.	Output Amplifier

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
V308		ELECTRON TUBE: Voltage regulator, 5651WA, spec MIL-E-1.	Voltage Reference Fig. 3-8
V309 thru V399		Not Used. Cont. See V450.	
XDS301		LIGHT, INDICATOR: 115 v, with integral resistor, for T-3-1/4 lamp, clear lens, LH64BC2, spec MIL-L-3661.	For DS301 Fig. 6-42
XDS302 thru XDS399		Not Used.	
XK301		SOCKET, ELECTRON TUBE: 7 contact miniature, beryllium copper, silver plated contacts, w/shock shield base TS101P02, MIL-S-12883.	For K301 Fig. 6-42
XK302 thru XK399		Not Used.	
XV301		SOCKET, ELECTRON TUBE: 7 contact miniature, no missing contacts, plastic body, provisions for mtg bayonet type electron tube shield, TS102P01, JAN-S-28.	For V301 Fig. 6-41
XV302		SOCKET, ELECTRON TUBE: 9 contact miniature, plastic body, provisions for mtg layout type electron tube shield, TS103P01, JAN-S-28.	For V302 Fig. 6-41
XV303 thru XV305		Not Used.	
XV306		Same as XK301.	For V306 Fig. 6-39
XV307		Same as XV302.	For V307 Fig. 6-39
XV308		Same as XV301.	For V308 Fig. 6-39
XV309 thru XV399		Not Used. Cont. See XV450.	
C401		Same as C353.	Fixed Trimmer Band 12 Fig. 6-38
C402		CAPACITOR, FIXED, MICA DIELECTRIC: 22 μμf ±10%, 500 v dc working, CM20B220K, spec MIL-R-11.	Parasitic Suppressor Fig. 6-41
C403 thru C449		Not Used.	
C450		Same as C310	Screen Bypass V451 Fig. 6-40
C451		CAPACITOR, FIXED, ELECTROLYTIC: 150 μf −15%, +75%, 30 v dc working, CL15CH151UP1, spec MIL-C-3965.	Phase Shift for V451 Fig. 6-40
C452		Same as C309.	Phase Shift for V451 Fig. 6-40
C453		Same as C309.	Phase Shift for V451 Fig. 6-40
C454		Same as C309.	Phase Shift for V451 Fig. 6-40
C455 thru C459		Not Used.	
C460		CAPACITOR, FIXED, PAPER DIELECTRIC: 47,000 μμf ±10%, 400 v dc working, CP05A1EE473K, spec MIL-C-25.	CW Wave Shaping Fig. 6-40
C461		Same as C460.	CW Wave Shaping Fig. 6-40
C462		Same as C460.	CW Wave Shaping Fig. 6-40
C463		Same as C460.	CW Wave Shaping Fig. 6-40
C464 thru C499		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
CR401 thru CR449		Not Used.	
CR450		Same as CR301.	Space Control for FS Keying Fig. 6-40
CR451		Same as CR301.	Keying Input Clipper Fig. 6-40
CR452		SEMICONDUCTOR DEVICE DIODE: 3 ma min forward current, 175 v max inverse voltage, 1N459, spec MIL-E-1.	CW Keying Output Clipper Fig. 6-40
CR453		Same as CR301.	Mark Control for FS Keying Fig. 6-40
CR454		Same as CR301.	Voltage Reference Diode for V450A Fig. 6-40
CR455 thru CR499		Not Used.	
E401 thru E449		Not Used.	
E450		BOARD, COMPONENT MOUNTING: Micarta board, 48 solder stud terminals, mfr 89661, dwg 54B2598.	Component Mounting and Insulation Fig. 6-40
E451		BOARD, COMPONENT MOUNTING: Micarta board, 24 solder stud terminals, mfr 89661, dwg 337C388.	Component Mounting and Insulation Fig. 6-40
E452		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 337C389.	Component Mounting and Insulation Fig. 6-40
E453		CLIP, ELECTRICAL: Ceramic body, one piece contact and soldering lug, mfr 76487, type 36002.	Grid Cap Fig. 6-40
E454		INSULATOR, STANDOFF: Miniature, melamine insulator, tin coated brass terminal, mfr 81312, type 750.	Standoff
E455		Same as E454.	Standoff
E456		Same as E454.	Standoff
E457		Same as E454.	Standoff
E458		Same as E454.	Standoff
E459 thru E499		Not Used.	
J401 thru J449		Not Used.	
J450		Same as J316.	RF Output T301 Fig. 6-40
J451		Same as J316.	Output Frequency Control Fig. 6-40
J452 thru J499		Not Used.	
R401 thru R449		Not Used.	
R450		Same as R351.	Series Dropping V452 Fig. 6-40
R451		Same as R303.	CW Plate Load V450 Fig. 6-40
R452		Same as R355.	Series Dropping V453 Fig. 6-40
R453		Same as R355.	Series Dropping V453 Fig. 6-40
R454		RESISTOR, FIXED, COMPOSITION: 270,000 ohms ±10%, ½ w, RC20GF274K, spec MIL-R-11.	Divider Grid V452 Fig. 6-40

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R455		Same as R355.	Series Dropping V453 Fig. 6-40
R456		RESISTOR, VARIABLE: 100,000 ohms ±10%, 2 w, RVLAYSA-104A, spec MIL-R-94.	Wave Shaping Symmetry Fig. 6-40
R457		RESISTOR, FIXED, COMPOSITION: 18,000 ohms ±10%, 2 w, RC42GF183K, spec MIL-R-11.	FSK Load V450 Fig. 6-40
R458		Same as R351.	Series Dropping V452 Fig. 6-40
R459		RESISTOR ASSEMBLY: Listed for reference only.	Fig. 6-40
R459A		RESISTOR, FIXED, WIREWOUND: 8000 ohms ±5%, 26 w, RW33V802, spec MIL-R-26.	Plate Load V454
R459B		Same as R459A.	Plate Load V454
R460		RESISTOR, VARIABLE: 5000 ohms ±10%, 2 w, RV4LAYSA502A, spec MIL-R-94.	Space Adjust Fig. 6-40
R461		RESISTOR, VARIABLE: 5000 ohms ±5%, 5 w at 40 deg. C, mfr 90376, type 900-008.	Shift Control Fig. 6-40
R462		Same as R460.	Mark Adjust Fig. 6-40
R463		Same as R355.	Keying Input Termination Fig. 6-40
R464		RESISTOR, FIXED, COMPOSITION: 1.2 meg ±10%, 1 w, RC32GF125K, spec MIL-R-11.	Keying Input Divider Fig. 6-40
R465		RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1 w, RC32GF683K, spec MIL-R-11.	Series Limiting Fig. 6-40
R466		Same as R465.	Bias Divider V450A Fig. 6-40
R467		RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, 2 w, RC42GF682K, spec MIL-R-11.	Bias CR451 Fig. 6-40
R468		RESISTOR, FIXED, COMPOSITION: 100,000 ohms ±10%, 1 w, RC32GF104K, spec MIL-R-11.	Series Wave Shaping Fig. 6-40
R469		Same as R353.	Bias Divider Fig. 6-40
R470		RESISTOR, FIXED, COMPOSITION: 100,000 ohms ±10%, 2 w, RC42GF104K, spec MIL-R-11.	Plate Load V451 Fig. 6-40
R471		RESISTOR, FIXED, COMPOSITION: 330,000 ohms ±10%, 1 w, RC32GF334K, spec MIL-R-11.	Screen Dropping V451 Fig. 6-40
R472		Same as R301.	Cathode Bias V451 Fig. 6-40
R473		Same as R348.	Phase Shift V451 Fig. 6-40
R474		Same as R348.	Phase Shift V451 Fig. 6-40
R475		Same as R348.	Phase Shift V451 Fig. 6-40
R476		Same as R311.	Output Divider V451 Fig. 6-40
R477		Same as R456.	200 Cycle Amplitude Fig. 6-40
R478		RESISTOR, FIXED, COMPOSITION: 3300 ohms ±10%, ½ w, RC20GF332K, spec MIL-R-11.	Cathode Bias V450 Fig. 6-40
R479		Same as R457.	Screen Divider V454 Fig. 6-40
R480		RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, ½ w, RC20GF473K, spec MIL-R-11.	Series Grid V450A Fig. 6-40
R481		Same as R346.	Bias Divider V450A Fig. 6-40
R482		Same as R303.	Series Grid V454 Fig. 6-40
R483		RESISTOR, VARIABLE: 500,000 ohms ±10%, 2 w, RV4LAYSA504A, spec MIL-R-94.	FSK Wave Shaping Fig. 6-40
R484		Same as R301.	Frequency Control Termination Fig. 6-40
R485		Same as R311.	Grid Divider V454 Fig. 6-40

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R486		Same as R470.	Screen Divider V454 Fig. 6-40
R487		Same as R303.	CW Keying Output Divider Fig. 6-40
R488		Same as R303.	CW Keying Output Divider Fig. 6-40
R489		RESISTOR, VARIABLE: 10,000 ohms ±10%, 2 w, RV4LAYSA103A, spec MIL-R-94.	Keying Bias Adjust Fig. 6-40
R490		Same as R470.	CW Keying Output Divider Fig. 6-40
R491		Same as R470.	CW Keying Output Divider Fig. 6-40
R492		Same as R367.	FSK Control Divider Fig. 6-40
R493		Same as R351.	FSK Control Divider Fig. 6-40
R494		Same as R311.	FSK Wave Shaping Voltage Divider Fig. 6-40
R495		RESISTOR, FIXED, COMPOSITION: 470,000 ohms ±10%, ½ w, RC20GF474K, spec MIL-R-11.	FSK Wave Shaping Voltage Divider Fig. 6-40
R496		Same as R470.	Keying Bias Voltage Divider Fig. 6-40
R497		Same as R470.	Keying Bias Voltage Divider Fig. 6-40
R498		Same as R303.	Keying Bias Voltage Divider Fig. 6-40
R499		Same as R351.	Voltage Dropping for V452 Fig. 6-40
S401 thru S449		Not Used.	
S450		SWITCH, ROTARY: 4 position, 1 pole, 1 section, shorting type contacts, mfr 89661, dwg 335C964H01.	Wave Shaping Fig. 6-40
S451		SWITCH, ROTARY: 2 position, 3 pole, 1 section, non-shorting type contacts, mfr 89661, dwg 335C901H01.	Wave Shaping Fig. 6-40
S452 thru S499		Not Used.	
T401 thru T449		Not Used.	
T450		TRANSFORMER, AUDIO FREQUENCY: 1 primary 3000 ohm, 1 secondary 50 ohm, 535 v working, 200 cps, mfr 89661, dwg 152A764H01.	Impedance Matching V450B Fig. 6-40
T451 thru T499		Not Used.	
TB401 thru TB449		Not Used.	
TB450		TERMINAL BOARD: Barrier type, 14 double screw type terminals, mfr 71785, type 14-141D.	Wire Termination Fig. 6-42
TB451 thru TB499		Not Used.	
V401 thru V449		Not Used.	
V450		Same as V302.	Fig. 3-8
V450A		Part of V450. Listed for reference only.	Keying Amplifier
V450B		Part of V450. Listed for reference only.	200 Cycle Amplitude

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

OSCILLATOR, RADIO FREQUENCY O-621/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
V451		Same as V301.	200 Cycle Oscillator Fig. 3-8
V452		ELECTRON TUBE: Glass envelope, voltage regulator, OA2WA, spec MIL-E-1.	Voltage Reference Fig. 3-8
V453		Same as V452.	Bias Regulator Fig. 3-8
V454		ELECTRON TUBE: Beam power amplifier receiving, 5933WA, spec MIL-E-1.	CW Keying Amplifier Fig. 3-8
V455 thru V499		Not Used.	
XV401 thru XV449		Not Used.	
XV450		Same as XV302.	For V450 Fig. 6-40
XV451		Same as XV301.	For V451 Fig. 6-40
XV452		Same as XV301.	For V452 Fig. 6-40
XV453		Same as XV301.	For V453 Fig. 6-40
XV454		SOCKET, ELECTRON TUBE: Steatite, 5 phosphor bronze contacts, quick mounting, mfr 02660, type 49SS5M.	For V454 Fig. 6-40
XV455 thru XV499		Not Used.	

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

501-599		AMPLIFIER, POWER SUPPLY: 350 v 0.55 amp, −350 v 0.1 amp, −24 v 2.15 amp, −12 v 1.06 amp, 12 v 1.06 amp dc and 115 v 5 amp ac output. 115 v, 220 v or 440 v, 60 cycles, signal phase operating power requirements. Drawer rotates approx. 175 deg. in either direction. 20$\frac{5}{16}$ in. lg, 17½ in. w, 10¾ in. h overall dimensions. Mfr 89661, dwg 476D357.	Supplies the Unregulated Plate and Bias dc Voltage
C501		CAPACITOR, FIXED, PAPER DIELECTRIC: 50,000 μμf ±10%, 1500 v dc working, CP26A1EH503K, spec MIL-C-25.	Suppressor +350 V Rectifier Fig. 6-49
C502		CAPACITOR, FIXED, PAPER DIELECTRIC: 10 μf ±10%, 600 v dc working, CP70B1EF106K, spec MIL-C-25.	Filter +350 V Supply Fig. 6-49
C503		Same as C502.	Filter +350 V Supply Fig. 6-49
C504		Same as C502.	Filter +350 V Supply Fig. 6-49
C505		Same as C501.	Suppressor 350 V Rectifier Fig. 6-49
C506		CAPACITOR, FIXED, PAPER DIELECTRIC: 2 μf ±10%, 600 v dc working, CP70B1EF205K, spec MIL-C-25.	Filter −350 V Supply Fig. 6-49
C507		CAPACITOR, FIXED, PAPER DIELECTRIC: 4 μf ±10%, 600 v dc working, CP70B1EF405K, spec MIL-C-25.	Filter −350 V Supply Fig. 6-49
C508		CAPACIOR, FIXED, ELECTROLYTIC:|800 μf −10%,+150%,50 v dc working, CE51C801G, spec MIL-C-62.	Filter −350 V Supply Fig. 6-49
C509		CAPACITOR, FIXED, ELECTROLYTIC:1500 μf −10%,+150%, 25 v dc working, CE51C152F, spec MIL-C-62.	Filter 12 V Supply Fig. 6-49
C510		Same as C509.	Filter 12 V Supply Fig. 6-49
C511		Same as C509.	Filter 12 V Supply Fig. 6-49
C512		Not Used.	
C513		Not Used.	
C514		CAPACITOR, FIXED, PAPER DIELECTRIC: 2 μf ±10%, 600 v dc working, CH53B1MF205K, spec MIL-C-18312.	DC Blocking Fig. 6-49

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C515 thru C599		Not Used. Cont. See C1401	
CR501		SEMICONDUCTOR, DEVICE, DIODE: 800 v peak inverse voltage, 1.5 ma, 175 deg. C max temp, mfr 05277, type 1N1226.	+350 V Rectifier Fig. 6-49
CR502		Same as CR501.	+350 V Rectifier Fig. 6-49
CR503		Same as CR501.	+350 V Rectifier Fig. 6-49
CR504		Same as CR501.	+350 V Rectifier Fig. 6-49
CR505		Same as CR501.	+350 V Rectifier Fig. 6-49
CR506		Same as CR501.	+350 V Rectifier Fig. 6-49
CR507		Same as CR501.	+350 V Rectifier Fig. 6-49
CR508		Same as CR501.	+350 V Rectifier Fig. 6-49
CR509		Same as CR501.	−350 V Rectifier Fig. 6-49
CR510		Same as CR501.	−350 V Rectifier Fig. 6-49
CR511		Same as CR501.	−350 V Rectifier Fig. 6-49
CR512		Same as CR501.	−350 V Rectifier Fig. 6-49
CR513		Same as CR501.	−350 V Rectifier Fig. 6-49
CR514		Same as CR501.	−350 V Rectifier Fig. 6-49
CR515		Same as CR501.	−350 V Rectifier Fig. 6-49
CR516		Same as CR501.	−350 V Rectifier Fig. 6-49
CR517		SEMICONDUCTOR DEVICE, DIODE: Silicone, 80 amp peak surge current, mfr 05277, type 1N1202.	12 V Rectifier Fig. 6-49
CR518		Smae as CR517.	12 V Rectifier Fig. 6-49
CR519		SEMICONDUCTOR DEVICE, DIODE: Silicone, 80 amp peak surge current, mfr 05277, type 1N1204.	−24 V Rectifier Fig. 6-49
CR520		Same as CR519.	−24 V Rectifier Fig. 6-49
CR521		Same as CR301.	Insulation Diode Fig. 6-49
CR522		Same as CR521.	Keying Circuit Blocking Fig. 6-49
CR523		Same as CR521.	Suppressor Diode Fig. 6-49
CR524 thru CR599		Not Used. Cont. See CR1401.	
DS501		Same as DS207.	Door Interlock Indicator Fig. 6-49
DS502		Same as DS501.	Filament Power on Indicator Fig. 6-49
DS503		Same as DS501.	Rectificer on Indicator Fig. 6-49
DS504		Same as DS501.	L. V. Rectifier on Indicator Fig. 6-49

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATION FUNCTION
DS505		Same as DS501.	L. V. Rectifier Overload Indicator Fig. 6-49
DS506 thru DS599		Not Used.	
E501		BOARD MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 337C126G02.	Component Mounting and Insulation Fig. 6-49
E502		TERMINAL BOARD: C/O 3 terminals and other mounting hardware, mfr 89661, dwg 231B936G01.	Component Mounting and Insulation Fig. 6-49
E503		RESISTOR BOARD: C/O 8 terminals and other mounting hardware, mfr 89661, dwg 231B916G02.	Component Mounting and Insulation Fig. 6-49
E504		RECTIFIER BOARD: C/O 14 terminals and other mtg hardware, mfr 89661, dwg 337C57G02.	Rectifier Mountig and Insulation Fig. 6-49
E505		RECTIFIER BOARD: C/O 14 terminals and other mounting hardware, mfr 89661, dwg 337C061G02.	Rectifier Mounting and Insulation Fig. 6-49
E506		TERMINAL BOARD: C/O 4 terminals and other mounting hardware, mfr 89661, dwg 231B869G01.	Component Mounting and Insulation Fig. 6-49
E507		RESISTOR BOARD: C/O 8 terminals and other mounting hardware, mfr 89661, dwg 231B954G02.	Component Mounting and Insulation Fig. 6-49
E508		KNOB: Black phenolic w/pointer, 1 in. dia knob, 1$\frac{1}{16}$ in. dia skirt accommodates $\frac{1}{4}$ in. shaft, mfr 88635, type VIZA. Same as E321.	Control Knob Fig. 5-23
E509		Same as E508.	Control Knob Fig. 5-23
E510		Same as E508.	Control Knob Fig. 5-23
E511		Same as E508.	Control Knob Fig. 5-23
E512		Same as E319.	Control Knob Fig. 5-23
E513		Same as E512.	Control Knob Fig. 5-23
E514		Same as E512.	Control Knob Fig. 5-23
E515		Same as E512.	Control Knob Fig. 5-23
E516		Same as E512.	Control Knob Fig. 5-23
E517		INSULATOR STANDOFF: Mineral filled melamine, brass, tin coated terminal, mfr 81312, type 776.	Standoff
E518		Same as E517.	Standoff
E519		Same as E517.	Standoff
E520		Same as E517.	Standoff
E521		Same as E517.	Standoff
E522		Same as E517.	Standoff
E523		Same as E517.	Standoff
E524		Same as E517.	Standoff
E525 thru E599		Not Used.	
		Cont. See E1401.	
F501		FUSE, CARTRIDGE: 5 amp, 250 v, F10G5R00A, spec MIL-F-15160.	Transmitter 115 v ac Filament Fig. 6-49
F502		FUSE, CARTRIDGE: 3 amp, 250 v, F10G3R00A, spec MIL-F-15160.	Transmitter 115 v ac Tuner Fig. 6-49

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
F503		Same as F501.	Transmitter 115 v ac Oven Fig. 6-49
F504		FUSE, CARTRIDGE: 4 amp, 250 v, F10G4R00A, spec MIL-F-15160.	−24 V Control Fig. 6-49
F505		FUSE, CARTRIDGE: 2 amp, 250 v, F10G2R00A, spec MIL-F-15160.	12 V Radio Phone Fig. 6-49
F506 thru F599		Not Used.	
J501		CONNECTOR, RECEPTACLE, ELECTRICAL: 5 female contacts, straight type, MS3102A14S5S, spec MIL-C-5015.	Handset Jack Fig. 6-49
J502 thru J599		Not Used.	
K501		RELAY, ARMATURE: 4 PDT, single break, 6 v dc, 214 ma, mfr 70309, type SKHX663. Same as K206.	+350 V Overload Relay Fig. 6-49
K502		RELAY, ARMATURE: 4 PDT, single break, 24 v dc, 57 ma, mfr 70309, type SKHX664. Same as K207.	−350 V Overload Relay Fig. 6-49
K503		RELAY, ARMATURE: DPDT, single break, 115 v ac, 15 amp, mfr 70309, type B0-6A115.	Door Interlock Relay Fig. 6-49
K504		RELAY, ARMATURE: 4 PDT, single break, 115 v ac, 15 amp, 1 inductive winding, 90 v ac, 0.10 amp, 112 ohms, mfr 70309, type PON12A90V (90 v ac coil).	Rectifier Power Control Relay Fig. 6-49
K505		RELAY, ARMATURE: 4 PDT, 145 ohms, 0.100 amp, 115 v ac, mfr 70309, type PON12A115V.	L.V. Rectifier Relay Fig. 6-49
K506		Same as K502.	Overload Auxiliary Relay Fig. 6-49
K507		RELAY, ARMATURE: 4 PDT, single break, 15.5 v dc, 60.4 ma, mfr 70309, type SKHX661.	Bias Keying Relay Fig. 6-49
K508		RELAY, ARMATURE: 24 v dc coil, mfr 70309, type LKHX125.	Carrier Suppressor Delay Open Relay Fig. 6-49
K509		Same as K507.	Break-in Follower Relay Fig. 6-49
K510		RELAY, ARMATURE: 4 PDT, single break, 10.13 v dc, 91.2 ma, mfr 70309, type SKHX662.	Push to Talk AM and USB Relay Fig. 6-49
K511 thru K599		Not Used.	
L501		REACTOR: 2.5 henries, 0.55 amp, 175 v at 120 cps, 17.6 ohms dc, resistance, mfr 89661, dwg 378A140G01.	Filter +350 V Supply Fig. 6-49
L502		Same as L501.	Filter +350 V Supply Fig. 6-49
L503		REACTOR: 10 henries, 0.10 amp, 175 v at 120 cps, 140 ohms dc resistance, mfr 89661, dwg 150A716H01.	Filter −350 V Supply Fig. 6-49
L504		Same as L503.	Filter −350 V Supply Fig. 6-49
L505		REACTOR: 0.063 henries, 6 v, 1.2 amp, 120 cps, 1.73 ohms dc resistance, mfr 89661, dwg 150A719H01.	Filter 12 V Supply Fig. 6-49
L506		REACTOR: 0.063 henries, 12 v, 1.91 ohms dcr, 535 v working, mfr 89661, dwg 150A737H01.	Filter 24 V Supply Fig. 6-49
L507 thru L599		Not Used. Cont. See L1401.	
M501		VOLTMETER: 150 full scale value measures ac current, white face, ruggedized, MR26W150ACVVR, spec MIL-M-10304.	VV Meter Fig. 6-49
M502 thru M599		Not Used.	
Q501		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
Q502		TRANSISTOR: Power, 200 ohms mx resistance, +30 v collector voltage, +1.5 amp collector current dc, 2.0 w total dissipation in free air, mfr 90139, type 2N95.	Switching Transistor Fig. 6-49
Q503 thru Q599		Not Used.	
R501		RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 1 w, RC32GF102K, spec MIL-R-11.	Suppressor +350 V Rectifier Fig. 6-49
R502		RESISTOR, VARIABLE: 10 ohms ±10%, 2 w, RA20LASB100A, spec MIL-R-19.	Adjust +350 V Rectifier Overload Relay Fig. 6-49
R503		Same as R501.	Suppressor −350 V Rectifier Fig. 6-49
R504		RESISTOR, VARIABLE: 250 ohms ±10%, 2 w, RA20LASB251A, spec MIL-R-19.	Adjust −350 V Rectifier Overload Relay Fig. 6-49
R505		RESISTOR, FIXED, COMPOSITION: 33,000 ohms ±10%, 2 w, RC42GF333K, spec MIL-R-11. Same as R355.	Bias Keying for Q502 Fig. 6-49
R506		Same as R505.	Bias Keying for Q502 Fig. 6-49
R507		RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, ½ w, RC20GF682K, spec MIL-R-11. Same as R371.	Bias Keying for Q502 Fig. 6-49
R508		RESISTOR, FIXED, WIREWOUND: 2000 ohms ±5%, 10 w, RW31G202, spec MIL-R-26.	FSK Termination Fig. 6-49
R509		RESISTOR, FIXED, COMPOSITION: 2200 ohms ±10%, 2 w, RC42GF222K, spec MIL-R-11.	FSK Termination Fig. 6-49
R510		Same as R509.	FSK Termination Fig. 6-49
R511		RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%, 2 w, RC42GF681K, spec MIL-R-11.	Bias Voltage Divider Q502 Fig. 6-49
R512		Same as R511.	Bias Voltage Divider Q502 Fig. 6-49
R513		Same as R511.	Bias Voltage Divider Q502 Fig. 6-49
R514		RESISTOR, FIXED, WIREWOUND: 50 ohms ±5%, 10 w, RW31G500, spec MIL-R-26.	Bleeder 12 V Supply Fig. 6-49
R515		RESISTOR, FIXED, WIREWOUND: 50 ohms ±5%, 38 w, RW35G500, spec MIL-R-26.	Bleeder −24 V Supply Fig. 6-49
R516		RESISTOR, FIXED, WIREWOUND: 100 ohms ±5%, 10 w, RW31G101, spec MIL-R-26.	Bleeder 12 V Supply Fig. 6-49
R517		RESISTOR, FIXED, COMPOSITION: 120 ohms ±10%, 2 w, RC42GF121K, spec MIL-R-11.	Filter 12 V Supply Fig. 6-49
R518 thru R521		Not Used.	
R522		RESISTOR, FIXED, WIREWOUND: 2500 ohms ±5%, 7 w, RW55V252, spec MIL-R-26.	Series Dropping for DS501 Fig. 6-49
R523		Same as R522.	Series Dropping for DS502 Fig. 6-49
R524		Same as R522.	Series Dropping for DS503 Fig. 6-49
R525		Same as R522.	Series Dropping for DS504 Fig. 6-49
R526		RESISTOR, FIXED, WIREWOUND: 310 ohms ±5%, 10 w, RW31G311, spec MIL-R-26.	Limiting Resistor for K504 Fig. 6-49
R527		RESISTOR, VARIABLE: 2500 ohms ±10%, 2 w, RV4LAYSA252A, spec MIL-R-94.	Bias Keying Relay K507 Adjust Fig. 6-49
R528		RESISTOR, FIXED, WIREWOUND: 8000 ohms ±5%, 18 w, RW33G802, spec MIL-R-26.	Series PH screen Dropping Fig. 6-49
R529		RESISTOR, FIXED, COMPOSITION: 150 ohms ±10%, 1 w, RC32GF151K, spec MIL-R-11.	Suppressor for K509 Fig. 6-49

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R530		Same as R353.	FSK Termination Fig. 6-49
R531		RESISTOR, FIXED, COMPOSITION: 180,000 ohms ±10%, 1 w, RC32GF184K, spec MIL-R-11.	Equalizing Resistor Fig. 6-49
R532		Same as R531.	Equalizing Resistor Fig. 6-49
R533		Same as R531.	Equalizing Resistor Fig. 6-49
R534		Same as R531.	Equalizing Resistor Fig. 6-49
R535		Same as R531.	Equalizing Resistor Fig. 6-49
R536		Same as R531.	Equalizing Resistor Fig. 6-49
R537		Same as R531.	Equalizing Resistor Fig. 6-49
R538		Same as R531.	Equalizing Resistor Fig. 6-49
R539		Same as R531.	Equalizing Resistor Fig. 6-49
R540		Same as R531.	Equalizing Resistor Fig. 6-49
R541		Same as R531.	Equalizing Resistor Fig. 6-49
R542		Same as R531.	Fig. 6-49
R543		Same as R531.	Equalizing Resistor Fig. 6-49
R544		Same as R531.	Equalizing Resistor Fig. 6-49
R545		Same as R531.	Equalizing Resistor Fig. 6-49
R546		Same as R531.	Equalizing Resistor Fig. 6-49
R547 thru R599		Not Used. Cont. See R1401.	
S501		SWITCH, ROTARY: 2 pole, 8 positions, contact ratings 30 amp, 230 v ac, mfr 82121, type JS2200.	Control Bus Voltage Adjustment Fig. 6-49
S502		SWITCH, TOGGLE: DPST, rated 25 amp, 125 v ac, bakelite body, 4 solder lug terminals, ST52K, spec JAN-S-23.	Filament Power Fig. 6-49
S503		SWITCH, PUSH: Momentary action, rated 30 v dc, 3 amp inductive, mfr 74059, type 2PB2. Same as S203.	Plate Power On Fig. 6-49
S504		Same as S503.	Plate Power Off Fig. 6-49
S505		Same as S503.	L.V. Rectifier Overload Reset Fig. 6-49
S506		RELAY, THERMAL: Time delay, normally open, mfr 93929, type RM30N0115.	Filament Time Delay Fig. 6-49
S507		SWITCH, ROTARY: 2 position, 20 pole, 5 section, non-shorting type contacts, mfr 89661, dwg 335C736H01.	Local Remote Switch Fig. 6-49
S508		SWITCH, ROTARY: 6 pole, 4 positions, 3 section, non-shorting contacts, mfr 89661, dwg 336C043H01.	Emission Selector Fig. 6-49
S509		SWITCH, ROTARY: 8 pole 2 position 2 section, non-shorting type contacts, mfr 89661, dwg 335C725H01.	6 Wire-2 Wire Remote Switch Fig. 6-49
S510		SWITCH, ROTARY: 4 pole, 4 positions 2 section, non-shorting type contacts, mfr 89661, dwg 335C723H01.	Power Selector Fig. 6-49
S511 thru S599		Not Used. Cont. See S1401.	
T501		TRANSFORMER, POWER, STEP DOWN AND STEP-UP: 3 input voltages, 16 output voltages, mfr 89661, dwg 152A502H01.	Input Power Stepdown Fig. 6-49

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
T502		TRANSFORMER, POWER, STEP-UP: Primary 220 v, 2 secondaries 420 v and 425 v, mfr 89661, dwg 150A723H01.	+350 V, −350 V Rectifier Fig. 6-49
T503		TRANSFORMER, POWER, STEP DOWN: 1 primary, 6 secondaries, 535 v working, mfr 89661, dwg 150A725H01.	−12 V ac Rectifier Fig. 6-49
T504 thru T599		Not Used.	
		Cont. See T1401.	
TB501		TERMINAL BOARD: Assembly c/o two 16 terminal and four 9 terminal boards. Listed for reference only.	Fig. 6-49
TB501A		TERMINAL BOARD: Barrier type, 16 double screw type terminals, mfr 71785, type 16-141D.	Input Terminal Board
TB501B		Same as TB501A.	Input Terminal Board
TB501C		TERMINAL BOARD: Barrier type, 9 double screw type terminals, mfr 71785, type 9-141D.	Input Terminal Board
TB501D		Same as TB501C.	Input Terminal Board
TB501E		Same as TB501C.	Input Terminal Board
TB501F		Same as TB501C.	Input Terminal Board
TB502 thru TB599		Not Used.	
		Cont. See TB1401.	
XC501 thru XC507		Not Used.	
XC508		SOCKET, ELECTRON TUBE: 7 contact miniature, beryllium copper, silver plated contacts, w/shock shield base, TS101P02, spec JAN-S-28. Same as XV301.	For C508 Fig. 6-49
XC509		Same as XK508.	For C509 Fig. 6-49
XC510		Same as XK508.	For C510 Fig. 6-49
XC511		Same as XK508.	For C511 Fig. 6-49
XC512 thru XC599		Not Used.	
XDS501		LIGHT, INDICATOR: 28 v, accommodates T-3-¼ lamp, plain white lens, LH62PW2, spec MIL-L-3661.	Socket for DS501 Fig. 6-49
XDS502		LIGHT, INDICATOR: Brass w/black nickel finish, amber lens, for T-3-¼ bayonet base lamp, LH62BA2, spec MIL-L-3661.	Socket for DS502 Fig. 6-49
XDS503		LIGHT, INDICATOR: Brass w/black nickel finish, plain blue convex lens, for T-3-¼ lamp, LH62BB2, spec MIL-L-3661.	Socket for DS503 Fig. 6-49
XDS504		LIGHT, INDICATOR: 28 v, accommodates T-3-¼ lamp, plain red lens, LH62BR2, spec MIL-L-3661.	Socket for DS504 Fig. 6-49
XDS505		Same as XDS501.	Socket for DS505 Fig. 6-49
XDS506 thru XDS599		Not Used.	
XF501		FUSE HOLDER: Nonindicating type, 250 v, 22 amp, unsealed, FHN22U, spec MIL-F-19207.	For F501 Fig. 6-49
XF502		Same as XF501.	For F502 Fig. 6-49
XF503		Same as XF501.	For F503 Fig. 6-49
XF504		Same as XF501.	For F504 Fig. 6-49
XF505		Same as XF501.	For F505 Fig. 6-49
XF506 thru XF599		Not Used.	
XS501 thru XS505		Not Used.	
XS506		SOCKET, ELECTRON TUBE: 7 contact, saddle type with shield base, TS102P03, spec MIL-S-12883.	For Switch S506 Fig. 6-49
XS507 thru XS599		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
601-799		CONTROL, ELECTRICAL FREQUENCY: Automatic control, 8.4 mc to 9.6 frequency range. 115 v, 60 cycles, single phase ac and 250 v regulated, −24 v unregulated dc operating power requirements. 20$\frac{5}{16}$ in. lg, 17½ in. w, 12¼ in. h overall dimenstions drawer rotates 171 deg. in either direction may be locked at 45, 90, 135 or 171 deg., mfr 89661, dwg 55C2374.	Provides Precise Setting for the Master Oscillator Frequency
C601 thru C612		Not Used.	
C613		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 μμf +100%, −20%, 500 v dc working, CK63Y103Z, spec MIL-C-11015.	Bypass T612 Fig. 6-46
C614		Same as C613.	Bypass T613 Fig. 6-46
C615		CAPACITOR, FIXED, MICA DIELECTRIC: 150 μμf ±5%, 500 v dc working, CM20C151J, spec MIL-C-5.	Pulse Coupling Fig. 6-46
C616		Same as C615.	Pulse Coupling Fig. 6-46
C617		Same as C615.	Pulse Coupling Fig. 6-46
C618		Same as C615.	Pulse Coupling Fig. 6-46
C619		Same as C613.	Bypass T602 Fig. 6-46
C620		Same as C613.	Bypass T603 Fig. 6-46
C621		CAPACITOR, FIXED, MICA DIELECTRIC: 670.5 μμf ±1%, 300 v dc working, mfr 89661, dwg 331C063H09.	Low Frequency Phase Shift Network Fig. 6-46
C622		CAPACITOR, FIXED, MICA DIELECTRIC: 957.5 μμf ±1%, 300 v dc working, mfr 89661, dwg 331C063H12.	Low Frequency Phase Shift Network Fig. 6-46
C623		CAPACITOR, FIXED, MICA DIELECTRI: 448.5 μμf ±1%, 500 v dc working, mfr 89661, dwg 331C063H07.	Low Frequency Phase Shift Network Fig. 6-46
C624		Same as C622.	Low Frequency Phase Shift Network Fig. 6-46
C625		Same as C621.	Low Frequency Phase Shift Network Fig. 6-46
C626		Same as C623.	Low Frequency Phase Shift Network Fig. 6-46
C627		CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 μμf ±10%, 300 v dc working, CM35C103K, spec MIL-C-5.	Coupling Grid V601A Fig. 6-46
C628		Same as C613.	Band Pass Filter T612 Fig. 6-46
C629		Same as C613.	Band Pass Filter T613 Fig. 6-46
C630		Not Used.	
C631		CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: 7 to 45 μμf, 500 v dc working, CV11D450, spec MIL-C-81. Same as C340.	Pulse Shaping Fig. 6-46
C632		Not Used.	
C633		CAPACITOR, FIXED, PAPER DIELECTRIC: 2 sections, 50,000 μμf +20 −10% ea section, 1000 v dc working, CP53B4EG503V, spec MIL-C-25.	Fig. 6-46
C633A		Part of C633. Listed for reference only.	Plate Decoupling V601A
C633B		Part of C633. Listed for reference only.	Plate Decoupling V601B
C634 thru C638		Not Used.	
C639		Same as C627.	Grid Coupling V601B Fig. 6-46

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C640		Same as C627.	AGC Filter Fig. 6-46
C641		CAPACITOR, FIXED, GLASS DIELECTRIC: 1000 μμf ±5%, 300 v dc working, CY15C102J, spec MIL-C-11272.	Part of FSK Input Filter Fig. 6-43
C642		Same as C641	Part of FSK Input Filter Fig. 6-43
C643		CAPACITOR, FIXED, MICA DIELECTRIC: 1000 μμf ±10%, 500 v dc working, CM30B102K, spec MIL-C-5.	Grid Coupling V602A Fig. 6-46
C644		CAPACITOR, FIXED, PAPER DIELECTRIC: 3 sections, 50,000 ohms ±20% ea section, 600 v dc working, CP54B5EF503M, spec MIL-C-25.	Plate Decoupling V602A Fig. 6-46
C644A		Part of C644. Listed for reference only.	Plate Decoupling V602A
C644B		Part of C644. Listed for reference only.	Plate Decoupling V602B
C644C		Part of C644. Listed for reference only.	Plate Decoupling V603A
C645		Same as C643.	Grid Coupling V602B Fig. 6-46
C646		CAPACITOR, FIXED, GLASS DIELECTRIC: 10,000 μμf ±5%, 300 v dc working, CY30C103J, spec MIL-C-11272.	RF Bypass C610 Center Tap Fig. 6-43
C647		Same as C627.	AGC Filters Fig. 6-46
C648		CAPACITOR, FIXED, MICA DIELECTRIC: 560 μμf ±10%, 500 v dc working, CM30B561K, spec MIL-C-5.	DC Blocking CR615 Fig. 6-46
C649		Not Used.	
C650		Same as C643.	Grid Coupling V603A Fig. 6-46
C651		Same as C646.	Part of FSK Input Filter Fig. 6-43
C652		CAPACITOR, FIXED, MICA DIELECTRIC: 3300 μμf ±10%, 500 v dc working, CM30B332K, spec MIL-C-5.	Phase Detector Filter Fig. 6-46
C653		Same as C627.	Cathode Bypass V603B Fig. 6-46
C654		Same as C627.	Coupling V606 Fig. 6-46
C655		Same as C301.	AGC Filter V606 Fig. 6-46
C656		Same as C303.	Screen Bypass V606 Fig. 6-46
C657		Same as C656.	DC Blocking CR619 Fig. 6-46
C658		Not Used.	
C659		CAPACITOR, FIXED, GLASS DIELECTRIC: 1128 μμf ±1%, 300 v dc, mfr 89661, dwg 231B743H20.	Grid-Cathode Feedback for V606 Fig. 6-43
C660		CAPACITOR, FIXED, PAPER DIELECTRIC: 33,000 μμf ±10%, 400 v dc working, CP09A1KE333K, spec MIL-C-25.	Cathode-Ground Feedback Capacitor for V606 Fig. 6-43
C661		Same as C646.	Part of FSK Input Filter Fig. 6-43
C662		Same as C319.	Interpolation Oscillator Main Tuning Capacitor Fig. 6-43
C663		Not Used.	
C664		CAPACITOR, FIXED, GLASS DIELECTRIC: 2438 μμf ±1%, 500 v dc, mfr 89661, dwg 231B743H16.	Interpolation Padder 60-70 KC Band Fig. 6-43
C665		CAPACITOR, FIXED, GLASS DIELECTRIC: 1084 μμf ±1%, 300 v dc, mfr 89661, dwg 231B743H17.	Interpolation Padder 70-80 KC Band Fig. 6-43
C666		CAPACITOR, FIXED, GLASS DIELECTRIC: 789 μμf ±1%, 300 v dc, mfr 89661, dwg 231B743H18.	Interpolation Padder 80-90 KC Band Fig. 6-43

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C667		CAPACITOR, FIXED, GLASS DIELECTRIC: 609 μμf ±1%, 300 v dc, mfr 89661, dwg 231B743H19.	Interpolation Padder 90-100 KC Band Fig. 6-43
C668		CAPACITOR, VARIABLE, AIR DIELECTRIC: 7.5 to 99.0 μμf, 850 v dc, CT1C100, spec JAN-C-92.	Interpolation Oscillator Trimmer 50-60 KC Band Fig. 6-43
C669		Same as C668.	Interpolation Oscillator Trimmer 60-70 KC Band Fig. 6-43
C670		Same as C668.	Interpolation Oscillator Trimmer 70-80 KC Band Fig. 6-43
C671		Same as C668.	Interpolation Oscillator Trimmer 80-90 KC Band Fig. 6-43
C672		Same as C668.	Interpolation Oscillator Trimmer 90-100 KC Band Fig. 6-43
C673		CAPACITOR, FIXED, MICA DIELECTRIC: 1000 μμf ±10%, 500 v dc working, CM20B102K, spec MIL-C-5.	Padder CR601 Fig. 6-47
C674		CAPACITOR, VARIABLE: Piston type, tubular, 16 μμf, 500 v dc working, PC35H160, spec MIL-C-14409.	1.0 MC Crystal Oscillator Tuning Fig. 5-22
C675		CAPACITOR, VARIABLE: Piston type, 12 μμf, 500 v dc working, mfr 14674, type 68-20-41.	1.1 MC Crystal Oscillator Tuning Fig. 5-22
C676		Same as C627.	Screen Decoupling V604 Fig. 6-47
C677		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 200 v dc working, CP29A1EC104K, spec MIL-C-25.	AGC Filter Fig. 6-47
C678		Same as C643.	DC Blocking Fig. 6-47
C679		CAPACITOR, FIXED, MICA DIELECTRIC: 470 μμf ±10%, 500 v dc working, CM20B471K, spec MIL-C-5.	Grid Coupling Fig. 6-47
C680		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 200 v dc working, CP29A3EC104K, spec MIL-C-25.	Cathode Bypass Fig. 6-47
C681		Same as C627.	Screen Bypass Fig. 6-47
C682		Same as C660.	Plate Decoupling V604 Fig. 6-47
C683		Same as C631.	Plate Circuit Tuning Fig. 6-47
C684		CAPACITOR, FIXED, MICA DIELECTRIC: 330 μμf ±2%, 500 v dc working, CM20D331G, spec MIL-C-5.	Coupling T608 Fig. 6-47
C685		CAPACITOR, FIXED, MICA DIELECTRIC: 10 μμf ±10%, 500 v dc working, CM20B100K, spec MIL-C-5.	Coupling T606 Fig. 6-47
C686		CAPACITOR, FIXED, MICA DIELECTRIC: 2200 μμf ±10%, 500 v dc working, CM30B222K, spec MIL-C-5.	Coupling T606 Fig. 6-47
C687		Same as C686.	Coupling T607 Fig. 6-47
C688		Same as C656.	Phase Detector Filter Fig. 6-47
C689		Same as C656.	Phase Detector Filter Fig. 6-47
C690		Same as C656.	Phase Detector Filter Fig. 6-47
C691		Same as C656.	Phase Detector Filter Fig. 6-47
C692		CAPACITOR, FIXED, PAPER DIELECTRIC: 2 section, 2 μf ±20% each section, 200 v dc working, mfr 83125, type 2MPDK2-2.	Phase Detector Load Fig. 6-48
C693		Same as C692.	Phase Detector Load Fig. 6-48

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C694		Same as C627.	B Plus Decoupling Fig. 6-47
C695		Not Used.	
C696		CAPACITOR, FIXED, PAPER DIELECTRIC: 2 section, 0.5 µf, 400 v dc working, mfr 89661, dwg 152A109H02.	Grid Coupling V607A Fig. 6-45
C697		CAPACITOR, FIXED, PAPER DIELECTRIC: 2 section, 2 µf, 400 v dc working, mfr 89661, dwg 152A109H01.	Cathode Coupling V607B Fig. 6-45
C698		Same as C656.	Cathode Bypass V607A Fig. 6-45
C699		CAPACITOR, FIXED, MICA DIELECTRIC: 150 µµf ±10%, 500 v dc working, CM20B151K, spec MIL-C-5. Cont. See C701.	Plate Load V607A Fig. 6-45
CP601 thru CP611		Not Used.	
CP612		ADAPTER: Straight adapter, one mb male, one bnc female, teflon insulator, mfr 94375, type 0756.	Adapter for J612
CP613 thru CP699		Not Used.	
CR601		Same as CR301.	Modulator Fig. 6-46
CR602		Same as CR601.	Modulator Fig. 6-46
CR603		Same as CR601.	Modulator Fig. 6-46
CR604		Same as CR601.	Modulator Fig. 6-46
CR605		Same as CR601.	Modulator Fig. 6-46
CR606		Same as CR601.	Phase Detector Diode Fig. 6-46
CR607		Same as CR601.	Phase Detector Diode Fig. 6-46
CR608		Same as CR601.	Phase Detector Diode Fig. 6-46
CR609		Same as CR601.	Phase Detector Diode Fig. 6-46
CR610		Same as CR601.	Phase Detector Diode Fig. 6-47
CR611		Same as CR601.	Phase Detector Diode Fig. 6-47
CR612		Same as CR601.	Phase Detector Diode Fig. 6-47
CR613		Same as CR601.	Phase Detector Diode Fig. 6-47
CR614		Same as CR601.	AGC Rectifier Fig. 6-47
CR615		Same as CR601.	Reactance Modulator Diode Fig. 6-43
CR616		Same as CR601.	Reactance Modulator Diode Fig. 6-43
CR617		Same as CR601.	Reactance Modulator Diode Fig. 6-43
CR618		Same as CR601.	Reactance Modulator Diode Fig. 6-43
CR619		Same as CR601.	AGC Rectifier Fig. 6-46
CR620		Same as CR601.	Filter for Mixer Bias Supply
CR621		Same as CR601.	Meter Rectifier M601 Fig. 6-45
CR622		Same as CR601.	Meter Rectifier M601 Fig. 6-45
CR623		Same as CR601.	Limiter Fig. 6-47
CR624		SEMICONDUCTOR DEVICE: Voltage reference type, wire lead mtg, color code bands, mfr 93983, type SV-5.	Bias Supply for Q601 Fig. 5-22

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—C ntinued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
CR625		Same as CR624.	Bias Supply for Q601 Fig. 5-22
CR626		Same as CR624.	Bias Supply for Q601 Fig. 5-22
CR627 thru CR699		Not Used.	
DS601		LAMP, GLOW: Neon gas, 1/25 w at 105 to 125 v, 1/10 w at 210 to 250 v, 100,000 ohm external resistance required, mfr 89661, type NE51. Same as DS201.	Oven Heater Indication
DS602 thru DS699		Not Used.	
E601 thru E603		Not Used.	
E604		BOARD, COMPONENT MOUNTING: Micarta board, 24 solder stud terminals, mfr 89661, dwg 54B3321.	Component Mounting and Insulation Fig. 6-46
E605		BOARD, COMPONENT MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 55C6830-1-1.	Component Mounting and Insulation Fig. 6-46
E606		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 52C2251.	Component Mounting and Insulation Fig. 6-46
E607		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 227B060.	Component Mounting and Insulation Fig. 6-46
E608		BOARD COMPONENT MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 227B054.	Component Mounting and Insulation Fig. 6-46
E609		BOARD, COMPONENT MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 227B047.	Component Mounting and Insulation Fig. 6-46
E610		BOARD, COMPONENT MOUNTING: Micarta board, 20 solder stud terminals, mfr 89661, dwg 55C6058.	Component Mounting and Insulation Fig. 6-47
E611		BOARD, COMPONENT MOUNTING: Micarta board, 24 solder stud terminals, mfr 89661, dwg 55C6060.	Component Mounting and Insulation Fig. 6-47
E612		BOARD, COMPONENT MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 227B052.	Component Mounting and Insulation Fig. 6-47
E613		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 236B098.	Component Mounting and Insulation Fig. 6-45
E614		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 227B055.	Component Mounting and Insulation Fig. 6-45
E615		BOARD, COMPONENT MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 337C029G01.	Component Mounting and Insulation Fig. 6-43
E616 thru E632		Not Used.	
E633		INSULATOR, STANDOFF: Miniature, solder lug type, ⅝ in. lg, ¼ in. across flats, mfr 89661, dwg 54B7174H01.	Standoff
E634		Same as E633.	Standoff
E635		Same as E633.	Standoff
E636		Same as E633.	Standoff
E637		Same as E633.	Standoff
E638		KNOB: Black phenolic 1⁷⁄₁₆ in. dia knob, 1½ in. dia skirt, accommodates ¼ in. dia shaft, mfr 88365, type VIZE. Same as E320.	Control Knob Fig. 5-23

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E639		KNOB: Black phenolic w/pointer, $\frac{3}{4}$ in. dia knob, $\frac{13}{16}$ in. dia skirt, accommodates $\frac{1}{4}$ in. dia shaft, mfr 88365, type VIZG. Same as E319.	Control Knob Fig. 5-23
E640		Same as E633.	Standoff
E641		Same as E633.	Standoff
E642		Same as E633.	Standoff
E643		Same as E633.	Standoff
E644		INSULATOR, STANDOFF: 4500 v dc breakdown at 60 cps, asbestos filled melamine, mfr 81312, type FT5.	Standoff
E645		Same as E644.	Standoff
E646		Same as E633.	Standoff
E647		Same as E633.	Standoff
E648		Same as E633.	Standoff
E649		Same as E633.	Standoff
E650		Same as E633.	Standoff
E651		Same as E633.	Standoff
E652		INSULATOR, STANDOFF: Ceramic insulator, solder stud terminal, stud mounted, mfr 71279, type X2220F6.	Standoff
E653		Same as E652.	Standoff
E654		Same as E652.	Standoff
E655		Same as E652.	Standoff
E656		Same as E652.	Standoff
E657		Same as E652.	Standoff
E658		INSULATOR, STANDOFF: Ceramic silicone insulator, solder stud terminal, tapped for 6-32 mtg screw, $\frac{5}{16}$ in. across flats, mfr 71279, type X1942F6.	Standoff
E659		Same as E658.	Standoff
E660		Same as E658.	Standoff
E661		BOARD, PRINTED CIRCUIT: C/O epoxy board w/printed circuit, eyelets, terminals and necessary hardware, mfr 89661, dwg 339C588G03.	1.0 MC Crystal Oscillator Fig. 5-22
E662		BOARD, PRINTED CIRCUIT: C/O epoxy board w/printed circuit, eyelets, terminals and necessary hardware, mfr 89661, dwg 339C589G03.	1.1 MC Crystal Oscillator Fig. 5-22
E663		BOARD, PRINTED CIRCUIT: C/O epoxy board w/printed circuit, eyelets, terminals and necessary hardware, mfr 89661, dwg 339C590G03.	Mixer Fig. 5-22
E664		DIAL, CONTROL: Black nylon knob, primary dial calibrated 0 to 99, secondary dial calibrated 0 to 15, mfr 89661, dwg 327C866H01. Same as E318.	Control Knob
E665 thru E699		Not Used.	
FL601		FILTER, BANDPASS: 40 to 110 kc, 10,000 ohms input, 10,000 ohms output, stud mtd., mfr 89661, dwg 150A790H01.	Band Pass Filter V601A Fig. 6-46
FL602		Same as FL601.	Band Pass Filter V601B Fig. 6-46
FL603		NETWORK: Phase changing 300 to 1500 kc, insertion loss less than 1 db. 50 v dc terminal to can, mfr 89661, dwg 152A606H01.	Phase Shift Network Fig. 6-46
FL604		FILTER, BANDPASS: Consists of 2 coils, 5 capacitors, 100 kc ±100 cps pass frequency, mfr 89661, dwg 152A769H01.	100 KC Filter Fig. 5-22
FL605 thru FL699		Not Used.	
HR601		HEATING ELEMENT, ELECTRICAL: 230 ohms ±7%, 115 v, copper wire lead terminals, mfr 89661, dwg 335C732H01.	Oven Heater Fig. 6-44
HR602		Same as HR601.	Oven Heater Fig. 6-44
HR603		Same as HR601.	Oven Heater Fig. 6-44
HR604		Same as HR601.	Oven Heater Fig. 6-44
HR605		Same as HR601.	Oven Heater Fig. 6-44
HR606		Same as HR601.	Oven Heater Fig. 6-44
HR607 thru HR699		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
J601		CONNECTOR, RECEPTACLE, ELECTRICAL: Kel-f insulator, silver plated brass body, straight type, mfr 74868, type 44575. Same as J301.	RF Input Fig. 6-46
J602		Not Used.	
J603		Not Used.	
J604		CONNECTOR, RECEPTACLE, ELECTRICAL: 1 round male contact, straight type, solid shell, panel mounted, mfr 91577, type 2914. Same as J316.	AGC Amplifier Cathode V603A Fig. 6-46
J605		Same as J604.	Test Jack V602A Fig. 6-46
J606		Same as J604.	Interpolation Oscillator V606 Fig. 6-46
J607		Same as J604.	Interpolation Oscillator V606 Fig. 6-46
J608		Same as J604.	Master Oscillator Phase Detector Output Fig. 6-46
J609		Same as J604.	Grid Fig. 6-47
J610		Same as J604.	Pulse Output Fig. 6-47
J611		Same as J604.	Amplifier Fig. 6-47
J612		Same as J601.	1.0 MC Test Output Connector Fig. 6-43
J613		Same as J604.	Master Oscillator Phase Detector Output Fig. 6-45
J614		Same as J604.	Frequency Control Output Fig. 6-45
J615		Same as J604.	Frequency Control Output Fig. 6-45
J616		Same as J601.	100 KC Output from Mixer Fig. 6-43
J617		Same as J601.	1 MC Test Output Fig. 6-43
J618		Same as J604.	Interpolation Oscillator Cathode V606 Fig. 6-43
J619		Same as J604.	Interpolation Oscillator Grid V606 Fig. 6-43
J620		Same as J601.	Cathode V603B Fig. 6-46
J621		Same as J604.	Interpolation Oscillator Input V606 Fig. 6-43
J622		CONNECTOR, RECEPTACLE, ELECTRICAL: Female contacts, low-loss plastic body, straight shape, mfr 08484, type EC3150. Same as J314.	Bottom Heater Connector Fig. 6-44
J623		Same as J622.	Top Heater Connector Fig. 6-44
J624 thru J699		Not Used.	
K601		Same as K301.	Heater Relay Fig. 6-48
K602		RELAY, ARMATURE: 266 ohms ±10%, at 25 deg. c, 4 form c contact arrangement, mfr 77523, type 22310-5.	Side Band Selector Fig. 6-46
K603 thru K699		Not Used.	
L601 thru L608		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
L609		COIL, RADIO FREQUENCY: 5.0 mh, 41 ohms, 125 ma, mfr 89661, dwg 152A110H02.	Plate Decoupling V604 Fig. 6-47
L610		COIL, RADIO FREQUENCY: 60 mh, 200 ohms, 100 ma, mfr 76493, type 693.	Part of FSK Input Filter Fig. 6-43
L611		Same as L610.	Part of FSK Input Filter Fig. 6-43
L612		Same as L301.	RF Choke Emitter Q601 Fig. 5-22
L613		Same as L612.	RF Choke Emitter Q602 Fig. 5-22
L614		COIL, RADIO FREQUENCY: .31 µh, 3.3 ohms dcr at 25 deg. c, mfr 89661, dwg 150A863H01.	Pulse Forming Fig. 6-47
L615		COIL, RADIO FREQUENCY: 1 winding, pie universal wound, 1155 turns, single silk insulation, Q of 40 min at 79 kc, mfr 89661, dwg 55C6156-1-25.	Interpolation Oscillator Tank 50 to 60 KC Band Fig. 6-43
L616		COIL, RADIO FREQUENCY: 1 winding, pie universal wound, 1080 turns, single silk insulation, Q of 50 min at 79 kc, mfr 89661, dwg 55C6156-1-5.	Interpolation Oscillator Tank 60 to 70 KC Band Fig. 6-43
L617		COIL, RADIO FREQUENCY: 1 winding, pie universal wound, 975 turns, single silk insulation, Q of 45 min at 79 kc, mfr 89661, dwg 55C6156-1-9.	Interpolation Oscillator Tank 70 to 80 KC Band Fig. 6-43
L618		COIL, RADIO FREQUENCY: 1 winding, pie universal wound, 900 turns, single silk insulation, Q of 45 min at 79 kc, mfr 89661, dwg 55C6156-1-13.	Interpolation Oscillator Tank 80 to 90 KC Band Fig. 6-43
L619		COIL, RADIO FREQUENCY: 1 winding, pie universal wound, 825 turns, single silk insulation, Q of 45 min at 79 kc, mfr 89661, dwg 55C6156-1-17.	Interpolation Oscillator Tank 90 to 100 KC Band Fig. 6-43
L620		COIL, RADIO FREQUENCY: 65 deg. C max ambient temperature, 100% duty cycle, mfr 89661, dwg 375A500.	Cathode Choke V606 Fig. 6-43
L621		COIL, RADIO FREQUENCY: 20 mh, 100 ohm, 125 ma, mfr 89661, dwg 152A110H01.	Master Oscillator Phase Detector Filter Fig. 6-45
L622		CHOKE, RADIO FREQUENCY: 3 mh ±10% at 1000 cps, 73 ohms dcr, mfr 89661, dwg 55C3795-1-1.	Master Oscillator Phase Detector Filter Fig. 6-45
L623		REACTOR: Fixed inductance type, 1 coil, 16 henries min at 60 cycles, 0.004 amp dc, 560 ohms ±15% dcr 1.5 −5 v rms test, mfr 89661, dwg 55C3741-1-1.	Cathode Coupling V607B Fig. 6-45
L624 thru L699		Not Used.	
M601		AMMETER: White face w/black markings, 0 to 200 full scale value, measures microamperes, MR26W200DCUAR, spec MIL-M-10304.	Deviation Calibrate Zero Adjust Fig. 6-48
M602		Not Used.	
M603		COUNTER, ROTATING, FIXED MOUNTING: Eight wheels numbered 0-9, 1 bank cw rotation, 1 bank ccw rotation, mf- 89661, dwg 337C257H01.	Frequency Interpretation Fig. 5-24
M604 thru M699		Not Used.	
MP601 thru MP604		Not Used.	
MP605		GEAR, BEVEL: (Pair) 32 pitch, 20 deg. pressure angle, 24 teeth, 0.750 in. pitch dia, mfr 89661, dwg 226B9[illegible]7H01.	Fig. 5-22
MP605A		Part of MP605. Listed for reference only.	Drive Gear
MP605B		Part of MP605. Listed for reference only.	Drive Gear
MP606		TOOL, ALIGNMENT: Mfr 72653, type 8276.	General Alignment
MP607		COUPLING, SHAFT FLEXIBLE: Brass nickel plated hub, 0.251 in. bore both ends, mfr 99934, type A-201.5.	Shaft Coupling
MP608		Same as MP607.	Shaft Coupling
MP609		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP610		DRIVER, GENEVA: 16 pitch, 20 deg. pressure angle, index for 15 teeth, 0.9375 pitch dia, mfr 89661, dwg 332C489H01.	Geneva Driver Fig. 5-24
MP611		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 32 teeth, 0.500 pitch dia, mfr 89661, dwg 232B118H01.	Drive Gear Fig. 5-24
MP612		Same as MP611.	Drive Gear Fig. 5-24
MP613		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 64 teeth, 1.000 pitch dia, mfr 89661, dwg 232B119H01.	Drive Gear Fig. 5-24
MP614		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 38 teeth, 0.5938 pitch dia, mfr 89661, dwg 232B120H01.	Drive Gear Fig. 5-25
MP615		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 110 teeth, 1.7187 pitch dia, mfr 89661, dwg 232B121H01.	Drive Gear Fig. 5-25
MP616		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 178 teeth, 2.7813 pitch dia, mfr 89661, dwg 232B122H01.	Drive Gear Fig. 5-25
MP617		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 110 teeth, 1.7187 pitch dia, mfr 89661, dwg 232B123H01.	Drive Gear Fig. 5-24
MP618		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 110 teeth, 1.7187 pitch dia, mfr 89661, dwg 232B124H01.	Drive Gear Fig. 5-24
MP619		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 48 teeth, 0.7500 pitch dia, mfr 89661, dwg 232B125H01.	Drive Gear Fig. 5-24
MP620		Same as MP619.	Drive Gear Fig. 5-24
MP621		GEAR, SPUR: 64 pitch, 20 deg. pressure angle, 48 teeth, 0.7500 pitch dia, mfr 89661, dwg 232B126H01.	Drive Gear Fig. 5-24
MP622		GEAR, SPUR: 16 pitch, 20 deg. pressure angle, 24 teeth, 1.500 pitch dia, mfr 89661, dwg 232B127H01.	Drive Gear Fig. 5-24
MP623		GEAR, BEVEL: 32 pitch, 20 deg. pressure angle, 30 teeth, 0.9375 pitch dia, mfr 89661, dwg 232B128H01.	Bevel Drive Fig. 5-24
MP624		Same as MP623.	Bevel Drive Fig. 5-24
MP625		Same as MP623.	Bevel Drive Fig. 5-24
MP626		Same as MP623.	Bevel Drive Fig. 5-24
MP627		GEAR, BEVEL· 48 pitch, 20 deg. pressure angle, 66 teeth, 1.3750 pitch dia, mfr 89661, dwg 232B129H01.	Bevel Drive Fig. 5-24
MP628		SPROCKET WHEEL: 15 teeth, 0.901 pitch dia, incl bearing, mfr 89661, dwg 232B142G01.	Drive Sprocket Idler Fig. 5-25
MP629		SPROCKET WHEEL: 15 teeth, 0.625 in. dia less teeth, 13/32 in. w incl hub, mfr 89661, dwg 225B721H01.	Drive Sprocket Fig. 5-25
MP630		SPROCKET WHEEL: For 3/16 in. pitch, 5/32 in. w, side flanged, link belt silent chain, 20 teeth, mfr 89661, dwg 230B711H01.	Drive Sprocket Fig. 5-25
MP631		SPROCKET WHEEL: For 3/16 in. pitch, 5/32 in. w, side flanged, link belt silent chain, 24 teeth, mfr 89661, dwg 230B845H01.	Drive Sprocket Fig. 5-25
MP632		CHAIN, ROLLER· 90 pitches, 3/16 in. pitch, 5/32 in. w, side flanged, stainless steel, mfr 89661, dwg 152A046H10.	Drive Chain Fig. 5-25
MP633		Not Used.	
MP634		BEARING, SLEEVE: Oilite bronze, 0.255 in. id, 0.500 in. od, mfr 70901, type TT504. Same as MP322.	Thrust Bearing Fig. 5-24
MP635		Same as MP634.	Thrust Bearing Fig. 5-25
MP636		Same as MP634.	Thrust Bearing Fig. 5-24
MP637		Same as MP634.	Thrust Bearing Fig. 5-24
MP638		Same as MP634.	Thrust Bearing Fig. 5-24
MP639		Same as MP634.	Thrust Bearing Fig. 5-24
MP640		Same as MP634.	Thrust Bearing Fig. 5-24
MP641		Same as MP634.	Thrust Bearing Fig. 5-24
MP642		Same as MP634.	Thrust Bearing Fig. 5-24
MP643		Same as MP634.	Thrust Bearing Fig. 5-25

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP644		Same as MP634.	Thrust Bearing Fig. 5-24
MP645		Same as MP634.	Trhust Bearing Fig. 5-25
MP646		Same as MP634.	Thrust Bearing Fig. 5-24
MP647		Same as MP634.	Thrust Bearing Fig. 5-24
MP648		Same as MP634.	Thrust Bearing Fig. 5-24
MP649		Same as MP634.	Thrust Bearing
MP650		Same as MP634.	Thrust Bearing Fig. 5-25
MP651		Same as MP634.	Thrust Bearing Fig. 5-25
MP652		Same as MP634.	Thrust Bearing Fig. 5-24
MP653		Same as MP634.	Thrust Bearing Fig. 5-25
MP654		Same as MP634.	Thrust Bearing Fig. 5-24
MP655		Same as MP634.	Thrust Bearing Fig. 5-24
MP656		Same as MP634.	Thrust Bearing Fig. 5-25
MP657		Same as MP634.	Thrust Bearing Fig. 5-24
MP658		Same as MP634.	Thrust Bearing Fig. 5-25
MP658		Same as MP634.	Thrust Bearing Fig. 5-25
MP659		BEARING, SLEEVE: Plain oilite bronze, 0.377 in. od, 0.250 in. id, $^{13}/_{16}$ in. lg, mfr 89661, dwg 225B387H03.	Support Bearing Fig. 5-24
MP660		Same as MP659.	Support Bearing Fig. 5-24
MP661		Same as MP659.	Support Bearing Fig. 5-24
MP662		Same as MP659.	Support Bearing Fig. 5-24
MP663		Same as MP659.	Support Bearing Fig. 5-24
MP664		Same as MP659.	Support Bearing Fig. 5-25
MP665		Same as MP659.	Support Bearing Fig. 5-24
MP666		Same as MP659.	Support Bearing Fig. 5-24
MP667		Same as MP659.	Support Bearing
MP668		Same as MP659.	Support Bearing
MP669		Same as MP659.	Support Bearing
MP670		Same as MP659.	Support Bearing Fig. 5-24
MP671		Same as MP659.	Support Bearing Fig. 5-24
MP672		Same as MP659.	Support Bearing Fig. 5-24
MP673		Same as MP659.	Support Bearing Fig. 5-24
MP674		Same as MP659.	Support Bearing Fig. 5-24
MP675		Same as MP659.	Support Bearing Fig. 5-24

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP676		Same as MP659.	Support Bearing Fig. 5-24
MP677		Same as MP659.	Support Bearing Fig. 5-24
MP678		Same as MP659.	Support Bearing Fig. 5-24
MP679		Same as MP659.	Support Bearing Fig. 5-24
MP680		Same as MP659.	Support Bearing Fig. 5-24
MP681		Same as MP659.	Support Bearing Fig. 5-24
MP682		BEARING, ROLLER, NEEDLE: Open end, 1 in. dia shaft, $1\frac{1}{4}$ in. od, 37 rollers 0.0925 in. dia, mfr 80648, tvpe GB168AS.	Support Bearing Fig. 5-24
MP683		BEARING, SLEEVE: Oilite bronze, 0.377 in. od, 0.2505 in. id, $\frac{1}{4}$ in. lg, mfr 89661, dwg 225B387H02.	Sleeve Bearing Fig. 5-24
MP684		Same as MP682.	Support Bearing Fig. 5-24
MP685		SHAFT: Stainless steel. 3.06 in. lg, 0.2497 in. dia, both ends chamferred, mfr 89661, dwg 232B145H01.	Transfer Motion Fig. 5-24
MP686		Same as MP685.	Transfer Motion Fig. 5-24
MP687		POSITIONER, GENEVA: 16 pitch, 20 deg. pressure angle, 15 teeth, 0.9375 pitch dia, mfr 89661, dwg 332C300H01.	Shutter Positioning Fig. 5-24
MP688		PLATE, STOP: Stainless steel, $\frac{1}{8}$ in. w slot, $1\frac{1}{16}$ in. od, $\frac{1}{4}$ in. dia center hole, mfr 89661, dwg 228B189H01.	Stops Rotation Fig. 5-24
MP689		WASHER, STOP: Stainless steel, 0.750 in. dia, $\frac{1}{4}$ in. dia center hole, stop extends 0.23 in., mfr 89661, dwg 225B326H01.	Stops Rotation Fig. 5-24
MP690		DIAL, CONTROL: Calibrated 0-15, black nylon knob, satin chrome finish dial, $1\frac{13}{16}$ in. dia less lock lever, mfr 89661, dwg 327C866H01.	Turns Counting Dial
MP691		SHAFT: Insulated stainless steel, $\frac{21}{32}$ in. lg, 0.249 in. dia, micarta sleeve, mfr 89661, dwg 55C4709.	Gear Box—Oven Coupling
MP692		Same as MP691.	Gear Box—Oven Coupling
MP693		COUPLING, SHAFT: Stainless steel, $\frac{11}{16}$ in. dia, 0.250 in. dia ream, mfr 89661, dwg 55C4703.	Gear Box—Oven Coupling Fig. 5-21
MP694		Same as MP693.	Gear Box—Oven Coupling Fig. 5-21
MP695		Same as MP627.	Bevel Drive Fig. 5-24
MP696 thru MP699		Not Used.	
		Cont. See MP701.	
P601 thru P603		Not Used.	
P604		CONNECTOR, PLUG, ELECTRICAL: Silver plated, w/jacket clamp, $\frac{13}{16}$ in. lg, mfr 74868, type 48825. Same as P114.	Mates with J604 Fig. 6-48
P605		Not Used.	
P606		CONNECTOR, PLUG, ELECTRICAL: Silver plated w/jacket clamp, for 0.120 to 0.145 in. od cable, mfr 74868, type 44525. Same as P307.	V606 Cathode Connector Fig. 6-43
P607		Same as P606.	V606 Grid Connector Fig. 6-43
P608		Same as P604.	Mates with J608 Fig. 6-48
P609		Same as P606.	V604 Grid Input Fig. 6-43
P610		Same as P606.	Mates with J610 Fig. 6-46
P611		Same as P604.	Mates with J611 Fig. 6-48

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
P612		CONNECTOR, PLUG, ELECTRICAL: BNC type, bayonet connection, 50 ohm impedance, weatherproof, UG88C/U, MS35168.	Mates with J612 Fig. 6-43
P613		Same as P604.	Mates with J613 Fig. 6-48
P614		Not Used.	
P615		Not Used.	
P616		Same as P606.	100 KC Output from E663 Fig. 6-43
P617		Same as P606.	1.0 MC Test Output Connector Fig. 6-43
P618		Same as P606.	V606 Cathode to Oven Deck Fig. 6-43
P619		Same as P606.	V606 Grid to Oven Deck Fig. 6-43
P620		Same as P606.	V606 Output to FSK Modulator Fig. 6-43
P621		Same as P606.	V606 Input to FSK Modulator Fig. 6-43
P622		CONNECTOR, PLUG, ELECTRICAL: Solid pin type contacts, low-loss plastic body, straight shape, mfr 08484, type EC3149. Same as P315.	Bottom Heater Connector Fig. 6-44
P623		Same as P622.	Top Heater Connector Fig. 6-44
P624 thru P699		Not Used.	
Q601		TRANSISTOR: −30 v dc collector to base, −0.5 v dc emitter to base, mfr 92671, type 2N384.	1.0 MC Oscillator Fig. 5-22
Q602		Same as Q601.	1.1 MC Oscillator Fig. 5-22
Q603		Same as Q601.	Mixer Fig. 5-22
Q604 thru Q699		Not Used.	
R601 thru R607		Not Used.	
R608		RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 2 w, RC42GF103K, spec MIL-R-11. Same as R367.	Dropping I601 Fig. 6-48
R609		RESISTOR, FIXED, COMPOSITION: 910 ohms ±5%, ½ w, RC20GF911J, spec MIL-R-11.	Bias Divider Fig. 6-46
R610		RESISTOR, VARIABLE, WIREWOUND: 1500 ohms ±10%, 2 w, RA20A1SD152A, spec MIL-R-19.	Side Band Balance Adjust Fig. 6-46
R611		RESISTOR, FIXED, COMPOSITION: 120,000 ohms ±10%, 1 w, RC32GF124K, spec MIL-R-11.	Bias Dividers Fig. 6-46
R612		Same as R611.	Bias Dividers Fig. 6-46
R613		RESISTOR, FIXED, COMPOSITION: 100,000 ohms ±10%, ½ w, RC20GF104K, spec MIL-R-11. Same as R205.	Phase Detector Load Fig. 6-46
R614		RESISTOR, FIXED, COMPOSITION: 100,000 ohms ±5%, ½ w, RC20GF104J, spec MIL-R-11.	Phase Detector Load Fig. 6-46
R615		Same as R614.	Phase Detector Load Fig. 6-46
R616		Same as R614.	Phase Detector Load Fig. 6-46
R617		RESISTOR, FIXED, COMPOSITION: 390 ohms ±10%, ½ w, RC20GF391K, spec MIL-R-11.	Load T602 Fig. 6-46
R618		Same as R617.	Load T602 Fig. 6-46
R619		Same as R617.	Load T603 Fig. 6-46
R620		Same as R617.	Load T603 Fig. 6-46
R621		RESISTOR, FIXED, FILM: 3400 ohms ±1%, ¼ w, RN65B3401F, spec MIL-R-10509.	Low Frequency Phase Shift Network Fig. 6-46

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—C ntinued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	L CATING FUNCTION
R622		RESISTOR, FIXED, FILM: 20,000 ohms ±1%, ¼ w, RN65B2002F, spec MIL-R-10509.	Low Frequency Phase Shift Network Fig. 6-46
R623		RESISTOR, FIXED, FILM: 604 ohms ±1%, ¼ w, RN65B6040F, spec MIL-R-10509.	Low Frequency Phase Shift Network Fig. 6-46
R624		Same as R623.	Low Frequency Phase Shift Network Fig. 6-46
R625		Same as R622.	Low Frequency Phase Shift Network Fig. 6-46
R626		Same as R621.	Low Frequency Phase Shift Network Fig. 6-46
R627		Same as R613.	Grid V601A Fig. 6-46
R628		RESISTOR, FIXED, COMPOSITION: 220,000 ohms ±10%, ½ w, RC20GF224K, spec MIL-R-11. Same as R311.	Attenuator J605 Fig. 6-46
R629		RESISTOR, FIXED, COMPOSITION: 33,000 ohms ±10%, 2 w, RC42GF333K, spec MIL-R-11. Same as R355.	Plate Decoupling V601A Fig. 6-46
R630		RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, ½ w, RC20GF103K, spec MIL-R-11.	Grid V601B Fig. 6-46
R631		RESISTOR, FIXED, COMPOSITION: 1500 ohms ±5%, ½ w, RC20GF152J, spec MIL-R-11.	Pulse Shaping Fig. 6-46
R632		Same as R629.	Plate Decoupling Fig. 6-46
R633		RESISTOR, FIXED, COMPOSITION: 68 ohms ±10%, ½ w, RC20GF680K, spec MIL-R-11.	Parasitic Suppressor Fig. 6-46
R634		RESISTOR, FIXED, COMPOSITION: 1 meg ±10%, ½ w, RC20GF105K, spec MIL-R-11. Same as R348.	AGC Filter Fig. 6-46
R635		Not Used.	
R636		RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, ½ w, RC20GF102K, spec MIL-R-11. Same as R301.	Plate Decoupling V602A Fig. 6-46
R637		RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, 2 w, RC42GF153K, spec MIL-R-11. Same as R351.	Plate Load V602A Fig. 6-46
R638		Same as R630.	Grid B602A Fig. 6-46
R639		RESISTOR, FIXED, COMPOSITION: 220 ohms ±10%, ½ w, RC20GF221K, spec MIL-R-11. Same as R305.	Cathode V602A Fig. 6-46
R640		RESISTOR, FIXED, COMPOSITION: 330 ohms ±10%, ½ w, RC20GF331K, spec MIL-R-11.	Cathode V602A Fig. 6-46
R641		Same as R636.	Plate Decoupling V602B Fig. 6-46
R642		RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, 2 w, RC42GF223K, spec MIL-R-11. Same as R353.	Plate Load V602B Fig. 6-46
R643		Same as R613.	Grid V602B Fig. 6-46
R644		Same as R639.	Cathode V602B Fig. 6-46
R645		RESISTOR, FIXED, COMPOSITION: 150 ohms ±10%, ½ w, RC20GF151K, spec MIL-R-11.	Cathode V602B Fig. 6-46
R646		Same as R636.	Plate Decoupling V603A Fig. 6-46
R647		Same as R613.	Grid V603A Fig. 6-46
R648		Same as R639.	Cathode V603A Fig. 6-46
R649		Same as R636.	Cathode V603A Fig. 6-46
R650		RESISTOR, FIXED, COMPOSITION: 470,000 ohms ±10%, ½ w, RC20GF474K, spec MIL-R-11. Same as R495.	AGC Dividers Fig. 6-46
R651		RESISTOR, FIXED, COMPOSITION: 120,000 ohms ±10%, ½ w, RC20GF124K, spec MIL-R-11.	AGC Filter Fig. 6-46
R652		RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, ½ w, RC20GF473K, spec MIL-R-11. Same as R480.	AGC Divider Fig. 6-46

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R653		RESISTOR, FIXED, COMPOSITION: 5600 ohms ±10%, ½ w, RC20GF562K, spec MIL-R-11.	Phase Detector Load Fig. 6-46
R654		Same as R653.	Phase Detector Load Fig. 6-46
R655		Same as R653.	Phase Detector Load Fig. 6-46
R656		Same as R653.	Phase Detector Load Fig. 6-46
R657		Same as R639.	Cathode Bias V603B Fig. 6-46
R658		Same as R650.	Grid V603B Fig. 6-46
R659		RESISTOR, FIXED, COMPOSITION: 180,000 ohms ±10%, ½ w, RC20GF184K, spec MIL-R-11.	AGC Bias Divider Fig. 6-46
R660		RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, ½ w, RC20GF153K, spec MIL-R-11. Same as R310.	AGC Bias Divider Fig. 6-46
R661		Same as R636.	Cathode Bypass CR619 Fig. 6-46
R662		Same as R652.	AGC Filter Fig. 6-46
R663		Same as R650.	Grid V606 Fig. 6-46
R664		RESISTOR, FIXED, COMPOSITION: 39,000 ohms ±10%, ½ w, RC20GF393K, spec MIL-R-11.	Screen Drop V606 Fig. 6-46
R665		Same as R636.	Decoupling V606 Fig. 6-46
R666		RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%, ½ w, RC20GF470K, spec MIL-R-11. Same as R314.	Parasitic Suppressor V606 Fig. 6-46
R667		RESISTOR, FIXED, COMPOSITION: 51 ohms ±5%, ½ w, RC20GF510J, spec MIL-R-11.	T609 Loading Fig. 6-43
R668		Same as R636.	Attenuator J605 Fig. 6-46
R669		RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, ½ w, RC20GF472K, spec MIL-R-11.	Part of FSK Modulator Fig. 6-43
R670		Same as R669.	Part of FSK Modulator Fig. 6-43
R671		RESISTOR, FIXED, COMPOSITION: 3900 ohms ±10%, ½ w, RC20GF392K, spec MIL-R-11.	Part of FSK Modulator Fig. 6-43
R672		Same as R671.	Part of FSK Modulator Fig. 6-43
R673		RESISTOR, VARIABLE, COMPOSITION: 1000 ohms ±10%, 1/5 w, RV4LAVSA102A, spec MIL-R-11.	FSK Modulator Balance Adjust Fig. 6-43
R674		Same as R650.	Grid V604 Fig. 6-47
R675		RESISTOR, FIXED, COMPOSITION: 180 ohms ±10%, ½ w, RC20GF181K, spec MIL-R-11.	Parasitic Suppressor V604 Fig. 6-47
R676		RESISTOR, FIXED, COMPOSITION: 18,000 ohms ±10%, 1 w, RC32GF183K, spec MIL-R-11.	Plate Load V604 Fig. 6-47
R677		RESISTOR, FIXED, COMPOSITION: 56,000 ohms ±10%, ½ w, RC20GF563K, spec MIL-R-11.	Screen Dropping V604 Fig. 6-47
R678		RESISTOR, FIXED, COMPOSITION: 680,000 ohms ±10%, ½ w, RC20GF684K, spec MIL-R-11.	AGC Bias Divider Fig. 6-47
R679		Same as R677.	AGC Bias Divider Fig. 6-47
R680		Same as R677.	AGC Filter Fig. 6-47
R681		RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, ½ w, RC20GF683K, spec MIL-R-11. Same as R358.	Grid V605 Fig. 6-47
R682		Same as R613.	Grid V605 Fig. 6-47
R683		Same as R675.	Cathode Bias V605 Fig. 6-47
R684		RESISTOR, FIXED, COMPOSITION: 27,000 ohms ±10%, ½ w, RC20GF273K, spec MIL-R-11.	Screen Dropping V605 Fig. 6-47
R685		RESISTOR, FIXED, COMPOSITION: 3300 ohms ±10%, ½ w, RC20GF332K, spec MIL-R-11. Same as R478.	Plate Decoupling V604 Fig. 6-47
R686		Same as R636.	Load T606 Fig. 6-47
R687		Same as R636.	Load T607 Fig. 6-47

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R688		RESISTOR, FIXED, COMPOSITION: 2.2 meg ±5%, ½ w, RC20GF225J, spec MIL-R-11.	Phase Detector Load Fig. 6-47
R689		Same as R688.	Phase Detector Load Fig. 6-47
R690		Same as R688.	Phase Detector Load Fig. 6-47
R691		Same as R688.	Phase Detector Load Fig. 6-47
R692		RESISTOR, FIXED, FILM: 2370 ohms ±1%, ½ w, RN70B2371F, spec MIL-R-10509.	Phase Detector Filter Fig. 6-45
R693		RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, ½ w, RC20GF101K, spec MIL-R-11.	Phase Detector Filter Fig. 6-45
R694		RESISTOR, FIXED, COMPOSITION: 270,000 ohms ±10%, ½ w, RC20GF274K, spec MIL-R-11. Same as R454.	Grid V607A Fig. 6-45
R695		RESISTOR, FIXED, COMPOSITION: 27,000 ohms ±10%, 1 w, RC32GF273K, spec MIL-R-11.	Plate Load V607A Fig. 6-45
R696		Same as R653.	Plate Load V607A Fig. 6-45
R697		Same as R645.	Cathode V607A Fig. 6-45
R698		Same as R613.	Phase Shift V607A Fig. 6-45
R699		Same as R650.	Grid V607B Fig. 6-45
		Cont. See R701.	
S601		SWITCH, ROTARY: 4 pole, 12 position, shorting type contacts, rotor and contacts, solid silver alloy, mfr 89661, dwg 337C036H01.	Interpolation Oscillator Band Switch Fig. 6-43
S602		SWITCH, THERMOSTATIC: 65 ±0.05 deg. C operating temperature, 2 terminals, mercury in glass, mfr 48620, type 28807. Same as S306.	Oven Heater Control Fig. 6-44
S603		SWITCH, THERMOSTATIC: 170 deg. F operating temperature, contacts close on temperature fall, hermetically sealed, mfr 89661, dwg 335C788H01. Same as S307.	Oven Heater Control Fig. 6-44
S604		SWITCH, TOGGLE: SPST, rated 15 amp at 125 v ac, phenolic body, 2 solder lug terminals, ST42A, spec JAN-S-23. Same as S304.	Oven On-Off Switch Fig. 6-48
S605		SWITCH, SENSITIVE: SPDT, 3 screw type terminals, AN3234-1, spec MIL-S-6743.	Sideband K602 Energize Fig. 6-48
S606 thru S699		Not Used.	
T601		Not Used.	
T602		TRANSFORMER, RADIO FREQUENCY: 1 primary, 1 secondary, center tapped, 25 v working, mfr 89661, dwg 150A906H01.	Modulator Fig. 6-46
T603		Same as T602.	Modulator Fig. 6-46
T604		TRANSFORMER, RADIO FREQUENCY: 1 primary, 1 secondary, center tapped, mfr 89661, dwg 55C3733-1-1.	Plate V602B Fig. 6-46
T605		Same as T604.	Plate V603B Fig. 6-46
T606		TRANSFORMER, RADIO FREQUENCY: 1 primary, 1 secondary, center tapped, 35 v working, mfr 89661, dwg 152A514H01.	Phase Detector Fig. 6-47
T607		Same as T606.	Phase Detector Fig. 6-47
T608		TRANSFORMER, RADIO FREQUENCY: 1 primary 260 v tapped, 1 secondary 2 v, mfr 89661, dwg 150A907H01.	Plate V605 Fig. 6-47
T609		TRANSFORMER, RADIO FREQUENCY: 50 to 100 kc, 2 windings, primary winding 32 mh min at 1000 cps, secondary winding 30 turns of 0.0179 in. dia wire, mfr 89661, dwg 55C3786-1-1.	Grid V606 Fig. 6-43
T610		TRANSFORMER, RADIO FREQUENCY: 50 to 100 kc, 2 windings, center tapped primary winding, 100 mh min at 1000 cps, mfr 89661, dwg 55C3787-1-1.	Cathode V603B Fig. 6-43
T611		TRANSFORMER, POWER, STEPDOWN: Primary 115 v, 50/60 cycles, single phase, 1 secondary winding, 6.3 v at 3.0 amp, mfr 89661, dwg 52C2140-1-1. Same as T305.	Filament Fig. 6-48

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTR L-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
T612		TRANSFORMER, RADIO FREQUENCY: Interstage type, 0.30 to 1.5 mc, 0.850 ohms dcr, 2550 ohms balanced load, mfr 89661, dwg 152A744H01.	Comparison Signal Fig. 6-46
T613		Same as T612.	Comparison Signal Fig. 6-46
T614 thru T699		Not Used.	
TB601		TERMINAL BOARD: Barrier type, phenolic, 13 feedthru type terminals, mfr 89661, dwg 331C056H13.	Wire Termination Fig. 6-48
TB602		TERMINAL BOARD ASSEMBLY. Listed for reference only.	Fig. 6-48
TB602A		TERMINAL BOARD: Barrier type, phenolic, 6 feedthru type terminals, mfr 89661, dwg 331C056H06.	Wire Termination
TB602B		TERMINAL BOARD: Barrier type, phenolic, 8 feedthru type terminals, mfr 89661, dwg 331C056H08.	Wire Termination
TB603		Same as TB602B.	Wire Termination Fig. 6-45
TB604		Not Used.	
TB605		TERMINAL BOARD: Mica phenolic, 10 double screw type terminals, barrier type, mfr 71785, type 10-141D. Same as TB101B.	Wire Termination Fig. 6-47
TB606		Not Used.	
TB607		Not Used.	
TB608		TERMINAL BOARD: Barrier type, phenolic board, 4 double screw type terminals, mfr 71785, type 4-141D. Same as TB304.	Wire Termination Fig. 6-48
TB609 thru TB699		Not Used.	
V601		ELECTRON TUBE: Miniature twin triode, recurring, 12AT7WA, spec MIL-E-1. Same as V302.	Fig. 3-8
V601A		Part of V601. Listed for reference only.	First I-F Amplifier
V601B		Part of V601. Listed for reference only.	Second I-F Amplifier
V602		Same as V601.	Fig. 3-8
V602A		Part of V602. Listed for reference only.	Third I-F Amplifier
V602B		Part of V602. Listed for reference only.	Fourth I-F Amplifier
V603		Same as V601.	Fig. 3-8
V603A		Part of V603. Listed for reference only.	Fifth I-F Amplifier
V603B		Part of V603. Listed for reference only.	Buffer Amplifier
V604		ELECTRON TUBE: Glass envelope, shaft cutoff pentode, 6AU6WA, spec MIL-E-1. Same as V301.	100 KC Crystal Oscillator Fig. 3-8
V605		Same as V604.	Buffer Amplifier Fig. 3-8
V606		Same as V604.	Interpolation Oscillator Fig. 3-8
V607		Same as V601.	Fig. 3-8
V607A		Part of V607. Listed for reference only.	First Feedback Amplifier
V607B		Part of V607. Listed for reference only.	Second Feedback Amplifier
V608		Same as V601.	Fig. 3-8
V608A		Part of V608. Listed for reference only.	Third Feedback Amplifier
V608B		Part of V608. Listed for reference only.	Third Feedback Amplifier
V609 thru V699		Not Used.	
XDS601		LIGHT, INDICATOR: 125 v, integral resistor, for T-3-¼ lamp, plain crystal lens, LH64BC2, spec MIL-L-3661.	For DS601 Fig. 6-48
XDS602 thru XDS699		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
XK601		SOCKET, ELECTRON TUBE: 8 contacts regularly spaced 45 deg. apart on 0.687 in. dia pin circle, TS101P01, spec JAN-S-28. Same as XK102.	For K601 Fig. 6-48
XK602 thru XK699		Not Used.	
XV601		SOCKET, ELECTRON TUBE: 9 contact miniature, plastic body, provisions for mtg layout type electron tube shield, TS103P01, spec JAN-S-28. Same as XV302.	For V601 Fig. 6-46
XV602		Same as XV601.	For V602 Fig. 6-46
XV603		Same as XV601.	For V603 Fig. 6-46
XV604		SOCKET, ELECTRON TUBE: 7 contact miniature, no missing contacts, plastic body, provisions for mtg, bayonet type electron tube shield, TS102P01, spec JAN-S-28. Same as XV301.	For V604 Fig. 6-47
XV605		Same as XV604.	For V605 Fig. 6-47
XV606		Same as XV604.	For V606 Fig. 6-46
XV607		Same as XV601.	For V607 Fig. 6-45
XV608		Same as XV601.	For V608 Fig. 6-45
XV609 thru XV699		Not Used.	
XY601		HOLDER, CRYSTAL UNIT: Base mounted, 2 solder lug terminals, accommodates CR18/U crystal unit, mfr 89661, dwg 335C931H03.	Socket for Y601 Fig. 5-22
XY602		Same as XY601.	Socket for Y602 Fig. 5-22
XY603 thru XY699		Not Used.	
Y601		CRYSTAL UNIT, QUARTZ: 1000 kc ±0.005%, CR18/U(1000 KC), spec MIL-C-3098.	1.0 MC Crystal Fig. 5-22
Y602		CRYSTAL UNIT, QUARTZ: 1100 kc ±0.005%, CR18/U(1100 KC), spec MIL-C-3098.	1.1 MC Crystal Fig. 5-22
Y603 thru Y699		Not Used.	
C701		CAPACITOR, FIXED, MICA DIELECTRIC: 2700 μμf ±10%, 500 v dc working, CM30B272K, spec MIL-C-5.	Plate Load V607B Fig. 6-45
C702		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 μf ±10%, 400 v dc working, CP91B1EE105K, spec MIL-C-25.	Coupling V607B Fig. 6-45
C703		CAPACITOR, FIXED, PAPER DIELECTRIC: 0.1 μf, 600 v dc working, CP29A1EF104K, spec MIL-C-25.	Coupling Fig. 6-45
C704		Same as C703.	Coupling V608A Fig. 6-45
C705		CAPACITOR, FIXED, MICA DIELECTRIC: 200 μμf ±5%, 500 v dc working, CM20C201J, spec MIL-C-5.	Cathode Bypass V607B Fig. 6-45
C706		CAPACITOR, FIXED, MICA DIELECTRIC: 2000 μμf ±5%, 500 v dc working, CM30D202J, spec MIL-C-5.	Cathode Coupling V608A Fig. 6-45
C707		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 μf ±10%, 100 v dc working, CP54B1EB105K, spec MIL-C-25.	Cathode Coupling V607B Fig. 6-45
C708		CAPACITOR, FIXED, ELECTROLYTIC:40 μf −15%,+50%, 30 v dc working, CL44BH400TP, spec MIL-C-3965. Same as C102.	Cathode Coupling V607B Fig. 6-45
C709		Same as C655.	Bypass M601 Fig. 6-48
C710		CAPACITOR, FIXED, GLASS DIELECTRIC: 265 μμf ±5%, 500 v dc working, mfr 89661, dwg 335C813H29.	Base Capacitor for C662 Fig. 6-43
C711		Not Used.	
C712		Same as C631.	V606 Padder 60-70 KC Band Fig. 6-43
C713		Same as C631.	V606 Padder 70-80 KC Band Fig. 6-43
C714		Same as C631.	V606 Padder 80-90 KC Band Fig. 6-43
C715		Same as C631.	V606 Padder 90-100 KC Band Fig. 6-43

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C716		CAPACITOR, FIXED, PAPER DIELECTRIC: 0.05 μf ±20%, 600 v dc working, CP29A1EF503M, spec MIL-C-25.	Decoupling V606 Fig. 6-46
C717		CAPACITOR, FIXED, GLASS DIELECTRIC: 24 μμf ±2%, 300 v dc working, CY10C240G, spec MIL-C-11272.	Base Circuit Q601 Fig. 5-22
C718		CAPACITOR, FIXED, GLASS DIELECTRIC: 1200 μμf ±5%, 500 v dc working, CY20C122J, spec MIL-C-11272.	Feedback Q601 Fig. 5-22
C719		CAPACITOR, FIXED, GLASS DIELECTRIC: 100 μμf ±5%, 300 v dc working, CY10C101J, spec MIL-C-11272.	Feedback Q601 Fig. 5-22
C720		CAPACITOR, FIXED, ELECTROLYTIC:1.7 μf −15%,+50%, 125 v dc working, CL44BP1R7TP, spec MIL-C-3965.	Filter Q601 Collector Supply Fig. 5-22
C721		Same as C717.	Base Circuit Q602 Fig. 5-22
C722		Same as C718.	Feedback Q602 Fig. 5-22
C723		Same as C719.	Feedback Q602 Fig. 5-22
C724		Same as C720.	Filter Q602 Collector Supply Fig. 5-22
C725		Same as C720.	Filter Q603 Collector Supply Fig. 5-22
C726		Same as C613.	Blocking Q601 Output Fig. 5-22
C728		Same as C613.	Coupling to J612 Fig. 5-22
C729		CAPACITOR, FIXED, PAPER DIELECTRIC: 33,000 μμf ±10%, 100 v dc working, CP05A1EB333K, spec MIL-C-25.	Filter for Q601, Q602, Q603 Supply Voltage Fig. 5-22
C730 thru C799		Not Used.	
MP701		SHAFT: Stainless steel, 1.94 in. lg, 0.249 in. dia, 0.028 in. groove 0.78 in. from one end, 0.03 in. chamfer both ends, mfr 89661, dwg 232B146H01.	Counter Drive Fig. 5-25
MP702		Same as MP701.	Counter Drive Fig. 5-24
MP703		SHAFT: Stainless steel, 2.66 in. lg, 0.249 in. dia, 0.03 chamfer both ends, mfr 89661, dwg 232B147H01.	Idler Shaft Fig. 5-25
MP704		SHAFT: Stainless steel, 2.19 in. lg, 0.2497 in. dia, 0.30 in. chamfer both ends, mfr 89661, dwg 232B148H01.	Idler Shaft Fig. 5-25
MP705		SHAFT: Stainless steel, 2.34 in. lg, 0.2497 in. dia, 0.030 in. chamfer both ends, mfr 89661, dwg 232B149H01.	Shutter Drive Fig. 5-25
MP706		Same as MP705.	Shutter Drive Fig. 5-24
MP707		SHAFT: Stainless steel, 3.49 in. lg, 0.2497 in. dia, 0.030 in. chamfer both ends, mfr 89661, dwg 232B150H01.	Tuning A Fig. 5-25
MP708		COLLAR, STOP: ⅞ in. lg, ½ in. w, ¼ in. thk, pressed in pin, mfr 89661, dwg 232B156G01.	Prevents Rotation Fig. 5-24
MP709		COLLAR, STOP: ⅞ in. lg, ½ in. w, ¼ in. thk, pressed in pin, mfr 89661, dwg 232B158G01.	Prevents Rotation Fig. 5-24
MP710		SHUTTER ARM and SHAFT ASSEMBLY: Includes shutter arm and shaft secured by roll pin, mfr 89661, dwg 232B161G01.	Moves Shutter Fig. 5-24
MP711		VERNIER AND SHAFT ASSEMBLY: Consists of vernier and shaft secured by roll pin, mfr 89661, dwg 232B169G01.	Tuning B Fig. 5-24
MP712		SHAFT SUPPORT ASSEMBLY: Consists of support and 0.250 in. id bearing, mfr 89661, dwg 232B171G01.	Shaft Support Fig. 5-24
MP713		BRACKET, LOCK: Stainless steel, 0.94 in. lg, 0.44 in. w, 0.30 in. thk, leg, mfr 89661, dwg 232B175H01.	Vernier Locking Fig. 5-24
MP714		CAP SCREW: Knurled head, brass 1.22 in. lg, 10-32 thd, mfr 89661, dwg 232B176H01.	Vernier Locking Fig. 5-24
MP715		ADAPTER: Switch actuator, stainless steel frame, oil impregnated bronze roller, 5 oz. operating force, mfr 89661, dwg 54B6831H02.	Actuates S605 Fig. 5-24

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP716		PIN, SPRING: Stainless steel, ⅜ in. lg, 0.078 in. dia, mfr 89661, dwg 50D5596H02.	Retain Parts Fig. 5-24
MP717		Same as MP716.	Retain Parts Fig. 5-25
MP718		Same as MP716.	Retain Parts Fig. 5-24
MP719		Same as MP716.	Retain Parts Fig. 5-24
MP720		RING, RETAINING: Carbon spring steel for 0.250 in. dia shaft, 0.025 in. groove, mfr 89462, type 5100-25-MD.	Retain Parts Fig. 5-24
MP721		Same as MP720.	Retain Parts Fig. 5-24
MP722		Same as MP720.	Retain Parts Fig. 5-24
MP723		Same as MP720.	Retain Parts Fig. 5-24
MP724		Same as MP720.	Retain Parts Fig. 5-24
MP725		Same as MP720.	Retain Parts Fig. 5-23
MP726		Same as MP720.	Retain Parts Fig. 5-23
MP727		Same as MP720.	Retain Parts Fig. 5-24
MP728		Same as MP720.	Retain Parts Fig. 5-23
MP729		Not Used.	
MP730		SHAFT: Stainless steel, 2.66 in. lg, 0.2497 in. dia, 0.030 in. chamfer both ends, mfr 89661, dwg 232B144H02.	Stop Assembly Support Fig. 5-23
MP731 thru MP799		Not Used.	
R701		RESISTOR, FIXED, COMPOSITION: 18,000 ohms ±10%, ½ w, RC20GF183K, spec MIL-R-11.	Plate Load V607B Fig. 6-45
R702		Same as R671.	Plate Load V607B Fig. 6-45
R703		RESISTOR, FIXED, COMPOSITION: 560 ohms ±10%, ½ w, RC20GF561K, spec MIL-R-11.	Cathode V607B Fig. 6-45
R704		RESISTOR, FIXED, COMPOSITION: 2700 ohms ±10%, ½ w, RC20GF272K, spec MIL-R-11.	Cathode V607B Fig. 6-45
R705		Same as R652.	Grid V608A Fig. 6-45
R706		Same as R637.	Plate Load V608A Fig. 6-45
R707		RESISTOR, FIXED, COMPOSITION: 56 ohms ±10%, ½ w, RC20GF560K, spec MIL-R-11. Same as R365.	Cathode V608A Fig. 6-45
R708		Same as R666.	Cathode V608A Fig. 6-45
R709		RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%, ½ w, RC20GF681K, spec MIL-R-11.	Grid V607A Fig. 6-45
R710		Same as R669.	Phase Detector Filter Fig. 6-45
R711		RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, ½ w, RC20GF223K, spec MIL-R-11.	Load for CR621 Fig. 6-45
R712		Same as R711.	Load for CR622 Fig. 6-45
R713		RESISTOR, FIXED, COMPOSITION: 430 ohms ±5%, ½ w, RC20GF431J, spec MIL-R-11.	V606 Test Circuit Loading 50-60 KC Band Fig. 6-43
R714		RESISTOR, FIXED, COMPOSITION: 180 ohms ±5%, ½ w, RC20GF181J, spec MIL-R-11.	V606 Test Circuit Loading 60-70 KC Band Fig. 6-43
R715		RESISTOR, FIXED, COMPOSITION: 100 ohms ±5%, ½ w, RC20GF101J, spec MIL-R-11.	V606 Test Circuit Loading 70-80 KC Band Fig. 6-43
R716		RESISTOR, FIXED, COMPOSITION: 68 ohms ±5%, ½ w,. RC20GF680J, spec MIL-R-11.	V606 Test Circuit Loading 80-90 KC Band Fig. 6-43
R717		RESISTOR, FIXED, COMPOSITION: 27 ohms ±5%, ½ w, RC20GF270J, spec MIL-R-11.	V606 Test Circuit Loading 90-100 KC Band Fig. 6-43
R718 thru R723		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R724		RESISTOR, FIXED, COMPOSITION: 1000 ohms ±5%, ½ w, RC20GF102J, spec MIL-R-11.	Isolation T602 Fig. 6-46
R725		Same as R724.	Isolation T602 Fig. 6-46
R726		Same as R724.	Isolation T603 Fig. 6-46
R727		Same as R724.	Isolation T603 Fig. 6-46
R728		RESISTOR, FIXED, COMPOSITION: 5100 ohms ±5%, 1 w, RC32GF512J, spec MIL-R-11.	Plate Load Fig. 6-46
R729		Same as R669.	Primary Loading T610 Fig. 6-43
R730		Same as R707.	RF Input Volt Divider
R731		Same as R707.	RF Input Volt Divider
R732		Same as R681.	Voltage Drop Fig. 6-46
R733		Same as R681.	Voltage Drop Fig. 6-46
R734		Same as R633.	Load CR623 Fig. 6-47
R735		Same as R639.	Shunt M601 Fig. 6-48
R736		Same as R711.	Part of Divider for E661, E662, E663 Fig. 6-43
R737		RESISTOR, FIXED, COMPOSITION: 27,000 ohms, ±10%, 2 w, RC42GF273K, spec MIL-R-11.	Part of Divider for E661, E662, E663 Fig. 6-43
R738		Same as R737.	Part of Divider for E661, E662, E663 Fig. 6-43
R739		Same as R660.	Part of Bias Network Q601 Fig. 5-22
R740		Same as R659.	Part of Bias Network Q601 Fig. 5-22
R741		Same as R636.	Current Limiting Q601 Emitter Fig. 5-22
R742		Same as R711.	Decoupling Q601 Output Fig. 5-22
R743		Same as R653.	D.C. Dropping Q601 Collector Supply Fig. 5-22
R744		Same as R660.	Part of Bias Network Q602 Fig. 5-22
R745		Same as R659.	Part of Bias Network Q602 Fig. 5-22
R746		Same as R636.	Current Limiting Q602 Emitter Fig. 5-22
R747		Same as R711.	Decoupling Q602 Output Fig. 5-22
R748		Same as R653	D.C. Dropping Q602 Collector Supply Fig. 5-22
R749		Same as R652.	Decoupling to J612 Fig. 5-22
R750		Same as R660.	Decoupling Q603 input Fig. 5-22
R751		Same as R660.	Decoupling Q603 input Fig. 5-22
R752		Same as R660.	Part of Bias Network Q603 Fig. 5-22
R753		Same as R636.	Current Limiting Q603 Emitter Fig. 5-22
R754		Not Used.	
R755		Same as R669.	D.C. Dropping Q603 Collector Supply Fig. 5-22

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

CONTROL-ELECTRICAL FREQUENCY C-2861/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R756		RESISTOR, FIXED, COMPOSITION: 2.2 meg ±10%, ½ w, RC20GF225K, spec MIL-R-11.	FL604 Termination Fig. 5-21
R757 thru R799		Not Used.	

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

801-999		AMPLIFIER, RADIO FREQUENCY: 300 kc to 1.5 mc frequency range. 0.045 w, 100 ohms impedance input, 500 w, 51.5 ohms impedance output. 115 v, 60 cycles, single phase ac and 350 v, −350 v, −24 v, 1250 v, 500 v dc operating power requirements. $20\frac{5}{16}$ in. lg, 17½ in. w, 17½ in. h overall dimensions. Drawer rotates 171 deg. in either direction may be locked at 45, 90, 135 or 171 deg., mfr 89661, dwg 477D778.	Raises the Output of the RF Oscillator to to Desired Operating Frequency and Power Level
B801		FAN, CENTRIFUGAL: Counterclockwise rotation, 12 o'clock blast, 115/230 v, mfr 89661, dwg 477D817H01.	Cooling V805, V806, V807, V808 Fig. 6-35
B802 thru B899		Not Used.	
C801		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 µµf +100 −20%, 500 v dc working, CK63Y103Z, spec MIL-C-11015. Same as C613.	Cathode Bypass for V802 Fig. 6-34
C802		CAPACITOR, FIXED, PAPER DIELECTRIC: 220,000 µµf ±10%, 400 v dc working, CP05A1EE224K, spec MIL-C-25.	Decoupling V801 Fig. 6-34
C803		CAPACITOR, FIXED, MICA DIELECTRIC: 3000 µµf ±5%, 500 v dc working, CM30D302J, spec MIL-C-5.	Plate Coupling V801 Fig. 6-34
C804		CAPACITOR, FIXED, PAPER DIELECTRIC: 10,000 µµf ±10%, 400 v dc working, CP05A1EE103K, spec MIL-C-25.	Decoupling V803 Fig. 6-34
C805		Not Used.	
C806		Not Used.	
C807		CAPACITOR, FIXED, MICA DIELECTRIC: 820 µµf ±10%, 500 v dc working, CM30B821K, spec MIL-C-5.	Screen Bypass V802 Fig. 6-34
C808		CAPACITOR, FIXED, MICA DIELECTRIC: 470 µµf ±10%, 500 v dc working, CM20B471K, spec MIL-C-5. Same as C679.	Plate Coupling V802 Fig. 6-34
C809		CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 µµf ±10%, 300 v dc working, CM35C103K, spec MIL-C-5. Same as C627.	Decoupling V802 Fig. 6-34
C810		CAPACITOR, FIXED, MICA DIELECTRIC: 8200 µµf ±10%, 500 v dc working, CM40B822K, spec MIL-C-5.	Screen Bypass V803 Fig. 6-34
C811		Same as C810.	Coupling Grid V804 Fig. 6-34
C812		Not Used.	
C813		Same as C810.	Plate Bypass V804 Fig. 6-34
C814		CAPACITOR, FIXED, PAPER DIELECTRIC: 47,000 µµf ±10%, 200 v dc working, CP05A1EC473K, spec MIL-C-25.	Cathode Bypass V804 Fig. 6-34
C815		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 µµf ±10%, 100 v dc working, CP05A1EB104K, spec MIL-C-25.	Grid Bypass V805 Thru V808 Fig. 6-34
C816		Not Used.	
C817		Not Used.	
C818		CAPACITOR, VARIABLE: 50-2000 µµf, 3000 v peak rating, with mtg flange, mfr 89661, dwg 54B3096.	Plate Tank Tuning Fig. 6-35
C819		Not Used.	
C820		Not Used.	
C821		Not Used.	
C822		CAPACITOR, FIXED, ELECTROLYTIC: 20 µf, 60 v dc working, CL44BK200TP, spec MIL-C-3965.	Cathode Bypass V801 Fig. 6-34
C823		CAPACITOR, FIXED, CERAMIC DIELECTRIC:4700 µµf +100% −20%, 500 v dc working, CK62Y472Z, spec MIL-C-11015. Same as C203.	Meter Bypass M806 Fig. 6-35

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C824 thru C828		Not Used.	
C829		CAPACITOR, FIXED, PAPER DIELECTRIC: 4 µf ±10%, 600 v dc working, CP70E1EF405K, spec MIL-C-25.	Phasing Capacitor B801 Fig. 6-34
C830		CAPACITOR, FIXED, MICA DIELECTRIC: 5600 µµf ±10%, 500 v dc working, CM35B562K, spec MIL-C-5. Same as C301.	Cathode Bypass B803 Fig. 6-34
C831		CAPACITOR, FIXED, PAPER DIELECTRIC: 500,000 µµf ±10%, 600 v dc working, CP53B1EF504K, spec MIL-C-25.	Filament Bypass V805 Thru V808 Fig. 6-35
C832		Not Used.	
C833		Not Used.	
C834		Same as C809.	SWR Overload RF Bypass Fig. 6-36
C835		Same as C809.	Coupling Fig. 6-36
C836		CAPACITOR, FIXED, MICA DIELECTRIC: 20,000 µµf ±5%, 2000 v dc working, CM70B203J, spec MIL-C-5.	Plate Coupling V805 thru V808 Fig. 6-35
C837		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 µµf ±10%, 2000 v dc working, CP70E1EJ104K, spec MIL-C-25.	Plate Decoupling V805 thru V808 Fig. 6-35
C838		CAPACITOR, FIXED, PAPER DIELECTRIC: 6 µf ±10%, 600 v dc working, CH70B1MF605K, spec MIL-C-18312.	Tuner Tuning Motor Phasing Fig. 6-35
C839		Not Used.	
C840		CAPACITOR, FIXED, MICA DIELECTRIC: 1500 µµf ±10%, 500 v dc working, CM30B152K, spec MIL-C-5.	RF Bypass Directional Coupler Fig. 6-36
C841		Same as C840.	RF Bypass Directional Coupler Fig. 6-36
C842		Same as C801.	RF Bypass Directional Coupler Fig. 6-35
C843		CAPACITOR, FIXED, MICA DIELECTRIC: 1000 µµf ±5%, 500 v dc working, CM30D102J, spec MIL-C-5.	Grid Coupling V802 Fig. 6-34
C844		CAPACITOR, FIXED, PAPER DIELECTRIC: 220,000 µµf ±10%, 200 v dc working, CP05A1KC224K, spec MIL-C-25.	RF Modulator Bypass Fig. 6-34
C845		Not Used.	
C846		Same as C823.	Meter Bypass M804 Fig. 6-35
C847		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 3300 µµf +100%, −20%, 500 v dc working, CK62Y332Z, spec MIL-C-11015.	Cathode Bypass V805 Fig. 6-35
C848		Same as C847.	Cathode Bypass V805 Fig. 6-35
C849		Same as C847.	Cathode Bypass V806 Fig. 6-35
C850		Same as C847.	Cathode Bypass V806 Fig. 6-35
C851		Same as C847.	Cathode Bypass V807 Fig. 6-35
C852		Same as C847.	Cathode Bypass V807 Fig. 6-35
C853		Same as C847.	Cathode Bypass V808 Fig. 6-35
C854		Same as C847.	Cathode Bypass V808 Fig. 6-35
C855		Same as C801.	Meter Bypass M802 Fig. 6-35
C856		Same as C801.	Meter Bypass M803 Fig. 6-35
C857		Same as C801.	Meter Bypass M801 Fig. 6-35
C858		CAPACITOR, FIXED, MICA DIELECTRIC: 820 µµf ±10%, 300 v dc working, CM20B821K, spec MIL-C-5.	Modulation Monitor Filter Fig. 6-34
C859		Same as C858.	Modulation Monitor Fig. 6-34
C860		CAPACITOR, FIXED ELECTROLYTIC: 15 µf −15%, +50%, 15 v dc working, CL44BE150TP, spec MIL-C-3965.	Modulation Monitor Audio Coupling Fig. 6-34

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C861		Same as C801.	Meter Bypass M805 Fig. 6-35
C862		CAPACITOR, FIXED, MICA DIELECTRIC: 5600 μμf ±10%, 500 v dc working, CM35C562K, spec MIL-C-5.	Coupling CR809 Fig. 6-36
C863		Same as C809.	RF Bypass CR809 Fig. 6-36
C864		Same as C860.	Audio Bypass Fig. 6-34
C865		Same as C801.	RF Bypass Output Metering Circuit Fig. 6-34
C866		Same as C801.	RF Bypass Modulator Monitor Metering Circuit Fig. 6-34
C867		Same as C801.	Filter for −350 V Bias Supply Fig. 6-34
C868		Same as C801.	Grid Filter for V801 Fig. 6-34
C869		CAPACITOR, FIXED, ELECTROLYTIC: 25 μf, 150 v dc working, CE51C250J, spec MIL-C-62.	Drive Cathode Bypass Fig. 6-34
C870 thru C899		Not Used.	
CR801		SEMICONDUCTOR DEVICE DIODE: 100 v peak inverse voltage, 5.0 ma min forward current at 25 deg. C temp, 1N198, spec MIL-E-1. Same as CR301.	V807 Overload Circuit Fig. 6-35
CR802		Same as CR801.	V808 Overload Circuit Fig. 6-35
CR803		Same as CR801.	V805 Overload Circuit Fig. 6-35
CR804		Same as CR801.	V806 Overload Circuit Fig. 6-35
CR805		Same as CR801.	Directional Coupler Fig. 6-36
CR806		Same as CR801.	Directional Coupler Fig. 6-36
CR807		Same as CR801.	RF Detector Modulation Monitor Fig. 6-34
CR808		Same as CR801.	Audio Detector Modulation Monitor Fig. 6-34
CR809		Same as CR801.	RF Detector SWR Overload Fig. 6-36
CR810		Same as CR801.	RF Detector Modulation Monitor Fig. 6-34
CR811		Same as CR801.	Audio Detector Modulation Monitor Fig. 6-34
CR812		Same as CR801.	RF Dector SWR Overload Fig. 6-36
CR813		Not Used.	
CR814		Not Used.	
CR815		Same as CR801.	Coupling Diode DC Amplifier Fig. 6-36
CR816		SEMICONDUCTOR DEVICE DIODE: 8 ohms max, 0.1 μa reverse, 85 ma forward, 8.2 volts, 1N756/A, spec MIL-E-1.	Voltage Regulation SWR Overload Circuit Fig. 6-35
CR817		Same as CR816.	Voltage Regulator SWR Overload Circuit Fig. 6-35

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
CR818		Same as CR816.	Voltage Regulation SWR Overload Circuit Fig. 6-35
CR819 thru CR899		Not Used. Cont. See CR953.	
DS801		Not Used.	
DS802		LAMP, INCANDESCENT: Single contact, miniature bayonet base, 28 v, MIL type MS15571-6. Same as DS207.	Tune-In Indication Fig. 6-35
DS803		Same as DS802.	Carrier-On Indication Fig. 6-35
DS804 thru DS899		Not Used.	
E801		SHIELD, ELECTRON TUBE: Heat dissipating, 7 pins, 1¾ in. lg, 0.810 in. dia, mfr 89661, dwg 54B6645H02.	Shield for V801
E802		Same as E801.	Shield for V802
E803		CLIP, ELECTRICAL: Ceramic body, one piece contact and soldering lug, mfr 76487, type 36002. Same as E453.	Grid Cap
E804		Not Used.	
E805		INSULATOR, STANDOFF: 4500 v dc breakdown at 60 cps, asbestos filled melamine, mfr 81312, type FT5. Same as E644.	Standoff Fig. 6-34
E806		Same as E805.	Standoff Fig. 6-34
E807 thru E809		Not Used.	
E810		BOARD, COMPONENT MOUNTING: Micarta board, 7 solder stud terminals, 2 clamps, mfr 89661, dwg 337C090G01.	Component Mounting and Insulation
E811		Not Used.	
E812		INSULATOR, STANDOFF: Miniature solder lug type, ⅝ in. lg, ¼ in. across flats, mfr 89661, dwg 54B7174H01. Same as E643.	Standoff
E813		Same as E812.	Standoff
E814		Same as E812.	Standoff
E815		Same as E812.	Standoff
E816		Same as E812.	Standoff
E817		Same as E812.	Standoff
E818		Same as E812.	Standoff
E819		Same as E812.	Standoff
E820		Same as E812.	Standoff
E821		Same as E812.	Standoff
E822		Same as E812.	Standoff
E823		Same as E812.	Standoff
E824		Same as E812.	Standoff
E825		BOARD, COMPONENT MOUNTING: Phenolic board, 8 spun-in solder post terminals, mfr 89661, dwg 239B148G01.	Component Mounting
E826 thru E829		Not Used.	
E830		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 52C2251. Same as E606.	Component Mounting in Driver Unit Fig. 6-34
E831		Not Used.	
E832		BOARD, COMPONENT MOUNTING: Micarta board, 14 solder stud terminals, mfr 89661, dwg 55C4774.	Component Mounting in Driver Unit Fig. 6-34
E833 thru E839		Not Used.	
E840		Same as E805.	Standoff Fig. 6-35
E841		Same as E805.	Standoff Fig. 6-35
E842		BOARD, COMPONENT MOUNTING: Micarta board, 12 solder stud terminals, mfr 89661, dwg 233B035G02.	Component Mounting and Insulation Fig. 6-35

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E843		Same as E812.	Standoff
E844		Same as E812.	Standoff
E845		Same as E812.	Standoff
E846		Not Used.	
E847		Same as E812.	Standoff
E848		Same as E812.	Standoff
E849		Same as E812.	Standoff
E850		Same as E812.	Standoff
E851		Same as E812.	Standoff
E852		Same as E812.	Standoff
E853		Same as E812.	Standoff
E854		Same as E812.	Standoff
E855		Same as E812.	Standoff
E856		Same as E812.	Standoff
E857		Same as E812.	Standoff
E858		Same as E812.	Standoff
E859		KNOB: Black phenolic, w/pointer, 1 in. dia knob, 1⅙ in. dia skirt accommodates ¼ in. shaft, mfr 88365, type VIZA. Same as E321.	Control Knob Fig. 5-23
E860		Same as E859.	Control Knob Fig. 5-23
E861 thru E876		Not Used.	
E877		BOARD, COMPONENT MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 233B040G02.	Component Mounting Fig. 6-35
E878		BOARD, COMPONENT MOUNTING: Micarta board, 10 solder stud terminals, mfr 89661, dwg 233B213G02.	Component Mounting Fig. 6-35
E879		Not Used.	
E880		BOARD, COMPONENT MOUNTING: Micarta board, 8 solder stud terminals, mfr 89661, dwg 237B304G01.	Component Mounting
E881		Same as E859.	Control Knob Fig. 5-23
E882		Same as E859.	Control Knob Fig. 5-23
E883		Same as E859.	Control Knob Fig. 5-23
E884		Same as E859.	Control Knob Fig. 5-23
E885		Same as E859.	Control Knob Fig. 5-23
E886		Same as E859.	Control Knob Fig. 5-23
E887		Same as E859.	Control Knob Fig. 5-23
E888		Same as E859.	Control Knob Fig. 5-23
E889		Same as E859.	Control Knob Fig. 5-23
E890		Same as E859.	Control Knob Fig. 5-23
E891		INSULATOR, STANDOFF: Miniature, melaminine insulator, tin coated brass terminals, mfr 81312, type 773.	Standoff
E892		Same as E891.	Standoff
E893		Same as E891.	Standoff
E894		Same as E891.	Standoff
E895		Same as E891.	Standoff
E896		Same as E891.	Standoff
E897		INSULATOR, STANDOFF: Steatite insulator, brown glaze finish, 1 in. lg, NS4AB0208, spec JAN-I-8.	Standoff
E898		Same as E897.	Standoff
E899		INSULATOR, STANDOFF: Steatite insulator, brown glaze finish, ⅜ in. lg, NS4AB4201, spec JAN-I-8. Cont. See E901.	Standoff
J801		CONNECTOR, RECEPTACLE, ELECTRICAL: Round male contact, straight type, solid shell, panel mounted, mfr 91577, type 2914. Same as J316.	Standoff Fig. 6-34
J802		CONNECTOR, RECEPTACLE, ELECTRICAL: Weatherproof, quick disconnect, 1000 v peak, brass body, silver plate finish, single contact, UG569/U, spec MS35323.	RF Output to Antenna Fig. 6-36
J803		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
J804		Same as J801.	Dummy Load Input Fig. 6-36
J805		Same as J801.	Input to Modulation Monitor Fig. 6-34
J806		ADAPTER: Connector angle type, single contact, UG567A/U, dwg MS35322.	RF Output Connector Fig. 6-34
J807		Not Used.	
J808		Same as J801.	RF Output Connector Fig. 6-34
J809 thru J899		Not Used.	
K801		RELAY, ARMATURE: 400 ohms ±10%, coil resistance at 25 deg. C, 115 v ac non-inductive, mfr 82415, type 5303-1HP.	Overload V805 thru V808 Fig. 6-35
K802		Not Used.	
K803		RELAY, ARMATURE: Continuous duty, 266 ohm coil resistance, 28 v dc, 4 form C contact arrangement, mfr 72983, type 22300-0.	CW-Phone Fig. 6-34
K804		Same as K803.	Power Level Fig. 6-34
K805		RELAY, ARMATURE: DPDT, single break, 115 v ac, 15 amp, mfr 70309, type B0-6A115. Same as K503.	Air Flow Interlock Relay Fig. 6-35
K806		RELAY, ARMATURE: 450 ohms ±10% coil resistance at 25 deg. C, 28 v dc, mfr 82415, type 5709-168X.	Antenna Dummy Load Fig. 6-36
K807		RELAY, ARMATURE: 24 v dc, 700 ohms ±10%, working, mfr 70309, type MEH6D24VDC.	Hi-Power Tuner-Off Fig. 6-35
K808		Not Used.	
K809		RELAY, ARMATURE: 5000 ohms ±10%, coil resistance at 25 deg. C, 115 v ac, non-inductive, mfr 82415, type 5303-2HP.	SWR Overload Fig. 6-35
K810 thru K899		Not Used.	
L801		COIL, RADIO FREQUENCY: 2.5 mh ±10%, 100 ma max, bakelite core, mfr 42498, type R-50 (2.5 MH).	Plate Load for V801 Fig. 6-34
L802 thru L803		Not Used.	
L804		COIL, RADIO, FREQUENCY: 500 µh, 1 in. lg, tinned copper axial wire leads, mfr 42498, type R50 (500 µh).	Shunt Peaking V802 Fig. 6-34
L805		COIL, RADIO FREQUENCY: 1761 to 1879 µµf, 6.0 to 6.4 µh, q of 100 min, mfr 89661, dwg 52C1980-1-1.	Coupling Coil Matches Impedance Fig. 6-35
L806		TRANSFORMER, RADIO FREQUENCY: 353 to 375 µµf, 30.1 to 31.9 µh, q of 100 min, mfr 89661, dwg 52C1979-1-1.	Tank Tuning Fig. 6-35
L807		Same as L801.	R. F. Filter V803 Fig. 6-34
L808		Same as L801.	Plate Choke V803 Fig. 6-34
L809		COIL, RADIO FREQUENCY: Single pie wound, 14.3 ohms dcr, 30 mh inductance, q of 30 min, mfr 89661, dwg 375A504G01.	Shunt Peaking V803 Fig. 6-34
L81		COIL, RADIO FREQUENCY: 2500 µh miniature, 3/8 in. lg, 0.297 in. dia, mfr 76487, type J300-2500.	RF Choke CR805 Fig. 6-36
L811		Same as L810.	RF Choke R806 Fig. 6-36
L812		Same as L810.	Decoupling V803 Fig. 6-34
L813		COIL, RADIO FREQUENCY: Single pie wound, 1.50 a dc, 4.35 mh inductance, mfr 89661, dwg 375A505G01.	Decoupling +1250 V DC Fig. 6-35
L814		Same as L810.	Decoupling Plate V802 Fig. 6-34
L815		COIL, RADIO FREQUENCY: 10 mh, 15/16 in. lg, ceramic form, cotter pin lug terminals, mfr 42498, type R100S(10 MH).	Modulation Monitor Filter Fig. 6-34
L816		Same as L801.	RF Filter V804 Cathode Fig. 6-34

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
L817		COIL, RADIO FREQUENCY: Duo-lateral wound, 83 ohms dcr, 15 mh inductance, mfr 89661, dwg 335C655H03.	Modulation Monitor in Put Coil Fig. 6-34
L818 thru L899		Not Used.	
M801		INDICATOR: Standing wave ratio dc movement, mfr 89661, dwg 221B821H01.	SWR Indicator Fig. 6-35
M802		AMMETER: 0-100 full scale value, white face w/black markings, measures microamperes, MR26W100DUAR, spec MIL-M-10304.	Tuner Position Indicator Fig. 6-35
M803		WATTMETER: 0-600 w and 120% modulation, white face w/ black markings, mfr 89661, dwg 221B822H01.	RF Output Fig. 6-35
M804		VOLTMETER: Calibrated 0 to 600 v dc and 0 to 1.5 kv dc, white face w/black markings, mfr 89661, dwg 227B093H01.	P. A. Test Voltmeter Fig. 6-35
M805		AMMETER: 0-20 and 0-80 full scale value, white face w/black markings, measures microamperes, mfr 89661, dwg 227B094H01.	Driver Test Ammeter Fig. 6-35
M806		AMMETER: 0-1.5 amp and 0-300 ma, white face w/black markings, mfr 89661, dwg 222B065H01.	P. A. Cathode Currents Fig. 6-35
M807 thru M899		Not Used.	
MP801		CHAIN, ROLLER: Stainless steel, ¾ in. w, 44 pitches, mfr 92114, Type 75SS44P.	Drive Chain
MP802		SPROCKET WHEEL: 20 teeth, 0.9430 pitch dia, for 0.1475 pitch, 0.150 w roller chain, mfr 89661, dwg 217B724.	Drive Sprocket
MP803		Same as MP802.	Drive Sprocket
MP804		Same as MP802.	Drive Sprocket
MP805		Same as MP802.	Drive Sprocket
MP806		BEARING, SLEEVE: Oilite bronze, 0.377 in. od, 0.250 in. id, ⅜ in. lg, mfr 89661, dwg 55C5878H01.	Thrust Bearing
MP807		Same as MP806.	Thrust Bearing
MP808		BEARING, BALL, ANNULAR: Corrosion resistant steel, mfr 89661, dwg 152A818H01.	Thrust Bearing
MP809		BEARING, THRUST: Oilite bronze, ⅜ in. id, ⅝ in. od, 1/16 in. thk, mfr 70901, type TT604.	Thrust Bearing
MP810		Same as MP809.	Thrust Bearing
MP811		BEARING, SLEEVE· Oilite bronze, 0.255 in. id, 0.500 in. od, mfr 70901, type TT504. Same as MP322.	Thrust Bearing
MP812		Same as MP811.	Thrust Bearing
MP813		Same as MP811.	Thrust Bearing
MP814		Same as MP811.	Thrust Bearing
MP815		Same as MP811.	Thrust Bearing
MP816		Same as MP811.	Thrust Bearing
MP817		WASHER, THRUST: Phosphor bronze, 0.218 in. od, 0.120 in. id, 0.032 in. thk, mfr 89661, dwg 152A028H01.	Thrust Bearing
MP818		BEARING, SLEEVE: Oilite bronze, 0.377 in. od, 0.2505 in. id, 5/16 in. lg, mfr 89661, dwg 225B387H08.	Thrust Bearing
MP819		BEARING, SLEEVE: Oilite bronze, 0.1875 in. id, 0.252 in. od, ¼ in. lg, mfr 70901, type AA225-2.	Thrust Bearing
MP820		GEAR, SPUR: 52 teeth, 32 pitch, 14½ deg. pressure angle, 1.625 pitch dia, mfr 89661, dwg 227B264.	Drive Gear
MP821		GEAR, WORM: Single thd, 20 deg, pressure angle, 0.4558 pitch dia, right hand, mfr 89661, dwg 227B177.	Tuning Worm
MP822		GEAR, HELICAL: 12 teeth, 24 pitch, 20 deg. pressure angle, 0.500 pitch dia, left hand, mfr 89661, dwg 55C4876H01.	Drive Gear
MP823		Same as MP811.	Thrust Bearing
MP824		Same as MP811.	Thrust Bearing
MP825		Same as MP811.	Thrust Bearing
MP826		Same as MP811.	Thrust Bearing
MP827		Same as MP811.	Thrust Bearing
MP828		Same as MP811.	Thrust Bearing
MP829		Same as MP811.	Thrust Bearing
MP830		Same as MP811.	Thrust Bearing
MP831		Same as MP811.	Thrust Bearing

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP832		Same as MP811.	Thrust Bearing
MP833		Same as MP811.	Thrust Bearing
MP834		Same as MP811.	Thrust Bearing
MP835		Same as MP811.	Thrust Bearing
MP836		Same as MP811.	Thrust Bearing
MP837		Same as MP811.	Thrust Bearing
MP838		Same as MP811.	Thrust Bearing
MP839		Same as MP811.	Thrust Bearing
MP840		Same as MP811.	Thrust Bearing
MP841		Same as MP811.	Thrust Bearing
MP842		Same as MP811.	Thrust Bearing
MP843		Same as MP811.	Thrust Bearing
MP844		Same as MP811.	Thrust Bearing
MP845		Same as MP811.	Thrust Bearing
MP846		GEAR, BEVEL: Brass, 24 teeth, 20 deg. pressure angle, 0.750 pitch dia, mfr 89661, dwg 233B099H01.	Drive Gear
MP847		Same as MP846.	Drive Gear
MP848		GEAR, WORM: 3 thd, left hand, 48 pitch, 0.500 pitch dia, mfr 89661, dwg 55C4896H01.	Drive Gear
MP849		GEAR, COMPOUND: C/O a 52 tooth, 32 pitch dia, 20 deg. pressure angle helical gear and a 40 tooth, 32 pitch, 20 deg. pressure angle bevel gear, mfr 89661, dwg 54B3106H01.	Transmits Rotation
MP850		Same as MP849.	Transmits Rotation
MP851		GEAR, SECTOR: 48 pitch, 14 teeth, 20 deg. pressure angle, 1 in. pitch dia, mfr 89661, dwg 55C6768.	Transmits Rotation
MP852		Not Used.	
MP853		GEAR, SECTOR: 48 pitch, 32 teeth, 20 deg. pressure angle, 3.333 pitch dia, mfr 89661, dwg 55C4912.	Transmits Rotation
MP854		GEAR, HELICAL: 18 normal pitch, 14 teeth, 20 deg. pressure angle, 0.7836 pitch dia, mfr 89661, dwg 227B178.	Transmits Rotation
MP855		GEAR, HELICAL: 45.26 normal pitch, 26 teeth, 20 deg. pressure angle, 0.8125 pitch dia, mfr 89661, dwg 55C5872.	Transmits Rotation
MP856		Same as MP855.	Transmits Rotation
MP857		BEARING, BALL: Thrust, single row stainless steel balls and race, ¼ in. id, 9/16 in. od, mfr 83678, type FT05.	Thrust Bearing
MP858		Same as MP857.	Thrust Bearing
MP859		Same as MP857.	Thrust Bearing
MP860		Same as MP857.	Thrust Bearing
MP861		Same as MP857.	Thrust Bearing
MP862		Same as MP857.	Thrust Bearing
MP863		Same as MP857.	Thrust Bearing
MP864		Same as MP857.	Thrust Bearing
MP865		Same as MP857.	Thrust Bearing
MP866		Same as MP857.	Thrust Bearing
MP867		Same as MP857.	Thrust Bearing
MP868		Same as MP857.	Thrust Bearing
MP869		BEARING, SLEEVE: Oilite bronze, 0.377 in. od, 0.2505 in. id, ⅜ in. lg, mfr 89661, dwg 225B387H04.	Thrust Bearing
MP870		Same as MP869.	Thrudt Bearing
MP871		Same as MP869.	Thrust Bearing
MP872		GEAR, COMPOUND: One gear 48 teeth 1.500 pitch dia, other gear 24 teeth 0.750 pitch dia, both gears 32 pitch and 20 deg. pressure angle, mfr 89661, dwg 55C5877-2-20.	Drive Gear
MP873		Same as MP872.	Drive Gear
MP874		BEARING, SLEEVE: Oilite bronze, 0.2505 in. id, 0.377 in. od, ⅝ in. lg, mfr 89661, dwg 225B387H09.	Thrust Bearing
MP875		Same as MP874.	Thrust Bearing
MP876		GEAR, HELICAL: Brass, 24 pitch, 20 deg. pressure angle, 12 teeth, 0.500 pitch dia, mfr 89661, dwg 55C4876H02.	Drive Gear
MP877		GEAR, BEVEL: 32 pitch, 40 teeth, 20 deg. pressure angle, 1.250 pitch dia, mfr 89661, dwg 54B3106H02.	Drive Gear
MP878		Same as MP877.	Drive Gear

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP879		GEAR, BEVEL: 32 pitch, 20 teeth 20 deg. pressure angle, 0.625 pitch dia, mfr 89661, dwg 54B3106H03.	Drive Gear
MP880		Same as MP879.	Drive Gear
MP881		Same as MP879.	
MP882		Same as MP879.	Drive Gear
MP883		GEAR, COMBINATION: 1 gear 15 teeth, 0.3125 pitch dia, other gear 53 teeth, 1.1042 pitch dia, both gears 48 pitch and 20 deg. pressure angle, mfr 89661, dwg 227B852.	Drive Gear
MP884		BEARING, BALL: Thrust stainless steel balls, $\frac{1}{2}$ in. id, $1\frac{7}{32}$ in. od, mfr 76527, type FT-1.	Thrust Bearing
MP885		BEARING, THRUST: Oilite bronze, 0.255 in. id, 0.625 in. od, $\frac{1}{16}$ in. thk, mfr 70901, type T601.	Thrust Bearing
MP886		Same as MP885.	Thrust Bearing
MP887		Same as MP885.	Thrust Bearing
MP888		Same as MP885.	Thrust Bearing
MP889		GEARSHAFT, SPUR: 48 pitch, 24 teeth; 20 deg. pressure angle, 0.500 pitch dia, shaft 0.2497 in. dia, $3\frac{19}{32}$ in. lg from hub of gear, mfr 89661, dwg 227B337.	Shaft Coupling
MP890		GEAR, SPUR: 48 pitch, 62 teeth, 20 deg. pressure angle, 1.2917 pitch dia, mfr 89661, dwg 227B338.	Drive Gear
MP891		GEAR, SPUR: 48 pitch, 92 teeth, 20 deg. pressure angle, 1.9166 pitch dia, mfr 89661, dwg 230B104.	Drive Gear
MP892		GEAR, SPUR: 48 pitch, 28 teeth, 20 deg. pressure angle, 0.5833 pitch dia, mfr 89661, dwg 227B241.	Drive Gear
MP893		GEAR, SPUR: 48 pitch, 42 teeth, 20 deg. pressure angle, 0.8750 pitch dia, mfr 89661, dwg 227B131.	Drive Gear
MP894		GEAR, SPUR: 48 pitch, 30 teeth, 20 deg. pressure angle, 0.6250 pitch dia, mfr 89661, dwg 227B168.	Drive Gear
MP895		GEAR, SPUR: 48 pitch, 90 teeth, 20 deg. pressure angle, 1.8750 pitch dia, mfr 89661, dwg 227B169.	Drive Gear
MP896		GEAR, SECTOR: Indexed for 60 teeth, 20 deg. pressure angle, 1.250 pitch dia, mfr 89661, dwg 227B336.	Drive Gear
MP897		BEARING, THRUST: Bronze, 0.44 in. od, 0.190 in. id, 0.062 in. thk, mfr 89661, dwg 375A279.	Thrust Bearing
MP898		GEAR, SPUR: 48 pitch, 92 teeth, 20 deg. pressure angle, 1.9166 pitch dia, mfr 89661, dwg 227B132.	Drive Gear
MP899		GEAR, SPUR: 48 pitch, 28 teeth, 20 deg. pressure angle, 0.5833 pitch dia, mfr 89661, dwg 227B130.	Transmits Rotation
		Cont. See MP901.	
P801 thru P803		Not Used.	
P804		CONNECTOR, PLUG, ELECTRICAL: Silver plated, w/jacket clamp, $\frac{3}{4}$ in. by $\frac{25}{32}$ in. L shape, mfr 74868, type 48800. Same as P131.	Dummy Load Input Fig. 6-35
P805		Same as P804.	Input to Modulation Monitor Fig. 6-35
P506 thru P899		Not Used.	
Q801		TRANSISTOR: 1 mc, 30 ohm min, 90 ohm max, 2N117, spec MIL-T-19500.	DC Amp SWR Overload Circuit Fig. 6-36
Q802		TRANSISTOR: 2 mc, 30 ohm min, 90 ohm max, 2N119, spec MIL-T-19500.	DC Amp SWR Overload Circuit Fig. 6-36
Q803 thru Q899		Not Used.	
R801		RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, $\frac{1}{2}$ w, RC20GF101K, spec MIL-R-11. Same as R693.	RF Input Resistance Fig. 6-34
R802		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESI NATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R803		Same as R801.	Cathode Bias for V802 Fig. 6-34
R804 thru R809		Not Used.	
R810		RESISTOR, VARIABLE, COMPOSITION: 1000 ohms ±10%, 2 w, RV4NAYSK102A, spec MIL-R-94.	AM Power Adjust Fig. 6-34
R811		RESISTOR, VARIABLE, COMPOSITION: 500 ohms ±10%, 2 w, RV4NAYSK501A, spec MIL-R-94.	Low Power Adjust Fig. 6-34
R812		Same as R811.	Drive Adjust Fig. 6-34
R813 thru R815		Not Used.	
R816		RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 2 w, RC42GF473K, spec MIL-R-11. Same as R367.	Screen Dropping V802 Fig. 6-34
R817		RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, 2 w, RC42GF682K, spec MIL-R-11. Same as R467.	Plate Load V802 Fig. 6-34
R818		Not Used.	
R819		Not Used.	
R820		RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, ½ w, RC20GF683K, spec MIL-R-11. Same as R358.	Grid Return V803 Fig. 6-34
R821		RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%, 2 w, RC42GF471K, spec MIL-R-11.	Cathode Bias V803 Fig. 6-34
R822		Same as R353.	Screen Dropping V803 Fig. 6-34
R823		RESISTOR, FIXED, WIREWOUND: 3100 ohms ±5%, 14 w, RW31V312, spec MIL-R-26.	Plate Load V804 Fig. 6-34
R824		Same as R823.	Plate Load V804 Fig. 6-34
R825		Same as R823.	Plate Load V804 Fig. 6-34
R826		RESISTOR, FIXED, COMPOSITION: 3900 ohms ±10%, 2 w, RC42GF392K, spec MIL-R-11.	Grid V804 Fig. 6-34
R827		RESISTOR, FIXED, WIREWOUND: 250 ohms ±5%, 14 w, RW56V251, spec MIL-R-26.	Cathode Bias V804 Fig. 6-34
R828		RESISTOR, FIXED, COMPOSITION: 150,000 μμf ±10%, ½ w, RC20GF154K, spec MIL-R-11.	Keying Input Divider Fig. 6-34
R829		Same as R816.	Voltage Dropping SWR Power Supply Fig. 6-35
R830		Same as R816.	Voltage Dropping SWR Power Supply Fig. 6-35
R831		RESISTOR, FIXED, COMPOSITION: 3300 ohms ±10%, 2 w, RC42GF332K, spec MIL-R-11.	Termination T801 Fig. 6-34
R832		Same as R831.	Termination T801 Fig. 6-34
R833		RESISTOR, VARIABLE, COMPOSITION: 100,000 ohms ±10%, 2 w, RV4LAYSA104A, spec MIL-R-94. Same as R456.	Tuner Position Max Adjust Fig. 6-35
R834		RESISTOR, VARIABLE: 10,000 ohms ±10%, 2 W, RV4LAYSA103A, MIL-R-94. Same as R489.	Tuner Position Zero Adjust Fig. 6-35
R835		RESISTOR, FIXED, WIREWOUND: 16.67 ohms ±1%, 5 w, mfr 89661, dwg 335C768H60.	Cathode Metering V806 Fig. 6-35
R836		Same as R835.	Cathode Metering V805 Fig. 6-35
R837		Same as R835.	Cathode Metering V808 Fig. 6-35
R838		Same as R835.	Cathode Metering V807 Fig. 6-35
R839		RESISTOR, FIXED, WIREWOUND: 3.33 ohms, 8 w, mfr 54294, type G102K.	Cathode Metering V805 thru V808 Fig. 6-35

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R840		Same as R834.	Overload Relay Adjust Fig. 6-35
R841		RESISTOR, FIXED, WIREWOUND: 1600 ohms ±5%, 10 w, RW31G162, spec MIL-R-26.	Screen Dropping V805
R842		Same as R841.	Screen Dropping V806 Fig. 6-35
R843		Same as R841.	Screen Dropping V807
R844		Same as R841.	Screen Dropping V808 Fig. 6-35
R845		RESISTOR, FIXED, FILM: 24.9 ohms ±1%, 1 w, RN75B24R9F, spec MIL-R-10509.	Meter Shunt Cathode Fig. 6-34
R846		RESISTOR, FIXED, FILM: 10 ohms ±1%, 1 w, RN75B10R0F, spec MIL-R-10509.	Meter Shunt Cathode V804 Fig. 6-34
R847		RESISTOR, FIXED, FILM: 100 ohms ±1%, 1 w, RN75B1000F, spec MIL-R-10509.	Meter Shunt Grid V805 thru V808 Fig. 6-34
R848		Not Used.	
R849		RESISTOR, FIXED, FILM: 750,000 ohms ±1%, 1 w, RN75B7503F, spec MIL-R-10509.	+1500 V Meter Meter Multiplier Fig. 6-35
R850		Same as R849.	+1500 V Meter Multiplier Fig. 6-35
R851		Same as R806.	+1500 V Divider Fig. 6-35
R852		RESISTOR, FIXED, FILM: 590,000 ohms ±1%, 1 w, RN75B5903F, spec MIL-R-10509.	+600 V Divider Fig. 6-34
R853		RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, ½ w, RC20GF472K, spec MIL-R-11. Same as R669.	+600 V Divider Fig. 6-34
R854		RESISTOR, FIXED, WIREWOUND: 60,000 ohms ±50%, ¼ w, RB15AE60001D, spec MIL-R-93.	−60 V Divider Fig. 6-34
R855		Same as R853.	− 60 V Divider Fig. 6-34
R856		Not Used.	
R857		RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, ½ w, RC20GF102K spec MIL-R-11. Same as R301.	Termination T805 Fig. 6-34
R858		Not Used.	
R859		Same as R806.	Grid Return V801 Fig. 6-34
R860		RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, ½ w, RC20GF223K, spec MIL-R-11. Same as R711.	Plate Decoupling V801 Fig. 6-34
R861		RESISTOR, FIXED, COMPOSITION: 1500 ohms ±10%, ½ w, RC20GF152K, spec MIL-R-11. Same as R302.	Cathode Bias V801 Fig. 6-34
R862		Not Used.	
R863		RESISTOR, FIXED, COMPOSITION: 150,000 ohms ±5%, ½ w, RC22GF154J, spec MIL-R-11.	M802 Multiplier Fig. 6-35
R864		RESISTOR, FIXED, COMPOSITION: 12,000 ohms ±5%, 2 w, RC42GF123J, spec MIL-R-11.	M802 Bridge Dropping Fig. 6-35
R865		RESISTOR, FIXED, COMPOSITION: 120,000 ohms ±5%, 2 w, RC42GF124J, spec MIL-R-11.	M802 Bridge Dropping Fig. 6-35
R866		RESISTOR, FIXED, COMPOSITION: 270 ohms ±10%, 2 w, RC42GF271K, spec MIL-R-11.	CR805 Balance Fig. 6-36
R867		RESISTOR, FIXED, COMPOSITION: 560 ohms ±5%, ½ w, RC20GF561J, spec MIL-R-11.	M801 Series Fig. 6-35
R868		Same as R866.	CR806 Balance Fig. 6-36
R869		RESISTOR, VARIABLE, COMPOSITION: 250 ohms ±10%, 2 w, RV4LAYSA251A, spec MIL-R-94.	Balance Adjust CR805 Fig. 6-36
R870		Same as R869.	Balance Adjust CR806 Fig. 6-36
R871		RESISTOR, FIXED, FILM: 51.1 ohms ±5%, 13 w, mfr 07115, type RD33P51R1J.	T804 Termination Fig. 6-36
R872		Same as R871.	T804 Termination Fig. 6-36

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R873		RESISTOR, VARIABLE, WIREWOUND: 1500 ohms ±10%, 2 w, RA20NASD152A, spec MIL-R-19.	M801 Calibrate Fig. 6-35
R874		RESISTOR, FIXED, COMPOSITION: 1500 ohms ±10%, 2 w, RC42GF152K, spec MIL-R-11.	SWR Bridge Fig. 6-35
R875		Same as R823.	Bias Divider V805 Thru V808 Fig. 6-34
R876		RESISTOR, FIXED, WIREWOUND: 1200 ohms ±5%, 10 w, RW31G122, spec MIL-R-26.	Bias Divider V805 Thru V808 Fig. 6-34
R877		RESISTOR, FIXED, COMPOSITION: 1100 ohms ±5%, 2 w, RC42GF112J, spec MIL-R-11.	Divider T804 Fig. 6-36
R878		RESISTOR, FIXED, COMPOSITION: 330 ohms ±5%, 2 w	Divider T804 Fig. 6-36
R879		Same as R878.	Divider T804 Fig. 6-36
R880		Same as R877.	Divider T804 Fig. 6-36
R881		Same as R869.	RF Balance Fig. 6-36
R882		RESISTOR, FIXED, COMPOSITION: 150 ohms ±10%, ½ w, RC20GF151K, spec MIL-R-11. Same as R645.	RF Modulator Bypass Fig. 6-34
R883		Same as R860.	Grid Return V802 Fig. 6-34
R884		RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, ½ w, RC20GF473K, spec MIL-R-11. Same as R480.	Keying Input Divider V802 Fig. 6-34
R885		Same as R823.	Divider Grid Bias for V805 Thru V808 Fig. 6-34
R886		RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, 2 w, RC42GF472K, spec MIL-R-11.	Modulation Input Divider Fig. 6-35
R887		RESISTOR, VARIABLE, COMPOSITION: 15,000 ±10%, 2 w, RV4NAYSD153A, spec MIL-R-94.	Modulation Input Divider Fig. 6-35
R888		RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%, 2 w, RC42GF681K, spec MIL-R-11. Same as R512.	Modulation Monitor Metering Divider Fig. 6-34
R889		RESISTOR, FIXED, COMPOSITION: 150 ohms ±10%, 2 w, RC42GF151K, spec MIL-R-11.	Modulation Monitor Metering Divider Fig. 6-34
R890		RESISTOR, FIXED, COMPOSITION: 1800 ohms ±10%, 2 w, RC42GF182K, spec MIL-R-11.	DC Return CR808 Fig. 6-34
R891		RESISTOR, VARIABLE, COMPOSITION: 1000 ohms ±10%, 2 w, RV4LAYSA102A, spec MIL-R-94.	Modulation Calibrate Fig. 6-34
R892		RESISTOR, FIXED, COMPOSITION: 2200 ohms ±10%, ½ w, RC20GF222K, spec MIL-R-11.	Voltage Divider CR809 Fig. 6-36
R893		Not Used.	
R894		Same as R806.	Divider Input Q801 Fig. 6-36
R895		Same as R834.	SWR Overload Adjust Fig. 6-36
R896		RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 2 w, RC42GF103K, spec MIL-R-11. Same as R367.	DC Load, CR808 and CR811 Fig. 6-34
R897		RESISTOR, FIXED, FILM: 261 ohms ±2%, 25 w, RD35P2610G, spec MIL-R-11804.	Dummy Load Fig. 6-35
R898		Same as R897.	Dummy Load Fig. 6-35
R899		Same as R897.	Dummy Load Fig. 6-35
		Cont. See R901.	
RT801		RESISTOR, THERMAL: 25,000 ohms, ±10% at 37.8 deg. C, 0.375 w, mfr 75263, type L0903-25K140R.	Temp Compensation, Q801 Fig. 6-36
RT802 thru RT899		Not Used.	
S801		SWITCH, ROTARY: 1 wafer, 28 v dc, 5 amp, 115 v ac, 5 amp, MS25002-1, spec MIL-S-6807.	Coupler Antenna Fig. 6-35
S802		Not Used.	
S803		SWITCH, PUSH: Momentary action, rated 30 v dc, 3 amp inductive, mfr 74059, type 2PB2. Same as S203.	Tuner-Up Fig. 6-35
S804		Same as S803.	Tuner-Down Fig. 6-35

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
S805		SWITCH, PUSH: 3PDT, 5 amp, 125-250 v ac, mfr 74059, type 3PB7.	Tuner-Slow Fig. 6-35
S806		SWITCH, ROTARY: 1 section, 3 positions, non-shorting type contacts, mfr 89661, dwg 54B3284.	Switch M804 Fig. 6-35
S807		Same as S806.	Tuner-Control Fig. 6-35
S808		Same as S806.	Switch M805 Fig. 6-35
S809		SWITCH, ROTARY: 1 section, 5 positions, non-shorting type contacts, mfr 89661, dwg 54B3282.	Switch M806 Fig. 6-35
S810		Same as S801.	Tuner Transformer Fig. 6-35
S811		SWITCH, TOGGLE: 125 v, 2 amp, on-off-on positions, solder lug terminals, mfr 88140, type ST52T.	Carrier Test Key Fig. 6-35
S812		SWITCH, PUSH: SPST, with lens, contact rating, 28 v dc, 20 amp, mfr 81640, type A3247AU.	Overload Reset Fig. 6-35
S813		SWITCH, AIRFLOW: SPDT, rated 5 amp at 250 v ac, 1½ in. lg, 1⁵⁄₁₆ in. w, 1⅛ in. h, mfr 89661, dwg 227B116.	Air Interlock Fig. 6-35
S814		SWITCH, ROTARY: 3 position, 2 pole, mfr 81716, type 75628F1C.	Switch M803 Fig. 6-35
S815		SWITCH, THERMOSTATIC: 115 v ac, 1 amp, contacts close on temperature fall, operates at 275 deg. F, mfr 89661, dwg 335C927H02.	P. A. Temperature Overload Fig. 6-35
S816		Same as S815.	P. A. Temperature Overload Fig. 6-35
S817		Same as S815.	P. A. Temperature Overload Fig. 6-35
S818		Same as S815.	P. A. Temperature Overload Fig. 6-35
S819 thru S899		Not Used.	
T801		TRANSFORMER, POWER, STEP-UP: 1 primary, 2.5 w, 0.30 to 1.5 mc, 1 secondary, center tapped, 1400 ohm load, 0.71 ohm dcr ea side, mfr 89661, dwg 152A666H01.	V804 Output Fig. 6-34
T802		TRANSFORMER, POWER, STEPDOWN: Open frame, 1 primary winding 115 v, 50/60 cycles, single phase, 3 secondary windings, 6 v, 10.4 amp, 6.3 v, 2.5 amp, 6.3 v, 2.1 amp, 2000 v insulation impregnated, mfr 89661, dwg 55C3600-1-1.	Filament Fig. 6-35
T803		TRANSFORMER, CURRENT: 1 primary, 2 turns, 1 secondary, 40 turns, mfr 89661, dwg 53C7824-1-16.	SWR Voltage Reference Fig. 6-36
T804		TRANSFORMER, CURRENT: 1 primary, 1 turn, 1 secondary, 20 turns, center tapped, mfr 89661, dwg 53C7824-1-1.	SWR Current Reference Fig. 6-36
T805		TRANSFORMER, POWER, STEP-UP: 1 primary, 0.045 w, 0.3 to 1.5 mc, 1 secondary, 50 ohm load, 265 v dc working, mfr 89661, dwg 152A665H01.	RF Coupling Modulator Bypass Fig. 6-34
T806		TRANSFORMER, POWER, STEPDOWN: Primary winding, 115 v, 50 to 60 cycles, single phase, 1 secondary winding, 25 v, 0.015 amp, mfr 89661, dwg 222B821-1-1.	Reflectometer Reference Voltage Fig. 6-35
T807 thru T899		Not Used.	
TB801		TERMINAL BOARD: Barrier type, phenolic board, 15 double screw type terminals, mfr 89661, dwg 237B339G02.	Wire Terminiation Fig. 6-35
TB820		Not Used.	
TB803		TERMINAL BOARD: Barrier type, phenolic board, 18 double screw type terminals, mfr 89661, dwg 237B339G01.	Wire Termination Fig. 6-34
TB804		TERMINAL BOARD: 4 double screw type terminals, mica phenolic, barrier type, mfr 71785, type 4-141D. Same as TB304.	Wire Termination Fig. 6-35
TB805		Not Used.	
TB806		TERMINAL BOARD: Barrier type 11, double screw type terminals, mfr 71785, type 11-141D.	Wire Termination Fig. 6-35
TB807		TERMINAL BOARD: Barrier type, phenolic board, 2 double screw type terminals, mfr 71785, type 2-141D.	Wire Termination Fig. 6-34

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATION FUNCTION
TB808		Same as TB807.	Wire Termination Fig. 6-35
TB809 thru TB899		Not Used.	
V801		ELECTRON TUBE: Glass envelope, sharp cutoff pentode, 6AU6WA, spec MIL-E-1. Same as V301.	Low Level Modulator Fig. 3-8
V802		Same as V801.	First IF Amplifier Fig. 3-8
V803		ELECTRON TUBE: Beam power amplifier, receiving, 5933WA, spec MIL-E-1. Same as V454.	Second IF Amplifier Fig. 3-8
V804		ELECTRON TUBE: Receiving triode 6080 wa, spec MIL-E-1. Same as V306.	Drive Amplifier Fig. 3-8
V805		ELECTRON TUBE: Radio beam power tetrode, used as amplifier, oscillator frequency multiplier, mfr 72092, type 4X150A.	Power Amplifier Fig. 3-8
V806		Same as V805.	Power Amplifier Fig. 3-8
V807		Same as V805.	Power Amplifier Fig. 3-8
V808		Same as V805.	Power Amplifier Fig. 3-8
V809 thru V899		Not Used.	
XC801 thru XC868		Not Used.	
XC69		Same as XK301.	Socket for C869 Fig. 6-34
XC870 thru XC899		Not Used.	
XDS801		Not Used.	
XDS802		LIGHT, INDICATOR: 28 v, accommodates T-3-1/4 lamp, green lens, LH62BG2, spec MIL-L-3661.	For DS802 Fig. 6-35
XDS803		Same as XDS502.	For DS803 Fig. 6-35
XDS804 thru XDS899		Not Used.	
XK801		Same as XC822.	For K801 Fig. 6-35
XK802 thru XK808		Not Used.	
XK809		Same as XC822.	For K809 Fig. 6-35
XK810 rhru XK899		Not Used.	
XV801		Same as XV301.	For V801 Fig. 6-34
XV802		Same as XV801.	For V802 Fig. 6-34
XV803		SOCKET, ELECTRON TUBE: Steatite, 5 phosphor bronze contacts, quick mounting, mfr 02660, type 49SS5M.	For V803 Fig. 6-34
XV804		Same as XC822.	For V804 Fig. 6-34
XV805		SOCKET, ELECTRON TUBE: Air systems socket, special 9 pin provision for chimney, mfr 72092, type SK600.	For V805 Fig. 6-35
XV806		Same as XV805.	For V806 Fig. 6-35
XV807		Same as XV805.	For V807 Fig. 6-35
XV808		Same as XV805.	For V808 Fig. 6-35
XV809 thru XV899		Not Used.	
CR901 thru CR952		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
CR953		Same as CR801.	
CR954 thru CR999		Not Used.	
E901		Same as E899.	Standoff
E902		Same as E899.	Standoff
E903		INSULATOR, STANDOFF: Ceramic, grade 4 brown glazed, no voltage rating, hole in center for mounting, NS4AB4101, spec JAN-I-8.	Standoff
E904		Same as E903.	Standoff
E905		Same as E903.	Standoff
E906		INSULATOR, STANDOFF: ¾ in. lg by ⅜ in. dia, brown glazed ceramic NS4AB0106, spec JAN-I-8.	Standoff
E907		Same as E906.	Standoff
E908		Same as E906.	Standoff
E909		Same as E906.	Standoff
E910		INSULATOR, STANDOFF: Turret type, mineral filled melamine, brass terminals, mfr 81312, type 864.	Standoff
E911		Same as E910.	Standoff
E912		Same as E910.	Standoff
E913		Same as E910.	Standoff
E914		INSULATOR, STANDOFF: Melamine insulator, tin coated brass terminal, mfr 81312, type 775. Same as E101.	Standoff
E915		Same as E914.	Standoff
E916		Same as E914.	Standoff
E917		Same as E914.	Standoff
E918		Same as E914.	Standoff
E919		Same as E914.	Standoff
E920		Same as E914.	Standoff
E921		Same as E914.	Standoff
E922		Same as E914.	Standoff
E923		KNOB: Black phenolic, 2 in. dia knob, 2⅛ in. dia skirt, accommodates ¼ in. dia shaft, mfr 88635, type VIZD.	Knob Fig. 5-23
E924		Same as E812.	Standoff
E925		Same as E812.	Standoff
E926		Same as E812.	Standoff
E927		DIAL ASSEMBLY: C/O a plate, spur gear, dial and coupling, mfr 89661, dwg 55C5877-6-2.	Knob
E928		Same as E923.	Knob Fig. 5-23
E929 thru E945		Not Used.	
E946		Same as E812.	Standoff
E947 thru E999		Not Used.	
MP901		GEAR, SPUR: 48 pitch, 25 teeth, 20 deg. pressure angle, 0.5208 pitch dia, mfr 89661, dwg 230B286.	Drive Gear
MP902		GEAR, SPUR: 48 pitch, 95 teeth, 20 deg. pressure angle, 1.9791 pitch dia, mfr 89661, dwg 230B285.	Drive Gear
MP903		SPROCKET WHEEL: 30 teeth, 0.187 circular pitch, 1.7857 pitch dia, mfr 89661, dwg 227B939.	Drive Sprocket
MP904 thru MP999		Not Used.	
R901		Same as R897	Dummy Load Fig. 6-35
R902		Same as R897.	Dummy Load Fig. 6-35
R903		Same as R874.	Voltage Divider RF Output Metering Fig. 6-35
R904		Same as R874.	Voltage Divider RF Output Metering Fig. 6-35

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER, RADIO FREQUENCY AM-2197/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R905		RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 1 w, RC32GF103K, spec MIL-R-11.	Voltage Divider 600 V Screen Supply Fig. 6-34
R906		Same as R892.	Voltage Divider Input CR812 Fig. 6-36
R907		Same as R857.	Voltage Divider CR812 Fig. 6-36
R908		RESISTOR, FIXED, COMPOSITION: 3300 ohms ±10%, ½ w, RC20GF332K, spec MIL-R-11. Same as R478.	Voltage Divider Input CR809 Fig 6-36
R909		Same as R833.	SWR Overload Adjust Fig. 6-36
R910		Same as R820.	Divider Input Q801 Fig. 6-36
R911		Not Used.	
R912		RESISTOR, FIXED, COMPOSITION: 5600 ohms ±5%, 2 w, RC42GF562J, spec MIL-R-11.	Series Dropping Resistor Fig. 6-36
R913		RESISTOR, FIXED, COMPOSITION: 6800 ohms ±5%, 2 w, RC42GF682J, spec MIL-R-11.	Voltage Divider for Transistor Power Supply Fig. 6-36
R914		Not Used.	
R915		RESISTOR, FIXED, COMPOSITION: 1800 ohms ±10%, 1 w, RC32GF182K, spec MIL-R-11.	V805 Thru V808 Bias Supply Fig. 6-36
R916		Same as R874.	PLATE LOAD for V802 Fig. 6-36
R917		Same as R874	Plate Load for V802 Fig. 6-36
R918		Same as R831.	Plate Load for V802 Fig. 6-36
R919		Same as R831.	Plate Load for V802 Fig. 6-36
R920 thru R924		Not Used.	
R925		RESISTOR, FIXED, COMPOSITION: 510 ohms ±5%, ½ w, RC20GF511J, spec MIL-R-11.	Emitter Current Limiting Q801 Fig. 6-36
R926 thru R999		Not Used.	

MOUNTING, VIBRATION AND SHOCK MT-2170/WRT

MP1101		SPRING, HELICAL, COMPRESSION: Stainless steel, 2.13 in. free height, 1.40 in. dia, mfr 51116, dwg S173.	Shockmount Fig. 5-29
MP1102		PAD, SHOCKMOUNT: Stainless steel, knitted wire, 1.85 in. free height, 1.10 in. dia, mfr 51116, dwg MC646.	Shockmount and Damping Fig. 5-29
MP1103		PAD, SHOCKMOUNT: Stainless steel, knitted wire, 0.50 in. free height, 2.42 in. od, 1.25 in. id, mfr 51116, dwg MP643.	Shockmount and Damping Fig. 5-29
MP1104		PAD, SHOCKMOUNT: Stainless steel knitted wire, 0.40 in. free height, 2.88 in. od, 1.25 in. id, mfr 51116, dwg MP642.	Shockmount and Damping Fig. 5-29
MP1105		BOLT: Steel, ½-13 thds, hex head, 0.73 in. across flats, 0.75 in. lg, mfr 51116, dwg H1157-21.	Secures Parts Fig. 5-29
MP1106		WASHER, FLAT: Stainless steel, 2.06 in. od, 0.516 in. id, 0.188 in. thk, mfr 51116, dwg STD1306-267.	Thrust Washer Fig. 5-29
MP1107		WASHER, FLAT: Stainless steel, 2.06 in. od, 1.172 in. id, 0.062 in. thk, mfr 51116, dwg STD1306-269.	Thrust Washer Fig. 5-29
MP1108		BASEPLATE SUBASSEMBLY: Consists of an angle, limiter cup, stiffener, gusset, limiter support, cup, cushion cup and plate spot welded together, mfr 51116, dwg R14365-1.	Supports Shockmounts Fig. 5-29

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

MOUNTING, VIBRATION AND SHOCK MT-2170/WRT

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP1109		INTERMEDIATE BEAM SUBASSEMBLY: Consists of a side plate, cushion bracket and cushion cup spot welded together, mfr 51116, dwg R14367-1.	Supports Shockmounts Fig. 5-29
MP1110		TRAY SUBASSEMBLY: Consists of an insert, plate, stud, stiffener channel tie, cushion cup and tray beam spot welded together, mfr 51116, dwg R14371-1.	Supports Shockmounts Fig. 5-29
MP1111		PIN, SPRING: Carbon steel, 0.187 in. dia, 1.750 in. lg, mfr 51116, dwg H1006-45.	Retains Parts Fig. 5-29
MP1112		SPRING, HELICAL, COMPRESSION: Stainless steel, 1.62 in. free height, 1.30 in. dia, mfr 51116, dwg S175.	Shockmount Fig. 5-29
MP1113		SPRING ASSEMBLY: Covered vushion, stainless steel wire, 1.44 in. compressed length, mfr 51116, dwg MF648.	Shockmount Fig. 5-29
MP1114		SPRING, HELICAL, COMPRESSION: 2.20 in. free height, 1.40 in. dia, mfr 51116, dwg S174.	Shockmount Fig. 5-29
MP1115		PAD, SHOCKMOUNT: Stainless steel, 1.70 in. free height, 1.10 in. dia, mfr 51116, dwg MC647.	Shockmount and Damping Fig. 5-29
MP1116		PAD, SHOCKMOUNT: Stainless steel knitted wire, 1.00 in. free height, 2.38 in. od, 1.44 in. id, mfr 51116, dwg MP645.	Shockmount and Damping Fig. 5-29
MP1117		PAD, SHOCKMOUNT: Stainless steel knitted wire, 0.25 in. free height, 2.62 in. od, 1.13 in. id, mfr 51116, dwg MP644.	Shockmount and Damping Fig. 5-29
MP1118		SPRING, HELICAL, TORSION: Stainless steel wire, 0.81 in. lg, 0.38 in. w, 0.66 in. h, mfr 51116, dwg R14399-1.	Shockmount Fig. 5-29
MP1119		BOLT: ¾-10 thds, hex head, 0.73 in. across flats, 1 in. lg, mfr 51116, dwg H1157-22.	Retain Parts Fig. 5-29
MP1120		WASHER, SPECIAL: Stainless steel, 1.84 in. od, 0.765 in. id, 0.188 in. thk, mfr 51116, dwg STD1593-11.	Thrust Washer Fig. 5-29
MP1121		STUD SUBASSEMBLY: Consists of a stud and insert, stainless steel, mfr 51116, dwg R14392-1.	Retain Parts Fig. 5-29
MP1122		CAM, LOCK: Steel, 1.7 in. lg, 1.19 in. w, 0.88 in. h, mfr 51116, dwg R14400-1.	Secures Frame Fig. 5-29
MP1123		BASEPLATE SUBASSEMBLY: Consists of a drive screw, installation placard, 3 cups, 2 brackets, pedestal, baseplate, plate and spacer spot welded together, mfr 51116, dwg R14386-1.	Support Shockmounts Fig. 5-29
MP1124		INTERMEDIATE SUBASSEMBLY: Consists of a corner tab, plate, cup, limiter cup and intermediate beam spot welded together, mfr 51116, dwg R14382-1.	Support Shockmounts Fig. 5-29
MP1125		TRAY SUBASSEMBLY: Consists of inserts, topping blocks, cups, plates, spacer and tray spot welded together, mfr 51116, dwg R14378-1.	Support Shockmounts Fig. 5-29
MP1126 thru MP1199		Not Used.	

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

C1401		CAPACITOR, FIXED, PAPER DIELECTRIC: 100,000 μμf ±10%, 400 v dc working, CP09A1KE104K, spec MIL-C-25.	DC Blocking V451A Fig. 6-50
C1402		CAPACITOR, FIXED, MICA DIELECTRIC: 390 μμf ±5%, 500 v dc working, CM20C391J, spec MIL-C-5. Same as C684.	DC Blocking V451B Fig. 6-50
C1403		CAPACITOR, FIXED, PAPER DIELECTRIC: 2 section, 500,000 μμf ±20% ea section, 600 v dc working, CP91B6EF504V, spec MIL-C-25.	First Audio Amp Plate Supply Filter Fig. 6-50
C1403A		Part of C1403. Listed for reference only.	Decoupling V451
C1403B		Part of C1403. Listed for reference only.	DC Blocking V542A
C1404		CAPACITOR, FIXED; MICA DIELECTRIC: 4700 μμf ±10%, 500 v dc working, CM35B472K, spec MIL-C-5. Same as C303.	Coupling Between V1401B and V1402A Fig. 6-50
C1405		Same as C1404.	DC Blocking V543A Fig. 6-50

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E1401		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 337C146G02.	Component Mtg in Speech Amplifier Fig. 6-50
E1402		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 337C147G02.	Component Mtg in Speech Amplifier Fig. 6-50
E1403		BOARD, COMPONENT MOUNTING: Micarta board, 26 solder stud terminals, mfr 89661, dwg 337C148G02.	Component Mtg in Speech Amplifier Fig. 6-50
E1404		BOARD, COMPONENT MOUNTING: Micarta board, 16 solder stud terminals, mfr 89661, dwg 337C149G02.	Component Mtg in Speech Amplifier Fig. 6-50
E1405		INSULATOR: Micarta, 3.19 lg, 0.50 in. w, 0.25 in. thk, 4 holes, 2 counter bored ea side, mfr 89661, dwg 232B106H01.	Standoff
E1406		Same as E1405.	Standoff
E1407		Same as E1405.	Standoff
E1408		Same as E891.	Standoff
E1409		Same as E1408.	Standoff
E1410		Same as E1408.	Standoff
E1411		Same as E1408.	Standoff
E1412		Same as E1408.	Standoff
E1413		Same as E1408.	Standoff
E1414		Same as E1408.	Standoff
E1415		Same as E517.	Standoff
E1416		Same as E891.	Standoff
E1417 thru E1499		Not Used.	
FL1401		FILTER, HIGH PASS: 1.5 db max from 300 cps to 100 kc, 50 db min attenuation at 100 cps, mfr 89661, dwg 152A663H01.	High Pass Filter 300 Cps Cutoff Fig. 6-50
FL1402		FILTER, LOW PASS: 1.5 db max at 3500 cps, 50 db min attenuation at 5000 cps, mfr 89661, dwg 152A662H01.	Low Pass Filter 3500 Cps Cutoff Fig. 6-50
FL1403 thru FL1499		Not Used.	
L1401		COIL, RADIO FREQUENCY: 820 μh ±10%, minimum q of 40, self resonant at 1.8 mc, LT7K226, dwg MS16223.	RF Choke Grid Circuit of V541A Fig. 6-50
L1402		Same as L1401.	RF Choke in Plate Circuit of V543A Fig. 6-50
L1403 thru L1499		Not Used.	
P1401		CONNECTOR, PLUG, ELECTRICAL: Straight 5 male contacts, 22 amp, MS3106B-14S-5P.	Handset Plug
P1402 thru P1499		Not Used.	
R1401		RESISTOR, VARIABLE, COMPOSITION: 5000 ohms ±10%, 2 w, mfr 89661, dwg 54B7110H07.	K509 Adjust Fig. 6-50
R1402		Same as R711.	Audio Input Fig. 6-50
R1403		Same as R678.	Plate Load V541A Fig. 6-50
R1404		Same as R348.	Grid V541B Fig. 6-50
R1405		Same as R367.	Plate Decoupling V541B Fig. 6-50
R1406		RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, 1 w, RC32GF223K, spec MIL-R-11.	Plate V541B Fig. 6-50
R1407		Same as R709.	Cathode V541B Fig. 6-50
R1408		Same as R669.	Cathode V541B Fig. 6-50

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

AMPLIFIER-POWER SUPPLY AM-2198/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R1446		Same as R1436.	Plate V544B Fig. 6-50
R1447		RESISTOR, FIXED, COMPOSITION: 270 ohms ±10%, ½ w, RC20GF271K, spec MIL-R-11.	Cathode V544B Fig. 6-50
R1448		Same as R1427.	Squelch Filter Fig. 6-50
R1449		Same as R1435.	Squelch Filter Fig. 6-50
R1450		RESISTOR, VARIABLE, COMPOSITION: 500,000 ohms ±10%, 2 w, RV4NAYSD504A, spec MIL-R-94.	Clipping Level Adjust Fig. 6-50
R1451		RESISTOR, VARIABLE, COMPOSITION: 500,000 ohms ±10%, 2 w, RV4NAYSG504A, spec MIL-R-94.	Modulation Level Adjust Fig. 6-50
R1452 thru R1499		Not Used.	
S1401		SWITCH, ROTARY: 2 position, 2 pole, 1 section, non-shorting contacts, mfr 89661, dwg 335C923H02.	Clipping (In-Out) Fig. 6-50
S1402		Part of R1431. Listed for reference only.	Squelch On-Off Fig. 6-50
S1403		Part of R1401. Listed for reference only.	AGC ON-Off Fig. 6-50
S1404 thru S1499		Not Used.	
T1401		TRANSFORMER, AUDIO FREQUENCY: 2 primaries, one tapped at 366 turns, 1 secondary 5000 ohms, mfr 89661, dwg 52C2104-1-1.	Sidetone Audio Input Output Fig. 6-50
T1402		Same as T1401.	Sidetone Audio Input Output Fig. 6-50
T1403 thru T1499		Not Used.	
TB1401		TERMINAL BOARD: Barrier type, phenolic board, 14 double screw type terminals, mfr 89661, dwg 237B235G01.	Wire Termination Fig. 6-49
TB1402 thru TB1499		Not Used.	
V1401		ELECTRON TUBE: Miniature twin triode receiving, 12AT7WA, spec MIL-E-1. Same as V302.	Fig. 3-8
V1401A		Part of V1401. Listed for reference only.	AGC Control
V1401B		Part of V1401. Listed for reference only.	First Audio Amplifier
V1402		Same as V1401.	Fig. 3-8
V1402A		Part of V1402. Listed for reference only.	Second Audio Amplifier
V1402B		Part of V1402. Listed for reference only.	AGC Amplifier
V1403		Same as V1401.	Fig. 3-8
V1403A		Part of V1403. Listed for reference only.	Audio Output Amplifier
V1403B		Part of V1403. Listed for reference only.	Sidetone Amplifier
V1404		Same as V1401.	Fig. 3-8
V1404A		Part of V1404. Listed for reference only.	Squelch Oscillator
V1404B		Part of V1404. Listed for reference only.	Buffer Amplifier
V1405 thru V1499		Not Used.	
XV1401		SOCKET, ELECTRON TUBE: 9 contact miniature, plastic body, provisions for mtg layout type electron tube shield, TS103P01, spec JAN-S-28. Same as XV302.	For V1401 Fig. 6-50
XV1402		Same as XV1401.	For V1402 Fig. 6-50
XV1403		Same as XV1401.	For V1403 Fig. 6-50
XV1404		Same as XV1401.	For V1404 Fig. 6-50
XV1405 thru XV1499		Not Used.	

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

TUNER, RADIO FREQUENCY TN-345/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E3316		INSULATOR, WASHER: Laminated plastic material, mfr 04677, dwg 2010892.	Part of S3306 Centrifugal Switch Fig. 5-27
E3317		Same as E3316.	Part of S3306 Centrifugal Switch Fig. 5-27
E3318		Same as E3316.	Part of S3306 Centrifugal Switch
E3319		Same as E3316.	Part of S3306 Centrifugal Switch
E3320		Same as E3316.	Part of S3306 Centrifugal Switch
E3321		Same as E3316.	Part of S3306 Centrifugal Switch
E3322		INSULATOR, WASHER: Shoulder laminated plastic material, mfr 04677, dwg 2010893.	Part of S3306 Centrifugal Switch
E3323		Same as E3322.	Part of S3306 Centrifugal Switch
E3324		Same as E3322.	Part of S3306 Centrifugal Switch
E3325		Same as E3322.	Part of S3306 Centrifugal Switch
E3326		Same as E3322	Part of S3360 Centrifugal Switch
E3327		Same as E3322.	Part of S3306 Centrifugal Switch
E3328 thru E3399		Not Used.	
J3301		CONNECTOR, RECEPTACLE, ELECTRICAL: 6 size 12 contacts, 24 size 16 contacts, male round, polarized, hermetically sealed, mfr 91577, type BFH32-8P002A101.	Connects Control Cable Fig. 5-26
J3302		CONNECTOR, RECEPTACLE, ELECTRICAL: Special construction, UG-271/U and UG-287/U modified, mfr 04677, dwg 2010916.	RF Input Connector Fig. 5-26
J3303 thru J3399		Not Used.	
K3301		RELAY, ARMATURE: DPDT, dc coil data −24 v, 0.146 amps, 275 ohms, mfr 04677, dwg 2012033.	Top and Bottom Limit Fig. 6-52
K2203 thru K3399		Not Used.	
L3301		COIL: Special construction, varying dia helix, 1 turn, 0.144 in. od copper wire silver plated, mfr 04677, dwg 2012020.	Coupling Coil Fig. 5-27
L3302		COIL ASSEMBLY: Special construction, 16 in. winding length, wound with 0.064 in. od silver clad copper wire on fiberglass 5⅝ in. dia coil at 10 T.P.I., mfr 04677, dwg 2012019-1.	Main Coil Fig. 5-27
L3303		COIL, ACTUATOR: Part of B3303. Listed for reference only.	Solenoid Coil Fig. 5-27
L3304		COIL, MAGNET: Part of MP3301. Listed for reference only.	Magnet Coil for 2 Speed Drive
L3305 thru L3399		Not Used.	
M3301		GAUGE, PRESSURE: Gas, dial and pointer type, 0 to 30 psi, brass case, ⅝ in. lg pipe with ⅛ in. pipe thd ⅜ in. lg, mfr 04677, dwg 2010896.	Pressure Gauge Fig. 5-26
M3302 thru M3399		Not Used.	
MP3301		DRIVE ASSEMBLY: 2 speed, 8.4 to 1, 1 to 1, mfr 04677, dwg 2012230.	Tuning Drive Fig. 5-27

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—C ntinued

TUNER, RADIO FREQUENCY TN-345/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP3337		ROLLER: Stainless steel materials mfr 04677, dwg 2010645.	Rack Gear Roller Fig. 5-27
MP3338		Same as MP3337.	Rack Gear Roller Fig. 5-27
MP3339		GEAR, RACK: Steel material, mfr 04677, dwg 2010685.	Shorting Ring Drive Fig. 5-27
MP3340		GEAR, RACK: Steel material, mfr 04677, dwg 2010686.	Shorting Ring Drive Fig. 5-27
MP3341		VALVE, RELIEF: 30 ±5 psi working pressure, 1/8 in. male pipe thd, mfr 43990, type 6010.	Pressure Relief Vavle Fig. 5-26
MP3342		VALAVE, AIR: Change valve for nitrogen, brass, nickel plated, includes done cap, mfr 01202, type 1468A8.	Air Valve Fig. 5-26
MP3343		RING, RETAINING: External type, stainless steel, type NAS670-31.	Secures Rod Extension to Housing Bearing Unit Fig. 5-27
MP3344		Same as MP3343.	Secures Rod Extension to Housing Bearing Unit Fig. 5-27
MP3345		Same as MP3343.	Secures Rod Rxtension to Housing Bearing Unit Fig. 5-27
MP3346		RING, RETAINING: External type stainless steel, type NAS670-25.	Used on Shockmount Bracket Shafts Fig. 5-26
MP3347		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3348		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3349		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3350		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3351		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3352		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3353		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3354		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3355		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3356		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3357		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3358		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3359		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3360		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3361		Same as MP3346.	Used on Shockmount Bracket Shafts
MP3362		RING, RETAINING: Internal type, stainless steel, type NAS50-75.	Used With MP3337 Fig. 5-27
MP3363		BALL, NYLON: 1/4 in. od ball with 0.0635 hole drilled thru center, mfr 04677, 2010894.	Part of S3306 Centrifugal Switch Fig. 5-27
MP3364		SHAFT AND WEIGHT PLATE ASSEMBLY: C/O shaft, base and 2 weight plates assembled with rivets, mfr 04677, dwg 2012012.	Part of S3306 Centrifugal Switch Fig. 5-27

TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—C ntinued

COUPLER, ANTENNA CU-760/WRT-1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
A3501		MOUNT, VIBRATION: Round mtg, 40-65 lb load rating, 3 in. sq by 1½ in. h o/a, natural rubber cushion, mild steel case, mfr 81860, type 2060T6. Same as A3301.	Shock Mount for Antenna Coupler Fig. 5-28
A3502		Same as A3501.	Shockmount for Antenna Coupler Fig. 5-28
A3503		Same as A3501.	Shockmount for Antenna Coupler Fig. 5-28
A5304		Same as A3501.	Shockmount for Antenna Coupler Antenna Coupler Fig. 5-28
A3505 thru A3599		Not Used.	
B3501		MOTOR BLOWER: Motor integral, 115 v, 60 cycles, ccw rotation ambient temp range −28 deg. to +120 deg. C, mfr 04677, dwg 2012738.	Blower Fig. 6-53
B3502 thru B3599		Not Used.	
E3501		TERMINAL, FEEDTHRU: Insulated teflon body, cap, center conductor ring and two O-rings, mfr 04677, dwg 2012713.	R.F. Output to Antenna Fig. 6-53
E3502		TERMINAL, FEEDTHRU: Insulated teflon body, cap, center conductor retaining ring and two O-rings, mfr 04677, dwg 2012758.	R.F. Input from Tuner Fig. 6-53
E3503		STRAP, CONDUCTOR: 0.012 brass strip ¾ in. w, silver plated, mfr 04677, dwg 2011473-1.	Ground Strap
E3504		CONTACT, ELECTRICAL: 0.010 beryllium copper material silver plated, 2 welded contact points, mfr 04677, dwg 2010890. Same as E3313.	Part of S3501 Centrifugal Switch
E3505		CONTACT, ELECTRICAL: 0.015 beryllium copper material silver plated, 1 welded contact point, mfr 04677, dwg 2010891. Same as E3314.	Port of S3501 Centrifugal Switch
E3506		CONTACT, ELECTRICAL: 0.015 beryllium copper material silver plated, 1 welded contact point, mfr 04677, dwg 2010889. Same as E3315.	Part of S3501 Centrifugal Switch
E3507		INSULATOR, WASHER: Laminated plastic material, mfr 04677, dwg 2010892. Same as E3316.	Part of S3501 Centrifugal Switch
E3508		Same as E3507.	Part of S3501 Centrifugal Switch
E3509		Same as E3507.	Part of S3501 Centrifugal Switch
E3510		Same as E3507.	Part of S3501 Centrifugal Switch
E3511		Same as E3507.	Part of S3501 Centrifugal Switch
E3512		Same as E3507.	Part of S3501 Centrifugal Switch
E3513		INSULATOR, WASHER: Shoulder laminated plastic material, mfr 04677, dwg 2010893. Same as E3322.	Part of S3501 Centrifugal Switch
E3514		Same as E3513.	Part of S3501 Centrifugal Switch
E3515		Same as E3513.	Part of S3501 Centrifugal Switch
E3516		Same as E3513.	Part of S3501 Centrifugal Switch
E3517		Same as E3513.	Part of S3501 Centrifugal Switch
F3518		Same as E3513.	Part of S3501 Centrifugal Switch

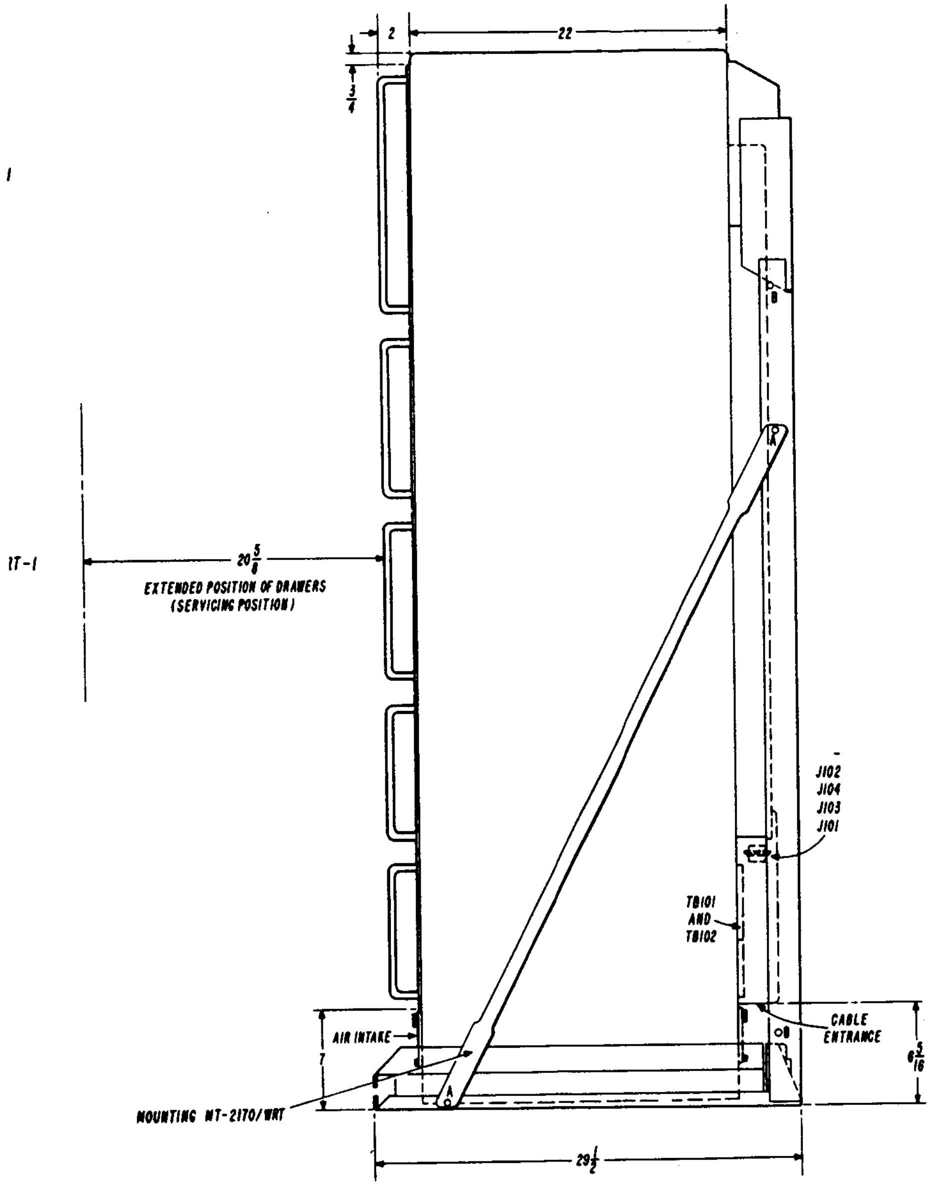
TABLE 7-1. RADIO TRANSMITTING SET AN/WRT-1 MAINTENANCE PARTS LIST—Continued

COUPLER, ANTENNA CU-760/WRT-1

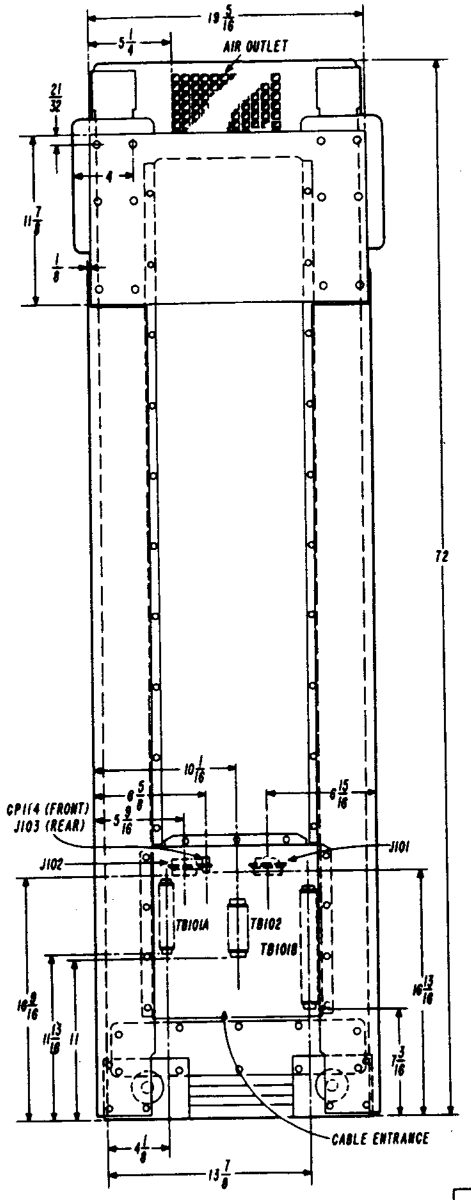
REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
P3504 thru P3599		Not Used.	
S3501		SWITCH ASSEMBLY: Centrifugal type, c/o E3504, E3505, E3506, E3507, MP3508, and MP3509. Listed for reference only.	Blower and Protective Switch Fig. 6-53
S3502 thru S3599		Not Used.	
TB3501		TERMINAL BOARD: Barrier type, 14 terminals, thermosetting plastic terminals and screws brass, nickel plated, mfr 75173, type 14-140D. Ssme as TB3301.	Terminal Strip Fig. 6-53
TB3502 thru TB3599		Not Used.	

INDEX

INDEX—Continued



RIGHT SIDE VIEW



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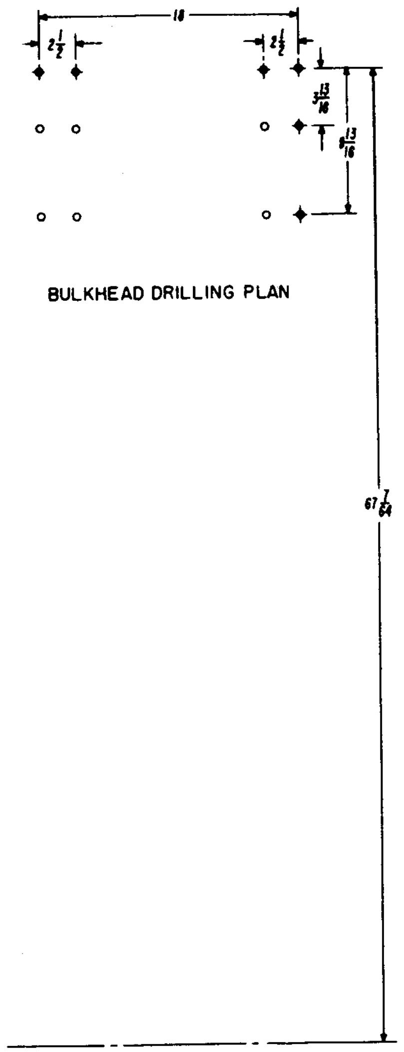
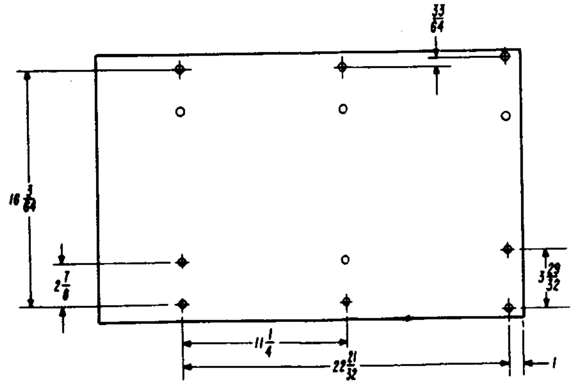
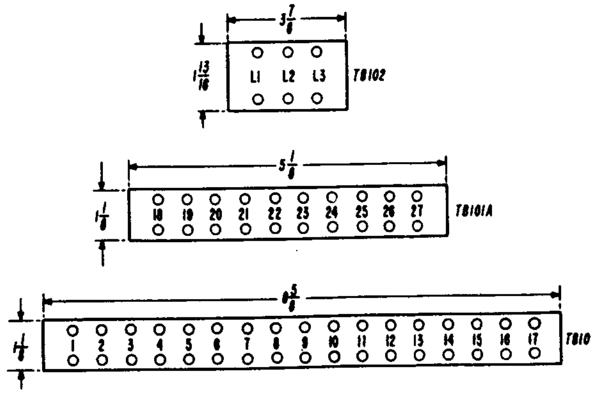


BULKHEAD DRILLING PLAN



DECK DRILLING PLAN



TERMINAL BOARD DETAILS

RECOMMENDED INSTALLATION PROCEDURE

A. IT IS RECOMMENDED THAT MOUNTING SYSTEM BE COMPLETELY ASSEMBLED AND INSTALLED IN SHIP PRIOR TO TRANSMITTER INSTALLATION.

B. BEGIN MOUNTING SYSTEM ASSEMBLY BY LAYING BASE MOUNT ON DECK. ATTACH SPACER CHANNELS TO REAR OF BASE MOUNT USING 1/4 INCH BOLTS PROVIDED. NOTE THAT FLANGES FACE TOWARD FRONT OF MOUNT.

C. ATTACH STABILIZER TO UPPER END OF SPACER CHANNELS USING 1/4 INCH BOLTS PROVIDED.

D. ALIGNMENT RODS ARE NOW TEMPORARILY INSTALLED AS DIAGONAL BRACE BETWEEN SPACER CHANNELS AND BASE MOUNT. ONE END OF ALIGNMENT ROD ATTACHES TO HOLE "A" IN OUTER FLANGE OF LOWER PORTION OF BASE, OTHER END OF ALIGNMENT ROD ATTACHES TO HOLE "A" IN OUTER FLANGE OF SPACER CHANNELS USING 1/4 INCH BOLTS PROVIDED.

E. MOUNTING SYSTEM IS NOW READY TO BE INSTALLED IN SHIP. SLIDE MOUNTING SYSTEM ASSEMBLY INTO POSITION MAKING SURE THAT REAR FACE OF STABILIZER IS IN CONTACT WITH FLAT ATTACHMENT SURFACE ON BULKHEAD. NOTE: BULKHEAD MUST OFFER FLAT UNBROKEN SURFACE FOR ATTACHMENT OF STABILIZER. IF THIS CONDITION DOES NOT EXIST, A 3/8 INCH MINIMUM THICKNESS STEEL PLATE 20 INCHES WIDE BY 12 INCHES HIGH (MINIMUM DIMENSIONS) MUST BE WELDED TO BULKHEAD AND ADEQUATELY SUPPORTED TO SERVE AS MOUNTING SURFACE. SHIMS MUST BE USED IN THE EVENT THE REAR FACE OF THE STABILIZER IS NOT FLUSH WITHIN 1/32 INCH WITH THE BULKHEAD. DO NOT ATTEMPT TO CLOSE UP ANY GAPS BY EXCESSIVE TIGHTENING OF ATTACHMENT BOLTS.

F. TWELVE (12) CLEARANCE HOLES (33/64 INCH DIA.) FOR 1/2 INCH DIAMETER ATTACHMENT BOLTS ARE NOW DRILLED IN DECK USING BASE MOUNT AS DRILL TEMPLATE. DO NOT WELD BASE TO DECK. ALL TWELVE (12) MOUNTING POINTS MUST BE USED. IF DECK IS MINIMUM OF 1/2 INCH THICK STEEL, HOLES MAY BE TAPPED. THINNER DECK PLATES REQUIRE USE OF NUTS AND WASHERS ON UNDERSIDE OF DECK.

G. TWELVE (12) CLEARANCE HOLES (.386 DIA.–W DRILL) FOR 3/8 INCH ATTACHMENT BOLTS ARE NOW DRILLED IN BULKHEAD PLATE USING STABILIZER AS DRILL TEMPLATE. DO NOT WELD STABILIZER TO BULKHEAD. ALL TWELVE (12) MOUNTING POINTS MUST BE USED. IF BULKHEAD IS MINIMUM OF 3/8 INCH THICK STEEL, HOLES MAY BE TAPPED. THINNER BULKHEAD PLATES REQUIRE USE OF NUTS AND WASHERS ON REAR FACE OF BULKHEAD.

H. CHECK TIGHTNESS OF ALL TWENTY-FOUR (24) ATTACHMENT BOLTS.

I. REMOVE ALIGNMENT RODS AND STORE BY BOLTING THEM TO THE INSIDE SURFACE OF THE SPACER CHANNELS USING HOLES "B".

J. THE TRANSMITTER MAY NOW BE INSTALLED AS FOLLOWS. (SEE TRANSMITTER INSTRUCTION MANUAL ALSO) SET CABINET IN PLACE ON MOUNT. FOUR (4) 1/2–13 UNC-2B TAPPED HOLES ARE PROVIDED IN THE BASE MOUNT FOR ATTACHMENT OF THE TRANSMITTER. IN ADDITION, THERE ARE SIXTEEN (16) 3/8–16 UNC-2B AND TWO (2) 3/4–10 UNC-2B TAPPED HOLES PROVIDED IN THE STABILIZER. ALL HOLES MUST BE USED. REQUIRED BOLT LENGTHS ARE AS FOLLOWS:
1/2 INCH DIAMETER BOLTS - 1 INCH TO 1 1/4 INCH LONG, THREADED TO WITHIN 3/8 INCH OF HEAD (4 REQUIRED)-USE FLAT WASHER UNDER HEAD.
3/4 INCH DIAMETER BOLTS - 1 1/4 INCH TO 1 1/2 INCH LONG, THREADED TO WITHIN 3/8 INCH OF HEAD (2 REQUIRED)-USE FLAT WASHER UNDER HEAD.
3/8 INCH DIAMETER BOLTS-1 3/8 INCH TO 1 7/8 INCH LONG, THREADED TO WITHIN 3/4 INCH OF HEAD (16 REQUIRED)-USE 9/32 INCH THICK SPACER WASHER UNDER HEAD.
NOTE: STABILIZER IS EQUIPPED WITH LOCKOUT TO FACILITATE INSTALLATION. LOCKOUT IS AUTOMATICALLY DISENGAGED WHEN PROPER LENGTH BOLTS ARE INSTALLED.

K. WHEN TRANSMITTER HAS BEEN COMPLETELY INSTALLED, CHECK TO MAKE SURE LOCKOUT HAS BEEN DISENGAGED AND TRANSMITTER IS FREELY SUPPORTED BY MOUNTS.

L. THE TRANSMITTER SHOULD BE MOUNTED TO DECK IN SUCH A MANNER THAT THE BOTTOM OF THE MOUNTING IS SUPPORTED OVER ITS ENTIRE SURFACE. IF THE TRANSMITTER IS TO BE MOUNTED, UP FROM THE DECK, ON ANGLES, CHANNELS ETC., A 1/2 INCH STEEL BED PLATE SHOULD BE PROVIDED AS A MOUNTING SURFACE. DRILLING ON THE BED SHOULD BE PERFORMED IN ACCORDANCE WITH THE "DECK DRILLING PLAN" SHOWN.

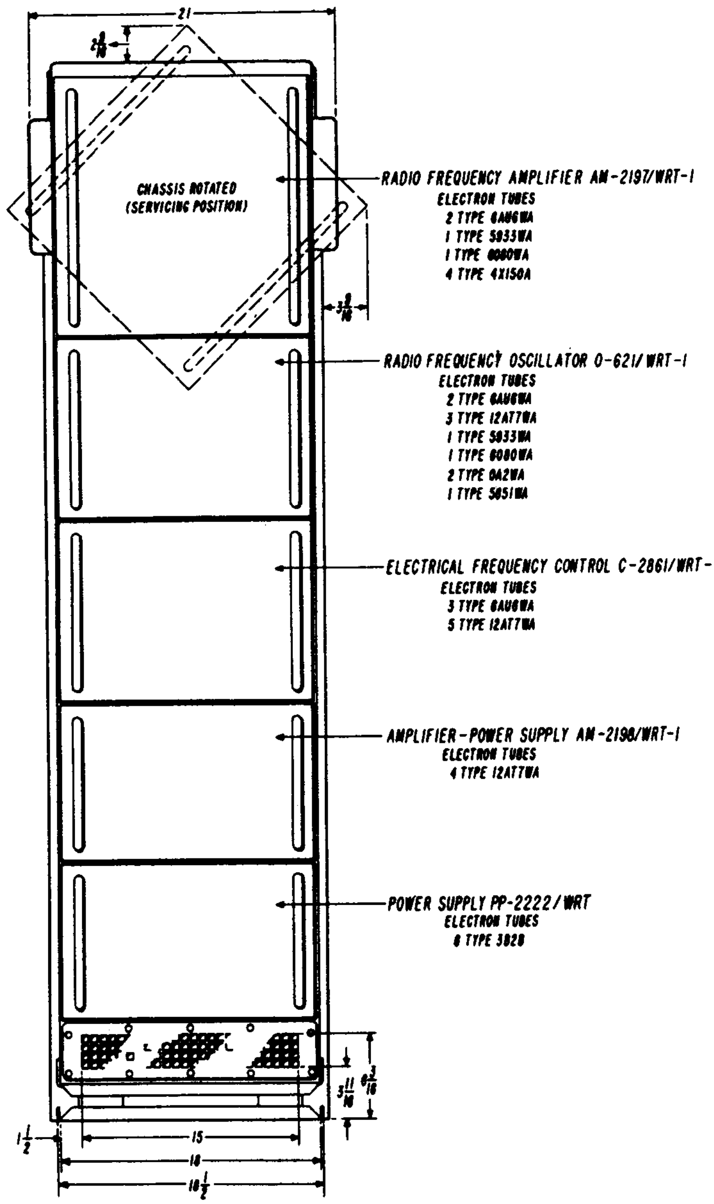
NOTES

1.

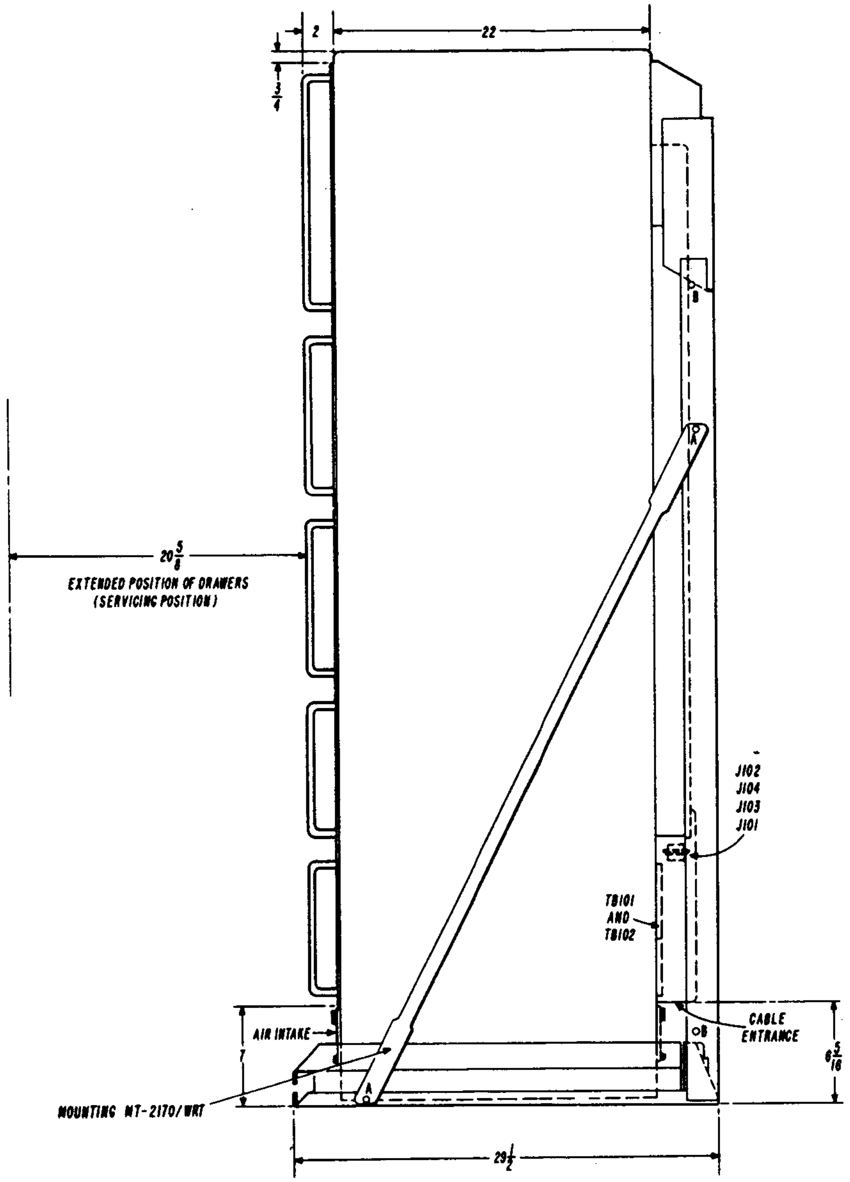
WEIGHT OF UNIT CRATED	1130 LBS.
WEIGHT OF UNIT UNCRATED	930 LBS. WITHOUT MOUNT (SEE NOTE 6)
OVERALL DIMENSIONS CRATED (EST.)	33 X 23 1/2 X 78 1/2
CUBIC CONTENT CRATED (EST.)	35.3 CU. FT.
POWER INPUT	440/220/115, 3 PHASE, 60 CPS, 3 KVA
HEAT DISSIPATION (EST.)	2000 WATTS
AMBIENT TEMPERATURE RANGE	0°C TO 50°C (OPERATING) (32°F TO 122°F)
RELATIVE HUMIDITY RANGE	30 TO 95%

2. ALLOW 1/2 INCH MINIMUM CLEARANCE ON ALL SIDES, BACK, AND TOP OF TRANSMITTER FRAME FOR SHOCKMOUNT DEFLECTION.
3. THE DISTRIBUTION AND SIZE OF CABLE ENTRANCE HOLES IS DETERMINED BY THE INSTALLING ACTIVITY. STUFFING TUBES CAN NOT BE USED.
4. ALL DIMENSIONS ARE IN INCHES.
5. ULTIMATE DISPLACEMENT OF INSTALLED EQUIPMENT IS .50 IN ALL DIRECTIONS FOR INSTALLATION CLEARANCE DETERMINATION.
6. THE WEIGHT OF THE COMPLETE MOUNTING SYSTEM IS 100 LBS. (EST.)
7. STRUCTURAL MEMBERS ARE STEEL; RESILIENT MEMBERS ARE STAINLESS STEEL.
8. EXTERNAL FINISH: STEEL-GRAY PAINT PER MIL-E-15090, CLASS 2 TYPE III. STAINLESS STEEL-PASSIVATE.

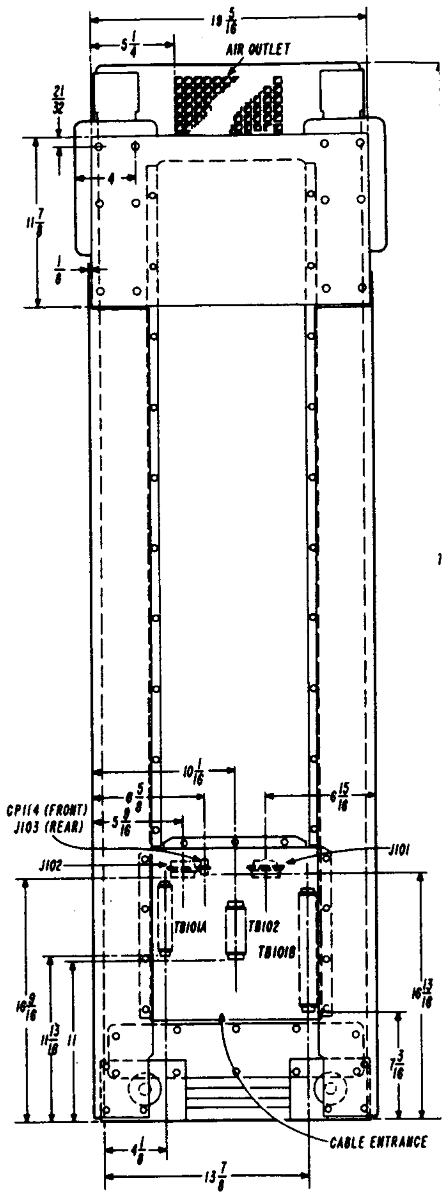
Figure 2-9. Transmitter Group OA-2321/WRT-1 and Mounting MT-2170/WRT, Outlin Drawing



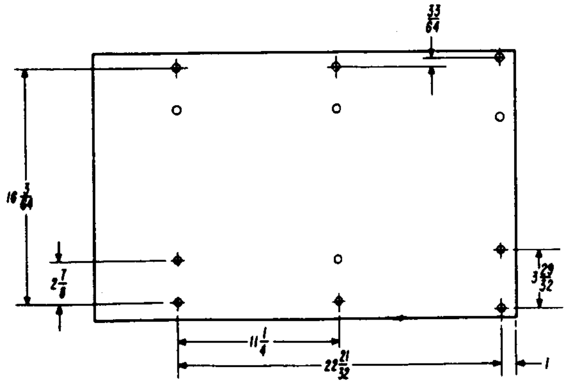
FRONT VIEW



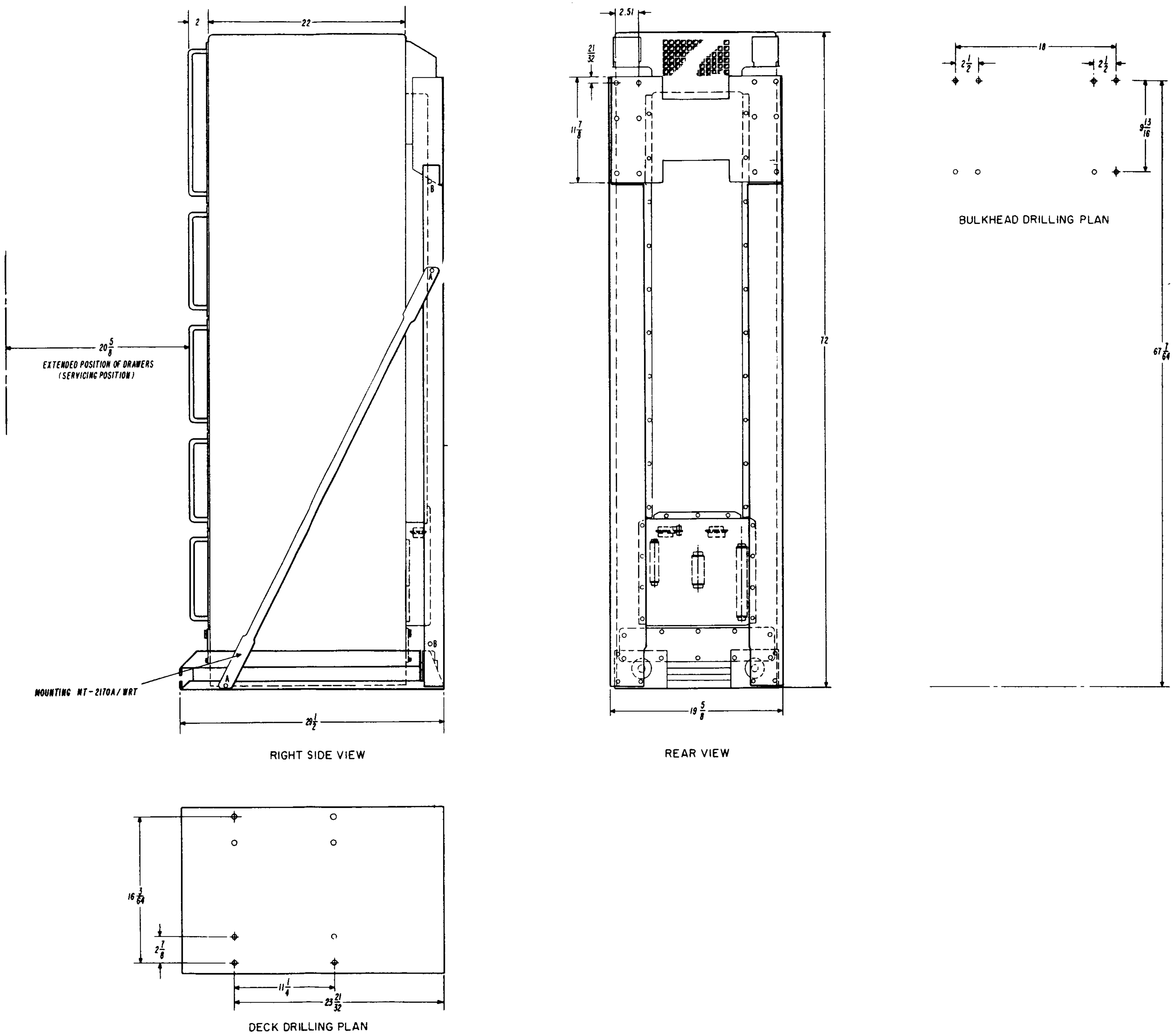
RIGHT SIDE VIEW



REAR VIEW



DECK DRILLING PLAN



RIGHT SIDE VIEW

REAR VIEW

BULKHEAD DRILLING PLAN

DECK DRILLING PLAN

RECOMMENDED INSTALLATION PROCEDURE

A. IT IS RECOMMENDED THAT MOUNTING SYSTEM BE COMPLETELY ASSEMBLED AND INSTALLED IN SHIP PRIOR TO TRANSMITTER INSTALLATION.

B. BEGIN MOUNTING SYSTEM ASSEMBLY BY LAYING BASE MOUNT ON DECK. ATTACH SPACER CHANNELS TO REAR OF BASE MOUNT USING 1/4 INCH BOLTS PROVIDED. NOTE THAT FLANGES FACE TOWARD FRONT OF MOUNT.

C. ATTACH STABILIZER TO UPPER END OF SPACER CHANNELS USING 1/4 INCH BOLTS PROVIDED.

D. ALIGNMENT RODS ARE NOW TEMPORARILY INSTALLED AS DIAGONAL BRACE BETWEEN SPACER CHANNELS AND BASE MOUNT. ONE END OF ALIGNMENT ROD ATTACHES TO HOLE "A" IN OUTER FLANGE OF LOWER PORTION OF BASE, OTHER END OF ALIGNMENT ROD ATTACHES TO HOLE "A" IN OUTER FLANGE OF SPACER CHANNELS USING 1/4 INCH BOLTS PROVIDED.

E. MOUNTING SYSTEM IS NOW READY TO BE INSTALLED IN SHIP. SLIDE MOUNTING SYSTEM ASSEMBLY INTO POSITION MAKING SURE THAT REAR FACE OF STABILIZER IS IN CONTACT WITH FLAT ATTACHMENT SURFACE ON BULKHEAD. NOTE: BULKHEAD MUST OFFER FLAT UNBROKEN SURFACE FOR ATTACHMENT OF STABILIZER. IF THIS CONDITION DOES NOT EXIST, A 3/8 INCH MINIMUM THICKNESS STEEL PLATE 20 INCHES WIDE BY 12 INCHES HIGH (MINIMUM DIMENSIONS) MUST BE WELDED TO BULKHEAD AND ADEQUATELY SUPPORTED TO SERVE AS MOUNTING SURFACE. SHIMS <u>MUST</u> BE USED IN THE EVENT THE REAR FACE OF THE STABILIZER IS NOT FLUSH WITHIN 1/32 INCH WITH THE BULKHEAD. DO NOT ATTEMPT TO CLOSE UP ANY GAPS BY EXCESSIVE TIGHTENING OF ATTACHMENT BOLTS.

F. EIGHT (8) CLEARANCE HOLES (33/64 INCH DIA.) FOR 1/2 INCH DIAMETER ATTACHMENT BOLTS ARE NOW DRILLED IN DECK USING BASE MOUNT AS DRILL TEMPLATE. <u>DO NOT WELD BASE TO DECK</u>. ALL EIGHT (8) MOUNTING POINTS MUST BE USED. IF DECK IS MINIMUM OF 1/2 INCH THICK STEEL, HOLES MAY BE TAPPED. THINNER DECK PLATES REQUIRE USE OF NUTS AND WASHERS ON UNDERSIDE OF DECK.

G. EIGHT (8) CLEARANCE HOLES (.386 DIA.–W DRILL) FOR 3/8 INCH ATTACHMENT BOLTS ARE NOW DRILLED IN BULKHEAD PLATE USING STABILIZER AS DRILL TEMPLATE. <u>DO NOT WELD STABILIZER TO BULKHEAD.</u> ALL EIGHT (8) MOUNTING POINTS MUST BE USED. IF BULKHEAD IS MINIMUM OF 3/8 INCH THICK STEEL, HOLES MAY BE TAPPED. THINNER BULKHEAD PLATES REQUIRE USE OF NUTS AND WASHERS ON REAR FACE OF BULKHEAD.

H. CHECK TIGHTNESS OF ALL SIXTEEN (16) ATTACHMENT BOLTS.

I. REMOVE ALIGNMENT RODS AND STORE BY BOLTING THEM TO THE INSIDE SURFACE OF THE SPACER CHANNELS USING HOLES "B."

J. THE TRANSMITTER MAY NOW BE INSTALLED AS FOLLOWS. (SEE TRANSMITTER INSTRUCTION MANUAL ALSO) SET CABINET IN PLACE ON MOUNT. FOUR (4) 1/2-13 UNC-2B TAPPED HOLES ARE PROVIDED IN THE BASE MOUNT FOR ATTACHMENT OF THE TRANSMITTER. IN ADDITION, THERE ARE EIGHT (8) 3/8-16 UNC-2B TAPPED HOLES PROVIDED IN THE STABILIZER. ALL HOLES MUST BE USED. REQUIRED BOLT LENGTHS ARE AS FOLLOWS:
1/2 INCH DIAMETER BOLTS - 1 INCH TO 1 1/4 INCH LONG, THREADED TO WITHIN 3/8 INCH OF HEAD (4 REQUIRED)-USE FLAT WASHER UNDER HEAD.

3/8 INCH DIAMETER BOLTS-13/8 INCH TO 17/8 INCH LONG, THREADED TO WITHIN 3/4 INCH OF HEAD (16 REQUIRED)-USE 9/32 INCH THICK SPACER WASHER UNDER HEAD.
NOTE: STABILIZER IS EQUIPPED WITH LOCKOUT TO FACILITATE INSTALLATION. LOCKOUT IS AUTOMATICALLY DISENGAGED WHEN PROPER LENGTH BOLTS ARE INSTALLED.

K. WHEN TRANSMITTER HAS BEEN COMPLETELY INSTALLED, CHECK TO MAKE SURE LOCKOUT HAS BEEN DISENGAGED AND TRANSMITTER IS FREELY SUPPORTED BY MOUNTS.

L. THE TRANSMITTER SHOULD BE MOUNTED TO DECK IN SUCH A MANNER THAT THE BOTTOM OF THE MOUNTING IS SUPPORTED OVER ITS ENTIRE SURFACE. IF THE TRANSMITTER IS TO BE MOUNTED, UP FROM THE DECK, ON ANGLES, CHANNELS ETC., A 1/2 INCH STEEL BED PLATE SHOULD BE PROVIDED AS A MOUNTING SURFACE. DRILLING ON THE BED SHOULD BE PERFORMED IN ACCORDANCE WITH THE "DECK DRILLING PLAN" SHOWN.

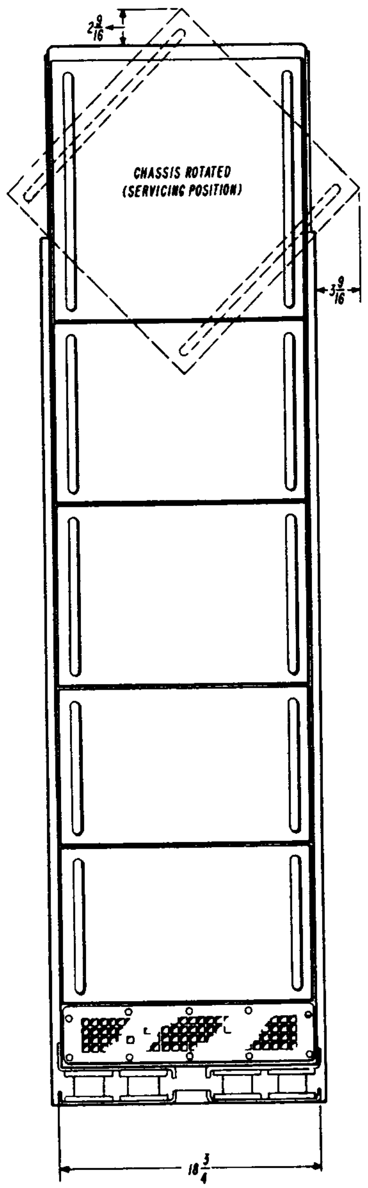
NOTES

1.

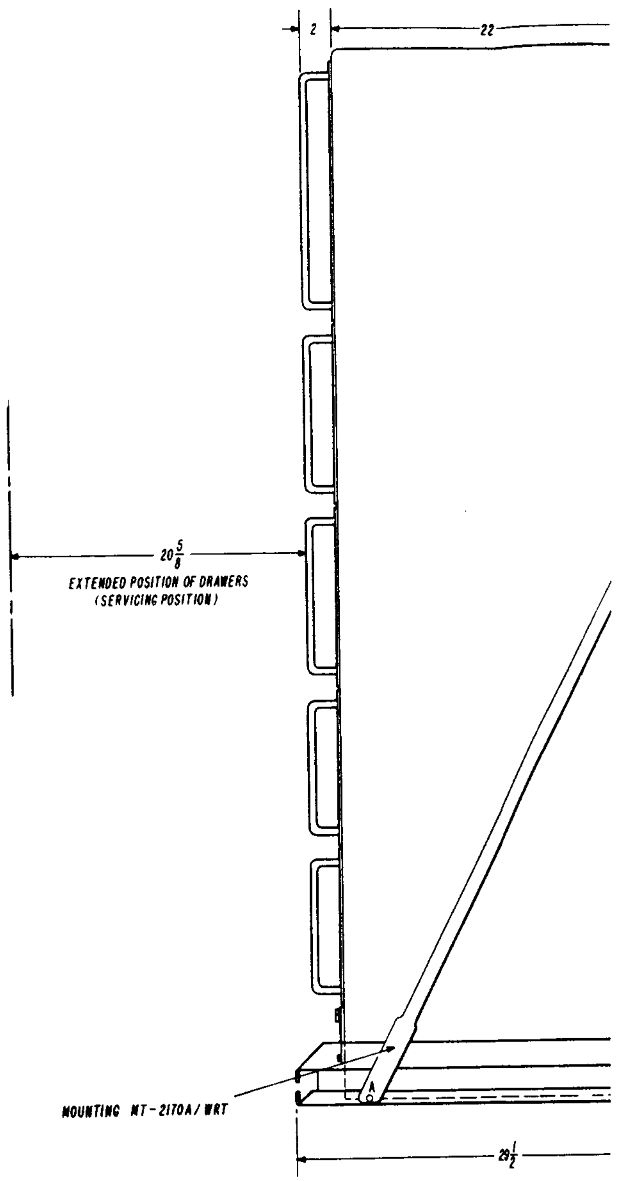
WEIGHT OF UNIT CRATED	154 LBS.
WEIGHT OF UNIT UNCRATED	100 LBS.
OVERALL DIMENSIONS CRATED (EST.)	3 CARTONS – 32 X 21 X 4, 21 X 15 X 5, 64 X 4 X 4
CUBIC CONTENT CRATED (EST.)	4.4 CU. FT.

2. ALLOW 1/2 INCH MINIMUM CLEARANCE ON ALL SIDES, BACK, AND TOP OF TRANSMITTER FRAME FOR SHOCKMOUNT DEFLECTION.
3. ALL DIMENSIONS ARE IN INCHES.

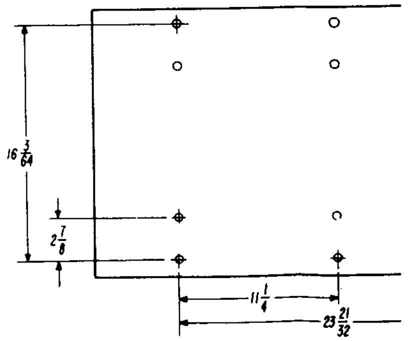
Figure 2-9A. Mounting MT-2170A/WRT, Installation Diagram



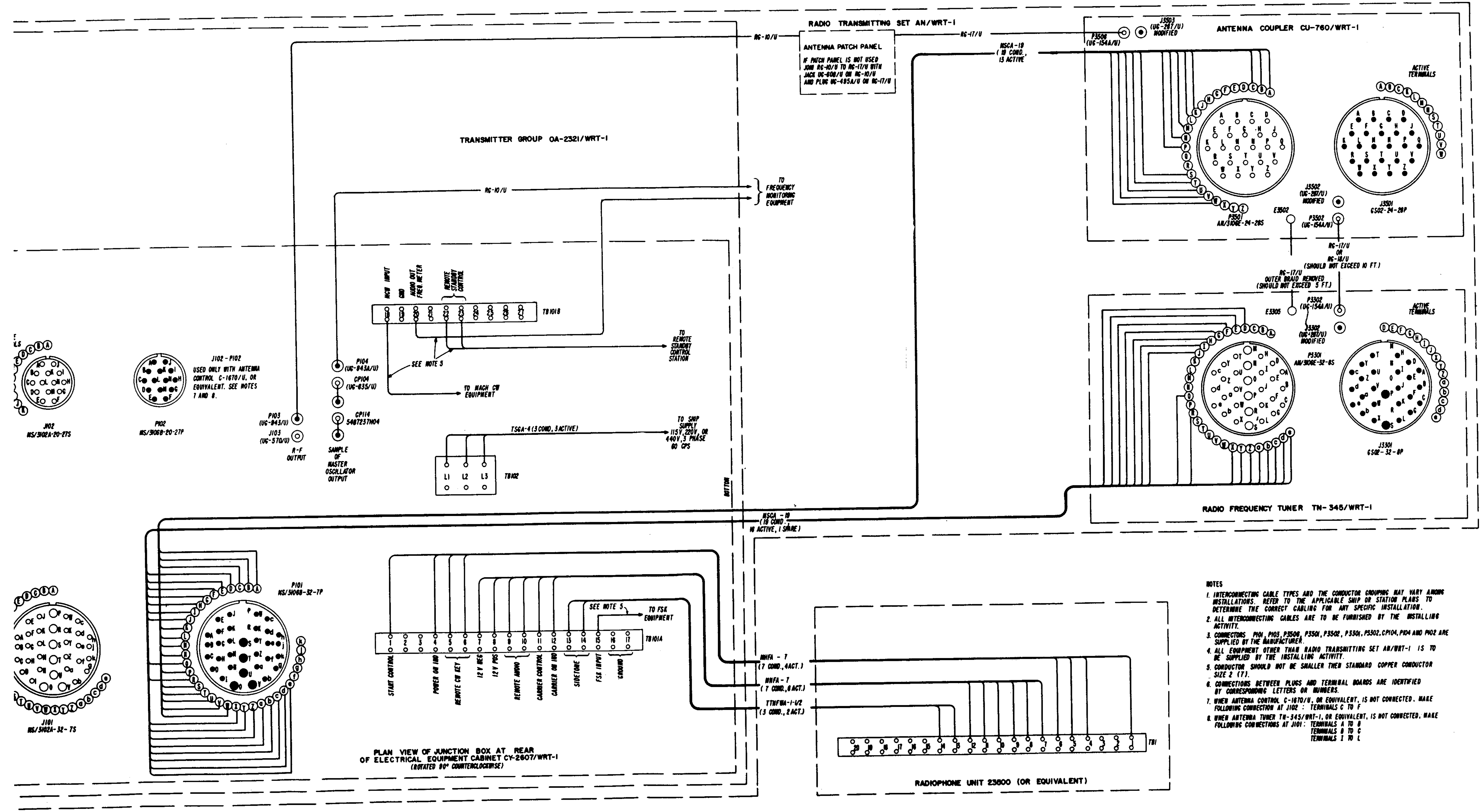
FRONT VIEW



RIGHT SIDE VIEW



DECK DRILLING PLAN



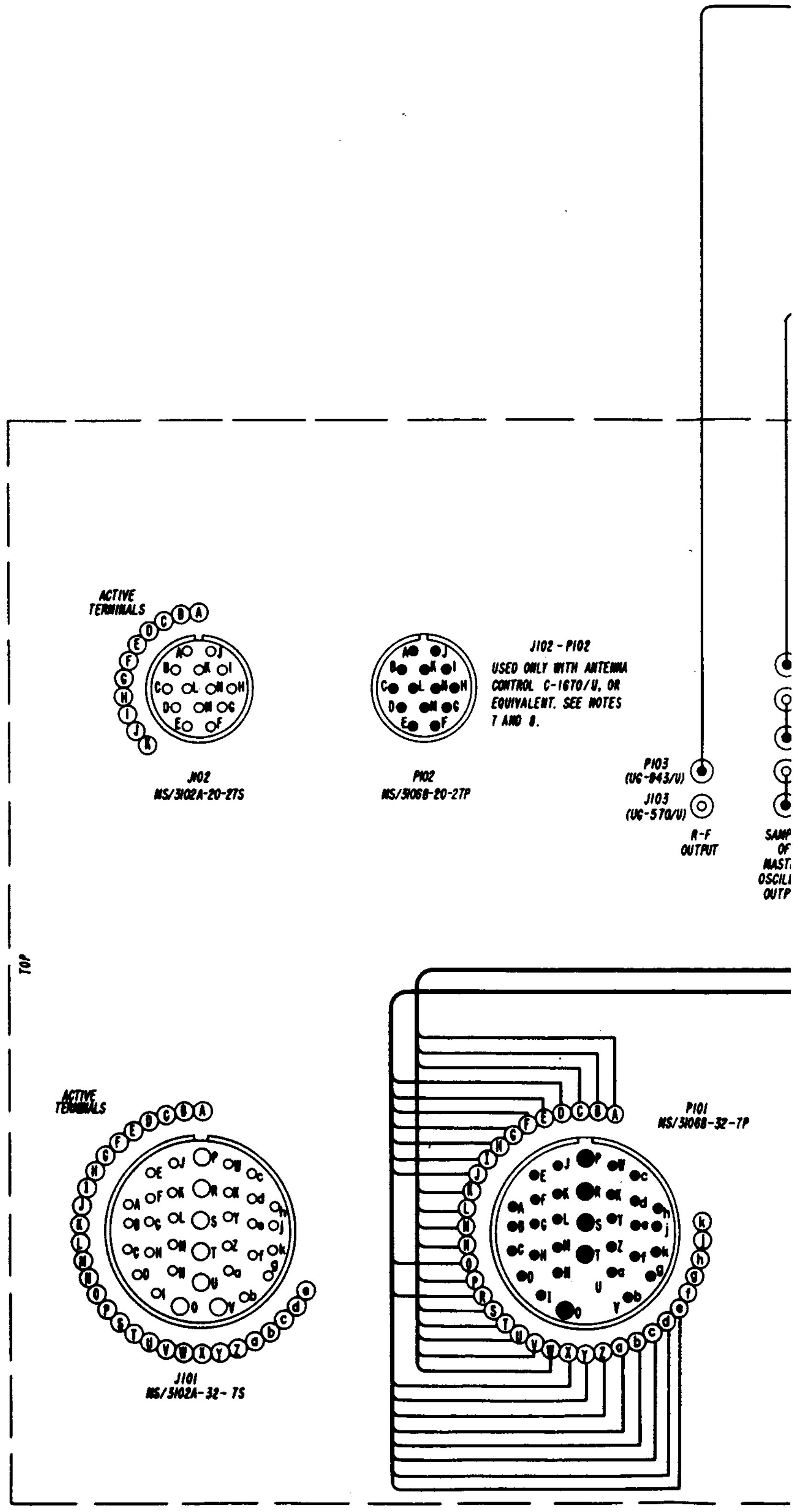
NOTES

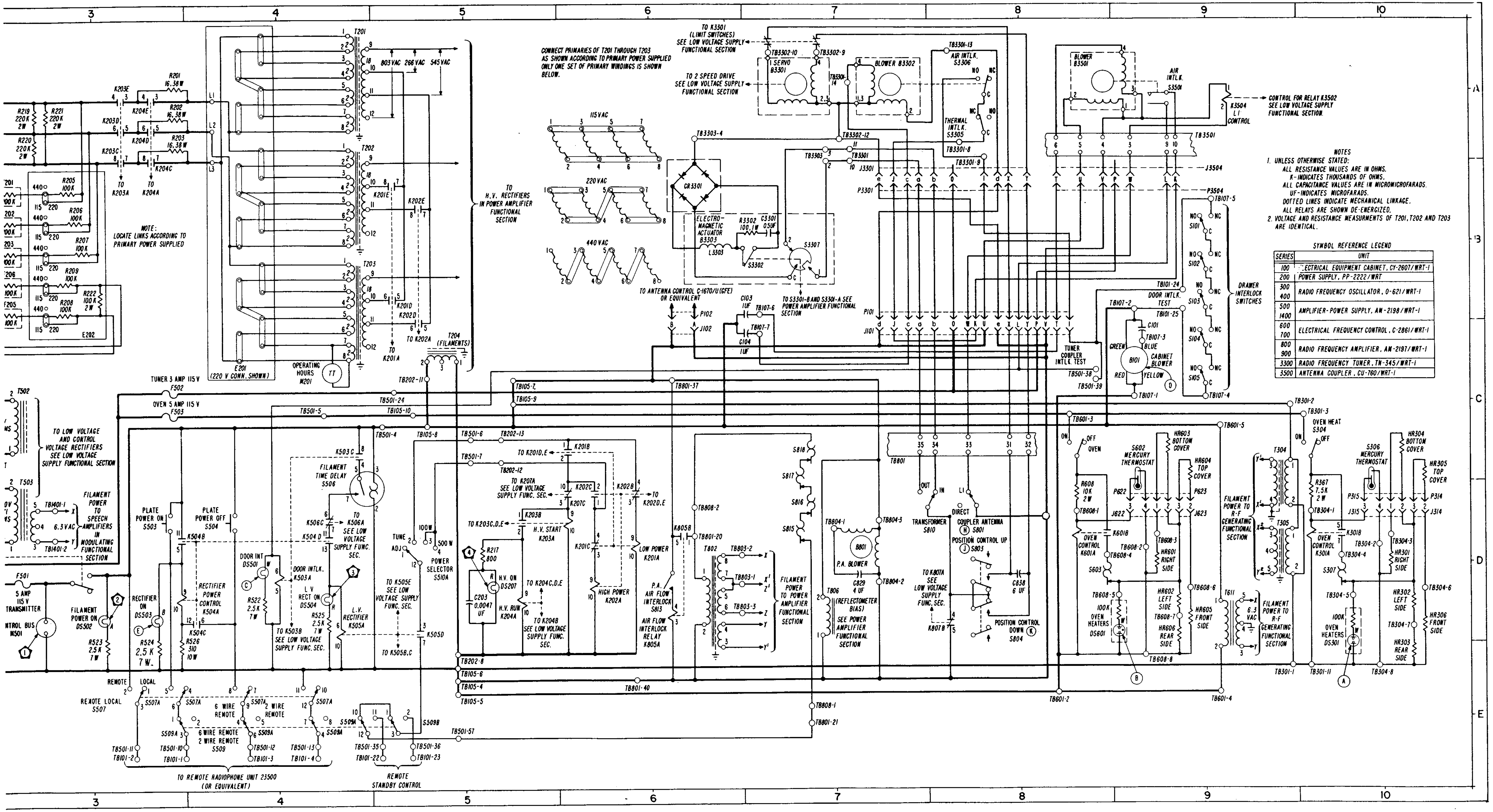
1. INTERCONNECTING CABLE TYPES AND THE CONDUCTOR GROUPING MAY VARY AMONG INSTALLATIONS. REFER TO THE APPLICABLE SHIP OR STATION PLANS TO DETERMINE THE CORRECT CABLING FOR ANY SPECIFIC INSTALLATION.
2. ALL INTERCONNECTING CABLES ARE TO BE FURNISHED BY THE INSTALLING ACTIVITY.
3. CONNECTORS P101, P103, P3506, P3501, P3502, P3301, P3302, CP104, P104 AND P102 ARE SUPPLIED BY THE MANUFACTURER.
4. ALL EQUIPMENT OTHER THAN RADIO TRANSMITTING SET AN/WRT-1 IS TO BE SUPPLIED BY THE INSTALLING ACTIVITY.
5. CONDUCTOR SHOULD NOT BE SMALLER THEN STANDARD COPPER CONDUCTOR SIZE 2 (7).
6. CONNECTIONS BETWEEN PLUGS AND TERMINAL BOARDS ARE IDENTIFIED BY CORRESPONDING LETTERS OR NUMBERS.
7. WHEN ANTENNA CONTROL C-1670/U, OR EQUIVALENT, IS NOT CONNECTED, MAKE FOLLOWING CONNECTION AT J102 : TERMINALS C TO F
8. WHEN ANTENNA TUNER TN-345/WRT-1, OR EQUIVALENT, IS NOT CONNECTED, MAKE FOLLOWING CONNECTIONS AT J101 : TERMINALS A TO B
TERMINALS B TO C
TERMINALS I TO L

Figure 2-10. Radi Transmitting Set AN/WRT-1, Int rconnecti n Diagram

TERM.	J102 SIGNAL NAMES
A	115V AC COMMON
B	115V AC FILAMENT
C	LOCAL BIAS KEYING RELAY K507
D	REMOTE KEYING FOLLOWER K509
E	GROUND
F	KEYING TO NC CONTACTS OF ANT. D.L. RELAY
G	AUTO TRANSFER
H	-24V DC
I	BREAK IN KEYING
J	GROUND
K	GROUND
L	
M	
N	
SEE NOTE 7	

TERM.	J101 SIGNAL NAMES
A	KEY INTLK. IN
B	KEY INTLK. COMMON
C	KEY INTLK. BY-PASS
D	TUNER LIMIT SWITCH TOP
E	TUNER POS. TOP
F	TUNER POS. ARM
G	TUNER GROUND
H	TUNER LIMIT SWITCH BOTTOM
I	TUNER AIR INTLK.
J	TUNER AIR INTLK.
K	COUPLER AIR INTLK.
L	COUPLER AIR INTLK.
M	TUNER IN CONTROL
N	COUPLER GROUND
O	115V TUNER LINE
P	115V COUPLER LINE
R	TUNER SPARE
S	COUPLER -24V
T	COUPLER BLOWER CAP. LINE
U	COUPLER 115V FIL. LINE
V	COUPLER 115V COMMON
W	COUPLER L-1 IN
X	TUNER CONTROL UP
Y	TUNER CONTROL DOWN
Z	TUNER SLOW
a	TUNER TRANS. OUT
b	TUNER TRANS. IN
c	TUNER BLOWER CAP. LINE
d	TUNER 115V FIL. LINE
e	TUNER 115V COMMON
SEE NOTE 8	





NOTES

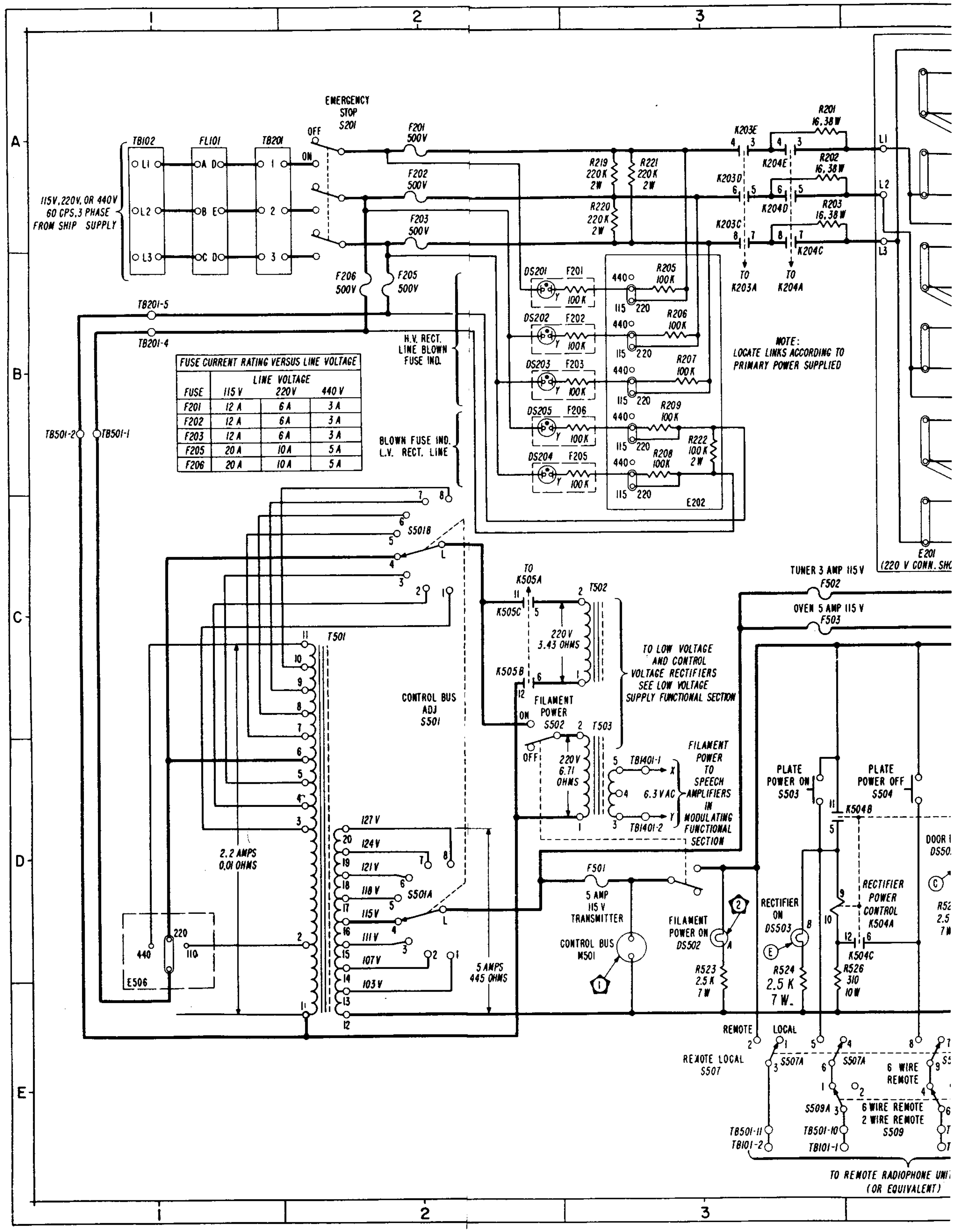
1. UNLESS OTHERWISE STATED:
   ALL RESISTANCE VALUES ARE IN OHMS.
   K-INDICATES THOUSANDS OF OHMS.
   ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.
   UF-INDICATES MICROFARADS.
   DOTTED LINES INDICATE MECHANICAL LINKAGE.
   ALL RELAYS ARE SHOWN DE-ENERGIZED.
2. VOLTAGE AND RESISTANCE MEASURMENTS OF T201, T202 AND T203 ARE IDENTICAL.

SYMBOL REFERENCE LEGEND

SERIES	UNIT
100	ELECTRICAL EQUIPMENT CABINET, CY-2607/WRT-1
200	POWER SUPPLY, PP-2222/WRT
300 400	RADIO FREQUENCY OSCILLATOR, O-621/WRT-1
500 1400	AMPLIFIER-POWER SUPPLY, AM-2198/WRT-1
600 700	ELECTRICAL FREQUENCY CONTROL, C-2861/WRT-1
800 900	RADIO FREQUENCY AMPLIFIER, AM-2197/WRT-1
3300	RADIO FREQUENCY TUNER, TN-345/WRT-1
3500	ANTENNA COUPLER, CU-760/WRT-1

Figure 5-30. Radio Transmitting Set AN/WRT-1, Primary Power Distribution Diagram

Ref. Desig.	*Location*
B101	9C
B801	7D
B3301	7A
B3302	7A
B3303	6B
B3501	8A
C101	9C
C103	7B
C104	7C
C203	5D
C829	7D
C838	8D
C3301	7B
E201	4C
E202	3B
E506	1D
F201	3B
F202	2A
F203	2A
F205	3B
F206	2B
F501	3D
F502	3C
F503	3C
J101	7C
J102	6C
J314	10D
J315	10D
J622	9D
J623	9D
J3301	7B
J3504	9B
K201A	6D
K201B	6C
K201C	6D
K201D	5B
K201E	5B
K202A	6D
K202B	6D
K202C	6D
K202D	5B
K202E	5B
K203A	5D
K203B	5D
K203C	3A
K203D	3A
K203E	3A
K204A	5D
K204D	3A
K204E	3A
K207C	6D
K301A	10D
K301B	10D
K503A	4D
K503C	4C
K504A	4D
K504B	3D
K504C	4D
K504D	4D
K505A	4D
K505B	2C
K505C	2C
K505D	5D
K506C	4D
K601A	8D
K601B	8D
K805A	6D
K805B	6D
K807B	8D
K3504	9A
L3303	6B
M201	4C
M501	3D
P101	7B
P102	6B
P314	10D
P315	10D
P622	9D
P623	9D
P3301	7B
P3504	9B
R201	3A
R202	3A
R203	3A
R205	3B
R206	3B
R207	3B
R208	3B
R209	3B
R217	5D
R219	3A
R220	3A
R221	3A
R222	3B
R367	10D
R522	4D
R523	3D
R524	3D
R525	4D
R526	3D
R608	8D
R3302	7B
S101	9B
S102	9B
S103	9B
S104	9C
S105	9C
S201	2A
S304	10C
S306	10C
S307	10D
S501	2C
S501A	2D
S501B	2C
S502	2C
S503	3D
S504	4D
S506	4C
S507	3E
S507A	4E
S507A	3E
S509A	3E
S509A	4E
S509B	5E
S510	5D
S602	9C
S603	8D
S604	8C
S801	8D
S803	8D
S804	8D
S810	8D
S813	6D
S815	7D
S816	7D
S817	7C
S818	7C
S3302	7B
S3305	8A
S3306	8A
S3307	7B
S3501	9A
T201	4A
T202	4B
T203	4B
T204	5C
T304	9C
T305	9D
T501	2C
T502	3C
T503	3D
T611	9D
T802	6D
T806	7D
CR3301	6B
DS201	2B
DS202	2B
DS203	2B
DS204	2B
DS205	2B
DS207	5D
DS301	10D
DS501	4D
DS502	3D
DS503	3D
DS504	4D
DS601	9D
FL101	1A
HR302	10D
HR303	10E
HR304	10C
HR304-3	10D
HR305	10C
HR306	10D
HR601	9D
HR602	9D
HR603	9C
HR604	9C
HR605	9D
HR606	9D
TB101	9B
TB101	3E
TB101	4E
TB101	5E
TB102	1A
TB105	5C
TB107	7B
TB201	1A
TB202	5C
TB301	9E
TB304	10D
TB501	8C
TB501	3E
TB501	4E
TB501	5E
TB601	8C
TB608	9D
TB801	7E
TB801	8C
TB803	6D
TB804	7D
TB808	7E
TB1401	3D
TB3301	7A
TB3302	7A
TB3303	7A
TB3501	9A



FUSE CURRENT RATING VERSUS LINE VOLTAGE			
	LINE VOLTAGE		
FUSE	115 V	220V	440 V
F201	12 A	6 A	3 A
F202	12 A	6 A	3 A
F203	12 A	6 A	3 A
F205	20 A	10 A	5 A
F206	20 A	10 A	5 A

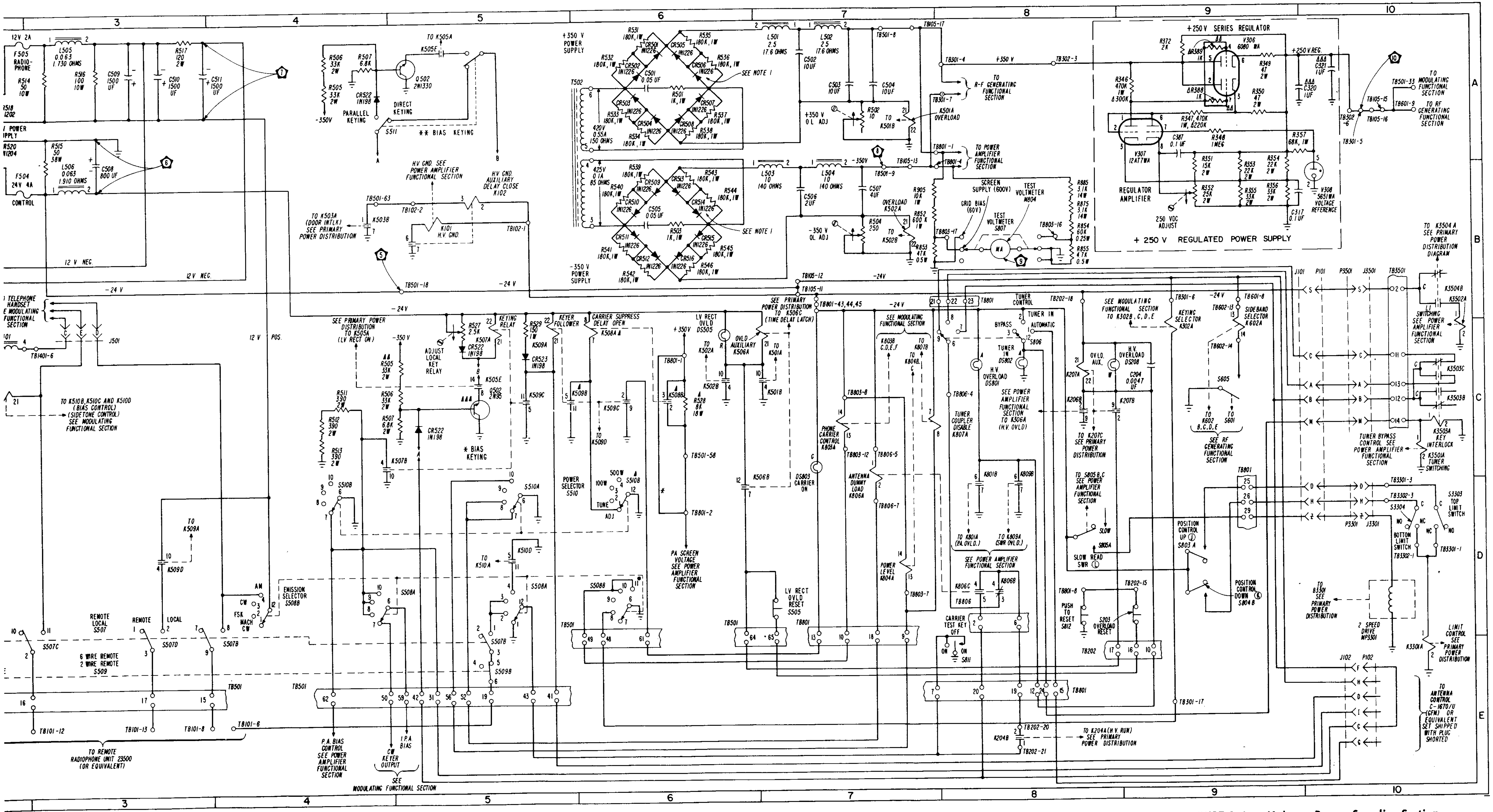
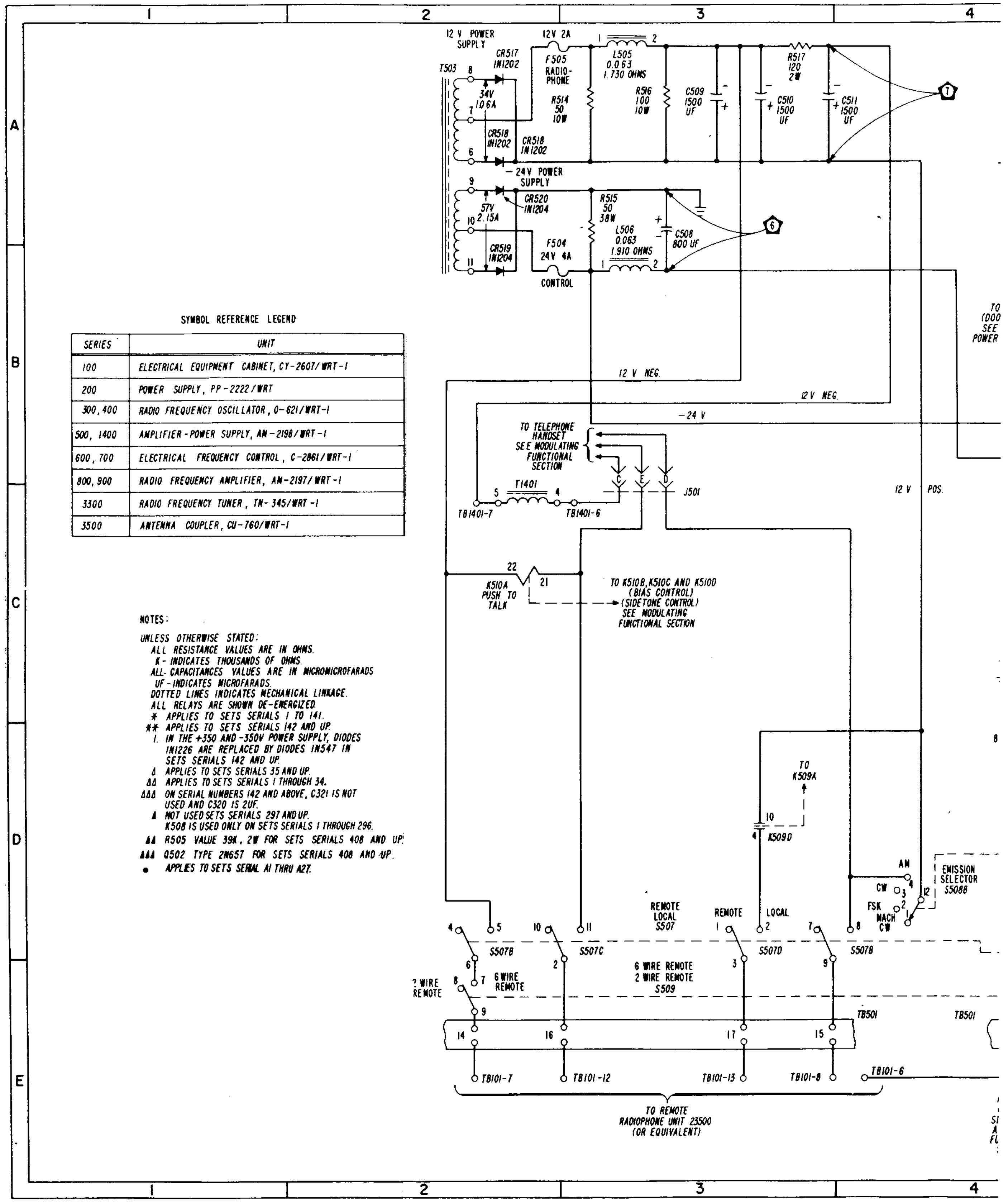


Figure 5-31. Radio Transmitting Set AN/WRT-1, Low Voltage Power Supplies Section, Functional Schematic Diagram

Ref. Desig.	*Location*	*Ref. Desig.*	*Location*	*Ref. Desig.*	*Location*	*Ref. Desig.*	*Location*
B3301	10D	K502B	7B	R503	6B	T503	2A
C204	9C	K503A	4A	R504	7B	T1401	2C
C317	9B	K503B	5A	R505	5C	TB101-6	4E
C320	10A	K505E	5C	R506	5C	TB101-7	2E
C321	10A	K506A	6C	R507	5C	TB101-8	3E
C387	9A	K507A	5C	R511	4C	TB101-12	3E
C501	6A	K507B	5C	R512	4C	TB101-13	3E
C502	7A	K508A	6C	R513	4C	TB102-1	5B
C503	7A	K508B	6C	R514	3A	TB102-2	5A
C504	7A	K509A	5C	R515	3A	TB105-1	7A
C505	6B	K509B	6C	R516	3A	TB105-11	7B
C506	7B	K509C	5C	R517	3A	TB105-12	7B
C507	7B	K509D	3D	R527	5B	TB105-13	7A
C508	3A	K510A	5D	R528	6C	TB105-15	10A
C509	3A	K510D	5D	R529	5B	TB105-16	10A
C510	3A	K602	9C	R531	6A	TB202-15	9D
C511	4A	K602A	9B	R532	6A	TB202-18	8B
CR501	6A	K801A	8D	R533	6A	TB202-20	8E
CR502	6A	K801B	8C	R534	6A	TB202-21	8E
CR503	6A	K803A	7C	R535	6A	TB301-4	8A
CR504	6A	K803B	7C	R536	6A	TB301-5	10A
CR505	6A	K804A	7D	R537	6A	TB301-6	9B
CR506	6A	K804B	7C	R538	6A	TB301-7	8A
CR507	6A	K806A	7D	R539	6B	TB301-17	9E
CR508	6A.	K806B	8D	R540	6B	TB302-3	8A
CR509	6B	K806C	8D	R541	6B	TB302-6	10A
CR510	6B	K807A	8C	R542	6B	TB501	6D
CR511	6B	K807B	7C	R543	6B	TB501-8	7A
CR512	6B	K809A	8D	R544	6B	TB501-9	7B
CR513	6B	K809B	8C	R545	6B	TB501-18	5B
CR514	6B	K3301A	10E	R546	6B	TB501-33	10A
CR515	6B	K3501A	10C	R852	7B	TB501-58	6C
CR516	6B	K3502A	10C	R853	7B	TB501-63	5A
CR517	2A	K3503A	10C	R854	8B	TB601-8	9B
CR518	2A	K3503B	10C	R855	8B	TB601-9	10A
CR519	2B	K3503C	10C	R875	8B	TB602-13	9B
CR520	2A	K3504B	10B	R885	8B	TB602-14	9C
CR521	5C	L501	7A	R905	7B	TB801	8B
CR522	5C	L502	7A	S203	9D	TB801-1	8A
CR523	5C	L503	7B	S505	7D	TB801-2	6D
DS208	9C	L504	7B	S507	3D	TB801-4	8A
DS505	6B	L505	3A	S507B	4D	TB801-8	8D
DS801	8C	L506	3A	S507C	3D	TB801-43	7B
DS802	8C	M804	8B	S507D	3D	TB801-44	7B
DS803	7C	MP3301	10D	S508A	5D	TB801-45	7B
F504	3A	P101	10B	S508B	4D	TB803-7	7D
F505	2A	P102	10E	S509	3E	TB803-8	7C
J101	10B	P3301	10D	S509B	5E	TB803-12	7C
J102	10E	P3501	10B	S510A	5D	TB803-16	8B
J501	3C	Q502	5C	S510B	4C	TB803-17	8B
J3301	10D	R346	9A	S511	4A	TB806	8D
J3501	10B	R347	9A	S601	9C	TB806-4	8C
K101	5B	R348	9A	S605	9C	TB806-5	7C
K102	5A	R349	9A	S803A	9D	TB806-7	7D
K204B	8E	R350	9A	S804B	9D	TB1401-6	3C
K206B	8C	R351	9A	S805	8C	TB1401-7	2C
K207A	8C	R352	9B	S805A	8D	TB3301-1	10D
K207C	8C	R354	9A	S806	8C	TB3301-3	10D
K302A	9B	R355	9B	S807	8B	TB3302-1	10D
K302B	9B	R356	9B	S811	8E	TB3302-3	10D
K306A	8C	R372	9A	S812	8D	TB3501	10B
K501A	7C	R388	9A	S3303	10D	V306	9A
K501B	7A	R389	9A	S3304	10D	V307	9A
K502A	7B	R501	6A	T502	6A	V308	10B
K502A	6C	R502	7A				



SYMBOL REFERENCE LEGEND

SERIES	UNIT
100	ELECTRICAL EQUIPMENT CABINET, CY-2607/WRT-1
200	POWER SUPPLY, PP-2222/WRT
300, 400	RADIO FREQUENCY OSCILLATOR, O-621/WRT-1
500, 1400	AMPLIFIER-POWER SUPPLY, AM-2198/WRT-1
600, 700	ELECTRICAL FREQUENCY CONTROL, C-2861/WRT-1
800, 900	RADIO FREQUENCY AMPLIFIER, AM-2197/WRT-1
3300	RADIO FREQUENCY TUNER, TN-345/WRT-1
3500	ANTENNA COUPLER, CU-760/WRT-1

NOTES:

UNLESS OTHERWISE STATED:
ALL RESISTANCE VALUES ARE IN OHMS.
K - INDICATES THOUSANDS OF OHMS.
ALL CAPACITANCES VALUES ARE IN MICROMICROFARADS
UF - INDICATES MICROFARADS.
DOTTED LINES INDICATES MECHANICAL LINKAGE.
ALL RELAYS ARE SHOWN DE-ENERGIZED.
* APPLIES TO SETS SERIALS 1 TO 141.
** APPLIES TO SETS SERIALS 142 AND UP.
1. IN THE +350 AND -350V POWER SUPPLY, DIODES 1N1226 ARE REPLACED BY DIODES 1N547 IN SETS SERIALS 142 AND UP.
Δ APPLIES TO SETS SERIALS 35 AND UP.
ΔΔ APPLIES TO SETS SERIALS 1 THROUGH 34.
ΔΔΔ ON SERIAL NUMBERS 142 AND ABOVE, C321 IS NOT USED AND C320 IS 2UF.
▲ NOT USED SETS SERIALS 297 AND UP. K508 IS USED ONLY ON SETS SERIALS 1 THROUGH 296.
▲▲ R505 VALUE 39K, 2W FOR SETS SERIALS 408 AND UP.
▲▲▲ Q502 TYPE 2N657 FOR SETS SERIALS 408 AND UP.
● APPLIES TO SETS SERIAL A1 THRU A27.

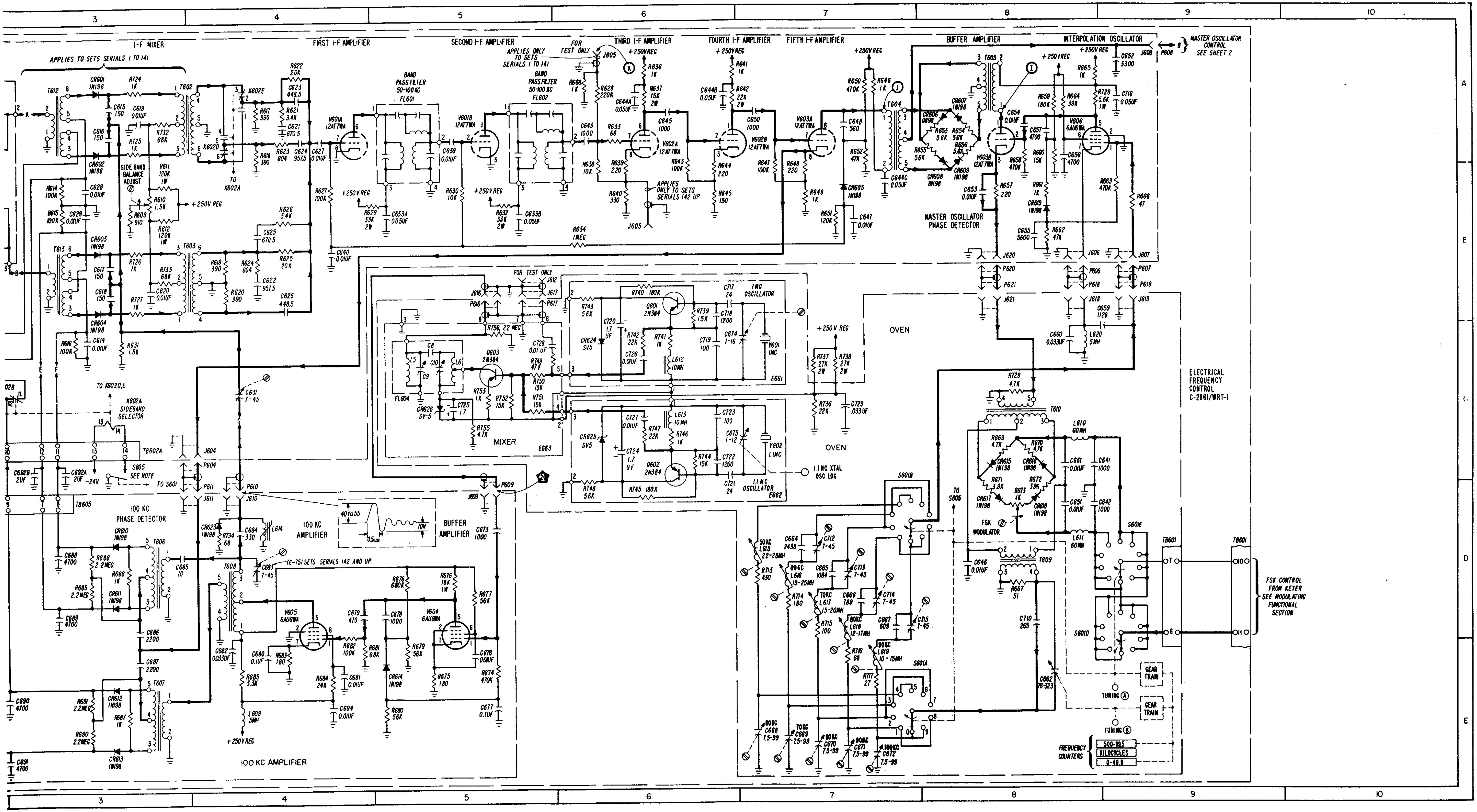
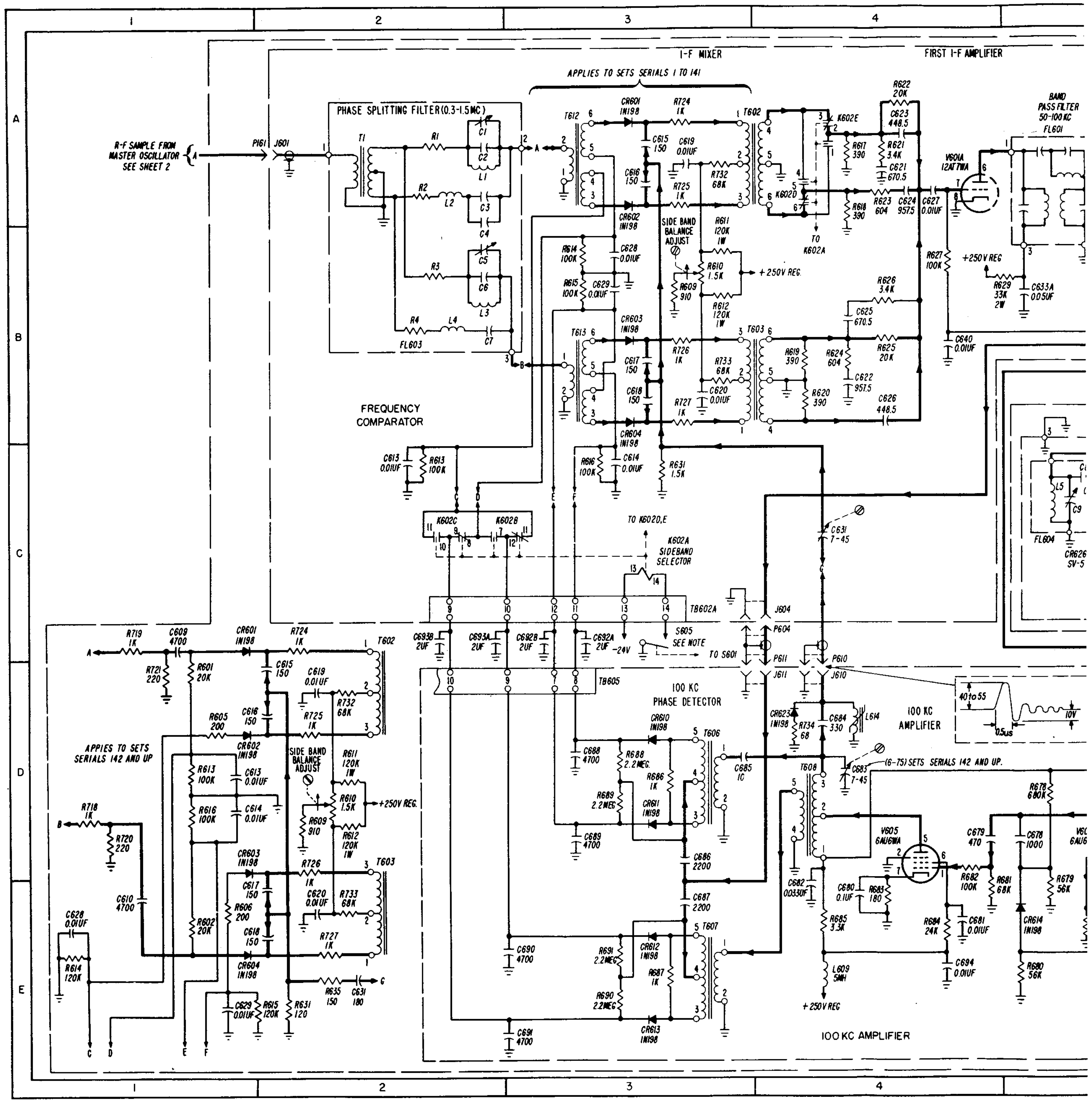
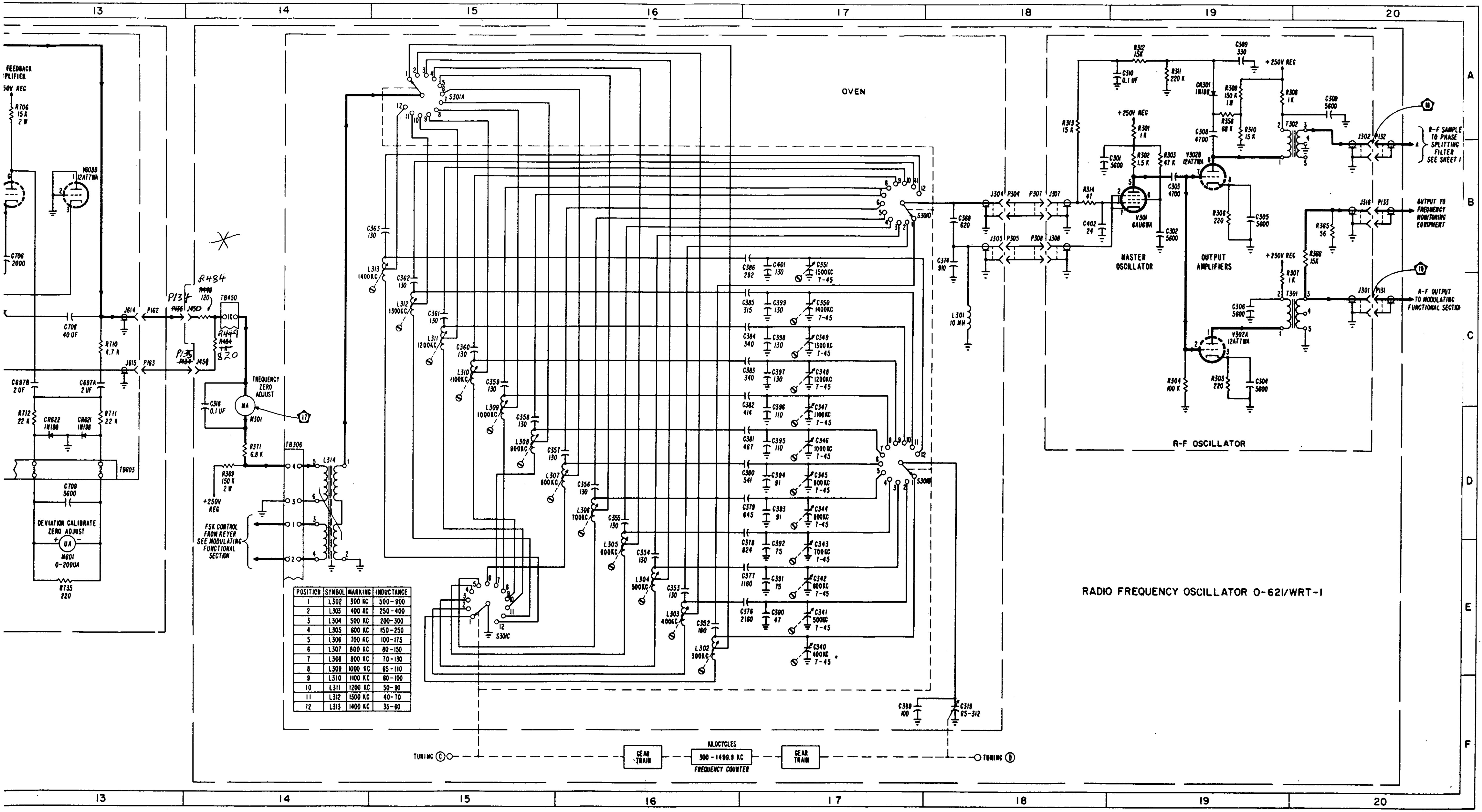


Figure 5-32. Radio Transmitting Set AN/WRT-1, R-F Generating Section, Functional Schematic Diagram (Sheet 1 of 2)

Ref. Desig.	*Location*	*Ref. Desig.*	*Location*	*Ref. Desig.*	*Location*	*Ref. Desig.*	*Location*	*Ref. Desig.*	*Location*
C613	2C	C685	3D	J608	9A	R628	6A	R716	7E
C614	3C	C686	3D	J609	5D	R629	4B	R717	7E
C615	3A	C687	3E	J610	4D	R630	5B	R718	1E
C616	3A	C688	3D	J611	4D	R631	3C	R719	1D
C617	3B	C689	3D	J612	5B	R632	5B	R720	1E
C618	3B	C690	4E	J616	5C	R633	6A	R721	1D
C619	3A	C691	3E	J617	5B	R634	6B	R724	3A
C620	3B	C692A	3C	J618	8B	R636	6A	R725	3A
C621	4A	C692B	3C	J619	9A	R637	6A	R726	3B
C622	4B	C693A	2C	J620	8B	R638	6B	R727	3B
C623	4A	C693B	2C	J621	8B	R639	6B	R728	8A
C624	4A	C694	4E	K602A	3C	R640	6B	R729	8C
C625	4B	C710	8D	K602B	2C	R641	6A	R732	3A
C626	4B	C712	7D	K602C	2C	R642	6A	R733	3B
C627	4A	C713	7D	K602D	4A	R643	6B	R734	4D
C628	3B	C714	7D	K602E	4A	R644	6B	R736	7C
C629	3B	C715	7D	K604	4C	R645	6B	R737	7C
C631	4C	C716	9A	L609	4E	R646	7A	R738	7C
C633A	5B	C717	6B	L610	8C	R647	7A	R739	6B
C633B	5B	C718	6B	L611	8D	R648	7A	R740	6B
C639	5A	C719	6C	L612	6C	R649	7B	R741	6C
C640	4B	C720	6C	L613	6C	R650	7A	R742	6C
C641	8C	C721	6C	L614	4D	R651	7B	R743	6B
C642	8D	C722	6C	L615	7D	R652	7A	R744	6C
C643	6A	C723	6C	L616	7D	R653	8A	R745	6D
C644A	6A	C724	6C	L617	7D	R654	8A	R746	6C
C644B	6A	C725	5C	L618	7D	R655	8A	R747	6C
C644C	7B	C726	6C	L619	7E	R656	8A	R748	6D
C645	6A	C727	6C	L620	8C	R657	8B	R749	5C
C646	8D	C728	5C	P161	2A	R658	8A	R750	5C
C647	7B	CR601	3A	P604	4C	R659	8A	R751	5C
C648	7A	CR602	3A	P606	8B	R660	8A	R752	5C
C650	7A	CR603	3B	P607	9A	R661	8B	R753	5C
C651	8D	CR604	3B	P608	9A	R662	8B	R754	5C
C652	9A	CR605	7B	P609	5D	R663	9A	R755	5C
C653	8B	CR606	8A	P610	4D	R664	8A	R756	5C
C654	8A	CR607	8A	P611	4D	R665	8A	S601A	7E
C655	8B	CR608	8A	P616	5C	R666	9A	S601B	7D
C656	8A	CR609	8A	P617	5B	R667	8D	S601D	9D
C657	8A	CR610	3D	P618	8B	R668	6A	S601E	9D
C659	9C	CR611	3D	P619	9A	R669	8C	S605	3C
C660	8C	CR612	3E	P620	8B	R670	8C	T602	4A
C661	8C	CR613	3E	P621	8B	R671	8D	T603	4B
C662	8E	CR614	5E	Q601	6B	R672	8D	T604	7A
C664	7D	CR615	8C	Q602	6C	R673	8D	T605	8A
C665	7D	CR616	8C	Q603	5C	R674	5E	T606	3D
C666	7D	CR617	8D	R609	3B	R675	5E	T607	3E
C667	7D	CR618	8D	R610	3B	R676	5D	T608	4D
C668	7E	CR619	8B	R611	3B	R677	5D	T609	8D
C669	7E	CR623	4D	R612	3B	R678	5D	T610	8C
C670	7E	CR624	6C	R613	2C	R679	5E	T612	3A
C671	7E	CR625	6C	R614	3B	R680	5E	T613	3B
C672	7E	CR626	5C	R615	3B	R681	4E	TB601	9D
C673	5D	E661	7C	R616	3C	R682	4D	TB602A	3C
C674	7C	E662	7D	R617	4A	R683	4E	TB605	3D
C675	7C	E663	5C	R618	4A	R684	4E	V601A	4A
C676	5E	FL601	5A	R619	4B	R685	4E	V601B	5A
C677	5E	FL602	5A	R620	4B	R686	3D	V602A	6A
C678	5D	FL603	2B	R621	4A	R687	3E	V602B	7A
C679	4D	FL604	5C	R622	4A	R688	3D	V603A	7A
C680	4E	J301	2C	R623	4A	R689	3D	V603B	8A
C681	4E	J601	2A	R624	4B	R690	3E	V604	5D
C682	4E	J605	6A	R625	4B	R691	3E	V605	4D
C683	4D	J606	8B	R626	4B	R714	7D	V606	8A
C684	4D	J607	9A	R627	4B	R715	7D	Y601	7C
								Y602	7C





POSITION	SYMBOL	MARKING	INDUCTANCE
1	L302	300 KC	500-900
2	L303	400 KC	250-400
3	L304	500 KC	200-300
4	L305	600 KC	150-250
5	L306	700 KC	100-175
6	L307	800 KC	80-150
7	L308	900 KC	70-130
8	L309	1000 KC	65-110
9	L310	1100 KC	60-100
10	L311	1200 KC	50-90
11	L312	1300 KC	40-70
12	L313	1400 KC	35-60

Figure 5-32. Radio Transmitting Set AN/WRT-1, R-F Generating Section, Functi nal Schematic Diagram (Sheet 2 of 2)

e 1-1
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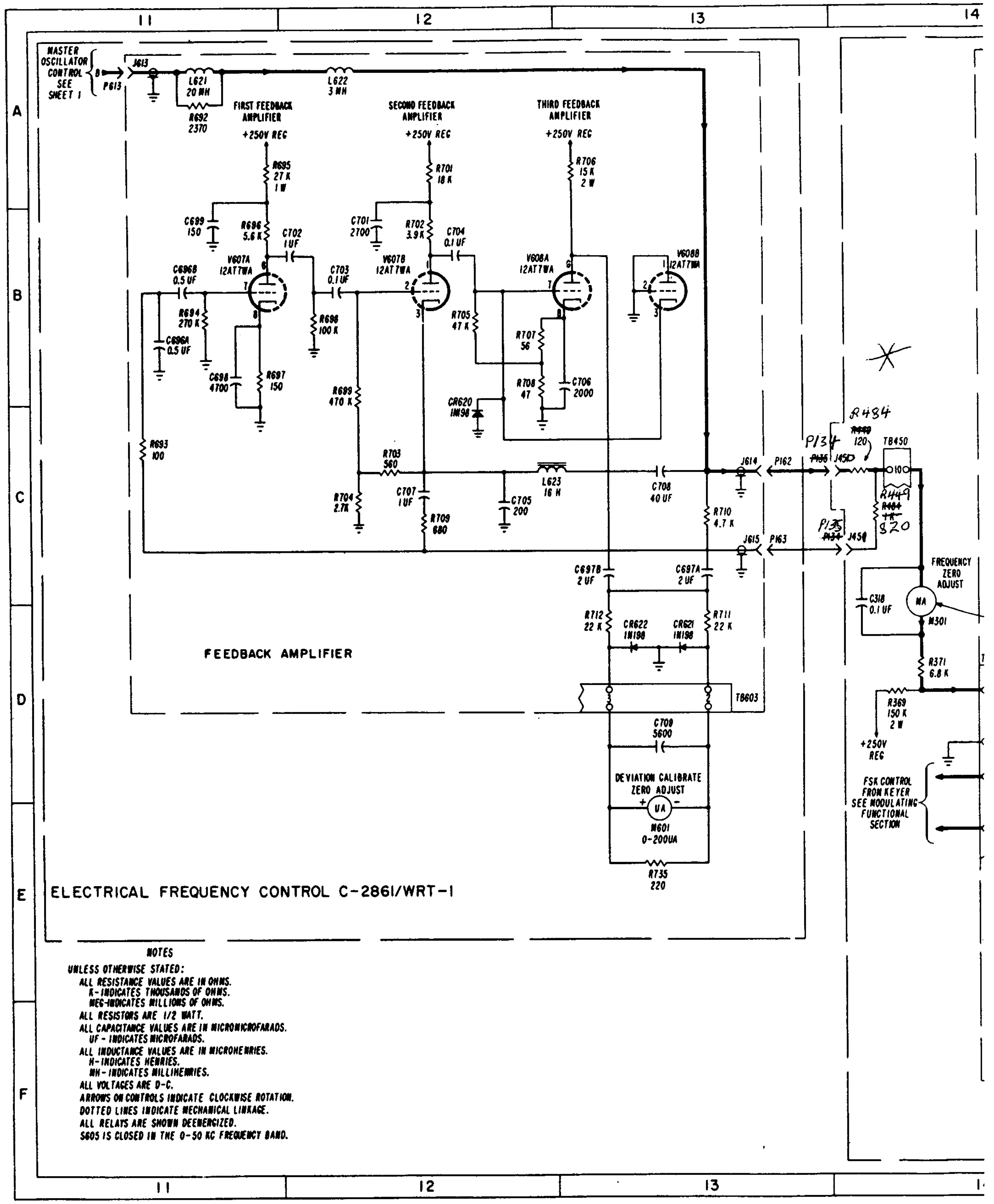
Ref. Desig.	*Location*
C301	19B
C302	19B
C303	19B
C304	19C
C305	19B
C306	19C
C308	19A
C309	20A
C310	19A
C318	14D
C319	18F
C340	17E
C341	17E
C342	17E
C343	17E
C344	17D
C345	17D
C346	17D
C347	17D
C348	17C
C349	17C
C350	17C
C351	17B
C352	16E
C353	16E
C354	16E
C355	16D
C356	16D
C357	16D
C358	15D
C359	15C
C360	15C
C361	15C
C362	15C
C363	B15
C368	18B
C374	18B
C376	17E
C377	17E
C378	17D
C379	17D
C380	17D
C381	17D
C382	17C
C383	17C
C384	17C
C385	17C
C386	17B
C389	17F
C390	17E
C391	17E
C392	17E
C393	17D
C394	17D
C395	17D
C396	17D
C397	17C
C398	17C
C399	17C
C401	17B
C402	18B
C696A	11B
C696B	11B
C697A	13C
C697B	13C
C698	11B
C699	11B
C701	12B
C702	12B
C703	12B
C704	12B
C705	12C
C706	13B
C707	12C
C708	13C
C709	13D
CR301	19A
CR621	13D
CR622	13D
J302	20B
J304	18B
J305	18B
J307	18B
J308	18B
J316	20B
J450	14C
J451	14C
J613	11A
J614	13C
J615	13C
L301	18C
L302	16E
L303	16E
L304	16E
L305	16E
L306	16D
L307	16D
L308	15D
L309	15D
L310	15C
L311	15C
L312	15C
L313	15C
L314	14D
L621	11A
L622	12A
L623	12C
M301	14D
M601	13E
P131	20C
P132	20B
P133	20B
P134	14C
P135	14C
P162	13C
P163	13C
P304	18B
P305	18B
P307	18B
P308	18B
P613	11A
R301	19A
R302	19B
R303	19B
R304	19C
R305	19C
R306	19B
R307	19C
R308	19A
R309	19A
R310	19A
R311	19A
R312	19A
R313	18A
R314	18B
R358	19A
R365	20B
R366	20B
R369	14D
R371	14D
R484	14C
R692	11A
R693	11C
R694	11B
R695	11A
R696	11B
R697	11B
R698	12B
R699	12B
R701	12A
R702	12B
R703	12C
R704	12C
R705	12B
R706	13A
R707	12B
R708	12B
R709	12C
R710	13C
R711	13D
R712	13D
R735	13E
S301A	15A
S301B	17D
S301C	15E
S301D	17B
T301	19C
T302	19A
TB306	14D
TB450	14C
TB603	13D
V301	19B
V302A	19C
V302B	19B
V607A	11B
V607B	12B
V608A	13B
V608B	13B



ELECTRICAL FREQUENCY CONTROL C-2861/WRT-1

NOTES

UNLESS OTHERWISE STATED:
ALL RESISTANCE VALUES ARE IN OHMS.
K-INDICATES THOUSANDS OF OHMS.
MEG-INDICATES MILLIONS OF OHMS.
ALL RESISTORS ARE 1/2 WATT.
ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.
UF - INDICATES MICROFARADS.
ALL INDUCTANCE VALUES ARE IN MICROHENRIES.
H-INDICATES HENRIES.
MH - INDICATES MILLIHENRIES.
ALL VOLTAGES ARE D-C.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
DOTTED LINES INDICATE MECHANICAL LINKAGE.
ALL RELAYS ARE SHOWN DEENERGIZED.
S605 IS CLOSED IN THE 0-50 KC FREQUENCY BAND.

* corrected as Per Page 1-1
cwe

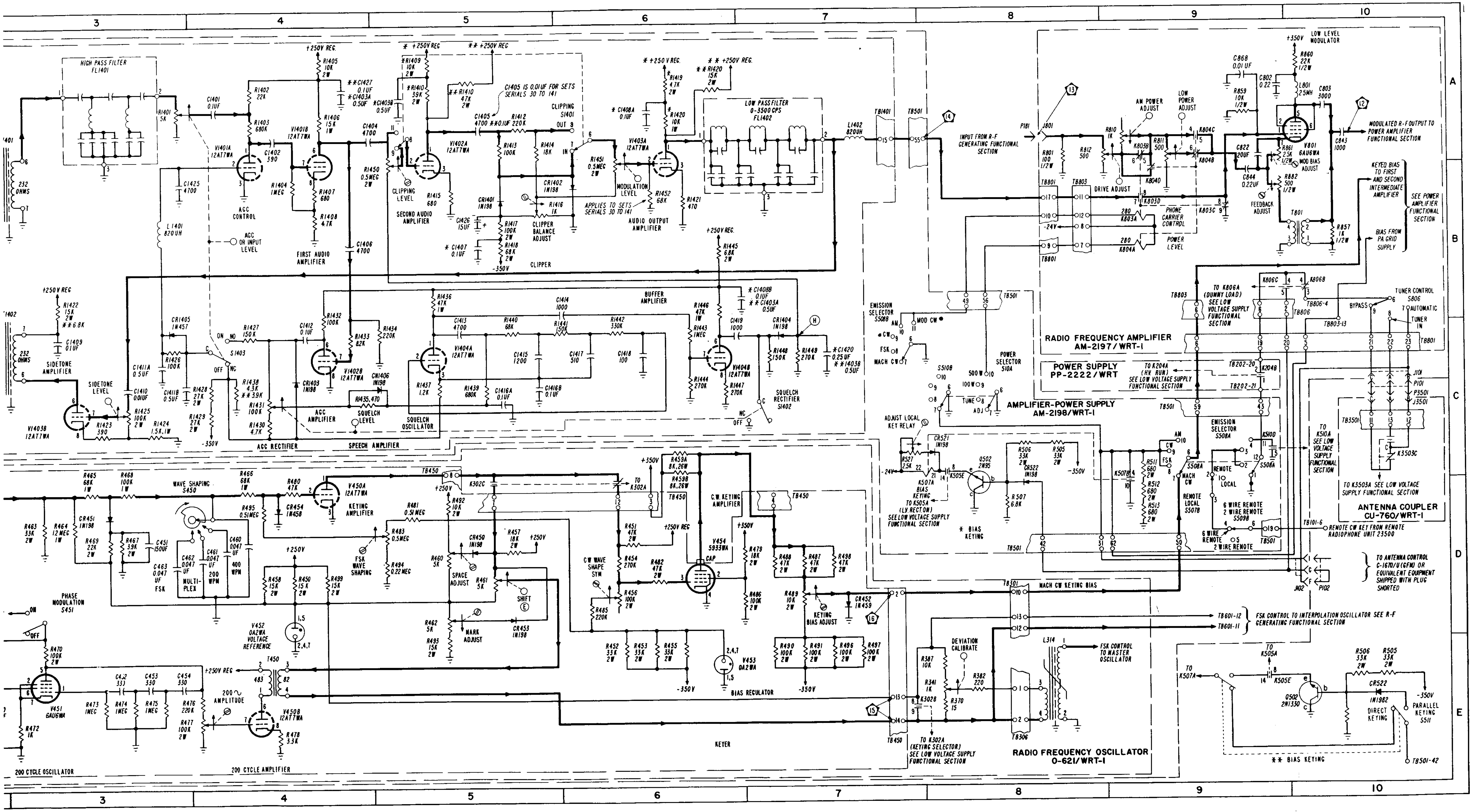
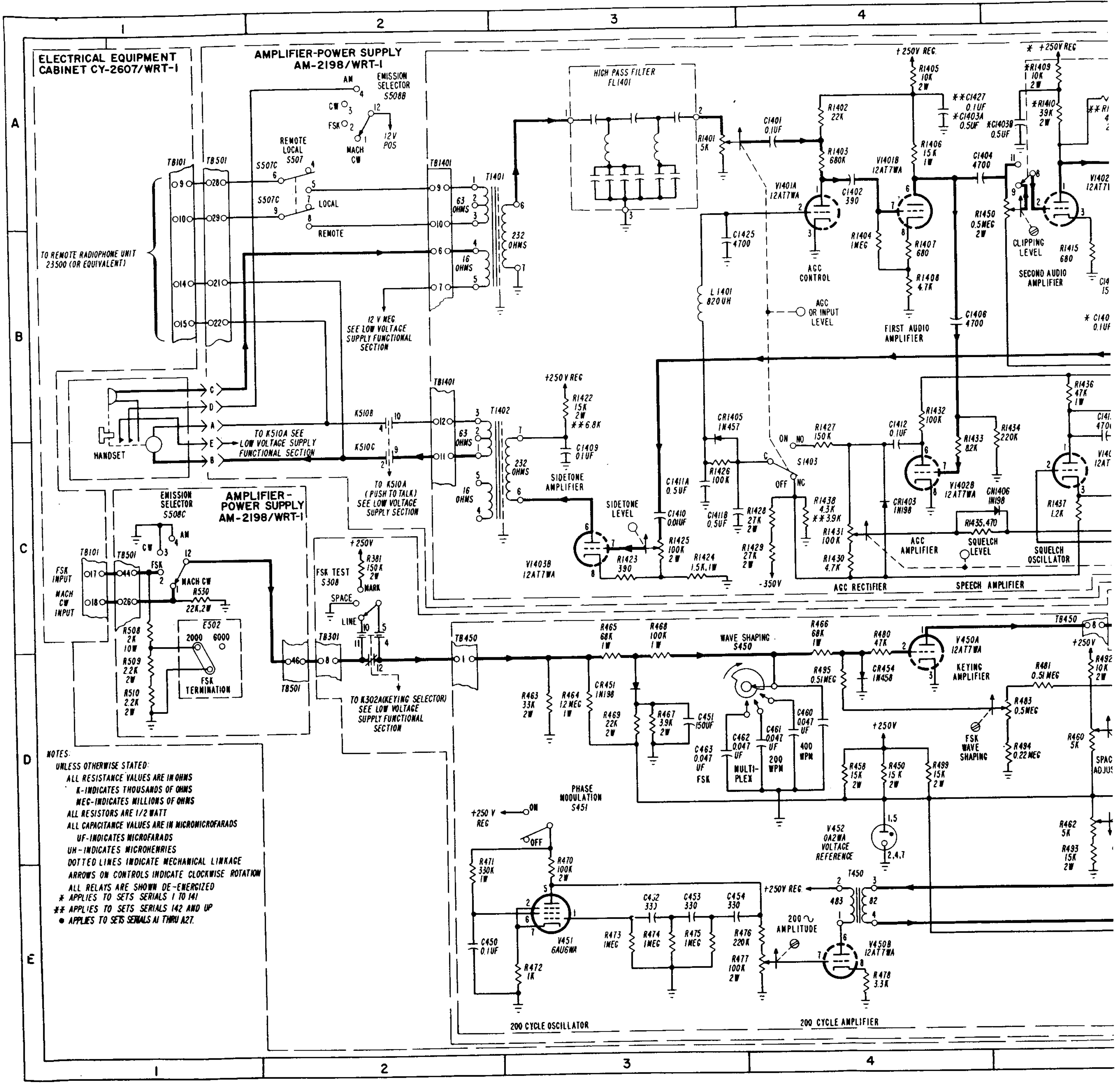


Figure 5-33. Radio Transmitting Set AN/WRT-1, Modulating Section, Functional Schematic Diagram

Ref. Desig.	Location
C450	3E
C451	3D
C452	3E
C453	3E
C454	3E
C460	4D
C461	4D
C462	4D
C463	3D
C802	9A
C803	10A
C822	9A
C843	10A
C844	9B
C845	9B
C1401	4A
C1402	4A
C1403A	4A
C1403B	5A
C1404	4A
C1405	5A
C1406	4B
C1407	5B
C1408A	6A
C1408B	7B
C1409	3C
C1410	3C
C1411A	3C
C1411B	3C
C1412	4C
C1413	5C
C1414	5B
C1415	5C
C1416A	5C
C1416B	5C
C1417	6C
C1418	6C
C1419	6C
C1420	7C
C1421	4B
C1425	3B
C1670	10D
CR450	5D
CR451	3D
CR452	7D
CR453	5D
CR454	4D
CR521	8C
CR522	8D
CR1401	5B
CR1402	5B
CR1403	4C
CR1404	7C
CR1405	3C
E502	1C
FL1401	3A
FL1402	7A
J101	10C
J102	10D
J801	8A
J3501	10C
K204B	9C
K302C	5C
K505E	8C
K507B	9C
K510B	2B
K510C	2C
K510D	9C
K803A	9B
K803B	9A
K803C	9B
K803D	9B
K803F	9B
K804A	9B
K804B	9A
K804C	9A
K806B	10B
K806C	9B
K3503A	10D
K3503C	10C
L801	10A
L314	8E
L1401	3B
L1402	7A
P101	10C
P102	10D
P181	8A
P3501	10C
Q502	8C
R341	8E
R370	8E
R382	8E
R387	8E
R450	4D
R451	6D
R452	6E
R453	6E
R454	6D
R455	6E
R456	6D
R457	5D
R458	4D
R459A	6C
R459B	6C
R460	5D
R461	5D
R462	5D
R463	3D
R464	3D
R465	3D
R466	4D
R467	3D
R468	3D
R469	3D
R470	3E
R471	2E
R472	3E
R473	3E
R474	3E
R475	3E
R476	3E
R477	3E
R478	4E
R479	7D
R480	4D
R481	5D
R482	6D
R483	5D
R485	6D
R486	7D
R487	7D
R488	7D
R489	7D
R490	7E
R491	7E
R492	5D
R493	5E
R494	5D
R495	4D
R496	7E
R497	7E
R498	7D
R499	4D
R505	8C
R506	8C
R507	8D
R508	1C
R509	1D
R510	1D
R511	9C
R512	9D
R513	9D
R527	7C
R530	1B
R801	8A
R810	9A
R811	9A
R812	8A
R857	10B
R859	9A
R860	10A
R861	9A
R1401	3A
R1402	4A
R1403	4A
R1404	4B
R1405	4A
R1406	4A
R1407	4B
R1408	4B
R1409	5A
R1410	5A
R1412	5A
R1413	5A
R1414	5A
R1415	5B
R1416	5B
R1417	5B
R1418	5B
R1419	6A
R1420	6A
R1421	6B
R1422	3B
R1423	3C
R1424	3C
R1425	3C
R1426	3C
R1427	4C
R1428	4C
R1429	4C
R1430	4C
R1431	4C
R1432	4B
R1433	4C
R1434	5C
R1435	4C
R1436	5B
R1437	5C
R1438	4C
R1439	5C
R1440	5C
R1441	5B
R1442	6C
R1443	6C
R1444	6C
R1445	6B
R1446	6B
R1447	6C
R1448	7C
R1449	7C
R1451	6A
S308	2C
S451	3D
S507	2A
S507B	9D
S507C	2A
S508A	9C
S508B	2A
S510B	8C
S1401	5A
S1403	4C
T450	4E
T805	10B
T1401	3A
T1402	3B
TB101	1A
TB101-6	10D
TB202-20	9C
TB202-21	9C
TB301	2D
TB306	8E
TB450	5C
TB501	9C
TB601-11	9D
TB601-12	9D
TB801	10C
TB803	9B
TB803-13	10C
TB806-4	10B
TB1401	7A
TB3501	10C
V450A	4D
V450B	4E
V451	3E
V452	4D
V454	6D
V801	10A
V1401A	4A
V1401B	4A
V1402A	5A
V1402B	4C
V1403A	6A
V1403B	3C
V1404A	5C



NOTES:

UNLESS OTHERWISE STATED:

ALL RESISTANCE VALUES ARE IN OHMS

K-INDICATES THOUSANDS OF OHMS

MEG-INDICATES MILLIONS OF OHMS

ALL RESISTORS ARE 1/2 WATT

ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS

UF-INDICATES MICROFARADS

UH-INDICATES MICROHENRIES

DOTTED LINES INDICATE MECHANICAL LINKAGE

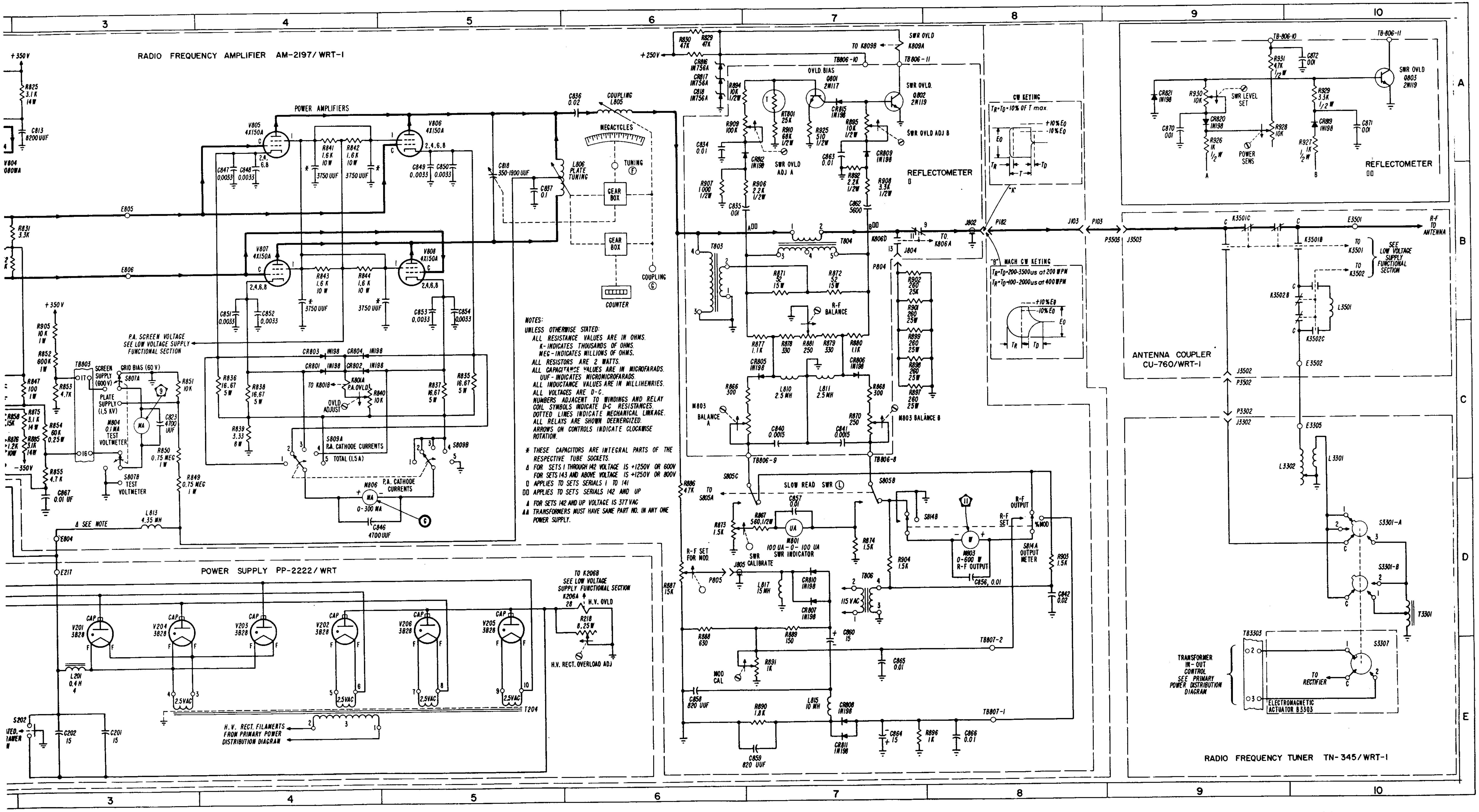
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION

ALL RELAYS ARE SHOWN DE-ENERGIZED

* APPLIES TO SETS SERIALS 1 TO 141

** APPLIES TO SETS SERIALS 142 AND UP

● APPLIES TO SETS SERIALS A1 THRU A27.



NOTES:

UNLESS OTHERWISE STATED:

ALL RESISTANCE VALUES ARE IN OHMS.
K-INDICATES THOUSANDS OF OHMS.
MEG-INDICATES MILLIONS OF OHMS.
ALL RESISTORS ARE 2 WATTS.
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
UUF-INDICATES MICROMICROFARADS.
ALL INDUCTANCE VALUES ARE IN MILLIHENRIES.
ALL VOLTAGES ARE D-C.
NUMBERS ADJACENT TO WINDINGS AND RELAY COIL SYMBOLS INDICATE D-C RESISTANCES.
DOTTED LINES INDICATE MECHANICAL LINKAGE.
ALL RELAYS ARE SHOWN DEENERGIZED.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

* THESE CAPACITORS ARE INTEGRAL PARTS OF THE RESPECTIVE TUBE SOCKETS.

Δ FOR SETS 1 THROUGH 142 VOLTAGE IS +1250V OR 600V
FOR SETS 143 AND ABOVE VOLTAGE IS +1250V OR 800V

0 APPLIES TO SETS SERIALS 1 TO 141

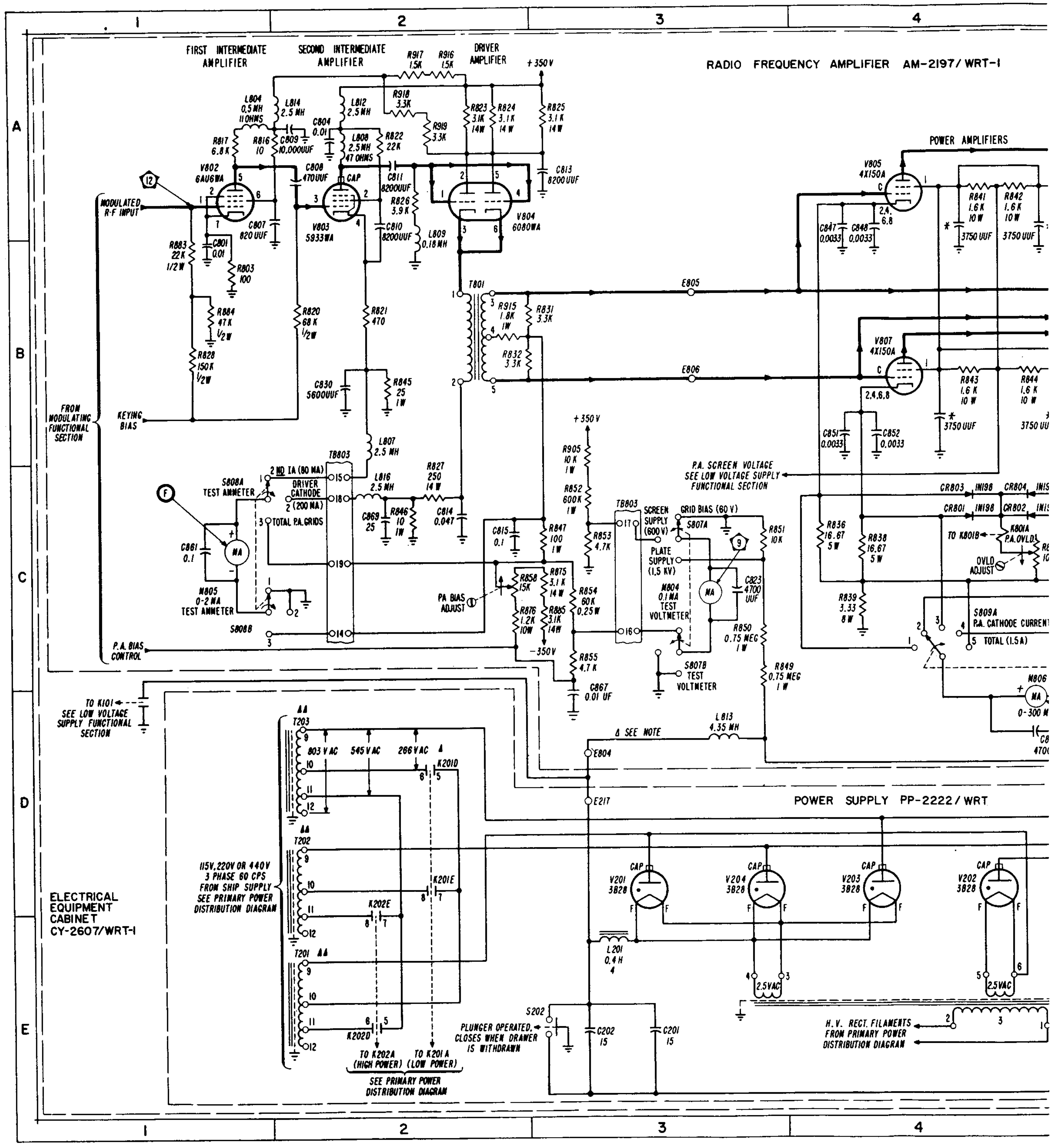
00 APPLIES TO SETS SERIALS 142 AND UP

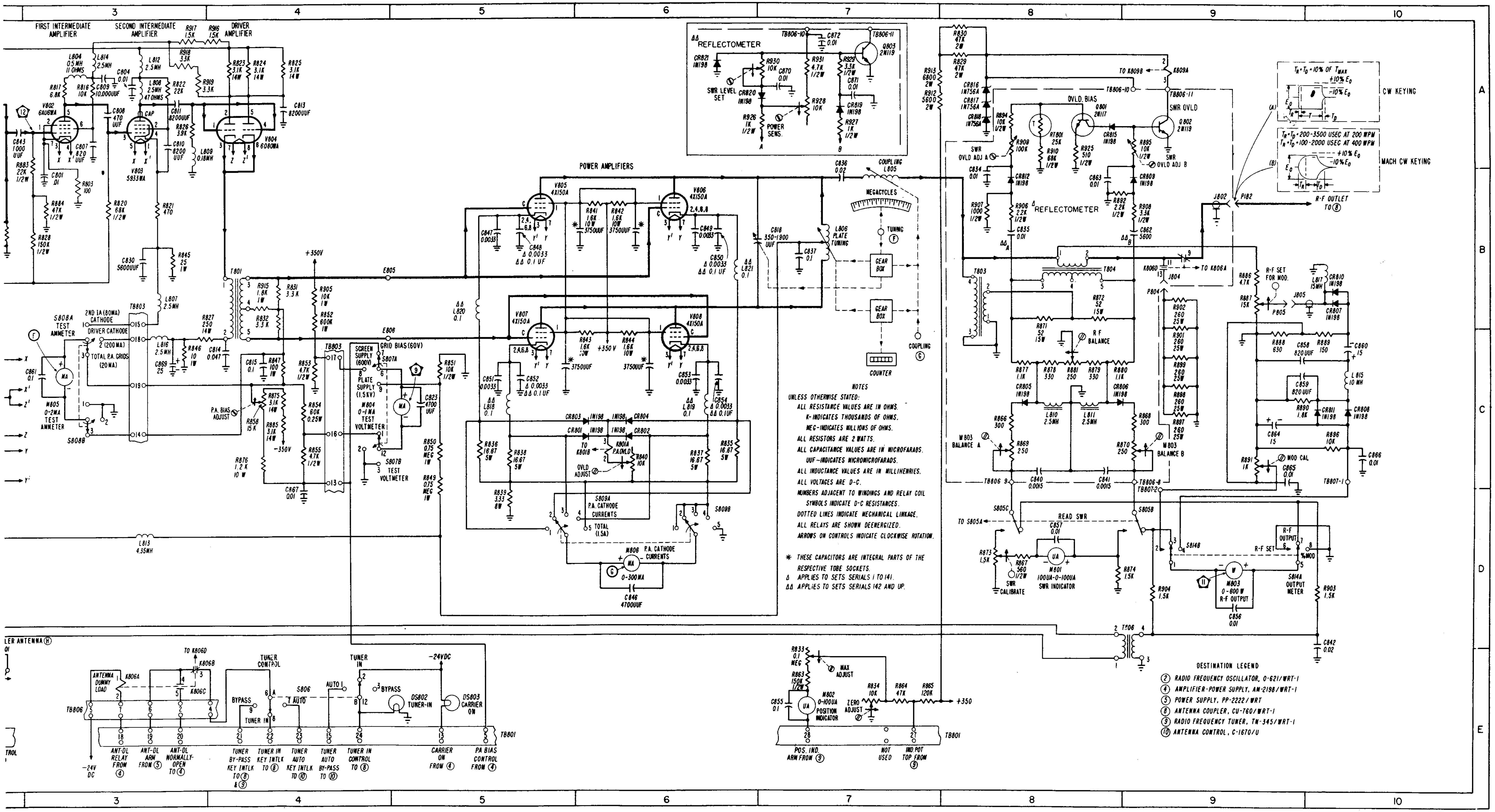
▲ FOR SETS 142 AND UP VOLTAGE IS 377 VAC

▲▲ TRANSFORMERS MUST HAVE SAME PART NO. IN ANY ONE POWER SUPPLY.

Figure 5-34. Radio Transmitting Set AN/WRT-1, Power Amplifier Section, Functional Schematic Diagram

Ref. Desig.	Location	Ref. Desig.	Location	Ref. Desig.	Location	Ref. Desig.	Location
C201	3E	CR821	9A	R820	2B	R899	7C
C202	3E	E217	3D	R821	2B	R901	7B
C804	2A	E804	3D	R822	2A	R902	7B
C807	1A	E805	3B	R823	2A	R903	8D
C808	2A	E806	3B	R824	2A	R904	7D
C809	2A	E3305	10C	R825	3A	R905	3B
C810	2A	E3501	10B	R826	2A	R906	7B
C811	2A	E3502	10C	R827	2C	R907	6B
C813	3A	J103	8B	R828	1B	R908	7B
C814	2C	J802	8B	R829	6A	R909	6A
C815	2C	J804	7B	R830	6A	R910	7A
C818	5A	J805	6D	R831	2B	R911	7A
C823	3C	J3302	9C	R832	2B	R925	7A
C830	2B	J3502	9C	R835	5C	R926	9A
C834	6A	J3503	9B	R836	4C	R927	10A
C835	7B	K201D	2D	R837	5C	R928	9A
C836	6A	K201E	2D	R838	4C	R929	10A
C837	5B	K202D	2E	R839	4C	R930	9A
C840	7C	K202E	2D	R840	4C	R931	9A
C841	7C	K206A	6D	R841	4A	RT801	7A
C842	8D	K801A	4C	R842	4A	S202	3E
C846	4D	K806D	7B	R843	4B	S805B	7C
C847	4A	K809A	7A	R844	4B	S805C	6C
C848	4A	K3501B	10B	R845	2B	S807A	3C
C849	5A	K3501C	9B	R846	2C	S807B	3C
C850	5A	K3502B	9B	R847	3C	S808A	1C
C851	4B	K3502C	10C	R849	3C	S808B	1C
C852	4B	L201	3E	R850	3C	S809A	4C
C853	5B	L804	1A	R851	3C	S809B	5C
C854	5B	L805	6A	R852	3C	S814A	8D
C856	8D	L806	6A	R853	3C	S814B	8D
C857	7D	L807	2B	R854	3C	S3301-A	10D
C858	6E	L808	2A	R855	3C	S3301-B	10D
C859	7E	L809	2A	R858	4C	S3307	10E
C860	7D	L810	7C	R866	6C	T201	2E
C861	1C	L811	7C	R867	7D	T202	2D
C862	7B	L812	2A	R868	7C	T203	2D
C863	7A	L813	3D	R870	7C	T801	2B
C864	7E	L814	2A	R871	7B	T803	6B
C865	7E	L815	7E	R872	7B	T804	7B
C866	8E	L816	2C	R873	6D	T806	7D
C867	3D	L817	7D	R874	7D	T3301	10D
C869	2C	L3301	10C	R875	3C	TB803	2B
C870	9A	L3302	10C	R876	2C	TB803	3C
C871	10A	L3501	10B	R877	7C	TB806-8	7C
C872	10A	M801	7D	R878	7C	TB806-9	7C
CR801	4C	M803	6C	R879	7C	TB806-10	7A
CR802	4C	M803	8D	R880	7C	TB806-11	7A
CR803	4C	M804	3C	R881	7C	TB807-1	8E
CR804	4C	M805	1C	R883	1B	TB807-2	8D
CR805	7C	M806	4C	R884	1B	TB3303	9D
CR806	7C	P103	8B	R885	2C	V201	3D
CR807	7D	P182	8B	R886	6D	V202	4D
CR808	7E	P804	7B	R887	6D	V203	4D
CR809	7A	P805	6D	R888	6D	V204	3D
CR810	7D	P3302	9C	R889	7D	V205	5D
CR811	7E	P3502	9C	R890	7E	V206	5D
CR812	7A	P3503	9B	R891	7E	V802	1A
CR815	7A	Q801	7A	R892	7B	V803	2A
CR816	6A	Q802	7A	R894	6A	V804	2A
CR817	6A	Q803	10A	R895	7A	V805	4A
CR818	6A	R218	6D	R896	8E	V806	5A
CR819	10A	R816	1A	R897	7C	V806	5A
CR820	9A	R817	1A	R898	7C	V807	4B
						V808	5B





NOTES

UNLESS OTHERWISE STATED:

ALL RESISTANCE VALUES ARE IN OHMS.
K-INDICATES THOUSANDS OF OHMS.
MEG-INDICATES MILLIONS OF OHMS.
ALL RESISTORS ARE 2 WATTS.
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
UUF-INDICATES MICROMICROFARADS.
ALL INDUCTANCE VALUES ARE IN MILLIHENRIES.
ALL VOLTAGES ARE D-C.
NUMBERS ADJACENT TO WINDINGS AND RELAY COIL SYMBOLS INDICATE D-C RESISTANCES.
DOTTED LINES INDICATE MECHANICAL LINKAGE.
ALL RELAYS ARE SHOWN DEENERGIZED.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

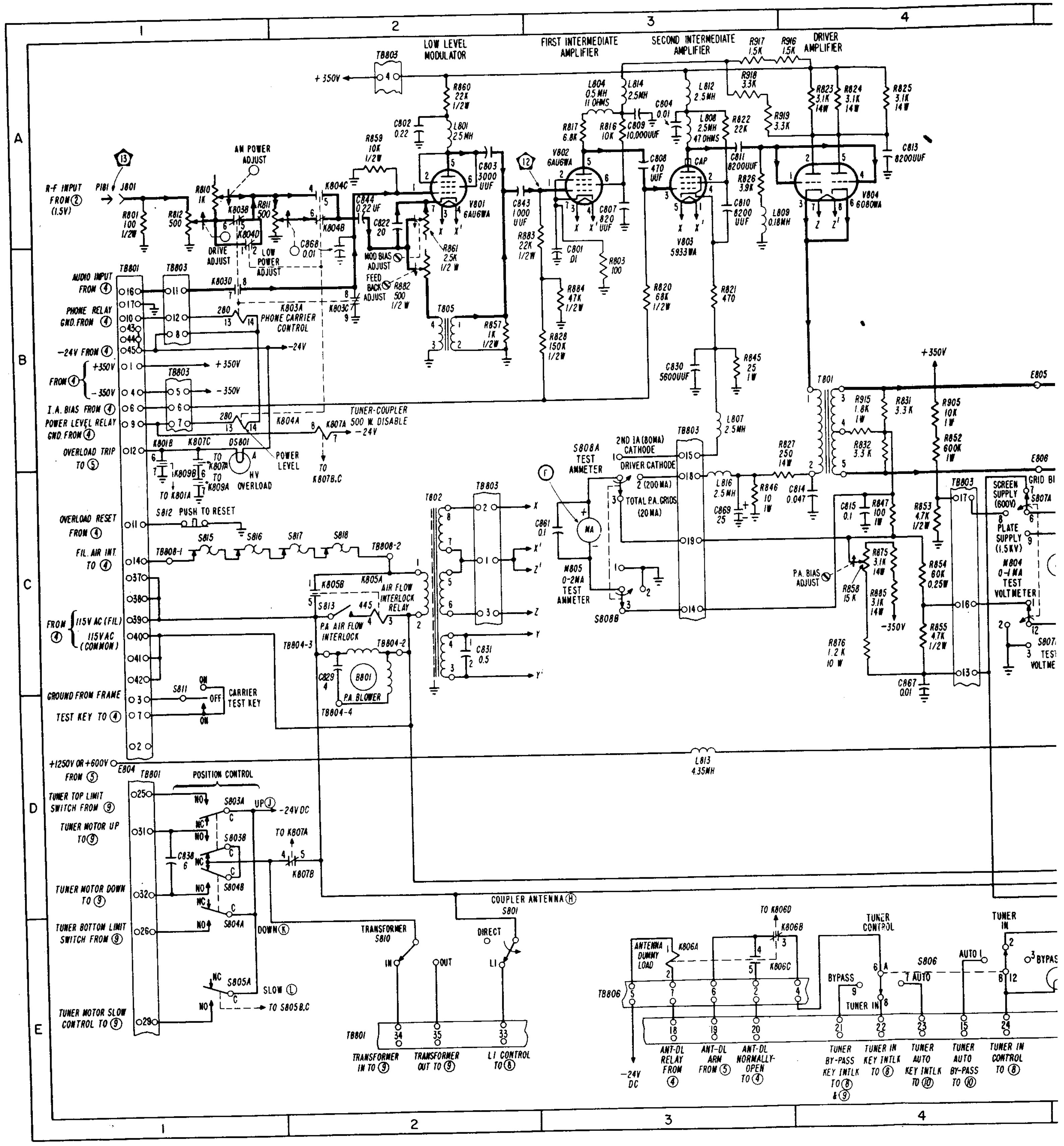
* THESE CAPACITORS ARE INTEGRAL PARTS OF THE RESPECTIVE TUBE SOCKETS.
Δ APPLIES TO SETS SERIALS 1 TO 141.
ΔΔ APPLIES TO SETS SERIALS 142 AND UP.

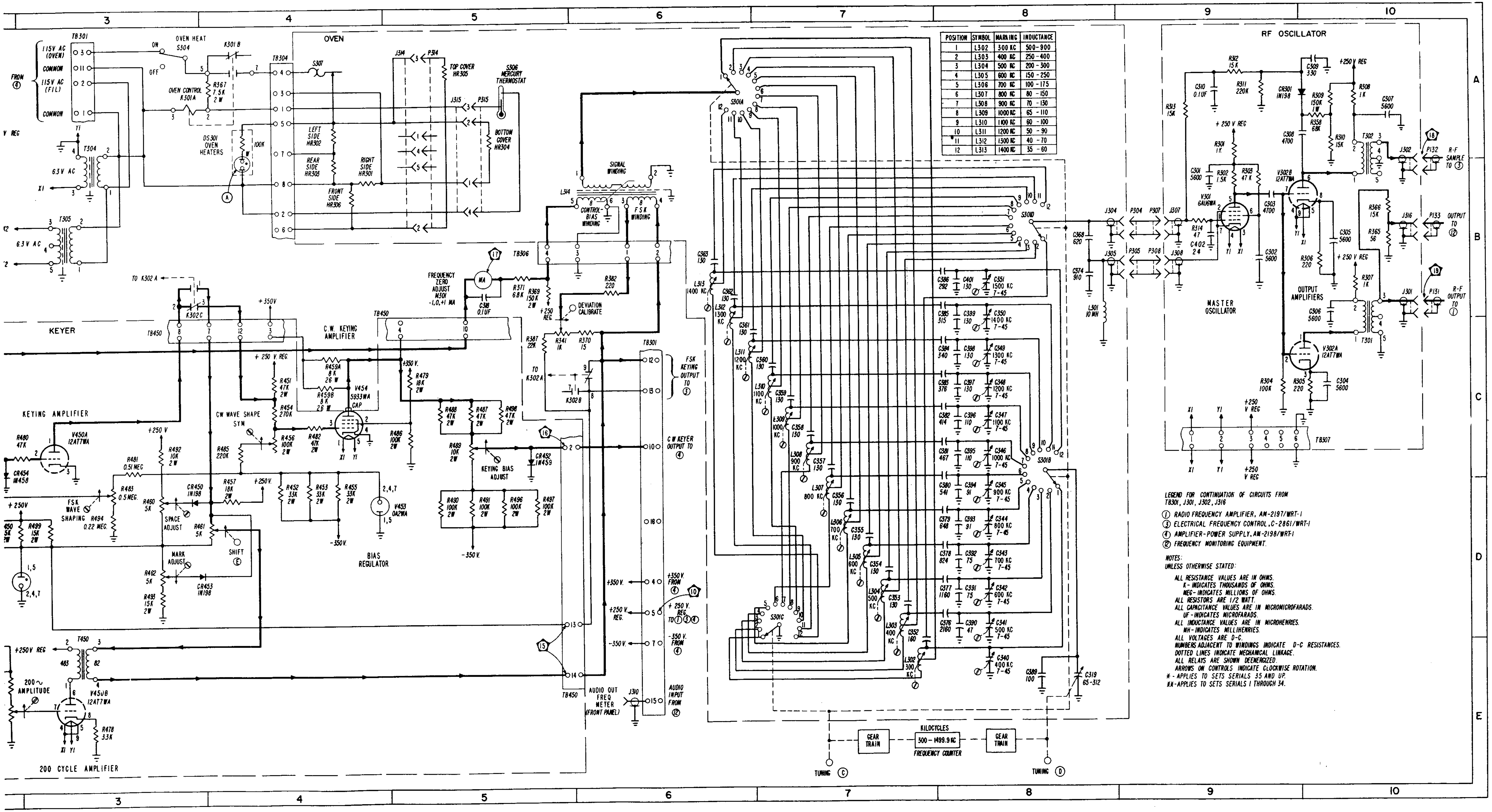
DESTINATION LEGEND

② RADIO FREQUENCY OSCILLATOR, O-621/WRT-1
④ AMPLIFIER-POWER SUPPLY, AM-2198/WRT-1
⑤ POWER SUPPLY, PP-2222/WRT
⑧ ANTENNA COUPLER, CU-760/WRT-1
⑨ RADIO FREQUENCY TUNER, TN-345/WRT-1
⑩ ANTENNA CONTROL, C-1670/U

Figure 6-26. Radio Frequency Amplifier AM-2197/WRT-1, Schematic Diagram

Ref. Desig.	Location
B801	2C
C802	2A
C803	2A
C804	3A
C807	3A
C808	3A
C809	3A
C810	3A
C811	3A
C813	4A
C814	4C
C815	4C
C818	7B
C822	2A
C823	5C
C829	2D
C830	3B
C831	2C
C834	8B
C835	8B
C836	7B
C837	7B
C838	1D
C840	8C
C841	8C
C842	10D
C843	2A
C844	2B
C846	6D
C847	5B
C848	5B
C849	6B
C850	6B
C851	5C
C852	5C
C853	6C
C854	6C
C855	7E
C856	9D
C857	8D
C858	9C
C859	9C
C860	10C
C861	3C
C862	9B
C863	8B
C864	9C
C865	9C
C866	10C
C867	4D
C868	2B
C869	3C
C870	7A
C871	7A
C872	7A
CR801	6C
CR802	6C
CR803	6C
CR804	6C
CR806	8C
CR807	10B
CR808	10C
CR809	8B
CR810	10B
CR811	10C
CR812	8B
CR816	8A
CR817	8A
CR818	8A
CR819	7A
CR820	7A
CR821	6A
DS801	1B
DS802	5E
DS803	5E
E804	1D
E805	4B
E806	4C
J801	1A
J802	9B
J804	9B
J805	9B
K801A	6C
K801B	1B
K803A	2B
K803B	1A
K803C	2B
K803D	1B
K804A	2B
K804B	2A
K804C	2A
K805A	2C
K805B	2C
K806A	3E
K806B	3E
K806D	9B
K807A	2B
K807B	2D
K807C	1B
K809A	9A
K809B	1C
L801	2A
L804	3A
L805	7B
L806	7B
L807	3B
L808	3A
L809	3A
L810	8C
L811	8C
L812	2A
L813	3D
L814	3A
L815	10C
L816	3C
L817	10B
L818	5C
L819	6C
L820	5B
L821	6B
M801	8D
M802	7E
M803	9C
M804	4C
M805	3C
M806	6D
P181	1A
P182	9B
P805	9B
Q801	8A
Q802	9A
Q803	7A
R801	1A
R810	1A
R811	2A
R812	1A
R816	3A
R817	3A
R820	3B
R821	3B
R822	3A
R823	4A
R824	4A
R825	4A
R826	3A
R827	3C
R828	3B
R829	8A
R830	8A
R831	4B
R832	4B
R833	7E
R834	7E
R835	6C
R836	5C
R837	6C
R838	5C
R839	5D
R840	6C
R841	6B
R842	6B
R843	6C
R844	6C
R845	3B
R846	3C
R847	4C
R849	5C
R850	5C
R851	5C
R852	4B
R853	4C
R854	4C
R855	4C
R857	2B
R858	4C
R859	2A
R860	2A
R861	2A
R863	7E
R864	7E
R865	7E
R866	8C
R867	8D
R868	9C
R869	8C
R870	9C
R871	8B
R872	8B
R873	8D
R875	4C
R876	4C
R877	8C
R878	8C
R880	8C
R881	8C
R882	2B
R883	3A
R884	3B
R885	4C
R886	9B
R887	9B
R888	9C
R889	10C
R890	9C
R891	9C
R892	8B
R894	8A
R895	9A
R896	10C
R897	9C
R898	9C
R899	9C
R901	9C
R902	9B
R903	10D
R904	9D
R905	4B
R906	8B
R907	8B
R908	9B
R909	8A
R910	8A
R911	9A
R912	7A
R913	7A
R914	2B
R915	4B
R925	8A
R926	6A
R927	6A
R928	7A
R929	7A
R930	7A
R931	7A
RT801	8A
S801	2E
S803A	1D
S803B	1D
S804A	1D
S804B	1D
S805A	1E
S805B	9D
S805C	8D
S806	4E
S807A	4C
S807B	4C
S808A	3B
S808B	3C
S809	6D
S809A	6D
S810	2E
S811	1C
S812	1C
S813	2C
S814	9D
S814A	9D
S815	1C
S816	1C
S817	2C
S818	2C
T801	4B
T802	2C
T803	8B
T804	8B
T805	2B
T806	9D
TB801	2E
TB803	2A
TB804-1	2D
TB804-2	2C
TB804-3	2C
TB806	3E
TB806-8	9C
TB806-9	8C
TB806-10	9A
TB806-11	9A
TB807-1	10C
TB807-2	9C
TB808-1	1C
TB808-2	2C
V801	2A
V803	3A
V804	4A
V805	5B
V806	6B
V807	5B
V808	6B





POSITION	SYMBOL	MARKING	INDUCTANCE
1	L302	300 KC	500-900
2	L303	400 KC	250 - 400
3	L304	500 KC	200 - 300
4	L305	600 KC	150 - 250
5	L306	700 KC	100 - 175
6	L307	800 KC	80 - 150
7	L308	900 KC	70 - 130
8	L309	1000 KC	65 - 110
9	L310	1100 KC	60 - 100
10	L311	1200 KC	50 - 90
11	L312	1300 KC	40 - 70
12	L313	1400 KC	35 - 60

LEGEND FOR CONTINUATION OF CIRCUITS FROM TB301, J301, J302, J316

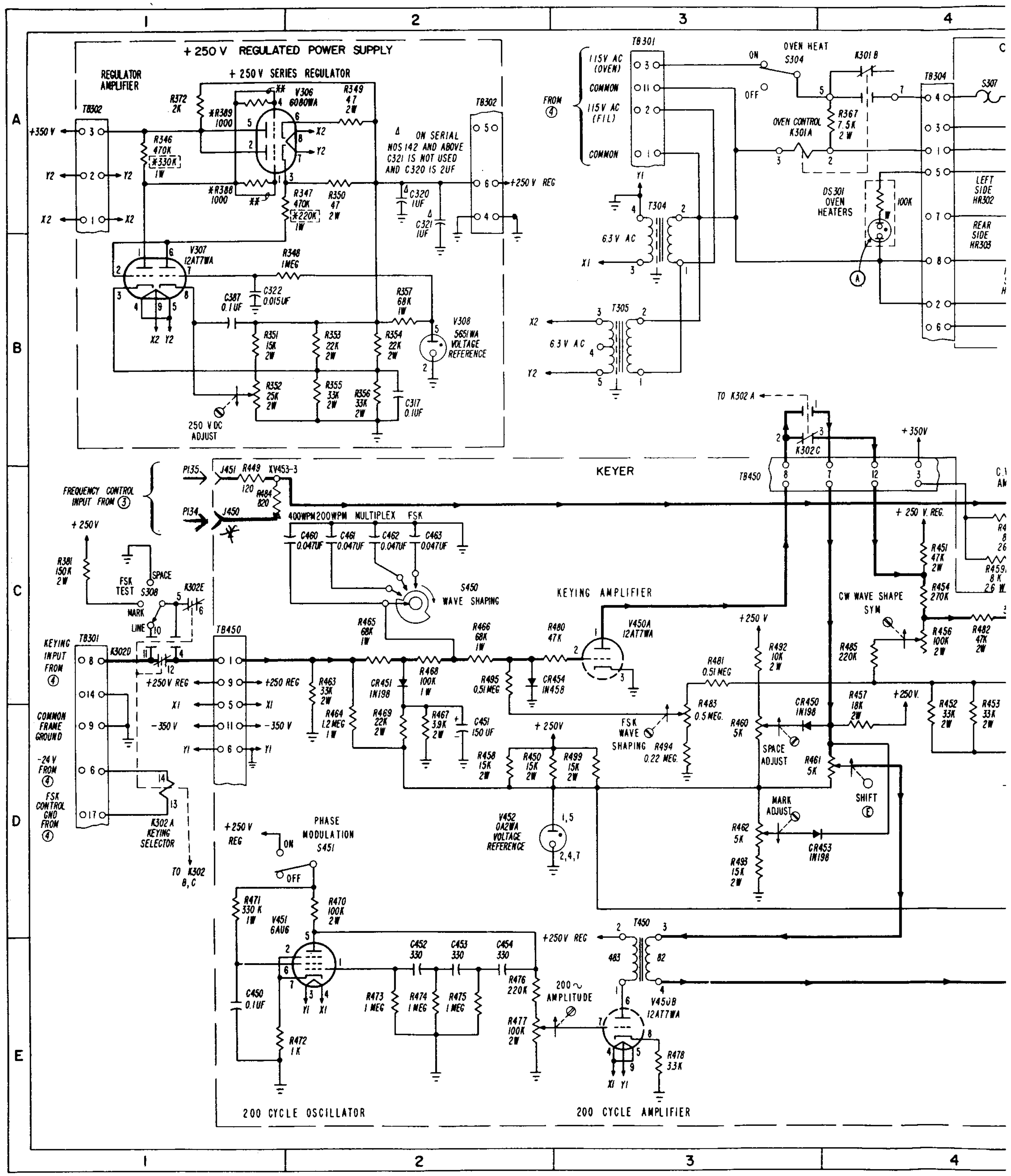
① RADIO FREQUENCY AMPLIFIER, AM-2197/WRT-1
③ ELECTRICAL FREQUENCY CONTROL, C-2861/WRT-1
④ AMPLIFIER-POWER SUPPLY, AM-2198/WRT-1
⑫ FREQUENCY MONITORING EQUIPMENT.

NOTES:
UNLESS OTHERWISE STATED:
ALL RESISTANCE VALUES ARE IN OHMS.
K- INDICATES THOUSANDS OF OHMS.
MEG- INDICATES MILLIONS OF OHMS.
ALL RESISTORS ARE 1/2 WATT.
ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.
UF - INDICATES MICROFARADS.
ALL INDUCTANCE VALUES ARE IN MICROHENRIES.
MH - INDICATES MILLIHENRIES.
ALL VOLTAGES ARE D-C.
NUMBERS ADJACENT TO WINDINGS INDICATE D-C RESISTANCES.
DOTTED LINES INDICATE MECHANICAL LINKAGE.
ALL RELAYS ARE SHOWN DEENERGIZED.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
* - APPLIES TO SETS SERIALS 35 AND UP.
** - APPLIES TO SETS SERIALS 1 THROUGH 34.

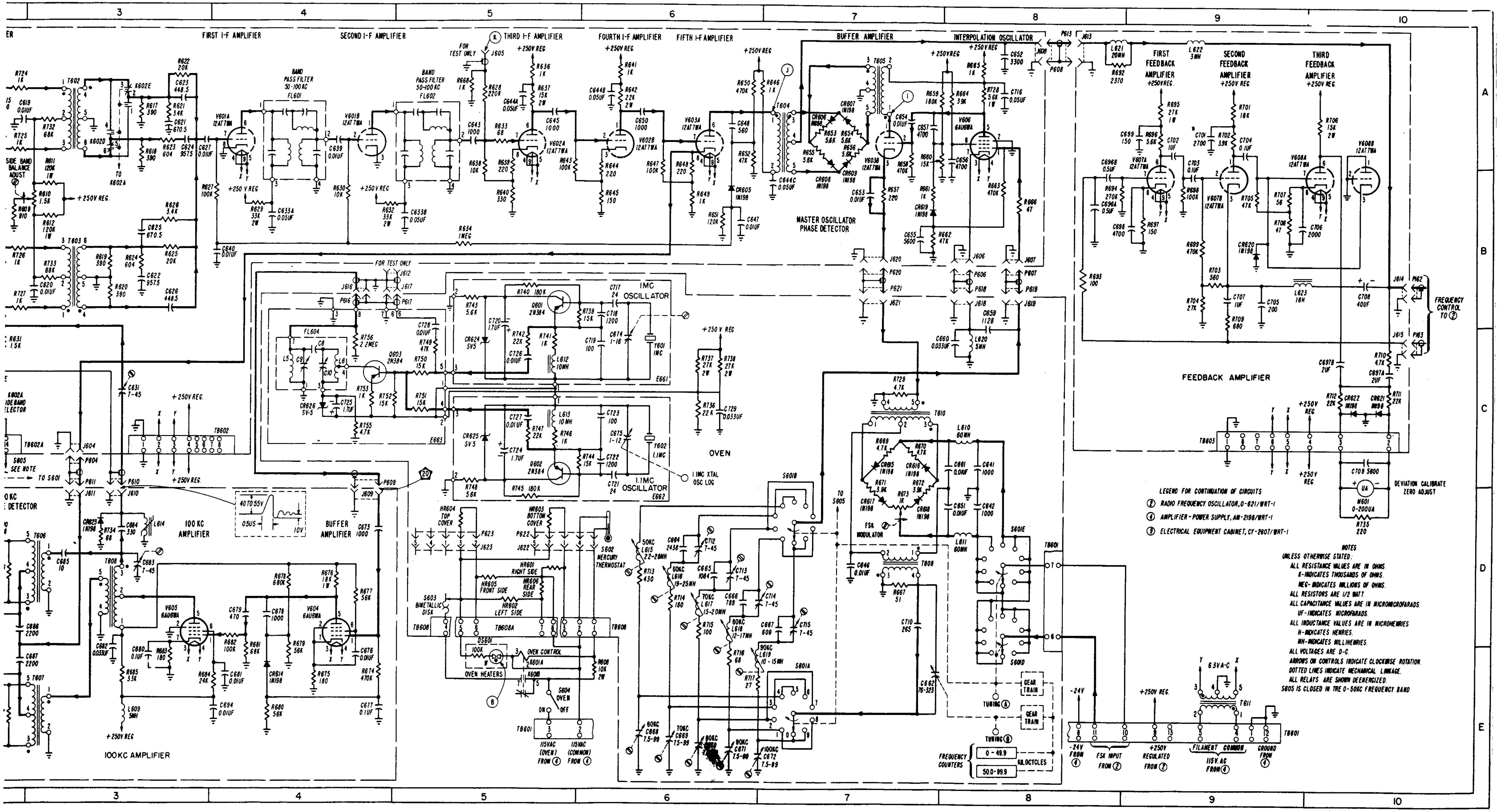
page 1-1

Figure 6-27. Radio Frequency Oscillator O-621/WRT-1, Schematic Diagram

Ref. Desig.	*Location*
C301	9B
C302	9B
C303	9B
C304	10C
C305	10B
C306	10B
C307	10A
C309	10A
C310	9A
C317	2B
C318	5B
C319	8E
C320	2A
C321	2A
C322	1B
C340	8E
C341	8D
C342	8D
C343	8D
C344	8D
C346	8C
C347	8C
C348	8C
C350	8B
C351	8B
C352	7D
C353	7D
C354	7D
C355	7D
C356	7D
C357	7C
C358	7C
C359	7C
C360	7C
C361	6C
C362	6B
C363	6B
C368	8B
C374	8B
C376	8D
C377	8D
C378	8D
C379	8D
C381	8C
C382	8C
C383	8C
C384	8C
C385	8B
C386	8B
C387	1B
C389	8E
C390	8D
C391	8D
C392	8D
C393	8D
C395	8C
C396	8C
C397	8C
C398	8C
C399	8B
C401	8B
C402	9B
C450	1E
C451	2D
C452	2E
C453	2E
C454	2D
C460	2C
C461	2C
C462	2C
C463	2C
CR301	9A
CR450	3D
CR451	2C
CR452	5C
CR453	3D
CR454	2C
DS301	4A
HR301	4B
HR302	4A
HR304	5A
HR305	5A
HR306	4B
J301	10B
J302	10A
J304	9B
J305	9B
J307	9B
J308	9B
J310	6E
J314	5A
J315	5A
J316	10B
J450	1C
J451	1C
K301A	3A
K301B	4A
K302A	5C
K302B	6C
K302C	3B
K302D	1C
K302E	1C
L301	8B
L302	7E
L303	7D
L304	7D
L305	7D
L306	7D
L307	7D
L308	7C
L309	7C
L310	7C
L311	6C
L312	6B
L313	6B
L314	5B
M301	5B
P131	10B
P132	10A
P133	10B
P134	1C
P135	1C
P304	9B
P305	9B
P307	9B
P308	9B
P314	5A
P315	5A
R301	9A
R302	9B
R303	9B
R304	9C
R305	10C
R306	10B
R307	10B
R308	10A
R309	10A
R310	10A
R311	9A
R312	9A
R313	9A
R314	9B
R341	5C
R346	1A
R347	1A
R348	2B
R349	2A
R350	2A
R351	1B
R352	1B
R353	2B
R354	2B
R355	2B
R356	2B
R357	2B
R358	10A
R365	10B
R366	10B
R367	4A
R369	5B
R370	6C
R371	5B
R372	1A
R381	1C
R382	6B
R387	5C
R388	1A
R389	1A
R449	1C
R450	2D
R451	4C
R452	4D
R453	4D
R454	4C
R455	4D
R456	4C
R457	4D
R458	2D
R449A	4C
R459B	4C
R460	3D
R461	3D
R462	3D
R463	2C
R464	2D
R465	2C
R466	2C
R467	2D
R468	2C
R469	2D
R470	2D
R472	2E
R473	2E
R474	2E
R475	2E
R476	2E
R477	2E
R478	3E
R479	5C
R480	3C
R481	3C
R482	4C
R483	3D
R484	1C
R485	4C
R486	5C
R487	5C
R488	5C
R489	5C
R490	5D
R491	5D
R492	3C
R493	3D
R494	3D
R495	2C
R496	5D
R497	5D
R498	5C
R499	3D
S301A	6A
S301B	8C
S301C	7D
S301D	8B
S304	3A
S306	5A
S307	4A
S308	1C
S450	2C
S451	2D
T301	10C
T302	10A
T304	3A
T305	3B
T450	3E
TB301	3A
TB302	2A
TB304	4A
TB306	5B
TB307	9C
TB450	5E
V301	9B
V302A	10C
V302B	9B
V306	2A
V307	1B
V308	2B
V450A	3C
V450B	3E
V451	2E
V452	2D
V454	4C
V553	4C



*{Signal Path} changed as per page 1-1



LEGEND FOR CONTINUATION OF CIRCUITS

② RADIO FREQUENCY OSCILLATOR, O-621/WRT-1

④ AMPLIFIER-POWER SUPPLY, AM-2198/WRT-1

⑨ ELECTRICAL EQUIPMENT CABINET, CY-2607/WRT-1

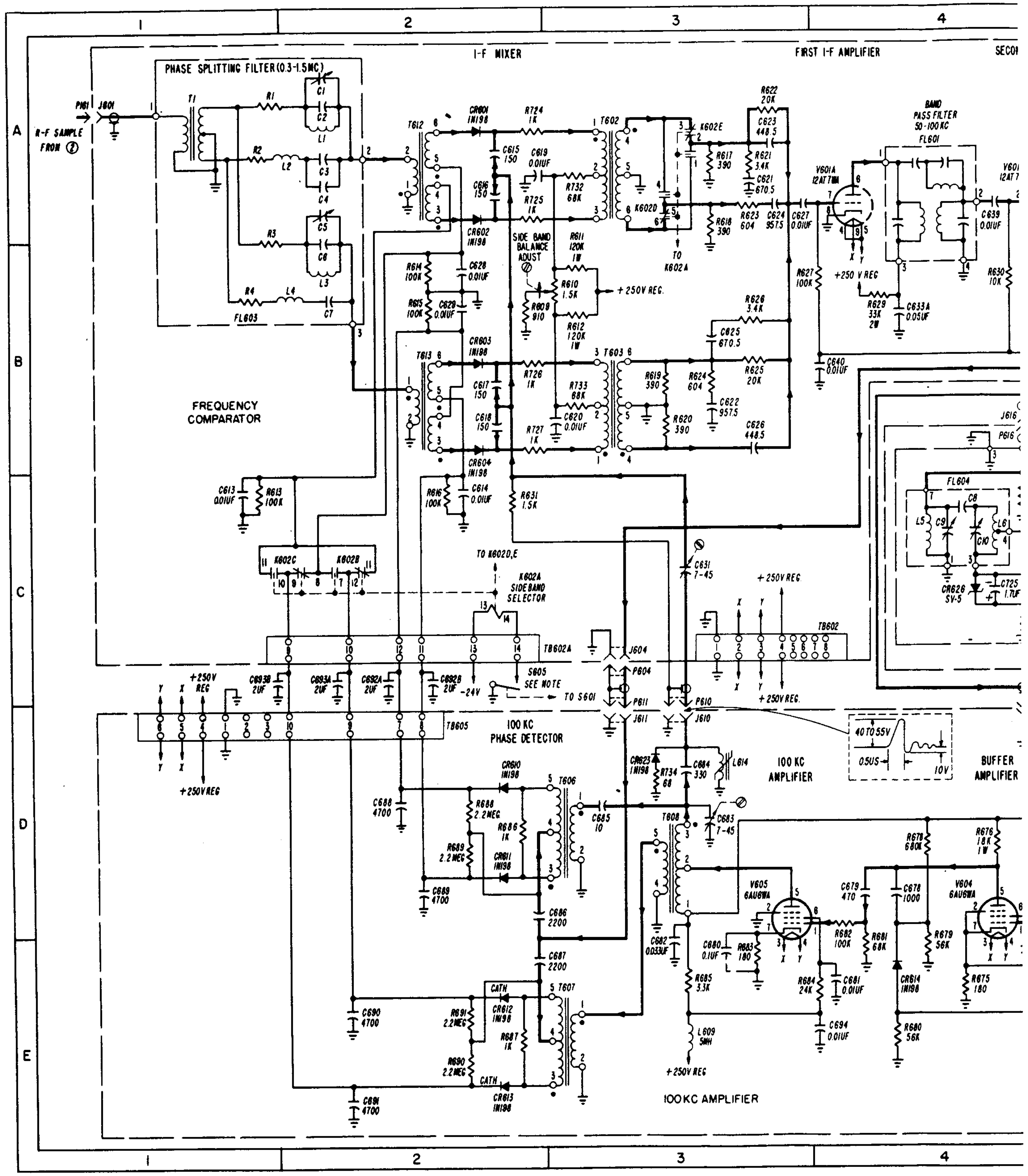
NOTES

UNLESS OTHERWISE STATED:
- ALL RESISTANCE VALUES ARE IN OHMS.
  - K-INDICATES THOUSANDS OF OHMS.
  - MEG-INDICATES MILLIONS OF OHMS.
- ALL RESISTORS ARE 1/2 WATT.
- ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.
  - UF-INDICATES MICROFARADS.
- ALL INDUCTANCE VALUES ARE IN MICROHENRIES
  - H-INDICATES HENRIES.
  - MH-INDICATES MILLIHENRIES.
- ALL VOLTAGES ARE D-C.
- ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
- DOTTED LINES INDICATE MECHANICAL LINKAGE.
- ALL RELAYS ARE SHOWN DEENERGIZED.

S605 IS CLOSED IN THE 0-50KC FREQUENCY BAND

Figure 6-28. Electrical Frequency Control C-2861/WRT-1, Schematic Diagram, Sets Serials 1 to 141

Ref. Desig.	Location
C613	2B
C614	2B
C615	2A
C616	2A
C617	2B
C618	2B
C619	2A
C620	3B
C621	3A
C622	3B
C623	3A
C624	3A
C625	3B
C626	3B
C627	3A
C628	2B
C629	2B
C631	3C
C633A	4B
C633B	5B
C639	4A
C640	4A
C641	8C
C642	8D
C643	5A
C644A	5A
C644B	6A
C644C	7B
C645	5A
C646	7D
C647	6B
C648	6A
C650	6A
C651	8D
C652	8A
C653	7B
C654	7A
C655	7B
C656	8A
C657	7A
C659	8C
C660	8C
C661	8C
C662	7E
C664	6D
C665	6D
C666	6D
C667	7D
C668	6E
C669	6E
C670	6E
C671	6E
C672	6E
C673	4D
C674	6C
C675	6C
C676	4E
C677	4E
C678	4D
C679	4D
C680	3E
C681	4E
C682	3E
C683	3D
C684	3D
C685	3D
C686	2D
C687	2E
C688	2D
C689	2D
C690	2E
C691	2E
C692A	2C
C692B	2C
C693A	2C
C693B	1C
C694	4E
C696A	8B
C696B	8B
C697A	10C
C697B	10C
C698	9B
C699	9A
C701	9A
C702	9A
C703	9B
C704	9A
C705	9B
C706	9B
C707	9B
C708	10B
C709	10C
C710	7D
C712	6D
C713	6D
C714	7D
C715	7D
C716	8A
C717	6B
C718	6B
C719	6C
C720	5B
C721	6C
C722	6C
C723	6C
C724	5C
C725	4C
C726	5C
C727	5C
C728	5C
CR601	2A
CR602	2A
CR603	2B
CR604	2B
CR605	6B
CR606	7A
CR607	7A
CR608	7A
CR609	7A
CR610	2D
CR611	2D
CR612	2E
CR613	2E
CR614	4E
CR615	7C
CR616	7C
CR617	7D
CR618	7D
CR619	7B
CR621	10C
CR622	10C
CR623	3D
CR624	5C
CR625	5C
CR626	4C
DS601	5E
E661	6C
E662	6D
E663	5C
FL601	4A
FL602	5A
FL603	1A
FL604	4C
HR601	5D
HR602	5D
HR603	5D
HR604	5D
HR605	5D
HR606	5D
J601	1A
J604	3C
J605	5A
J606	8B
J607	8B
J608	8A
J609	4D
J610	3D
J611	3D
J612	5B
J613	8A
J614	10B
J615	10C
J616	4C
J617	5B
J618	8B
J619	8B
J620	7B
J621	7B
J622	5D
J623	5D
K601A	5E
K601B	5E
K602A	2C
K602B	2C
K602C	2C
K602D	3A
K602E	3A
L609	3E
L610	8C
L611	8D
L612	5C
L613	5C
L614	3D
L615	6D
L616	6D
L617	6D
L618	6D
L619	6E
L620	8C
L621	8A
L622	9A
L623	9B
M601	10D
P161	1A
P162	10B
P163	10C
P604	3C
P606	8B
P607	8B
P608	8A
P609	4D
P610	3D
P611	3D
P613	8A
P616	4C
P617	5B
P618	8B
P619	8B
P620	7B
P621	7B
P622	5D
P623	5D
Q601	5B
Q602	5C
Q603	4C
R608	6E
R609	2B
R610	3B
R611	3B
R612	3B
R613	1C
R614	2B
R615	2B
R616	2C
R617	3A
R618	3A
R619	3B
R620	3B
R621	3A
R622	3A
R623	3A
R624	3B
R625	3B
R626	3B
R627	4B
R628	5A
R629	4B
R630	4B
R631	2C
R632	4B
R633	5A
R634	5B
R635	2C
R636	5A
R637	5A
R638	5A
R639	5A
R640	5B
R641	6A
R642	6A
R643	5A
R644	6A
R645	6B
R646	7A
R647	6A
R648	6A
R649	6B
R650	6A
R651	6B
R652	6A
R653	7A
R654	7A
R655	7A
R656	7A
R657	7B
R658	7A
R659	7A
R660	7A
R661	7B
R662	7B
R663	8B
R664	8A
R665	8A
R666	8B
R667	7D
R668	5A
R669	7C
R670	7C
R671	7D
R672	7D
R673	7D
R674	4E
R675	4E
R676	4D
R677	4D
R678	4D
R679	4E
R680	4E
R681	4E
R682	4D
R683	3E
R684	4E
R685	3E
R686	2D
R687	2E
R688	2D
R689	2D
R690	2E
R691	2E
R692	8A
R693	8B
R694	8B
R695	9A
R696	9A
R697	9B
R698	9B
R699	9B
R701	9A
R702	9A
R703	9B
R704	9B
R705	9B
R706	10A
R707	9B
R708	9B
R709	9B
R710	10C
R711	10C
R712	10C
R713	6D
R714	6D
R715	6D
R716	6E
R717	6E
R724	2A
R725	2A
R726	2B
R727	2B
R728	8A
R729	7C
R732	3A
R733	3B
R734	3D
R735	10D
R736	6C
R737	6C
R738	6C
R739	6B
R740	5B
R741	5C
R742	5C
R743	5B
R744	6C
R745	5D
R746	5C
R747	5C
R748	5C
R749	5C
R750	5C
R751	5C
R752	4C
R753	4C
R754	4C
R755	4C
R756	4C
S601A	7E
S601B	7D
S601D	8E
S601E	8D
S602	6D
S603	5D
S604	5E
S605	2C
T602	3A
T603	3B
T604	7A
T605	7A
T606	3D
T607	3E
T608	3D
T609	7D
T610	7C
T611	9E
T612	2A
T613	2B
TB601	5E
TB601	8D
TB601	9E
TB602	3C
TB602A	2C
TB603	9C
TB605	2D
TB608	5D
TB608	6D
TB608A	5D
V601A	4A
V601B	4A
V602A	5A
V602B	6A
V603A	6A
V603B	7A
V604	4D
V605	3D
V606	8A
V607A	9B
V607B	9B
V606A	10B
V608B	10B
Y601	6C
Y602	6C



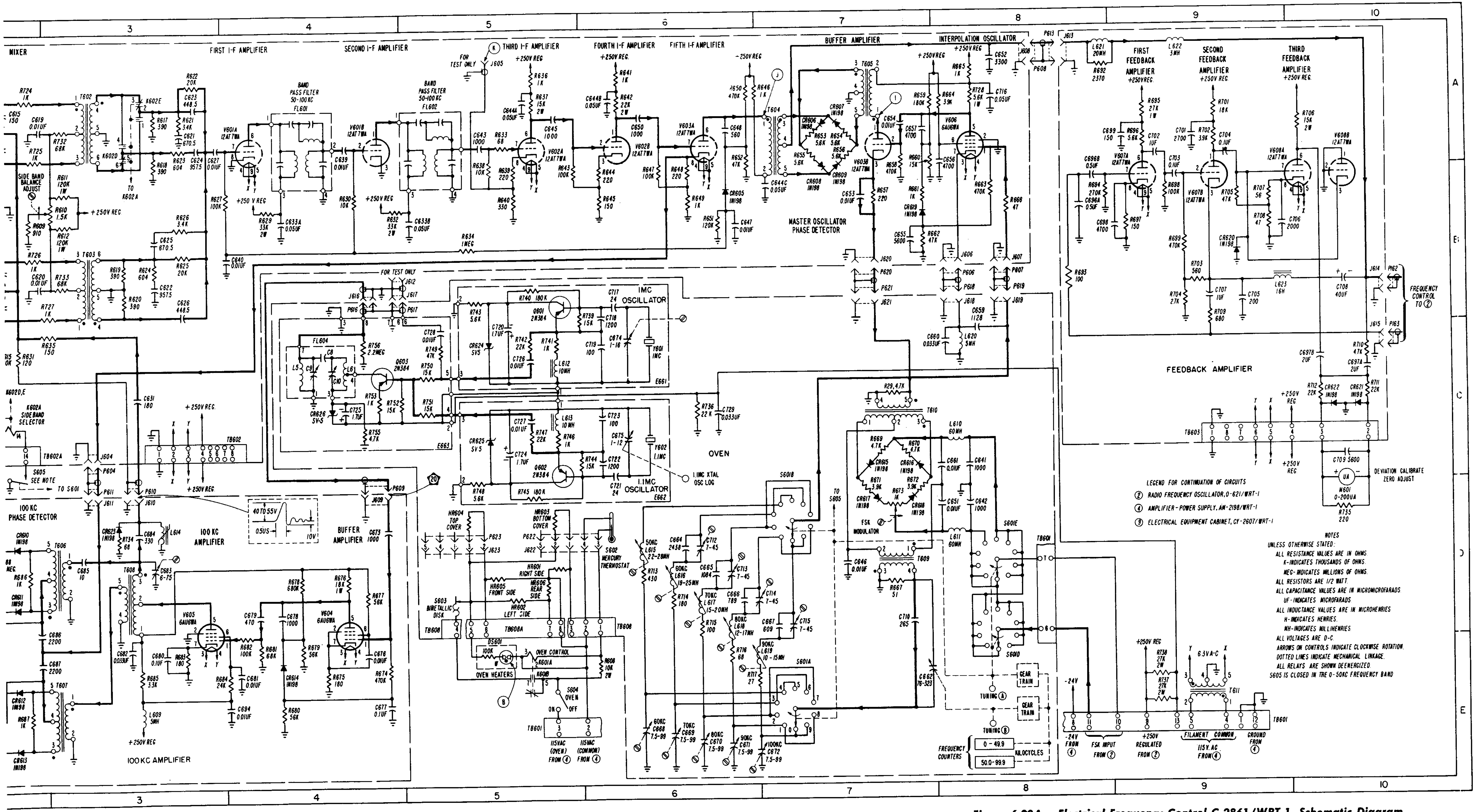
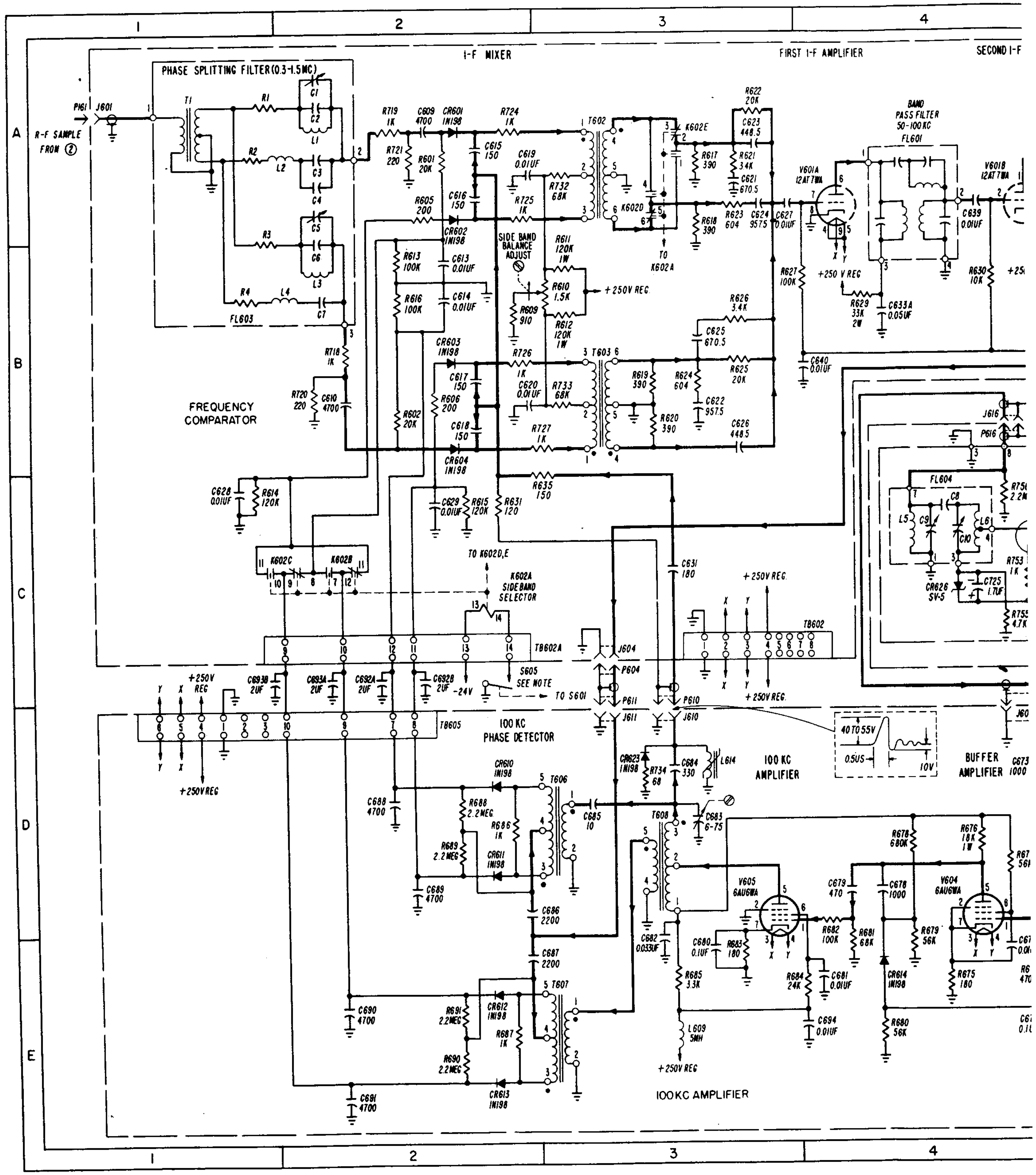
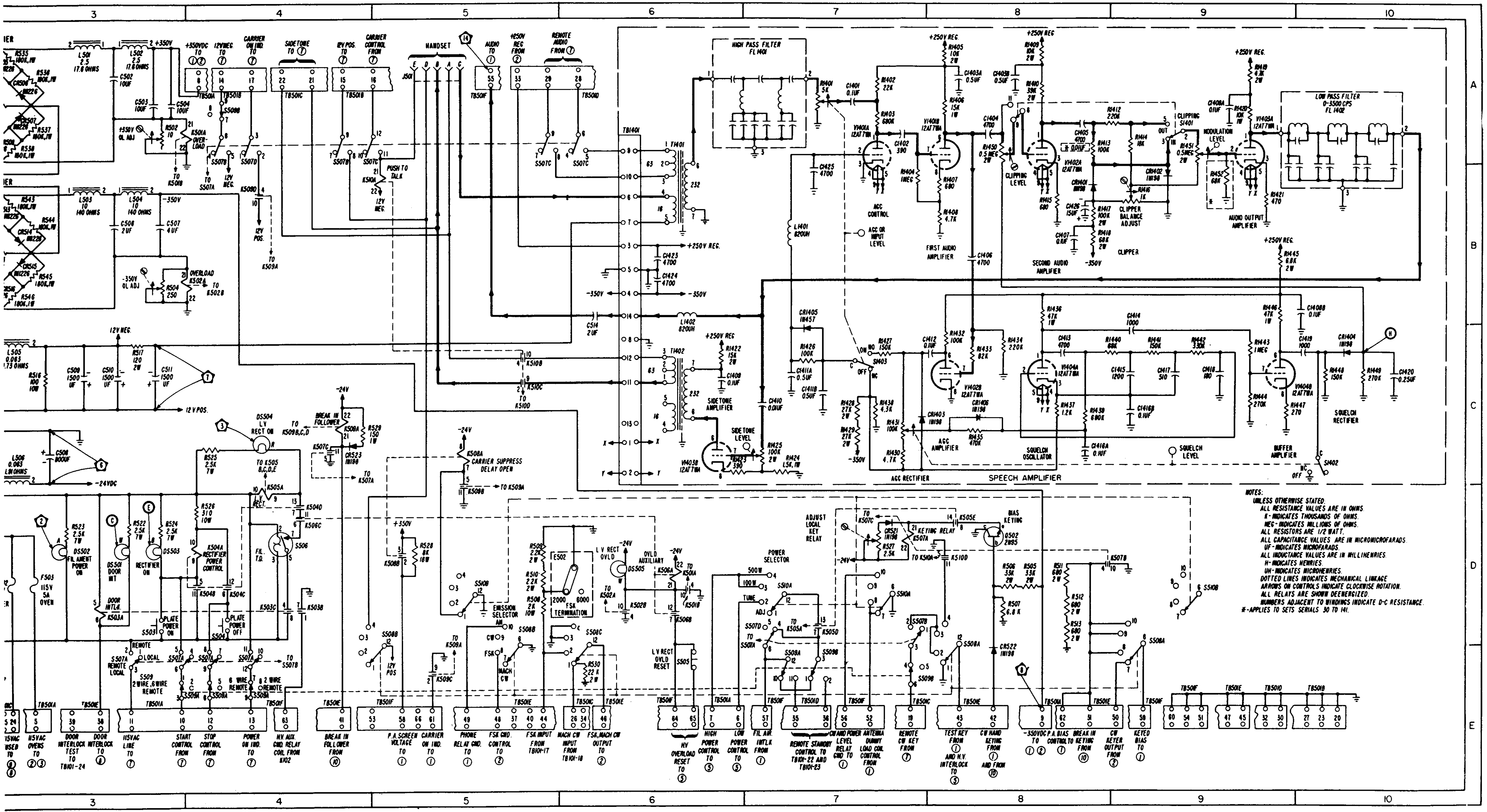


Figure 6-28A. Electrical Frequency Control C-2861/WRT-1, Schematic Diagram, Sets Serials 142 and up

Ref. Desig.	Location
C613	2B
C614	2B
C615	2A
C616	2A
C617	2B
C618	2B
C619	2A
C620	3B
C621	3A
C622	3B
C623	3A
C624	3A
C625	3B
C626	3B
C627	3A
C628	2B
C629	2B
C631	3C
C633A	4B
C633B	5B
C639	4A
C640	4A
C641	8C
C642	8D
C643	5A
C644A	5A
C644B	6A
C644C	7B
C645	5A
C646	7D
C647	6B
C648	6A
C650	6A
C651	8D
C652	8A
C653	7B
C654	7A
C655	7B
C656	8A
C657	7A
C659	8C
C660	8C
C661	8C
C662	7E
C664	6D
C665	6D
C666	6D
C667	7D
C668	6E
C669	6E
C670	6E
C671	6E
C672	6E
C673	4D
C674	6C
C675	6C
C676	4E
C677	4E
C678	4D
C679	4D
C680	3E
C681	4E
C682	3E
C683	3D
C684	3D
C685	3D
C686	2D
C687	2E
C688	2D
C689	2D
C690	2E
C691	2E
C692A	2C
C692B	2C
C693A	2C
C693B	1C
C694	4E
C696A	8B
C696B	8B
C697A	10C
C697B	10C
C698	9B
C699	9A
C701	9A
C702	9A
C703	9B
C704	9A
C705	9B
C706	9B
C707	9B
C708	10B
C709	10C
C710	7D
C712	6D
C713	6D
C714	7D
C715	7D
C716	8A
C717	6B
C718	6B
C719	6C
C720	5B
C721	6C
C722	6C
C723	6C
C724	5C
C725	4C
C726	5C
C727	5C
C728	5C
CR601	2A
CR602	2A
CR603	2B
CR604	2B
CR605	6B
CR606	7A
CR607	7A
CR608	7A
CR609	7A
CR610	2D
CR611	2D
CR612	2E
CR613	2E
CR614	4E
CR615	7C
CR616	7C
CR617	7D
CR618	7D
CR619	7B
CR621	10C
CR622	10C
CR623	3D
CR624	5C
CR625	5C
CR626	4C
DS601	5E
E661	6C
E662	6D
E663	5C
FL601	4A
FL602	5A
FL603	1A
FL604	4C
HR601	5D
HR602	5D
HR603	5D
HR604	5D
HR605	5D
HR606	5D
J601	1A
J604	3C
J605	5A
J606	8B
J607	8B
J608	8A
J609	4D
J610	3D
J611	3D
J612	5B
J613	8A
J614	10B
J615	10C
J616	4C
J617	5B
J618	8B
J619	8B
J620	7B
J621	7B
J622	5D
J623	5D
K601A	5E
K601B	5E
K602A	2C
K602B	2C
K602C	2C
K602D	3A
K602E	3A
L609	3E
L610	8C
L611	8D
L612	5C
L613	5C
L614	3D
L615	6D
L616	6D
L617	6D
L618	6D
L619	6E
L620	8C
L621	8A
L622	9A
L623	9B
M601	10D
P161	1A
P162	10B
P163	10C
P604	3C
P606	8B
P607	8B
P608	8A
P609	4D
P610	3D
P611	3D
P613	8A
P616	4C
P617	5B
P618	8B
P619	8B
P620	7B
P621	7B
P622	5D
P623	5D
Q601	5B
Q602	5C
Q603	4C
R608	6E
R609	2B
R610	3B
R611	3B
R612	3B
R613	1C
R614	2B
R615	2B
R616	2C
R617	3A
R618	3A
R619	3B
R620	3B
R621	3A
R622	3A
R623	3A
R624	3B
R625	3B
R626	3B
R627	4B
R628	5A
R629	4B
R630	4B
R631	2C
R632	4B
R633	5A
R634	5B
R635	2C
R636	5A
R637	5A
R638	5A
R639	5A
R640	5B
R641	6A
R642	6A
R643	5A
R644	6A
R645	6B
R646	7A
R647	6A
R648	6A
R649	6B
R650	6A
R651	6B
R652	6A
R653	7A
R654	7A
R655	7A
R656	7A
R657	7B
R658	7A
R659	7A
R660	7A
R661	7B
R662	7B
R663	8B
R664	8A
R665	8A
R666	8B
R667	7D
R668	5A
R669	7C
R670	7C
R671	7D
R672	7D
R673	7D
R674	4E
R675	4E
R676	4D
R677	4D
R678	4D
R679	4E
R680	4E
R681	4E
R682	4D
R683	3E
R684	4E
R685	3E
R686	2D
R687	2E
R688	2D
R689	2D
R690	2E
R691	2E
R692	8A
R693	8B
R694	8B
R695	9A
R696	9A
R697	9B
R698	9B
R699	9B
R701	9A
R702	9A
R703	9B
R704	9B
R705	9B
R706	10A
R707	9B
R708	9B
R709	9B
R710	10C
R711	10C
R712	10C
R713	6D
R714	6D
R715	6D
R716	6E
R717	6E
R718	2B
R719	2A
R720	2B
R721	2A
R724	2A
R725	2A
R726	2B
R727	2B
R728	8A
R729	7C
R732	3A
R733	3B
R734	3D
R735	10D
R736	6C
R737	9E
R738	9E
R739	6B
R740	5B
R741	5C
R742	5C
R743	5B
R744	6C
R745	5D
R746	5C
R747	5C
R748	5C
R749	5C
R750	5C
R751	5C
R752	4C
R753	4C
R754	4C
R755	4C
R756	4C
S601A	7E
S601B	7D
S601D	8E
S601E	8D
S602	6D
S603	5D
S604	5E
S605	2C
T602	3A
T603	3B
T604	7A
T605	7A
T606	3D
T607	3E
T608	3D
T609	7D
T610	7C
T611	9E
T612	2A
T613	2B
TB601	5E
TB601	8D
TB601	9E
TB602	3C
TB602/	2C
TB603	9C
TB605	2D
TB608	5D
TB608	6D
TB608/	5D
V601A	4A
V601B	4A
V602A	5A
V602B	6A
V603A	6A
V603B	7A
V604	4D
V605	3D
V606	8A
V607A	9B
V607B	9B
V606A	10B
V608B	10B
Y601	6C
Y602	6C

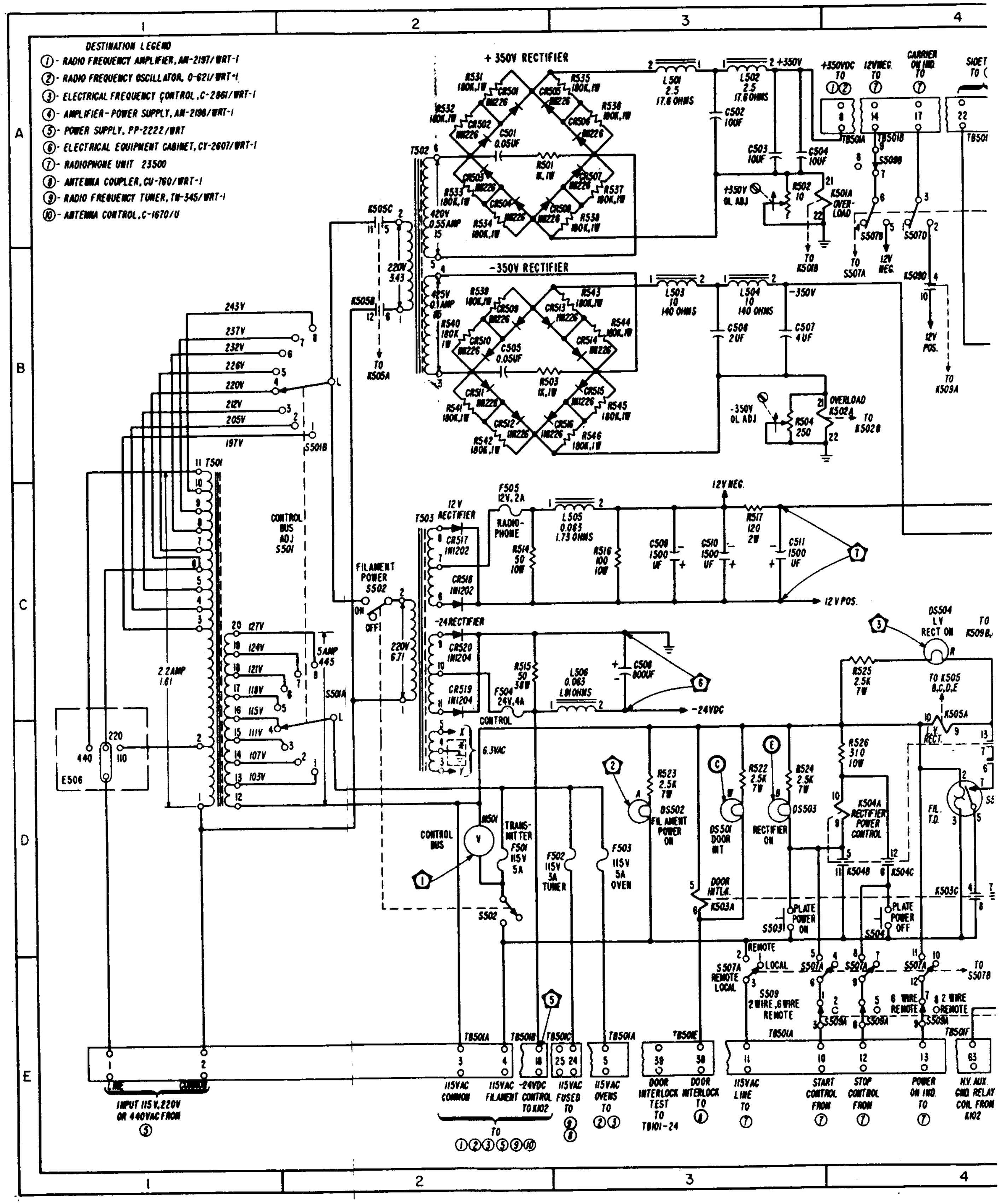


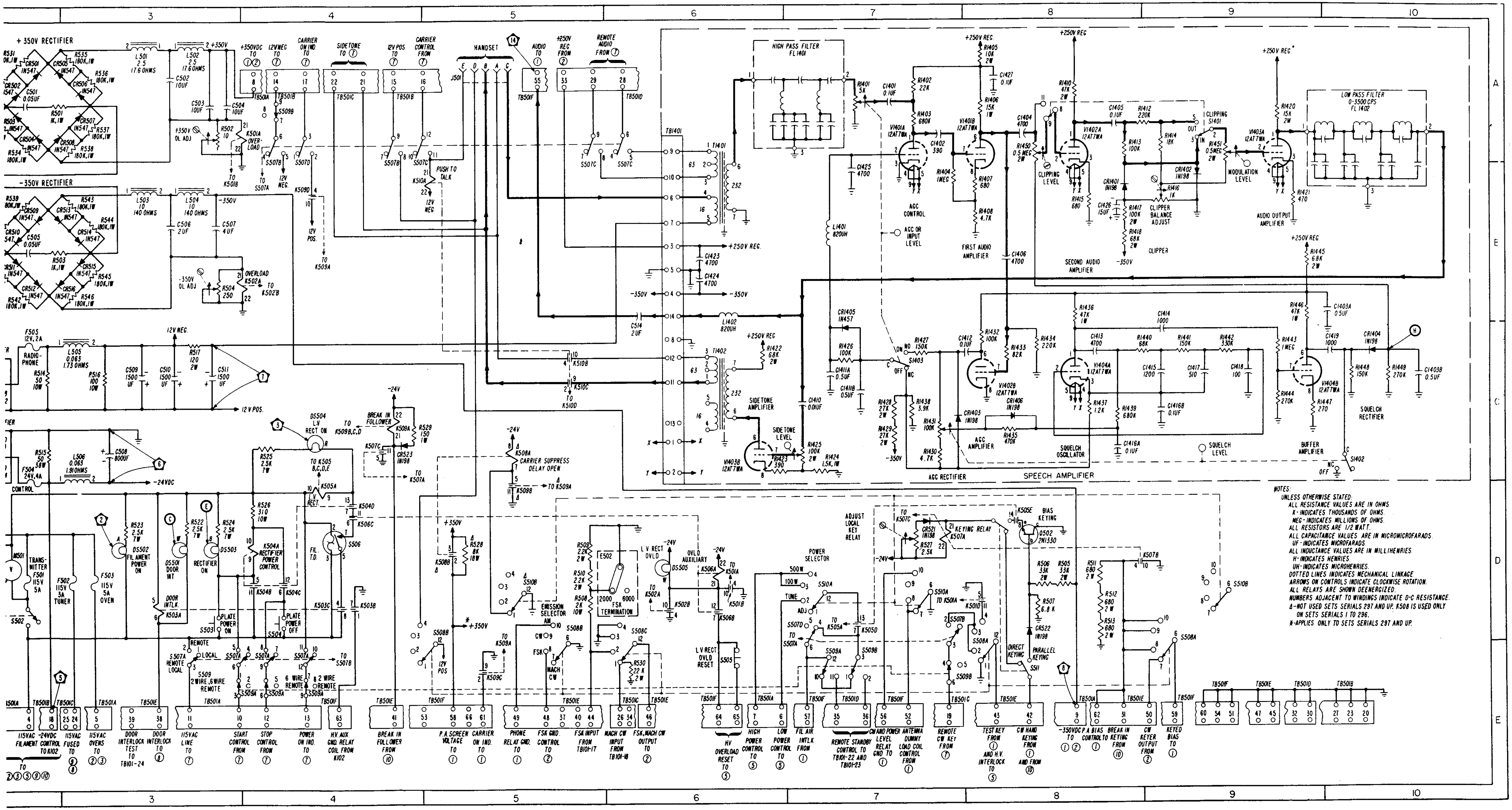


NOTES:
UNLESS OTHERWISE STATED:
ALL RESISTANCE VALUES ARE IN OHMS.
K-INDICATES THOUSANDS OF OHMS.
MEG-INDICATES MILLIONS OF OHMS.
ALL RESISTORS ARE 1/2 WATT.
ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.
UF-INDICATES MICROFARADS.
ALL INDUCTANCE VALUES ARE IN MILLIHENRIES.
H-INDICATES HENRIES.
UH-INDICATES MICROHENRIES.
DOTTED LINES INDICATES MECHANICAL LINKAGE
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
ALL RELAYS ARE SHOWN DEENERGIZED.
NUMBERS ADJACENT TO WINDINGS INDICATE D-C RESISTANCE.
#-APPLIES TO SETS SERIALS 30 TO 141.

Figure 6-29. **Amplifier-Power Supply AM-2198/WRT-1, Schematic Diagram, Sets Serials 1 to 141**

Ref. Desig.	Location
C501	2A
C502	3A
C503	3A
C504	3A
C505	2B
C506	3B
C507	3B
C508	3C
C509	3C
C510	3C
C511	3C
C514	6C
C1401	7A
C1402	7A
C1403A	8A
C1403B	8A
C1404	8A
C1405	8A
C1406	8B
C1407	8B
C1408A	9A
C1408B	10B
C1409	6C
C1410	7C
C1411A	7C
C1411B	7C
C1412	8C
C1414	9B
C1415	9C
C1416A	8C
C1416B	9C
C1417	9C
C1418	9C
C1419	10C
C1420	10C
C1423	6B
C1424	6B
C1425	7B
C1426	8B
CR501	2A
CR502	2A
CR503	2A
CR504	2A
CR505	2A
CR506	3A
CR507	3A
CR508	3A
CR509	2B
CR510	2B
CR511	2B
CR512	2B
CR513	3B
CR514	3B
CR515	3B
CR516	3B
CR517	2C
CR518	2C
CR519	2C
CR520	2C
CR521	7D
CR522	8E
CR523	4C
CR1401	8B
CR1402	9B
CR1403	8C
CR1404	10C
CR1405	7B
DS501	3D
DS502	3D
DS503	3D
DS504	4C
DS505	6D
E502	5D
E506	1D
F501	2D
F502	3D
F503	3D
F504	2C
F505	2C
FL1401	7A
FL1402	10A
J501	5A
K501A	4A
K501B	6D
K502A	4B
K502B	6D
K503A	3D
K503B	4D
K503C	4D
K504A	4D
K504B	4D
K504C	4D
K504D	4D
K505A	4D
K505B	2B
K505C	2A
K505D	7D
K505E	8D
K506A	6D
K506B	6D
K506C	4D
K507A	7D
K507B	9D
K507C	4C
K508A	5C
K508B	5D
K509A	4C
K509B	5D
K509C	5E
K509D	4B
K510A	4B
K510B	5C
K510C	5C
K510D	8D
L501	3A
L502	3A
L503	3B
L504	3B
L505	3C
L506	3C
L1401	7B
L1402	6B
M501	2D
Q502	8D
R501	2A
R502	3A
R503	2B
R504	3B
R505	8D
R506	8D
R507	8D
R508	5D
R509	5D
R510	5D
R511	8D
R512	8D
R513	8D
R514	2C
R515	2C
R516	3C
R517	3C
R522	3D
R523	3D
R524	3D
R525	4C
R526	4D
R527	7D
R528	5D
R529	5C
R530	6E
R531	2A
R532	2A
R533	2A
R534	2A
R535	3A
R536	3A
R537	3A
R538	3A
R539	2B
R540	2B
R541	2B
R542	2B
R543	3B
R544	3B
R545	3B
R546	3B
R1401	7A
R1402	7A
R1403	7A
R1404	7B
R1405	8A
R1406	8A
R1407	8B
R1408	8B
R1409	8A
R1410	8A
R1411	8A
R1412	9A
R1413	8A
R1414	9A
R1415	8B
R1416	9B
R1417	8B
R1418	8B
R1419	9A
R1420	9A
R1421	9B
R1422	6C
R1423	6C
R1424	7C
R1425	7C
R1426	7C
R1427	7C
R1428	7C
R1429	7C
R1430	7C
R1431	7C
R1432	8C
R1433	8C
R1434	8C
R1435	8C
R1436	8B
R1437	8C
R1438	7C
R1439	8C
R1440	9C
R1441	9C
R1442	9C
R1443	9C
R1444	9C
R1445	9B
R1446	9B
R1447	10C
R1448	10C
R1449	10C
R1450	8A
R1451	9A
S501	2C
S501A	2C
S501B	2B
S502	2C
S502	2D
S503	3D
S504	4D
S505	6E
S506	4D
S507A	3E
S507A	4B
S507A	4E
S507B	4A
S507B	7D
S507C	4A
S507C	5B
S507C	6B
S507D	4A
S508A	8D
S508A	9D
S508B	5D
S508C	6D
S509	3E
S509A	4E
S509A	7E
S509B	4A
S509B	7E
S510A	7D
S510B	5D
S510B	9D
S1401	8A
S1402	10C
S1403	7C
T501	1B
T502	2A
T503	2C
T1401	6A
T1402	6C
TB501A	2E
TB501A	3E
TB501A	4A
TB501A	6E
TB501A	8E
TB501B	2E
TB501B	4A
TB501B	10E
TB501C	4E
TB501C	4A
TB501C	6E
TB501C	7E
TB501D	6A
TB501D	7E
TB501D	9E
TB501E	3E
TB501E	4E
TB501E	5E
TB501E	6E
TB501E	8E
TB501E	9E
TB501F	4E
TB501F	5A
TB501F	5E
TB501F	6E
TB501F	7E
TB501F	9E
TB1401	6A
V1401A	7A
V1401B	8A
V1402A	8A
V1402B	8C
V1403A	9A
V1403B	6C
V1404A	8C
V1404B	10C





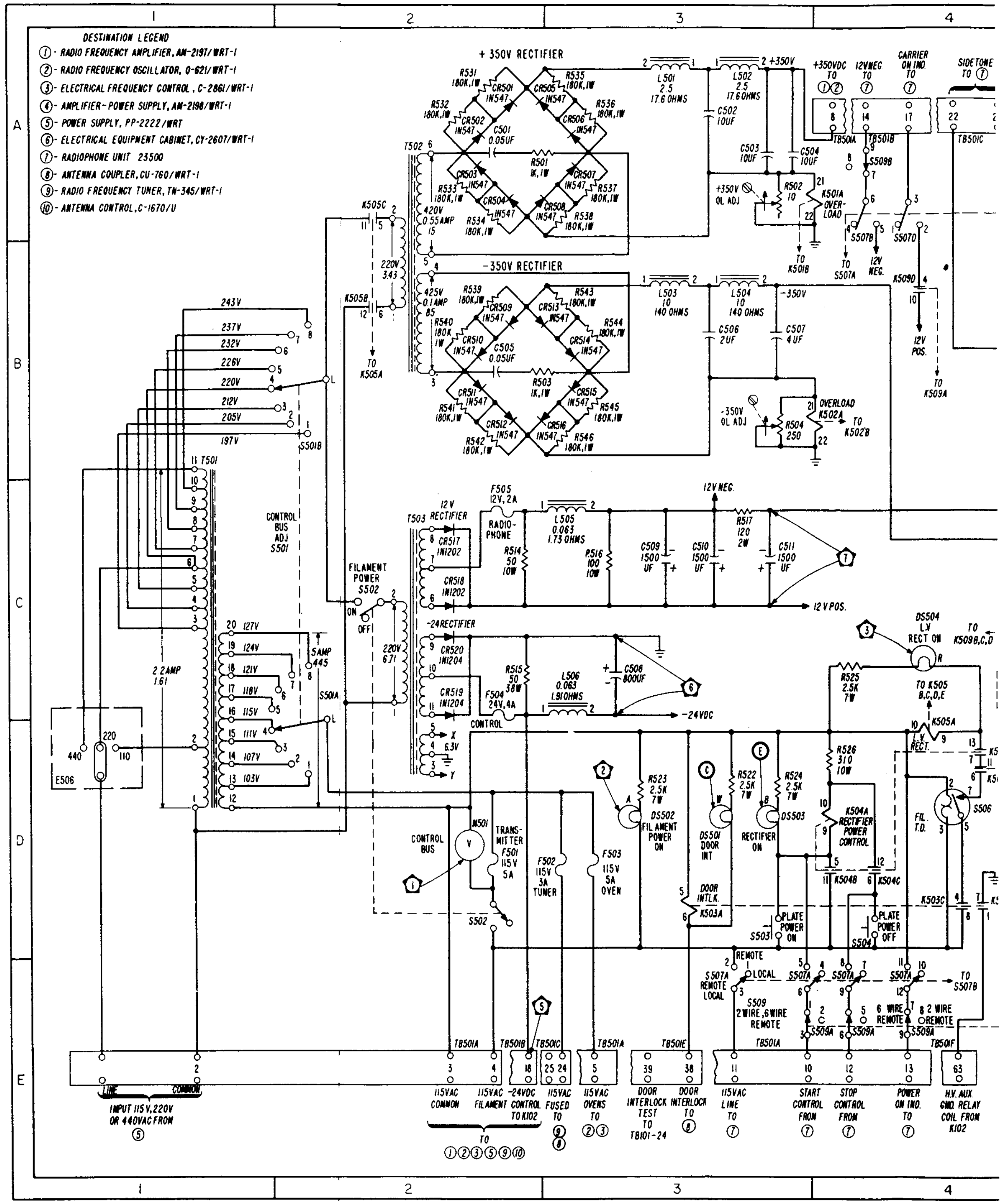
NOTES:

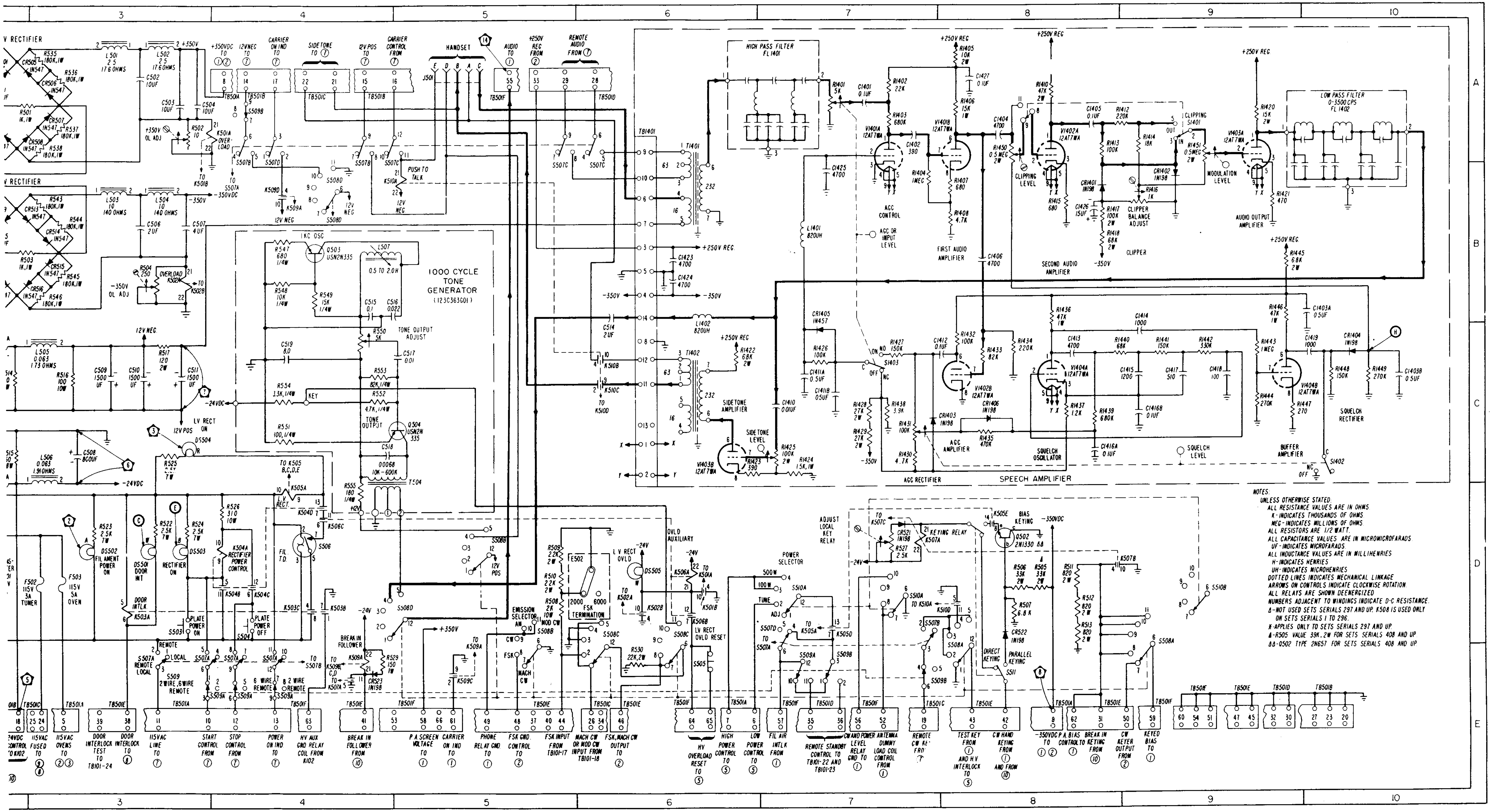
UNLESS OTHERWISE STATED:

ALL RESISTANCE VALUES ARE IN OHMS.
K- INDICATES THOUSANDS OF OHMS.
MEG- INDICATES MILLIONS OF OHMS.
ALL RESISTORS ARE 1/2 WATT.
ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.
UF- INDICATES MICROFARADS.
ALL INDUCTANCE VALUES ARE IN MILLIHENRIES.
H- INDICATES HENRIES.
UH- INDICATES MICROHENRIES.
DOTTED LINES INDICATE MECHANICAL LINKAGE.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
ALL RELAYS ARE SHOWN DEENERGIZED.
NUMBERS ADJACENT TO WINDINGS INDICATE D-C RESISTANCE.
Δ-NOT USED SETS SERIALS 297 AND UP. K508 IS USED ONLY ON SETS SERIALS 1 TO 296.
✱-APPLIES ONLY TO SETS SERIALS 297 AND UP.

Figure 6-29A. Amplifier-Power Supply AM-2198/WRT-1, Schematic Diagram, Sets Serials 142 and up

Ref. Desig.	*Location*
C501	2A
C502	3A
C503	3A
C504	3A
C505	2B
C506	3B
C507	3B
C508	3C
C509	3C
C510	3C
C511	3C
C514	6C
C1401	7A
C1402	7A
C1403B	10C
C1404	8A
C1405	8A
C1406	8B
C1411A	7C
C1411B	7C
C1412	7C
C1413	8C
C1414	9C
C1415	9C
C1416A	8C
C1416B	9C
C1417	9C
C1418	9C
C1419	10C
C1423	6B
C1424	6B
C1425	7B
C1426	8B
C1427	8A
CR501	2A
CR502	2A
CR503	2A
CR504	2A
CR505	3A
CR506	3A
CR507	3A
CR508	3A
CR509	2B
CR510	2B
CR511	2B
CR512	2B
CR513	2B
CR514	3B
CR515	3B
CR516	2B
CR517	2C
CR518	2C
CR519	2C
CR520	2C
CR521	7D
CR522	8D
CR523	4C
CR1401	8B
CR1402	9B
CR1403	7C
CR1404	10C
CR1405	7B
CR1406	8C
DS501	3D
DS502	3D
DS503	3D
DS504	4C
DS505	6D
E502	6D
E506	1D
F501	2D
F502	2D
F503	3D
F504	2C
F505	2C
FL1401	7A
FL1402	10A
K501A	4A
K501B	6D
K502B	6D
K503A	3D
K503B	4D
K503C	4D
K504A	4D
K504B	4D
K504C	4D
K504D	4D
K505A	4D
K505B	2B
K505C	2A
K505D	7D
K505E	8D
K506A	6D
K506B	6D
K506C	4D
K507A	7D
K507B	8D
K507C	4C
K508A	5C
K508B	5D
K509A	4C
K509C	5E
K509D	4B
K510A	5B
K510B	5C
K510C	5C
L501	3A
L502	3A
L503	3B
L504	3B
L505	3C
L506	3C
L1401	7B
L1402	6B
M501	2D
Q502	8D
R501	3A
R502	3A
R503	2B
R504	3B
R505	8D
R506	8D
R507	8D
R508	5D
R509	5D
R510	5D
R511	8D
R512	8D
R513	8D
R514	2C
R515	2C
R516	3C
R517	3C
R522	3D
R523	3D
R524	3D
R525	4C
R526	4D
R527	7D
R528	5D
R529	4C
R530	6E
R531	2A
R532	2A
R533	2A
R534	2A
R536	3A
R537	3A
R538	3A
R539	2B
R540	2B
R541	2B
R542	2B
R543	3B
R544	3B
R545	3B
R546	3B
R1401	7A
R1402	7A
R1403	7A
R1404	7B
R1405	8A
R1406	8A
R1407	8B
R1408	8B
R1410	8A
R1412	9A
R1413	8A
R1414	9A
R1415	8B
R1416	9B
R1417	8B
R1418	8B
R1420	9A
R1421	9B
R1422	6C
R1423	6C
R1426	7C
R1427	7C
R1428	7C
R1429	7C
R1430	7C
R1431	7C
R1432	8C
R1433	8C
R1434	8C
R1435	8C
R1436	8B
R1437	8C
R1438	7C
R1439	8C
R1440	9C
R1441	9C
R1442	9C
R1443	9C
R1444	9C
R1445	9B
R1446	9B
R1447	9C
R1448	10C
R1449	10C
R1450	8A
R1451	9A
S501A	2C
S501B	2B
S502	2C
S503	3D
S504	4D
S505	6E
S506	4D
S507A	3E
S507A	4E
S507B	4A
S507C	4A
S507C	5A
S507D	4A
S507D	7D
S508A	8E
S508A	9D
S508B	5D
S508B	5E
S509A	4E
S509A	7E
S509B	4A
S509B	7E
S510A	7D
S510B	5D
S510B	9D
S511	8E
S1401	9A
S1402	10C
S1403	7C
T501	1B
T502	2A
T503	2C
T1401	6A
T1402	6C
TB501A	2E
TB501A	3E
TB501A	4A
TB501A	6E
TB501A	8E
TB501B	2E
TB501B	4A
TB501B	10E
TB501C	3E
TB501C	4A
TB501C	6E
TB501D	6A
TB501D	7E
TB501D	9E
TB501E	3E
TB501E	4E
TB501E	5E
TB501E	8E
TB501E	9E
TB501F	4E
TB501F	5A
TB501F	5E
TB501F	6E
TB501F	7E
TB501F	9E
TB1401	6A
V1401A	7A
V1401B	8A
V1402A	8A
V1402B	8C
V1403A	9A
V1403B	6C
V1404A	8C
V1404B	10C

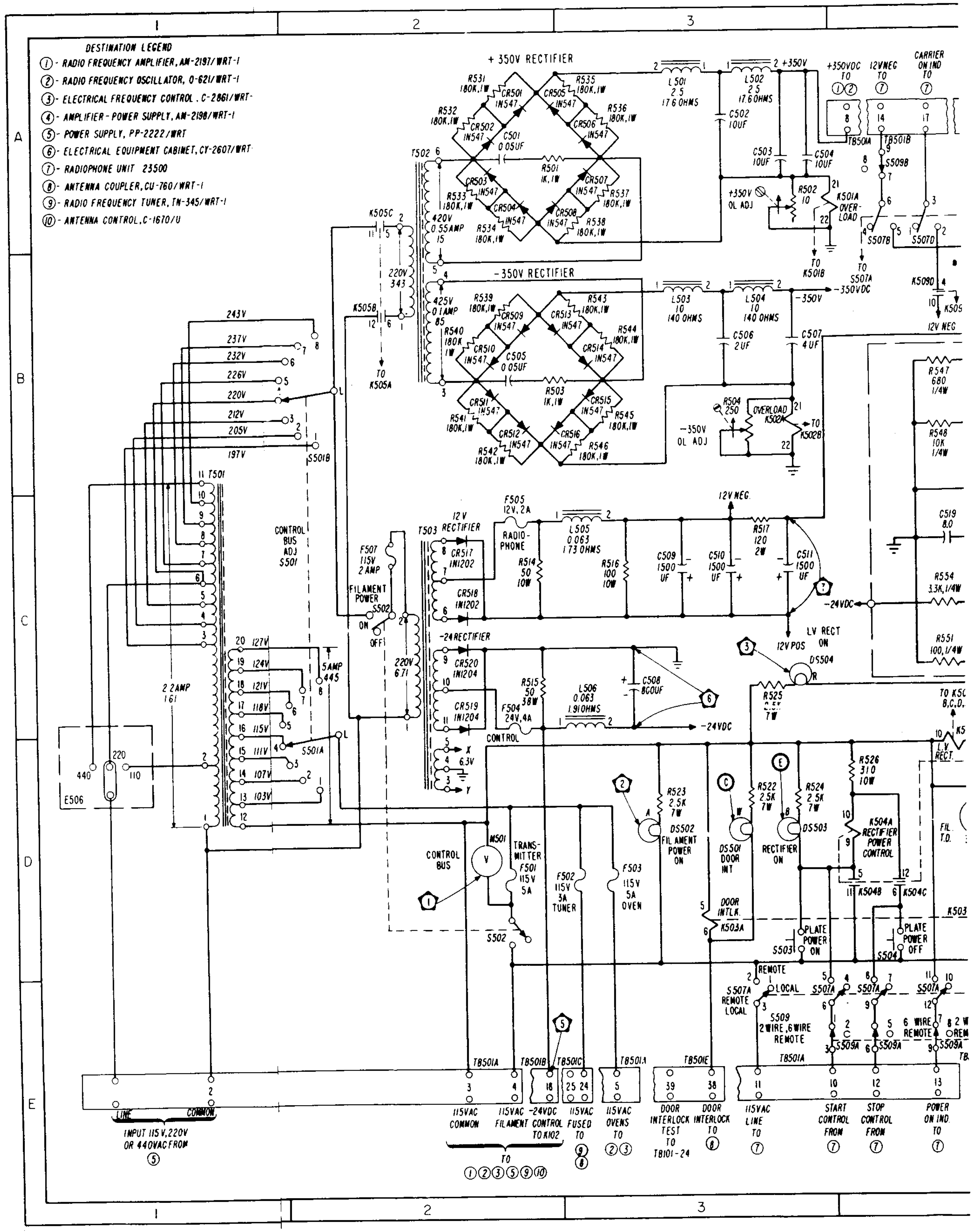


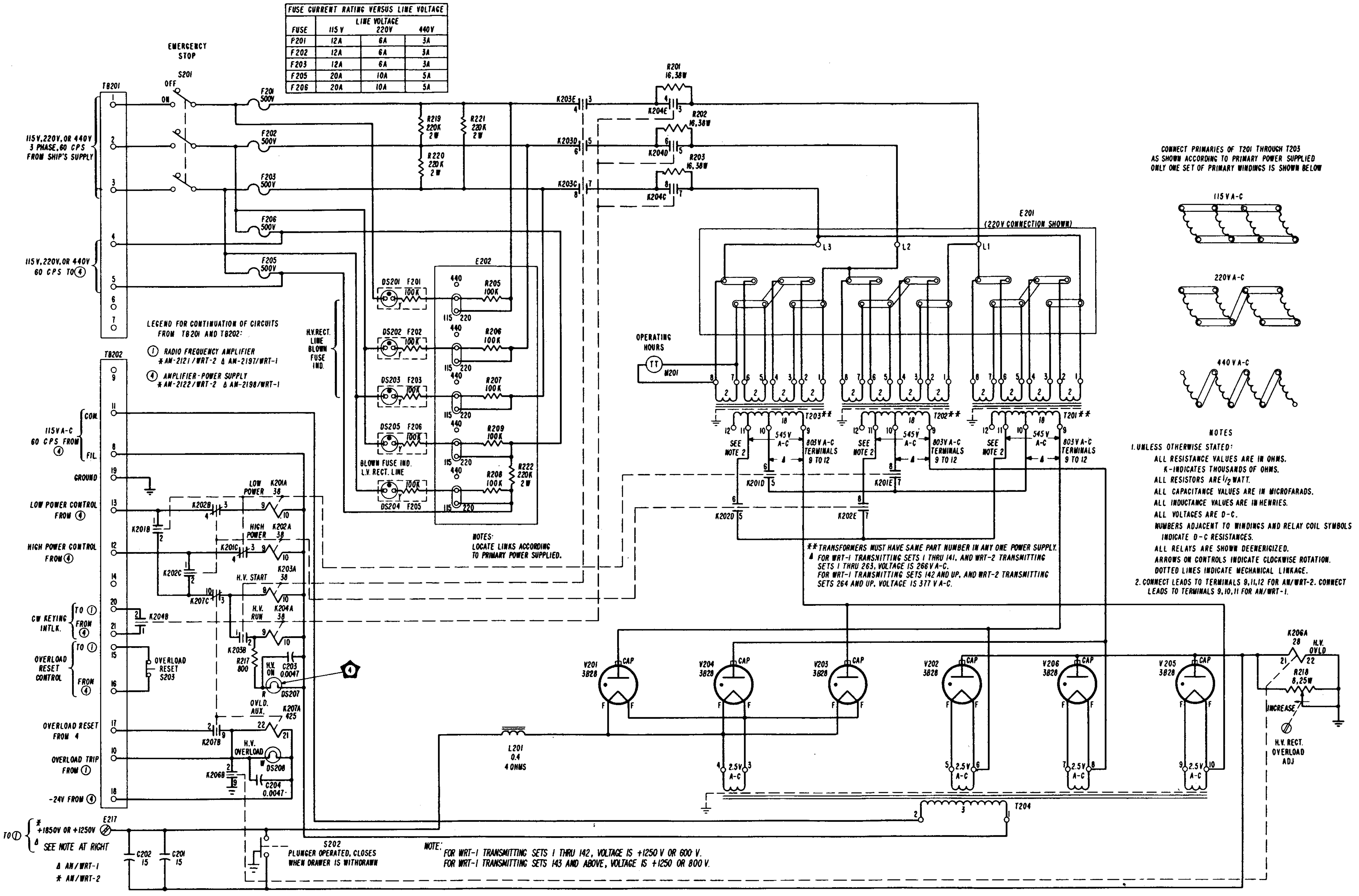


NOTES:
UNLESS OTHERWISE STATED:
ALL RESISTANCE VALUES ARE IN OHMS.
K-INDICATES THOUSANDS OF OHMS.
MEG-INDICATES MILLIONS OF OHMS.
ALL RESISTORS ARE 1/2 WATT.
ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS.
UF-INDICATES MICROFARADS.
ALL INDUCTANCE VALUES ARE IN MILLIHENRIES
H-INDICATES HENRIES
UH-INDICATES MICROHENRIES
DOTTED LINES INDICATES MECHANICAL LINKAGE
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
ALL RELAYS ARE SHOWN DEENERGIZED
NUMBERS ADJACENT TO WINDINGS INDICATE D-C RESISTANCE.
Δ-NOT USED SETS SERIALS 297 AND UP. K508 IS USED ONLY ON SETS SERIALS 1 TO 296.
✱-APPLIES ONLY TO SETS SERIALS 297 AND UP.
▲-R505 VALUE 39K, 2W FOR SETS SERIALS 408 AND UP.
ΔΔ-Q502 TYPE 2N657 FOR SETS SERIALS 408 AND UP.

Figure 6-29B. Amplifier-Power Supply AM-2198A/WRT-1, Schematic Diagram

Ref. Desig.	*Location*	*Ref. Desig.*	*Location*	*Ref. Desig.*	*Location*	*Ref. Desig.*	*Location*
C501	2A	E502	6D	R527	7D	R1451	9A
C502	3A	E506	1D	R528	5D	S501A	2C
C503	3A	F501	2D	R529	4C	S501B	2B
C504	3A	F502	2D	R530	6E	S502	2C
C505	2B	F503	3D	R531	2A	S503	3D
C506	3B	F504	2C	R532	2A	S504	4D
C507	3B	F505	2C	R533	2A	S505	6E
C508	3C	FL1401	7A	R534	2A	S506	4D
C509	3C	FL1402	10A	R536	3A	S507A	3E
C510	3C	K501A	4A	R537	3A	S507A	4E
C511	3C	K501B	6D	R538	3A	S507B	4A
C514	6C	K502B	6D	R539	2B	S507C	4A
C515	4B	K503A	3D	R540	2B	S507C	5A
C516	4B	K503B	4D	R541	2B	S507D	4A
C517	4C	K503C	4D	R542	2B	S507D	7D
C518	4C	K504A	4D	R543	3B	S508A	8E
C519	4C	K504B	4D	R544	3B	S508A	9D
C1401	7A	K504C	4D	R545	3B	S508B	5D
C1402	7A	K504D	4D	R546	3B	S508B	5E
C1403B	10C	K505A	4D	R547	4B	S508D	4D
C1404	8A	K505B	2B	R548	4B	S509A	4E
C1405	8A	K505C	2A	R549	4B	S509A	7E
C1406	8B	K505D	7D	R550	4C	S509B	4A
C1411A	7C	K505E	8D	R551	4C	S509B	7E
C1411B	7C	K506A	6D	R552	4C	S510A	7D
C1412	7C	K506B	6D	R553	4C	S510B	5D
C1413	8C	K506C	4D	R554	4C	S510B	9D
C1414	9C	K507A	7D	R555	4C	S511	8E
C1415	9C	K507B	8D	R1401	7A	S1401	9A
C1416A	8C	K507C	4C	R1402	7A	S1402	10C
C1416B	9C	K508A	5C	R1403	7A	S1403	7C
C1417	9C	K508B	5D	R1404	7B	T501	1B
C1418	9C	K509A	4C	R1405	8A	T502	2A
C1419	10C	K509C	5E	R1406	8A	T503	2C
C1423	6B	K509D	4B	R1407	8B	T504	4D
C1424	6B	K510A	5B	R1408	8B	T1401	6A
C1425	7B	K510B	5C	R1410	8A	T1402	6C
C1426	8B	K510C	5C	R1412	9A	TB501A	2E
C1427	8A	L501	3A	R1413	8A	TB501A	3E
CR501	2A	L502	3A	R1414	9A	TB501A	4A
CR502	2A	L503	3B	R1415	8B	TB501A	6E
CR503	2A	L504	3B	R1416	9B	TB501A	8E
CR504	2A	L505	3C	R1417	8B	TB501B	2E
CR505	3A	L506	3C	R1418	8B	TB501B	4A
CR506	3A	L507	4B	R1420	9A	TB501B	10E
CR507	3A	L1401	7B	R1421	9B	TB501C	3E
CR508	3A	L1402	6B	R1422	6C	TB501C	4A
CR509	2B	M501	2D	R1423	6C	TB501C	6E
CR510	2B	Q502	8D	R1426	7C	TB501D	6A
CR511	2B	Q503	4B	R1427	7C	TB501D	7E
CR512	2B	Q504	4C	R1428	7C	TB501D	9E
CR513	2B	R501	3A	R1429	7C	TB501E	3E
CR514	3B	R502	3A	R1430	7C	TB501E	4E
CR515	3B	R503	2B	R1431	7C	TB501E	5E
CR516	2B	R504	3B	R1432	8C	TB501E	8E
CR517	2C	R505	8D	R1433	8C	TB501E	9E
CR518	2C	R506	8D	R1434	8C	TB501F	4E
CR519	2C	R507	8D	R1435	8C	TB501F	5A
CR520	2C	R508	5D	R1436	8B	TB501F	5E
CR521	7D	R509	5D	R1437	8C	TB501F	6E
CR522	8D	R510	5D	R1438	7C	TB501F	7E
CR523	4C	R511	8D	R1439	8C	TB501F	9E
CR1401	8B	R512	8D	R1440	9C	TB1401	6A
CR1402	9B	R513	8D	R1441	9C	V1401A	7A
CR1403	7C	R514	2C	R1442	9C	V1401B	8A
CR1404	10C	R515	2C	R1443	9C	V1402A	8A
CR1405	7B	R516	3C	R1444	9C	V1402B	8C
CR1406	8C	R517	3C	R1445	9B	V1403A	9A
DS501	3D	R522	3D	R1446	9B	V1403B	6C
DS502	3D	R523	3D	R1447	9C	V1404A	8C
DS503	3D	R524	3D	R1448	10C	V1404B	10C
DS504	4C	R525	4C	R1449	10C		
DS505	6D	R526	4D	R1450	8A		





FUSE CURRENT RATING VERSUS LINE VOLTAGE			
FUSE	LINE VOLTAGE 115 V	220V	440V
F201	12A	6A	3A
F202	12A	6A	3A
F203	12A	6A	3A
F205	20A	10A	5A
F206	20A	10A	5A

LEGEND FOR CONTINUATION OF CIRCUITS FROM TB201 AND TB202:

① RADIO FREQUENCY AMPLIFIER
*AN-2121/WRT-2 Δ AN-2197/WRT-1

④ AMPLIFIER-POWER SUPPLY
*AN-2122/WRT-2 Δ AN-2198/WRT-1

NOTES:
LOCATE LINKS ACCORDING TO PRIMARY POWER SUPPLIED.

**TRANSFORMERS MUST HAVE SAME PART NUMBER IN ANY ONE POWER SUPPLY.
Δ FOR WRT-1 TRANSMITTING SETS 1 THRU 141, AND WRT-2 TRANSMITTING SETS 1 THRU 263, VOLTAGE IS 266V A-C.
FOR WRT-1 TRANSMITTING SETS 142 AND UP, AND WRT-2 TRANSMITTING SETS 264 AND UP, VOLTAGE IS 377 V A-C.

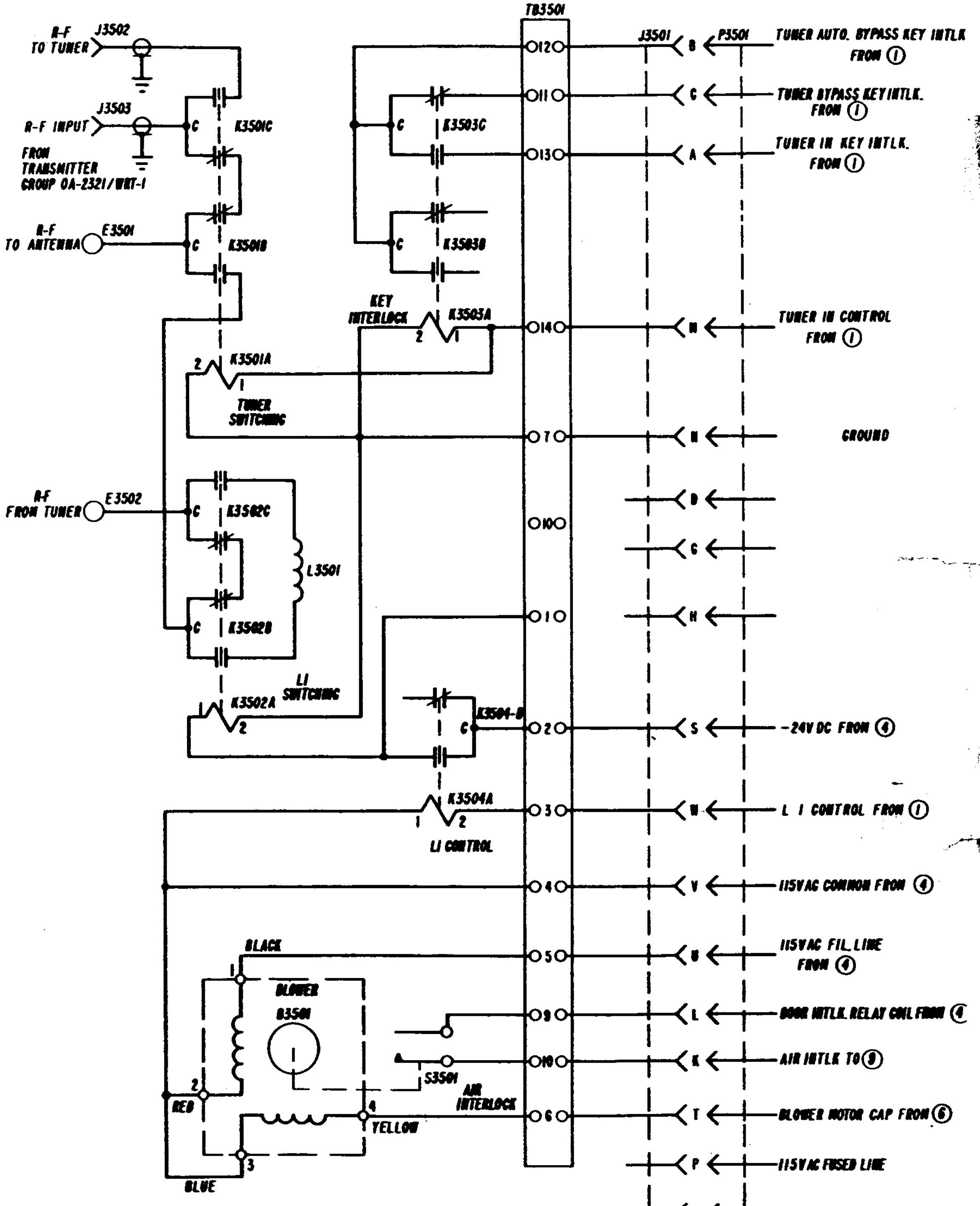
NOTE:
FOR WRT-1 TRANSMITTING SETS 1 THRU 142, VOLTAGE IS +1250 V OR 600 V.
FOR WRT-1 TRANSMITTING SETS 143 AND ABOVE, VOLTAGE IS +1250 OR 800 V.

CONNECT PRIMARIES OF T201 THROUGH T203 AS SHOWN ACCORDING TO PRIMARY POWER SUPPLIED ONLY ONE SET OF PRIMARY WINDINGS IS SHOWN BELOW

NOTES

1. UNLESS OTHERWISE STATED:
   - ALL RESISTANCE VALUES ARE IN OHMS. K-INDICATES THOUSANDS OF OHMS.
   - ALL RESISTORS ARE 1/2 WATT.
   - ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   - ALL INDUCTANCE VALUES ARE IN HENRIES.
   - ALL VOLTAGES ARE D-C.
   - NUMBERS ADJACENT TO WINDINGS AND RELAY COIL SYMBOLS INDICATE D-C RESISTANCES.
   - ALL RELAYS ARE SHOWN DEENERIGIZED.
   - ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
   - DOTTED LINES INDICATE MECHANICAL LINKAGE.
2. CONNECT LEADS TO TERMINALS 9,11,12 FOR AN/WRT-2. CONNECT LEADS TO TERMINALS 9,10,11 FOR AN/WRT-1.

Figure 6-30. Power Supply PP-2222/WRT, Schematic Diagram



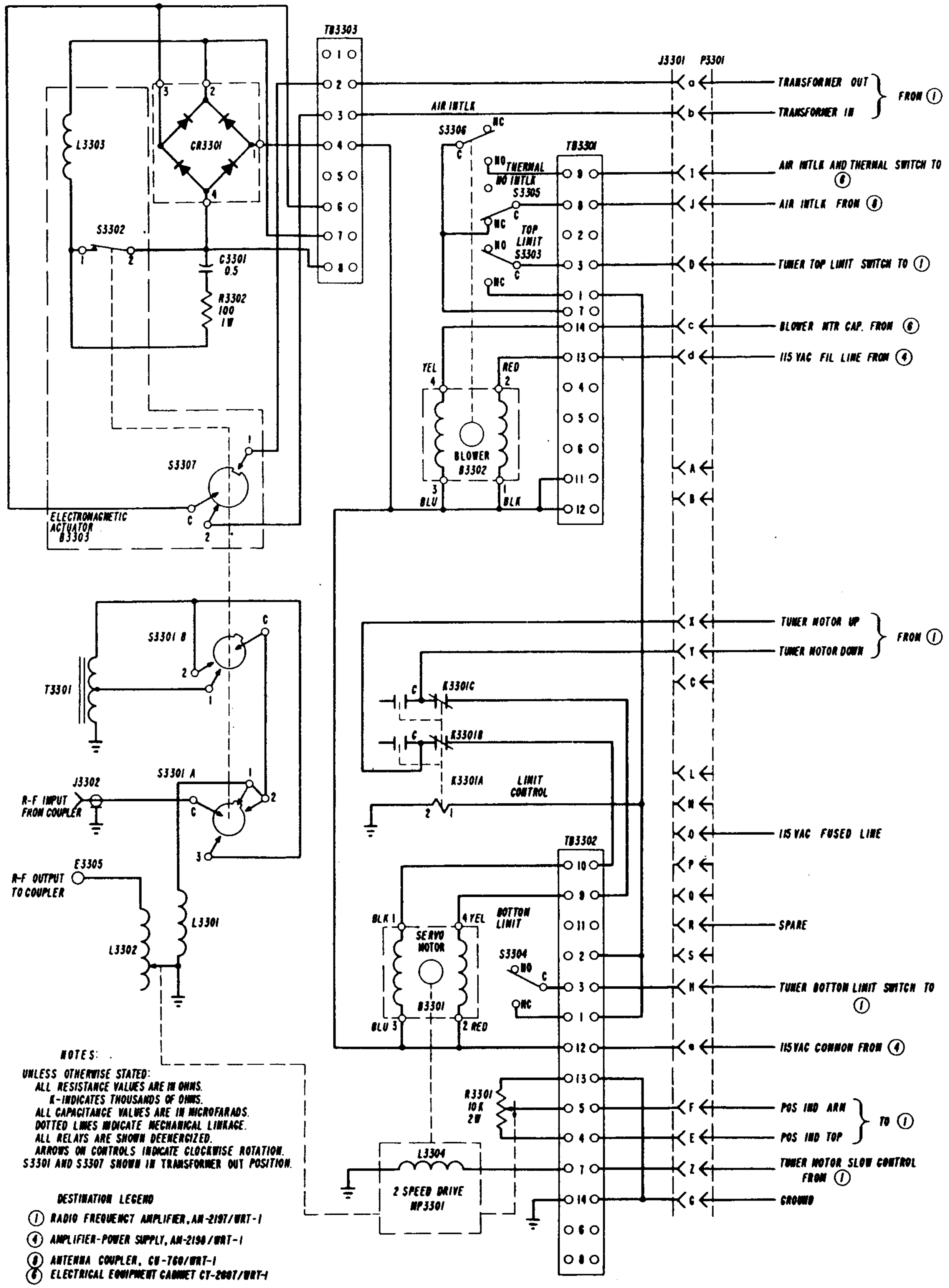
NOTES

1. ALL RELAYS ARE SHOWN DE-ENERGIZED.

DESTINATION LEGEND

① RADIO FREQUENCY AMPLIFIER, AM-2197/WRT-1
④ AMPLIFIER-POWER SUPPLY, AM-2198/WRT-1
⑨ RADIO FREQUENCY TUNER, TN-345/WRT-1
⑥ ELECTRICAL EQUIPMENT CABINET CY-2607/WRT-1

Figure 6-32. Antenna Coupler CU-760/WRT-1, Schematic Diagram



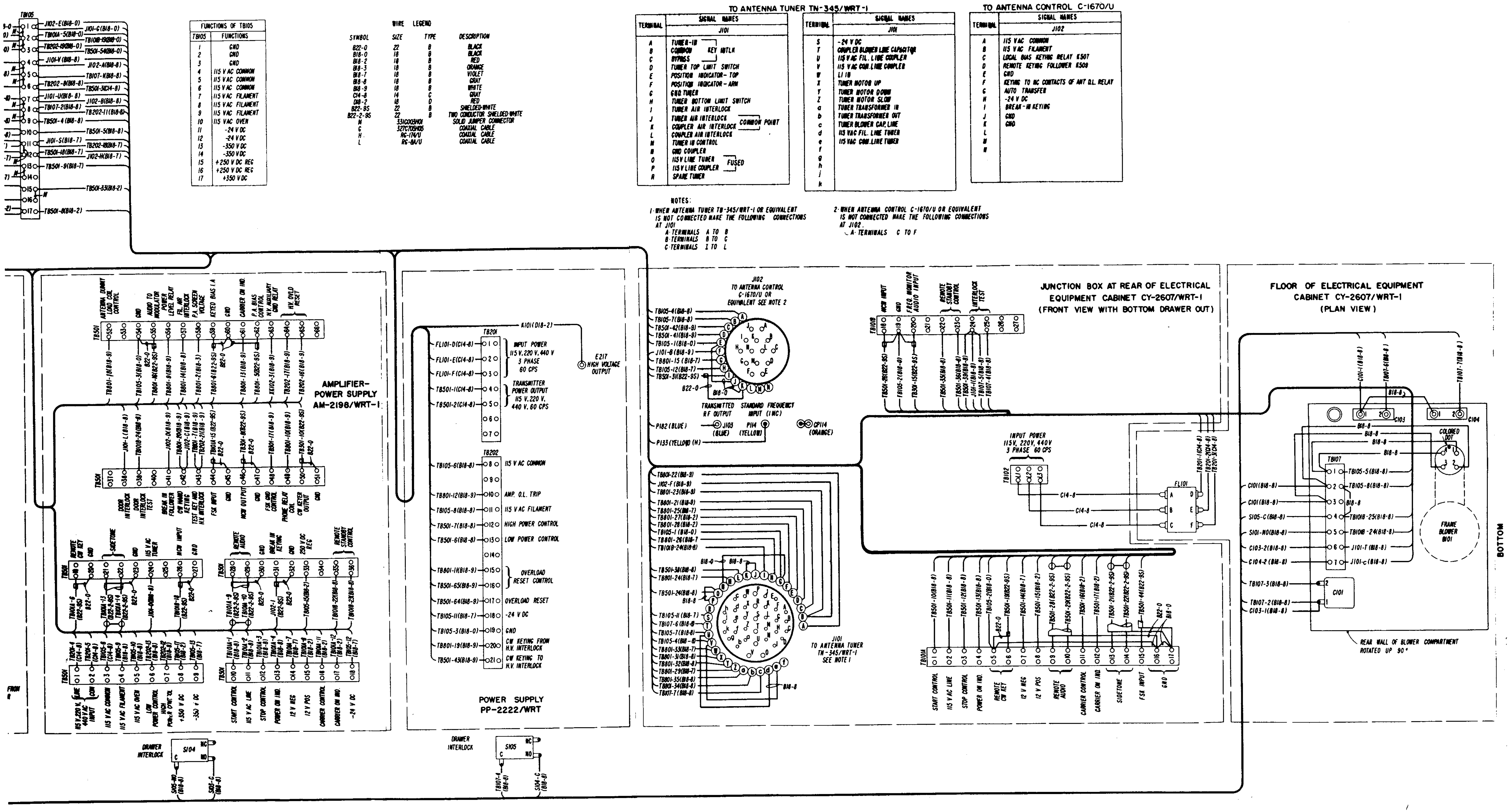
NOTES:

UNLESS OTHERWISE STATED:
ALL RESISTANCE VALUES ARE IN OHMS.
K-INDICATES THOUSANDS OF OHMS.
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
DOTTED LINES INDICATE MECHANICAL LINKAGE.
ALL RELAYS ARE SHOWN DEENERGIZED.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
S3301 AND S3307 SHOWN IN TRANSFORMER OUT POSITION.

DESTINATION LEGEND

① RADIO FREQUENCY AMPLIFIER, AM-2197/WRT-1
④ AMPLIFIER-POWER SUPPLY, AM-2198/WRT-1
⑧ ANTENNA COUPLER, CU-760/WRT-1
⑥ ELECTRICAL EQUIPMENT CABINET CY-2607/WRT-1

Figure 6-31. Radio Frequency Tuner TN-345/WRT-1, Schematic Diagram



FUNCTIONS OF TB105

TB105	FUNCTIONS
1	GND
2	GND
3	GND
4	115 V AC COMMON
5	115 V AC COMMON
6	115 V AC COMMON
7	115 V AC FILAMENT
8	115 V AC FILAMENT
9	115 VAC FILAMENT
10	115 VAC OVEN
11	-24 V DC
12	-24 V DC
13	-350 V DC
14	-350 V DC
15	+250 V DC REG
16	+250 V DC REG
17	+350 V DC

WIRE LEGEND

SYMBOL	SIZE	TYPE	DESCRIPTION
B22-0	22	B	BLACK
B18-0	18	B	BLACK
B18-2	18	B	RED
B18-3	18	B	ORANGE
B18-7	18	B	VIOLET
B18-8	18	B	GRAY
B18-9	18	B	WHITE
C14-8	14	C	GRAY
D18-2	18	D	RED
B22-9S	22	B	SHIELDED-WHITE
B22-2-9S	22	B	TWO CONDUCTOR SHIELDED-WHITE
M	331C003H01		SOLID JUMPER CONNECTOR
G	327C705H05		COAXIAL CABLE
H	RG-174/U		COAXIAL CABLE
L	RG-8A/U		COAXIAL CABLE

TO ANTENNA TUNER TN-345/WRT-1

TERMINAL	SIGNAL NAMES J101
A	TUNER-IN
B	COMMON KEY INTLK
C	BYPASS
D	TUNER TOP LIMIT SWITCH
E	POSITION INDICATOR- TOP
F	POSITION INDICATOR - ARM
G	GND TUNER
H	TUNER BOTTOM LIMIT SWITCH
I	TUNER AIR INTERLOCK
J	TUNER AIR INTERLOCK
K	COUPLER AIR INTERLOCK COMMON POINT
L	COUPLER AIR INTERLOCK
M	TUNER IN CONTROL
N	GND COUPLER
O	115V LINE TUNER
P	115V LINE COUPLER FUSED
R	SPARE TUNER

TERMINAL	SIGNAL NAMES J101
S	-24 V DC
T	COUPLER BLOWER LINE CAPACITOR
U	115 VAC FIL. LINE COUPLER
V	115 VAC COM. LINE COUPLER
W	L1 IN
X	TUNER MOTOR UP
Y	TUNER MOTOR DOWN
Z	TUNER MOTOR SLOW
a	TUNER TRANSFORMER IN
b	TUNER TRANSFORMER OUT
c	TUNER BLOWER CAP. LINE
d	115 VAC FIL. LINE TUNER
e	115 VAC COM. LINE TUNER
f	
g	
h	
j	
k	

TO ANTENNA CONTROL C-1670/U

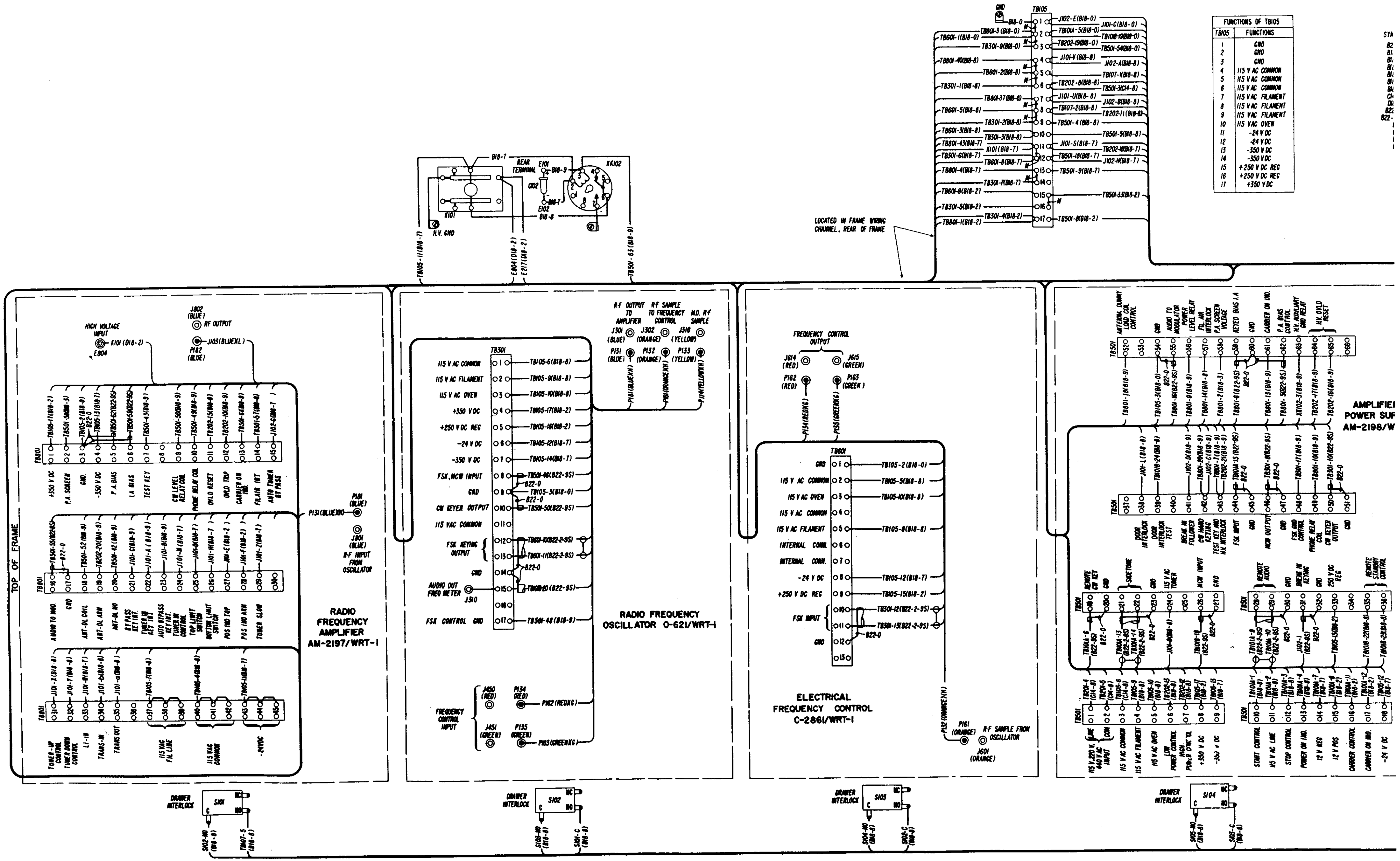
TERMINAL	SIGNAL NAMES J102
A	115 VAC COMMON
B	115 VAC FILAMENT
C	LOCAL BIAS KEYING RELAY K507
D	REMOTE KEYING FOLLOWER K508
E	GND
F	KEYING TO NC CONTACTS OF ANT O.L. RELAY
G	AUTO TRANSFER
H	-24 V DC
I	BREAK-IN KEYING
J	GND
K	GND
L	
M	
N	

NOTES:

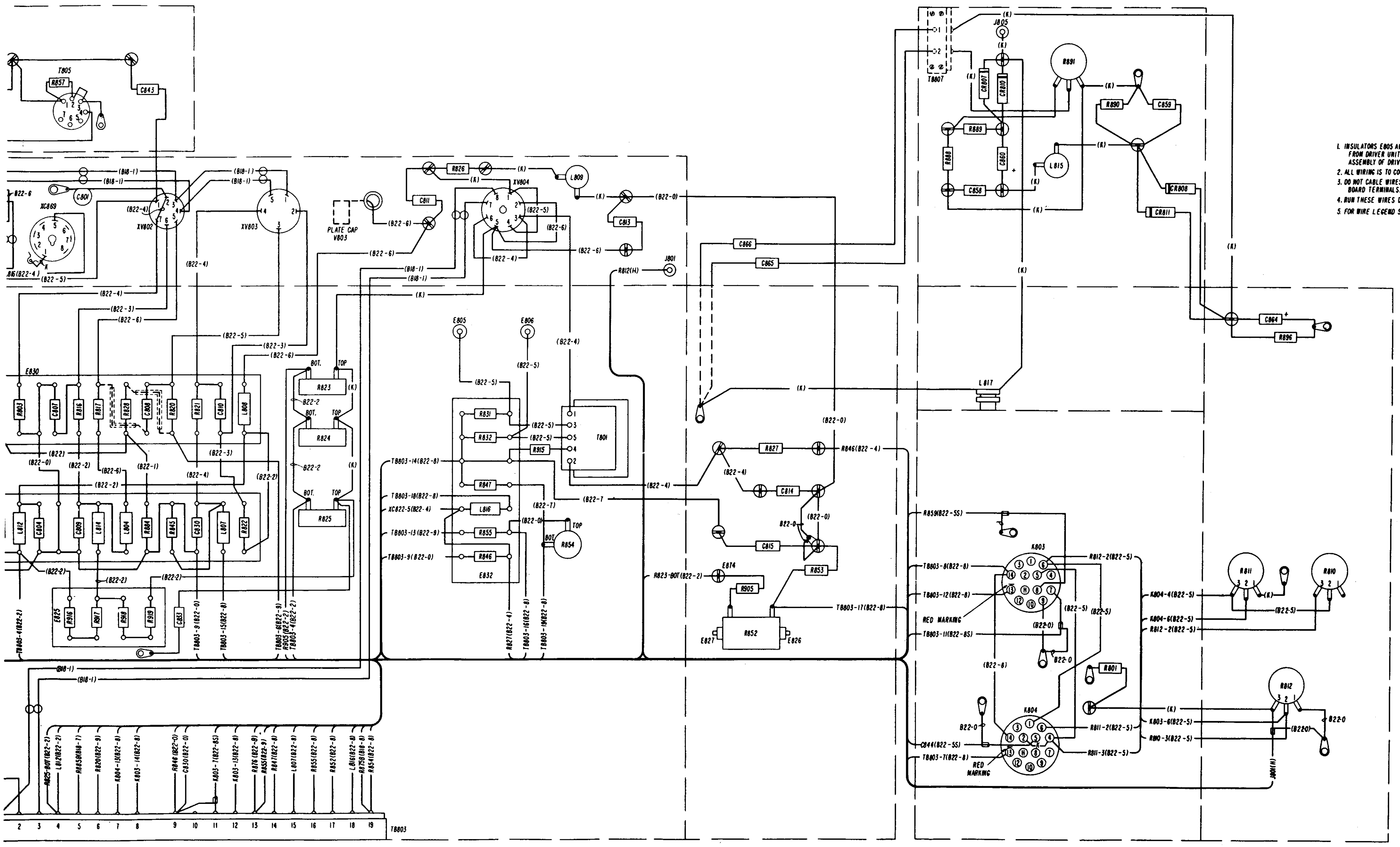
1. WHEN ANTENNA TUNER TN-345/WRT-1 OR EQUIVALENT IS NOT CONNECTED MAKE THE FOLLOWING CONNECTIONS AT J101
   - A. TERMINALS A TO B
   - B. TERMINALS B TO C
   - C. TERMINALS I TO L

2. WHEN ANTENNA CONTROL C-1670/U OR EQUIVALENT IS NOT CONNECTED MAKE THE FOLLOWING CONNECTIONS AT J102.
   - A. TERMINALS C TO F

Figure 6-33. Electrical Equipment Cabinet CY-2607/WRT-1, Wiring Diagram



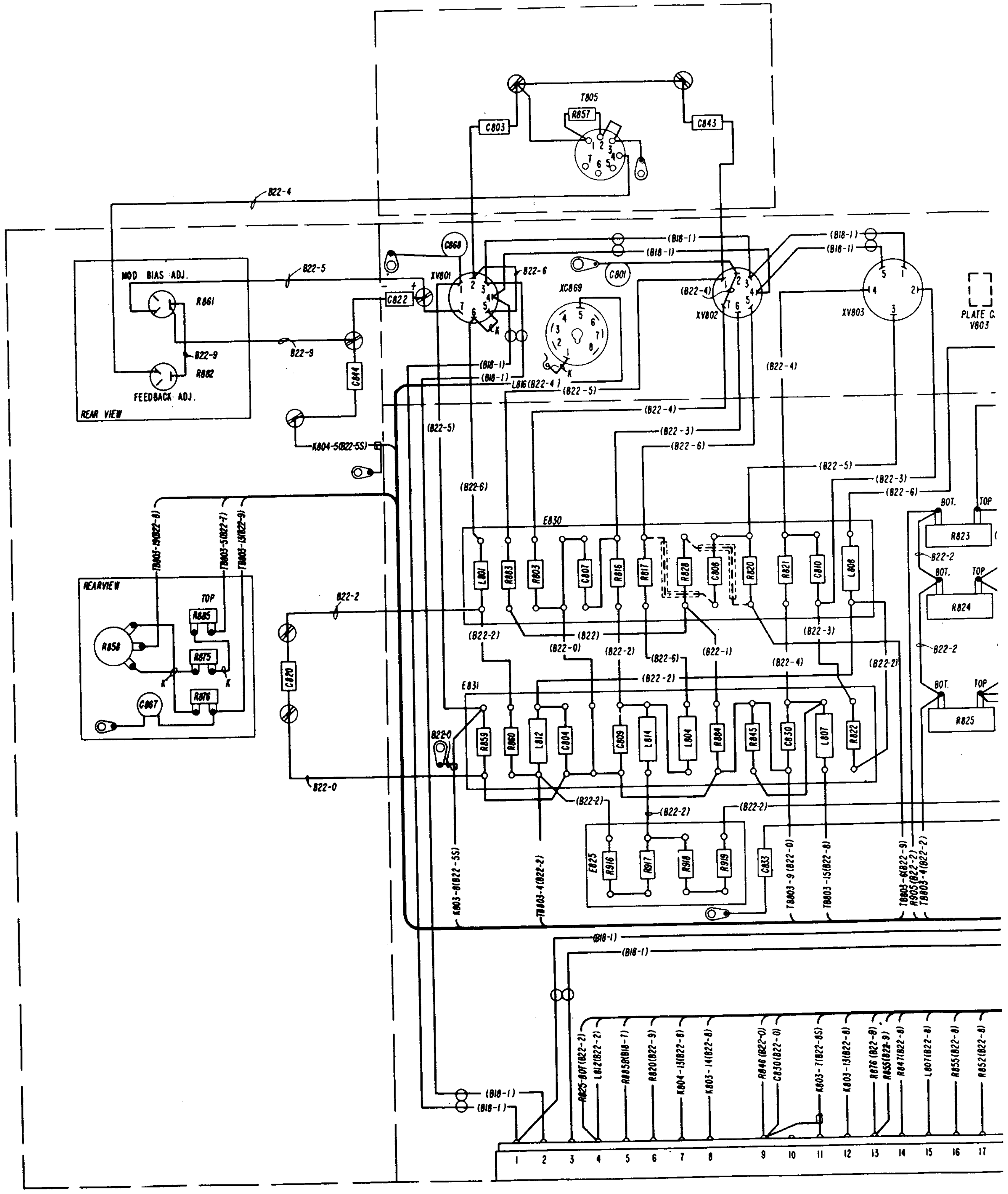
FUNCTIONS OF TB105	
TB105	FUNCTIONS
1	GND
2	GND
3	GND
4	115 V AC COMMON
5	115 V AC COMMON
6	115 V AC COMMON
7	115 V AC FILAMENT
8	115 V AC FILAMENT
9	115 VAC FILAMENT
10	115 VAC OVEN
11	-24 V DC
12	-24 V DC
13	-350 V DC
14	-350 V DC
15	+250 V DC REG
16	+250 V DC REG
17	+350 V DC

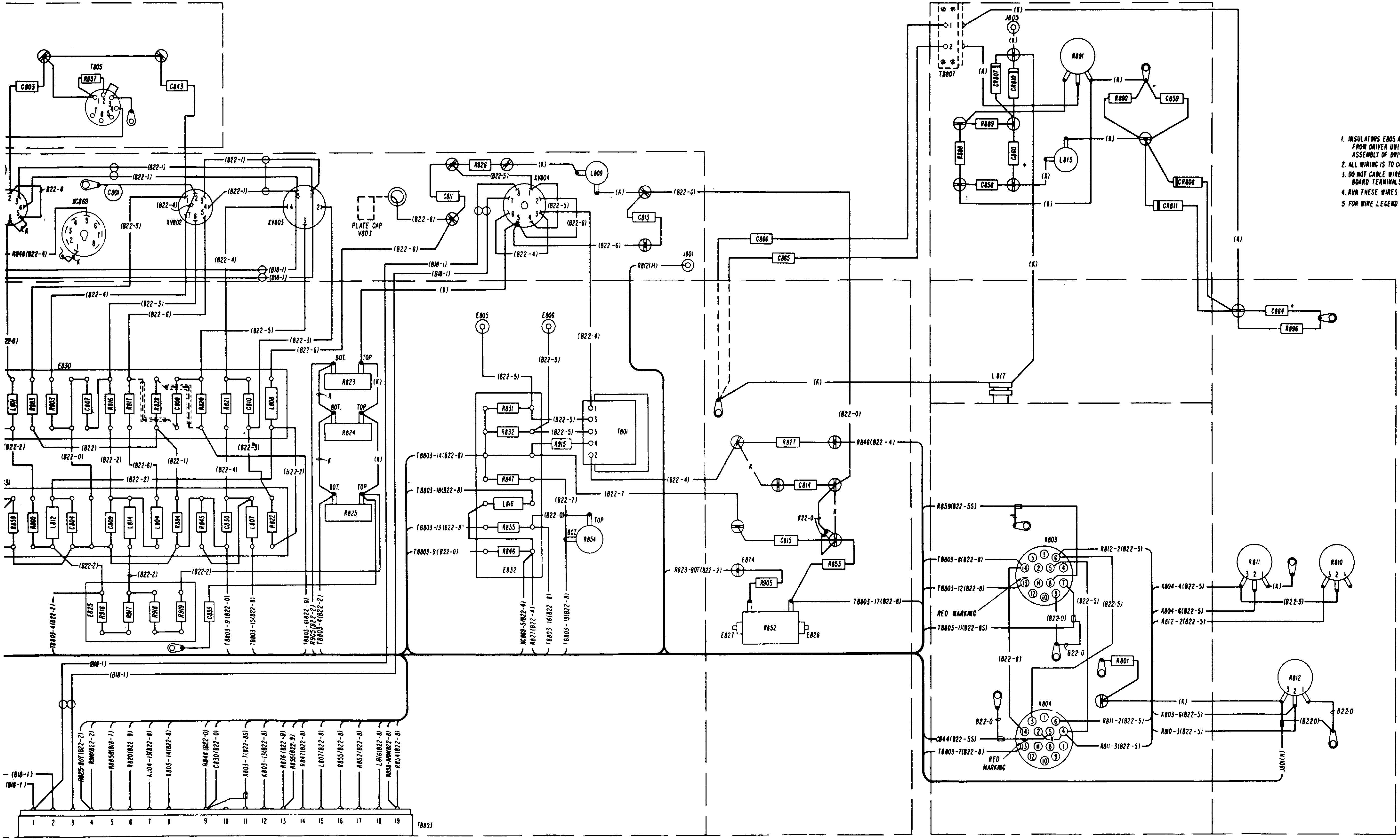


NOTES

1. INSULATORS E805 AND E806 ARE MOUNTED ON POWER AMPLIFIER CHASSIS. WIRES FROM DRIVER UNIT ARE TO BE SOLDERED TO THESE INSULATORS AFTER ASSEMBLY OF DRIVER AND POWER AMPLIFIER UNITS.
2. ALL WIRING IS TO CONFORM WITH "GENERAL WIRING NOTES", DRAWING 51-D-3647.
3. DO NOT CABLE WIRES CONNECTING TUBE SOCKET TERMINALS TO RESISTOR BOARD TERMINALS.
4. RUN THESE WIRES DIRECT. CONNECT WITHOUT SERVICE LOOPS.
5. FOR WIRE LEGEND SEE FIG 6-54.

Figure 6-34. Radio Frequency Amplifier AM-2197/WRT-1, Driver Wiring Diagram, Sets Serials 1 to 141

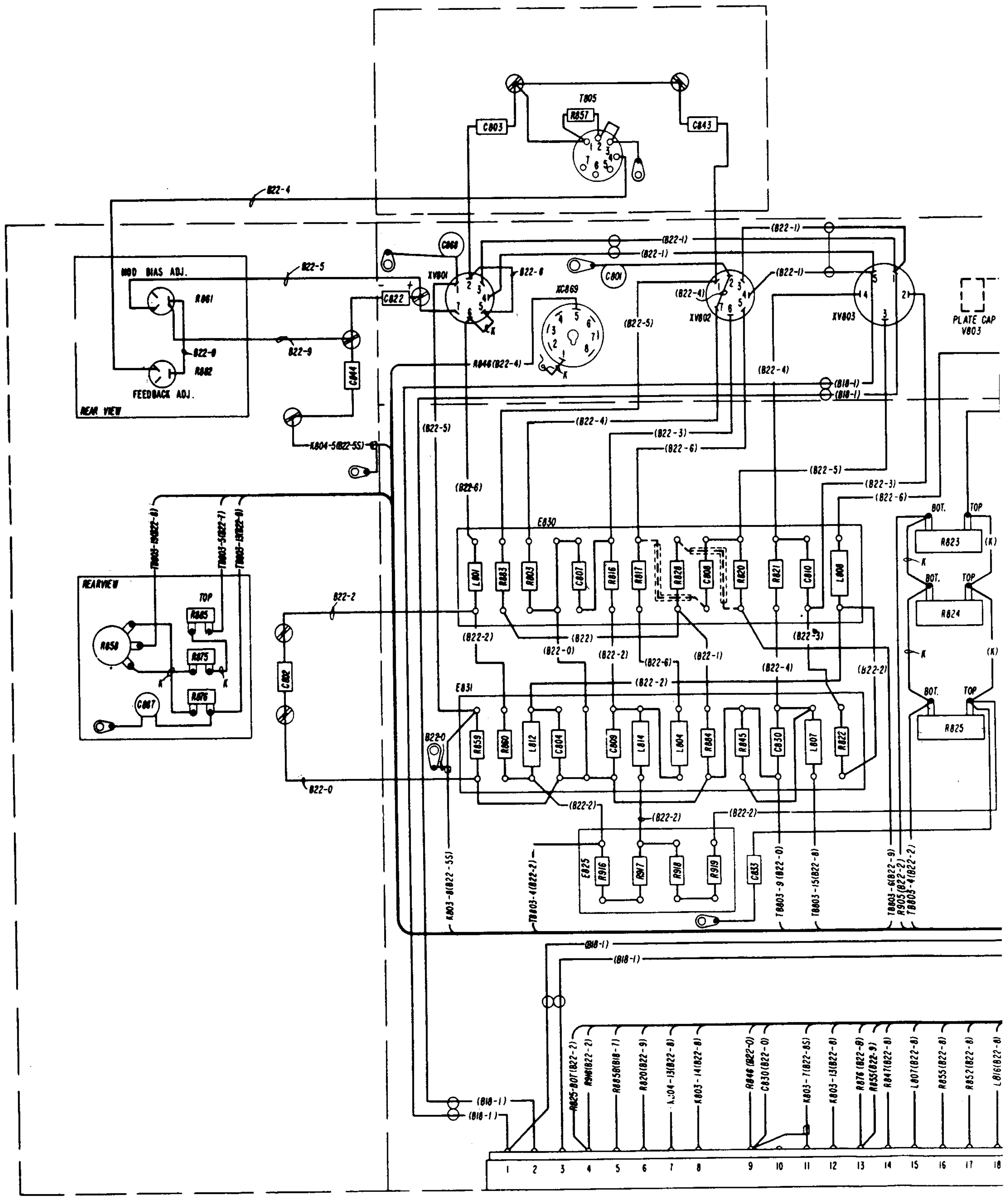

T805
R857
C803
C843
B22-4
MOD BIAS ADJ.
R861
B22-9
R882
FEEDBACK ADJ.
REAR VIEW
B22-5
C868
XV801
B22-6
C801
C822
XC869
C844
(B18-1)
L816(B22-4)
(B22-5)
(B22-4)
(B22-3)
(B22-6)
XV802
XV803
PLATE C
V803
K804-5(B22-5S)
TB803-19(B22-8)
TB803-5(B22-7)
TB803-1(B22-9)
REARVIEW
TOP
R885
R858
R875
R876
C867
B22-2
C820
E830
L801
R883
R803
C807
R816
R817
R828
C808
R820
R821
C810
L808
(B22-2)
(B22)
(B22-0)
(B22-1)
(B22-3)
R823
R824
R825
BOT.
E831
B22-0
R859
R860
L812
C804
C809
L814
L804
R884
R845
C830
L807
R822
E825
R916
R917
R918
R919
C833
K803-6(B22-5S)
TB803-4(B22-2)
TB803-9(B22-0)
TB803-15(B22-8)
TB803-6(B22-9)
R905(B22-2)
TB803-4(B22-2)
R825-BOT(B22-2)
L812(B22-2)
R885(B18-1)
R820(B22-9)
K804-13(B22-8)
K803-14(B22-8)
R846(B22-0)
C830(B22-0)
K803-7(B22-8S)
K803-13(B22-8)
R876(B22-8)
R855(B22-9)
R847(B22-8)
L807(B22-8)
R855(B22-8)
R852(B22-8)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17



NOTES

1. INSULATORS E805 AND E806 ARE MOUNTED ON POWER AMPLIFIER CHASSIS. WIRES FROM DRIVER UNIT ARE TO BE SOLDERED TO THESE INSULATORS AFTER ASSEMBLY OF DRIVER AND POWER AMPLIFIER UNITS.
2. ALL WIRING IS TO CONFORM WITH "GENERAL WIRING NOTES", DRAWING 51-D-3647.
3. DO NOT CABLE WIRES CONNECTING TUBE SOCKET TERMINALS TO RESISTOR BOARD TERMINALS.
4. RUN THESE WIRES DIRECT. CONNECT WITHOUT SERVICE LOOPS.
5. FOR WIRE LEGEND SEE FIG 6-54.

Figure 6-34A. Radio Frequency Amplifier AM-2197/WRT-1, Driver Wiring Diagram, Sets Serials 142 and up


T805
R857
C803
C843
B22-4
MOD BIAS ADJ.
R861
R862
FEEDBACK ADJ.
REAR VIEW
B22-5
B22-9
C822
C844
C868
XV801
XC869
C801
XV802
XV803
PLATE CAP V803
K804-5(B22-5S)
R846(B22-4)
E830
L801
R883
R803
C807
R816
R817
R828
C808
R820
R821
C810
L808
R823
R824
R825
BOT.
TOP
REARVIEW
TOP
R885
R858
R875
R876
C887
B22-2
C802
B22-0
E831
R859
R860
L812
C804
C809
L814
L804
R884
R845
C830
L807
R822
E825
R916
R917
R918
R919
C833
K803-8(B22-5S)
TB803-4(B22-2)
TB803-9(B22-0)
TB803-15(B22-0)
(B18-1)
R825-BOT(B22-2)
R846(B22-2)
R885R(B18-1)
R820(B22-9)
K804-13(B22-0)
K803-14(B22-0)
R846(B22-0)
C830(B22-0)
K803-7(B22-8S)
K803-13(B22-0)
R876(B22-9)
R855(B22-9)
R847(B22-0)
L807(B22-0)
R855(B22-0)
R857(B22-0)
L816(B22-0)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

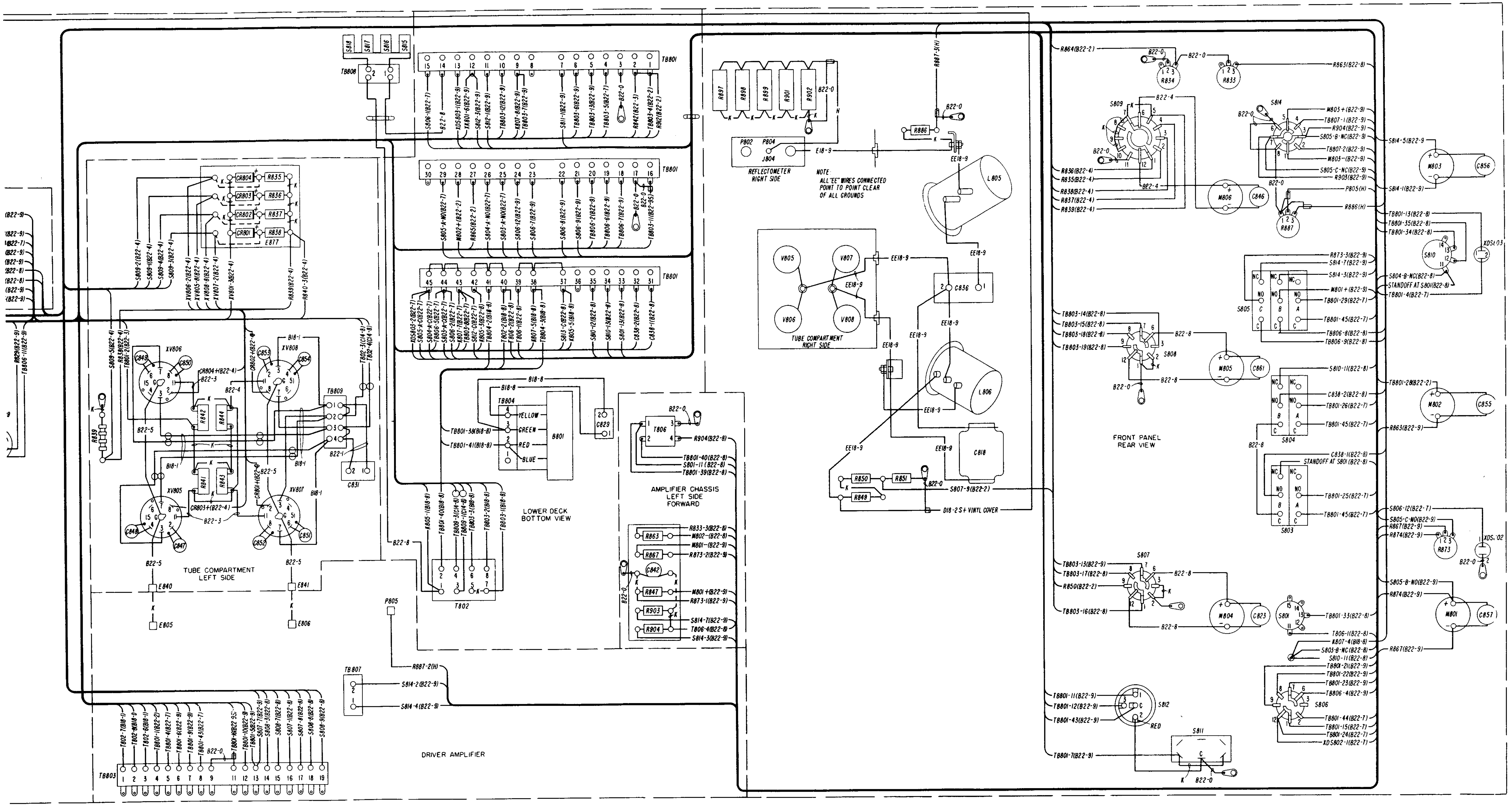
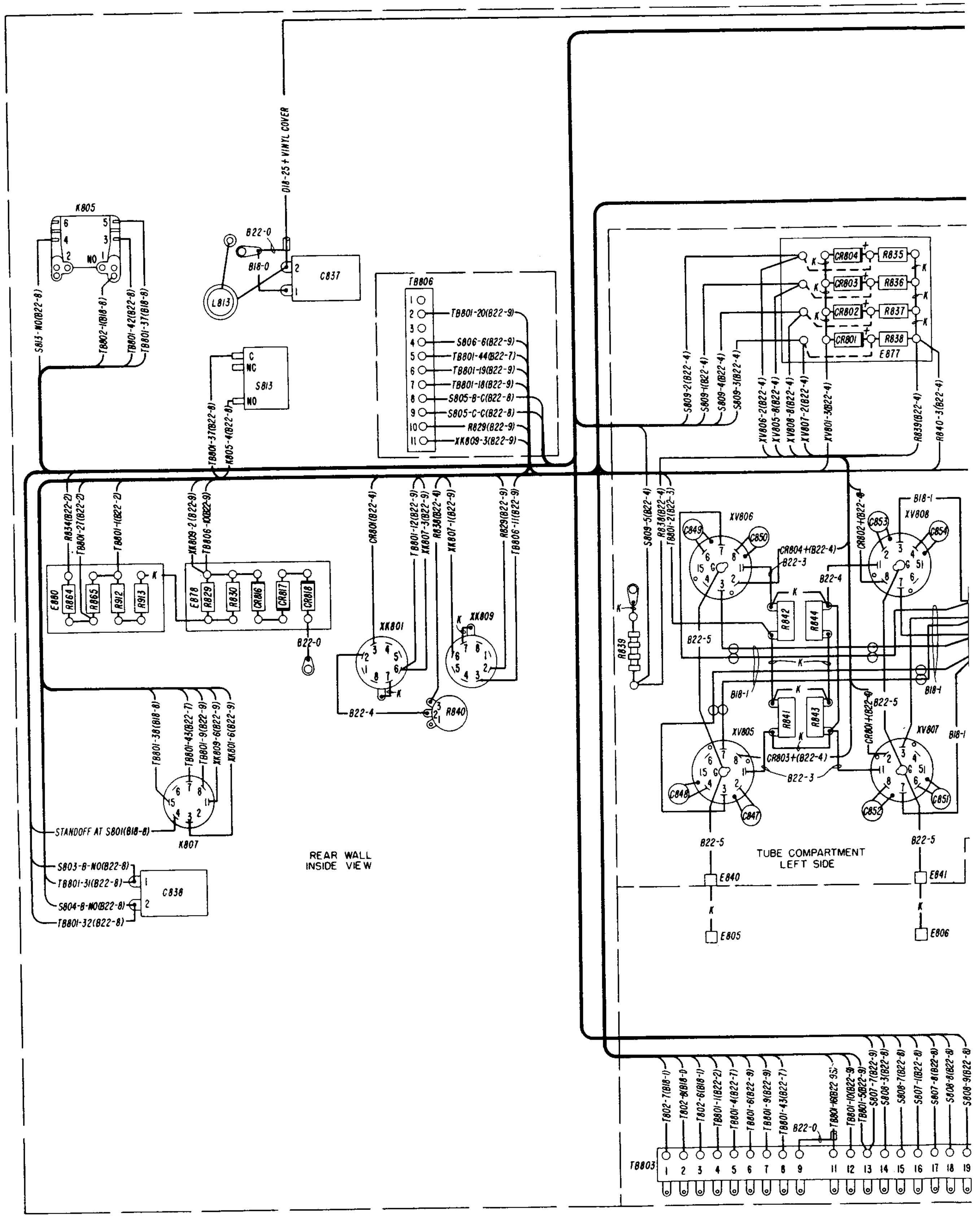


Figure 6-35. Radio Frequency Amplifier AM-2197/WRT-1, Power Amplifier, Wiring Diagram, Sets Serials 1 to 141


K805
S813-NO(B22-8)
TB802-1(B18-8)
TB801-42(B22-8)
TB801-37(B18-8)
B22-0
B18-0
L813
C837
D18-25+VINYL COVER
S813
TB801-37(B22-8)
K805-4(B22-8)
TB806
TB801-20(B22-9)
S806-6(B22-9)
TB801-44(B22-7)
TB801-19(B22-9)
TB801-18(B22-9)
S805-B-C(B22-8)
S805-C-C(B22-8)
R829(B22-9)
XK809-3(B22-9)
E880
R864
R865
R912
R913
E878
R829
R830
CR816
CR817
CR818
B22-0
XK801
XK809
R840
B22-4
K807
STANDOFF AT S801(B18-8)
S803-B-NO(B22-8)
TB801-31(B22-8)
S804-B-NO(B22-8)
TB801-32(B22-8)
C838
REAR WALL
INSIDE VIEW
E877
CR804
CR803
CR802
CR801
R835
R836
R837
R838
XV806
XV808
XV805
XV807
R839
R841
R842
R843
R844
C847
C848
C849
C850
C851
C852
C853
C854
B22-3
B22-4
B22-5
B18-1
TUBE COMPARTMENT
LEFT SIDE
E840
E841
E805
E806
TB803

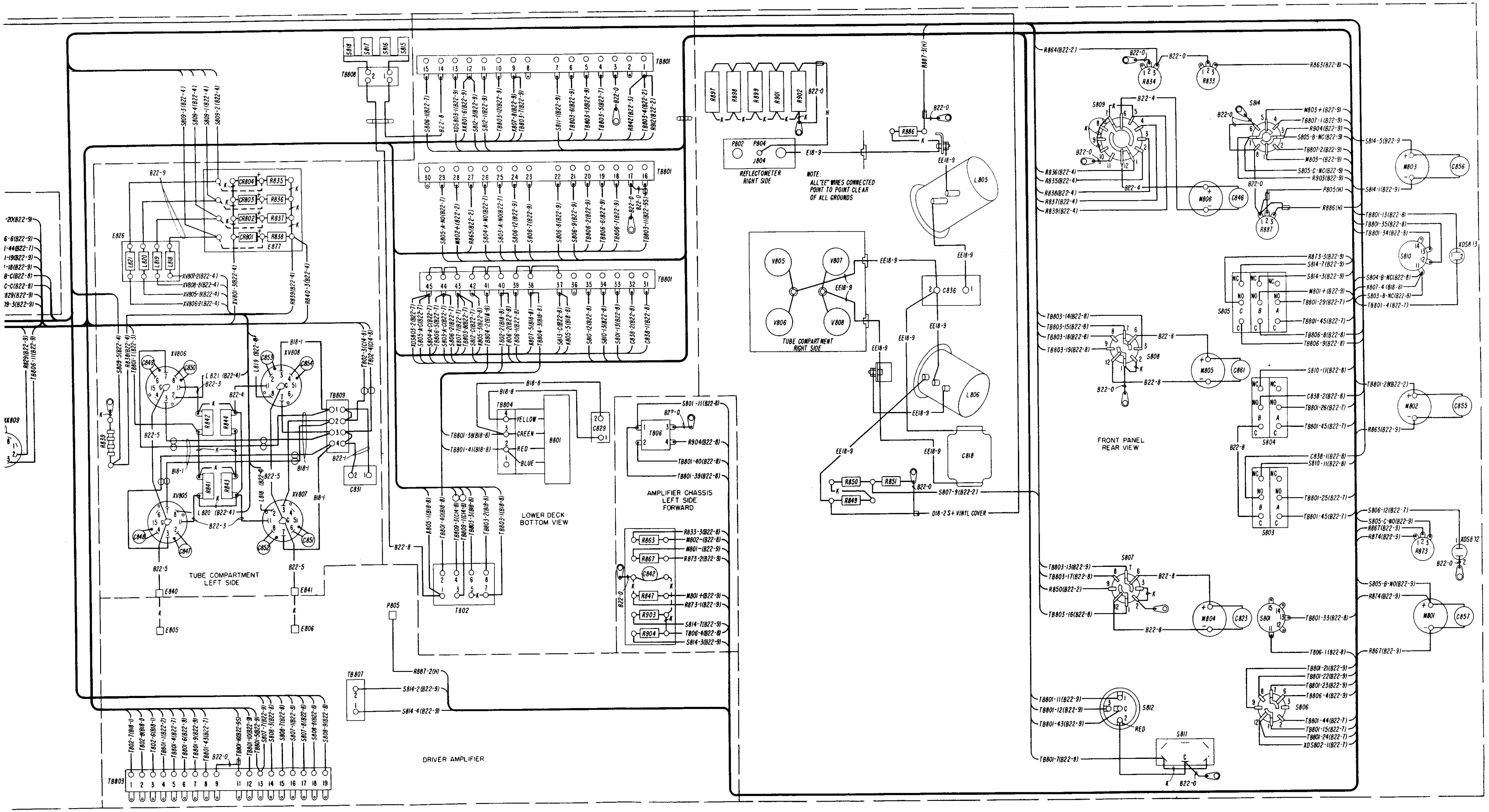
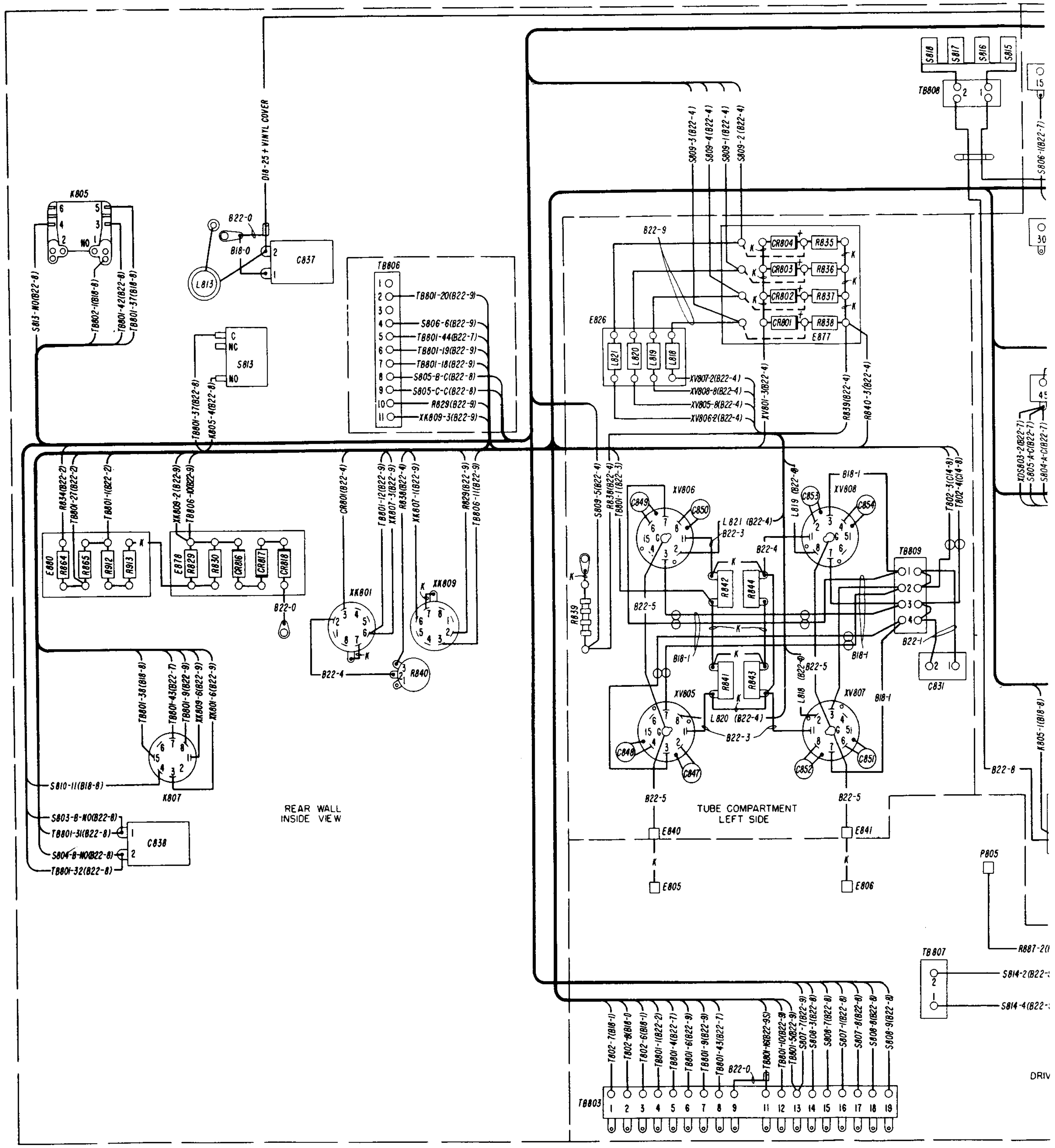
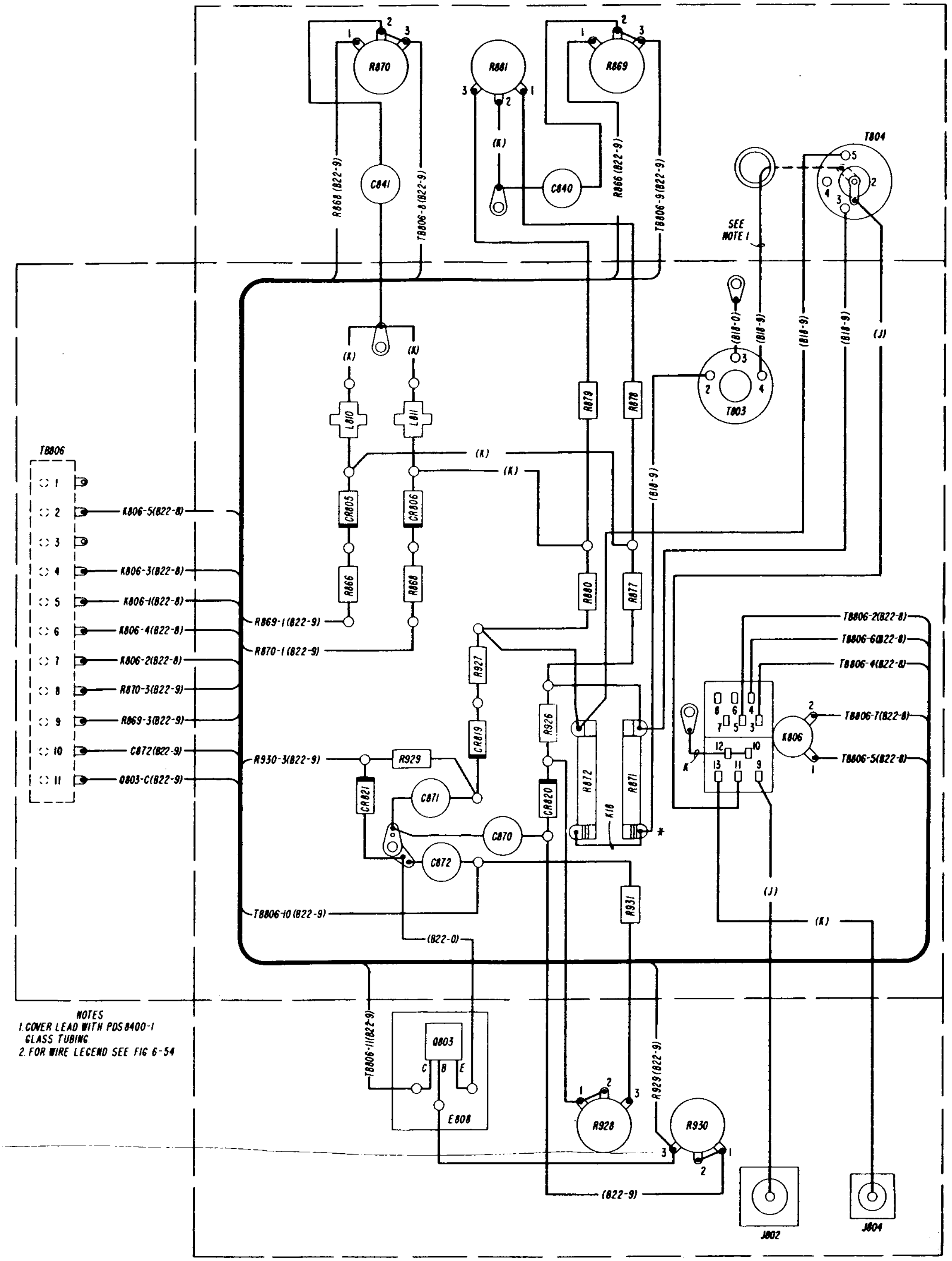


Figure 6-35A. Radio Frequency Amplifier AM-2197/WRT-1, Power Amplifier, Wiring Diagram, Sets Serials 142 and up


K805
D18-25 + VINYL COVER
B22-0
B18-0
C837
L813
S813
TB806
E880
E878
XK801
XK809
R840
B22-4
K807
C838
REAR WALL
INSIDE VIEW
E826
E877
XV806
XV808
XV805
XV807
TB809
C831
R839
TUBE COMPARTMENT
LEFT SIDE
E840
E841
E805
E806
P805
TB807
TB803
DRIV



NOTES
1 COVER LEAD WITH PDS 8400-1 GLASS TUBING
2 FOR WIRE LEGEND SEE FIG 6-54

Figure 6-36A. Radio Frequency Amplifier AM-2197/WRT-1, Reflectometer, Wiring Diagram, Sets Serials 142 and up

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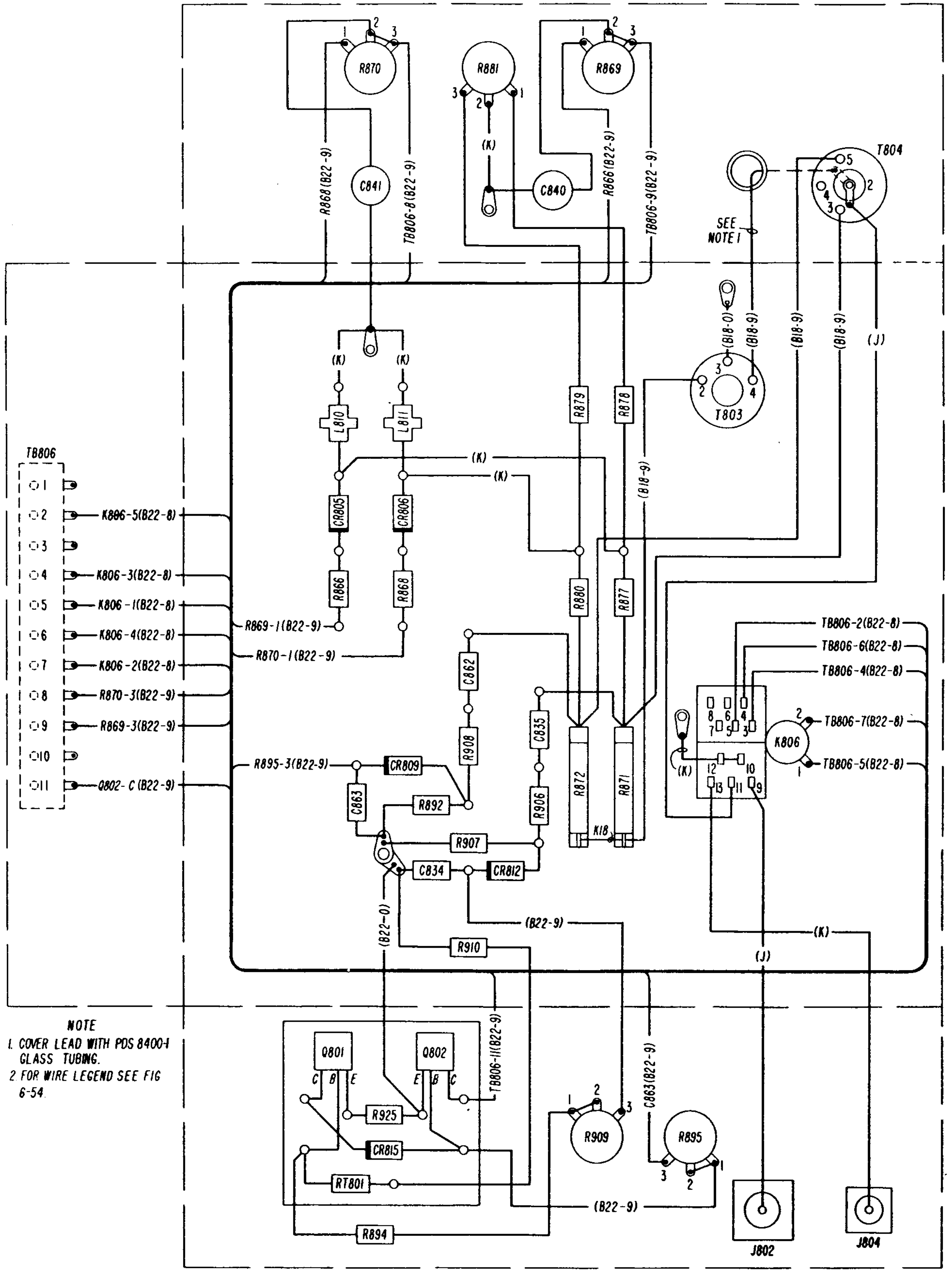
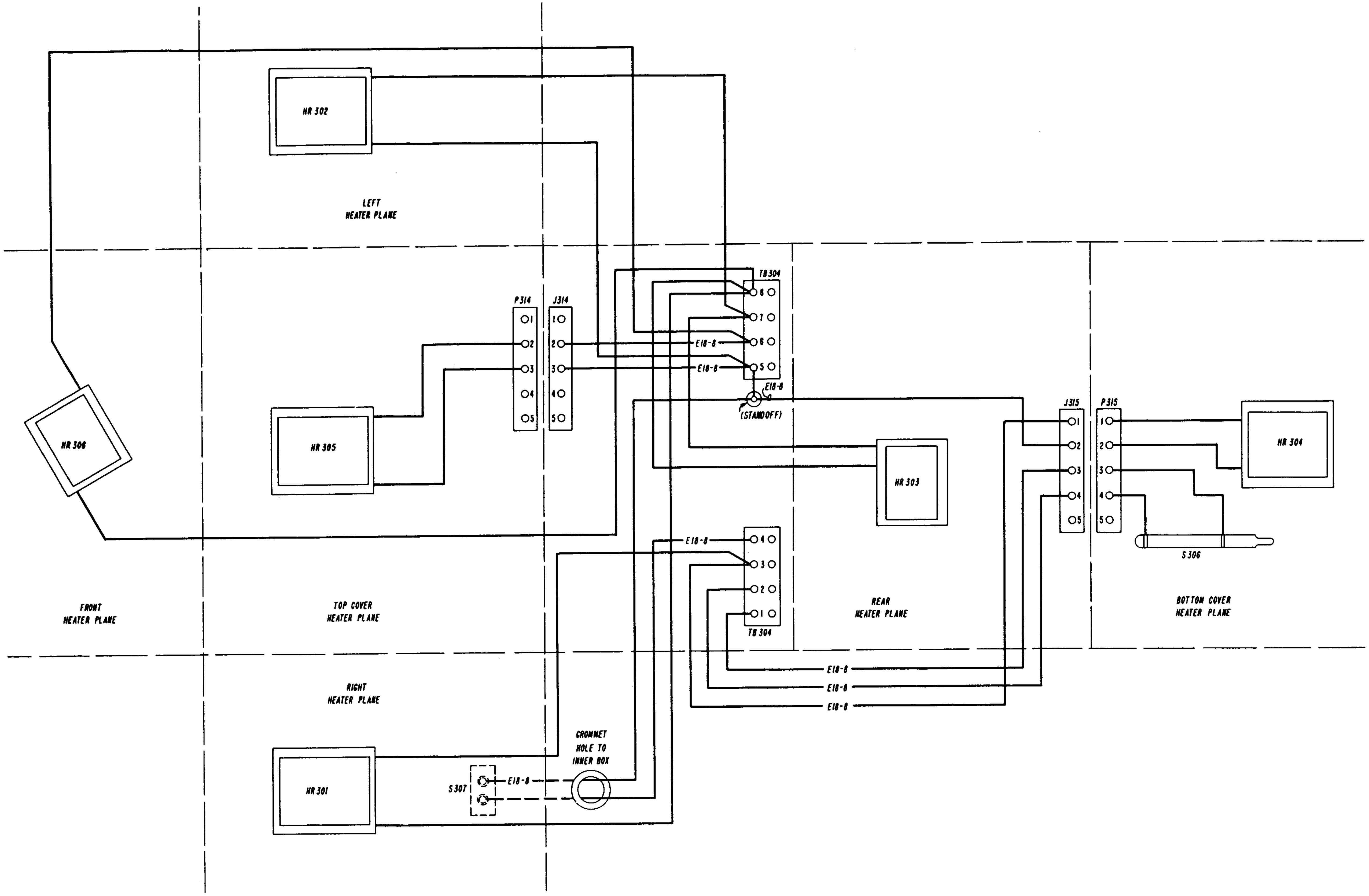
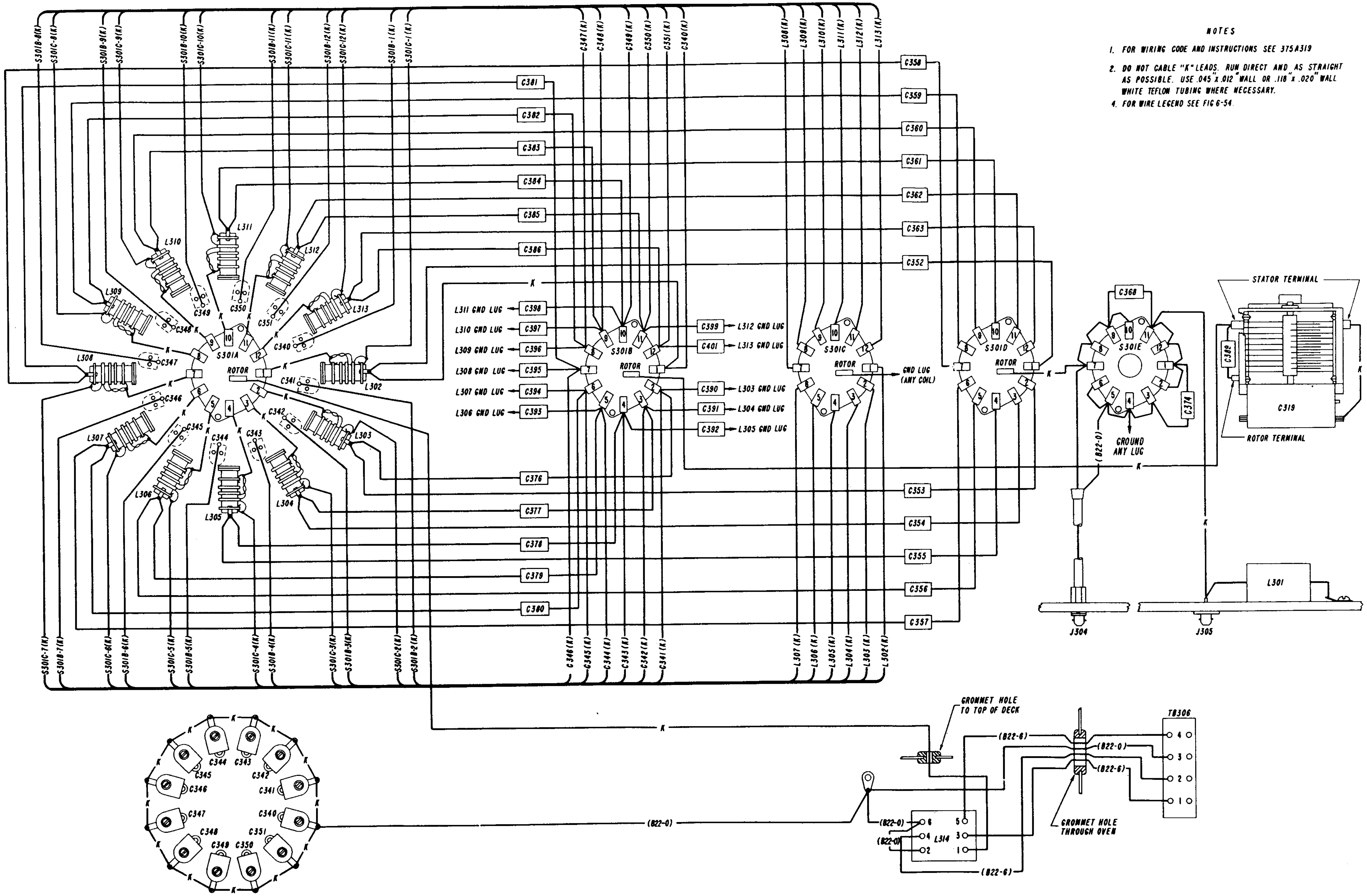


NOTE
1. COVER LEAD WITH PDS 8400-1 GLASS TUBING.
2 FOR WIRE LEGEND SEE FIG 6-54

Figure 6-36. Radio Frequency Amplifier AM-2197/WRT-1, Reflectometer, Wiring Diagram, Sets Serials 1 to 141



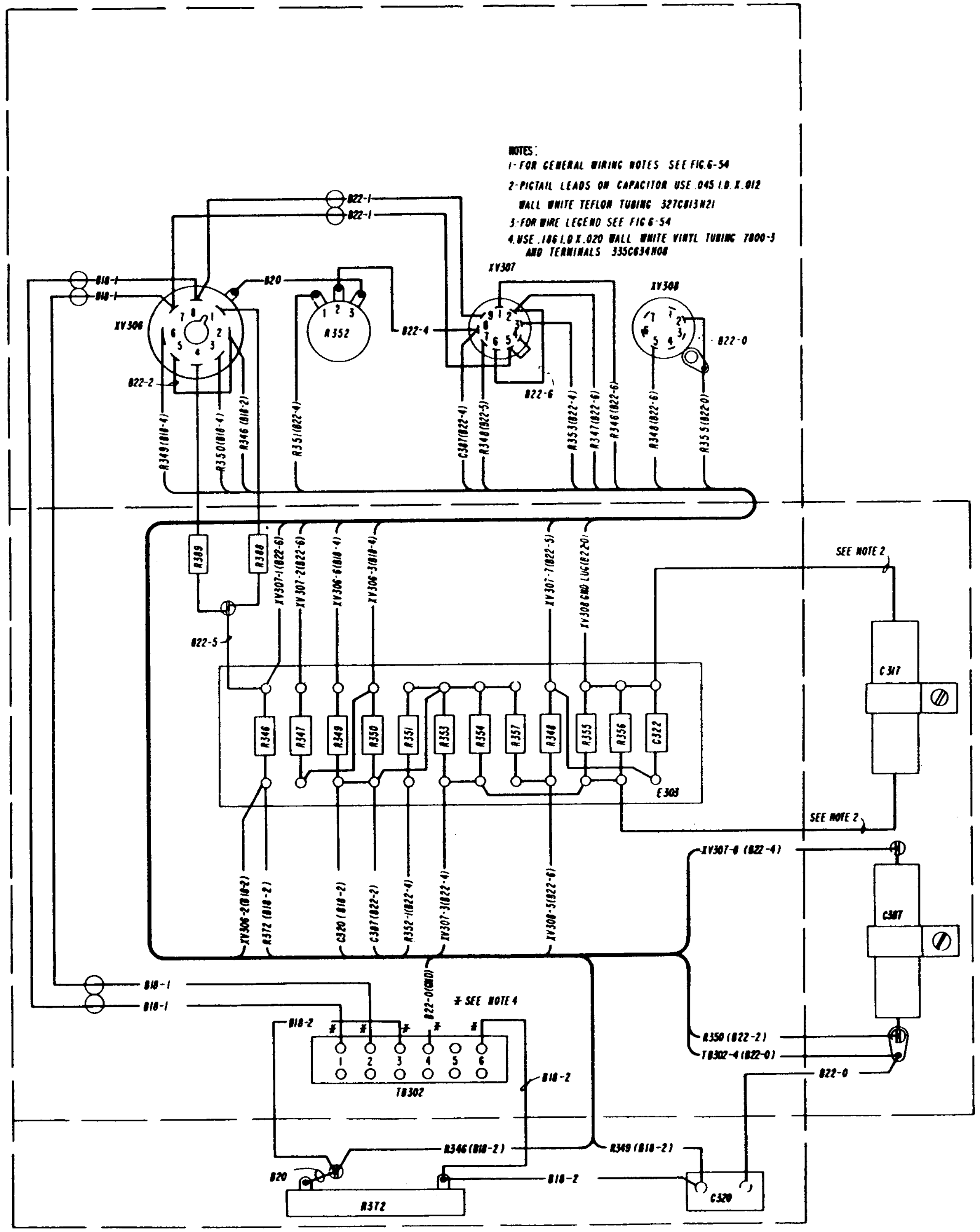
Figur 6-37. Radi Frequency Oscillator O-621/WRT-1, Oven Heaters, Wiring Diagram



NOTES

1. FOR WIRING CODE AND INSTRUCTIONS SEE 375A319
2. DO NOT CABLE "K" LEADS. RUN DIRECT AND AS STRAIGHT AS POSSIBLE. USE .045" x .012" WALL OR .118" x .020" WALL WHITE TEFLON TUBING WHERE NECESSARY.
4. FOR WIRE LEGEND SEE FIG 6-54.

Figure 6-38. Radio Frequency Oscillator O-621/WRT-1, Oven Deck, Wiring Diagram



NOTES:
1-FOR GENERAL WIRING NOTES SEE FIG.6-54
2-PIGTAIL LEADS ON CAPACITOR USE .045 I.D. X .012
WALL WHITE TEFLON TUBING 327C013H21
3-FOR WIRE LEGEND SEE FIG 6-54
4.USE .106 I.D X .020 WALL WHITE VINYL TUBING 7800-3
AND TERMINALS 335C634H08

Figure 6-39A. Radio Frequency Oscillator O-621/WRT-1, +250 V Regulator, Wiring Diagram, Sets Serials 142 and up

NOTES:
1-FOR WIRE LEGEND SEE FIG 6-54.
* THIS CIRCUIT APPLIES TO SETS SERIALS 35 TO 141
** THIS CIRCUIT APPLIES TO SETS SERIALS 1 THROUGH 34.

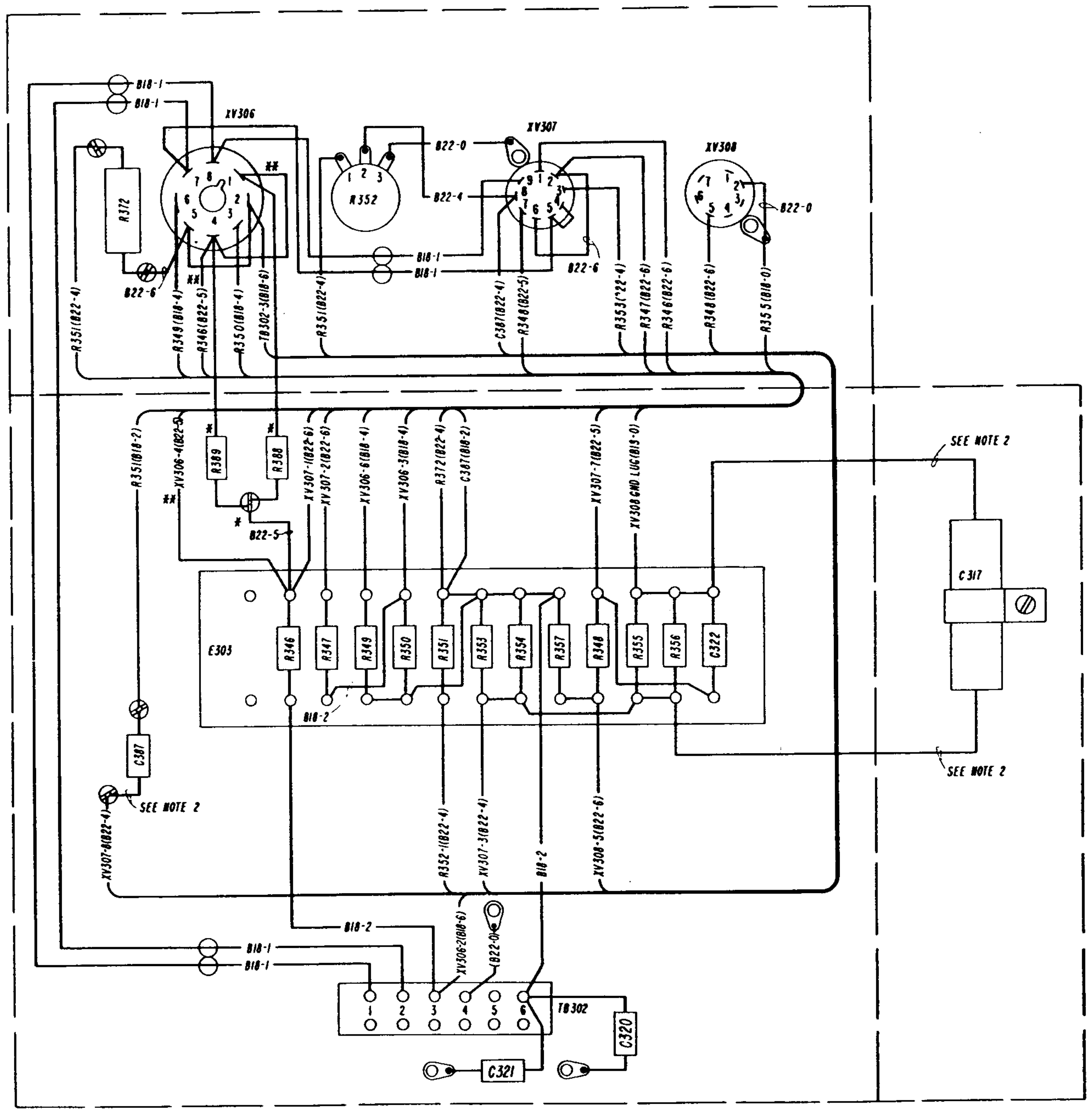
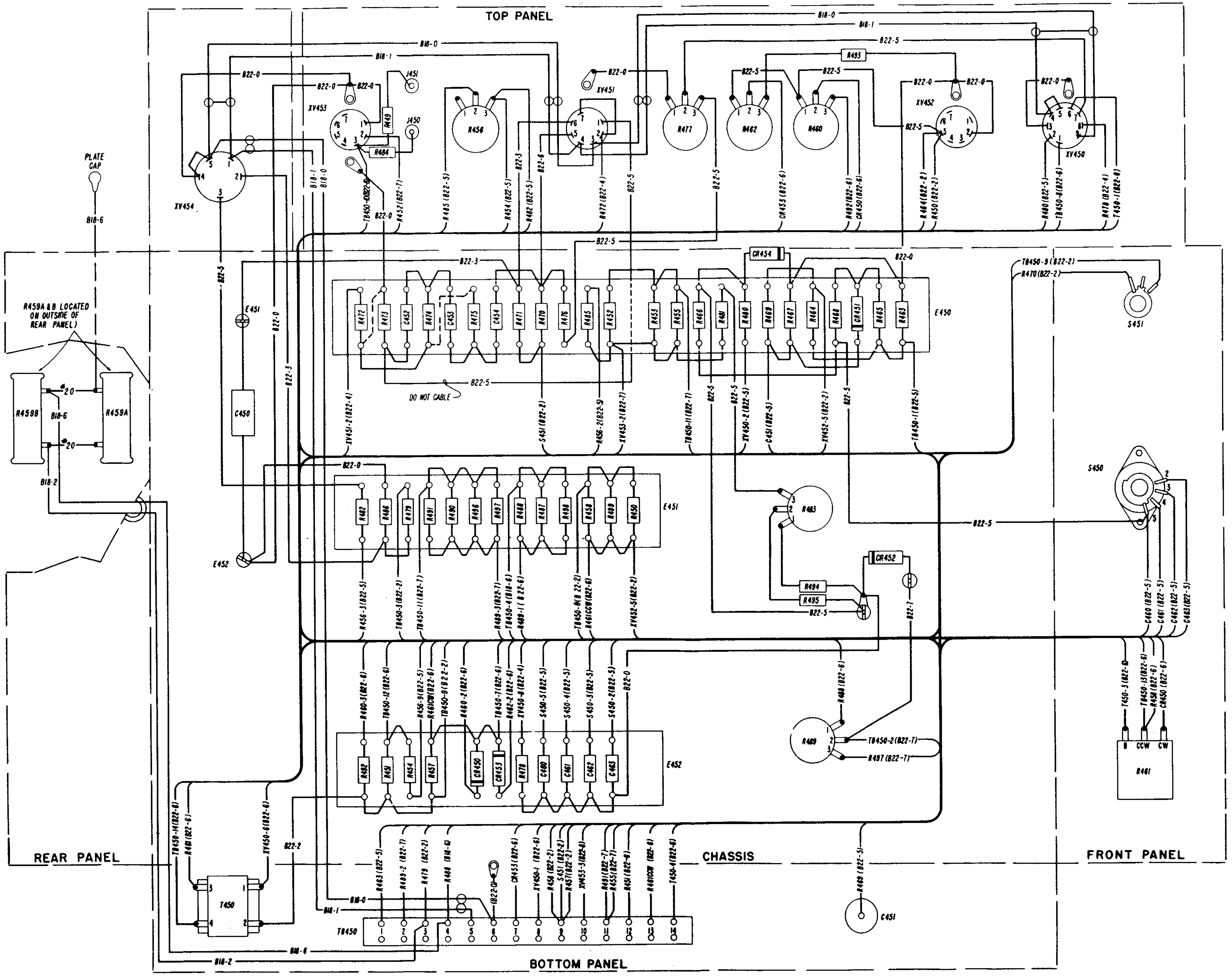
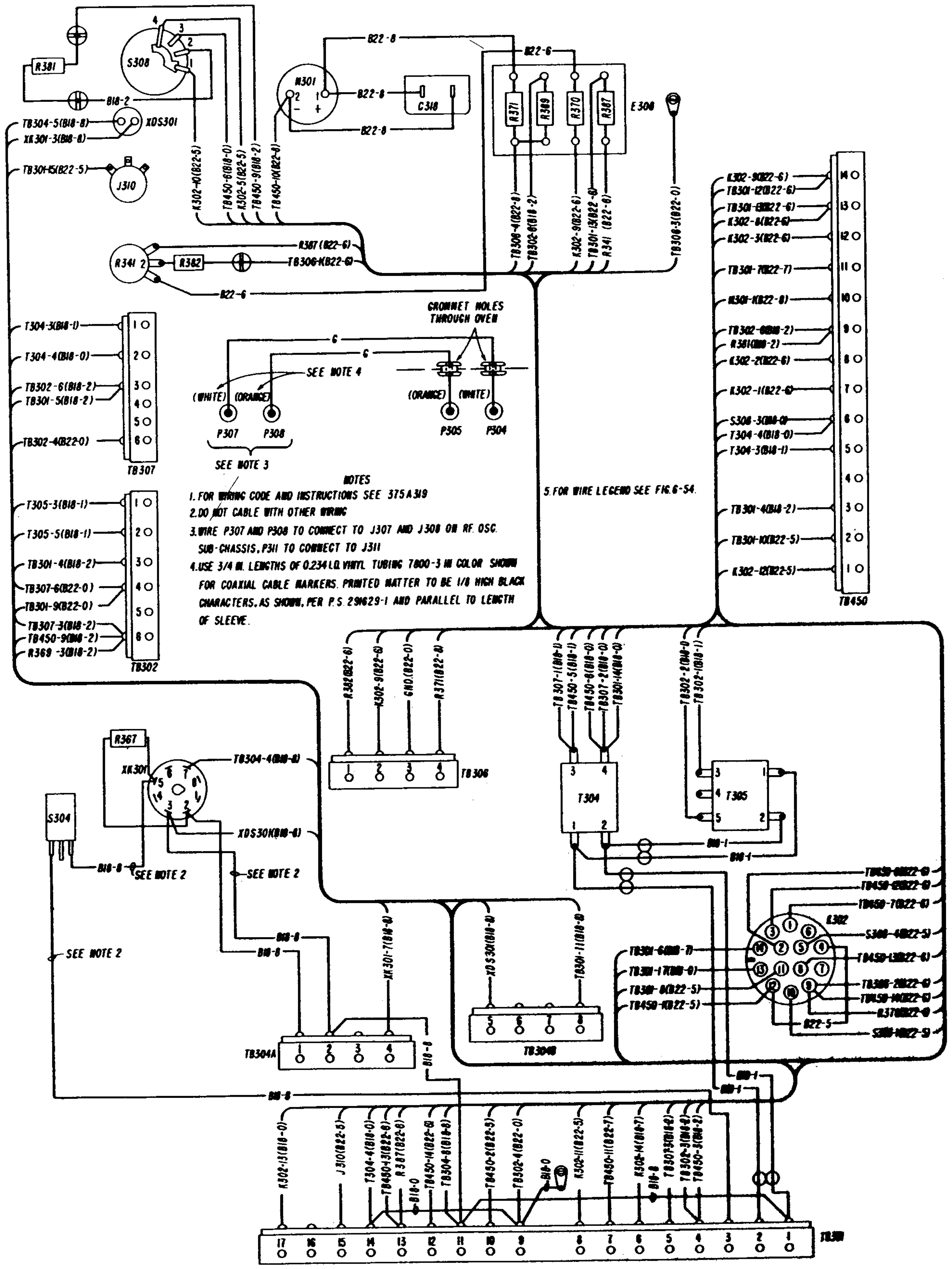


Figure 6-39. Radio Frequency Oscillator O-621/WRT-1, +250 V Regulator, Wiring Diagram, Sets Serials 1 to 141



NOTES:
1. FOR WIRING CODE AND INSTRUCTIONS SEE DWG. 375A319
2. ⦶⦶ OR ⦶——⦶ INDICATES TWISTED PAIR. DO NOT CABLE WITH OTHER WIRING.
3. FOR WIRE LEGEND SEE FIG 6-54

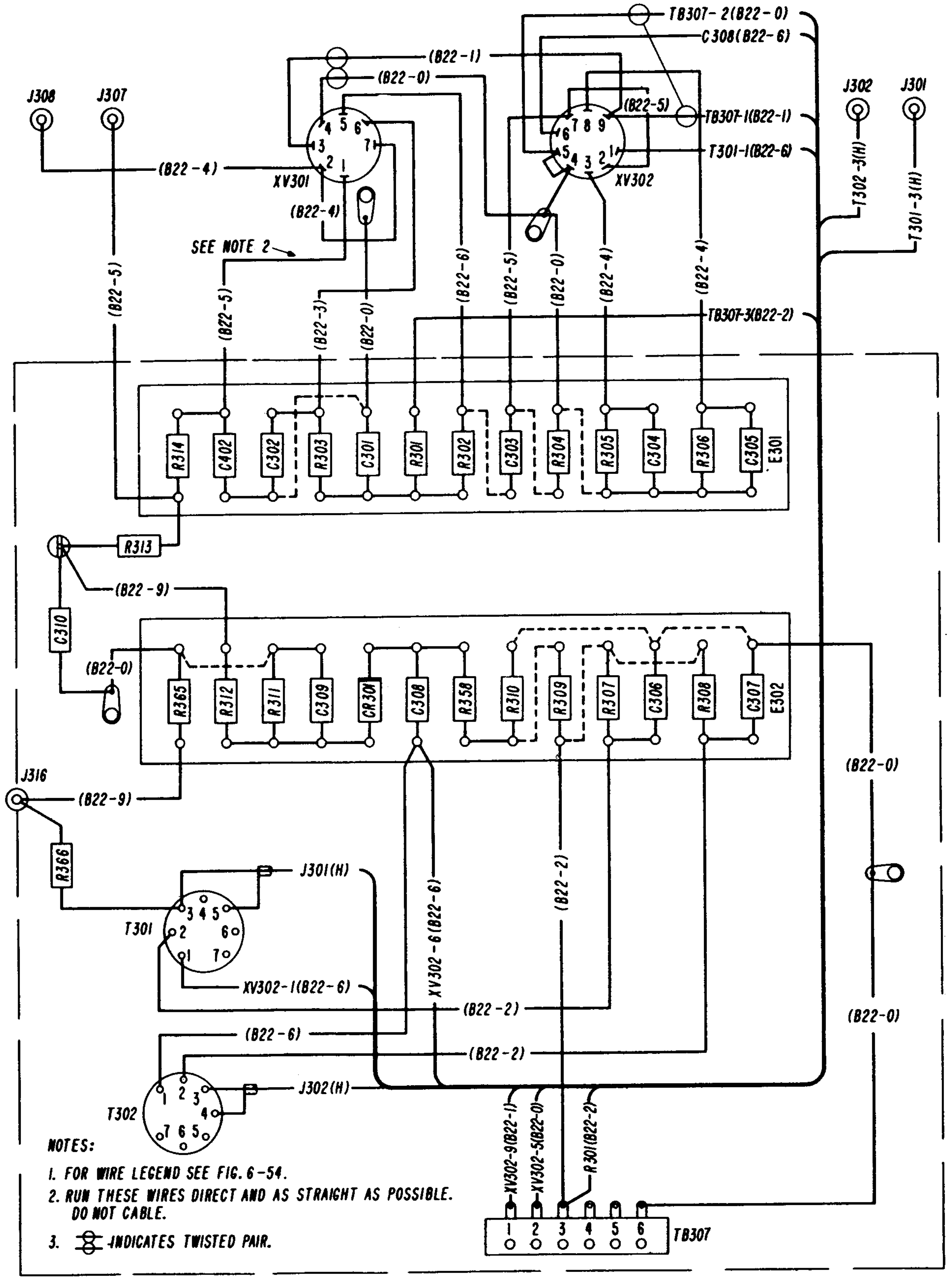
Figure 6-40. Radio Frequency Oscillator O-621/WRT-1, Keyer Circuits, Wiring Diagram



NOTES

1. FOR WIRING CODE AND INSTRUCTIONS SEE 375A319
2. DO NOT CABLE WITH OTHER WIRING
3. WIRE P307 AND P308 TO CONNECT TO J307 AND J308 ON RF. OSC. SUB-CHASSIS, P311 TO CONNECT TO J311
4. USE 3/4 IN. LENGTHS OF 0.234 I.D. VINYL TUBING 7800-3 IN COLOR SHOWN FOR COAXIAL CABLE MARKERS. PRINTED MATTER TO BE 1/8 HIGH BLACK CHARACTERS, AS SHOWN, PER P.S. 291629-1 AND PARALLEL TO LENGTH OF SLEEVE.
5. FOR WIRE LEGEND SEE FIG. 6-54.

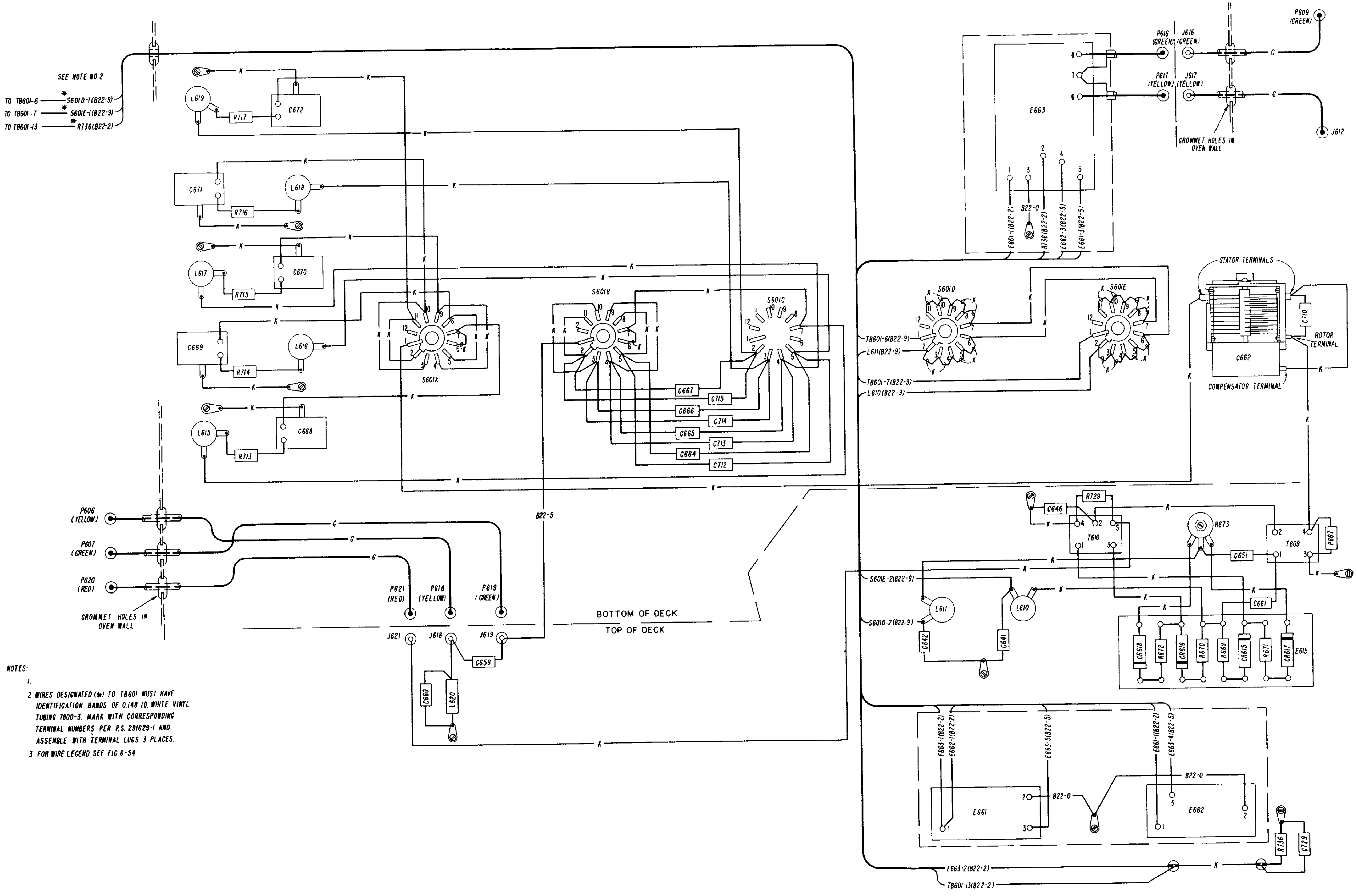
Figure 6-42. Radi Frequency Oscillator O-621/WRT-1, 300 Kc to 1.5 Mc Chassis, Wiring Diagram



NOTES:

1. FOR WIRE LEGEND SEE FIG. 6-54.
2. RUN THESE WIRES DIRECT AND AS STRAIGHT AS POSSIBLE. DO NOT CABLE.
3. ⊕ INDICATES TWISTED PAIR.

Figure 6-41. Radi Frequency Oscillator O-621/WRT-1, R-F scillator Sub-Chassis, Wiring Diagram



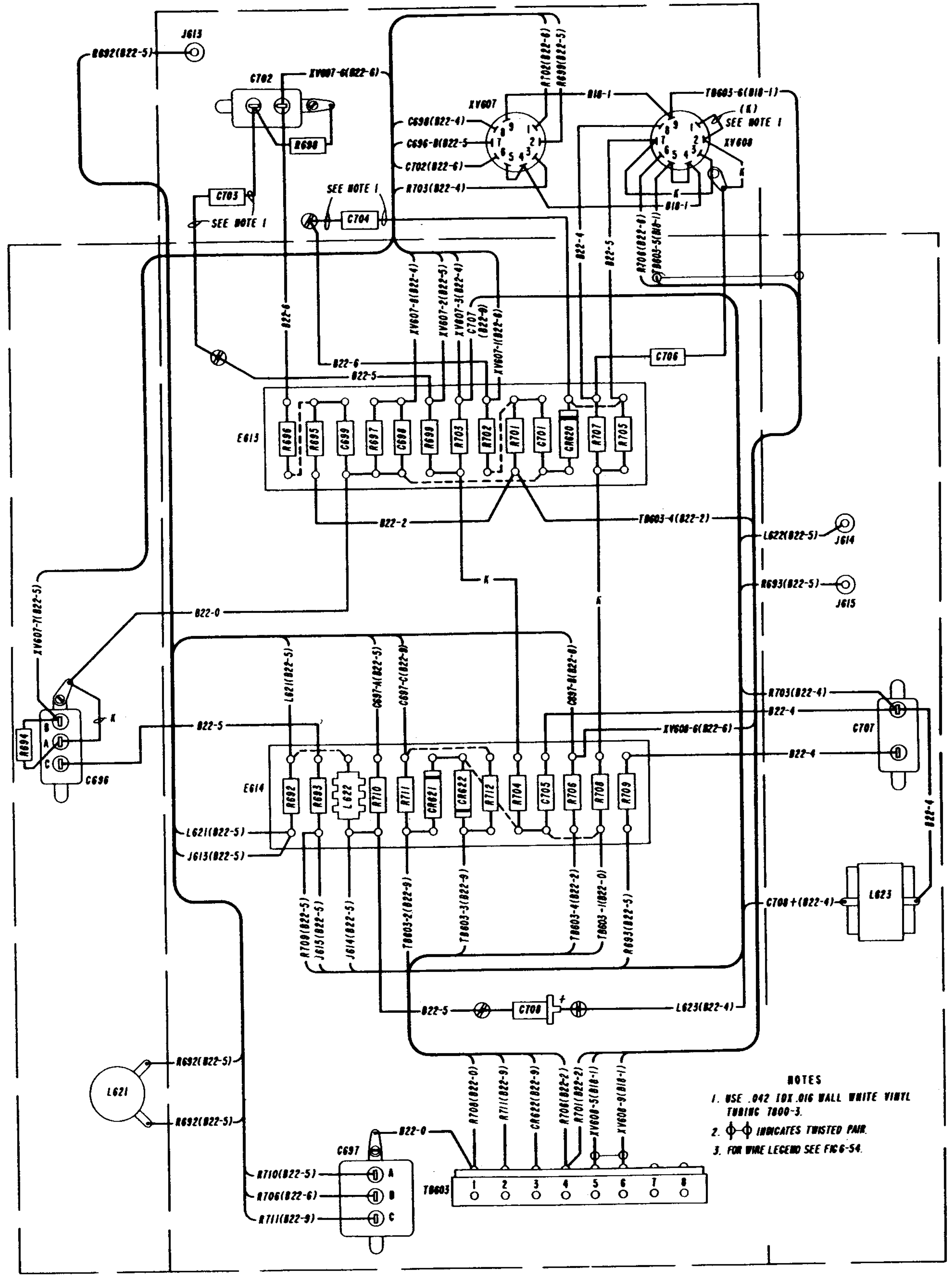
NOTES:

1.

2 WIRES DESIGNATED (✱) TO TB601 MUST HAVE IDENTIFICATION BANDS OF 0.148 I.D. WHITE VINYL TUBING 7800-3. MARK WITH CORRESPONDING TERMINAL NUMBERS PER P.S. 291629-1 AND ASSEMBLE WITH TERMINAL LUGS 3 PLACES.

3 FOR WIRE LEGEND SEE FIG 6-54.

Figure 6-43. Electrical Frequency C ntr l C-2861/WRT-1, Switch and Capacitor Assembly, Wiring Diagram



NOTES

1. USE .042 IDX .016 WALL WHITE VINYL TUBING T800-3.
2. ɸ—ɸ INDICATES TWISTED PAIR.
3. FOR WIRE LEGEND SEE FIG 6-54.

Figure 6-45. Electrical Frequency Control C-2861/WRT-1, Feedback Amplifier, Wiring Diagram

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NOTE:

FOR GENERAL WIRING NOTES SEE 375A319
FOR WIRE LEGEND SEE FIG.6-54.

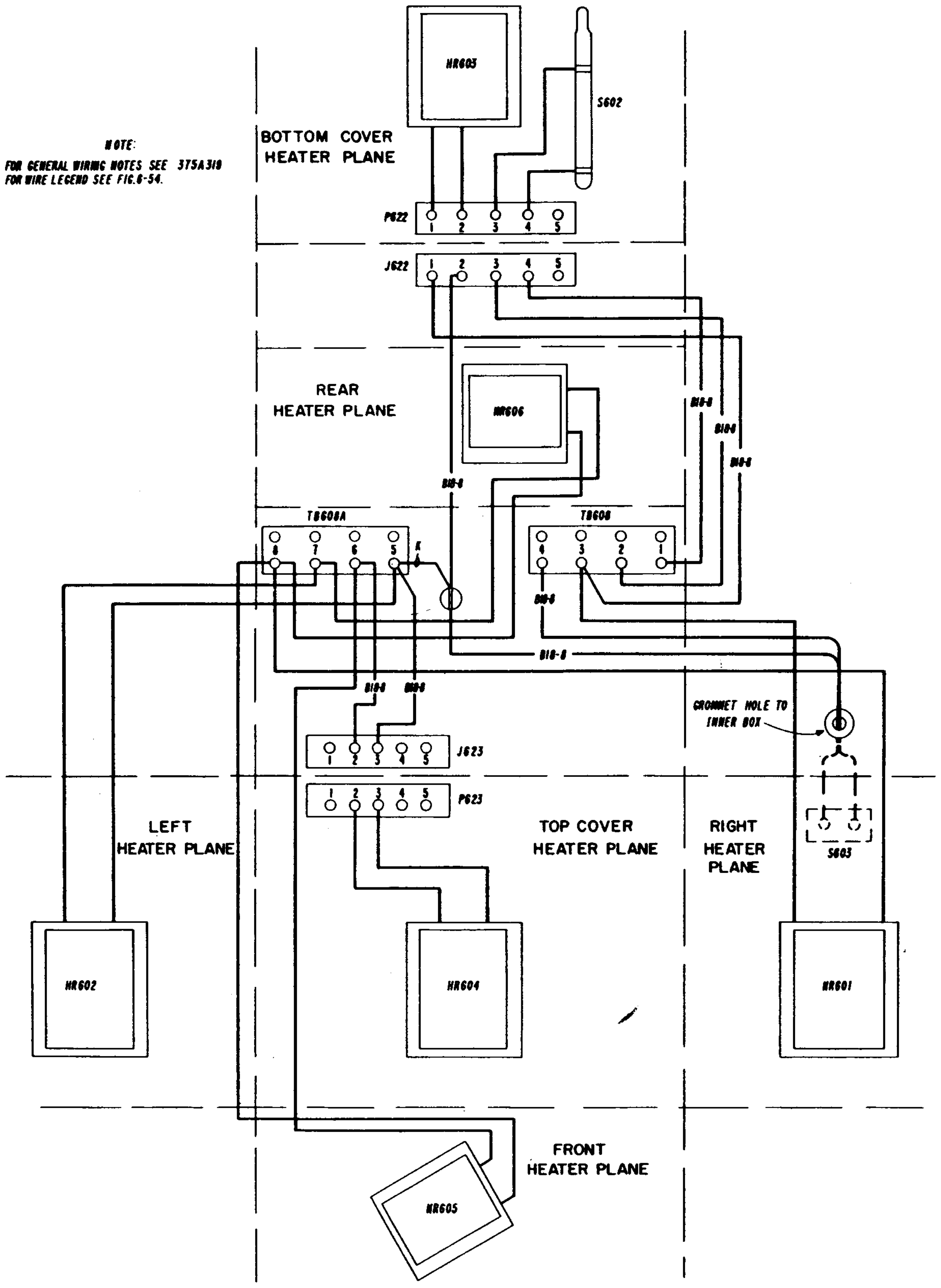
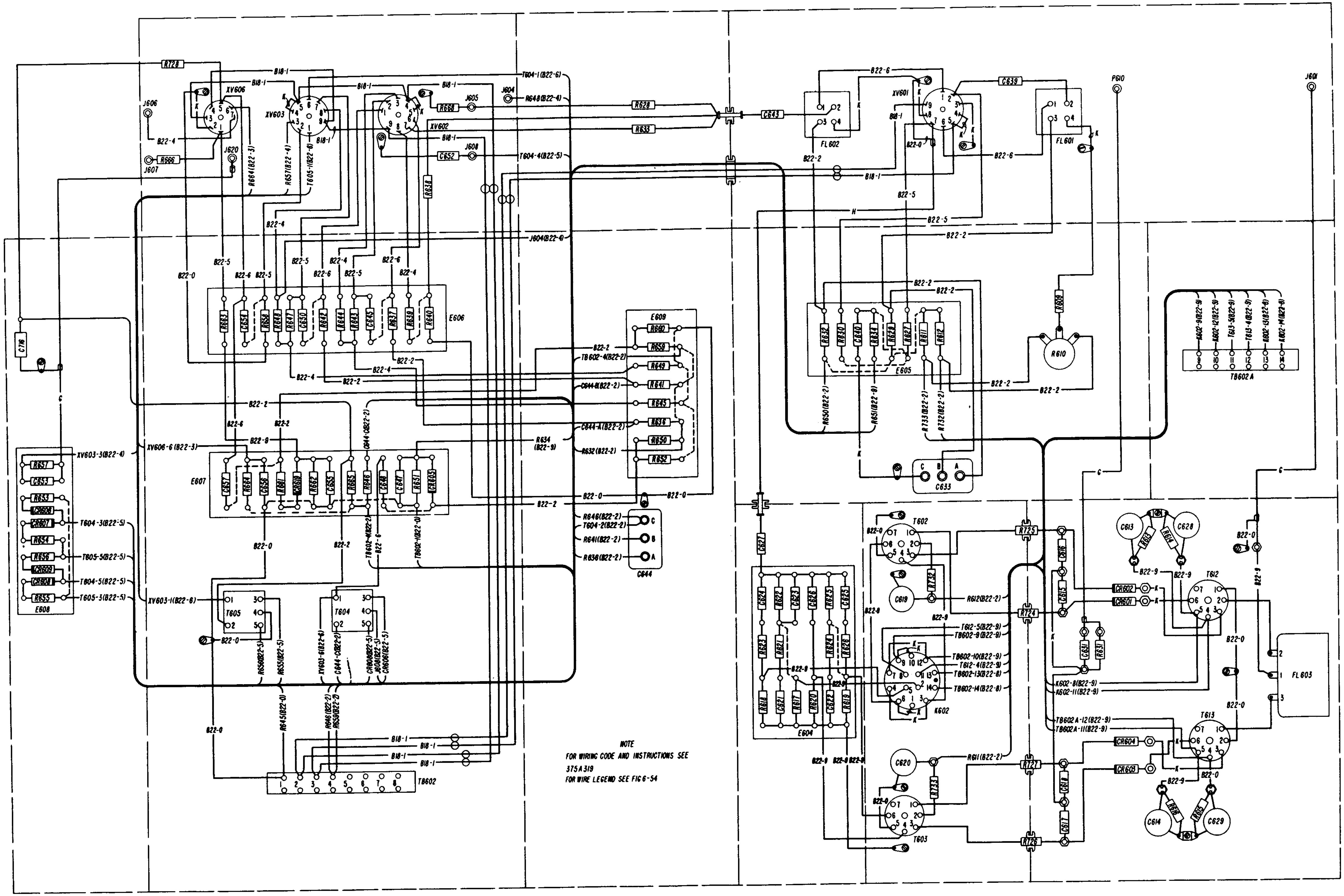


Figure 6-44. Electrical Frequency Control C-2861/WRT-1, Oven Heaters, Wiring Diagram



NOTE
FOR WIRING CODE AND INSTRUCTIONS SEE 375A319
FOR WIRE LEGEND SEE FIG 6-54

Figure 6-46. Electrical Frequency Control C-2861/WRT-1, Frequency Comparator, Wiring Diagram

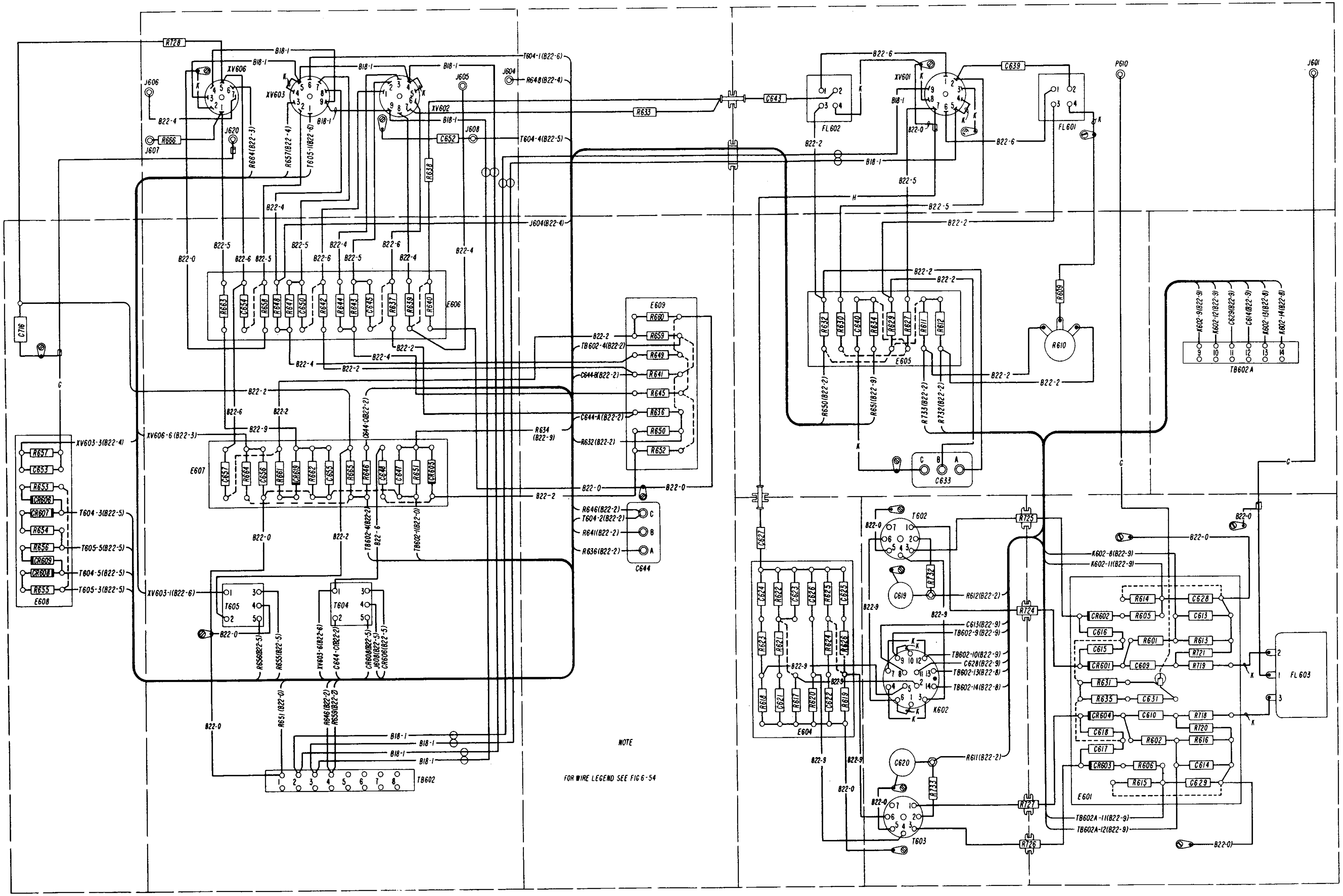
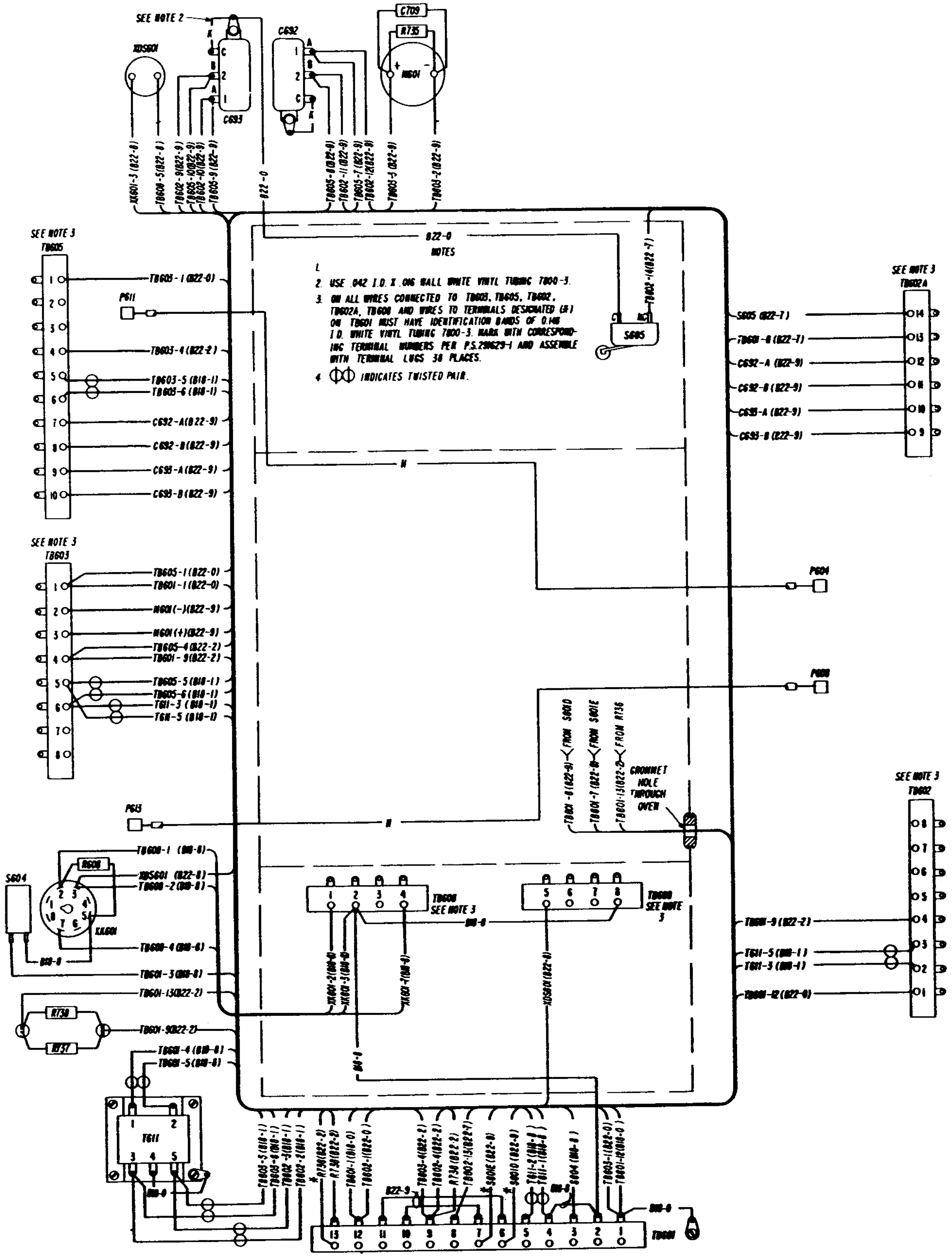


Figure 6-46A. Electrical Frequency Control C-2861/WRT-1, Frequency Comparator, Wiring Diagram, Sets Serials 142 and up



NOTES

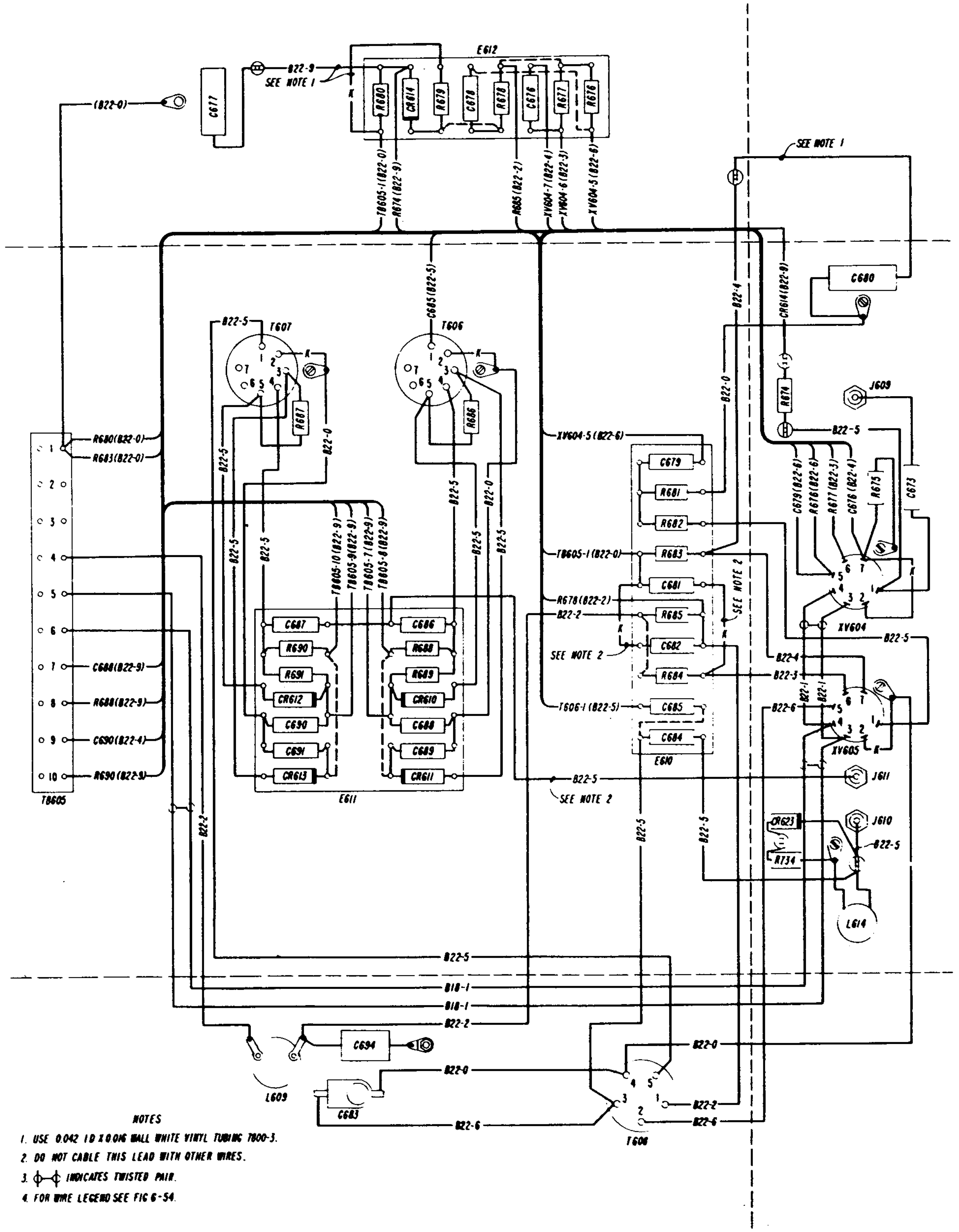
1.

2. USE .042 I.D. X .016 WALL WHITE VINYL TUBING T800-3.

3. ON ALL WIRES CONNECTED TO TB603, TB605, TB602, TB602A, TB608 AND WIRES TO TERMINALS DESIGNATED (#) ON TB601 MUST HAVE IDENTIFICATION BANDS OF 0.146 I.D. WHITE VINYL TUBING T800-3. MARK WITH CORRESPONDING TERMINAL NUMBERS PER P.S.290629-1 AND ASSEMBLE WITH TERMINAL LUGS 38 PLACES.

4. ΦΦ INDICATES TWISTED PAIR.

Figure 6-48. Electrical Frequency Control C-2681/WRT-1, Interconnecting Diagram



NOTES

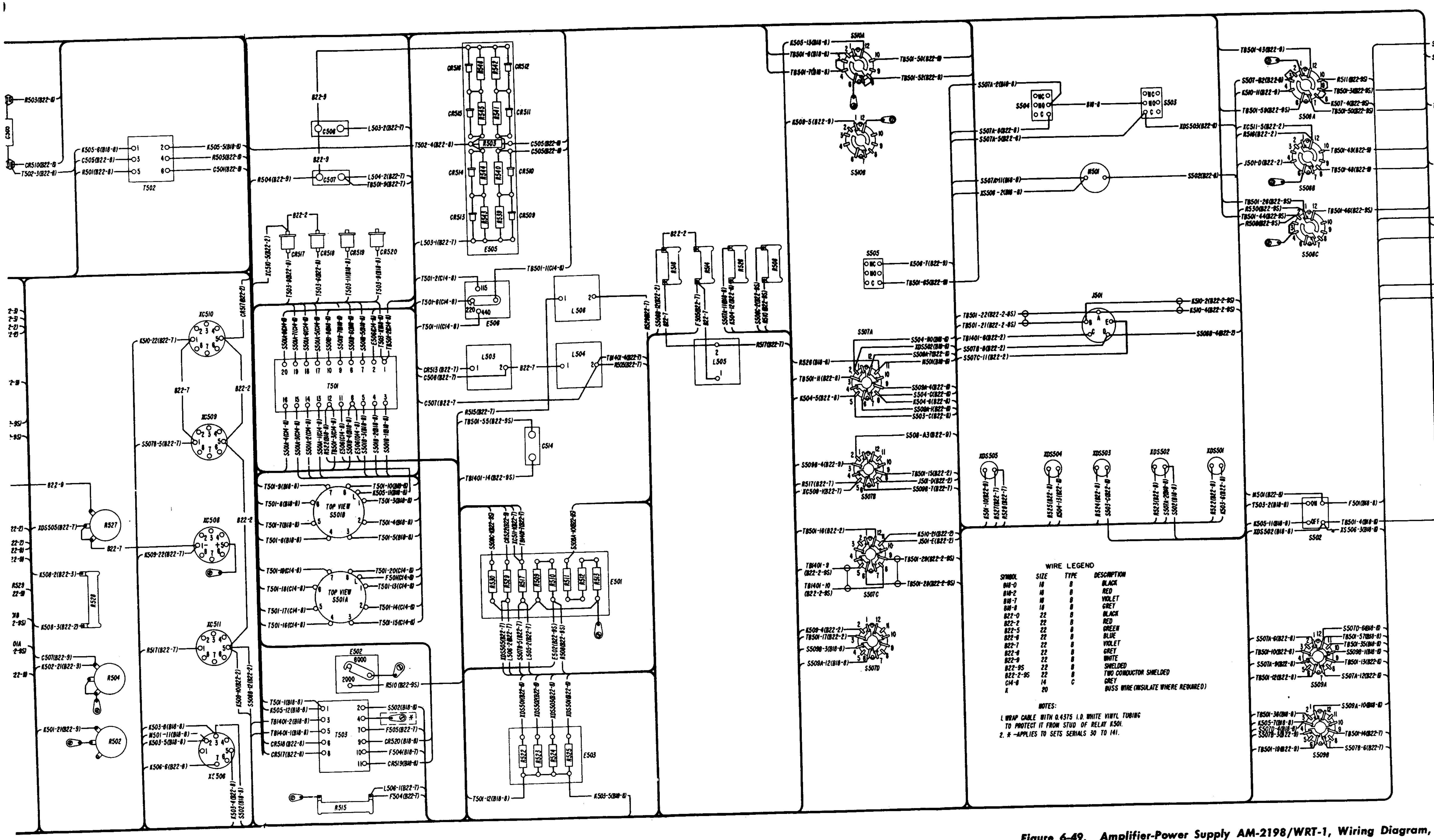
1. USE 0.042 ID X 0.016 WALL WHITE VINYL TUBING T800-3.

2. DO NOT CABLE THIS LEAD WITH OTHER WIRES.

3. Φ—Φ INDICATES TWISTED PAIR.

4. FOR WIRE LEGEND SEE FIG 6-54.

Figure 6-47. Electrical Frequency Control C-2861/WRT-1, 100 Kc Amplifier, Wiring Diagram



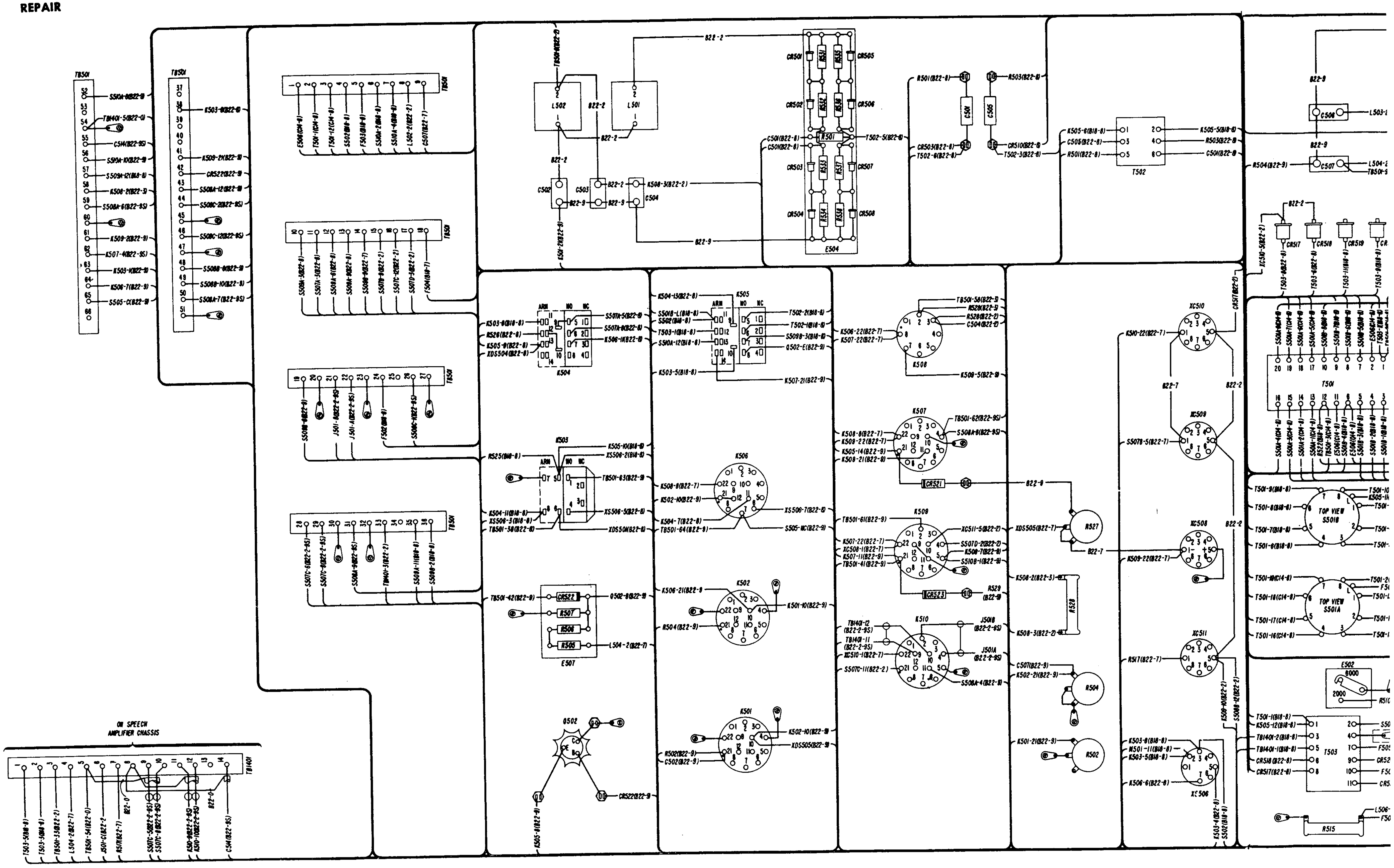
WIRE LEGEND

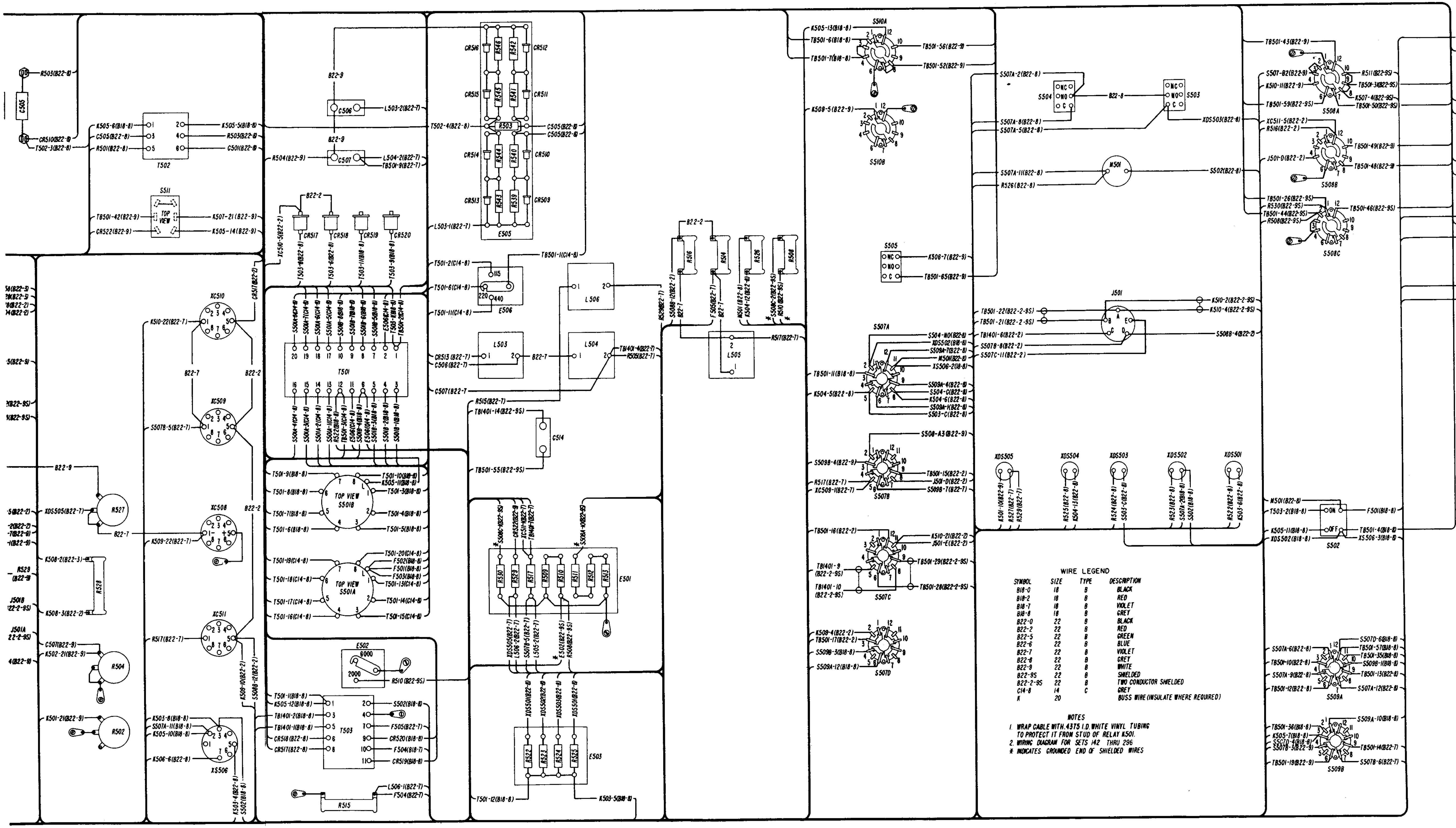
SYMBOL	SIZE	TYPE	DESCRIPTION
B18-0	18	B	BLACK
B18-2	18	B	RED
B18-7	18	B	VIOLET
B18-8	18	B	GREY
B22-0	22	B	BLACK
B22-2	22	B	RED
B22-5	22	B	GREEN
B22-6	22	B	BLUE
B22-7	22	B	VIOLET
B22-8	22	B	GREY
B22-9	22	B	WHITE
B22-9S	22	B	SHIELDED
B22-2-9S	22	B	TWO CONDUCTOR SHIELDED
C14-8	14	C	GREY
K	20		BUSS WIRE (INSULATE WHERE REQUIRED)

NOTES:

1. WRAP CABLE WITH 0.4375 I.D. WHITE VINYL TUBING TO PROTECT IT FROM STUD OF RELAY K501.
2. * –APPLIES TO SETS SERIALS 30 TO 141.

Figure 6-49. Amplifier-Power Supply AM-2198/WRT-1, Wiring Diagram, Sets Serials 1 t 141


TB501
L502
L501
C502
C503
C504
E504
CR501
CR502
CR503
CR504
CR505
CR506
CR507
CR508
R501
C501
C505
T502
K504
K505
K503
E507
Q502
K506
K502
K501
K508
K507
K509
K510
R527
R528
R504
R502
XC510
XC509
XC508
XC511
XC506
T501
TOP VIEW S501B
TOP VIEW S501A
E502
T503
R515
CR517
CR518
CR519
C506
C507
OR SPEECH AMPLIFIER CHASSIS
TB1401



WIRE LEGEND

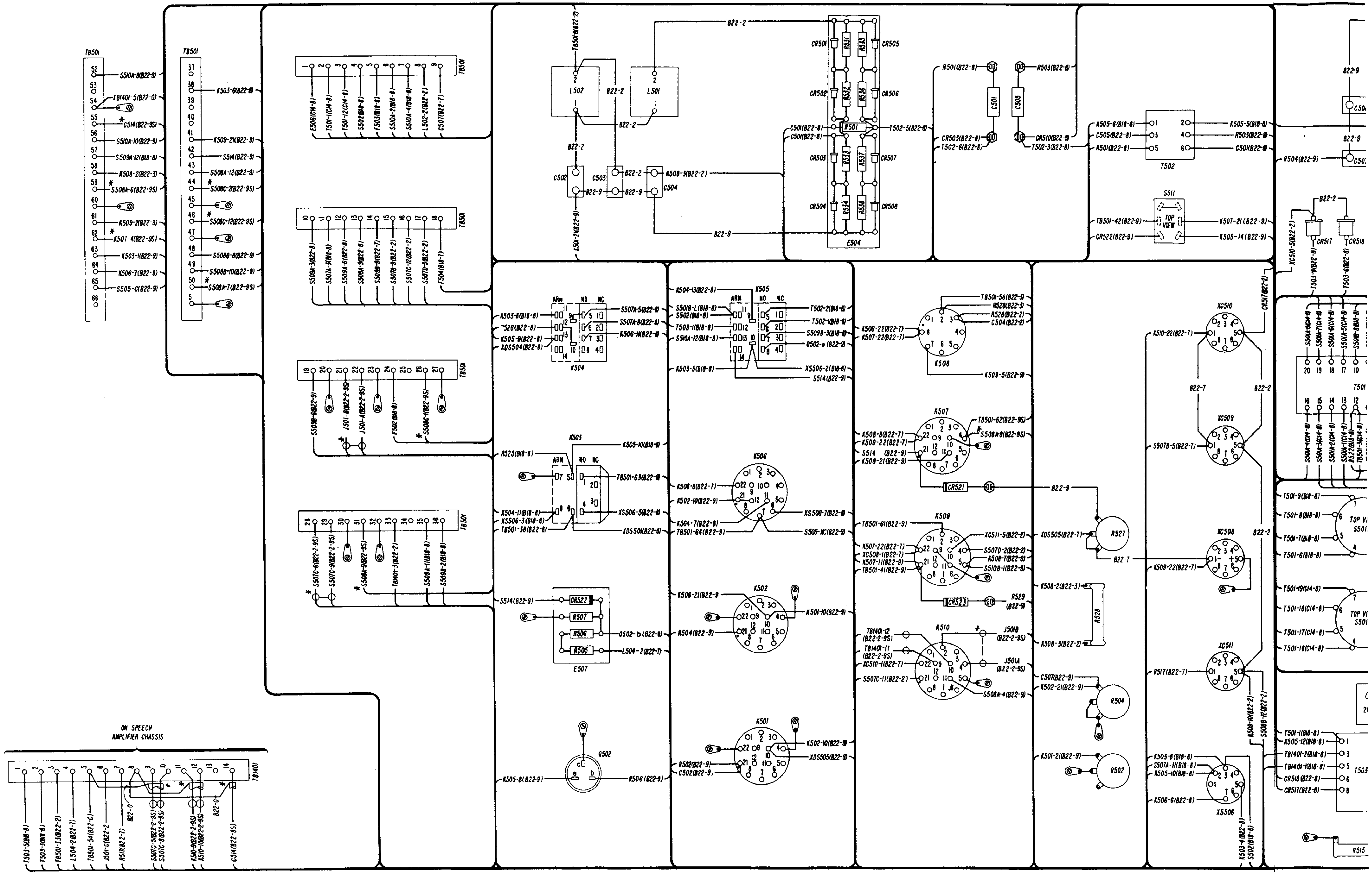
SYMBOL	SIZE	TYPE	DESCRIPTION
B18-0	18	B	BLACK
B18-2	18	B	RED
B18-7	18	B	VIOLET
B18-8	18	B	GREY
B22-0	22	B	BLACK
B22-2	22	B	RED
B22-5	22	B	GREEN
B22-6	22	B	BLUE
B22-7	22	B	VIOLET
B22-8	22	B	GREY
B22-9	22	B	WHITE
B22-9S	22	B	SHIELDED
B22-2-9S	22	B	TWO CONDUCTOR SHIELDED
C14-8	14	C	GREY
K	20		BUSS WIRE (INSULATE WHERE REQUIRED)

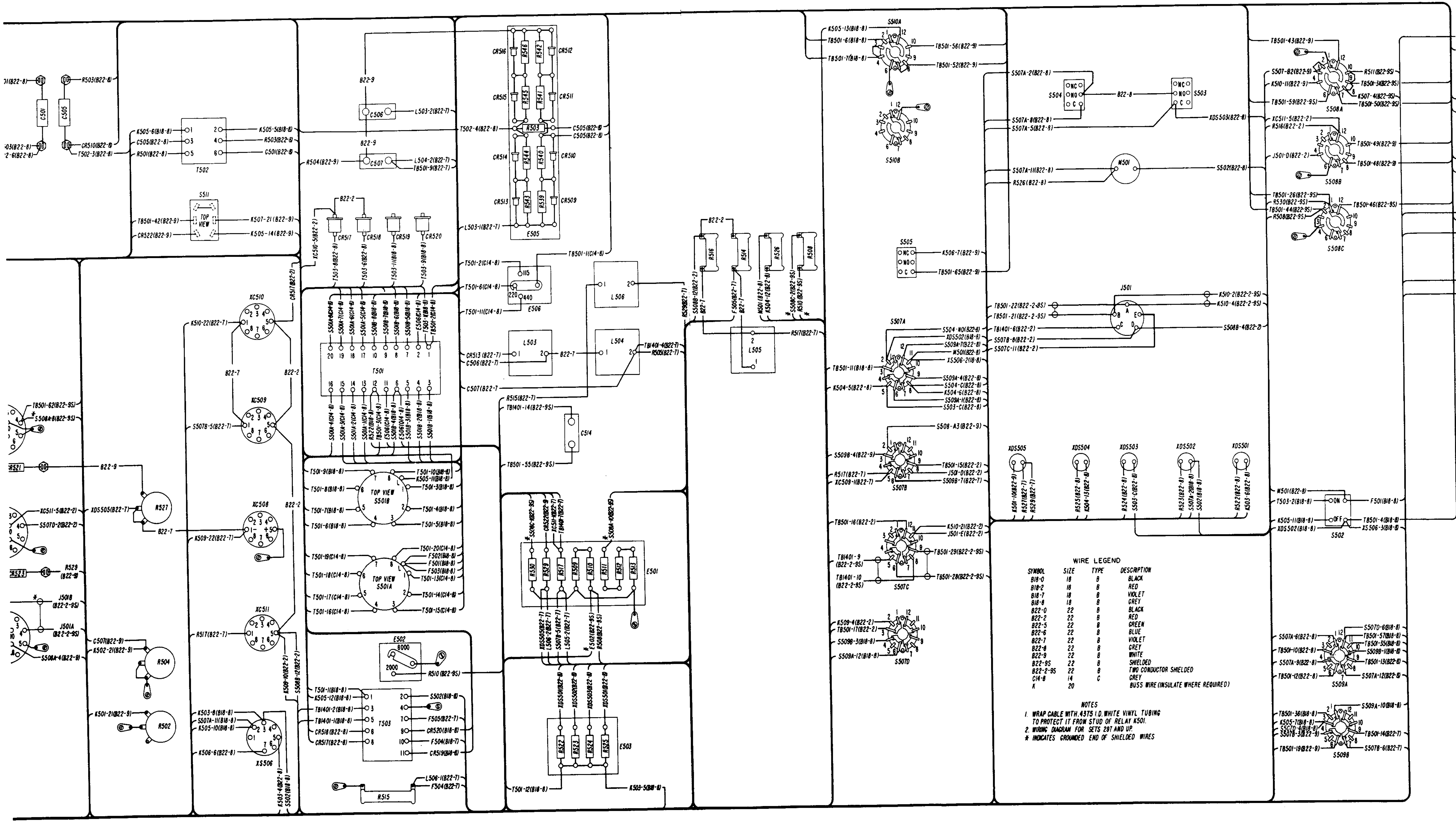
NOTES

1. WRAP CABLE WITH .4375 I.D. WHITE VINYL TUBING TO PROTECT IT FROM STUD OF RELAY K501.
2. WIRING DIAGRAM FOR SETS 142 THRU 296

* INDICATES GROUNDED END OF SHIELDED WIRES

Figure 6-49A. Amplifier-Power Supply AM-2198/WRT-1, Wiring Diagram, Sets Serials 142 t 296


TB501
TB501
TB501
TB1401
ON SPEECH AMPLIFIER CHASSIS
L502
L501
C502
C503
C504
CR501
CR502
CR503
CR504
CR505
CR506
CR507
CR508
R501
R531
R532
R533
R534
R535
R536
R537
R538
E504
C501
C505
T502
S511
TOP VIEW
K504
ARM
NO
NC
K505
K503
K506
K502
K501
E507
CR522
R507
R506
R505
Q502
K508
K507
K509
K510
CR521
CR523
R529
J501B
J501A
R527
R528
R504
R502
XC510
XC509
XC508
XC511
XS506
CR517
CR518
T501
S501
R515



WIRE LEGEND

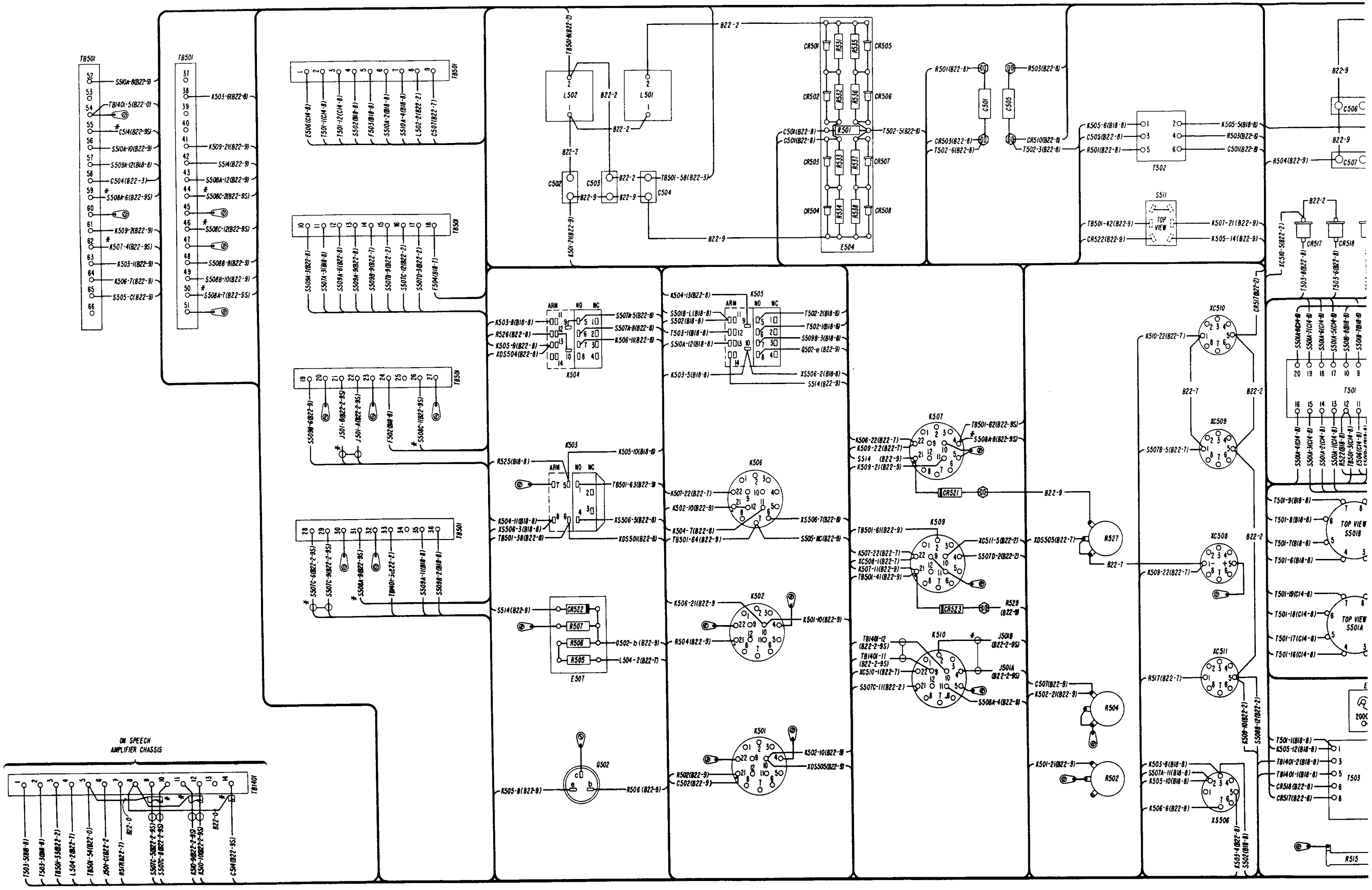
SYMBOL	SIZE	TYPE	DESCRIPTION
B18-0	18	B	BLACK
B18-2	18	B	RED
B18-7	18	B	VIOLET
B18-8	18	B	GREY
B22-0	22	B	BLACK
B22-2	22	B	RED
B22-5	22	B	GREEN
B22-6	22	B	BLUE
B22-7	22	B	VIOLET
B22-8	22	B	GREY
B22-9	22	B	WHITE
B22-9S	22	B	SHIELDED
B22-2-9S	22	B	TWO CONDUCTOR SHIELDED
C14-8	14	C	GREY
K	20		BUSS WIRE (INSULATE WHERE REQUIRED)

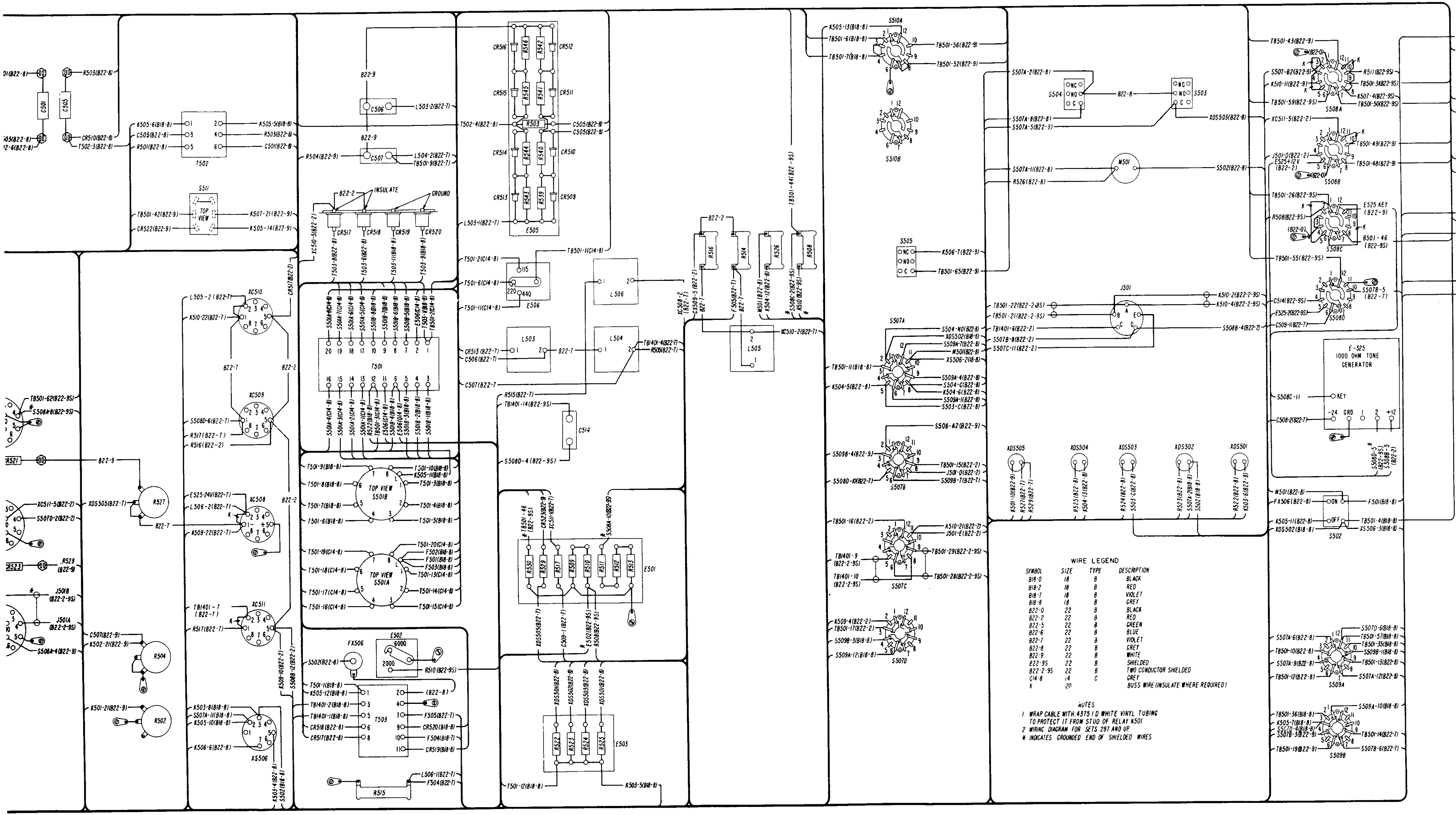
NOTES

1. WRAP CABLE WITH .4375 I.D. WHITE VINYL TUBING TO PROTECT IT FROM STUD OF RELAY K501.
2. WIRING DIAGRAM FOR SETS 297 AND UP.

* INDICATES GROUNDED END OF SHIELDED WIRES

Figure 6-49B. Amplifier-Power Supply AM-2198/WRT-1, Wiring Diagram, Sets Serials 297 and up


TB501
TB501
TB501
TB501
TB501
TB501
ON SPEECH AMPLIFIER CHASSIS
TB1401
L502
L501
C502
C503
C504
CR501
CR502
CR503
CR504
CR505
CR506
CR507
CR508
R531
R532
R533
R534
R535
R536
R537
R538
R501
E504
C501
C505
T502
S511
TOP VIEW
K504
ARM
NO
NC
K505
K503
E507
CR522
R507
R506
R505
Q502
K506
K502
K501
K507
K509
K510
CR521
CR523
R529
J501B
J501A
R527
R504
R502
XC510
XC509
XC508
XC511
XS506
CR517
CR518
T501
TOP VIEW S501B
TOP VIEW S501A
T503
R515



WIRE LEGEND

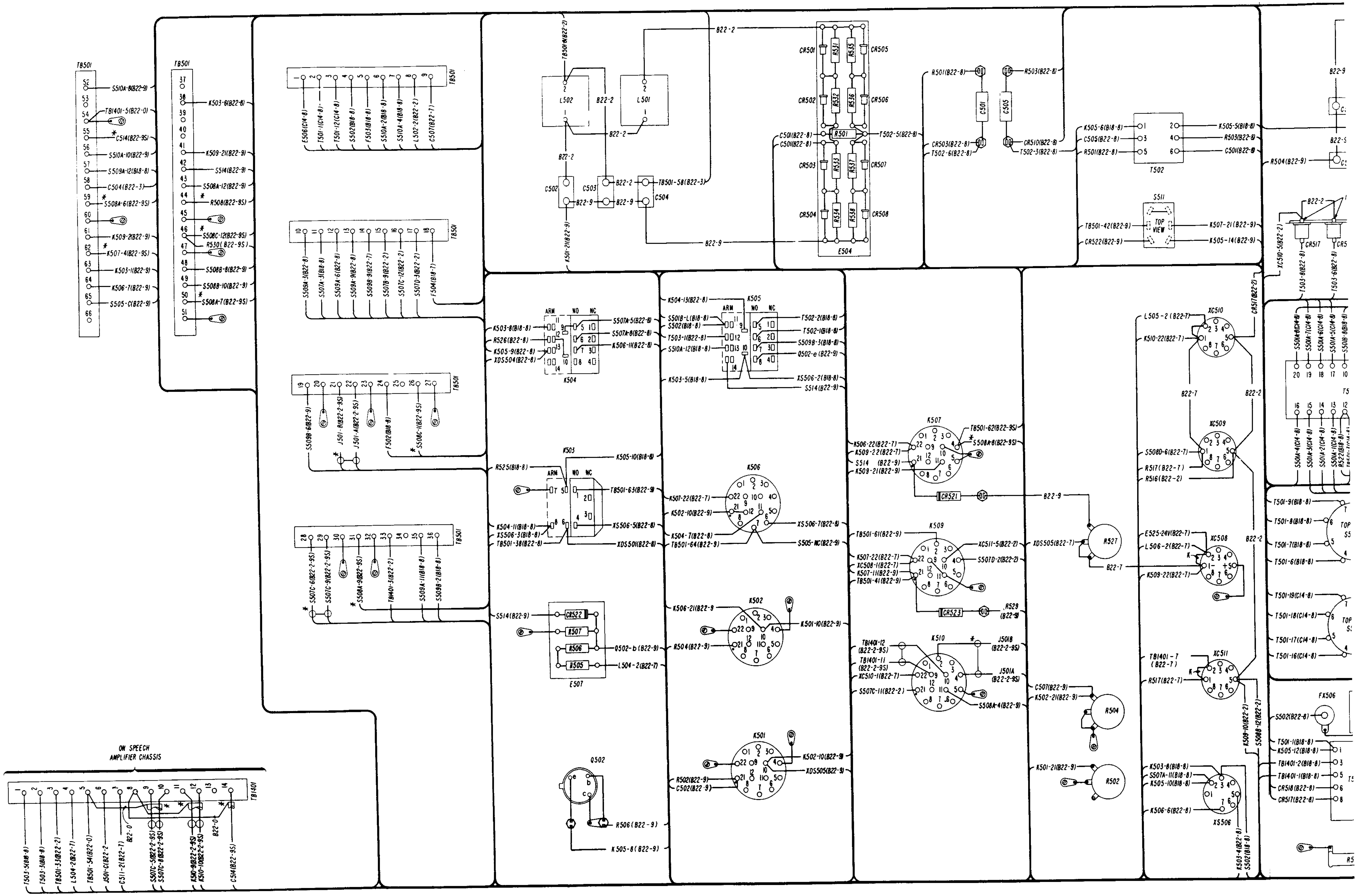
SYMBOL	SIZE	TYPE	DESCRIPTION
B18-0	18	B	BLACK
B18-2	18	B	RED
B18-7	18	B	VIOLET
B18-8	18	B	GREY
B22-0	22	B	BLACK
B22-2	22	B	RED
B22-5	22	B	GREEN
B22-6	22	B	BLUE
B22-7	22	B	VIOLET
B22-8	22	B	GREY
B22-9	22	B	WHITE
B22-9S	22	B	SHIELDED
B22-2-9S	22	B	TWO CONDUCTOR SHIELDED
C14-8	14	C	GREY
K	20		BUSS WIRE (INSULATE WHERE REQUIRED)

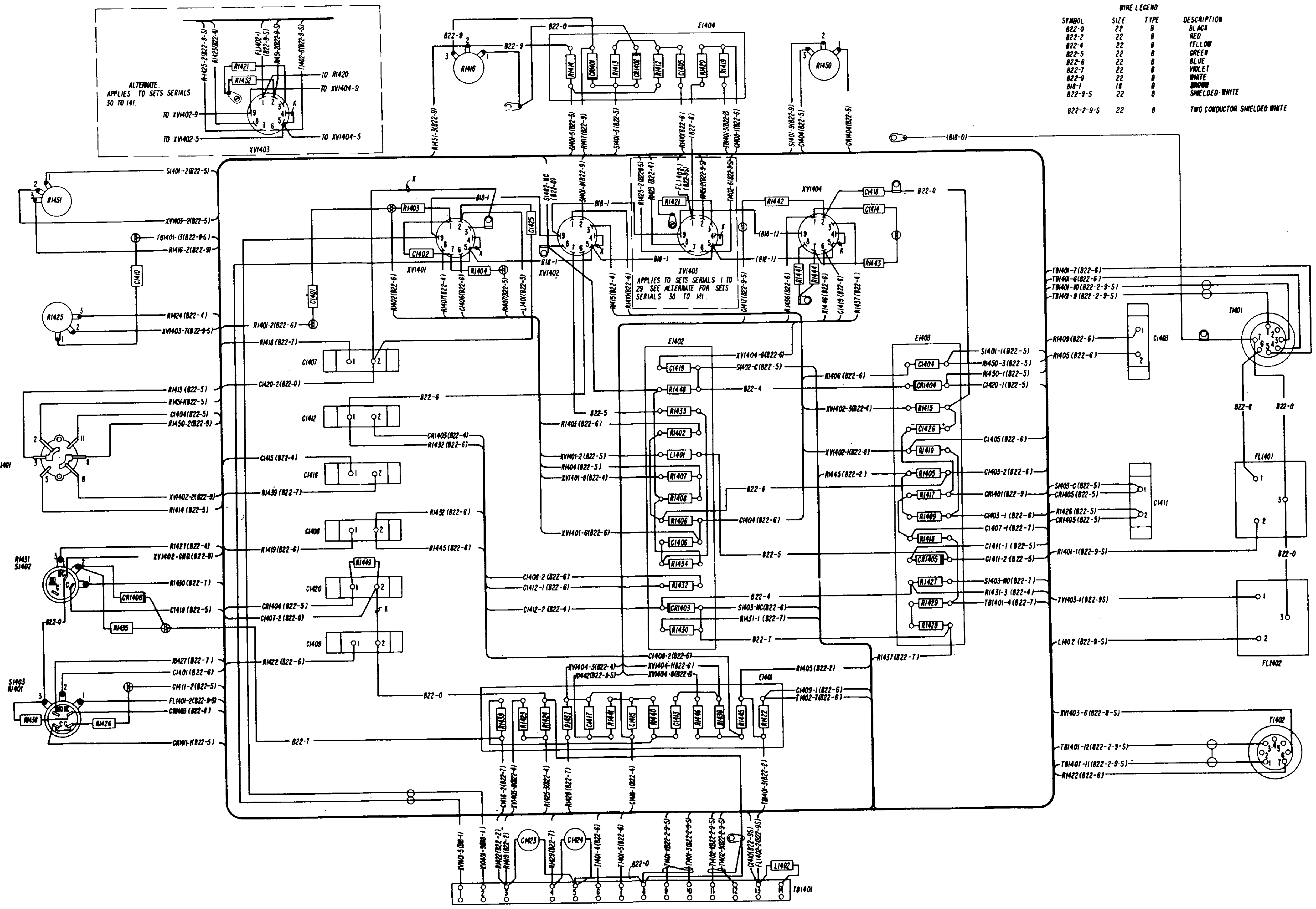
NOTES

1. WRAP CABLE WITH .4375 I.D. WHITE VINYL TUBING TO PROTECT IT FROM STUD OF RELAY K501.
2. WIRING DIAGRAM FOR SETS 297 AND UP.

* INDICATES GROUNDED END OF SHIELDED WIRES

Figure 6-49C. Amplifier-Power Supply AM-2198A/WRT-1, Wiring Diagram


TB501
TB501
ON SPEECH AMPLIFIER CHASSIS
TB1401
L502
L501
B22-2
B22-9
C502
C503
C504
CR501
CR502
CR503
CR504
CR505
CR506
CR507
CR508
R501
E504
C501
C505
T502
S511
TOP VIEW
K504
K505
K503
ARM
NO
NC
K506
K507
K509
K510
K502
K501
CR521
CR523
E507
CR522
R507
R506
R505
Q502
R527
R504
R502
J501B
J501A
XC510
XC509
XC508
XC511
XS506
FX506



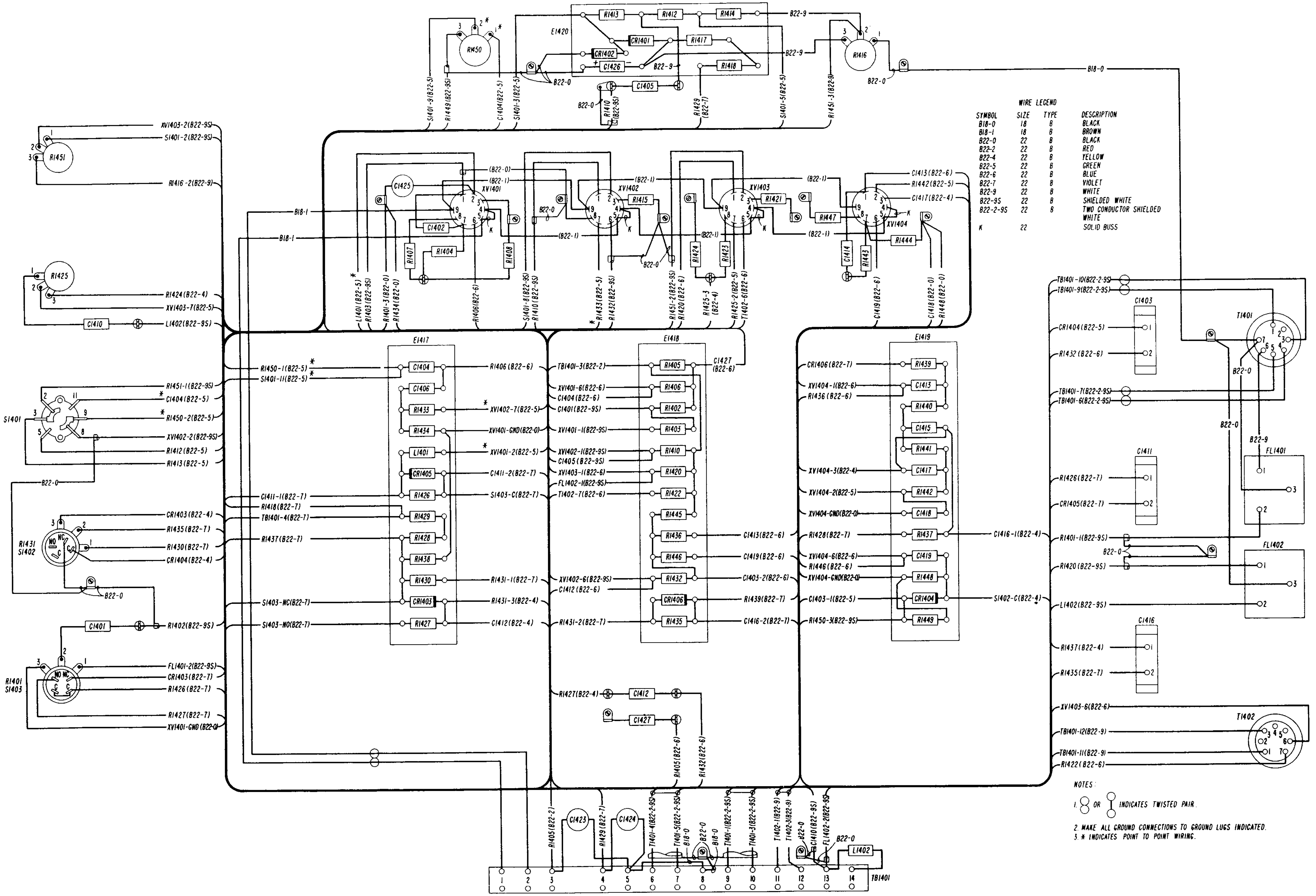
ALTERNATE: APPLIES TO SETS SERIALS 30 TO 141.

XV1403 APPLIES TO SETS SERIALS 1 TO 29 SEE ALTERNATE FOR SETS SERIALS 30 TO 141.

WIRE LEGEND

SYMBOL	SIZE	TYPE	DESCRIPTION
B22-0	22	B	BLACK
B22-2	22	B	RED
B22-4	22	B	YELLOW
B22-5	22	B	GREEN
B22-6	22	B	BLUE
B22-7	22	B	VIOLET
B22-9	22	B	WHITE
B18-1	18	B	BROWN
B22-9-S	22	B	SHIELDED-WHITE
B22-2-9-S	22	B	TWO CONDUCTOR SHIELDED WHITE

Figure 6-50. Amplifier-Power Supply AM-2198/WRT-1, Speech Amplifier, Wiring Diagram, Sets Serials 1 to 141



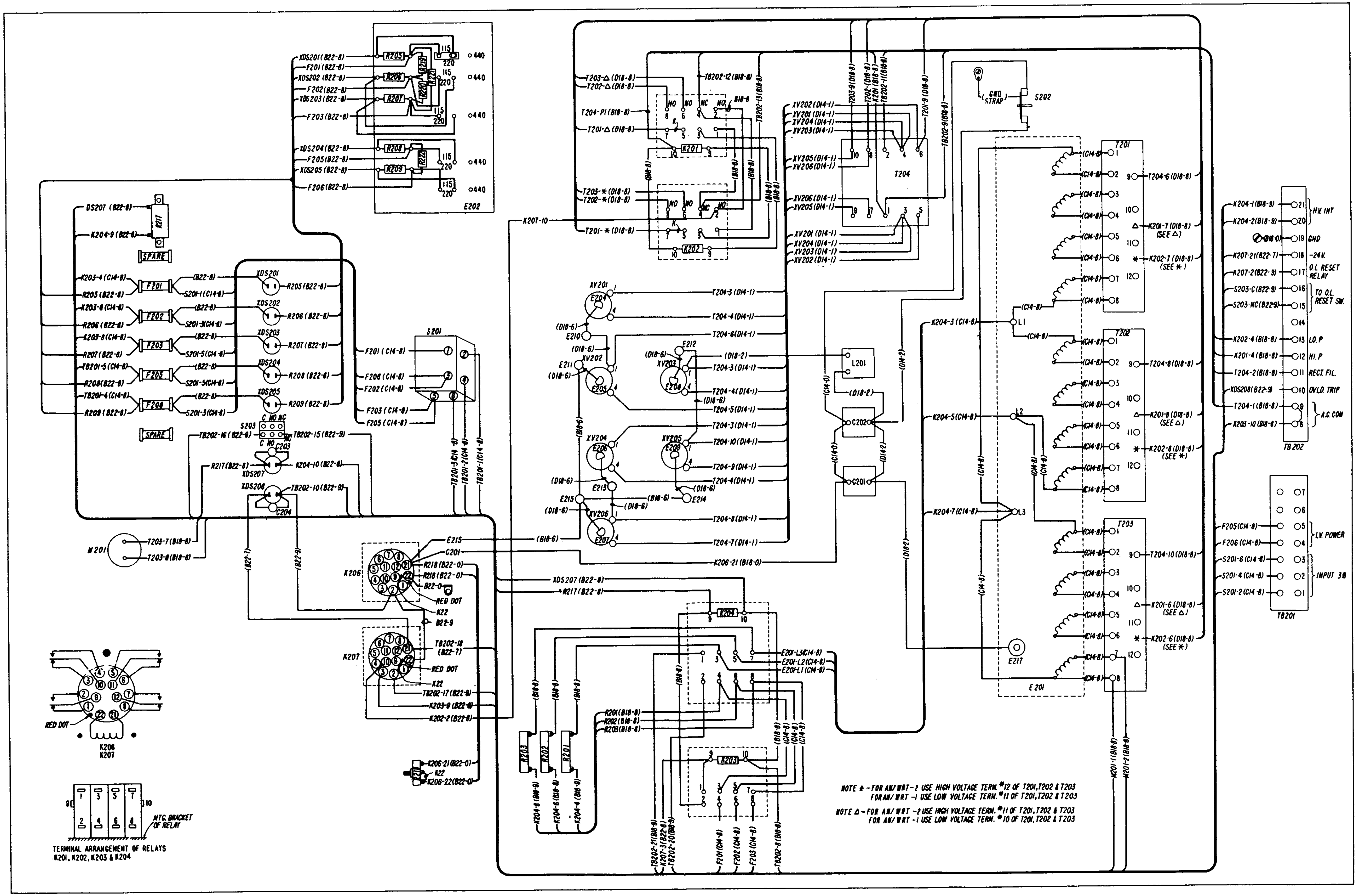
WIRE LEGEND

SYMBOL	SIZE	TYPE	DESCRIPTION
B18-0	18	B	BLACK
B18-1	18	B	BROWN
B22-0	22	B	BLACK
B22-2	22	B	RED
B22-4	22	B	YELLOW
B22-5	22	B	GREEN
B22-6	22	B	BLUE
B22-7	22	B	VIOLET
B22-9	22	B	WHITE
B22-9S	22	B	SHIELDED WHITE
B22-2-9S	22	B	TWO CONDUCTOR SHIELDED WHITE
K	22		SOLID BUSS

NOTES:

1. 8 OR ⚲ INDICATES TWISTED PAIR.
2. MAKE ALL GROUND CONNECTIONS TO GROUND LUGS INDICATED.
3. * INDICATES POINT TO POINT WIRING.

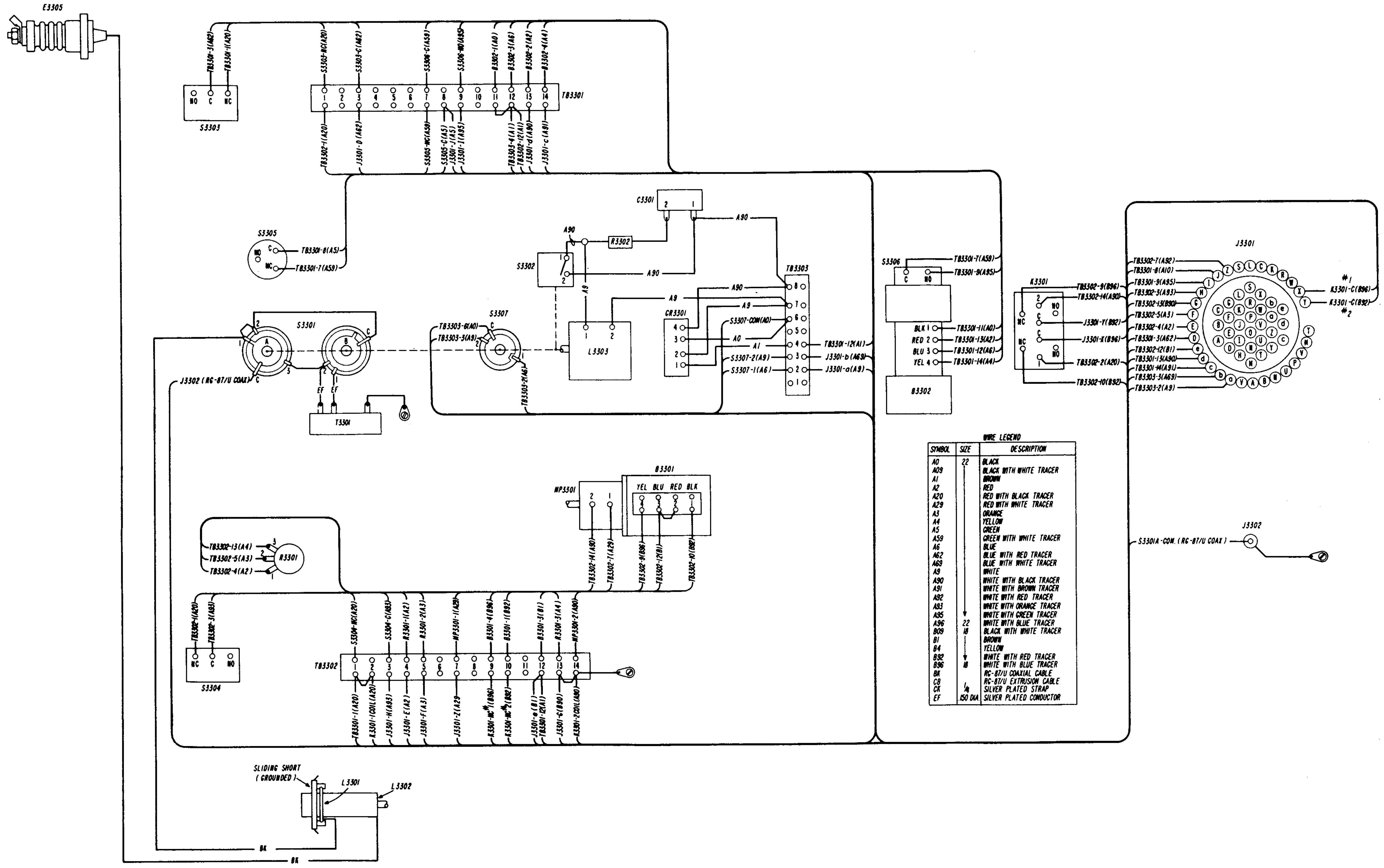
Figure 6-50A. Amplifier-Power Supply AM-2198/WRT-1, Spe ch Amplifier, Wiring Diagram, Sets Serials 142 and up



NOTE * – FOR AN/WRT-2 USE HIGH VOLTAGE TERM. #12 OF T201, T202 & T203
FOR AN/WRT-1 USE LOW VOLTAGE TERM. #11 OF T201, T202 & T203

NOTE Δ – FOR AN/WRT-2 USE HIGH VOLTAGE TERM. #11 OF T201, T202 & T203
FOR AN/WRT-1 USE LOW VOLTAGE TERM. #10 OF T201, T202 & T203

Figure 6-51. Power Supply PP-2222/WRT, Wiring Diagram



WIRE LEGEND

SYMBOL	SIZE	DESCRIPTION
A0	22	BLACK
A09		BLACK WITH WHITE TRACER
A1		BROWN
A2		RED
A20		RED WITH BLACK TRACER
A29		RED WITH WHITE TRACER
A3		ORANGE
A4		YELLOW
A5		GREEN
A59		GREEN WITH WHITE TRACER
A6		BLUE
A62		BLUE WITH RED TRACER
A69		BLUE WITH WHITE TRACER
A9		WHITE
A90		WHITE WITH BLACK TRACER
A91		WHITE WITH BROWN TRACER
A92		WHITE WITH RED TRACER
A93		WHITE WITH ORANGE TRACER
A95		WHITE WITH GREEN TRACER
A96	22	WHITE WITH BLUE TRACER
B09	18	BLACK WITH WHITE TRACER
B1		BROWN
B4		YELLOW
B92		WHITE WITH RED TRACER
B96	18	WHITE WITH BLUE TRACER
BK		RC-87/U COAXIAL CABLE
CB		RC-87/U EXTRUSION CABLE
CK	1/4	SILVER PLATED STRAP
EF	.150 DIA.	SILVER PLATED CONDUCTOR

Figur 6-52. Radio Frequency Tuner TN-345/WRT-1, Wiring Diagram

FOR STANDARD STRANDED WIRE, THE FIRST LETTER ON WIRE SYMBOLS INDICATES VOLTAGES AS FOLLOWS:

B = 600 VOLTS
C = 1000 VOLTS
D = 3000 VOLTS
E = 600 VOLTS WITH HIGH TEMP. RATING

THE TWO DIGITS FOLLOWING THE FIRST LETTER INDICATE SIZE OF WIRE.

IN ALL CASES EXCEPT "TWISTED PAIRS", THE THIRD DIGIT (FOLLOWING THE FIRST DASH) INDICATES COLOR IN THE FOLLOWING CODE:

0—BLACK
1—BROWN
2—RED
3—ORANGE
4—YELLOW
5—GREEN
6—BLUE
7—VIOLET
8—GREY
9—WHITE

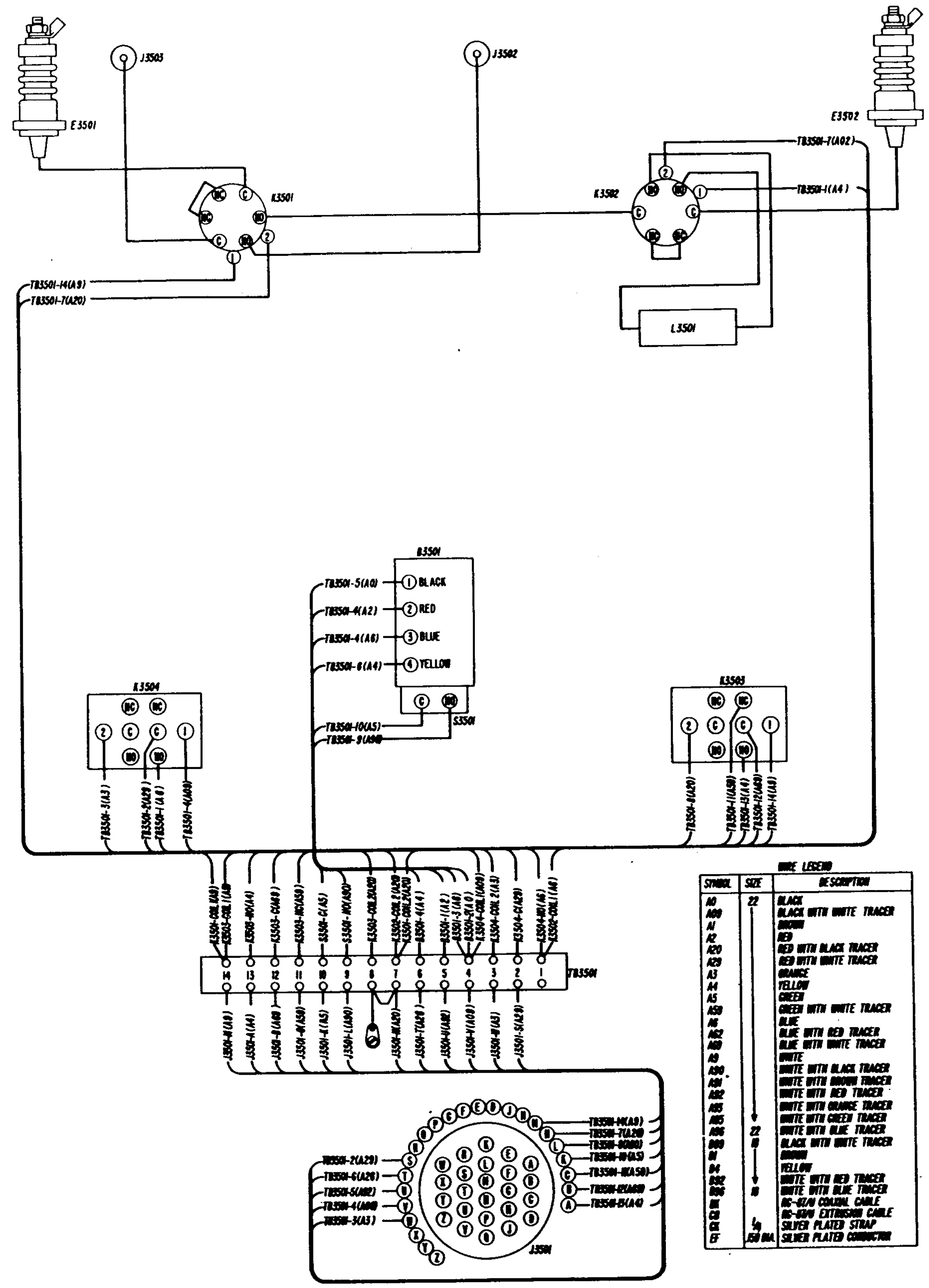
IN THE CASE OF "TWISTED PAIRS", THE THIRD DIGIT WILL BE "2" AND THE FOURTH DIGIT BECOMES THE COLOR CODE AS INDICATED ABOVE.

THE LETTER "S" FOLLOWING THE COLOR CODE DIGIT INDICATES THAT THE WIRE OR PAIR IS SHIELDED.

THE FOLLOWING SPECIAL CODES ARE USED FOR OTHER TYPES OF CONNECTION MATERIAL:

G	~~93 OHM COAX 327C705H05~~ RG 195/u {corrected as per Page 1-1 ewe
H	~~RG-174/U~~ RG174/u
J	5/16 x .010 SILVER PLATES (28AA03) COPPER STRAP
K	#20 TINNED COPPER WIRE (SOLID) .032 DIAM. WITH 2003-2.042 I.D. VINYL TUBING
K18	#18 SOLID TINNED COPPER WIRE
K22	#22 SOLID TINNED COPPER WIRE
L	RG-8A/U COAX CABLE
N	VINYL TUBING 2003-2.042 I.D.
P	RG-58/U COAX CABLE
Q	1/8 x .010 SILVER PLATED (28AA03) COPPER STRAP
R	5/16 x .025 SILVER PLATED (28AA03) COPPER STRAP
M	SOLID JUMPER CONNECTOR 331C003H01
S	#22 SOLID TINNED COPPER WIRE WITH 0.042 I.D. TEFLON TUBING

Figure 6-54. Wir Leg nd for Wiring Diagrams in Transmitter Group OA-2321/WRT-1



WIRE LEGEND

SYMBOL	SIZE	DESCRIPTION
A0	22	BLACK
A09		BLACK WITH WHITE TRACER
A1		BROWN
A2		RED
A20		RED WITH BLACK TRACER
A29		RED WITH WHITE TRACER
A3		ORANGE
A4		YELLOW
A5		GREEN
A59		GREEN WITH WHITE TRACER
A6		BLUE
A62		BLUE WITH RED TRACER
A69		BLUE WITH WHITE TRACER
A9		WHITE
A90		WHITE WITH BLACK TRACER
A91		WHITE WITH BROWN TRACER
A92		WHITE WITH RED TRACER
A93		WHITE WITH ORANGE TRACER
A95		WHITE WITH GREEN TRACER
A96	22	WHITE WITH BLUE TRACER
B09	18	BLACK WITH WHITE TRACER
B1		BROWN
B4		YELLOW
B92		WHITE WITH RED TRACER
B96	18	WHITE WITH BLUE TRACER
[illegible]		RG-[illegible]/U COAXIAL CABLE
[illegible]		RG-[illegible]/U EXTRUSION CABLE
[illegible]	1/4	SILVER PLATED STRAP
EF	.150 DIA.	SILVER PLATED CONDUCTOR

Figure 6-53. Antenna C upler CU-760/WRT-1, Wiring Diagram