PRELIMINARY

TRAINEE'S GUIDE

for

ELECTRONICS TECHNICIANS

Shipboard Equipment
Indoctrination Course

HIGH FREQUENCY COMMUNICATION TRANSMITTERS

VOLUMES 1 and 2
INFORMATION SHEETS
ASSIGNMENT SHEETS
JOB SHEETS

October 1967

FOREWORD

The Preliminary Trainee's Guide for High Frequency Communication Transmitters contains the Information Sheet, Assignment Sheets, and Job Sheets for the applicable portion of the Electronics Technician Class A, A3 Course.

CONTENTS

INTRODUCTION

SAFETY

Extreme danger of personal injury or damage to equipment is present when power is applied to electronics equipment. It is imperative that all safety precautions and warnings given in the technical manual be followed when performing the procedures given on the job sheets. The safety requirements of NavShips Technical Manual, Chapter 9670, should be observed.

HOW TO USE THIS GUIDE

This trainee guide does not supersede any existing publications, but, supplements the information contained in the technical manuals utilized in the course. The primary purpose of this guide is to provide self study material that requires a minimum of supervision.

The trainee should study the information sheets and reading assignment, answer the self test items, and perform the job sheets as directed.

Assignment Sheet N1-1-1A

INTRODUCTION TO THE AN/SRT-14, 15, and 16

STUDY ASSIGNMENT

NavShips 92121 (A) Technical Manual for Transmitting Sets AN/SRT-14, 15, and 16. Study Section 1, pages 1-1 through 1-23

STUDY QUESTIONS

1. What are the major differences between the AN/SRT-14 and the AN/SRT-15?

2. What comprises the AN/SRT-16?

3. List the frequency range and power output of each of the following transmitters.

   a. AN/SRT-14

   b. AN/SRT-15

   c. AN/SRT-16

4. What is the difference in input power requirements between the AN/SRT-14 and the AN/SRT-15?

5. List the antenna requirements for each of the following transmitters.

   a. AN/SRT-14

   b. AN/SRT-15

   c. AN/SRT-16

Information Sheet N1-1-1I

INTRODUCTION TO MEDIUM AND HIGH FREQUENCY TRANSMITTERS

INTRODUCTION

This information sheet is to inform you of what to do and what not to do in the AN/SRT-14, 15, 16 Transmitter Lab.

REFERENCE

NavShips 92121 (A), Technical Manual For Radio Transmitting Sets AN/SRT-14, 15, 16

INFORMATION

CAUTION

The "STANDBY/OPERATE" switch (PP) must be in the "STANDBY" position whenever a drawer is open. With this switch in the "STANDBY" position the 300v, 500v and 1300v power supplies are incomplete, thus reducing the danger of shock.

The danger is only reduced, not removed, 110v can be and often is FATAL.

NOTE

Control (C) should be in the 5-11 MC range. NEVER change position of this switch; if (C) is not in the 5-11 MC. range- NOTIFY THE LAB INSTRUCTOR.

1. The drawers of the transmitters, in the lab, are not tightly closed and secured as they would be aboard ship. This necessitates used of the "BATTLE SHORT" switch to short out interlock circuitry. Shorting the interlock circuit allows opening drawers without causing the transmitter to completely shut down.

2. This transmitter normally uses a 35' whip antenna. In this lab a light bulb is used as a dummy load. A commerical dummy load is a pure resistance; a light bulb is resistave in nature, but still contains a certain amount of inductance and capacitance. The antenna tuning system electrically lengthens or shortens the antenna and matches impedance; therefore, the antenna tuning unit (ATU) must be used to achieve maximum transfer of energy to the load when using a light bulb as a dummy load.

Job Sheet N1-1-1J

INTRODUCTION TO MEDIUM AND HIGH FREQUENCY TRANSMITTERS (Part 1)

INTRODUCTION

This job sheet has been prepared to familiarize you with the front panel controls: their titles, short titles, location, and the symbol number of the components they affect.

In most cases, the titles clearly reflect the purpose of the control and give an indication of the circuits affected.

When this job sheet is completed it will be a valuable reference, that information contained is brief and consice, when individual schematics and circuits are studied in class.

EQUIPMENT

AN/SRT-14, 15

REFERENCE

NavShips 92121 (A); Technical Manual for Radio Transmitter AN/SRT-14, 15, 16

JOB STEPS

1. Locate control on transmitter.

2. Fill in "LOCATION DRAWER" and "FRONT PANEL TITLE" blanks.

NOTE

Step 3 should be done during evening study time.

3. Study the following pages in the technical manual, then fill in the "ACTUATES" blank.

Section 1- pages 1-4 through 1-6
Section 2- pages 2-1 through 2-5 and page 2-131
Section 3- pages 3-29 and pages 3-41 through 3-46
Section 4- pages 4-1 through 4-12

CONTROL	LOCATION DRAWER	FRONT PANEL TITLE	ACTUATES (SYMBOL NUMBER)
A			
B			
C			
D			
E			
F			
G			
H			
J			
K			
L			
M			
N			
P			
R			
S			
T			
U			
V			
W			
X			
Y			
Z			

CONTROL	LOCATION DRAWER	FRONT PANEL TITLE	ACTUATES (SYMBOL NUMBER)
AA			
BB			
CC			
DD			
EE			
FF			
GG			
HH			
JJ			
KK			
LL			
MM			
NN			
PP			
RR			
UU			
VV			
WW			

CONTROL	LOCATION DRAWER	FRONT PANEL TITLE	ACTUATES (SYMBOL NUMBER)
ZZ			
AB			
AC			
AD			
AE			
AF			
AG			
AH			

Job Sheet N1-1-2J

INTRODUCTION TO MEDIUM AND HIGH FREQUENCY TRANSMITTERS (Part 2)

INTRODUCTION

This job sheet has been prepared to familiarize you with the proper procedure for energizing, tuning and de-energizing the AN/SRT-14. It is necessary that you use the proper method to prevent damage to the equipment.

Maintenance of electronic equipment includes tuning as an integral part. Particular attention should be paid to the information presented, here, since the maintenance of this equipment will be your responsibility in the near future.

Many troubles can be localized to a small area by noting improper response to the operation of a control; these are known as "front panel symptoms." Audible relay operation, indicator lights and meter readings are some of the means by which a technician makes an anlysis of a trouble. Therefore, EACH TIME YOU OPERATE A CONTROL, WATCH AND LISTEN FOR PROPER RESPONSE.

REFERENCES

NavShips 92121 (A), Technical Manual for Radio Transmitter AN/SRT-14, 15, 16
NavShips 92121.21, Operating Instructions for Radio Transmitter AN/SRT-14, 15, 16
Information and Job Sheets

a. Transmitter Information Sheet #1
b. Transmitter Job Sheet #1.

EQUIPMENT

AN/SRT-14

JOB STEPS

1. Energizing procedure and initial settings.

    a. Ensure that the transmitter is NOT keyed.

    b. Do NOT use the cabinet heaters.

c. Place the "STANDBY/OPERATE" switch (PP) in the "STANDBY" position.

d. Place the "EMERGENCY" switch (MM) in the "OFF' position.

e. Place the "INTERLOCK BATTLE SHORT" switch (UU) in the "ON" position.

f. Turn the bulkhead switch ON.

NOTE

There are two types of questions in this job sheet: the "Q" type and the "SELF TEST ITEM" type. The "Q" type should be answered with the transmitter in front of you. The "SELF TEST ITEM" type requires only the technical manual or your classroom notes (also from previous weeks), for references, in order to be answered. DO NOT WASTE YOUR LAB TIME ON "SELF TEST ITEMS".

Q1. What were indication?

Q2. When the "EMERGENCY" switch is "OFF" and the bulkhead switch is ON, the three indicator lights for the three oscillator heaters in the RFO are on. What conclusion do you come to?

g. Place the "EMERGENCY" switch in the "ON" position.

h. Depress the "START" switch (RR) and list the events that take place that can be heard or seen. Drawers may be opened to identify relays, motors, lamps, etc.

CAUTION

Look, but do NOT touch items inside the drawers.

(1).
(2).
(3).
(4).
(5).

(use additional numbers as necessary)

Mark with an asterisk (*) those events that can be seen on the front panel with the drawers closed.

i. Check the voltage indicated, list the readings obtained from the RFA front panel voltmeter. The "VOLTMETER" control (J) determines which voltage is being measured by the "VOLTMETER."

(1). RF in
(2). Bias
(3). LV
(4). MV
(5). PA Ec2
(6). PA Eb

Q3. What do the numerals behind the label of each switch position of control (J) mean?

SELF TEST ITEMS #1:

What is the reason for having a time delay between start switch operation and the power supply voltage?

Q4. What does a power supply indicator light that is "ON" indicate?

j. The following are the initial switch positions on the LLRM drawer.

(1). Place the "LOCAL/REMOTE" switch (X) in the "LOCAL" position.

(2). Place the "KEYING RATE" switch (S) in the "TT" position.

(3). Place the "SERVICE SELECTOR" switch (U) in the "HAND" position. To turn this switch, push in, turn, then release it. The switch should snap out again.

(4). Place the "NEUTRAL/POLAR" switch (R) in the "NEUTRAL" position.

k. The following are the initial switch and control settings for the RFA unit.

(1). Place the "INT-OSC-EXT" switch (A) in the "INT" position.

(2). In this lab, control (C) is NEVER touched; however, for your information to turn this switch, depress it, turn, and release it. Ensure that it returns to the normal position.

NOTE

To unlock the locking bars on controls (B) and (D) rotate them counterclockwise.

(3). Turn the "TUNE IPA" control (B) to "ZERO."

(4). Turn the "TUNE PA" control (D) to "ZERO."

(5). Turn "VOLTMETER" control (J) to "RF IN."

(6). Turn "IPA METER" switch (G) to Ic2."

(7). Turn "PA METER" switch (H) to Ic2."

SELF TEST ITEM #2:

What is the meaning of:

Ic1

Ic2

Ik

Eb

1. The following are the initial switch and control settings for the ATU unit. They are located on the CONTROL INDICATOR which is mounted on the front panel of the RFO drawer.

(1). Place the "ANTENNA TRANSFER" switch (AE) in the "TUNER IN" position.

(2). Turn the "TRANSFORMER" switch (AC) to "DIRECT".

(3). Turn the "SWR CALIBRATE" switch (AB) to the 8:1 position.

(4). Depress the "UP" button (AF) and hold it until the "TUNING POSITION METER" indicates "100".

(5). Place the "ANTENNA COUPLER LOADING" switch (AD) to "DIRECT".

m. The following are the initial switch positions for the TRANSMITTER COUPLER unit (LAU). The TRANSMITTER COUPLER is mounted on the bulkhead near the bulkhead switch.

(1). Turn the "INPUT TAP" switch (VV) to position "4".

(2). Turn the "OUTPUT TAP" switch (WW) to position "4".

Q5. What do the screen overload and PA overload lights indicate when they are lit?

SELF TEST ITEM #3:

Why should the "TUNE IPA" control (B) and the "TUNE PA" control (D) be turned to zero for the initial setting?

2. Tuning Procedures

a. The following are the switch and control settings for tuning the RFO.

(1). Expose the RFO frequency selector switches by rotating the catch on the door until it releases, then lower the door to the horizontal position. Set up the RFO for a frequency of 6.90780 MC.

(2). Set controls (AA) and (BB) to the proper position as determined from the chart inside the RFO door.

(3). Turn the "RFO BAND" selector switch (FF) to the correct band as determined by the frequency being used.

(4). Turn the "MC" control (GG) to the desired MC reading.

(5). Turn the "100 KC STEP" switch (HH) to the desired 100 KC reading.

(6). Turn the "10 KC STEP" switch (JJ) to the desired 10 KC reading.

(7). Turn the "1 KC STEP" switch (CC) to the desired 1 KC reading.

(8). Turn the "100 CPS STEP" switch (DD) to the desired 100 CPS reading.

(9). Turn the "10 CPS STEP" switch (EE) to the desired 10 CPS reading.

(10). Cover the RFO controls by closing the door and rotating the catch, insuring that the door is closed tight.

NOTE

The RFO is now tuned. To test that the RFA is receiving a signal from the RFO, continue with the following steps:

(11). Rotate the (J) control to the "RF IN" position.

(12). Rotate the (ZZ) control full clockwise.

(13). Ensure that the (A) control is on "INT".

(14). Momentarily KEY the transmitter.

(15). If sufficient drive from the RFO to the RFA is not indicated on the "VOLTMETER" , notify the instructor.

NOTE

Observe that the transmitter is still in "STANDBY".

b. Tuning the IPA, PA and the antenna system.

(1). Turn the "STANDBY/OPERATE" switch (PP) to the "OPERATE" position, and list the front panel indications that were a result of placing the "STANDBY/OPERATE" switch to the "OPERATE" position; take "VOLTMETER" readings.

(a). RF IN
(b). Bias
(c). LV
(d). MV
(e). PA Ec2
(f). PA Eb
(g). OTHER INDICATIONS

(2). Place "TEST KEY" (T) to the "LOCKED" position.

(3). Rotate (ZZ) control for a mid-scale reading on the "VOLTMETER" "RF IN".

(4). Adjust the "TUNE IPA" control (B) for a peak on the "IPA" current meter; however, DO NOT EXCEED a reading of 40 on the top scale.

Q6. If the IPA current meter reading exceeds 40 on the top scale, which control would be adjusted to reduce the reading below 40; (B) or (ZZ)?

(5). Adjust the "TUNE PA" control (D) for a peak on the PA current meter. DO NOT EXCEED a reading of 70 on the top scale.

(6). Tune the antenna by depressing the "DOWN" button (AG) on the "CONTROL INDICATOR" until the SWR meter indicates a dip into the green.

NOTE

If trouble is encountered in obtaining a decent dip into the green, follow the procedures in section 4, page 18, para., 6c.

CAUTION

DO NOT CHANGE position of the (AC), (AD), or (AE) switches while the transmitter is being keyed.

(7). When a dip is observed, depress the "SLOW" button (AH) and hold it in while alternately depressing the "UP" button (AF) and the "DOWN" button (AG) to ensure that the needle deflects as far as possible into the green portion of the meter.

(8). Turn the "SWR CALIBRATE" switch to the "4:1" position. If the "SWR BALANCE" meter indicates in the red, perform step (7) above. If the "SWR BALANCE" meter still indicates in the red, see the NOTE above.

SELF TEST ITEM #4:

What can be assumed if rotation of control (ZZ) results in a sufficient indication on the VOLTMETER?

SELF TEST ITEM #5:

What would the SWR be, with (AB) in the 4:1 position and the "SWR BALANCE" meter indicating in the green?

(9). Balance the RF current by observing the "ANT CURRENT" meter on the RFA drawer and the RF ammeter on the TRANSMITTER COUPLER, and alternately moving the "INPUT TAP" switch (VV) and the "OUTPUT TAP" switch (WW) until there is not MORE THAN 0.5 amperes difference between the two meter readings.

NOTE

At this point it is necessary to trim the "TUNE PA" control to provide optimum operation of the transmitter.

(10). Readjust the "TUNE PA" control for a peak on the "PA CURRENT" meter, DO NOT TO EXCEED a reading of 70 on the top scale.

(11). Readjust the antenna system and "TUNE PA" for minimum SWR and optimum operation.

SELF TEST ITEM #6:

Why does trimming control (D), after the original tuning, produce optimum operation?

3. Shut-down Procedures

a. Shutting-down to "STANDBY".

(1). "TEST KEY" (T) to the "OFF" position (center).

(2). "STANDBY/OPERATE" switch to "STANDBY".

b. Complete shut-down

(1). "TEST KEY" (T) to "OFF".

(2). "STANDBY/OPERATE" switch to "STANDBY".

(3). "MAIN POWER" switch (RR), push "STOP".

(4). These following controls may be operated in any order:

(a). "EMERGENCY" switch (MM) to "OFF".

(b). "INTERLOCK BATTLE SHORT" (UU) to "OFF".

(c). Bulkhead switch, "PUSH OFF".

NOTE

In this lab, the bulkhead switch is left in the "ON" position to keep the oscillator ovens up to temperature.

CAUTION

NEVER switch from OPERATE to STANDBY when the transmitter is keyed.

NEVER press the "STOP" button (RR) when the transmitter is either keyed or in "OPERATE".

4. Perform steps 1, 2, and 3 of this job sheet for a frequency of 7.2736 MC.

5. Tune the transmitter to 8.5643 MC. Use this job sheet for reference if necessary.

Q7. The 1,300 volt PRI and 1,300 volt OUTPUT lights are good, but they are extinguished. The 500 WATT READY light is "ON". What is the trouble with this AN/SRT-15?

SELF TEST ITEM # 7:

What is the object of the "SQUELCH TRIG CONTROL" (L) and when is it used?

6. Tune the transmitter to 9.8203 MC. or 10.4681 MC without the use of this job sheet, the Technical Manual, or the Operating Instructions. Have your partner check you for proper "TURN ON/TURN OFF" procedures.

SELF TEST ITEM #8:

What is the object of the "GAIN TO CLIP" control (M), and when is it used?

7. Practice tuning the transmitter to different frequencies in the 5-11 MC band until YOUR procedures are perfect; continue to note the front panel indications that result from the operation of the various controls, so YOU will know what should happen and when.

SELF TEST ITEM #9:

Why are the "CABINET HEATERS" not used in this lab (the fuses are pulled)?

Assignment Sheet N1-2-1A

RFO PROBLEMS AND BLOCK DIAGRAM

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Transmitting Sets AN/SRT-14, 15, and 16. Study section 2, pages 2-1 through 2-6 and page 2-135. Section 4, pages, 4-12 through 4-15

STUDY QUESTIONS

1. List the signals that the AN/SRT-14 is designed to transmit.

2. What is the power output and frequency range of the AN/SRT-14?

3. What is the power output and corresponding frequency range of the AN/SRT-15 and 16?

4. What are the input and output frequencies of RFO Unit 2?

5. What frequencies are generated by RFO Unit 3?

NOTE

Transmitter output frequencies to be assigned by the instructor.

TRANSMITTER OUTPUT FREQUENCIES

CONTROL		POSITION OF CONTROLS	
EE			
DD			
CC			
JJ			
HH			
AA			
BB			
FF			
GG			

UNITS	OUTPUT FREQUENCY OF UNITS		
5			
6			
8			
9			
10			

UNITS	OSCILLATOR FREQUENCY OF UNITS		
3			
6			
8			

Assignment Sheet N1-2-2A

RFO-AN/SRT-14, 15, 16 UNITS 1 THROUGH 6

STUDY ASSIGNMENTS

NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, 16
Study section 2 page 2-7 thru 2-12, 2-14 thru 2-20 and section 4 page 4-16 thru 4-21. Study section7 page 7-15 thru 7-38, and page 7-181 thru 7-201

STUDY QUESTIONS

1. What do the following components do in the oscillator (V-2001) circuit?

   a. C-2005 and C-2006

   b. C-2004 and R-2007

2. What components are connected to the bottom of R-2023 thru J-2004 (1C).

3. There is an output from all unit 2 jacks except J-2034. What could be the trouble?

4. If you change frequency from 21.2200 MC to 21.2240 MC?

   a. Would inductance chosen by S-2051 increase or decrease? Why?

   b. Would capacitance chosen by S-2051 increase or decrease? Why?

   c. Would inductance chosen by S-2052 and S-2053 increase or decrease? Why?

5. There is a unit 4 component open that causes no output. List 4 components.

6. What determines whether a mixer will be subtractive mixer or a additive mixer?

7. If the control grid of V-2151 is receiving its signal from unit 12. What is the condition of K-2151?

   What is done to the signal from unit 1?

8. How is the free running frequency of V-2202A varied?

9. How is the unit 6 oscillator locked in?

10. What is the purpose of the reactance tube in the unit 6? How does it accomplish this?

Assignment Sheet N1-2-3A

OPERATION OF AN/SRT-14, 15, 16

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, 16
Study all of section 5 review section page 4-12 thru 4-21

STUDY QUESTIONS

1. How do you unlock the tune IPA control?

2. Why is the front panel control "U" a push to turn switch?

3. What is the object to turning front panel control "UU" on in our lab?

4. When should the BATTLE SHORT switch be in the "ON" position?

5. Why should front panel control "PP" be in the "STANDBY" position when you open the RFA drawer?

6. Why should front panel control "X" be in the "LOCAL" position when tuning the transmitter?

7. Why should the RFO covering door for the frequency selection controls be closed tight on a AN/SRT-14? On a AN/SRT-15?

8. Which front panel control should be used to reduce PA current reading if it exceeds 70 on the top scale?

9. What is an acceptable SWR reading in our lab?

10. What can you do to the transmitter from a remote station?

Assignment Sheet N1-2-4A

RFO AN/SRT-14, 15, 16 UNITS 7 THROUGH 14

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for AN/SRT-14, 15, 16 Radio Transmitting Sets
Study section 2, page 2-20- thru 2-41, page 2-12 thru 2-14
Study section 7, page 7-38 thru 7-67, 7-8 thru 7-14, 7-174 thru 7-180 and 7-204 thru 7-233

STUDY QUESTIONS

1. What type of teletype signal is needed to key unit 12?

2. What components determine the Fo of the 100 KC oscillator with V-2127 removed from the circuit? (unit 12).

3. What causes an increase in the Fo of the 100 KC oscillator? How is it done? (unit 12)

4. What causes a decrease in the Fo of the 100 KC oscillator? How is it done? (unit 12)

5. What controls the amount of shift we will get from the 100 KC oscillator?

6. What would be the effect on the voltage at the tiepoint E-2926 if the arm of R-2933 was moved up as shown on the schematic? (unit 14)

7. What is the purpose of C-2352 at the bottom of S-2326G? (unit 8)

8. How is the 5 MC signal adjusted for proper mixing in V-2426? (unit 9)

9. What frequencies would be obtained from units 9 and 10 to get an RFO output of 14 MC?

10. Why is S-2802 and its associated components necessary in unit 11C?

11. What functions are performed by the Zero Adjust Indicator circuit?

12. Explain how the oscillator in unit 3 is zero beat to the crystal oscillator in unit 1?

a. How would the zero beat indicator (V-2917) indicate that unit 3 and unit 1 are zero beat?

13. Redraw the plate circuit of V-2802 and 2803 in unit 11C showing the switch S-2801 positioned so that all the resistors are in use.

14. Why is V-2301 a class "C" amplifier?

Job Sheet N1-2-1J

RADIO FREQUENCY OSCILLATOR (Part 1)

INTRODUCTION

This job sheet was prepared to familiarize you with the RFO operational, maintenance and troubleshooting procedures

Practice in performing operational and maintenance procedures is provided for your benefit.

As your progress through this job sheet, forecast the wave form or voltage you should see and rationalize the waveform or voltage you obtain.

No high voltage is required for RFO operation. The "STANDBY/OPERATE" switch will be in the "STANDBY" position while doing this job sheet.

REFERENCE

NavShips 92121 (A), Technical Manual for Radio Transmitter AN/SRT-14, 15, 16

EQUIPMENT

Oscilloscope
Electronic Multimeter, or Front Panel Meter, M-1301
Set of Co-axial Cables
R.F Probe
Special Alignment Tool
Extension Test Cable
AN/SRT-14

NOTE

The Technical Manual, as stated above, is to be used as a reference; i.e., to seek specific bits of information. In those cases where the steps in the job sheet conflict with the directions in the Technical Manual do the steps as stated in the job sheet; the reference to the Technical Manual is to aid your understading of what is happening in that particular circuit and/or job step.

JOB STEPS

1. Determine if trouble exists by attempting to tune the RFO to a frequency in each position of "RFO BAND" switch (FF). Use the procedures as set forth in TRANSMITTER JOB SHEET #2.

   a. This check will eliminate any possibility of "Operator" trouble and will show up any deficiencies in "FREQUENCY CONVERTER UNITS 11A, 11B, 11C".

      Frequency Converter 11A 3 to 6 MC. _____.
      Frequency Converter 11B 6 to 16 MC. _____.
      Frequency Converter 11C 16 to 26 MC. _____.

   b. If these checks show a deficiency in one of the Converter Units, contact the Lab Instructor, if no trouble exists, proceed.

2. Check operation of unit 1 (V-2001, V-2002A and V-2002B). Connect vertical input of oscilloscope to 100 KC XTAL jack on front of the RFO. Insure that a good ground exists between the transmitter and the oscilloscope.

   a. Set scope on Internal Sweep at about 23 KC. Check for and view 4 cycles of waveform appearing at the 100 KC XTAL jack. Set scope on Internal Sync.

      Draw wave form observed _____.

   b. Connect co-ax between the front panel meter and the 100 KC XTAL jack and measure the voltage.

      Voltage measured _____. Correct voltage _____.

3. Check output of unit 1 (this checks V-2003A).

   a. Insert RF probe into test point located on unit 2 and measure the voltage.

      Voltage measured _____. Correct voltage_____.

4. Check output of unit 1 (this checks V-2003B).

   a. Insert RF probe into test point 1-B location on unit 5 and measure the voltage.

      Voltage measured _____. Correct voltage _____.

NOTE

There are two types of questions in this job sheet: the "Q" type and the "SELF TEST ITEM" type. The "Q" type should be answered in the lab during lab time as the question will be more easily answered with the transmitter in front of you. The "SELF TEST ITEM" type requires only the technical manual or your classroom notes (also from previous weeks), for references, in order to be answered. DO NOT WASTE YOUR LAB TIME ON "SELF TEST ITEMS".

Q1. Which other units does UNIT 1 feed?

5. Check output the unit 2 (this checks V-2031, V-2032, and V-2034A).

   a. Insert RF probe into test point 2-E on unit 10 and measure the voltage.

      Voltage measured _____. Correct voltage _____.

6. Check output of unit 2 (this checks V-2034A).

   a. Insert RF probe into test point 2-D located on unit 7 and measure the voltage.

      Voltage measured _____. Correct voltage _____.

7. Check output of unit 2 (this checks V-2033A).

   a. Insert RF probe into test point 2-A located on unit 4 and measure the voltage.

      Voltage measured _____. Correct voltage _____.

8. Check output of unit 2 (this checks V-2033B).

   a. Insert RF probe into test point 2-B on unit 5 and measure the voltage.

      Voltage measured _____. Correct voltage _____.

Q2. Which tube half feeds 1 MC to unit 6?

9. Check output of unit 3 (this checks V-2051). See table on page 6-14.

   a. Insert RF probe into point 3-A located on unit 3 and measure the voltage.

      Voltage measured _____. Correct voltage _____.

10. Locate the "INT. OSC. ZERO ADJ." control on the equipment and on the schematic. Decide what the object of the adjustment is and what pattern should be observed in step 12a.

11. Check with your instructor before proceeding. Inst. initial _____.

12. Check the frequency of unit 3.

   a. Connect scope to take Lissajous pattern of the "INTERPOLATION OSCILLATOR" against the "CRYSTAL OSCILLATOR".

   b. Use procedure as set forth in the Instruction Book, section 6, page 13, except step 2: Control (Z) should be in the center position "OFF". Adjust L-2080, "INT, OSC. ZERO ADJ." only.

      Ratio observed _____. Correct ratio _____.

13. Check output of unit 4 (this checks V-2101 and V-2102).

   a. Insert RF probe into test point 5-A located on unit 6 and measure the voltage.

      Voltage measured _____. Correct voltage _____.

Q3. Where else can the output of unit 4 be checked?

14. Check output of unit 5 (this checks all tubes).

    a. Insert RF probe into test point 5-A located on unit 6 and measured the voltage.

    Voltage measured _____. Correct voltage _____.

Q4. Where else can the output of unit 5 be checked?

15. Check operation of unit 6 (this checks V-2201 and V-2202A).

    a. Observe waveform at 10 KC jack on front panel of the RFO.

    b. Scope on Internal sweep at about 5 KC. Use Internal Sync.

    Waveform observed _____.

16. Locate R-2210 on the equipment and on the schematic. Decide what the object of this resistor is and what pattern should be observed in step 18a.

17. Check with your instructor before proceeding. Inst. initial _____.

18. Check frequency of 10:1 Divider (this checks V-2202A).

    a. Observe Lissajous pattern of 10 KC against the 100 KC Crystal.

    b. Scope Internal Sweep "OFF". Refer to section 7, 31 in Instruction Book. Adjust R-2210 only.

19. Locate C-2219 and Z-2201 on the equipment and on the schematic. Decide the purpose, or purposes, of these components and what pattern should be observed in step 21a.

20. Check with your instructor before proceeding. Inst initial _____.

21. Check operation of unit 6 (this check V-2202B, V-2204, and V-2205).

    a. Observe Lissajous pattern of 10 KC step against the 100 KC crystal with know "JJ" in position 9.

    b. Refer to section 7, sheets 32 and 33, para. 5, (1), (d), steps 1 thru 7.

    Ratio observed _____. Correct ratio _____.

22. Check frequency of unit 6.

    a. Observe Lissajous pattern of 10 KC step against 10 KC with knob "JJ" in all positions 9 thru 0.

    b. Refer to section 7, sheet 33, para. 5, (1), (d), steps 8 thru 10.

RATIO OBSERVED	CORRECT RATIO	CIRCUIT SYMBOL OF COMPONENT ADJUSTED	ADJUSTMENT LABEL
8.	8.	8.	8.
7.	7.	7.	7.
6.	6.	6.	6.
5.	5.	5.	5.
4.	4.	4.	4.
3.	3.	3.	3.
2.	2.	2.	2.
1.	1.	1.	1.
0.	0.	0.	0.

23. Check the output of unit 6 (this checks V-2006, V-2007, V-2008 and V-2009).

    a. Insert RF probe into test point 6-B located on unit 8 and measure the voltage.

    Voltage measured _____. Correct voltage _____.

Q5. What is the frequency at test point 7-B?

24. Check output of unit 7 (this checks V-2301 and V-2302).

a. Insert RF probe into test point 7-B located on unit 9 and measure the voltage.

Voltage measured _____. Correct voltage _____.

Q6. What is the frequency at test point 7-B?

25. Check output of unit 7 (this checks V-2303 and V-2304).

a. Insert RF probe into test point 7-A located on unit 8 and measure the voltage.

Voltage measured _____. Correct voltage _____.

Q7. What is the frequency at test point 7-A?

26. Check output of unit 8 (this checks V-2326, V-2327, V-2328, V-2329 and V-2334).

a. Connect RF lead into 100 KC step jack located on the front of RFO and measure the voltage.

Voltage measured _____. Correct voltage_____.

27. Locate C-2339 and Z-2326 on the equipment and schematic. Decide the purpose or purposes, of these components and what pattern should be observed in step 29a.

28. Check with your instructor before proceeding. Inst. initial _____.

29. Check frequency of unit 8.

a. Observe Lissajous pattern of 100 KC against 100 KC CRYSTAL with knob "HH" in all positions, 9 through 0.

b. Refer to section 7 sheets 42 through 43, para. 5, (1), (c), steps 1 through 9.

RATIO OBSERVED	CORRECT RATIO	CIRCUIT SYMBOL OF COMPONENT ADJUSTED	ADJUSTMENT LABEL
8.	8.	8.	8.
7.	7.	7.	7.
6.	6.	6.	6.
5.	5.	5.	5.
4.	4.	4.	4.
3.	3.	3.	3.
2.	2.	2.	2.
1.	1.	1.	1.
0.	0.	0.	0.

30. Check output of unit 8 (this checks V-2330, V-2331, V-2332 and V-2333).

a. Insert RF probe into test point 8-B located on unit 9 and measure the voltage.

Voltage measured _____. Correct voltage _____.

31. Check output of unit 9 (this checks all tubes).

a. Insert RF probe into the following test points and measure the voltage.

9-A located on unit 11A.
9-B located on unit 11B.
9-C located on unit 11C.

b. Insure that the RFO is adjusted to produce a frequency in the range being tested.

Voltage measured		Correct voltage
9-A _____.	3 to 6 MC	9-A _____.
9-B _____	6 to 16 MC	9-B _____.
9-C _____	16 to 26 MC	9-C _____.

32. Check output of unit 10 (this checks all tubes)

a. Insert RF probe into the following test points and measure the voltage.

10-A located on unit 11A.
10-B located on unit 11B.
10-C located on unit 11C.

b. Insure that the RFO is adjusted to produce a frequency in the range being tested.

Voltage measured		Correct voltage
10-A _____	.3 to 6 MC.	10-A _____.
10-B _____	6 to 16 MC.	10-B _____.
10-C _____	16 to 26 MC.	10-C _____.

33. The keying voltage is delivered to unit 11-A, 11-B, and 11-C to hold the mixer cut-off until the transmitter is keyed. To get an output from the below test points, THE TRANSMITTER MUST BE KEYED.

34. Check output of units 11-A, 11-B, and 11-C (this checks all tubes).

a. Insert RF probe into the following test points and measure the voltage.

11-A located on unit 11-A.
11-B located on unit 11-B.
11-C located on unit 11-C.

b. Insure that the RFO is adjusted to produce a frequency in the range being tested. Insure that the meter is properly set up.

Voltage measured		Correct voltage
11-A _____	.3 to 6 MC.	11-A _____.
11-B _____	6 to 16 MC.	11-B _____.
11-C _____	16 to 26 MC.	11-C _____.

NOTE

As you have already observed in step 1a, the output of units 11-A, 11-B, and 11-C may also be observed without the use of the TF test probe and co-ax cable.

35. Check output of unit 12 (this checks all tubes).

a. Insert RF probe into test point 12-A located on unit 12 and measure the voltage.

Voltage measured _____. Correct voltage _____.

36. Check frequency of unit 12.

a. Refer to section 7, sheets 63 through 64, para. 5 ee (1), (a), step 1 through 3. The Alternate Method, steps 1 through 3 should also be used for experience.

Ratio observed _____. Correct ratio _____.

37. After completion of the checks, on the following page, any trouble in the RADIO FREQUENCY OSCILLATOR will be located to a single unit, and in some cases to one or two tubes and components. Refer to section 7, on the Instruction Book for detailed information on troubleshooting individual units of the RFO.

SELF-TEST ITEMS

1. If V-2526 filament opened, what unit besides unit 10 would have no output?

2. If V-2302 filament opened, what units beside unit 7 (test point 7-B) would have no output?

3. If pin 1 of V-2033 opened, what units would have no output?

4. Front panel troubleshooting

   a. What units can be determined to be bad by the use of front panel controls only?

   b. What tubes can be determine to be good by use of front panel test points, RF co-ax and M-1301 only?

   c. List the steps you would use to localize a trouble to a single specific unit using front panel controls and test points only.

5. There is a good output from the RFO to the RFA. When making a routine frequency check (on the RFO) it is discovered that there is no output from the 100 KC step jack. What is the most-likely trouble?

Job Sheet N1-2-2J

RADIO FREQUENCY OSCILLATOR (Part 2)

INTRODUCTION

This job sheet was prepared to exemplify and make clear the various relationships between units, the effects of various circuits on PROPER RFO operation; and to review the information discussed in the classroom.

These, and all, job steps require reference to the Technical Manual for information, your classroom notes for information, and THOUGHT.

REFERENCE

NavShips 92121 (A), Technical Manual for Radio Transmitter AN/SRT-14, 15, 16

EQUIPMENT

Oscilloscope
Electronic Multimeter
Front panel meter, M-1301
Set of test leads
RF probe
AN/SRT-4 Transmitter

JOB STEPS

1. _____

   a. Using the oscilloscope for a Lissajous pattern, check unit 6, (step OSC) against unit 1 and adjust for proper pattern.

   b. Check unit 3 against unit 1 and adjust for proper pattern.

   c. Check unit 6 (step OSC) against unit 3.

NOTE

There are two types of questions in this job sheet; the "Q" type and the "SELF TEST ITEM" type. The "Q" type should be answered in lab during lab time as the question will be more easily answered with the transmitter in front of you. The "SELF TEST ITEM" type requires only the Technical Manual or your classroom notes (also from previous weeks), for references, in order to be answered. DO NOT WASTE YOUR LAB TIME ON "SELF TEST ITEM".

Q1. What is the meaning of the pattern observed in step 1c?

Q2. What should the title of this job step be?

2. Unit 6

   a. Check unit 6 (step OSC) against unit 1 and adjust for proper pattern.

   b. While observing the pattern, pull V-2201.

   c. Check the voltage at test point 6-B.

Q3. Is the voltage at test point 6-B proper?

Q4. If it is incorrect, in what way is it incorrect and why?

Q5. Is the frequency at test point 6-B correct?

Q6. If it is incorrect, in what way is it incorrect and why?

SELF TEST ITEM #1:

Which way would the STEP OSCILLATOR (V-2205) frequency go if the filament of V-2204 opened.

SELF TEST ITEM #2:

You received a report that your transmitter is off frequency by approximately 200 to 310 KC. By logical troubleshooting, you found that V-2204 had open filaments.

a. What should be done after replacing V-2204?

b. What page and paragraph should you refer to in the Technical Manual to restore this SRT to proper operation?

SELF TEST ITEM #3:

Could the same type trouble occur in unit 8 (V-2329)? Explain your answer !!!

Q7. Where else can you check the output of unit 12 besides at test point 12-A?

Q8. Where else can you check the output of unit 3 besides at test point 3-A?

Q9. What voltages can be checked at the RFO TEST SOCKET?

3. Perform steps 2, 3, 4, and 5 on page 1-9 in NAVSHIPS 92121.42, adjust as necessary in step 3.

Assignment Sheet N1-3-1A

RFA - AN/SRT-14, 15, 16

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, 16
Study section 2, page 2-90 thru 2-103, section 7 page 7-81 thru 7-95 and page 7-251 thru 7-255

STUDY QUESTIONS

1. Explain how the Buffer Amplifier (V-1301) is keyed on and off?

2. List the function of each section of the Band Switch:

   S-1301C Rear

   S-1301A Front

   S-1301A Rear

3. Explain how RF surge is prevented when switching the ATU is or out.

4. Explain how bias is obtained form the IPA, V-1302.

5. How is bias obtained for the PA in 100 Watt operation?

6. Explain the operation of the screen overload circuit.

7. What is the purpose of S-1378? Explain its operation.

8. What effect could B-1306 have on the plate overload circuit? Explain.

9. Redraw the 500 watt disable circuit showing complete path from -24 volts ATD through K-1304 to ground. Show all components in the path.

10. Redraw the plate tank circuits of V-1302 with the band switch shown in position 4. Show the complete path for tube current as well as signal path.

11. What type of Modulation is used on V-1304 for voice operation?

12. How are voltages applied to V-1304 affected by energizing K-1304?

13. What keeps K-1304 energized after S-1388 is released.

14. What are the purposes of the PA-Harmonic filter connected to S-1302?

Job Sheet N1-3-1J

RADIO FREQUENCY AMPLIFIER

INTRODUCTION

This job sheet was prepared to familiarize you with some of the maintenance and troubleshooting checks and procedures used when working with the RADIO FREQUENCY AMPLIFIER of the AN/SRT-14.

The RADIO FREQUENCY AMPLIFIER uses voltages which are dangerous to life. Observe safety precautions when working on any energized circuit.

Under no conditions will the RFA drawer be open with the "STANDBY/OPERATE" switch in the "OPERATE" position. The IPA and PA stages may be checked for proper operation with the drawer closed by using the IPA and PA current meters on the front panel.

Keep in mind that the reason for the meters and indicators on the transmitter front panel is to make troubleshooting easier and safer.

REFERENCES

NavShips 92121 (A), Technical Manual for Radio Transmitter AN/SRT-14,
NavShips 92121.42 Maintenance Standards Book for Radio Transmitter AN/SRT-14
NavPers 10188-B, Electronics Technician 3

EQUIPMENT

AN/SRT-14
AN/PSM-4( )

JOB STEPS

1. Review all material on SAFETY PRECAUTIONS.

2. Determine that the RFO is functioning properly.

CAUTION

DO NOT CHANGE position of any switch while the transmitter is keyed.

a. Properly set up the RFO to a frequency in each band and read the RF voltage indicated with the VOLTMETER switch in the "RF IN" position. KEY THE TRANSMITTER.

b. Rotate the EXCITATION control fully clockwise and insure that the "INT-OSC-EXT" switch (A) is in the "INT" position.

c. Voltage measured: 0.3 to 6 MC _____.

6 to 16 MC _____.

16 to 26 MC _____.

3. Determine that the keying circuits are functioning correctly.

CAUTION

DO NOT OPEN ANY DRAWER WHEN THE "STANDBY/OPERATE" SWITCH IS IN THE "OPERATE" POSITION.

a. Measure the keying voltage at terminal 44 on terminal board E-1397 in the RFA drawer. Locate E-1397-44 on the schematic.

b. Follow the procedure set forth in section 7, page 81 in the Technical Manual.

c. Voltage measured: TEST KEY "UP" _____.

TEST KEY "CENTERED" _____.

4. Determine if the Power Supplies are supplying the proper voltages to the RFA.

   a. "STANDBY/OPERATE" switch (PP) to "OPERATE".

   b. "SERVICE SELECTOR" switch (U) "HAND" and "PHONE".

NOTE

Transmitter must be keyed to have readings in "PHONE".

   c. Voltage readings:

HAND	PHONE
BIAS _____.	BIAS _____.
LV _____.	LV _____.
MV _____.	MV _____.
PA Ec2 _____.	PA Ec2 _____.
PA Eb _____.	PA Eb _____.

Q1. If R-1328 opened, what would be the front panel indications?

5. Check ATU bypass cut-off.

   a. Measure the voltage (negative DC) at terminal 52, on terminal board E-1397 while switching (AE) between "TUNER IN" and "BYPASS". Locate E-1397-52 on the schematic.

CAUTION

OBSERVE SAFETY PRECAUTIONS FOR MEASURING VOLTAGES.

   b. Voltage measured _____. Correct voltage _____.

c. Compare the reading obtained against that given in figure 7-70, page 85, of the Technical Manual.

NOTE

If the checks in steps 2 through 5 showed any abnormal readings, notify the lab instructor.

6. Determine if trouble exists.

a. Attempt to tune the transmitter to 8.5 MC; if you need to refresh your memory, use the procedure as set forth in the "Operation of the AN/SRT-14, 15, and 16; Transmitter Job Sheet "2".

b. Tuning results _____.

7. Check the "OVERLOAD INDICATOR LIGHTS" on the front panel of the RFA to insure that an overload does not exist; if and overload is found, press the "SCREEN OVERLOAD RESET" button.

NOTE

If the overload condition still exists, notify the lab instructor.

8. Take IPA readings.

a. The IPA is held cut-off by fixed bias. There will be no current in any position if the transmitter is not keyed, if the IPA is not properly tuned, if the buffer (V-1301), or if the IPA (V-1302) is faulty.

b. Current readings with "SERVICE SELECTOR" switch (U) in:

PHONE	CORRECT READING	HAND	CORRECT READING
Ic1 _____.	_____.	Ic1 ____.	_____.
Ic2 _____.	_____.	Ic2 ____.	_____.
Ik _____.	_____.	Ik ____.	_____.

Q3. What would be the front panel indications on M-1303 if R-1327 increased to 3 ohms?

10. Compare readings obtained against table 7-35, section 7, page 81 of the Technical Manual.

NOTE

If no reading is obtained in any position of the PA meter selector switch, notify the lab instructor.

CAUTION

NEVER MEASURE ANY HIGH VOLTAGE WITH AN EXTERNAL METER. USE THE BUILD-IN METER TO MEASURE THIS VOLTAGE.

11. Look up the voltage and resistance readings for the PA stage in section 7 of the Technical Manual. Take the resistance measurements as indicated.

VOLTAGE	RESISTANCE	MEASURED RESISTANCE
Pin 1 _____.	_____.	_____.
Pin 2 _____.	_____.	_____.

12. Determine if the RFA is properly aligned in the 5 to 11 MC band.

a. Tune the RFO for an output at 5 MC.

b. Tune the "IPA TUNE" (B) to 5 MC.

c. Note the IPA DIAL readings: _____.

d. Tune the RFO for an output at 11 MC.

e. Tune the "IPA TUNE" (B) to 11 MC.

f. Note the IPA DIAL reading: _____.

g. Is the RFA properly aligned: _____?

h. List the sections, paragraphs, and page number where you found the information in the Technical Manual to determine "g" above.

NOTE

If a peak cannot be obtained on the IPA meter at either 5 or 11 MC, indicate below, the dial reading and the frequency that a peak was obtained at.

LOW END	HIGH END
freq _____.	freq _____.
dial _____.	dial _____.

13. Perform steps 1 through 7 on pages 1-13 in NAVSHIPS 92121.42; stay in the 5 - 11 MC range.

SELF TEST ITEMS

1. What type of capacitor is C-1319?

2. What is I-1316?

3. What is the RFA drawer blower cooling?

4. What would the front panel indications be if F-1301 opened?

5. What do the following symbols means?

   Ic1 _____.

   Ic2 _____.

   Ik _____.

6. If L-1301 were to short, which band of "BANDSWITCH" (C) would be affected?

7. What resistors are in the PA screen grid voltage metering circuit?

8. When measuring PA screen voltage on M-1301, the meter pegs. Which resistors in the metering circuit could have decreased in value?

Assignment Sheet N1-5-1A

ATU - AN/SRT-14, 15, 16

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, 16
Study section 2, page 2-14 thru 2-46, 2-107 thru 110, 2-116 thru 2-124, section 7 page 7-107 thru 7-126, 7-277 thru 7-282, page 285 and 286, and ATU Schematic

STUDY QUESTIONS

1. Redraw T-3201 in the Transmitter Coupler, and its associated switches, showing S-3202 in position 4 and S-3201 in position 1. With the switches in these positions, would T-3201 be a step-up or a step-down transformer?

2. With S-402 in the remote position, explain how B-3502 in energized.

3. Redraw the signal path thru the ATU with S-402 in the "DIRECT" position. Label all switches and switch positions. Use separate sheet.

4. Explain how the antenna is tuned to frequencies below 1 Mc.

5. What is the purpose of R-302 and C-301 in the RF tuner?

6. Explain how S-3511 is stopped at the desired position.

7. What prevents arching during rotation of S-3511?

8. Redraw the position indicator circuit, showing how changing the position of L-302 tap will change the meter reading.

Job Sheet N1-5-1J

ANTENNA TUNING UNIT

INTRODUCTION

The antenna tuning system electrically lengthens or shortens the antenna to make it appear as an odd multiple quarter wavelength to the transmitter. To do this efficiently the coupler and tuner are placed at the base of the antenna: on the side of the stack, the top of the mast, underneather the bridge, or any other inacessable location. When trouble is present in the antenna tuning system, determine whether the trouble is in the coupler, tuner or the control indicator before lowering the tuner and coupler from its inaccessable location.

This job sheet will indicate the methods that might be used to determine that area of trouble by taking voltage readings in the control indicator.

REFERENCES

NavShips 92121 (A), Technical Manual for Radio Transmitter Set AN/SRT-14, 15, 16
NavShips 92121.42 Maintenance Standards Book for Radio Transmitter AN/SRT-14, 15, 16

EQUIPMENT

AN/SRT-14
AN/PSM-4( )
Test Leads

JOB STEPS

NOTE

Key transmitter only when necessary.

1. Check ATU system as per table 7-40, page 7-108, of the Technical Manual.

NOTE

Correlate the voltage test points given in this job sheet to the points on your schematic.

2. Position meter circuit.

a. Draw a simplified schematic of the position meter and R-301 circuit.

Instructor initial _____.

b. Make "ZERO" and "PULL SCALE" adjustments on "POSITION" meter.

(1). Push "UP" button until the "POSITION" meter reads 100.

(a). Measure the voltage on pin 1 of M-402: _____.

(b). Measure the voltage at E-402: _____.

(2). Push "DOWN button until "POSITION" meter reads 0.

(a). Measure the voltage at pin 1 of M-402: _____.

(b). Measure the voltage at the arm of R-413: _____.

3. SWR circuit.

a. Tune the transmitter up to the antenna system (position meter reading 100).

b. Open control indicator cover and measure voltage from R-405 and 406 to ground.

R-405 _____.

R-406 _____.

NOTE

There are two types of questions in this job sheet: the "Q" type and the "SELF TEST ITEM" type. The "Q" type should be answered in lab during lab time as the questions will be more easily answered with the transmitter in front of you. The "SELF TEST ITEM" type requires only the technical manual or your classroom notes (also from previous weeks), for references, in order to be answered. DO NO WASTE YOUR LAB TIME ON "SELF TEST ITEMS".

Q1. What is the true significance of the readings obtained in steps 2 and 3?

c. Tune the antenna system for as low an SWR as possible.

d. Open control indicator cover and measure the voltage from E-405 and E-406 to ground.

E-405 _____.

E-406 _____.

Q2. If the SWR meter doesn't indicat at all, what components could be bad?

e. Unkey the transmitter.

4. S-404

a. Locate the common terminal on S-404.

Q3. What kind of voltage is on it?

b. Measure the voltage from the common terminal of S-404 to ground.

c. Measure, in reference to ground, the voltage leaving S-404.

_____.

d. While measuring the voltage in step c, switch the "ANTENNA COUPLER LOADING" switch to the next position.

Q5. What happened? Why? Was the indication correct?

Q6. If the indication in step d was correct but there was no motor noise in the coupler, what components in the coupler could be bad?

5. S-403.

a. Measure the voltage on the common terminal of S-403 to ground. _____.

b. Measure, in reference to ground, the voltage leaving S-403. _____.

c. While measuring the voltage in step b, switch the "TRANSFORMER" switch to the next position.

Q7. Which switch in the tunner passed the voltage to the motor?

6. S-402.

a. Switch S-402 to "BYPASS" and measure the voltage on S-402 with the transmitter in "STANDBY".

(1). Terminal 1 _____.

(2). Terminal 2 _____.

(3). Terminal 3 _____.

(4). Terminal 4 _____.

(5). Terminal 5 _____.

(6). Terminal 6 _____.

b. Put the transmitter in "OPERATE" and measure the voltage on S-402.

(1). Terminal 1 _____.

(2). Terminal 2 _____.

(3). Terminal 3 _____.

(4). Terminal 4 _____.

(5). Terminal 5 _____.

(6). Terminal 6 _____.

c. Key the transmitter and measure the voltage on S-402.

(1). Terminal 1 _____.

(2). Terminal 2 _____.

(3). Terminal 3 _____.

(4). Terminal 4 _____.

(5). Terminal 5 _____.

(6). Terminal 6 _____.

Q8. What component passed the voltage that is different between steps b and e?

d. Unkey the transmitter and switch S-402 to "REMOTE".

e. Key the transmitter.

Q9. What happened? Why?

7. S-405 and S-406.

a. Measure voltage on S-405 to ground.

(1). Left side C _____.

(2). Left side NC _____.

(3). Left side NC _____.

(4). Right side C _____.

(5). Right side NC _____.

(6). Right side NC _____.

b. Measure voltage on S-406 to ground.

(1). Left side C _____.

(2). Left side NC _____.

(3). Left side NC _____.

(4). Right side C _____.

(5). Right side NC _____.

(6). Right side NC _____.

c. Measure voltage on S-405, terminal C, left side, and push the "UP" section.

Q10. What effect does this voltage have in the tuner?

Q11. What effect does S-407 have in the tuner?

Q12. What is the indication if the blower motor in the tuner fails?

8. Open RF line indication.

a. Tune the transmitter to a frequency between 5 and 7 MC.

b. Record the meter readings including SWR and POSITION.

c. Unkey the transmitter.

d. Remove the co-ax connector on the LAU labeled "RF OUTPUT."

CAUTION

DO NOT KEY THE TRANSMITTER ANY LONGER THAN NECESSARY

e. Retune the PA and antenna system as necessary.

f. Record the meter readings including SWR and POSITION.

g. Tune the transmitter to a frequency between 9 and 11 MC.

h. Record the meter readings including SWR and POSITION.

i. Unkey the transmitter.

j. Reconnect the co-ax connector on the LAU.

k. Retune the PA and antenna system as necessary.

l. Record the meter readings including SWR and POSITION.

m. STATE YOUR CONCLUSIONS.

SELF TEST ITEM #1:

How does the frequency affect the indications in step m above?

SELFT TEST ITEM #2:

How would the indications be affected if the break in the RF line occurred near the base of the antenna?

Assignment Sheet N1-6-1A

CONTROL CIRCUITS AN/SRT-14, 15, 16

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, 16
Study section 2, 2-110 thru 2-116, 2-125, section 7 page 7-161 thru 7-172 and the Control Circuits Information Sheet

STUDY QUESTIONS

1. What switches must be closed before K-3001 will energize?

2. List all relays that operate in -24v A. T. D.

3. With the service selector switch in the PHONE position, what switches must be closed and which relays must be energized to energize K-3005?

4. What is the purpose of K-503?

5. What would be the result if R-519 in the lead to K-504 were to open?

6. Which relays operate in -24v after standby?

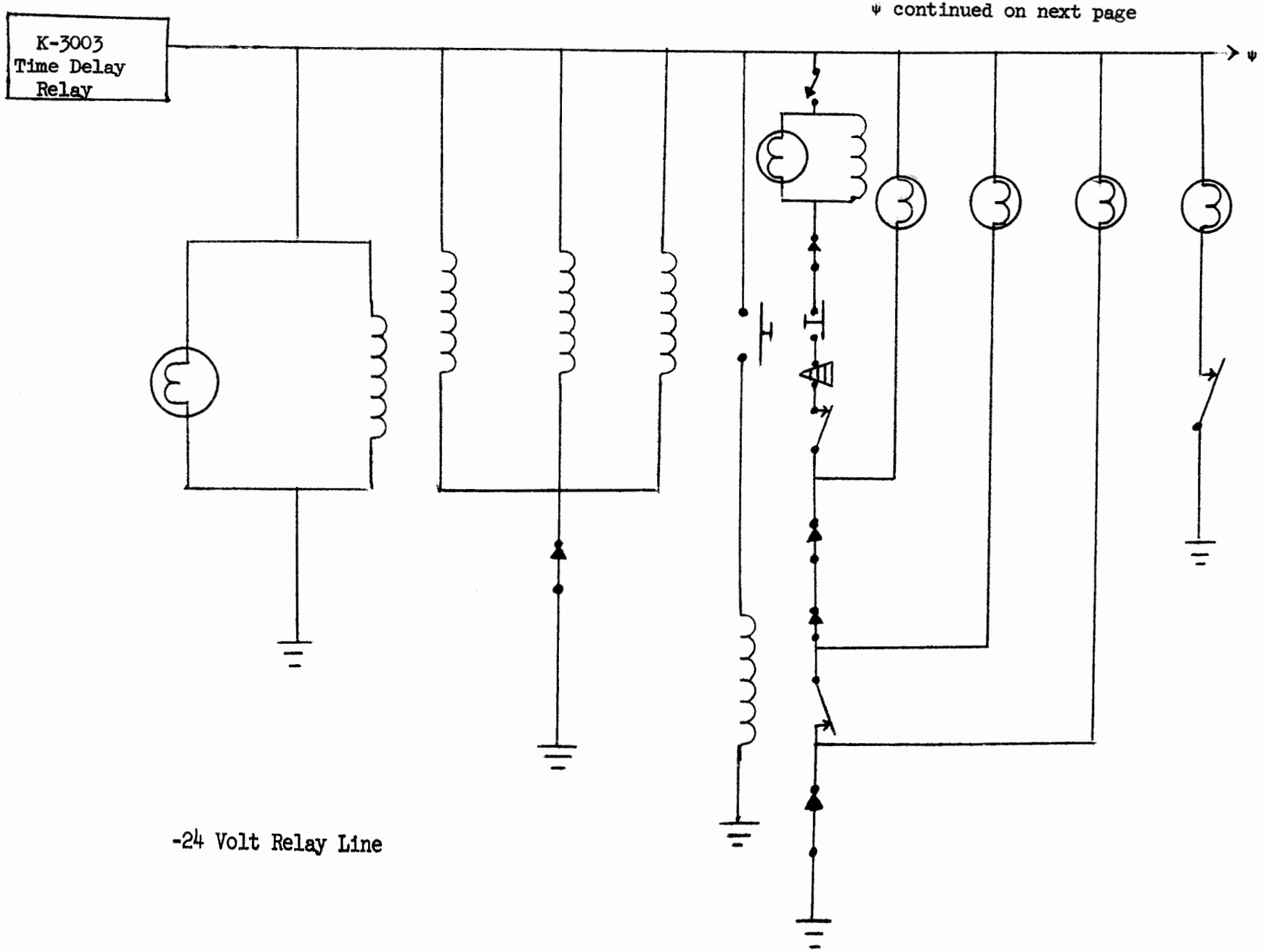
7. What is the operating voltage for K-1107?

8. What is the purpose of K-502? Explain its operation?

9. What is the purpose of S-1383? Why is it necessary?

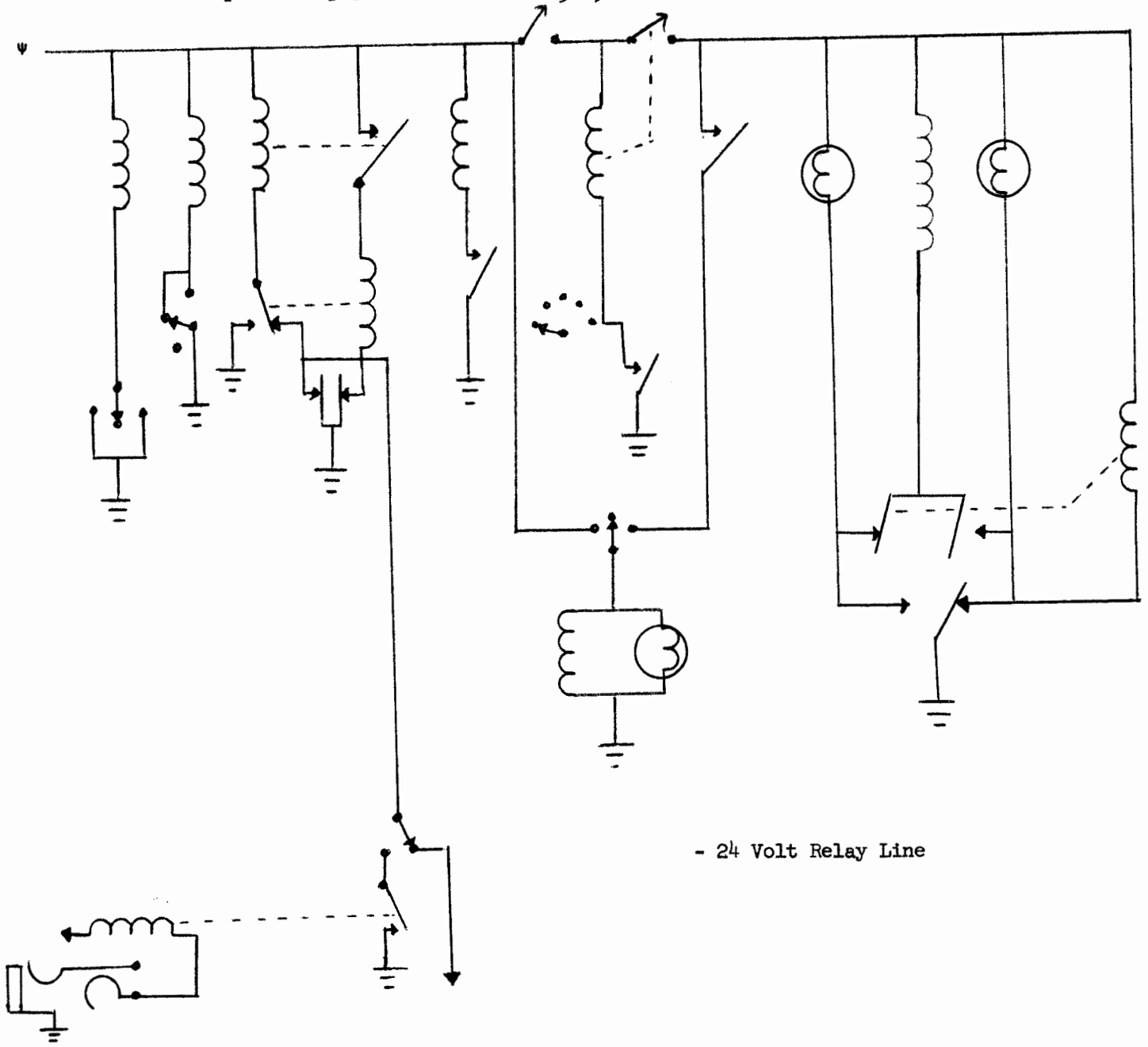
10. What would be the result if contact 9F of S-1106 were shorted to ground?

11. What would be the result if R-3019 in the LVPS were to open?


K-3003
Time Delay
Relay
ψ continued on next page
ψ
-24 Volt Relay Line

ψ continued from previous page

S-3005



- 24 Volt Relay Line

Information Sheet N1-6-1I

CONTROL CIRCUITS AN/SRT-14, 15, 16

INTRODUCTION

Use NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, and 16; pages 7-161/7-162, figure 7-114 Transmitter Group OA-684/SRT and mounting MT-1423/SRT Control Circuit, Simplified Schematic.

When you close the bulkhead switch, trace continuity until you find a components that become energized because you closed the bulkhead switch. The next thing to do is trace out what the components that become energized does, etc.

You must be capable of using the Technical Manual in this manner in order to become familiar with new equipment. If questions arise, write them down, try to find the answer yourself, and if there are questions that remain unanswered, bring them to class.

REFERENCE

NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, and 16

INFORMATION

1. CW SEQUENCE

    a. Bulkhead to Start

        (1). Bulkhead Switch
        (2). Emergency Switch S-3001
            (a). 110v Utility Outlet
            (b). S-3003 Cabinet Heaters

    b. Start to Time Delay

        (1). S-3004 Start Switch
        (2). K-3001 Master Control Relay

(a). LVPS Primary T-3001
(b). -24 v d-c
(c). T-2921 Filament Transformer
(d). 250 v d-c reg.
(e). -12 v d-c
(f). RFA Filament and Blowers

c. Time Delay to Standby Operate

(1). K-3003 (30 sec. time delay)
(2). K-3004
(a). Blowers
(b). 250 v d-c
(c). -220 v d-c
(d). 300 v d-c (After K-504, 500 v d-c supply energizes)

d. Standby Operate to Key

(1). S-3005 Standby Operate Switch
(2). K-3005 (-24 v d-c Standby Voltage Relay)
(3). K-503 (1300 v d-c) 100 watt only
(4). K-501 (500 v d-c)
(5). K-504 Energizes, 300 v d-c available

2. PHONE SEQUENCE

Same as CW steps a through c

(3). K-502 (reduce 1300 v d-c to 1050 v d-c)
(4). K-1106 (remove short from mod. Transformer T-1004)
(5). K-1302 (remove short from PA screen)
Modulation circuit.

d. Standby to Operate Switch S-3005

e. Press to talk (key)

(1). K-1107 (press to talk relay (ground for K-1306)
(2). K-1306 (-24 v d-c to K-1101 keying rely)
(3). K-1101 Keying Relay (ground for K-1306)
(4). K-3005 After Standby -24 v d-c
(5). K-503 (1050 v d-c) 100 watt operation only
(6). K-501 (500 v d-c supply)
(7). K-504 (Energized by 500 v d-c (300 v d-c LVPS now available)

3. 500 WATT SEQUENCE

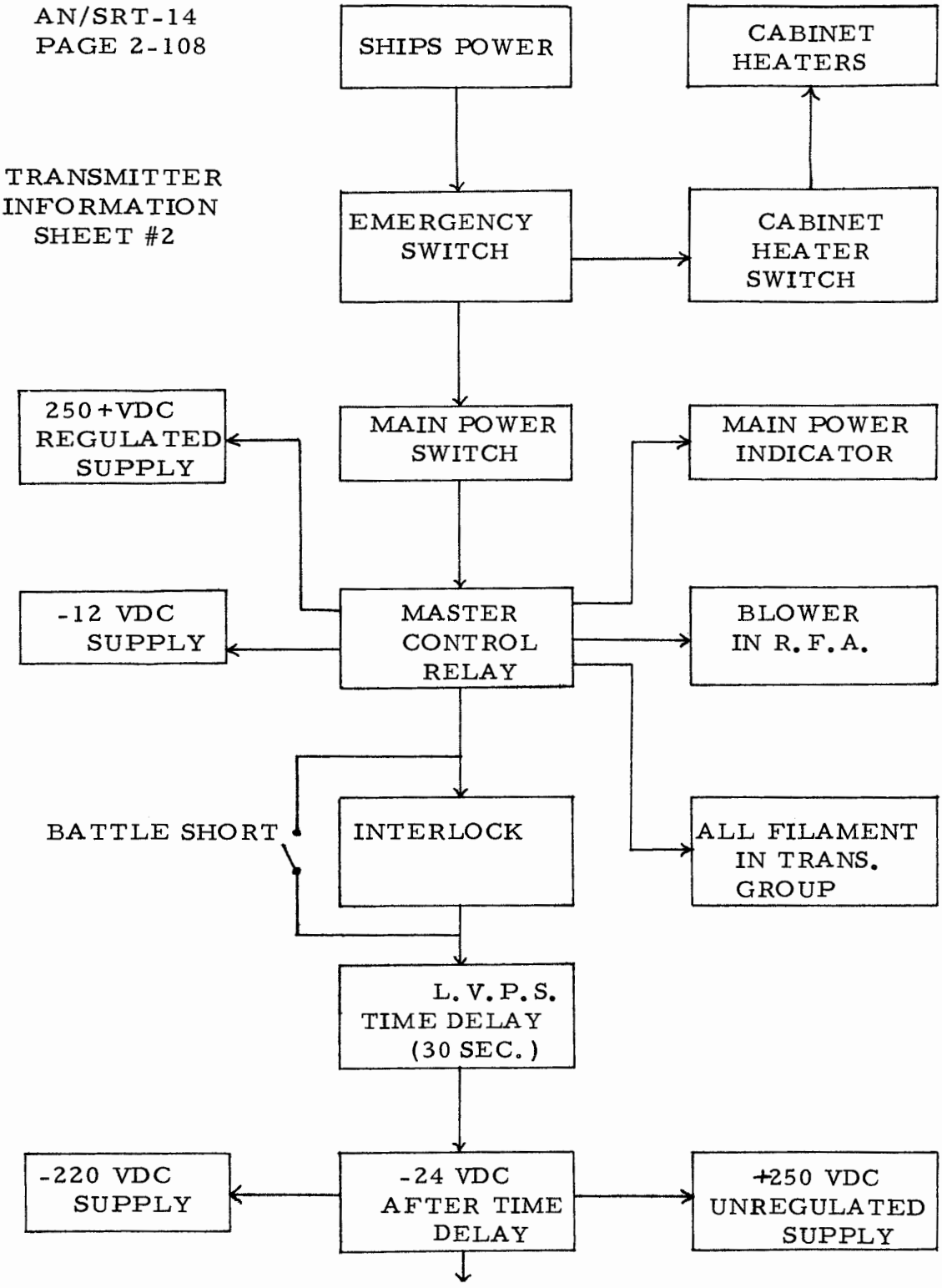
Same as CW a through d

e. S-1388 (500 watt push for 500 watt)

(1). K-1304 (500 watt relay)
(2). K-1104 (T-1104 transformer LLRM output is switched HLRM)

115 V BLOCK
AN/SRT-14
PAGE 2-108

TRANSMITTER
INFORMATION
SHEET #2



Job Sheet N1-6-1J

CONTROL CIRCUITS

INTRODUCTION

This job sheet was prepared to show the value of the control circuit schematic when troubleshooting the AN/SRT-14.

While doing this job sheet you will notice that the indicator lights on the front panel come on in several definite sequences. The particular sequence is determined by the mode of operation selected by the operator.

When one indicator does not light at the proper time, there is trouble some where in THAT circuit. The trouble can be easily localized by: using the schematic diagram for the particular circuit, your knowledge of basic electronics, proper use of test equipment (knowing the capabilities of the test equipment available) and LOGICAL TROUBLESHOOTING PROCEDURES assuming of course, that YOU know whether or not that particular light is supposed to come on at that time. However, when several indicator lights don't come on at the proper time, the trouble is probably common to more than one circuit; troubleshooting, in this case, can be more efficiently done by using the control circuit schematic: figure 7-114.

The "OPERATION" job sheet directed your attention to WHEN various lights are supposed to come on; this job sheet, if done thoughtfully, will direct your attention to WHY these various lights come on.

REFERENCE

NavShips 92121 (A), Technical Manual for Radio Transmitter Sets AN/SRT-14, 15, 16

EQUIPMENT

AN/SRT-14

CAUTION

THE POWER SUPPLIES CONTAIN VOLTAGES WHICH ARE DANGEROUS TO LIFE. OBSERVE PRECAUTIONS FOR WORKING WITH HIGH VOLTAGES.

NOTE

The following power supplies are contained in the AN/SRT-14

1. Locate these power supplies on figure 7-114.

LVPS	Negative 220 v	Bias supply
	Positive 250 v	Unregulated
	Positive 300 v	Low voltage
	Negative -24 v	Relay supply
MVPS	Positive 500 v	Medium voltage
	Positive 12 v	PA Plate voltage
LLRM	Positive 250 v	Regulated
	Negative 12 v	Carbon microphone supply

2. Locate the following points on figure 7-114.

All high voltages can be measured by using the voltmeter on the RFA DRAWER. In addition, the PA screen voltage can be measured on the same voltmeter (figure 7-158)

The 1300/1050v supply will NOT be measured with an external voltmeter under any condition.

All supplies, except the negative 24v and the negative 12v have indicator lights to indicate the presence of voltage. The positive 500v and the 1300/1050v supplies have indicator lights to show primary power supplied to the transformer as well as output lights.

The negative 24v relay supply and the negative 12v carbon microphone supply do not have indicator lamps, however, these voltage can be measured from the front panel as follows.

a. The negative 24v can be measured at either J-3007, or J-3008 on the front panel of the LVPS. These jacks are labeled INT TEST.

b. The negative 12v can be measured from contact "C" on J-1106, the handset jack on the LLRM, with the CARBON/DYN switch (Y) in "CARBON" (see figure 7-153)

NOTE

The use of figure 7-114 will be sufficient to complete this job sheet.

3. "SERVICE SELECTOR" switch (U) to "PHONE".

4. Turn on bulkhead switch, (UU) and (MM).

NOTE

There are two types of questions in this job sheet. The "Q" type and the "SELF TEST ITEM" type. The "Q" type should be answered in lab during lab time as the questions will be more easily answered with the transmitter in front of you. The "SELF TEST ITEM" type requires only the technical manual or your classroom notes (also from previous weeks), for reference in order to be answered. DO NOT WASTE YOUR LAB TIME ON "SELF TEST ITEM".

Q1. What units have primary power applied?

5. Push "START" (RR).

Q2. What units have primary power applied?

Q3. BEFORE TIME DELAY what d-c voltages are available, and to which items are these voltages applied?

Q4. AFTER TIME DELAY what d-c voltages are available, and to which items are these voltages applied?

6. Turn (U) to "HAND".

Q5. What happened, and why?

7. Turn (U) to "PHONE".

8. Turn (PP) to "OPERATE".

Q6. What happened, and why?

9. Turn (U) to "HAND".

Q7. What happened, and why?

10. Push (U) as if to turn it.

Q8. What happened, and why?

11. Turn (U) to "PHONE".

12. "TEST KEY" (T) up (locked on).

Q9. What happened, and why?

13. Turn (J) to "PA Eb", read voltage _____.

14. "TEST KEY" (T) to "OFF" (center).

15. Turn (U) to "HAND".

16. "TEST KEY" (T) up (locked on).

Q10. Why does step 13 voltage differ from step 16 voltage?

17. Shut down transmitter.

SELF TEST ITEMS

1. What is the purpose of K-504?

2. What damage could result if the "EMERGENCY SWITCH" (MM) were to be switched "OFF" while the transmitter was in "OPERATE" and "KEYED"?

3. Locate the following items on figure 7-114 and determine what would be the result, front panel and otherwise, if each item were to go bad (open), by itself.

a. F-3005
b. F-3006
c. F-3007
d. F-3008
e. F-3009
f. F-3010
g. K-3004
h. R-2940
i. F-2917
j. F-503
k. F-501
l. F-502
m. F-1001
n. F-1002
o. F-1301
p. K-501
q. K-502
r. K-503
s. K-504
t. K-1101
u. K-1107
v. K-1306
w. S-1383
x. R-3024
y. C-3011

4. In which position of (U) does K-3005 have a perament ground?

Assignment Sheet N1-7-1A

LLRM BLOCK AND AUDIO CIRCUITS

STUDY ASSIGNMENT.

NavShips 92121 (A), Technical Manual for Radio Transmitting Sets AN/SRT-14, 15, 16
Study section 2, page 2-65 thru 2-74, 2-133 and section 7, page 7-237 page 7-67 thru 7-74

STUDY QUESTIONS

1. Why are V-1001 and V-1002 mounted on a separate chassis?

2. What is the purpose of the Side-Tone amplifier circuits?

3. What voltages are supplied by the power supplies within the LLRM?

4. What is the purpose of K-1102?

5. With S-1102 in the DYNAMIC position, what would be the indications if R-1004 were to open?

6. With S-1102 in the CARBON position, what voltage (s) would be found at pin "C" of J-1106?

7. Why is the signal applied to the suppressor grid of V-1001?

8. What is the purpose of Z-1001?

9. What would be the result if C-1012 were to open?

10. What is the purpose of K-1106?

11. What would be the result of the bottom of the top resistor in E-1003 were to be ungrounded?

Assignment Sheet N1-7-2A

LLRM KEYING AND POWER SUPPLY

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Radio Transmitter Sets AN/SRT-14, 15, 16
Study section 2, page 2-74 thru 2-87, 2-133 and section7, page 7-74 thru 7-77, page 7-237, study section 6, all pages

STUDY QUESTIONS

1. With V-1015A cut off, what should the cathode-to-ground potential be?

2. When would S-1107 be used?

3. How much power is normally dissipated by R-1087?

4. In the space condition, what should the voltage be at pin 1 of V-1007?

5. With service selection switch as shown, what voltage would be felt on the cathode of V-1008A?

6. What would be the indications if R-1103 was open?

7. What is the purpose of R-1116?

8. What would be the result if R-1058 were to open?

9. How is a change in the regulated voltage detected by V-1011?

10. What is the voltage from pin 8 of V-1010 to ground?

11. What would be the front panel indications if F-1001 was blown?

Job Sheet N1-7-1J

LOW LEVEL RADIO MODULATOR

INTRODUCTION

This job sheet was prepared to familiarize you with the methods to be used:

a. When checking the LLRM for proper operation.

b. In making repairs to the LLRM when trouble is encountered.

c. In making adjustments to the LLRM either after restoring malfunctions or simply to restore it to proper operation.

d. In using the Technical Manual when doing a, b, and c (above).

As the LLRM is used in all modes of operation in the AN/SRT-14 (also 15 and 16), it is vital that you understand what is happening throughout the LLRM in all of its parts, in all of most trouble, not because it fails more often than other units, but because when it does fail the ET's have more difficulty in analyzing the trouble. A little reflection on the role the LLRM places in proper transmitter operation will reveal that "Lack of knowledge" of the manner in which the LLRM affects overall transmitter operation is the prime reason for this difficulty.

Doing this job sheet thoughtfully will reinforce the knowledge learned in the classroom.

REFERENCE

NavShips 92121 (A), Technical Manual for Radio Transmitter AN/SRT-14, 15, 16

EQUIPMENT

AN/SRT-14
Microphone
Earphones
OS-8
PSM-4
Test Lead

JOB STEPS

1. Testing for proper operation.

a. Audio chain

(1). Check for modulation, pages 7-71 and 6-8.

Q1. Which method, of the two methods in the Technical Manual, should be used in this lab to check modulation?

CAUTION

Consult instructor before making the modulation check.

Q2. Do the controls concerned have the proper effect? (using the steps listed on page 6-8, check 7).

(2). Check the Sidetone Amplifier by inserting a mike into the "MIC" jack and earphones into the "EARPHONES" jack. Speak into the mike and you should be able to hear what is spoken. (Transmitter must be in what mode of operation?

b. Keying circuits

(1). Check the keying voltage at the RFO test socket.

(a). HAND, MACH, PHONE-Unkeyed
Voltage reading _____. Correct voltage _____.

(b). HAND, MACH, PHONE- Keyed
Voltage reading _____. Correct voltage _____.

(c). FSK, FAX- Space
Voltage reading _____. Correct voltage _____.

(d). FSK, FAX- Mark
Voltage reading _____. Correct voltage _____.

SELF TEST ITEM #1:

Draw a simplified schematic of the keying voltage line showing every plug, pin, terminal board, terminal and/or other tie point from the LLRM to the RFA. Use figure 7-167 for interconnections.

(2). Check audio oscillator for operation by placing the transmitter in "HAND", depress the test key and listen for a 1000 hertz tone in the earphones. (What other method could be used to check the audio oscillator?).

Q3. How can the dumping action be checked?

c. Power supply circuits.

(1). +250 Voltage reading _____.

(2). -12v d-c Voltage reading _____.

Q4. Where did you measure the +250 v d-c ?

Q5. Where did you measure the -12v d-c?

(3). ATU transfer function: measure this voltage on terminal 3 of S-402 in the Control Indicator.

Voltage - keyed _____.

Voltage - unkeyed _____.

Q6. Describe the color coding of each wire on terminal 3 of S-402.

NOTE

The previous steps will indicate if there is trouble in the LLRM; if trouble is indicated, notify the instructor.

2. LLRM adjustments.

a. Audio Circuits: Make the audio circuits adjustments as described in section 7, sheets 73 through 74, paragraph 6 b (1) (a) 2. Substitute the michrophone for the audio oscillator; key the michrophone and hold it about 1 inch from the mouth. Sing a steady AH-H-H at a comfortable pitch and reasonably low volume into the mike.

ADJUST: GAIN TO CLIP, CLIPPER SYM, AND SEQUELCH TRIG.

b. Keying Circuits: Adjust "ZERO ADJUST", "KEYER OUT". "(-) LIMIT", and "(+) LIMIT". (as directed on p. 7-75).

SELF TEST ITEM #2:

What additional equipment is required to adjust "NEUTRAL POLAR MARK" and "POLAR SPACE"?

Q7. What is the purpose (what effect does it have) of the "AUDIO OSC FEEDBACK" adjustment?

c. Power supply circuits.

(1). Adjust for 250v d-c out of the +250v d-c regulated supply. (as directed on p. 7-76).

(2). Adjust R-1134 as per instructions in the Technical Manual, p. 7-76.

CAUTION

The "STANDBY/OPERATE" switch (PP) must be in the "OPERATE" position for SOME of the following checks.

Use schematics constantly-Know where these checks are made-Know what you are doing at all times.

When making any checks inside the drawers, use care that you do NOT damage the transmitter, the test equipment or yourself.

What voltage is applied to L1/R1 of K-1106 in each mode of operation? DO NOT MEASURE. USE SCHEMATIC for answered.

HAND/MACH _____.

FSK/FAX _____.

PHONE _____.

Q8. What is the explanation of arcing between the two balls atop K-1106 during voice transmission?

3. Troubleshooting Tests.

a. Audio circuits.

(1). AGC (V-1013A).

(a). AGC switch (P) "OFF", transmitter keyed.
Voltage pin 1 _____.
Voltage pin 7 _____.

(b). AGC switch (P) "ON", transmitter keyed, no voice input.
Voltage pin 1 _____.
Voltage pin 7 _____.

(c). Voice signal input.
Voltage pin 1 _____.
Voltage pin 7 _____.

(d). Increased voice signal input.
Voltage pin 1 _____.
Voltage pin 7 _____.

(2). Squelch circuit.

(a). Check that "SQUELCH TRIG" (L) has proper effect.

(b). Check as described in the Technical Manual.

(3). Voice amplifier circuits.

(a). Check for signal at V-1014, pins 1 and 2; or Z-1001, at pin 3.

Q9. If a proper signal is present at this point, what tubes can reasonably be assumed to be good?

(b). Locate R-1046 and R-1047 on the schematic and on the equipment; check for equal audio signal at each resistor.

CAUTION

What voltages are present on the following elements if the tubes are not conducting? DO NOT MEASURE.

V-1003 pin 1 _____.
pin 6 _____.

V-1005 pin 1 _____.
pin 6 _____.
pin 2 _____.
pin 7 _____.
pin 3 _____.
pin 8 _____.

V-1006 pin 6 _____.
pin 2 _____.

V-1007 pin 3 _____.
pin 2 _____.

(c). Locate T-1003, pin 4 and the junction of R-1126 and R-1004; check for an audio signal at either point.

CAUTION

What d-c voltage is present on the two balls atop K-1106?

b. Keying circuits

(1). Recheck for correct keying voltage at the RFO test socket; make adjustments as necessary.

(2). "SERVICE SELECTOR" in "HAND". Take the following voltage readings:

LOCATION		UNKEYED	KEYED
R-1102, R-1103 junction		_____	_____
R-1096 arm		_____	_____
V-1096	pin 1	_____	_____
	pin 6	_____	_____
	pin 2	_____	_____
	pin 7	_____	_____
V-1016	pin 1	_____	_____
	pin 2	_____	_____
	pin 7	_____	_____
	pin 5	_____	_____
V-1015	pin 8	_____	_____
	pin 2	_____	_____

SELF TEST ITEM #3:

What is the significance of the voltage reading at V-1015, pin 8?

(3). "SERVICE SELECTOR" (U) in "PHONE". Take the following voltage readings.

LOCATION		UNKEYED	KEYED
R-1102, R-1103 junction		_____	_____
R-1096 arm		_____	_____
V-1017	pin 1	_____	_____
	pin 6	_____	_____
	pin 2	_____	_____
	pin 7	_____	_____

LOCATION		UNKEYED	KEYED
V-1016	pin 1	_____	_____
	pin 2	_____	_____
	pin 7	_____	_____
	pin 5	_____	_____
V-1015	pin 8	_____	_____
	pin 2	_____	_____

SELF TEST ITEM #4:

What is the significance of the voltage reading at V-1015, pin 8?

(4). "SERVICE SELECTOR" (U) in "FSK". Take the following voltage readings.

LOCATION		UNKEYED	KEYED
R-1102, R-1103 junction		_____	_____
R-1096 arm		_____	_____
V-1017	pin 1	_____	_____
	pin 6	_____	_____
	pin 2	_____	_____
	pin 7	_____	_____
V-1016	pin 1	_____	_____
	pin 2	_____	_____
	pin 7	_____	_____
	pin 5	_____	_____
V-1015	pin 8	_____	_____
	pin 2	_____	_____

SELF TEST ITEM #5:

In steps (2), (3), and (4) above, note the differences and explain (a) why there is a difference, (b) where these different voltages are being applied and (c) why this difference is desirable?

c. Power supply circuits

(1). Trace the wire on pin 8 of V-1011 to C-1038. Take the voltage reading at this point while varying R-1086.

Q10. Which direction (CW or CCW) simulates an increase in the +250v d-c REG. ?

(2). Take the voltage reading on pin 6 of V-1011 and simulate a decrease in the +250v d-c REG. supply.

Q11. What effect does each change in voltage on pin 6 of V-1011 have on the plate resistance of V-101 ?

Q12. What effect does the plate resistance of V-1010 have on the +250v d-c REG. out?

(3). Take the necessary voltage readings to support your hypothesis.

Point Voltage Taken	Voltage	Remarks
1.	_____	_____
2.	_____	_____
3.	_____	_____

(Use additional numbers as necessary)

Q13. What would be the effect on the +250 v d-c Reg. out if V-1012 were to de-ionize and stay de-ionized?

Assignment Sheet N1-8-1A

POWER SUPPLIES AN/SRT-14, 15, 16

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Radio Transmitter Sets AN/SRT-14, 15, 16
Study section 2, page 2-51 thru 2-65 and section 7, page 7-1 thru 7-8, 7-9, thru 7-107, 7-257 thru 7-261, and 7-267 page 7-163, 7-173

STUDY QUESTIONS

1. Explain how K-501 is energized.

2. Explain the function of E-503 for 100W operation.

3. Explain the function of K-504.

4. Explain how the 1300 volt supply is reduced to 1050 volts for phone operation?

5. Why is the PA plate voltage reduced for phone operation?

6. List the units supplied by the negative 24 volts (after time delay).

7. What is the purpose of K-1501 (HVPS)?

8. What is the purpose of K-1504 (HVPS)?

9. Redraw from J-1502 terminal 4- to K-1304.

10. Redraw from J-1502 terminal 16 to S-1381.

Job Sheet N1-8-1J

POWER SUPPLIES

INTRODUCTION

The study of the control circuits schematic established what voltages are available and when they are available. The study of the other schematics established where these various voltages are used. The study of the power supply schematics showed that all the power supplies are conventional and straight-forward in every respect.

The majority of power supply troubles will be bad tubes. The majority of power supply fuse failures will be caused by an excessive drain on the power supply, hence, the trouble will be in one of the circuits that is being fed by the power supply.

Most of the few troubles that actually occur in a power supply other than tube, will be obvious because of evidence of burning and overheating.

The few remaining troubles will best be localized to a component by resistance checks with the power off and the drawer completely removed from the cabinet, the reason being: Unnecessarily taking voltage readings in a high voltage circuit is generally considered hazardous and anybody with common sense would avoid taking unnecessary chances.

The only problem, then, is to identify and relate the physical components in the drawer to the symbols on the schematic. This job sheet was prepared to guide you in ONE method of identifying and locating components.

REFERENCES

NavShips 92121 (A), Technical Manual for Radio Transmitter Sets AN/SRT-14, 15, 16

a. Section 1 & 3: major units
b. Section 4 : front panel controls
c. Section 5 : Tubes and fuses
d. Section 6 : Test points and mechanical items.
e. Section 7 : All items not previously identified and located
f. Section 8 : Physical description of all components

EQUIPMENT

AN/SRT-14, 15

JOB STEPS

1. MVPS: Locate on the schematic and list all components mounted on the top and side views only:

   a. Left side
   b. rear wall
   c. front panel (inside and out)
   d. right side
   e. floor of chassis

NOTE

STEP (f) may be done by deduction.

   f. not visible portion of chassis

2. LVPS: Locate on the schematic and list here all components mounted on the top and side views only:

   a. left side
   b. rear wall
   c. front panel (inside and out)
   d. right side
   e. floor of chassis

NOTE

STEP (f) may be done by deduction.

   f. not visible portion of chassis

3. Perform steps 2 through 5 on page 1-3 in NavShips 92121.42; stay in the 5-11 mc range.

4. Perform steps 1 through 3 on page 1-5 NavShips 92121.42; stay in 5-11 mc range.

SELF TEST ITEM #1:

What is the ripple frequency on the output of each power supply in the AN/SRT-14?

Job Sheet N1-8-2J

MECHANICAL DEVICES, MAINTENANCE STANDARDS BOOK AND CLEANING AN/SRT-14, 15, 16

INTRODUCTION

This job sheet was prepared to familiarize you with the procedures and methods to be used in greasing and cleaning the AN/SRT-14, 15, 16.

REFERENCES

NavShips 92121 (A), Section 6
NavShips 92121.42, Pages 2-53 thru 2-63

EQUIPMENT

AN/SRT-14, 15
Vacuum Cleaner
Solvent, Dry Cleaning, P-S-661b
Grease, Mil-G-3279
Oil, Mil-L-9000 (MS 9250, SAE 30)

JOB STEPS

1. Clean air filters: check references, note the differences between the three cleaning procedures.

    a. Remove air filters
    b. Vacuum air filters
    c. Clean in solvent and let drain and dry
    d. Replace air filters

2. Remove drawers

    a. Use a hexagonal type wrench to unscrew the socket head captive screws on the front drawer. Ensure that the screws are completely released.

    b. Pull the drawer out to the stops using the handles on the front of the drawer.

    c. Remove all interconnecting cables from the drawer by releasing the locking bars and removing the cable plugs. The connectors and spring assemblies are spring loaded: have a firm grip on them before removing.

d. The interconnecting cable plugs are located on the top rear side of all units except the Radio Frequency Oscillator, in which case they are located on the bottom, rear side of the drawer.

e. After removing the interconnecting cable plug from a drawer, hang it on the cable post provided.

f. Depress the locking latches on each side of the channel support which is located on the lower rear of the drawer, and pull the drawer out. At this time, BE PREPARED TO SUPPORT THE ENTIRE WEIGHT OF THE DRAWER.

3. Lubricate rails, rollers, latches and roller shafts as per instructions in the references.

4. Clean transmitter using vacuum cleaner, solvent and cloth.

5. Replace drawers.

a. To replace the drawer, full engage the inner slide. Depress the spring loaded stop buttons and slide the inner slide completely into the other outer slide.

b. Place channel rails over the rollers on the rail mounts in the frame, and push the drawer slowly into the stops. If binding is encountered, pull the drawer all the way out to the positive stops. Then lift the front of the drawer slightly, and push it in slowly.

c. To reconnect the interconnecting cables insert the connectors and lock in place insuring that the cables are positioned properly and replace in the proper connection. These cables are spring loaded, have a firm grip on them before removing them from the post.

d. Close the drawer by depressing the spring loaded stop buttons and push the drawer slowly in until firmly in place. Investigate any binding to prevent damaging the cables.

e. Secure the drawers by tightening the socket head captive screws firmly, but not too tight. Exercise care to prevent cross-threading.

Assignment Sheet N1-9-1A

HIGH LEVEL RADIO MODULATOR AN/SRT-14, 15, 16

STUDY ASSIGNMENT

NavShips 92121 (A), Technical Manual for Radio Transmitter Sets AN/SRT-14, 15, 16
Study section 2, page 2-187 thru 2-190; section 7 page 7-77 thru 7-81 and 7-247

STUDY QUESTIONS

1. Why are V-1603, V-1604 connected as they are?

2. What is the purpose of CR-1601?

3. Redraw the modulation signal path from V-1006 and V-1007 to the primary of to 1601.

4. Redraw the ground circuit of K-1601, showing complete path through all relays, switches etc.

5. What would be the results if R-1603 was shorted?

4. Redraw the ground circuit of K-1601, showing complete path through all relays, switches etc.

5. What would be the results if R-1603 was shorted.

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