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NAVSHIPS 92121(A)

INSTRUCTION BOOK

*for*

RADIO TRANSMITTING SETS

AN/SRT-14, AN/SRT-14A, AN/SRT-15,  
AN/SRT-15A, AN/SRT-16 AND AN/SRT-16A

SECTION 7

CORRECTIVE MAINTENANCE

FEDERAL TELEPHONE AND RADIO COMPANY

*A division of* INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

CLIFTON, NEW JERSEY

DEPARTMENT OF THE NAVY

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## TABLE OF SECTIONS

| <i>Section</i> | <i>Title</i>           |
|----------------|------------------------|
| 1              | General Description    |
| 2              | Theory of Operation    |
| 3              | Installation           |
| 4              | Operation              |
| 5              | Operator's Maintenance |
| 6              | Preventive Maintenance |
| 7              | Corrective Maintenance |
| 8              | Parts Lists            |

## TABLE OF CONTENTS

| <i>Paragraph</i>   | <i>Page</i> | <i>Paragraph</i>  | <i>Page</i> |
|--|-------------|---|-------------|
| 1. Introduction .....  | 7-1         | (a) Removal and Repair .....  | 7-28        |
| 2. Theory of Localization .....  | 7-2         | (b) Replacement and Adjust-<br>ments .....  | 7-28        |
| 3. Trouble-Shooting the Transmitter Bay .....  | 7-2         | <i>l.</i> Electronic Frequency Converter, Unit 5<br>(Z-2158) Trouble Shooting .....     | 7-28        |
| <i>a.</i> General .....  | 7-2         | <i>m.</i> Electronic Frequency Converter, Unit 5<br>(Z-2158) Repair and Adjustment .... | 7-28        |
| <i>b.</i> Test Equipment Required .....  | 7-2         | (1) Electrical Adjustments .....  | 7-28        |
| <i>c.</i> Locating Faulty Unit .....   | 7-2         | (2) Mechanical Adjustments .....  | 7-30        |
| 4. Trouble-Shooting and Repair of the Major<br>Units .....                           | 7-8         | ( <i>a.</i> ) Removal and Repair .....  | 7-30        |
| <i>a.</i> Removal of Major Units .....   | 7-8         | ( <i>b.</i> ) Replacement and Adjust-<br>ments .....                                    | 7-30        |
| <i>b.</i> Replacement of Major Units .....   | 7-8         | <i>n.</i> Electronic Frequency Converter, Unit 6<br>(Z-2204), Trouble Shooting .....    | 7-30        |
| 5. Radio Frequency Oscillator O-275/SRT<br>(RFO), Trouble Shooting .....             | 7-8         | <i>o.</i> Electronic Frequency Converter, Unit 6<br>(Z-2204) Repair and Adjustment .... | 7-31        |
| <i>a.</i> RFO Mounting, Unit 14 (Z-2901),<br>Trouble Shooting .....                  | 7-12        | (1) Electrical Adjustments .....  | 7-31        |
| <i>b.</i> RFO Mounting, Unit 14 (Z-2901), Re-<br>pair and Adjustment .....           | 7-12        | ( <i>a.</i> ) R-2210 Adjustment .....   | 7-31        |
| (1) Electrical Adjustments .....   | 7-12        | ( <i>b.</i> ) C-2219 Adjustment .....   | 7-31        |
| (2) Mechanical Adjustments .....   | 7-13        | ( <i>c.</i> ) T-2202 Adjustment .....   | 7-32        |
| ( <i>a.</i> ) Removal and Repair .....   | 7-13        | ( <i>d.</i> ) Step Oscillator S-2201 Ad-<br>justments .....                             | 7-32        |
| ( <i>b.</i> ) Replacement and Adjust-<br>ments .....                                 | 7-14        | ( <i>e.</i> ) 10-Kc Step Filter Adjust-<br>ments .....                                  | 7-33        |
| <i>c.</i> Radio Frequency Oscillator, Unit 1<br>(Z-2001), Trouble Shooting .....     | 7-15        | ( <i>f.</i> ) T-2203, T-2204, T-2205 Ad-<br>justment .....                              | 7-34        |
| <i>d.</i> Radio Frequency Oscillator, Unit 1<br>(Z-2001), Repair and Adjustment .... | 7-18        | ( <i>g.</i> ) 10-Kc Trap Adjustment .....   | 7-34        |
| (1) Electrical Adjustments .....   | 7-18        | (2) Mechanical Adjustments .....  | 7-38        |
| (2) Mechanical Adjustments .....   | 7-18        | ( <i>a.</i> ) Removal and Repair .....  | 7-38        |
| ( <i>a.</i> ) Removal and Repair .....   | 7-18        | ( <i>b.</i> ) Replacement and Adjust-<br>ments .....                                    | 7-38        |
| ( <i>b.</i> ) Replacement and Adjust-<br>ments .....                                 | 7-20        | <i>p.</i> Frequency Multiplier, Unit 7 (Z-2305),<br>Trouble Shooting .....              | 7-38        |
| <i>e.</i> Frequency Multiplier, Unit 2 (Z-2034),<br>Trouble Shooting .....           | 7-20        | <i>q.</i> Frequency Multiplier, Unit 7 (Z-2305),<br>Repair and Adjustments .....        | 7-38        |
| <i>f.</i> Frequency Multiplier, Unit 2 (Z-2034),<br>Repair and Adjustment .....      | 7-20        | (1) Electrical Adjustments .....  | 7-38        |
| (1) Electrical Adjustments .....   | 7-20        | (2) Mechanical Adjustments .....  | 7-41        |
| (2) Mechanical Adjustments .....   | 7-21        | ( <i>a.</i> ) Removal and Repair .....  | 7-41        |
| ( <i>a.</i> ) Removal and Repair .....   | 7-21        | ( <i>b.</i> ) Replacement and Adjust-<br>ments .....                                    | 7-41        |
| ( <i>b.</i> ) Replacement and Adjust-<br>ments .....                                 | 7-21        | <i>r.</i> Electronic Frequency Converter, Unit 8<br>(Z-2330), Trouble Shooting .....    | 7-41        |
| <i>g.</i> Radio Frequency Oscillator, Unit 3<br>(Z-2053), Trouble Shooting .....     | 7-21        | <i>s.</i> Electronic Frequency Converter, Unit 8<br>(Z-2330) Repair and Adjustment .... | 7-41        |
| <i>h.</i> Radio Frequency Oscillator, Unit 3<br>(Z-2053) Repair and Adjustment ....  | 7-21        | (1) Electrical Adjustments .....  | 7-41        |
| (1) Electrical Adjustments .....   | 7-21        | ( <i>a.</i> ) C-2339 Adjustment .....   | 7-41        |
| (2) Mechanical Adjustments .....   | 7-25        | ( <i>b.</i> ) T-2326 Adjustment .....   | 7-42        |
| ( <i>a.</i> ) Removal and Repair .....   | 7-25        | ( <i>c.</i> ) S-2326 Step Oscillator Ad-<br>justments .....                             | 7-42        |
| ( <i>b.</i> ) Replacement and Adjust-<br>ments .....                                 | 7-26        | ( <i>d.</i> ) S-2326 Step Filter Adjust-<br>ments .....                                 | 7-43        |
| <i>i.</i> Frequency Multiplier, Unit 4 (Z-2103),<br>Trouble Shooting .....           | 7-26        | ( <i>e.</i> ) Z-2327, Z-2328 and Z-2329<br>Adjustments .....                            | 7-43        |
| <i>k.</i> Frequency Multiplier, Unit 4 (Z-2103)<br>Repair and Adjustment .....       | 7-27        | ( <i>f.</i> ) 100-Kc Trap Adjustment ....   | 7-44        |
| (1) Electrical Adjustments .....   | 7-27        |   |             |
| (2) Mechanical Adjustments .....   | 7-28        |   |             |

**TABLE OF CONTENTS (Cont'd)**

| <i>Paragraph</i>   | <i>Page</i> | <i>Paragraph</i>  | <i>Page</i> |
|--|-------------|---|-------------|
| (2) Mechanical Adjustments .....   | 7-44        | (1) Electrical Adjustments .....  | 7-63        |
| (a) Removal and Repair .....   | 7-44        | (a) F.S.O. ZERO ADJ.<br>(R-2916) Adjustment ....                          | 7-64        |
| (b) Replacement and Adjust-<br>ments .....   | 7-44        | (b) F.S.O. RANGE ADJ.<br>(R-2919) Adjustment ....                         | 7-65        |
| t. Electronic Frequency Converter, Unit 9<br>(Z-2426), Trouble Shooting .....              | 7-45        | (c) T-2126 Adjustment .....   | 7-67        |
| u. Electronic Frequency Converter, Unit 9<br>(Z-2426), Repair and Adjustment ....          | 7-45        | (2) Mechanical Adjustments .....  | 7-67        |
| (1) Electrical Adjustments .....   | 7-45        | (a) Removal and Repair .....  | 7-67        |
| (2) Mechanical Adjustments .....   | 7-47        | (b) Replacement and Adjust-<br>ments .....                                | 7-67        |
| (a) Removal and Repair .....   | 7-47        | ff. Control-Indicator C-1352/SRT, Trouble<br>Shooting .....               | 7-67        |
| (b) Replacement and Adjust-<br>ments .....   | 7-49        | gg. Control-Indicator, C-1352/SRT, Repair<br>and Adjustment .....         | 7-67        |
| v. Frequency Multiplier, Unit 10 (Z-2526),<br>Trouble Shooting .....                       | 7-49        | (1) Electrical Adjustments .....  | 7-67        |
| w. Frequency Multiplier, Unit 10 (Z-<br>2526) Repair and Adjustment .....                  | 7-49        | (2) Mechanical Adjustments .....  | 7-68        |
| (1) Electrical Adjustments .....   | 7-49        | (a) Removal and Repair .....  | 7-68        |
| (2) Mechanical Adjustments .....   | 7-51        | (b) Replacement and Adjust-<br>ments .....                                | 7-68        |
| (a) Removal and Repair .....   | 7-51        | 6. Radio Modulator MD-229/SRT, Low Level<br>Radio Modulator (LLRM) .....  | 7-68        |
| (b) Replacement and Adjust-<br>ments .....   | 7-51        | a. Trouble Shooting .....   | 7-68        |
| x. Electronic Frequency Converter, Unit<br>11A (Z-2626), Trouble Shooting .....            | 7-52        | (1) Audio Circuits .....  | 7-68        |
| y. Electronic Frequency Converter, Unit<br>11A (Z-2626), Repair and Adjust-<br>ment .....  | 7-52        | (2) Keying Circuits .....   | 7-72        |
| (1) Electrical Adjustments .....   | 7-52        | (3) Power Supply Circuits .....   | 7-72        |
| (2) Mechanical Adjustments .....   | 7-52        | b. Repair and Adjustment .....  | 7-73        |
| (a) Removal and Repair .....   | 7-52        | (1) Electrical Adjustments .....  | 7-73        |
| (b) Replacement and Adjust-<br>ments .....   | 7-53        | (a) Audio Circuits .....  | 7-73        |
| z. Electronic Frequency Converter, Unit<br>11B (Z-2651) Trouble Shooting .....             | 7-53        | 1. CLIPPER SYM. Control .....   | 7-73        |
| aa. Electronic Frequency Converter, Unit<br>11B (Z-2651), Repair and Adjust-<br>ment ..... | 7-53        | 2. GAIN TO CLIP (M) and<br>SQUELCH TRIG. (L)<br>Controls .....            | 7-73        |
| (1) Electrical Adjustments .....   | 7-53        | 3. 500 W. AUDIO LEVEL<br>Control .....                                    | 7-74        |
| (2) Mechanical Adjustments .....   | 7-56        | (b) Keying Circuits .....   | 7-74        |
| (a) Removal and Repair .....   | 7-56        | 1. Neutral Polar Mark and<br>Space Controls .....                         | 7-74        |
| (b) Replacement and Adjust-<br>ment .....  | 7-56        | 2. (+) LIMIT and (-)<br>LIMIT Controls .....                              | 7-75        |
| bb. Electronic Frequency Converter, Unit<br>11C (Z-2801) Trouble Shooting .....            | 7-56        | 3. ZERO ADJ. Control ....   | 7-75        |
| cc. Electronic Frequency Converter, Unit<br>11C (Z-2801), Repair and Adjust-<br>ment ..... | 7-57        | 4. AUDIO OSC. FEED-<br>BACK Control .....                                 | 7-76        |
| (1) Electrical Adjustments .....   | 7-57        | 5. TIME CONST ADJ.<br>Control .....                                       | 7-76        |
| (2) Mechanical Adjustments .....   | 7-61        | (c) Power Supply Circuits .....   | 7-76        |
| (a) Removal and Repair .....   | 7-61        | 1. 250 V.P.S. Control .....   | 7-76        |
| (b) Replacement and Adjust-<br>ments .....   | 7-61        | 2. -12-Volt Supply .....  | 7-77        |
| dd. Radio Frequency Oscillator, Unit 12<br>(Z-2127), Trouble Shooting .....                | 7-63        | (2) Mechanical Adjustments .....  | 7-77        |
| ee. Radio Frequency Oscillator, Unit 12<br>(Z-2127), Repair and Adjustment ....            | 7-63        | (a) Removal and Repair .....  | 7-77        |
|  |             | (b) Replacement and Adjust-<br>ments .....                                | 7-77        |
|  |             | 7. Radio Modulator MD-230/SRT, High Level<br>Radio Modulator (HLRM) ..... | 7-77        |
|  |             | a. Trouble Shooting .....   | 7-77        |
|  |             | b. Repair and Adjustments .....   | 7-79        |
|  |             | (1) Electrical Adjustments .....  | 7-79        |

## TABLE OF CONTENTS (Cont'd)

| <i>Paragraph</i>  | <i>Page</i> | <i>Paragraph</i>  | <i>Page</i> |
|---|-------------|---|-------------|
| (2) Mechanical Adjustments .....  | 7-79        | 9. Power Supply PP-1094/SRT, Low Voltage<br>Power Supply (LVPS) .....             | 7-95        |
| (a) Removal and Repair .....  | 7-79        | a. Trouble Location .....   | 7-95        |
| (b) Replacements and Adjust-<br>ments .....                             | 7-79        | b. Repair and Adjustment .....  | 7-95        |
| 8. Radio Frequency Amplifier AM-1008/SRT<br>(RFA) .....                 | 7-81        | (1) Electrical Adjustments .....  | 7-95        |
| a. Trouble Shooting .....   | 7-81        | (2) Mechanical Adjustments .....  | 7-95        |
| b. Repair and Adjustment .....  | 7-82        | (a) Removal and Repair .....  | 7-95        |
| (1) Electrical Adjustments .....  | 7-82        | (b) Replacements .....  | 7-97        |
| (a) Buffer and IPA Circuits .....                                       | 7-82        | 10. Power Supply PP-1095/SRT, Medium Volt-<br>age Power Supply (MVPS) .....       | 7-97        |
| 1. 19- to 26-Mc Band Ad-<br>justments .....                             | 7-82        | a. Trouble Location .....   | 7-97        |
| 2. 11- to 19-Mc Band Ad-<br>justments .....                             | 7-83        | b. Repair and Adjustment .....  | 7-97        |
| 3. 5- to 11-Mc Band Ad-<br>justments .....                              | 7-84        | (1) Electrical Adjustments .....  | 7-97        |
| 4. 2- to 5-Mc Band Adjust-<br>ments .....                               | 7-86        | (2) Mechanical Adjustments .....  | 7-99        |
| 5. 0.3- to 0.8-Mc and 0.8-<br>to 2-Mc Band Adjust-<br>ment .....        | 7-86        | (a) Removal and Repair .....  | 7-99        |
| (b) PA Circuit .....  | 7-86        | (b) Replacement .....   | 7-99        |
| 1. C-1319, C-1320, C-1321<br>Adjustments .....                          | 7-86        | 11. Power Supply PP-1096/SRT, High Voltage<br>Power Supply (HVPS) .....           | 7-99        |
| 2. R-1345, R-1348 Adjust-<br>ment .....                                 | 7-86        | a. Trouble Location .....   | 7-99        |
| 3. Harmonic Trap Adjust-<br>ment .....                                  | 7-87        | b. Repair and Adjustment .....  | 7-99        |
| 4. L-1339, L-1340, L-1341<br>L-1342, L-1329 and<br>L-1331 Adjustment .. | 7-88        | (1) Electrical Adjustments .....  | 7-99        |
| 5. C-1319 Coupling Ad-<br>justment .....                                | 7-88        | (2) Mechanical Adjustments .....  | 7-99        |
| (2) Mechanical Adjustments .....  | 7-89        | (a) Removal and Repair .....  | 7-99        |
| (a) Removal and Repair .....  | 7-89        | (b) Replacement .....   | 7-99        |
| 1. C-1319, C-1320 and<br>C-1321 .....                                   | 7-89        | 12. Mounting MT-1423/SRT (Base Mount) ...   | 7-99        |
| 2. L-1329, L-1331, L-<br>1339, L-1340, L-1341<br>and L-1342 .....       | 7-91        | a. Trouble Location .....   | 7-99        |
| 3. IPA Dial Drive Assem-<br>bly .....                                   | 7-91        | b. Repair and Adjustment .....  | 7-101       |
| 4. PA Dial Drive Assem-<br>bly .....                                    | 7-91        | (1) Electrical Adjustments .....  | 7-101       |
| 5. Harmonic Trap Capaci-<br>tor C-1323 .....                            | 7-92        | (2) Mechanical Adjustments .....  | 7-101       |
| 6. PA Tuning Counter-<br>balance Assembly .....                         | 7-93        | (a) Removal and Repair .....  | 7-101       |
| 7. Right Angle Drive As-<br>sembly .....                                | 7-93        | (b) Replacement .....   | 7-101       |
| 8. Bandswitches S-130 1<br>and S-1302 .....                             | 7-93        | 13. Cabinet, Electrical Equipment CY-1571/<br>SRT (100-Watt Frame Assembly) ..... | 7-101       |
| 9. Blower Motor B-1306 ..   | 7-95        | a. Trouble Location .....   | 7-101       |
| 10. IPA Subassembly .....   | 7-95        | b. Repair and Adjustment .....  | 7-105       |
| (b) Replacement and Adjust-<br>ments .....                              | 7-95        | (1) Electrical Adjustments .....  | 7-105       |
|   |             | (2) Mechanical Adjustments .....  | 7-105       |
|   |             | (a) Removal and Repair .....  | 7-105       |
|   |             | (b) Replacement .....   | 7-105       |
|   |             | 14. Cabinet, Electrical Equipment CY-1572/<br>SRT (HLRM Cabinet) .....            | 7-105       |
|   |             | a. Trouble Location .....   | 7-105       |
|   |             | b. Repair and Adjustment .....  | 7-105       |
|   |             | (1) Electrical Adjustments .....  | 7-105       |
|   |             | (2) Mechanical Adjustments .....  | 7-105       |
|   |             | (a) Removal and Repair .....  | 7-105       |
|   |             | (b) Replacement .....   | 7-107       |
|   |             | 15. Cabinet, Electrical Equipment CY-1573/<br>SRT (HVPS Cabinet) .....            | 7-107       |
|   |             | a. Trouble Location .....   | 7-107       |
|   |             | b. Repair and Adjustment .....  | 7-107       |
|   |             | (1) Electrical Adjustments .....  | 7-107       |
|   |             | (2) Mechanical Adjustments .....  | 7-107       |
|   |             | (a) Removal and Repair .....  | 7-107       |
|   |             | (b) Replacement .....   | 7-107       |

**TABLE OF CONTENTS (Cont'd)**

| <i>Paragraph</i>   | <i>Page</i> | <i>Paragraph</i>   | <i>Page</i> |
|--|-------------|--|-------------|
| 16. Antenna Tuning Equipment .....   | 7-107       | (c) Bypass Section Alignment ....  | 7-118       |
| a. System Trouble Shooting .....   | 7-107       | (d) Loading Section Alignment .....  | 7-121       |
| b. Test and Alignment .....  | 7-108       | (e) Purging and Pressurizing ....  | 7-121       |
| 17. Transmitter Coupler CU-402/SRT (Load<br>Adjust Unit) .....   | 7-108       | 19. Radio Frequency Tuner TN-229/SRT .....   | 7-121       |
| a. Trouble Location .....  | 7-108       | a. Trouble Location .....  | 7-121       |
| (1) Electrical Adjustments .....   | 7-109       | (1) General .....  | 7-121       |
| (a) Voltage Divider R-3201 ....  | 7-110       | (2) Trouble-Shooting the Main Drive<br>Assembly of the R-f Tuner ....                | 7-122       |
| (b) R-3206 and R-3207 .....  | 7-110       | (3) Trouble-Shooting the Impedance<br>Transformer Switch S-308 ....                  | 7-122       |
| (c) Transformer T-3202 Load-<br>ing Circuit, (R-3202,<br>R-3203 and R-3204,<br>R-3205) .....                                 | 7-111       | b. Repair and Adjustment .....   | 7-122       |
| (d) Matching Procedure for<br>Crystal Diodes .....   | 7-111       | (1) Electrical Adjustments .....   | 7-122       |
| (e) Final Test to Be Performed<br>when SWR Monitor Z-<br>3201 is Replaced in the<br>Transmitter Coupler CU-<br>402/SRT ..... | 7-111       | (2) Mechanical Adjustments .....   | 7-123       |
| (2) Mechanical Adjustments .....   | 7-112       | (a) Removal and Repair .....   | 7-123       |
| (a) Removal and Repair .....   | 7-112       | 1. Removal of Unit from<br>Shock Mount Bases ..                                      | 7-124       |
| (b) Replacement .....  | 7-112       | 2. Removal of Input End<br>(Bottom) Housing ....                                     | 7-124       |
| 18. Antenna Coupler CU-372/SRT .....   | 7-112       | 3. Removal of Output End<br>(Top) Housing .....                                      | 7-124       |
| a. Trouble Location .....  | 7-112       | 4. Removal of Components<br>in Drive Section .....                                   | 7-125       |
| (1) General .....  | 7-112       | 5. Removal and Disas-<br>sembly of Impedance<br>Transformer Switch<br>Assembly ..... | 7-125       |
| (2) Trouble-Shooting the Antenna<br>Coupler Bypass Section Switch<br>Assembly S-3514 and Switch<br>S-3512 .....              | 7-115       | 6. Removal of Shorting<br>Ring Assembly .....  | 7-126       |
| (3) Trouble Location of the Antenna<br>Coupler Loading Section Switch<br>Assembly S-3513, and Switch<br>S-3511 .....         | 7-115       | (b) Replacement and Adjust-<br>ments .....   | 7-126       |
| b. Repair and Adjustment .....   | 7-116       | 1. Clutch-Brake Unit Ad-<br>justment .....   | 7-126       |
| (1) Electrical Adjustments .....   | 7-116       | 2. Contacts, Bearings and<br>Gaskets .....   | 7-126       |
| (2) Mechanical Adjustments .....   | 7-116       | 3. Purging and Pressuriz-<br>ing .....   | 7-126       |
| (a) Removal and Repair .....   | 7-116       | 20. Maintenance of Relays .....  | 7-127       |
| 1. Removal of Unit from<br>Shock Mount Bases ....  | 7-116       | a. Contact Burnishing .....  | 7-127       |
| 2. Removal of Junction<br>Box .....  | 7-116       | b. Contact Cleaning .....  | 7-127       |
| 3. Removal of Housing ....   | 7-116       | 21. Component Characteristics .....  | 7-127       |
| 4. Removal of Loading<br>Section from Unit ....  | 7-117       | a. Electron Tubes .....  | 7-127       |
| 5. Disassembly of Bypass<br>Section .....  | 7-117       | b. Crystal Data .....  | 7-129       |
| 6. Disassembly of Loading<br>Section .....   | 7-117       | c. Winding Data .....  | 7-129       |
| 7. Removal of Vacuum<br>Capacitor C-3501 and<br>Coil L-3503 .....  | 7-118       | d. Emergency Measures .....  | 7-129       |
| (b) Replacement and Adjust-<br>ments .....   | 7-118       | (1) Transformer Windings .....   | 7-129       |
|  |             | (2) Audio Transformers .....   | 7-129       |
|  |             | (3) Bridging Defective Stage .....   | 7-129       |
|  |             | (4) Fixed Resistors .....  | 7-129       |
|  |             | (5) Variable Resistors .....   | 7-130       |
|  |             | (6) Chokes and Coils .....   | 7-130       |
|  |             | (7) Tubes .....  | 7-130       |
|  |             | (8) INTERLOCK BATTLE SHORT .....   | 7-130       |
|  |             | (9) R-f Tuner Emergency Switches ...   | 7-130       |
|  |             | (a) Centrifugal Switch .....   | 7-130       |
|  |             | (b) Thermal Switch .....   | 7-130       |
|  |             | (10) Cheaters .....  | 7-130       |

## LIST OF ILLUSTRATIONS

| <i>Figure</i> | <i>Title</i>   | <i>Page</i> | <i>Figure</i> | <i>Title</i>   | <i>Page</i> |
|---------------|--|-------------|---------------|--|-------------|
| 7-1           | Radio Frequency Oscillator O-275/SRT, Block Diagram .....                                | 7-9         | 7-32          | RFO, Unit 7 (Z-2305), Top View .....                             | 7-38        |
| 7-2           | Typical Lissajous Patterns .....   | 7-10        | 7-33          | RFO, Unit 7 (Z-2305), Cover Removed, Bottom View .....           | 7-38        |
| 7-3           | Radio Frequency Oscillator O-275/SRT and Control-Indicator C-1352/SRT, Front Panel ..... | 7-11        | 7-34          | RFO, Unit 8 (Z-2330), Voltage and Resistance Chart .....         | 7-39, 7-40  |
| 7-4           | RFO, Unit 14 (Z-2901), Voltage and Resistance Chart .....                                | 7-12        | 7-35          | RFO, Unit 8 (Z-2330), Top View .....                             | 7-42        |
| 7-5           | RFO, Unit 14 (Z-2901) Right Side View, Units Removed .....                               | 7-13        | 7-36          | RFO, Unit 8 (Z-2330), Covers Removed, Bottom View .....          | 7-43        |
| 7-6           | Radio Frequency Oscillator O-275/SRT, Covers Removed, Left Side View .....               | 7-14        | 7-37          | RFO, Unit 9 (Z-2426), Cover Removed, Left View .....             | 7-45        |
| 7-7           | Radio Frequency Oscillator O-275/SRT, Covers Removed, Right Side View .....              | 7-15        | 7-38          | RFO, Unit 9 (Z-2426), Covers Removed, Right View .....           | 7-47        |
| 7-8           | Radio Frequency Oscillator O-275/SRT, Covers Removed, Top View .....                     | 7-16        | 7-39          | RFO, Unit 9 (Z-2426), Voltage and Resistance Chart .....         | 7-48        |
| 7-9           | Radio Frequency Oscillator O-275/SRT, Bottom View .....                                  | 7-16        | 7-40          | RFO, Unit 10 (Z-2526), Voltage and Resistance Chart .....        | 7-50        |
| 7-10          | Radio Frequency Oscillator O-275/SRT, Front Panel Removed, Chain Drives ..               | 7-17        | 7-41          | RFO, Unit 10 (Z-2526), Covers Removed, Bottom Oblique View ..... | 7-52        |
| 7-11          | RFO, Unit 1 (Z-2001), Voltage and Resistance Chart .....                                 | 7-19        | 7-42          | RFO, Unit 10 (Z-2526), Covers Removed, Right View .....          | 7-53        |
| 7-12          | RFO, Unit 1 (Z-2001), Top View .....   | 7-20        | 7-43          | RFO, Unit 11A (Z-2626), Voltage and Resistance Chart .....       | 7-54        |
| 7-13          | RFO Frequency Check, Test Setup .....  | 7-20        | 7-44          | RFO, Unit 11A (Z-2626), Top View ...                             | 7-55        |
| 7-14          | RFO, Unit 1 (Z-2001), Cover Removed, Bottom View .....                                   | 7-21        | 7-45          | RFO, Unit 11A (Z-2626), Cover Removed, Bottom View .....         | 7-55        |
| 7-15          | RFO, Unit 2 (Z-2034), Voltage and Resistance Chart .....                                 | 7-22        | 7-46          | RFO, Unit 11B (Z-2651), Voltage and Resistance Chart .....       | 7-58        |
| 7-16          | RFO, Unit 2 (Z-2034), Top View .....   | 7-23        | 7-47          | RFO, Unit 11B (Z-2651), Covers Removed, Top Oblique View .....   | 7-59        |
| 7-17          | RFO, Unit 2 (Z-2034), Cover Removed, Bottom View .....                                   | 7-23        | 7-48          | RFO, Unit 11B (Z-2651), Covers Removed, Right View .....         | 7-60        |
| 7-18          | RFO, Unit 3 (Z-2053), Top Oblique View .....   | 7-23        | 7-49          | RFO, Unit 11C (Z-2801), Voltage and Resistance Chart .....       | 7-62        |
| 7-19          | RFO, Unit 3 (Z-2053), Right Side View ..   | 7-24        | 7-50          | RFO, Unit 11C (Z-2801), Covers Removed, Left View .....          | 7-63        |
| 7-20          | RFO, Unit 3 (Z-2053), Tube Shelf, Wiring Side .....                                      | 7-25        | 7-51          | RFO, Unit 11C (Z-2801), Cover Removed, Right View .....          | 7-64        |
| 7-21          | RFO, Unit 3 (Z-2053), Voltage and Resistance Chart .....                                 | 7-26        | 7-52          | RFO, Unit 12 (Z-2127), Top View .....                            | 7-65        |
| 7-22          | RFO, Unit 4 (Z-2103), Voltage and Resistance Chart .....                                 | 7-27        | 7-53          | RFO, Unit 12 (Z-2127), Bottom View ..                            | 7-65        |
| 7-23          | RFO, Unit 4 (Z-2103), Top View .....   | 7-28        | 7-54          | RFO, Unit 12 (Z-2127), Voltage and Resistance Chart .....        | 7-66        |
| 7-24          | RFO, Unit 4 (Z-2103), Cover Removed, Bottom View .....                                   | 7-28        | 7-55          | Control-Indicator C-1352/SRT, Inner View .....                   | 7-68        |
| 7-25          | RFO, Unit 5 (Z-2158), Voltage and Resistance Chart .....                                 | 7-29        | 7-56          | LLRM, Voltage and Resistance Chart .....                         | 7-69, 7-70  |
| 7-26          | RFO, Unit 5 (Z-2158), Top View .....   | 7-30        | 7-57          | Typical Percentage Modulation Patterns ..                        | 7-71        |
| 7-27          | RFO, Unit 5 (Z-2158), Cover Removed, Bottom View .....                                   | 7-31        | 7-58          | Radio Modulator MD-229/SRT (LLRM), Top View .....                | 7-74        |
| 7-28          | RFO, Unit 6 (Z-2204), S-2201 Cover Removed, Top View .....                               | 7-32        | 7-59          | Radio Modulator MD-229/SRT (LLRM), Bottom View .....             | 7-75        |
| 7-29          | RFO, Unit 6 (Z-2204), Cover Removed, Bottom View .....                                   | 7-33        | 7-60          | Symmetrical Clipping Waveform .....                              | 7-76        |
| 7-30          | RFO, Unit 6 (Z-2204), Voltage and Resistance Chart .....                                 | 7-35, 7-36  | 7-61          | LLRM Test Circuit for Simulating Keying Signals .....            | 7-76        |
| 7-31          | RFO, Unit 7 (Z-2305), Voltage and Resistance Chart .....                                 | 7-37        | 7-62          | Radio Modulator MD-229/SRT (LLRM), Front Panel .....             | 7-77        |

**LIST OF ILLUSTRATIONS (Cont'd)**

| <i>Figure</i> | <i>Title</i>   | <i>Page</i>  | <i>Figure</i> | <i>Title</i>  | <i>Page</i>  |
|---------------|--|--------------|---------------|---|--------------|
| 7-63          | Radio Modulator MD-229/SRT Unit Adjustments, Door Opened .....                                       | 7-78         | 7-92          | Electrical Equipment Cabinet CY-1572/SRT (HLRM Frame), Side Covers Removed, Top View .....                | 7-109        |
| 7-64          | Radio Modulator MD-230/SRT (HLRM), Top View .....  | 7-78         | 7-93          | Electrical Equipment Cabinet CY-1573/SRT (HVPS Frame), Side Covers Removed, Top View .....                | 7-110        |
| 7-65          | Radio Modulator MD-230/SRT (HLRM), Front panel .....   | 7-79         | 7-94          | Transmitter Coupler CU-402/SRT, Side Covers Removed, Right Inner View ..                                  | 7-110        |
| 7-66          | HLRM Voltage and Resistance Chart ....   | 7-80         | 7-95          | Standing Wave Ratio (SWR) Monitor Alignment, Test Setup .....   | 7-111        |
| 7-67          | Radio Frequency Amplifier AM-1008/SRT (RFA), Block Diagram .....                                     | 7-82         | 7-96          | Crystal Matching, Test Setup .....  | 7-112        |
| 7-68          | Radio Frequency Amplifier AM-1008/SRT (RFA), Top View .....  | 7-83         | 7-97          | Antenna Coupler CU-372/SRT, with Housing and Shock Mounts .....   | 7-112        |
| 7-69          | Radio Frequency Amplifier AM-1008/SRT (RFA), Right View, Cover Removed from IPA Subassembly .....    | 7-84         | 7-98          | Antenna Coupler CU-372/SRT, Mechanical Drives .....   | 7-113, 7-114 |
| 7-70          | RFA Voltage and Resistance Chart .....   | 7-85         | 7-99          | Antenna Coupler CU-372/SRT, Junction Box Assembly .....   | 7-115        |
| 7-71          | Radio Frequency Amplifier AM-1008/SRT (RFA), Left View .....   | 7-86         | 7-100         | Antenna Coupler CU-372/SRT, Less Housing .....  | 7-116        |
| 7-72          | Radio Frequency Amplifier AM-1008/SRT (RFA), Bottom View .....                                       | 7-87         | 7-101         | Cross Section of S-3514 Assembly .....  | 7-117        |
| 7-73          | Radio Frequency Amplifier AM-1008/SRT (RFA), Front Panel .....                                       | 7-88         | 7-102         | Antenna Coupler CU-372/SRT, Loading Section .....   | 7-117        |
| 7-74          | RFA, S-1302 Bandswitch Assembly, Left Oblique View .....   | 7-89         | 7-103         | R-f Tuner TN-229/SRT, with Housing and Shock Mounts .....   | 7-118        |
| 7-75          | RFA, Power Amplifier (PA), Mechanical Drive System .....   | 7-90         | 7-104         | R-f Tuner, Test Setup .....   | 7-118        |
| 7-76          | RFA, Intermediate Power Amplifier (IPA), Mechanical Drive System .....                               | 7-91         | 7-105         | R-f Tuner TN-229/SRT, Mechanical Drives .....   | 7-119, 7-120 |
| 7-77          | RFA, S-1301 and S-1302 Bandswitch, Mechanical Drive System .....                                     | 7-92         | 7-106         | R-f Tuner TN-229/SRT, Less Housing .....  | 7-122        |
| 7-78          | LVPS, Voltage and Resistance Chart ....  | 7-94         | 7-107         | R-f Tuner TN-229/SRT, Drive Section, Clutch Side .....  | 7-123        |
| 7-79          | Power Supply PP-1094/SRT (LVPS), Front Panel .....   | 7-96         | 7-108         | R-f Tuner TN-229/SRT, Drive Section, Air Duct Side .....  | 7-123        |
| 7-80          | Power Supply PP-1094/SRT (LVPS), Top View .....  | 7-98         | 7-109         | Typical Pressurization and Purging Setup .....  | 7-124        |
| 7-81          | Power Supply PP-1094/SRT (LVPS), Bottom View .....   | 7-98         | 7-110         | Bridging Defective Transformer Winding .....  | 7-127        |
| 7-82          | Power Supply PP-1095/SRT (MVPS), Front Panel .....   | 7-100        | 7-111         | Alternate Method of Bridging Transformer Windings .....   | 7-129        |
| 7-83          | Power Supply PP-1095/SRT (MVPS), Top View .....  | 7-100        | 7-112         | Emergency Repair of Audio Transformer .....   | 7-129        |
| 7-84          | Power Supply PP-1095/SRT (MVPS), Bottom View .....   | 7-101        | 7-113         | Bypassing a Defective Stage .....   | 7-130        |
| 7-85          | MVPS, Voltage and Resistance Chart ....  | 7-102        | 7-114         | Transmitter Group OA-684/SRT and Mounting MT-1423/SRT, Control Circuits, Simplified Schematic .....       | 7-161        |
| 7-86          | HVPS, Voltage and Resistance Chart .....   | 7-103, 7-104 | 7-115         | Modulator Power Supply Group OA-685/SRT, Control Circuits, Simplified Schematic .....                     | 7-163        |
| 7-87          | Power Supply PP-1096/SRT (HVPS), Front Panel .....   | 7-105        | 7-116         | Antenna Coupler CU-372/SRT, and R-f Tuner TN-229/SRT, Control Circuits, Simplified Schematic .....        | 7-165        |
| 7-88          | Power Supply PP-1096/SRT (HVPS), Top View .....  | 7-106        | 7-117         | Primary Power Distribution Diagram, Transmitter Group and Mounting, AN/SRT-14, 15 and 16. ....            | 7-167        |
| 7-89          | Mounting MT-1423/SRT, Top View ....  | 7-106        | 7-118         | Primary Power Distribution Diagram, Modulator Power Supply Group and Mounting, AN/SRT-14, 15 and 16. .... | 7-169        |
| 7-90          | Electrical Equipment Cabinet CY-1571/SRT (100 W. Frame), Units Removed, Front View .....             | 7-107        |               |   |              |
| 7-91          | Electrical Equipment Cabinet CY-1571/SRT (100 W. Frame), Cover Removed Showing Terminal Boards ..... | 7-109        |               |   |              |



## LIST OF ILLUSTRATIONS (Cont'd)

| <i>Figure</i> | <i>Title</i>   | <i>Page</i>  | <i>Figure</i> | <i>Title</i>   | <i>Page</i>         |
|---------------|--|--------------|---------------|--|---------------------|
| 7-119         | Primary Power Distribution Diagram, Antenna Tuning Equipment, AN/SRT-14, 15 and 16 .....     | 7-171        | 7-151         | Control-Indicator C-1352/SRT, Schematic Diagram .....                              | 7-234               |
| 7-120         | Radio Frequency Oscillator O-275/SRT (RFO), Simplified Trouble Location, Block Diagram ..... | 7-173        | 7-152         | Control-Indicator C-1352/SRT, Wiring Diagram .....                                 | 7-235               |
| 7-121         | RFO, Unit 14 (Z-2901), Schematic Diagram .....   | 7-175        | 7-153         | Radio Modulator MD-229/SRT (LLRM), Schematic Diagram .....                         | 7-237               |
| 7-122         | RFO, Unit 14 (Z-2901), Wiring Diagram (Sheets 1 and 2) .....                                 | 7-177, 7-179 | 7-154         | Radio Modulator MD-229/SRT (LLRM), Wiring Diagram (Sheets 1, 2 and 3) .....        | 7-239, 7-241, 7-243 |
| 7-123         | RFO, Unit 1 (Z-2001), Schematic Diagram .....  | 7-181        | 7-155         | Radio Modulator MD-229/SRT (LLRM), Servicing Block Diagram .....                   | 7-245               |
| 7-124         | RFO, Unit 1 (Z-2001), Wiring Diagram .....   | 7-183        | 7-156         | Radio Modulator MD-230/SRT (HLRM), Schematic Diagram .....                         | 7-247               |
| 7-125         | RFO, Unit 2 (Z-2034), Schematic Diagram .....  | 7-185        | 7-157         | Radio Modulator MD-230/SRT (HLRM), Wiring Diagram .....                            | 7-249               |
| 7-126         | RFO, Unit 2 (Z-2034), Wiring Diagram .....   | 7-187        | 7-158         | Radio Frequency Amplifier AM-1008/SRT (RFA), Schematic Diagram .....               | 7-251               |
| 7-127         | RFO, Unit 3 (Z-2053), Schematic Diagram .....  | 7-189        | 7-159         | Radio Frequency Amplifier AM-1008/SRT (RFA), Wiring Diagram (Sheets 1 and 2) ..... | 7-253, 7-255        |
| 7-128         | RFO, Unit 3 (Z-2053), Wiring Diagram .....   | 7-191        | 7-160         | Power Supply PP-1094/SRT (LVPS), Schematic Diagram .....                           | 7-257               |
| 7-129         | RFO, Unit 4 (Z-2103), Schematic Diagram .....  | 7-193        | 7-161         | Power Supply PP-1094/SRT (LVPS), Wiring Diagram .....                              | 7-259               |
| 7-130         | RFO, Unit 4 (Z-2103), Wiring Diagram .....   | 7-194        | 7-162         | Power Supply PP-1095/SRT (MVPS), Schematic Diagram .....                           | 7-261               |
| 7-131         | RFO, Unit 5 (Z-2158), Schematic Diagram .....  | 7-195        | 7-163         | Power Supply PP-1095/SRT (MVPS), Wiring Diagram .....                              | 7-263               |
| 7-132         | RFO, Unit 5 (Z-2158), Wiring Diagram .....   | 7-197        | 7-164         | Power Supply PP-1096/SRT (HVPS), Schematic Diagram .....                           | 7-265               |
| 7-133         | RFO, Unit 6 (Z-2204), Schematic Diagram .....  | 7-199        | 7-165         | Power Supply PP-1096/SRT (HVPS), Wiring Diagram .....                              | 7-267               |
| 7-134         | RFO, Unit 6 (Z-2204), Wiring Diagram .....   | 7-201        | 7-166         | Mounting MT-1423/SRT, Schematic Diagram .....                                      | 7-269               |
| 7-135         | RFO, Unit 7 (Z-2305), Schematic Diagram .....  | 7-203        | 7-167         | Electrical Equipment Cabinet CY-1571/SRT (100 W. Frame), Wiring Diagram .....      | 7-271               |
| 7-136         | RFO, Unit 7 (Z-2305), Wiring Diagram .....   | 7-205        | 7-168         | Electrical Equipment Cabinet CY-1572/SRT (HLRM Frame), Wiring Diagram .....        | 7-273               |
| 7-137         | RFO, Unit 8 (Z-2330), Schematic Diagram .....  | 7-207        | 7-169         | Electrical Equipment Cabinet CY-1573/SRT (HVPS Frame), Wiring Diagram .....        | 7-275               |
| 7-138         | RFO, Unit 8 (Z-2330), Wiring Diagram .....   | 7-209        | 7-170         | Antenna Coupler CU-372/SRT, Schematic Diagram .....                                | 7-277               |
| 7-139         | RFO, Unit 9 (Z-2426), Schematic Diagram .....  | 7-211        | 7-171         | Antenna Coupler CU-372/SRT, Wiring Diagram (Sheets 1 and 2) .....                  | 7-279, 7-281        |
| 7-140         | RFO, Unit 9 (Z-2426), Wiring Diagram .....   | 7-213        | 7-172         | R-f Tuner TN-229/SRT, Schematic Diagram .....                                      | 7-282               |
| 7-141         | RFO, Unit 10 (Z-2526), Schematic Diagram .....   | 7-215        | 7-173         | R-f Tuner TN-229/SRT, Wiring Diagram .....   | 7-283               |
| 7-142         | RFO, Unit 10 (Z-2526), Wiring Diagram .....  | 7-217        | 7-174         | Transmitter Coupler CU-402/SRT, Schematic Diagram .....                            | 7-285               |
| 7-143         | RFO, Unit 11A (Z-2626), Schematic Diagram .....  | 7-219        | 7-175         | Transmitter Coupler CU-402/SRT, Wiring Diagram .....                               | 7-286               |
| 7-144         | RFO, Unit 11A (Z-2626), Wiring Diagram .....   | 7-221        |               |  |                     |
| 7-145         | RFO, Unit 11B (Z-2651), Schematic Diagram .....  | 7-223        |               |  |                     |
| 7-146         | RFO, Unit 11B (Z-2651), Wiring Diagram .....   | 7-225        |               |  |                     |
| 7-147         | RFO, Unit 11C (Z-2801), Schematic Diagram .....  | 7-227        |               |  |                     |
| 7-148         | RFO, Unit 11C (Z-2801), Wiring Diagram .....   | 7-229        |               |  |                     |
| 7-149         | RFO, Unit 12 (Z-2127), Schematic Diagram .....   | 7-231        |               |  |                     |
| 7-150         | RFO, Unit 12 (Z-2127), Wiring Diagram .....  | 7-233        |               |  |                     |

**LIST OF TABLES**

| <i>Table No.</i> | <i>Title</i>  | <i>Page</i> | <i>Table No.</i> | <i>Title</i>   | <i>Page</i> |
|------------------|---|-------------|------------------|--|-------------|
| 7-1              | System Trouble-Shooting Chart .....   | 7-3         | 7-24             | Unit 11A, R-f Voltage at Test Points .....                                     | 7-52        |
| 7-2              | Preliminary RFO Check by Means of<br>External Oscilloscope .....                | 7-10        | 7-25             | Unit 11B, R-f Voltage at Test Points .....                                     | 7-53        |
| 7-3              | RFO Test Point Socket E-2919 .....  | 7-11        | 7-26             | Unit 11B, 100-Kc Step Filter Adjust-<br>ments .....                            | 7-56        |
| 7-4              | RFO Front Panel Control Knobs and<br>Respective Subunits .....                  | 7-13        | 7-27             | Unit 11B, 1-Mc Step Filter Adjustments ..                                      | 7-57        |
| 7-5              | Unit 1, R-f Voltage at Test Points .....  | 7-15        | 7-28             | Unit 11C, R-f Voltage at Test Points ....                                      | 7-57        |
| 7-6              | Unit 2, R-f Voltage at Test Points .....  | 7-20        | 7-29             | Unit 11C, 100-Kc Step Filter Adjust-<br>ments .....                            | 7-60        |
| 7-7              | Unit 3, S-2053 and AN/USM-29 10<br>Knob Positions and Adjustments .....         | 7-24        | 7-30             | Unit 11C, 1-Mc Step Filter Adjustments ..                                      | 7-61        |
| 7-8              | Unit 3, S-2052 and AN/USM-29 100<br>Knob Positions and Adjustments .....        | 7-25        | 7-31             | Indications of Failure and Probable<br>Faults in the LLRM Audio Circuits ....  | 7-72        |
| 7-9              | Unit 3, S-2051 and AN/USM-29 1K<br>Knob Positions and Adjustments .....         | 7-25        | 7-32             | Indications of Failure and Probable<br>Faults in the LLRM Keying Circuits .... | 7-73        |
| 7-10             | Unit 5, R-f Voltage at Test Points .....  | 7-28        | 7-33             | Indications of Failure and Probable<br>Faults in the LLRM Power Supplies ....  | 7-73        |
| 7-11             | Unit 6, R-f Voltage at Test Points .....  | 7-31        | 7-34             | Indications of Failure and Probable<br>Faults in the HLRM .....                | 7-79        |
| 7-12             | Unit 6, 10-Kc Step Oscillator Adjust-<br>ments .....                            | 7-33        | 7-35             | Typical RFA Test Meter Readings .....  | 7-81        |
| 7-13             | Unit 6, 10-Kc Step Filter Adjustments ....                                      | 7-34        | 7-36             | Indications of Failure and Probable<br>Faults in the LVPS .....                | 7-96        |
| 7-14             | Unit 7, R-f Voltage at Test Points .....  | 7-38        | 7-37             | Indications of Failure and Probable<br>Faults in the MVPS .....                | 7-97        |
| 7-15             | Unit 8, R-f Voltage at Test Points .....  | 7-41        | 7-38             | MVPS Voltages Measured at the RFA<br>Voltmeter .....                           | 7-97        |
| 7-16             | Unit 8, 100-Kc Step Oscillator Adjust-<br>ments .....                           | 7-43        | 7-39             | Indications of Failure and Probable<br>Faults in the HVPS .....                | 7-99        |
| 7-17             | Unit 8, 100-Kc Step Filter Adjustments ..                                       | 7-44        | 7-40             | Antenna Tuning Equipment Trouble-<br>Shooting Chart .....                      | 7-108       |
| 7-18             | Unit 9, R-f Voltage at Test Points .....  | 7-45        | 7-41             | R-f Tuner Trouble Location Chart .....   | 7-121       |
| 7-19             | RFO, Final Output Frequencies and (A),<br>(B), (F) and (G) Knob Positions ..... | 7-46        | 7-42             | Tube Characteristics .....   | 7-128       |
| 7-20             | Unit 9, 100-Kc Step Filter Adjustments  | 7-46        | 7-43             | Winding Data .....   | 7-131       |
| 7-21             | Unit 9, 5-Mc Step Filter Adjustments ....                                       | 7-49        |                  |  |             |
| 7-22             | Unit 10, R-f Voltage at Test Points .....                                       | 7-49        |                  |  |             |
| 7-23             | Unit 10, 1-Mc Step Filter Adjustments ....                                      | 7-51        |                  |  |             |

## SECTION 7

### CORRECTIVE MAINTENANCE

#### 1. INTRODUCTION.

This section contains information required for the repair of Radio Transmitting Sets AN/SRT-14, 15 and 16.

##### Note

The AN/SRT-14A, 15A and 16A are non-magnetic versions of the AN/SRT-14, 15 and 16 respectively. As the nonmagnetic versions vary from the standard types only in the material used for cabinet panels, all information on the corrective maintenance of the AN/SRT-14, 15 and 16, as set forth in the following section, applies equally as well for the AN/SRT-14A, 15A and 16A.

##### Note

Where, throughout this section, reference is made to either low level radio modulator or high level radio modulator, it should not be

interpreted as meaning the technique of modulation known as grid modulation or low level modulation, but rather as referring to the operating *power* level.

Maintenance personnel must be prepared to repair and align units that have failed in operation. The source of the trouble must be located, the defect remedied, and the equipment restored to operating condition. The following paragraphs describe the theory of localization of faults and system trouble-shooting procedures, and contain detailed instructions for trouble-shooting and repair of the various units of this equipment.

Maintenance personnel must try to find the source of the trouble causing equipment failure, particularly when the trouble is a recurrent one. The recurrence of a fault usually indicates that the *effect*, not the *cause*, has been remedied.

## FAILURE REPORTS

"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 nameplate), the type number and serial number of the major unit (from the major unit nameplate), and the type number and reference designation of the particular defective part (from the instruction book). Describe the cause of the failure completely, continuing on the back of the card if necessary. Do not substitute brevity for clarity. And remember — there are two sides to the failure report —

#### "YOUR SIDE"

Every FAILURE REPORT is a boost for you:

1. It shows that you are doing your job.
2. It helps make your job easier.
3. It insures available replacements.
4. It gives you a chance to pass your knowledge to every man on the team.

#### "NAVY SIDE"

The Bureau of Ships uses the information to:

1. Evaluate present equipment.
2. Improve future equipment.
3. Order replacements for stock.
4. Prepare field changes.
5. Publish the information.

Always keep a supply of failure report forms on board. You can get them from the nearest District Publications and Printing Office."

## WARNING

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OBSERVE SAFETY REGULATIONS AT ALL TIMES. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE ON. DO NOT USE "BATTLE SHORT" (U) FOR BYPASSING INTERLOCKS. NEVER MEASURE POTENTIALS IN EXCESS OF 1,000 VOLTS BY MEANS OF FLEXIBLE TEST LEADS OR PROBES.

### 2. THEORY OF LOCALIZATION.

The manner in which the equipment operates or fails to operate often indicates the source of trouble. Knowledge of the control circuits is most important for the localization of faults. Therefore, the technician should familiarize himself with the simplified power and control schematics, figures 7-114 through 7-119. The sequence of the operations that result in the establishment of a frequency is accompanied by visual panel indications.

The order in which the visual indications appear is shown in table 7-1, together with the probable sources of trouble. This chart shows the sequence of operations between turning on the power and going on the air with the carrier, and will assist maintenance personnel in localizing a fault.

### 3. TROUBLE-SHOOTING THE TRANSMITTER BAY.

a. GENERAL.—Radio Transmitting Sets AN/SRT-14, 15 and 16 are manually operated.

The system trouble-shooting chart, table 7-1, lists visual indications of transmitter bay operation. The heavy blocks tell what is to be observed, and the heavy paths between these blocks describe the indication that should be obtained when the transmitter bay is operating properly, from the time that main power is applied to the time that the carrier is keyed on the air. Indications of proper operation are listed in the general order in which they occur. Each indication along the heavy path is evidence of proper operation only if all preceding indications have been obtained. However, it should be noted that some of the indications may occur simultaneously. If the proper indication is not obtained, the lighter blocks name the unit (or units) in which trouble may exist. The technician should then refer to the trouble-shooting information for that particular unit.

#### Note

If the proper indication fails to occur, first check the indicating component.

The transmitter bay may be operated without radiating an r-f carrier from the antenna. A dummy load,

type DA-91/U, is used to permit the transmitter to be operated at full power during test and maintenance procedures. This load is connected to the cable from the transmitter that terminates in P-3314, normally connected to J-3201 in the Transmitter Coupler CU-402/SRT, to the "N" type coaxial receptacle on the dummy load. The transmitter can thus be completely isolated from the remainder of the equipment.

#### b. TEST EQUIPMENT REQUIRED.

(1) MULTIMETER ME-25A/U.—0 to 1,000 v ac/dc in 7 ranges; 0 to 1,000 ma in 6 ranges; 0 to 1,000 megohms in 6 ranges.

(2) OSCILLOSCOPE OS-8A/U.—Sensitivity, 0.1 v (RMS)/in.; response,  $\pm 3$  db from 30 cps to 2 mc.

(3) FREQUENCY METER AN/USM-29 OR AN/FRM-3.—15 kc to 26 mc in 10-cps steps; accurate to within 0.0001 percent  $\pm 4$  cps; ( $\pm 1$  cps in 1 mc  $\pm 4$  cps).

(4) RECEIVER TYPE RBA, RBB, RBC SERIES OR EQUIVALENT.—Frequency coverage: 15 kc to 500 kc; 0.5 to 4.0 mc; 4.0 to 27.0 mc.

(5) AUDIO OSCILLATOR TS-382A/U.—20 to 200,000 cps,  $\pm 2$  percent; output, 0 to 100 mw.

(6) DUMMY LOAD DA-91/U.—600 watt; air cooled.

(7) SIGNAL GENERATOR, RF, AN/URM-25.—10 kc to 50 mc; output, 2v maximum.

(8) AMMETER, DC, NAVY TYPE 60107 OR MULTIMETER AN/PSM-4.—0 to 1,000  $\mu$ a, in 5 ranges; accuracy,  $\pm 2$  percent.

(9) RESISTANCE BRIDGE, ZM-4/U.—1 to 10 megohms; accuracy,  $\pm 0.15$  percent.

(10) RADIO FREQUENCY BRIDGE, NAVY TYPE 60094.—Range 400 kc to 60 mc; resistance, 0-1,000 ohms  $\pm 1$  percent; reactance, 0-5,000 ohms at 1 mc,  $\pm 2$  percent.

(11) VARIABLE RESISTOR, TYPE RVINATFE-105B PER MIL-R-94A OR EQUIVALENT.—1 meg linear taper potentiometer.

c. LOCATING FAULTY UNIT.—Because each function of the transmitter bay is contained in a separate drawer, with facilities to extend the drawer and bypass the accompanying interlock, it is possible to maintain operation of the system and thereby simplify servicing. Defective operation can be traced to one drawer or another by noting the failure of one of its functions. The systematic location and repair of faults may be summarized as follows:

(1) determine which unit the fault is in;

(2) using the trouble location chart, servicing block diagram, schematic diagram, or the voltage and resistance chart, examine the unit in detail to determine which component failed and why;

(3) replace the defective component or components, or adjust correctly;

(4) check the equipment thoroughly.

TABLE 7-1. SYSTEM TROUBLE-SHOOTING CHART

ABBREVIATIONS OF MAJOR UNITS USED IN  
THE SYSTEM TROUBLE SHOOTING CHART.

|      |  |
|------|--|
| RFA  | RADIO FREQUENCY AMPLIFIER, (AM-1008/SRT)   |
| LLRM | LOW LEVEL RADIO MODULATOR, (MD-229/SRT)    |
| RFO  | RADIO FREQUENCY OSCILLATOR, (O-275/SRT)    |
| LVPS | LOW VOLTAGE POWER SUPPLY, (PP-1094/SRT)    |
| MVPS | MEDIUM VOLTAGE POWER SUPPLY, (PP-1095/SRT) |
| HVPS | HIGH VOLTAGE POWER SUPPLY, (PP-1096/SRT)   |
| HLRM | HIGH LEVEL RADIO MODULATOR, (MD-230/SRT)   |
| MTG  | BASE MOUNT (MT-1423/SRT)                   |
| ATU  | ANTENNA TUNING EQUIPMENT                   |

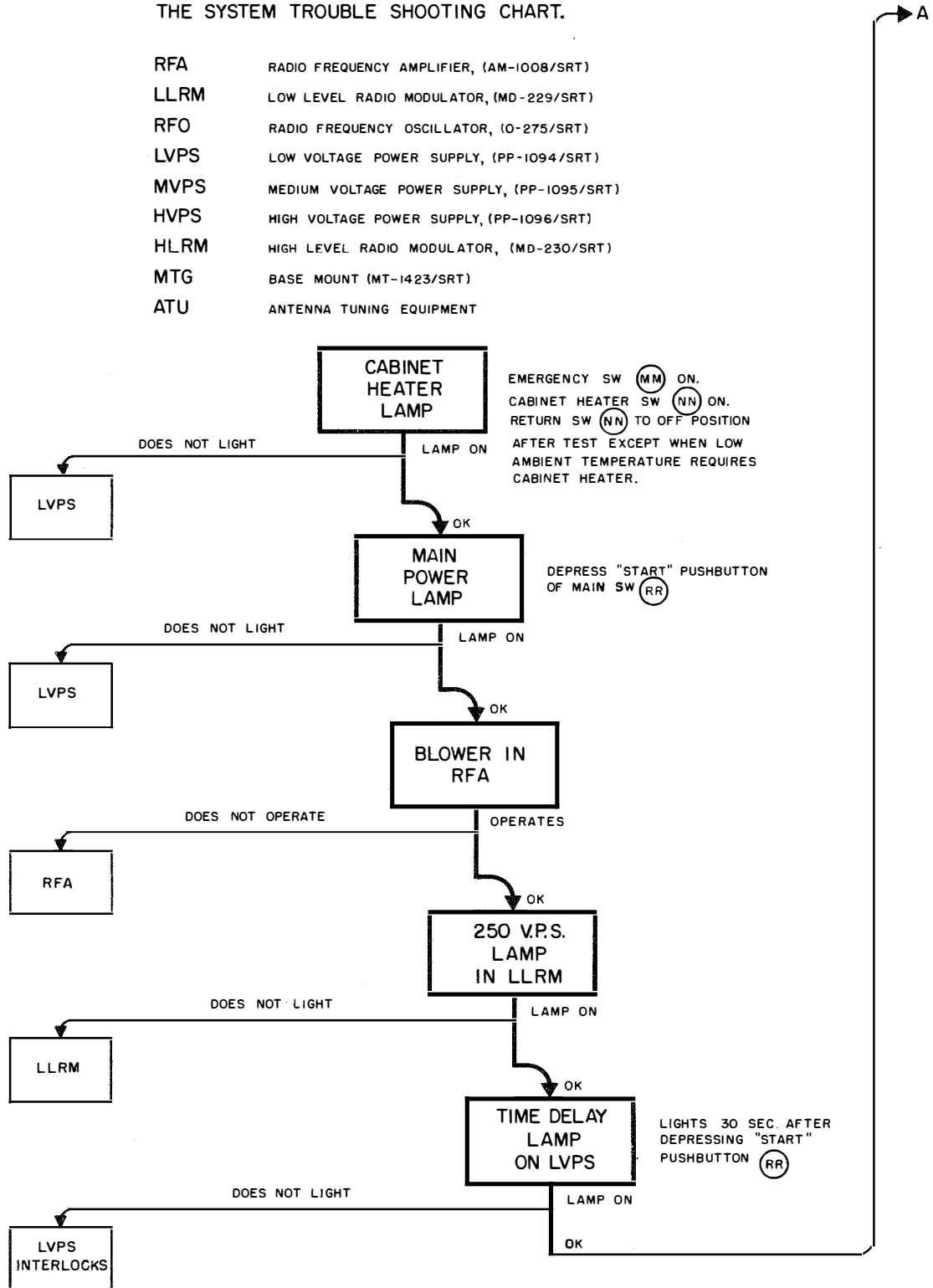


TABLE 7-1. SYSTEM TROUBLE-SHOOTING CHART (Cont'd)

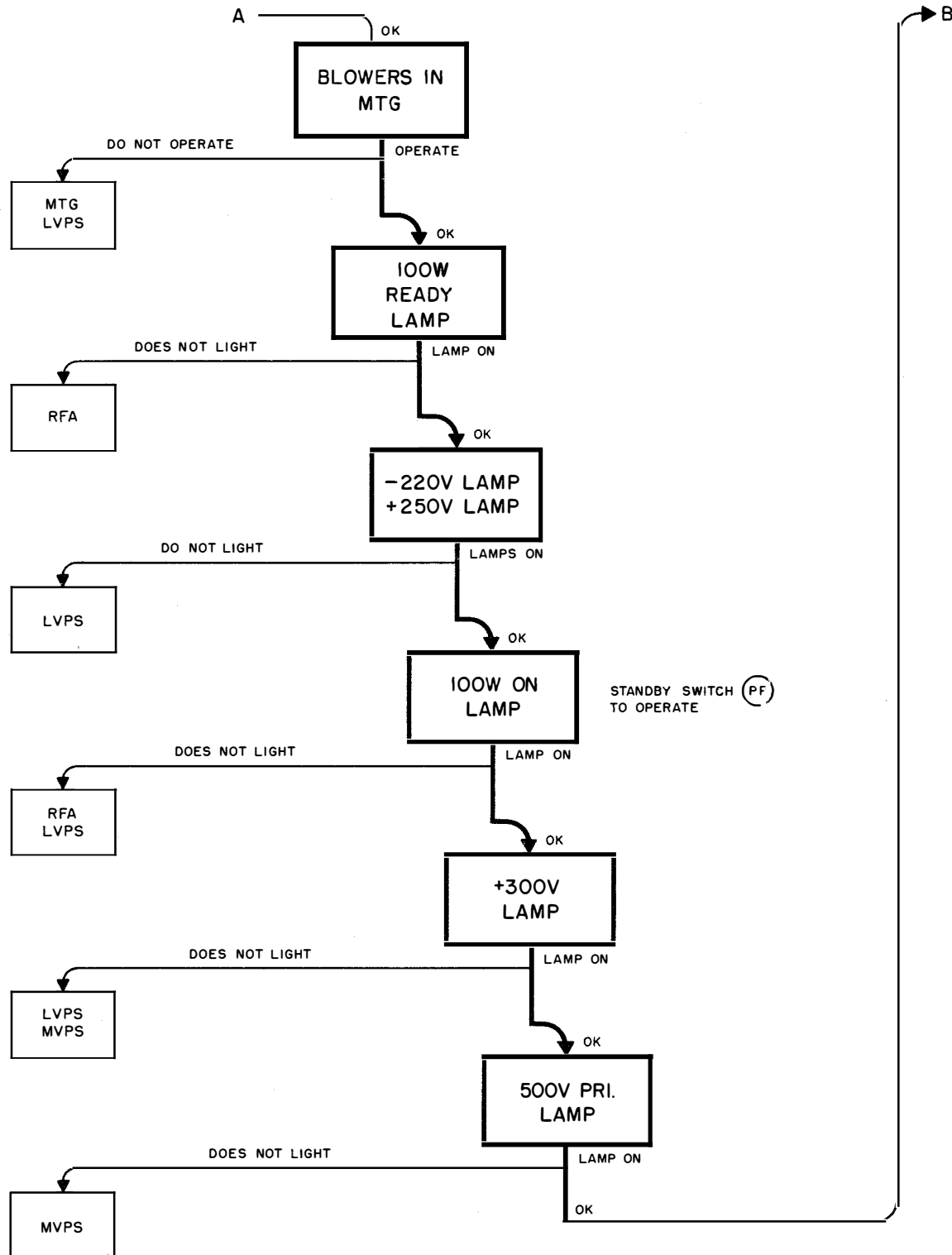


TABLE 7-1. SYSTEM TROUBLE-SHOOTING CHART (Cont'd)

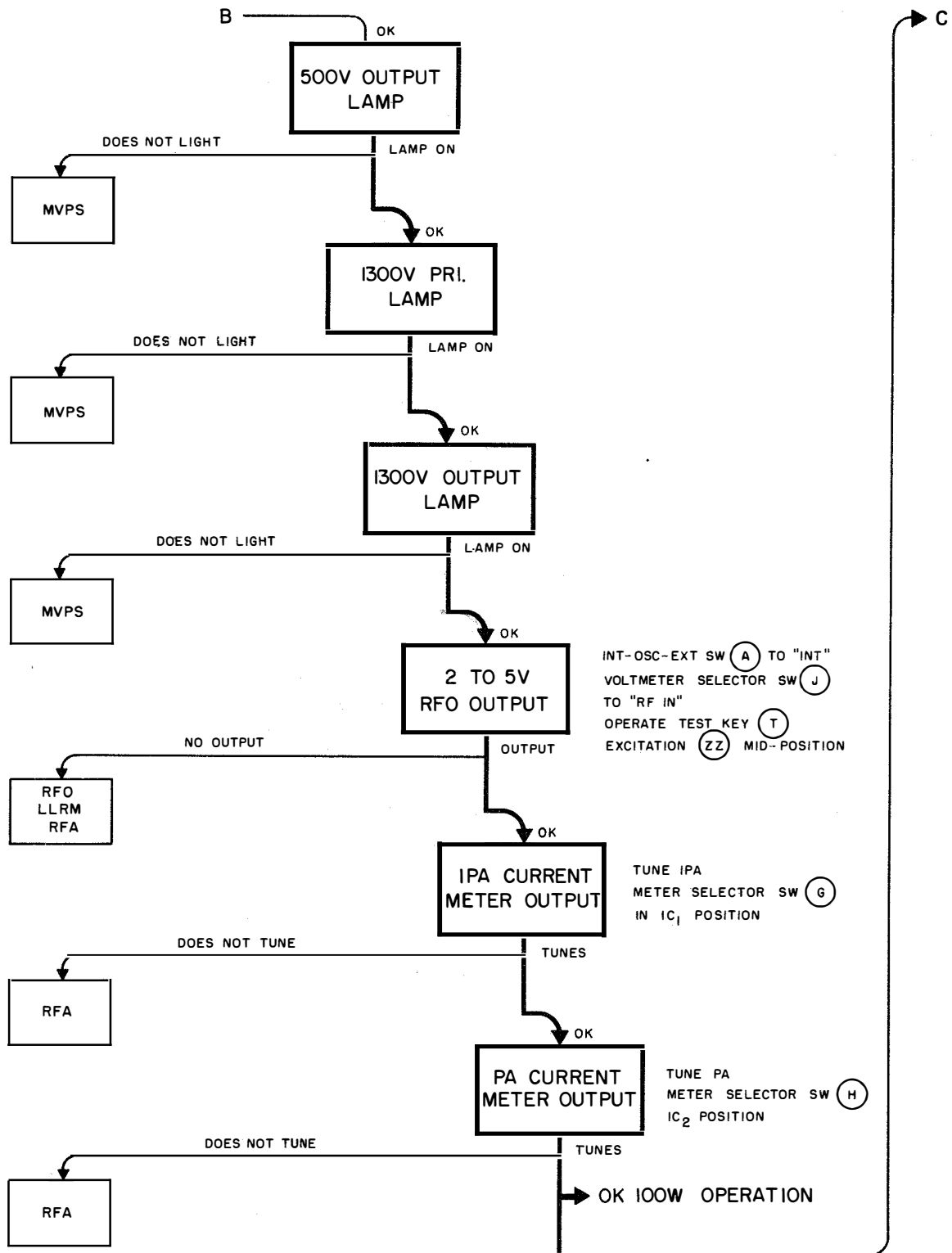


TABLE 7-1. SYSTEM TROUBLE-SHOOTING CHART (Cont'd)

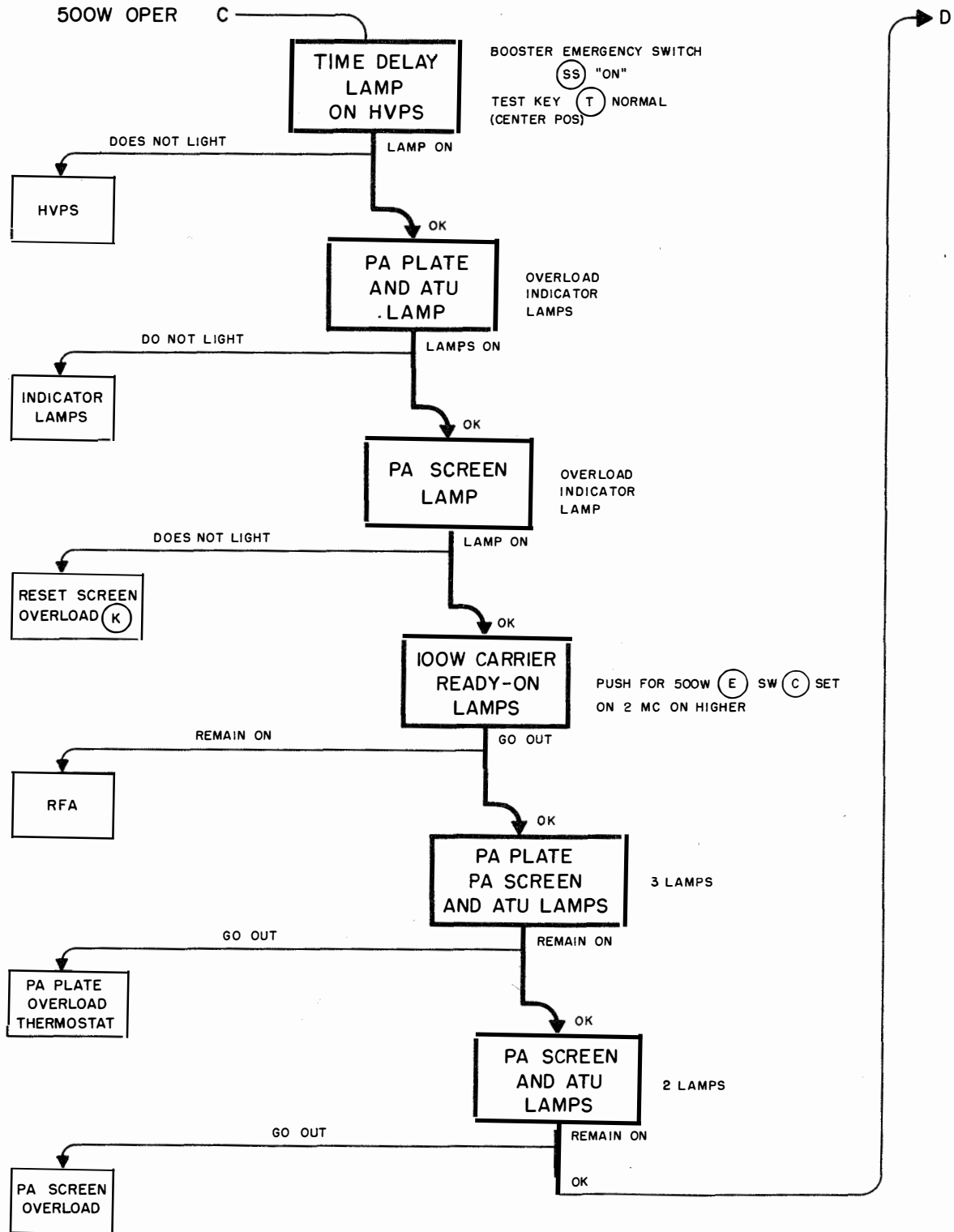
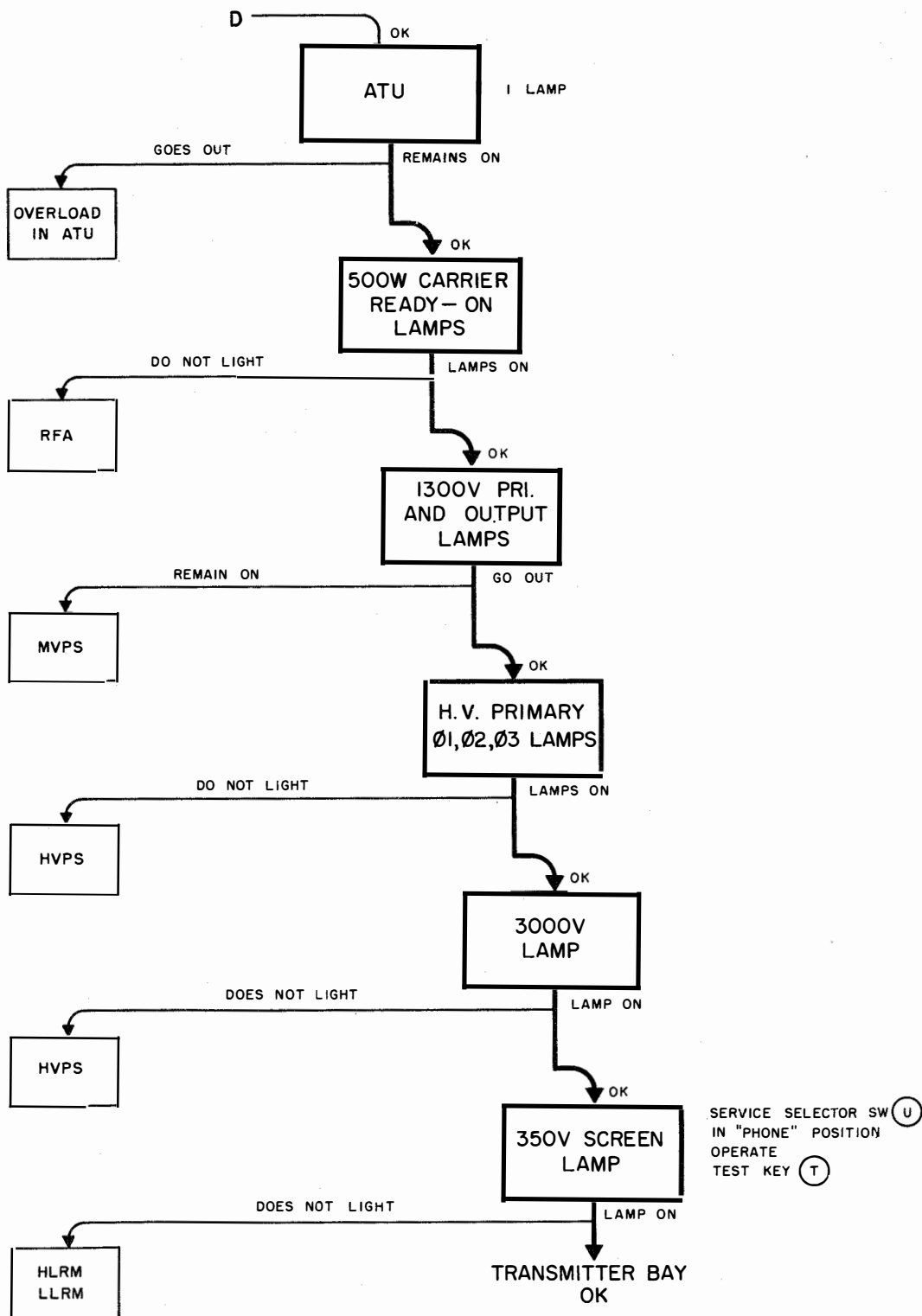




TABLE 7-1. SYSTEM TROUBLE-SHOOTING CHART (Cont'd)



#### 4. TROUBLE-SHOOTING AND REPAIR OF THE MAJOR UNITS.

The units of the transmitter bay are discussed in the following paragraphs. Where warranted, a servicing block diagram, a schematic diagram, and a voltage and resistance chart accompany the discussion.

a. REMOVAL OF MAJOR UNITS.—Removal of major units in the transmitter bay can be accomplished as follows:

*Step 1.* Loosen captive screws on unit drawer front panel by means of hex wrench mounted on the low voltage power supply (LVPS) front panel. Pull chassis forward until inner slide latch hits stop on front of rail. To remove chassis from cabinet frame, remove two screws, one on each inner rail, that are now accessible. These screws are retainers for the inner slide latch in case of failure of latch spring.

*Step 2.* Now depress the latch on each inner slide and pull the chassis forward to clear the projection on the front of the rail.

*Step 3.* Disconnect associated cables and plugs from the chassis. Posts have been provided on the front of the transmitter cabinet to support the cabinet interconnecting plugs in the event of complete removal of a major unit. These posts support the plug when the major unit extension cable is used. Refer to Section 3 for the unit extension cable assembly instructions.

#### CAUTION

THE CHASSIS IS NOW FREE TO BE REMOVED ENTIRELY FROM THE CABINET. PERSONNEL REMOVING CHASSIS SHOULD NOW BE PREPARED TO SUPPORT THE ENTIRE WEIGHT OF THE CHASSIS.

*Step 4.* Pull the chassis forward until the inner slide disengages from the front rail roller, and the chassis will be completely free from the cabinet.

*Step 5.* Remove the outer protective cover panels by loosening the fasteners mounting the panels to the chassis assembly.

b. REPLACEMENT OF MAJOR UNITS.—Replace the unit drawer in the cabinet by reversing the sequence of the steps indicated for the removal of a major unit (paragraph 4a).

*Step 1.* Push the drawer in slowly until the drawer stops midway into position. Care must be taken to prevent drawer from hitting the interconnecting plug attached to the associated supporting post.

*Step 2.* Replace screws on inner rails. Remove interconnecting plug from its supporting post and connect to the receptacle provided on the rear of the drawer.

*Step 3.* Depress both left and right stops on drawer slides, and push the drawer in until it is properly seated into position.

*Step 4.* Tighten all the captive screws on the front panel.

#### Note

In the event a unit drawer is replaced by a new unit, it may be necessary to realign the support pins at the rear of the cabinet. If misalignment exists when installing a new unit drawer, refer to figure 7-90 and perform the following steps:

*Step 1.* Loosen the support pins at the rear of cabinet associated with drawer.

*Step 2.* Loosen the screws supporting the drawer front panel.

*Step 3.* Slide drawer in cabinet until properly seated.

*Step 4.* Tighten the rear support pins and all screws on the front panel.

#### 5. RADIO FREQUENCY OSCILLATOR O-275/SRT (RFO), TROUBLE SHOOTING.

The radio frequency oscillator (RFO) is comprised of 14 plug-in units and a chassis consisting of a mounting rack for the 14 subunits. A frequency is set up by rotating knobs to the desired frequency in conjunction with the table mounted on the RFO front panel door to determine settings of Ⓐ and Ⓑ knobs. Figure 7-1 represents the RFO simplified block diagram.

When a frequency is set up but there is no RFO output as indicated on the radio frequency amplifier (RFA) VOLTMETER, with switch Ⓙ in RF IN position and EXCITATION control ① fully clockwise, one or more of the RFO subunits or the cabinet interconnecting cable may be faulty. If the RFO output fails during transmission, the CARRIER ON light will remain ON, but the RFA panel mounted VOLTMETER with switch Ⓙ in the RF IN position will show zero output. The VOLTMETER should show an output of from 2 to 5 volts, depending on the setting of the EXCITATION control ①, also on the RFA front panel (figure 7-73).

If the RFA VOLTMETER shows no RFO output, perform the following procedure to localize the fault to a particular RFO subunit. When the faulty subunit is located, use the individual schematic diagram and voltage chart to locate the faulty component.

#### Note

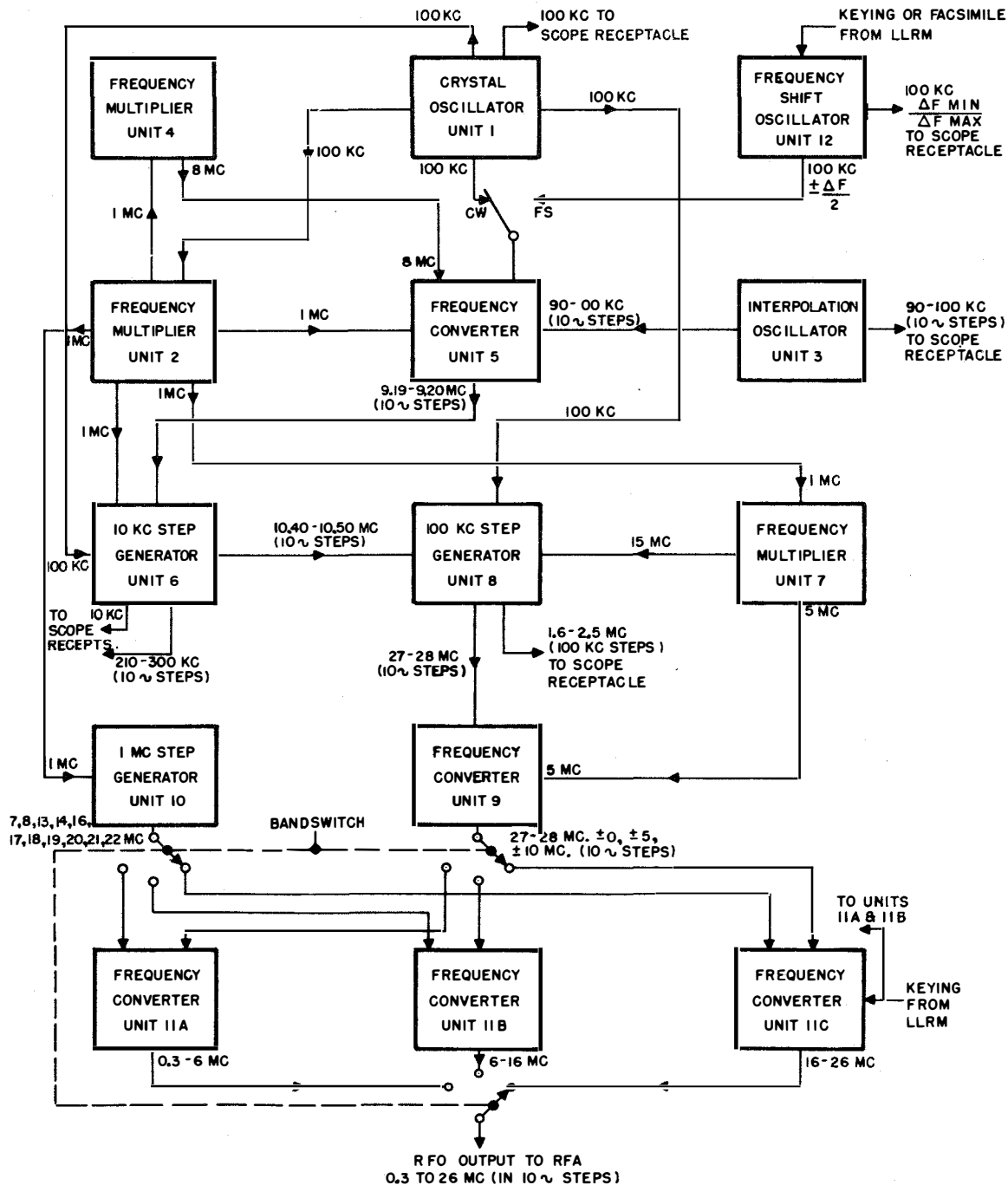
To determine that the lack of RFO output is not due to the low level radio modulator (LLRM) keying circuit, check for output at RFO test socket E-2919 KEY V. IN (figure 7-6). With TEST KEY ⊕ in the center position, Multimeter ME-25A/U should read approximately -30 volts. With TEST KEY ⊕ operated, the meter should now read zero volts.

After it has been determined that the LLRM keying circuit is operating properly, and there is still no RFO output, perform the following steps:

*Step 1.* Check units 11A (Z-2626), 11B (Z-2651), and 11C (Z-2801) by setting up three different frequencies—the first frequency in the range of 0.3 mc to 6 mc, the second frequency within 6 mc to 16 mc, and the third frequency within 16 to 26 mc, according to the settings of BAND knob (F). If only the second and third frequencies give an RFO output as indicated

on the RFA VOLTMETER with switch (J) in RF IN position, unit 11A (Z-2626) is probably at fault. If only the first and third frequencies give an RFO output, unit 11B (Z-2651) is probably at fault. If only the first and second frequencies give an RFO output, unit 11C (Z-2801) is probably at fault.

*Step 2.* Check for an RFO output during FSK and FAX operation. Place SERVICE SELECTOR switch (U) on the low level radio modulator (LLRM) front panel in the FSK and FAX positions alternately.



**Figure 7-1. Radio Frequency Oscillator O-275/SRT, Block Diagram**

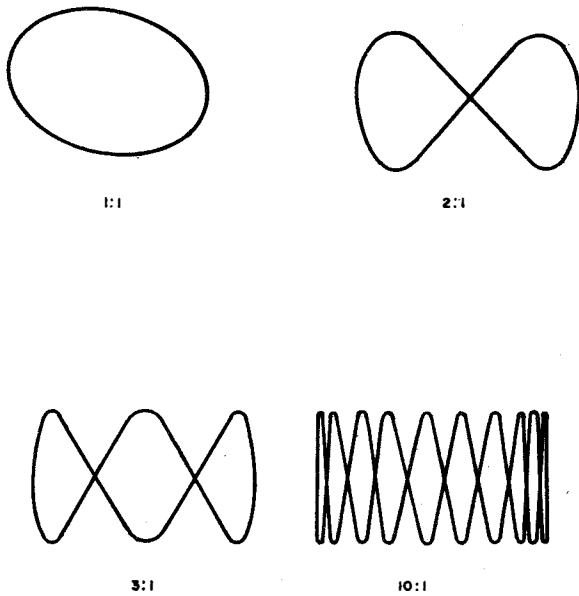


Figure 7-2. Typical Lissajous Patterns

If there is no RFO output during FSK operation, the radio frequency oscillator, unit 12, is probably at fault. If there is no RFO output from any of the output units, make the oscilloscope checks indicated in table 7-2 to locate the faulty unit:

**Note**

To check the frequency of any signal fed to the oscilloscope, use Lissajous patterns and try to get the smallest frequency ratio possible, preferably a 1:1 ratio. See figure 7-2 for typical Lissajous patterns.

Step 3. Check the 100-kc output of the crystal oscillator by means of an external oscilloscope such as the OS-8A/U or equivalent, connected to the 100

KC XTAL jack on the RFO front panel or by means of the WWV frequency check as indicated in paragraph 5c.

**Note**

The oscilloscope checks only the presence of an output from unit 1. It does not check the accuracy of the frequency.

Step 4. Check the 90- to 100-kc output of unit 3 by means of the ZERO BEAT INDICATOR, or with the oscilloscope (OS-8A/U or equivalent) connected to the INT. OSC. jack on the RFO front panel with ZERO ADJ switch (2) in the INT. OSC. position (paragraph 5g).

Step 5. Check the 10-kc output of unit 6 with the oscilloscope connected to the 10 KC jack on the front panel of the RFO (paragraph 5n).

Step 6. Check the 210- to 300-kc output of the phase-locked oscillator in unit 6 with the oscilloscope connected to the 10 KC STEP jack on the RFO front panel (paragraph 5o(1)(e)).

Step 7. Check the 1.6-mc to 2.5-mc output of the phase-locked oscillator in unit 8 with the oscilloscope connected to the 100 KC STEP jack on the RFO front panel (paragraph 5s).

Step 8. If only unit 1 gives an output among the signals checked in steps 3, 4, 5, 6 and 7, check the regulated filament voltage at test socket E-2919 pin 2 and the regulated +250 volts at test socket E-2919 pin 4 (see table 7-3). Test socket E-2919 is mounted on the left side of the RFO drawer and is accessible without removing the RFO protective panel.

**Note**

When checking for regulated filament and plate voltages, it is convenient to check all the pins on test socket E-2919.

TABLE 7-2. PRELIMINARY RFO CHECK BY MEANS OF EXTERNAL OSCILLOSCOPE

| OSCILLOSCOPE OS-8A/U  |                       | LISSAJOUS PATTERN RATIO | SETTING OF RFO KNOBS<br>(POSITION OF OTHER KNOBS IMMATERIAL) |    |    |        |        |     | REFER TO FOLLOWING PARAGRAPHS FOR A DETAILED CHECK OF PROBABLE FAULTS |
|-----------------------|-----------------------|-------------------------|--|----|----|--------|--------|-----|---|
| "X" INPUT TO RFO JACK | "Y" INPUT TO RFO JACK |                         | CC   | DD | EE | HH     | JJ     | KK  |   |
| 10 KC                 | 100 KC X-TAL          | 10:1                    |  |    |    |        |        |     | 5d(1) and 5o(1)   |
| 10 KC STEP            | 100 KC X-TAL          | 3:1                     |  |    |    |        | 9      |     | 5d(1) and 5o(1)   |
| 10 KC STEP            | 10 KC                 | 29:1 TO 21:1            |  |    |    |        | 8 to 0 |     | 5o(1)   |
| 100 KC STEP           | 10 KC STEP            | 8:1                     |  |    |    | 8      | 9      |     | 5s(1) and 5o(1)   |
| 100 KC STEP           | 100 KC X-TAL          | 25:1 TO 16:1            |  |    |    | 9 to 0 |        |     | 5e(1) and 5o(1)   |
| INT. OSC.             | 100 KC X-TAL          | 1:1                     | 9  | 9  | 10 |        |        |     | 5b(1) and 5d(1)   |
| F.S. OSC.             | 100 KC X-TAL          | 1:1                     |  |    |    |        |        | 0   | 5e-1(1) and 5b(1)   |
| F.S. OSC.             | INT. OSC.             | 1:1                     | 9  | 8  | 0  |        |        | 200 | 5e-1(1) and 5b(1)   |

CONDITIONS: EMERGENCY SWITCH (M) ON, OPERATE-STANDBY switch (P) on STANDBY, depress START on MAIN POWER switch (R) and open frequency selection door on the RFO front panel.

TEST EQUIPMENT REQUIRED: Oscilloscope OS-8A/U, or equivalent.

**TABLE 7-3. RFO TEST POINT SOCKET E-2919**

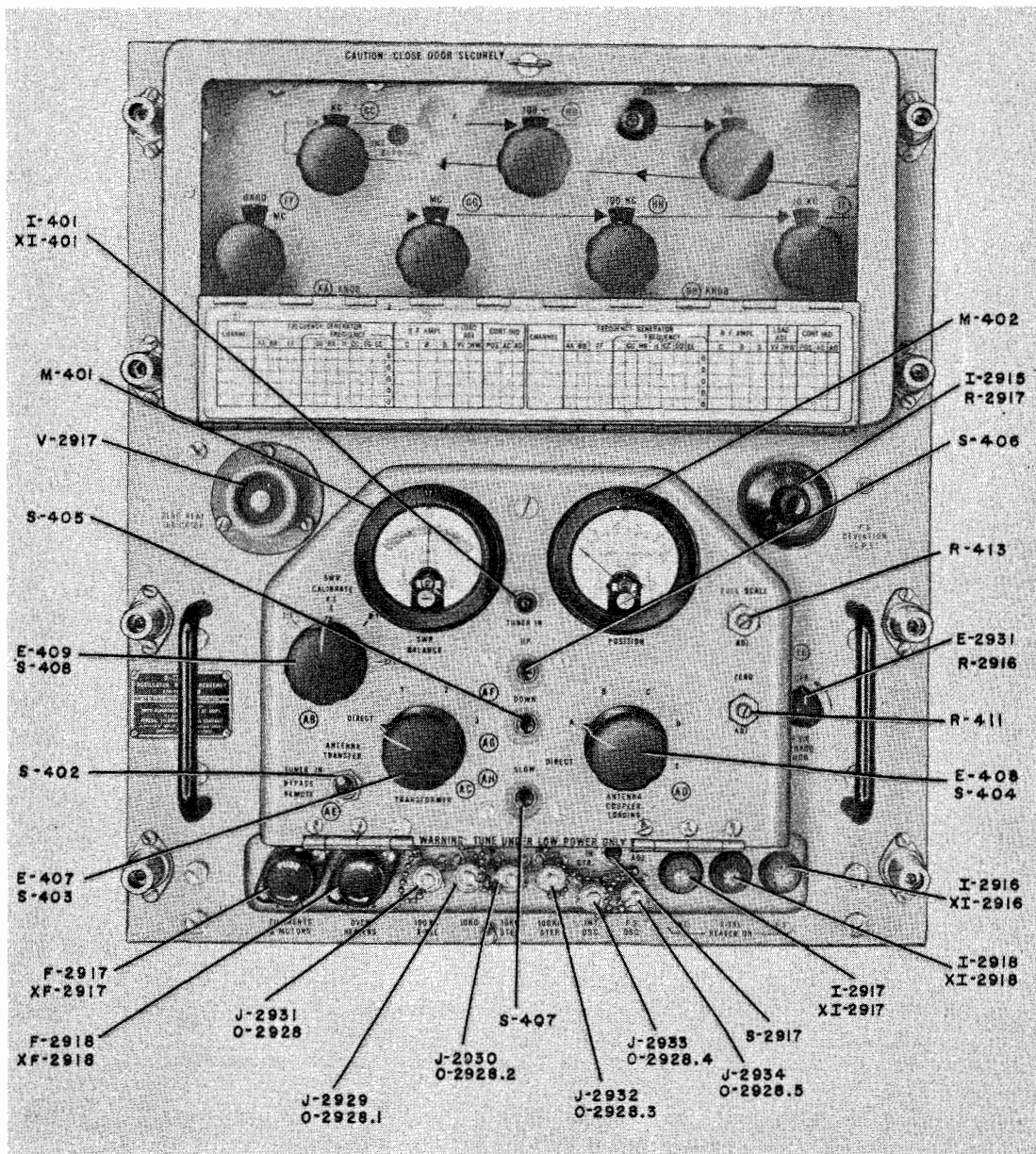
| PIN NO. | READING             |
|---------|---------------------|
| 1       | GND                 |
| 2       | 6.3 V A.C. REG      |
| 3       | 6.3 V A.C. UNREG    |
| 4       | 250 V DC REG        |
| 5       | 250 V DC UNREG      |
| 6       | -24 V AFTER T.D.    |
| 7       | NC                  |
| 8       | KEY V. IN FROM LLRM |

*Step 9.* Check the RFO subunits in the given order, starting with unit 6, by measuring the voltages at the test points provided on each unit.

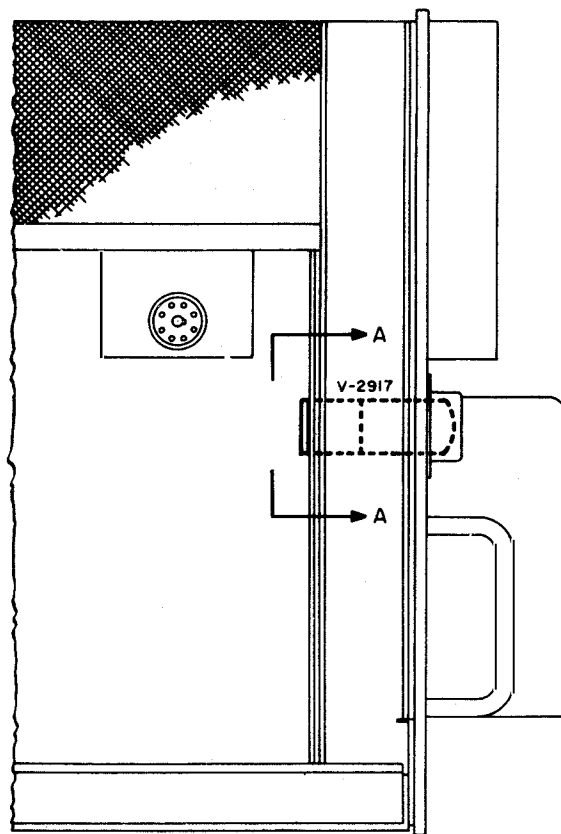
The radio frequency oscillator (RFO) simplified trouble-location diagram, figure 7-120, shows a method of localizing trouble in the RFO. This diagram indicates minimum r-f output measurements at the test points to indicate which unit is at fault.

Heavy blocks identify the unit (or units) and the associated test point. Lighter blocks identify units in which trouble may exist.

If the output of a unit is below the r-f voltage as indicated at the test point, follow the path to the left of the heavy block. If, however, the test point output is normal, then proceed to the right of the heavy block. When trouble has been localized to a unit, refer to the maintenance information pertaining to the particular unit.



**Figure 7-3. Radio Frequency Oscillator O-275/SRT and Control-Indicator C-1352/SRT, Front Panel**



NOTES

1. MEASUREMENTS TO CHASSIS USING MULTIMETER ME-25A/U. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON THE 1 VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON THE 250 VOLT SCALE.
2. TRANSMITTER IN STANDBY.
3. TEST KEY (T) IN CENTER POSITION.
4. SWITCH (Z) TO INT. OSC. POSITION.

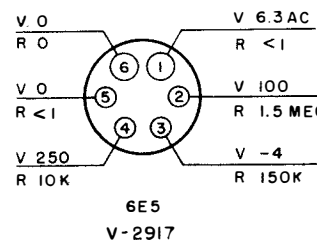
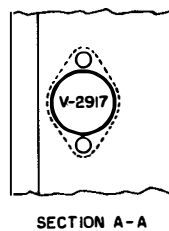


Figure 7-4. RFO, Unit 14 (Z-2901), Voltage and Resistance Chart

**CAUTION**

Low r-f output at unit 5 or 9 does not necessarily indicate trouble in the particular unit. A decrease in r-f output may be due to the lack of one of the inputs feeding these units.

Therefore, rather than realigning these units for an increase of r-f output, check the inputs fed to the mixer tubes on unit 5 or 9 at the pins on the tube socket itself.

*Step 10.* Check bandswitch labeled BAND (F) on the RFO panel for proper output (paragraph 5, step 1), and the cabinet interconnecting cable carrying the r-f output to the RFA.

When the faulty unit is located, use the troubleshooting and repair information for that particular unit.

*a. RFO MOUNTING, UNIT 14 (Z-2901), TROUBLE SHOOTING.*—The mounting contains the output chassis selector switch S-2996, V-2917, the 6E5 electron-ray tube, ZERO BEAT INDICATOR, fuses, test points, 6.3 v a-c filament supplies, RFO subunit drive mechanisms and the r-f interconnecting cables for the subunits (refer to figures 7-3, 7-5 and 7-10). When all the RFO subunits are operating properly but there is no indication of an RFO output on the RFA VOLTMETER with switch (J) in position RF IN, and switch (A) to INT position, check the output chassis

selector (S-2996) in the mounting (unit 14) and the r-f cable that connects the RFO output to the RFA.

If a unit is not receiving its input but the unit that supplies this input is operating, check the continuity of the coaxial cable between the units. If a frequency cannot be set up, check the voltage at test socket E-2919 and fuses on the front panel. Table 7-3 lists the RFO test points at socket E-2919 and nominal voltages. Figure 7-121 is the schematic, figure 7-122, sheets 1 and 2, the wiring diagrams, and figure 7-4 the voltage and resistance chart for unit 14.

*b. RFO MOUNTING, UNIT 14 (Z-2901), REPAIR AND ADJUSTMENT.*

(1) ELECTRICAL ADJUSTMENTS.—The regulated 6.3-volt a-c filament supply for the RFO is regulated by thermal resistor R-2929 in the primary of the regulated filament supply. This voltage may be checked at 6.3 V A.C. REG. on TEST POINTS socket E-2919, located on the left side of the RFO drawer. This socket is accessible without removing the protective side panel (figure 7-6).

To adjust the regulated filament voltage, remove the protective side panel (left) and adjust potentiometer R-2953, located in the upper left-hand corner of the RFO drawer (figure 7-6).

RANGE ADJ. (R-2919), ZERO ADJ. (R-2916), and F.S. DEVIATION (C.P.S.) control (K) (R-2917) are

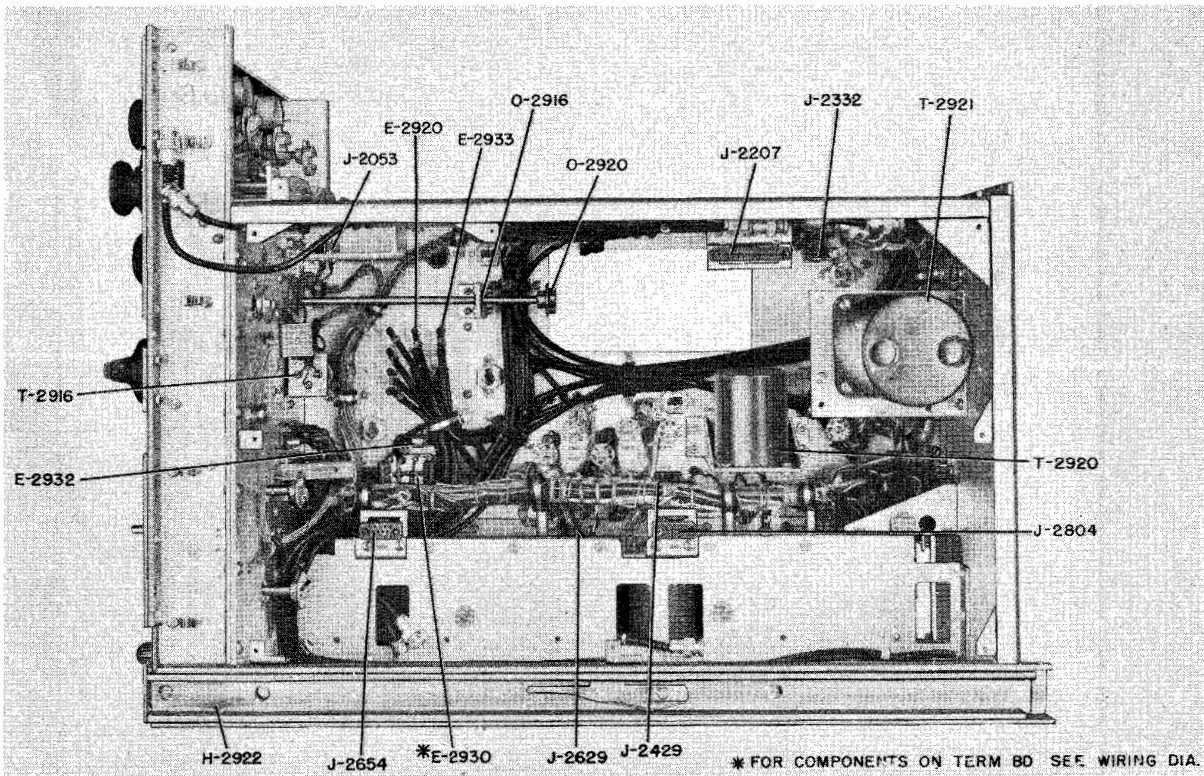


Figure 7-5. RFO, Unit 14 (Z-2901) Right Side View, Units Removed

adjusted when unit 12, radio frequency oscillator (Z-2127), is aligned. For a detailed procedure on the adjustment of the controls associated with unit 12, refer to paragraph 5ee(1).

F.S.K. PHASE MOD control (L) is a function of operation (Section 4, Operation), and is checked when the audio oscillator feedback control in the low level radio modulator (LLRM) is adjusted. Refer to paragraph 6b(1)(b)4.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To remove the RFO drawer, unit 14, refer to paragraph 4a.

To gain access to the RFO subunits, electron eye V-2917, potentiometer R-2953, and bandswitch BAND (F) (S-2996), remove the protective cover plates.

Transformers on unit 14 are located on the right side of the chassis and are made accessible by first removing units 6 (Z-2204), 11B (Z-2651), and 11C (Z-2801) from the mounting (figures 7-5 and 7-7). The mounting plate supporting these three units must also be removed, by removing 13 machine screws holding it in place.

Subunits operated by means of shafts and/or chain drives and their respective control knobs are listed in table 7-4.

BAND knob (F) drives switch S-2996, which is part of the RFO mounting, unit 14, and is not considered a subunit.

TABLE 7-4. RFO FRONT PANEL CONTROL KNOBS AND RESPECTIVE SUBUNITS

| KNOBS    | KC (C)                | MC (G)                 | 100 KC (H)                             | 10 KC (J) | (A)     | (B) |
|----------|-----------------------|------------------------|--|-----------|---------|-----|
|          | 100 ~ (D)<br>10 ~ (E) |                        |  |           |         |     |
| SUB UNIT | 3                     | 11B (Bot)<br>11C (Bot) | 8<br>9 (Bot)<br>11B (Top)<br>11C (Top) | 6         | 9 (Top) | 10  |

To remove bandswitch S-2996, perform the following steps:

Step 1. Set BAND knob (F) on the RFO front panel to the 16-26 MC position.

Step 2. Remove the four screws supporting S-2996 to the RFO unit 14.

Step 3. Remove the bandswitch, being careful not to damage socket XV-2917, located on the inner front panel.

Step 4. Disconnect wires from bandswitch wafer S-2996A, and remove bandswitch S-2996.

For removing a subunit in the RFO, it is essential at all times that the subunit switch shaft be in position 0 as indicated by the position of red pointer on the subunit shaft. It will be found that when the above condition is met, the flexible coupler (figure 7-6) will be in a position to uncouple and the subunit can be

removed from the mounting (figures 7-6, 7-7, 7-8, and 7-9).

All subunit switch shafts are provided with flexible couplers adjacent to the inner front panel, directly behind the associated sprocket (figures 7-6 and 7-7). In the subunit 8 drive mechanism, however, adjustable bearings are provided on its drive shaft to compensate for variations in tolerances; this is a *factory adjustment*.

To remove a chain (figure 7-10) perform the following steps:

*Step 1.* Loosen setscrews on adjustable idler associated with chain.

*Step 2.* Remove keeper.

*Step 3.* Remove disconnect pin and tubular pin.

*Step 4.* Remove chain.

**Note**

In some cases, a chain with an adjustable idler may be removed without disassembly of chain.

**1. REMOVAL OF CHAIN DRIVE SUBASSEMBLIES.**

a. **ADJUSTABLE IDLER O-2922.** (See figure 7-10.)—Loosen the two setscrews on the associated idler arm.

b. **DRIVER SPROCKET.**—To remove a driver sprocket and shaft assembly, loosen setscrews on couplers associated with sprocket to be removed. Move couplers along shaft so that the retaining ring is accessible. Remove the retaining ring directly in the rear of the panel bearing. The sprocket and shaft assembly can now be removed.

**Note**

Special assembly pliers No. 0 and No. 22 manufactured by Waldes-Kohinoor Inc. are to be used in removing and replacing retaining rings.

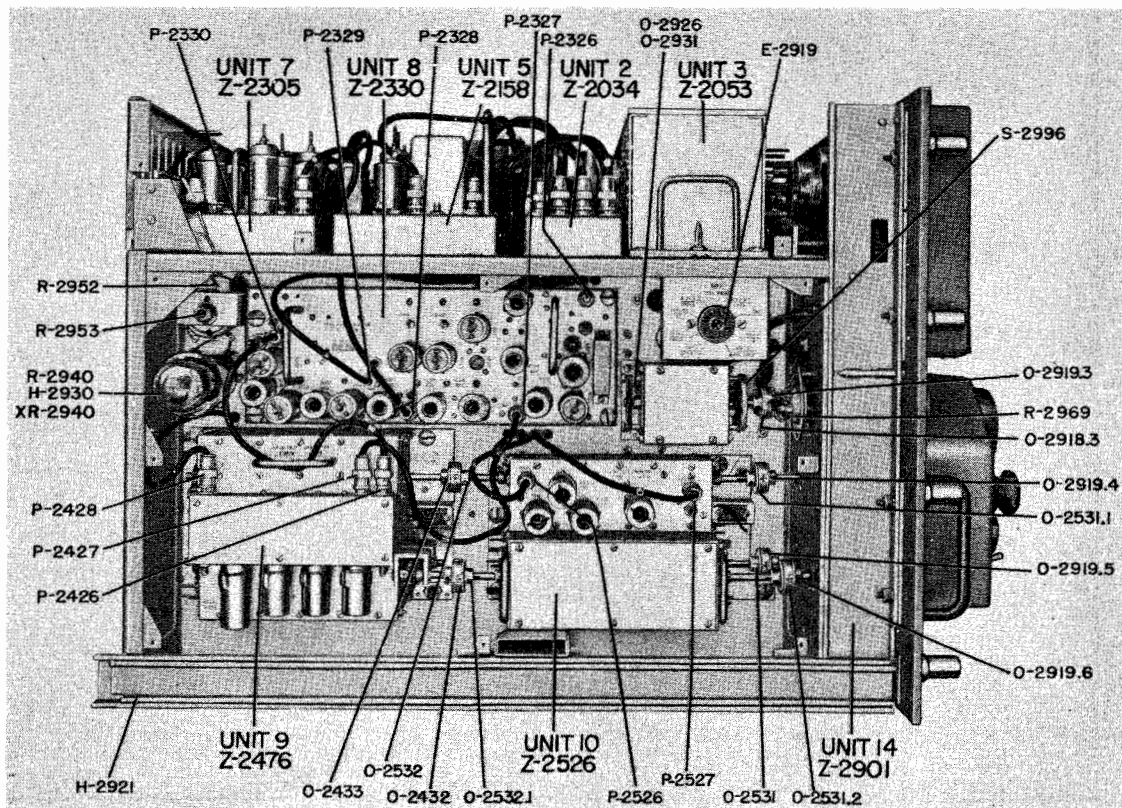
c. **FIXED IDLER O-2929 AND O-2917.** (See figure 7-10.)—Remove retaining ring and slide idler sprocket from its shaft.

**(b) REPLACEMENT AND ADJUSTMENTS.**

—To replace the RFO drawer, unit 14, in the transmitter cabinet, refer to paragraph 4b, Replacement of Major Units.

Subassemblies and subunits may be replaced in the mounting (unit 14) by reversing the sequence of steps indicated for the removal of subassemblies and subunits.

Extreme care must be exercised in aligning unit 8 coupling drive shaft when replacing the shaft and coupling assembly. All subunits in the RFO mounting (unit 14) are mechanically coupled to the front panel control knobs by means of two-piece flexible couplers.



**Figure 7-6. Radio Frequency Oscillator O-275/SRT, Covers Removed, Left Side View**



These couplers compensate for variations in shaft alignment. Unit 8 has no flexible coupler, but is provided with adjustable bearings, to compensate for possible misalignment.

(c) CHAIN DRIVE.—Install a chain on unit 14 mounting in the following manner:

*Step 1.* Assemble chain (figure 7-10) and refer to Parts Lists, Section 8, for proper amount of links for individual chains.

*Step 2.* Place chain on sprockets.

*Step 3.* Adjust idler for proper tension.

*Step 4.* Tighten setscrews.

**Note**

Idler and chain tension *must always* be adjusted prior to tightening adjustable couplers.

c. RADIO FREQUENCY OSCILLATOR, UNIT 1 (Z-2001), TROUBLE SHOOTING.—The radio frequency oscillator (unit 1) has five 100-kc outputs. These r-f outputs can be measured at the test points by means of Multimeter ME-25A/U, or equivalent. (Use the probe for all r-f measurements.) If an output as indicated in table 7-5 is present, it can be assumed that

the oscillator is operating. Check the four other outputs (signals 1a, 1b, 1c, and 1d) of unit 1. See trouble location diagram, figure 7-120.)

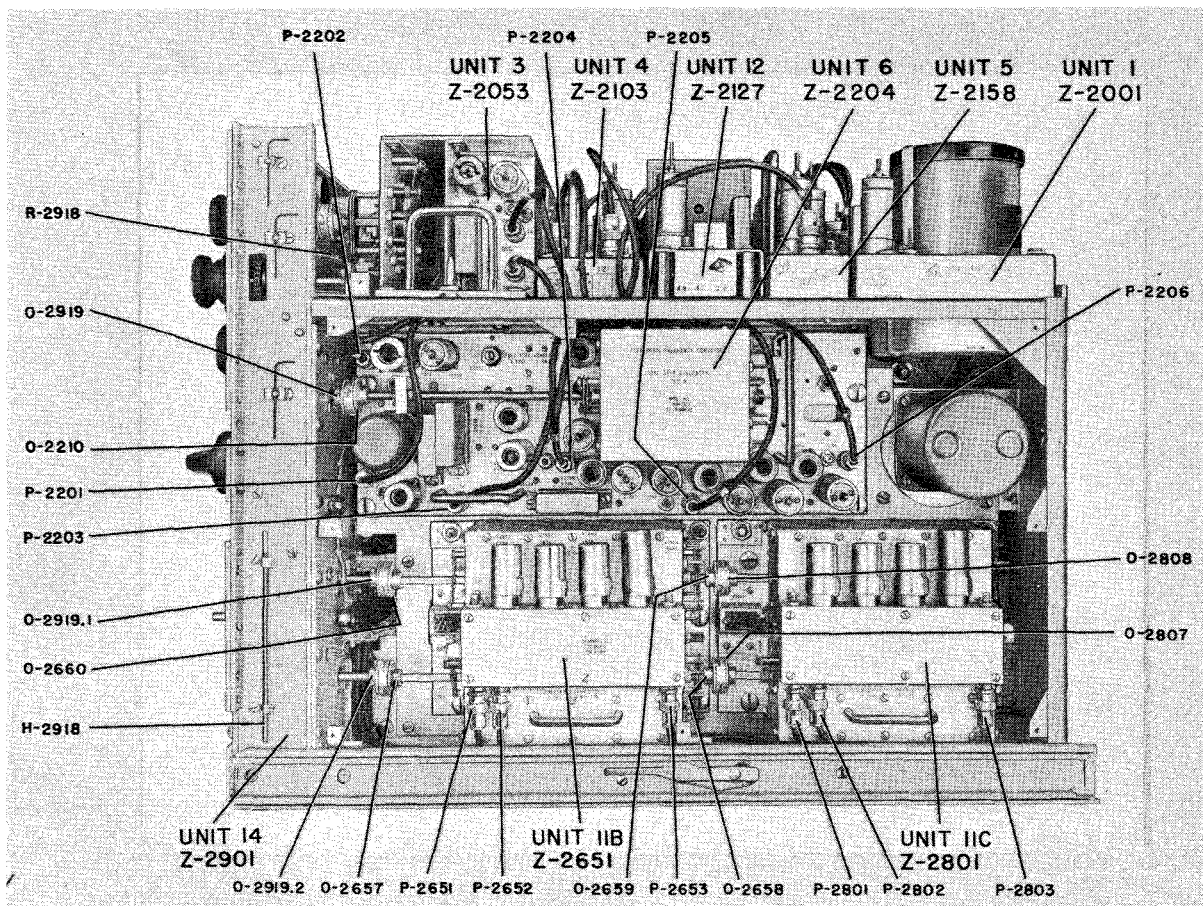
**TABLE 7-5. UNIT 1, R-F VOLTAGE AT TEST POINTS**

| OUTPUT | JACK         | UNIT | NOMINAL VOLTAGE |
|--------|--------------|------|-----------------|
| 1a     |              | 2    | 13.5            |
| 1b     |              | 5    | 0.3 min.        |
| 1c     |              | 6    | 7.0             |
| 1d     |              | 8    | 13.5            |
| 1e     | 100 KC X-TAL | 14   | 1.0 min.        |

To check the r-f outputs of unit 1, the RFO drawer must be extended all the way out, the interlock bypassed, and OPERATE-STANDBY switch  $\text{\textcircled{P}}$  in STANDBY position.

Output 1e may be checked at front panel jack 100-KC X-TAL.

If outputs 1a, 1c and 1e are present but outputs 1b and 1d are not, tube V-2003 (5814) is probably at fault. If none of the outputs of unit 1 are present, check the output of tube V-2001 (5654) by measuring the drive in the cathode follower tube V-2002A (5814).



**Figure 7-7. Radio Frequency Oscillator O-275/SRT, Covers Removed, Right Side View**

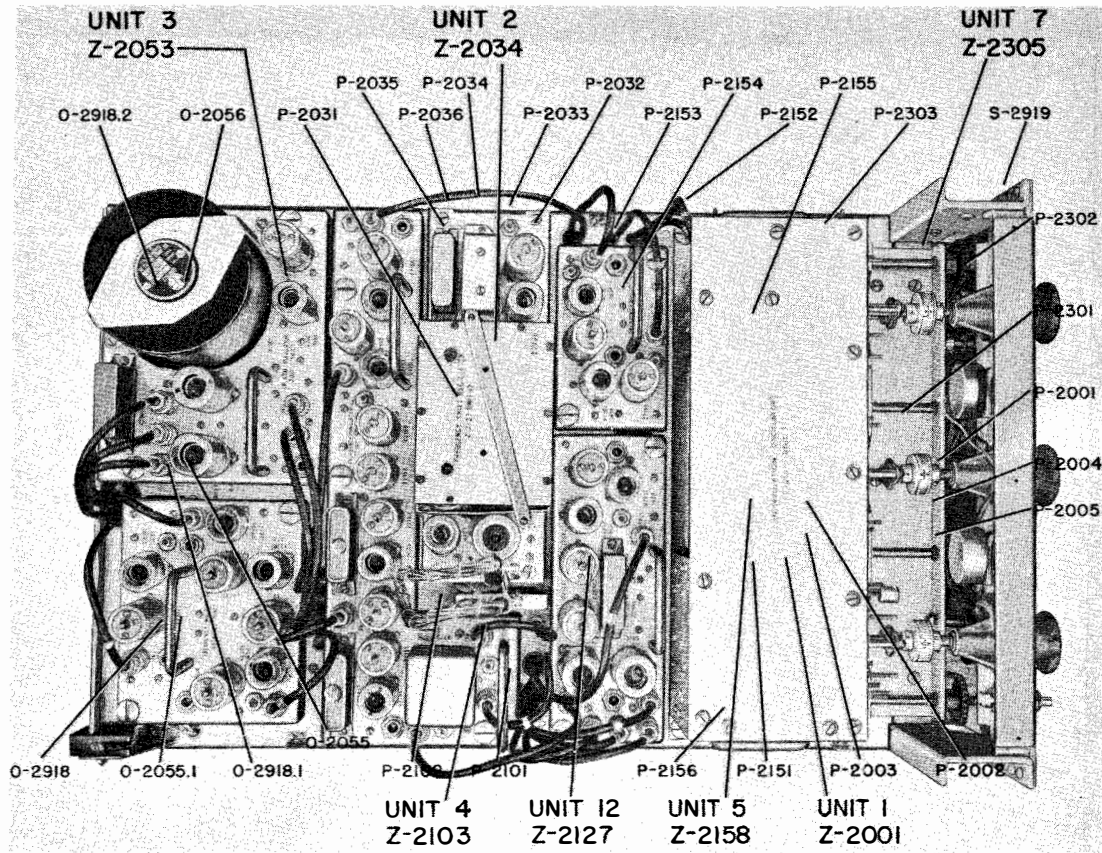


Figure 7-8. Radio Frequency Oscillator O-275/SRT, Covers Removed, Top View

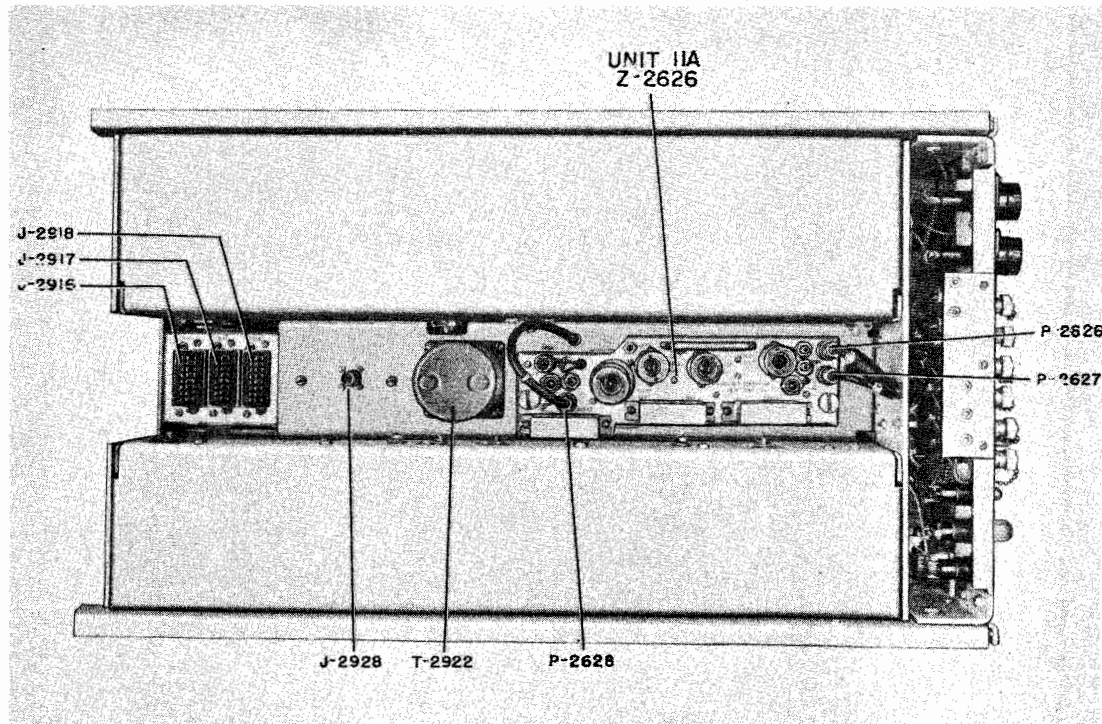
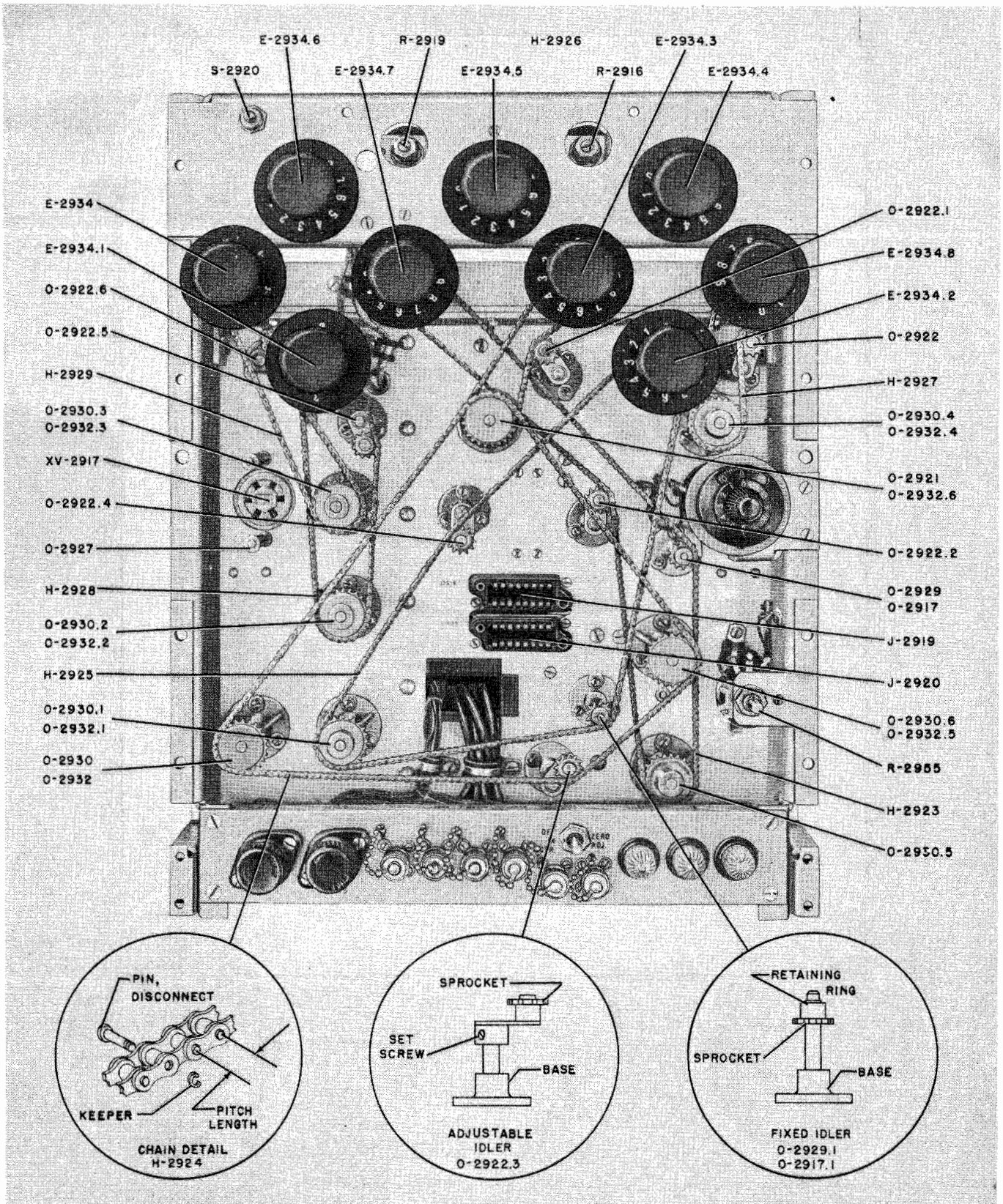


Figure 7-9. Radio Frequency Oscillator O-275/SRT, Bottom View



**Figure 7-10. Radio Frequency Oscillator O-275/SRT, Front Panel Removed, Chain Drives**

**Note**

Unit 1 must be placed on an extension test cable before this can be done.

If the oscillator tube V-2001 (5654) is operating, tube V-2002A (5814) is probably at fault. If tube V-2001 (5654) is not operating, check the tube and circuit (using the voltage and resistance chart, figure 7-11) and replace the defective component. Figure 7-123 is the schematic and figure 7-124 is the wiring diagram. Components in unit 1 are identified in figures 7-12 and 7-14.

**d. RADIO FREQUENCY OSCILLATOR, UNIT 1 (Z-2001), REPAIR AND ADJUSTMENT.**

(1) ELECTRICAL ADJUSTMENTS.—Only one adjustment should be made on unit 1. The top slug of inductance L-2001 (figure 7-12) should be adjusted when the output frequency of unit 1 is not 100 kc and whenever tube V-2001 (5654) is replaced.

*Step 1.* With transmitter in stand-by, switch Ⓢ in STANDBY, allow the RFO oscillator ovens to cycle for at least one hour.

*Step 2.* Tune a receiver (type RBB or equivalent) to 2.5 mc, connected to the ship's receiving antenna.

*Step 3.* Turn BFO on receiver front panel to "off".

*Step 4.* Connect a coaxial cable from 100 KC X-TAL jack on RFO front panel to the "T" type BNC connector (see figure 7-13) and terminate connector to the receiver antenna input.

*Step 5.* Measure the output signal of the 100 KC X-TAL 25th harmonic, on the receiver signal strength meter, and record.

*Step 6.* Connect the ship's receiving antenna with a variable resistor type RVINATFE105B per MIL-R-94A or equivalent in series, to the type "T" connector as shown in figure 7-13.

*Step 7.* Adjust the attenuator so that the signal from WWV is at the same level as recorded in step 5.

*Step 8.* With connections made as indicated in figure 7-13, adjust L-2001 on unit 1 (Z-2001) of the RFO, for a zero beat indication. L-2001, on unit 1, is accessible by extending the RFO drawer all the way out and cheating the RFO interlock. Refer to figure 7-12 for location of L-2001.

*Step 9.* Zero beat indication may be heard through the receiver speaker and observed visually by the indication on the receiver OUTPUT meter. The pointer on the OUTPUT meter will oscillate about the null, the frequency of this oscillation being the test frequency. At high beat frequencies, the meter pointer cannot respond and will remain at the null position. As the zero beat is approached, the pointer on the OUTPUT meter will begin to oscillate rapidly. Then, as tuning L-2001 towards zero beat is continued, pointer

movement slows down to an extremely slow movement or standstill.

**Note**

Perform zero beat adjustment only when frequency standard station WWV is not modulating.

In an AN/SRT-16, unit 1 of the other transmitter group may be used, if it is known to be operating properly, in place of the above check against station WWV, by adjusting the top slug of inductance L-2001 until a 1:1 Lissajous pattern is obtained on the oscilloscope. A Lissajous pattern may be obtained by connecting both 100 KC X-TAL outputs to the X and Y axes of the oscilloscope OS-8A/U (or equivalent). If a zero beat cannot be obtained by adjusting the top slug of inductance L-2001, place unit 1 on a subunit extension test cable and adjust the bottom slug of inductance L-2001.

**CAUTION**

The bottom slug of inductance L-2001 is a *factory adjustment* and should *not* be tampered with unless absolutely necessary.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—Unit 1 may be removed by turning the two 1/4-turn cowl fasteners and removing the five cables connected to the chassis. The handle should be used to pull the chassis from the mounting.

**CAUTION**

When removing unit 1, pull handle slowly and straight out so as not to bend any of the pins on the connecting plug.

To remove the crystal oven plug-in unit, loosen the two screws holding the metal bracket and remove bracket. The crystal oven can now be removed by pulling it from the socket.

The following steps should be taken to remove the thermostat in the crystal oven plug-in unit:

*Step 1.* Remove three screws on top rim of oven.

*Step 2.* Lift off top cover and remove layer of spun glass insulation and crystal cover.

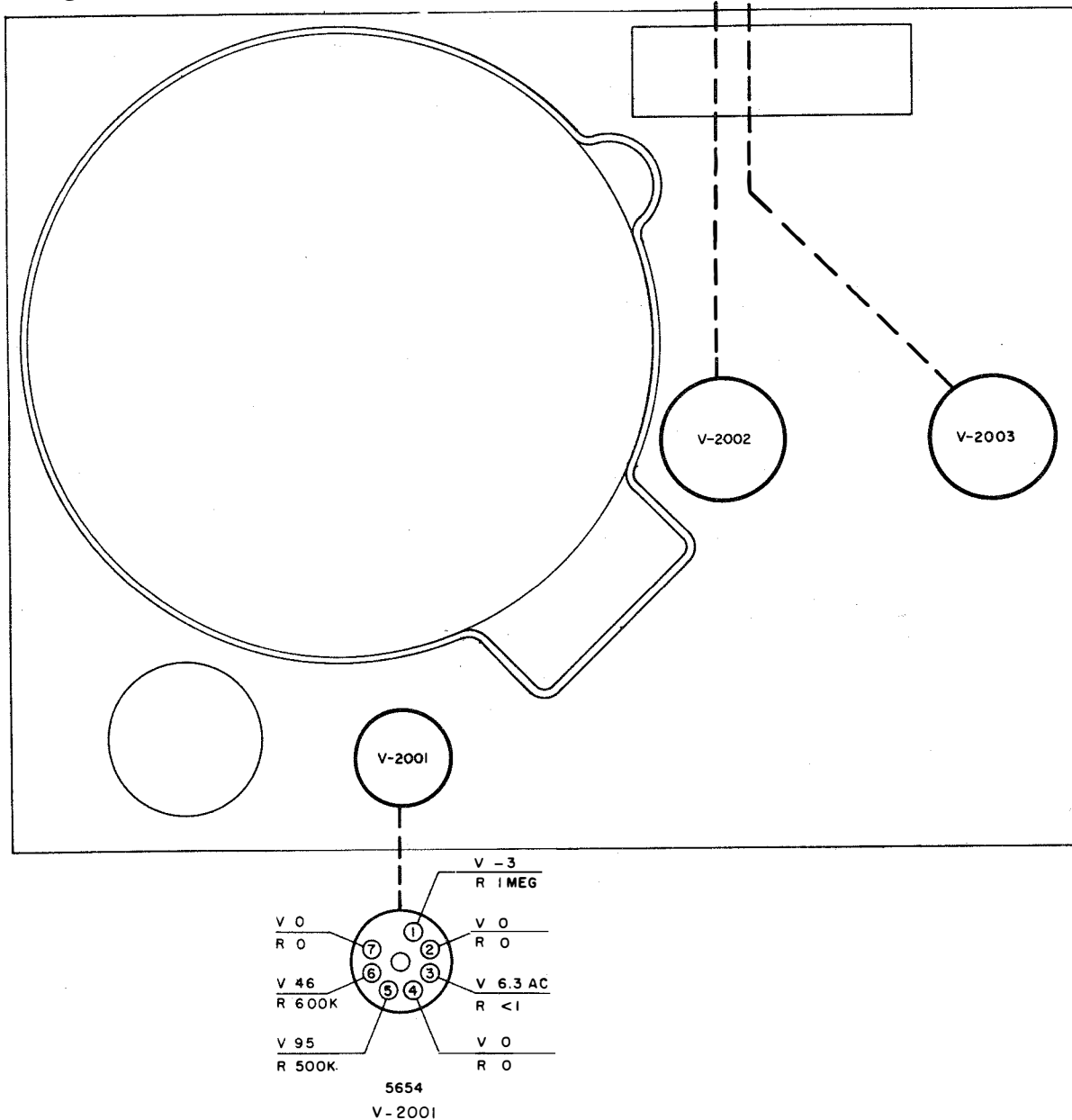
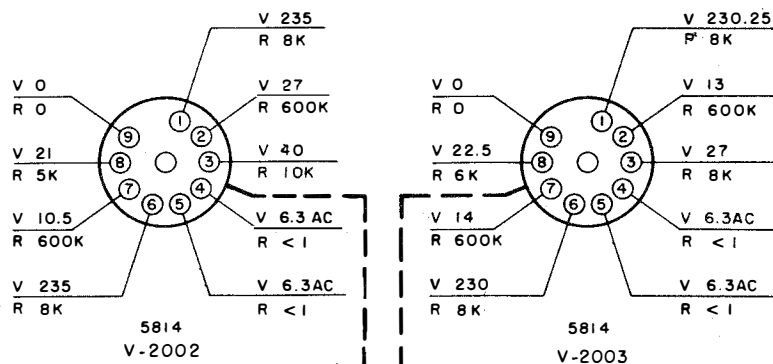
*Step 3.* Lift out bakelite centering ring and remove three screws around rim of socket end of the oven assembly.

**Note**

When a Bliley crystal is used in unit 1, it may be necessary to push out three threaded pins that hold the bakelite ring before removing the bakelite spacer ring. When a James Knight crystal is used, there is a slight opening where the ring fits the aluminum crystal

**NOTES**

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.



**Figure 7-11. RFO, Unit 1 (Z-2001), Voltage and Resistance Chart**

housing which allows the use of a screwdriver to be inserted to permit lifting of the bakelite spacer ring.

Step 4. Carefully remove exterior housing and pad of spun glass insulation.

Step 5. Carefully remove thin strip of spun glass insulation at base of the assembly.

Step 6. The thermostat is now accessible and may be removed. Mark connections so that they may be replaced in the same manner in which they were originally installed.

(b) REPLACEMENT AND ADJUSTMENTS.—

To replace the crystal oven, plug it into its socket, replace the bracket, and tighten the two screws that attach the bracket to the chassis. The crystal oven has seven pins, two of which are larger than the other five. Make sure pins are lined up properly before replacing oven in its socket. To replace unit 1, line up the two chassis guide holes on unit 1 with the chassis guide pins on unit 14 mounting. Push unit 1 down slowly until it is properly seated in position and tighten the two cowl fasteners. Connect the five cables to the proper jacks on unit 1.

**CAUTION**

Do not force unit 1 into position. Forcing may cause the pins on its connecting plug to be damaged.

**Note**

When replacing unit 1 with a new unit 1, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

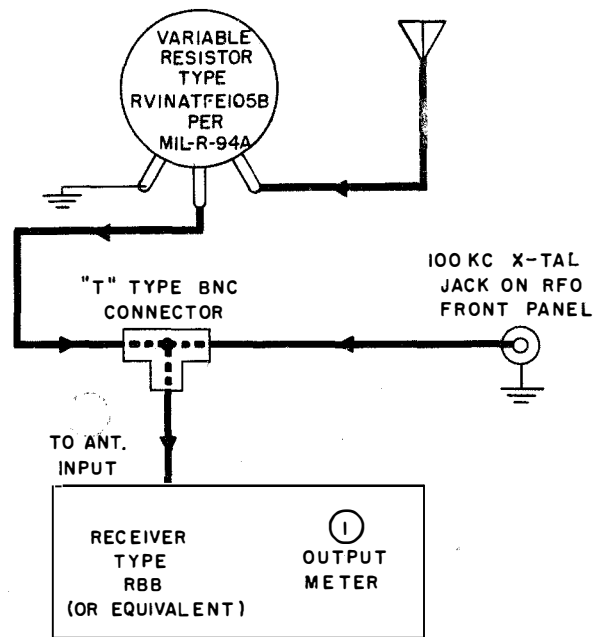


Figure 7-13. RFO Frequency Check, Test Setup

e. FREQUENCY MULTIPLIER, UNIT 2 (Z-2034), TROUBLE SHOOTING.—The frequency multiplier (unit 2) has five 1-mc outputs. (See trouble location diagram, figure 7-120.)

These r-f outputs can be measured at the test points by means of Multimeter ME-25A/U, or equivalent. (Use the probe for all r-f measurements.) Table 7-6 indicates r-f measurements at test points on unit 2.

To check the r-f outputs of unit 2, the RFO drawer must be extended, the interlock bypassed and OPERATE-STANDBY switch (P) placed in STANDBY.

TABLE 7-6. UNIT 2, R-F VOLTAGE AT TEST POINTS

| OUTPUT | UNIT | NOMINAL VOLTAGE |
|--------|------|-----------------|
| 2a     | 4    | 8.7             |
| 2b     | 5    | 1.2             |
| 2c     | 6    | 1.2             |
| 2d     | 7    | 8.7             |
| 2e     | 10   | 8.7             |

The one input to unit 2 (signal 1a) can be checked at J-2038 on unit 2. If only signals 2e and 2d are present in the output, tube V-2033 (5814) is probably at fault. If only signals 2b, 2c and 2a are present, tube V-2034 (5814) is probably at fault. If no output signal is present, use the trouble location diagram, figure 7-120, schematic, figure 7-125, wiring diagram, figure 7-126, and voltage and resistance chart, figure 7-15.

f. FREQUENCY MULTIPLIER, UNIT 2 (Z-2034), REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—In unit 2, the six adjustments that can be made are the top and

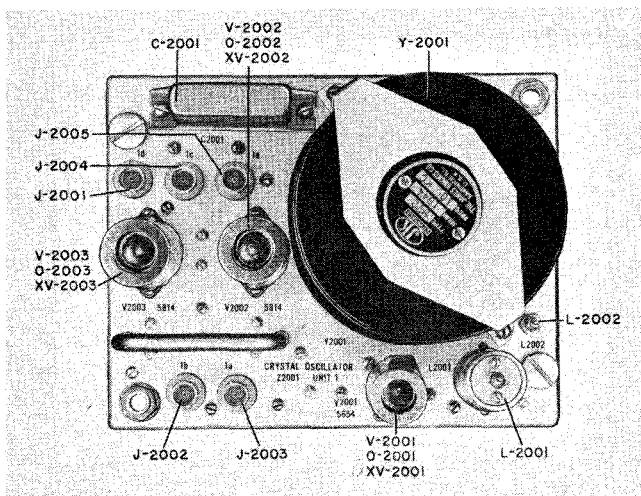


Figure 7-12. RFO, Unit 1 (Z-2001), Top View

bottom slugs of Z-2031, Z-2032, and Z-2033. Refer to figures 7-16 and 7-17.

### WARNING

These six adjustments are *factory adjustments* and should *not* be tampered with unless a transformer is replaced or an adjustment has become loose.

Unit 2 is located on the top of the RFO mounting (figure 7-8) and the top slugs of Z-2031, Z-2032, and Z-2033 may therefore be adjusted without removing unit 2 from the mounting. The RFO drawer must be pulled all the way out and the top protective cover removed in order to make these adjustments.

**Step 1.** Place equipment in stand-by condition, OPERATE-STANDBY switch  $\text{\textcircled{P}}$  in STANDBY position.

**Step 2.** Bypass the RFO interlock.

**Step 3.** Connect Multimeter ME-25A/U, or equivalent, to output 2a, using the r-f probe, and set meter on 15.0-volt scale.

**Step 4.** Adjust the top slugs of Z-2031, Z-2032, and Z-2033 for a maximum reading on Multimeter ME-25A/U.

**Step 5.** Connect unit 2 to a subunit extension test cable and adjust the bottom slugs of Z-2031, Z-2032, and Z-2033 for maximum reading on Multimeter ME-25A/U.

### (2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—Unit 2 may be removed by turning the two 1/4-turn cowl fasteners and removing the six cables connected to the chassis. Use the handle to remove unit 2 from the mounting.

### CAUTION

When removing unit 2, pull handle slowly and straight out so as not to bend any of the pins on its connecting plug.

(b) REPLACEMENT AND ADJUSTMENTS.—To replace unit 2, line up the chassis guide holes on unit 2 with the chassis guide pins on unit 14. Push unit 2 slowly until it is properly seated in position, and tighten the two cowl fasteners. Connect the six cables to the proper jacks on unit 2.

### CAUTION

Do not force unit 2 into position. Forcing may cause the pins on its connecting plug to be damaged.

### Note

When replacing unit 2 with a new unit 2, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14

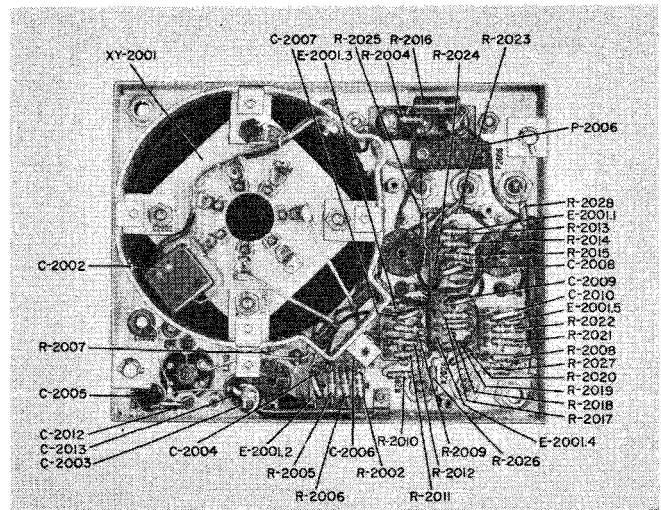


Figure 7-14. RFO, Unit 1 (Z-2016), Cover Removed, Bottom View

mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

No adjustments are required on unit 2 unless Z-2031, Z-2032, or Z-2033 is replaced. When replacing any one of these transformers adjust its top and bottom slugs as indicated in paragraph 5f(1).

g. RADIO FREQUENCY OSCILLATOR, UNIT 3 (Z-2053), TROUBLE SHOOTING.—The interpolation oscillator, unit 3 (figures 7-18, 7-19 and 7-20), is the most critical unit in the RFO. Extreme care should be taken to prevent changing the variable inductors during servicing. In the event that tests indicate that unit 3 is in need of alignment, always attempt to zero the unit with the INT. OSC. ZERO ADJ. (front panel) as described in paragraph 5 b (1) (a). If this control does not bring unit 3 into alignment, check unit 1 alignment as indicated in paragraph 5 d (1) before deciding the trouble to be in unit 3.

Unit 3 has two outputs (3a and 3b) of 90 to 100 kc in 10-cps steps. These frequencies are set up manually by means of the RFO front panel knobs  $\text{\textcircled{C}}$ ,  $\text{\textcircled{D}}$ , and  $\text{\textcircled{E}}$ . Unit 3 output frequency can be checked on the ZERO BEAT INDICATOR and adjusted as indicated in paragraph 5 b (1) (a).

If there is no output from unit 3, check r-f voltage at jack INT. OSC. on RFO front panel. Use Multimeter ME-25A/U (or equivalent) with r-f probe; the reading should be approximately 0.2 volt. Use the trouble location diagram, figure 7-120, and refer to unit 3 schematic diagram, figure 7-127, the wiring diagram, figure 7-128, and the voltage and resistance chart, figure 7-21, to locate the fault.

### b. RADIO FREQUENCY OSCILLATOR, UNIT 3 (Z-2053), REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—All adjustments on unit 3 are factory adjustments with the ex-

ception of INT. OSC. ZERO ADJ. L-2080. The factory adjustments should not be tampered with unless the adjustable component has been changed or complete alignment is required because of poor operation of the unit indicated by Lissajous patterns from frequency comparison and the minimum r-f voltage measurements using the RFO trouble location diagram.

taken to replace components in Z-2052 so that the combination of capacitors used to replace a component is of the exact same value as the components being replaced.

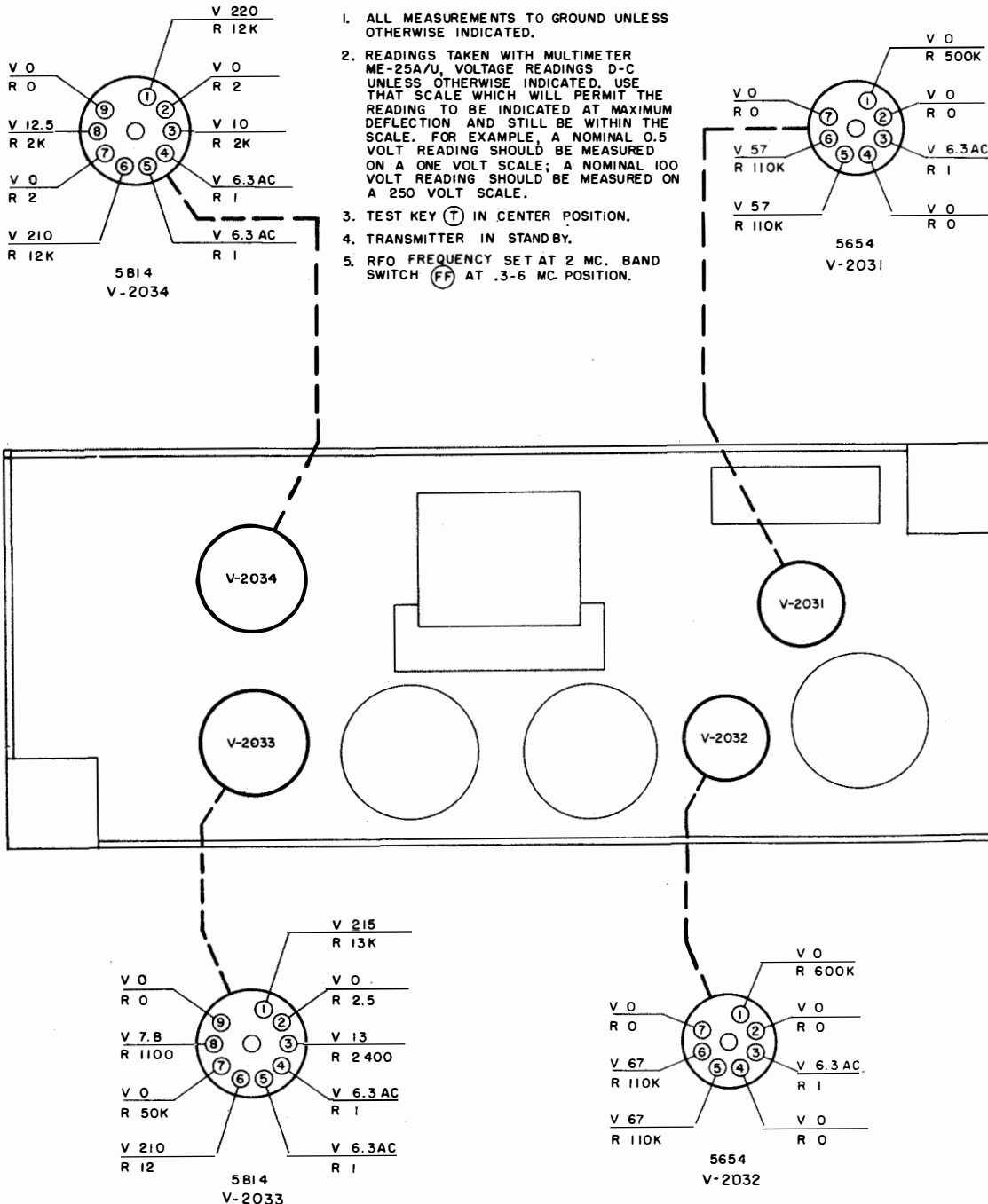
**CAUTION**

Combinations of precision capacitors are used in assembly Z-2052 and extreme care must be

(a) INTERPOLATION OSCILLATOR ZERO ADJUST L-2080.—Whenever oscillator tube V-2051 is replaced, it generally throws unit 3 out of alignment. The step accuracy of the 1,000-, 100- and 10-cycle switches (S-2051, S-2052 and S-2053 respectively) is retained, and all that need be done is to zero the INT.

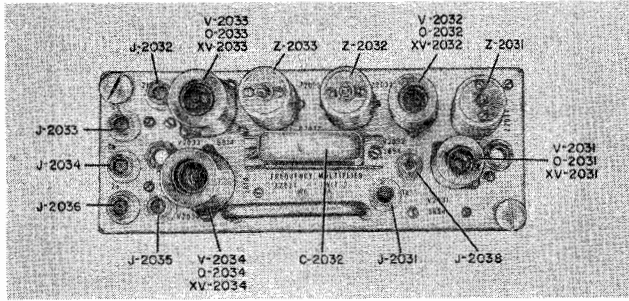
**NOTES**

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC. POSITION.



**Figure 7-15. RFO, Unit 2 (Z-2034), Voltage and Resistance Chart**





**Figure 7-16. RFO, Unit 2 (Z-2034), Top View**

OSC. ZERO ADJ. This adjustment can be made without removing the RFO drawer, as follows:

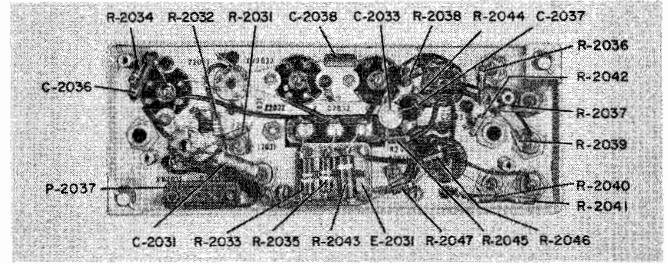
*Step 1.* Allow oscillator ovens to cycle for one hour (i.e., oven indicators blinking on and off).

*Step 2.* Place equipment in a stand-by condition, OPERATE-STANDBY switch (P) in the STANDBY position.

*Step 3.* Turn the KC knob (C) to position 9, the 100-cycle knob (D) to position 9, and the 10-cycle knob (E) to position 10. This sets the output frequency of unit 3 at 100 kc.

*Step 4.* Place INT. OSC. - F.S. OSC. switch (Z) on the RFO front panel to position INT. OSC.

*Step 5.* Adjust INT. OSC. ZERO ADJ. (L-2080) on the front panel with an insulated screwdriver to get minimum frequency opening and closing of electron eye 6E5 (front panel) and labeled ZERO BEAT INDICATOR. A minimum deviation in deflection is



**Figure 7-17. RFO, Unit 2 (Z-2034), Cover Removed, Bottom View**

ideal. Refer to Section 2 for detailed electron eye indication.

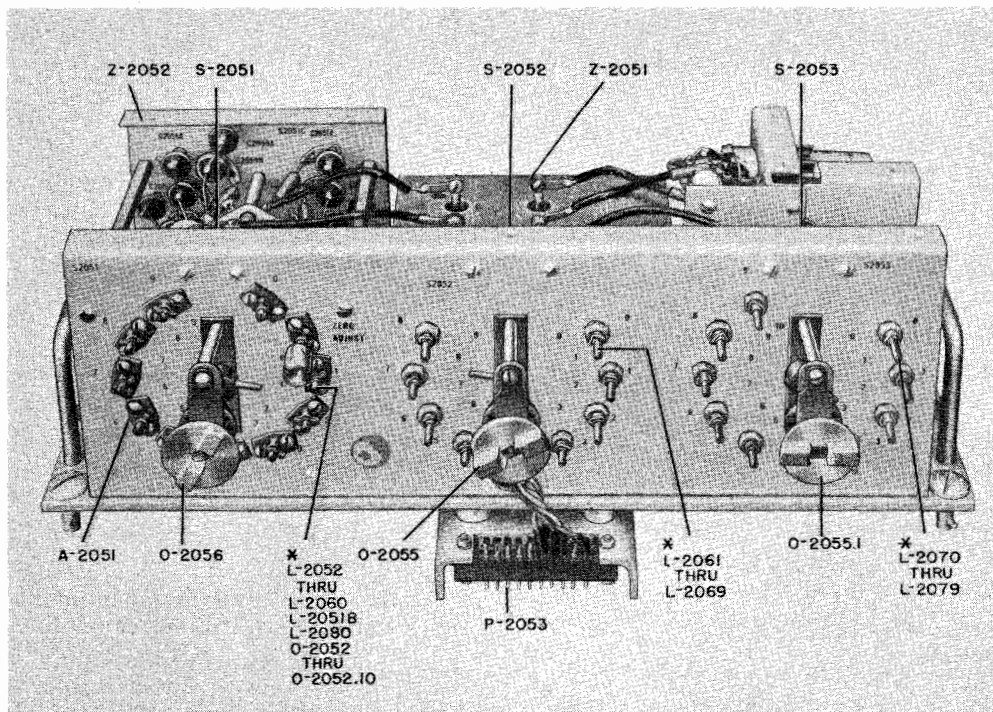
An alternate means of checking the frequency of unit 3 may be accomplished by means of an external oscilloscope. Use Oscilloscope OS-8A/U, or equivalent. Follow steps 1, 2, and 3 in the preceding frequency check.

*Step 1.* Connect cable from INT. OSC. jack on the RFO front panel to the vertical input of the oscilloscope.

*Step 2.* Connect cable from 100 KC X-TAL jack on the RFO front panel to the horizontal input of the oscilloscope.

A 1:1 ratio Lissajous pattern should appear on the oscilloscope (refer to figure 7-2). If not, adjust INT. OSC. ZERO ADJ. until a 1:1 pattern that is as nearly stationary as possible is observed on the oscilloscope.

(b) UNIT 3 ALIGNMENT.—The alignment of unit 3 is a critical process and should be undertaken only by the most skilled technical personnel.



**Figure 7-18. RFO, Unit 3 (Z-2053), Top Oblique View**

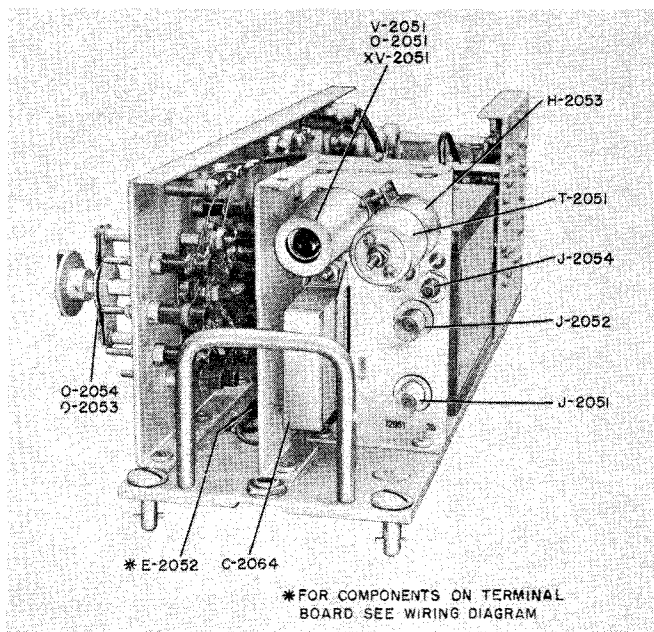


Figure 7-19. RFO, Unit 3 (Z-2053), Right Side View

Perform the following procedure to align the interpolation oscillator. These adjustments are to be made at a base depot only and are not intended for field use. For field check of unit 3, refer to paragraph 5 g.

An accurate frequency meter is required to make these adjustments. Frequency Meter AN/USM-29 or the AN/FRM-3 may be used.

**CAUTION**

These adjustments are factory adjustments and should *not* be tampered with unless absolutely necessary.

*Step 1.* Remove unit 3 from mounting (as described in 5 b (2) (a) below), place on extension test cables, cheat interlock, and place equipment in STANDBY condition.

*Step 2.* Connect unit 3 output (3a) to the input of the AN/USM-29, or equivalent.

*Step 3.* The AN/USM-29 has a built-in oscilloscope. If an external oscilloscope, such as the OS-8A/U, is used, connect the output of unit 3 to the vertical input and the output of the frequency meter to the horizontal input of the oscilloscope to obtain a Lissajous pattern.

*Step 4.* Warm up the ovens and filaments at least one hour before making adjustments.

*Step 5.* Place unit 3 switch S-2051 at position 0, switch S-2052 at position 9, and switch S-2053 at position 10. This will set up a frequency of 91 kc on unit 3.

*Step 6.* Position the AN/USM-29 frequency selection knobs to 91 kc.

*Step 7.* Adjust INT. OSC. ZERO ADJ. (L-2080) for a 1:1 Lissajous pattern, as observed on the AN/USM-29 oscilloscope. If a 1:1 Lissajous figure cannot be obtained when adjusting L-2080, then L-2051B, the coarse adjustment (at adjustment label 0), must be set so that a 1:1 Lissajous pattern may be obtained when L-2080 is approximately in the center of its range.

**Note**

Adjustment of L-2080 and L-2051B must be made *only* when the output of unit 3 is 91 kc.

*Step 8.* Place unit 3 switch S-2051 at position 0 and switch S-2052 at position 9. On the AN/USM-29 set the 1K knob to position 0 and the 100 knob to position 9.

*Step 9.* Place both the unit 3 switch S-2053 and the 10 knob of the AN/USM-29 to the positions listed in table 7-7, and adjust the corresponding inductors, labeled on the front of unit 3, for a 1:1 Lissajous pattern as observed on the AN/USM-29 oscilloscope. Adjustments must be made in the order given in table 7-7.

TABLE 7-7. UNIT 3, S-2053 AND AN/USM-29 10 KNOB POSITIONS AND ADJUSTMENTS

| POSITION OF S-2053 AND 10 KNOB (AN/USM-29) | ADJUSTMENT | ADJUSTMENT LABEL |
|--|------------|------------------|
| 9  | L-2079     | 9                |
| 8  | L-2078     | 8                |
| 7  | L-2077     | 7                |
| 6  | L-2076     | 6                |
| 5  | L-2075     | 5                |
| 4  | L-2074     | 4                |
| 3  | L-2073     | 3                |
| 2  | L-2072     | 2                |
| 1  | L-2071     | 1                |
| 0  | L-2070     | 0                |

*Step 10.* Place unit 3 switch S-2051 to position 0 and switch S-2053 to position 10. On the AN/USM-29 set the 1K knob to position 0 and the 10 knob to position 10.

*Step 11.* Place both unit 3 switch S-2052 and the 100 knob of the AN/USM-29 to the positions listed in table 7-8, and adjust the corresponding inductors labeled on the front of unit 3 for a 1:1 Lissajous pattern as observed on the AN/USM-29 oscilloscope. Adjustments must be made in the order given in table 7-8.

*Step 12.* Place unit 3 switch S-2052 to position 9 and switch S-2053 to position 10. On the AN/USM-29, set the 100 knob to position 9 and the 10 knob to position 10.

*Step 13.* Place both unit 3 switch S-2051 and the 1K knob of the AN/USM-29 to the positions listed in table 7-9, and adjust the corresponding inductors labeled on the front of unit 3 for a 1:1 Lissajous pattern as observed on the AN/USM-29 oscilloscope. Adjustments must be made in the order given in table 7-9.

**TABLE 7-8. UNIT 3, S-2052 AND AN/USM-29  
100 KNOB POSITIONS AND ADJUSTMENTS**

| POSITION OF S-2052 AND 100 KNOB (AN/USM-29) | ADJUSTMENT | ADJUSTMENT LABEL |
|---|------------|------------------|
| 8   | L-2069     | 8                |
| 7   | L-2068     | 7                |
| 6   | L-2067     | 6                |
| 5   | L-2066     | 5                |
| 4   | L-2065     | 4                |
| 3   | L-2064     | 3                |
| 2   | L-2063     | 2                |
| 1   | L-2062     | 1                |
| 0   | L-2061     | 0                |

**TABLE 7-9. UNIT 3, S-2051 AND AN/USM-29  
1K KNOB POSITIONS AND ADJUSTMENTS**

| POSITION OF S-2051 AND 1K KNOB (AN/USM-29) | ADJUSTMENT | ADJUSTMENT LABEL |
|--|------------|------------------|
| 1  | L-2052     | 1                |
| 2  | L-2053     | 2                |
| 3  | L-2054     | 3                |
| 4  | L-2055     | 4                |
| 5  | L-2056     | 5                |
| 6  | L-2057     | 6                |
| 7  | L-2058     | 7                |
| 8  | L-2059     | 8                |
| 9  | L-2060     | 9                |

*Step 14.* Recheck INT. OSC. ZERO ADJ. (L-2080) at 91 kc by repeating steps 5 and 6 and adjusting L-2080 for a 1:1 Lissajous pattern, if necessary.

(c) T-2051 FILTER ADJUSTMENT.—Unit 3 contains a band-pass filter, T-2051 (90-100 kc), which has two adjustments.

**Note**

The following adjustments were made at the factory and should not be tampered with unless the transformer has been replaced or if an adjustment has become loose.

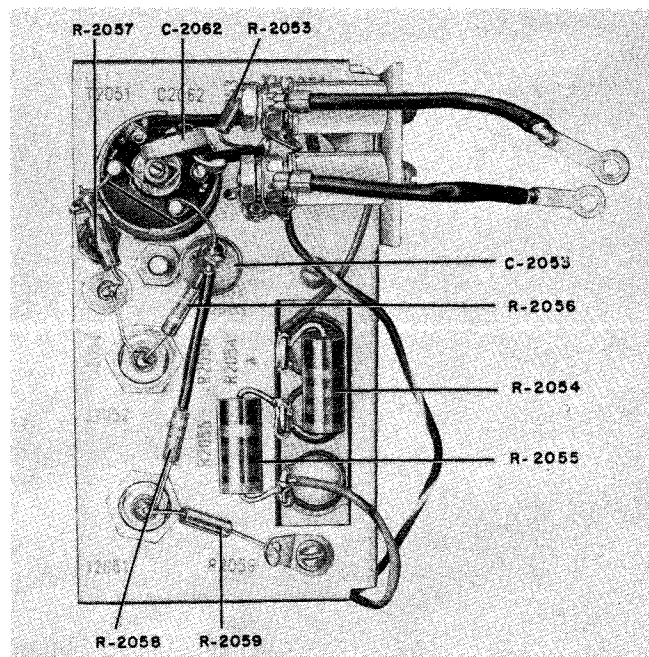
*Step 1.* Turn switch S-2051 to position 4, switch S-2052 to position 9, and switch S-2053 to position 10. This sets up unit 3 for a 95-kc output.

*Step 2.* Connect Multimeter ME-25A/U (or equivalent) with r-f probe to test point 3a (J-2054). Connect output 3a (J-2052) to its own cable on the mounting with an extension test cable.

*Step 3.* Adjust first the bottom and then the top slug of filter T-2051 to obtain a peak reading on the multimeter. Apply glyptal to the top adjustment screw.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—The following procedure should be followed to remove unit 3 from the mounting (unit 14):



**Figure 7-20. RFO, Unit 3 (Z-2053), Tube Shelf, Wiring Side**

*Step 1.* Place knobs Ⓞ, Ⓟ and Ⓠ to position 0. (Red dots on flexible couplers should face upward.)

*Step 2.* Disconnect the two cables plugged into unit 3.

*Step 3.* Loosen the four 1/4-turn cowl fasteners that secure unit 3 to the mounting.

*Step 4.* Using the two handles, pull unit slowly and straight up until plugs and couplers are disengaged.

To reach the switch wafers, oscillator oven and tube sockets, remove the 12 screws holding the top cover plate of unit 3, and remove the cover plate. The left side cover plate may also be removed at this time.

To remove assembly Z-2052, loosen screws and pull straight backwards.

The following steps should be observed to remove oven assembly Z-2051:

*Step 1.* Remove connections C, D, G and K at top of oven assembly.

*Step 2.* Remove the two screws supporting the oven assembly at the bottom of unit 3.

*Step 3.* Remove the oven assembly far enough from the chassis to disconnect leads to the oven terminal and plate.

Whenever oven Z-2051 is removed and replaced by another oven, L-2051B, mounted on front plate of unit 3, must also be removed and replaced.

**CAUTION**

Because of critical circuitry, L-2051B and oven Z-2051 should not be replaced indi-

vidually. When one or the other is replaced, both items (L-2051B and Z-2051) should be replaced as a unit.

When oven assembly Z-2051 has been removed from unit 3, the thermostat (S-2054) in the oven may be removed and replaced as follows:

*Step 1.* Remove the nine flathead screws holding the terminal end of the oven assembly.

*Step 2.* Remove the two large flathead screws at the bottom of the oven assembly.

*Step 3.* Remove melamine box surrounding the oven assembly.

*Step 4.* Unsolder thermostat leads to terminal lugs "T".

*Step 5.* Remove and replace thermostat.

*Step 6.* Reassemble and glyptal all screws.

(b) REPLACEMENT AND ADJUSTMENTS.

—To replace the oscillator oven, replace screws on bottom of unit 3 and replace wires on the proper lugs as follows:

- "H"—Gray-green
- "H"—No connection
- "T"—Gray
- "T"—Gray-red

To replace assembly Z-2052, slide it onto the shaft of switch S-2051. The keyway "pip" on the switch wafer

rotor must be lined up with the "pip" on switch wafer rotor of switch S-2051. Replace the four mounting screws and connect the wire.

To replace unit 3, be sure to place red dots on flexible couplers facing upwards, and place Ⓒ, Ⓓ, and Ⓔ front panel knobs on position 0. At this point, the red indicators on the shafts should be pointing to position 0.

Line up the two chassis guide holes on unit 3 with the chassis guide pins on unit 14 mounting. Push unit 3 straight down, making sure couplers are mating properly. Properly seat unit 3 in position, and tighten the four cowl fasteners. The top and side covers may be replaced before or after unit 3 is mounted.

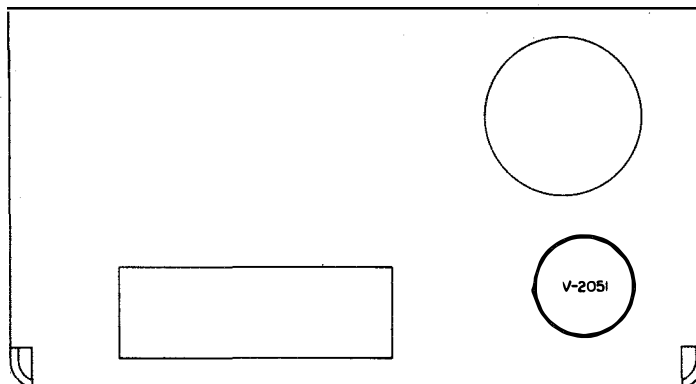
**CAUTION**

Do not force unit 3 into position. Forcing may cause the pins on its connecting plug to be damaged.

**Note**

When replacing unit 3 with a new unit 3, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

j. FREQUENCY MULTIPLIER, UNIT 4 (Z-2103), TROUBLE SHOOTING.—The frequency multiplier



NOTES

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY Ⓓ IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH Ⓔ AT .3-6 MC POSITION.

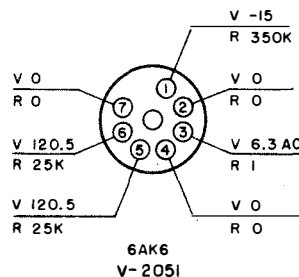
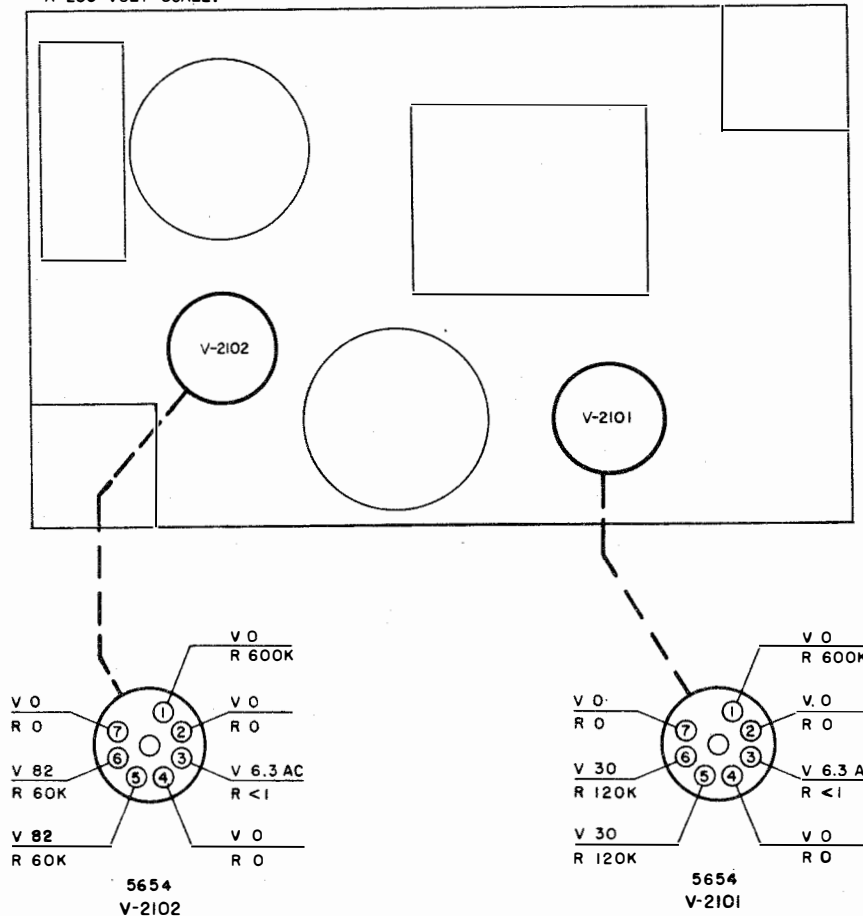


Figure 7-21. RFO, Unit 3 (Z-2053), Voltage and Resistance Chart

**NOTES**

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.



**Figure 7-22. RFO, Unit 4 (Z-2103), Voltage and Resistance Chart**

(unit 4) receives a 1-mc signal (approximately 8.0 volts), which can be checked at test point 2a with a multimeter (ME-25A/U or equivalent), using the r-f probe. The output is an 8-mc signal which can be checked at 4a (approximately 1.1 volts). If there is no output, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-129, the wiring diagram, figure 7-130, and the voltage and resistance chart, figure 7-22, to locate the faulty component.

**k. FREQUENCY MULTIPLIER, UNIT 4  
(Z-2103) REPAIR AND ADJUSTMENT.**

(1) **ELECTRICAL ADJUSTMENTS.**—The four adjustments that may be made on unit 4 are the top and bottom slugs of Z-2101 and Z-2102 (figures 7-23 and 7-24).

**Note**

These four adjustments are made at the *factory* and should *not* be tampered with unless one of the transformers has been replaced or if an adjustment has become loose.

Unit 4 is located on the top of the RFO, figure 7-8, and the top slugs of Z-2101 and Z-2102 may therefore be adjusted without removing unit 4 from the mounting. The RFO drawer must be pulled all the way out, and its top protective cover removed in order to make these adjustments.

**Note**

Do not make these adjustments until units 1 and 2 are properly aligned.

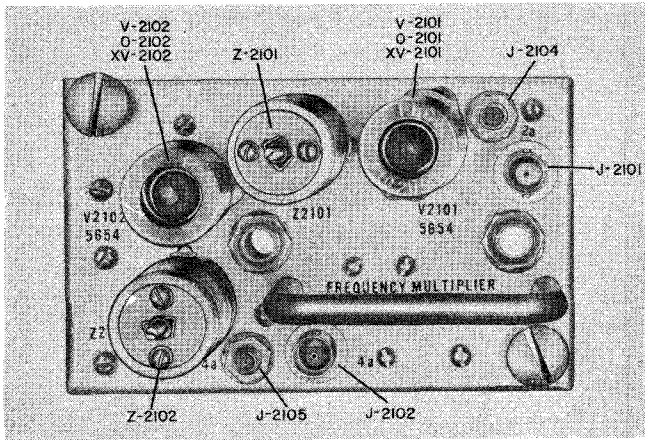


Figure 7-23. RFO, Unit 4 (Z-2103), Top View

**Step 1.** Pull the RFO drawer out, cheat interlock, and place equipment in stand-by condition, switch  $\text{\textcircled{P}}$  in STANDBY.

**Step 2.** Connect Multimeter ME-25A/U (or equivalent) with r-f probe to output 4a, using 2.5-volt scale.

**Step 3.** Adjust top slugs of Z-2101 and Z-2102 for maximum reading on Multimeter ME-25A/U.

**Step 4.** Connect unit 4 to an extension test cable, and adjust bottom slugs of Z-2101 and Z-2102 for maximum reading on Multimeter ME-25A/U.

**Step 5.** Repeat steps 3 and 4 for maximum voltage output and seal (glyptal) the top slugs.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—Unit 4 may be removed by loosening the two 1/4-turn cowl fasteners and removing the two cables connected to the chassis. Use handle to remove from mounting.

**CAUTION**

When removing unit 4, pull handle slowly and straight up so as not to bend any of the pins on the connecting plug.

(b) REPLACEMENT AND ADJUSTMENTS.

—To replace unit 4, line up the two chassis guide holes on unit 4 with the chassis guide pins on unit 14 mounting. Push unit 4 down slowly until it is properly seated in position, and tighten the two cowl fasteners. Connect the two cables to proper jacks on unit 4.

**CAUTION**

Do not force unit 4 into position. Forcing may cause the pins on its connecting plug to be damaged.

**Note**

When replacing unit 4 with a new unit 4, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14

mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

No adjustments are required on unit 4 unless Z-2101 or Z-2102 is replaced. When replacing either one of these transformers, adjust its top and bottom slug as described in paragraph 5k(1).

l. ELECTRONIC FREQUENCY CONVERTER, UNIT 5 (Z-2158) TROUBLE SHOOTING.—The electronic frequency converter (unit 5) has five inputs and one output. Signal 2b can be checked at test point 2b, signal 3a at test point 3a on unit 3, signal 4a at test point 4a, signal 1b at test point 1b (during CW operation CARRIER ON), and signal 12a at test point 12a on unit 12. If no signal is present (during FSK operation), on either test points 1b or 12a, check proper operation of relay K-2151 in unit 5. Refer to table 7-10 for nominal r-f voltages at test points. The output signal may be checked at test point 5a (approximately 1.0 volt). If there is no output, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-131, the wiring diagram, figure 7-132, and the voltage and resistance chart, figure 7-25, to locate the fault.

TABLE 7-10. UNIT 5, R-F VOLTAGE AT TEST POINTS

| TEST POINT | NOMINAL VOLTAGE    |
|------------|--------------------|
| 4a         | 1.1                |
| 2b         | 0.9                |
| 5a         | 1.0                |
| 1b         | 0.2 CW, CARRIER ON |

m. ELECTRONIC FREQUENCY CONVERTER, UNIT 5 (Z-2158) REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—The 14 adjustments that can be made on unit 5 are the top and

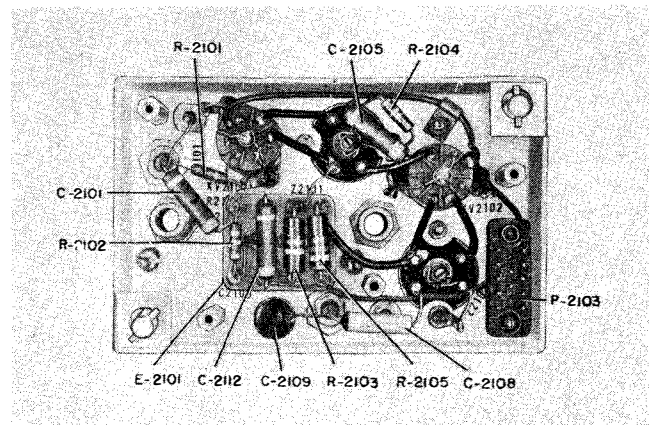


Figure 7-24. RFO, Unit 4 (Z-2103), Cover Removed, Bottom View

bottom slugs of Z-2151 through Z-2157; refer to figures 7-26 and 7-27.

of the transformers is replaced or an adjustment becomes loose.

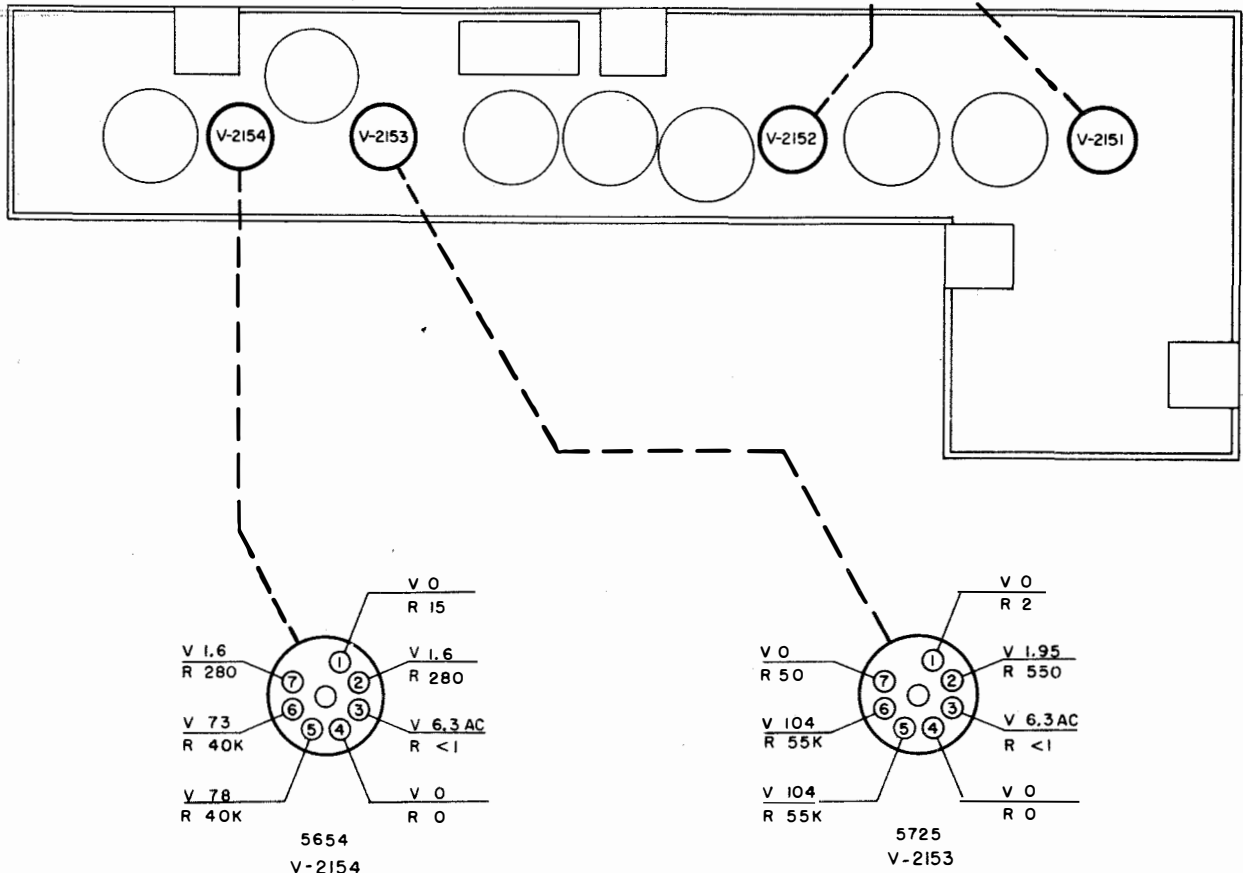
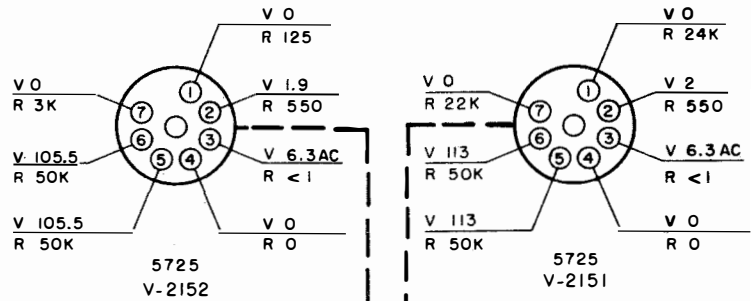
**Note**

These 14 adjustments are made at the *factory* and should *not* be tampered with unless one

The RFO drawer must be pulled out, interlock cheated, and the unit must be connected to an extension test cable to make these adjustments. Refer to Section 1 for extension test cable fabrication instructions.

**NOTES**

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.



**Figure 7-25. RFO, Unit 5 (Z-2158), Voltage and Resistance Chart**

**Note**

Do not make these adjustments until units 1, 2, 3, and 4 are properly aligned.

*Step 1.* Pull RFO drawer all the way out and cheat interlock.

*Step 2.* Connect unit 5 to an extension test cable, and connect cables to following jacks on unit 5: 4a, 2b, 1b, and 3a.

*Step 3.* Place equipment in stand-by condition, switch  $\text{\textcircled{P}}$  in STANDBY.

*Step 4.* Place knob  $\text{\textcircled{C}}$  at 5,  $\text{\textcircled{D}}$  at 0, and knob  $\text{\textcircled{E}}$  at 0 (position of other knobs immaterial).

*Step 5.* Connect Multimeter (ME-25A/U or equivalent) with r-f probe to test point 5a and set meter on the 2.5-volt scale.

*Step 6.* Adjust top and bottom slugs of Z-2151 through Z-2157 for maximum reading on Multimeter ME-25A/U. Apply glyptal to the top adjustment screws of Z-2151 through Z-2157.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—Unit 5 may be removed by turning four 1/4-turn cowl fasteners and removing the six cables connected to chassis. Use handles to remove unit 5 from the mounting. Figures 7-26 and 7-27 show the location of all components on unit 5.

**CAUTION**

When removing unit 5, pull handles slowly and straight up so as not to bend any of the pins on the connecting plug.

(b) REPLACEMENT AND ADJUSTMENTS.

—To replace unit 5, line up guide holes with guide

pins on mounting. Seat unit 5 properly, and tighten cowl fasteners. Connect the six cables to proper jacks on unit 5.

**CAUTION**

Do not force unit 5 into position. This may cause the pins on its connecting plug to be damaged.

**Note**

When replacing unit 5 with a new unit 5, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

No adjustments are required on unit 5 unless one of the transformers, Z-2151 through Z-2157, is replaced. Adjustments should be performed as described in paragraph 5m(1).

n. ELECTRONIC FREQUENCY CONVERTER, UNIT 6 (Z-2204), TROUBLE SHOOTING.—The electronic frequency converter (unit 6), figures 7-28 and 7-29, has three inputs and three outputs. Two of the outputs can be checked by means of an external oscilloscope (OS-8A/U or equivalent), enabling an operational check of unit 6 at two points. Signal 6c is the 10-kc output of blocking oscillator tube V-2202A (12AU7), which can be checked by means of an oscilloscope at the 10 KC jack on the RFO front panel. If this signal is not present, tube V-2201 (5654) or V-2202 (12AU7) is probably at fault. Signal 6a is the 210- to 300-kc output of the oscillator stage, which can also be checked by means of an oscilloscope at the 10 KC STEP jack on the front panel of the RFO. If signal 6a is not present, check tubes V-2203 (5725), V-2204

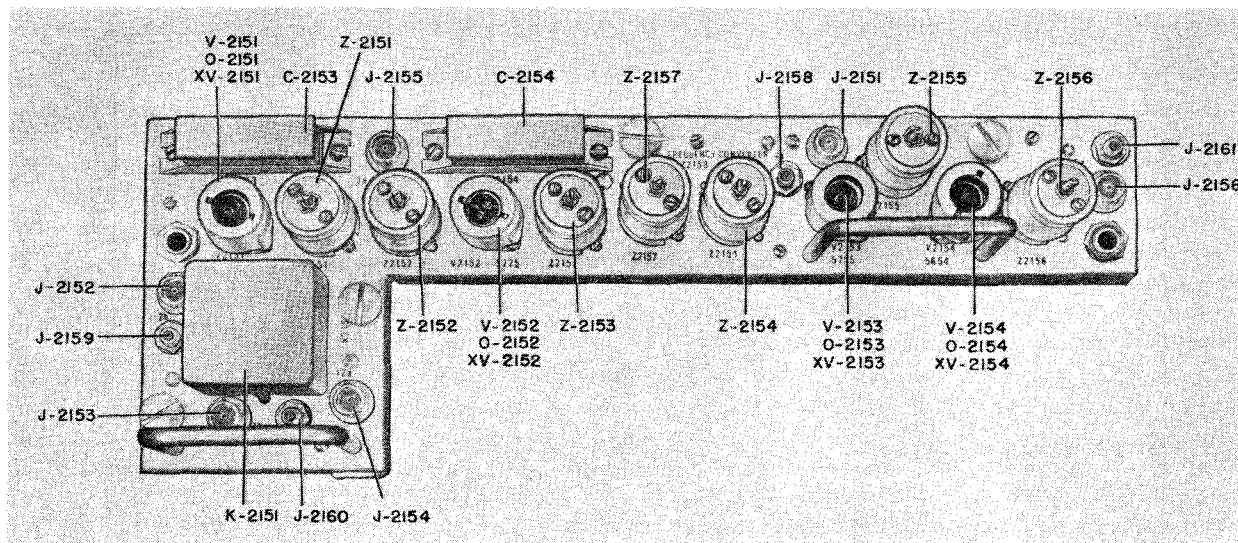


Figure 7-26. RFO, Unit 5 (Z-2158), Top View



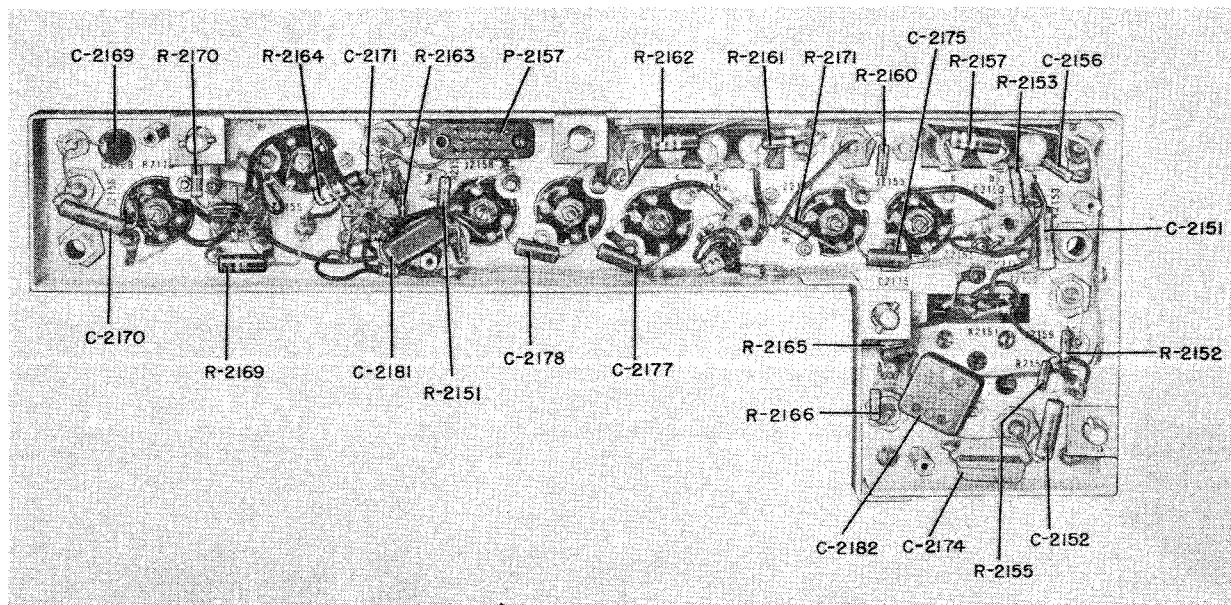


Figure 7-27. RFO, Unit 5 (Z-2158), Cover Removed, Bottom View

(5654), and V-2205 (6AK6). If signals 6a, 6c and all of the inputs are present but there is no output (signal 6b), check tubes V-2206 (5725), V-2207 (5725), V-2208 (5654), and V-2209 (5654). Nominal r-f voltages may be measured by means of Multimeter ME-25A/U (with r-f probe) as indicated in table 7-11.

TABLE 7-11. UNIT 6, R-F VOLTAGE AT TEST POINTS

| TEST POINT | NOMINAL VOLTAGE |
|------------|-----------------|
| 1a         | 7.0             |
| 2c         | 0.9             |
| 5a         | 0.9             |
| 6b         | 0.8             |

Use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-133, the wiring diagram, figure 7-134, and the voltage and resistance chart, figure 7-30, to locate the faulty component.

*o.* ELECTRONIC FREQUENCY CONVERTER, UNIT 6 (Z-2204), REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—All adjustments on unit 6 are factory adjustments with the exception of R-2210 and C-2219 (figure 7-28). The factory adjustments should not be tampered with unless the adjustable component has been changed or complete alignment is required because of poor operation of unit 6, as determined by the trouble location diagram method outlined in figure 7-120.

(a) R-2210 ADJUSTMENT.—Whenever tube V-2202 is replaced, or a complete alignment of unit 6 is undertaken, potentiometer R-2210 (figure 7-28) must be adjusted as follows:

**Note**

R-2210 may be adjusted without removing unit 6 from mounting. Unit 1 must be properly aligned before adjusting R-2210.

*Step 1.* Place equipment in stand-by condition, switch  $\text{\textcircled{P}}$  in STANDBY. Allow proper warm-up (1 hour) for ovens and filaments.

*Step 2.* Connect a cable from jack 10 KC on front panel of RFO to vertical input of Oscilloscope OS-8A/U, or equivalent.

*Step 3.* Connect a cable from jack 100 KC X-TAL on the RFO front panel to the horizontal input of the oscilloscope.

*Step 4.* Loosen locknut and adjust R-2210 for a stable 10:1 Lissajous pattern on the oscilloscope screen. (Refer to figure 7-2.)

*Step 5.* Rotate R-2210 clockwise until the pattern breaks up. Turn R-2210 back until the 10:1 pattern reappears. Mark this position on the chassis.

*Step 6.* Rotate R-2210 counterclockwise until the pattern breaks up again. Turn R-2210 back until the 10:1 pattern reappears. Mark this position on the chassis.

*Step 7.* Set R-2210 midway between the two marked positions.

**Note**

If a 10:1 Lissajous pattern cannot be obtained, but one of a different ratio (for instance 9:1 or 11:1), check the values of the components of the RC circuits in the blocking oscillator.

(b) C-2219 ADJUSTMENT.—Whenever mixer tube V-2203, reactance tube V-2204, or oscillator tube V-2205 are replaced, variable capacitor C-2219 (fig-

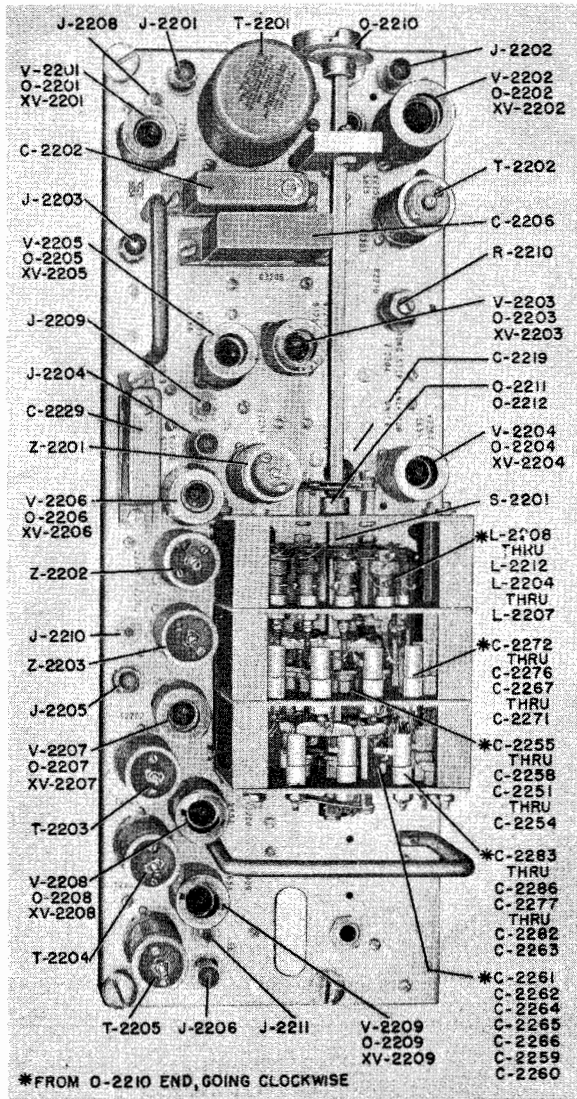


Figure 7-28. RFO, Unit 6 (Z-2204), S-2201 Cover Removed, Top View

ure 7-29) must be adjusted. C-2219 is adjusted in the following manner:

**Note**

Unit 1 and R-2210 must be properly aligned before making adjustments of C-2219. C-2219 may be adjusted without removing unit 6 from the mounting.

Step 1. Place equipment in stand-by condition, switch Ⓟ in STANDBY.

Step 2. After proper warm-up place knob Ⓜ to position 9 (300 kc). Positions of other knobs are immaterial.

Step 3. Connect a cable from 10 KC STEP jack on RFO front panel to the vertical input of Oscilloscope OS-8A/U, or equivalent.

Step 4. Connect a cable from 100 KC X-TAL jack on RFO front panel to the horizontal input of the oscilloscope.

Step 5. Adjust C-2219 for a stable 3:1 Lissajous pattern on the oscilloscope screen.

Step 6. Rotate C-2219 clockwise until the pattern breaks up. Turn C-2219 back until the 3:1 pattern reappears. Mark position of adjustment slot.

Step 7. Rotate C-2219 counterclockwise until pattern breaks up again. Turn C-2219 back until the 3:1 pattern reappears. Mark position of adjustment slot.

Step 8. Set C-2219 adjustment slot at a midpoint between the two markings.

Step 9. Zero the interpolation oscillator as described in paragraph 5b(1)(a).

Step 10. Disconnect the cable from 100 KC X-TAL jack and connect the cable between the horizontal input of the oscilloscope and the INT. OSC. jack.

Step 11. Place front panel knobs Ⓜ, Ⓞ, and Ⓟ to position 9, and Ⓢ to position 10.

Step 12. A 3:1 Lissajous pattern should now be observed on the oscilloscope screen. If the correct pattern can be found by rotating the INT. OSC. ZERO ADJ. a half turn in either direction, unit 6 is on frequency; if it is not, align the 10-kc step switch S-2201 as instructed in paragraph 5o(1)(d). Do not adjust C-2219 to obtain this 3:1 pattern.

Step 13. If the correct pattern was obtained in step 12, other positions of switch S-2201 may be checked by observing the Lissajous patterns as indicated in table 7-2.

**Note**

No adjustments should be made in this check. If any switch position does not produce the correct Lissajous pattern, proceed with the alignment of switch S-2201.

(c) T-2202 ADJUSTMENT.—The adjustments of ringing coil T-2202 are factory adjustments and should not be tampered with unless it is replaced or an adjustment becomes loose. Unit 6 must be removed from the mounting and placed on extension test cables for this adjustment. (See paragraph 5o(2)(a).) The top and bottom slugs of T-2202 should be set so that they are turned in an equal distance and touch each other.

For a more efficient alignment, connect an oscilloscope with frequency response characteristics of at least 2 mc between pin 1 of T-2202 and chassis ground, with a 1/2-megohm, 1/2-watt resistor used to isolate the oscilloscope test probe. Adjust first the bottom, then the top slug of T-2202 for maximum positive pulse, with minimum ringing.

(d) STEP OSCILLATOR S-2201 ADJUSTMENTS.—Whenever a complete alignment of the 10-kc step switch S-2201 is required, adjustments Z-2201 and

C-2219 (on top of unit 6 chassis) and inductors L-2204 through L-2212 (adjusted through access holes marked D0 through D8, respectively, at the rear of S-2201) will require adjustment.

**Note**

The 10-kc step switch adjustments are factory adjustments and should not be tampered with unless absolutely necessary. These adjustments cannot be made until unit 1, the 10-kc blocking oscillator, and transformer T-2202 in unit 6 have been properly aligned. Use the special insulated alignment screwdriver provided with the RFO.

The S-2201 adjustments are made in the following manner, with unit 6 removed from the mounting and placed on extension test cables. Allow (1 hour) warm-up for ovens and filaments.

*Step 1.* Turn S-2201 to position 9 (300 kc).

*Step 2.* Connect a cable from 100 KC X-TAL jack on RFO front panel to the vertical input of Oscilloscope OS-8A/U, or equivalent.

*Step 3.* Connect a cable from 10 KC STEP jack on RFO front panel to the horizontal input of the oscilloscope and place equipment in STANDBY condition.

*Step 4.* Set C-2219 to half capacity position (adjustment slot parallel with the two capacitor mounting screws).

*Step 5.* Adjust Z-2201 for a 3:1 Lissajous pattern.

*Step 6.* Rotate Z-2201 clockwise until the pattern unlocks, and then counterclockwise until it locks in again.

*Step 7.* Rotate Z-2201 counterclockwise until the pattern unlocks, and then clockwise until the pattern locks in again. Note the number of turns through the "lock-in" range of the oscillator and set Z-2201 at the midrange point.

*Step 8.* Disconnect the scope cable to the 100 KC X-TAL jack on RFO front panel, and connect this cable to the 10 KC jack on the front panel.

*Step 9.* For the positions 8 through 0 of S-2201, use table 7-12. Turn slugs of indicators clockwise until oscillator unlocks, and then turn slowly counterclockwise until the oscillator locks at Lissajous pattern count indicated in table 7-12.

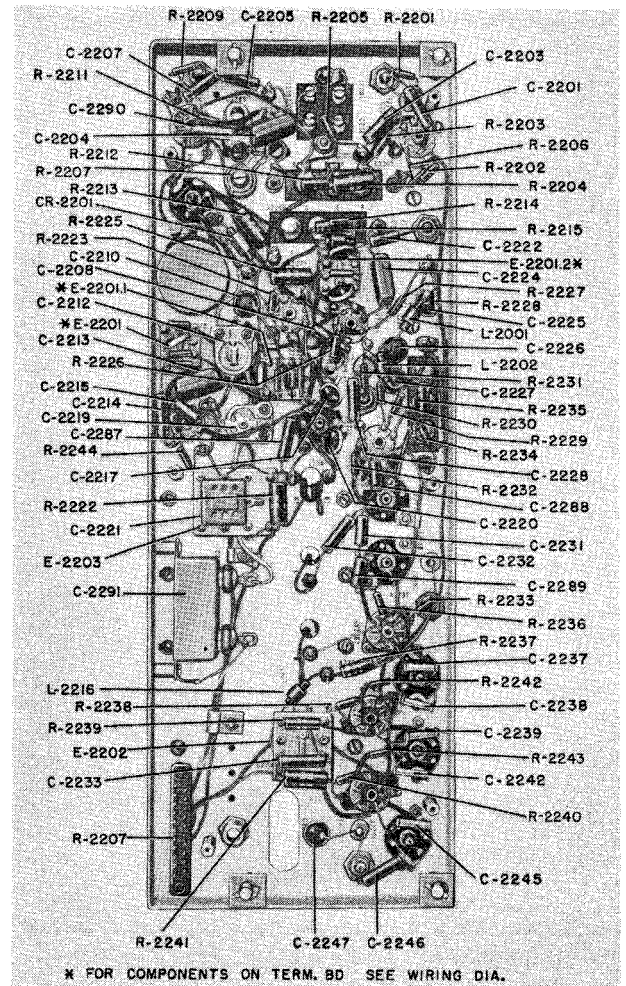
*Step 10.* Turn slugs counterclockwise until oscillator unlocks, then turn slowly clockwise until the oscillator again locks. Note the number of turns through the "lock-in" range of the oscillator and set the slugs at the midrange point.

*Step 11.* Glyptal has been applied to all critical adjustments of unit 6. Reapply glyptal to any of these adjustments that have been moved.

**TABLE 7-12. UNIT 6, 10-KC STEP  
OSCILLATOR ADJUSTMENTS**

| POSITION OF S-2201 | ADJUSTMENT | ADJUSTMENT LABEL | LISSAJOUS PATTERN |
|--------------------|------------|------------------|-------------------|
| 8                  | L-2212     | D8               | 29:1              |
| 7                  | L-2211     | D7               | 28:1              |
| 6                  | L-2210     | D6               | 27:1              |
| 5                  | L-2209     | D5               | 26:1              |
| 4                  | L-2208     | D4               | 25:1              |
| 3                  | L-2207     | D3               | 24:1              |
| 2                  | L-2206     | D2               | 23:1              |
| 1                  | L-2205     | D1               | 22:1              |
| 0                  | L-2204     | D0               | 21:1              |

**(e) 10-KC STEP FILTER ADJUSTMENTS.—** Whenever a component is replaced in the 10-kc step filter circuit, or a complete alignment of unit 6 is required, the 1.21- to 1.3-mc filter adjustments (10-kc



**Figure 7-29. RFO, Unit 6 (Z-2204), Cover Removed, Bottom View**

steps), Z-2202 and Z-2203 (located on the top of unit 6 chassis), and variable capacitors C-2267 through C-2276 (marked C, and C0 through C8, respectively, at the rear of S-2201) and C-2277 through C-2286 (marked B, and B0 through B8, respectively, at the rear of S-2201) will require adjustment.

**Note**

The 10-kc step filter adjustments are factory adjustments and should not be tampered with unless absolutely necessary. These adjustments cannot be made unless units 1, 2, and the other sections of unit 6 have been properly aligned.

It is assumed that unit 6 is still removed from the mounting and connected by extension test cables.

*Step 1.* Place S-2201 to position 9. Positions of other knobs immaterial.

*Step 2.* Connect Multimeter ME-25A/U (or equivalent) to pin 1 of mixer tube V-2207 and ground, with meter on the 2.5-volt scale. Place equipment in STANDBY condition.

*Step 3.* After proper warm-up (1 hour) for ovens and filaments, adjust in sequence Z-2202, C-2267 (through access hole C), Z-2203, and C-2277 (through access hole B) to obtain a peak reading on the multimeter. Repeat the adjustments until an absolute peak is reached.

*Step 4.* Place switch S-2201 to position 8, and following the sequence in table 7-13, adjust the corresponding variable filter capacitors, using the special insulated screwdriver, for the remaining positions of switch S-2201. A peak reading should be obtained for each adjustment.

(f) T-2203, T-2204, T-2205 ADJUSTMENT.—The 10.4-10.5-mc filter adjustments are the top and bottom slugs of transformers T-2203, T-2204 and T-2205 (figure 7-28) and are adjusted whenever a complete alignment is required or a component in the filter circuit has been replaced.

**Note**

These are factory adjustments and should not be tampered with unless absolutely necessary. Units 1, 2, 3, 4, 5, and the other sections of unit 6 must be properly aligned before making these adjustments.

*Step 1.* Connect Multimeter ME-25A/U (or equivalent) to test point 6b (J-2211), and place equipment in STANDBY condition.

*Step 2.* Place switch S-2201 (unit 6) to position 5, and the RFO front panel knobs Ⓞ, Ⓟ, and Ⓠ to position 0 (positions of other knobs immaterial). This setting will pass a frequency (10.45 mc), through filters T-2203, T-2204, and T-2205, which is at the mid-point of the band-pass range.

**TABLE 7-13. UNIT 6, 10-KC STEP FILTER ADJUSTMENTS**

| POSITION OF S-2201 | ADJUSTMENT       | ADJUSTMENT LABEL |
|--------------------|------------------|------------------|
| 8                  | C-2276<br>C-2286 | C8<br>B8         |
| 7                  | C-2275<br>C-2285 | C7<br>B7         |
| 6                  | C-2274<br>C-2284 | C6               |
| 5                  | C-2273<br>C-2283 | C5<br>B5         |
| 4                  | C-2272<br>C-2282 | C4<br>B4         |
| 3                  | C-2271<br>C-2281 | C3<br>B3         |
| 2                  | C-2270<br>C-2280 | C2<br>B2         |
| 1                  | C-2269<br>C-2279 | C1<br>B1         |
| 0                  | C-2268<br>C-2278 | C0<br>B0         |

*Step 3.* After proper warm-up (6 hours), adjust first the bottom, then the top slugs of T-2203, T-2204, and T-2205 to obtain a peak reading on the multimeter. Repeat the adjustments until an absolute peak is reached.

(g) 10-KC TRAP ADJUSTMENT.—The adjustment for the 10-kc trap is variable capacitor C-2212.

**Note**

This is a factory adjustment and should not be tampered with unless absolutely necessary.

Use a calibrated receiver, containing an "S" meter and capable of giving a minimum of 70-db attenuation at 10 kc away from the desired frequency of 10.4 to 10.5 mc. Use attenuators to limit the input to the receiver.

*Step 1.* Place equipment in STANDBY condition. It is assumed that unit 6 is still removed from the mounting and connected by means of extension test cables.

*Step 2.* After proper warm-up (1 hour) place switch S-2201 on position 9, the RFO front panel knobs Ⓞ on position 5, and Ⓟ and Ⓠ on position 0 (positions of other knobs immaterial).

*Step 3.* Disconnect cable to jack 6b (J-2206) on unit 6, and in its place connect the input to the receiver.

*Step 4.* Tune the receiver to the output frequency of unit 6 (10.495 mc).

*Step 5.* Retune the receiver very slowly for the

NOTES

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.

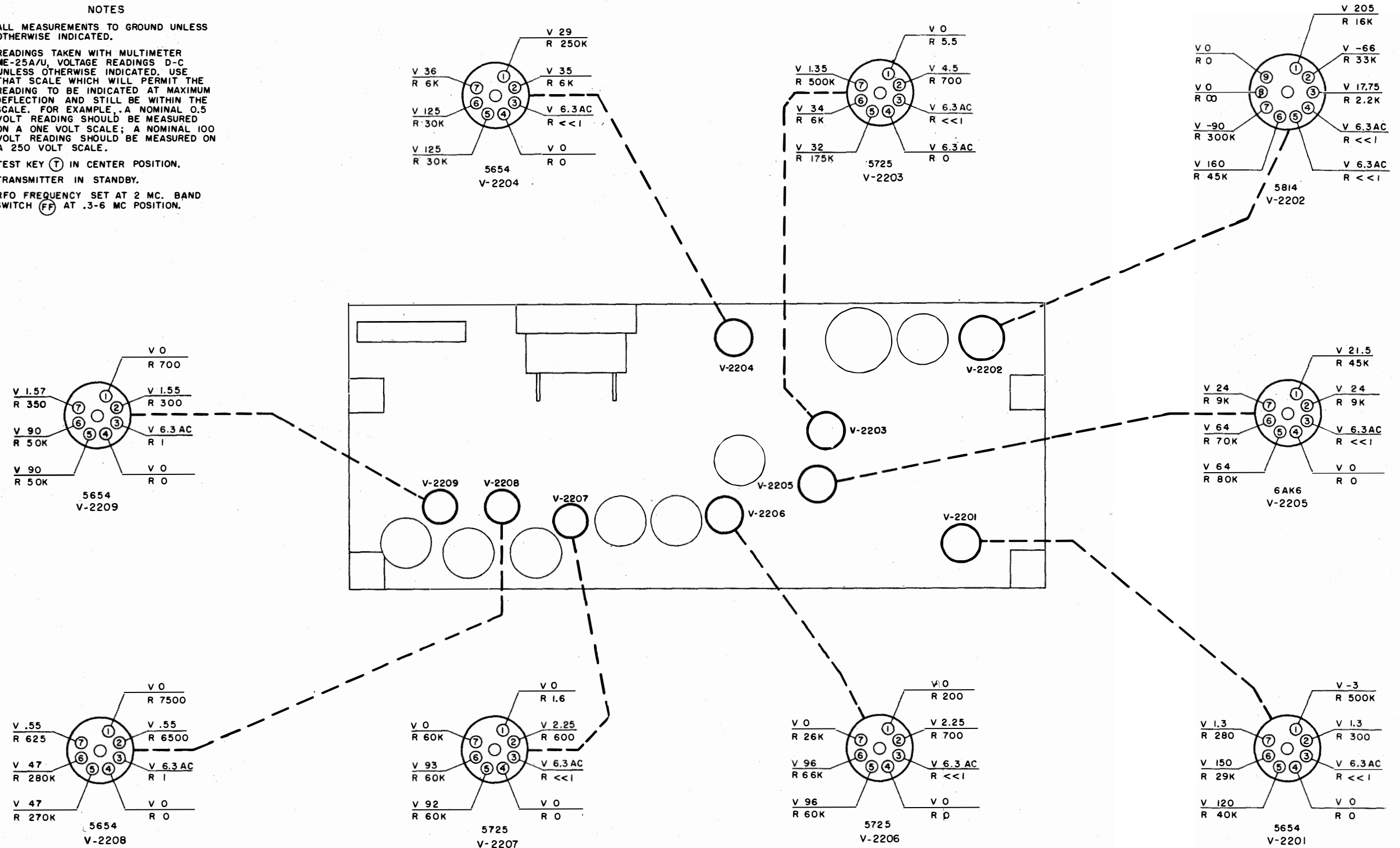


Figure 7-30. RFO, Unit 6 (Z-2204), Voltage and Resistance Chart

NOTES

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.

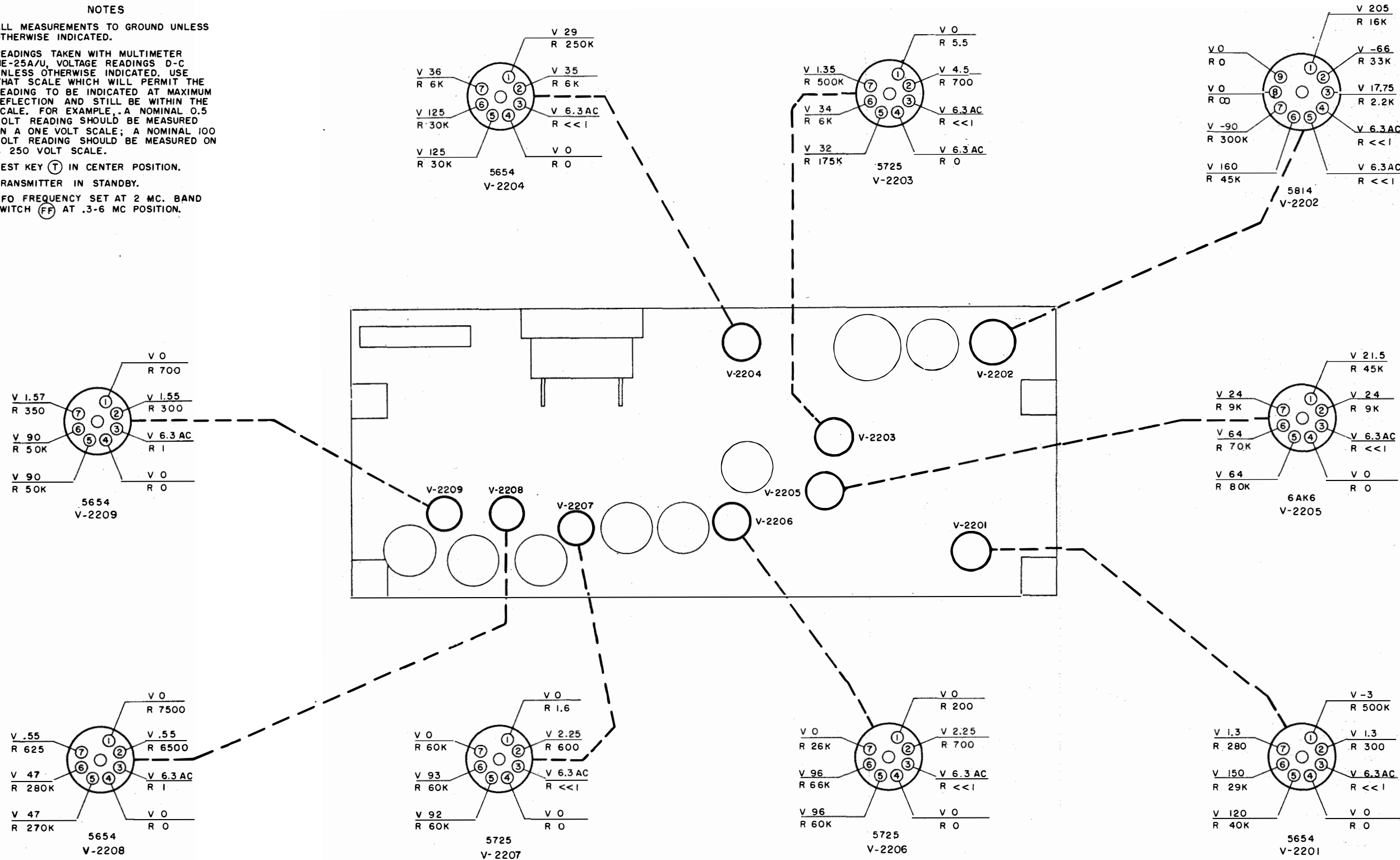


Figure 7-30. RFO, Unit 6 (Z-2204), Voltage and Resistance Chart

**CORRECTIVE  
MAINTENANCE**

**NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A**

**Section 7  
Paragraph 5 o (1) (g)**

next small peak (approximately 70 db down) at a frequency of 10.485 mc.

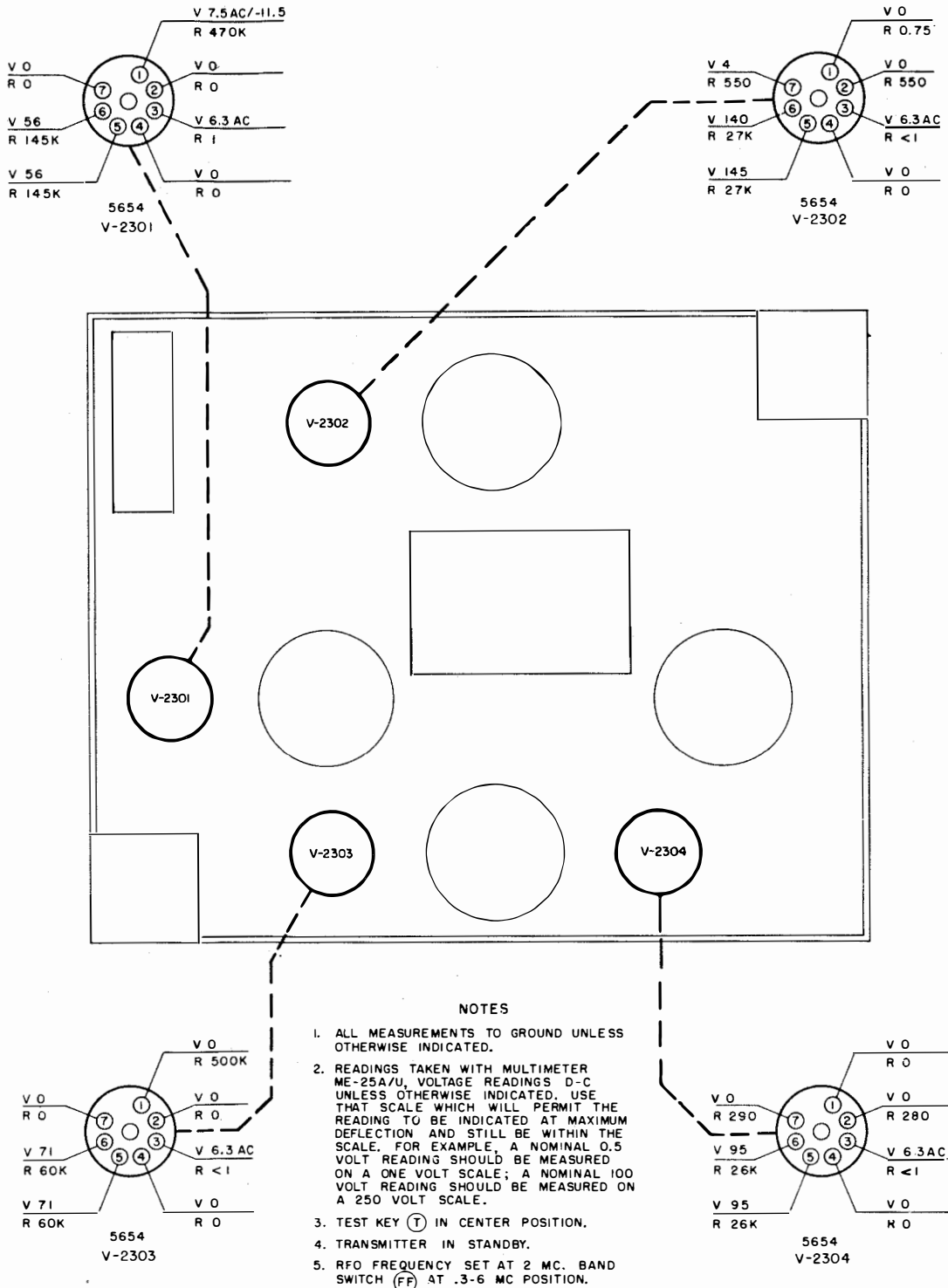
signal strength on "S" meter. If necessary, adjust C-2212 as in step 6 above.

*Step 6.* Adjust C-2212 until this peak is at a minimum, as observed on the receiver "S" meter.

*Step 7.* Tune receiver to 10.505 mc and observe

**Note**

The best possible balance should be obtained between steps 6 and 7.



**NOTES**

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.

**Figure 7-31. RFO, Unit 7 (Z-2305), Voltage and Resistance Chart**

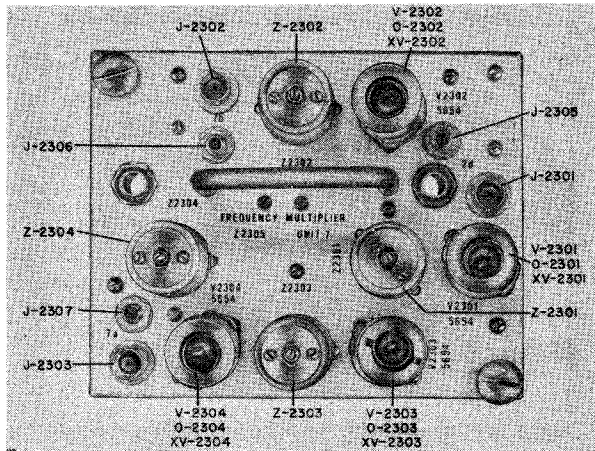


Figure 7-32. RFO, Unit 7 (Z-2305), Top View

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—The following steps should be taken to remove unit 6 from the mounting (unit 14):

Step 1. Turn knob (J) to indicate position 0.

Step 2. Check that red dots on unit 6 coupler are facing outward.

Step 3. Disconnect the six cables plugged into unit 6.

Step 4. Loosen the four 1/4-turn cowl fasteners.

Step 5. Using handles, pull unit 6 slowly and straight out until its plug and coupler are disengaged.

**CAUTION**

When removing unit 6, pull handles slowly so as not to damage pins on connecting plug. Do not apply any chemicals to the trimmer capacitors on S-2201.

(b) REPLACEMENT AND ADJUSTMENTS.

—To replace unit 6, set shaft indicator on unit to position 0. Check that knob (J) is in position 0. Push unit 6 in slowly until coupler engages and plug is properly seated. Tighten the four cowl fasteners. Connect the six cables to the proper jacks on unit 6.

**CAUTION**

Do not force unit 6 into position. Forcing may cause the pins on its connecting plug to be damaged. Be sure that both switch S-2201 and knob (J) indicate the same position.

**Note**

When replacing unit 6 with a new unit 6, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment be sure to

tighten the power plug screws and guide bushing nuts.

p. FREQUENCY MULTIPLIER, UNIT 7 (Z-2305), TROUBLE SHOOTING.—The frequency multiplier (unit 7) has two outputs. Signal 7a (15 mc) can be checked at test point 7a. Signal 7b (5 mc) can be checked at test point 7b. Refer to table 7-14 for nominal r-f voltage at test points.

TABLE 7-14. UNIT 7, R-F VOLTAGE AT TEST POINTS

| TEST POINT | NOMINAL VOLTAGE |
|------------|-----------------|
| 7a         | 1.0             |
| 7b         | 1.4             |
| 2d         | 7.5             |

If only signal 7b is present, check tubes V-2303 (5654) and V-2304 (5654). If only signal 7a is present, check tube V-2302 (5654). If neither output is present, check tube V-2301 (5654). Use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-135, the wiring diagram, figure 7-136, and the voltage and resistance chart, figure 7-31, to locate the faulty component.

q. FREQUENCY MULTIPLIER, UNIT 7 (Z-2305), REPAIR AND ADJUSTMENTS.

(1) ELECTRICAL ADJUSTMENTS.—In unit 7, the eight adjustments that may be made are the top and bottom slugs of Z-2301, Z-2302, Z-2303, and Z-2304 (figures 7-32 and 7-33).

**Note**

These eight are *factory adjustments* and should *not* be tampered with unless a transformer is replaced or an adjustment becomes loose.

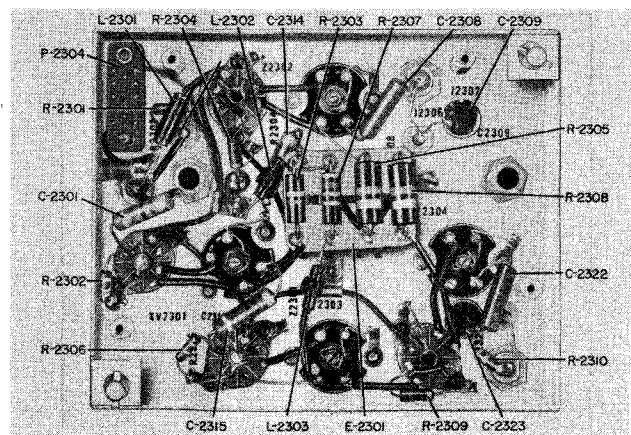
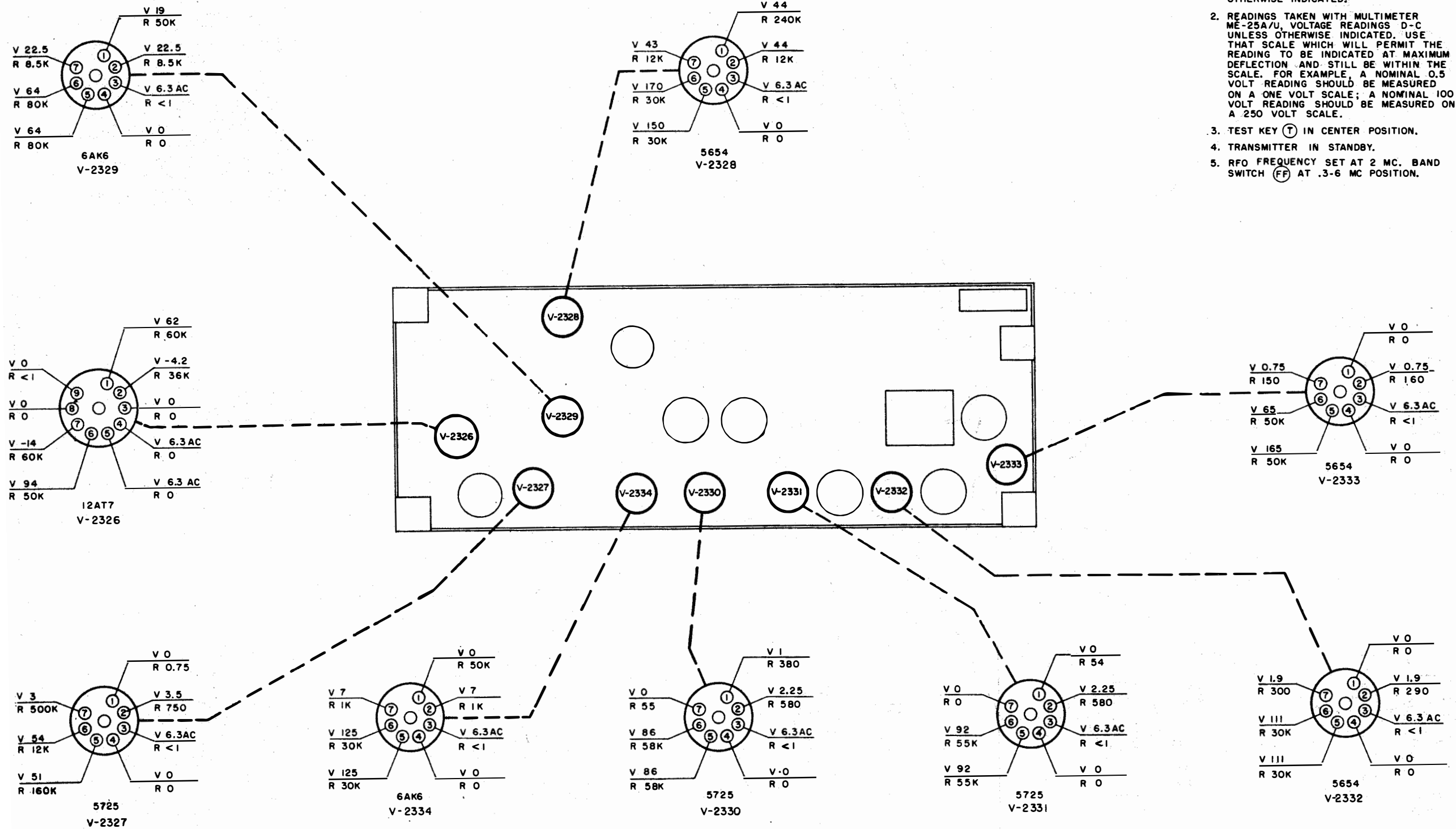


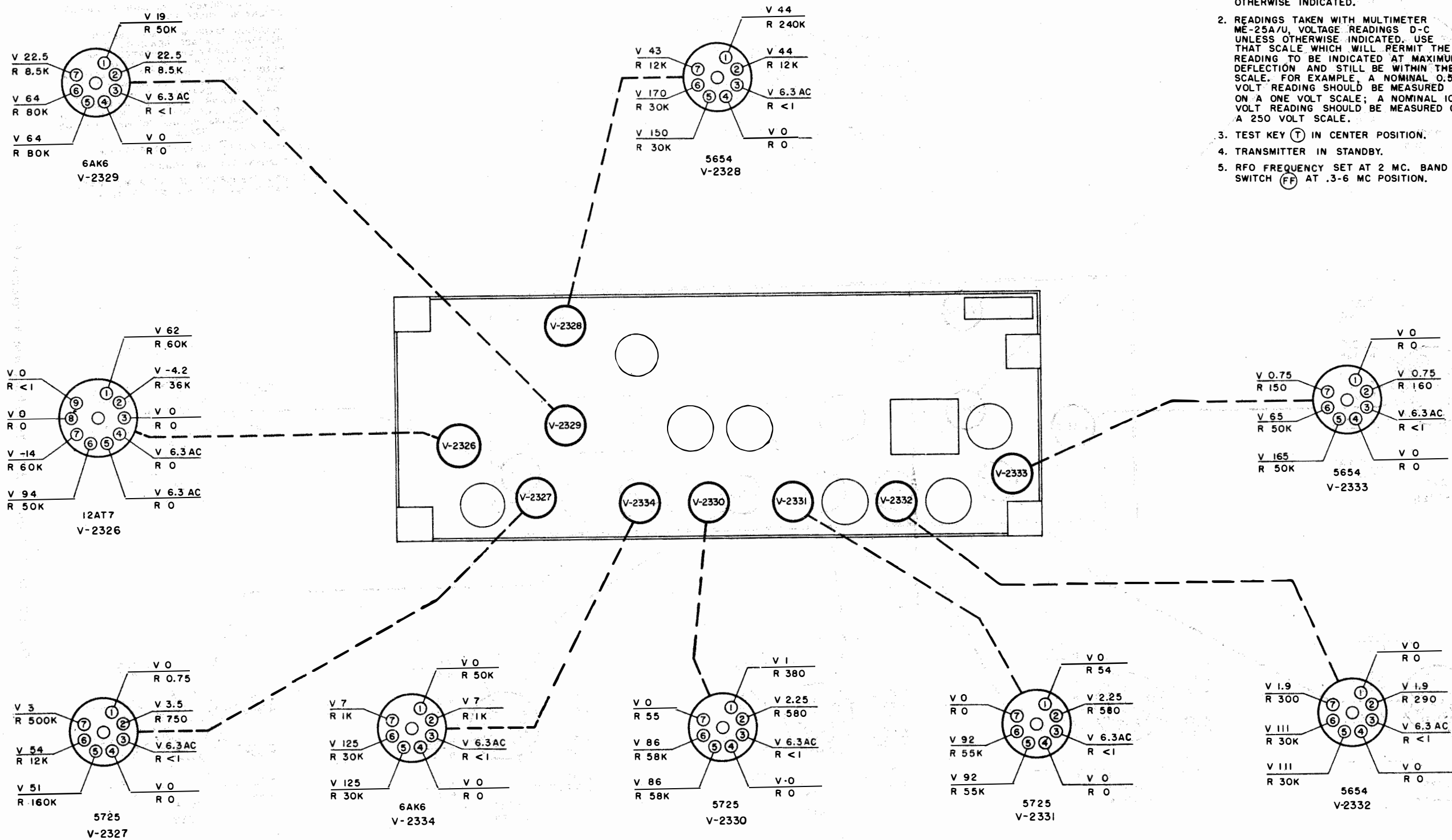
Figure 7-33. RFO, Unit 7 (Z-2305), Cover Removed, Bottom View





- NOTES
1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
  2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
  3. TEST KEY (T) IN CENTER POSITION.
  4. TRANSMITTER IN STANDBY.
  5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.

Figure 7-34. RFO, Unit 8 (Z-2330), Voltage and Resistance Chart



- NOTES
1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
  2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
  3. TEST KEY (T) IN CENTER POSITION.
  4. TRANSMITTER IN STANDBY.
  5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.

Figure 7-34. RFO, Unit 8 (Z-2330), Voltage and Resistance Chart

Since unit 7 is located on the top of the RFO, the top slugs may be adjusted without removing unit 7 from the mounting. Pull RFO drawer all the way out and remove its top cover.

**Note**

Do not make these adjustments until units 1 and 2 are properly aligned.

*Step 1.* Place equipment in stand-by condition, switch  $\text{\textcircled{P}}$  in STANDBY.

*Step 2.* Connect Multimeter ME-25A/U (or equivalent) to jack 7b, using 2.5-volt scale with r-f probe.

*Step 3.* Adjust top slugs of Z-2301 and Z-2302 for maximum reading on meter.

*Step 4.* Place unit 7 on an extension test cable, and adjust the bottom slugs of Z-2301 and Z-2302 for a maximum reading on Multimeter ME-25A/U. Refer to Section 1 for extension test cable fabrication instructions.

*Step 5.* Connect multimeter to jack 7a and leave meter on 2.5-volt scale.

*Step 6.* Connect the extension cable to unit 7 and adjust the bottom slugs of Z-2303 and Z-2304, for maximum reading on multimeter. Apply glyptal to the top slugs of Z-2301 through Z-2304.

**(2) MECHANICAL ADJUSTMENTS.**

**(a) REMOVAL AND REPAIR.**—Unit 7 may be removed by turning the two 1/4-turn cowl fasteners and removing the three cables connected to the chassis. Use handle to remove unit 7 from mounting.

**CAUTION**

Pull handle slowly and straight up so as not to bend the pins on the connecting plug.

**(b) REPLACEMENT AND ADJUSTMENTS.**

—To replace unit 7, line up guide holes on unit with guide pins on mounting. Push down until properly seated, and tighten the two cowl fasteners. Connect three cables to proper jacks on unit 7.

**CAUTION**

Do not force unit 7 into position. Forcing may damage the pins on its connecting plug.

No adjustments are required on unit 7, unless Z-2301, Z-2302, Z-2303, or Z-2304 is replaced. When replacing any one of these transformers, adjust its top and bottom slugs; refer to paragraph 5q(1).

**Note**

When replacing unit 7 with a new unit 7, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure

to tighten the power plug screws and guide bushing nuts.

**7. ELECTRONIC FREQUENCY CONVERTER, UNIT 8 (Z-2330), TROUBLE SHOOTING.**—The electronic frequency converter (unit 8) has three inputs and two outputs. Input signal 1d can be checked at test point 1d, signal 7a at test point 7a, and signal 6b at test point 6b. Refer to table 7-15 for nominal r-f voltages at test points. Output signal 8a (1.6 mc and 2.5 mc in 100-kc steps) can be checked by means of an oscilloscope or multimeter by connecting to jack 100 KC STEP on the RFO front panel. Output signal 8b can be checked at test point 8b. If signal 8b is present but 8a is not, check tube V-2334 (6AK6).

**TABLE 7-15. UNIT 8, R-F VOLTAGE AT TEST POINTS**

| TEST POINT                          | NOMINAL VOLTAGE |
|-------------------------------------|-----------------|
| 1d                                  | 13.5            |
| 7a                                  | 1.0             |
| 6b                                  | 0.7             |
| 8b                                  | 1.0             |
| (8a) 100 KC STEP jack on RFO panel. | 0.8             |

A stage-by-stage r-f voltage measurement of unit 8 can be made by means of Multimeter ME-25A/U (or equivalent), using the r-f probe. If there is no output, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-137, the wiring diagram, figure 7-138, and the voltage and resistance chart, figure 7-34.

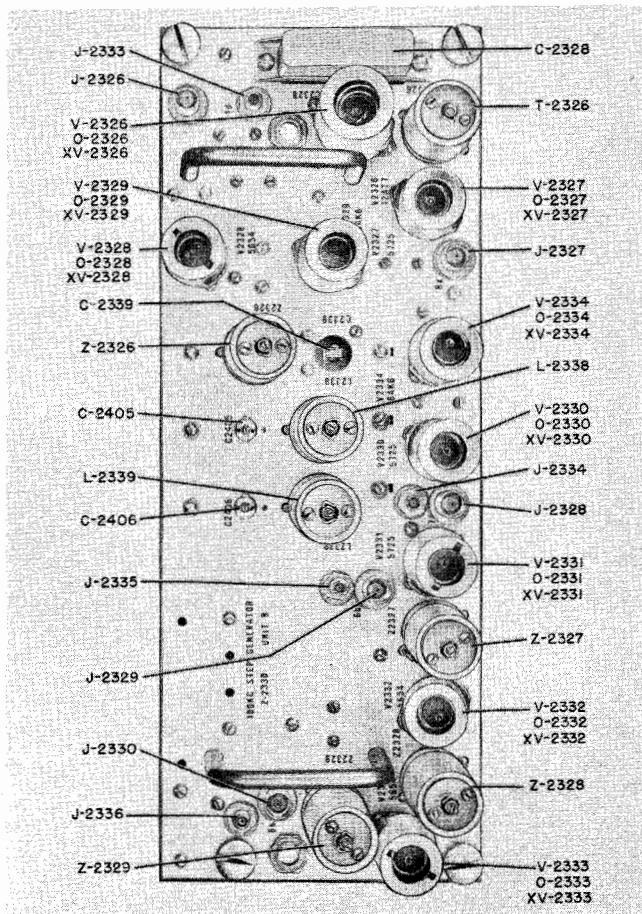
**8. ELECTRONIC FREQUENCY CONVERTER, UNIT 8 (Z-2330) REPAIR AND ADJUSTMENT.**

**(1) ELECTRICAL ADJUSTMENTS.**—All the adjustments on unit 8 are factory adjustments with the exception of C-2339. The factory adjustments should *not* be tampered with unless the adjustable component has been changed or complete alignment is required because of poor operation of unit 8 as determined by the trouble location method outlined in figure 7-120.

**(a) C-2339 ADJUSTMENT.**—Whenever V-2327, V-2328, or V-2329 is replaced, variable capacitor C-2339 (figure 7-35) must be adjusted in the following manner:

**Note**

C-2339 may be adjusted without removing unit 8 from the mounting. Unit 1 must be properly aligned before making this adjustment.



**Figure 7-35. RFO, Unit 8 (Z-2330), Top View**

**Step 1.** Place switch  $\textcircled{P}$  in STANDBY.

**Step 2.** After proper warm-up (1 hour) for ovens and filaments, place frequency selection knob  $\textcircled{H}$  to position 9. Positions of other knobs are immaterial.

**Step 3.** Connect a cable from 100 KC X-TAL jack on RFO front panel to the vertical input of Oscilloscope OS-8A/U (or equivalent).

**Step 4.** Connect a cable from the 100 KC STEP jack on RFO front panel to the horizontal input of the oscilloscope.

**Step 5.** Adjust C-2339 for a stable 25:1 Lissajous pattern on the oscilloscope screen.

**Step 6.** Rotate C-2339 clockwise until the pattern breaks up. Turn C-2339 back until the 25:1 pattern reappears. Mark position of adjustment slot.

**Step 7.** Rotate C-2339 counterclockwise until the pattern breaks up again. Turn C-2339 back until the 25:1 pattern reappears. Mark position of adjustment slot.

**Step 8.** Set C-2339 adjustment slot at a midpoint between the two markings.

**Step 9.** If the correct pattern was obtained in steps 1-9, other positions of switch S-2326 (knob  $\textcircled{H}$ ) may

be checked by observing the Lissajous patterns as indicated in table 7-2.

**Note**

No adjustments should be made in this check. If any switch position does not produce the correct Lissajous pattern, proceed with the alignment of switch S-2326.

**(b) T-2326 ADJUSTMENT.**—The two adjustments of ringing coil T-2326, top and bottom slugs, are factory adjustments and should not be tampered with unless T-2326 is replaced or an adjustment becomes loose. Unit 8 must be removed from the mounting and placed on extension test cables for these adjustments. See paragraph 5s(2)(a).

For a rough adjustment of T-2326, the top and bottom slugs are turned in an equal distance and touch each other.

For a more efficient alignment of T-2326, connect Oscilloscope OS-8A/U (or equivalent) between pins 1 and 4 of T-2326, with a 1/2-megohm, 1/2-watt resistor used to isolate the oscilloscope test probe. Adjust the bottom, then the top slugs of T-2326 for maximum positive pulse with minimum ringing.

**(c) S-2326 STEP OSCILLATOR ADJUSTMENTS.**—Whenever a complete alignment of the 100-kc step switch, S-2326, is required, adjustments Z-2326 and C-2339 (on top of the unit 8 chassis) and L-2327 through L-2335 (adjusted through access holes marked G0 through G8, respectively, at the front of switch S-2326) will require adjustment.

**Note**

The 100-kc step switch adjustments are factory adjustments and should not be tampered with unless absolutely necessary. These adjustments cannot be made unless unit 1 and T-2326 (unit 8) are properly aligned.

These adjustments are made in the following manner, with unit 8 removed from the mounting and placed on extension test cables. Allow sufficient warm-up for ovens and filaments (until oven lights cycle 1 hour).

**Step 1.** Turn S-2326 to position 9 (2.5 mc).

**Step 2.** Connect a cable from 100 KC X-TAL jack on RFO front panel to the vertical input of Oscilloscope OS-8A/U, or equivalent.

**Step 3.** Connect a cable from 100 KC STEP jack (output 8a) to the horizontal input of the oscilloscope, and place equipment in STANDBY condition.

**Step 4.** Set C-2339 to half capacity position (adjustment slot parallel with the two capacitor mounting screws).

**Step 5.** Adjust Z-2326 for a 25:1 Lissajous pattern.

**Step 6.** Rotate Z-2326 clockwise until the pattern unlocks, and then counterclockwise until it locks in again.

*Step 7.* Rotate Z-2326 counterclockwise until the pattern unlocks, and then clockwise until the pattern locks in again. Note the number of turns through the "lock-in" range of the oscillator and set Z-2326 at the midrange point.

*Step 8.* For the positions 8 through 0 of S-2326, use table 7-16. Turn slugs of inductors clockwise until oscillator unlocks, then turn slowly counterclockwise until the oscillator locks at Lissajous pattern count indicated in table 7-16.

*Step 9.* Turn slugs counterclockwise until oscillator unlocks, then turn slowly clockwise until the oscillator locks in again. Note the number of turns through the "lock-in" range of the oscillator and set the slugs at the midrange point.

*Step 10.* Glyptal has been applied to all critical adjustments of unit 8. Reapply glyptal to any of these adjustments that have been moved.

**(d) S-2326 STEP FILTER ADJUSTMENTS.**—Whenever a component is replaced in the 100-kc step filter circuit, or a complete alignment of unit 8 is re-

**TABLE 7-16. UNIT 8, 100-KC STEP  
OSCILLATOR ADJUSTMENTS**

| POSITION OF S-2326 | ADJUSTMENT | ADJUSTMENT LABEL | LISSAJOUS PATTERN |
|--------------------|------------|------------------|-------------------|
| 8                  | L-2335     | G8               | 24:1              |
| 7                  | L-2334     | G7               | 23:1              |
| 6                  | L-2333     | G6               | 22:1              |
| 5                  | L-2332     | G5               | 21:1              |
| 4                  | L-2331     | G4               | 20:1              |
| 3                  | L-2330     | G3               | 19:1              |
| 2                  | L-2329     | G2               | 18:1              |
| 1                  | L-2328     | G1               | 17:1              |
| 0                  | L-2327     | G0               | 16:1              |

quired, the 16.6-17.5-mc filter adjustments (100-kc steps), L-2338, L-2339, C-2405, and C-2406 (located on the top of unit 8 chassis), and C-2362 through C-2370 (marked F0 through F8, respectively, at the rear of S-2326), and C-2371 through C-2379 (marked E0 through E8, respectively, at the rear of S-2326) will require adjustment.

**Note**

The 100-kc filter adjustments are factory adjustments and should not be tampered with unless absolutely necessary. These adjustments cannot be made unless units 1, 2, 7 and the other sections of unit 8 have been properly aligned.

It is assumed that unit 8 is still removed from the mounting and connected by extension test cables.

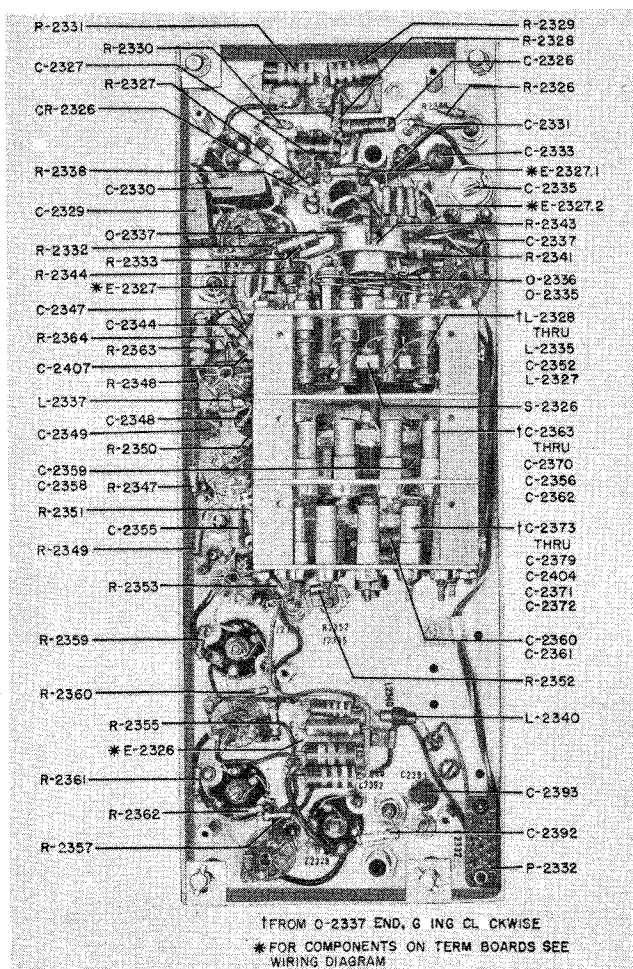
*Step 1.* Place S-2326 to position 9. Positions of other knobs immaterial.

*Step 2.* Connect Multimeter ME-25A/U or equivalent) to pin 7 of mixer tube V-2331 and ground, with meter on the 2.5-volt scale. Place equipment in STANDBY condition.

*Step 3.* After proper warm-up (until oven lights cycle 1 hour) for ovens and filaments, adjust in sequence L-2338, C-2405, L-2339, and C-2406 (on top of unit 8 chassis) to obtain a peak reading on the multimeter.

*Step 4.* Place switch S-2326 to position 8, and following the sequence in table 7-17, adjust the corresponding variable filter capacitors, using the special insulated screwdriver, for the remaining positions of switch S-2326. A peak reading should be obtained for each adjustment.

**(e) Z-2327, Z-2328, Z-2329 ADJUSTMENT.**—The 27-28-mc filter adjustments are the top and bottom slugs of transformers Z-2327, Z-2328, and Z-2329 (figures 7-35 and 7-36).



**Figure 7-36. RFO, Unit 8 (Z-2330), Covers Removed, Bottom View**

**Note**

These are factory adjustments and should not be tampered with unless absolutely necessary. Units 1, 2, 3, 4, 5, 6, 7, and the other sections of unit 8 must be properly aligned before making these adjustments. Allow proper warm-up (until ovens have been cycling for 1 hour) for ovens and filaments.

**Note**

This is a factory adjustment and should not be tampered with unless absolutely necessary.

Use a calibrated receiver, containing an "S" meter and capable of giving a minimum of 70-db attenuation at 100 kc away from the desired frequency of 27 to 28 mc. Use attenuators to limit the input to the receiver.

**TABLE 7-17. UNIT 8, 100-KC STEP FILTER ADJUSTMENTS**

| POSITION OF S-2326 | ADJUSTMENT       | ADJUSTMENT LABEL |
|--------------------|------------------|------------------|
| 8                  | C-2370<br>C-2379 | F8<br>E8         |
| 7                  | C-2369<br>C-2378 | F7<br>E7         |
| 6                  | C-2368<br>C-2377 | F6<br>E6         |
| 5                  | C-2367<br>C-2376 | F5<br>E5         |
| 4                  | C-2366<br>C-2375 | F4<br>E4         |
| 3                  | C-2365<br>C-2374 | F3<br>E3         |
| 2                  | C-2364<br>C-2373 | F2<br>E2         |
| 1                  | C-2363<br>C-2372 | F1<br>E1         |
| 0                  | C-2362<br>C-2371 | E0<br>F0         |

*Step 1.* On unit 8, remove cables from receptacles 1d, 7a and 6b.

*Step 2.* Connect the RF OUTPUT X MULT terminal of signal generator AN/URM-25 to jack 6b.

*Step 3.* Tune the signal generator to 28 mc and energize the transmitter.

*Step 4.* Connect the a-c probe of Multimeter ME-25A/U to test point 8b (J-2336).

*Step 5.* With maximum r-f output from the signal generator, adjust bottom slugs of Z-2327, Z-2328, and Z-2329 (see figure 7-35) for maximum voltage indication on the multimeter.

*Step 6.* Retune the signal generator to 27 mc and adjust the top slugs of Z-2327, Z-2328, and Z-2329 (see figure 7-35) for maximum voltage indication on the multimeter.

*Step 7.* Apply glyptal to the top slugs of Z-2327, Z-2328, and Z-2329.

(f) 100-KC TRAP ADJUSTMENT.—The adjustment for the 100-kc trap is variable capacitor C-2335.

*Step 1.* Place equipment in STANDBY condition. It is assumed that unit 8 is still removed from the mounting and connected by means of extension test cables.

*Step 2.* After proper warm-up (until oven lights cycle for 1 hour), place switch S-2326 to position 9, and the RFO front panel knob (J) to position 5. All other knobs to position 0.

*Step 3.* Disconnect cable to jack 8b (J-2330) on unit 8, and in its place connect the input to the receiver.

*Step 4.* Tune the receiver to the output frequency of unit 8 (27.950 mc).

*Step 5.* Retune the receiver very slowly for the next small peak (approximately 70 db down) at a frequency of 27.850 mc.

*Step 6.* Adjust C-2335 until this peak is at a minimum.

*Step 7.* Tune receiver to 28.050 mc and observe signal strength on "S" meter. If necessary, adjust C-2335 as in step 6 above.

**Note**

The best possible balance should be obtained between steps 6 and 7.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—Perform the following procedures to remove unit 8 from the mounting:

*Step 1.* Turn knob (H) to position 0.

*Step 2.* Disconnect cables connected to unit 8.

*Step 3.* Loosen cowl fasteners.

*Step 4.* Pull unit 8 slowly and straight out by the two handles until the plug and coupler are disengaged.

**CAUTION**

Use care in removing unit 8 from mounting so as not to damage pins on connecting plug.

(b) REPLACEMENT AND ADJUSTMENTS.—To replace unit 8, set knob (H) at position 0. Check that red dot on coupler faces out away from mounting. Be sure shaft indicator (red pointer) on unit 8 is also set on 0. Line up guide holes on unit 8 with guide pins on unit 14 mounting. Tighten cowl fasteners, and connect cables to proper jacks on unit 8.

**CAUTION**

Do not force unit 8 into position. Forcing may damage S-2326 coupler or pins on connecting plug.

**Note**

When replacing unit 8 with a new unit 8, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

i. ELECTRONIC FREQUENCY CONVERTER, UNIT 9 (Z-2426), TROUBLE SHOOTING.—The electronic frequency converter, unit 9 (figures 7-37 and 7-38), has two inputs and one output. Table 7-19 lists the final output frequencies of unit 9 and respective knob positions. The nominal r-f voltage may be measured at the test points on unit 9, by means of Multimeter ME-25A/U, using the r-f probe (table 7-18).

**TABLE 7-18. UNIT 9, R-F VOLTAGE AT TEST POINTS**

| TEST POINT | NOMINAL VOLTAGE<br>VOLTAGE VARIES APPROXIMATELY $\pm 20\%$ WITH<br>SETTING OF KNOB $\text{\textcircled{A}}$ |
|------------|---|
| 7b         | 1.3   |
| 8b         | 0.9   |
| 9          | 1.6   |

If there is no output, as indicated in table 7-18, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-139, the wiring diagram, figure 7-140, the voltage resistance chart, figure 7-39, and output frequency chart, table 7-19, to locate the fault.

ii. ELECTRONIC FREQUENCY CONVERTER, UNIT 9 (Z-2426), REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—All the adjustments on unit 9 are *factory adjustments* and should *not* be tampered with unless it is absolutely necessary.

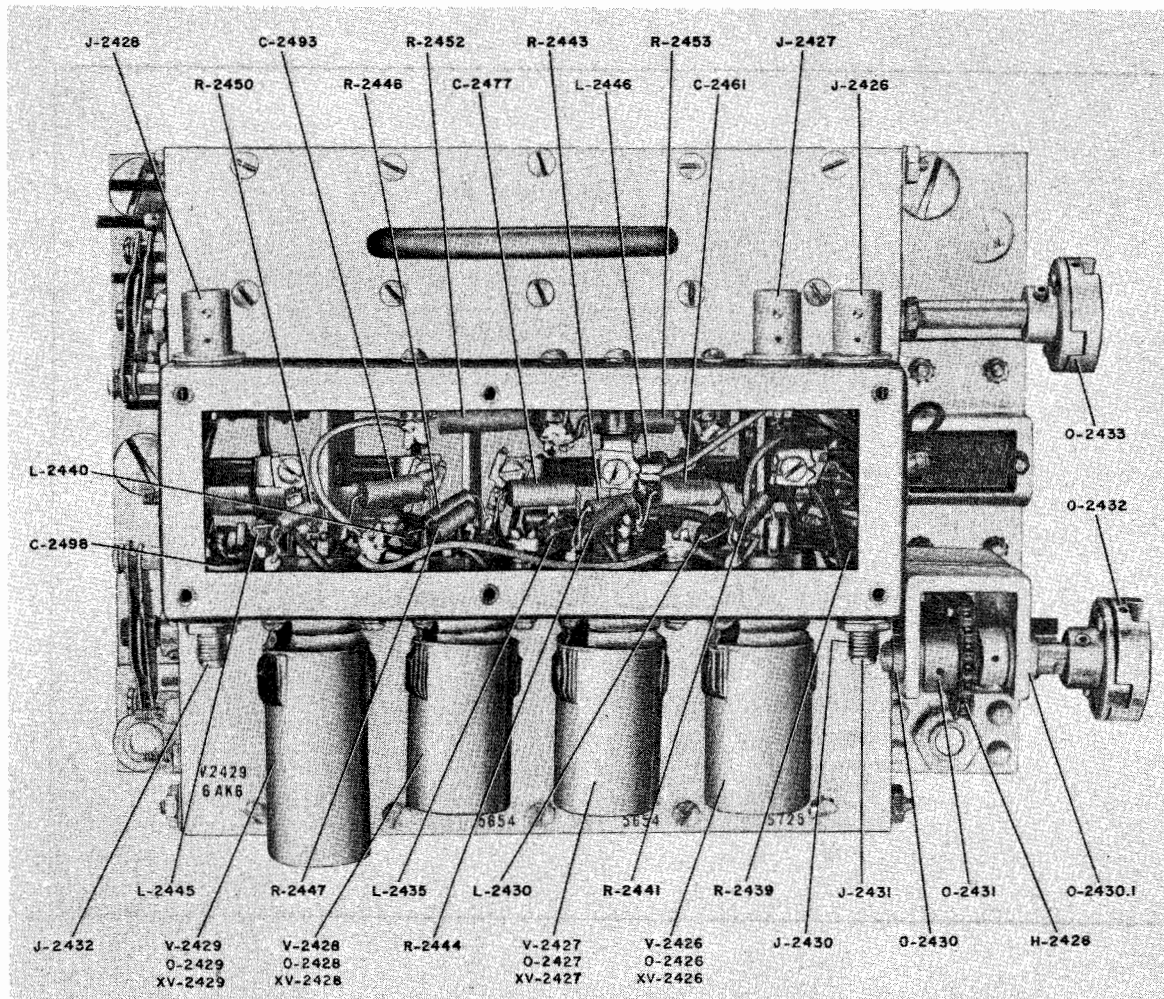


Figure 7-37. RFO, Unit 9 (Z-2426), Cover Removed, Left View

TABLE 7-19. RFO, FINAL OUTPUT FREQUENCIES AND Ⓐ, Ⓑ, Ⓕ AND Ⓒ KNOB POSITIONS

| OUTPUT<br>FREQUENCY<br>(MC) | UNIT 9                          |                             | UNIT 10                         |                             | KNOB<br>Ⓕ<br>POSITION | KNOB<br>Ⓒ | OUTPUT<br>UNIT<br>SELECTED |
|-----------------------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|-----------------------|-----------|----------------------------|
|                             | KNOB<br>Ⓐ<br>POSITION<br>S-2426 | OUTPUT<br>FREQUENCY<br>(MC) | KNOB<br>Ⓑ<br>POSITION<br>S-2526 | OUTPUT<br>FREQUENCY<br>(MC) |                       |           |                            |
| 0.3-1                       | 0                               | 22-23                       | 10                              | 22                          | 0.3-6 mc              | *         | 11A                        |
| 1-2                         | 0                               | 22-23                       | 9                               | 21                          |                       | *         |                            |
| 2-3                         | 0                               | 22-23                       | 8                               | 20                          |                       | *         |                            |
| 3-4                         | 0                               | 22-23                       | 7                               | 19                          |                       | *         |                            |
| 4-5                         | 0                               | 22-23                       | 6                               | 18                          |                       | *         |                            |
| 5-6                         | 1                               | 27-28                       | 10                              | 22                          |                       | *         |                            |
| 6-7                         | 0                               | 22-23                       | 4                               | 16                          | 6-16 mc               | 6         | 11B                        |
| 7-8                         | 1                               | 27-28                       | 8                               | 20                          |                       | 7         |                            |
| 8-9                         | 0                               | 22-23                       | 3                               | 14                          |                       | 8         |                            |
| 9-10                        | 0                               | 22-23                       | 2                               | 13                          |                       | 9         |                            |
| 10-11                       | 1                               | 27-28                       | 5                               | 17                          |                       | 0         |                            |
| 11-12                       | 1                               | 27-28                       | 4                               | 16                          |                       | 1         |                            |
| 12-13                       | 2                               | 32-33                       | 8                               | 20                          |                       | 2         |                            |
| 13-14                       | 2                               | 32-33                       | 7                               | 19                          |                       | 3         |                            |
| 14-15                       | 2                               | 32-33                       | 6                               | 18                          |                       | 4         |                            |
| 15-16                       | 3                               | 37-38                       | 10                              | 22                          |                       | 5         |                            |
| 16-17                       | 3                               | 37-38                       | 9                               | 21                          | 16-26 mc              | 6         | 11C                        |
| 17-18                       | 3                               | 37-38                       | 8                               | 20                          |                       | 7         |                            |
| 18-19                       | 2                               | 32-33                       | 3                               | 14                          |                       | 8         |                            |
| 19-20                       | 1                               | 27-28                       | 1                               | 8                           |                       | 9         |                            |
| 20-21                       | 3                               | 37-38                       | 5                               | 17                          |                       | 0         |                            |
| 21-22                       | 3                               | 37-38                       | 4                               | 16                          |                       | 1         |                            |
| 22-23                       | 0                               | 22-23                       | 1                               | 14                          |                       | 2         |                            |
| 23-24                       | 3                               | 37-38                       | 3                               | 14                          |                       | 3         |                            |
| 24-25                       | 3                               | 37-38                       | 2                               | 13                          |                       | 4         |                            |
| 25-26                       | 2                               | 32-33                       | 0                               | 7                           |                       | 5         |                            |

\* In the 0.3-6-mc band, the position knob Ⓒ is immaterial.

TABLE 7-20. UNIT 9, 100-KC STEP  
FILTER ADJUSTMENTS

| Position of Pointer<br>on S-2427 | ADJUSTMENT | ADJUSTMENT<br>LABEL |
|----------------------------------|------------|---------------------|
| 8                                | C-2440     | C8                  |
|                                  | C-2456     | D8                  |
|                                  | C-2472     | E8                  |
|                                  | C-2487     | F8                  |
| 7                                | C-2439     | C7                  |
|                                  | C-2455     | D7                  |
|                                  | C-2471     | E7                  |
|                                  | C-2486     | F7                  |
| 6                                | C-2438     | C6                  |
|                                  | C-2454     | D6                  |
|                                  | C-2470     | E6                  |
|                                  | C-2485     | F6                  |
| 5                                | C-2437     | C5                  |
|                                  | C-2453     | D5                  |
|                                  | C-2469     | E5                  |
|                                  | C-2484     | F5                  |
| 4                                | C-2436     | C4                  |
|                                  | C-2452     | D4                  |
|                                  | C-2468     | E4                  |
|                                  | C-2483     | F4                  |
| 3                                | C-2435     | C3                  |
|                                  | C-2451     | D3                  |
|                                  | C-2467     | E3                  |
|                                  | C-2482     | F3                  |

TABLE 7-20. UNIT 9, 100-KC STEP  
FILTER ADJUSTMENTS (Cont'd.)

| Position of Pointer<br>on S-2427 | ADJUSTMENT | ADJUSTMENT<br>LABEL |
|----------------------------------|------------|---------------------|
| 2                                | C-2434     | C2                  |
|                                  | C-2450     | D2                  |
|                                  | C-2466     | E2                  |
|                                  | C-2481     | F2                  |
| 1                                | C-2433     | C1                  |
|                                  | C-2449     | D1                  |
|                                  | C-2465     | E1                  |
|                                  | C-2480     | F1                  |
| 0                                | C-2432     | C0                  |
|                                  | C-2448     | D0                  |
|                                  | C-2464     | E0                  |
|                                  | C-2479     | F0                  |

Unit 9 must be placed on a subunit extension test cable and transmitter must be in STANDBY to make these adjustments.

**Note**

Use the special insulated screwdriver supplied with the RFO for all of the adjustments on unit 9. Do not make these adjustments until units 1, 2, 3, 4, 5, 6, 7, and 8 are properly aligned.



*Step 1.* Place unit 9 on extension test cable, and connect following jacks on unit 9: 7b and 8b. Refer to Section 1 for extension test cable fabrication instructions.

*Step 2.* Set the slugs of capacitors C-2431 and C-2447 (labeled C and D at the front of S-2426) and C-2463 and C-2478 (labeled E and F at the rear of S-2426) at their midposition. Determine the midposition of the slugs by rotating the slugs first clockwise and then counterclockwise, counting the number of turns and setting slug at the midpoint.

*Step 3.* Set frequency selection knobs as follows:  $\text{Ⓜ}$  at 9,  $\text{Ⓝ}$  at 4,  $\text{Ⓞ}$  at 5,  $\text{Ⓟ}$  and  $\text{Ⓠ}$  at 0. (Setting of other knobs immaterial.)

*Step 4.* Set (red pointer) indicator on unit 9 switches as follows: S-2426 at 3 and S-2427 at 9.

*Step 5.* Connect Multimeter ME-25A/U to test point 9 and place meter on the 2.5-volt scale, using r-f probe.

*Step 6.* Adjust the slugs of L-2429, L-2434, L-2439, and L-2444 (labeled C3, D3, E3, and F3, respectively, on S-2426) for a maximum meter reading.

**Note**

Adjustments labeled C0 through C8 and D0 through D8 are accessible at the front of S-2426 and S-2427. Adjustments labeled E0 through E8 and F0 through F8 are accessible at the rear of S-2426 and S-2427.

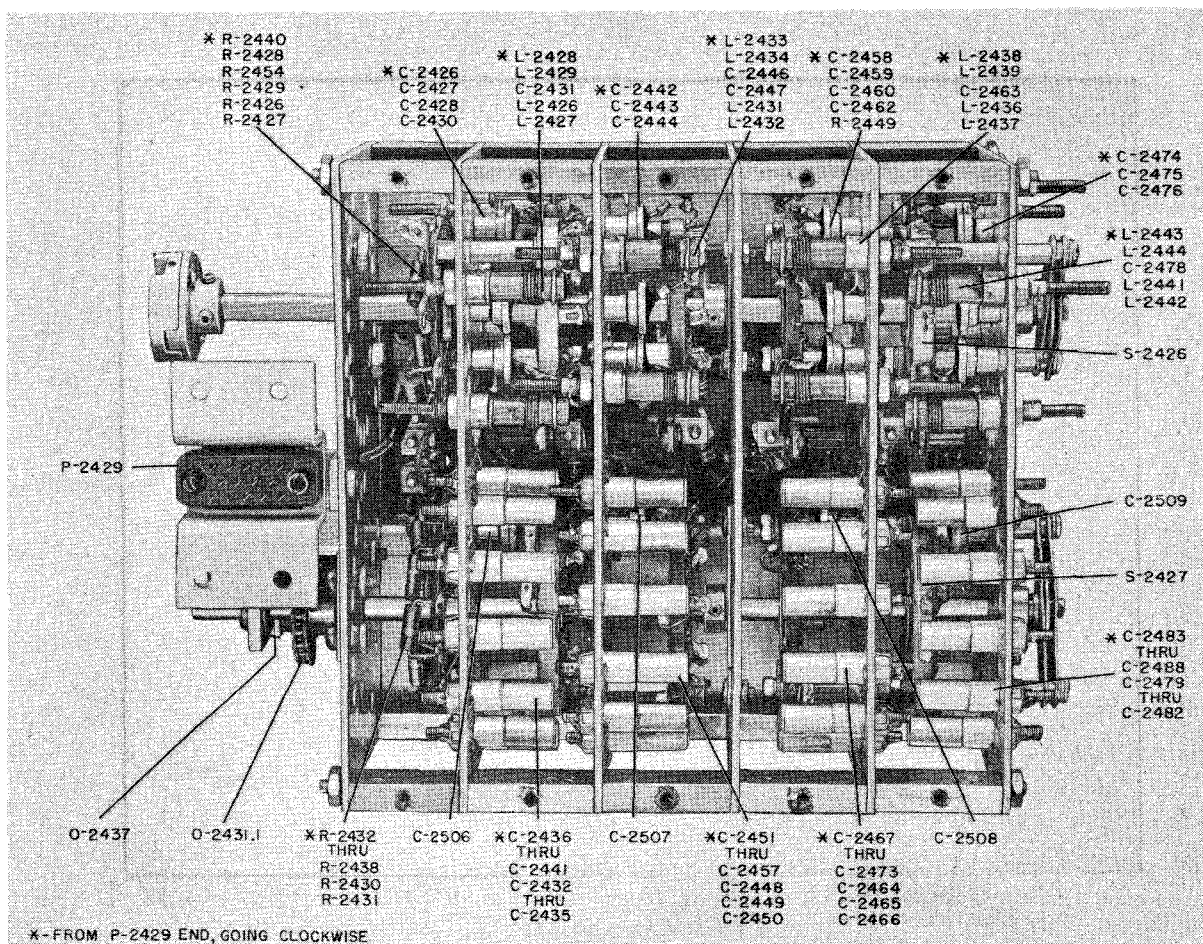
*Step 7.* Turn switch S-2427 on unit 9 to the positions listed in table 7-20 and, for each position, adjust the four corresponding capacitors on S-2427 for a maximum meter reading.

*Step 8.* Turn  $\text{Ⓜ}$  knob to 4,  $\text{Ⓝ}$  knob to 4,  $\text{Ⓞ}$  knob to 5, and the  $\text{Ⓟ}$  and  $\text{Ⓠ}$  knobs to 0.

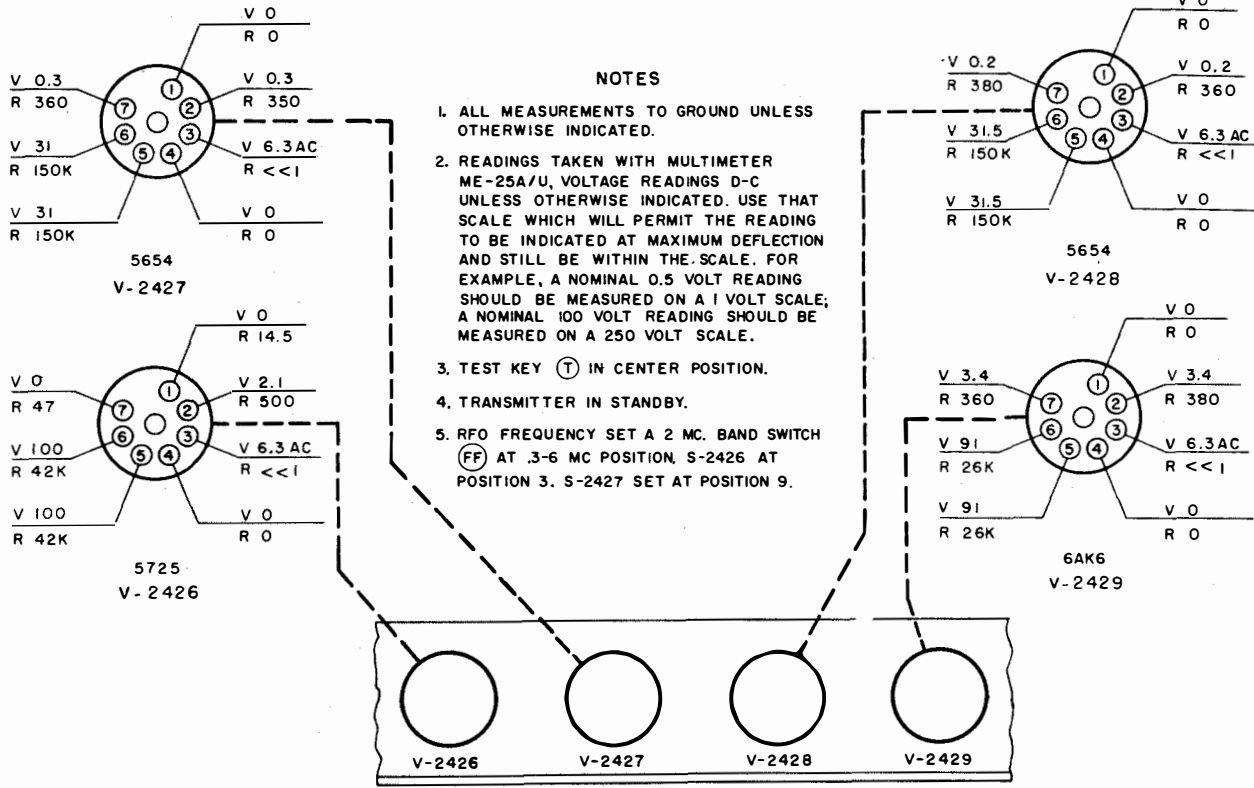
*Step 9.* Turn the (red pointer) indicator on switch S-2426 (unit 9) to the positions listed in table 7-21 and, for each position, adjust the four corresponding inductors on S-2426 for a maximum reading on the meter.

**(2) MECHANICAL ADJUSTMENTS.**

**(a) REMOVAL AND REPAIR.**—To remove unit 9, set knobs  $\text{Ⓜ}$  and  $\text{Ⓝ}$  on the RFO front panel to position 0. Turn the four 1/4-turn cowl fasteners and



**Figure 7-38. RFO, Unit 9 (Z-2426), Covers Removed, Right View**



SECTION A - A

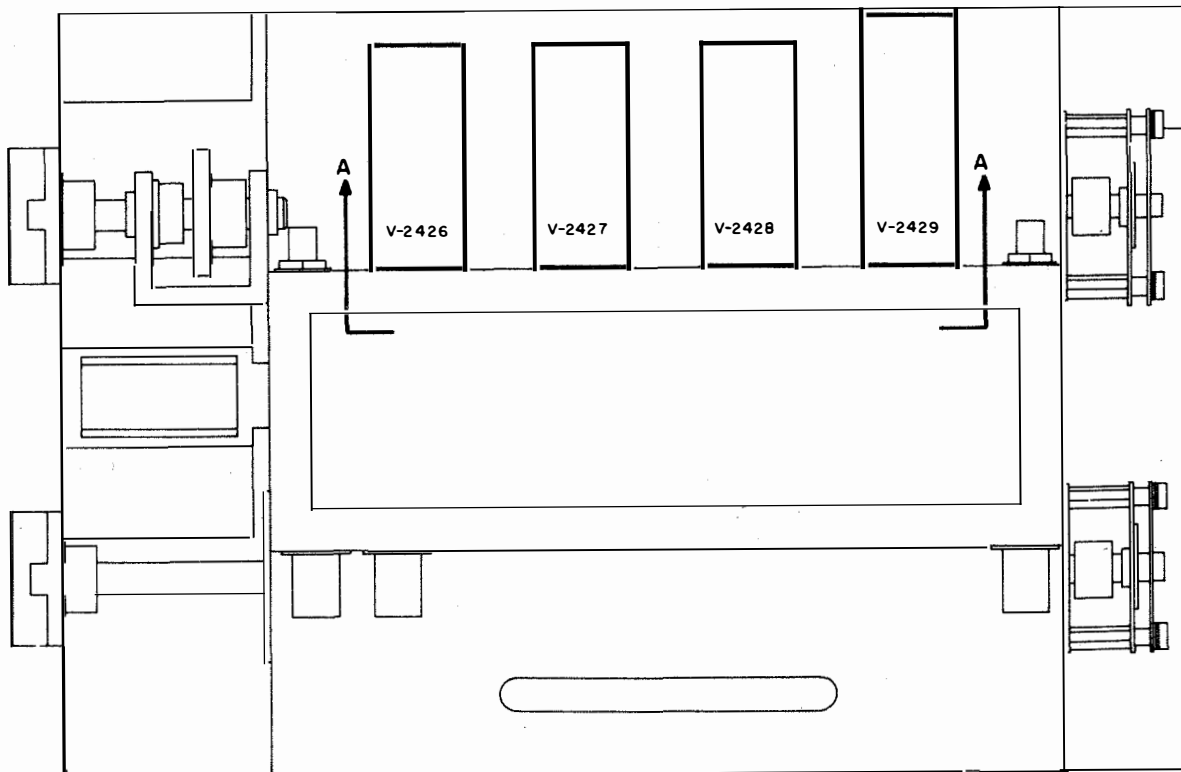


Figure 7-39. RFO, Unit 9 (Z-2426), Voltage and Resistance Chart

TABLE 7-21. UNIT 9, 5-MC STEP  
FILTER ADJUSTMENTS

| Position of Pointer on S-2426 | ADJUSTMENT | ADJUSTMENT LABEL |
|-------------------------------|------------|------------------|
| 2                             | L-2428     | C2               |
|                               | L-2433     | D2               |
|                               | L-2438     | E2               |
|                               | L-2443     | F2               |
| 1                             | L-2427     | C1               |
|                               | L-2432     | D1               |
|                               | L-2437     | E1               |
|                               | L-2442     | F1               |
| 0                             | L-2426     | C0               |
|                               | L-2431     | D0               |
|                               | L-2436     | E0               |
|                               | L-2441     | F0               |

remove the three cables connected to the chassis. Use the handles to pull the chassis from the mounting.

**CAUTION**

Pull handles slowly and straight out so as not to bend the pins on the connecting plug.

To gain access to the tube sockets, first remove the cover plate between the tubes and the jacks. This plate is held to the chassis by six machine screws. To reach the coils and capacitors used in the switching circuits, remove the remaining three cover plates.

**CAUTION**

Do not apply any chemicals to trimmer capacitors on S-2426 and S-2427.

The chain and sprocket assembly on unit 9 may be removed as follows (refer to figures 7-37 and 7-38):

*Step 1.* After unit 9 has been removed from unit 14 mounting, loosen idler assembly O-2437, and remove the three screws supporting the chain and sprocket assembly bracket.

*Step 2.* Loosen the setscrews in sprocket O-2431.1 on S-2427 switch shaft.

**Note**

Hex wrenches are mounted in clips on the right side of the RFO drawer. See figure 7-7.

*Step 3.* Remove assembly from unit 9.

**(b) REPLACEMENT AND ADJUSTMENTS.**

—Replace unit 9 as follows:

*Step 1.* Set control knobs Ⓐ and Ⓑ to position 0.

*Step 2.* Set red pointer on S-2426 and S-2427 of unit 9 also to position 0.

*Step 3.* Check that red dots on flexible couplers are facing outward.

*Step 4.* Line up guide holes and couplers on unit 9 with guide pins and couplers on unit 14.

*Step 5.* Push unit 9 in slowly until it is properly seated, and couplers are mating properly.

*Step 6.* Tighten cowl fasteners.

*Step 7.* Connect the three jacks on unit 9 with proper cables.

**CAUTION**

Do not force unit 9 into position. Forcing may damage the flexible couplers, shafts, or the pins on the connecting plug.

The chain and sprocket assembly is provided with an adjustable idler (O-2437). This idler should be adjusted to provide proper chain tension and minimize backlash. For lubrication information, refer to Section 6.

**Note**

When replacing unit 9 with a new unit 9, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

When replacing a filter component in unit 9, adjust the slug as described in paragraph 5u (1).

v. FREQUENCY MULTIPLIER, UNIT 10 (Z-2526), TROUBLE SHOOTING.—The frequency multiplier (unit 10) receives a 1-mc signal (2e) from unit 2 which can be checked at test point 2e on unit 10. The output of unit 10 can be checked at test point 10 on unit 10 and also at test point 10a, 10b or 10c on unit 11A, 11B or 11C, respectively, depending on the position of BAND switch Ⓢ. Table 7-22 indicates nominal r-f voltages to be measured at the test points. Use Multimeter ME-25A/U with r-f probe.

TABLE 7-22. UNIT 10, R-F VOLTAGE  
AT TEST POINTS

| TEST POINT | NOMINAL VOLTAGE |
|------------|-----------------|
| 2e         | 7.5             |
| 10         | 0.5             |

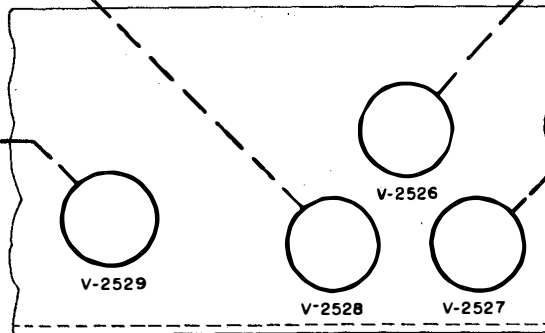
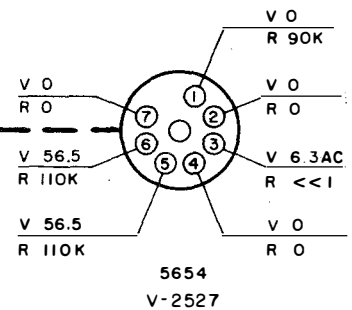
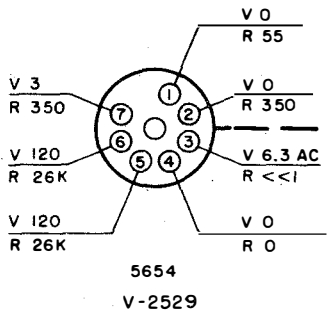
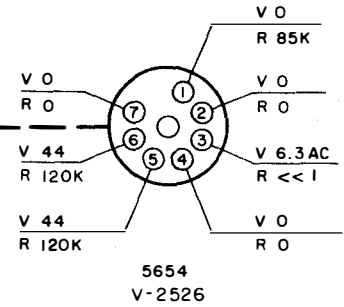
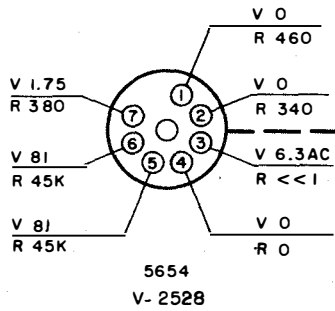
If there is no output from unit 10, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-141, the wiring diagram, figure 7-142, and the voltage and resistance chart, figure 7-40, to locate the fault.

w. FREQUENCY MULTIPLIER, UNIT 10 (Z-2526) REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—All the adjustments on unit 10 are *factory adjustments* and should *not* be tampered with unless it is absolutely

NOTES

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.



SECTION A-A

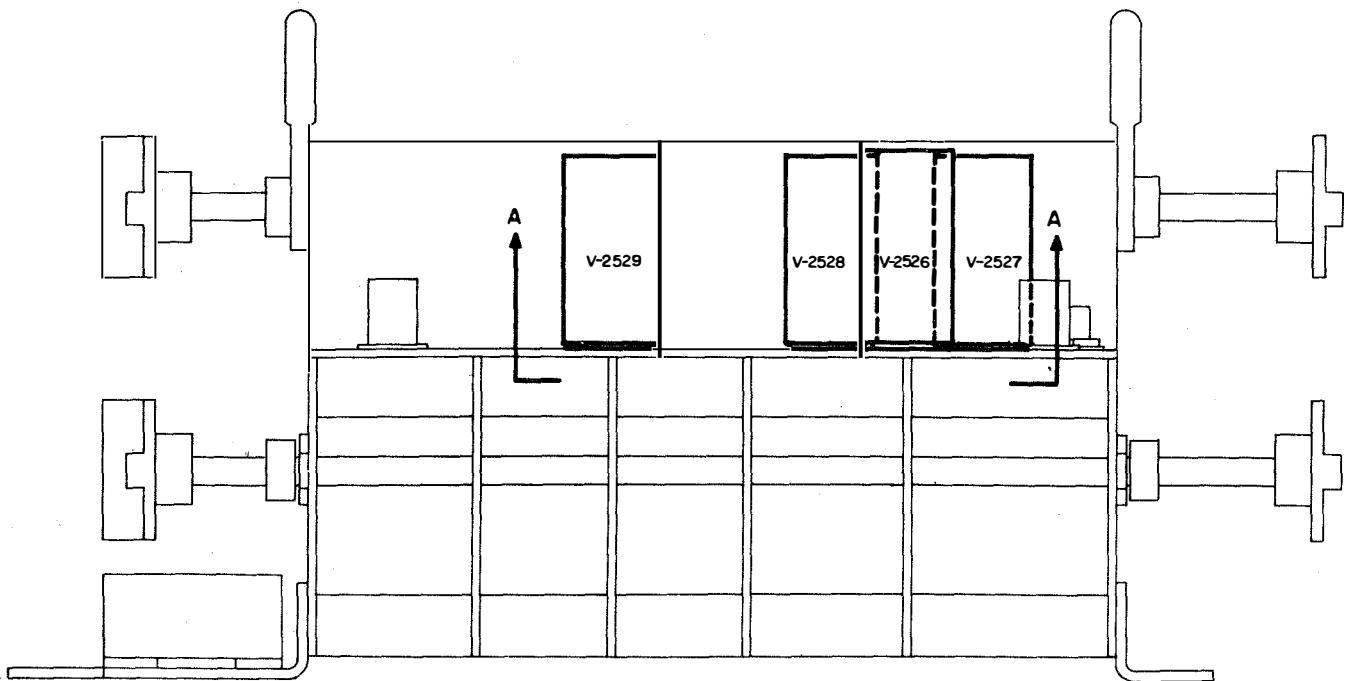


Figure 7-40. RFO, Unit 10 (Z-2526), Voltage and Resistance Chart

necessary. Unit 10 must be placed on subunit extension test cables and switch Ⓢ must be in STANDBY in order to make these adjustments.

**Note**

Use the special insulated screwdriver supplied with the RFO for all the adjustments on unit 10. Do not make these adjustments unless units 1 and 2 are properly aligned.

*Step 1.* Place unit 10 on the subunit extension test cable and connect a cable to jack 2e and jack 10 on unit 10. Refer to section 1 for extension test cable fabrication instructions.

*Step 2.* Connect Multimeter ME-25A/U (or equivalent), using the r-f probe, to jack 10 on unit 10 (use 2.5-volt scale).

*Step 3.* Using table 7-23, set switch S-2526 pointer as indicated and adjust coils for maximum output as indicated on Multimeter ME-25A/U.

**(2) MECHANICAL ADJUSTMENTS.**

**(a) REMOVAL AND REPAIR.**—To remove unit 10, set knob Ⓢ at position 0, and check that red dot on unit 10 coupler is facing outward. Remove the two cables connected to unit 10, and loosen the cowl fasteners.

**CAUTION**

Pull handles slowly and straight out to remove unit 10 from mounting, being careful not to bend the pins on connecting plug.

To reach tube sockets, remove bottom plate of unit 10. Remove remaining two plates to provide access to the switches. Figures 7-41 and 7-42 show the location of all components on unit 10.

**(b) REPLACEMENT AND ADJUSTMENTS.**

—To replace unit 10 set knob Ⓢ at 0 position. Set red pointer on unit 10 shaft to position 0. Line up guide holes and couplers on unit 10 with guide pins and couplers on unit 14 mounting. Push unit 10 in slowly until it is properly seated, and tighten cowl fasteners. Connect the two cables to the proper jacks on unit 10.

**CAUTION**

Do not force unit 10 into position. Forcing may damage the couplers or the pins on the connecting plug.

**Note**

When replacing unit 10 with a new unit 10, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment be sure to tighten the power plug screws and guide bushing nuts.

**TABLE 7-23. UNIT 10, 1-MC STEP  
FILTER ADJUSTMENTS**

| FREQUENCY (MC) | POSITION OF S-2526 POINTER | ADJUSTMENT | ADJUSTMENT LABEL |
|----------------|----------------------------|------------|------------------|
| 7              | 0                          | L-2526     | F0               |
|                |                            | L-2537     | E0               |
|                |                            | L-2548     | D0               |
|                |                            | L-2559     | C0               |
|                |                            | L-2570     | B0               |
| 8              | 1                          | L-2527     | F1               |
|                |                            | L-2538     | E1               |
|                |                            | L-2549     | D1               |
|                |                            | L-2560     | C1               |
|                |                            | L-2571     | B1               |
| 13             | 2                          | L-2528     | F2               |
|                |                            | L-2539     | E2               |
|                |                            | L-2550     | D2               |
|                |                            | L-2561     | C2               |
|                |                            | L-2572     | B2               |
| 14             | 3                          | L-2529     | F3               |
|                |                            | L-2540     | E3               |
|                |                            | L-2551     | D3               |
|                |                            | L-2562     | C3               |
|                |                            | L-2573     | B3               |
| 16             | 4                          | L-2530     | F4               |
|                |                            | L-2541     | E4               |
|                |                            | L-2552     | D4               |
|                |                            | L-2563     | C4               |
|                |                            | L-2574     | B4               |
| 17             | 5                          | L-2531     | F5               |
|                |                            | L-2542     | E5               |
|                |                            | L-2553     | D5               |
|                |                            | L-2564     | C5               |
|                |                            | L-2575     | B5               |
| 18             | 6                          | L-2532     | F6               |
|                |                            | L-2543     | E6               |
|                |                            | L-2554     | D6               |
|                |                            | L-2565     | C6               |
|                |                            | L-2576     | B6               |
| 19             | 7                          | L-2533     | F7               |
|                |                            | L-2544     | E7               |
|                |                            | L-2555     | D7               |
|                |                            | L-2566     | C7               |
|                |                            | L-2577     | B7               |
| 20             | 8                          | L-2534     | F8               |
|                |                            | L-2545     | E8               |
|                |                            | L-2556     | D8               |
|                |                            | L-2567     | C8               |
|                |                            | L-2578     | B8               |
| 21             | 9                          | L-2535     | F9               |
|                |                            | L-2546     | E9               |
|                |                            | L-2557     | D9               |
|                |                            | L-2568     | C9               |
|                |                            | L-2579     | B9               |
| 22             | 10                         | L-2536     | F10              |
|                |                            | L-2547     | E10              |
|                |                            | L-2558     | D10              |
|                |                            | L-2569     | C10              |
|                |                            | L-2580     | B10              |

NOTE: The position of front panel frequency selection knobs does not matter.

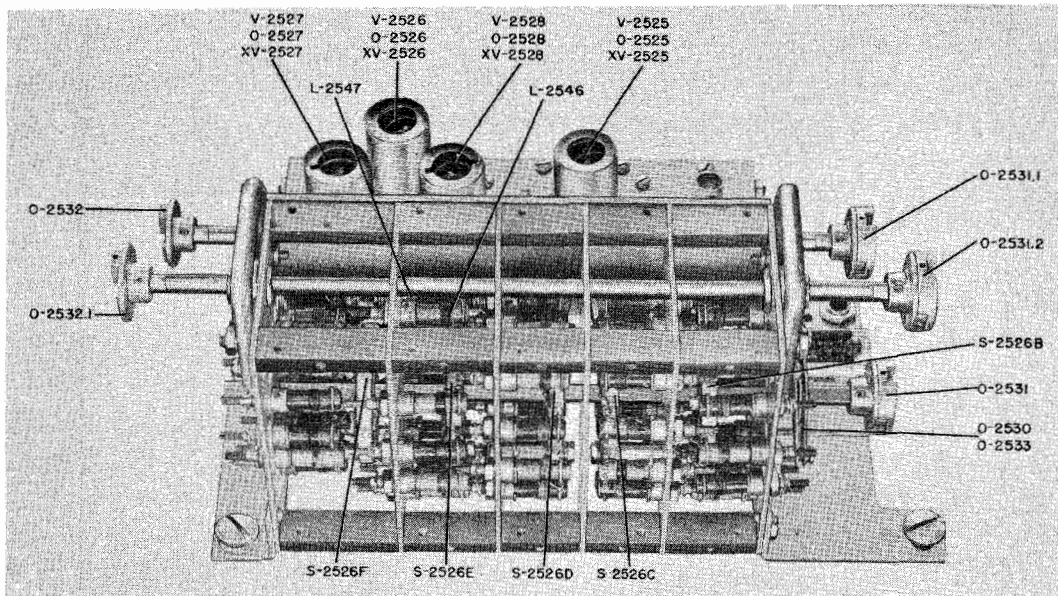


Figure 7-41. RFO, Unit 10 (Z-2526), Covers Removed, Bottom Oblique View

x. ELECTRONIC FREQUENCY CONVERTER, UNIT 11A (Z-2626), TROUBLE SHOOTING.—The electronic frequency converter (unit 11A) has two inputs and one output. Input signal 9a can be checked at test point 9a, and signal 10a at test point 10a. Output signal 11a can be checked at test point 11a. Table 7-24 indicates nominal r-f voltage to be measured at the test points. Use Multimeter ME-25A/U with r-f probe.

If there is no output, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-143, the wiring diagram, figure 7-144, and the voltage and resistance chart, figure 7-43, to locate the fault.

y. ELECTRONIC FREQUENCY CONVERTER, UNIT 11A (Z-2626), REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—The two adjustable components on unit 11A are L-2629 and L-2630 (figure 7-44).

**Note**

These are *factory adjustments* and should *not* be tampered with unless an inductor is replaced or its adjustment has become loose.

Alignment of unit 11A will be indicated if there is a substantial reduction of r-f output or no output at the test points when the frequency setting as indicated by the RFO frequency selection knobs is between 0.3 mc and 6.0 mc.

Since unit 11A is located on the bottom of the RFO mounting (unit 14), L-2629 and L-2630 may be adjusted without removing unit 11A from the mounting (see figure 7-9).

TABLE 7-24. UNIT 11A R-F VOLTAGE AT TEST POINTS

| TEST POINT | NOMINAL VOLTAGE |
|------------|-----------------|
| 9a         | 1.5             |
| 10a        | 0.3             |
| 11a        | 3.0             |

**Note**

Do not make these adjustments until all units except 11B and 11C are properly aligned.

*Step 1.* Place equipment in stand-by condition, switch  $\text{\textcircled{P}}$  in STANDBY, and TEST KEY  $\text{\textcircled{T}}$  in locked up position.

*Step 2.* Set up a frequency of 6 mc on frequency selection knobs on the RFO front panel.

*Step 3.* Connect Multimeter ME-25A/U (or equivalent) with r-f probe to test point 11a and use 2.5-volt scale.

*Step 4.* Adjust L-2629 and L-2630 for maximum meter reading and apply glyptal to them.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To remove unit 11A, disconnect three cables from chassis, loosen cowl fasteners, and use handle to remove unit 11A from mounting. Figures 7-44 and 7-45 show the location of components of unit 11A.

**CAUTION**

Pull handle slowly and straight out so as not to bend pins on connecting plug.

(b) REPLACEMENT AND ADJUSTMENTS.—To replace unit 11A, line up the two chassis guide holes on unit 11A with the two guide pins on unit 14 mounting. Push unit 11A in slowly until it is properly seated, and tighten the two cowl fasteners. Connect the three cables to the proper jacks on unit 11A.

**CAUTION**

Do not force unit 11A into position. Forcing may damage the pins on connecting plug.

No adjustments are required on unit 11A unless L-2629 or L-2630 is replaced. When replacing an inductor, adjust its slug (see paragraph 5y(1)).

**Note**

When replacing unit 11A with a new unit 11A, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

z. ELECTRONIC FREQUENCY CONVERTER, UNIT 11B (Z-2651), TROUBLE SHOOTING.—The electronic frequency converter (unit 11B) has two inputs and one output. Nominal r-f voltages may be checked by means of Multimeter ME-25A/U at the test points of unit 11B as indicated in table 7-25.

**TABLE 7-25. UNIT 11B, R-F VOLTAGE AT TEST POINTS**

| TEST POINT | NOMINAL VOLTAGE |
|------------|-----------------|
| 9b         | 1.0             |
| 10b        | 0.4             |
| 11b        | 2.4             |

NOTE: Above voltages can be measured only when BAND knob (F) is in position 6-16 MC.

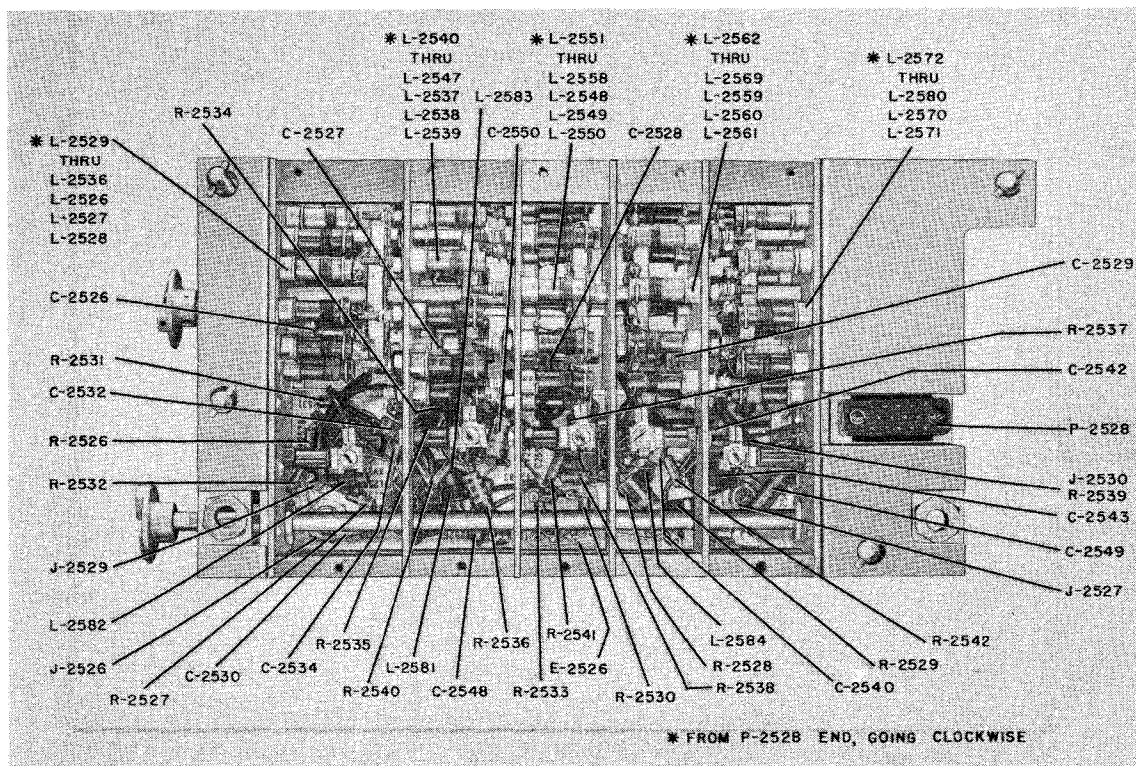
If there is no output, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-145, the wiring diagram, figure 7-146, and the voltage and resistance chart, figure 7-46, to locate the fault.

**aa. ELECTRONIC FREQUENCY CONVERTER, UNIT 11B (Z-2651), REPAIR AND ADJUSTMENT.**

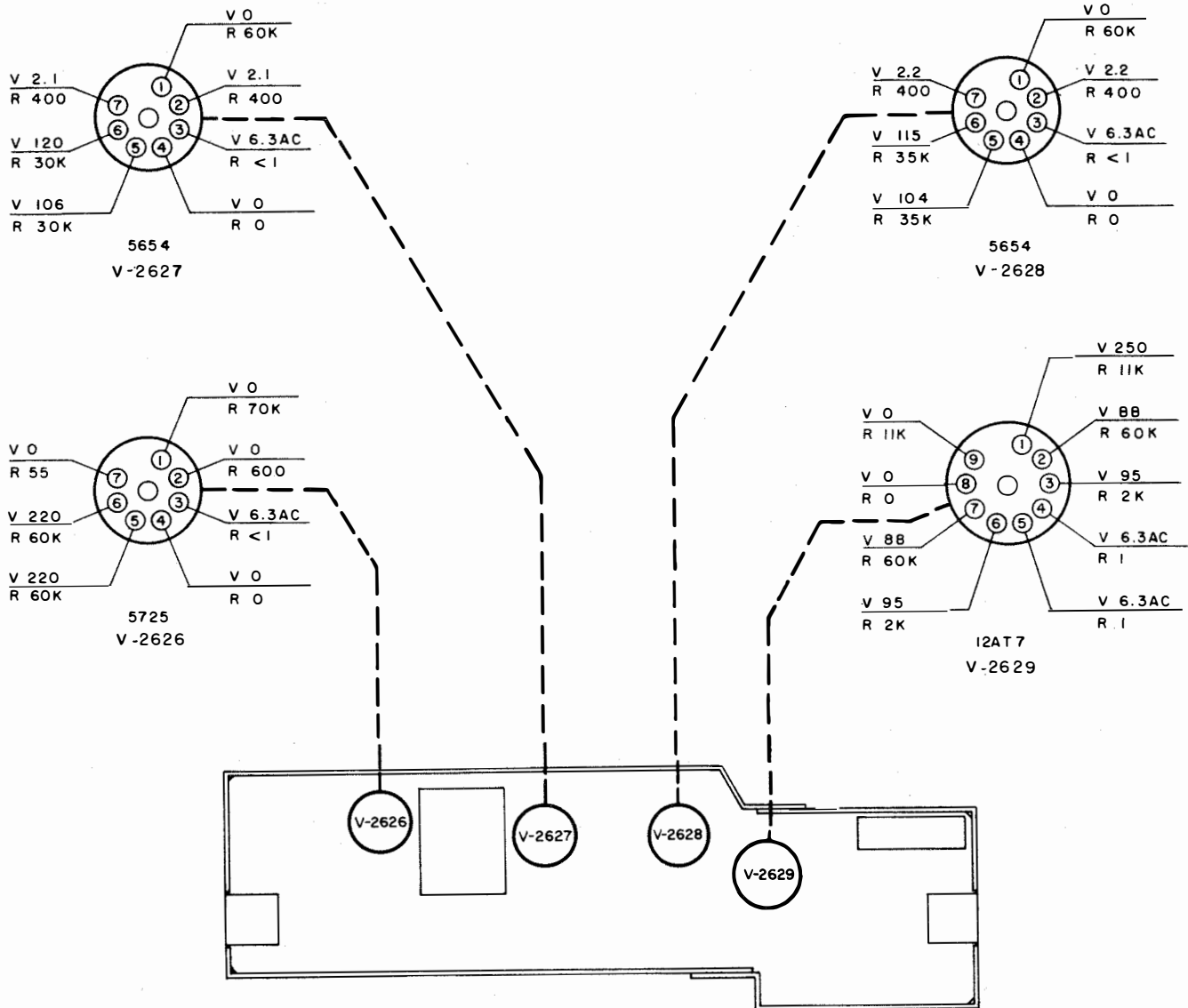
(1) ELECTRICAL ADJUSTMENTS.—All adjustments on unit 11B are *factory adjustments* and should *not* be tampered with unless absolutely necessary. Connect unit 11B to a subunit extension test cable to make these adjustments. Refer to Section 1 for extension test cable fabrication instructions.

**Note**

Do not make these adjustments until all RFO units except 11A and 11G are properly aligned.



**Figure 7-42. RFO, Unit 10 (Z-2526), Covers Removed, Right View**



NOTES

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN UP POSITION.
4. TRANSMITTER IN STANDBY.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.

Figure 7-43. RFO, Unit 11A (Z-2626), Voltage and Resistance Chart



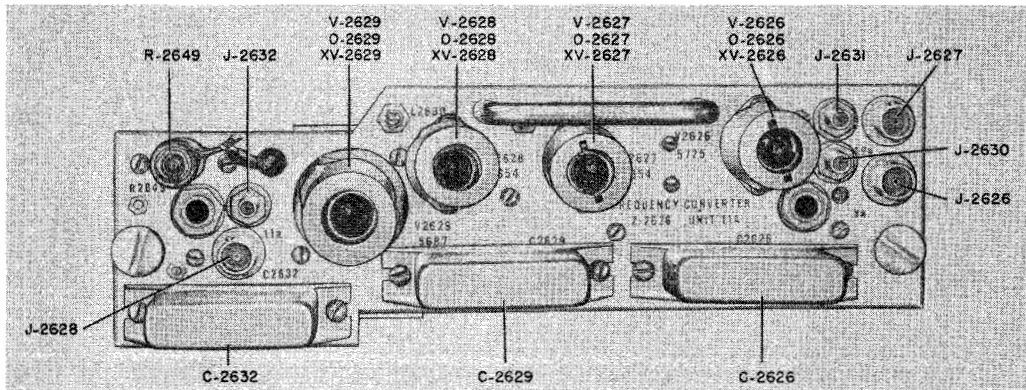


Figure 7-44. RFO, Unit 11A (Z-2626), Top View

Alignment of unit 11B will be indicated if there is a substantial reduction (see figure 7-120) of r-f output or no output at test point 11b, after it has been established that the mixer and amplifier stages (V-2651 through V-2654) are known to be operating properly. RFO front panel knob BAND (F) must be in position 6-16 MC for this check.

**Note**

Adjustments on S-2651 and S-2652 are located as follows: C, C0 through C9 and D, D0 through D9 at the front of S-2651; B0 through B8 and C0 through C8 at the front of S-2652; E, E0 through E9 and F, F0 through F9 at the rear of S-2651; D0 through D8 and E0 through E8 at the rear of S-2652.

*Step 1.* Set RFO front panel frequency selection knobs for a frequency of 15.94500 mc. This sets switch S-2651 on unit 11B at position 5 and switch S-2652 at 9.

*Step 2.* Place unit 11B on a subunit extension cable. Connect jacks 9b and 10b on unit 11B to corresponding cables of unit 14 mounting.

*Step 3.* Switches (P) in STANDBY and TEST KEY (T) in locked up position. Set the slugs of capacitors C-2660, C-2687, C-2710 and C-2737 (labeled C, D, E, and F, respectively, on S-2651) at their midpositions. Use the special insulated screwdriver and determine the midposition of the slugs by rotating slugs first clockwise then counterclockwise, counting the number of turns and setting slug at the midpoint.

**WARNING**

Use the special insulated screwdriver supplied with the RFO to make adjustments labeled C, C0 through C9, D, D0 through D9, and E, E0 through E9 on S-2651 and B0 through B8, C0 through C8, and D0 through D8 on S-2652.

*Step 4.* Connect Multimeter ME-25A/U to test point 11b and place meter on the 5.0-volt scale using r-f probe.

*Step 5.* Adjust the slugs of L-2656, L-2666, L-2680 and L-2690 (labeled C5, D5, E5 and F5, respectively, on S-2651) for a maximum reading on the meter.

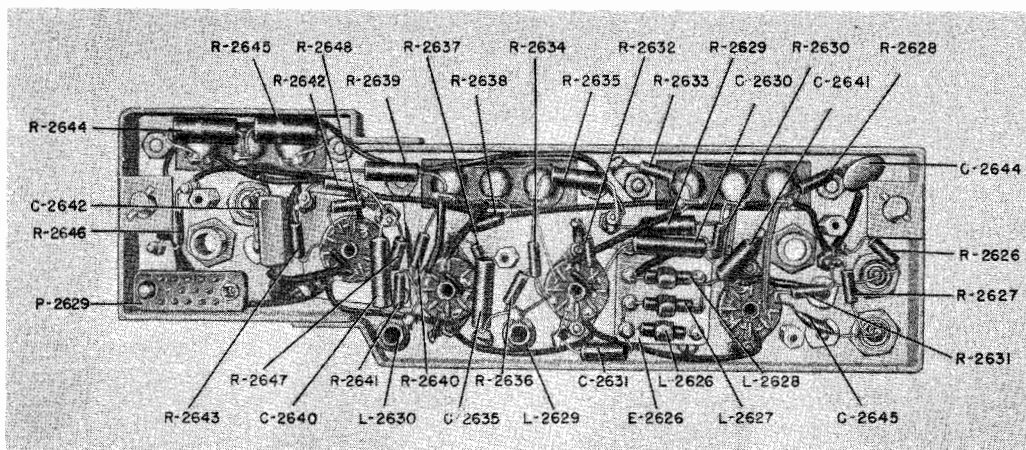


Figure 7-45. RFO, Unit 11A (Z-2626), Cover Removed, Bottom View

**TABLE 7-26. UNIT 11B, 100-KC STEP  
FILTER ADJUSTMENTS**

| Position of Red Pointer on S-2652 | FREQUENCY in MC. | ADJUSTMENT    | ADJUSTMENT LABEL |
|-----------------------------------|------------------|---------------|------------------|
| 9                                 | 15.945           | No adjustment |                  |
| 8                                 | 15.845           | C-2676        | B8               |
|                                   |                  | C-2753        | C8               |
|                                   |                  | C-2726        | D8               |
|                                   |                  | C-2752        | E8               |
| 7                                 | 15.745           | C-2675        | B7               |
|                                   |                  | C-2727        | C7               |
|                                   |                  | C-2725        | D7               |
|                                   |                  | C-2751        | E7               |
| 6                                 | 15.645           | C-2674        | B6               |
|                                   |                  | C-2677        | C6               |
|                                   |                  | C-2724        | D6               |
|                                   |                  | C-2750        | E6               |
| 5                                 | 15.545           | C-2672        | B5               |
|                                   |                  | C-2699        | C5               |
|                                   |                  | C-2722        | D5               |
|                                   |                  | C-2748        | E5               |
| 4                                 | 15.445           | C-2670        | B4               |
|                                   |                  | C-2697        | C4               |
|                                   |                  | C-2720        | D4               |
|                                   |                  | C-2746        | E4               |
| 3                                 | 15.345           | C-2668        | B3               |
|                                   |                  | C-2695        | C3               |
|                                   |                  | C-2718        | D3               |
|                                   |                  | C-2744        | E3               |
| 2                                 | 15.245           | C-2666        | B2               |
|                                   |                  | C-2693        | C2               |
|                                   |                  | C-2716        | D2               |
|                                   |                  | C-2742        | E2               |
| 1                                 | 15.145           | C-2664        | B1               |
|                                   |                  | C-2691        | C1               |
|                                   |                  | C-2714        | D1               |
|                                   |                  | C-2740        | E1               |
| 0                                 | 15.045           | C-2662        | B0               |
|                                   |                  | C-2689        | C0               |
|                                   |                  | C-2712        | D0               |
|                                   |                  | C-2738        | E0               |

After adjustments have been made as indicated in table 7-26, return (red pointer) indicator on S-2652 to position 4. Set S-2551 on unit 11B and knobs Ⓐ and Ⓑ to the positions shown in table 7-27.

Adjust corresponding inductors for a maximum reading on multimeter. Frequency selection knobs on RFO front panel should be set to the corresponding settings as indicated in table 7-27.

**(2) MECHANICAL ADJUSTMENTS.**

**(a) REMOVAL AND REPAIR.**—Unit 11B should be removed from the mounting as follows:

*Step 1.* Set knobs Ⓓ and Ⓔ at position 0.

*Step 2.* Check that red dots on couplers are facing outward from the mounting.

*Step 3.* Remove the three cables connected to unit 11B.

*Step 4.* Loosen cowl fasteners, and use handles to remove unit 11B from the mounting.

**CAUTION**

Pull handles slowly and straight out so as not to damage the pins on connecting plug and the unit 11B couplers. Do not apply chemicals to trimmer capacitors on S-2652.

**WARNING**

Before removing unit 11B or 11C, remove all power from transmitter group including 110 volts ac supplied to the oven heaters.

To reach tube sockets, remove the cover plate between the jacks and the tubes by removing six machine screws. The remaining three plates may be removed to reach the switch components. Figures 7-47 and 7-48 show the location of all components on unit 11B.

**(b) REPLACEMENT AND ADJUSTMENTS.**

—To replace unit 11B, place knobs Ⓓ and Ⓔ at position 0. Set shaft indicators (red pointers) on unit 11B to position 0. Line up guide holes and couplers on unit 11B with guide pins and couplers on unit 14 mounting. Push unit 11B in slowly, making sure that couplers are mating properly, with red dots coinciding. Tighten cowl fasteners and connect cables to proper jacks.

**CAUTION**

Do not force unit 11B into position. Forcing may damage pins on connecting plug and couplers.

**Note**

When replacing unit 11B with a new unit 11B, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

No electrical adjustments are required on unit 11B unless one of the filter components is replaced. When replacing a component, adjust its slug. (See paragraph 5aa (1).)

**bb. ELECTRONIC FREQUENCY CONVERTER, UNIT 11C (Z-2801) TROUBLE SHOOTING.**—The electronic frequency converter (unit 11C) has two inputs and one output. Nominal r-f voltages may be checked by means of Multimeter ME-25A/U at the test points on unit 11C as indicated in table 7-28.

If there is no output, use the trouble location diagram, figure 7-120, the schematic diagram, figure 7-147, wiring diagram, figure 7-148, and the voltage and resistance chart, figure 7-49, to locate the fault.

TABLE 7-27. UNIT 11B, 1-MC STEP FILTER ADJUSTMENTS

| Position of Red Pointer |        | KNOBS |   | FREQUENCY IN MC. | ADJUSTMENT                           | ADJUSTMENT LABEL     |
|-------------------------|--------|-------|---|------------------|--------------------------------------|----------------------|
| S-2651                  | S-2652 | Ⓐ     | Ⓑ |                  |                                      |                      |
| 4                       | 4      | 2     | 6 | 14.445           | L-2655<br>L-2665<br>L-2679<br>L-2689 | C4<br>D4<br>E4<br>F4 |
| 3                       | 4      | 2     | 7 | 13.445           | L-2654<br>L-2664<br>L-2678<br>L-2688 | C3<br>D3<br>E3<br>F3 |
| 2                       | 4      | 2     | 8 | 12.445           | L-2653<br>L-2663<br>L-2677<br>L-2687 | C2<br>D2<br>E2<br>F2 |
| 1                       | 4      | 1     | 4 | 11.445           | L-2652<br>L-2662<br>L-2676<br>L-2686 | C1<br>D1<br>E1<br>F1 |
| 0                       | 4      | 1     | 5 | 10.445           | L-2651<br>L-2661<br>L-2675<br>L-2685 | C0<br>D0<br>E0<br>F0 |
| 9                       | 4      | 0     | 2 | 9.445            | L-2660<br>L-2670<br>L-2684<br>L-2694 | C9<br>D9<br>E9<br>F9 |
| 8                       | 4      | 0     | 3 | 8.445            | L-2659<br>L-2669<br>L-2683<br>L-2693 | C8<br>D8<br>E8<br>F8 |
| 7                       | 4      | 1     | 8 | 7.445            | L-2658<br>L-2668<br>L-2682<br>L-2692 | C7<br>D7<br>E7<br>F7 |
| 6                       | 4      | 0     | 4 | 6.445            | L-2657<br>L-2667<br>L-2681<br>L-2691 | C6<br>D6<br>E6<br>F6 |

cc. ELECTRONIC FREQUENCY CONVERTER,  
UNIT 11C (Z-2801), REPAIR AND  
ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—All adjustable components on unit 11C are *factory adjusted* and should *not* be tampered with unless absolutely necessary. Connect unit 11C to an extension test cable to make these adjustments. Refer to Section 1 for extension test cable fabrication instructions.

TABLE 7-28. UNIT 11C, R-F VOLTAGE  
AT TEST POINTS

| TEST POINT | NOMINAL VOLTAGE |
|------------|-----------------|
| 9c         | 1.0             |
| 10c        | 0.3             |
| 11c        | 4.5             |

NOTE: Above voltages can be measured only when BAND knob Ⓕ is in position 16-26 MC.

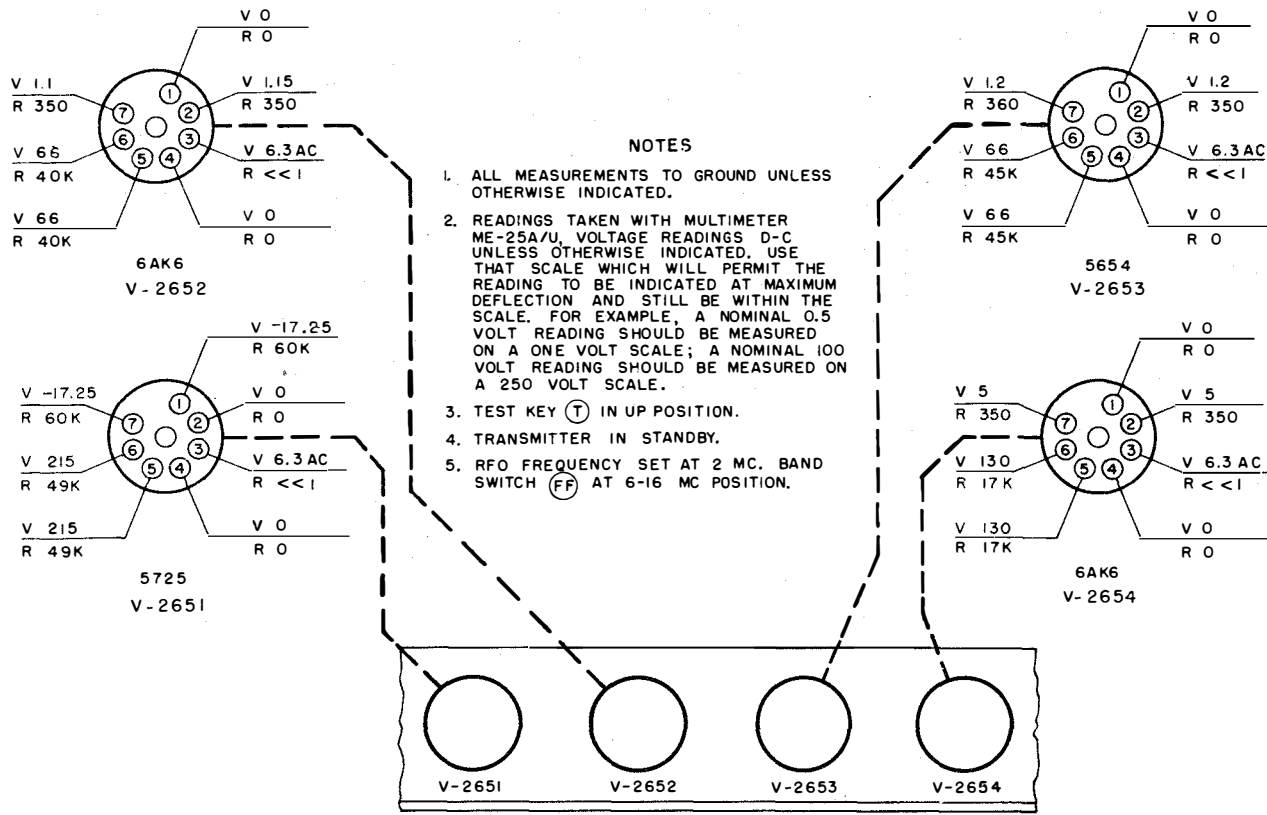
**Note**

Do not make these adjustments until all RFO units except 11A and 11B are properly aligned. Alignment of unit 11C will be indicated if there is a substantial reduction (see figure 7-120) of r-f output or no output at test point 11c, after it has been established that the mixer and amplifier stages (V-2801 through V-2804) are known to be operating properly. RFO front panel knob BAND Ⓕ must be in position 16-26 MC for this check.

*Step 1.* Set RFO front panel frequency selection knobs for a frequency of 25.94500 mc. This sets switch S-2801 on unit 11C at position 5 and switch S-2802 at 9.

*Step 2.* Remove unit 11C from mounting and use the subunit extension cable. Connect jacks 9c and 10c on unit 11C to corresponding cables of unit 14 mounting.

*Step 3.* Connect Multimeter ME-25A/U to jack



SECTION A-A

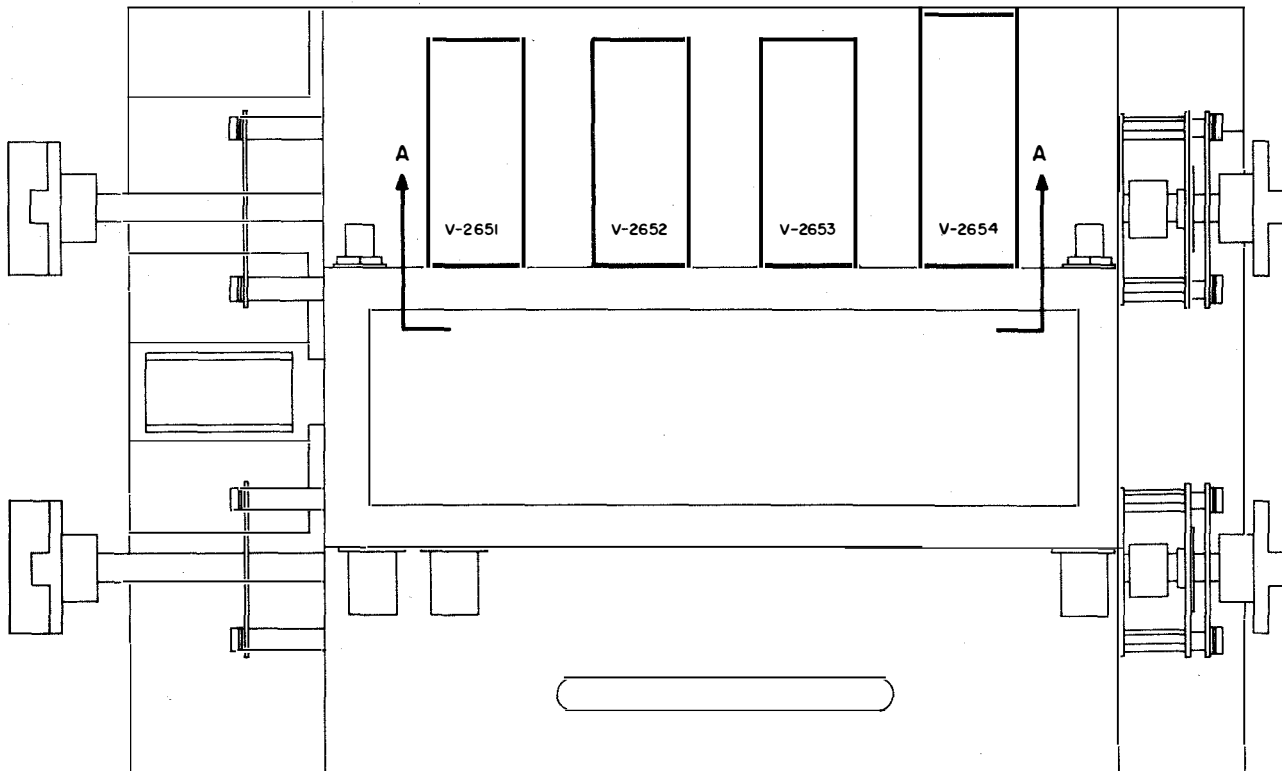
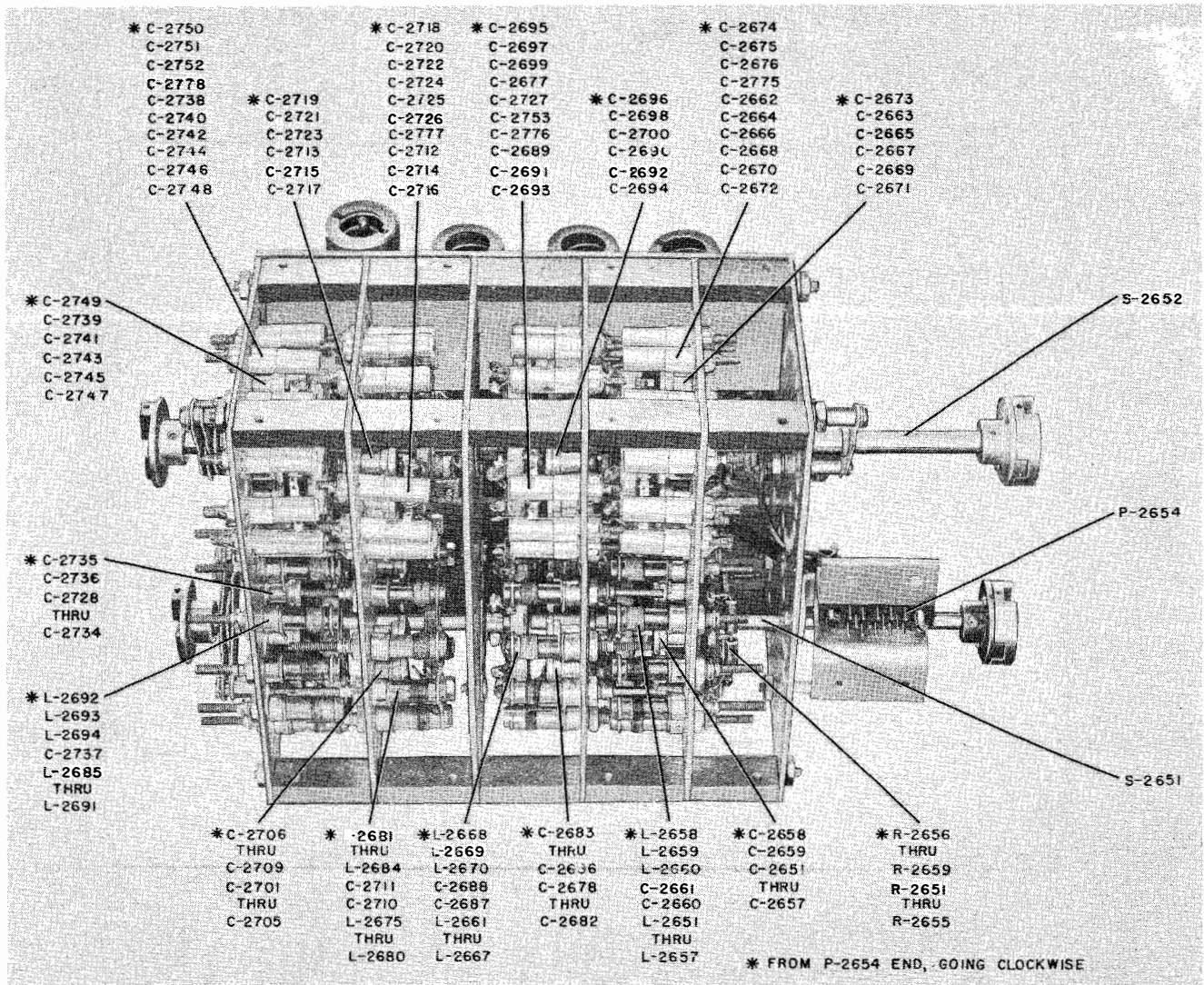


Figure 7-46. RFO, Unit 11B (Z-2651), Voltage and Resistance Chart



**Figure 7-47. RFO, Unit 11B (Z-2651), Covers Removed, Top Oblique View**

11e on unit 11c and set meter on 5-volt scale, using the r-f probe.

**Step 4.** Switch  $\textcircled{P}$  in STANDBY, and TEST KEY  $\textcircled{T}$  in locked up position. Set the slugs of capacitors C-2810, C-2845, C-2865, and C-2887 (labeled B, C, D and E, respectively, on S-2801) at their midpositions. Use the special insulated screwdriver and determine the midposition of the slugs by rotating first clockwise and then counterclockwise, counting the number of turns and setting the slugs at their midposition.

**Note**

Adjustments on S-2801 and S-2802 are located as follows: B, B0 through B9, C, C0 through C9, B7T and C7T at the front of S-2801; A0 through A8 and B0 through B8 at the front of S-2802; D, D0 through D9 and E,

E0 through E9 at the rear of S-2801; C0 through C8 and D0 through D8 at the rear of S-2802.

**WARNING**

Use the special insulated screwdriver supplied with the RFO to make adjustments labeled B, B0 through B9, C, C0 through C9, B7T, C7T, and D, D0 through D9 on S-2801 and A0 through A8, B0 through B8, and C0 through C8 on S-2802.

**Step 5.** Set knob  $\textcircled{A}$  at 2 and  $\textcircled{B}$  at 0.

**Step 6.** Adjust the slugs of L-2806, L-2816, L-2826 and L-2836 (labeled B5, C5, D5 and E5, respectively, on S-2801) for a maximum reading on the meter.

**Step 7.** Rotate the indicator (red pointer) of switch S-2802 to the positions listed in table 7-29 and

**7 Section**

**Paragraph 5 cc (1)**

**NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A**

**CORRECTIVE  
MAINTENANCE**

adjust the four corresponding capacitors on S-2802 for a maximum meter reading.

After adjustments have been made as indicated in table 7-29, return indicator on S-2802 to position 4. Set S-2801 on unit 11C and knobs (AA) and (BB) to the positions shown in table 7-30.

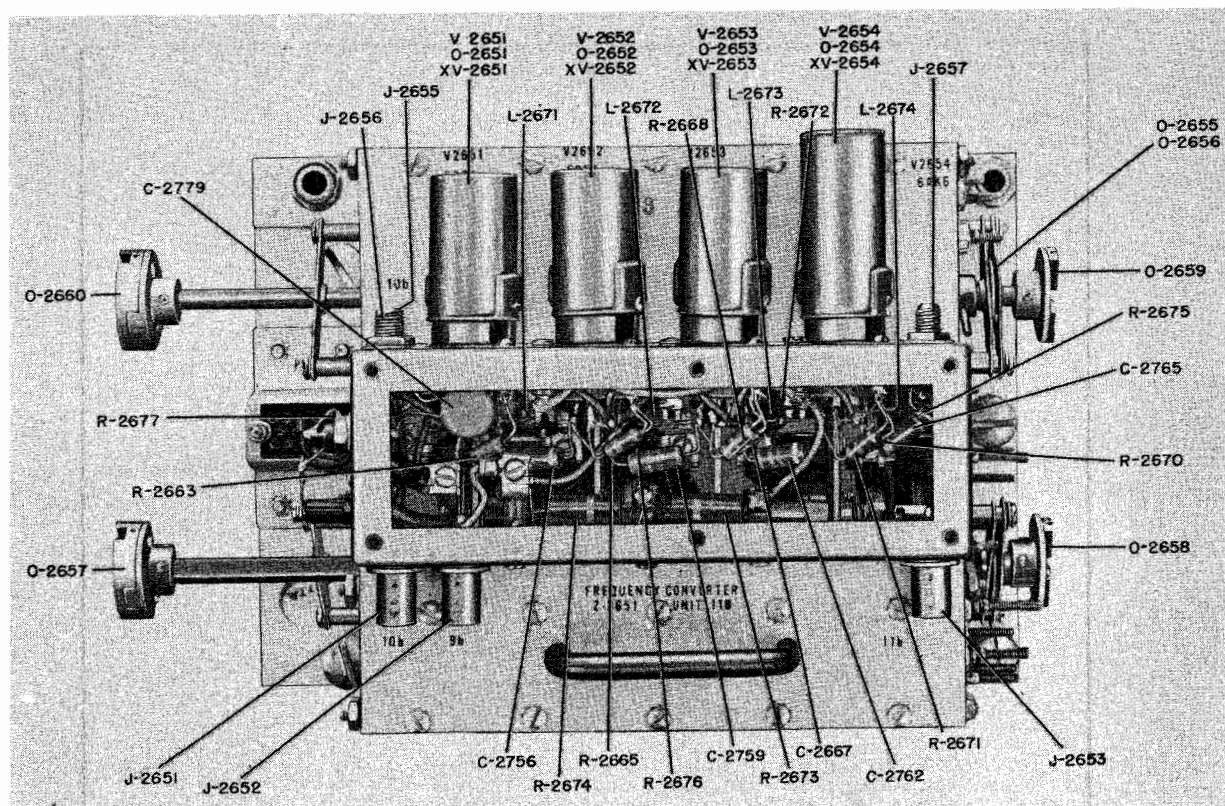
Adjust corresponding inductors for a maximum reading on multimeter. Frequency selection knobs on RFO front panel should be set as indicated in table 7-30.

**TABLE 7-29. UNIT 11C, 100-KC STEP  
FILTER ADJUSTMENTS (Cont'd)**

**TABLE 7-29. UNIT 11C, 100-KC STEP  
FILTER ADJUSTMENTS**

| Position of Red Pointer |        | FREQUENCY IN MC. | ADJUSTMENT | ADJUSTMENT LABEL |
|-------------------------|--------|------------------|------------|------------------|
| S-2801                  | S-2802 |                  |            |                  |
| 5                       | 8      | 25.845           | C-2819     | A8               |
|                         |        |                  | C-2839     | B8               |
|                         |        |                  | C-2859     | C8               |
|                         |        |                  | C-2878     | D8               |
| 5                       | 7      | 25.745           | C-2818     | A7               |
|                         |        |                  | C-2838     | B7               |
|                         |        |                  | C-2858     | C7               |
|                         |        |                  | C-2877     | D7               |
| 5                       | 6      | 25.645           | C-2817     | A6               |
|                         |        |                  | C-2837     | B6               |
|                         |        |                  | C-2857     | C6               |
|                         |        |                  | C-2876     | D6               |

| Position of Red Pointer |        | FREQUENCY IN MC. | ADJUSTMENT | ADJUSTMENT LABEL |
|-------------------------|--------|------------------|------------|------------------|
| S-2801                  | S-2802 |                  |            |                  |
| 5                       | 5      | 25.545           | C-2816     | A5               |
|                         |        |                  | C-2836     | B5               |
|                         |        |                  | C-2856     | C5               |
|                         |        |                  | C-2875     | D5               |
| 5                       | 4      | 25.445           | C-2815     | A4               |
|                         |        |                  | C-2835     | B4               |
|                         |        |                  | C-2855     | C4               |
|                         |        |                  | C-2874     | D4               |
| 5                       | 3      | 25.345           | C-2814     | A3               |
|                         |        |                  | C-2834     | B3               |
|                         |        |                  | C-2854     | C3               |
|                         |        |                  | C-2873     | D3               |
| 5                       | 2      | 25.245           | C-2813     | A2               |
|                         |        |                  | C-2833     | B2               |
|                         |        |                  | C-2853     | C2               |
|                         |        |                  | C-2872     | D2               |
| 5                       | 1      | 25.145           | C-2812     | A1               |
|                         |        |                  | C-2832     | B1               |
|                         |        |                  | C-2852     | C1               |
|                         |        |                  | C-2871     | D1               |
| 5                       | 0      | 25.045           | C-2811     | A0               |
|                         |        |                  | C-2831     | B0               |
|                         |        |                  | C-2851     | C0               |
|                         |        |                  | C-2870     | D0               |



**Figure 7-48. RFO, Unit 11B (Z-2651), Covers Removed, Right View**

TABLE 7-30. UNIT 11C, 1-MC STEP FILTER ADJUSTMENTS

| Position of Red Pointer |        | KNOBS |   | FREQUENCY IN MC. | ADJUSTMENT                           | ADJUSTMENT LABEL     |
|-------------------------|--------|-------|---|------------------|--------------------------------------|----------------------|
| S-2801                  | S-2802 | Ⓐ     | Ⓑ |                  |                                      |                      |
| 4                       | 4      | 3     | 2 | 24.445           | L-2805<br>L-2815<br>L-2825<br>L-2835 | B4<br>C4<br>D4<br>E4 |
| 3                       | 4      | 3     | 3 | 23.445           | L-2804<br>L-2814<br>L-2844<br>L-2834 | B3<br>C3<br>D3<br>E3 |
| 2                       | 4      | 0     | 1 | 22.445           | L-2803<br>L-2813<br>L-2843<br>L-2833 | B2<br>C2<br>D2<br>E2 |
| 1                       | 4      | 3     | 4 | 21.445           | L-2802<br>L-2812<br>L-2842<br>L-2832 | B1<br>C1<br>D1<br>E1 |
| 0                       | 4      | 3     | 5 | 20.445           | L-2801<br>L-2811<br>L-2841<br>L-2831 | B0<br>C0<br>D0<br>E0 |
| 9                       | 4      | 1     | 1 | 19.445           | L-2810<br>L-2820<br>L-2830<br>L-2840 | B9<br>C9<br>D9<br>E9 |
| 8                       | 4      | 2     | 3 | 18.445           | L-2809<br>L-2819<br>L-2829<br>L-2839 | B8<br>C8<br>D8<br>E8 |
| 7                       | 4      | 3     | 8 | 17.445           | L-2808<br>L-2818<br>L-2828<br>L-2838 | B7<br>C7<br>D7<br>E7 |
| 6                       | 4      | 3     | 9 | 16.445           | L-2807<br>L-2817<br>L-2827<br>L-2837 | B6<br>C6<br>D6<br>E6 |

*Step 8.* Set knob Ⓐ at 3, Ⓑ at 5, Ⓒ at 16-26 and all others at 0.

*Step 9.* Place indicator on S-2801 at 7, and S-2802 at 0.

*Step 10.* Connect a calibrated receiver (RBA, RBB, RBC series; see paragraph 3b) tuned to 20 mc, in place of Multimeter ME-25A/U connected to output jack 11c on unit 11C.

*Step 11.* Adjust traps L-2845 and L-2846 (labeled B7T and C7T, respectively, on S-2801) for a minimum receiver output as indicated on the receiver OUTPUT meter.

*Step 12.* Disconnect the receiver from output jack 11c and connect the Multimeter ME-25A/U in its place.

*Step 13.* Set RFO frequency selection knobs to 17.44500 mc.

*Step 14.* Set S-2801 indicator on unit 11C at position 7 and S-2802 at 4.

*Step 15.* Adjust L-2808, L-2818, L-2828, and L-2838 (labeled B7, C7, D7 and E7, respectively, on S-2801) for a maximum reading on the meter.

## (2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—Unit 11C is removed from the mounting (unit 14) in the same manner as unit 11B (see paragraph 5aa(2)(a)).

(b) REPLACEMENT AND ADJUSTMENTS.—Unit 11C is replaced in the same manner as unit 11B (see paragraph 5aa(2)(b)).

### Note

When replacing unit 11C with a new unit 11C, it may be necessary to loosen the power plug mounting screws and the chassis guide bushing nuts to effect proper alignment on unit 14 mounting. After proper alignment, be sure to tighten the power plug screws and guide bushing nuts.

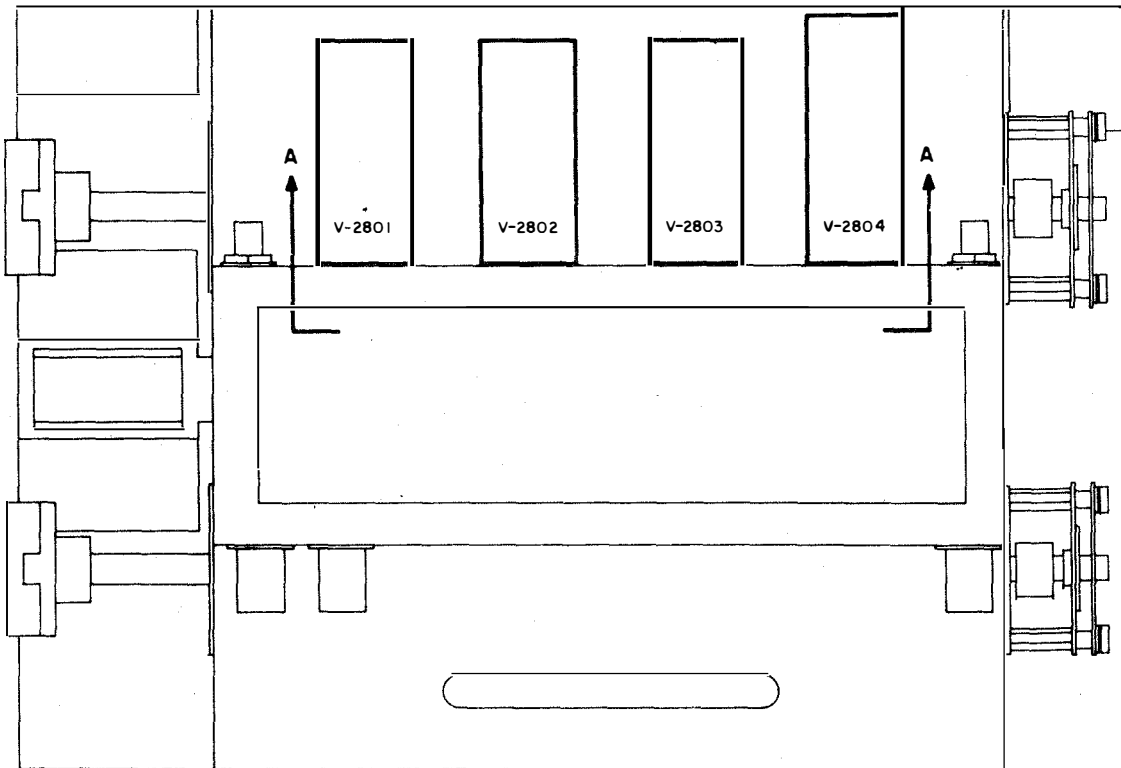
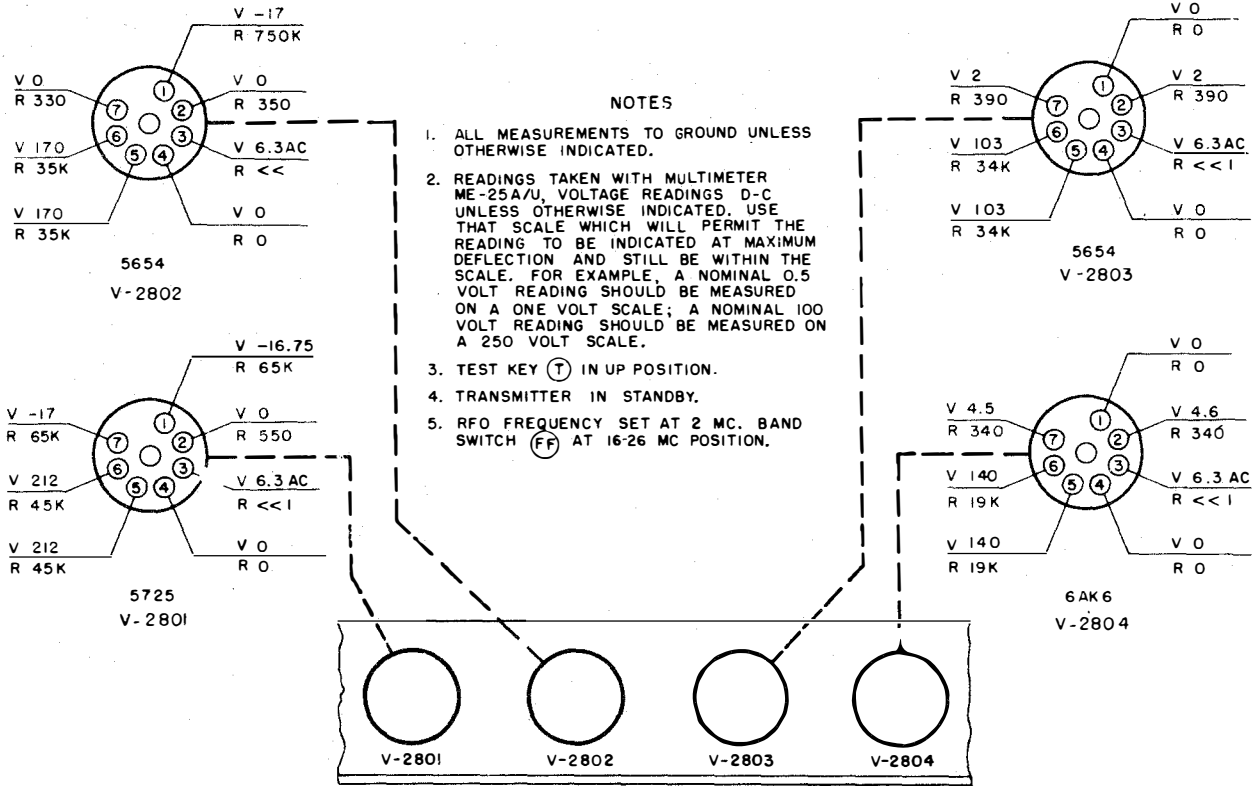


Figure 7-49. RFO, Unit 11C (Z-2801), Voltage and Resistance Chart



When replacing a filter component, adjust its slug as previously described in paragraph 5cc(1). Figures 7-50 and 7-51 show the location of all components in unit 11C.

*dd.* RADIO FREQUENCY OSCILLATOR, UNIT 12 (Z-2127), TROUBLE SHOOTING.—The radio frequency oscillator (unit 12), figures 7-52 and 7-53, has two outputs. One of these outputs can be checked at the arm of potentiometer R-2916 (figure 7-3) and the other output can be checked by means of the ZERO BEAT INDICATOR when switch (Z) on the RFO front panel is in position F.S. OSC. If there is no unit 12 output, check r-f voltage at jack F.S. OSC. or RFO front panel. Use Multimeter ME-25A/U, or equivalent, with r-f probe; the reading should be approximately 10.0 volts. Use the trouble location diagram, figure

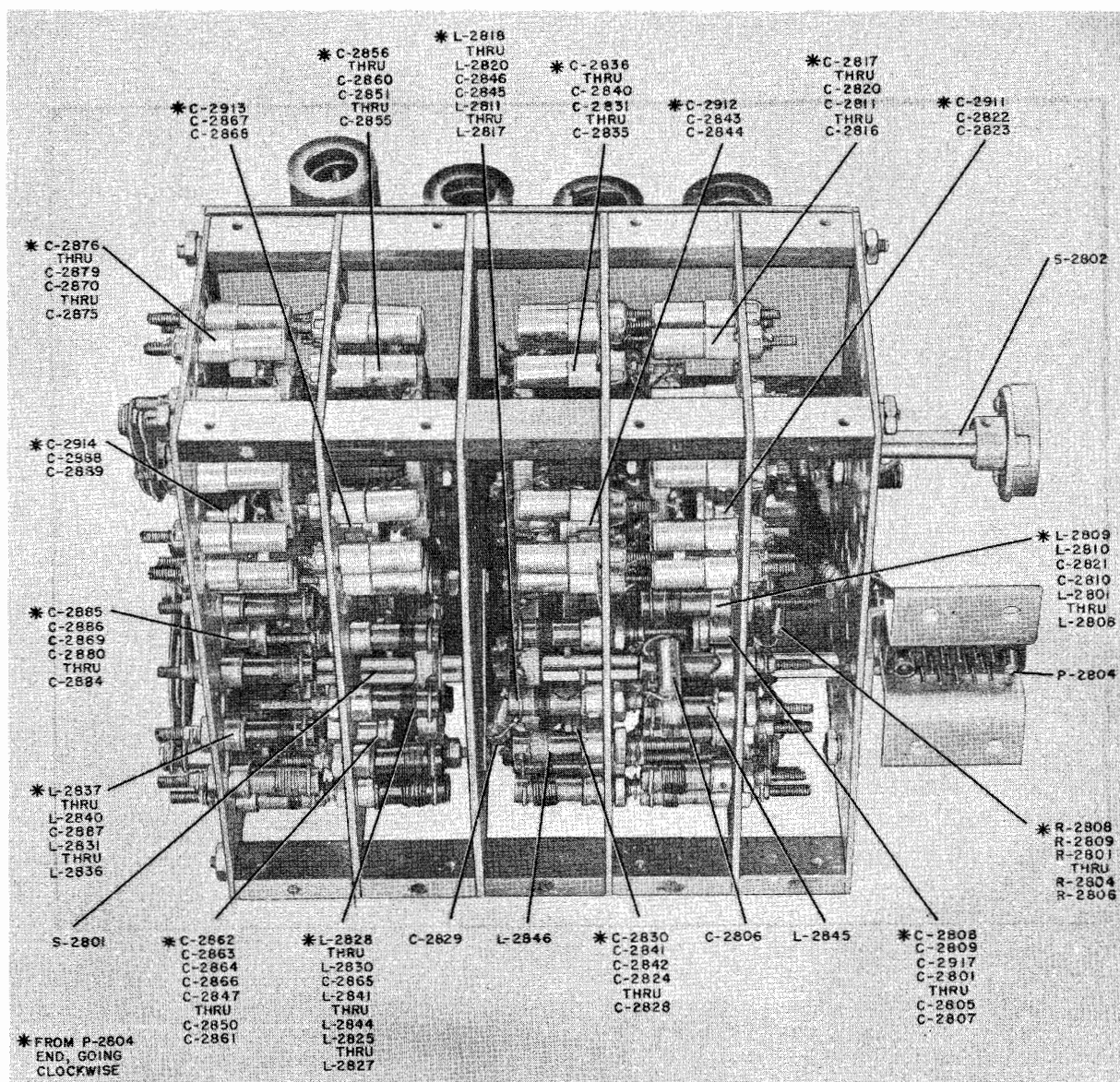
7-120, for minimum r-f voltages, and refer to the schematic diagram, figure 7-149, the wiring diagram, figure 7-150, and the voltage and resistance chart, figure 7-54, to locate the fault.

*ee.* RADIO FREQUENCY OSCILLATOR, UNIT 12 (Z-2127), REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS—Four adjustments may be made when aligning unit 12. Two are located on unit 12 (Z-2126 and T-2126) (figure 7-52), and two are screwdriver adjustments on the RFO front panel (figure 7-3), F.S.O. ZERO ADJ. (R-2916) and F.S.O. RANGE ADJ. (R-2919).

**Note**

Oven Z-2126 must be cycling at least one hour before adjustments are made on unit 12.



**Figure 7-50. RFO, Unit 11C (Z-2801), Covers Removed, Left View**

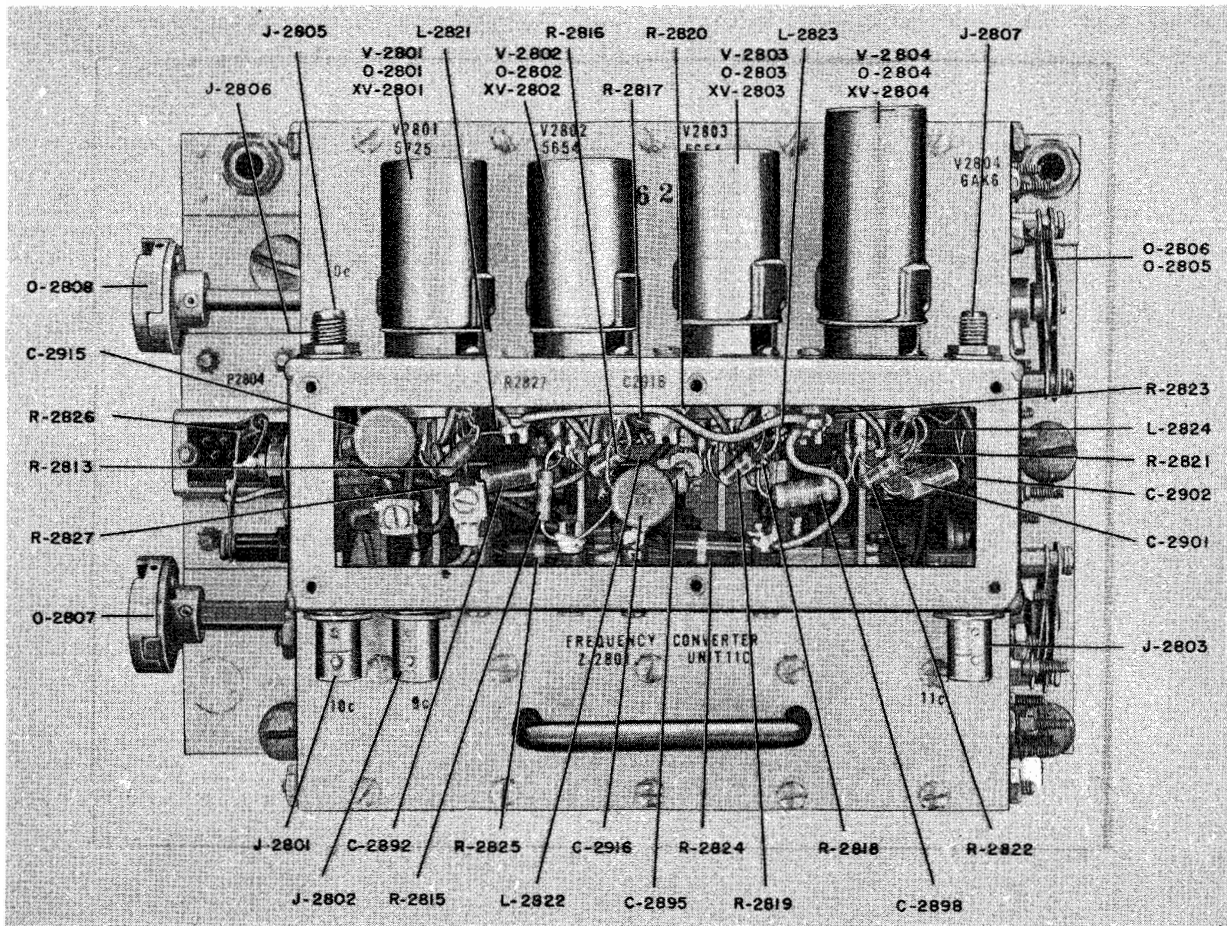


Figure 7-51. RFO, Unit 11C (Z-2801), Cover Removed, Right View

(a) F.S.O. ZERO ADJ. (R-2916) ADJUSTMENT.—F.S.O. ZERO ADJ. control is the fine adjustment for setting the unshifted frequency of unit 12 at 100 kc. Whenever tube V-2126, V-2127, or V-2128 is replaced, this control should be adjusted as follows:

**Note**

F.S.O. ZERO ADJ. may be adjusted from the front panel. Do not make this adjustment until unit 1 is properly aligned.

**Step 1.** Place equipment in a stand-by condition, OPERATE-STANDBY switch (P) in the STANDBY position. Ovens should be on at least one hour.

**Step 2.** Set controls as follows: F.S. DEVIATION (K) locked at 0; F.S.K. PHASE MOD. (L) fully counterclockwise; switch (Z) to F.S. OSC.

**Step 3.** Open the door covering knobs on front panel of the RFO. Adjust R-2916 (at upper right-hand corner labeled F.S.O. ZERO ADJ.) to get minimum frequency opening and closing of electron eye 6E5 mounted on front panel of RFO (ZERO BEAT INDICATOR). A minimum deviation in deflection is ideal. Refer to Section 2, for detailed electron eye indication.

An alternate method of checking the frequency of unit 12 may be accomplished by means of an external oscilloscope. Use Oscilloscope OS-8A/U or equivalent.

Follow steps 1 and 2 in the preceding frequency check.

**Step 1.** Connect cable from F.S. OSC. jack on the RFO front panel to the vertical input of the oscilloscope.

**Step 2.** Connect cable from 100 KC X-TAL jack on the RFO front panel to the horizontal input of the oscilloscope.

**Step 3.** Adjust R-2916, F.S.O. ZERO ADJ., to obtain a 1:1 Lissajous pattern on the oscilloscope. (Refer to figure 7-2.)

**Note**

If a 1:1 Lissajous pattern cannot be obtained by adjusting F.S.O. ZERO ADJ., pull the radio frequency oscillator (RFO) drawer out, bypass the interlock, and adjust L-2126 (located on the left side of unit 12; see figure 7-52) for a 1:1 Lissajous pattern on the oscilloscope. L-2126 is the coarse adjustment and

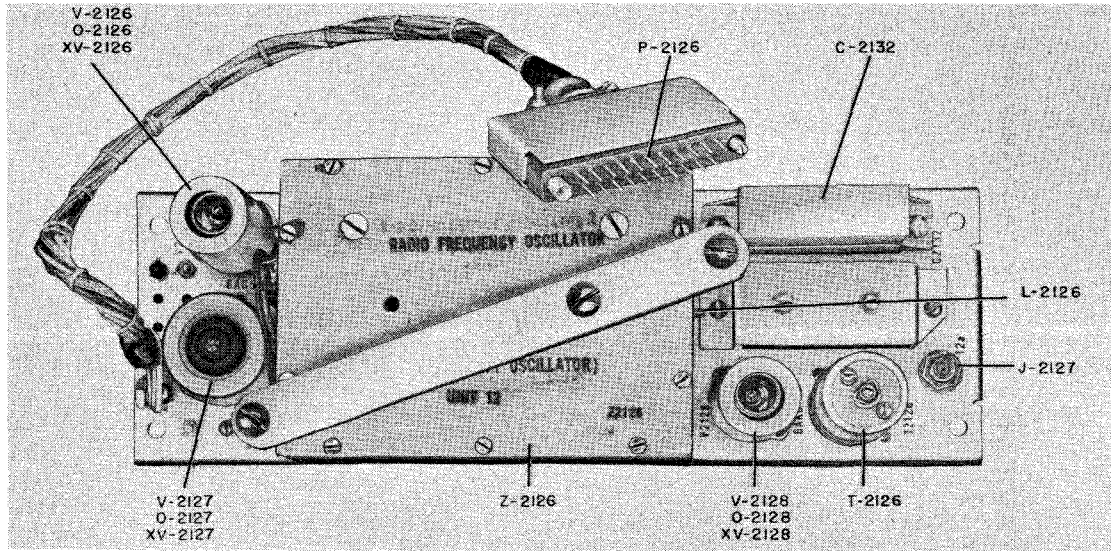


Figure 7-52. RFO, Unit 12 (Z-2127), Top View

should be adjusted with the F.S.O. ZERO ADJ. control in its midposition.

(b) F.S.O. RANGE ADJ. (R-2919) ADJUSTMENT.—The F.S.O. RANGE ADJ. control is adjusted so that F.S. DEVIATION (C.P.S.) control (KK) reads the deviation frequency correctly. It is adjusted as follows:

**Note**

Do not make this adjustment unless ovens have been operating at least one hour. The radio frequency oscillator (RFO) and the low level radio modulator (LLRM) must be properly aligned before making this adjustment.

Step 1. Check zero beat of unit 3; see paragraph 5b(1).

Step 2. Connect cable from 100 KC X-TAL jack on the RFO front panel to the vertical input of Oscilloscope OS-8A/U, or equivalent.

Step 3. Open the radio frequency amplifier (RFA) drawer, and on the right side (see figure 7-69) disconnect the cable from J-1308, mounted on the IPA assembly.

Step 4. Connect this cable to the horizontal input of the oscilloscope.

Step 5. Adjust NEUTRAL POLAR MARK (R-1079) keying voltage on LLRM to +10 volts.

Step 6. Set up a frequency of 0.399500 mc on the RFO frequency selection knobs.

Step 7. Transmitter controls should be set as follows: SERVICE SELECTOR (U) at FSK; switch (A) to INT.; F.S.K. PHASE MOD. (L) counterclockwise to

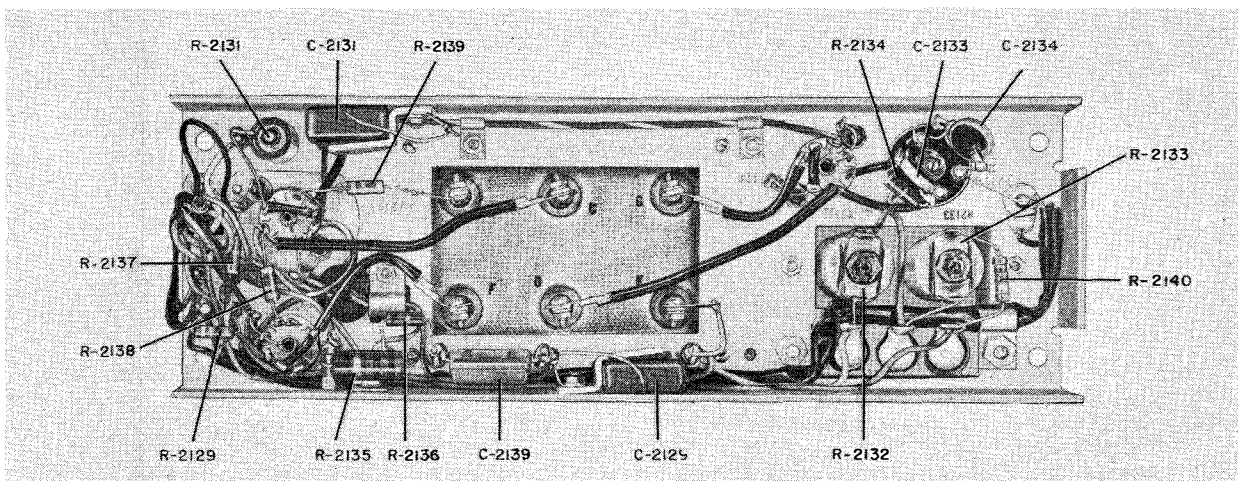


Figure 7-53. RFO, Unit 12 (Z-2127), Bottom View

# 7 Section

Paragraph 5 ee (1) (b)

NAVSHIPS 92121(A)

AN/SRT-14, 14A, 15, 15A, 16, 16A

CORRECTIVE  
MAINTENANCE

OFF; switch (PP) to STANDBY; TEST KEY (T) in "up" position; EXCITATION control (Z) clockwise; F.S. DEVIATION control (KK) at 500.

Step 8. Place switch (V) on LLRM front panel to the MARK position.

Step 9. Adjust F.S.O. RANGE ADJ. on RFO front panel for a 4:1 Lissajous pattern on the oscilloscope.

Step 10. Reset frequency selection knobs on RFO front panel to 0.400500 mc.

Step 11. Adjust (-) LIMIT KEYER OUT control on LLRM front panel for a 4:1 Lissajous pattern.

Step 12. Adjust F.S.O. RANGE ADJ., if necessary, so that F.S. DEVIATION control (KK) reads  $500 \pm 25$ .

### Note

Setting of the +10-volt and -10-volt FSK keying voltages (in the LLRM) should be

### NOTES

1. ALL MEASUREMENTS TO GROUND UNLESS OTHERWISE INDICATED.
2. READINGS TAKEN WITH MULTIMETER ME-25A/U, VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A ONE VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
3. TEST KEY (T) IN CENTER POSITION.
4. TRANSMITTER IN STANDBY. SERVICE SELECTOR (U) AT FSK POSITION.
5. RFO FREQUENCY SET AT 2 MC. BAND SWITCH (FF) AT .3-6 MC POSITION.

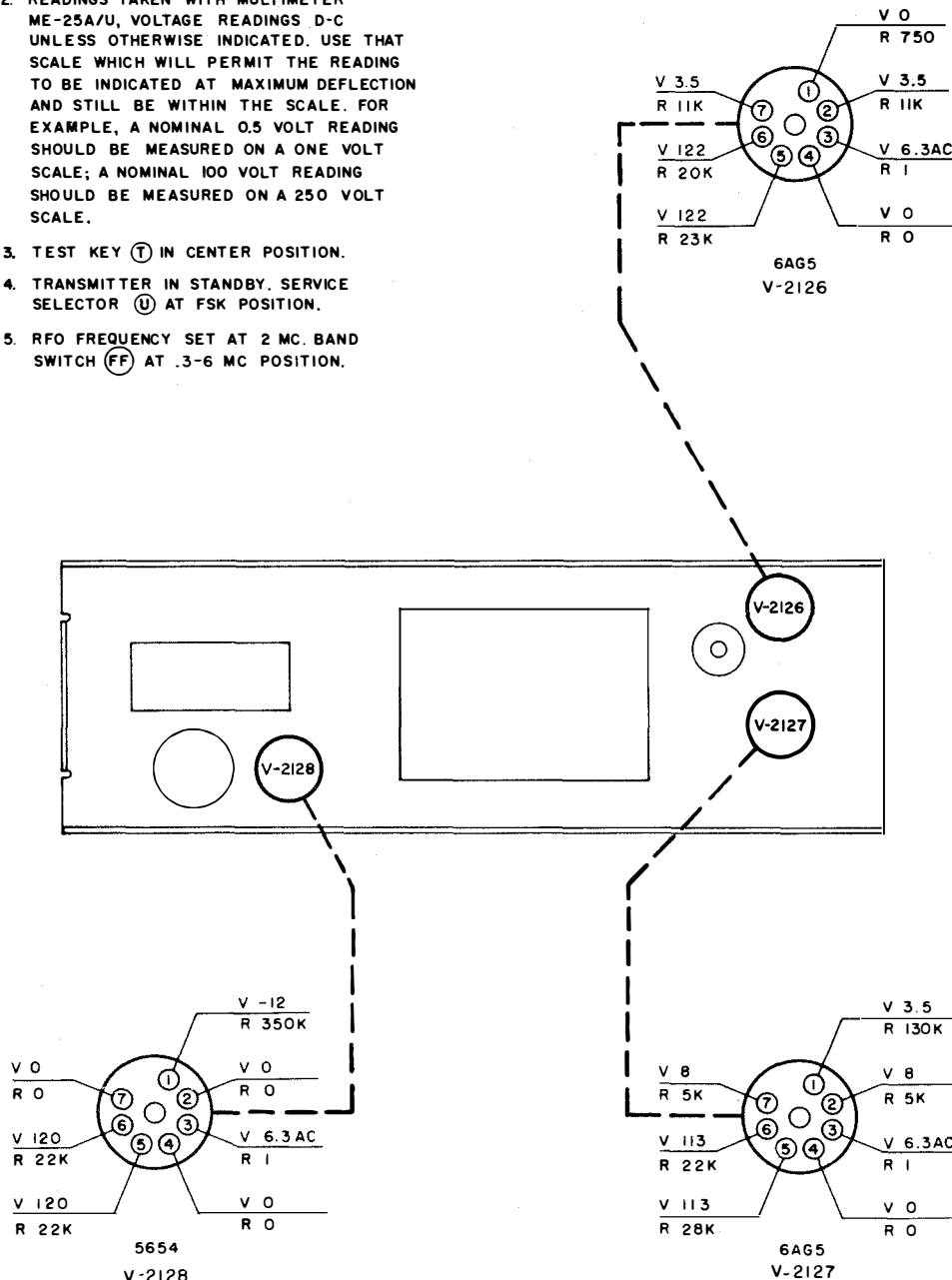


Figure 7-54. RFO, Unit 12 (Z-2127), Voltage and Resistance Chart

checked and reset if necessary (refer to paragraph 6b(1)(b)1 before adjustment of the F.S.O. RANGE ADJ. control.

(c) T-2126 ADJUSTMENT.—Low r-f output at test point 12a on unit 12 may indicate that T-2126 should be adjusted. Both the top and bottom slugs of T-2126 are adjusted for maximum output as indicated on Multimeter ME-25A/U, or equivalent, using the r-f probe. It should read approximately 10 to 13 volts.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—Unit 12 (figure 7-8) may be taken off the mounting by removing four screws, one at each corner of the chassis, and disconnecting the power plug. Replace screws and washers on standoffs while unit 12 is off the mounting so as not to misplace them.

The following steps should be taken to remove oven assembly Z-2126:

*Step 1.* Remove tubes V-2126, V-2127, and V-2128.

*Step 2.* Remove the screw in the oven retainer strap, fastened to the top of the oven.

*Step 3.* Remove two screws supporting the retainer strap standoffs at bottom of unit 12 and remove oven retainer strap and standoff assembly.

*Step 4.* Remove melamine terminal protective cover by removing the two screws on either side of the oven assembly.

*Step 5.* Remove screws supporting terminal lugs on melamine end plate.

*Step 6.* Disconnect lugs on bottom of oven and lugs labeled "T", "T", and "H" on left side of oven.

*Step 7.* Remove the four screws supporting oven assembly to chassis.

To remove thermostat S-2054 in oven assembly:

*Step 1.* Unsolder the two thermostat leads.

*Step 2.* Remove six remaining flathead screws around edge of oven assembly supporting terminal end plate.

*Step 3.* Remove the two large flathead screws on top of the oven. This will allow the upper part of the melamine box surrounding the oven assembly to be lifted free of the end plate. It is not necessary to remove this box entirely; merely loosen it from the terminal end plate and slide back toward V-2128.

**CAUTION**

Do not disturb the adjustment screws (L-2126) at the end of the oven assembly.

*Step 4.* The end terminal board should now be carefully tilted downward toward the chassis. This will allow access to the thermostat.

(b) REPLACEMENT AND ADJUSTMENTS.—To replace oven assembly Z-2126 and thermostat S-2054, reverse the removal procedure as indicated in paragraph 5ee(2)(a).

**CAUTION**

Do not force unit 12 power plug into position. Forcing may damage the pins on the connecting plug.

No adjustments are required on unit 12 unless a component has been replaced. When replacing a component, adjust according to procedure indicated in paragraph 5ee(1).

**Note**

UNIT 13 IS NOT USED IN AN/SRT-14, 15 AND 16.

ff. CONTROL-INDICATOR C-1352/SRT, TROUBLE SHOOTING.—The control of the tuning functions accomplished in the Antenna Coupler CU-372/SRT and R-F Tuner TN-229/SRT is from the Control-Indicator C-1352/SRT, mounted on the RFO front panel (figure 7-3).

The control-indicator contains seven controls and the indicating meters required to manually tune the antenna tuning equipment; see figures 7-3 and 7-55.

Locating trouble in the control-indicator is accomplished when trouble-shooting the complete antenna tuning equipment (paragraph 16a). A continuity check may be made of the control-indicator wiring, and relay and switch contacts may be cleaned and adjusted. Figure 7-151 is the schematic and figure 7-152 the wiring diagram.

gg. CONTROL-INDICATOR C-1352/SRT, REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—The only electrical adjustments required in the control-indicator are potentiometers R-411 and R-413, used to calibrate POSITION indicator meter M-402.

Calibration of the POSITION indicator meter is as follows:

*Step 1.* Transmitter in stand-by condition.

*Step 2.* Depress button  $\text{\textcircled{AG}}$  labeled DOWN, on control-indicator, until the POSITION indicator meter is at minimum reading.

*Step 3.* Adjust ZERO ADJ., on control-indicator panel, to read 0 on the POSITION indicator meter.

*Step 4.* Depress button  $\text{\textcircled{AF}}$  labeled UP, on control-indicator, until the POSITION indicator meter is at maximum reading.

*Step 5.* Adjust FULL SCALE ADJ., on control-indicator panel, to read 100 on the POSITION indicator meter.

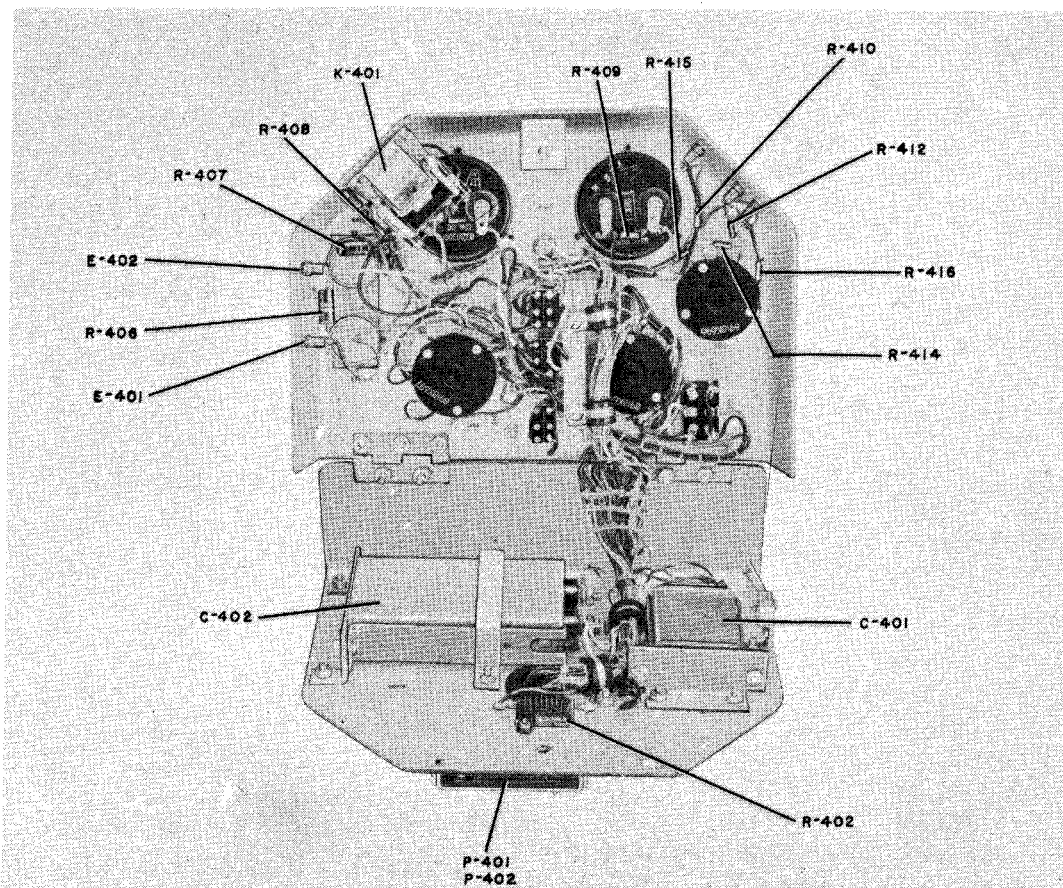


Figure 7-55. Control-Indicator C-1352/SRT, Inner View

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—The control-indicator may be removed from the RFO front panel as follows:

*Step 1.* Loosen the knurled screw on the control-indicator panel, allowing the control-indicator to open on its hinge.

*Step 2.* Remove the four screws supporting the rear panel of the control-indicator to the RFO front panel, and remove the control-indicator from the RFO.

**CAUTION**

When removing the control-indicator from the RFO, pull unit slowly and straight out so as not to bend any of the pins on the connecting plugs.

(b) REPLACEMENT AND ADJUSTMENTS.

—To replace the control-indicator, line up the four holes on the control-indicator with the four threaded holes on the RFO panel. Push the control-indicator in slowly until it is properly seated in position. Replace the four screws supporting the control-indicator rear panel to the RFO panel.

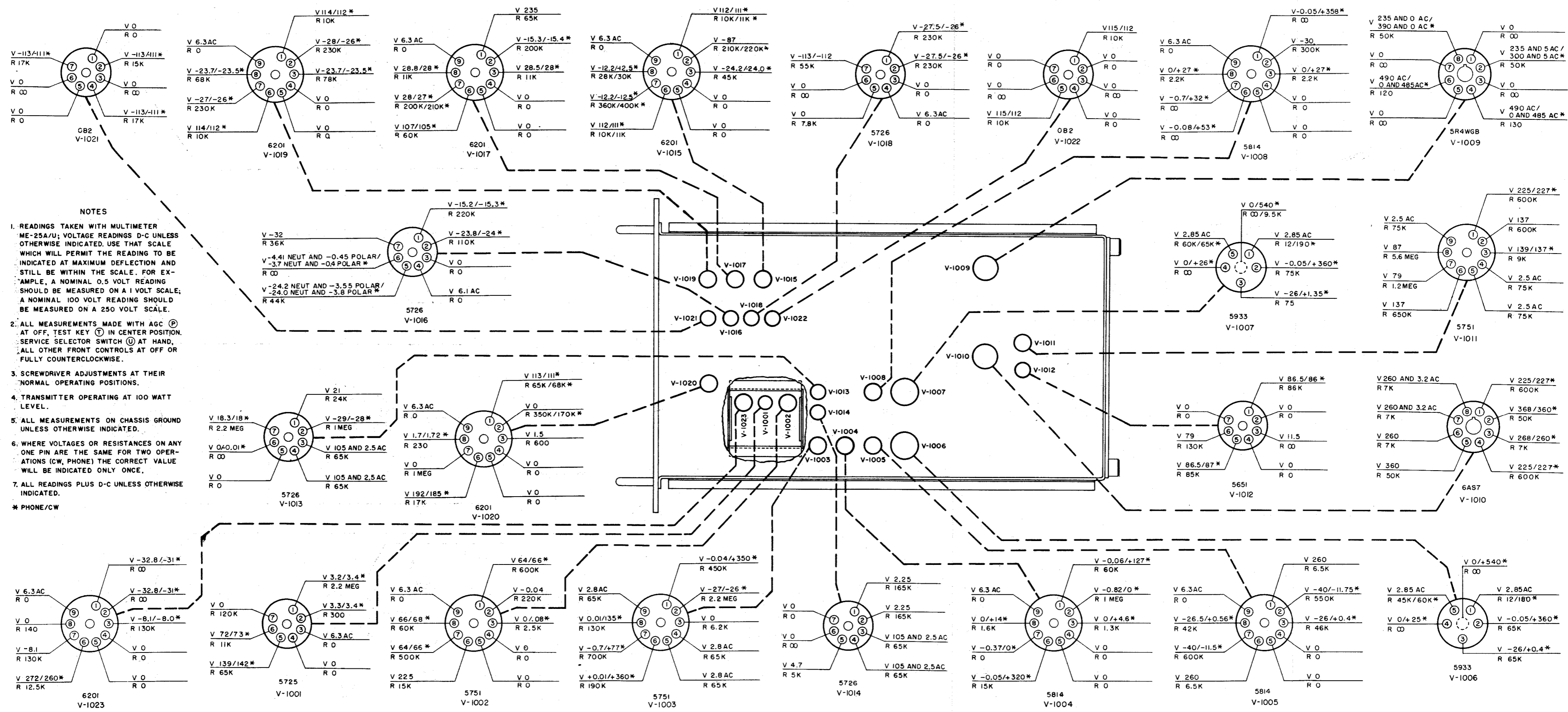
**CAUTION**

Do not force the control-indicator into position. Forcing may cause the pins on its connecting plugs to be damaged.

**6. RADIO MODULATOR MD-229/SRT (LOW LEVEL RADIO MODULATOR, LLRM).**

*a. TROUBLE SHOOTING.*—When a fault has been localized to the low level radio modulator (LLRM), first determine in which circuit the fault exists. To simplify trouble location, the LLRM is divided into three major circuit divisions: audio circuit, keying circuits, and power supply circuits. Refer to the schematic, figure 7-153, wiring diagram, figure 7-154 (sheets 1, 2 and 3), servicing block diagram, figure 7-155, and the voltage and resistance chart, figure 7-56.

(1) AUDIO CIRCUITS.—When trouble occurs in the audio circuits of the LLRM, the transmitter will not operate properly during phone operation. If there is no modulation present in the radio frequency amplifier (RFA) output during 100-watt or 500-watt operation, use an external oscilloscope (OS-8A/U, or equivalent) to locate the faulty portion of the audio circuits. The audio output of the LLRM can be observed on the oscilloscope as follows:



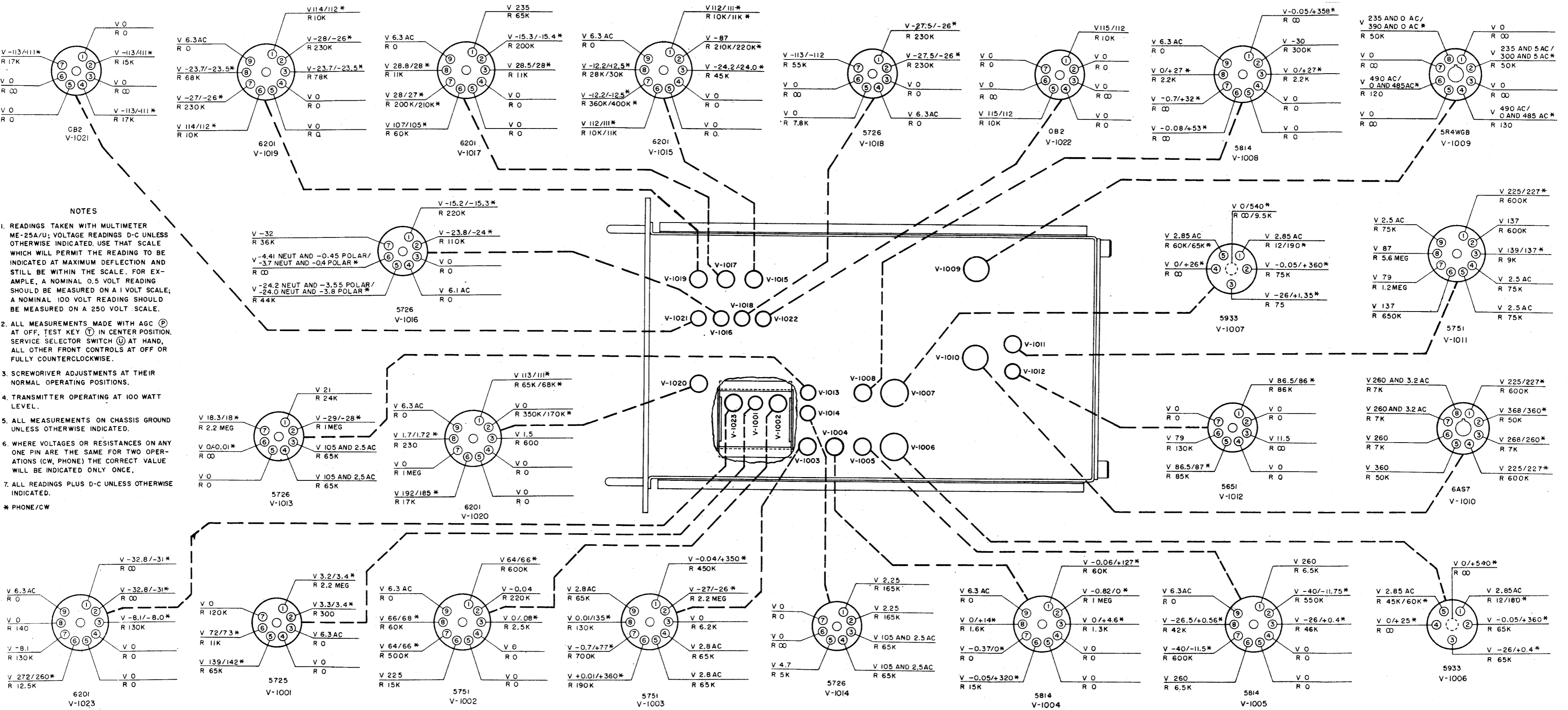
- NOTES**
1. READINGS TAKEN WITH MULTIMETER ME-25A/U; VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A 1 VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
  2. ALL MEASUREMENTS MADE WITH AGC (P) AT OFF, TEST KEY (T) IN CENTER POSITION, SERVICE SELECTOR SWITCH (U) AT HAND, ALL OTHER FRONT CONTROLS AT OFF OR FULLY COUNTERCLOCKWISE.
  3. SCREWDRIVER ADJUSTMENTS AT THEIR NORMAL OPERATING POSITIONS.
  4. TRANSMITTER OPERATING AT 100 WATT LEVEL.
  5. ALL MEASUREMENTS ON CHASSIS GROUND UNLESS OTHERWISE INDICATED.
  6. WHERE VOLTAGES OR RESISTANCES ON ANY ONE PIN ARE THE SAME FOR TWO OPERATIONS (CW, PHONE) THE CORRECT VALUE WILL BE INDICATED ONLY ONCE.
  7. ALL READINGS PLUS D-C UNLESS OTHERWISE INDICATED.
- \* PHONE/CW

ORIGINAL

Figure 7-56. LIRM, Voltage and Resistance Chart

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

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- NOTES**
1. READINGS TAKEN WITH MULTIMETER ME-25A/U; VOLTAGE READINGS D-C UNLESS OTHERWISE INDICATED. USE THAT SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A 1 VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.
  2. ALL MEASUREMENTS MADE WITH AGC (P) AT OFF, TEST KEY (T) IN CENTER POSITION. SERVICE SELECTOR SWITCH (U) AT HAND, ALL OTHER FRONT CONTROLS AT OFF OR FULLY COUNTERCLOCKWISE.
  3. SCREWDRIVER ADJUSTMENTS AT THEIR NORMAL OPERATING POSITIONS.
  4. TRANSMITTER OPERATING AT 100 WATT LEVEL.
  5. ALL MEASUREMENTS ON CHASSIS GROUND UNLESS OTHERWISE INDICATED.
  6. WHERE VOLTAGES OR RESISTANCES ON ANY ONE PIN ARE THE SAME FOR TWO OPERATIONS (CW, PHONE) THE CORRECT VALUE WILL BE INDICATED ONLY ONCE.
  7. ALL READINGS PLUS D-C UNLESS OTHERWISE INDICATED.
- \* PHONE/CW

Figure 7-56. LLRM, Voltage and Resistance Chart



(a) **RAPID PERCENTAGE MODULATION CHECK.**—For routine field percentage modulation check using the ANT. CURRENT meter on the radio frequency amplifier (RFA) front panel, refer to Section 6, table 6-4.

(b) **PRECISE PERCENTAGE MODULATION CHECK.**—A more precise method of checking the percentage of modulation by means of an external oscilloscope (OS-8A/U, or equivalent) may be accomplished as follows:

**CAUTION**

Turn both transmitter and oscilloscope off while making the following connections:

*Step 1.* Couple the r-f output of the transmitter (terminal on the rear of the ANT. CURRENT meter, figure 7-71) to the vertical deflection plates of the oscilloscope.

**Note**

A minimum amount of r-f coupling is desirable. This may be accomplished by connecting wires to both the ANT. CURRENT meter and the vertical input of the oscilloscope, and loosely coupling these wires without making any metallic connection between the two. Capacitive coupling between these wires should be varied as required to provide as near as possible a trapezoidal pattern without phase shift. Figure 7-57 (a, b, c) represents a typical modulation pattern, and (d) shows an ideal trapezoidal pattern.

*Step 2.* Connect the modulation output jack, J-1309 (see figure 7-69), provided for test purposes on the right side of the radio frequency amplifier (RFA) drawer, to the horizontal input jack of the oscilloscope.

**Note**

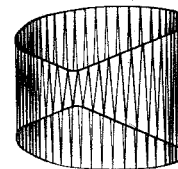
All leads from the RFA to the oscilloscope should be properly shielded to minimize crosstalk and phase shift.

*Step 3.* Place SERVICE SELECTOR switch (U) in PHONE position. Microphone switch (Y) must be in the proper position, the press-to-talk push button on the microphone must be depressed, and the microphone must be receiving a voice signal, with the transmitter "on the air".

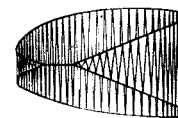
*Step 4.* Refer to figure 7-57 for typical percentage modulation waveforms and adjust the % MOD. control (N) for 100 percent modulation at audio peaks.

If no output appears on the oscilloscope during the modulation check, turn the equipment off, and disconnect leads from the RFA and oscilloscope.

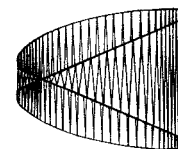
The following trouble-location steps outline a procedure for localizing trouble by the general process of



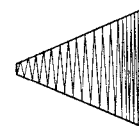
(a)  
UNDERMODULATION



(b)  
OVERMODULATION



(c)  
100% MODULATION



(d)

**Figure 7-57. Typical Percentage Modulation Patterns**

isolating incorrectly operating circuit elements in the audio amplifier chain.

Using oscilloscope OS-8A/U cable W101, connect the vertical input of the oscilloscope to pin 3 of tube V-1004. See figure 7-58.

**WARNING**

The LLRM uses voltages that are dangerous to life. Extreme caution should be exercised when working with the LLRM drawer pulled all the way out.

No connection is made to the horizontal input of the oscilloscope; use internal sync and adjust for suitable display on the cathode-ray tube.

If no signal appears on the oscilloscope, the fault lies in one or more of the following stages (refer to the LLRM block diagram, figure 7-155):

- Preamplifiers V-1001 and V-1002A
- Cathode follower V-1002B
- Clipper V-1014
- Audio amplifier V-1004A

If a signal appears on the oscilloscope, the fault may lie in one or more of the following stages:

- Phase inverter V-1003B
- Cathode followers V-1005A and V-1005B
- Power amplifiers V-1006 and V-1007
- AGC rectifier V-1013A
- Squelch multivibrator V-1008
- Squelch rectifier CR-1002
- Limiter V-1013B

To readily determine whether the fault is in the last three stages (squelch circuit), use a clip lead and ground pin 2 on V-1013B (see figure 7-58), thus disabling the squelch circuit.

Make a stage-by-stage check by connecting a 1,000-cps audio signal to pin C of HANDSET jack (J-1106) on the front panel of the LLRM, figure 7-62. (An audio oscillator such as models LAJ, LAJ-1, LAJ-2, and TS-382A/U may be used, with a signal amplitude of approximately 25 millivolts.) Place carrier "on the air" by grounding pin D of HANDSET jack.

If it has been determined the fault does not exist in the squelch circuit, leave pin 2 of V-1013B grounded, thus keeping the squelch circuit inoperative. The oscilloscope probe, connected to the vertical input jack of the oscilloscope, may now be used to make the stage-by-stage check of the audio circuits.

*Step 1.* Place ground connection between the oscilloscope and LLRM drawer.

*Step 2.* Set the oscilloscope on internal sync (no connection on horizontal input).

The audio signal should be visible on the oscilloscope in increasing amplitude as the probe is advanced from the grid to the plate of each audio amplifier (see block diagram, figure 7-155). When a signal is present at the input to a stage and not at the output, that stage is faulty. Table 7-31 will aid the technician in locating a fault in the LLRM audio circuits.

(2) **KEYING CIRCUITS.**—When trouble occurs in the keying circuits of the LLRM, the transmitter will not operate properly during hand (HAND) keying, machine (MACH) keying and frequency-shift keying (FSK).

The mode of operation as selected by the SERVICE SELECTOR switch (U) will determine the particular keying circuits employed.

In both hand and machine keying, the carrier is turned on the air. At the same time an audio oscillator produces an audio signal for aural monitoring of the keying signal. In frequency-shift keying, signals are produced that control the operation of the frequency-shift oscillator (unit 12) in the radio frequency oscillator (RFO) and can be phase-modulated by an audio signal.

In photo transmission (FAX) the sole function of the LLRM is to connect the FAX input directly to the deviation control R-2917 on unit 14 of the RFO.

Table 7-32 will aid the technician in locating a fault in the LLRM keying circuits. Refer to the servicing block diagram, figure 7-155, the schematic, figure 7-153, and the voltage and resistance chart, figure 7-56. The LLRM front panel component locations and unit adjustments are shown in figures 7-62 and 7-63, respectively.

(3) **POWER SUPPLY CIRCUITS.**—Contained in the LLRM is a +250-volt regulated power supply. This voltage is supplied to the keying and audio stages.

The -12-volt power supply provides operating voltage for the carbon microphone.

The antenna bypass transfer circuit consists of relay K-1102 and tube V-1023.

**TABLE 7-31. INDICATIONS OF FAILURE AND PROBABLE FAULTS IN THE LLRM AUDIO CIRCUITS**

| INDICATION OF FAILURE   | PROBABLE FAULT  |
|---|---|
| Carrier undermodulated.   | GAIN TO CLIP (M) maladjusted. If readjustment does not help, check adjustment of % MOD (N) control and amplification of audio stages. |
| Carrier overmodulated.  | GAIN TO CLIP (M) maladjusted. If readjustment does not help, check adjustment of % MOD (N) control and clipper V-1014.                |
| Modulation present with carbon microphone but not with dynamic microphone.              | Dynamic microphone, microphone input control switch CARBON DYN (Y), or pre-amplifier V-1001.  |
| Modulation present with dynamic microphone but not with carbon microphone.              | Carbon microphone, microphone input control switch CARBON DYN (Y), microphone input transformer T-1103, or -12-volt power supply.     |
| No sidetone signal or amplitude very low.   | SIDETONE control (W) maladjusted or sidetone amplifier V-1004B (if modulation is present).  |
| Carrier modulated by noise when press-to-talk push button is depressed (without voice). | Squelch circuit (V-1008 and CR-1002) and SQUELCH TRIG control (L).  |
| Carrier undermodulated and audio signal distorted.                                      | Cathode followers V-1005A and V-1005B. Power amplifiers V-1006, V-1007.   |
| Noise or howling in audio.  | Microphonic stage V-1001 and V-1002.  |

TABLE 7-32. INDICATIONS OF FAILURE AND PROBABLE FAULTS IN THE LLRM KEYING CIRCUITS

| INDICATION OF FAILURE  | PROBABLE FAULT  |
|--|---|
| Carrier does not key.  | Remote radiophone unit, relays K-1306 in the RFA, K-1101 and K-1107, buffer V-1015A, keying control V-1016, multivibrator V-1017, dumping tube V-1015B, limiter V-1018, and keyer V-1019. |
| Does not key in HAND, MACH, and FSK positions.                         | SERVICE SELECTOR switch (U), S-1101, LOCAL-REMOTE switch (X), V-1015, V-1016, V-1017, V-1018 and V-1019. In MACH and FSK service, voltage regulators V-1021 and V-1022.                   |
| No monitoring signal in HAND and MACH positions.                       | Audio oscillator V-1020 and amplifier V-1004.   |
| Screen overload in power amplifier stage (RFA).                        | Operate reset button (K); if condition still exists check V-1015 and V-1005.  |
| Transmitter keying output garbled.                                     | KEYING RATE switch (S), TIME CONST. ADJ. CONTROL (on preamplifier chassis) and LLRM front panel screwdriver UNIT ADJUSTMENTS.   |
| Keying transients present in RFA output waveform during key operation. | Dumping circuit V-1015 and cathode follower V-1005.   |

Table 7-33 will aid the technician in locating a fault in the LLRM power supply circuits. Refer to the schematic, figure 7-153, and the voltage and resistance chart, figure 7-56.

#### b. REPAIR AND ADJUSTMENT.

##### (1) ELECTRICAL ADJUSTMENTS.

##### (a) AUDIO CIRCUITS.

1. CLIPPER SYM. CONTROL.—The clipper symmetry control is a unit adjustment, adjusted to compensate for differences in plate current characteristics of the speech clipper tube, V-1014, and provide equal positive and negative clipping action; it may be adjusted as follows:

Extend LLRM drawer and remove protective cover plates to make the following connections:

*Step 1.* SERVICE SELECTOR switch (U) at PHONE position. CARBON-DYN. switch (Y) at CARBON position. AGC ON-OFF switch (P) at OFF position. GAIN TO CLIP (M) full clockwise position. SQUELCH TRIG (L) full counterclockwise position. LOCAL-REMOTE (X) at LOCAL position.

*Step 2.* Connect audio signal generator (such as LAJ series) set at 1,000 cps to terminal 3 of trans-

former T-1003, accessible at the bottom of the LLRM drawer, figure 7-59.

*Step 3.* Connect oscilloscope probe (OS-8A/U, or equivalent) from vertical input of oscilloscope to pin 1 of tube V-1014.

*Step 4.* Turn transmitter and test equipment on.

#### CAUTION

VOLTAGES DANGEROUS TO LIFE ARE PRESENT.

*Step 5.* Adjust the oscilloscope (OS-8A/U or equivalent) horizontal frequency control so as to display two cycles on the cathode-ray tube.

*Step 6.* Adjust GAIN TO CLIP control (M) until a small amount of clipping of the 1,000-cps signal appears on the oscilloscope. This is evidenced by flattening of the peaks of the 1,000-cps sine wave.

*Step 7.* Adjust CLIPPER SYM. control for symmetrical clipping on top and bottom of the sine wave, figure 7-60. Readjust control (M) as necessary to maintain the desired signal amplitude.

2. GAIN TO CLIP (M) AND SQUELCH TRIG. (L) CONTROLS.—The GAIN TO CLIP (M) con-

TABLE 7-33. INDICATIONS OF FAILURE AND PROBABLE FAULTS IN THE LLRM POWER SUPPLIES

| INDICATION OF FAILURE                     | PROBABLE FAULT   |
|---|--|
| No 250-volt output.                       | Fuses F-1001 and F-1002, rectifier V-1009, regulators V-1010, V-1011 and V-1012. |
| Poor regulation.                          | Regulator V-1010, regulator control V-1011 and voltage regulator V-1012.         |
| No filament voltage.                      | LLRM filament circuit including F-1002.  |
| No sidetone.                              | -12-volt supply.   |
| Bypass transfer circuit does not operate. | Relay K-1102 and tube V-1023 on preamplifier chassis.                            |

trol is a front panel control knob and its adjustment is a function of operation. Section 4 indicates the method for proper adjustment of this control. It should provide clipping action as indicated in figure 7-60. SQUELCH TRIG. (L) control is also a front panel control knob adjusted as a function of operation. Setting this control adjusts the speech signals to noise level ratio during pauses in speech. Refer to Section 4 for the procedure of adjusting this control during operation.

3. 500 W. AUDIO LEVEL CONTROL.—The 500 W. AUDIO LEVEL control is a unit adjustment used as a modulation compensating control during 500-watt operation. It is adjusted to provide 100 percent modulation in 500-watt operation. With % MOD. control (N) properly adjusted (see paragraph 6a(1)) for 100-watt operation, the 500 W. AUDIO LEVEL is adjusted to provide 100 percent modulation at the 500-watt level. Use the percentage modulation adjustment method as outlined in paragraph 6a(1).

(b) KEYING CIRCUITS.

1. NEUTRAL POLAR MARK AND POLAR SPACE CONTROLS.—These controls are unit adjustments and are adjusted by means of an external test circuit, figure 7-61. This test circuit simulates variable voltage source of machine-keying operation. Components required are: a 45-volt battery, a 50 K potentiometer, and a double-pole, double-throw switch wired as illustrated in figure 7-61.

Step 1. Transmitter at 100-watt level, switch (P) at STANDBY; SERVICE SELECTOR switch (U) at MACH; NEUT. POLAR switch (R) at NEUT.; TEST KEY (T) at center position.

Step 2. Connect output of test circuit between terminal 9R of S-1101A and chassis ground. This terminal (9R) has a gray-red wire connected to it. S-1101A is the first switch wafer of the service selector switch (U). See figure 7-58.

Step 3. Connect Multimeter ME-25A/U, or equivalent, between the KEY V. IN of TEST POINTS

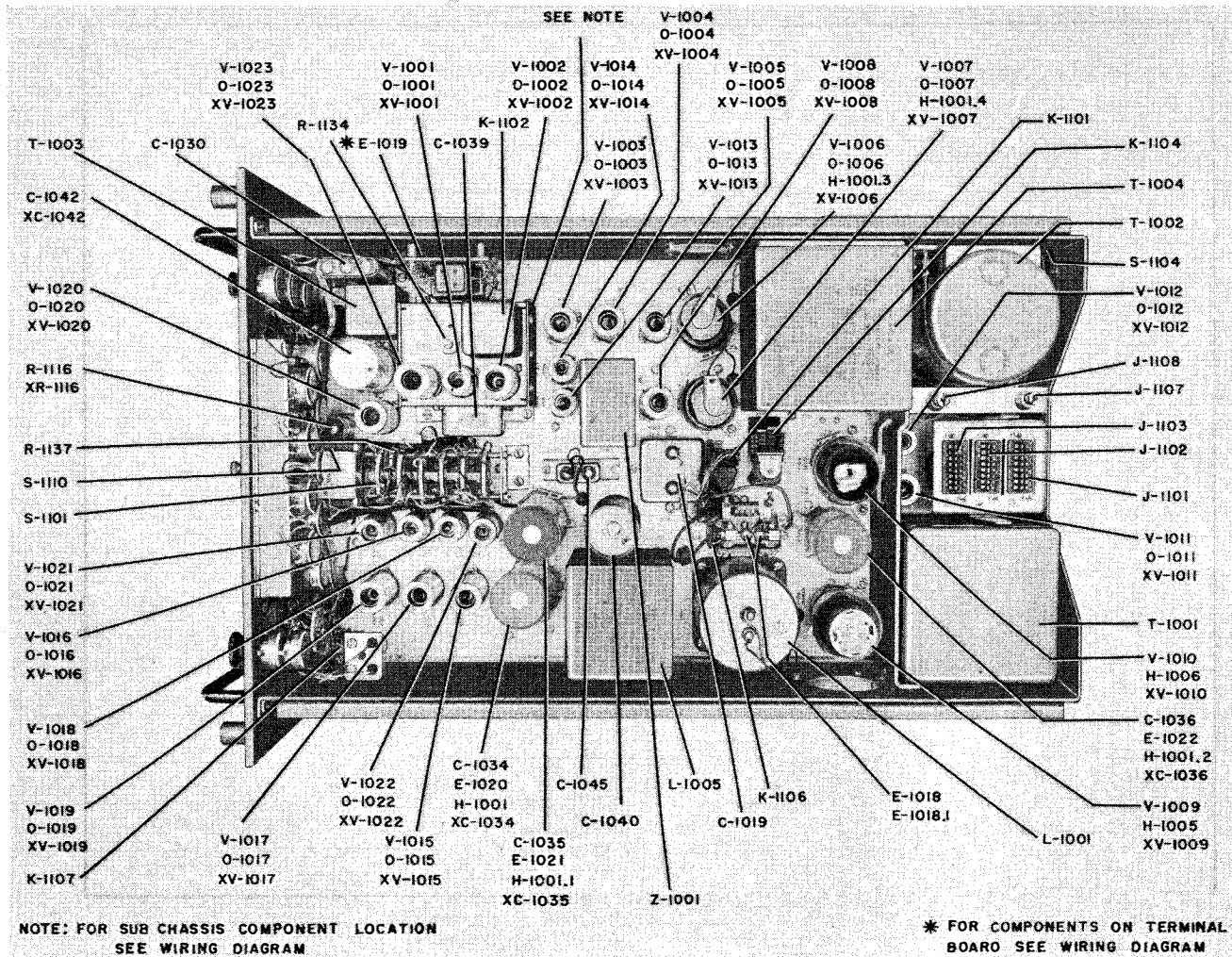


Figure 7-58. Radio Modulator MD-229/SRT (LLRM), Top View

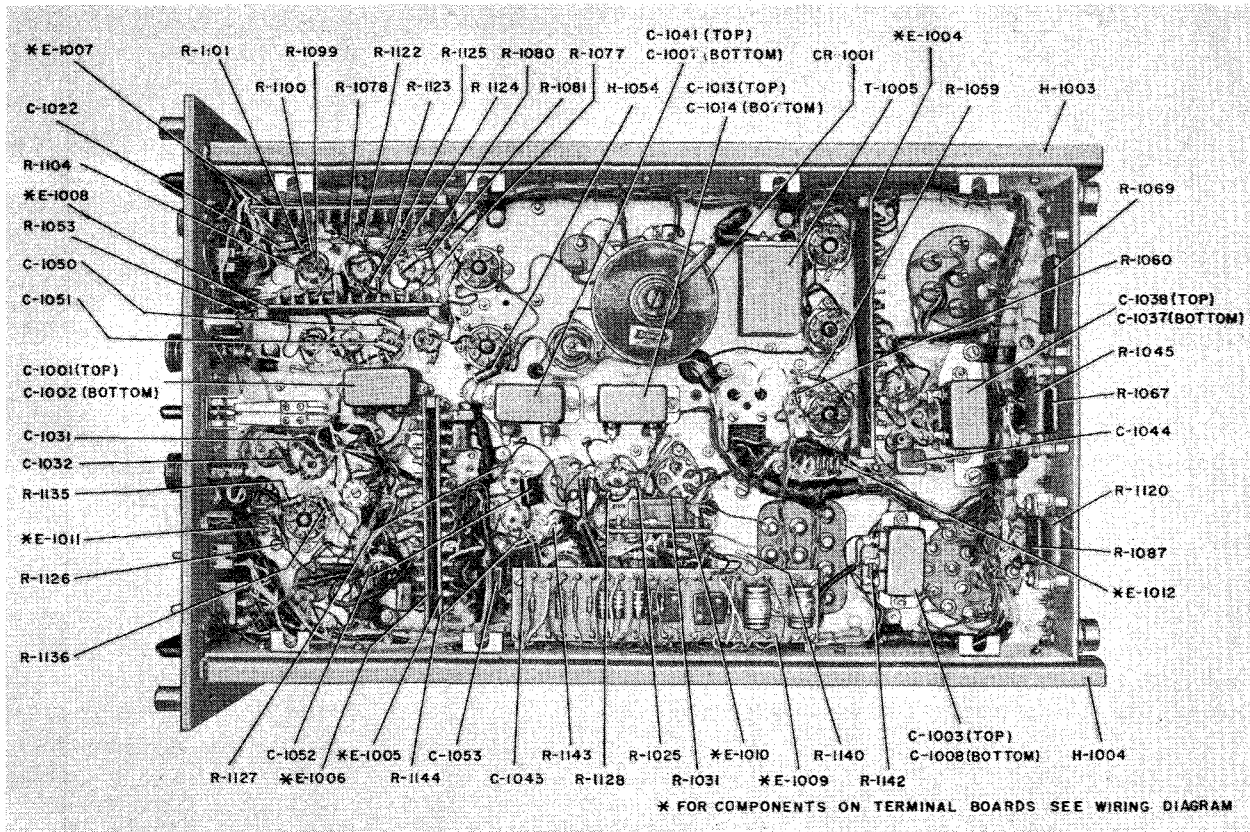


Figure 7-59. Radio Modulator MD-229/SRT (LLRM), Bottom View

socket E-2919 (located on the left side of the RFO, figure 7-6) and chassis ground.

**Step 4.** With the test circuit output adjusted at zero volts, Multimeter ME-25A/U connected to KEY V, IN should read negative or space condition. Set NEUTRAL POLAR MARK control to full counter-clockwise position.

**Step 5.** Adjust the test circuit output to approximately +28 volts. Slowly advance NEUTRAL POLAR MARK control until the meter just snaps to zero volts, mark condition. Lock NEUTRAL POLAR MARK control.

**Step 6.** Set NEUTRAL POLAR switch (R) to POLAR and POLAR SPACE control to full counter-clockwise position.

**Step 7.** Set test circuit output to +30 volts to insure that keyer is in mark condition, and then set the test circuit output to -30 volts (operate the DPDT switch of test circuit).

**Step 8.** Slowly advance the POLAR SPACE control until the keyer goes into space condition (negative reading on meter). Lock POLAR SPACE control.

2. (+) LIMIT AND (-) LIMIT CONTROLS.—The (+) LIMIT and (-) LIMIT unit adjustment controls are the coarse adjustments for the

frequency-shift operation of unit 12 in the RFO. These controls are adjusted to provide a symmetrical frequency-shift output as indicated in the RFO unit 12 alignment procedure of paragraph 5ee(1). These limits may be checked at the RFO test points socket E-2919 as follows:

**Step 1.** With transmitter in stand-by condition, set the SERVICE SELECTOR switch (U) at FSK.

**Step 2.** Connect multimeter (ME-25A/U, or equivalent) between the VOLTS MARK SPACE of test socket E-2919, on the RFO, and chassis ground (figure 7-6).

**Step 3.** Check for a reading of approximately -10 volts on meter.

**Step 4.** Operate switch (V) to MARK and check for approximately +10 volts on meter.

#### Note

The setting of these controls should be checked when proper results are not obtained in the checking of F.S. DEVIATION control (K), in paragraph 5ee(1).

3. ZERO ADJ. CONTROL.—This control is a unit adjustment and its setting should be checked as follows:

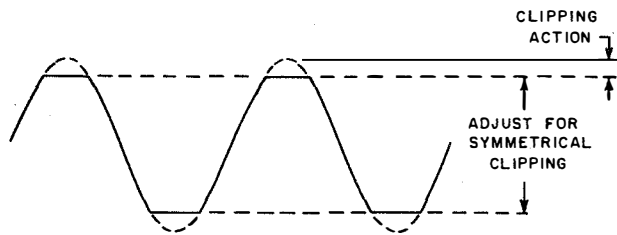


Figure 7-60. Symmetrical Clipping Waveform

Step 1. With the transmitter in stand-by condition set SERVICE SELECTOR switch (U) in HAND position.

Step 2. Remove clipper tube V-1018 (see figure 7-58).

Step 3. Connect meter, ME-25A/U (or equivalent), between pin 1 of XV-1018 and chassis ground. Set meter on +100-volt scale.

Step 4. Operate TEST KEY (T) to its locked-up position and adjust ZERO ADJ. for a reading of +25 volts on the meter.

Step 5. Return TEST KEY (T) to its normal position and reverse the polarity of the meter. The meter should now read approximately -30 volts ( $\pm 10$  volts).

Step 6. Set SERVICE SELECTOR switch (U) to the MACH. position. The meter should still read as in step 5.

Step 7. Reverse polarity of meter and operate switch (V) to MARK. The meter should now read as in step 4.

Step 8. Disconnect meter and replace V-1018 and its tube shield.

4. AUDIO OSC. FEEDBACK CONTROL.—The AUDIO OSC. FEEDBACK control is a unit adjustment and may be adjusted as follows:

Step 1. Transmitter in stand-by, SERVICE SELECTOR switch (U) at FSK.

Step 2. Connect a 200-cycle output (LAJ series, or equivalent) to the vertical input of Oscilloscope OS-8A/U (or equivalent).

**Note**

Adjust the audio generator output voltage level to provide approximately 1-inch deflection on oscilloscope.

Step 3. Using "internal sync", adjust horizontal fine frequency control on Oscilloscope OS-8A/U for a 2-cycle display and adjust vertical gain so that two complete sine waves may be observed, and note the amplitude.

Step 4. Disconnect the external audio oscillator from the oscilloscope, and in its place connect the 200-cycle output of the wobbulator circuit. This output is measured by connecting the vertical input of the oscil-

loscope (OS-8A/U or equivalent) to the white-blue-green wire of the fourth wafer (counting from front to rear) on the SERVICE SELECTOR switch (U) S-1101. (See figure 7-58.)

**Note**

Keep the same setting of the oscilloscope controls as for the external audio signal generator.

Step 5. Adjust the AUDIO OSC. FEEDBACK control for the same amplitude as noted in step 3.

The 200-cycle wobbulator output is fed to the F.S.K. PHASE MOD. control (L) in the RFO (unit 14). Its operation may be observed by connecting the vertical input of the oscilloscope (OS-8A/U, or equivalent) to the arm of this control. Connection may be made by pulling the RFO drawer out, removing unit 6 and placing on extension test cables. Connect vertical input of oscilloscope to terminal 3 of transformer T-2916. Refer to figures 7-5 and 7-121. An increase and decrease of 200-cps amplitude should be observed as this control is rotated.

5. TIME CONSTANT ADJ. CONTROL.—When replacing tube V-1023 in the preamplifier subchassis, it may be necessary to readjust the TIME CONSTANT ADJ. control mounted on this subchassis. This adjustment is a function of operation; for a detailed explanation of its setting, refer to Section 4.

(c) POWER SUPPLY CIRCUITS.

1. 250 V.P.S. CONTROL.—This control is a unit adjustment for the 250-volt regulated power supply. It provides regulated plate voltage to both the low level radio modulator (LLRM) and the radio frequency oscillator (RFO) and is adjusted in the following manner:

Step 1. Place the equipment in stand-by condition, switch (P) in STANDBY.

Step 2. Connect meter (ME-25A/U, or equivalent) to either the 250 V.P.S. test jack provided on the LLRM front panel (J-1110), figure 7-62, or at the RFO test point socket, E-2919 (on the left side of the RFO drawer; see figure 7-6).

Step 3. Set the 250 V.P.S. control (figure 7-63) for a 250-volt reading on the ME-25A/U Multimeter.

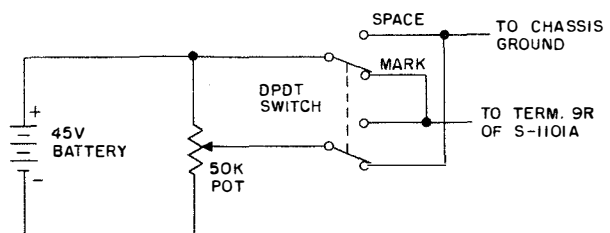


Figure 7-61. LLRM Test Circuit for Simulating Keying Signals

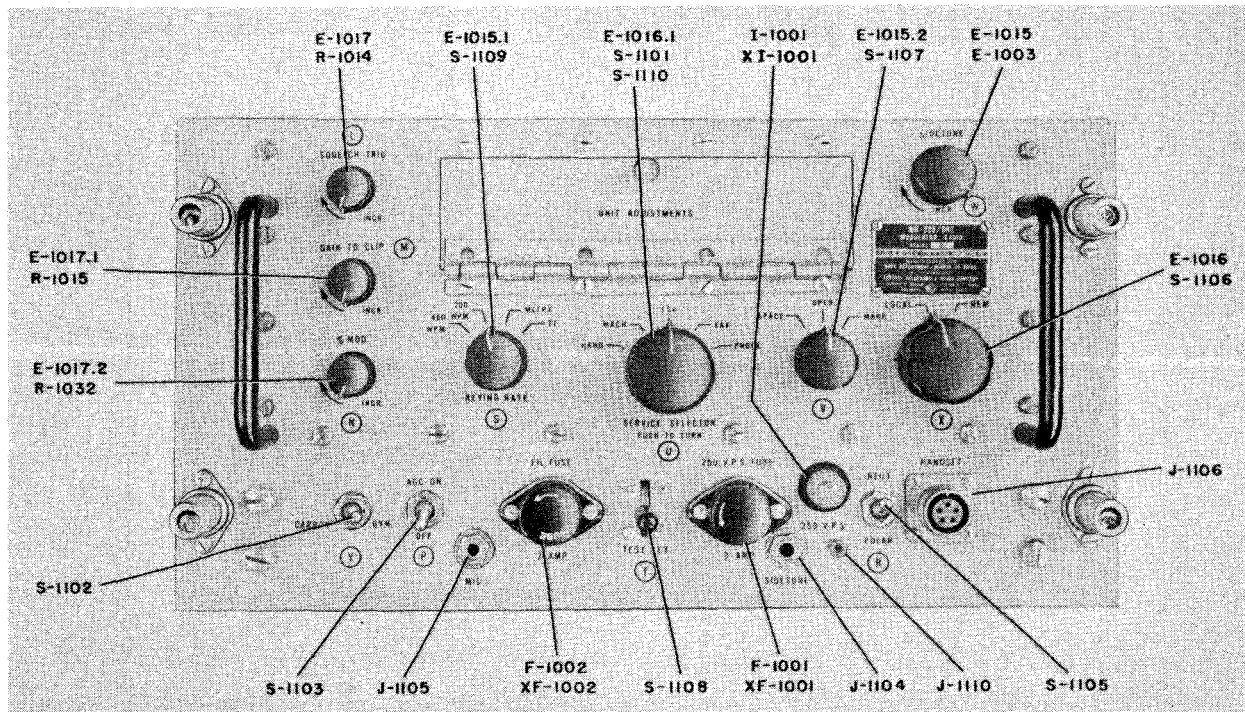


Figure 7-62. Radio Modulator MD-229/SRT (LLRM), Front Panel

2. -12-VOLT SUPPLY.—There are no electrical adjustments for the -12-volt supply. The output of this supply may be checked by connecting a meter (ME-25A/U, or equivalent) between pin D of HANDSET jack J-1106 (on LLRM front panel, figure 7-62) and chassis ground.

#### (2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To remove the LLRM from the transmitter group cabinet, loosen the four front panel captive screws and pull the LLRM drawer out to its stop. Remove the interconnecting cable at the rear of the drawer and lift the drawer and remove it from the transmitter group cabinet. The preamplifier subchassis may be removed by loosening the four 1/4-turn fasteners and removing the subchassis from the main chassis.

#### CAUTION

When removing the preamplifier subchassis, pull slowly and straight up so as not to bend any of the pins on the connecting plug.

#### Note

If necessary, the air gap on the ball gap assembly of relay K-1106 should be set for a 0.020-inch air gap.

#### WARNING

Short the ball gap assembly to ground before adjusting the air gap.

#### (b) REPLACEMENT AND ADJUSTMENTS.

—To replace the preamplifier subchassis, push down slowly until it is properly seated into position, and tighten the fasteners. The LLRM drawer is replaced as indicated in paragraph 4b.

#### CAUTION

Do not force the subchassis into position. Forcing may cause the pins on its connecting plug to be damaged.

### 7. RADIO MODULATOR MD-230/SRT, HIGH LEVEL RADIO MODULATOR (HLRM).

a. TROUBLE SHOOTING.—If the carrier is not modulated in PHONE during 500-watt operation, but is modulated during 100-watt operation, the high level radio modulator (HLRM) is probably faulty. Check the 3000 V and 350 V SCREEN indicator lights. The 350 V SCREEN indicator light will go on only when the press-to-talk push button on the microphone is depressed. If the 350 V SCREEN indicator light does not go on, check connections to terminal board E-1606, relay K-1601, and associated circuit in the HLRM subunit chassis. See figures 7-64 and 7-65 for component locations. If the 3000 V indicator light does not go on, check the interconnecting high voltage cable and the high voltage source from the high voltage Power Supply PP-1096/SRT (HVPS). Check the fuses in the HVPS. (See Section 5, table 5-4.) If the TIME DELAY indicator light of the high voltage Power Supply PP-1096/SRT is on, use the VOLTMETER on the

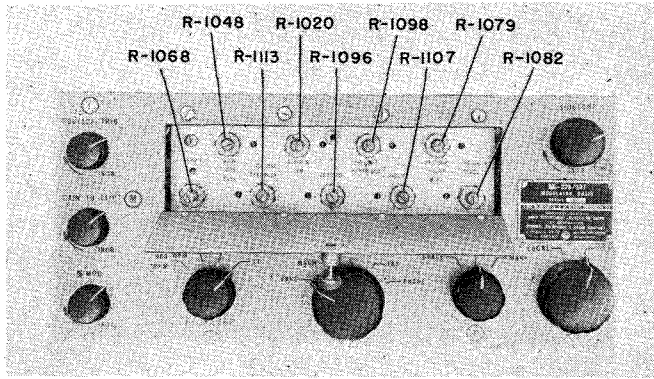


Figure 7-63. Radio Modulator MD-229/SRT Unit Adjustments, Door Opened

Radio Frequency Amplifier AM-1008/SRT (RFA) front panel and VOLTMETER switch (J) to PA E<sub>b</sub> (5000 V) position, to measure the voltage. If no voltage is present, check HVPS indicator lights H.V. PRIMARY  $\phi$ 1,  $\phi$ 2 and  $\phi$ 3. If any of these lamps do not light, refer to the HVPS trouble location section, paragraph 11a.

If the 3000 V and 350 V SCREEN indicator lamps are on but the HLRM does not operate (no voice modulation in phone during 500-watt operation), check the input signals to audio amplifiers V-1601 and V-1602 at test points GRID 1, V-1601, and GRID 1, V-1602,

provided on the front panel of the HLRM (figure 7-65). If input signals are present, check tubes V-1601 and V-1602.

**WARNING**

THE HLRM USES VOLTAGES THAT ARE DANGEROUS TO LIFE. EXTREME CAUTION MUST BE EXERCISED WHEN WORKING ON THE HIGH LEVEL RADIO MODULATOR (HLRM).

If the bias of -50 volts is not present at the grids of V-1601 and V-1602, check the -50-volt bias supply. The bias supply consists of a selenium rectifier mounted on the HLRM subunit chassis (figure 7-64) and is connected to the grids of tubes V-1601 and V-1602 from terminal board E-1606 terminal No. 8.

Table 7-34 will aid the technician in locating a fault in the HLRM.

The HLRM voltage and resistance chart, figure 7-66, the schematic diagram, figure 7-156, and the wiring diagram, figure 7-157, can be used to locate the faulty component.

**WARNING**

Do not measure the high voltage (3,000 volts) present in this drawer. Resistance measurements can be made with all power removed

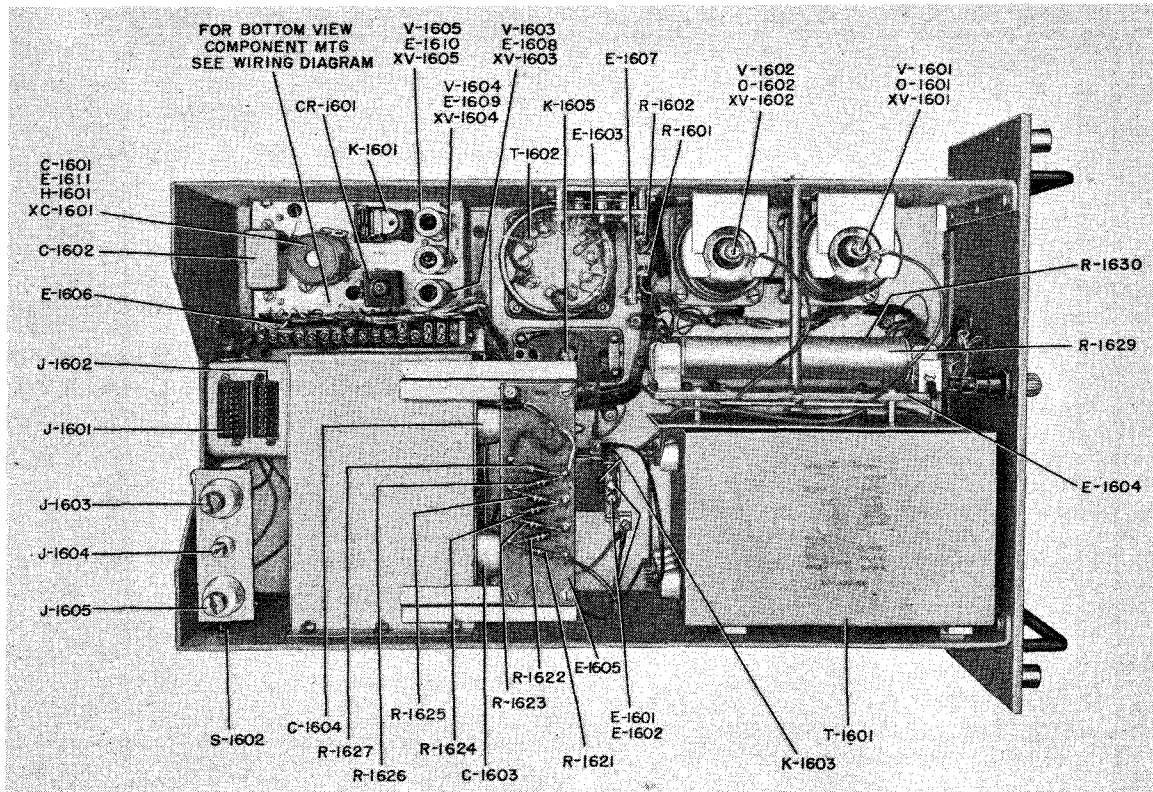


Figure 7-64. Radio Modulator MD-230/SRT (HLRM), Top View



TABLE 7-34. INDICATIONS OF FAILURE AND PROBABLE FAULTS IN THE HLRM

| INDICATION OF FAILURE   | PROBABLE FAULT  |
|---|---|
| No modulation in 500-watt operation.  | No high voltage from HVPS.<br>Relay K-1605.<br>V-1601 and V-1602.<br>Relay K-1601 and K-1603. |
| Input signals present at GRID 1 V-1601 and GRID 1 V-1602 but no modulation. | Tubes V-1601 and V-1602.  |
| No bias at grids of V-1601 and V-1602.                                      | Bias supply in HLRM subunit chassis.  |
| 350 V SCREEN does not light, but 3000 V does light.                         | No high voltage from HVPS.<br>Tubes V-1603, V-1604, and V-1605.                               |

from the HLRM. Before working on the HLRM, short all circuits to ground with a shorting probe.

By removing V-1601 and V-1602, resistance can be measured at the tube sockets.

**b. REPAIR AND ADJUSTMENT.**

(1) ELECTRICAL ADJUSTMENTS.—None.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To remove the HLRM from its cabinet, refer to paragraph 4a.

All HLRM components, figure 7-64, are accessible from the top of the HLRM drawer. There are no components on the bottom of the HLRM chassis.

To remove tubes V-1601 and V-1602, remove the plate cap clip, loosen the two screws holding the tube

clamp, remove the clamp, and carefully pull the tube out of its socket.

To remove the HLRM subunit chassis, remove the four mounting screws accessible from the bottom of the HLRM drawer.

Disconnect subunit interconnecting cable at terminal board E-1606 and remove subunit chassis.

When using the extension test cable on the HLRM, loosen the screws at the rear of the HLRM drawer supporting J-1601 and J-1602 bracket.

Move bracket up as far as possible and tighten screws at the rear of the HLRM drawer. This will permit use of the extension test cable.

**(b) REPLACEMENTS AND ADJUSTMENTS.**

—To replace the HLRM drawer, refer to paragraph 4b. To replace tubes V-1601 and V-1602, and the subunit chassis, reverse the removal procedures.

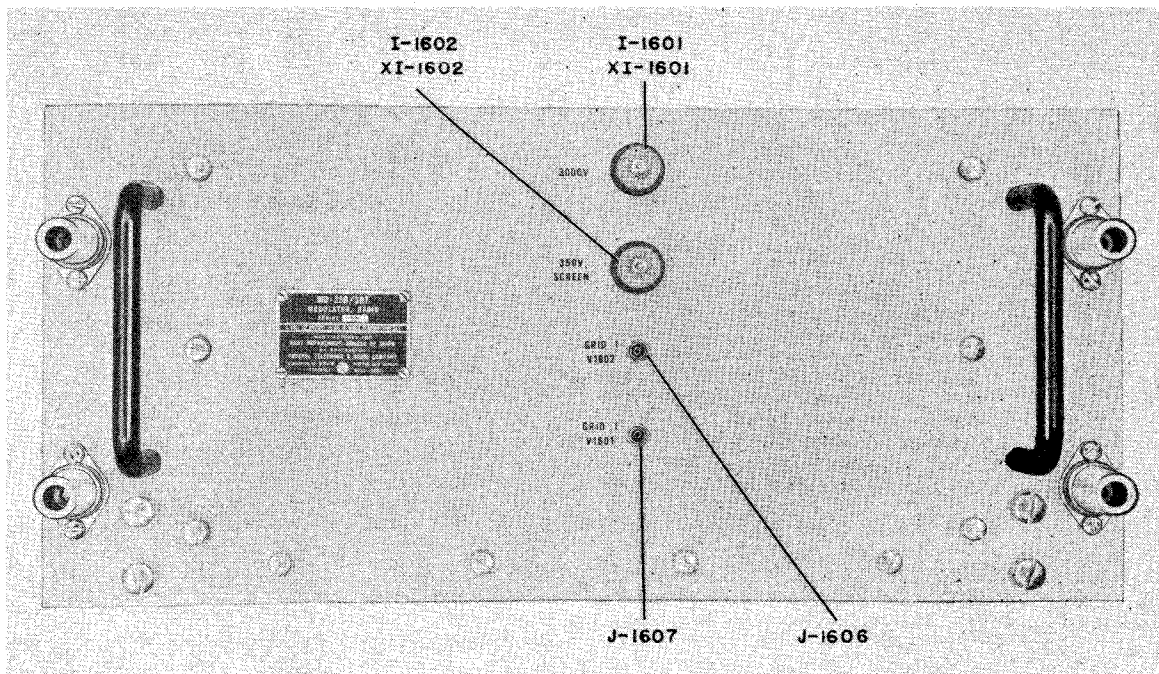


Figure 7-65. Radio Modulator MD-230/SRT (HLRM), Front Panel

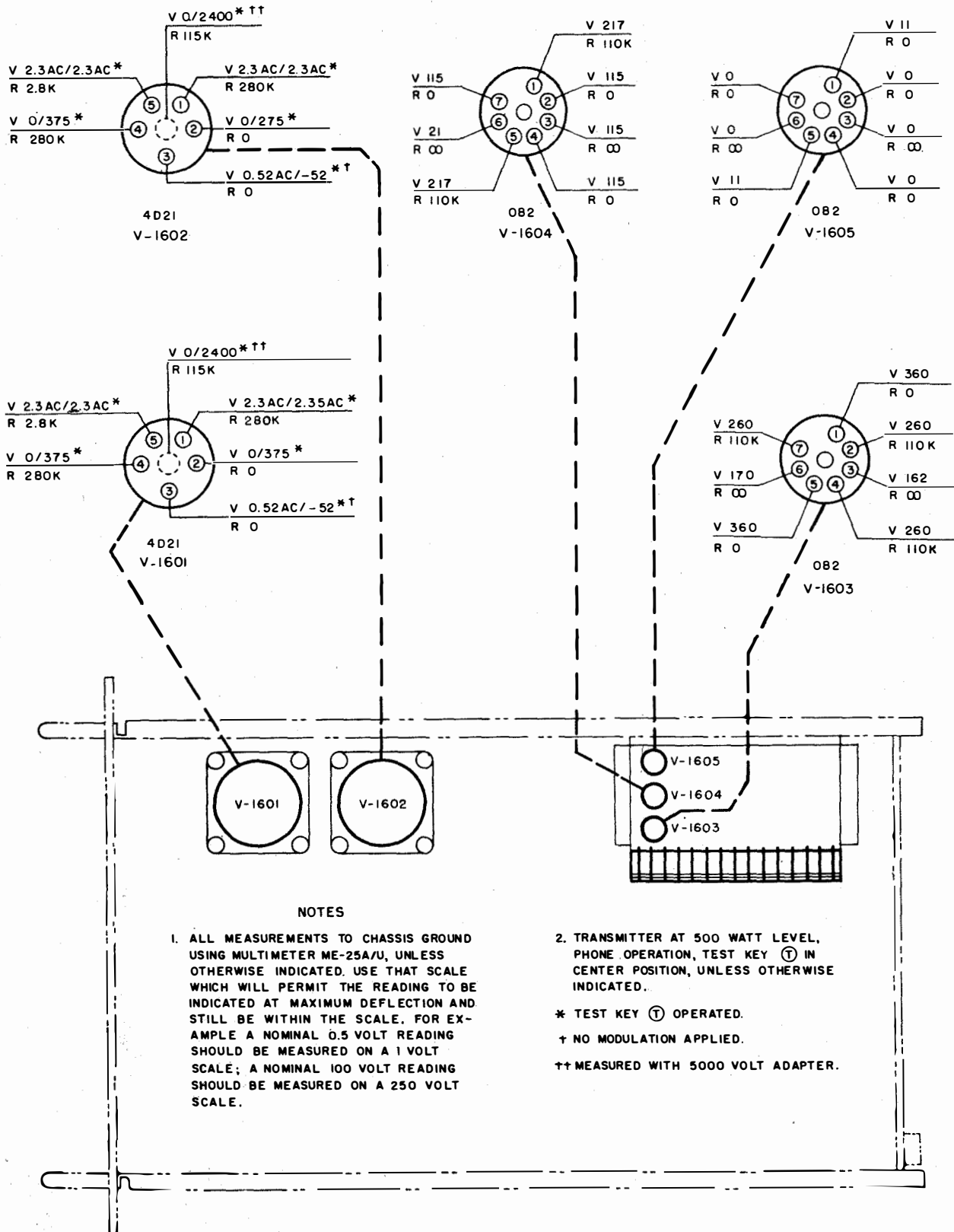


Figure 7-66. HLRM Voltage and Resistance Chart

**CAUTION**

When using the extension test cable, replace the bracket supporting J-1601 and J-1602 to its proper position before replacing the HLRM drawer.

If the air gap between E-1601 and E-1602 (on relay K-1603) is out of adjustment, set it for a 0.030-inch air gap.

**WARNING**

**SHORT BALL GAP ASSEMBLY TO GROUND BEFORE ADJUSTING THE AIR GAP.**

**8. RADIO FREQUENCY AMPLIFIER AM-1008/SRT (RFA).**

a. **TROUBLE SHOOTING.**—When a fault is localized to the RFA, visual indications will aid in locating the faulty circuit. The RFA block diagram is represented in figure 7-67. These indications will vary with the mode of transmission and the power level of the output. Both the **VOLTMETER** and **ANT. CURRENT** meters may be used to check the r-f input and output of the RFA, respectively. **METER SELECTOR** switch (J) should be in the **RF IN (5 V)** position for checking the input to the RFA, with switch (A) to **INT.** and control (Z) clockwise.

The antenna tuning equipment group may be eliminated as a source of trouble, and the transmitter bay operated without radiating an r-f carrier, by connecting **Dummy Load DA-91/U** as described in paragraph 3a.

If there is an r-f input to the RFA but no r-f output, the fault may be in the low level radio modulator

(LLRM) keying circuits (paragraph 6a(2)) as well as in the RFA. The r-f keying voltage from the LLRM can be checked at IPA subassembly terminal board E-1397, terminal 44, located at the top of the RFA drawer. (See figure 7-68.)

With **Multimeter ME-25A/U** (or equivalent) connected between terminal 44 of terminal board E-1397 and chassis ground, the following voltages should appear:

Operate **TEST KEY** (T) with transmitter in stand-by condition and **PHONE** operation; meter should read zero volts; with **TEST KEY** (T) in center position, meter should now read at least -18 volts.

If the LLRM keying circuit is properly producing this voltage, the intermediate power amplifier (IPA) and the power amplifier (PA) stages should be checked by using the **IPA CURRENT** and **PA CURRENT** meters with associated metering selector switches (G) and (H). (See figure 7-73.)

Table 7-35 is a list of typical readings for all modes of transmission and power levels, with transmitter set at a frequency of 6 mc and **TEST KEY** (T) operated with the antenna tuning equipment adjusted for the lowest standing wave ratio (SWR).

**WARNING**

**THE RFA USES VOLTAGES THAT ARE DANGEROUS TO LIFE. EXTREME CAUTION MUST BE EXERCISED WHEN WORKING ON THE RFA.**

If the power supply operating voltages (as indicated by **VOLTMETER** readings) are incorrect, check the corresponding power supply.

If the IPA and PA operating voltages are correct, but there is no IPA or PA cathode current,  $I_k$  (500

**TABLE 7-35. TYPICAL RFA TEST METER READINGS**

| METER                      | METER SELECTOR SWITCH POSITION |                             | 100-WATT OPERATION |              | 500-WATT OPERATION |              |
|----------------------------|--------------------------------|-----------------------------|--------------------|--------------|--------------------|--------------|
|                            |                                |                             | PHONE              | CW, FSK, FAX | PHONE              | CW, FSK, FAX |
| VOLT-METER                 | VOLT-METER<br>(J)              | RF IN (5 V)                 | 2*                 | 2*           | 2*                 | 2*           |
|                            |                                | BIAS (500 V)                | -200               | -200         | -200               | -200         |
|                            |                                | LV (500 V)                  | 260                | 260          | 280                | 280          |
|                            |                                | MV (1000 V)                 | 430                | 430          | 460                | 470          |
|                            |                                | PA E <sub>c2</sub> (1000 V) | 220                | 220          | 390                | 400          |
| PA E <sub>b</sub> (5000 V) | 900                            | 1100                        | 2300               | 2800         |                    |              |
| IPA CURRENT                | IPA<br>(G)                     | I <sub>c1</sub> (5 ma)      | 1                  | 1            | 1                  | 1            |
|                            |                                | I <sub>c2</sub> (10 ma)     | 7.5                | 7.5          | 9                  | 9            |
|                            |                                | I <sub>k</sub> (500 ma)     | 60                 | 60           | 60                 | 60           |
| PA CURRENT                 | PA<br>(H)                      | I <sub>c1</sub> (50 ma)     | 18                 | 20           | 15                 | 12           |
|                            |                                | I <sub>c2</sub> (100 ma)    | 68                 | 54           | 28                 | 16           |
|                            |                                | I <sub>k</sub> (1 A)        | 0.2                | 0.2          | 0.3                | 0.3          |

\* Depends upon setting of **EXCITATION** control (Z).

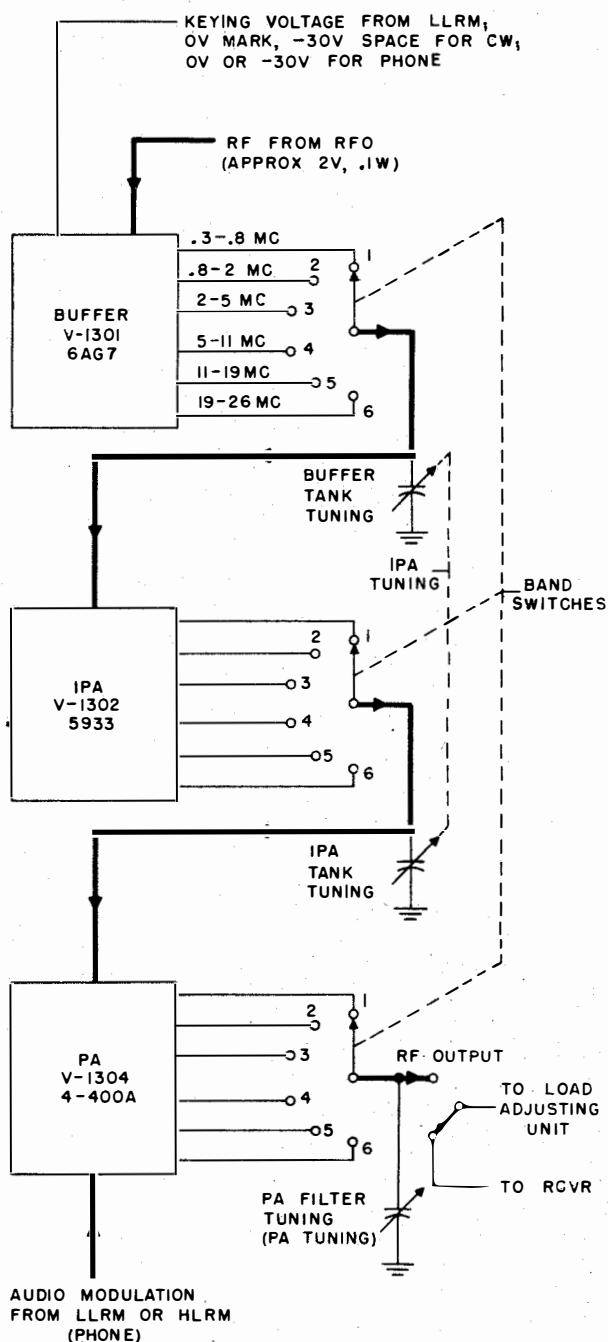


Figure 7-67. Radio Frequency Amplifier AM-1008/SRT (RFA), Block Diagram

ma) and  $I_k$  (1A), check buffer tube V-1301 (figure 7-69) and the LLRM keying circuits as described in paragraph 6a(2).

If the cathode current is absent or low in only one of the stages (IPA or PA), check that stage. If the RFA blower and all of the RFA filaments are not energized, check fuse labeled 3 AMP FILAMENTS AND MOTOR on the RFA front panel.

If an RFA overload occurs, as evidenced by either the PA SCREEN or PA PLATE overload indicator lights going off, check the power amplifier circuit,

using the PA CURRENT meter and switch (H). An RFA overload indication may be caused by an absence of power amplifier plate voltage, or excessive plate or screen dissipation, due to improper setting of the EXCITATION control (Z). (See Section 4.)

If the RFA cannot be tuned, refer to the schematic diagram, figure 7-158, and wiring diagram, figure 7-159, and the voltage and resistance diagram, figure 7-70, to locate the faulty component. When a fault is localized to the RFA control circuits, the control circuits schematics, figures 7-114 and 7-115, may be used to trace through the circuits.

Figures 7-67 through 7-77 show the location of all the components in the RFA.

b. REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—Section 4 contains complete information for the adjustment of the front panel controls. The following paragraphs describe the adjustment of controls not located on the front panel. To make these adjustments, the RFA drawer must be fully extended from the transmitter group cabinet.

WARNING

THE RFA USES VOLTAGES THAT ARE DANGEROUS TO LIFE. EXTREME CAUTION SHOULD BE EXERCISED WHEN TRANSMITTER IS OPERATING WITH RFA DRAWER EXTENDED.

(a) BUFFER AND IPA CIRCUITS.—Four slug-tuned inductors in the buffer circuit, four in the IPA circuit, and a padder capacitor are the electrical adjustments that may be utilized in these circuits. The adjustable inductors for bands 2 to 5 mc, 5 to 11 mc, 11 to 19 mc, and 19 to 26 mc are adjusted from the bottom of the RFA drawer, figure 7-72. Padder capacitor C-1304 is located on the right side of the RFA next to IPA tube socket XV-1302, and is accessible when the IPA compartment protective cover plate is removed. (See figure 7-69.) OPERATE-STANDBY switch (P) is placed in OPERATE for these adjustments.

Note

The four slug-tuned inductors in the buffer and IPA circuits can be adjusted only after replacing a damaged coil, since the adjusting screws for these coils are cut off and glyptal is applied after alignment.

1. 19- TO 26-MC BAND ADJUSTMENTS.—The adjustments for the 19- to 26-mc band are made in the following manner:

Step 1. Set BANDSWITCH selector (C) to the 19-26 MC position.

Step 2. Set up a frequency of 19 mc on RFO front panel knobs.

*Step 3.* Place switch **(A)** on RFA panel to INT and operate TEST KEY **(T)** on the LLRM front panel.

*Step 4.* Set capacitor C-1304 (figure 7-69) to its midposition.

**Note**

This adjustment must be made with care, as L-1344 is located directly above C-1304, and may easily be damaged.

*Step 5.* Set VOLTMETER switch **(J)** to RF IN (5 V) and adjust EXCITATION control **(Z)** so that VOLTMETER reads at least 2 volts.

*Step 6.* Set TUNE IPA knob **(B)** for a setting of 10 on IPA dial.

*Step 7.* Set IPA switch **(G)** to  $I_{c1}$  (5 ma) and adjust L-1302 for a maximum reading on IPA CURRENT meter.

*Step 8.* Set PA switch **(H)** to  $I_{c1}$  (50 ma) and adjust L-1307 for a maximum reading on PA CURRENT meter.

*Step 9.* Set up a frequency of 26 mc on RFO front panel knobs.

*Step 10.* Retune TUNE IPA control **(B)** for a maximum reading on PA CURRENT meter. (Dial setting should be around 95.)

*Step 11.* Adjust C-1304 and rock TUNE IPA control **(B)** simultaneously until both give a maximum reading on the PA CURRENT meter.

*Step 12.* Set up a frequency of 19 mc on RFO panel knobs.

*Step 13.* Retune TUNE IPA control **(B)** for a maximum reading on PA CURRENT meter.

*Step 14.* Readjust L-1302 and L-1307 for maximum reading on PA CURRENT meter.

*Step 15.* Repeat steps 9, 10, and 11.

*Step 16.* Cut off the protruding portion of the adjusting screw on L-1302 and L-1307, and coat the remaining end with glyptal.

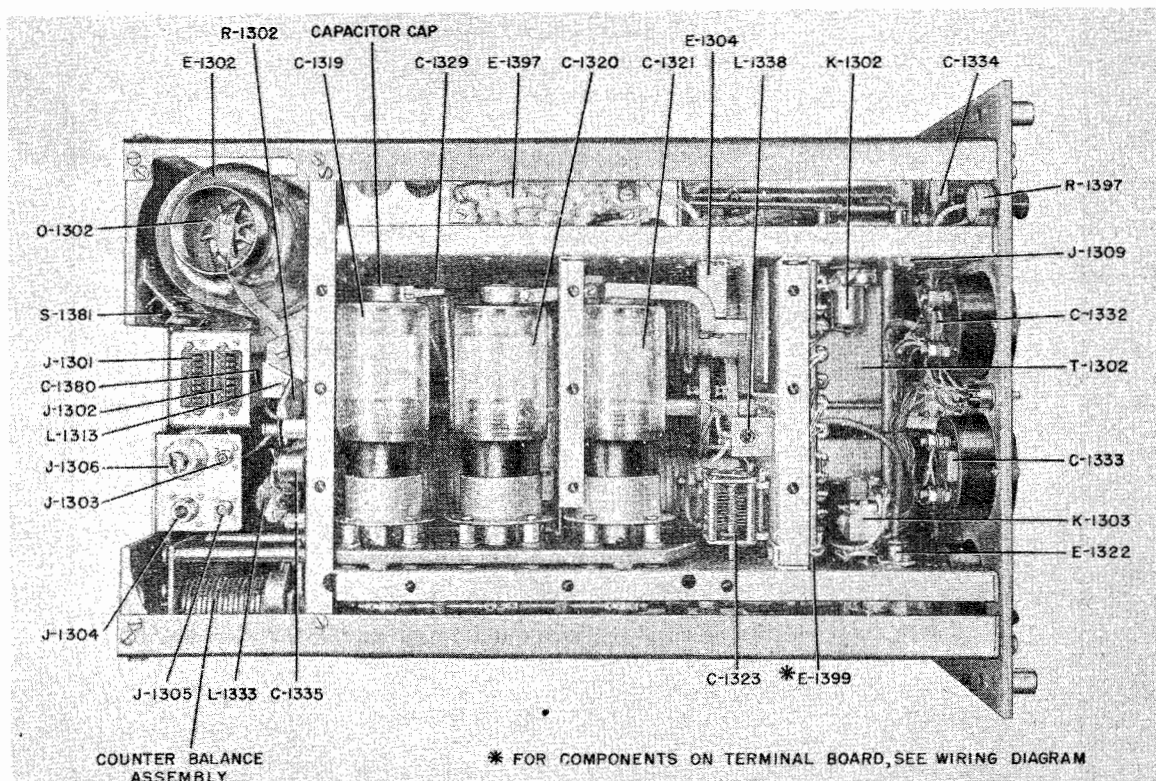
**2. 11- TO 19-MC BAND ADJUSTMENTS.—**  
The adjustments for the 11- to 19-mc band are made in the following manner:

*Step 1.* Set BANDSWITCH selector **(C)** to the 11-19 MC position.

*Step 2.* Set up a frequency of 11 mc on RFO front panel knobs.

*Step 3.* Place switch **(A)** on RFA panel to INT and operate TEST KEY **(T)** on the LLRM panel.

*Step 4.* Set TUNE IPA knob **(B)** to read 10 on IPA dial, then turn IPA switch **(G)** to  $I_{c1}$  (5 ma) and



**Figure 7-68. Radio Frequency Amplifier AM-1008/SRT (RFA), Top View**

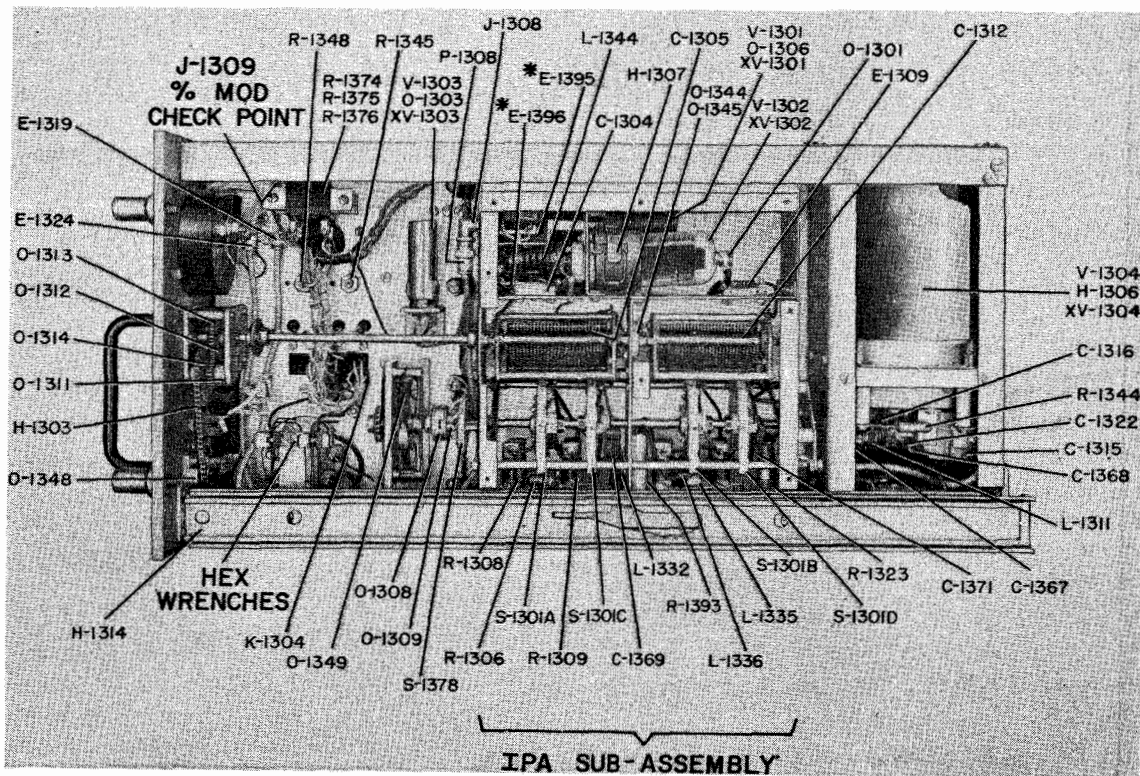


Figure 7-69. Radio Frequency Amplifier AM-1008/SRT (RFA), Right View, Cover Removed from IPA Subassembly

adjust L-1303 for a maximum reading on IPA CURRENT meter.

Step 5. Set PA switch (H) at  $I_{c1}$  (50 ma) and adjust L-1308 for a maximum reading on PA CURRENT meter.

Step 6. Set up a frequency of 19 mc on RFO front panel knobs.

Step 7. Rotate TUNE IPA knob (B) for a maximum reading on PA CURRENT meter. This reading should be equal to or greater than the previous one and should occur before minimum capacity, that is, 100 on IPA dial.

**Note**

If resonance does not occur before 100 on IPA dial, repeat steps 4 and 5, but in step 4, set IPA dial at a lower dial reading.

Step 8. Cut off the protruding portion of the adjusting screw on L-1303 and L-1308, and coat the remaining end with glyptal.

3. 5- TO 11-MC BAND ADJUSTMENTS.—The adjustments for the 5- to 11-mc band are made in the following manner:

Step 1. Turn BANDSWITCH control (C) to the 5-11 MC position.

Step 2. Set up a frequency of 5 mc on the RFO front panel knobs.

Step 3. Set switch (A), on RFA front panel, to INT and operate TEST KEY (T) on the LLRM front panel.

Step 4. Rotate TUNE IPA knob (B) so that IPA dial reads 12. Adjust L-1304 for a maximum reading on the IPA CURRENT meter, with IPA switch (C) set at  $I_{c1}$  (5 MA).

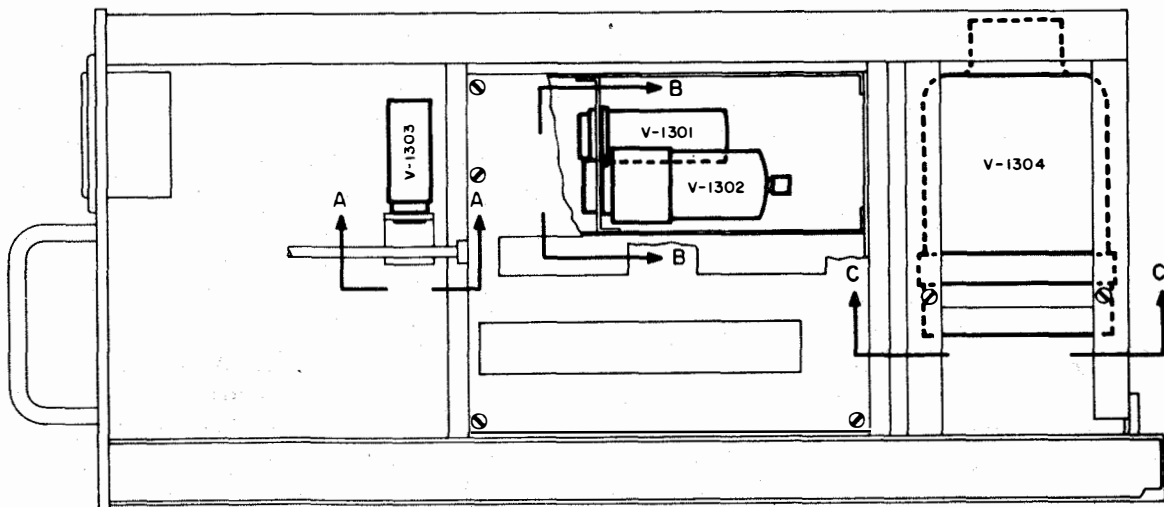
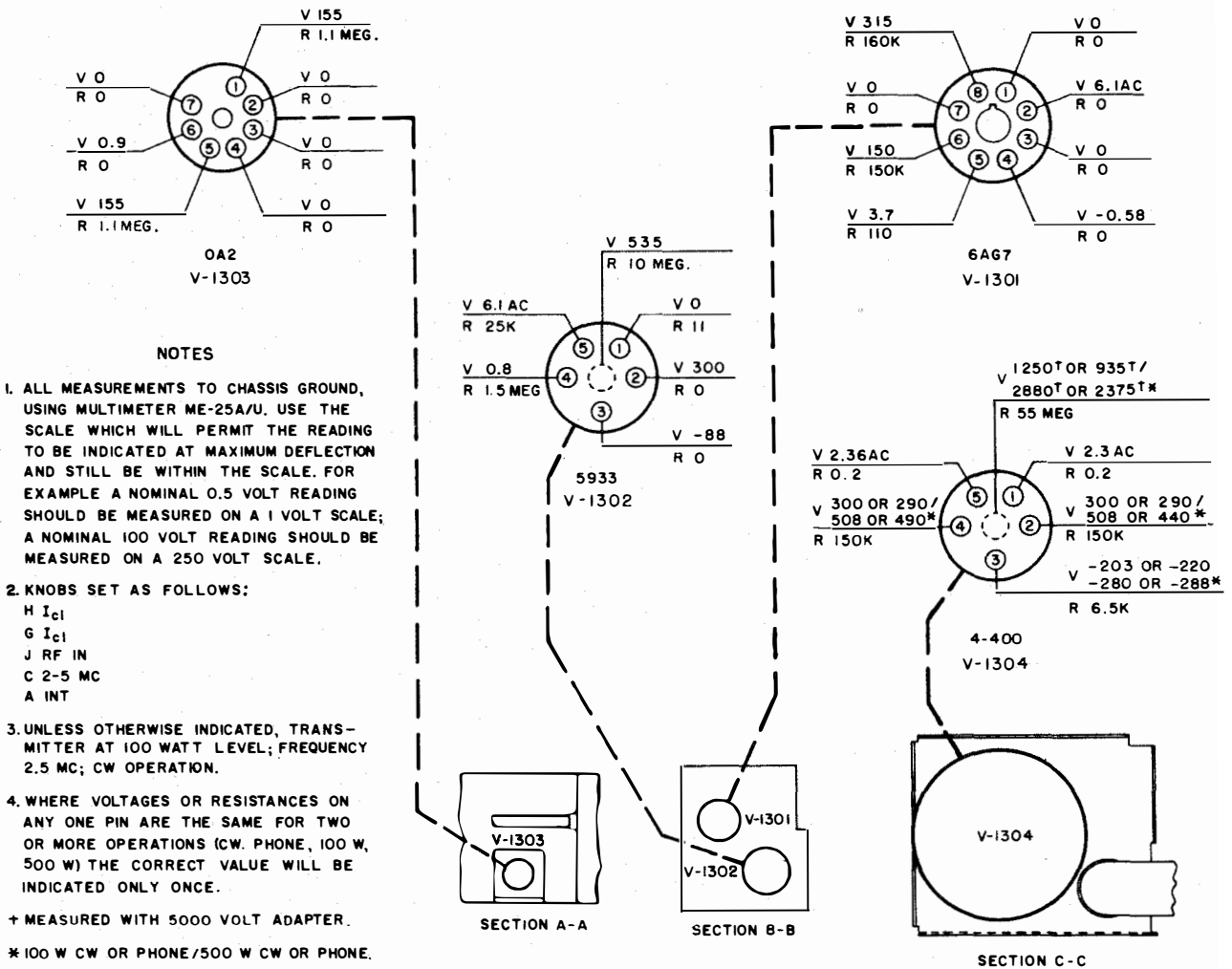
Step 5. Adjust L-1309 for a maximum reading on the PA CURRENT meter, with PA switch (H) set at  $I_{c1}$  (50 ma).

Step 6. Set up a frequency of 11 mc on the RFO front panel knobs.

Step 7. Rotate TUNE IPA knob (B) for a maximum reading on the IPA CURRENT meter.

**Note**

Maximum PA CURRENT meter reading should occur before the IPA dial reaches 100. If it does not, repeat steps 2 through 6, but in step 4, set the IPA dial at a lower reading.



**Figure 7-70. RFA Voltage and Resistance Chart**

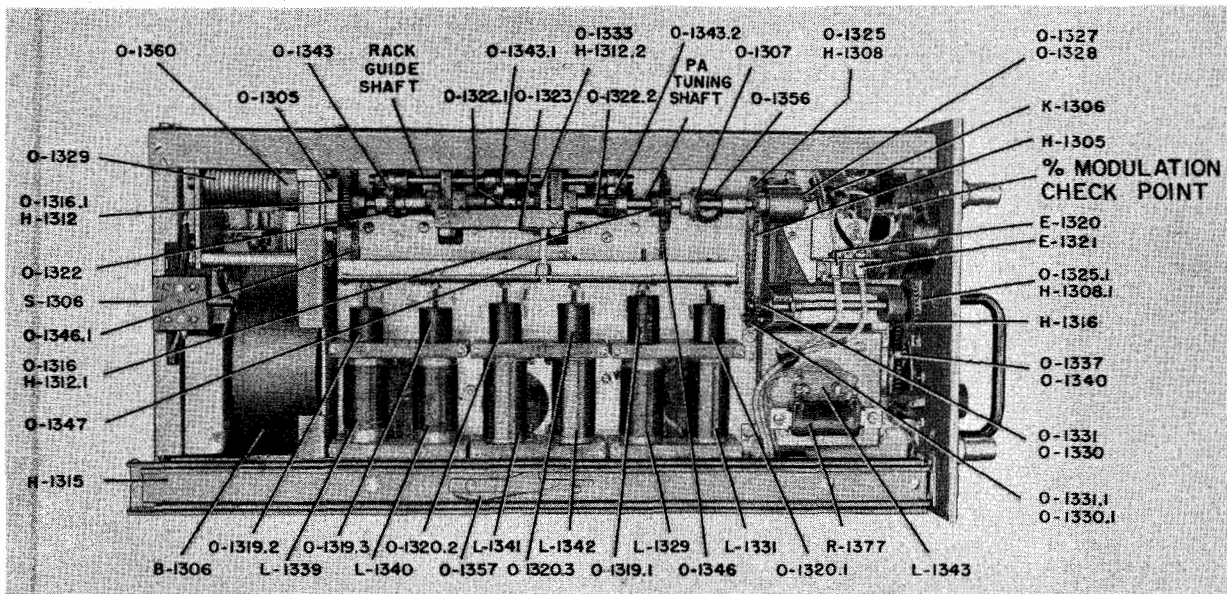


Figure 7-71. Radio Frequency Amplifier AM-1008/SRT (RFA), Left View

Step 8. Cut off the protruding portion of the adjustment screw on L-1304 and L-1309, and coat the remaining end with glyptal.

4. 2- TO 5-MC BAND ADJUSTMENTS.—The adjustments for the 2- to 5-mc band are made in the following manner:

Step 1. Set BANDSWITCH selector (C) to the 2-5 MC position.

Step 2. Set up a frequency of 2 mc on RFO front panel knobs.

Step 3. Place switch (A) on RFA panel to INT and operate TEST KEY (T) on the LLRM front panel.

Step 4. Set TUNE knob (B) to read 2.5 on IPA dial, then set IPA switch (G) to  $I_{c1}$  (5 ma) and adjust L-1305 for a maximum reading on IPA CURRENT meter.

Step 5. Set PA switch (H) at  $I_{c1}$  (50 ma) and adjust L-1310 for a maximum reading on PA CURRENT meter.

Step 6. Set up a frequency of 5 mc on RFO front panel knobs.

Step 7. Rotate TUNE IPA knob (B) for a maximum reading on the PA CURRENT meter. This reading should occur at the lower end of the IPA dial reading. If it does not, repeat steps 2 through 5, but in step 4 set the dial at a slightly lower reading.

Step 8. Cut off the protruding portion of the adjusting screw on L-1305 and L-1310, and coat the remaining end with glyptal.

5. 0.3- TO 0.8-MC AND 0.8- TO 2-MC BAND ADJUSTMENT.—There are no adjustments in the buffer and IPA circuits for the 0.3- to 0.8-mc and 0.8- to 2-mc bands.

(b) PA CIRCUIT.—All power amplifier circuit adjustments are on the left side of the RFA, figure 7-71, with the exception of L-1337, located on the bottom of the RFA, figure 7-72, and L-1338, on the top, figures 7-68 and 7-74.

1. C-1319, C-1320, C-1321 ADJUSTMENTS.—Vacuum capacitors C-1319, C-1320 and C-1321 (figure 7-68) are adjusted in the following manner:

Step 1. Rotate TUNE PA control (D) clockwise until vacuum capacitors C-1319, C-1320, and C-1321 stop at minimum capacity (minimum engagement of fixed and movable plates).

Step 2. Position the movable plate of each capacitor (C-1319, C-1320, C-1321) so that a 1/16-inch space exists between the fixed and movable plates, as observed through the glass envelope.

**Note**

C-1319 is adjusted by the hex-head setscrew on the adjusting collar, located approximately two inches to the right of gear O-1322 and rack O-1343, both controlling C-1319 (figure 7-75). The hex-head setscrews on the adjusting collars for the adjustment of C-1320 and C-1321 are located about two inches to the left of the respective gear and rack assembly (O-1322.1, O-1343.1 and O-1322.2, O-1343.2, respectively).

2. R-1345, R-1348 ADJUSTMENT.—Bias adjustments R-1345 (100 watt) and R-1348 (500 watt) (figure 7-69) are adjusted in the following manner:

Step 1. Place the equipment in stand-by condition, OPERATE-STANDBY switch (P) at STANDBY.

Step 2. Connect the d-c probe of Multimeter ME-25A/U (or equivalent) to the junction of L-1311



and R-1344. Place Multimeter ME-25A/U on the 250-volt scale, and set meter function selector to minus (-).

L-1338 (figures 7-68 and 7-74), and L-1337 (figure 7-72), are made in the following manner:

**Note**

The junction of L-1311 and R-1344 is accessible from the right side of the RFA, at the rear, beneath PA tube socket XV-1304. Connect a clip lead to the left side of resistor R-1344 (located across the two insulators). (See figure 7-69.)

**WARNING**

**EXERCISE CARE AS HIGH VOLTAGES ARE PRESENT.**

*Step 3.* Adjust 100-watt bias control R-1345 for a meter reading of -105 volts. R-1345 is located on the right side of the RFA (figure 7-69).

*Step 4.* Place 500-watt booster equipment in operation and actuate CARRIER READY 500 W by pushing switch (E) on the RFA front panel. BANDSWITCH must be in position 2-5 MC or higher, and the door covering the RFO frequency selection knobs must be closed.

*Step 5.* Adjust 500-watt bias control R-1348 (figure 7-69) for a meter reading of -200 volts.

**Note**

Adjustment of R-1348 is not required in the AN/SRT-14.

**3. HARMONIC TRAP ADJUSTMENT.—**  
The three harmonic trap adjustments, C-1323 and

**Note**

These adjustments are *factory adjustments* and should not be tampered with unless a component has been replaced.

**WARNING**

**EXTREME CAUTION SHOULD BE EXERCISED WHEN MAKING THESE ADJUSTMENTS AS THEY ARE LOCATED NEAR POINTS OF 1,300-VOLT POTENTIAL.**

*Step 1.* Connect the output of the transmitter to Dummy Load DA-91/U. (See paragraph 3a.)

*Step 2.* With transmitter set up for 100-watt operation, set RFO knobs for a frequency of 2.5 mc.

*Step 3.* Set BANDSWITCH (C) to the 2-5 MC position.

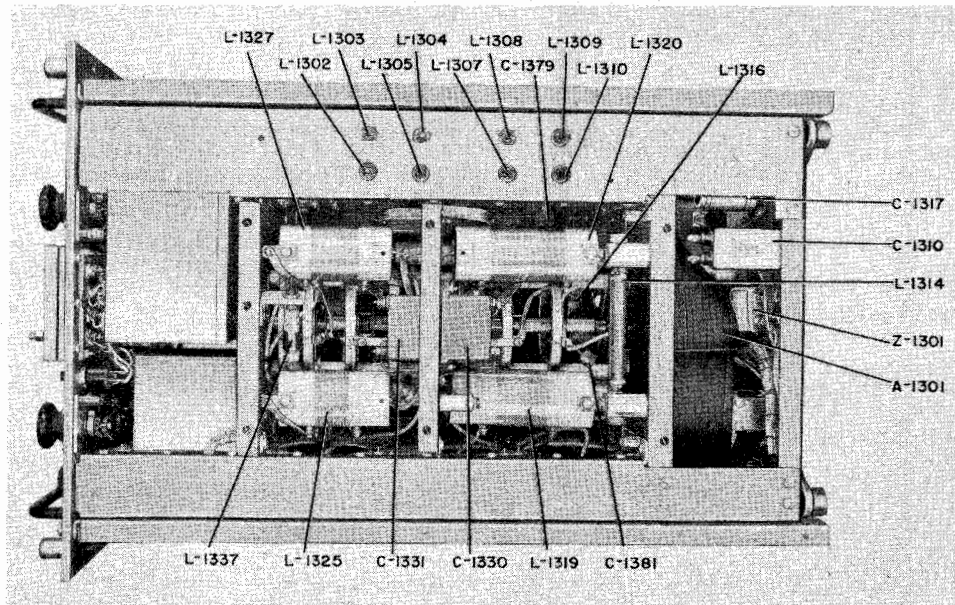
*Step 4.* Tune the transmitter for maximum power output as indicated on the ANT CURRENT meter.

*Step 5.* Turn the carrier on by operating TEST KEY (T) on the LLRM front panel.

*Step 6.* Place a pick-up loop of wire connected to a receiver near the PA coil in use (receiver RBA, RBB, or RBC series, or equivalent).

**Note**

The pick-up loop should be set to pick up sufficient signal without overloading the receiver.



**Figure 7-72. Radio Frequency Amplifier AM-1008/SRT (RFA), Bottom View**

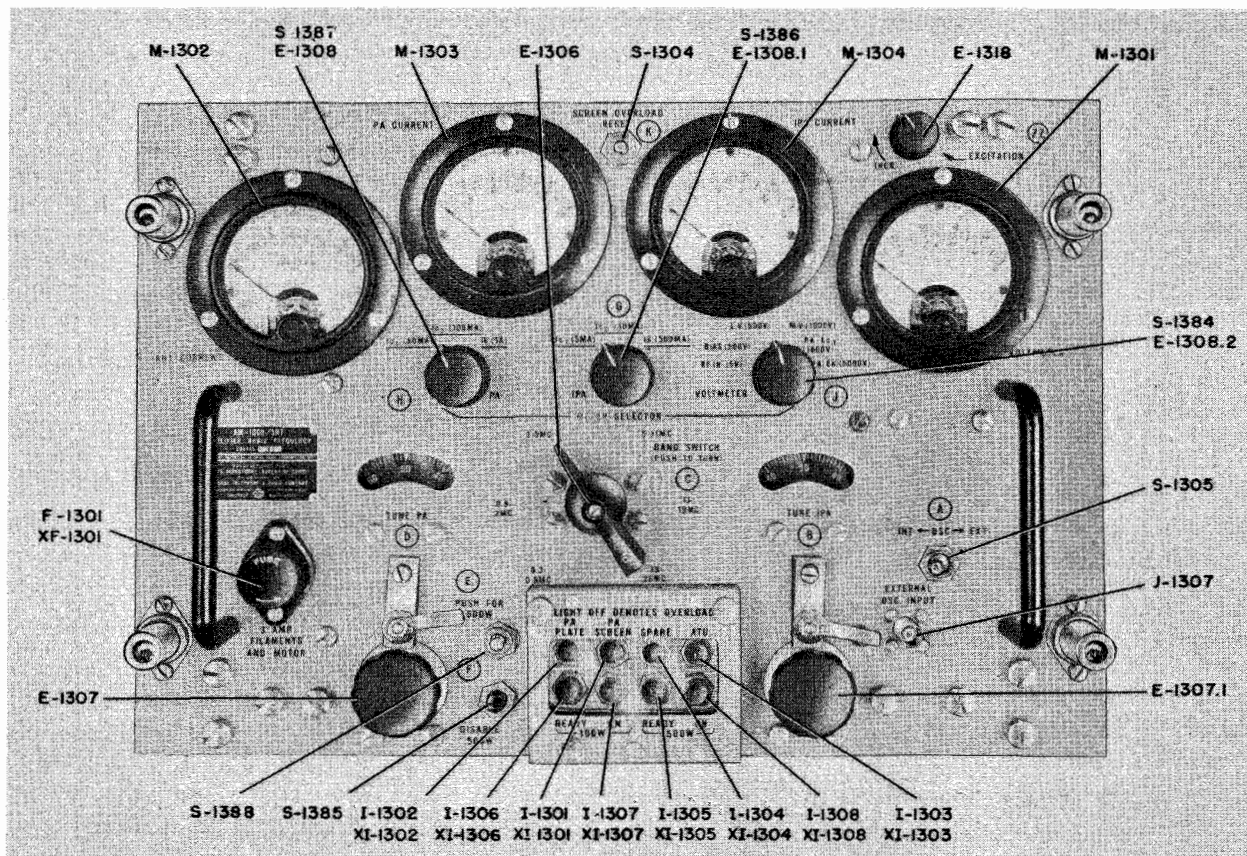


Figure 7-73. Radio Frequency Amplifier AM-1008/SRT (RFA), Front Panel

Step 7. Tune the receiver to the second harmonic (5 mc) of the transmitter output.

Step 8. Adjust L-1337 for minimum receiver output. L-1337 is accessible at the bottom of the RFA by removing the protective cover plate, figure 7-72.

Step 9. Repeat steps 4 through 8, with an RFO frequency of 4.5 mc and a receiver frequency of 9 mc.

Step 10. Loosen setscrews in either bevel gear O-1307 or O-1356. (See figure 7-75.)

**Note**

Use the hex wrenches mounted on the right side of RFA drawer (figure 7-69).

Step 11. Adjust capacitor C-1323 to provide a minimum receiver output. Tighten setscrews on bevel gears after adjustment has been completed.

Step 12. For a final alignment at this stage, repeat steps for the adjustment of L-1337.

Step 13. With transmitter conditions the same, set up a frequency of 6.0 mc on the RFO front panel.

Step 14. Set BANDSWITCH © to the 5-11 MC position.

Step 15. Tune transmitter for a maximum power output as indicated on the ANT. CURRENT meter.

Step 16. Tune receiver (RBA, RBB, RBC series) to 12.0 mc.

Step 17. Adjust L-1338 for a minimum receiver output. L-1338 is located at the top of the RFA drawer (figures 7-68 and 7-74), and is accessible without removing the protective cover plate.

4. L-1339, L-1340, L-1341, L-1342, L-1329 AND L-1331 ADJUSTMENT.—The iron cores of L-1339, L-1340, L-1341, L-1342, L-1329 and L-1331, figure 7-71, are O-1319.2, O-1319.3, O-1320.2, O-1320.3, O-1319.1, and O-1320.1, respectively (figure 7-71), and are adjusted so that the distance between the core top surface and the actuating plate bottom surface is as follows (positioning is not critical): O-1320.1, O-1320.2 and O-1320.3, 5/8 inch; O-1319.1, 3/8 inch, O-1319.2 and O-1319.3, 3/4 inch.

5. C-1319 COUPLING ADJUSTMENT.—Vacuum capacitor C-1319 (figures 7-68 and 7-75) is adjusted for optimum coupling for all bands in the following manner:

Step 1. Connect the output of the transmitter to Dummy Load DA-91/U. Refer to paragraph 3a.

*Step 2.* Set up a frequency of 17.2 mc on the RFO front panel, and tune for maximum transmitter output at the 100-watt level.

*Step 3.* Detune the IPA, if necessary, to obtain PA  $I_{c1}$  of 15 ma as indicated on PA CURRENT meter.

*Step 4.* Rotate TUNE PA knob  $\odot$  for a maximum output as indicated on the ANT CURRENT meter.

**Note**

PA  $I_{c2}$  will be maximum at the peak of the r-f output as indicated on the ANT CURRENT meter.

*Step 5.* While rocking the TUNE PA control  $\odot$  for a maximum r-f output, adjust C-1319 using the hex-head setscrew on the adjusting collar, as outlined in paragraph 8b(1)(b)1 to obtain PA  $I_{c2}$  of 60 ma. This completes the adjustment. Coupling will now be optimum for all bands.

**(2) MECHANICAL ADJUSTMENTS.**

**(a) REMOVAL AND REPAIR.**—To remove the RFA drawer from the transmitter group cabinet, refer to paragraph 4a. Lubrication instructions are given in Section 6.

**1. C-1319, C-1320 AND C-1321.**—Vacuum capacitors C-1319, C-1320 or C-1321 (figures 7-68, 7-75) may be removed in the following manner:

*Step 1.* Rotate TUNE PA knob  $\odot$  on RFA front panel in a counterclockwise direction to indicate 0 on

the PA dial. Vacuum capacitors should be at maximum capacity at this point.

*Step 2.* Loosen fasteners on protective plate on top of the RFA drawer, and remove cover.

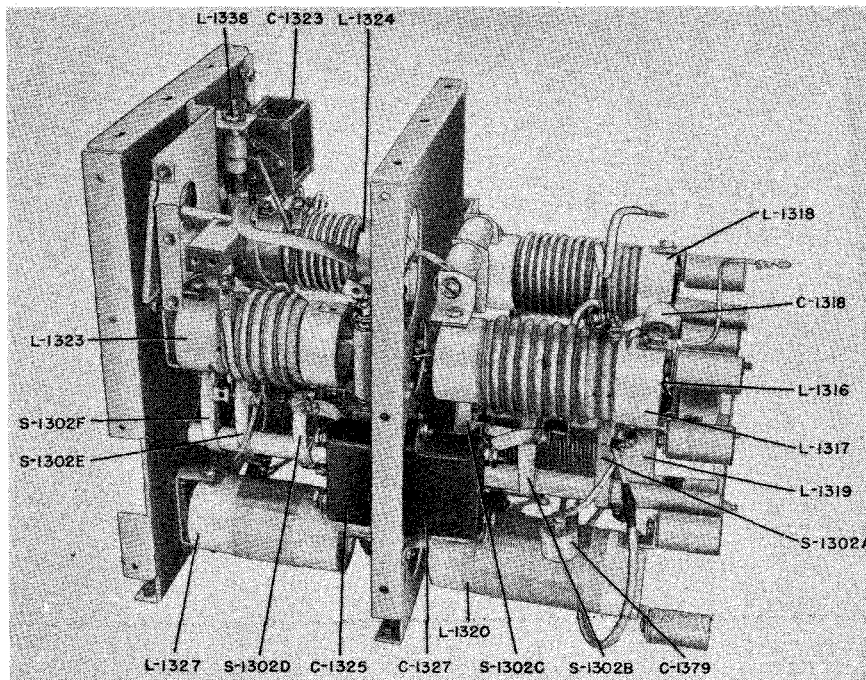
*Step 3.* The vacuum capacitors are tuned by means of a rack and pinion arrangement. (See figure 7-75.) Rack assembly O-1343 is connected to the movable plate of the vacuum capacitors by the 1/4-28 threaded screw of the rack assembly. The rack assembly is held in place against the pinion gear O-1322 by the rack guide spacer located on the stationary guide shaft, by means of two adjustable collars. Loosen the two setscrews on one of the collars of the particular capacitor assembly to be removed, and slide collar aside. This will permit the rack guide spacer to be moved and the rack can then be lifted from the pinion gear.

*Step 4.* Loosen the screw that holds the cap ring onto the capacitor cap (located at opposite end of the vacuum capacitor rack assembly, figure 7-68). Remove cap ring connected to the capacitor.

*Step 5.* Grasping the capacitor firmly in one hand, remove the four mounting screws that hold the capacitor in place, and carefully lift out the capacitor.

**CAUTION**

When removing a vacuum capacitor, make sure the rack assembly is clear of the pinion gear. Extreme care should be exercised when removing the capacitor so as not to damage the delicate vacuum extrusion point of the glass envelope.



**Figure 7-74. RFA, S-1302 Bandswitch Assembly, Left Oblique View**

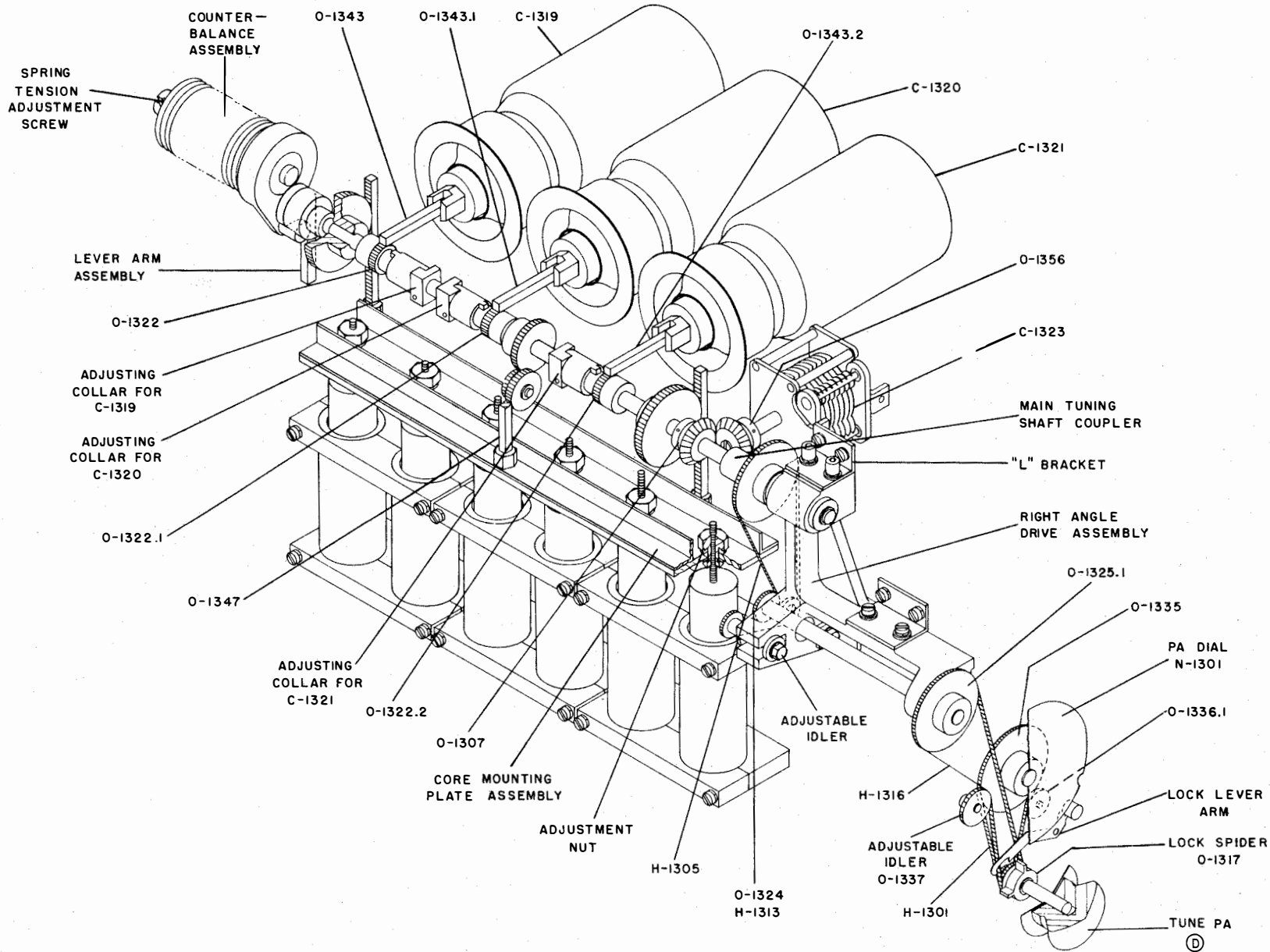


Figure 7-75. RFA, Power Amplifier (PA), Mechanical Drive System

2. L-1329, L-1331, L-1339, L-1340, L-1341 AND L-1342.—To remove the variable inductors, perform the following steps:

*Step 1.* With the RFA drawer removed from the transmitter group cabinet, rotate TUNE PA knob ① on the front panel in a clockwise direction to indicate 100 on the dial, figure 7-73. At this point, the variable inductors will be at minimum inductance, and the core mounting assembly plate will be its uppermost position.

*Step 2.* Remove top cover plate of the RFA chassis by loosening the fasteners.

*Step 3.* Loosen the adjusting locknuts associated with the core assembly to be removed. Adjust the locknuts so that the iron core will be all the way up against the core mounting plate assembly. At this point, the iron core will be almost completely disengaged from its associated coil form.

*Step 4.* Remove the screws on the melamine blocks supporting the coil forms.

*Step 5.* Remove the melamine blocks from the coil forms, and disconnect wires from the standoffs mounted on the rear of the coil supporting blocks.

*Step 6.* Remove the coil from the RFA drawer, being particularly careful not to damage the iron core. The iron core may also be removed at this time by completely removing the top adjusting nut and lockwasher.

**3. IPA DIAL DRIVE ASSEMBLY.**

*Step 1.* Turn TUNE IPA knob ② in a clockwise direction, until it stops. IPA dial should point to 0 on the dial.

*Step 2.* Plates of variable capacitors C-1305 and C-1312 should be fully meshed. If not, loosen setscrews on shaft coupler O-1321, figure 7-76. Rotate shaft until plates are meshed, and tighten setscrews.

**4. PA DIAL DRIVE ASSEMBLY.**

*Step 1.* Rotate TUNE PA dial ① in a clockwise direction until vacuum capacitors C-1319, C-1320 and C-1321 reach minimum capacity (minimum engagement of fixed and movable plates).

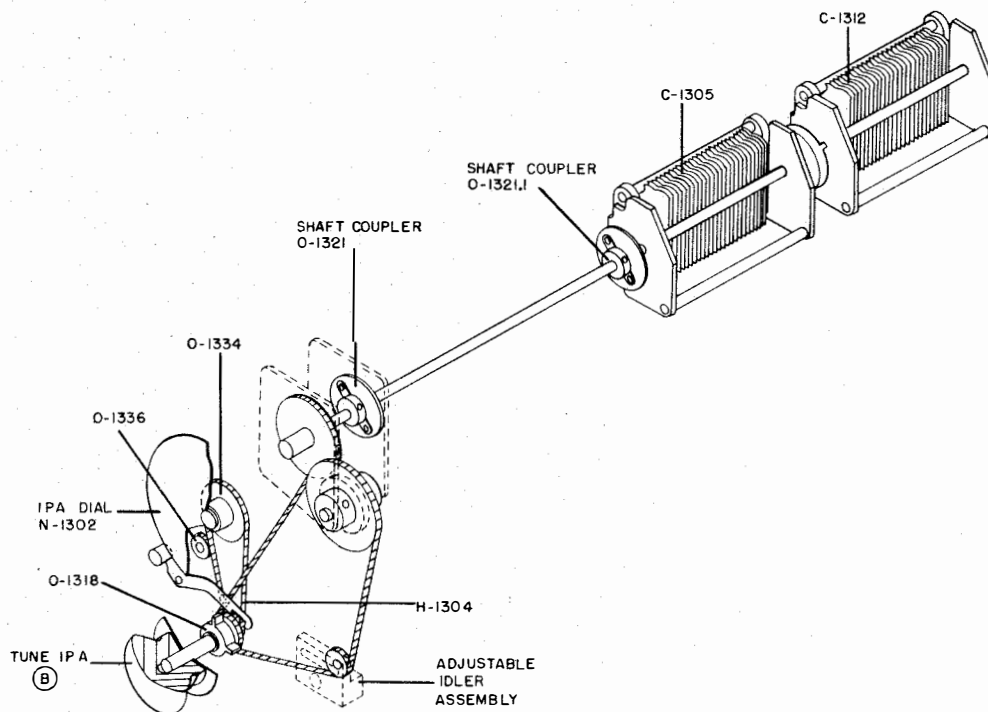
*Step 2.* PA dial should point to 100 on the dial.

The PA dial drive assembly (figure 7-75) is calibrated from 0 to 100 over a 315-degree range. It consists of three sprockets for the chain drive from knob shaft to dial, and from knob shaft to the right-angle drive assembly. An adjustable idler, O-1337, is provided to minimize lash in the dial drive chain. The drive assembly may be removed in the following manner:

*Step 3.* Remove the screws supporting the front panel of the RFA drawer.

*Step 4.* Remove the four screws on the front panel supporting the dial drive mounting plate assembly.

*Step 5.* The dial drive assembly may be removed from the front panel as a unit. (See figure 7-75.) After the dial drive assembly is off the front panel, the sprockets may be removed by removing either the retaining ring or the pin on the shaft associated with the sprocket. The idler assembly may be removed by loosening the two setscrews on the idler arm assembly and removing it from its shaft assembly.



**Figure 7-76. RFA, Intermediate Power Amplifier (IPA), Mechanical Drive System**

The lock lever assembly spring may be removed by removing the lock lever arm assembly from its shaft.

The dial assembly plate may be removed by first disconnecting chain H-1316 from the dial sprocket, and then removing the sprocket from its shaft. The dial assembly may now be removed from its shaft.

The sprocket has three slotted holes, 120 degrees apart. These permit a 12-degree adjustment of the dial, and may be adjusted in the following manner:

*Step 1.* Loosen the screws on dial sprocket O-1335.

*Step 2.* Looking at the rear of the dial drive assembly, place the two indentations in the dial plate facing downward. Set dial plate 0 mark at the top center of assembly by means of slotted holes in sprocket so that the dial indentation on the right is directly above lock spider O-1317.

#### 5. HARMONIC TRAP CAPACITOR C-1323.

—Harmonic trap capacitor C-1323 (figure 7-75) may be removed in the following manner:

*Step 1.* With the RFA drawer removed from the transmitter group cabinet, rotate TUNE PA knob Ⓞ on the front panel so that the setscrews on bevel gear O-1356 of the capacitor assembly are accessible (figure 7-75).

*Step 2.* Loosen the setscrews in the bevel gear.

*Step 3.* Remove screws supporting relay K-1303, mounted on the left panel (figure 7-68). Do not remove wires, but swing relay towards the front panel to gain access to the lower left-hand mounting screw of resistor board E-1399.

*Step 4.* Remove the five screws supporting resistor board E-1399, and carefully move the resistor board away from its mounting panel to provide accessibility to the mounting screws for harmonic trap capacitor C-1323.

*Step 5.* Disconnect the lead on harmonic trap capacitor C-1323, and remove the two screws support-

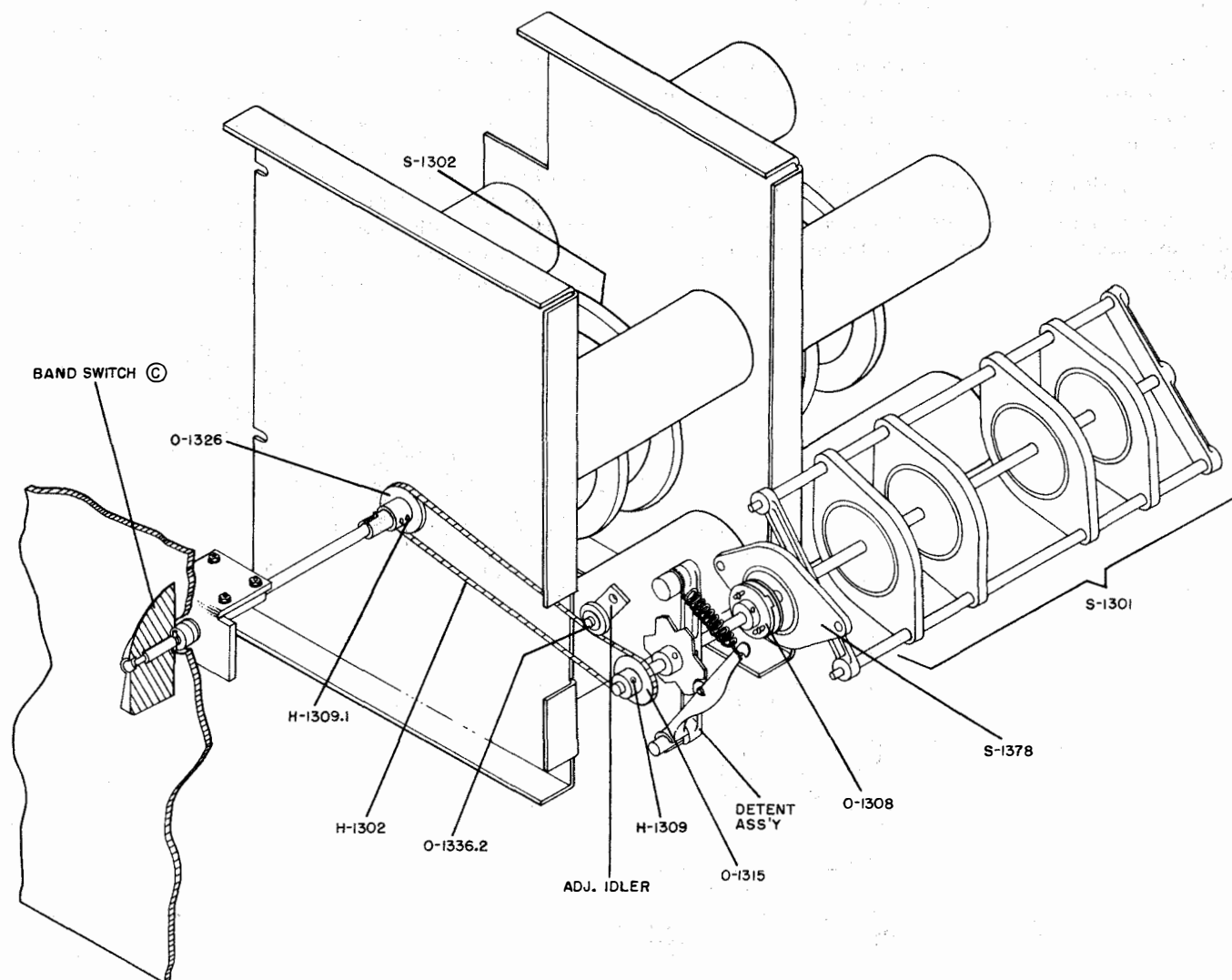


Figure 7-77. RFA, S-1301 and S-1302 Bandswitch, Mechanical Drive System

ing the capacitor. Hold bevel gear in one hand, and, with the other hand, withdraw the capacitor from the chassis.

6. PA TUNING COUNTERBALANCE ASSEMBLY.—The spring-loaded nonlinear counterbalance assembly, figures 7-68 and 7-75, mounted at the top left rear section of the RFA chassis, is provided to overcome frictional losses in the main PA tuning drive assembly. This main assembly drive tunes the harmonic trap capacitor, the vacuum capacitors, and the variable inductors. A variation in spring tension may be obtained by positioning the 10-32 screw at the rear mounting plate of the counterbalance assembly. A hole is provided in the shaft, extending through the center of the rear counterbalance mounting plate, so that a screwdriver may be inserted, and the shaft prevented from rotating whenever an increase or decrease in spring tension is necessary. (See figure 7-75.)

### CAUTION

Whenever the counterbalance assembly is disassembled, the rear adjustment screw *must* be removed, in order to release the spring tension in the counterbalance assembly.

*Step 1.* Remove top cover plate of the RFA chassis by loosening the fasteners. Remove the support angle (the upper left edge of the RFA drawer) by removing three screws from the top, three from the left side, and two from the front panel.

*Step 2.* Remove spring tension from counterbalance assembly by removing the rear adjustment screw.

*Step 3.* By means of an offset screwdriver, remove the four screws supporting the counterbalance rear plate assembly.

*Step 4.* Withdraw the counterbalance assembly from the RFA chassis. The lever arm assembly, pinned to the shaft, will remain on the main drive shaft and also the four counterbalance assembly spacers mounted on the inner rear panel of the RFA chassis.

7. RIGHT ANGLE DRIVE ASSEMBLY.—The right angle drive assembly (figure 7-75) provides a means of tuning from one main control, TUNE PA knob (D) on the front panel, the vacuum capacitors, variable inductors and the harmonic trap capacitor.

It consists of an aluminum casting, right angle bracket with shafts, sprockets and a chain provided with an adjustable idler to minimize lash. The arrangement of the chain is such that it provides a means of reversing the direction of rotation from the TUNE PA (D) dial drive assembly to the main drive tuning shaft assembly. The right-angle drive assembly may be removed in the following manner:

*Step 1.* Remove top cover plate of the RFA chassis by loosening the fasteners. Remove the support angle (the upper left edge of the RFA drawer) by removing three screws from the top, three from the left side, and two from the front panel.

*Step 2.* Disconnect chain H-1316 from right angle drive assembly to the PA dial drive assembly, by loosening adjustable idler O-1337.

*Step 3.* Loosen the 4-40 setscrew, and remove the pin on the shaft coupler connected to the main tuning shaft (figure 7-75).

*Step 4.* Remove the two hex head screws on the "L" bracket at the top of the right-angle casting and the five mounting screws supporting the right-angle casting to the chassis.

*Step 5.* Rotate right angle drive assembly 90 degrees to the left, and pull assembly towards the front panel until it is disconnected from the main tuning drive shaft. To remove chain H-1305 and sprocket, loosen the setscrews and remove the pins. A sprocket may be removed with its shaft by removing the shaft retaining ring at the opposite end of the sprocket shaft.

The main PA tuning drive shaft consists of the following mechanical components mounted on the vacuum capacitor tuning base (figure 7-75). Three drive shafts are coupled by means of drive couplers to form a single shaft connecting the right angle drive assembly to the counterbalance assembly.

The upper shaft supports the vacuum capacitor rack guide spacers and collars. This guide shaft (figure 7-71) is fixed and locked in place by two setscrews.

The lower shaft supports the gear and pinion assembly to drive rack O-1347 in the center of the core mounting plate assembly. This shaft is also fixed and locked by two setscrews. Gears and sprockets are fastened on their respective shafts by means of setscrews and pins. There is a provision on the main tuning shaft to adjust the travel of the vacuum capacitors by means of adjustable collars. (Refer to paragraph 8b(1)(b)1.)

8. BANDSWITCHES S-1301 AND S-1302. (See figures 7-74 and 7-77.)—If any of the components of bandswitches S-1301 and S-1302 are replaced, it will be necessary to check proper phasing of these switches after reassembly. (Refer to figure 7-77.)

Phasing of bandswitches may be accomplished as follows:

*Step 1.* Turn BANDSWITCH selector (C) on RFA front panel to the 2-5 MC position. Make sure that the PUSH TO TURN feature is fully released. Contactor arms of switch S-1302 should be centered on No. 3 contact of switch, as observed from the bottom of the RFA drawer.

*Step 2.* At this point, the detent assembly (on right side of the RFA drawer) should be fully engaged in one of the detent positions. Contactor arms of switch S-1301 should be centered on No. 3 contact of switch, as observed from the right side of the RFA drawer. Remove IPA assembly cover plate if necessary.

*Step 3.* If S-1301 contactor arm is not on position 3, loosen the setscrews in coupler O-1308, rotate switch S-1301 to position 3 and tighten setscrews in O-1308. Adjustable idler on chain H-1302 should be set to minimize backlash.

NOTES

1. TRANSMITTER OPERATED AT 100 WATT LEVEL, CW OPERATION.
2. ALL METER READINGS PLUS D-C, UNLESS OTHERWISE INDICATED. USE THAT METER SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE, A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON A 1 VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON A 250 VOLT SCALE.

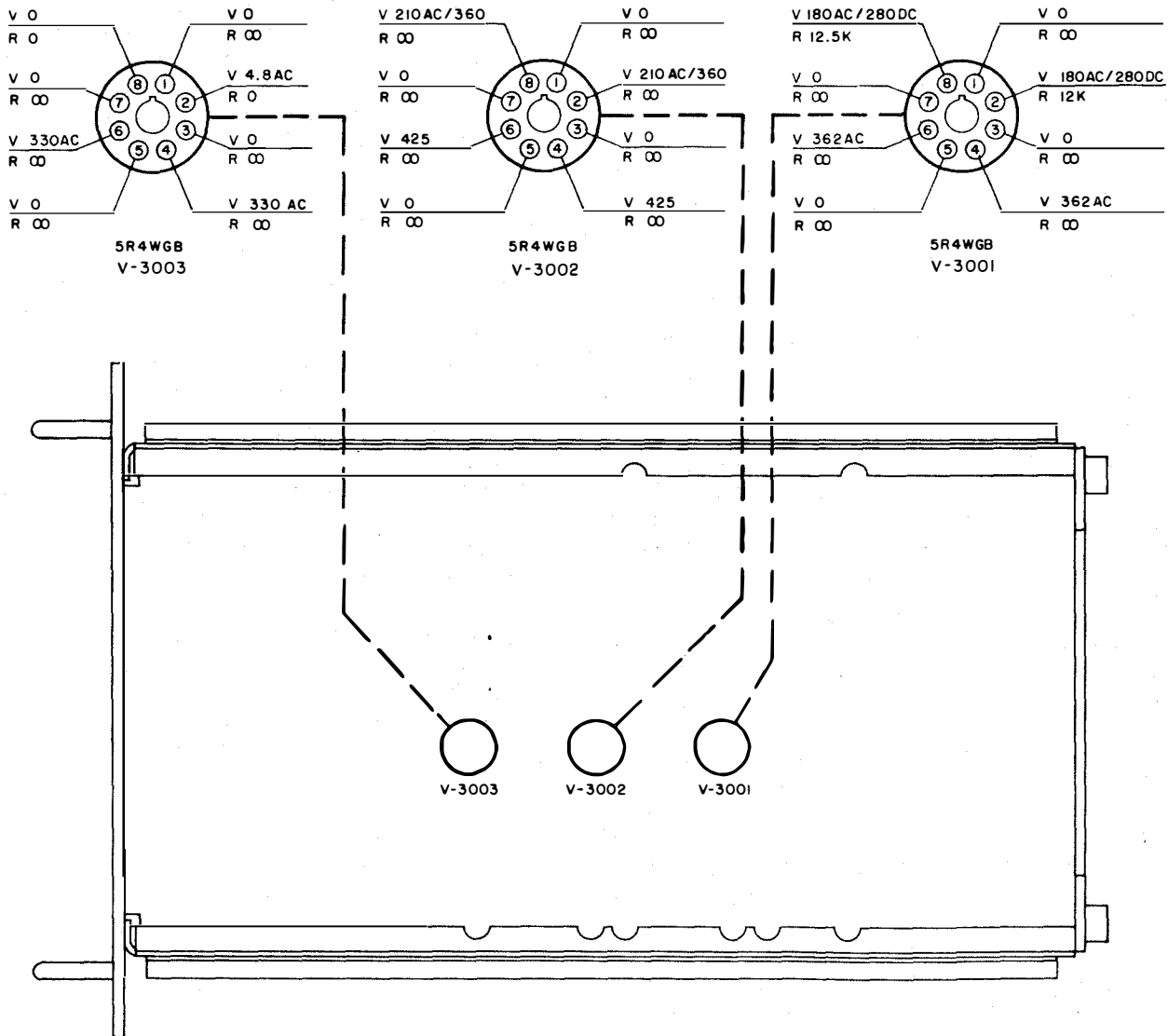


Figure 7-78. LVPS, Voltage and Resistance Chart



9. BLOWER MOTOR B-1306.—Remove the RFA blower, figure 7-71, according to the following steps:

*Step 1.* With RFA drawer removed from the transmitter group cabinet, remove screws supporting rear panel on RFA drawer. Exercise care to remove only the screws supporting this panel.

*Step 2.* Remove screw supporting L-1313. (See figure 7-68.)

*Step 3.* Remove the four screws supporting blower motor brackets on RFA rear panel.

*Step 4.* Remove flexible hose A-1301 between XV-1304 assembly and blower housing (figure 7-72).

*Step 5.* Carefully remove blower assembly B-1306 from bottom of the RFA drawer.

10. IPA SUBASSEMBLY.—When a component in the IPA subassembly is to be replaced, and the component is inaccessible from the right side of the RFA drawer, remove the IPA subassembly as follows (see figure 7-69):

*Step 1.* With RFA drawer removed from the transmitter group cabinet, remove the IPA subassembly protective cover.

*Step 2.* Remove the support angle (the upper right edge of the RFA drawer) by removing two screws on the front panel, four from the top and four from the right side.

*Step 3.* Loosen setscrews on IPA shaft couplers, O-1321 and O-1321.1, and remove shaft between couplers (figure 7-76).

*Step 4.* Rotate BANDSWITCH selector © to the 2-5 MC position. At this position the red dots on coupler O-1308 will be facing outwards (figure 7-77).

*Step 5.* Disconnect wire on the right side of the IPA subassembly, and disconnect P-1308 from J-1308 on left side of IPA subassembly (figure 7-69).

*Step 6.* Remove all screws supporting IPA subassembly to main chassis.

*Step 7.* If IPA subassembly is to be removed entirely from RFA drawer, wires on both switch S-1378 (figure 7-69) and terminal board E-1397 (figure 7-68) will have to be disconnected.

(b) REPLACEMENT AND ADJUSTMENTS.—To replace the RFA drawer, reverse the removal procedure.

To replace any of the components in the RFA drawer, reverse the removal procedure, and adjust according to the procedures outlined in paragraph 8b(1).

See Section 6 for lubrication instructions.

**9. POWER SUPPLY PP-1094/SRT, LOW VOLTAGE POWER SUPPLY (LVPS).**

a. TROUBLE LOCATION.—The LVPS receives input power from the ship's supply, and supplies power

to all the other units in the transmitter group except for the crystal oven circuits, which are supplied from a separate 110-volt a-c source. Table 7-36 lists the indications of LVPS failure and the probable faults. Use the voltage and resistance chart, figure 7-78, in conjunction with the schematic, figure 7-160, and wiring diagram, figure 7-161, to locate the fault.

**b. REPAIR AND ADJUSTMENT.**

(1) ELECTRICAL ADJUSTMENTS.—There are no electrical adjustments on the low voltage power supply, except the time delay adjustment of relay K-3003, which should be adjusted for a 33-second time delay. The adjustable cams of relay K-3003 can be adjusted for a time delay of 18 to 46 seconds.

The following voltage checks may be made on the LVPS front panel, permitting power supply output measurements, by means of Multimeter ME-25A/U (or equivalent).

**WARNING**

**DANGEROUS VOLTAGES ARE PRESENT.**

(a) Bias voltage supply of -220 volts may be checked on the radio frequency amplifier (RFA) front panel with VOLTMETER switch ④ in position BIAS (500V). If there is no reading on the VOLTMETER, use Multimeter ME-25A/U (or equivalent) to check for proper voltage at test point -220 V on front panel of LVPS. If no voltage is present, refer to trouble location chart, table 7-36, to locate the fault.

(b) The +300-volt supply may be checked on the RFA with VOLTMETER switch ④ in position LV (500 V). If there is no reading on the meter, use Multimeter ME-25A/U (or equivalent), and check for proper voltage at test point +300 V on front panel of LVPS. If voltage is present at LVPS test point, but not at the RFA VOLTMETER, check interconnecting cable between the units. If no voltage is present, refer to trouble location chart, table 7-36, to locate the fault.

(c) The +250 unregulated voltage, supplied to the RFO, may be checked at test point +250 V on front panel of LVPS. If voltage is present at the test point in the LVPS, but not at test point 250 V. D.C. UNREG. at TEST POINTS socket E-2919 on the radio frequency oscillator (RFO) left side, check interconnecting cable and associated connecting plugs of the transmitter frame. Refer to trouble location chart, table 7-36, to locate the fault.

(d) Refer to the primary power distribution diagrams, figures 7-117 and 7-118, for proper terminals and relay contacts supplying power to cabinet heaters and blower motors in the transmitter bay.

**(2) MECHANICAL ADJUSTMENTS.**

(a) REMOVAL AND REPAIR.—The low voltage power supply drawer may be removed according to the instructions given in paragraph 4a. All components on the LVPS (figures 7-79, 7-80, and 7-81)

TABLE 7-36. INDICATIONS OF FAILURE AND PROBABLE FAULTS IN THE LVPS

| INDICATION OF FAILURE   | PROBABLE FAULT  |
|---|---|
| CABINET HEATER indicator light does not light when CABINET HEATER switch $\text{Ⓜ}$ is turned on (with EMERGENCY SWITCH $\text{Ⓜ}$ ON). | Fuses F-3001, F-3002, or cabinet heater switch S-3002.  |
| MAIN POWER INDICATOR light goes on when START push button is depressed, and goes off when it is released.                               | Relay K-3001.   |
| Nothing happens when START push button is depressed.  | Fuses F-3007, F-3008.   |
| Blowers in mounting do not operate after time delay relay K-3003 is energized.  | Relay K-3004, or fuses F-3005, F-3006.  |
| TIME DELAY indicator light does not light approximately 30 seconds after START push button is depressed.                                | -24-volt supply (relay line), interlocks, fuses F-3005, F-3006, F-3007, F-3008, F-3009, F-3010, or time delay relay K-3003. Check that all drawers in transmitter bay are properly seated. (If unit drawer is extended, check that its interlock is properly checked.) With transmitter power off, the interlock circuit continuity may be checked at the INT. TEST jacks on LVPS front panel.  |
| -220 V, 250 V and 300 V indicator lights do not light.  | If any one of these lamps is not on, check respective power supply. If TIME DELAY indicator light does not light, check fuse F-3009. If TIME DELAY indicator light is on, check relay K-3004.<br><br><b>Note</b><br>The outputs of the -220-, +250- and +300-volt supplies can be checked at the test points provided on the LVPS front panel. The output of the +300-volt supply can be checked with VOLTMETER selector switch $\text{Ⓝ}$ on RFA front panel in the LV (500 V) position. The output of the -220-volt bias supply can be checked with VOLTMETER selector switch $\text{Ⓝ}$ on the RFA front panel in the BIAS (500 V) position. If any output is incorrect, check rectifier and filter for that supply. |

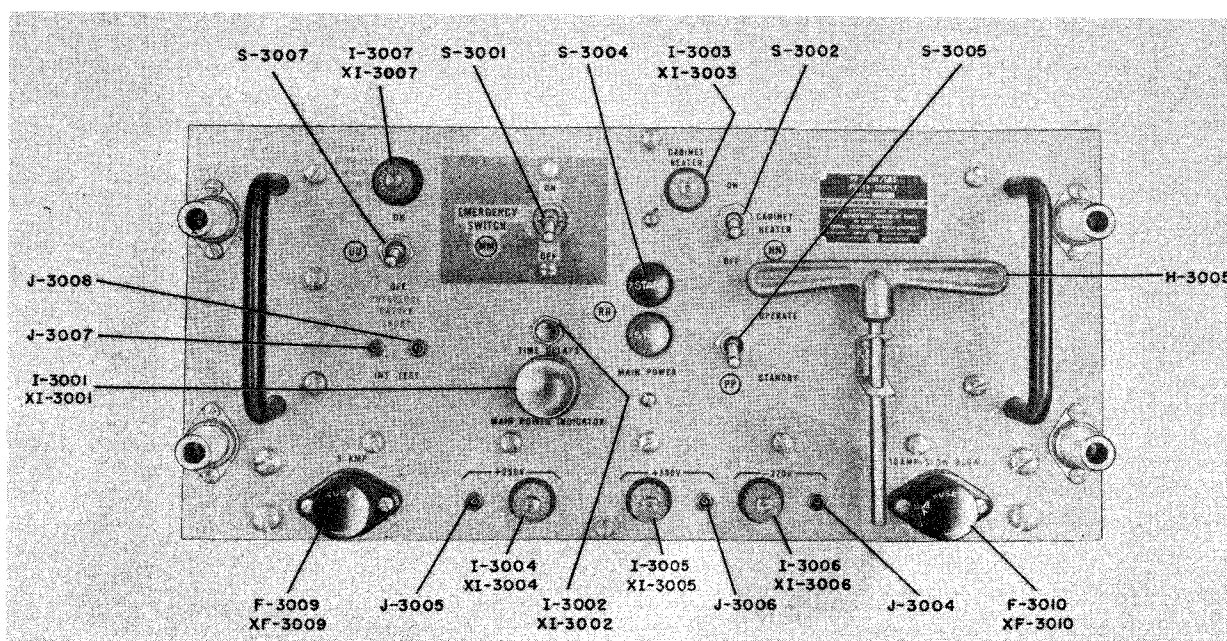


Figure 7-79. Power Supply PP-1094/SRT (LVPS), Front Panel

**TABLE 7-37. INDICATIONS OF FAILURE AND PROBABLE FAULTS IN THE MVPS**

| INDICATION OF FAILURE   | PROBABLE FAULT   |
|---|--|
| 500 V PRI. or 1300 V PRI. indicator lights do not light during 100-watt operation.                            | Relay K-501 and K-503 and its control circuit. Fuse F-502 or F-501.  |
| 500 V PRI. indicator light does not light in 500-watt operation.  | Relay K-501 or fuse F-501.   |
| 500 V PRI. and 1300 V PRI. indicator lights go on but 500 V OUTPUT and 1300 V OUTPUT indicator lights do not. | Filament circuit protected by fuse F-503.  |
| 500 V PRI. and 500 V OUTPUT indicator lights do not light.  | Fuse F-501.  |
| 500 V PRI. indicator light goes on but 500 V OUTPUT indicator light does not.                                 | +500-volt rectifier and filter circuit (V-501 and V-502).<br><b>Note</b><br>The output of the +500-volt supply can be checked at the test point 500 V OUTPUT on the MVPS front panel, and also on the RFA front panel with VOLTMETER switch ④ in the MV (1000 V) position. |
| 1300 V PRI. and 1300 V OUTPUT indicator lights do not light.  | Fuse F-502 and relay K-503.  |
| 1300 V PRI. indicator light goes on, but 1300 V OUTPUT indicator light does not.                              | +1300-volt rectifier and filter circuit (V-503 and V-504).<br><b>Note</b><br>The output of the +1300-volt supply can be checked on the RFA front panel with VOLTMETER switch ④ in the PA E <sub>b</sub> (5000 V) position.   |
| Keying transients present in RFA output waveform during CW operation.   | Dumping circuit in the low level radio modulator, LLRM. See paragraph 6a(2).   |

are readily accessible, and may be replaced by removing their respective mounting bolts. Plug-in type filter capacitors are secured by means of clamp plates and wing nuts.

(b) REPLACEMENTS.—Refer to paragraph 4b to replace the LVPS drawer.

**10. POWER SUPPLY PP-1095/SRT, MEDIUM VOLTAGE POWER SUPPLY (MVPS).**

(See figures 7-82, 7-83 and 7-84.)

a. TROUBLE LOCATION.—Table 7-37 lists indications of failure and probable faults in the medium voltage power supply (MVPS). The voltage and resistance chart, figure 7-85, in conjunction with the schematic, figure 7-162, and wiring diagram, figure 7-163, may be used to locate the faulty component.

**WARNING**

THE MVPS USES HIGH VOLTAGES THAT ARE DANGEROUS TO LIFE. EXTREME CAUTION SHOULD BE EXERCISED WHEN WORKING ON THE MVPS.

b. REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—There are no electrical adjustments on the medium voltage power supply.

Table 7-38 lists MVPS voltages to be checked by means of the VOLTMETER on the radio frequency amplifier (RFA) front panel for both 100- and 500-watt operation.

**TABLE 7-38. MVPS VOLTAGES MEASURED AT THE RFA VOLTMETER**

| POSITION OF KNOB ④ (RFA)    | 100-WATT OPERATION (VOLTS) | 500-WATT OPERATION (VOLTS) |
|-----------------------------|----------------------------|----------------------------|
| MV (1000 V)                 | 500                        | 500                        |
| PA E <sub>c2</sub> (1000 V) | 300                        | 500                        |
| PA E <sub>b</sub> (5000 V)  | 1300                       | 3000                       |
| PA E <sub>b</sub> (5000 V)  | 1050                       | 2400                       |
| (Knob ④ on LLRM to PHONE)   |                            |                            |

**WARNING**

THE MVPS USES HIGH VOLTAGES THAT ARE DANGEROUS TO LIFE. EXTREME CAUTION SHOULD BE EXERCISED WHEN WORKING ON THE MVPS.

(a) The +500-volt supply may be checked on the RFA front panel by means of the VOLTMETER and associated selector switch ④ in the MV (1000 V)

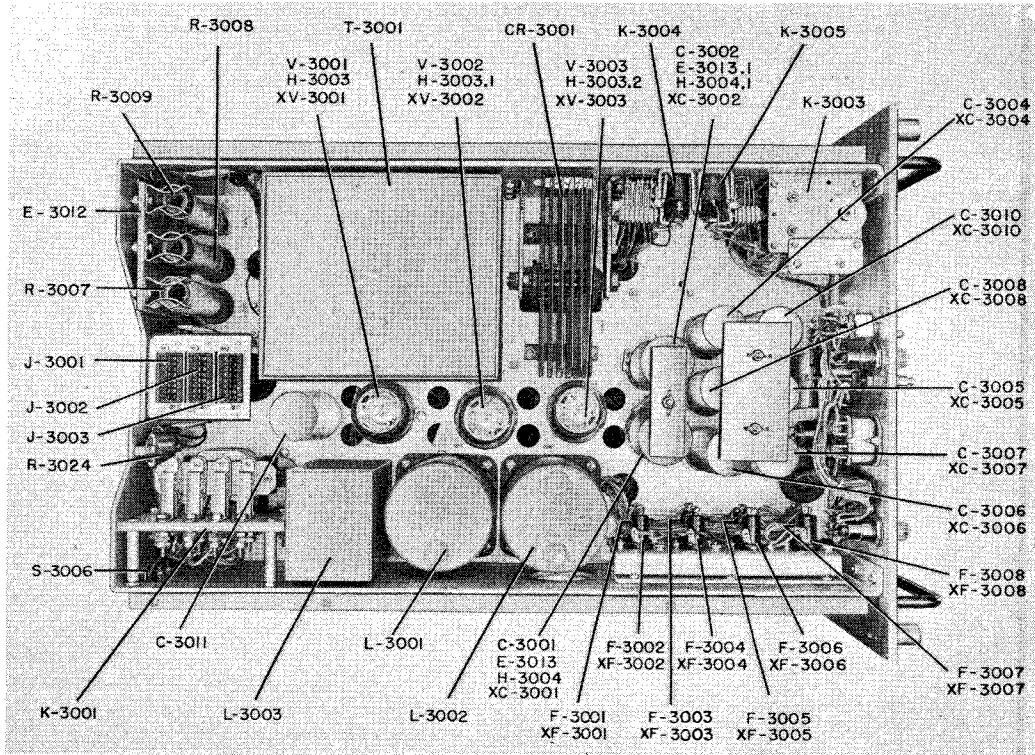


Figure 7-80. Power Supply PP-1094/SRT (LVPS), Top View

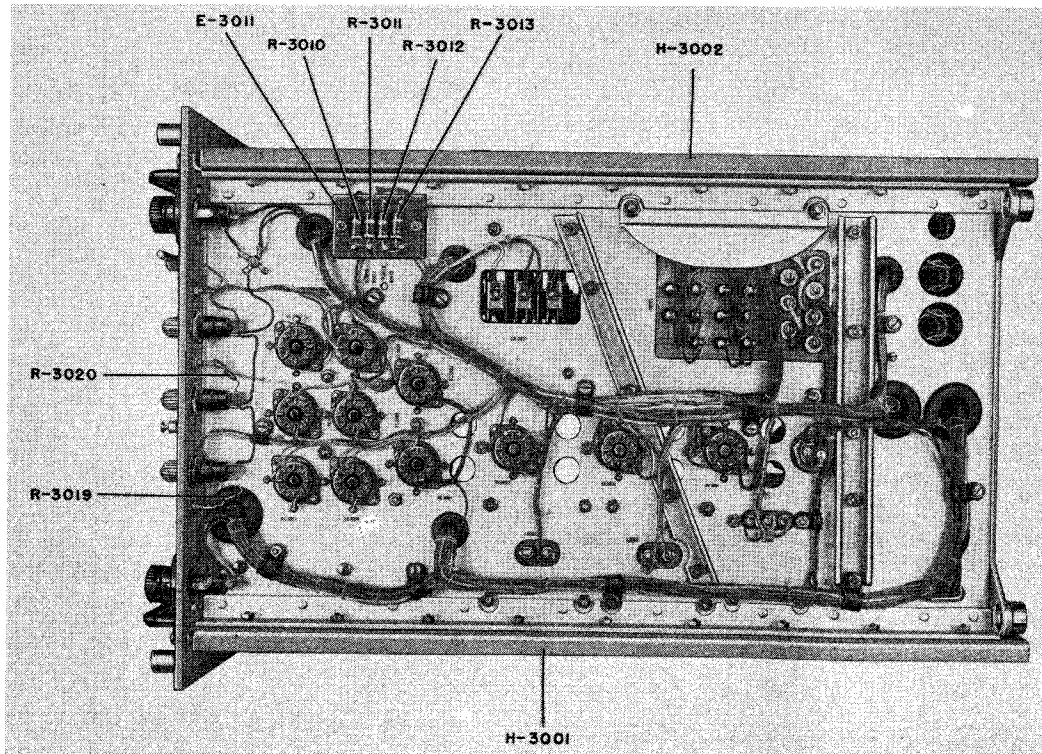


Figure 7-81. Power Supply PP-1094/SRT (LVPS), Bottom View

TABLE 7-39. INDICATIONS OF FAILURE AND PROBABLE FAULTS IN THE HVPS

| INDICATION OF FAILURE   | PROBABLE FAULT   |
|---|--|
| TIME DELAY indicator light does not light 30 seconds after BOOSTER EMERGENCY SWITCH Ⓢ is turned on.                             | Fuses F-1504, F-1505, or time delay relay K-1504.  |
| HV PRIMARY $\phi 1$ , $\phi 2$ and $\phi 3$ indicator lights do not light when all 500-watt operation conditions have been met. | Input circuit: relay K-1502, fuses F-1501, F-1502 and F-1503.  |
| One of the HV PRIMARY indicator lights does not light, and the other two light dimly.   | Open line in circuit in which unlit indicator light is connected. If HV PRIMARY $\phi 1$ is not lit, check F-1501; $\phi 2$ , F-1502; and $\phi 3$ , F-1503.   |
| HV PRIMARY indicator lights go on but 3000 V indicator light in HLRM does not.  | +2400/+3000-volt rectifier circuit (V-1501 through V-1506).<br><br><b>Note</b><br>The output of the +2400/+3000-volt supply can be checked by the VOLT-METER in the RFA, with VOLTMETER switch Ⓣ in the PA E <sub>b</sub> (5000 V) position during 500-watt operation. |

position for both 100-watt and 500-watt operation (table 7-38). When there is no reading at both the MV (1000 V) and PA E<sub>c2</sub> (1000 V) positions on the RFA VOLTMETER, check the +500-volt output by means of Multimeter ME-25A/U (or equivalent). A test point has been provided on the front panel of the MVPS, labeled 500 V OUTPUT, for the purpose of checking the +500-volt output of the MVPS. If there is voltage present at the test point on the MVPS front panel, but no indication on the RFA VOLTMETER, check the continuity of the interconnecting cable in the transmitter frame. If the interconnecting plug and cable are found to be good, refer to the trouble location chart, table 7-37, to locate the fault.

(b) The +1,050/+1,300-volt supply may be checked by means of the VOLTMETER on the RFA front panel with associated selector switch Ⓣ in position PA E<sub>b</sub> (5000 V). Do not check these high potentials by means of an external voltmeter. If there is high voltage in the MVPS as indicated by the 1300 V OUTPUT lamp, and no indication of high voltage output on the RFA voltmeter, turn off all power supplies, and make a continuity check of the high voltage interconnecting cable. If the high voltage interconnecting cable is found to be good, refer to the trouble location chart, table 7-37, to locate the fault.

#### (2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—The medium voltage power supply drawer may be removed from the transmitter bay by following the procedure in paragraph 4a.

All components and fuses are readily accessible when the MVPS drawer has been pulled all the way out (figure 7-83).

(b) REPLACEMENT.—Refer to paragraph 4b to replace the MVPS drawer.

### 11. POWER SUPPLY PP-1096/SRT, HIGH VOLTAGE POWER SUPPLY (HVPS).

a. TROUBLE LOCATION.—Table 7-39 lists indications of failure and probable faults in the HVPS. The voltage and resistance chart, figure 7-86, in conjunction with the schematic, figure 7-164, and wiring diagram, figure 7-165, may be used to locate the faulty component.

#### WARNING

THE HVPS USES HIGH VOLTAGES THAT ARE DANGEROUS TO LIFE. EXTREME CARE SHOULD BE EXERCISED WHEN WORKING ON THE HVPS.

#### b. REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—All links on E-1503 and E-1504 must be properly set for the ship's supply. (See Section 3, figure 3-13.)

#### (2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—The HVPS is removed from its cabinet in the same manner as the other drawers, as indicated in paragraph 4a. Figures 7-87 and 7-88 show the location of components in the HVPS.

(b) REPLACEMENT.—To replace the HVPS drawer, reverse the removal procedure as indicated in paragraph 4b.

### 12. MOUNTING MT-1423/SRT (BASE MOUNT)

a. TROUBLE LOCATION.—If the blowers do not rotate when the START push button of MAIN POWER switch Ⓢ is depressed, and time delay relay K-3003 has energized, check the -24-volt supply, relay K-3004 and fuses F-3007, F-3008. See table 7-36 and power distribution diagram, figure 7-117.

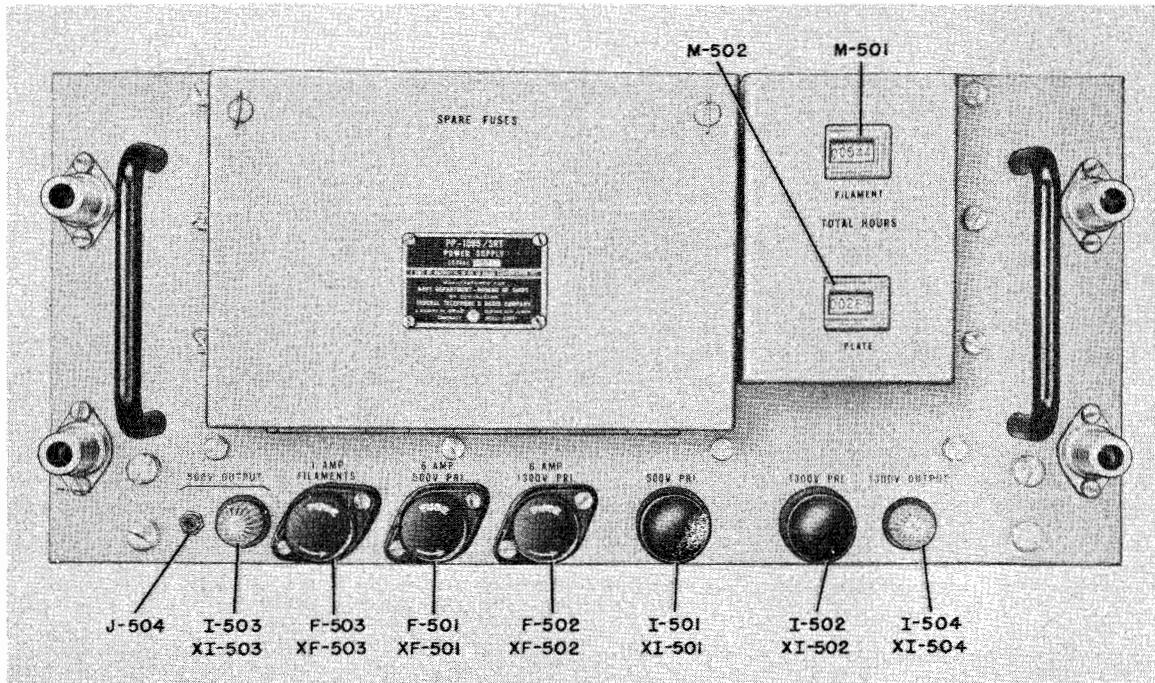


Figure 7-82. Power Supply PP-1095/SRT (MVPS), Front Panel

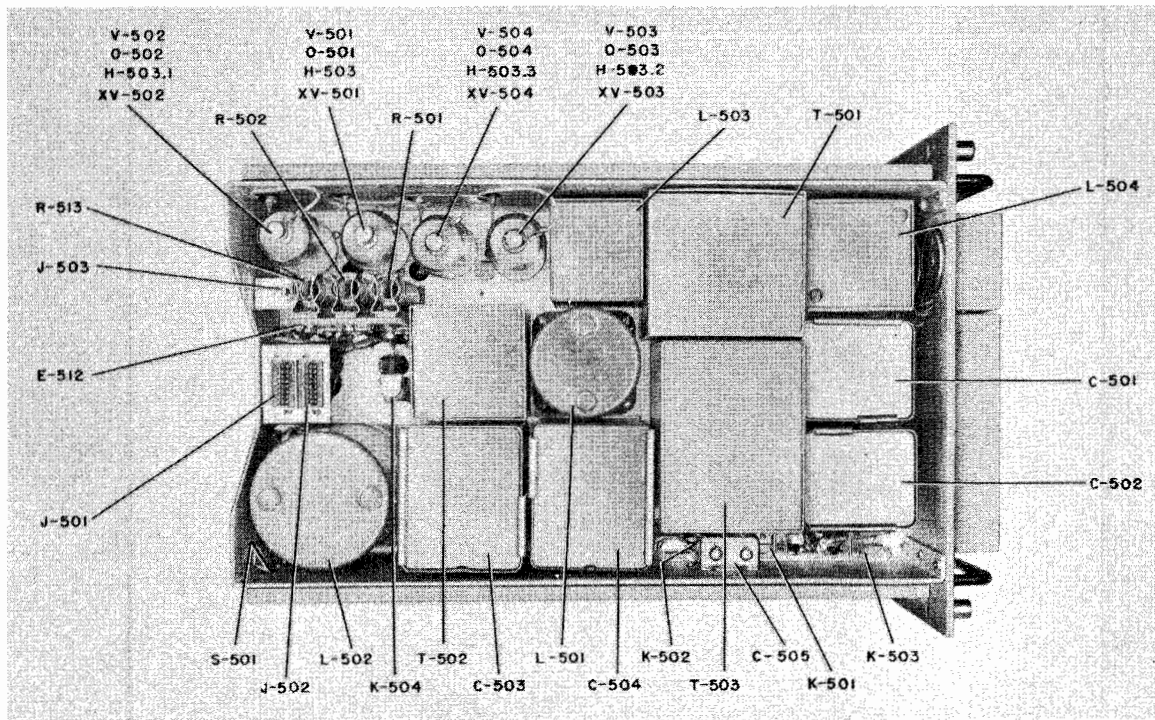


Figure 7-83. Power Supply PP-1095/SRT (MVPS), Top View

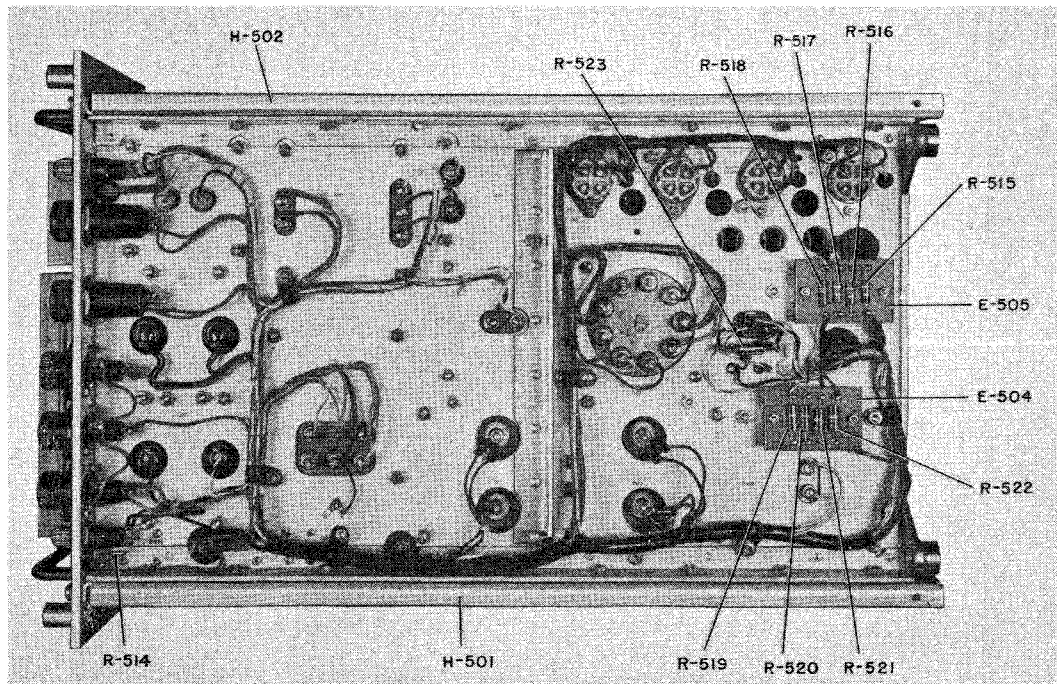


Figure 7-84. Power Supply PP-1095/SRT (MVPS), Bottom View

**Note**

In the AN/SRT-16, operation of the right or left transmitter group will energize the blowers in the mounting. If the blowers do not operate when one of the transmitter groups is being used, try using the other transmitter group. If the blowers now operate, the trouble is in the low voltage power supply (LVPS), and not in the mounting.

If the CABINET HEATER indicator light does not light when the CABINET HEATER switch (N) is closed, check fuses F-3001 and F-3002 in the LVPS. Figure 7-166 is the schematic for the base mount.

**Note**

In the AN/SRT-16, CABINET HEATER switch (N) on either of the LVPS front panels will operate their respective cabinet heaters and associated indicator lamps.

**b. REPAIR AND ADJUSTMENT.**

(1) ELECTRICAL ADJUSTMENTS.—None.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To gain access to air filters O-706, O-707, and O-708 (figure 7-89), remove the front panel of the mounting at the base of the cabinet by loosening the four captive screws that hold the panel in place.

To clean the air filters, refer to Section 6.

To reach heating elements HR-701 through HR-704 and blowers B-701 and B-702, the cabinets on top of the mounting must be taken off.

Blower assemblies B-701 and B-702 (figure 7-89) may be removed as follows:

*Step 1.* Remove the clamp assembly.

*Step 2.* Loosen clamps H-702 and H-703, and remove blower connector O-709.

*Step 3.* Loosen air duct clamp assembly H-705, and disconnect ground strap.

*Step 4.* Disconnect leads to blower motor, and remove blower assembly B-701. Blower assembly B-702 is removed in the same manner.

(b) REPLACEMENT.—To replace any part of the mounting, reverse the removal procedure.

**13. CABINET, ELECTRICAL EQUIPMENT CY-1571/SRT (100-WATT FRAME ASSEMBLY).**

(See figures 7-90 and 7-91.)

a. TROUBLE LOCATION.—If a unit operates when the test cable (Section 3) is used, but does not operate when properly seated in the cabinet, the extensible cable assembly and the mating connectors for that drawer should be checked. If there is no input power to the transmitter group, and all unit fuses are known to be good, check filters Z-601 and Z-602. If there is no power to the RFO oven circuits and fuse F-2918 is good, check filters Z-603 and Z-604. Figure 7-167 is the wiring diagram for the transmitter group cabinet.

NOTES

1. USE MULTIMETER ME-25A/U SCALE WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON THE 1 VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON THE 250 VOLT SCALE.

2. UNLESS OTHERWISE INDICATED, TRANSMITTER AT 100 WATT LEVEL, SERVICE SELECTOR SWITCH (1) IN HAND POSITION, TEST KEY (T) IN CENTER POSITION, D-C VOLTAGE READING.

\* CW OR PHONE/CW OR PHONE WITH TEST KEY (T) IN OPERATION POSITION.

\*\*CW OR PHONE, SAME READINGS WITH (1) IN CENTER POSITION OR IN OPERATING POSITION.

† MEASURED WITH 5000 VOLTAGE ADAPTER.

†† HIGH VOLTAGE, DANGER, DO NOT MEASURE.

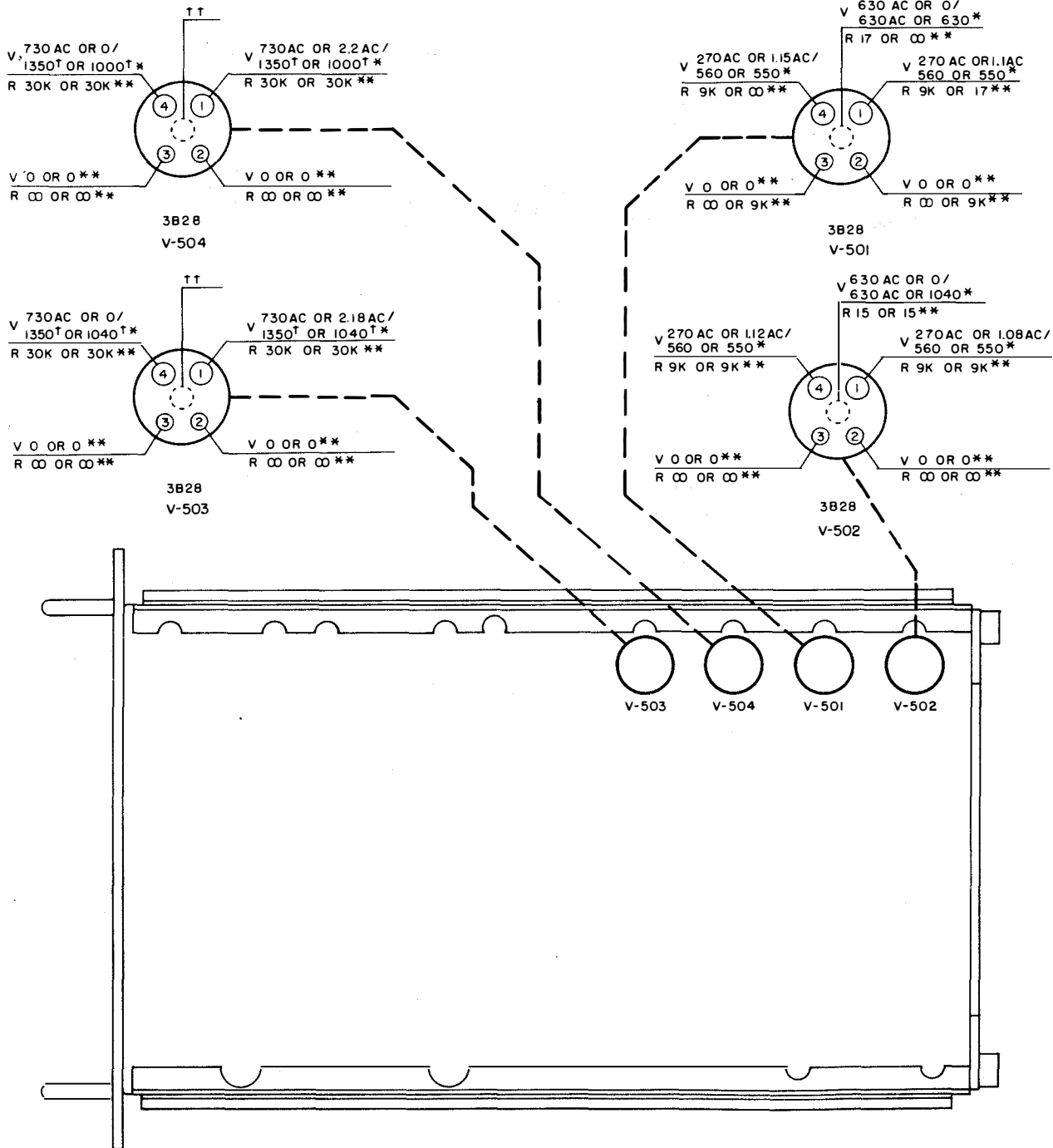
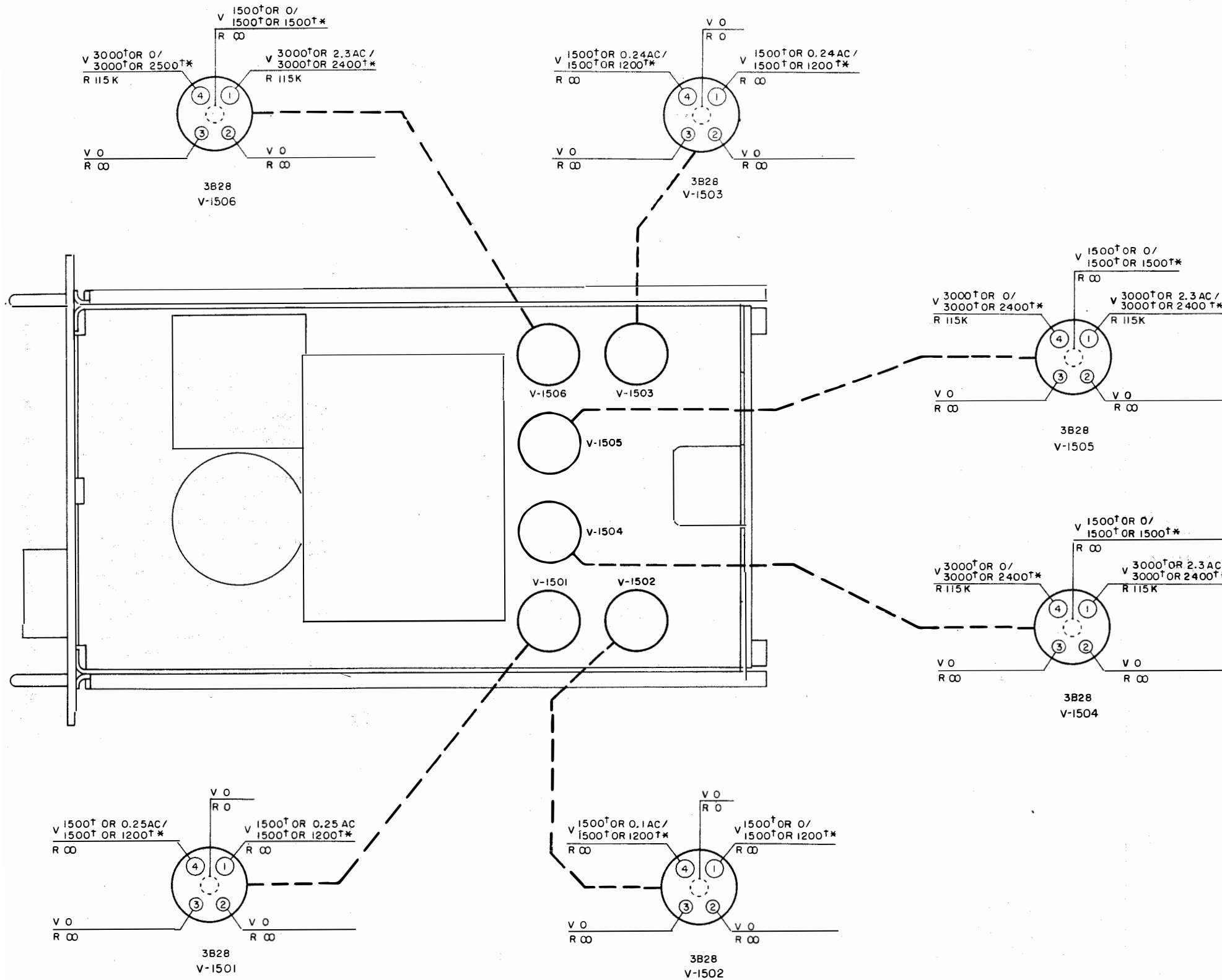


Figure 7-85. MVPS, Voltage and Resistance Chart

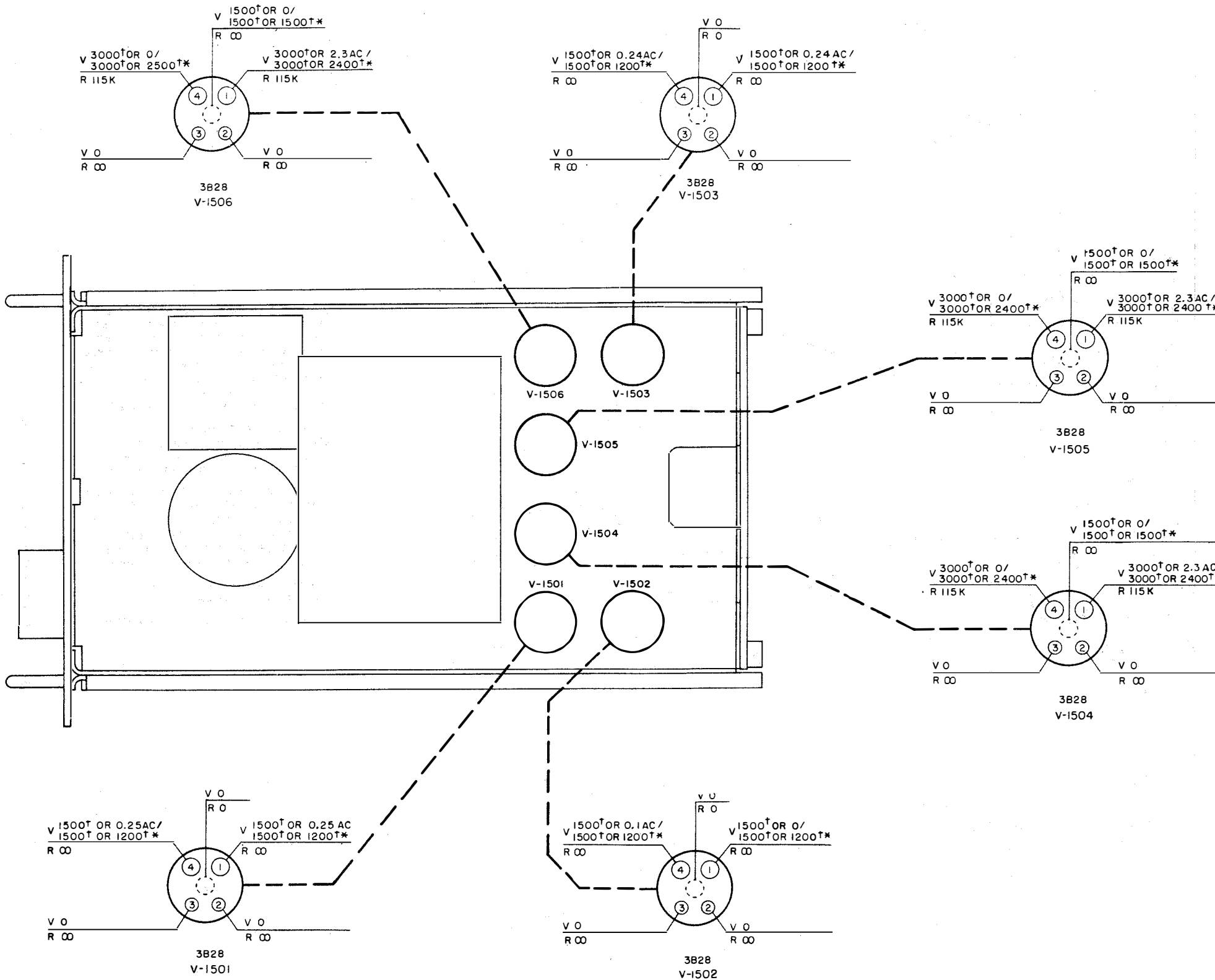




NOTES

1. USE THAT SCALE OF MULTIMETER ME-25A/U WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON THE 1 VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON THE 250 VOLT SCALE.
  2. TRANSMITTER AT 500 WATT LEVEL, SERVICE SELECTOR SWITCH (U) AT HAND POSITION, TEST KEY (T) IN CENTER POSITION, UNLESS OTHERWISE INDICATED.
  3. WHERE VOLTAGES OR RESISTANCES ON ANY ONE PIN ARE THE SAME FOR THE TWO OR MORE OPERATIONS (CW., PHONE, TEST KEY (T) IN CENTER POSITION, TEST KEY (T) IN OPERATING POSITION) THE CORRECT VALUE WILL BE INDICATED ONLY ONCE.
- \* CW OR PHONE/CW OR PHONE WITH TEST KEY (T) IN OPERATING POSITION.  
† MEASURED WITH 5000 VOLT ADAPTER.

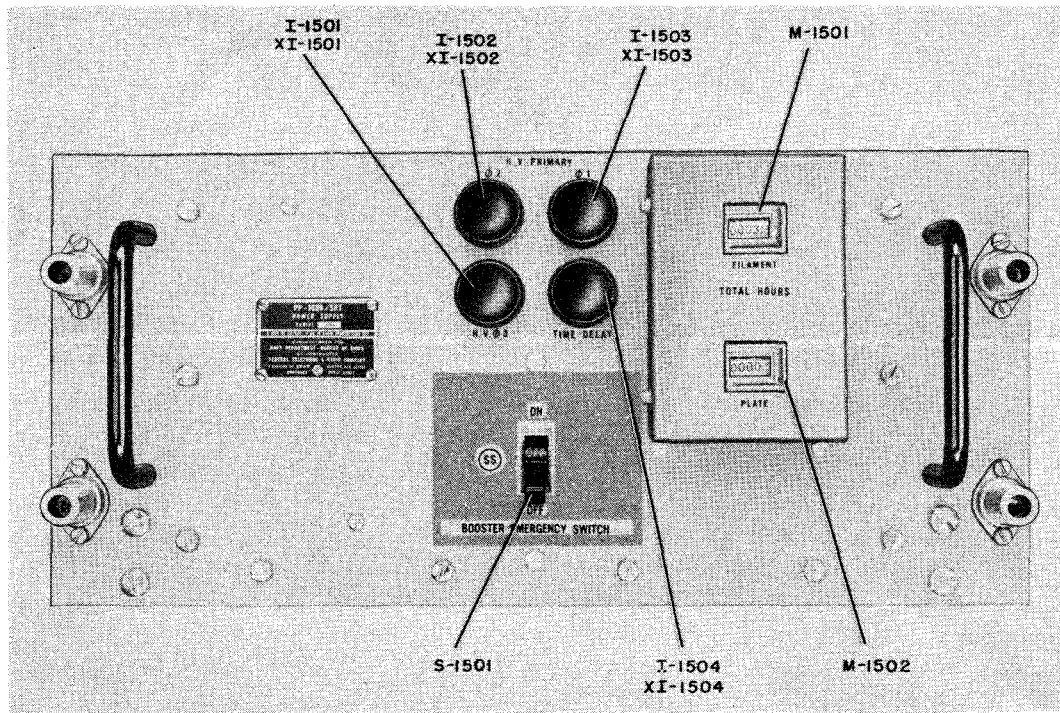
Figure 7-86. HVPS, Voltage and Resistance Chart



NOTES

1. USE THAT SCALE OF MULTIMETER ME-25A/U WHICH WILL PERMIT THE READING TO BE INDICATED AT MAXIMUM DEFLECTION AND STILL BE WITHIN THE SCALE. FOR EXAMPLE A NOMINAL 0.5 VOLT READING SHOULD BE MEASURED ON THE 1 VOLT SCALE; A NOMINAL 100 VOLT READING SHOULD BE MEASURED ON THE 250 VOLT SCALE.
  2. TRANSMITTER AT 500 WATT LEVEL, SERVICE SELECTOR SWITCH (U) AT HAND POSITION, TEST KEY (T) IN CENTER POSITION, UNLESS OTHERWISE INDICATED.
  3. WHERE VOLTAGES OR RESISTANCES ON ANY ONE PIN ARE THE SAME FOR THE TWO OR MORE OPERATIONS (CW., PHONE, TEST KEY (T) IN CENTER POSITION, TEST KEY (T) IN OPERATING POSITION) THE CORRECT VALUE WILL BE INDICATED ONLY ONCE.
- \* CW OR PHONE/CW OR PHONE WITH TEST KEY (T) IN OPERATING POSITION.  
† MEASURED WITH 5000 VOLT ADAPTER.

Figure 7-86. HVPS, Voltage and Resistance Chart



**Figure 7-87. Power Supply PP-1096/SRT (HVPS), Front Panel**

**b. REPAIR AND ADJUSTMENT.**

- (1) ELECTRICAL ADJUSTMENTS.—None.
- (2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To reach the terminal boards and r-f interference filters, the medium voltage power supply (MVPS) must be removed. Remove the protective cover plate to gain access to the terminal boards. (See figure 7-91.) To remove the cable supports and extensible spring assemblies, loosen two screws on supporting clamp, and remove assembly (figure 7-90). It is not necessary to remove clamp block from the cabinet to remove the cable supports.

**Note**

When working on the interconnecting cables, rail assemblies, and associated equipment on the rear of the cabinet, remove the side panels for greater accessibility.

**WARNING**

SHIP'S POWER IS ALWAYS PRESENT ON THE TERMINAL BOARDS. TO REMOVE THIS VOLTAGE, POWER MUST BE TURNED OFF AT THE SHIP'S DISTRIBUTION PANEL.

(b) REPLACEMENT.—Reverse the removal procedure to replace a part in the transmitter group cabinet. Figures 7-90 and 7-91 show the location of components in the transmitter group cabinet.

**14. CABINET, ELECTRICAL EQUIPMENT  
CY-1572/SRT (HLRM CABINET).**

a. TROUBLE LOCATION.—The extensible connecting cable assembly should be checked for continuity when the high level radio modulator (HLRM) does not operate with the interconnecting cables properly seated on the unit.

**WARNING**

SHIP'S POWER IS ALWAYS PRESENT ON TERMINAL BOARDS. POWER MUST BE TURNED OFF AT THE SHIP'S DISTRIBUTION PANEL TO REMOVE THIS VOLTAGE.

See figure 7-168 for the high level radio modulator cabinet wiring diagram.

**b. REPAIR AND ADJUSTMENT.**

- (1) ELECTRICAL ADJUSTMENTS.—None.
- (2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To remove the extensible cable support and spring assembly, loosen two screws on the supporting clamp, and remove assembly. It is not necessary to remove the clamp block from the cabinet to remove the cable supports.

Remove the terminal board cover to reach the terminal boards. Removing the side panels of the HLRM cabinet will make the extensible cable assembly, ter-

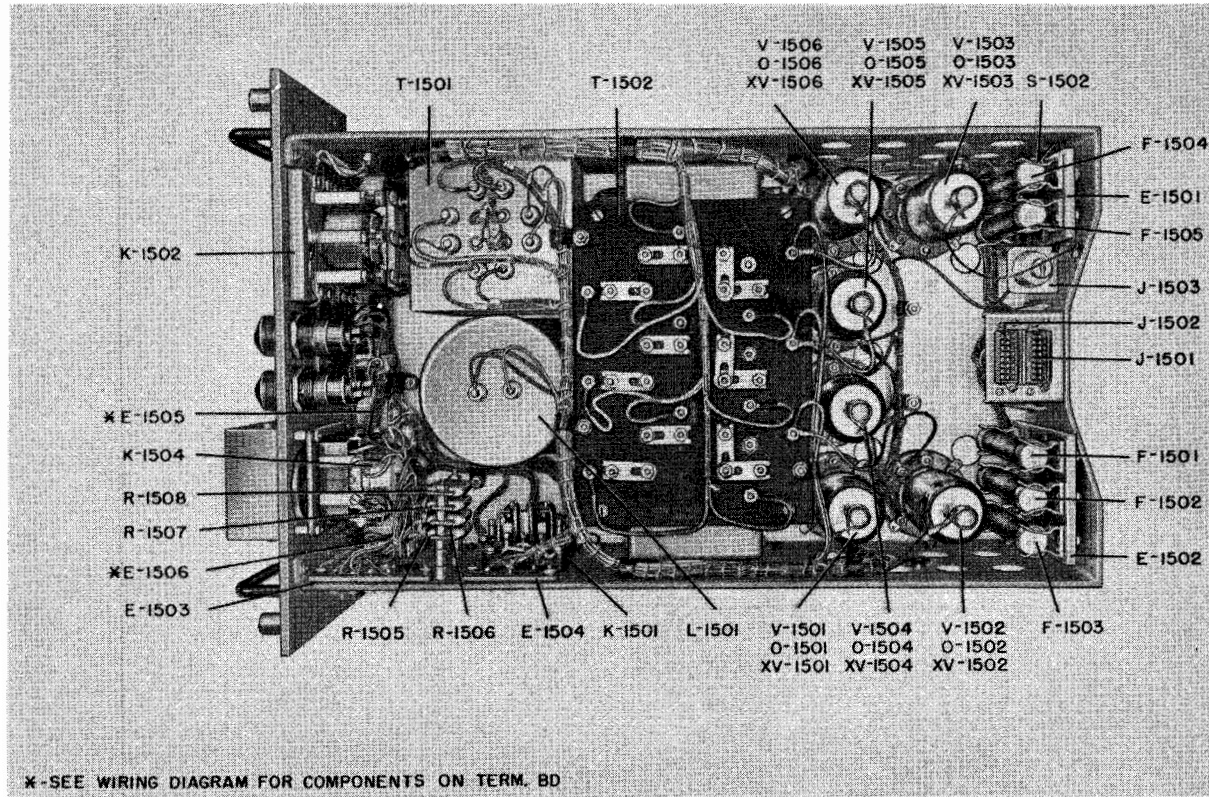


Figure 7-88. Power Supply PP-1096/SRT (HVPS), Top View

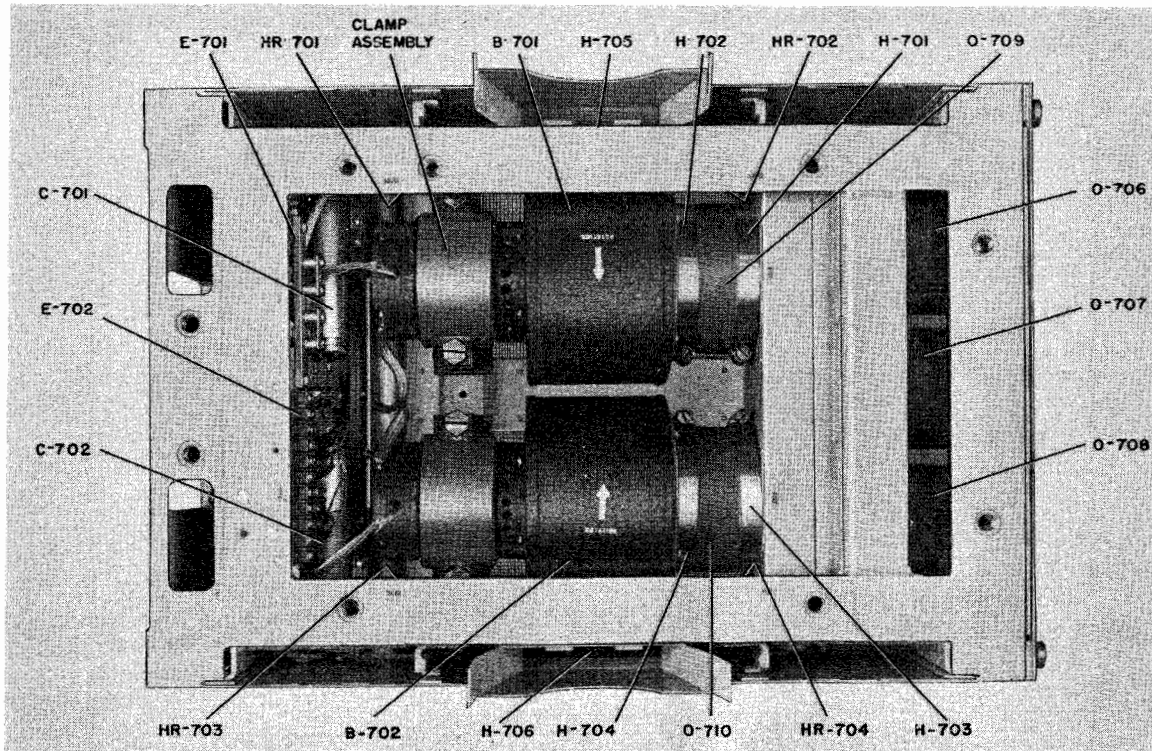


Figure 7-89. Mounting MT-1423/SRT, Top View

terminal boards and the rail assemblies more accessible. Figure 7-92 shows the location of components in the HLRM cabinet.

(b) REPLACEMENT.—To replace a part of the HLRM cabinet, reverse the removal procedure.

**15. CABINET, ELECTRICAL EQUIPMENT  
CY-1573/SRT (HVPS CABINET).**

a. TROUBLE LOCATION.—The extensible connecting cable assembly should be checked for continuity when the high voltage power supply (HVPS) does not operate with the interconnecting cables properly seated on the unit. When there is no three-phase power to the HVPS, and the HVPS fuses are known to be good, check r-f interference filters Z-1401, Z-1402 and Z-1403, located at the bottom of the HVPS frame.

**WARNING**

**SHIP'S POWER IS ALWAYS PRESENT ON  
TERMINAL BOARDS. TO REMOVE THIS  
VOLTAGE, POWER MUST BE TURNED  
OFF AT THE SHIP'S DISTRIBUTION  
PANEL.**

See figure 7-169 for the high voltage power supply cabinet wiring diagram.

b. REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—None.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—To remove the extensible cable support and spring assembly, loosen two screws on the supporting clamp and remove assembly. It is not necessary to remove the clamp block from the cabinet to remove the cable supports.

Remove the terminal board cover to reach the terminal boards. Removing the side panels of the HVPS cabinet will make the extensible cable assembly, terminal boards, and the rail assemblies more accessible. Figure 7-93 shows the location of components in the HVPS cabinet.

(b) REPLACEMENT.—To replace a part in the HVPS cabinet, reverse the removal procedure.

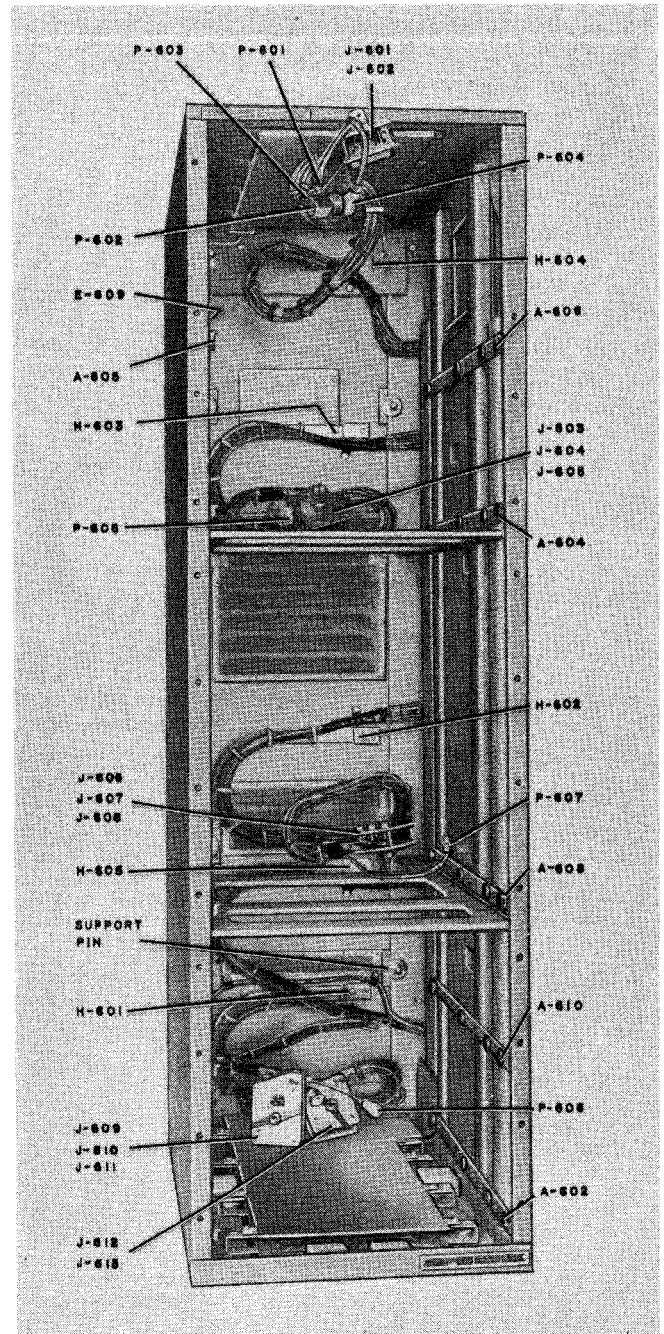
**16. ANTENNA TUNING EQUIPMENT.**

a. SYSTEM TROUBLE SHOOTING.—The antenna tuning equipment consists of Radio Frequency Tuner TN-229/SRT and Antenna Coupler CU-372/SRT. Control-Indicator C-1352/SRT and Transmitter Coupler CU-402/SRT are also used with the antenna tuning equipment but are part of Transmitter Group OA-684/SRT.

The antenna tuning equipment should provide a standing wave ratio (SWR) of better than 4:1. Section 4, in conjunction with the antenna tuning chart mounted on the RFO panel of the transmitter, indicates switch and control settings for the antenna tuning

equipment at different transmitter frequencies when a 35-foot whip antenna is used. If their settings do not provide a proper SWR, use the antenna tuning equipment trouble-shooting chart, table 7-40, to localize the probable source of trouble to a specific unit. It is assumed, in the following trouble location procedures, that the transmitter bay is operating satisfactorily; the primary concern is with defects within the antenna tuning equipment.

The trouble-shooting chart, table 7-40, is to be used by observing visual indications of the control-indicator



**Figure 7-90. Electrical Equipment Cabinet CY-1571/  
SRT (100 W. Frame), Units Removed, Front View**

unit and aural indications of motor noises in the r-f tuner and antenna coupler, without the aid of test equipment.

When trouble has been localized to a particular unit, refer to the trouble location information for that unit. If a defect or trouble is located, or a suspected defect or trouble is indicated, then the testing and alignment instructions for a particular unit are to be followed to locate the suspected defective component or stage.

**Note**

A visual inspection of each unit should be made. Check all plugs, receptacles, wiring, solder joints and grounds. Plugs and receptacles should be tightly connected. Adapters on first extrusion cables should be securely fastened by the setscrews. (After inspection, replace tape on adapters.) Make sure that no short or open circuits exist in the wiring and that all solder joints and grounds are secure.

*b.* TEST AND ALIGNMENT.—The test and alignment instructions in the succeeding paragraphs are to be followed only after the trouble location procedure has indicated a defective unit or subassembly.

Refer to figure 7-116 for a simplified control circuit of the r-f tuner and antenna coupler. Reference should also be made to unit schematics, wiring diagrams and component identification illustrations.

**17. TRANSMITTER COUPLER CU-402/SRT (LOAD ADJUST UNIT).**

(See figure 7-94.)

*a.* TROUBLE LOCATION.—The Transmitter Coupler CU-402/SRT (load adjust unit) function is to improve the impedance match between the radio frequency amplifier and the antenna tuning equipment. If all of the transmitter and antenna tuning operations have been followed, and a proper standing wave ratio (SWR) cannot be obtained, trouble may exist in the transmitter coupler, provided it has been determined that the antenna coupler and r-f tuner are operating properly as determined by the trouble-shooting chart, table 7-40.

Autotransformer T-3201, switches S-3201 (V) and S-3202 (W), and r-f ammeter M-3201 comprise the impedance matching circuit. If switches (V) and (W) do not operate properly at all of the settings, the impedance matching circuit components and the contacts on the switch wafers should be checked for continuity.

Standing wave ratio (SWR) monitor Z-3201 detects and monitors the transmission line SWR in conjunction with Control-Indicator C-1352 SRT, mounted on the radio frequency oscillator front panel.

When a proper SWR cannot be obtained, and the components in the control-indicator, antenna coupler, and r-f tuner are known to be functioning properly, trouble may exist in the SWR monitor Z-3201 circuit.

**TABLE 7-40. ANTENNA TUNING EQUIPMENT TROUBLE-SHOOTING CHART**

| CONDITIONS  | NORMAL INDICATIONS  | PROBABLE SOURCE OF ABNORMAL INDICATIONS  |
|---|---|--|
| Rotate TRANSFORMER knob (A).                              | Motor noise in r-f tuner.   | Motor B-303 in r-f tuner.  |
| Rotate ANTENNA COUPLER LOADING knob (B).                  | Motor noise in antenna coupler.   | Motor B-3501 in antenna coupler.   |
| Indication on POSITION meter.                             | 0 to 100 depending on position of r-f tuner sliding short. Motor noise.                   | Potentiometer R-301. Drive motor B-301 in r-f tuner.   |
| Operate ANTENNA TRANSFER switch (C).                      | Motor noise in antenna coupler.   | Motor B-3502 in antenna coupler.   |
| Indication on SWR BALANCE meter.                          | LOW or HIGH, depending on SWR.  | SWR monitor circuit Z-3201 in transmitter coupler.   |
| Rotate SWR CALIBRATE knob (D).                            | Greater indication approaching position 2:1.  | R-410, R-412; R-414, R-415 and R-416 in control-indicator unit.  |
| ANTENNA TRANSFER switch (E) to TUNER IN.                  | TUNER IN indicator lamp I-401 lights.   | ANTENNA TRANSFER SWITCH (E). TUNER IN indicator lamp I-401.  |
| Depress UP switch (F) and then DOWN switch (G).           | POSITION meter indicates up (towards 100) and down (towards 0) position.                  | Main drive motor B-301. Clutch-brake assembly O-301 in r-f tuner.  |
| Depress UP switch (F).                                    | One-way scanning time from 0 to 100 on POSITION meter should be approximately 22 seconds. | Main drive motor B-301. Clutch-brake O-301 adjustment.   |
| Depress UP switch (F) and SLOW switch (H) simultaneously. | One-way scanning time from 0 to 100 on POSITION meter should be approximately 52 seconds. | Main drive motor speed limiting governor S-307. R-302 and C-301 in governor circuit of B-301 in r-f tuner. |

(1) **ELECTRICAL ADJUSTMENTS.**— Standing wave ratio (SWR) monitor Z-3201 in the transmitter coupler is a critical electrical component. If possible, it should be replaced as a unit when it is known to be faulty. However, if replacements are not available, and operation is essential, an experienced technician, with adequate test facilities, may use the following procedure to repair unit Z-3201.

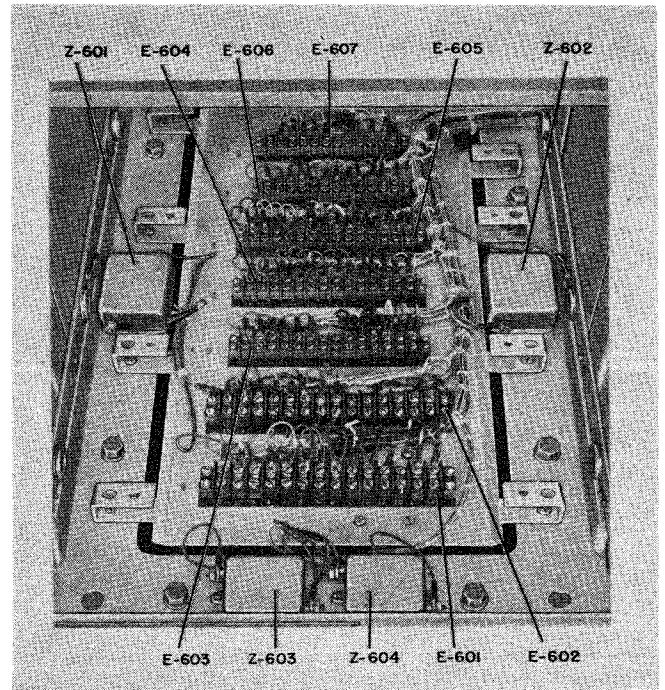
**CAUTION**

Repair should not be attempted by inexperienced personnel or without adequate test facilities, as these procedures are outlined for base depot use *only*.

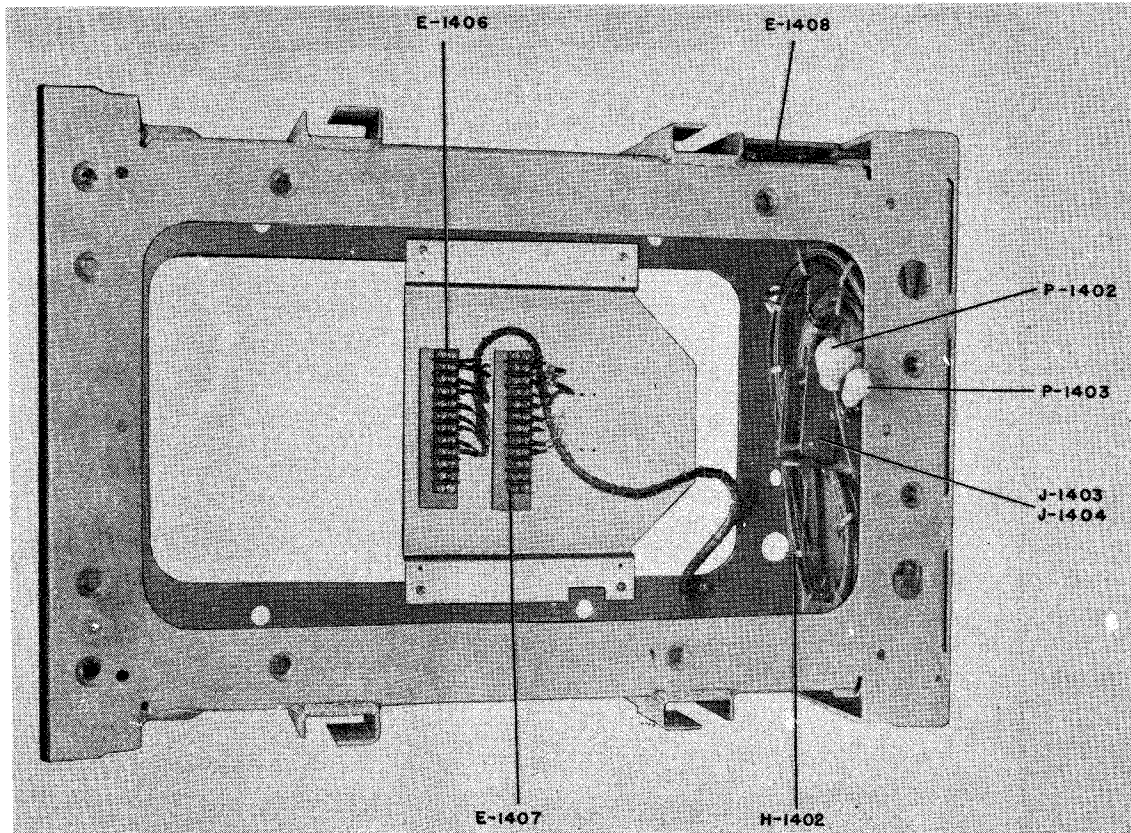
**Note**

When soldering components in Z-3201, hold leads with a heat conducting device, such as pliers, to avoid damage to Z-3201 due to heat. Replace components in exactly the same physical location as the original part to assure constant distributed capacity in circuit.

Switches S-3201 (Ⓜ), S-3202 (Ⓜ) and transformer T-3201 may be checked by making a continuity check, using Multimeter ME-25A/U (or equivalent), in conjunction with the schematic, figure 7-174, and wiring diagram, figure 7-175.



**Figure 7-91. Electrical Equipment Cabinet CY-1571/SRT (100 W. Frame), Cover Removed Showing Terminal Boards**



**Figure 7-92. Electrical Equipment Cabinet CY-1572/SRT (HLRM Frame), Side Covers Removed, Top View**

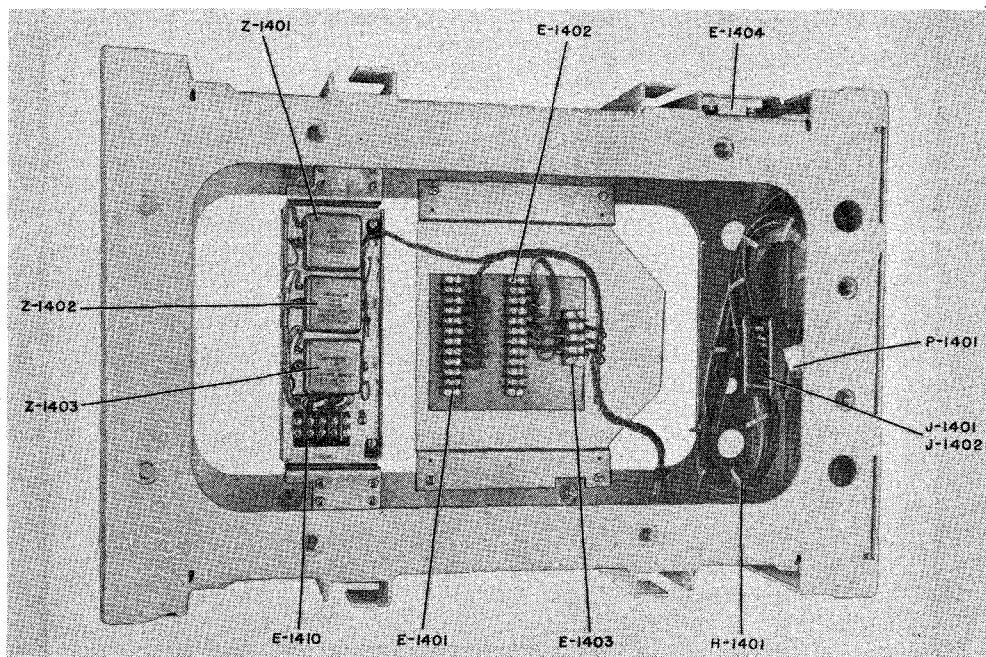


Figure 7-93. Electrical Equipment Cabinet CY-1573/SRT (HVPS Frame), Side Covers Removed, Top View

(a) VOLTAGE DIVIDER R-3201.—Whenever a component is replaced in voltage divider R-3201, the following procedure must be observed:

**Note**

Protect resistors from heat when soldering.

*Step 1.* On Resistance Bridge ZM-4/U, measure resistance from point E (figure 7-174) to point F. This value must be between 3,875 and 4,280 ohms. Correct if necessary by changing the 510-ohm resistor nearest to point E.

*Step 2.* Measure resistance of each of the arms (1,000-ohm resistors, point F to point G, and point F to point H on figure 7-174). Resistance of each arm must be within 3,800 or 4,200 ohms. Resistance of arm F to G must be within 120 ohms of resistance of arm F to H. To correct, change resistor in either arm nearest to point G or H.

(b) R-3206 AND R-3207.—Whenever R-3206 or R-3207 is replaced, the selection of these components must be determined with the following test equipment:

R-f source, 50 watts at 3.0 mc. The AN/SRT-14, 15 and 16 may be used as an r-f source, by detuning the radio frequency amplifier (RFA) to provide the required r-f output.

Dummy Load DA-91/U.

Two test potentiometers consisting of 500-ohm, 1/2-watt potentiometers, good at 3.0 mc (Centralab Model 1 Hi-Torque Radiohm, or equivalent) in series with 100-ohm 1/2-watt resistors.

D-c Microammeter, Navy type 60107.

Four-pole two-position (4PDT) switch, assembled with two 5,100-ohm, 1/2-watt and one 100-ohm, 1/2-watt fixed resistors, assembled as shown in figure 7-95.

Proceed as follows to replace R-3206 and R-3207:

*Step 1.* Connect test potentiometer assemblies (500-ohm potentiometer and 100-ohm fixed resistor) for R-3206 and R-3207, keeping lead length as short as possible. Adjust potentiometer to near maximum resistance.

*Step 2.* Feed approximately 50 watts rf at 3.0 mc into monitor at A with Dummy Load DA-91/U on

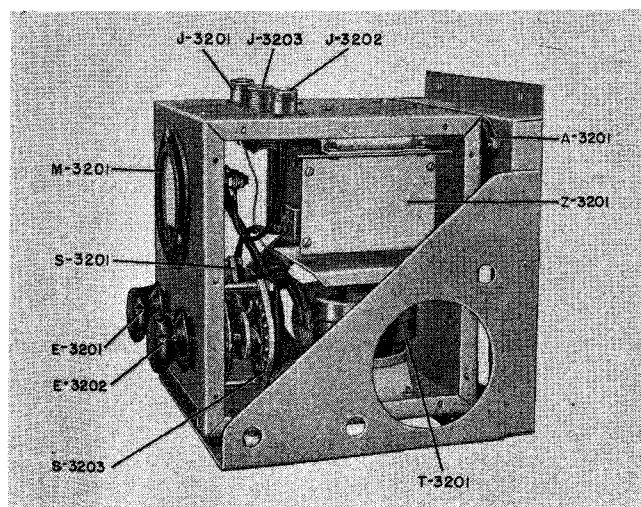


Figure 7-94. Transmitter Coupler CU-402/SRT, Side Covers Removed, Right Inner View



output at B and 4PDT switch in REFL position. Adjust potentiometer in place of R-3207 to give minimum output from terminal C as indicated on microammeter. This should be less than 5 microamperes and as close to zero as possible.

*Step 3.* Reverse monitor connections, feeding approximately 50 watts rf at 3.0 mc into monitor at B with Dummy Load DA-91/U at A, and 4PDT switch in INC position. Adjust potentiometer in place of R-3206 to give minimum output from terminal D as indicated on microammeter. This should be less than 5 microamperes and as close to zero as possible. Remove test potentiometer assemblies and measure resistance of each on Resistance Bridge ZM-4/U. Replace each with selected fixed resistor whose actual resistance is within 1 percent of the respective value measured. This may necessitate paralleling two 1/2-watt resistors, in which case select one resistor whose measured resistance is slightly above (within 35 ohms) the required value. Determine parallel resistance necessary to bring total resistance to required value as follows:

$$X = \frac{A B}{A+B}$$

where

- A = resistance available
- B = total resistance required
- X = parallel resistance

Choose for X a 1/2-watt resistor whose value is as close to X as possible within 10 percent below calculated value.

(c) TRANSFORMER T-3202 LOADING CIRCUIT (R-3202, R-3203 AND R-3204, R-3205).—The selection of these resistor combinations (R-3202, R-3203 and R-3204, R-3205) should be such that they will be within 1 ohm of each other, as measured by means of Resistance Bridge ZM-4/U.

(d) MATCHING PROCEDURE FOR CRYSTAL DIODES.—Use the following test equipment for matching crystal diodes:

**CAUTION**

Repair should not be attempted by inexperienced personnel, or without adequate test facilities, as these procedures are outlined for base depot use *only*.

Signal generator, 0.3 and 26.0 mc, AN/URM-25 (or equivalent).

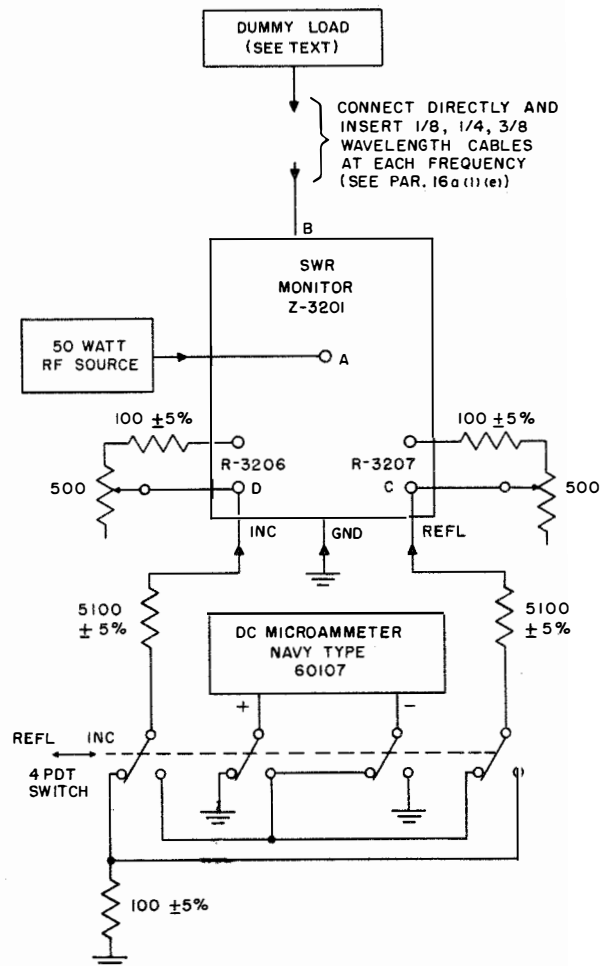
Multimeter ME-25A/U, (or equivalent)

D-c Microammeter, Navy type 60107 (or equivalent)

5,600-ohm  $\pm 5\%$ , 1/2-watt fixed carbon resistor  
0.15  $\mu$ f fixed, 200-vdcw, paper capacitor

**Note**

Before matching, crystals must be aged by heating at 100°C. (212°F.) and maintain this temperature for one hour.



**Figure 7-95. Standing Wave Ratio (SWR) Monitor Alignment, Test Setup**

*Step 1.* Connect equipment as shown in figure 7-96.

*Step 2.* Apply maximum r-f voltage from the AN/URM-25, as indicated in figure 7-96, with crystal diode in place. Measure and record d-c current on microammeter, Navy Type 60107, to nearest 5 microamperes. Compare the diode currents at 0.3 mc, and then compare the diode currents at 26 mc. Keep the AN/URM-25 output the same at both 0.3 mc and 26 mc.

*Step 3.* Select pairs of crystals for CR-3201 and CR-3202 that are within 10 microamperes at both 0.3 mc and 26.0 mc.

(e) FINAL TEST TO BE PERFORMED WHEN SWR MONITOR Z-3201 IS REPLACED IN TRANSMITTER COUPLER CU-402/SRT.—The following additional test equipment is required:

RG-8/U, 1/4 and 1/8 wavelength cables, constructed as follows:

Cut 3/8 wavelength of cable for 2.0 mc (122 feet), 8.0 mc (30.5 feet) and 25.0 mc (9.75 feet). Cut 1/3 off total length of 3/8 wavelength cables and term-

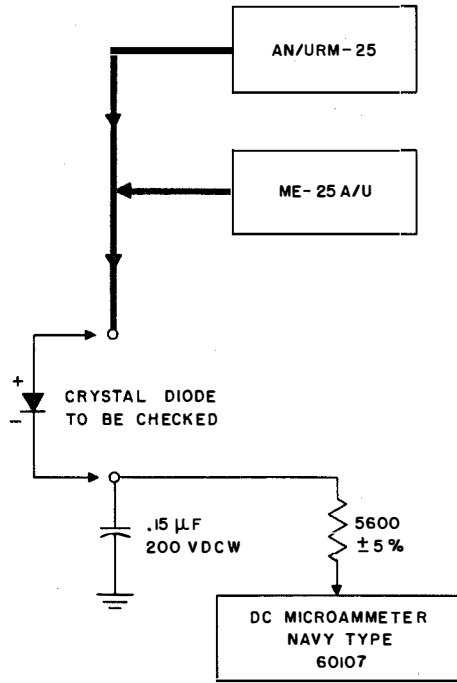


Figure 7-96. Crystal Matching, Test Setup

inate each cable. Measure 1/4 wavelength cable with Radio Frequency Bridge, Navy Type 60094 (or equivalent), shifting frequency slightly to determine point of "O" reactance—perform for each frequency (1/8 wavelength cable will be correct for same frequency). Use these frequencies in the test. Attach proper connectors as required.

R-f source, 50 watts at 2.0, 8.0, and 25.0 mc. (The AN/SRT-14, 15 or 16 may be used, by detuning RFA stages.)

Dummy Load DA-91/U. Four required, with proper connectors to connect four in parallel.

Refer to figure 7-95, and proceed as follows:

Set r-f source in turn to each frequency determined for cable lengths (nominally 2, 8, and 25 mc). Perform the following at each frequency, using four dummy loads in parallel:

**Step 1.** With load directly on monitor r-f output (B of Z-3201), 4PDT switch in REFL position, read current on microammeter. Switch 4PDT to INC position and read microammeter. Calculate standing wave ratio (SWR) and record.

$$SWR = \frac{INC + REFL + 106}{INC - REFL}$$

**Step 2.** Insert 1/8 wavelength cable between monitor and load and proceed as in step 1.

**Step 3.** Insert 1/4 wavelength cable between monitor and load and proceed as in step 1.

**Step 4.** Insert 3/8 wavelength cable between monitor and load and proceed as in step 1.

**Limits:** Indicated SWR must be between 3:1 and 6:1.

(2) MECHANICAL ADJUSTMENTS.—There are no mechanical adjustments in Transmitter Coupler CU-402/SRT.

(a) REMOVAL AND REPAIR.—The transmitter coupler, figure 7-94, may be removed from the mounting bracket as follows:

**Step 1.** Disconnect cables to J-3201, J-3202, and J-3203.

**Step 2.** Remove screws supporting shock mounts to mounting bracket.

All components in the transmitter coupler are accessible by removing both side panels on unit.

(b) REPLACEMENT.—To reassemble the transmitter coupler, reverse the disassembly procedures. No lubrication is necessary in the transmitter couplers.

## 18. ANTENNA COUPLER CU-372/SRT.

(See figure 7-97.)

### a. TROUBLE LOCATION.

(1) GENERAL.—After isolating trouble to the antenna coupler by using the antenna tuning equipment trouble location chart, table 7-40, a further check of the antenna coupler may be performed to localize the trouble to either the bypass section or the loading section of the antenna coupler.

A circuit check of the antenna coupler may be accomplished as a bench test by supplying 115 volts ac and 24 volts dc to actuate the switches in the antenna coupler, and checking for continuity through the switch contacts.

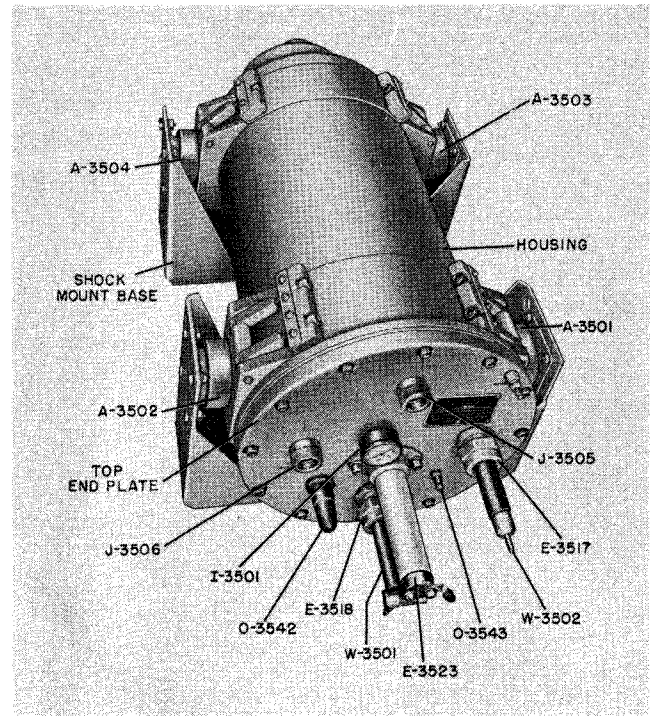
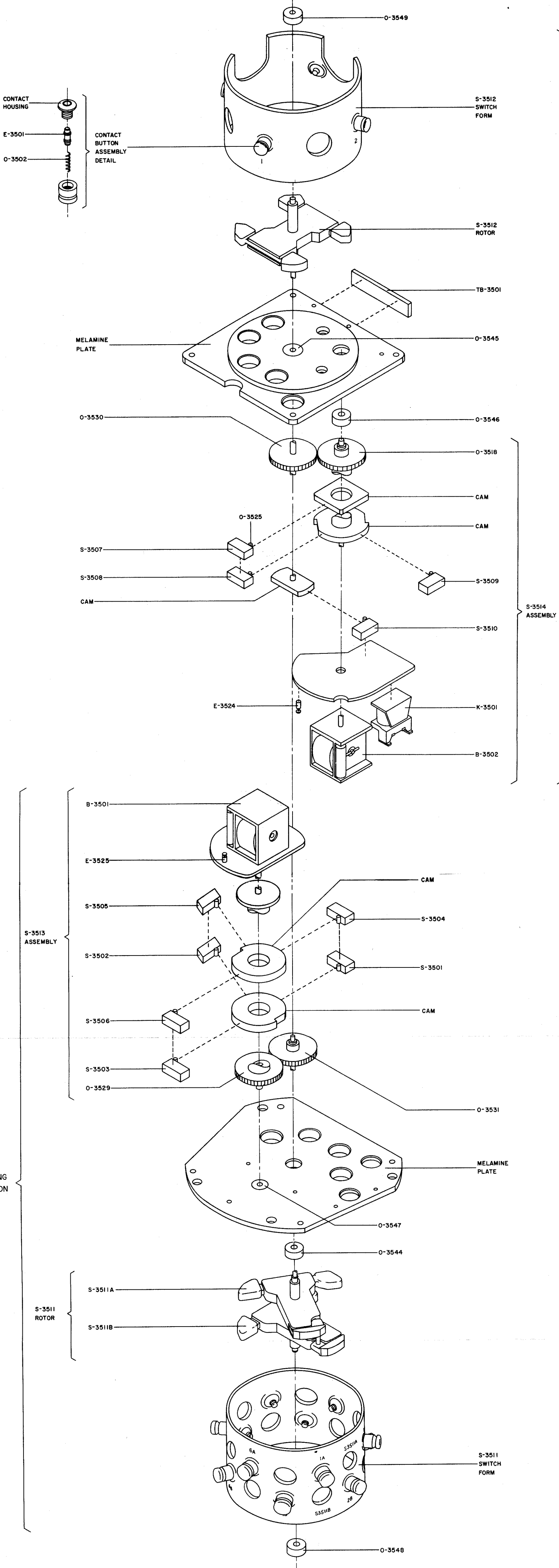


Figure 7-97. Antenna Coupler CU-372/SRT, with Housing and Shock Mounts



BYPASS SECTION

S-3514 ASSEMBLY

S-3513 ASSEMBLY

LOADING SECTION

S-3511 ROTOR

CORRECTIVE MAINTENANCE

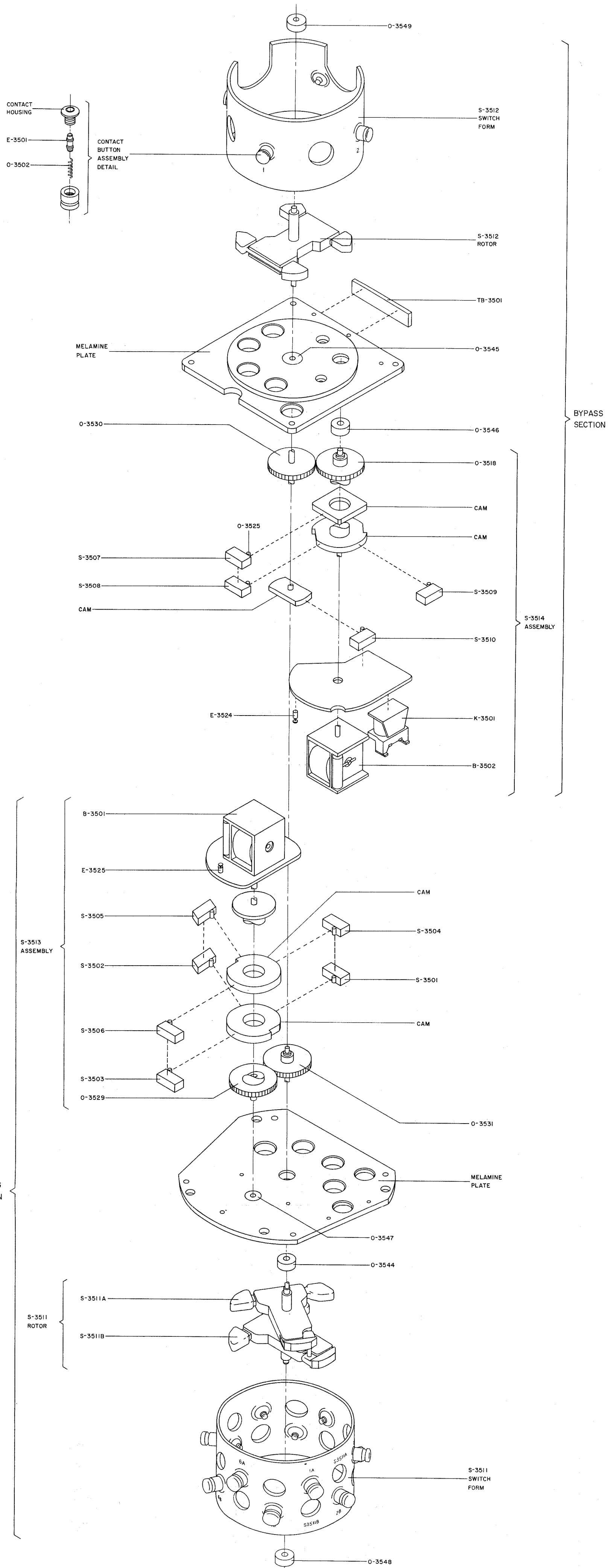
NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

Section 7

Figure 7-98. Antenna Coupler CU-372/SRT, Mechanical Drives

ORIGINAL

7-113



ORIGINAL

Figure 7-98. Antenna Coupler CU-372/SRT, Mechanical Drives

It is not necessary to disassemble the antenna coupler for these circuit checks, as measurements and connections are made directly at the pins on the receptacles of the antenna coupler assembly. Refer to the schematic, figure 7-170, and wiring diagram, figure 7-171, sheets 1 and 2.

**(2) TROUBLE SHOOTING THE ANTENNA COUPLER BYPASS SECTION, SWITCH ASSEMBLY S-3514, AND SWITCH S-3512.**

Power requirements: 115 volts ac, 24 volts dc.

*Step 1.* Connect one side of 115 volts ac to pin V of J-3504.

*Step 2.* Connect other side of 115 volts ac to pin U of J-3504 and check for continuity by connecting Multimeter ME-25A/U between FROM SWR MONITOR and TO ANTENNA terminals of the antenna coupler. Zero ohms indicates continuity between contacts 1 and 4 of switch S-3512.

*Step 3.* Check for continuity between pins A and B of J-3502. This indicates that switch S-3507 is operating properly.

*Step 4.* Check for open circuit between pins C and N of J-3502. No reading on the multimeter indicates switch S-3510 is operating properly.

*Step 5.* Apply 24 volts dc to pin M of J-3502 and the antenna coupler ground terminal, thereby operating relay K-3501. At this point, with 115 volts ac still connected to pin U of J-3504, motor B-3502 should rotate switch S-3512.

*Step 6.* Check for continuity between TO RF TUNER and FROM SWR MONITOR terminals of the antenna coupler. Zero ohms indicates that contacts 3 and 4 of S-3512 are properly shorted by S-3512 rotor.

*Step 7.* Check for continuity between pins A and B of J-3502. This checks switch S-3507.

*Step 8.* Check for continuity between pins C and N of J-3502. This checks switch S-3510.

**(3) TROUBLE LOCATION OF THE ANTENNA COUPLER LOADING SECTION, SWITCH ASSEMBLY S-3513, AND SWITCH S-3511.**

Power requirements: 115 volts ac.

**Note**

The following steps to be performed only after step 5 of paragraph 18a(2) has been completed.

*Step 1.* Connect one side of 115 volts ac to pin V of J-3501.

*Step 2.* Connect other side of 115 volts ac to pin A of J-3504. Motor B-3501 should actuate rotor of switch S-3511.

*Step 3.* Connect Multimeter ME-25A/U (or equivalent) between TO ANTENNA and FROM RF TUNER terminals of the antenna coupler. Zero ohms at this point will indicate continuity between contacts 1 and 2 of switch S-3512 and contacts 1A and 2B of switch S-3511.

*Step 4.* Apply 115 volts ac to pin F of J-3504. Zero ohms, as indicated on the multimeter, shows continuity between contacts 2A, 4A, 6A and 1B of switch S-3511.

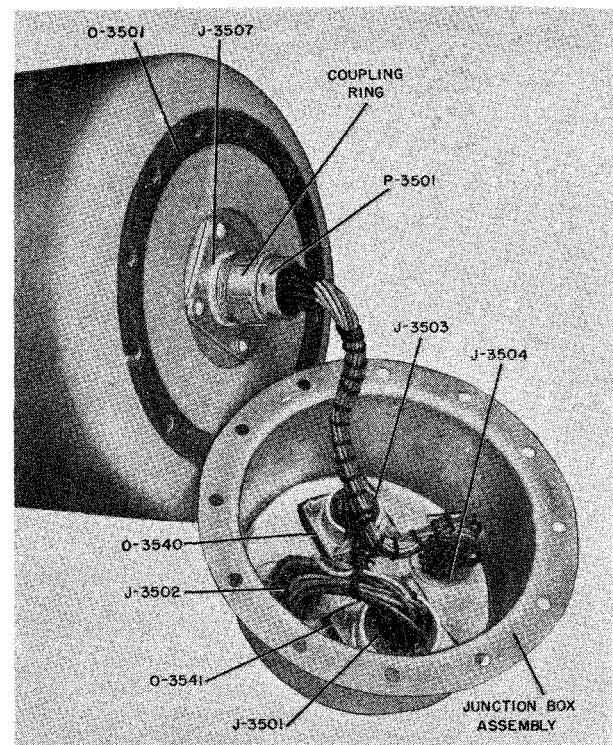
*Step 5.* Apply 115 volts ac to pin E of J-3504. Meter should still show zero ohms. This checks contacts 2B, 4B, 3A, and 1A of switch S-3511.

*Step 6.* Apply 115 volts ac to pin C of J-3504. The meter should now read infinity (no reading). This checks capacitor C-3501. A meter reading would indicate a possible shorted capacitor, C-3501. At this point disconnect meter lead at FROM RF TUNER terminal and connect instead to the antenna coupler ground. No reading on meter indicates that capacitors C-3502 and C-3503 are not shorted.

**Note**

Remove meter lead from ground and return to FROM RF TUNER terminal.

*Step 7.* Apply 115 volts ac to pin D of J-3504. Zero ohms on the meter indicates that contacts 2B, 6B, 1A, and 5A of S-3511 are properly engaged with rotor of S-3511.



**Figure 7-99. Antenna Coupler CU-372/SRT, Junction Box Assembly**

Step 8. Apply 115 volts ac to pin B of J-3504. No reading on meter indicates that capacitor C-3501 is not shorted. At this point, contacts 4A, 6A, 1B, 6B, 2A, and 3B are engaged by S-3511 rotors.

**b. REPAIR AND ADJUSTMENT.**

(1) ELECTRICAL ADJUSTMENTS.—There are no electrical adjustments in the antenna coupler.

(2) MECHANICAL ADJUSTMENTS.

(a) REMOVAL AND REPAIR.—If the results of the trouble location procedures indicated in paragraph 18a point to a defective component or adjustment in the antenna coupler, the disassembly procedures should be followed step by step.

**WARNING**

ANTENNA COUPLER CU-372/SRT IS PRESSURIZED WITH PREPURIFIED DRY NITROGEN. IF DISASSEMBLY OF THE UNIT, OTHER THAN THE MOUNTING EQUIPMENT OR THE JUNCTION BOX ASSEMBLY, IS REQUIRED, THE PRESSURE MUST FIRST BE RELEASED. THIS IS ACCOMPLISHED BY PULLING EXHAUST RELIEF VALVE STEM O-3542 (FIGURE 7-97) AND RELEASING THE GAS WITHIN THE UNIT UNTIL PRESSURE GAUGE I-3501 READS ZERO PSI.

**CAUTION**

The antenna coupler weighs approximately 100 pounds. Provide adequate support when working on the unit. During disassembly, keep the unit away from moisture, dirt or other foreign matter.

**1. REMOVAL OF UNIT FROM SHOCK MOUNT BASES.**

(See figure 7-97.)

Step 1. Remove all grounding straps and interconnecting cables from the antenna coupler assembly.

Step 2. Remove the 16 screws supporting the four shock mounts to their bases.

**CAUTION**

Handle the antenna coupler with care so as not to damage any of the components, which protrude from either end of the unit. The unit must be removed from permanent location and brought into a protected work area if complete disassembly is to be performed.

**2. REMOVAL OF JUNCTION BOX.**

(See figure 7-99.)

Step 1. Remove the 12 screws supporting the ring which clamps the junction box assembly to the housing.

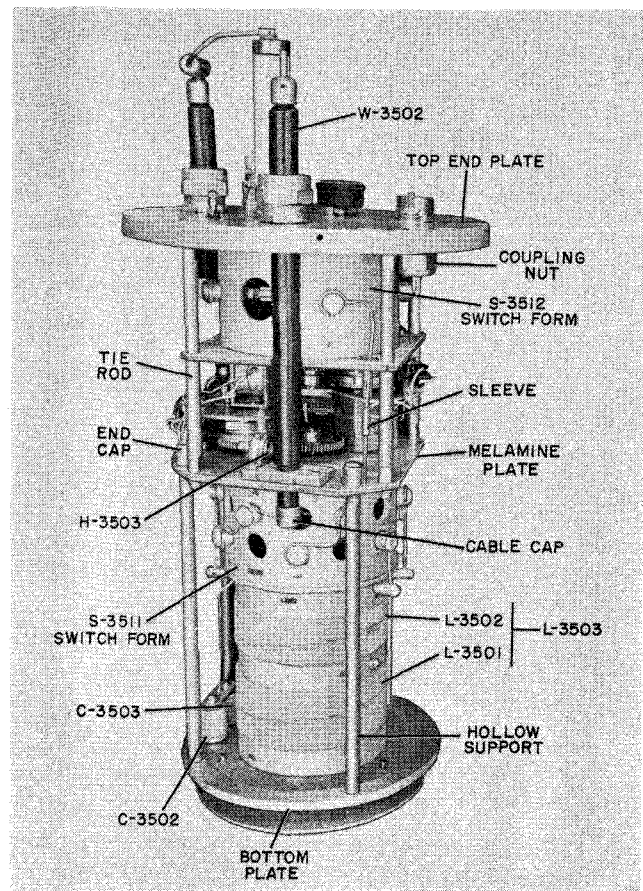


Figure 7-100. Antenna Coupler CU-372/SRT, Less Housing

Step 2. Disconnect plug P-3501 from connector J-3507, mounted on housing, by unscrewing the coupling ring.

Step 3. A circuit check of wiring in the junction box may be accomplished by referring to the wiring diagram, figure 7-171 (sheet 2).

**Note**

To remove J-3502 or J-3504, the receptacles must be unsoldered from the junction box assembly.

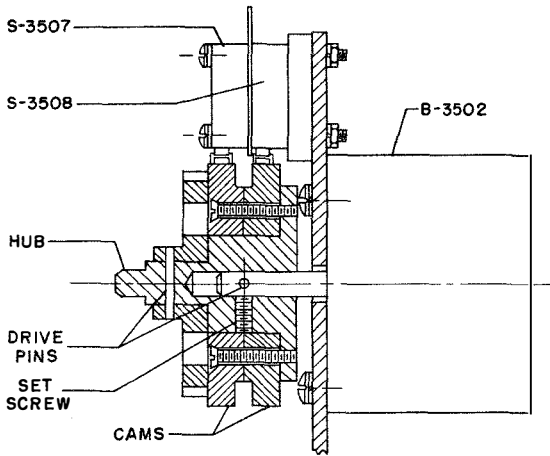
**3. REMOVAL OF HOUSING.**

(See figure 7-97.)

Step 1. Discharge dry nitrogen gas in the unit by pulling the stem on relief valve O-3542 until pressure gauge I-3501 reads zero. Valves O-3542, O-3543 and pressure gauge I-3501 may be removed by unscrewing them from the top end plate.

**Note**

Place register marks on both housing and end plate to facilitate reassembly.



**Figure 7-101. Cross Section of S-3514 Assembly**

*Step 2.* Remove the 12 screws supporting the end plate at the top of the unit.

*Step 3.* The housing and unit may be separated by axially removing one from the other. Note that the housing remains mounted in the shock mount assemblies. At this point the inner components of the antenna coupler are accessible (figure 7-100).

*Step 4.* Receptacles and terminals may be removed from the top end plate of the unit by unsoldering leads and loosening coupling nut or screws fastening receptacle to end plate. "O" rings, associated with receptacles, may also be removed.

**4. REMOVAL OF LOADING SECTION FROM UNIT.**

(See figures 7-98 and 7-99.)

*Step 1.* Unsolder sleeve (figure 7-100) and slide sleeve back on conductor.

*Step 2.* Loosen cable cap on cable W-3502.

*Step 3.* Two laced cables, which run from J-3507 through two of the hollow supports to terminal board TB-3501, must be disconnected from the terminal board.

**Note**

Color coding of wires on both sides of terminal board TB-3501 are identical, thereby facilitating reconnections.

*Step 4.* Remove the hex nuts on the four tie rods.

**CAUTION**

The sections should be separated axially; be careful all components clear one another.

**5. DISASSEMBLY OF BYPASS SECTION.**

—If trouble location procedures indicate trouble with the bypass switch or drive mechanism, a step-by-step disassembly procedure must be followed. Refer to figures 7-98 and 7-100.

*Step 1.* Separate switch assembly S-3514 and melamine plate from S-3512 switch form by removing the four tie rods supporting the melamine plate.

*Step 2.* At this point, stator contacts on switch form of S-3512 may be removed and replaced by using the special tool, H-3503, mounted on the unit (figure 7-100). Contact button assemblies may be removed, allowing contact E-3501 or spring O-3502 to be replaced. See contact button assembly detail of figure 7-98.

*Step 3.* S-3514 assembly may be removed from the melamine plate by removing the screws in S-3514 assembly spacers.

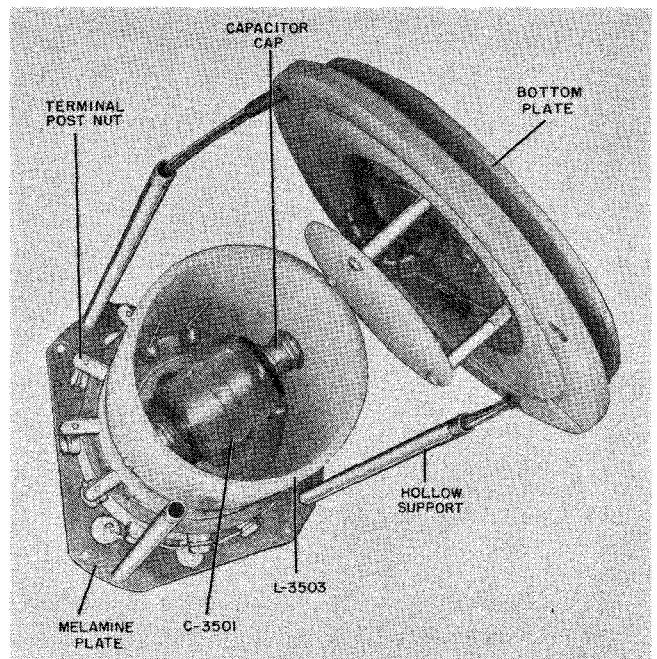
*Step 4.* Spur gears O-3530 and O-3518 and their associated cams may be removed by knocking out the pins and loosening the setscrews.

*Step 5.* Switches actuated by the cams and their actuators may be removed by first disconnecting the wires to the switch and then removing the screws supporting the switch to the mounting plate.

*Step 6.* Relay K-3501 is removed by unsoldering the leads and removing the four screws which mount the relay to the mounting plate.

*Step 7.* With the spur gear, O-3518, and the cams removed on S-3514 assembly, motor B-3502 may be removed and replaced. The hub, on motor B-3502 shaft, must be removed in order to replace motor B-3502, by knocking out the drive pin (figure 7-101) and loosening the setscrew.

**6. DISASSEMBLY OF LOADING SECTION.—**If trouble location procedures of paragraph



**Figure 7-102. Antenna Coupler CU-372/SRT, Loading Section**

18a indicate trouble exists in the loading section switch or drive mechanism, a step-by-step disassembly procedure should be followed. Refer to figures 7-98 and 7-100.

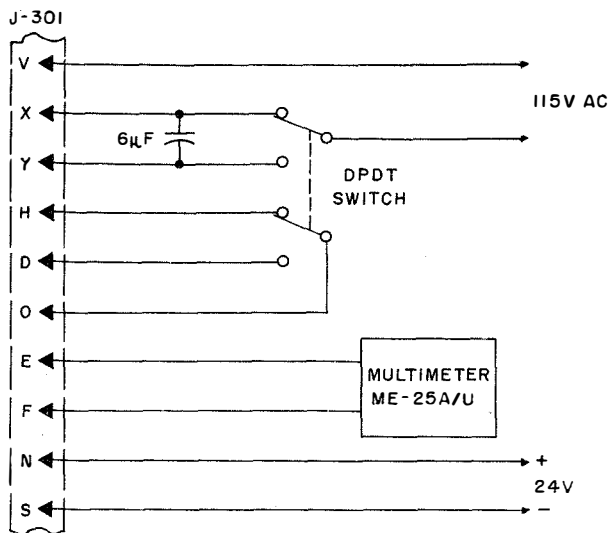
*Step 1.* Separate switch assembly S-3513 and melamine plate from S-3511 switch form by removing the end caps supporting the melamine plate to the four hollow supports.

*Step 2.* Contact buttons on S-3511 switch form may be removed and replaced by means of the special tool, H-3503, mounted on melamine plate. (See figure 7-100.)

*Step 3.* Switch assembly S-3513 is removed in the same manner as switch assembly S-3514. (See paragraph 18b(2)(a)5, step 4.)

*Step 4.* All the components in switch assembly S-3513 and S-3511 switch rotors are removed in the same manner as components in switch assembly S-3514 and S-3512 switch rotor. (See paragraph 18b(2)(a)5, steps 5, 6 and 8.)

**7. REMOVAL OF VACUUM CAPACITOR C-3501 AND COIL L-3503.—If trouble location pro-**



**Figure 7-104. R-F Tuner, Test Setup**

cedures indicate trouble with vacuum capacitor C-3501 or coil L-3503, a step-by-step disassembly procedure should be followed. (Refer to figures 7-100 and 7-102.)

*Step 1.* Loosen the end caps, figure 7-100, to allow the four hollow supports to be unthreaded from the bottom plate. The bottom plate and components mounted on it can now be hinged back on the three cables that pass through the hollow supports. (See figure 7-102.)

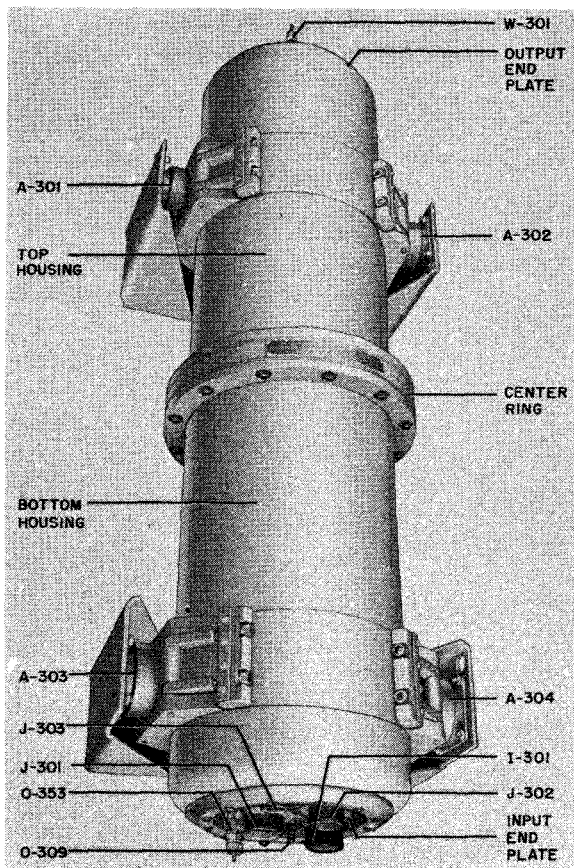
*Step 2.* Loosen setscrews on each of the eight terminal post nuts. This allows the coil and vacuum capacitor assembly to be separated from the switch form and melamine plate.

**(b) REPLACEMENT AND ADJUSTMENTS.**—All replaceable parts, assemblies and subassemblies of the antenna coupler are reassembled and replaced in reverse order from the procedures outlined in paragraph 18b(2) (a). The following general points in reassembly and replacement should be particularly noted:

1. Align register marks inscribed during disassembly procedures.
2. All setscrews, etc., which were fixed with glyptal should have glyptal reapplied to them prior to reassembly.
3. Stake both ends of replaced drive pins.
4. When replacing valves, cable terminals or pressure gauge on the end plate, recoat the threads with sealing compound.
5. If the tape has been removed from W-3501 and W-3502, it must be rewrapped with polyethylene electrical tape.

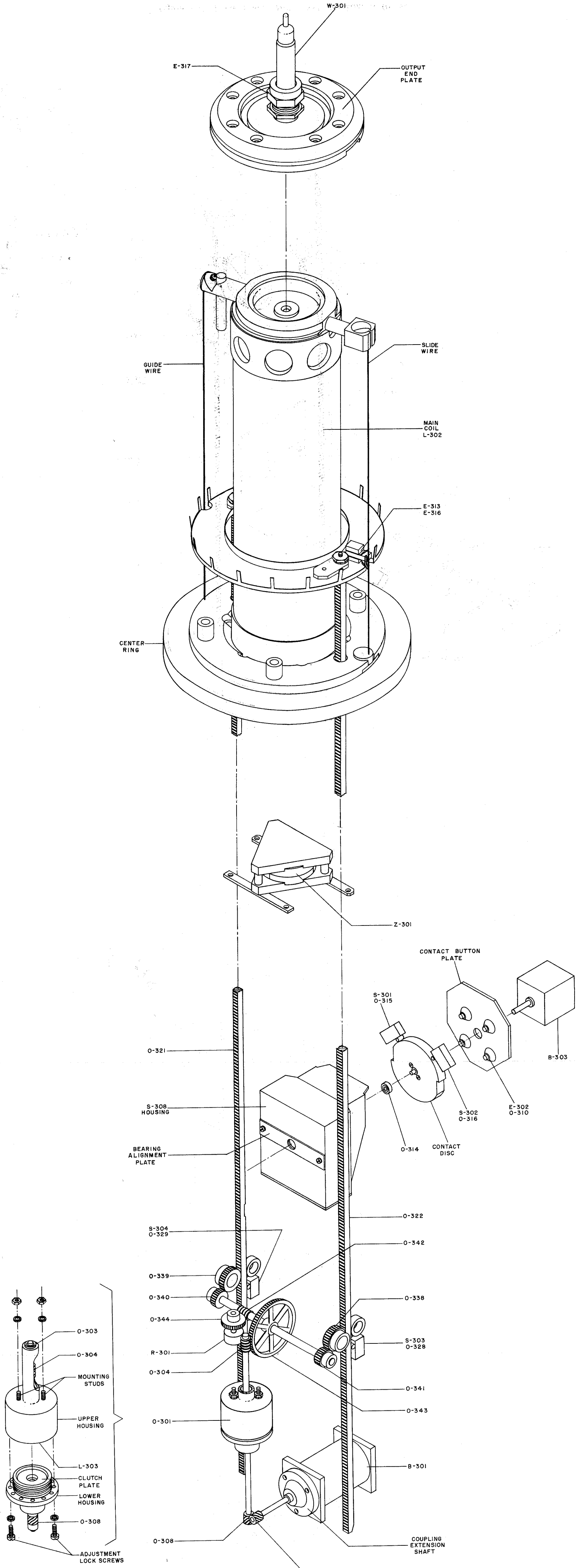
6. When reassembling or replacing components, refer to Section 6 for lubrication information.

**(c) BYPASS SECTION ALIGNMENT.**—Proper meshing of spur gears O-3530 and O-3518 is indicated when switches mounted on S-3514 switch as-



**Figure 7-103. R-F Tuner TN-229/SRT, with Housing and Shock Mounts**





ORIGINAL

CORRECTIVE  
MAINTENANCE

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

Section 7

Figure 7-105. R-F Tuner TN-229/SRT, Mechanical Drives

7-119

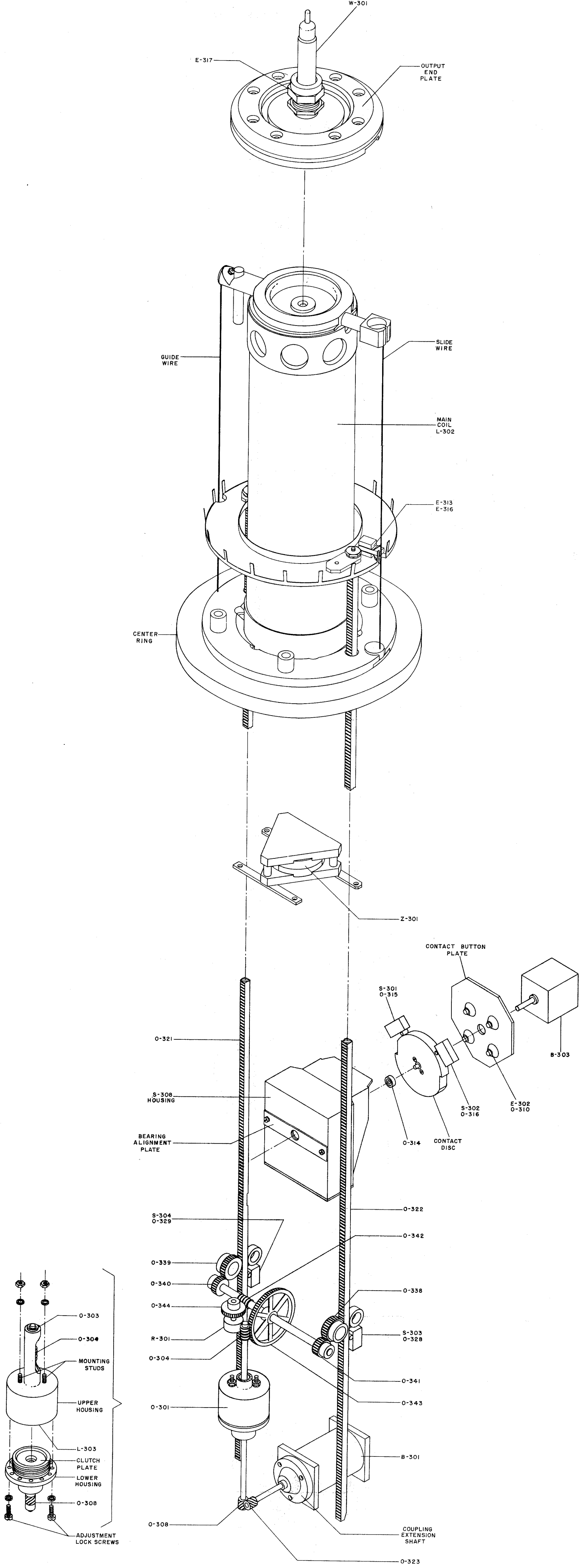


Figure 7-105. R-F Tuner TN-229/SRT, Mechanical Drives

**CORRECTIVE  
MAINTENANCE**

**NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A**

**Section 7  
Paragraph 18 b (2) (c)**

sembly are as follows: S-3507 and S-3510 actuated, and S-3509 not operated. When cams are in this position, S-3512 switch rotor should be in a position to connect contact buttons 1 and 2 together, and 3 and 4 together. S-3512 rotor contacts should be in exact center of contact button on S-3512 switch form, as observed through holes in switch form.

The cam adjacent to spur gear O-3518 is replaced and adjusted so that the center of the high side of the cam is in position to fully actuate switch S-3510 when switch S-3507 is actuated and switch S-3509 is not operated.

The cam next to O-3518 is installed so that switch S-3507 is actuated when S-3512 rotor is in exact center of contact button on S-3512 switch form.

The cam adjacent to S-3514 assembly mounting plate is installed so that switch S-3509 is not operated when switch S-3510 actuator is in the center of the high side of cam and S-3510 is actuated.

As a final check of proper synchronization of the bypass switch drive mechanism, the antenna coupler should be checked for both electrical and mechanical performance according to the procedures outlined in paragraph 18a.

**(d) LOADING SECTION ALIGNMENT.—**

Proper alignment of spur gears O-3529 and O-3531 is indicated when cam nearest drive motor B-3501 is in a position where roller actuator of switch S-3506 is fully relaxed and at the lowest part of the notch in the cam. At this position, rotor of switch S-3511A should be engaged in the center of contact buttons 2A, 4A, and 6A and rotor of switch S-3511B should be engaged in the center of contact buttons 1B, 3B, and 5B, as observed through holes in S-3511 switch form.

The cam adjacent to spur gear O-3529 is adjusted so that roller actuator of switch S-3503 is fully relaxed and at the bottom of the notch in the cam when the rotor of switch S-3511A is engaged in the center of contact buttons 1A, 3A, and 5A, and the rotor of switch S-3511B is engaged in the center of contact buttons 2B, 4B, and 6B on S-3511 switch form as observed through holes in S-3511 switch form.

As a final check of proper synchronization of the loading switch drive mechanism, the antenna coupler should be checked for both electrical and mechanical performance according to the procedures outlined in paragraph 18a.

**(e) PURGING AND PRESSURIZING.—**

After the antenna coupler is completely reassembled, the unit must be purged to eliminate moisture that may have accumulated during corrective maintenance procedures. The following steps are not for routine preventive maintenance where pressurization is required because of normal leakage, but rather for repressurizing when the unit has been opened for repair or adjustment purposes. The following equipment is required:

- Cylinder of prepurified dry nitrogen
- Regulator valve and gauges

Hose with proper fittings to connect needle valve of pressurizing equipment to the antenna coupler intake valve.

Refer to figure 7-109 for a typical pressurization and purging setup.

*Step 1.* Attach the hose from needle valve (1) to intake valve (2) of the unit to be purged and open cylinder valve (7).

*Step 2.* Adjust regulator valve (3) to deliver approximately 10 to 15 psi. Note total psi of cylinder at gauge (4).

*Step 3.* Open exhaust relief valve (5) on the unit by inserting tool in hole provided on the valve stem, pull stem against valve spring tension, and hold it in this position during purging.

*Step 4.* Purge the unit until the pressure gauge (4) shows a drop of 100 psi from total psi of cylinder noted in step 2.

*Step 5.* Release the stem on relief valve (5) and allow the prepurified dry nitrogen to enter until gauge (6) on the unit reads 20 psi.

**19. RADIO FREQUENCY TUNER TN-229/SRT.**

(See figure 7-103.)

**a. TROUBLE LOCATION.**

(1) GENERAL.—After isolating trouble to the r-f tuner, with the use of the antenna tuning equipment trouble-shooting chart, table 7-41, a further check of the r-f tuner may be performed to localize the trouble to either the main drive and sliding short section or the impedance transformer switch drive, motor B-303.

**TABLE 7-41. R-F TUNER TROUBLE LOCATION CHART**

| J-301       |           | RESISTANCE<br>IN<br>OHMS | PROBABLE SOURCE<br>OF ABNORMAL<br>INDICATIONS         |
|-------------|-----------|--------------------------|---|
| FROM<br>PIN | TO<br>PIN |                          |   |
| E           | G         | 10 K                     | Position indicator R-301                              |
| E           | F         | *                        | Position indicator R-301                              |
| F           | G         | *                        | Position indicator R-301                              |
| O           | N         | 17                       | Clutch-brake coil L-303                               |
| W           | X         | 200                      | Main drive motor B-301                                |
| W           | Y         | 200                      | Main drive motor B-301                                |
| X           | Y         | 400                      | Main drive motor B-301                                |
| V           | U         | 300                      | Blower motor B-302                                    |
| V           | T         | 800                      | Blower motor B-302                                    |
| U           | T         | 1200                     | Blower motor B-302                                    |
| W           | V         | 0                        | Centrifugal governor S-307                            |
| K           | L         | 0                        | Thermostatic switch S-305<br>Centrifugal switch S-306 |

\* Depends upon position of R-301.

A circuit check of the r-f tuner may be accomplished as a bench test by supplying 115 volts ac, and 24 volts dc to actuate the main drive mechanism and switches in the r-f tuner and checking for continuity through switch contacts and coils.

It is not necessary to disassemble the r-f tuner for these preliminary circuit checks. All measurements and connections are made directly at the pins on the receptacles of the r-f tuner assembly.

Refer to the trouble location chart, table 7-41, the schematic, figure 7-172, and the wiring diagram, figure 7-173.

(2) TROUBLE-SHOOTING THE MAIN DRIVE ASSEMBLY OF THE R-F TUNER.—As a preliminary trouble location check of the r-f tuner, use the trouble location chart, table 7-41, to localize probable source of trouble by means of abnormal resistance readings.

The following represents a more detailed method of localizing trouble in the r-f tuner after circuit checks have been made as indicated in table 7-41.

Power requirements: 115 volts ac, 24 volts dc.

Refer to figure 7-104 for test setup schematic, and connect a 6- $\mu$ f, 200-vdcw paper capacitor as indicated.

For purposes of a bench test to check main coil L-302 and sliding short assembly, substitute the drive motor phase shift capacitor (mounted in the control-indicator unit) with a 6- $\mu$ f, 200-vdcw paper dielectric capacitor across pins X and Y of J-301 (figure 7-104).

Connect a double-pole, double-throw switch, Multimeter ME-25A/U (or equivalent), 115 volts ac and 24 volts dc to the pins on J-301 of the r-f tuner as shown in figure 7-104, r-f tuner test setup diagram.

Operate the DPDT switch; main drive motor B-301 will operate, and the sliding short assembly will travel to the end of coil L-302, causing limit switch to operate, actuating clutch-brake O-301. Reversing the DPDT switch will cause the sliding short assembly to reverse direction. Scanning speed and direction may be checked by observing the pointer movement of Multimeter ME-25A/U. Set multimeter on the proper resistance scale so that position indicator potentiometer R-301 reads from zero to 10,000 ohms.

To check continuity of main coil L-302, connect Multimeter ME-25A/U (or equivalent), using lowest resistance scale, to W-301 and the r-f tuner ground terminal. W-301 is the first extrusion cable at the top of the r-f tuner assembly, figure 7-103.

**Note**

Zero adjust Multimeter ME-25A/U accurately, as full resistance of coil L-302 is only 0.5 ohm.

Operate the DPDT switch so that the sliding short runs alternately to the top and bottom of L-302, and note deviation in reading of multimeter.

Reading should vary from zero ohms to approximately 0.5 ohm. A large variation of multimeter pointer movement would indicate a possible damaged coil, L-302, or a defective sliding short assembly.

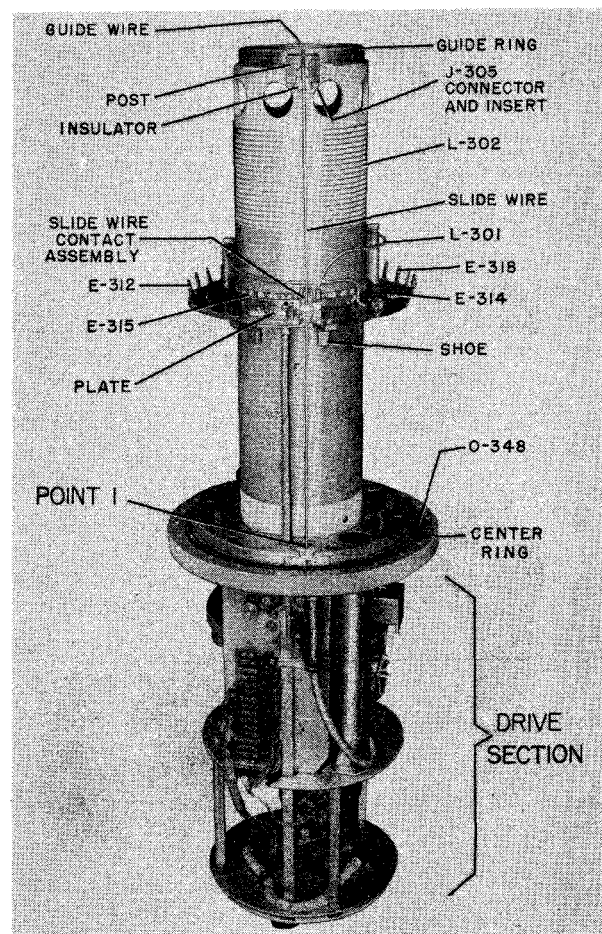


Figure 7-106. R-F Tuner TN-229/SRT, Less Housing

(3) TROUBLE-SHOOTING IMPEDANCE TRANSFORMER SWITCH S-308

(See figure 7-105.)

Step 1. Apply 115 volts ac to pin V of J-301 on r-f tuner.

Step 2. Connect Multimeter ME-25A/U (or equivalent) between J-303 and the first extrusion cable extending from the r-f tuner assembly, W-301. (See figure 7-103.)

Step 3. Apply other side of 115 volts ac to pin M of J-301. This will actuate motor B-303, driving switch S-308. At this point the multimeter should show continuity (zero ohms). This checks main coil L-302, coupling coil L-301 and contacts 2 and 4, of S-308.

Step 4. Disconnect 115 volts ac from pin M of J-301, and connect to pin J of J-301. This will actuate motor B-303, rotating switch S-308. Multimeter should show continuity (zero ohms), between J-303 and r-f tuner ground. This checks contacts 1 and 2 of S-308.

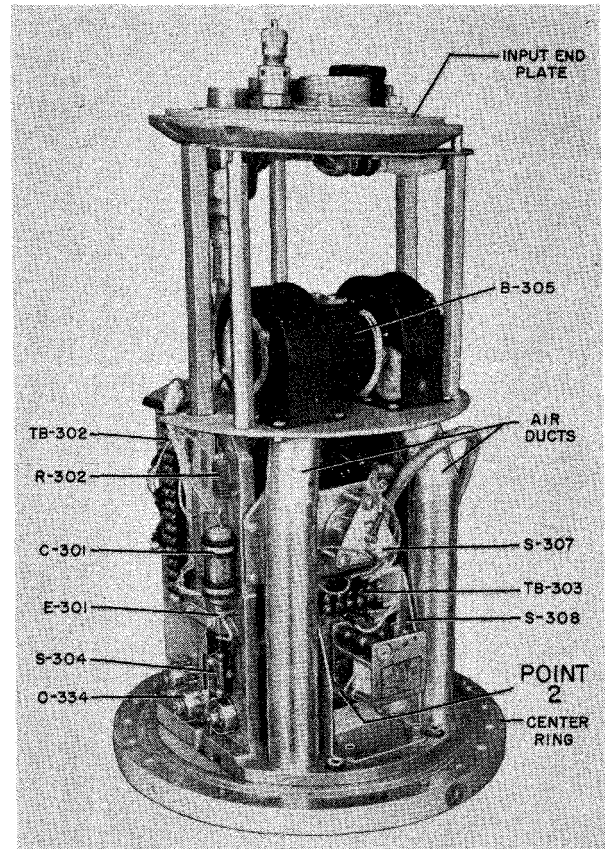
b. REPAIR AND ADJUSTMENT.

(1) ELECTRICAL ADJUSTMENTS.—There are no electrical adjustments in the r-f tuner.

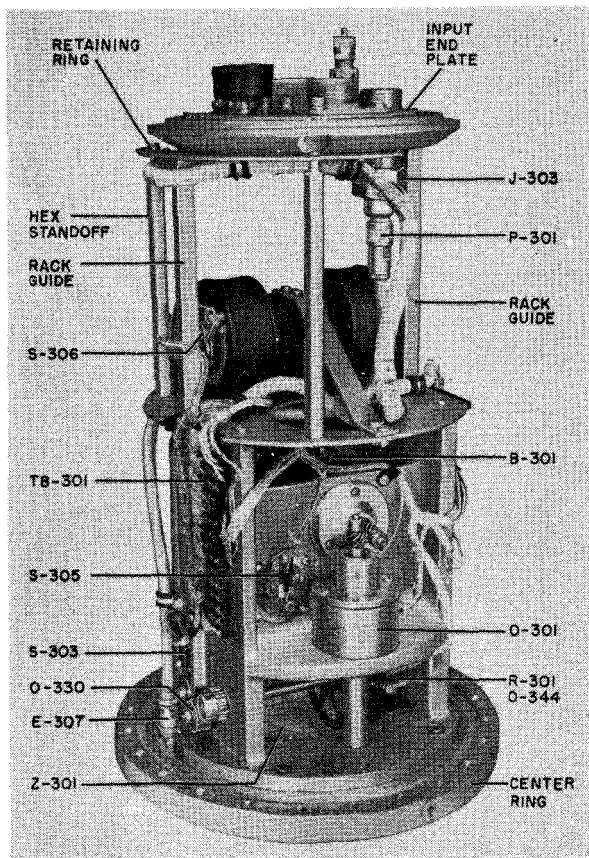
**(2) MECHANICAL ADJUSTMENTS.**

**(a) REMOVAL AND REPAIR.**—If the results of the trouble location procedures indicated in paragraph 19a point to a defective component or adjustment in the r-f tuner, the disassembly procedures must be performed in the sequence described. However, in most cases, it will not be necessary to disassemble the unit completely for routine maintenance or replacement of a faulty circuit element. Familiarity with the disassembly procedure will enable the technician to perform the minimum required disassembly to have access to the defective part, since several steps in the procedure may be eliminated. A considerable degree of maintenance may be performed by merely removing the bottom housing from the r-f tuner, which exposes the main drive motor, blower motor, switch drive, clutch-brake assembly, governors, thermostatic switch, terminal boards, position potentiometer, and limit switches (figures 7-107 and 7-108).

If the defective component cannot be reached by removing the bottom housing, the top must then be removed as described in paragraph 19b(2)(a)3. The contact fingers of the shorting ring and slide wire assembly may then be checked, if desired. Impedance transformer Z-301 is accessible when the bottom housing (paragraph 19b(2)(a)2) and drive assembly (paragraph 19b(2)(a)4) are removed from the r-f tuner.



**Figure 7-108. R-F Tuner TN-229/SRT, Drive Section, Air Duct Side**



**Figure 7-107. R-F Tuner TN-229/SRT, Drive Section, Clutch Side**

The r-f tuner trouble location chart, table 7-41, should be consulted to localize the defect to a particular assembly or part. Reference to the input end (bottom) of the r-f tuner indicates the end where the motors and r-f input cable (J-303) are located. The output end (top) is the opposite end where the first extrusion r-f output cable to the antenna coupler is attached. Except for a periodic overhaul for lubrication purposes, it is not necessary to disassemble the r-f tuner beyond the point required for correction of the difficulties indicated during trouble shooting. Every two years it is necessary to overhaul the r-f tuner completely, except for the drive shafts, in order to repack and lubricate the bearings as indicated in Section 6. A special wrench is provided in the r-f tuner for removal of contact buttons in switch assembly S-308.

**WARNING**

**R-F TUNER TN-229/SRT IS PRESSURIZED WITH PREPURIFIED DRY NITROGEN. IF DISASSEMBLY OF THE UNIT, OTHER THAN THE MOUNTING EQUIPMENT, IS REQUIRED, THE PRESSURE MUST FIRST BE RELEASED. THIS IS ACCOMPLISHED BY PULLING THE STEM ON RELIEF VALVE O-353 (FIGURE 7-103) AND RE-**

LEASING THE GAS WITHIN THE UNIT  
UNTIL THE PRESSURE GAUGE I-301  
READS ZERO PSI.

**1. REMOVAL OF UNIT FROM SHOCK  
MOUNT BASES.**

(See figure 7-103.)

*Step 1.* Remove all grounding straps and interconnecting cables from the r-f tuner.

*Step 2.* Remove the 16 screws supporting the shock mounts to their bases.

**Note**

The unit must be removed from permanent location and brought into a protected work area if complete disassembly is to be performed. Provide adequate support when working on the unit. During disassembly keep the unit away from moisture, dirt or other foreign matter.

**CAUTION**

The r-f tuner weighs approximately 135 pounds. Handle with care so as not to damage any of the components which protrude from either end of the unit.

**2. REMOVAL OF INPUT END (BOTTOM)  
HOUSING.**

(See figure 7-103.)

*Step 1.* Discharge dry nitrogen gas in the unit by operating the relief valve O-353 and releasing the gas until pressure gauge I-301 reads zero psi. Valves O-353, O-309 and pressure gauge I-301 may be removed by unscrewing them from the input end plate.

**Note**

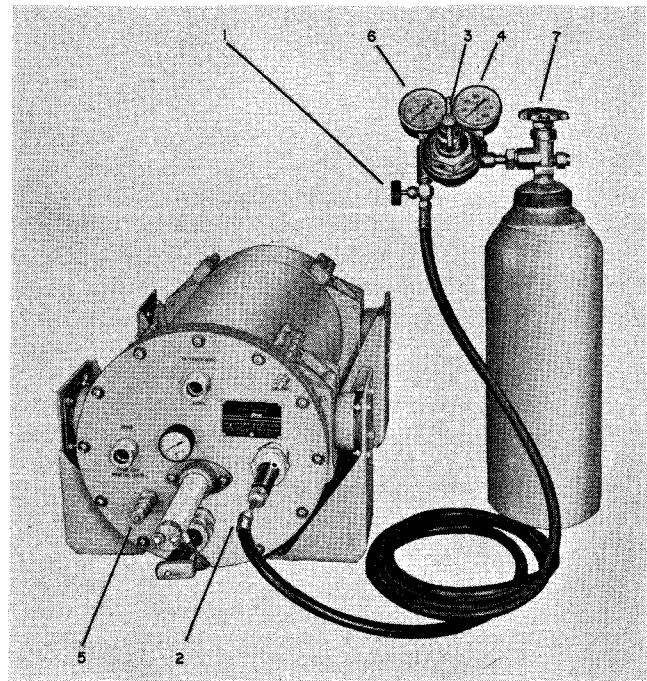
Place register marks on bottom housing, input end plate, and center ring, to facilitate reassembly.

*Step 2.* Remove the 12 screws supporting the ring which clamps the input end (bottom) housing at the center of the r-f tuner assembly.

*Step 3.* Remove the 12 screws supporting the input end plate at the bottom of the unit.

*Step 4.* Bottom housing and unit may be separated by axially removing one from the other. Shock mounts are still mounted on the housing and may be removed at this time, if necessary. At this point, the inner components of the r-f tuner input end are accessible. See figures 7-107 and 7-108.

*Step 5.* Receptacles may be removed from the input end plate of the unit by removing screws or loosening coupling nut fastening receptacle to the input end plate. "O" rings and gaskets associated with receptacles may also be removed.



**Figure 7-109. Typical Pressurization and Purging Setup**

**3. REMOVAL OF OUTPUT END (TOP)  
HOUSING.**

(See figure 7-103.)

*Step 1.* Discharge dry nitrogen gas in the unit by operating relief valve O-353 and releasing the gas until pressure gauge I-301 reads zero psi.

**Note**

Place register marks on top housing, output end plate and center ring, to facilitate reassembly.

*Step 2.* Remove the 12 screws supporting the ring which clamps the output end (top) housing at the center of the r-f tuner.

*Step 3.* Remove the eight screws supporting the output end plate at the top of the unit.

*Step 4.* Top housing and unit may be separated by axially removing one from the other.

**CAUTION**

When removing top housing from unit, exercise care so as not to bend any of the contacts on the shorting ring assembly.

Shock mounts are still mounted to housing, and may be removed at this time, if necessary. Removal of the housing will provide access to all the main coil and sliding short assembly components (figure 7-106).

*Step 5.* The top end plate and the first extrusion connector W-301 may be removed from the unit by pulling the connector from the insert at the top end of the coil form.

**4. REMOVAL OF COMPONENTS IN DRIVE SECTION.**—The major components of the r-f tuner drive section are mounted within a machined casting, figures 7-107 and 7-108.

If trouble location procedures indicate trouble in the impedance transformer switch assembly or the main coil drive mechanism, a step-by-step disassembly procedure must be followed. For component location, refer to figures 7-106, 7-107, and 7-108.

Components mounted on the machined casting are accessible by removing their mounting screws and disconnecting associated wires.

Main coil drive motor B-301 and impedance transformer Z-301 with switch assembly S-308 are mounted within the drive section casting and must be removed according to the following sequence:

*Step 1.* The input end plate at the bottom of the unit may be removed by disconnecting the coaxial cable connector to J-303 and removing the three retaining rings supporting the input end plate to the three hex standoffs.

*Step 2.* Remove screws mounting limit switch S-303 to the casting without removing wires.

*Step 3.* Remove four screws mounting terminal board TB-301 to the casting. It is not necessary to disconnect wires from terminal boards.

*Step 4.* Remove four screws supporting thermo-static switch S-305 to the casting.

*Step 5.* Remove two screws supporting position indicator potentiometer R-301 to the casting.

*Step 6.* Remove three screws supporting drive motor B-301 extension shaft to the casting.

*Step 7.* Remove two nuts on threaded studs supporting the clutch-brake assembly O-301 to the casting.

*Step 8.* Remove four screws mounting terminal board TB-302 to the casting.

*Step 9.* Remove all cable clamps supporting the wiring harness to the casting.

*Step 10.* Unsolder wires connected to R-302 and C-301, mounted on the casting, directly above terminal board TB-302.

*Step 11.* Remove blower assembly, including air ducts and mounting plate, together with the wiring harness from the casting within the r-f tuner drive section.

**5. REMOVAL AND DISASSEMBLY OF  
IMPEDANCE TRANSFORMER  
SWITCH ASSEMBLY.**

(See figure 7-108.)

*Step 1.* Unsolder coaxial cable terminated in slide wire insulator, POINT 1 of figure 7-106.

*Step 2.* Remove nuts and mounting plates supporting racks O-321 and O-322 to the shorting ring assembly.

*Step 3.* Remove four screws supporting the drive section casting to the center ring of the r-f tuner.

*Step 4.* Remove six screws supporting the main coil and shorting ring assembly to the center ring of the r-f tuner.

*Step 5.* Remove main coil and shorting ring assembly from the drive section of the r-f tuner.

**CAUTION**

Before separating the center ring from the drive section, register marks must be placed on the center ring and drive section casting. The center ring must be properly oriented when unit is reassembled.

*Step 6.* Remove four screws from bracket supporting the impedance switch assembly to the casting.

*Step 7.* Unsolder leads between impedance transformer Z-301 and contact buttons of switch S-308; see POINT 2 on figure 7-108. Remove assembly from casting.

*Step 8.* Impedance switch assembly housing is removed by removing the three screws on the top supporting the housing to the bracket and three screws on the bottom supporting the housing and bearing alignment plate (figure 7-105).

*Step 9.* Switches actuated by the cam and their actuators may be removed by first disconnecting the wires to the switch and then removing the screws supporting the switch to the mounting plate (figure 7-105).

*Step 10.* The cam may be removed by unscrewing the two flathead screws supporting the cam to the motor shaft (figure 7-105).

**CAUTION**

Place register marks on cam and motor shaft for proper orientation when replacing cam on motor B-303 shaft.

*Step 11.* At this point, the stator contacts on melamine plate may be removed and replaced by using the special tool, H-302, mounted within the r-f tuner.

*Step 12.* To gain access to motor B-303 mounting screws, remove melamine plate and unsolder leads between S-308 contacts and coaxial connectors on assembly.

*Step 13.* Remove four screws supporting motor B-303 to the assembly.

*Step 14.* Impedance transformer Z-301 may be removed by removing the four screws on the bracket supporting the transformer to the casting.

6. REMOVAL OF SHORTING RING  
ASSEMBLY.*(See figures 7-105 and 7-106.)*

*Step 1.* Remove slide wire and guide wire by loosening nuts at the insulator post and guide ring assembly.

*Step 2.* To remove guide ring assembly, remove two screws supporting ring to the coil form.

*Step 3.* Unsolder connection between the top of the coil and the output connector, W-301, at the top of the unit.

*Step 4.* Shorting ring and coil may be separated by axially removing shorting ring from the top end of the coil form.

**(b) REPLACEMENT AND ADJUSTMENTS.**

—All replaceable parts, subassemblies, and assemblies of the r-f tuner are reassembled and replaced in reverse order from the procedures outlined in paragraph 19b(2)(a). The following general points in reassembly and replacement should be particularly noted:

*Step 1.* Align register marks inscribed during disassembly procedures.

*Step 2.* All setscrews, etc., which were fixed with glyptal should have glyptal reapplied to them prior to reassembly.

*Step 3.* Stake both ends of replaced drive pins.

*Step 4.* When replacing cable terminals, valves or pressure gauge on the end plate, recoat the threads with sealing compound.

*Step 5.* When reassembling or replacing components, reference should be made to Section 6 for lubrication information.

*Step 6.* Wherever registry marks have been placed, according to disassembly instructions, care must be exercised when replacing to line up register marks for proper orientation of component.

**1. CLUTCH-BRAKE UNIT ADJUSTMENT.**

—When the r-f tuner is disassembled for overhaul and lubrication purposes, clutch-brake unit O-301 should be checked and adjusted to maintain an air gap of 0.008 inch. The function of the brake in the clutch-brake unit is to prevent overtravel of the shorting ring when releasing either the UP  $\text{\textcircled{AF}}$  or DOWN  $\text{\textcircled{AG}}$  button on the control-indicator unit. Braking time is a function of air gap existing between the driver plate and the braking face of the brake winding housing (see detail in figure 7-105).

Air gap within the clutch-brake unit is adjusted by rotating the lower housing within the upper housing of the unit. Each position of the locking hole in the lower housing represents air gap adjustments in increments of 0.004 inch, and two sets of locking screw tapped holes in upper housing permit 0.002-inch adjustments.

*Step 1.* Remove locking screws supporting lower housing to upper housing.

*Step 2.* With clutch-brake unit removed from casting (paragraph 19b(2)(a)5, steps 6 and 7), unscrew lower housing completely from upper housing. Remove any dirt or other foreign matter that may have accumulated on the clutch and brake mating surfaces. Use dry cleaning solvent P-S-661b, Type II. After cleaning, replace lower housing by screwing it in the upper housing.

*Step 3.* Rotate lower housing clockwise until it reaches its limit. At this point there is zero air gap between driven and driving plates.

*Step 4.* Rotate lower housing counterclockwise for 0.008-inch air gap (two holes in lower housing), and replace locking screws.

**2. CONTACTS, BEARINGS AND GASKETS.**—If either main coil L-302 or coupling coil L-301 is damaged, rewinding of the coils will be necessary. Refer to table 7-43, Winding Data.

Inspect the contacts on the shorting ring assembly to be sure they make firm contact with main coil L-302 and the top housing when assembled. All shorting ring contacts and the inner surface of the top housing should be cleaned prior to reassembly.

The slide wire contact assembly should be adjusted to provide firm contact against the slide wire. The slide wire lock nut on the guide ring post should be tightened firmly.

Clean all gears, racks, rollers, and bearings, and lubricate in accordance with the lubrication instructions and materials specified in Section 6.

Check shorting ring assembly over the entire range of travel. Binding may indicate improper alignment of shorting sleeve or racks.

Replace any gaskets or "O" rings that appear worn or cracked.

**CAUTION**

Exercise care not to pinch or shear gaskets and "O" rings when reassembling the r-f tuner.

Ball bearings may be removed, when located on a shaft, by applying pressure on their inner races. When located in holes, they may be removed by pressing on their outer races.

**3. PURGING AND PRESSURIZING.**—After the r-f tuner is completely reassembled, the unit must be purged to eliminate moisture that may have accumulated during corrective maintenance procedures. The following steps are not for routine preventive maintenance, where pressurization is necessary because of normal leakage, but rather for repressurizing when the unit has been opened for repair or adjustment purposes. The following equipment is required:



Cylinder of prepurified dry nitrogen; regulator valve and gauges; hose with proper fittings to connect needle valve of pressurizing equipment of the r-f tuner intake valve.

Refer to figure 7-109 for a typical pressurization and purging setup.

*Step 1.* Attach hose from needle valve (1) to intake valve (2) of unit to be purged, and open cylinder valve (7).

*Step 2.* Adjust regulator valve (3) to deliver approximately 10 to 15 psi. Note total psi of cylinder at gauge (4).

*Step 3.* Open exhaust relief valve (5) on unit by inserting tool in hole provided on the valve stem, pull stem against valve spring tension, and hold it in this position during purging.

*Step 4.* Purge unit until pressure gauge (4) shows a drop of 100 psi from total psi of cylinder noted in step 2.

*Step 5.* Release stem on relief valve (5) and allow the prepurified dry nitrogen to enter until gauge (6) on unit reads 20 psi. (Increase regulator valve (3) output to provide 20 psi in r-f tuner as indicated by gauge (6) on unit.)

## 20. MAINTENANCE OF RELAYS.

Relay contacts must be kept in good condition to maintain satisfactory operation. Dust and pitted contacts are the principal causes of relay trouble. The presence of undue sparking between contacts is an indication of trouble. Burnishing and cleaning of the contacts will usually clear up most relay troubles.

*a. CONTACT BURNISHING.*—Contact burnishing should always be done with a suitable burnishing tool. *Never use a file.* To burnish, rub the burnisher back and forth between the contacts two or three times. When burnishing normally open contacts, press the contacts together manually to give a slight pressure on the blade of the burnisher; for normally closed contacts, the spring tension will provide sufficient pressure.

### CAUTION

When burnishing contacts, take care not to jar the springs out of adjustment or to change the air gaps. Also take care not to lose the bushing between contact arms.

*b. CONTACT CLEANING.*—Relay contacts should be cleaned with dry cleaning solvent P-S-661b, type II, in the following manner: dip the flat end of a clean toothpick in the cleaning solvent to a depth of one-quarter inch, and deposit the liquid on the contacts while holding the contacts slightly separated. Rub the flat end of the toothpick back and forth two or three times between the contacts, while exerting a slight pressure against the sides of the toothpick. The liquid will soften any deposit that may have collected on the contacts, and the rubbing will remove it. The contacts

should now be flushed with a small amount of cleaning solvent taken up on the clean point of the toothpick. The end of the toothpick used for rubbing should not be used during this operation. Flush the sides as well as the top of the contacts, to prevent the deposit of loosened dirt upon the contact surface.

### Note

On a relay where the separation or location of the contacts is such that it is not practicable to insert a toothpick, burnishing alone will be satisfactory.

## 21. COMPONENT CHARACTERISTICS.

*a. ELECTRON TUBES.*—Table 7-42 lists the rated tube characteristics for all types of vacuum tubes used in the AN/SRT-15. This data does not represent maximum or recommended operating conditions, but represents the conditions under which the tube is tested to determine whether or not it is satisfactory after manufacture. After longer service, tubes will show substantial reduction (up to 20 percent) in transconductance and emission under the standard test conditions. By making an allowance for normal decrease in transconductance or emission, and normal increase in gas rectifier cathode-anode drop, tubes with excessively low performance levels may be detected.

### Note

All tubes of a given type supplied with the equipment shall be consumed prior to employment of tubes from general stock.

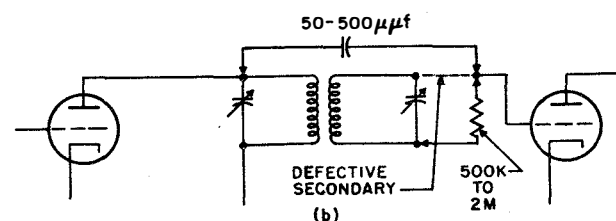
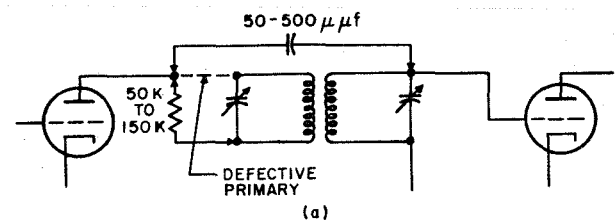


Figure 7-110. Bridging Defective Transformer Winding

7-128

TABLE 7-42. TUBE CHARACTERISTICS

| TUBE TYPE | FILAMENT VOLTAGE (V) | FILAMENT CURRENT (A) | PLATE VOLTAGE (V)  | GRID BIAS (V)           | SCREEN VOLTAGE (V) | PLATE CURRENT (MA)  | SCREEN CURRENT (MA) | A-C PLATE RESISTANCE (OHMS) | VOLTAGE AMPLIFICATION FACTOR (MU)                          | TRANSCONDUCTANCE (MICROMHOS)                         |         | EMISSION   |           |      |
|-----------|----------------------|----------------------|--|-------------------------|--------------------|---|---------------------|-----------------------------|--|--|---------|--|-----------|------|
|           |                      |                      |  |                         |                    |   |                     |                             |  | Normal   | Minimum | I <sub>s</sub> (MA)  | Test Volt |      |
| 0A2       | —                    | —                    | Anode supply: 185 V dc MIN.  |                         |                    |   |                     |                             |  |  |         | Starting voltage: 185 V dc min.<br>Operating voltage: 150 V dc approx.<br>Operating current: 5 ma min.<br>30 ma max. |           |      |
| 0B2       | —                    | —                    | Anode supply: 133 V dc min.  |                         |                    |   |                     |                             |  |  |         | Starting voltage: 133 V dc min.<br>Operating voltage: 108 V dc approx.<br>Operating current: 5 ma min.<br>30 ma max. |           |      |
| 3B28      | 2.5                  | 5                    | Peak inverse voltage: Output current: 250 ma max.<br>11 KV max/anode current of 1 A max. |                         |                    |   |                     |                             |  |  |         |  | 5000      | 14.0 |
| 4-400A    | 5.0                  | 14.1                 | 2500   | -67.5                   | 500                | 160   |                     |                             | 5.25   |  |         | 7000 min.  | 2500      |      |
| 4D21      | 5.0                  | 6.5                  | 2500   | -71.5                   | 500                | 50  |                     |                             | 5.85   |  |         | 4000 min.  | 2500      |      |
| 5R4WGB    | 5.0                  | 2                    | Plate voltage: 850 V ac*<br>Output current: 140 ma dc min.                               |                         |                    |   |                     |                             | Peak inverse voltage: 2800 V max.                          |  |         | 225*   | 75*       |      |
| 6AG5      | 6.3                  | 0.3                  | 250  | 0                       | 150                | 7   | 2                   | 800,000                     |  | 5000   | 4000    | 25 min.  | 10        |      |
| 6AG7      | 6.3                  | 0.65                 | 300  | -3                      | 150                | 30  | 6.5                 | 130,000                     |  | 1700   | 9200    | 180 min.   | 20        |      |
| 6AK6      | 6.3                  | 0.15                 | 180  | -9                      | 180                | 15  | 2.5                 | 200,000                     |  | 2250   | 1900    |  |           |      |
| 6AS7G     | 6.3                  | 2.5                  | 135*   | 0*                      |                    | 125*  |                     | 280                         | 2*   | 7000*  | 5800*   | 75*  | 10*       |      |
| 6E5       | 6.3                  | 0.3                  | 250  | -4                      |                    | 5.3   |                     |                             | Target voltage: 250 V dc max.<br>Target current: 3.1 ma dc |  |         | 15 min.  | 30        |      |
| 12AU7     | 12.6                 | 0.15                 | 250*   | -8.5*                   |                    | 10.5*   |                     | 7700                        | 17*  | 2200*  | 1750*   |  |           |      |
| 5651      |                      |                      | Starting voltage: 115 V dc min.<br>Operating voltage: 87 V dc approx.                    |                         |                    |   |                     |                             |  | Operating current:<br>1.5 ma (min.) to 3.5 ma (max.) |         |  |           |      |
| 5654      | 6.3                  | 0.175                | 120  | -2                      | 120                | 7.5   | 2.5                 | 340,000                     |  | 5000   | 3750    |  |           |      |
| 5687      | 6.3                  | 0.9                  | 120*   | -2                      |                    | 34  |                     | 2000                        | 20*  | 11000  | 8000    | 125 min.   | 15        |      |
| 5725      | 6.3                  | 0.175                | 120  | -2                      | 120                | 5.2   | 3.5                 |                             |  | 3200   | 2500    |  |           |      |
| 5726      | 6.3                  | 0.3                  | Plate voltage 117 V ac*  |                         |                    | Peak inverse voltage: 260 V max.<br>Output current: 9 ma dc max.* |                     |                             |  |  |         | 40*  | 10*       |      |
| 5751      | 12.6                 | 0.175                | 250*   | -3*                     |                    | 1.1   |                     | 58,000                      | 70*  | 1200   | 900     |  |           |      |
| 5814      | 12.6                 | 0.175                | 250*   | -8.5*                   |                    | 10.5*   |                     | 6250                        | 19.5*  | 2200*  | 1750*   |  |           |      |
| 5933      | 6.3                  | 0.9                  | 750  | -32                     | 300                | 60  | 5                   |                             |  |  |         |  |           |      |
| 6201      | 6.3                  | 0.3                  | 250  | 200 ohms R <sub>k</sub> |                    | 10  |                     | 10,900                      | 60   | 5500   |         |  |           |      |

\* Each section.

ORIGINAL

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16ACORRECTIVE  
MAINTENANCE

7 Section

**b. CRYSTAL DATA.**—Radio Frequency Oscillator Z-2001 (crystal oscillator, unit 1) is a crystal-controlled oscillator. A schematic of the crystal oscillator circuit is shown in figure 7-93. Following are the characteristics of the crystal and its oven:

Crystal oscillator frequency ..... 100 kc  
 Combined accuracy and stability of crystal and oven over ambient temperature range of -20°C. (-4°F.) to 65°C. (149°F.) (and 30% to 95% relative humidity) is within 0.0005%.

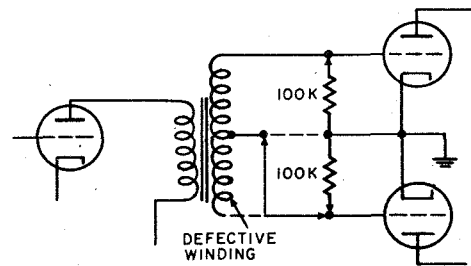
Oven operating temperature ..... 70°C. (158°F.)  
 Oscillator accuracy ..... 0.00011%

Oven dimensions  
 Overall height ..... 4-5/8 inches  
 Overall diameter ..... 3-3/4 inches

Diameters of oven pins  
 Pins 2, 3, 4, 5, and 6 ..... 0.125 inch  
 Pins 1 and 7 ..... 0.156 inch

**c. WINDING DATA.**—Table 7-43 lists all the wire-wound electrical components except resistors, in the AN/SRT-15, and pertinent data to permit emergency repair of them in the field. The diagrams, listed by number in the "Diagram" column of table 7-43, follow the table and start on page 7-156. At the bottom of each page of table 7-43 a footnote references the page or pages on which the diagrams appear.

**d. EMERGENCY MEASURES.**—There may be occasions when a technician or operator must resort to emergency measures to keep the equipment in operation. A few such methods are described in the following paragraphs.



**Figure 7-112. Emergency Repair of Audio Transformer**

Some of the procedures described may require a certain amount of "cut-and-try". It must be borne in mind, too, that parts which are repaired or bridged must be replaced as soon as possible to restore complete normal functioning of the equipment.

**Note**

Operators should not resort to these measures unless authorized.

(1) **TRANSFORMER WINDINGS.** (See figures 7-110 and 7-111.)—The simplified schematics of figures 7-110 and 7-111 illustrate two methods of emergency repair which may be tried when a transformer winding opens or burns out. Figure 7-110 shows a method which may be used when capacitors are available.

The resistor used in a defective primary may be a value between 50,000 and 150,000 ohms; in a defective secondary the resistor value may range from 500,000 to 2 megohms.

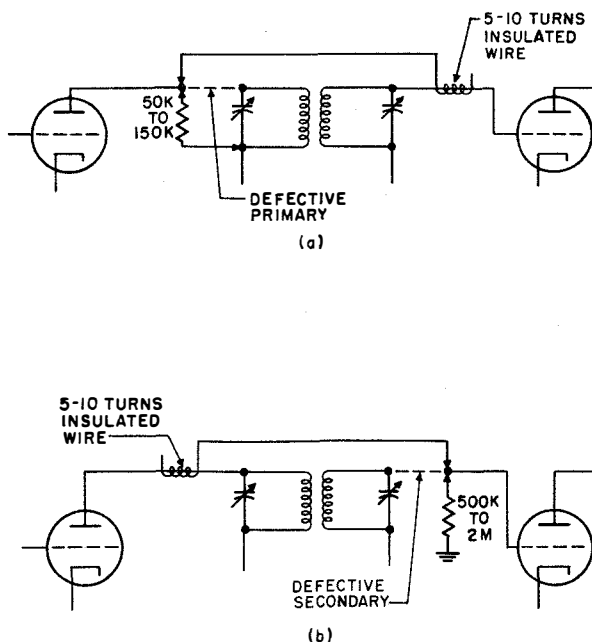
For audio frequencies, the capacitor value may be 0.1 to 0.5  $\mu$ f.

In figure 7-111, a method of bridging is shown when a capacitor is not available. A few turns of insulated wire are placed around the undamaged winding and then connected to the plate or grid, as applicable. Some adjustment may be required to give the desired coupling.

(2) **AUDIO TRANSFORMERS.** (See figure 7-112.)—A tapped audio transformer may be temporarily repaired by placing two resistors of equal value in the secondary, as illustrated.

(3) **BRIDGING DEFECTIVE STAGE.** (See figure 7-113.)—When the procedures described in the two preceding paragraphs do not produce satisfactory results, it is possible to bridge an entire stage. This method is shown in figure 7-113.

(4) **FIXED RESISTORS.**—The value of a carbon resistor will decrease when overheated. Should this condition become permanent, the resistor value may be increased by scraping or filing the resistor until the approximate value is obtained. Use care in filing and scraping, and keep a constant check on the changing value. Be sure the removal of insulation does not cause a short.



**Figure 7-111. Alternate Method of Bridging Transformer Windings**

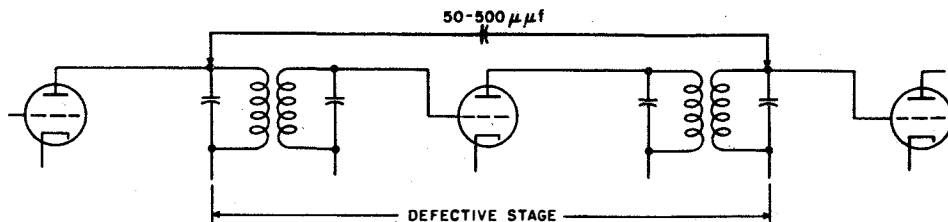


Figure 7-113. Bypassing a Defective Stage

Wire-wound resistors may be repaired, temporarily, by clamping the broken spot or bridging it with solder or wire. Although the overall value will be somewhat less than the original, circuit function should be restored.

(5) VARIABLE RESISTORS.—Faulty operation of variable resistors and potentiometers is usually caused by poor contact, wear and dirt.

The part is cleaned with dry-cleaning solvent 14F SNSN G51-S-4718-10, and then polished with an ordinary pencil eraser, preferably one not too gritty. Carefully adjust the tension of the moving arm, if necessary, to get a better contact.

When a variable resistor is too badly worn to repair, a fixed resistor should be substituted. This resistor is finally chosen after different values are tried in the circuit. The resistor that gives the best results under these emergency conditions should be the one used.

A wire-wound variable resistor may be repaired by slipping a metal tab under or over the break or by clamping. In this case, too, the value will be somewhat lower but circuit function should be restored.

(6) CHOKES AND COILS.—When a coil or choke becomes useless through corrosion, or if repair or bridging is impractical, it may be rewound.

Remove the wire on the coil form, carefully noting the number of turns and the manner of winding. Rewind with new wire of the same size and insulation on the old coil form. Table 7-43 may be consulted in cases where no emergency exists.

(7) TUBES.—In some cases, a stage may be bridged, as described in paragraph 3e(3), if a tube replacement is not immediately available.

Power amplifier tube V-1304 (4-400A) in the radio frequency amplifier output stage may be replaced with

a type 5D21, if available, provided operation is limited to the 100-watt level.

(8) INTERLOCK BATTLE SHORT. (See figure 7-79.)—In case of failure of the drawer interlocks, INTERLOCK BATTLE SHORT switch  $\text{Ⓢ}$  is provided on the front panel of Low Voltage Power Supply PP-1094 /SRT (LVPS). When placed in the ON position, it bypasses all the interlock switches on the drawers.

**Note**

INTERLOCK BATTLE SHORT switch  $\text{Ⓢ}$  is to be used only in emergencies.

(9) R-F TUNER EMERGENCY SWITCHES.—Although there is no interlock in the r-f tuner, two switches are provided to prevent operation of the equipment at 500 watts under the following conditions:

(a) CENTRIFUGAL SWITCH.—If, for some reason, r-f tuner blower motor B-302 fails, its centrifugal switch S-306 will open and prevent 500-watt operation.

(b) THERMAL SWITCH.—When the temperature in the r-f tuner rises to  $150^{\circ} - 115^{\circ}\text{C}$ . ( $200^{\circ} - 240^{\circ}\text{F}$ .), thermal switch S-305 will open and prevent 50-watt operation.

These safeguards are provided in the r-f tuner at the high (500-watt) level while still not preventing operation at the low (100-watt) level.

(10) CHEATERS.—With a drawer partially pulled out of its inner compartment, the interlock may be bypassed through the "cheater" switch mounted on the left side of the chassis, towards the rear. The hard-rubber rod of the switch is pushed in to close the circuit.

TABLE 7-43. WINDING DATA

|   |   |  |
|---|---|--|
| <p>1. All wires are AWG copper wire unless otherwise specified.</p> <p>2. In "wire size" column, E = enamel<br/> F = fiber, synthetic<br/> R = resin<br/> Formex = synthetic resin (brand)<br/> CSC = cotton, single covered<br/> SSC = silk, single covered</p> <p>3. In "DC resistance" column, Low = less than one ohm.<br/> <b>IMPREGNATION: MOISTURE AND FUNGUS PROOFING OF COILS.</b></p> <p style="text-align: center;"><b>Note</b></p> <p>All varnish shall be moisture and fungus resistant per MIL-V-173A.</p> <p>To obtain an even coating, dipping and draining of parts should be done in opposite directions. After the treatment is complete, the coating must be dry and hard on all portions of the coil and form; all surfaces must be free of bubbles, foreign matter and dents.</p> <p style="text-align: center;"><b>METHOD I</b></p> <p>Perform the sequence of operations as called for in the winding data.</p> <ol style="list-style-type: none"> <li>Clean all surfaces of coil form with dry cleaning solvent (P-S-661b, TYPE II).<br/> Bake for 1/2 hour at 100°C (212°F).<br/> Remove from oven and allow to cool at room temperature.</li> <li>Wind coil.<br/> Bake for 1 hour at 100°C (212°F).<br/> Remove from oven and allow to cool to 55°-66°C (130°-150°F).</li> <li>Immerse in mixed varnish.<br/> Air dry for 10 minutes.<br/> Bake for 1 hour at 100°C (212°F).<br/> Allow to cool to 55°-66°C (130°-150°F).</li> </ol> | <p style="text-align: center;"><b>GENERAL NOTES</b></p> <ol style="list-style-type: none"> <li>Brush on mixed varnish.<br/> Air dry for 10 minutes after brushing.<br/> Bake for 1 hour at 100°C (212°F).<br/> Allow to cool to 55°-66°C (130°-150°F).</li> <li>Brush on unmixed varnish.<br/> Air dry for 10 minutes after brushing.<br/> Bake for 1 hour at 100°C (212°F).</li> <li>Immerse in mixed varnish in vacuum.<br/> Air dry for 10 minutes.<br/> Bake for 8 hours at 100°C (212°F).<br/> Allow to cool to 55°-66°C (130°-150°F).<br/> Unmixed varnish shall be Insl-X #U-86-T varnish.<br/> Mixed varnish shall be a mixture of 100 parts Insl-X #U-86-T varnish to 86 parts thinner #80.</li> </ol> <p style="text-align: center;"><b>METHOD II</b></p> <ol style="list-style-type: none"> <li>Remove oil and grease with dry cleaning solvent (P-S-661b, TYPE II).</li> <li>Dry in oven or with infrared light at 100°C (212°F) long enough to substantially dehydrate the material (not less than two hours).</li> <li>Allow to cool to +60°C (140°F).</li> <li>Spray, brush, or dip (depending on the size and shape of the piece), using one of the following baking varnishes:<br/> Insl-X #95T<br/> Insl-X #85T<br/> Insl-X #85-IT<br/> Mass &amp; Waldstein Durad #524</li> <li>Dry in air for 10 minutes.</li> <li>Bake in 100°C (212°F) for a maximum of 30 minutes.</li> <li>Allow to cool to +60°C (140°F).</li> <li>Repeat step 4.</li> <li>Dry in air for 10 minutes.</li> <li>Bake at 100°C (212°F) for a minimum of 1 hour.</li> </ol> | <p>NOTE 1: Insl-X No. 95T, as sold commercially, has a 43% solid content. To obtain the required 25% mixture add 0.86 part thinner.</p> <p>NOTE 2: Phenolic parts which require no additional assembly shall be treated with #95T. Parts which are subjected to assembly of metal parts, such as eyelets, rivets, screws, etc., shall be treated with #85T or #85-IT.</p> <p>NOTE 3: When the coating material is at the proper specified viscosity, <i>each</i> coat should be from 1 to 1.5 mils thick.</p> <p style="text-align: center;"><b>METHOD III</b></p> <p>Oven temperature for following procedures shall be 70°-100°C (158°-212°F).</p> <ol style="list-style-type: none"> <li>After winding, bake 2 hours.</li> <li>Apply a coat of varnish to the hot coil, thinned 3 parts of varnish to 1 part Xylol.</li> <li>Air dry at least 30 minutes, and bake in oven at least 1 hour.</li> <li>While coil is hot, apply second coat, full strength; air dry at least 15 minutes and bake at least 1 hour.<br/> Varnish to be applied liberally to all accessible surfaces of wire (and other portions as specified) for both coats.</li> </ol> <p style="text-align: center;"><b>METHOD IV</b></p> <ol style="list-style-type: none"> <li>Place in oven for 2 hours at 150°C (300°F)* to dry.</li> <li>Let cool at room temperature for approximately 15 minutes.</li> <li>Vacuum impregnate in Dow-Corning #996 varnish or equivalent.</li> <li>Place in oven for 4 hours at 150°C (300°F)*.</li> <li>Repeat steps 3 and 4 two more times, but dip instead of impregnate.</li> </ol> |
|---|---|--|

\* For L-1333, dry at 100°C (212°F).

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING   | WIRE SIZE   | TURNS         | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS                            | REMARKS   |  |
|--------------------|----------------|-----------|---|---|---------------|-----------------------|-----------------|--|---|--|
| L-301              | D-2010915      | (1)       | Single winding, single layer.   | RADIO FREQUENCY TUNER TN-229/SRT  |               |                       |                 |  |   | RF coil: max ID 7-1/16 in., min. IC 6-1/4 in., ID of coil to vary according to diagram.    |
|                    |                |           |   | 0.144 in. dia silver clad copper wire half hard                                       | 1             |                       |                 |  |   |  |
| L-302              | D-2010768      | (2)       | Single winding, single layer. Threaded silicone bonded fiberglass form. | 0.064 in. dia silver clad copper wire 4 nos. hard                                     | 141.875       |                       |                 |  | RF coil.  |  |
| L-303              | A-2010642      | (3)       | Single winding, multi-layer wound; core cold rolled steel.              |   | 900           | 15.7                  |                 |  | Electromagnet: 24 V dc, 3.3 amp.  |  |
| Z-301              | B-2011212      | (4)       | Single winding, toroidal core of Allegheny Mumetal hydrogen annealed.   | 0.0125 in. thk soft copper strip silver pl, 29 in. lg tapered from 1/2 in. to 1/4 in. | 7 tapped at 6 |                       |                 |  | Impedance transformer: 0.3 mc to 2 mc; turns insulated by fiberglass tape.                            |  |
| L-501              | NL-980824-1    | (5)       | Single winding, single layer.   | POWER SUPPLY PP-1095/SRT  |               |                       |                 |  | 2250 V. rms insulated for 875 volts inst.   | Filter choke, smoothing; inductance 3 hy at 414 ma; 120 cps $\pm$ 5%. Hermetically sealed. |
|                    |                |           |   | #25F  | 1560          | 35                    |                 |  |   |  |
| L-502              | NL-980823-1    | (5)       | Single winding, single layer.   | #24F  | 2000          | 40                    |                 | 2250 V. rms insulated for 875 volts inst.  | Filter choke, swinging; inductance 3 to 15 hy at 414 to 50 ma; 120 cps $\pm$ 5%. Hermetically sealed. |  |
| L-503              | NL-980851-1    | (5)       | Single winding, single layer.   | #29F  | 2450          | 125                   |                 | 5200 V. rms insulated for 3000 volts inst. | Filter choke, smoothing; inductance 8 hy at 230 ma; 120 cps $\pm$ 5%. Hermetically sealed.            |  |
| L-504              | NL-980850-1    | (5)       | Single winding, single layer.   | #28F  | 2750          | 140                   |                 | 5200 V. rms insulated for 3000 volts inst. | Filter choke, swinging; inductance 40 to 8 hy at 230 to 50 ma; 100-120 cps. Hermetically sealed.      |  |

\* For diagrams (1) through (5), see page 7-156.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIG-NATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING  | WIRE SIZE                            | TURNS  | D-C RESISTANCE (Ohms)           | IMPED-ANCE RATIO | HIPOT A-C VOLTS  | REMARKS   |
|---------------------|----------------|-----------|--|--------------------------------------|--|---------------------------------|------------------|--|---|
| T-501               | NL-980846-1    | (6)       | Primary (1-2)<br>Secondary (3-5)   | #13F<br>#23F                         | 150<br>1720 ct at<br>860                             | Low<br>29                       |                  | 1500 V.<br>rms Pri.<br>2300 V.<br>rms Sec.                           | Power transformer plate type: rated at 360 VA. Terminals 1 and 2: 110 volts $\pm 10\%$ input (primary) 60 cps $\pm 5\%$ . Terminals 3 and 5: 1240 volts at 414 ma (center tapped); regulation 5% max. Electrostatic shield between primary and secondary. Hermetically sealed.  |
| T-502               | NL-980849-1    | (7)       | Primary (1-2)<br>Secondary #3 (8-9)<br>Secondary #2 (6-7)<br>Secondary #1 (3-5)                          | #23F<br>#17F<br>#11F<br>#11F         | 293<br>17½<br>7<br>7 ct at 3½                        | 3.5<br>Low<br>Low<br>Low        | 1500 V           | 1500 V.<br>rms Pri.<br>5200 V.<br>rms Sec.                           | Power transformer, filament type: terminals 1 and 2, input (primary): 110 volts $\pm 10\%$ 60 cps $\pm 5\%$ , sec. #3 (8 and 9): 6.3 volts at 2 amp, sec. #2 (6 and 7): 2.5 volts at 10 amp, sec. #1 (3 and 5): 2.5 volts at 10 amp, term. #4 is center tap; regulation 10% max. Electrostatic shield between primary and secondary. Hermetically sealed. |
| T-503               | NL-980848-1    | (8)       | Primary<br>Secondary   | #13F<br>#27F                         | 144 tapped<br>at 113<br>3310 ct at<br>1655           | Low<br>220                      |                  | 1500 V.<br>rms<br>4250 V.<br>rms                                     | Power transformer step-up; Primary: 110 V. rms $\pm 10\%$ , 60 cps $\pm 5\%$ . Secondary: 2480 V. rms ct at 190 ma full primary; or 3160 V. rms ct at 230 ma tapped primary. Regulation 5% max; electrostatic shield between primary and secondary; hermetically sealed.  |
| L-1001              | NL-980616-1    | (5)       | Single winding, single layer.  | #30F                                 | 2740   | 168 max                         |                  | 1850   | Input reactor: Inductance: 5 hy min. at 200 ma. Frequency: 100-120 cps. Hermetically sealed.  |
| L-1005              | NL-980617-1    | (5)       | Single winding, single layer.  | #17F                                 | 335  | 1.25                            |                  | 1500   | Input reactor: Inductance: 0.1 hy to 0.4 hy at 1.5 to 0.1 amp. Frequency: 100-120 cps. Hermetically sealed.   |
| T-1001              | NL-982185-1**  | (9)       | Primary (1-2)<br>Secondary #1 (3-5)<br>Secondary #2 (6-7)  | #21E<br>#30E<br>2-#17E               | 251<br>2360 ct at<br>1180<br>6                       | 2.2<br>199<br>Low               |                  | 1500<br>2000<br>1500   | Plate transformer: Primary (1-2): 110 volts $\pm 10\%$ , 50-60 cps. Secondary #1 (3-5): 1000 volts, 150 ma, terminal 4 is center tap. Secondary #2 (6-7): 2.5 volts at 4.75 amp. Regulation 5% max. Hermetically sealed. Electrostatic shield between primary and secondary windings.   |
| T-1002              | NL-980606-1    | (10)      | Primary (1-2)<br>Secondary #1 (3-5)<br>Secondary #2 (6-7)<br>Secondary #3 (8-10)<br>Secondary #4 (11-12) | #21F<br>#16F<br>#15F<br>#16F<br>#18F | 280<br>17 ct at<br>8½<br>17<br>17 ct at<br>8½<br>13½ | 2.2<br>Low<br>Low<br>Low<br>Low |                  | Primary:<br>1500 V<br>test.<br>Other<br>windings:<br>1850 V<br>test. | Filament transformer: Primary (1-2): 110 volts $\pm 10\%$ , 50-60 cps. Secondary #1 (3-5): 6.3 volts, 2.8 amp, terminal 4 ct. Secondary #2 (6-7): 6.3 volts, 4.25 amp. Secondary #3 (8-10): 6.3 volts, 3 amp; terminal 9 ct. Secondary #4 (11-12): 5 volts, 2 amp. Secondary #5 (13-14): 15   |

\* For diagrams (5) and (6) through (10), see page 7-156.

\*\* Later production models use NL-901614-1.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL                           | FTL DWG NUMBER | DIA-GRAM* | WINDING   | WIRE SIZE                                | TURNS  | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO   | HIPOT A-C VOLTS      | REMARKS   |
|--|----------------|-----------|---|--|--|-----------------------|---|----------------------|---|
| T-1002 (cont'd.)                             |                |           | Secondary #5 (13-14)<br>Secondary #6 (15-17)                      | #25F<br>#20F                             | 39½<br>46 tapped at 43½  | Low<br>Low            |   |                      | volts, 0.3 amp. Secondary #6 (15-16): 16.5 volts. Secondary #6 (15-17): 17.5 volts, 1 amp. Regulation: secondaries 1-4 is 10%, 5 and 6 is 5% max. Hermetically sealed. Electrostatic shield between primary and secondary windings.   |
| T-1003                                       | NL-980977-1    | (11)      | Primary (1-3)<br>Secondary (4-5)                                  | #29E<br>#42E                             | 273 tapped at 68<br>4911   | 6.5<br>1840           | 333:1<br>or<br>5714:1   | 1000                 | AF input transformer: Primary (1-3) impedance: 600 ohms. 35 ohm tap (1-2). Secondary (4-5) impedance: 200,000 ohms. Frequency response: 100 cps to 5 kc ±½ db. Maximum level: 18 db. Distortion: ½ percent max. Hermetically sealed.  |
| T-1004                                       | NL-980978-1    | (12)      | Primary (P-P)<br>Secondary No. 1 (G-G)<br>Secondary No. 2 (0-10K) | #31E<br>#31E<br>#32E                     | 2144 tapped at 1072<br>1148 ct at 574<br>3494 tapped at 3348, 3203 | 84<br>81<br>410       | Primary (P-P): 1500<br>Secondary No. 1: 2100<br>Secondary No. 2: 3700 |                      | AF modulation transformer: Primary (P-P): 4200 ohms with 120 ma balanced. Secondary No. 1: 1000 ohms over-all with 20 ma balanced. Secondary No. 2: 8000, 9000 and 10,000 ohms with 140 ma unbalanced. Frequency response: 100 to 15 kc ±½ db. Distortion: 1% max. Hermetically sealed. |
| T-1005                                       | NL-980979-1    | (13)      | Primary (1-2)<br>Secondary (3-4)                                  | #43E<br>#38E                             | 6132<br>1672   | 3600<br>2600          | 25:1  | 1500 V Pri. and Sec. | AF plate coupling transformer: Primary (1-2): 15,000 ohms with 8 ma dc. Secondary (3-4): 600 ohms. Max level: +25 dbm. Frequency response: 200 to 4500 cps ±½ db. Distortion: 5% max. Hermetically sealed.  |
| Z-1001                                       | NL-980974-1    | (14)      | Dual Terminals 1-2<br>Terminals 2-3                               | #36E<br>#33E                             | 2123<br>1269   | 250<br>192<br>58      |   | 600                  | Low pass filter: Impedance: 10,000 ohms input and output. Cutoff: 6000 cps. Max insertion loss: 0.5 db. Max level: +3 db. Hermetically sealed.  |
| <b>RADIO FREQUENCY AMPLIFIER AM-1008/SRT</b> |                |           |   |  |  |                       |   |                      |   |
| E-1309                                       | NL-980955-1    | (15)      | Single winding, single layer, spaced 1/16 in. apart.              | #18 bare, tinned copper wire, 9 in. long | 7  |                       |   |                      | Parasitic suppressor: wire wound around a 330-ohm, 1-watt resistor.   |

\* For diagrams (10) through (15) see pages 7-156 and 7-157.



TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING  | WIRE SIZE            | TURNS   | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS  |
|--------------------|----------------|-----------|--|----------------------|---|-----------------------|-----------------|-----------------|--|
| L-1301             | NL-981864-1    | (16)      | Three pies, single universal winding; unshielded; ceramic form (NS-3-W-02-08) per JAN-I-8. | 10/41 E SSC Litz     | Pie 1: 100 turns<br>Pie 2: 100 turns<br>Pie 3: approx 90 turns<br>(See "Remarks") |                       |                 |                 | RF coil: pie 3 contains enough wire to produce inductance of $700 \mu\text{h} \pm 5\%$ . Winding is clockwise when viewed from top (Pie 1). Q: 50 min. at 790 kc. Impregnate per method 2. |
| L-1302             | NL-980705-2-4  | (17)      | Single winding, single layer, space wound; unshielded; ceramic form Millen #69046.         | No. 14 single Formex | 6 double spaced   |                       |                 |                 | RF coil: inductance: $0.38 \mu\text{h}$ w/slug withdrawn. Q: 100.0 min. at 25.0 mc. Impregnate per method 3.   |
| L-1303             | NL-980705-2-3  | (17)      | Single winding, single layer; close wound; unshielded; ceramic form Millen #69046.         | No. 14 single Formex | 10  |                       |                 |                 | RF coil: inductance: $0.82 \mu\text{h}$ w/slug withdrawn. Q: 90.0 min. at 25.0 mc. Impregnate per method 3.  |
| L-1304             | NL-980705-2-2  | (17)      | Single winding, single layer; close wound; unshielded, ceramic form Millen #69046.         | No. 20 single Formex | 18  |                       |                 |                 | RF coil: inductance: $2.5 \mu\text{h}$ w/slug withdrawn. Q: 70.0 min. at 7.9 mc. Impregnate per method 3.  |
| L-1305             | NL-980705-2-1  | (17)      | Single winding, single layer; close wound; unshielded; ceramic form Millen #69046.         | No. 26 single Formex | 47  |                       |                 |                 | RF coil: inductance $14.0 \mu\text{h}$ w/slug withdrawn. Q: 50.0 min. at 2.5 mc. Impregnate per method 3.  |
| L-1306             | NL-982818-1    | (18)      | Single, universal winding, one pie, unshielded; ceramic form.                              | No. 36 single nylon  | 397   | 28                    |                 |                 | RF coil: inductance: 2.5 mh at 125 ma. Impregnate per method 4.  |
| L-1307             | Same as L-1302 |           |  |                      |   |                       |                 |                 |  |
| L-1308             | Same as L-1303 |           |  |                      |   |                       |                 |                 |  |
| L-1309             | Same as L-1304 |           |  |                      |   |                       |                 |                 |  |
| L-1310             | Same as L-1305 |           |  |                      |   |                       |                 |                 |  |
| L-1311             | NL-982759-1    | (19)      | Single winding, five pies, universal wound; unshielded; ceramic form.                      | No. 36E single nylon | 332 per pie; (total turns—1660)   | 100                   |                 |                 | RF coil: inductance: $10.0 \text{ mh} \pm 5\%$ at 0.125 amp D.C. Freq: 0.3-26 mc. Impregnate per method 4.   |

\* For diagrams (16) through (19) see page 7-157.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING   | WIRE SIZE  | TURNS                                       | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|--------------------|----------------|-----------|---|--|---|-----------------------|-----------------|-----------------|---|
| L-1313             | NL-982571-1    | (20)      | Single winding, four layers, bank wound, unshielded; texolite #1422 form.             | No. 26E CSC  | 113 feet to fill space indicated in diagram | 6                     |                 |                 | RF coil: Inductance: 0.45 mh +10% -5% at 300 ma. Q: 35 min. at 0.79 mc. Freq: 0.8-2 mc. Impregnate per method 3.                |
| L-1314             | NL-982758-1    | (21)      | Single winding, single layer, helix; unshielded; ceramic form Ohmite type Z-7.        | No. 32 bare copper wire  | 192   | 4.6                   |                 |                 | RF coil: Inductance: 85 $\mu$ h +20-0 $\mu$ h at 0.5 mc, 1.0 amp. Q: 100 min. at 2.5 mc. Freq: 2.0 mc. Impregnate per method 4. |
| L-1315             | NL-982757-1    | (22)      | Single winding, single layer, helix; unshielded; ceramic form Ohmite type Z-14.       | #33E   | 130   | 3.08                  |                 |                 | RF coil: Inductance: 44.0 $\mu$ h at 0.6 amp. Q: 80.0 min. at 4.0 mc. Freq: 11-26 mc. Impregnate per method 4.                  |
| L-1316             | NL-983952-1    | (22)      | Single winding, single layer, close wound; unshielded; ceramic form Ohmite type Z-14. | No. 28E B & S  | 90  |                       |                 |                 | RF coil: Inductance: 26.0 $\mu$ h $\pm$ 5% at 2.5 mc, 1.2 amp. Q: 85 min. at 5 mc. Freq: 11-26 mc. Impregnate per method 3.     |
| L-1317             | NL-982110-3    | (23)      | Single winding, single layer; unshielded; threaded ceramic form.                      | 3/16 in. O.D. by 0.032 in. wall, silver plated, 1/2 HD copper tubing | 7 1/2                                       |                       |                 |                 | RF coil: Inductance: 1.7 $\mu$ h.   |
| L-1318             | NL-982109-3    | (24)      | Single winding, single layer; unshielded; threaded ceramic form.                      | 1/8 in. O.D. by 0.032 in. wall, silver plated, 1/2 HD copper tubing  | 11  |                       |                 |                 | RF coil: Inductance: 3.2 $\mu$ h.   |
| L-1319             | NL-982108-3    | (25)      | Single winding, single layer; unshielded; threaded ceramic form.                      | No. 14 silver clad copper wire                                       | 17  |                       |                 |                 | RF coil: Inductance: 8 $\mu$ h.   |
| L-1320             | NL-982107-3    | (25)      | Single winding, single layer; unshielded; threaded ceramic form.                      | No. 18 silver clad copper wire                                       | 43  |                       |                 |                 | RF coil: Inductance: 44 $\mu$ h.  |
| L-1323             | NL-982114-3    | (26)      | Single winding, single layer; unshielded; threaded ceramic form.                      | 3/16 in. by 0.032 in. wall, silver plated, 1/2 HD copper tubing      | 4 1/2, adj. tap 5/8 turns from finish       |                       |                 |                 | RF coil: Inductance: 0.85 $\mu$ h.  |
| L-1324             | NL-982113-3    | (27)      | Single winding, single layer; unshielded; threaded ceramic form.                      | 1/8 in. by 0.032 in. wall silver plated, 1/2 HD copper tubing        | 6 1/2, adj. tap 1 1/4 turns from finish     |                       |                 |                 | RF coil: Inductance: 1.6 $\mu$ h.   |

\* For diagrams (20) through (27) see page 7-157.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING   | WIRE SIZE                      | TURNS   | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|--------------------|----------------|-----------|---|--------------------------------|---|-----------------------|-----------------|-----------------|---|
| L-1325             | NL-982112-3    | (28)      | Single winding, single layer; unshielded; threaded ceramic form.                                | No. 14 silver clad copper wire | 11 tapped at 1, 1 $\frac{1}{4}$ , 1 $\frac{1}{2}$ turns from start    |                       |                 |                 | RF coil: Inductance: 7.4 $\mu$ h.   |
| L-1327             | NL-982111-3    | (28)      | Single winding, single layer; unshielded; threaded ceramic form.                                | No. 18 silver clad copper wire | 27 tapped at 3 $\frac{1}{8}$ , 4 and 4 $\frac{7}{8}$ turns from start |                       |                 |                 | RF coil: Inductance: 24 $\mu$ h.  |
| L-1329             | NL-981966-2-4  | (29)      | Single winding, single layer, unshielded; phenolic form.  | No. 20 single Formex           | 56 tapped at 6 turns from start                                       |                       |                 |                 | RF coil: Inductance: 52 $\mu$ h at 2.5 mc. Q: 125.0 min. Impregnate per method 3.   |
| L-1331             | NL-981966-2-3  | (30)      | Single winding, single layer, unshielded; phenolic form.  | No. 26 single Formex           | 130 tapped at 10 turns from start                                     |                       |                 |                 | RF coil: Inductance: 245 $\mu$ h at 790 kc. Q: 110.0 min. Impregnate per method 3.  |
| L-1332             | Same as L-1306 |           |   |                                |   |                       |                 |                 |   |
| L-1333             | NL-982572-1    | (31)      | Single winding, four pies, tapered; universal wound; unshielded, ceramic form, JW Miller #4551. | No. 28 CSC                     | 720   | 10                    |                 |                 | RF coil: Inductance: 4.0 mh at 0.6 amp. Q: 20 min. at 0.15 mc. Freq: 0.3 to 0.8 mc. Impregnate per method 4.  |
| L-1334             | NL-981865-1    | (32)      | One pie, CW, single, universal wound, unshielded; ceramic form (NS-3-W-02-08) per JAN-I-8.      | No. 10/41E Litz SSC            | 70 approx. (See "Remarks")  |                       |                 |                 | RF coil: An inductance of 90 $\mu$ h $\pm$ 5 percent is required. Q: 50 min at 790 kc. The number of turns is decided by the total inductance. Impregnate per method 2. |
| L-1335             | Same as L-1301 |           |   |                                |   |                       |                 |                 |   |
| L-1336             | Same as L-1334 |           |   |                                |   |                       |                 |                 |   |
| L-1337             | NL-980705-2-5  | (17)      | Single winding, single layer, close wound; unshielded; ceramic form Millen #69046.              | No. 26E                        | 35  |                       |                 |                 | RF coil: Inductance: 10 $\mu$ h w/slug withdrawn. Q: 75.0 min. at 2.5 mc; Impregnate per method 3.  |
| L-1338             | NL-980705-2-6  | (17)      | Single winding, single layer, close wound; unshielded; ceramic form Millen #69046.              | No. 20E                        | 16  |                       |                 |                 | RF coil: Inductance: 2.25 $\mu$ h w/slug withdrawn. Q: 100.0 min. at 7.9 mc. Impregnate per method 3.   |

\* For diagram (17) see page 7-157; for diagrams (28) through (32) see pages 7-157 and 7-158.

7-138

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING   | WIRE SIZE                                   | TURNS                          | D-C RESISTANCE (Ohms)                    | IMPEDANCE RATIO | HIPOT A-C VOLTS                         | REMARKS  |
|--------------------|----------------|-----------|---|---|--------------------------------|--|-----------------|---|--|
| L-1339             | NL-981966-2-2  | (29)      | Single winding, single layer; unshielded; phenolic form.  | No. 20 single Formex                        | 56                             |  |                 |   | RF coil: Inductance: 52 $\mu$ h. Q: 125.0 min. at 2.5 mc; impregnate per method 3.   |
| L-1340             | Same as L-1339 |           |   |   |                                |  |                 |   |  |
| L-1341             | NL-981966-2-1  | (30)      | Single winding, single layer, unshielded; phenolic form.  | No. 26 single Formex                        | 130                            |  |                 |   | RF coil: Inductance: 245 $\mu$ h. Q: 110.0 min. at 790 kc; impregnate per method 3.  |
| L-1342             | Same as L-1341 |           |   |   |                                |  |                 |   |  |
| L-1343             | NL-980624-1    | (5)       | Single winding, multi-layer.  | #30E  | 3571                           | 200                                      |                 | Insulated for 3000 volts inst.          | Reactor, filter choke; Inductance: 10 hy at 150 ma. Power level: 12 W. Frequency: 100 to 5000 cps. Load impedance: 7000 ohms. To operate at sea level. Hermetically sealed.  |
| L-1344             | Same as L-1311 |           |   |   |                                |  |                 |   |  |
| L-1345             | NL-901613-1    | (33)      | Single winding, single layer, air core.   | #16 soft, bare, tinned copper wire          | 4                              |  |                 |   | RF coil: Inductance: 0.1 $\mu$ h.  |
| T-1302             | NL-980605-1    | (34)      | 3 windings.<br>Primary (1-2)<br>Secondary #1 (3-4)<br>Secondary #2 (5-7)  | #19F<br>#12F<br>#10F                        | 284<br>14<br>11 ct at 5 1/2    | 1.3<br>Low<br>Low                        |                 | 1500<br>1500<br>1500 V                  | Power transformer, step-down: Primary: 110 V rms $\pm$ 10%, 60 cps $\pm$ 5% Sec. #1: 6.3 V at 6.5 amp. Sec #2: 5.0 V at 14.5 amps, term. 6 is ct. Electrostatic shield between primary and secondary windings. Hermetically sealed.  |
| L-1501             | NL-980881-1    | (5)       | Single winding, single layer.   | #24   | 1100                           | 25                                       |                 | 6400                                    | Reactor: Swinging choke. Inductance: 8 hy to 2 hy at 600 to 10 ma DC. Frequency: 300 cps. Hermetically sealed.   |
| T-1501             | NL-980883-1    | (36)      | Primary #1 (1-2)<br>Primary #2 (3-4)<br>Secondary #4 (5-6)<br>Secondary #3 (7-8)<br>Secondary #2 (9-10)<br>Secondary #1 (11-12) | #26F<br>#26F<br>#12F<br>#12F<br>#12F<br>#8F | 425<br>425<br>5<br>5<br>5<br>5 | 11.8<br>12.7<br>Low<br>Low<br>Low<br>Low |                 | Primary 1500 V<br>Other windings 5200 V | Filament transformer: 440 volt operation, 50/60 cyc: Primary, connect terminals 2 and 3. 220 volt operation: Primary, connect terminal 1 to 3 and connect terminal 2 to 4. Secondary No. 4 (5-6): 2.5 volts, 5 amp. Secondary No. 3 (7-8): 2.5 volts, 5 amp. Secondary No. 2 (9-10): 2.5 volts, 5 amp. Secondary No. 1 (11-12): 2.5 volts, 15 amp. Electrostatic shield between primary and secondary windings. Hermetically sealed. |

\* For diagram (5) see page 7-156; for diagrams (29), (30), (33), (34) and (36) see pages 7-157 and 7-158.

ORIGINAL

7 Section

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16ACORRECTIVE  
MAINTENANCE

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING  | WIRE SIZE                            | TURNS                      | D-C RESISTANCE (Ohms)   | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS  |
|--------------------|-----------------|-----------|--|--------------------------------------|----------------------------|---|-----------------|-----------------|--|
| T-1502             | NL-980880-1     | (37)      | Phase 1, 2, 3:<br>Primary #1   | #20F                                 | 177 tapped at 33, 66       | 1.2   |                 | 1500            | Three phase plate transformer: Primary: 220 V or 440 V rms, 3 phase, 3 wire delta, 50-60 cps; Pri. #1: 220 V. Pri. #2: 220 V. To operate from 220 V connect the 2 coils of each phase in parallel; for 440 V connect the 2 coils of each phase in series. Secondary: 1835 V rms at 518 VA per phase or 2260 V rms at 425 VA per phase; pri. & sec. values same for all 3 phases. Regulation: 5%. Electrostatic shield between pri. & sec. windings. Open core. |
|                    |                 |           | Primary #2   | #20F                                 | 177                        | 1.2   |                 | 1500            |  |
|                    |                 |           | Secondary  | #25F                                 | 1490                       | 42  |                 | 7000            |  |
| T-1601             | NL-980976-1     | (38)      | Two windings:<br>Primary P1-P2<br>Secondary 0-8K   | RADIO MODULATOR MD-230/SRT           |                            |   |                 | 7500            | High level modulator: Primary (P1-P2): 22,000 ohms w/130 ma balanced. Secondary: 8,000 ohms w/340 ma. Taps at 6,000 and 7,000 ohms. 355 watts, unbalanced. Frequency response: 100 cps to 4.5 kc $\pm$ 1 db with specified load. Distortion: 2% max. Output 355 watts unbalanced, Hermetically sealed.   |
|                    |                 |           |  | #28E                                 | 5200, ct at 2600           | 315   | 275:1           |                 |  |
|                    |                 |           |  | #28E                                 | 1880, tapped at 1577, 1300 | 96  |                 | 7500            |  |
|                    |                 |           |  |                                      |                            |   |                 |                 |  |
| T-1602             | NL-980873-1     | (39)      | 4 windings:<br>Primary #1 (1-2)<br>Primary #2 (3-4)<br>Secondary #1 (5-7)<br>Secondary #2 (8-10) | #29F                                 | 710                        | 28  | Low             | 1500            | Filament transformer: Primaries: 220 V or 440 V, 60 cycles, single phase. For 220 volts operation: Join terminals 1 to 3 and terminals 2 to 4. For 440-volt operation: Join terminals 2 to 3. Secondary (5-7): 82 volts, at 2.5 VA, ct. Secondary (8-10): 5 volts at 13 amp, ct. Electrostatic shield between primary and secondary windings. Hermetically sealed.   |
|                    |                 |           |  | #29F                                 | 710                        | 32  |                 | 1500            |  |
|                    |                 |           |  | #32F                                 | 274, ct at 137             | 27  |                 | 1500            |  |
|                    |                 |           |  | #10F                                 | 17, ct at 8 1/2            |   |                 | 1500            |  |
| L-2001             | NL-960140-14-1  | (40)      | Two pies, one winding, universal, untapped; shielded; plastic form.                              | RADIO FREQUENCY OSCILLATOR O-275/SRT |                            |   |                 |                 | RF coil: Inductance: 1700 $\mu$ h at 1000 cps without slug, 3.65 to 7.1 mh w/slug tuning. Impregnate per method 1, steps 1, 2, 4, 4.   |
|                    |                 |           |  | No. 38EF                             | 420 per pie                | 34  |                 |                 |  |
| L-2002             | NL-960090-14-19 | (41)      | Single universal winding; one pie. Unshielded bakelite form Cambridge Thermionic #ES-184.        | No. 38 EF                            | 540                        | 34  |                 |                 | RF coil: Inductance: 1340 $\mu$ h at 0.25 mc without slug, 1700 to 2400 $\mu$ h w/slug tuning; min. Q: 20. Impregnate per method 1, steps 1, 2, 4, 4.  |
| L-2051A            | NL-960085-3     | (42)      | Single winding, six layer, bank wound; max. coil lg 11/16 in.; unshielded; ceramic form.         | No. 5/36 EF2 Litz                    | 170 tapped at 29, 119      | $\pm$ 10%<br>O-C, 3.45<br>O-K, 0.57<br>K-G, 1.85<br>G-C, 0.95 |                 |                 | RF coil: Inductance: 432.5 $\mu$ h $\pm$ 1% when mtd in Z-2051. 457.5 $\pm$ 1% in air at 100 kc. Impregnate per method 1, steps 1, 2, 6, 3, 3, 3.  |

\* For diagrams (37) through (42) see page 7-158.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING  | WIRE SIZE  | TURNS               | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|--------------------|----------------|-----------|--|------------|---------------------|-----------------------|-----------------|-----------------|---|
| L-2051B            | NL-960187-2    | (43)      | Single winding, unshielded H.L. Crowley Crolite 29 ceramic form.                       | No. 23R    | 24-42 (See Remarks) |                       |                 |                 | RF coil: Each coil must be chosen to make its accompanying impedance (Z-2051) resonate at 100 kc $\pm 0.005\%$ . The capacity will vary from 735 $\mu\mu\text{f}$ (24 turns) to 891 $\mu\mu\text{f}$ (42 turns). Impregnate per method 1, steps 1, 2, 3, 3. |
| L-2052             | NL-960086-2    | (44)      | Single winding, single layer, unshielded ceramic form. H.L. Crowley Crolite #29.       | No. 23R    | 23                  |                       |                 |                 | RF coil: Inductance: 3.95 $\mu\text{h}$ (in air) without slug; 4.2 to 5.4 $\mu\text{h}$ with slug tuning. Q: 115 at 7.9 mc. Impregnate per method 1, steps 1, 2, 3, 3.  |
| L-2053             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2054             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2055             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2056             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2057             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2058             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2059             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2060             | Same as L-2052 |           |  |            |                     |                       |                 |                 |   |
| L-2061             | NL-960120-2-4  | (45)      | Single winding, single layer, unshielded; bakelite form, Cambridge Thermionic #ES-184. | No. 22 EF2 | 13                  |                       |                 |                 | RF coil: Inductance: 0.62 $\mu\text{h}$ at 25 mc in air without slug; 0.67 $\mu\text{h}$ to 1.2 $\mu\text{h}$ with slug tuning. Impregnate per method 1, steps 1, 2, 4, 4, 5.   |
| L-2062             | NL-960120-2-3  | (45)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184. | No. 22 EF2 | 12 $\frac{1}{2}$    |                       |                 |                 | RF coil: Inductance: 0.62 $\mu\text{h}$ at 25 mc in air without slug; 0.67 $\mu\text{h}$ to 1.2 $\mu\text{h}$ with slug tuning. Impregnate per method 1, steps 1, 2, 4, 4, 5.   |
| L-2063             | Same as L-2061 |           |  |            |                     |                       |                 |                 |   |
| L-2064             | Same as L-2062 |           |  |            |                     |                       |                 |                 |   |
| L-2065             | Same as L-2061 |           |  |            |                     |                       |                 |                 |   |
| L-2066             | Same as L-2062 |           |  |            |                     |                       |                 |                 |   |
| L-2067             | Same as L-2061 |           |  |            |                     |                       |                 |                 |   |
| L-2068             | Same as L-2062 |           |  |            |                     |                       |                 |                 |   |
| L-2069             | Same as L-2061 |           |  |            |                     |                       |                 |                 |   |

\* For diagrams (43) through (45) see pages 7-158 and 7-159.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING  | WIRE SIZE          | TURNS                 | D-C RESISTANCE (Ohms)                                  | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS  |
|--------------------|-----------------|-----------|--|--------------------|-----------------------|--|-----------------|-----------------|--|
| L-2070             | NL-960120-2-2   | (46)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.           | No. 20 EF2         | 3                     |  |                 |                 | RF coil: Adj. slug tuning. Impregnate per method 1, steps 1, 2, 4, 4, 5.   |
| L-2071             | NL-960120-2-1   | (46)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.           | No. 20 EF2         | 2½                    |  |                 |                 | RF coil: Adj. slug tuning. Impregnate per method 1, steps 1, 2, 4, 4, 5.   |
| L-2072             | Same as L-2070  |           |  |                    |                       |  |                 |                 |  |
| L-2073             | Same as L-2071  |           |  |                    |                       |  |                 |                 |  |
| L-2074             | Same as L-2070  |           |  |                    |                       |  |                 |                 |  |
| L-2075             | Same as L-2071  |           |  |                    |                       |  |                 |                 |  |
| L-2076             | Same as L-2070  |           |  |                    |                       |  |                 |                 |  |
| L-2077             | Same as L-2071  |           |  |                    |                       |  |                 |                 |  |
| L-2078             | Same as L-2070  |           |  |                    |                       |  |                 |                 |  |
| L-2079             | Same as L-2071  |           |  |                    |                       |  |                 |                 |  |
| L-2080             | Same as L-2052  |           |  |                    |                       |  |                 |                 |  |
| L-2126             | NL-960084-3     | (47)      | One winding, eight layer; bank wound, max. coil lg 1 in.; unshielded ceramic form.               | No. 5/36 EF2, Litz | 314 tapped at 53, 228 | ±10%<br>O-K, 1.10<br>K-G, 3.7<br>G-C, 1.7<br>O-C, 6.54 |                 |                 | RF coil: Inductance: 139 μh ±2% in air at 100 kc. Resonance: 1812 μμf ±2%. Impregnate per method 1, steps 1, 2, 6, 3, 3, 3.                  |
| L-2201             | NL-960147-1-3   | (48)      | Single, universal winding; one pie; unshielded; iron core form. Cambridge Thermionic LPG-3-460F. | No. 38 EF          | 245                   | 10.5   |                 |                 | RF coil: Inductance: 460 μh ±5% at 1000 cps in air.  |
| L-2202             | Same as L-2201  |           |  |                    |                       |  |                 |                 |  |
| L-2204             | NL-960090-14-16 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184.     | No. 5/41 EF2 Litz  | 102                   | 2.5  |                 |                 | RF coil: Inductance: 70 μh at 1.25 mc without slug. 74 μh to 113 μh with slug tuning. Min. Q: 50. Impregnate per method 1, steps 1, 2, 4, 4. |
| L-2205             | Same as L-2204  |           |  |                    |                       |  |                 |                 |  |
| L-2206             | Same as L-2204  |           |  |                    |                       |  |                 |                 |  |

\* For diagrams (46) through (49) see page 7-159.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIG-NATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING   | WIRE SIZE         | TURNS | D-C RESISTANCE (Ohms) | IMPED-ANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|---------------------|-----------------|-----------|---|-------------------|-------|-----------------------|------------------|-----------------|---|
| L-2207              | NL-960090-14-15 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184.    | No. 5/41 EF2 Litz | 88    | 2.1                   |                  |                 | RF coil: Inductance: 49 $\mu$ h at 1.25 mc without slug. 52 $\mu$ h to 83 $\mu$ h with slug tuning. Min. Q: 45. Impregnate per method 1, steps 1, 2, 4, 4.  |
| L-2208              | Same as L-2207  |           |   |                   |       |                       |                  |                 |   |
| L-2209              | NL-960090-14-18 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184.    | No. 34 EF2        | 76    | 1.8                   |                  |                 | RF coil: Inductance: 35 $\mu$ h at 2.5 mc without slug. 38 $\mu$ h to 66 $\mu$ h w/slug tuning. Min. Q: 15. Impregnate per method 1, steps 1, 2, 4, 4.      |
| L-2210              | Same as L-2209  |           |   |                   |       |                       |                  |                 |   |
| L-2211              | NL-960090-14-14 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184.    | No. 5/41 EF2 Litz | 69    | 1.6                   |                  |                 | RF coil: Inductance: 29 $\mu$ h at 2.5 mc without slug. 32 $\mu$ h to 53 $\mu$ h w/slug tuning. Min. Q: 40. Impregnate per method 1, steps 1, 2, 4, 4.      |
| L-2212              | Same as L-2211  |           |   |                   |       |                       |                  |                 |   |
| L-2215              | Same as L-2201  |           |   |                   |       |                       |                  |                 |   |
| L-2216              | Same as L-2201  |           |   |                   |       |                       |                  |                 |   |
| L-2301              | NL-961903-1     | (50)      | Single winding, close wound on powdered iron form notched (Stackpole type ICS).                 | No. 28E           | 36    | 0.141                 |                  |                 | RF coil: Inductance: 10 $\mu$ h $\pm$ 10%; Q: 50 minimum. Impregnate per method 1, steps 1, 2, 3, 3, 5.   |
| L-2302              | NL-960147-1-2   | (51)      | Single universal winding; one pie; unshielded; phenolic form, Cambridge Thermionic #LPB-3-120F. | No. 38 EF         | 191   | 7.5                   |                  |                 | RF coil: Inductance: 120 $\mu$ h $\pm$ 5% at 1000 cps in air.   |
| L-2303              | Same as L-2302  |           |   |                   |       |                       |                  |                 |   |
| L-2326              | Same as L-2302  |           |   |                   |       |                       |                  |                 |   |
| L-2327              | NL-960090-14-17 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184.    | No. 38 EF2        | 36    | 1.7                   |                  |                 | RF coil: Inductance: 7.4 $\mu$ h at 5 mc without slug. 8.0 $\mu$ h to 15.6 $\mu$ h with slug tuning. Min. Q: 40. Impregnate per method 1, steps 1, 2, 4, 4. |
| L-2328              | Same as L-2327  |           |   |                   |       |                       |                  |                 |   |

\* For diagrams (49) through (51) see page 7-159.



TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING   | WIRE SIZE  | TURNS | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|--------------------|-----------------|-----------|---|------------|-------|-----------------------|-----------------|-----------------|---|
| L-2329             | NL-960090-14-20 | (52)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.          | No. 38 EF  | 36    | 1.6                   |                 |                 | RF coil: Inductance: 5.8 $\mu$ h at 5.0 mc without slug. 6.1 to 11.5 $\mu$ h with slug tuning. Min. Q: 50-60. Impregnate per method 1, steps 1, 2, 4, 4.            |
| L-2330             | Same as L-2329  |           |   |            |       |                       |                 |                 |   |
| L-2331             | NL-960090-14-22 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184.    | No. 38 EF2 | 27    | 1.25                  |                 |                 | RF coil: Inductance: 4.3 $\mu$ h at 5.0 mc without slug. 4.5 $\mu$ h to 8.6 $\mu$ h with slug tuning. Min. Q: 40. Impregnate per method 1, steps 1, 2, 4, 4.        |
| L-2332             | Same as L-2331  |           |   |            |       |                       |                 |                 |   |
| L-2333             | NL-960090-14-21 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184.    | No. 38 EF2 | 22    | 1.0                   |                 |                 | RF coil: Inductance: 3.1 $\mu$ h at 5.0 mc without slug. 3.3 $\mu$ h to 6.0 $\mu$ h with slug tuning. Min. Q: 35. Impregnate per method 1, steps 1, 2, 4, 4.        |
| L-2334             | Same as L-2333  |           |   |            |       |                       |                 |                 |   |
| L-2335             | Same as L-2333  |           |   |            |       |                       |                 |                 |   |
| L-2336             | NL-960147-1-1   | (51)      | Single, universal winding; one pie; unshielded; phenolic form, Cambridge Thermionic #LPB-3-63F. | No. 38 EF  | 138   | 5.5                   |                 |                 | RF coil: Inductance: 63 $\mu$ h $\pm$ 5% at 1000 cps in air.  |
| L-2337             | Same as L-2336  |           |   |            |       |                       |                 |                 |   |
| L-2338             | NL-960140-14-32 | (53)      | Single winding, single layer; shielded; plastic form.   | No. 32 EF2 | 10    |                       |                 |                 | RF coil: Inductance: 1.19 $\mu$ h at 12.5 mc without slug. Min. Q: 75. Impregnate per method 1, steps 1, 2, 4, 4.   |
| L-2339             | NL-960140-14-33 | (53)      | Single winding, single layer, shielded; plastic form.   | No. 32 EF2 | 10    |                       |                 |                 | RF coil: Inductance: 1.19 $\mu$ h at 12.5 mc without slug. Min. Q: 75. Impregnate per method 1, steps 1, 2, 4, 4.   |
| L-2340             | Same as L-2302  |           |   |            |       |                       |                 |                 |   |
| L-2426             | NL-960090-14-1  | (54)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.          | No. 30 EF2 | 8     |                       |                 |                 | RF coil: Inductance: 0.53 $\mu$ h at 12.5 mc without slug. 0.56 $\mu$ h to 0.95 $\mu$ h with slug tuning. Min. Q: 50-55. Impregnate per method 1, steps 1, 2, 4, 4. |
| L-2427             | NL-960090-14-5  | (55)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.          | No. 28 EF2 | 7     |                       |                 |                 | RF coil: Inductance: 0.40 $\mu$ h at 12.5 mc without slug. 0.45 $\mu$ h to 0.70 $\mu$ h with slug tuning. Min Q: 40-55. Impregnate per method 1, steps 1, 2, 4, 4.  |

\* For diagrams (49), (51), and (52) through (55) see page 7-159.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING  | WIRE SIZE  | TURNS | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS  |
|--------------------|-----------------|-----------|--|------------|-------|-----------------------|-----------------|-----------------|--|
| L-2428             | NL-960090-14-3  | (55)      | Single winding; single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.       | No. 22 EF2 | 5     |                       |                 |                 | RF coil: Inductance: 0.21 $\mu$ h at 25 mc without slug. 0.23 $\mu$ h to 0.34 $\mu$ h with slug tuning. Min Q: 60-70. Impregnate per method 1, steps 1, 2, 4, 4.                 |
| L-2429             | NL-960090-14-4  | (55)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.       | No. 22 EF2 | 4     |                       |                 |                 | RF coil: Inductance: 0.16 $\mu$ h at 25 mc without slug. 0.17 $\mu$ h to 0.25 $\mu$ h with slug tuning. Min. Q: 50-65. Impregnate per method 1, steps 1, 2, 4, 4.                |
| L-2430             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2431             | Same as L-2426  |           |  |            |       |                       |                 |                 |  |
| L-2432             | Same as L-2427  |           |  |            |       |                       |                 |                 |  |
| L-2433             | Same as L-2428  |           |  |            |       |                       |                 |                 |  |
| L-2434             | Same as L-2429  |           |  |            |       |                       |                 |                 |  |
| L-2435             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2436             | Same as L-2426  |           |  |            |       |                       |                 |                 |  |
| L-2437             | Same as L-2427  |           |  |            |       |                       |                 |                 |  |
| L-2438             | Same as L-2428  |           |  |            |       |                       |                 |                 |  |
| L-2439             | Same as L-2429  |           |  |            |       |                       |                 |                 |  |
| L-2440             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2441             | Same as L-2426  |           |  |            |       |                       |                 |                 |  |
| L-2442             | Same as L-2427  |           |  |            |       |                       |                 |                 |  |
| L-2443             | Same as L-2428  |           |  |            |       |                       |                 |                 |  |
| L-2444             | Same as L-2429  |           |  |            |       |                       |                 |                 |  |
| L-2445             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2446             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2526             | NL-960090-14-12 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184. | No. 38 EF2 | 22    | 1.0                   |                 |                 | RF coil: Inductance: 3.1 $\mu$ h at 5.0 mc without slug. 3.3 $\mu$ h to 6.0 $\mu$ h with slug tuning. Min. Q: 35. One term. grounded. Impregnate per method 1, steps 1, 2, 4, 4. |
| L-2527             | NL-960090-14-6  | (54)      | Single winding, single layer, unshielded; bakelite form, Cambridge Thermionic #ES-184.       | No. 38 EF  | 17    |                       |                 |                 | RF coil: Inductance: 2.1 $\mu$ h at 7.9 mc without slug. 2.4 $\mu$ h to 4.2 $\mu$ h with slug tuning. Min. Q: 45-50. Impregnate per method 1, steps 1, 2, 4, 4.                  |

\* For diagrams (49), (54), and (55) see page 7-159.

ORIGINAL

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING  | WIRE SIZE  | TURNS | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|--------------------|----------------|-----------|--|------------|-------|-----------------------|-----------------|-----------------|---|
| L-2528             | NL-960090-14-8 | (54)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184. | No. 32 EF  | 12    |                       |                 |                 | RF coil: Inductance: 0.93 $\mu$ h at 7.9 mc without slug. 1.0 $\mu$ h to 1.9 $\mu$ h with slug tuning. Min. Q: 45. Impregnate per method 1, steps 1, 2, 4, 4.       |
| L-2529             | NL-960090-14-9 | (54)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184. | No. 32 EF2 | 10    |                       |                 |                 | RF coil: Inductance: 0.75 $\mu$ h at 12.5 mc without slug. 0.80 $\mu$ h to 1.40 $\mu$ h with slug tuning. Min. Q: 60-65. Impregnate per method 1, steps 1, 2, 4, 4. |
| L-2530             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2531             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2532             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2533             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2534             | Same as L-2427 |           |  |            |       |                       |                 |                 |   |
| L-2535             | Same as L-2427 |           |  |            |       |                       |                 |                 |   |
| L-2536             | NL-960090-14-2 | (56)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184. | No. 22 EF2 | 7     |                       |                 |                 | RF coil: Inductance: 0.31 $\mu$ h at 25 mc without slug. 0.33 $\mu$ h to 0.55 $\mu$ h with slug tuning. Min. Q: 70-75. Impregnate per method 1, steps 1, 2, 4, 4.   |
| L-2537             | Same as L-2526 |           |  |            |       |                       |                 |                 |   |
| L-2538             | Same as L-2527 |           |  |            |       |                       |                 |                 |   |
| L-2539             | Same as L-2528 |           |  |            |       |                       |                 |                 |   |
| L-2540             | Same as L-2529 |           |  |            |       |                       |                 |                 |   |
| L-2541             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2542             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2543             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2544             | Same as L-2426 |           |  |            |       |                       |                 |                 |   |
| L-2545             | Same as L-2427 |           |  |            |       |                       |                 |                 |   |
| L-2546             | Same as L-2427 |           |  |            |       |                       |                 |                 |   |
| L-2547             | Same as L-2536 |           |  |            |       |                       |                 |                 |   |
| L-2548             | Same as L-2526 |           |  |            |       |                       |                 |                 |   |
| L-2549             | Same as L-2527 |           |  |            |       |                       |                 |                 |   |
| L-2550             | Same as L-2528 |           |  |            |       |                       |                 |                 |   |

\* For diagrams (54) and (56) see page 7-159.

CORRECTIVE  
MAINTENANCENAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

Section 7

7-145

TABLE 7-43. WINDING DATA (Cont'd)

| DESIG-NATION SYMBOL | FTL DWG NUMBER | DIA-GRAM | WINDING | WIRE SIZE | TURNS | D-C RESISTANCE (Ohms) | IMPED-ANCE RATIO | HIPOT A-C VOLTS | REMARKS |
|---------------------|----------------|----------|---------|-----------|-------|-----------------------|------------------|-----------------|---------|
| L-2551              | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2552              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2553              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2554              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2555              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2556              | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2557              | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2558              | Same as L-2536 |          |         |           |       |                       |                  |                 |         |
| L-2559              | Same as L-2526 |          |         |           |       |                       |                  |                 |         |
| L-2560              | Same as L-2527 |          |         |           |       |                       |                  |                 |         |
| L-2561              | Same as L-2528 |          |         |           |       |                       |                  |                 |         |
| L-2562              | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2563              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2564              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2565              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2566              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2567              | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2568              | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2569              | Same as L-2536 |          |         |           |       |                       |                  |                 |         |
| L-2570              | Same as L-2526 |          |         |           |       |                       |                  |                 |         |
| L-2571              | Same as L-2527 |          |         |           |       |                       |                  |                 |         |
| L-2572              | Same as L-2528 |          |         |           |       |                       |                  |                 |         |
| L-2573              | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2574              | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2575              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2576              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2577              | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2578              | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2579              | Same as L-2427 |          |         |           |       |                       |                  |                 |         |

7-146

ORIGINAL

ORIGINAL

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING  | WIRE SIZE  | TURNS | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS  |
|--------------------|-----------------|-----------|--|------------|-------|-----------------------|-----------------|-----------------|--|
| L-2580             | Same as L-2536  |           |  |            |       |                       |                 |                 |  |
| L-2581             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2582             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2583             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2584             | Same as L-2302  |           |  |            |       |                       |                 |                 |  |
| L-2626             | Same as L-2336  |           |  |            |       |                       |                 |                 |  |
| L-2627             | Same as L-2336  |           |  |            |       |                       |                 |                 |  |
| L-2628             | Same as L-2336  |           |  |            |       |                       |                 |                 |  |
| L-2629             | Same as L-2209  |           |  |            |       |                       |                 |                 |  |
| L-2630             | Same as L-2209  |           |  |            |       |                       |                 |                 |  |
| L-2651             | NL-960090-14-7  | (55)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.       | No. 32 EF2 | 15    |                       |                 |                 | RF coil: Inductance: 1.25 $\mu$ h at 7.9 mc without slug. 1.40 $\mu$ h to 2.60 $\mu$ h with slug tuning. Min. Q: 45-50. Impregnate per method 1, steps 1, 2, 4, 4.                   |
| L-2652             | Same as L-2651  |           |  |            |       |                       |                 |                 |  |
| L-2653             | Same as L-2528  |           |  |            |       |                       |                 |                 |  |
| L-2654             | Same as L-2529  |           |  |            |       |                       |                 |                 |  |
| L-2655             | Same as L-2426  |           |  |            |       |                       |                 |                 |  |
| L-2656             | Same as L-2426  |           |  |            |       |                       |                 |                 |  |
| L-2657             | NL-960090-14-10 | (52)      | Single winding, single layer; unshielded; bakelite form, Cambridge Thermionic #ES-184.       | No. 38 EF  | 36    | 1.6                   |                 |                 | RF coil: Inductance: 5.8 $\mu$ h at 5.0 mc without slug. 6.1 $\mu$ h to 11.5 $\mu$ h with slug tuning. Min. Q: 50-60. One term. grounded. Impregnate per method 1, steps 1, 2, 4, 4. |
| L-2658             | NL-960090-14-13 | (49)      | Single, universal winding; one pie; unshielded; bakelite form, Cambridge Thermionic #ES-184. | No. 38 EF2 | 27    | 1.25                  |                 |                 | RF coil: Inductance: 4.3 $\mu$ h at 5.0 mc without slug. 4.5 $\mu$ h to 8.6 $\mu$ h with slug tuning. Min. Q: 40. One term. grounded. Impregnate per method 1, steps 1, 2, 4, 4.     |
| L-2659             | Same as L-2526  |           |  |            |       |                       |                 |                 |  |
| L-2660             | Same as L-2527  |           |  |            |       |                       |                 |                 |  |
| L-2661             | Same as L-2651  |           |  |            |       |                       |                 |                 |  |
| L-2662             | Same as L-2651  |           |  |            |       |                       |                 |                 |  |
| L-2663             | Same as L-2528  |           |  |            |       |                       |                 |                 |  |

\* For diagrams (49), (52), and (55) see page 7-159.

7-147

CORRECTIVE  
MAINTENANCENAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

Section 7

7-148

TABLE 7-43. WINDING DATA (Cont'd)

| DESIG-<br>NATION<br>SYMBOL | FTL DWG<br>NUMBER | DIA-<br>GRAM | WINDING | WIRE SIZE | TURNS | D-C<br>RESISTANCE<br>(Ohms) | IMPED-<br>ANCE<br>RATIO | HIPOT<br>A-C<br>VOLTS | REMARKS |
|----------------------------|-------------------|--------------|---------|-----------|-------|-----------------------------|-------------------------|-----------------------|---------|
| L-2664                     | Same as L-2529    |              |         |           |       |                             |                         |                       |         |
| L-2665                     | Same as L-2426    |              |         |           |       |                             |                         |                       |         |
| L-2666                     | Same as L-2426    |              |         |           |       |                             |                         |                       |         |
| L-2667                     | Same as L-2657    |              |         |           |       |                             |                         |                       |         |
| L-2668                     | Same as L-2658    |              |         |           |       |                             |                         |                       |         |
| L-2669                     | Same as L-2526    |              |         |           |       |                             |                         |                       |         |
| L-2670                     | Same as L-2527    |              |         |           |       |                             |                         |                       |         |
| L-2671                     | Same as L-2302    |              |         |           |       |                             |                         |                       |         |
| L-2672                     | Same as L-2302    |              |         |           |       |                             |                         |                       |         |
| L-2673                     | Same as L-2302    |              |         |           |       |                             |                         |                       |         |
| L-2674                     | Same as L-2302    |              |         |           |       |                             |                         |                       |         |
| L-2675                     | Same as L-2651    |              |         |           |       |                             |                         |                       |         |
| L-2676                     | Same as L-2651    |              |         |           |       |                             |                         |                       |         |
| L-2677                     | Same as L-2528    |              |         |           |       |                             |                         |                       |         |
| L-2678                     | Same as L-2529    |              |         |           |       |                             |                         |                       |         |
| L-2679                     | Same as L-2426    |              |         |           |       |                             |                         |                       |         |
| L-2680                     | Same as L-2426    |              |         |           |       |                             |                         |                       |         |
| L-2681                     | Same as L-2657    |              |         |           |       |                             |                         |                       |         |
| L-2682                     | Same as L-2658    |              |         |           |       |                             |                         |                       |         |
| L-2683                     | Same as L-2526    |              |         |           |       |                             |                         |                       |         |
| L-2684                     | Same as L-2527    |              |         |           |       |                             |                         |                       |         |
| L-2685                     | Same as L-2651    |              |         |           |       |                             |                         |                       |         |
| L-2686                     | Same as L-2651    |              |         |           |       |                             |                         |                       |         |
| L-2687                     | Same as L-2528    |              |         |           |       |                             |                         |                       |         |
| L-2688                     | Same as L-2529    |              |         |           |       |                             |                         |                       |         |
| L-2689                     | Same as L-2426    |              |         |           |       |                             |                         |                       |         |
| L-2690                     | Same as L-2426    |              |         |           |       |                             |                         |                       |         |
| L-2691                     | Same as L-2657    |              |         |           |       |                             |                         |                       |         |
| L-2692                     | Same as L-2658    |              |         |           |       |                             |                         |                       |         |

ORIGINAL

7 Section

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16ACORRECTIVE  
MAINTENANCE

ORIGINAL

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM | WINDING | WIRE SIZE | TURNS | D-C RESISTANCE (Ohms) | IMPED-ANCE RATIO | HIPOT A-C VOLTS | REMARKS |
|--------------------|----------------|----------|---------|-----------|-------|-----------------------|------------------|-----------------|---------|
| L-2693             | Same as L-2526 |          |         |           |       |                       |                  |                 |         |
| L-2694             | Same as L-2527 |          |         |           |       |                       |                  |                 |         |
| L-2801             | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2802             | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2803             | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2804             | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2805             | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2806             | Same as L-2536 |          |         |           |       |                       |                  |                 |         |
| L-2807             | Same as L-2528 |          |         |           |       |                       |                  |                 |         |
| L-2808             | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2809             | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2810             | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2811             | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2812             | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2813             | Same as L-2426 |          |         |           |       |                       |                  |                 |         |
| L-2814             | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2815             | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2816             | Same as L-2536 |          |         |           |       |                       |                  |                 |         |
| L-2817             | Same as L-2528 |          |         |           |       |                       |                  |                 |         |
| L-2818             | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2819             | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2820             | Same as L-2529 |          |         |           |       |                       |                  |                 |         |
| L-2821             | Same as L-2302 |          |         |           |       |                       |                  |                 |         |
| L-2822             | Same as L-2302 |          |         |           |       |                       |                  |                 |         |
| L-2823             | Same as L-2302 |          |         |           |       |                       |                  |                 |         |
| L-2824             | Same as L-2302 |          |         |           |       |                       |                  |                 |         |
| L-2825             | Same as L-2427 |          |         |           |       |                       |                  |                 |         |
| L-2826             | Same as L-2536 |          |         |           |       |                       |                  |                 |         |
| L-2827             | Same as L-2528 |          |         |           |       |                       |                  |                 |         |

7-149

CORRECTIVE  
MAINTENANCENAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

Section 7

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING  | WIRE SIZE                | TURNS                    | D-C RESISTANCE (Ohms)            | IMPEDANCE RATIO | HIPOT A-C VOLTS                | REMARKS  |
|--------------------|----------------|-----------|--|--------------------------|--------------------------|----------------------------------|-----------------|--------------------------------|--|
| L-2828             | Same as L-2528 |           |  |                          |                          |                                  |                 |                                |  |
| L-2829             | Same as L-2529 |           |  |                          |                          |                                  |                 |                                |  |
| L-2830             | Same as L-2529 |           |  |                          |                          |                                  |                 |                                |  |
| L-2831             | Same as L-2426 |           |  |                          |                          |                                  |                 |                                |  |
| L-2832             | Same as L-2426 |           |  |                          |                          |                                  |                 |                                |  |
| L-2833             | Same as L-2426 |           |  |                          |                          |                                  |                 |                                |  |
| L-2834             | Same as L-2427 |           |  |                          |                          |                                  |                 |                                |  |
| L-2835             | Same as L-2427 |           |  |                          |                          |                                  |                 |                                |  |
| L-2836             | Same as L-2536 |           |  |                          |                          |                                  |                 |                                |  |
| L-2837             | Same as L-2528 |           |  |                          |                          |                                  |                 |                                |  |
| L-2838             | Same as L-2528 |           |  |                          |                          |                                  |                 |                                |  |
| L-2839             | Same as L-2529 |           |  |                          |                          |                                  |                 |                                |  |
| L-2840             | Same as L-2529 |           |  |                          |                          |                                  |                 |                                |  |
| L-2841             | Same as L-2426 |           |  |                          |                          |                                  |                 |                                |  |
| L-2842             | Same as L-2426 |           |  |                          |                          |                                  |                 |                                |  |
| L-2843             | Same as L-2426 |           |  |                          |                          |                                  |                 |                                |  |
| L-2844             | Same as L-2427 |           |  |                          |                          |                                  |                 |                                |  |
| L-2845             | Same as L-2658 |           |  |                          |                          |                                  |                 |                                |  |
| L-2846             | Same as L-2658 |           |  |                          |                          |                                  |                 |                                |  |
| T-2051             | NL-960140-14-5 | (57)      | Two windings, 2 pies, universal wound; shielded; plastic form. | No. 38 EF2               | 420 each, Pri. and Sec.  | 38 each Pri. and Sec.            |                 |                                | RF transformer: can has no core. Inductance: Pri. and Sec. each 2170 $\mu$ h at 1000 cps. Min. Q: 50. Impregnate per method 1, steps 1, 2, 4, 4.   |
| T-2126             | NL-960140-14-8 | (57)      | Two windings, 2 pies, universal wound; shielded; plastic form. | No. 38 EF2               | 420 each, Pri. and Sec.  | 38 each, Pri. and Sec.           |                 |                                | RF transformer: Same as T-2051 except for mounting.  |
| T-2201             | NL-960048-1    | (13)      | Two windings.<br>Primary (1-2)<br><br>Secondary (3-4)          | Pri: 40F<br><br>Sec: 37E | Pri: 448<br><br>Sec: 896 | Pri:<br>10,000<br>Sec:<br>44,000 | 10:44           | 2000 V.<br>Pri.<br>and<br>Sec. | Pulse transformer: repetition freq: 10,000 cps. Pulse width: 10-20 cps. Pri.: 0.5 hy at 3 V, 1000 cps. Peak signal voltage: Pri.: 110 V neg, 10 V pos; Sec.: 225 V positive. Average current in primary: 5 ma DC. Leading edge of pulse 4 $\mu$ sec. max. for a 225 V. pulse. Hermetically sealed. |

\* For diagram (13) see page 7-156; for diagram (57) see page 7-159.



TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FIL DWG NUMBER            | DIA-GRAM* | WINDING  | WIRE SIZE          | TURNS                           | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|--------------------|---------------------------|-----------|--|--------------------|---------------------------------|-----------------------|-----------------|-----------------|---|
| T-2202             | NL-960140-14-16           | (58)      | Two windings, universal wound, two pies, coils touch each other; shielded; plastic form. | No. 34 EF2         | 160 each, Primary and Secondary | 5.1                   | 1:1             |                 | RF transformer: Inductance: Primary and Secondary each 230 $\mu$ h at 1000 cps without slug and can. Min. Q: 25 at 0.79 mc. Impregnate per method 1, steps 1, 2, 4, 4.  |
| T-2203             | NL-960140-14-19           | (59)      | Two windings, single layer; shielded; plastic form.                                      | No. 32 EF2         | 19 each Primary and Secondary   |                       | 1:1             |                 | RF transformer: Inductance: Primary and Secondary each 2.8 $\mu$ h at 7.9 mc without slug and can. Min. Q: 80. Impregnate per method 1, steps 1, 2, 4, 4.   |
| T-2204             | Same as T-2203            |           |  |                    |                                 |                       |                 |                 |   |
| T-2205             | Same as T-2203            |           |  |                    |                                 |                       |                 |                 |   |
| T-2326             | NL-960140-14-27           | (60)      | Two windings, universal, two pies, coils touch each other; shielded; plastic form.       | No. 7/41 EF2, Litz | 38 each Pri. & Sec.             | 0.79                  | 1:1             |                 | RF transformer: Inductance: Pri. & Sec., each 16 $\mu$ h at 1000 cps without slug and can. Min. Q: 45 at 2.5 mc. Impregnate per method 1, steps 1, 2, 4, 4.   |
| T-2916             | UTC 89564-A Dwg # SH-5722 | (13)      | Two windings: Primary (1-2) Secondary (3-4)  | #42F #44F          | 3750 7500                       | 730 3300              | 1:4             | 750 750         | AF transformer: Primary: impedance 15,000 ohms, 4 ma. Secondary: impedance 60,000 ohms. Freq range: 40 to 15,000 cps $\pm$ 2 db; max level 0 db.  |
| T-2920             | NL-980604-1               | (61)      | Two windings: Primary (1-2) Secondary (3-4)  | #26F #19F          | 399 46                          | 5.8 Low               |                 | 1500 1500       | Filament transformer: Pri: 60 V $\pm$ 10%, 50/60 cps. Sec.: 6.3 V at 2.4 amp. Regulation: 9% max. Electrostatic shield between primary and secondary windings. Hermetically sealed.                                 |
| T-2921             | NL-980603-1               | (6)       | Two windings: Primary (1-2) Secondary (3-5)  | #24F #12F          | 378 23, ct at 11 $\frac{1}{2}$  | 5.0 Low               |                 | 1500 1500       | Filament transformer: Pri.: 110 V rms $\pm$ 10%, 50/60 cps. Sec.: 6.3 V at 9.5 amp, ct. (4) Regulation: 10% max. Electrostatic shield between primary and secondary windings. Hermetically sealed.                  |
| T-2922             | NL-960398-1               | (61)      | Two windings: Primary (1-2) Secondary (3-4)  | #32F #20F          | 1030 69                         | 52 Low                |                 | 1500 1500       | Filament transformer: Pri.: 110 V rms $\pm$ 10%; 50/60 cps. Sec.: 6.3 V. at 2.0 amp. Regulation: 18% max. Electrostatic shield between primary and secondary windings. Hermetically sealed.                         |
| Z-2031             | NL-960140-14-2            | (62)      | Two windings, universal, 2 pies; shielded; plastic form.                                 | #7/41 EF2 Litz     | 78 each Pri. & Sec.             | 1.86                  | 1:1             |                 | RF transformer: Inductance: Pri. & Sec. each 75 $\mu$ h at 1000 cps without slug and can. Min. Q: 70 at 1.25 mc. Includes capacitors C-2034 & C-2035. Peak freq. 500 kc. Impregnate per method 1, steps 1, 2, 4, 4. |
| Z-2032             | NL-960140-14-3            | (62)      | Two windings, universal, 2 pies; shielded; plastic form.                                 | #7/41 EF2 Litz     | 78 each Pri. & Sec.             | 1.86                  | 1:1             |                 | RF transformer: Inductance: Pri. & Sec. each 75 $\mu$ h at 1000 cps without slug and can. Min. Q: 70 at 1.25 mc. Includes capacitors C-2039 & C-2040. Peak freq. 1 mc. Impregnate per method 1, steps 1, 2, 4, 4.   |

\* For diagrams (6) and (13) see page 7-156; for diagrams (58) through (62) see pages 7-159 and 7-160.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING  | WIRE SIZE      | TURNS               | D-C RESISTANCE (Ohms) | IMPED-ANCE RATIO | HIPOT A-C VOLTS | REMARKS   |
|--------------------|-----------------|-----------|--|----------------|---------------------|-----------------------|------------------|-----------------|---|
| Z-2033             | NL-960140-14-4  | (62)      | Two windings, universal, 2 pies; shielded; plastic form. | #7/41 EF2 Litz | 78 each Pri. & Sec. | 1.86                  | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 75 $\mu$ h at 1000 cps without slug and can. Min. Q: 70 at 1.25 mc. Includes capacitor C-2041. Peak freq. 1 mc. Impregnate per method 1, steps 1, 2, 4, 4.             |
| Z-2101             | NL-960140-14-6  | (63)      | Two windings, single layer; shielded; plastic form.      | #34 EF2        | 41 each Pri. & Sec. |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 8.4 $\mu$ h at 3.95 mc without slug and can. Min. Q: 75. Includes capacitors C-2103 & C-2104. Peak freq. 4 mc. Impregnate per method 1, steps 1, 2, 4, 4.              |
| Z-2102             | NL-960140-14-7  | (59)      | Two windings, single layer; shielded; plastic form.      | #32 EF2        | 19 each Pri. & Sec. |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 2.8 $\mu$ h at 7.9 mc without slug and can. Min. Q: 80. Includes capacitor C-2107. Peak freq. 8 mc. Impregnate per method 1, steps 1, 2, 4, 4.                         |
| Z-2151             | NL-960140-14-9  | (62)      | Two windings, universal, 2 pies; shielded; plastic form. | #7/41 EF2 Litz | 78 each Pri. & Sec. | 1.86                  | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 75 $\mu$ h at 1000 cps without slug and can. Min. Q: 70 at 1.25 mc. Includes capacitors C-2155 & C-2156. Peak freq. 1.1 mc. Impregnate per method 1, steps 1, 2, 4, 4. |
| Z-2152             | NL-960140-14-10 |           | Same as Z-2151, incl C-2157 & C-2158                     |                |                     |                       |                  |                 |   |
| Z-2153             | NL-960140-14-11 | (62)      | Two windings, universal, 2 pies; shielded; plastic form. | #7/41 EF2 Litz | 78 each Pri. & Sec. | 1.86                  | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 75 $\mu$ h at 1000 cps without slug and can. Min. Q: 70 at 1.25 mc. Includes capacitors C-2159 & C-2160. Peak freq. 1.2 mc. Impregnate per method 1, steps 1, 2, 4, 4. |
| Z-2154             | NL-960140-14-12 |           | Same as Z-2153; incl C-2161 & C-2162                     |                |                     |                       |                  |                 |   |
| Z-2155             | NL-960140-14-13 | (64)      | Two windings, single layer; shielded; plastic form.      | #32 EF2        | 19 each Pri. & Sec. |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 2.8 $\mu$ h at 7.9 mc without slug and can. Min. Q: 80. Includes capacitors C-2165 & C-2166. Peak freq. 9.2 mc. Impregnate per method 1, steps 1, 2, 4, 4.             |
| Z-2156             | NL-960140-14-14 | (64)      | Two windings, single layer; shielded; plastic form.      | #32 EF2        | 19 each Pri. & Sec. |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 2.8 $\mu$ h at 7.9 mc without slug and can. Min. Q: 80. Includes capacitor C-2176. Peak freq. 9.2 mc. Impregnate per method 1, steps 1, 2, 4, 4.                       |
| Z-2157             | NL-960140-14-15 |           | Same as Z-2153; incl C-2179 & C-2180                     |                |                     |                       |                  |                 |   |

\* For diagrams (59), (62), (63), and (64) see page 7-160.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER  | DIA-GRAM* | WINDING   | WIRE SIZE      | TURNS                            | D-C RESISTANCE (Ohms) | IMPED-ANCE RATIO | HIPOT A-C VOLTS | REMARKS  |
|--------------------|-----------------|-----------|---|----------------|----------------------------------|-----------------------|------------------|-----------------|--|
| Z-2201             | NL-960140-14-17 | (65)      | Single winding, universal, one pie; shielded; plastic form. | #7/41 EF2 Litz | 250                              | 6.5                   |                  |                 | RF coil: Inductance: 410 $\mu$ h at 1000 cps without slug and can. Min. Q: 70 at 0.79 mc. Includes capacitor C-2218. Impregnate per method 1, steps 1, 2, 4, 4.  |
| Z-2202             | NL-960140-14-18 | (66)      | Single winding, universal, one pie; shielded; plastic form. | #7/41 EF2 Litz | 56                               | 1.3                   |                  |                 | RF coil: Inductance: 36 $\mu$ h at 1000 cps without slug and can. Min. Q: 50 at 2.5 mc. Includes capacitor C-2230. Impregnate per method 1, steps 1, 2, 4, 4.  |
| Z-2203             | NL-960140-14-22 |           | Same as Z-2202; incl C-2234                                 |                |                                  |                       |                  |                 |  |
| Z-2301             | NL-960140-14-23 | (63)      | Two windings, single layer; shielded; plastic form.         | #32 EF2        | 33 each Pri. & Sec.              |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 5.5 $\mu$ h at 3.95 mc without slug and can. Min. Q: 70. Includes capacitors C-2303 & C-2304. Peak freq. 5 mc. Impregnate per method 1, steps 1, 2, 4, 4.   |
| Z-2302             | NL-960110-14-24 | (63)      | Two windings, single layer; shielded; plastic form.         | #32 EF2        | 33 each Pri. & Sec.              |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 5.5 $\mu$ h at 3.95 mc without slug and can. Min. Q: 70. Includes capacitor C-2307. Peak freq. 5 mc. Impregnate per method 1, steps 1, 2, 4, 4.             |
| Z-2303             | NL-960140-14-25 | (67)      | Two windings, single layer; shielded; plastic form.         | #32 EF2        | 10 each Pri. & Sec.              |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 1.19 $\mu$ h at 12.5 mc without slug and can. Min. Q: 75. Includes capacitors C-2317 & C-2318. Peak freq. 15 mc. Impregnate per method 1, steps 1, 2, 4, 4. |
| Z-2304             | NL-960140-14-26 | (67)      | Two windings, single layer; shielded; plastic form.         | #32 EF2        | 10 each Pri. & Sec.              |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 1.19 $\mu$ h at 12.5 mc without slug and can. Min. Q: 75. Includes capacitor C-2321. Peak freq. 15 mc. Impregnate per method 1, steps 1, 2, 4, 4.           |
| Z-2326             | NL-960140-14-28 | (66)      | Single winding, universal, one pie; shielded plastic form.  | #7/41 EF2 Litz | 51                               | 1.24                  |                  |                 | RF coil: Inductance: 31 $\mu$ h at 1000 cps without slug and can. Min. Q: 50 at 2.5 mc. Includes capacitor C-2340. Impregnate per method 1, steps 1, 2, 4, 4.  |
| Z-2327             | NL-960140-14-29 | (68)      | Two windings, single layer; shielded; plastic form.         | #32 EF2        | 6 $\frac{1}{2}$ each Pri. & Sec. |                       | 1:1              |                 | RF transformer: Inductance: Pri. & Sec. each 0.66 $\mu$ h at 12.5 mc without slug and can. Min. Q: 55. Includes capacitors C-2383 & C-2384. Impregnate per method 1, steps 1, 2, 4, 4.                   |
| Z-2328             | NL-960140-14-30 |           | Same as Z-2327; incl C-2387 & C-2388                        |                |                                  |                       |                  |                 |  |

\* For diagrams (63) and (65) through (68) see page 7-160.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIG-<br>NATION<br>SYMBOL     | FTL DWG<br>NUMBER   | DIA-<br>GRAM* | WINDING   | WIRE SIZE   | TURNS  | D-C<br>RESISTANCE<br>(Ohms)                         | IMPED-<br>ANCE<br>RATIO | HIPOT<br>A-C<br>VOLTS  | REMARKS  |
|--------------------------------|---------------------|---------------|---|---|--|---|-------------------------|--|--|
| Z-2329                         | NL-960140-<br>14-31 | (68)          | Two windings, single layer; shielded; plastic form.   | #32 EF2   | 6½ each<br>Pri. & Sec.   |   | 1:1                     |  | RF transformer: Inductance: Pri. & Sec. each 0.66 μh at 12.5 mc without slug and can. Min. Q: 55. Includes capacitor C-2391. Impregnate per method 1, steps 1, 2, 4, 4.  |
| POWER SUPPLY PP-1094/SRT       |                     |               |   |   |  |   |                         |  |  |
| L-3001                         | NL-980692-1         | (5)           | Single winding, single layer.   | #28F  | 2300   | 85  |                         | 1850   | Reactor: swinging choke; inductance 3 to 12 hy at 230 to 23 ma. Freq: 100-120 cps. Hermetically sealed.  |
| L-3002                         | NL-980680-1         | (5)           | Single winding, single layer.   | #29F  | 3000   | 135   |                         | 1700   | Reactor: swinging choke; inductance 10 to 40 hy at 125 to 12.5 ma. Freq: 100-120 cps. Hermetically sealed.   |
| L-3003                         | NL-980679-1         | (69)          | Terms. 1-2<br>(Input section)<br>Terms. 2-3<br>(Filter section)   | #28F<br>#28F  | 1730<br>1190   | 60<br>35  |                         | 1850<br>1850   | Reactor: Dual filter choke; input section; inductance 2 to 10 hy at 230 to 23 ma DC, Filter section; 2 hy at 230 ma DC, Freq: 100-120 cps. Hermetically sealed.  |
| T-3001                         | NL-982565-1         | (70)          | Primary (1-2)<br>Sec. #1 (3-7)<br><br>Sec. #2 (8-9)<br>Sec. #3 (10-11)<br>Sec. #4 (12-13)<br>Sec. #5 (14-18)<br><br>Sec. #6 (19-21) | #14E<br>#14E<br><br>#18E<br>#18E<br>#18E<br>#25E<br><br>#30E                              | 144<br>88 tapped<br>at 77, 44,<br>11<br>7<br>7<br>7<br>1150<br>tapped at<br>1078, 575,<br>72<br>800 ct at<br>400 | Low<br>Low<br><br>Low<br>Low<br>Low<br>33<br><br>63 |                         | 1500<br>1500<br><br>1500<br>1500<br>1500<br>2700<br><br>1500 | Power transformer: Pri: 110 V ±10%, 50/60 cps. Sec. #1 (3-7): 64 V, 3 amp (4-6): 48 V, ct. Sec. #2: 5.0 V, 2 amp. Sec. #3: 5.0 V, 2 amp. Sec. #4: 5.0 V, 2 amp. Sec. #5 (14-18): 840 V, 230 ma (15-17): 740 V, ct. Sec. #6: 590 V, 125 ma, ct. Electrostatic shield between primary & secondary windings. Hermetically sealed. |
| TRANSMITTER COUPLER CU-402/SRT |                     |               |   |   |  |   |                         |  |  |
| T-3201                         | NL-901601-<br>14    | (71)          | Single winding, multi-layer wound; toroidal core 0.001 in. thk Al-legheny Mumetal hydrogen annealed after winding.                  | 0.021 in. thk silver pl copper sheet, tapered ½ in. to 3/16 in. Term G is at ½ in. wd end | 7 tapped at<br>6, 5, 3   |   |                         |  | Impedance transformer: Impedance at 1.0 mc (G-1) 370 + j 100 ohms, (1-2) 170 + j 45 ohms, (2-3) 42 + j 10 ohms, (3-4) 42 + j 10 ohms. Turns insulated by electrical tape.  |

\* For diagram (5) see page 7-156; for diagrams (68) through (71) see page 7-160.

TABLE 7-43. WINDING DATA (Cont'd)

| DESIGNATION SYMBOL | FTL DWG NUMBER | DIA-GRAM* | WINDING   | WIRE SIZE                            | TURNS      | D-C RESISTANCE (Ohms) | IMPEDANCE RATIO | HIPOT A-C VOLTS | REMARKS  |
|--------------------|----------------|-----------|---|--------------------------------------|------------|-----------------------|-----------------|-----------------|--|
| T-3202             | NL-961094-1    | (72)      | Single winding, single layer, close toroidal wound; core 0.001 in. thk Allegheny Mumetal hydrogen annealed after winding; shielded. | #24 Triple coated formex wire        | 10 ct at 5 |                       |                 |                 | RF transformer: Impedance: $330 + j 240$ ohms at 1.0 mc $800 + j 330$ ohms at 3.0 mc. Turns insulated by fiberglass tape. Grounding strap is ct. |
| L-3501             | p/o L-3503     | (73)      | Single winding, bank wound on silicone bonded fiberglas form.   | #85-86 Litz wire, double silk enamel | 79         |                       |                 |                 | RF coil: 1 mh $\pm 10\%$ at 250 kc.  |
| L-3502             | p/o L-3503     | (74)      | Single winding, bank wound on silicone bonded fiberglas form.   | #85-36 Litz wire, double silk enamel | 58         |                       |                 |                 | RF coil: 700 mh $\pm 10\%$ at 790 kc.  |
| L-3503             | D-2011139      | (75)      | Two windings, bank wound on silicone bonded fiberglas form.   |                                      |            |                       |                 |                 | RF transformer: consists of L-3501 and L-3502.   |

\* For diagrams (72) through (75) see page 7-160.

TABLE 7-43. WINDING DATA

|           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|
| <p>1</p>  | <p>2</p>  | <p>3</p>  | <p>4</p>  | <p>5</p>  |
| <p>6</p>  | <p>7</p>  | <p>8</p>  | <p>9</p>  | <p>10</p> |
| <p>11</p> | <p>12</p> | <p>13</p> | <p>14</p> | <p>15</p> |

|           |           |           |
|-----------|-----------|-----------|
| <p>19</p> | <p>24</p> | <p>29</p> |
| <p>18</p> | <p>23</p> | <p>28</p> |
| <p>17</p> | <p>22</p> | <p>27</p> |
| <p>16</p> | <p>21</p> | <p>26</p> |
| <p>15</p> | <p>20</p> | <p>25</p> |

TABLE 7-43. WINDING DATA

TABLE 7-43. WINDING DATA

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

CORRECTIVE  
MAINTENANCE

|           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|
| <p>30</p> | <p>31</p> | <p>32</p> | <p>33</p> | <p>34</p> |
| <p>35</p> | <p>36</p> | <p>37</p> | <p>38</p> | <p>39</p> |
| <p>40</p> | <p>41</p> | <p>42</p> | <p>43</p> |           |



TABLE 7-43. WINDING DATA

|   |   |   |   |  |
|---|---|---|---|--|
| <p>23 TURNS TOTAL</p> <p>1/2" MIN</p> <p>1/2" MIN</p> <p>1 TURN</p> <p>3/8"</p> <p>21 TURNS</p> <p>1 TURN</p> <p>44</p> | <p>5/16"</p> <p>45</p>  | <p>1/2"</p> <p>46</p>   | <p>53 TURNS</p> <p>228 TURNS</p> <p>314 TURNS</p> <p>47</p>                 | <p>17" MAX</p> <p>1/2" MIN</p> <p>1/2"</p> <p>1/2"</p> <p>48</p> |
| <p>15/16"</p> <p>5/32"</p> <p>13/32"</p> <p>49</p>  | <p>3/8" MIN</p> <p>1/32"</p> <p>3/8" MIN</p> <p>5/8 + 1/32"</p> <p>50</p> | <p>17" MAX</p> <p>1/2" MIN</p> <p>3/16"</p> <p>1/2"</p> <p>51</p> | <p>1/4"</p> <p>5/32"</p> <p>13/32"</p> <p>52</p>                            | <p>COIL A</p> <p>13/16"</p> <p>53</p>                            |
| <p>5/16"</p> <p>5/32"</p> <p>13/32"</p> <p>54</p>   | <p>11/32"</p> <p>5/32"</p> <p>13/32"</p> <p>55</p>                        | <p>9/32"</p> <p>5/32"</p> <p>13/32"</p> <p>56</p>                 | <p>COIL COIL</p> <p>B A</p> <p>1/8"</p> <p>13/16"</p> <p>3/4"</p> <p>57</p> | <p>COIL A</p> <p>COIL B</p> <p>3/4"</p> <p>58</p>                |

TABLE 7-43. WINDING DATA

|           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|
| <p>59</p> | <p>60</p> | <p>61</p> | <p>62</p> | <p>63</p> |
| <p>64</p> | <p>65</p> | <p>66</p> | <p>67</p> | <p>68</p> |
| <p>69</p> | <p>70</p> | <p>71</p> | <p>72</p> | <p>73</p> |
| <p>74</p> | <p>75</p> |           |           |           |

- NOTES:
- 1. IN AN/SRT-16, THE HEATERS IN THE TWO MOUNTINGS ARE INDIVIDUALLY ENERGIZED FROM THE CABINET HEATER SWITCH (NN) IN EACH TRANSMITTER GROUP. IN AN/SRT-15 THE HEATERS IN THE TWO MOUNTINGS ARE IN PARALLEL.
  - 2. RESISTANCE VALUES EXPRESSED IN OHMS UNLESS OTHERWISE INDICATED.
  - 3. SEE ANTENNA COUPLER AND RADIO FREQUENCY TUNER CONTROL CIRCUITS FOR INTERCONNECTING DATA BETWEEN TRANSMITTER GROUP AND ANTENNA COUPLER.
  - 4. COLOR CODE--R-RED, Y-YELLOW, GR-GREEN, BU-BLUE.
  - 5. (---) DENOTES INTERCONNECTING CABLING, FOR DETAILS SEE INTERCONNECTING CABLING DIAGRAMS IN SECTION 3 OF INSTRUCTION BOOK.
  - 6. OTHER CONNECTIONS IN 500W STACK ARE THE SAME AS 100W STACK.
  - 7. IN AN/SRT-14, JUMPERS ARE PLACED BETWEEN E606(76) AND E606(77) AND BETWEEN E608(1) AND E608(2).

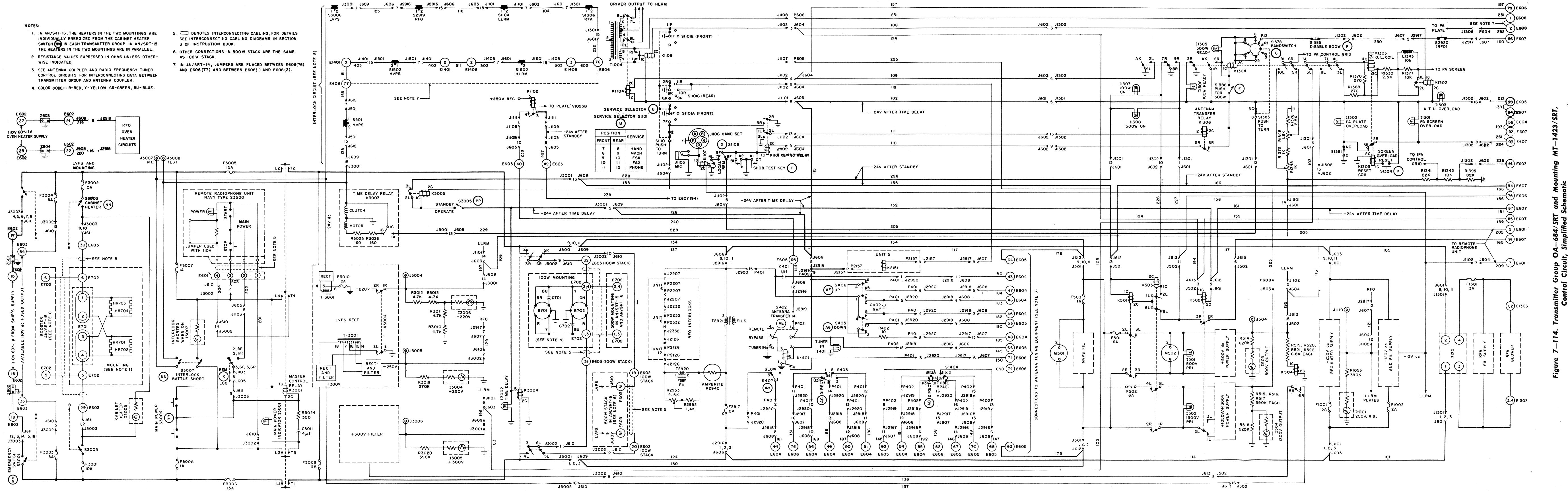
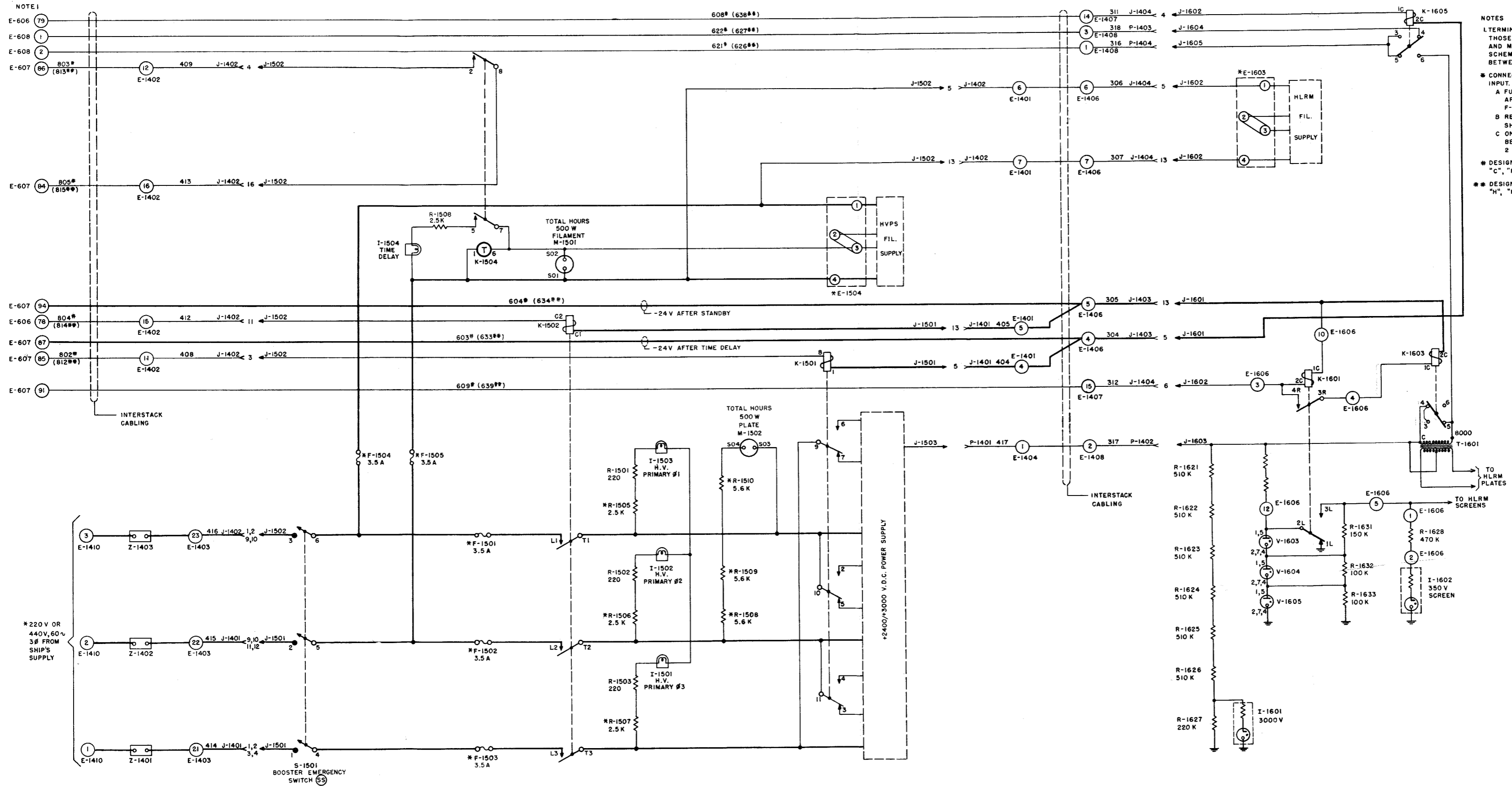


Figure 7-114. Transmitter Group OA-684/SRT and Mounting AT-1423/SRT, Control Circuit, Simplified Schematic

CORRECTIVE  
MAINTENANCE

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A



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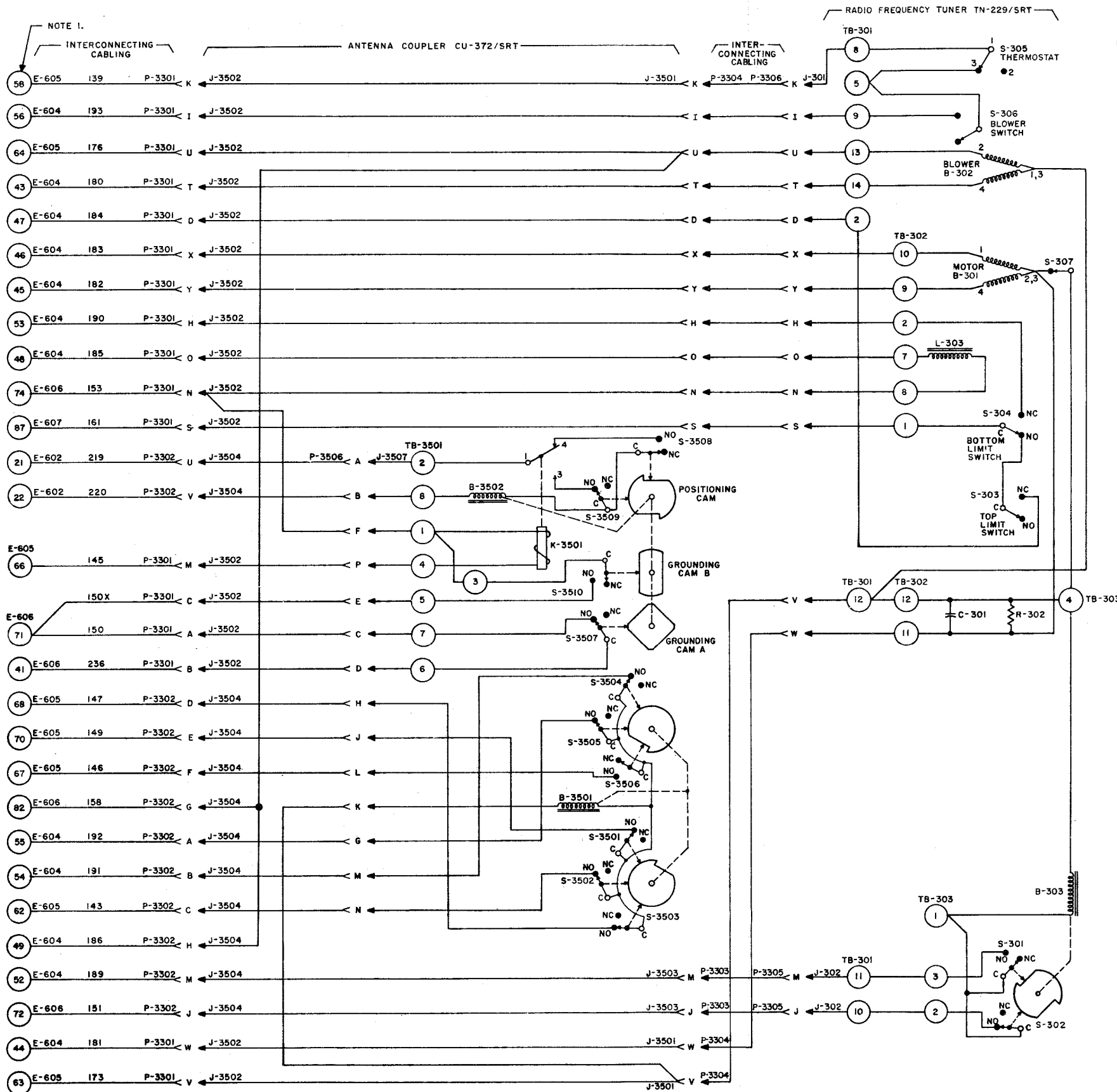
Figure 7-115. Radio Modulator-Power Supply Group OA-685/SRT, Control Circuits, Simplified Schematic

ORIGINAL

**CORRECTIVE  
MAINTENANCE**

**NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A**

**Section 7**



NOTE 1.  
INTERCONNECTING CABLING

ANTENNA COUPLER CU-372/SRT

INTERCONNECTING CABLING

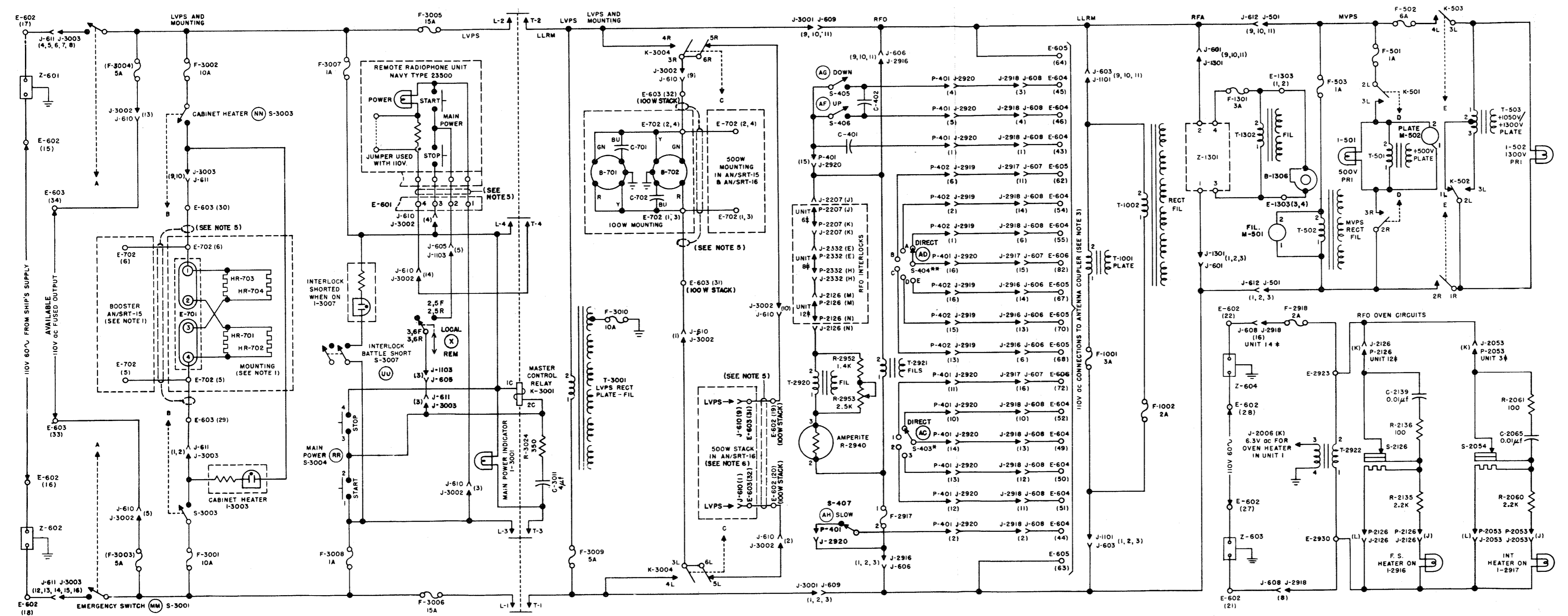
RADIO FREQUENCY TUNER TN-229/SRT

NOTES:-  
1. TERMINALS AT LEFT EDGE OF SHEET ARE DUPLICATE OF THOSE FOUND ON THE TRANSMITTER GROUP AND MOUNTING CONTROL CIRCUITS SIMPLIFIED SCHEMATIC (FIGURE 7-114). TO TRACE ANY CIRCUIT MATCH TERMINAL NUMBERS ON EACH DRAWING.

ORIGINAL

7-165/7-166

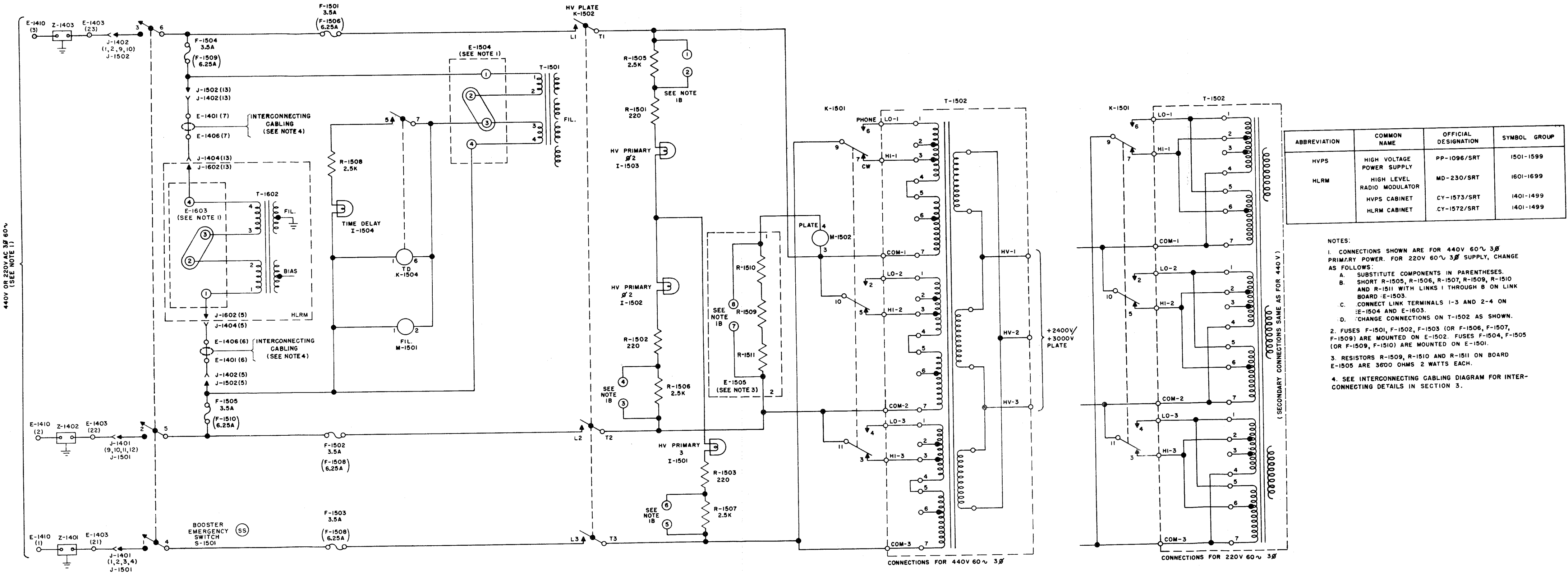
Figure 7-116. Antenna Coupler CU-372/SRT, and R-F Tuner TN-229/SRT, Control Circuits, Simplified Schematic



| ABBREVIATION | COMMON NAME                        | OFFICIAL DESIGNATION       | SYMBOL GROUP         |
|--------------|------------------------------------|----------------------------|----------------------|
| LVPS         | LOW VOLTAGE POWER SUPPLY           | PP-1094/SRT                | 3001-3099            |
| MVPS         | MEDIUM VOLTAGE POWER SUPPLY        | PP-1095/SRT                | 501-599              |
| RFO          | RADIO FREQUENCY OSCILLATOR         | O-275/SRT                  | 401-499<br>2001-2999 |
| LLRM         | LOW LEVEL RADIO MODULATOR          | MD-229/SRT                 | 1001-1299            |
| RFA          | RADIO FREQUENCY AMPLIFIER          | AM-1008/SRT                | 1301-1399            |
|              | TRANSMITTER GROUP CABINET MOUNTING | CY-1571/SRT<br>MT-1423/SRT | 601-699              |

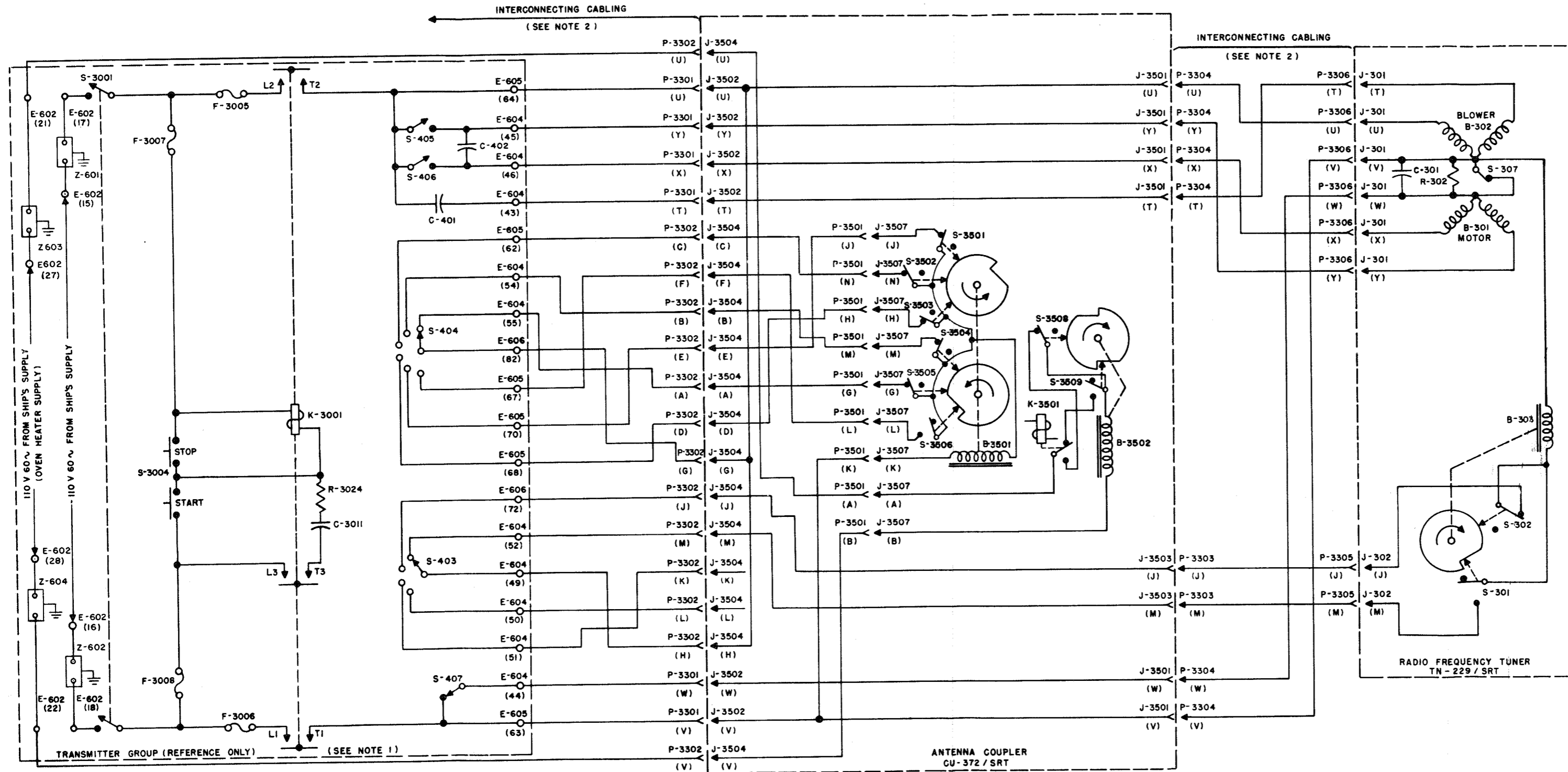
- NOTES:
1. IN AN/SRT-16 THE HEATERS IN THE TWO MOUNTINGS ARE INDIVIDUALLY ENERGIZED FROM THE CABINET HEATER SWITCH (NM) IN EACH TRANSMITTER GROUP. IN AN/SRT-15 THE HEATERS IN THE TWO MOUNTINGS ARE IN PARALLEL.
  2. RESISTANCE VALUES EXPRESSED IN OHMS UNLESS OTHERWISE INDICATED.
  3. SEE PRIMARY POWER DISTRIBUTION DIAGRAM, ANTENNA COUPLER AND RADIO FREQUENCY TUNER FOR INTERCONNECTING DATA FOR PRIMARY POWER BETWEEN TRANSMITTER GROUP AND ANTENNA COUPLER.
  4. COLOR CODE—R-RED, Y-YELLOW, GN-GREEN, BU-BLUE.
  5. DENOTES INTERCONNECTING CABLING. FOR DETAILS SEE INTERCONNECTING CABLING DIAGRAMS IN SECTION 3.
  6. OTHER CONNECTIONS IN 500 W STACK ARE THE SAME AS 100 W STACK.
- † UNIT 1, UNIT 3, UNIT 6, ETC. REFER TO PLUG-IN UNITS OF THE RADIO FREQUENCY OSCILLATOR, O-275/SRT
- \* FRONT PANEL DESIGNATION OF S-403 IS AS FOLLOWS; TRANSFORMER (AC)
- \*\* FRONT PANEL DESIGNATION OF S-404 IS AS FOLLOWS; ANTENNA COUPLER LOADING (AD)

Figure 7-117. Primary Power Distribution Diagram, Transmitter Group and Mounting, AN/SRT-14, 15 and 16



ORIGINAL

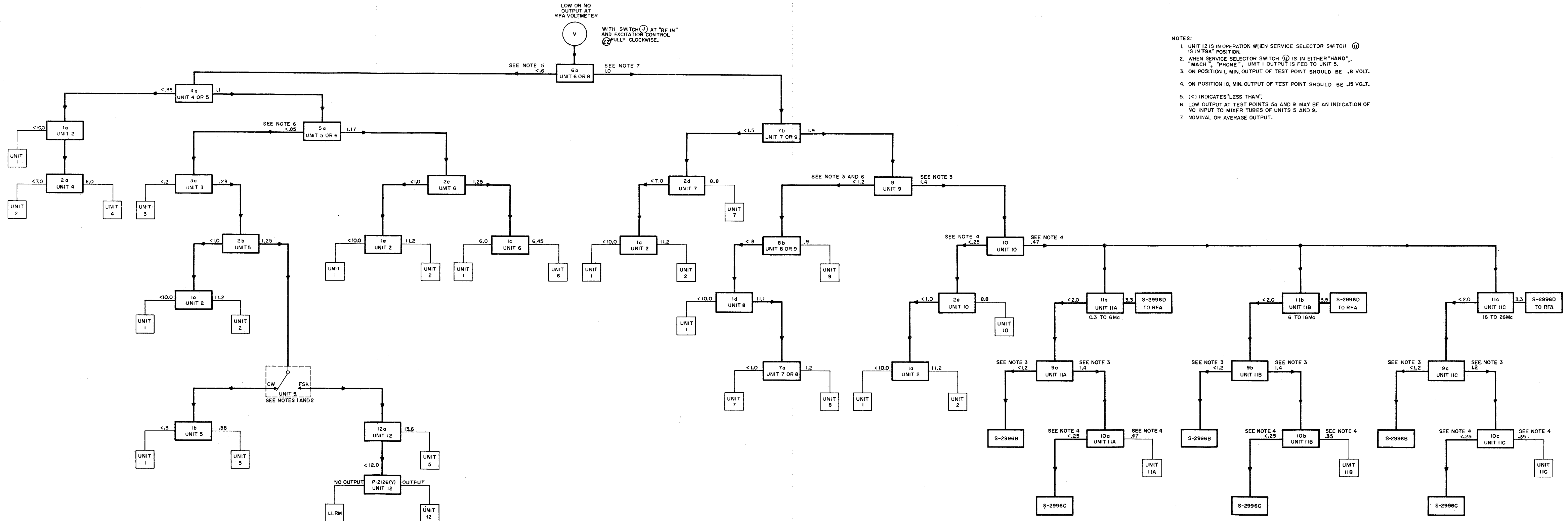
Figure 7-118. Primary Power Distribution Diagram, Modulator Power Supply Group and Mounting, AN/SRT-14, 15 and 16



- NOTES
- 1. SEE PRIMARY POWER DISTRIBUTION DIAGRAM, TRANSMITTER GROUP AND MOUNTING, FOR DETAIL OF CONNECTIONS. FIGURE 7-117.
  - 2. SEE INTERCONNECTING CABLING DIAGRAM FOR INTERCONNECTING DETAILS. IN SECTION 3.

Figure 7-119. Primary Power Distribution Diagram, Antenna Tuning Equipment, AN/SRT-14, 15 and 16





- NOTES:
- 1. UNIT 12 IS IN OPERATION WHEN SERVICE SELECTOR SWITCH ① IS IN "FSK" POSITION.
  - 2. WHEN SERVICE SELECTOR SWITCH ① IS IN EITHER "HAND", "MACH", "PHONE", UNIT 1 OUTPUT IS FED TO UNIT 5.
  - 3. ON POSITION I, MIN. OUTPUT OF TEST POINT SHOULD BE .8 VOLT.
  - 4. ON POSITION IO, MIN. OUTPUT OF TEST POINT SHOULD BE .5 VOLT.
  - 5. (<) INDICATES "LESS THAN".
  - 6. LOW OUTPUT AT TEST POINTS 5a AND 9 MAY BE AN INDICATION OF NO INPUT TO MIXER TUBES OF UNITS 5 AND 9.
  - 7. NOMINAL OR AVERAGE OUTPUT.

Figure 7-120. Radio Frequency Oscillator O-275/SRT (RFO), Simplified Trouble Location, Block Diagram

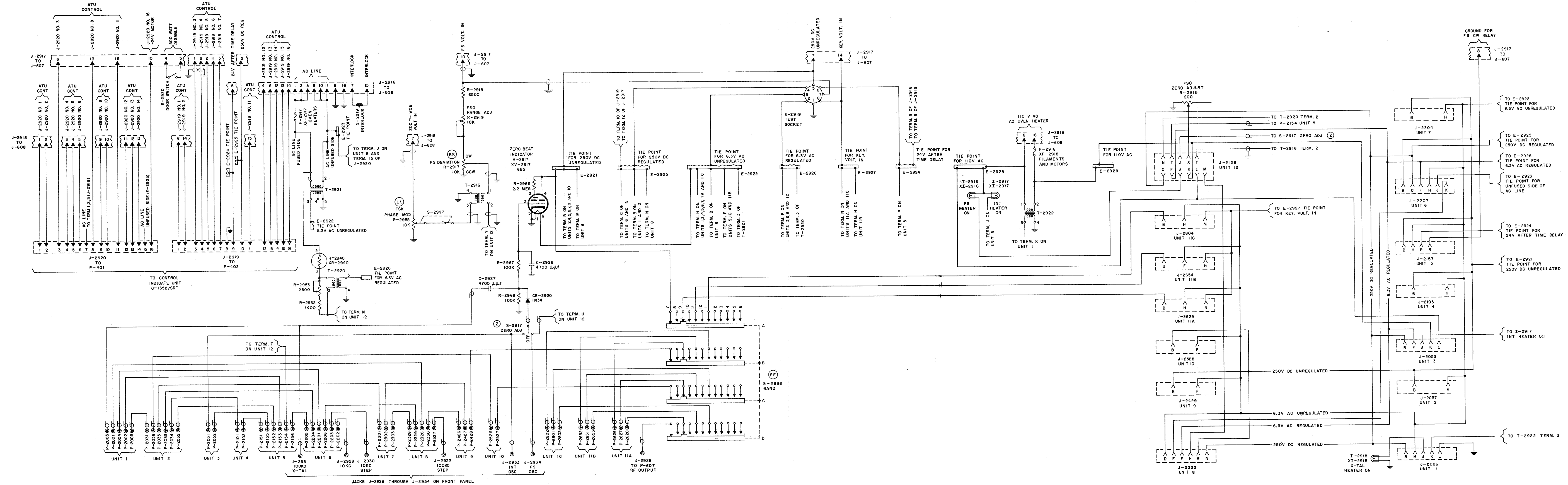


Figure 7-121. RFO, Unit 14 (Z-2901), Schematic Diagram

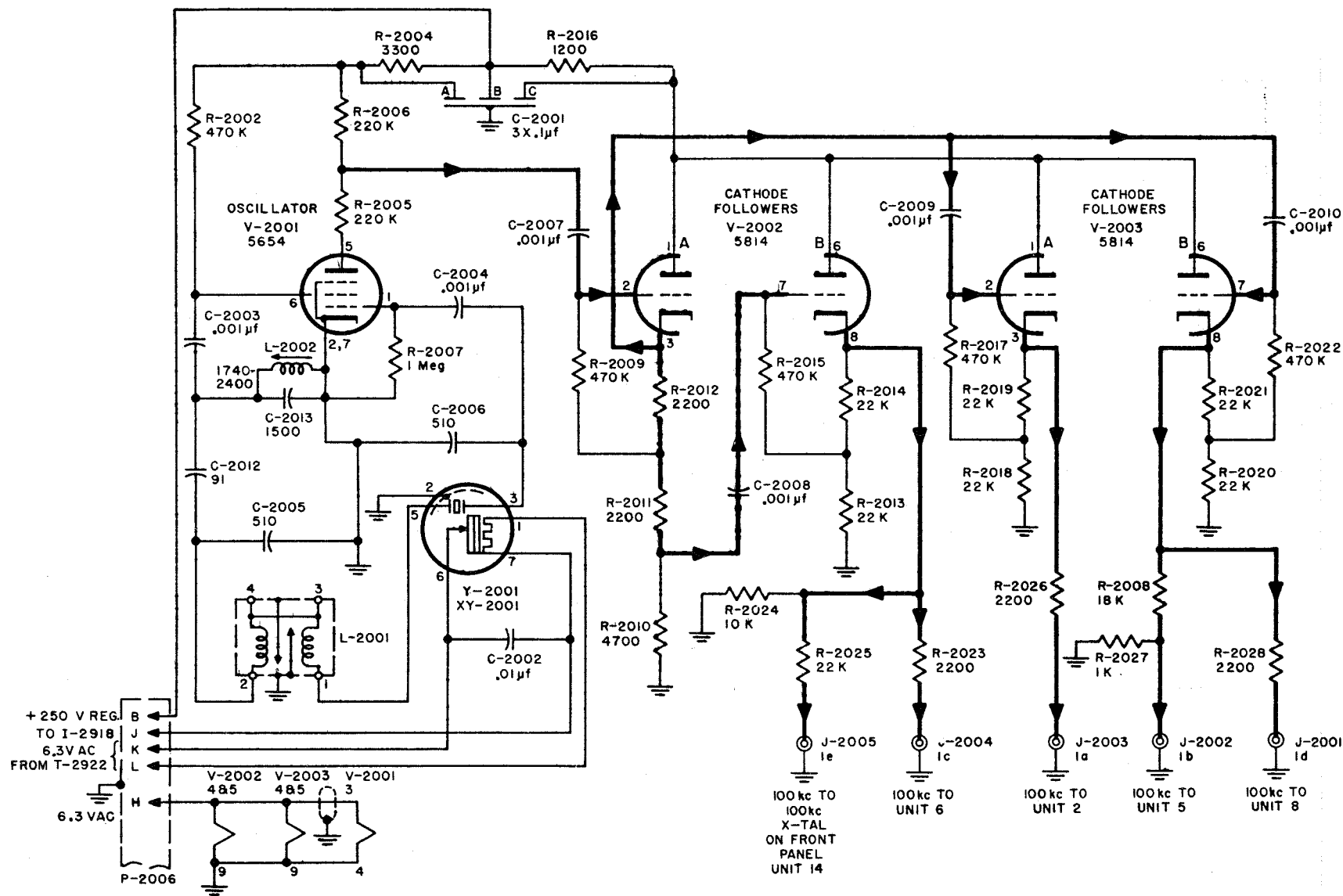


**COAXIAL INTERCONNECTIONS  
FOR RFO UNIT 14, (Z-2901)**

| CABLE<br>TAG NO. | CABLE<br>TYPE | FROM |            | TO   |                   |
|------------------|---------------|------|------------|------|-------------------|
|                  |               | UNIT | CONN       | UNIT | CONN              |
| 1a               | RG-58/U       | 1    | J-2003     | 2    | J-2031            |
| 1b               | "             | 1    | J-2002     | 5    | J-2153            |
| 1c               | "             | 1    | J-2004     | 6    | J-2201            |
| 1d               | "             | 1    | J-2001     | 8    | J-2326            |
| 1e               | "             | 1    | J-2005     | *    | J-2931            |
| 2a               | "             | 2    | J-2034     | 4    | J-2101            |
| 2b               | "             | 2    | J-2032     | 5    | J-2152            |
| 2c               | "             | 2    | J-2033     | 6    | J-2204            |
| 2d               | "             | 2    | J-2035     | 7    | J-2301            |
| 2e               | "             | 2    | J-2036     | 10   | J-2526            |
| 3a               | "             | 3    | J-2052     | 5    | J-2155            |
| 3b               | "             | 3    | J-2051     | *    | J-2933            |
| 4a               | "             | 4    | J-2102     | 5    | J-2151            |
| 214              | "             | *    | S-2917 (C) | *    | CR-2920<br>E-2930 |
| 5a               | "             | 5    | J-2156     | 6    | J-2205            |
| 6a               | "             | 6    | J-2203     | *    | J-2930            |
| 6b               | "             | 6    | J-2206     | 8    | J-2329            |
| 6c               | "             | 6    | J-2202     | *    | J-2929            |
| 7a               | "             | 7    | J-2303     | 8    | J-2328            |
| 7b               | "             | 7    | J-2302     | 9    | J-2427            |
| 8a               | "             | 8    | J-2327     | *    | J-2932            |
| 8b               | "             | 8    | J-2330     | 9    | J-2426            |
| 9                | "             | 9    | J-2428     | *    | S-2996 B-7        |
| 9a               | "             | 11A  | J-2626     | *    | S-2996 B-9        |
| 9b               | "             | 11B  | J-2652     | *    | S-2996 B-11       |
| 9c               | "             | 11C  | J-2802     | *    | S-2996 B-1        |
| 10               | "             | 10   | J-2527     | *    | S-2996 C-7        |
| 10a              | "             | 11A  | J-2627     | *    | S-2996 C-9        |
| 10b              | "             | 11B  | J-2651     | *    | S-2996 C-11       |
| 10c              | RG-58/U       | 11C  | J-2801     | *    | S-2996 C-1        |
| 11               | RG-62/U       | *    | J-2928     | *    | S-2996 D-7        |
| 11a              | "             | 11A  | J-2628     | *    | S-2996 D-9        |
| 11b              | "             | 11B  | J-2653     | *    | S-2996 D-11       |
| 11c              | RG-62/U       | 11C  | J-2803     | *    | S-2996 D-1        |
| 12a              | RG-58/U       | 12   | J-2126-T   | 5    | J-2154            |
| 236              | RG-58/U       | *    | J-2931     | *    | C-2927<br>E-2930  |
| 237              | RG-58/U       | 12   | J-2126-U   | *    | J-2934            |

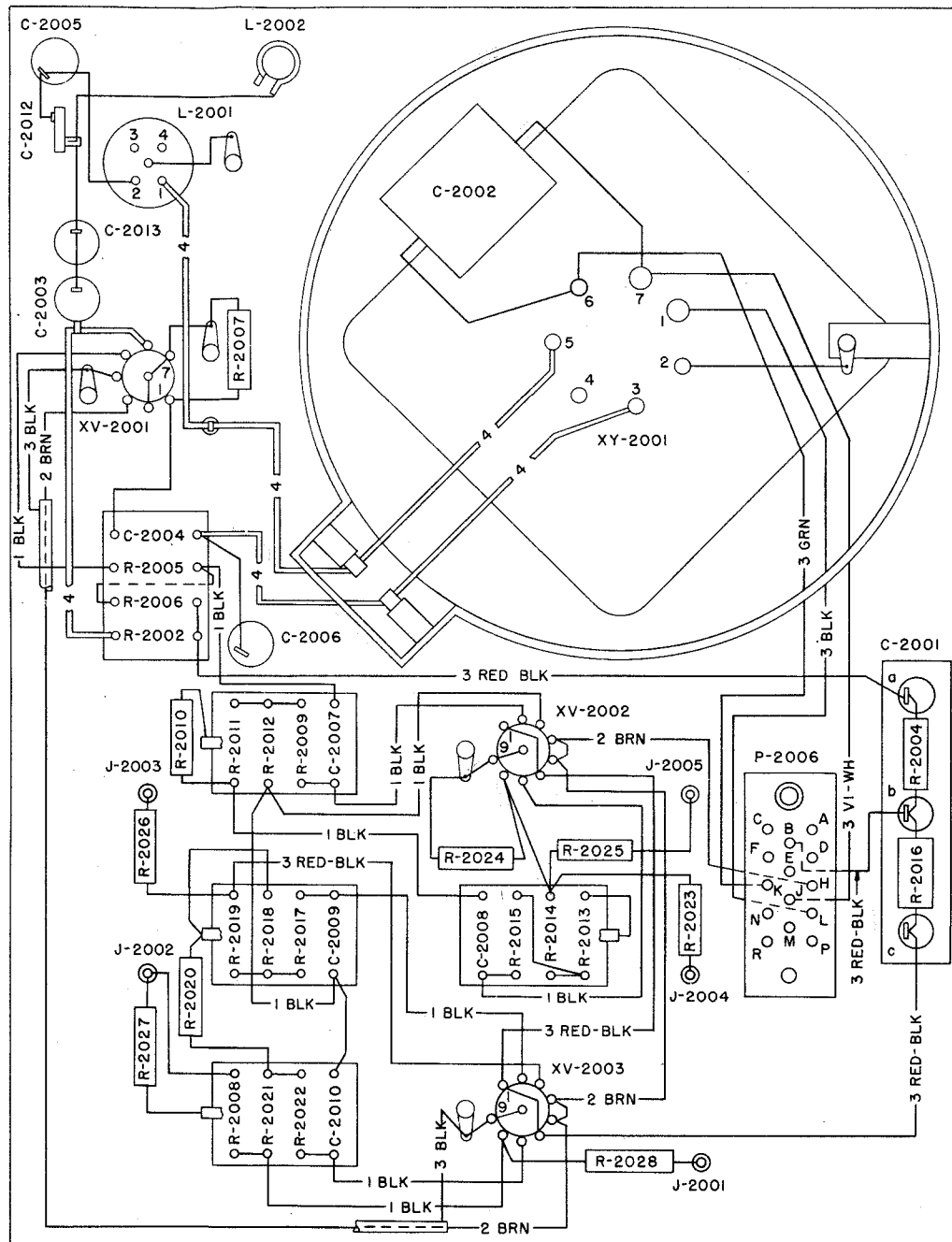
\* DENOTES FRAME MOUNTED CONNECTOR

**Figure 7-122. RFO, Unit 14 (Z-2901), Wiring Diagram (Sheet 2 of 2)**



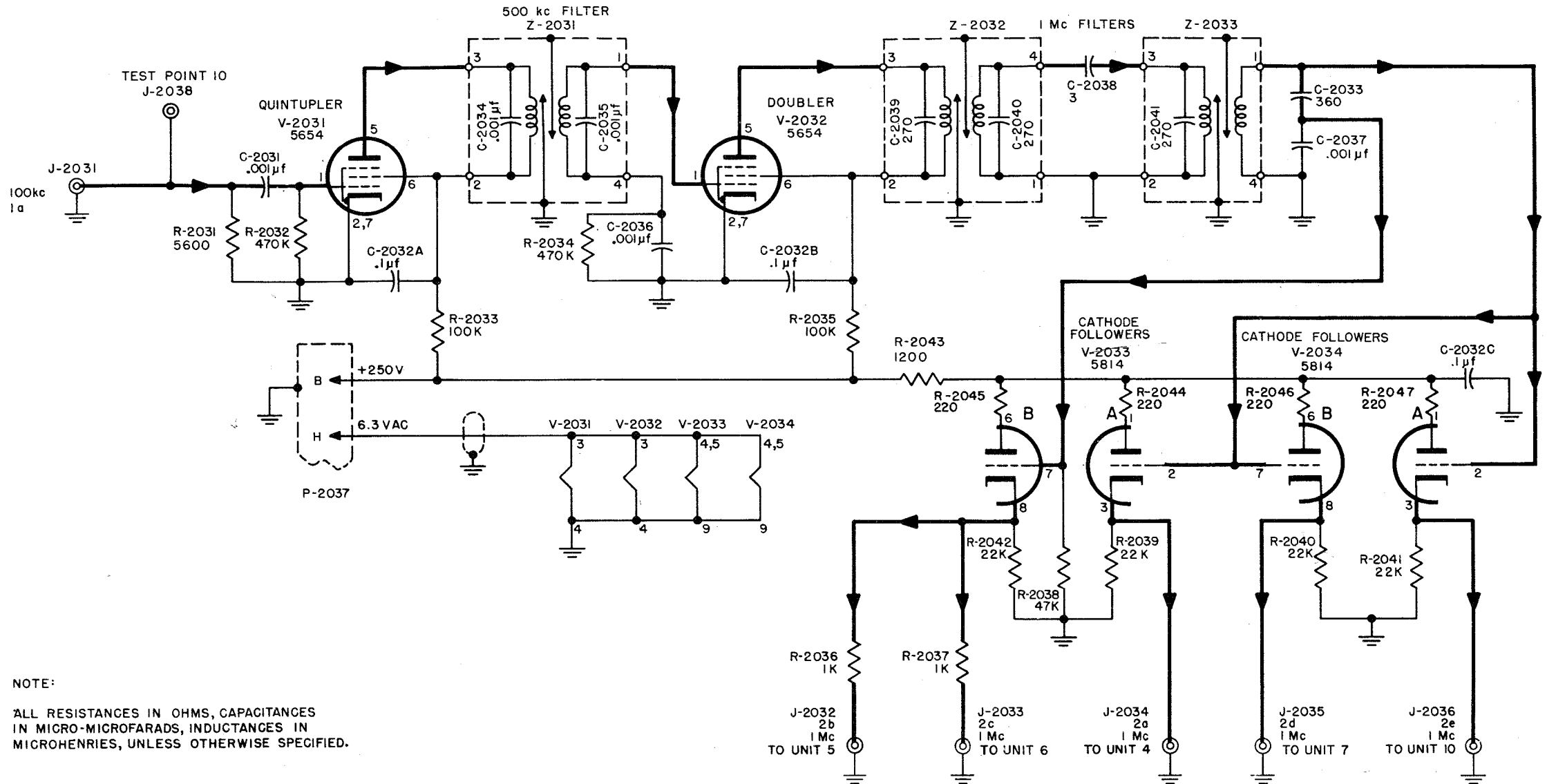
NOTE:  
ALL RESISTANCES IN OHMS, CAPACITANCES  
IN MICRO-MICROFARADS, INDUCTANCES IN  
MICROHENRIES, UNLESS OTHERWISE SPECIFIED.

Figure 7-123. RFO, Unit 1 (Z-2001), Schematic Diagram



| WIRE NO.   | DESCRIPTION   |
|------------|---|
| 1          | NO. 20 AWG SOLID SINGLE CONDUCTOR, 1000V INSULATION               |
| 2          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION (SHIELDED) |
| 3          | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION            |
| 4          | NO. 14 AWG SOLID BARE COPPER TINNED (BUS) WIRE                    |
| ALL OTHERS | NO. 20 AWG SOLID COPPER TINNED (BUS) WIRE                         |

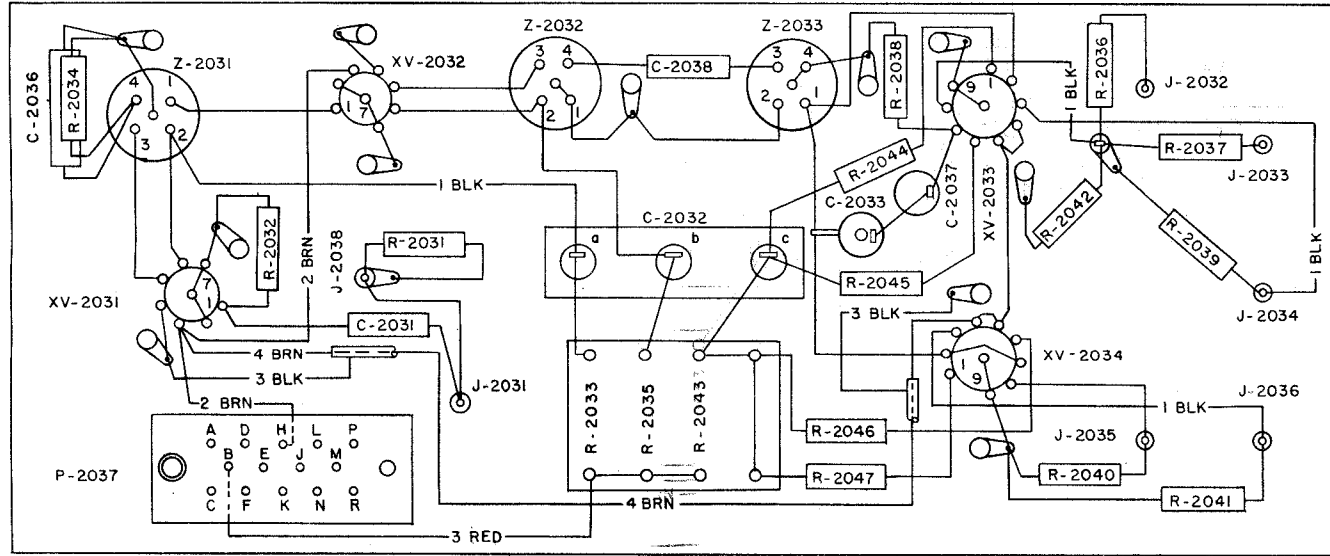
**Figure 7-124. RFO, Unit 1 (Z-2001), Wiring Diagram**



NOTE:

ALL RESISTANCES IN OHMS, CAPACITANCES  
IN MICRO-MICROFARADS, INDUCTANCES IN  
MICROHENRIES, UNLESS OTHERWISE SPECIFIED.

Figure 7-125. RFO, Unit 2 (Z-2034), Schematic Diagram



| WIRE NO.   | DESCRIPTION   |
|------------|---|
| 1          | NO. 20 AWG SOLID SINGLE CONDUCTOR, 1000V INSULATION               |
| 2          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION            |
| 3          | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION            |
| 4          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION (SHIELDED) |
| ALL OTHERS | NO. 20 AWG SOLID COPPER TINNED (BUS) WIRE                         |

Figure 7-126. RFO, Unit 2 (Z-2034), Wiring Diagram



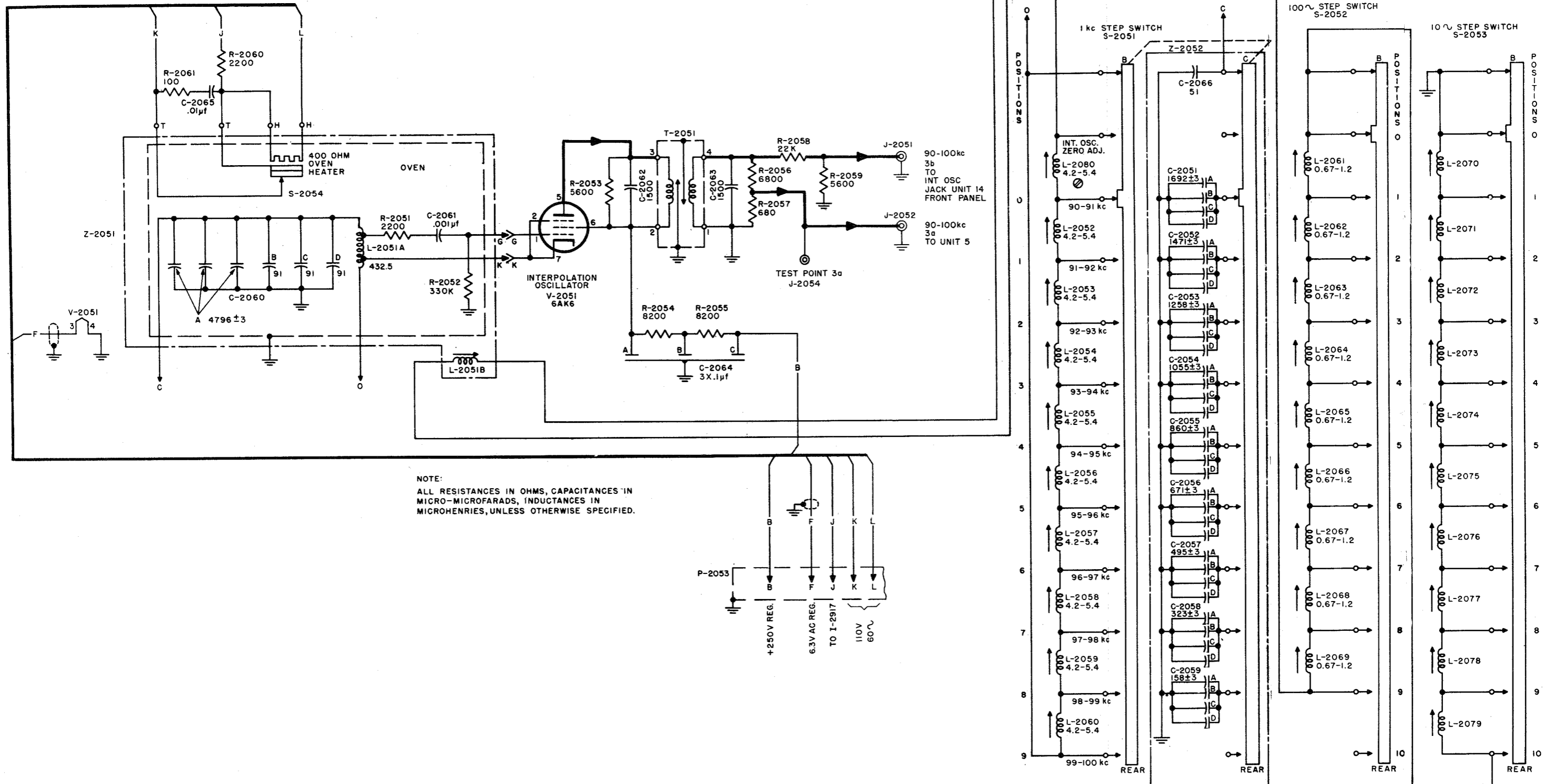
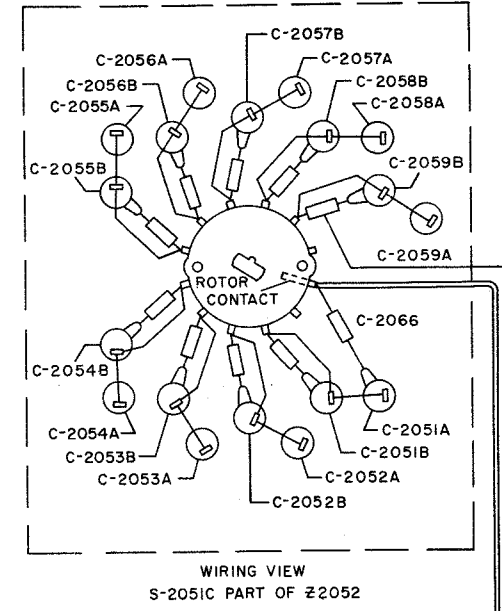
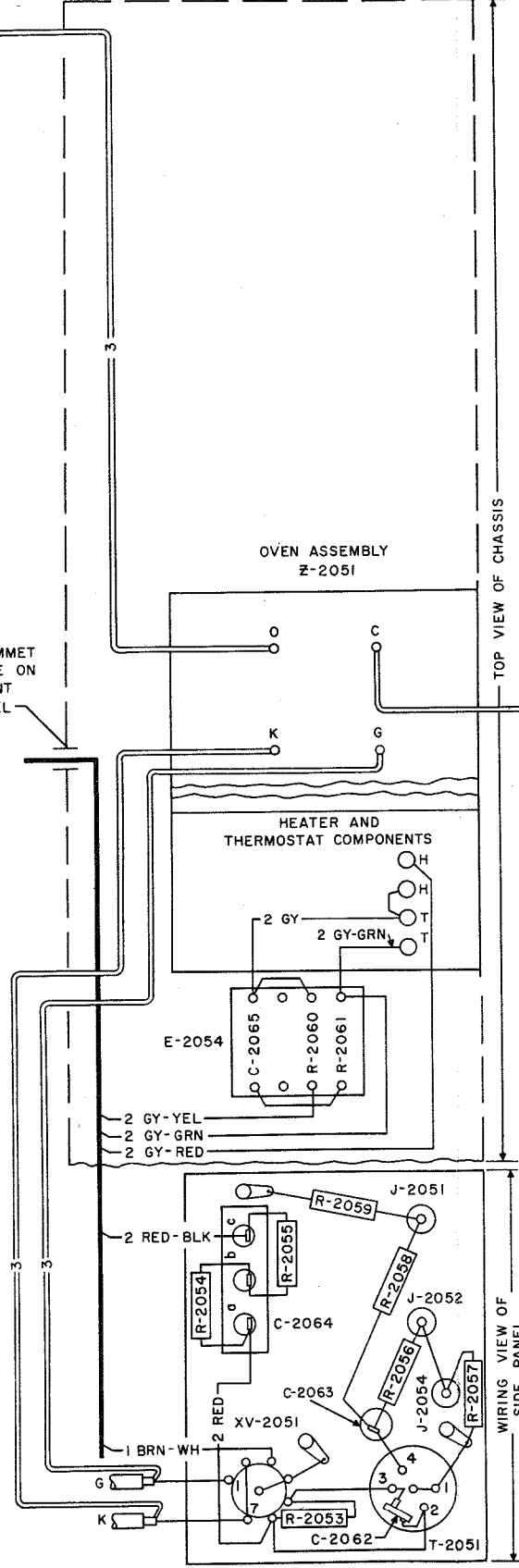
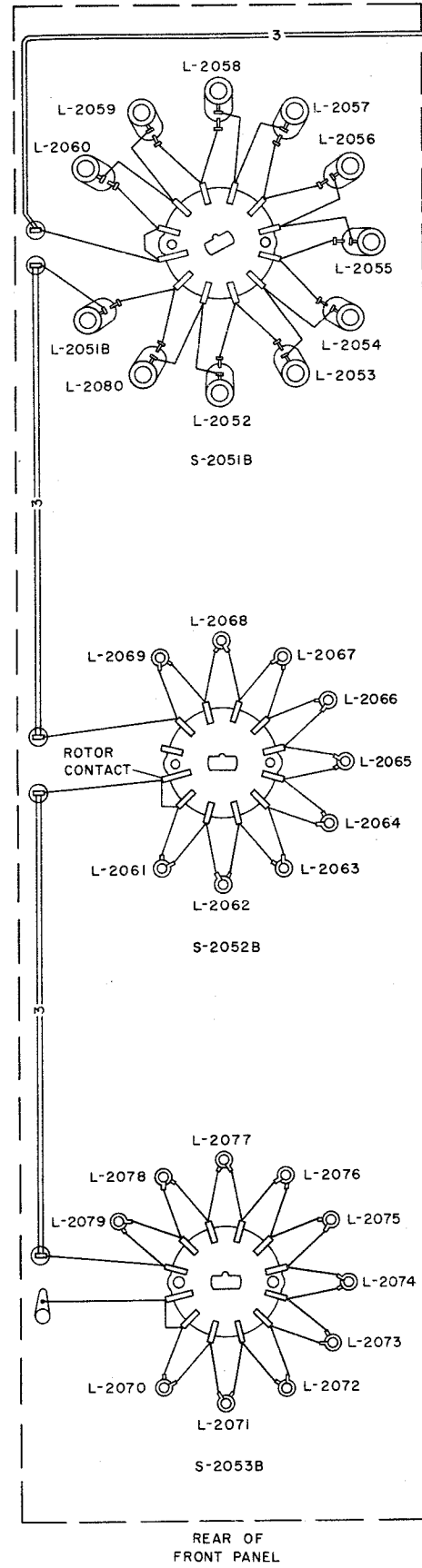
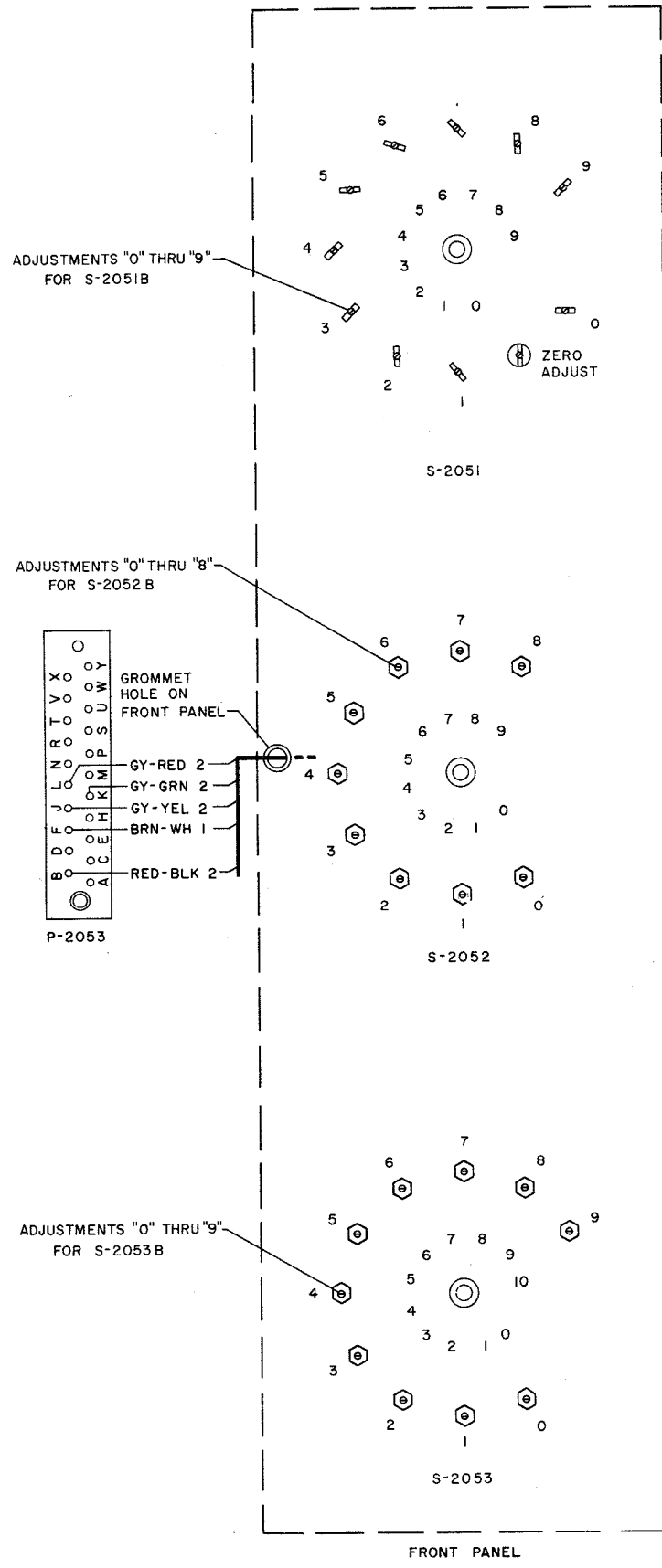


Figure 7-127. RFO, Unit 3 (Z-2053), Schematic Diagram

CORRECTIVE MAINTENANCE

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AN/SRT-14, 14A, 15, 15A, 16, 16A



\*"C" AND "D" PART OF CAPACITOR USED ONLY AS REQUIRED

| WIRE NO.   | DESCRIPTION  |
|------------|--|
| 1          | NO. 20 AWG STRANDED SINGLE CONDUCTOR 1000V INSULATION  |
| 2          | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION |
| 3          | NO. 14 AWG SOLID COPPER TINNED (BUS) WIRE              |
| 4          | NO. 16 AWG SOLID COPPER TINNED (BUS) WIRE              |
| ALL OTHERS | NO. 20 AWG SOLID COPPER TINNED (BUS) WIRE              |

ORIGINAL

Figure 7-128. RFO, Unit 3 (Z-2053), Wiring Diagram

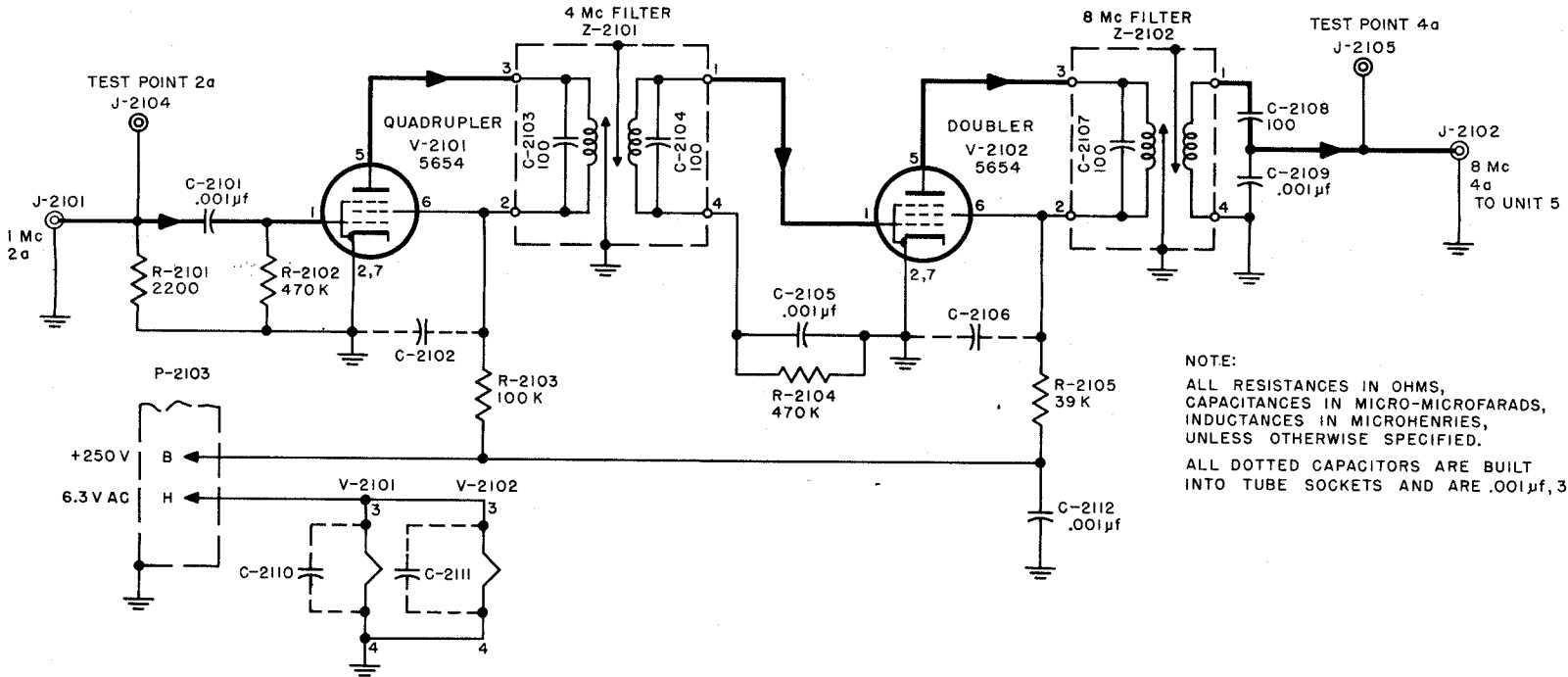
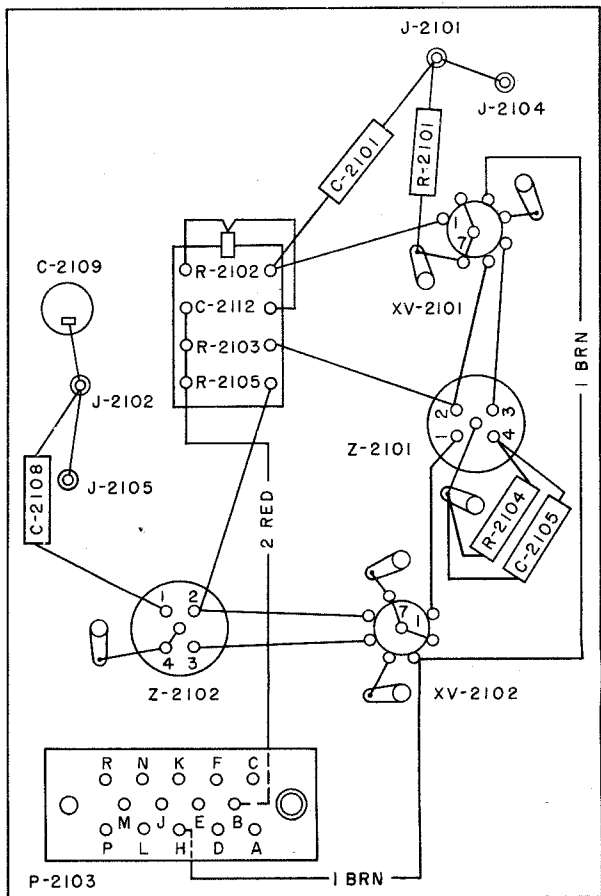
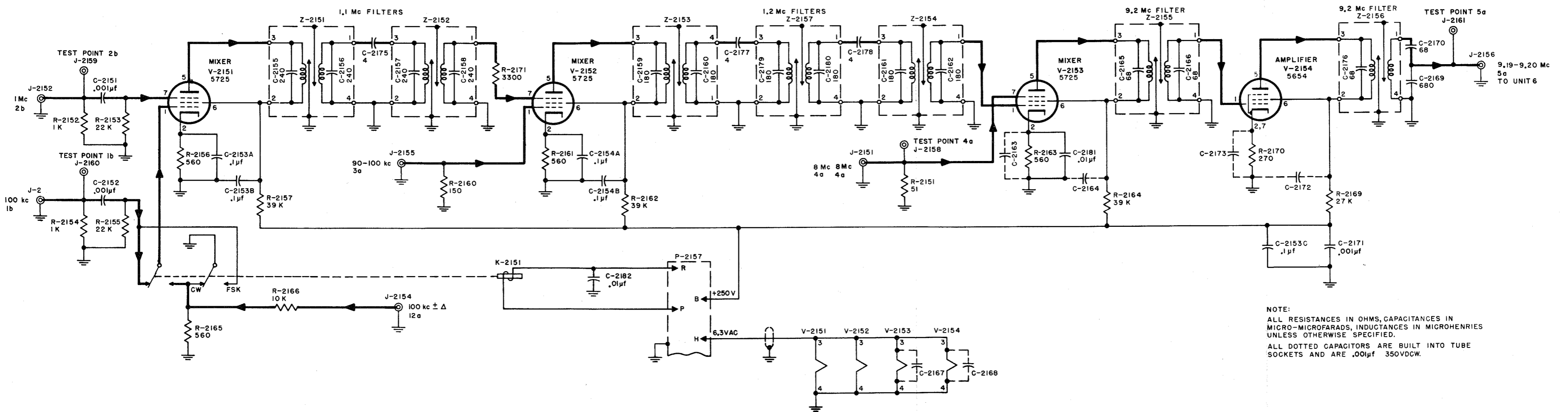


Figure 7-129. RFO, Unit 4 (Z-2103), Schematic Diagram



| WIRE NO.   | DESCRIPTION   |
|------------|---|
| 1          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000 V INSULATION |
| 2          | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION  |
| ALL OTHERS | NO. 20 AWG SOLID COPPER, TINNED (BUS) WIRE.             |

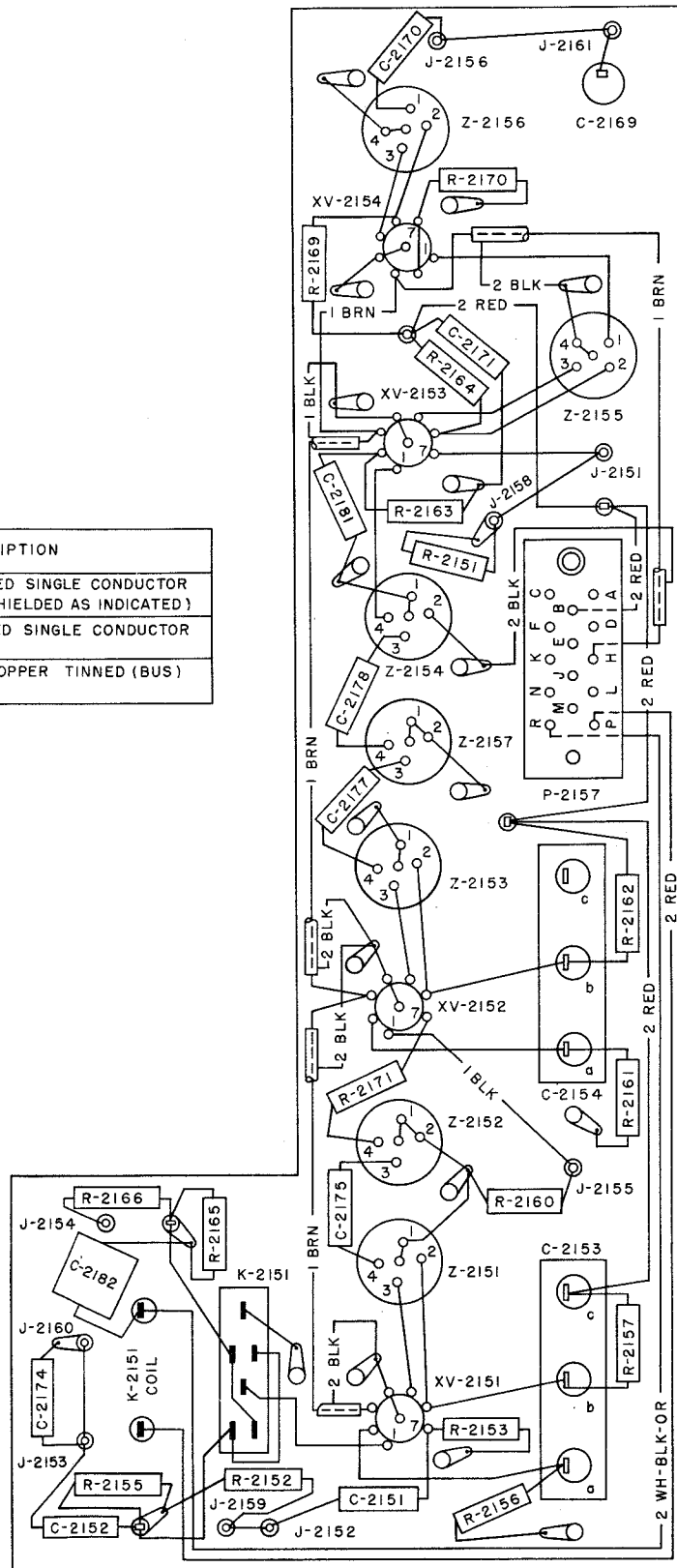
Figure 7-130. RFO, Unit 4 (Z-2103), Wiring Diagram



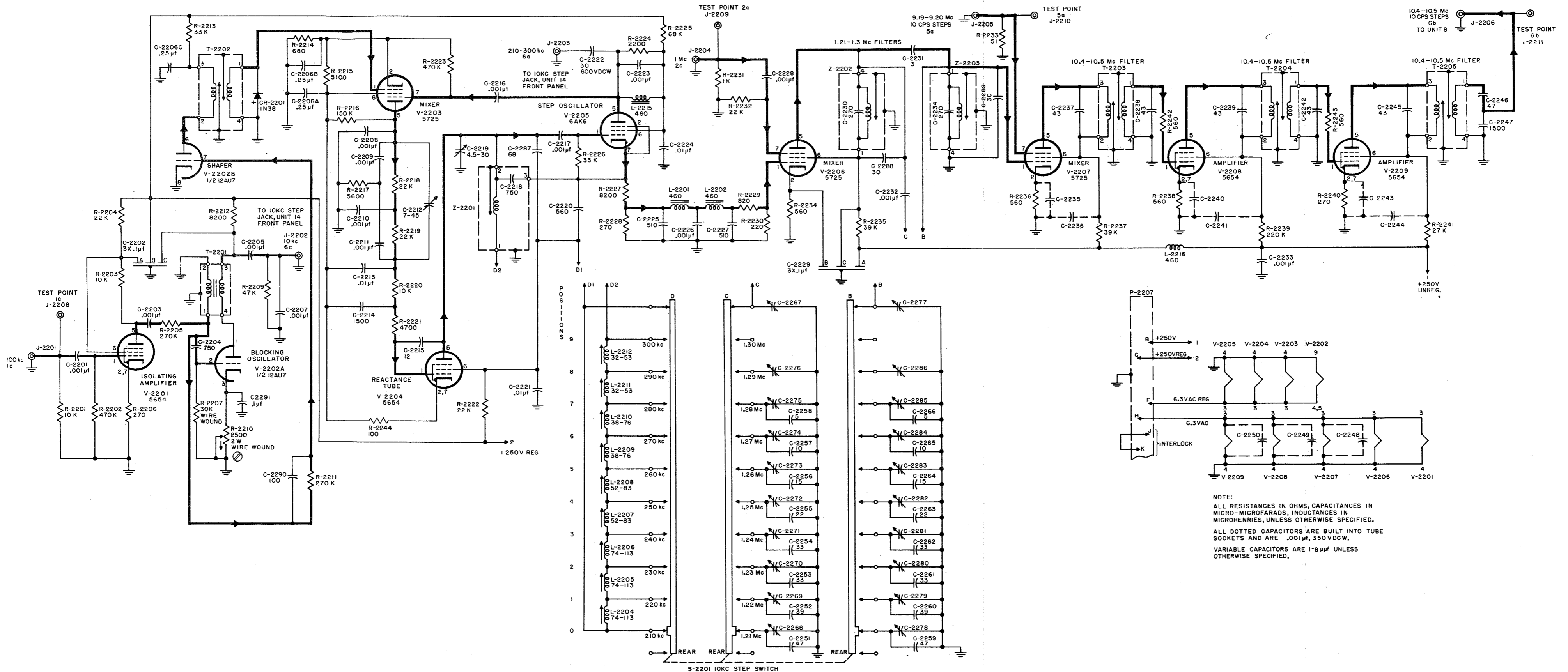
NOTE:  
ALL RESISTANCES IN OHMS, CAPACITANCES IN  
MICRO-MICROFARADS, INDUCTANCES IN MICROHENRIES  
UNLESS OTHERWISE SPECIFIED.  
ALL DOTTED CAPACITORS ARE BUILT INTO TUBE  
SOCKETS AND ARE .001µf 350VDCW.

Figure 7-131. RFO, Unit 5 (Z-2158), Schematic Diagram

| WIRE NO.   | DESCRIPTION  |
|------------|--|
| 1          | NO. 20 AWG STRANDED SINGLE CONDUCTOR 1000 V INSULATION (SHIELDED AS INDICATED) |
| 2          | NO. 22 AWG STRANDED SINGLE CONDUCTOR 1000 V INSULATION                         |
| ALL OTHERS | NO. 20 AWG SOLID COPPER TINNED (BUS) WIRE                                      |



**Figure 7-132. RFO, Unit 5 (Z-2158), Wiring Diagram**



NOTE:  
ALL RESISTANCES IN OHMS, CAPACITANCES IN MICRO-MICROFARADS, INDUCTANCES IN MICROHENRIES, UNLESS OTHERWISE SPECIFIED.  
ALL DOTTED CAPACITORS ARE BUILT INTO TUBE SOCKETS AND ARE .001µf, 350 VDCW.  
VARIABLE CAPACITORS ARE 1-8 µf UNLESS OTHERWISE SPECIFIED.

Figure 7-133. RFO, Unit 6 (Z-2204), Schematic Diagram

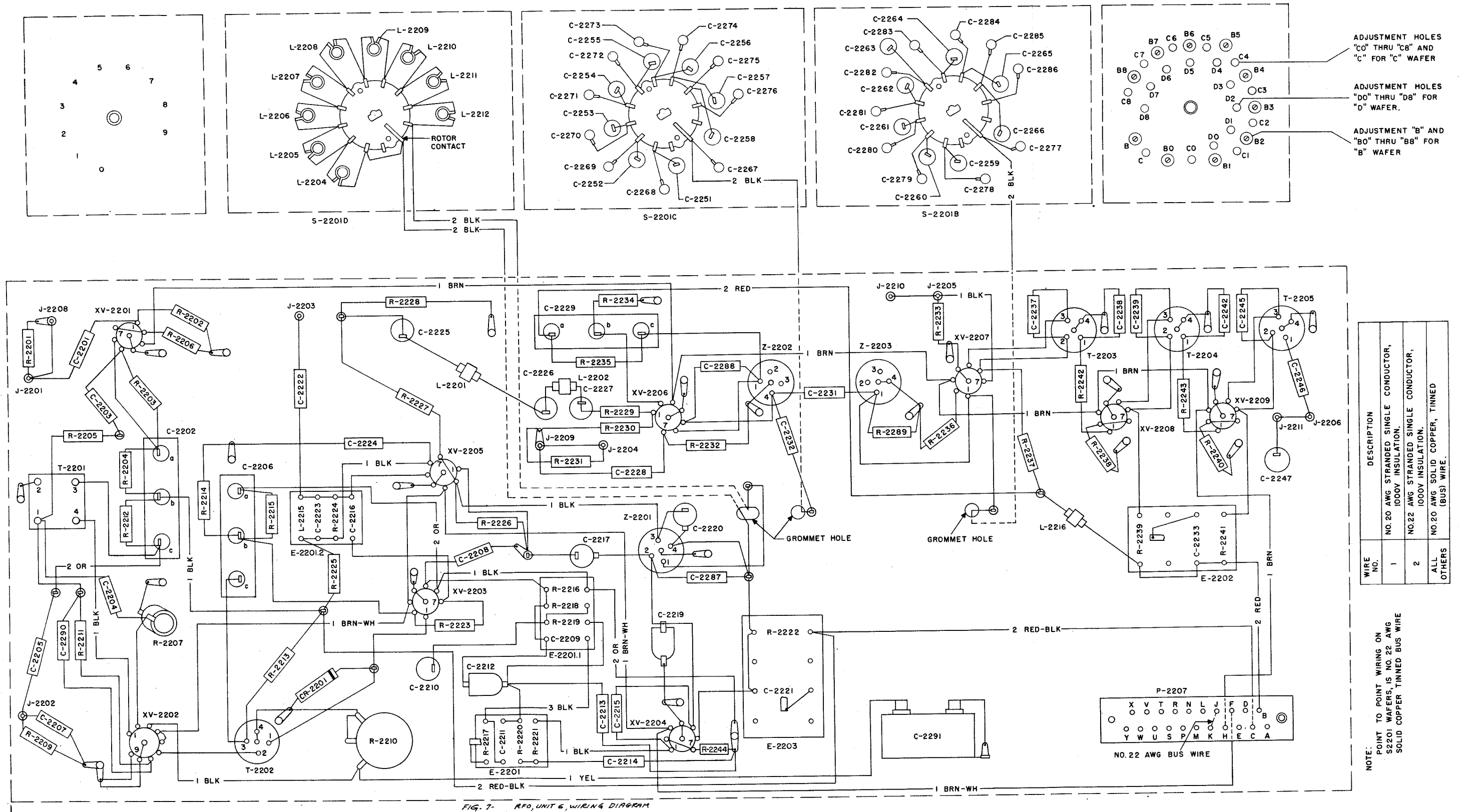
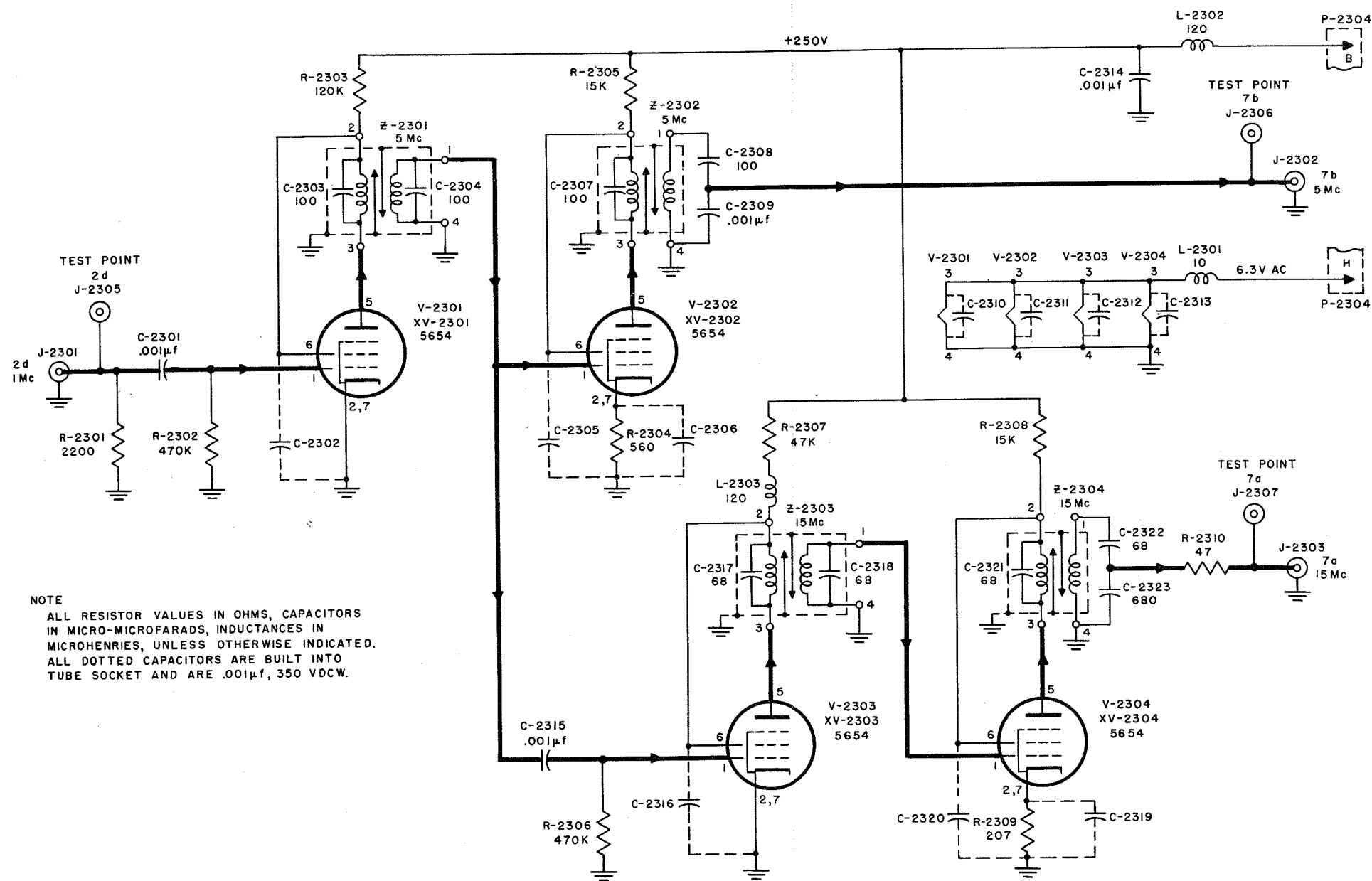


FIG. 7- RFO, UNIT 6, WIRING DIAGRAM

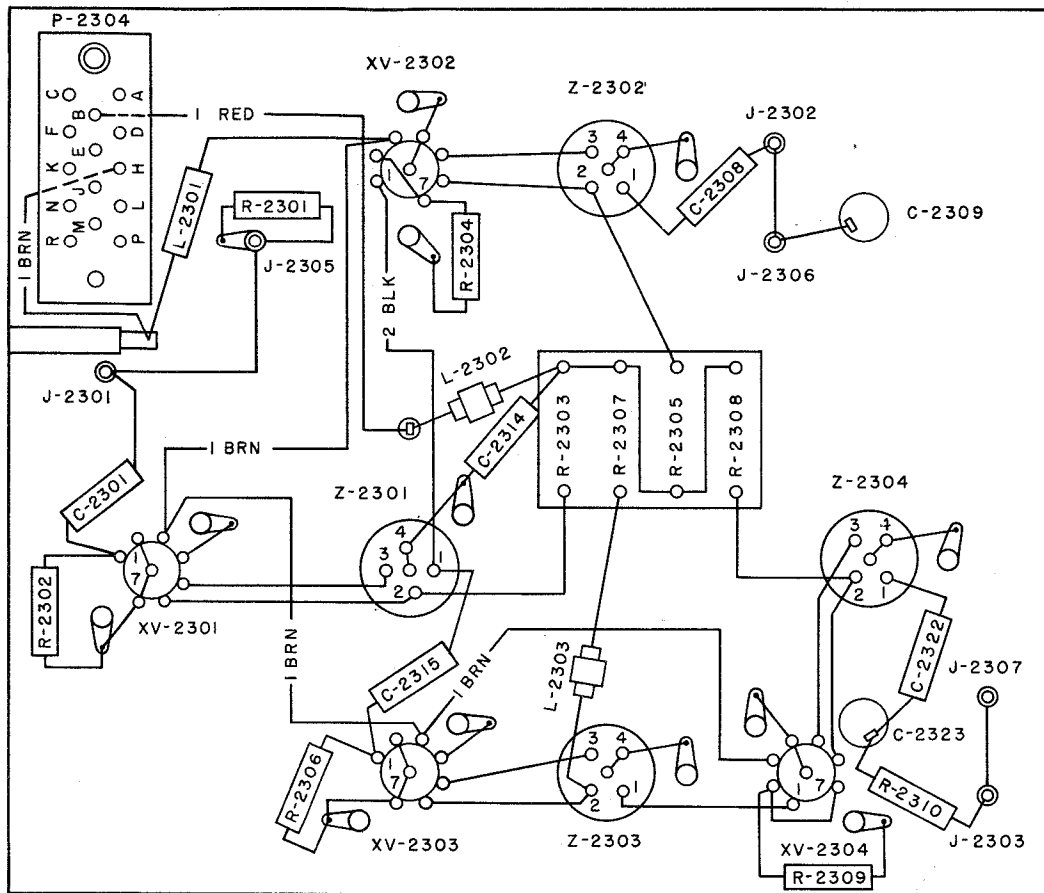
Figure 7-134. RFO, Unit 6 (Z-2204), Wiring Diagram





NOTE  
ALL RESISTOR VALUES IN OHMS, CAPACITORS  
IN MICRO-MICROFARADS, INDUCTANCES IN  
MICROHENRIES, UNLESS OTHERWISE INDICATED.  
ALL DOTTED CAPACITORS ARE BUILT INTO  
TUBE SOCKET AND ARE .001 $\mu$ f, 350 VDCW.

Figure 7-135. RFO, Unit 7 (Z-2305), Schematic Diagram



| WIRE NO.   | DESCRIPTION  |
|------------|--|
| 1          | NO. 20 AWG STRANDED SINGLE CONDUCTOR<br>1000V INSULATION |
| 2          | NO. 20 AWG SOLID SINGLE CONDUCTOR<br>1000V INSULATION    |
| ALL OTHERS | NO. 20 AWG SOLID COPPER TINNED<br>(BUS) WIRE             |

Figure 7-136. RFO, Unit 7 (Z-2305), Wiring Diagram

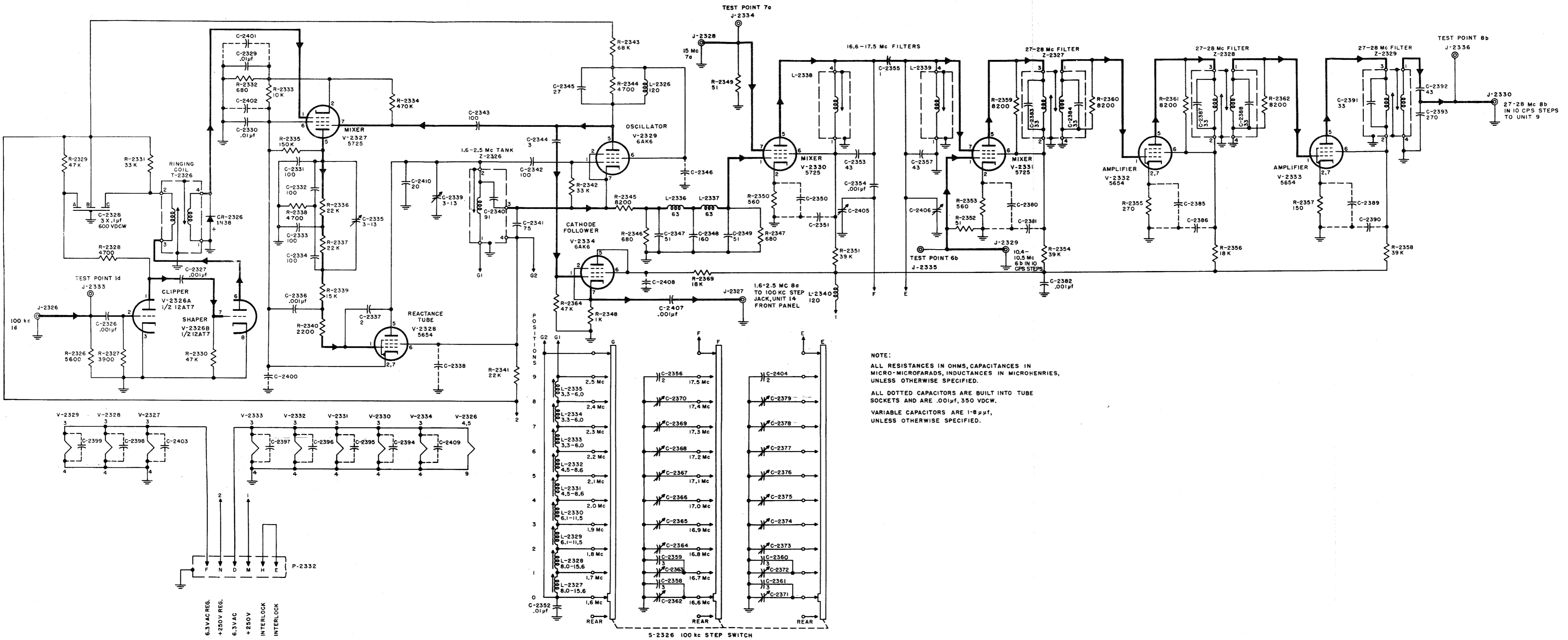


Figure 7-137. RFO, Unit 8 (Z-2330), Schematic Diagram

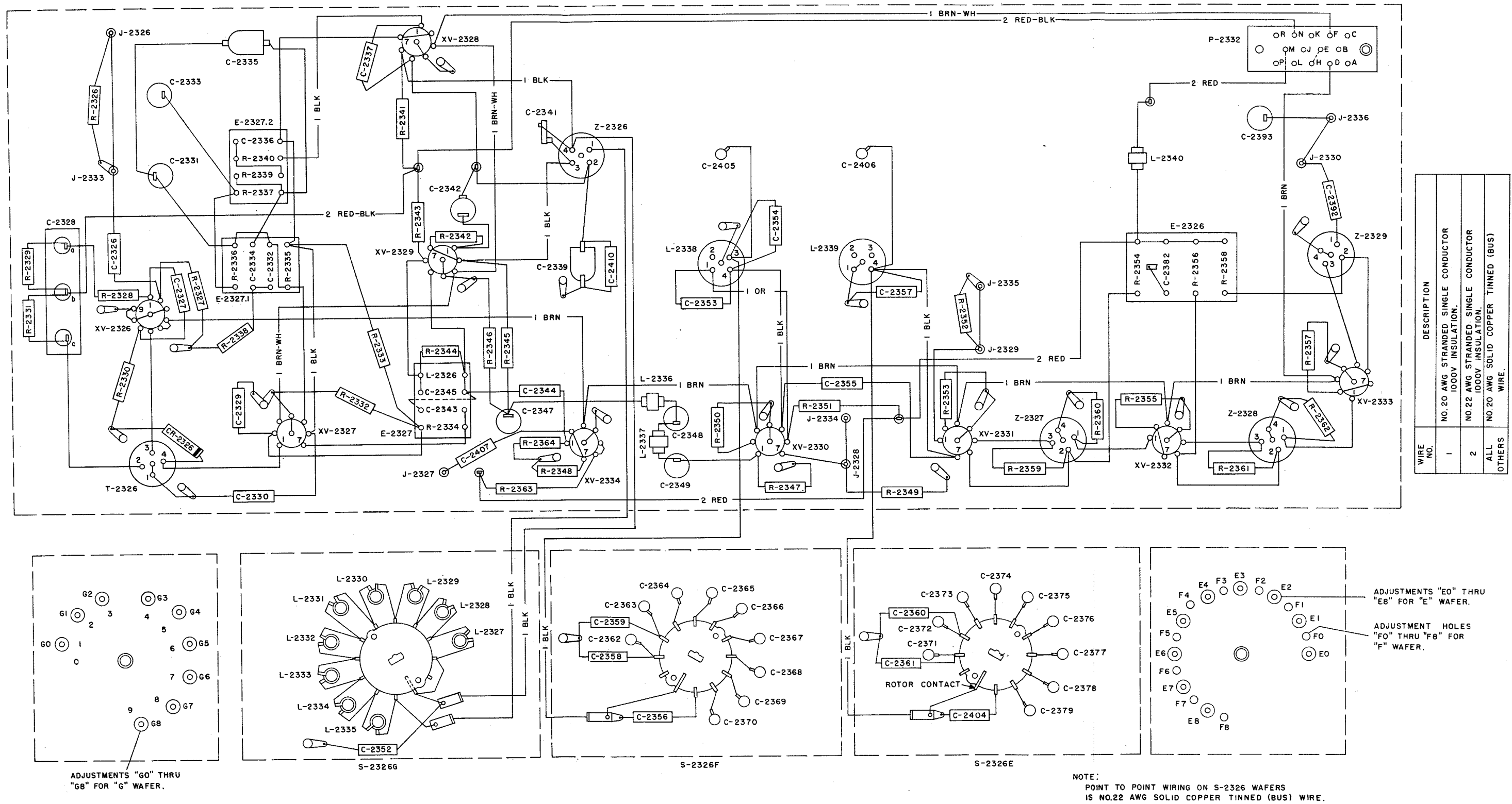
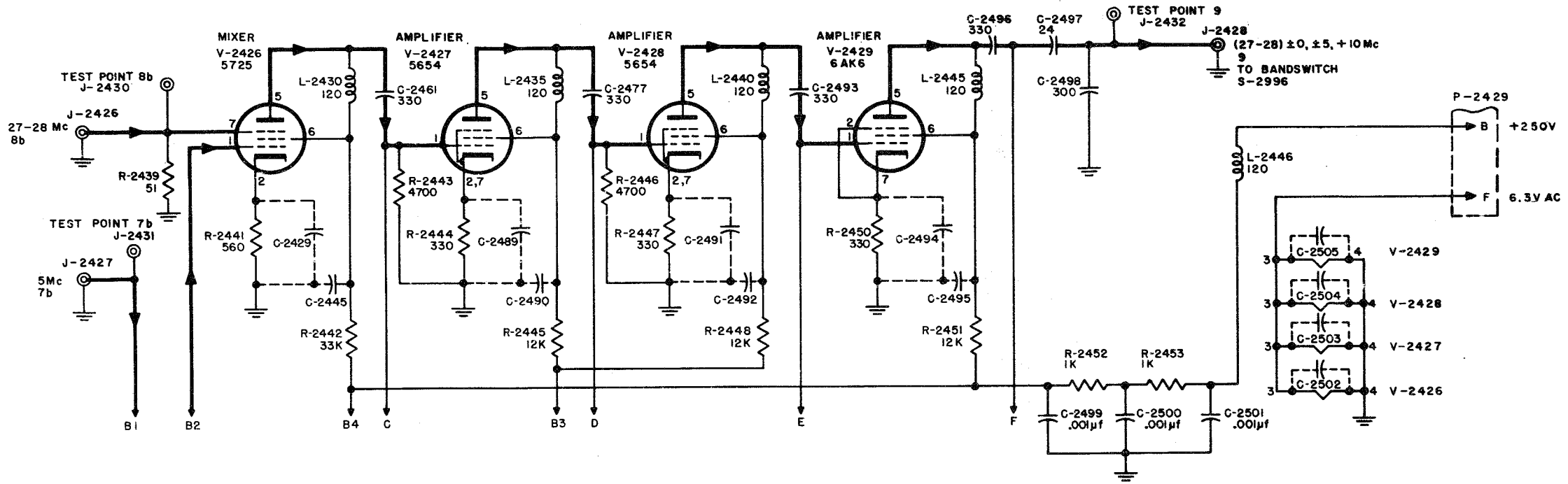
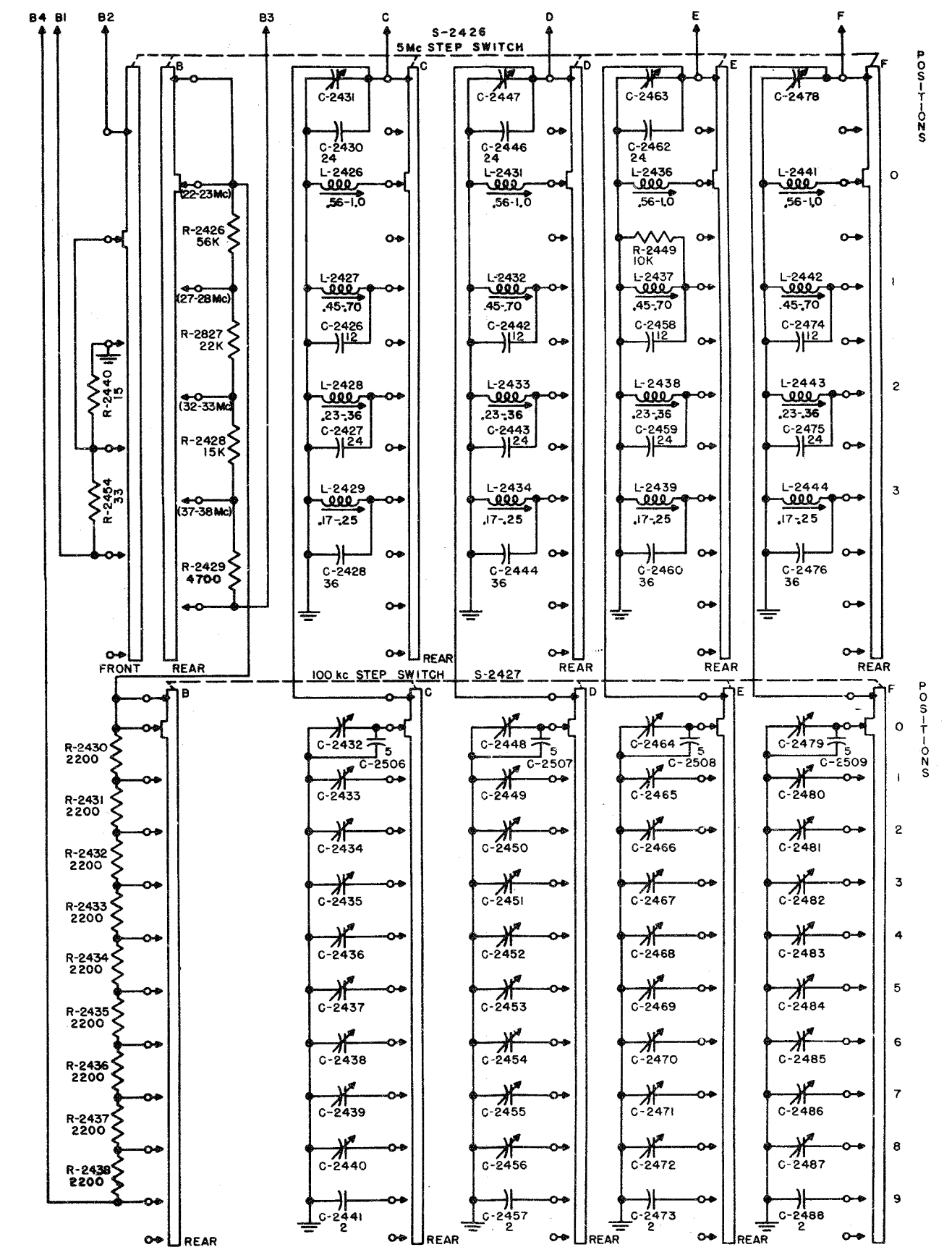


Figure 7-138. RFO, Unit 8 (Z-2330), Wiring Diagram



NOTE:  
 ALL RESISTANCES IN OHMS, ALL CAPACITANCES IN MICRO-MICROFARADS, ALL INDUCTANCES IN MICROHENRIES UNLESS OTHERWISE SPECIFIED.  
 ALL DOTTED CAPACITORS ARE BUILT INTO TUBE SOCKETS AND ARE .001μf, 350 VDCW.  
 VARIABLE CAPACITORS ARE IN 1-7μf UNLESS OTHERWISE SPECIFIED.

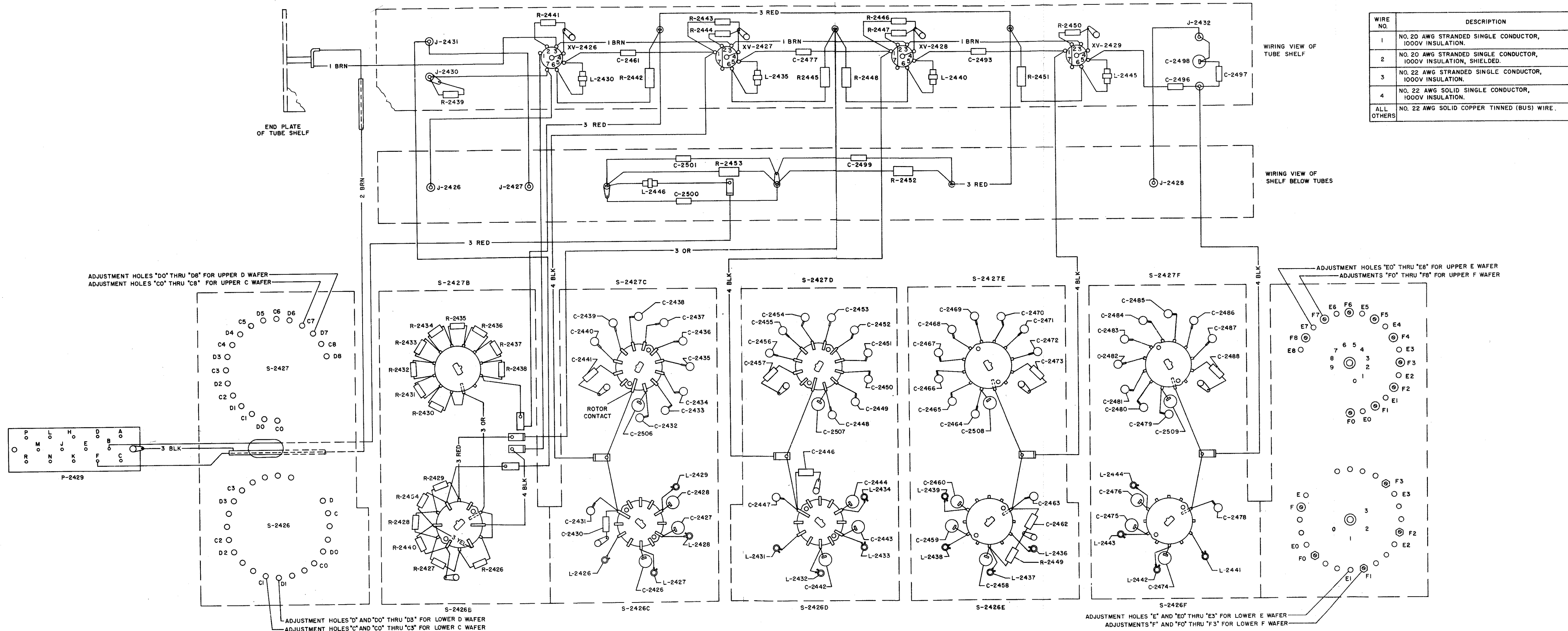


ORIGINAL

7-211/7-212

Figure 7-139. RFO, Unit 9 (Z-2426), Schematic Diagram

CORRECTIVE  
MAINTENANCE



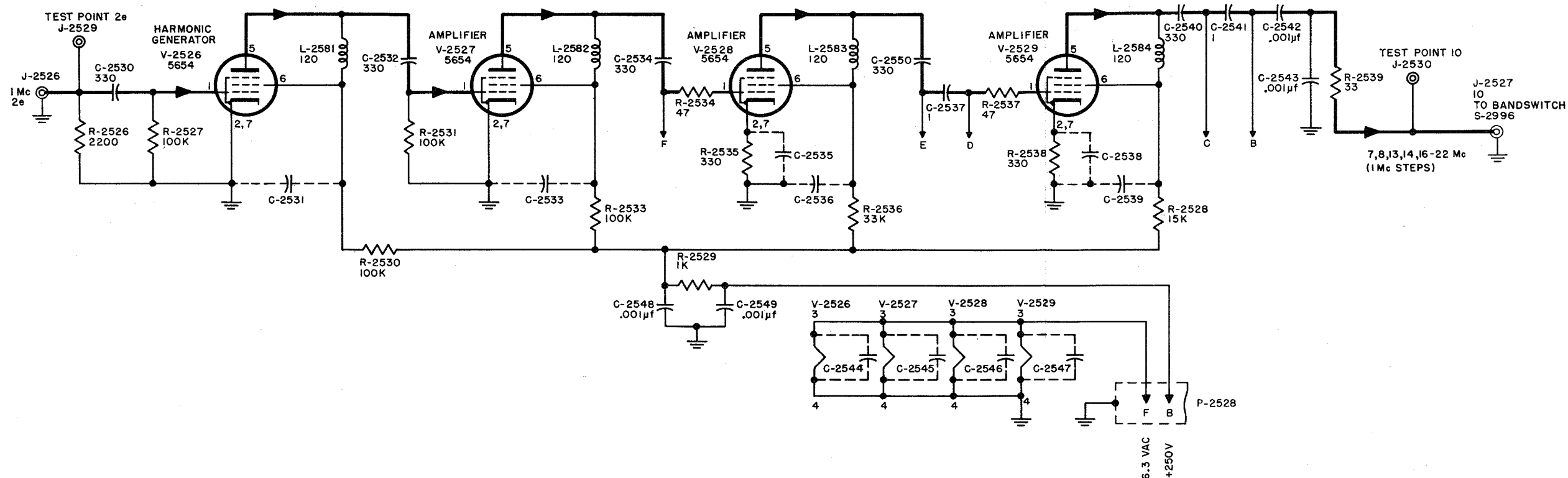
| WIRE NO.   | DESCRIPTION   |
|------------|---|
| 1          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.           |
| 2          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION, SHIELDED. |
| 3          | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.           |
| 4          | NO. 22 AWG SOLID SINGLE CONDUCTOR, 1000V INSULATION.              |
| ALL OTHERS | NO. 22 AWG SOLID COPPER TINNED (BUS) WIRE.                        |

Figure 7-140. RFO, Unit 9 (Z-2426), Wiring Diagram

ORIGINAL

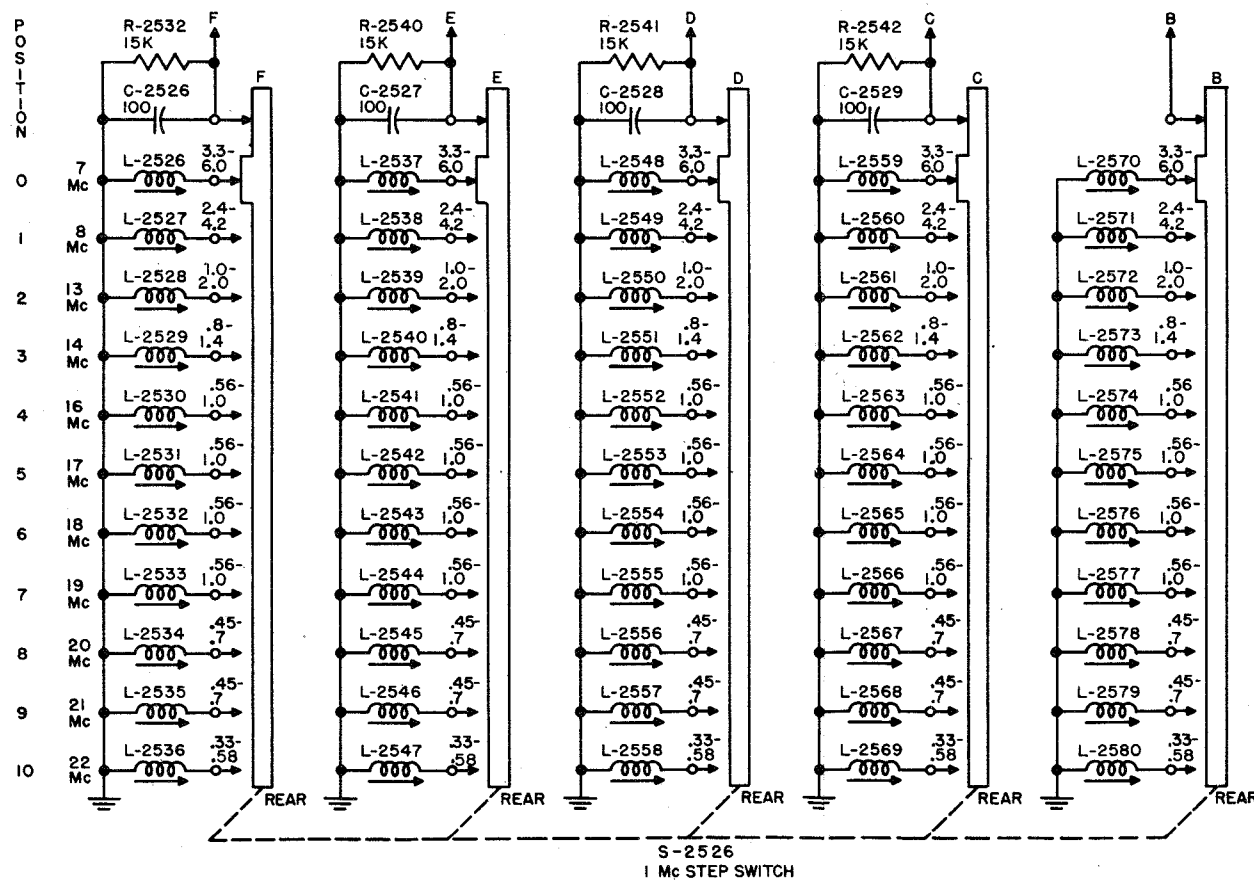
CORRECTIVE MAINTENANCE

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A



NOTE:

ALL RESISTANCES IN OHMS, CAPACITANCES IN MICRO-MICROFARADS, INDUCTANCES IN MICROHENRIES, UNLESS OTHERWISE SPECIFIED.  
ALL DOTTED CAPACITORS ARE BUILT INTO TUBE SOCKET AND ARE .001 μf, 350 VDCW.



ORIGINAL

Figure 7-141. RFO, Unit 10 (Z-2526), Schematic Diagram

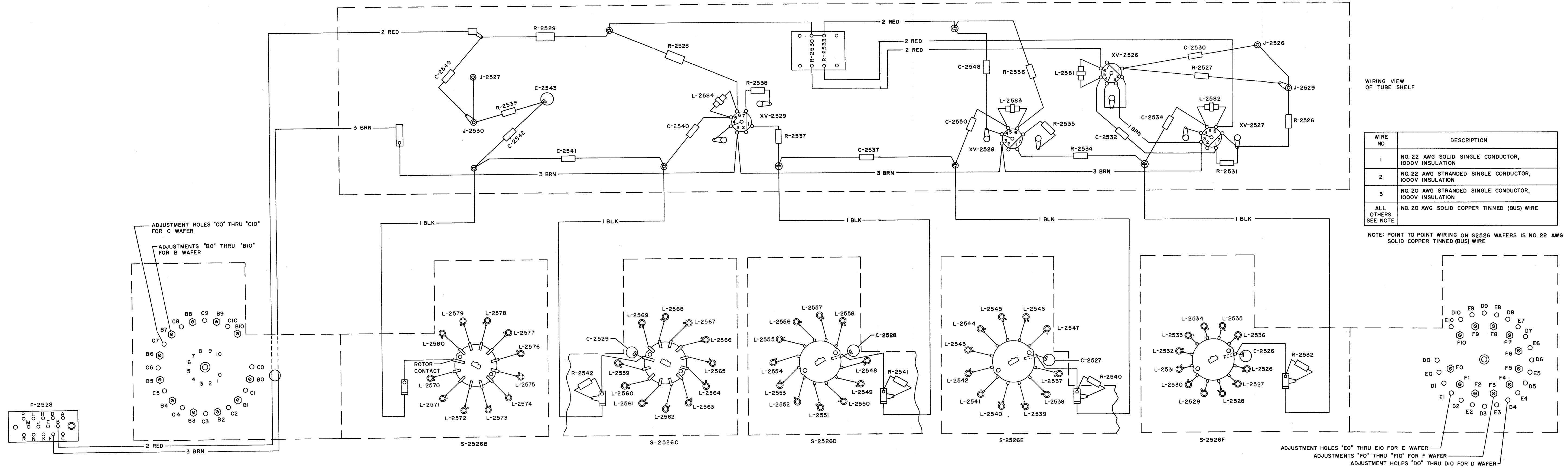


Figure 7-142. RFO, Unit 10 (Z-2526), Wiring Diagram



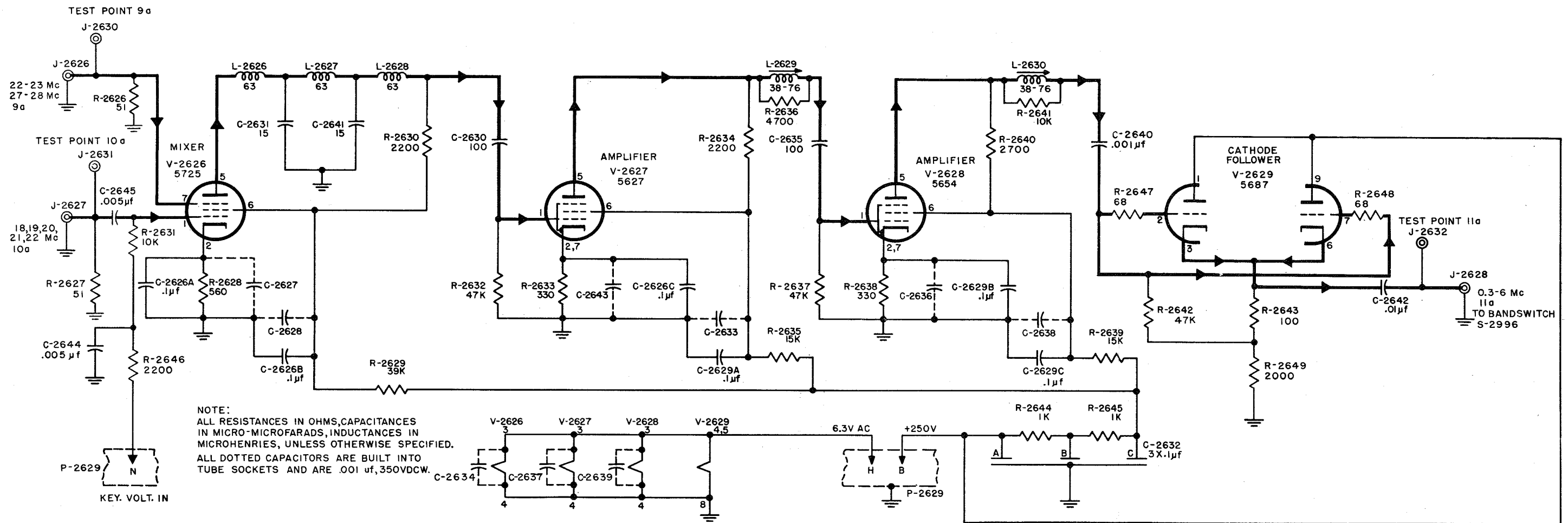
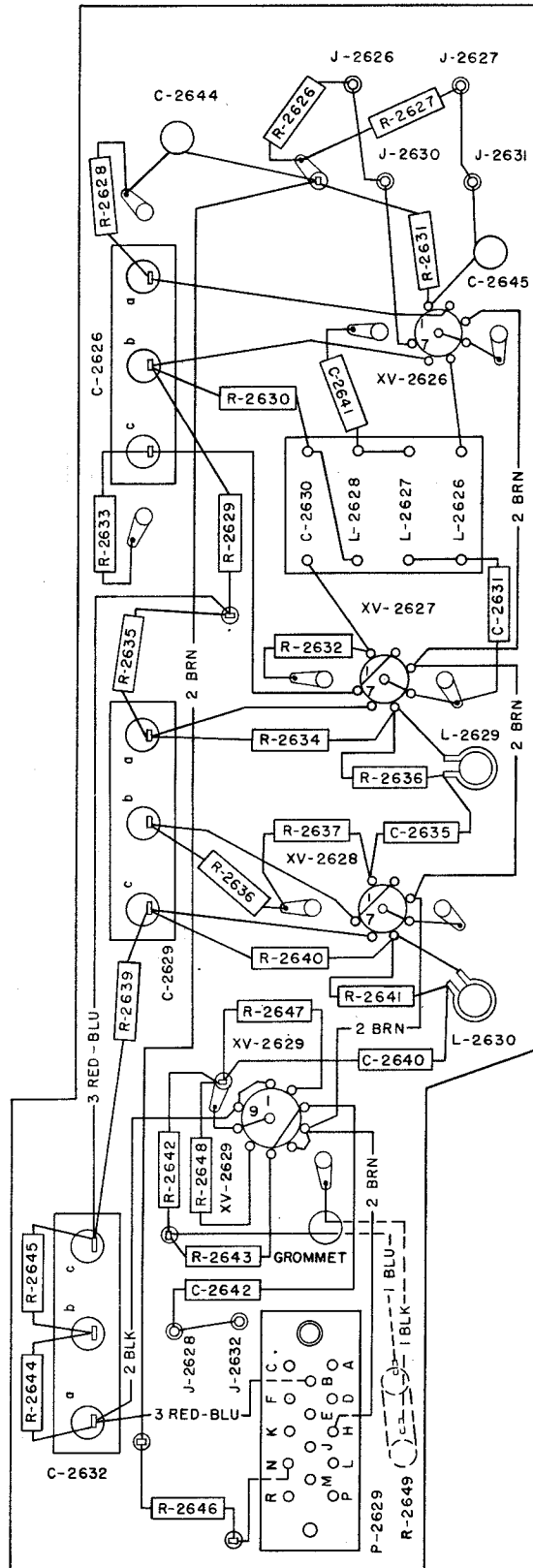
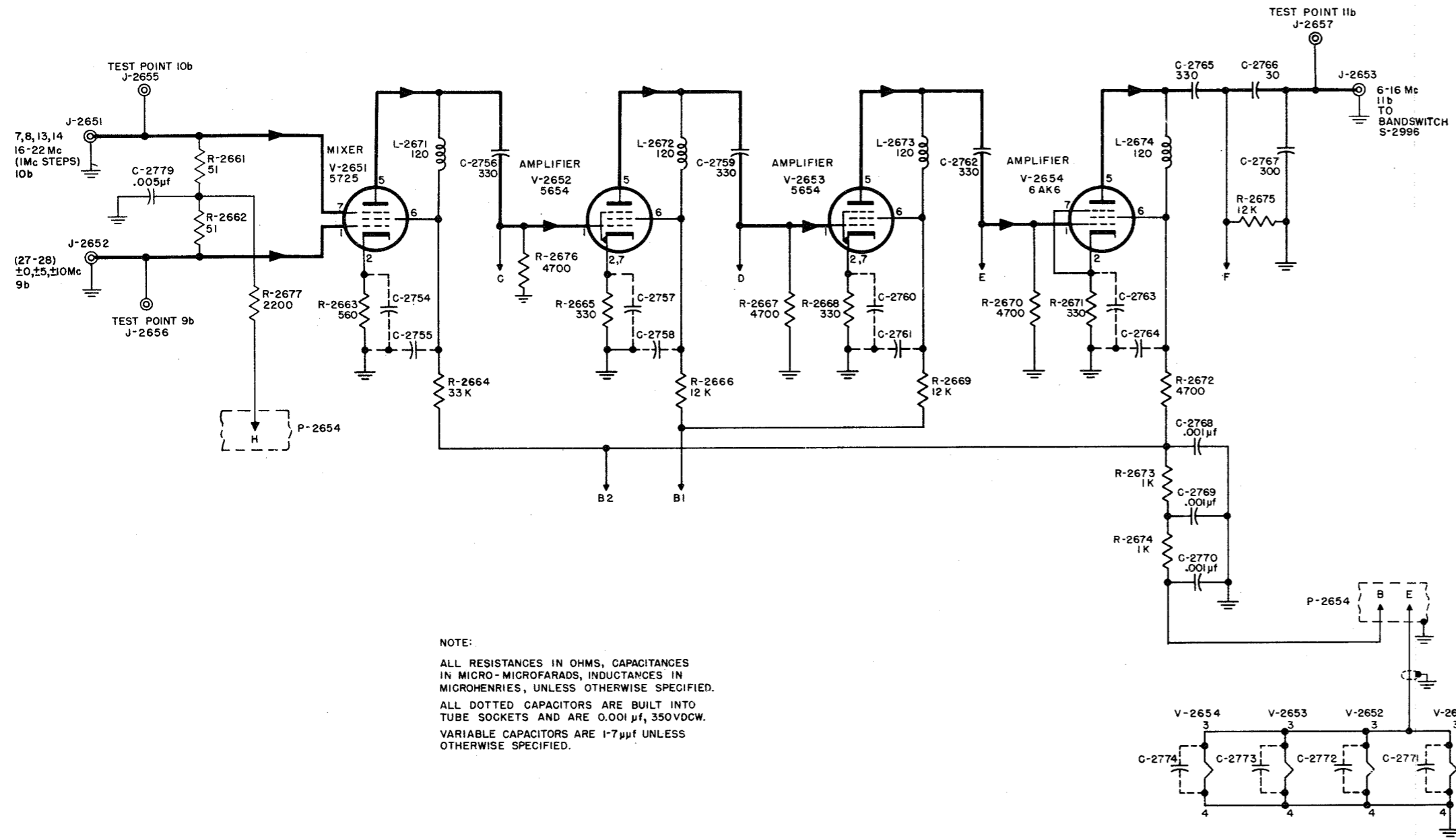


Figure 7-143. RFO, Unit 11A (Z-2626), Schematic Diagram

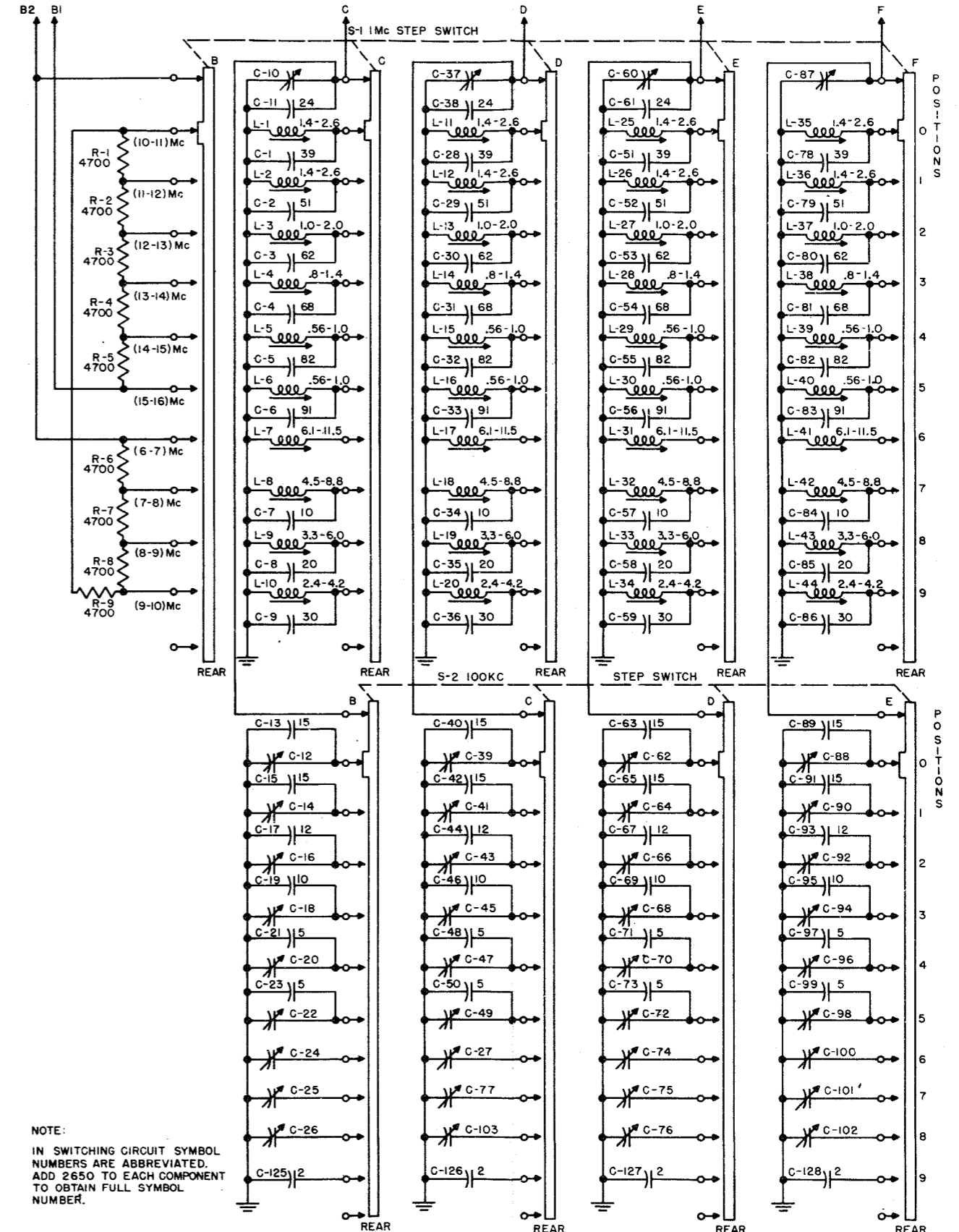
| WIRE NO    | DESCRIPTION   |
|------------|---|
| 1          | NO. 18 AWG STRANDED SINGLE CONDUCTOR, 1000 V. INSULATION. |
| 2          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000 V. INSULATION. |
| 3          | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000 V. INSULATION. |
| ALL OTHERS | NO. 20 AWG SOLID COPPER, TINNED (BUS) WIRE.               |



**Figure 7-144. RFO, Unit 11A (Z-2626), Wiring Diagram**



NOTE:  
ALL RESISTANCES IN OHMS, CAPACITANCES  
IN MICRO-MICROFARADS, INDUCTANCES IN  
MICROHENRIES, UNLESS OTHERWISE SPECIFIED.  
ALL DOTTED CAPACITORS ARE BUILT INTO  
TUBE SOCKETS AND ARE 0.001  $\mu$ f, 350VDCW.  
VARIABLE CAPACITORS ARE 1-7  $\mu$ f UNLESS  
OTHERWISE SPECIFIED.



NOTE:  
IN SWITCHING CIRCUIT SYMBOL  
NUMBERS ARE ABBREVIATED.  
ADD 2650 TO EACH COMPONENT  
TO OBTAIN FULL SYMBOL  
NUMBER.

ORIGINAL

Figure 7-145. RFO, Unit 11B (Z-2651), Schematic Diagram

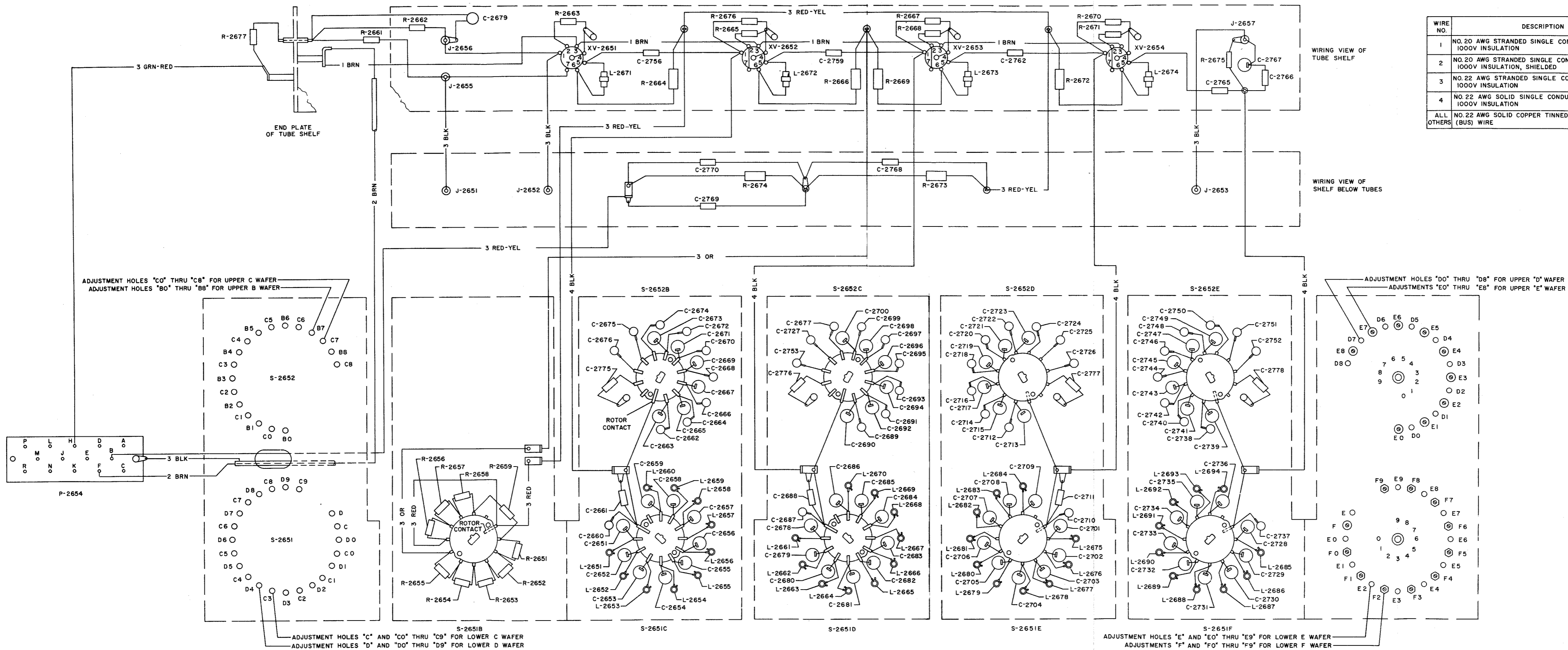
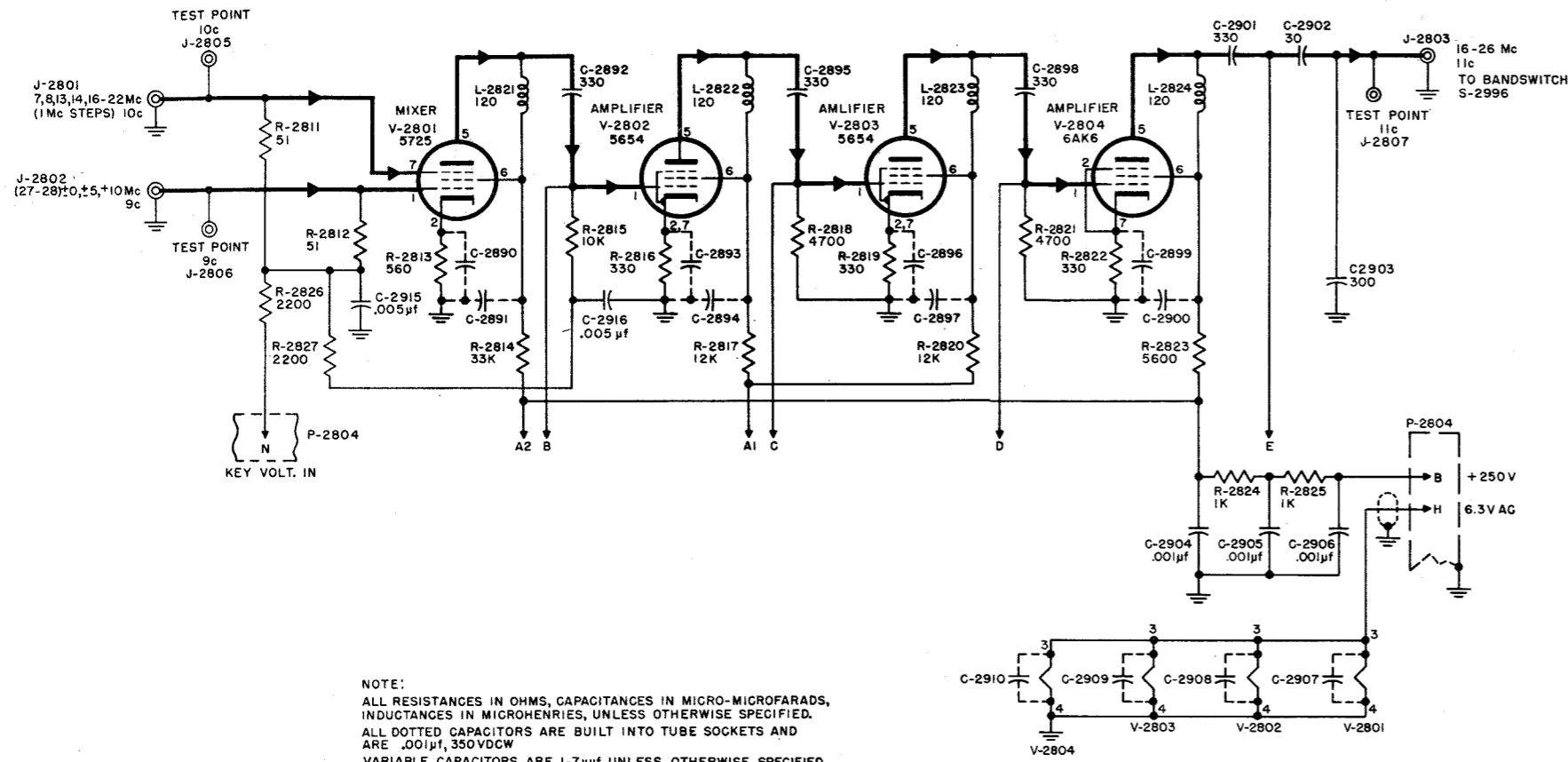
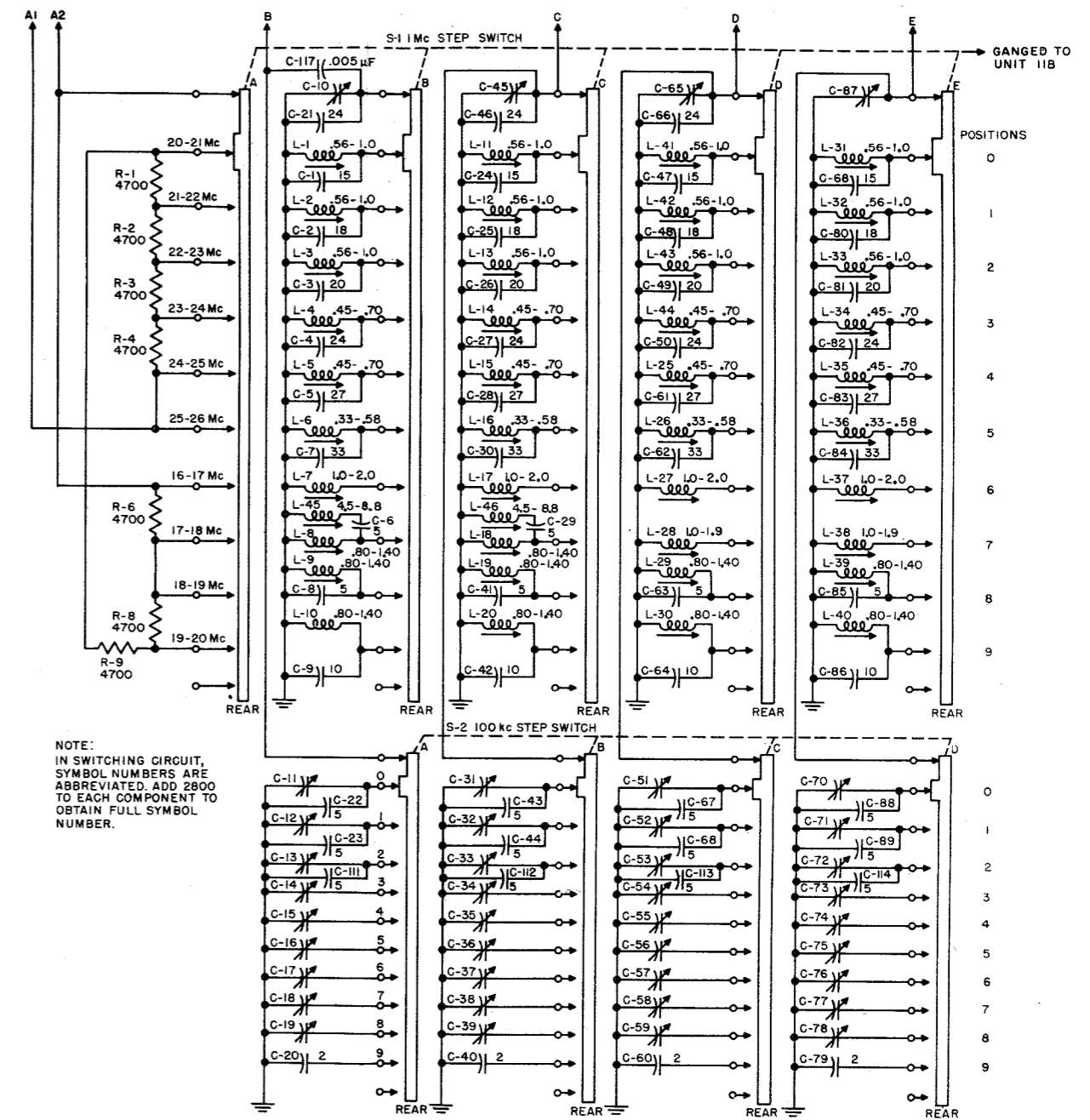


Figure 7-146. RFO, Unit 11B (Z-2651), Wiring Diagram

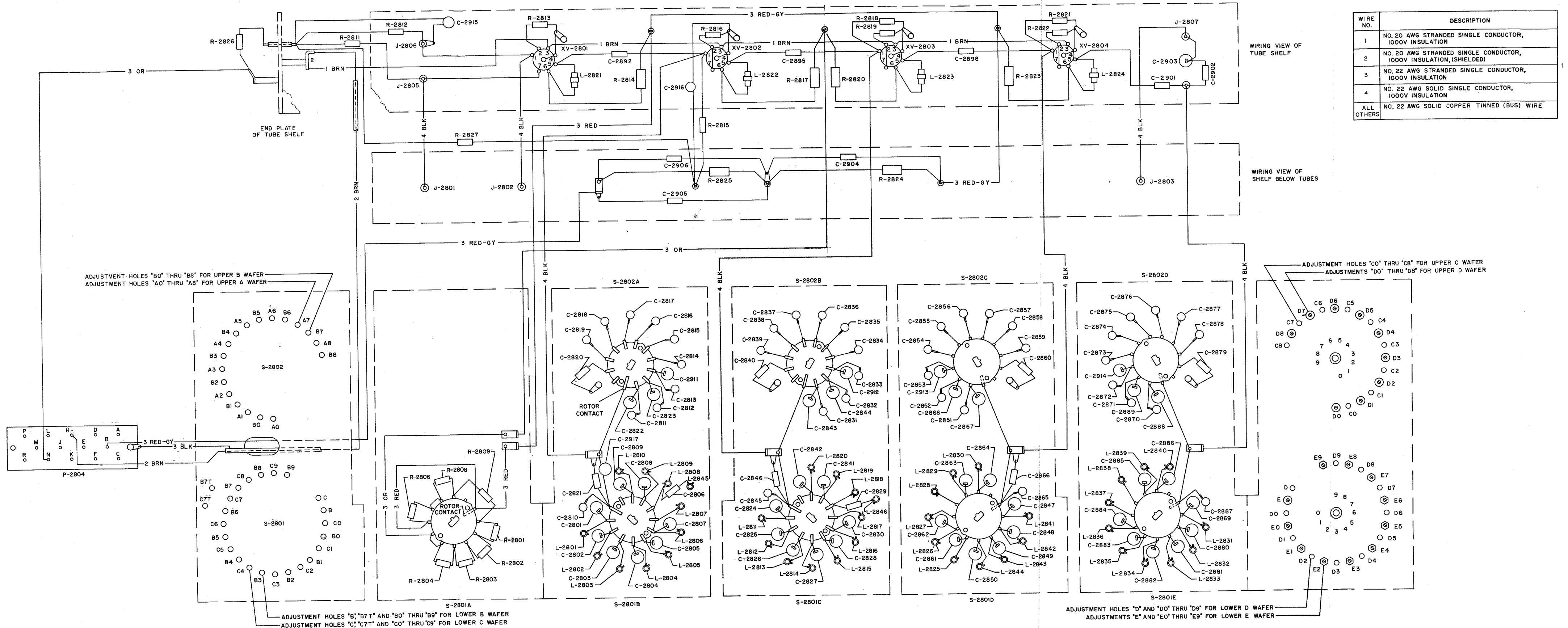


NOTE:  
ALL RESISTANCES IN OHMS, CAPACITANCES IN MICRO-MICROFARADS,  
INDUCTANCES IN MICROHENRIES, UNLESS OTHERWISE SPECIFIED.  
ALL DOTTED CAPACITORS ARE BUILT INTO TUBE SOCKETS AND  
ARE .001μf, 350VDCW  
VARIABLE CAPACITORS ARE 1-7μf UNLESS OTHERWISE SPECIFIED.



NOTE:  
IN SWITCHING CIRCUIT,  
SYMBOL NUMBERS ARE  
ABBREVIATED. ADD 2800  
TO EACH COMPONENT TO  
OBTAIN FULL SYMBOL  
NUMBER.

Figure 7-147. RFO, Unit 11C (Z-2801), Schematic Diagram



| WIRE NO.   | DESCRIPTION  |
|------------|--|
| 1          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION             |
| 2          | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION, (SHIELDED) |
| 3          | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION             |
| 4          | NO. 22 AWG SOLID SINGLE CONDUCTOR, 1000V INSULATION                |
| ALL OTHERS | NO. 22 AWG SOLID COPPER TINNED (BUS) WIRE                          |

Figure 7-148. RFO, Unit 11C (Z-2801), Wiring Diagram

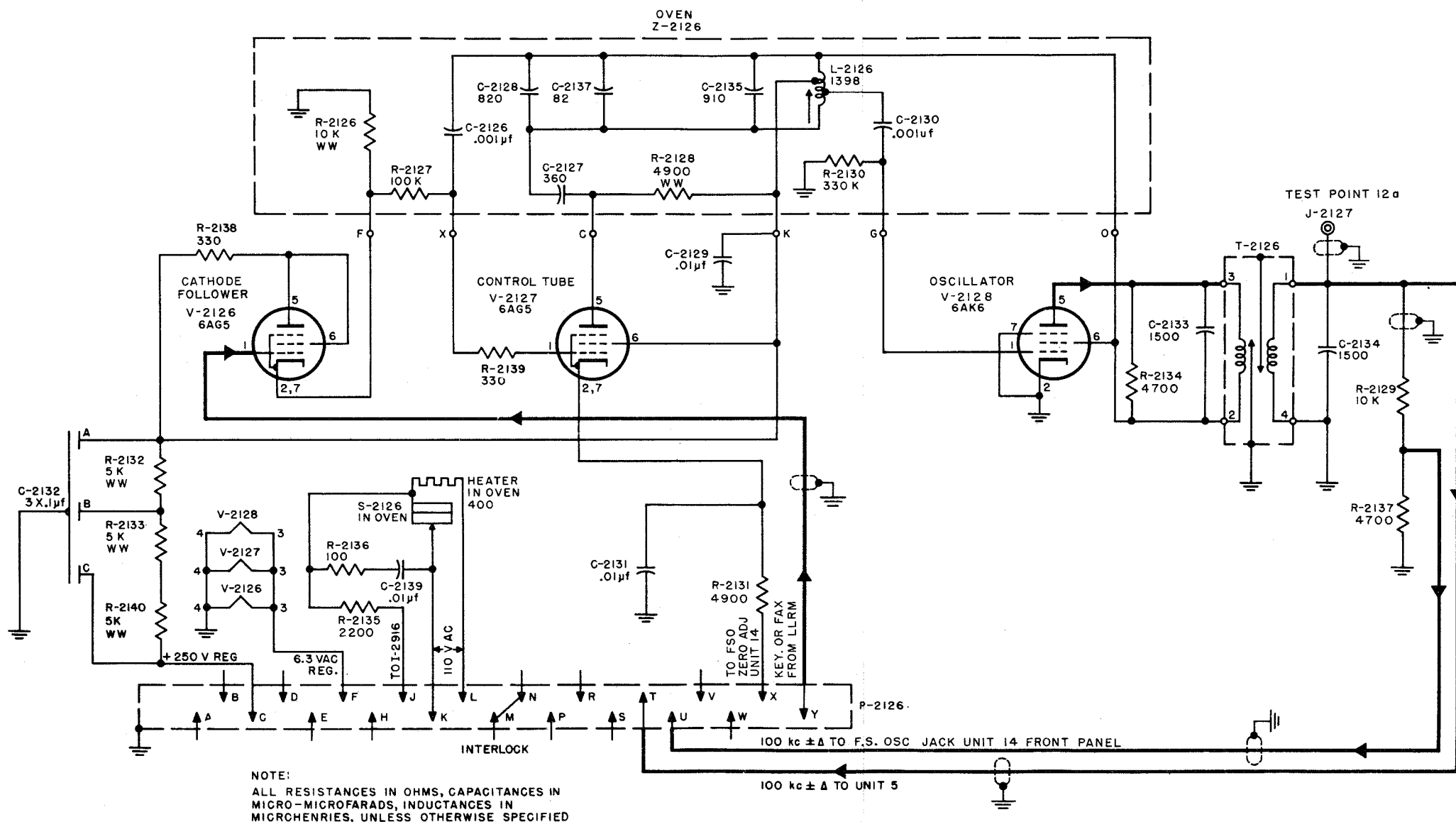
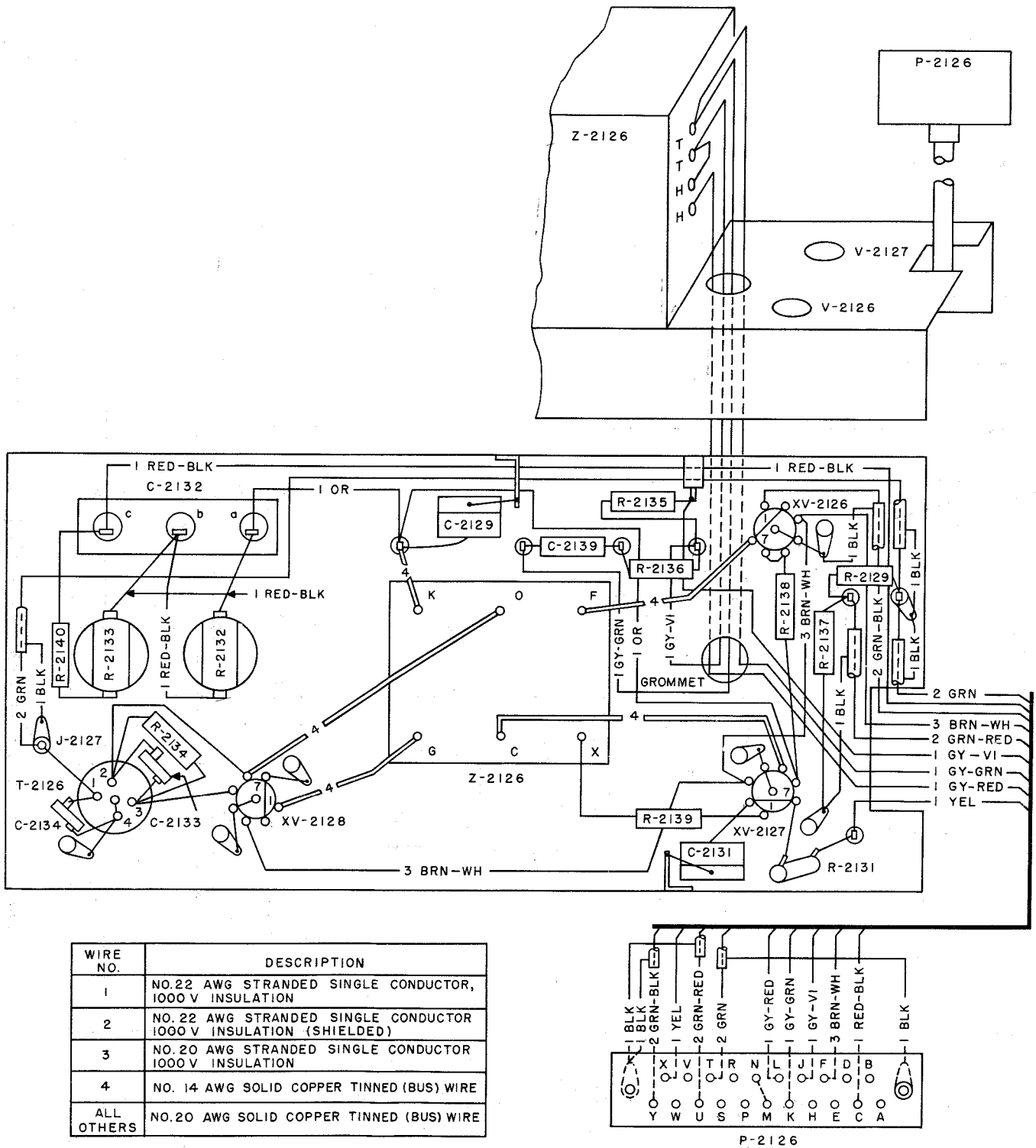


Figure 7-149. RFO, Unit 12 (Z-2127), Schematic Diagram



**Figure 7-150. RFO, Unit 12 (Z-2127), Wiring Diagram**



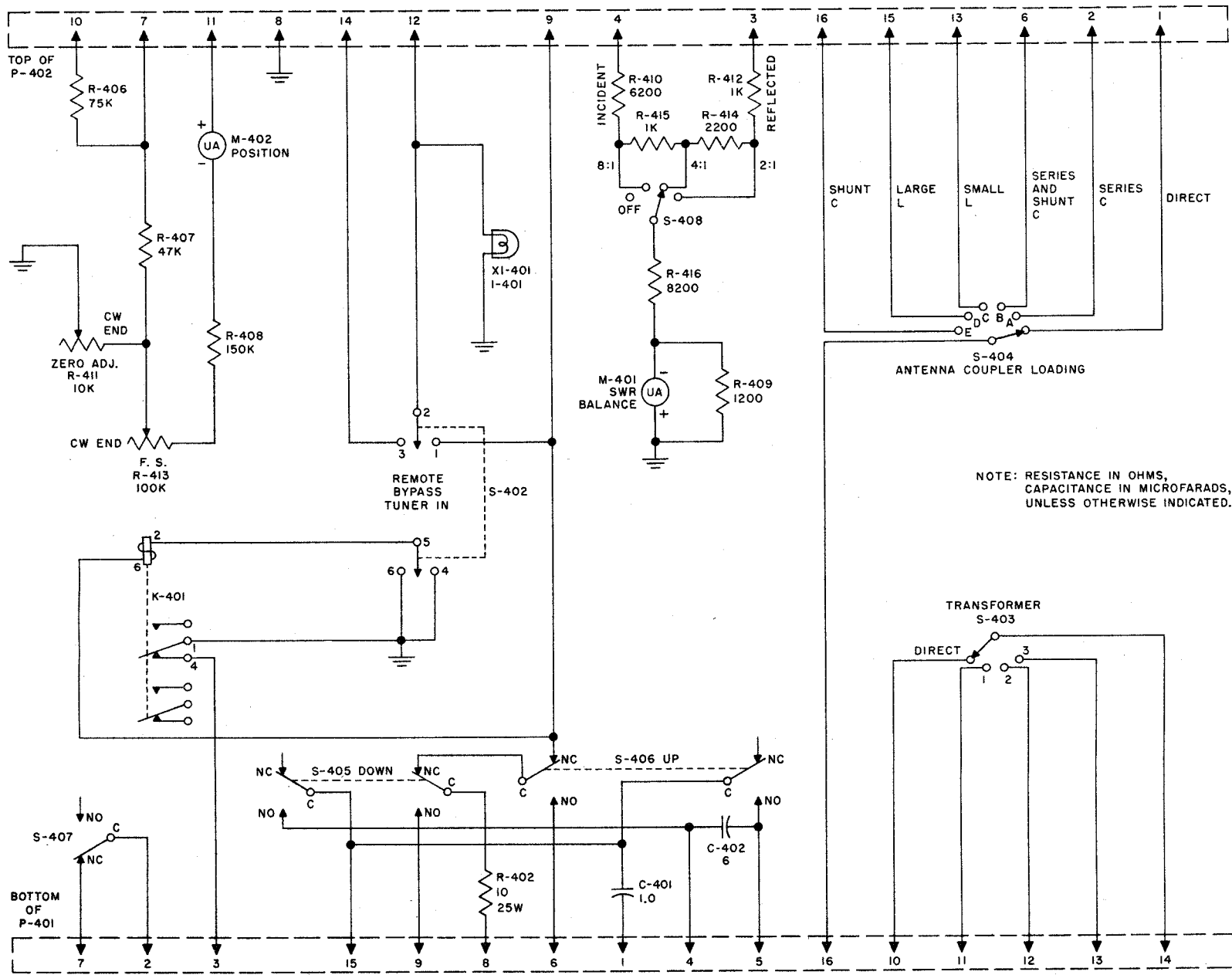


Figure 7-151. Control-Indicator C-1352/SRT, Schematic Diagram

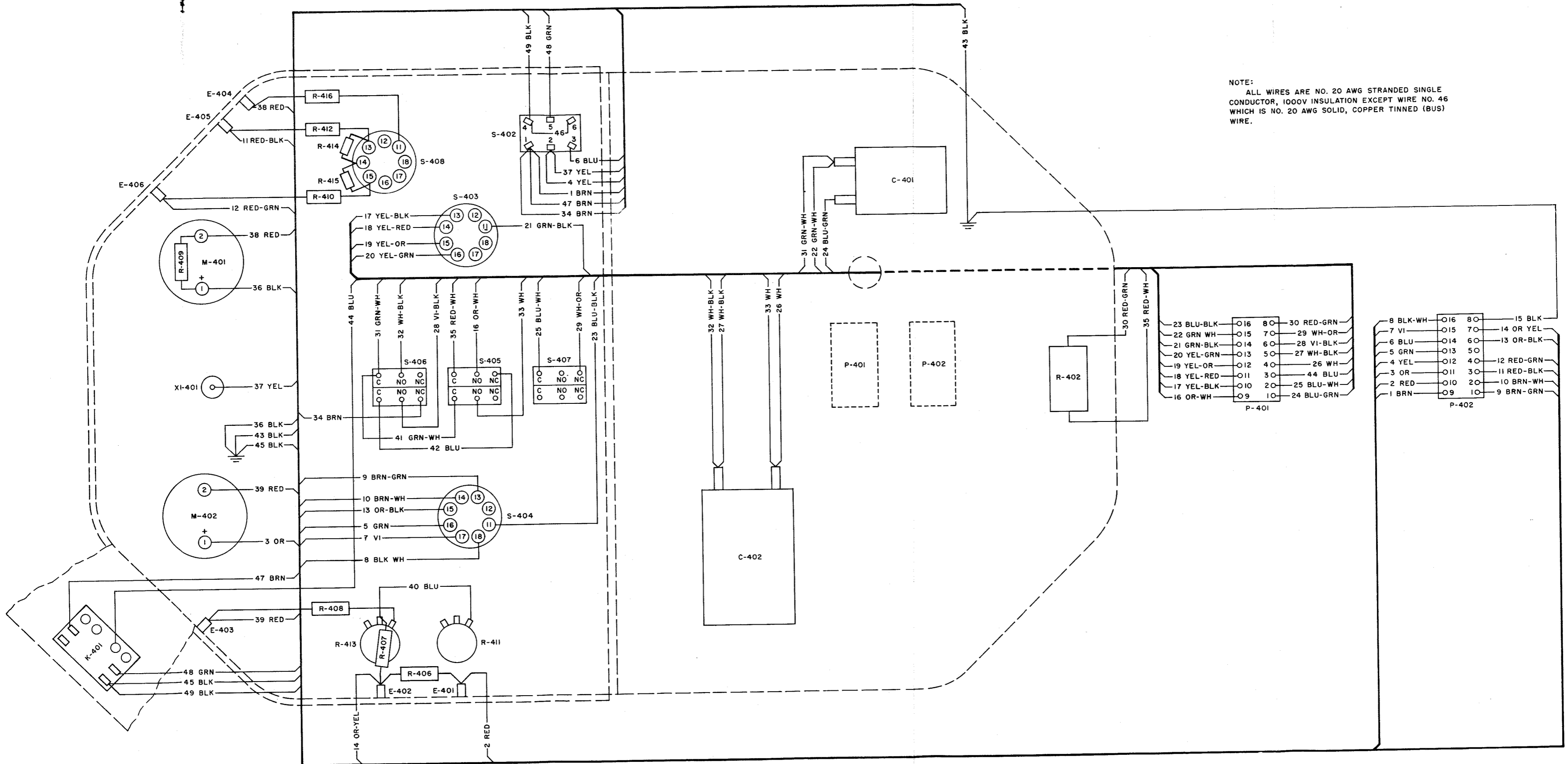


Figure 7-152. Control-Indicator C-1352/SRT, Wiring Diagram

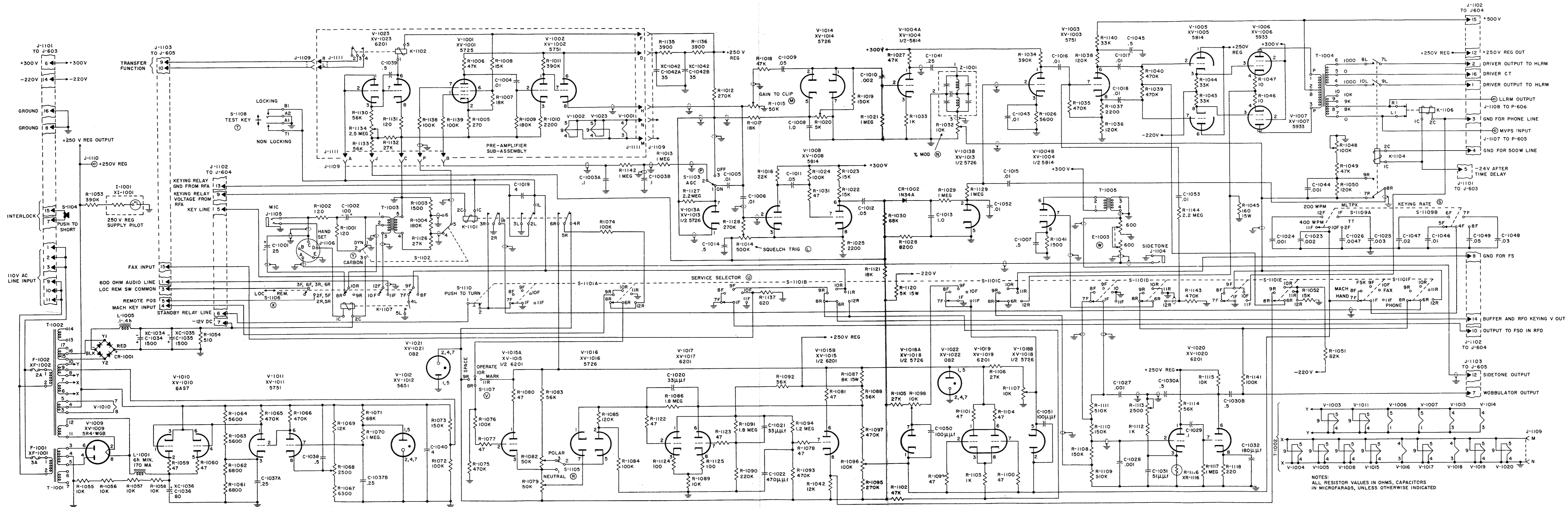


Figure 7-153. Radio Modulator MD-229/SRT (LRM), Schematic Diagram



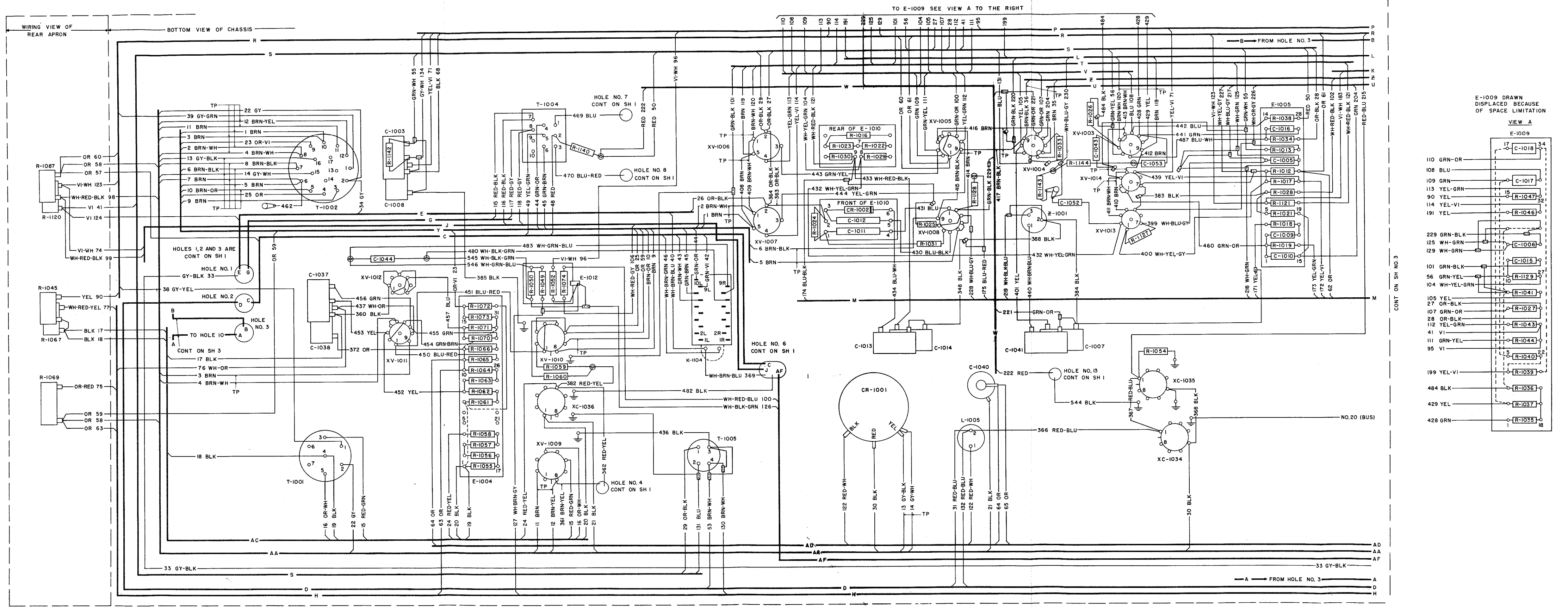
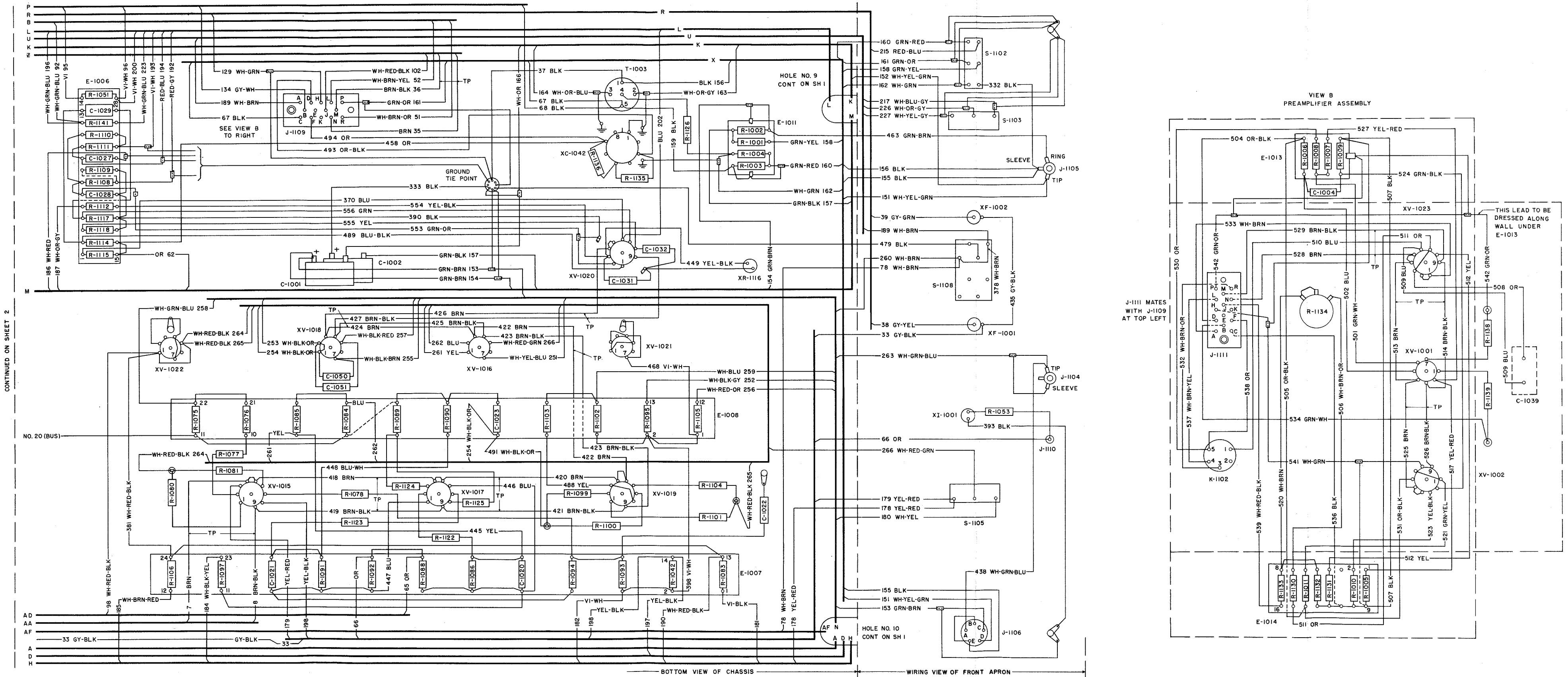


Figure 7-154. Radio Modulator MD-229/SRT (LRM), Wiring Diagram (Sheet 2 of 3)



CONTINUED ON SHEET 2

ORIGINAL

Figure 7-154. Radio Modulator MD-229/SRT (LLRM), Wiring Diagram (Sheet 3 of 3)

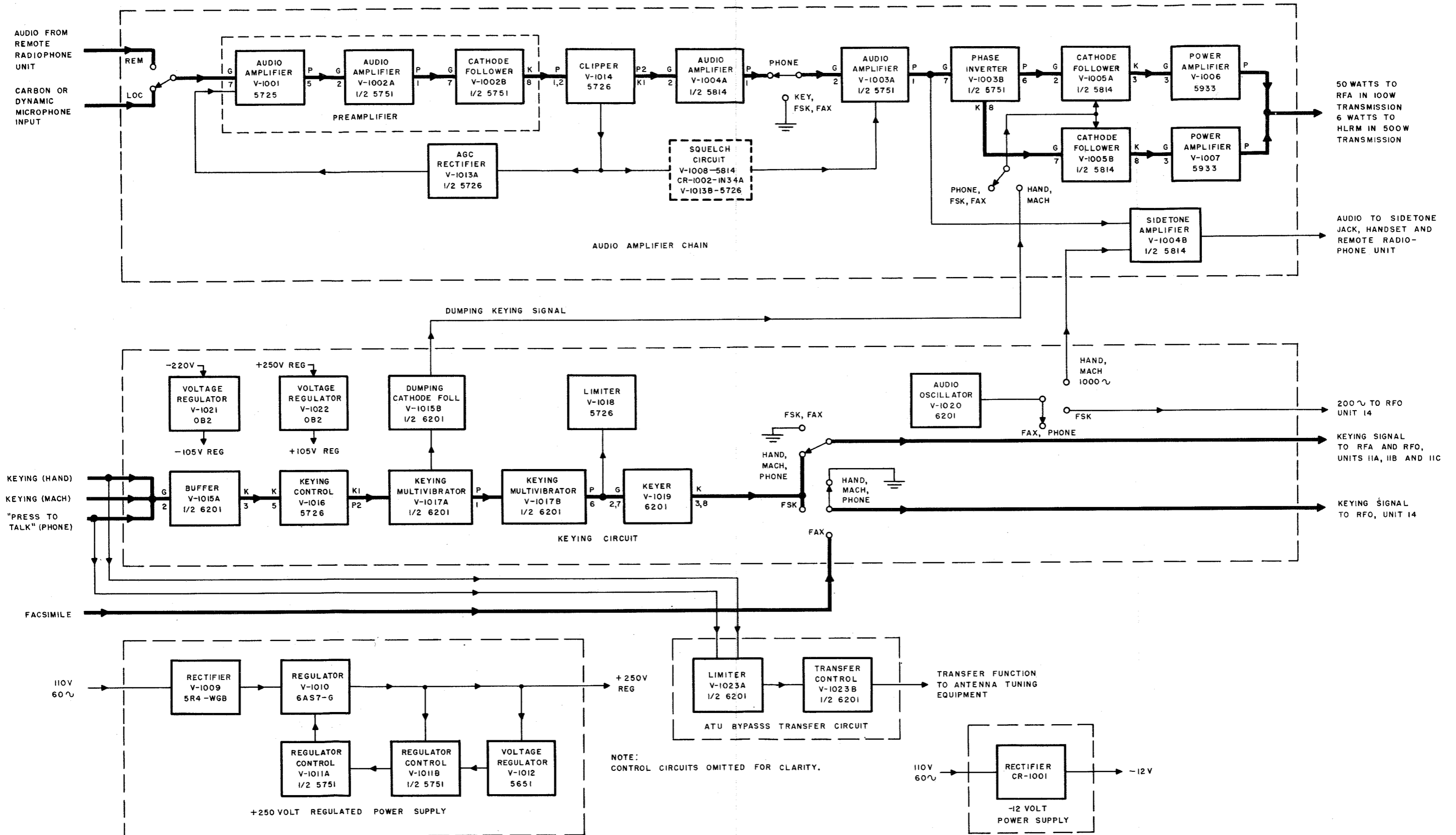


Figure 7-155. Radio Modulator MD-229/SRT (LLRM), Servicing Block Diagram

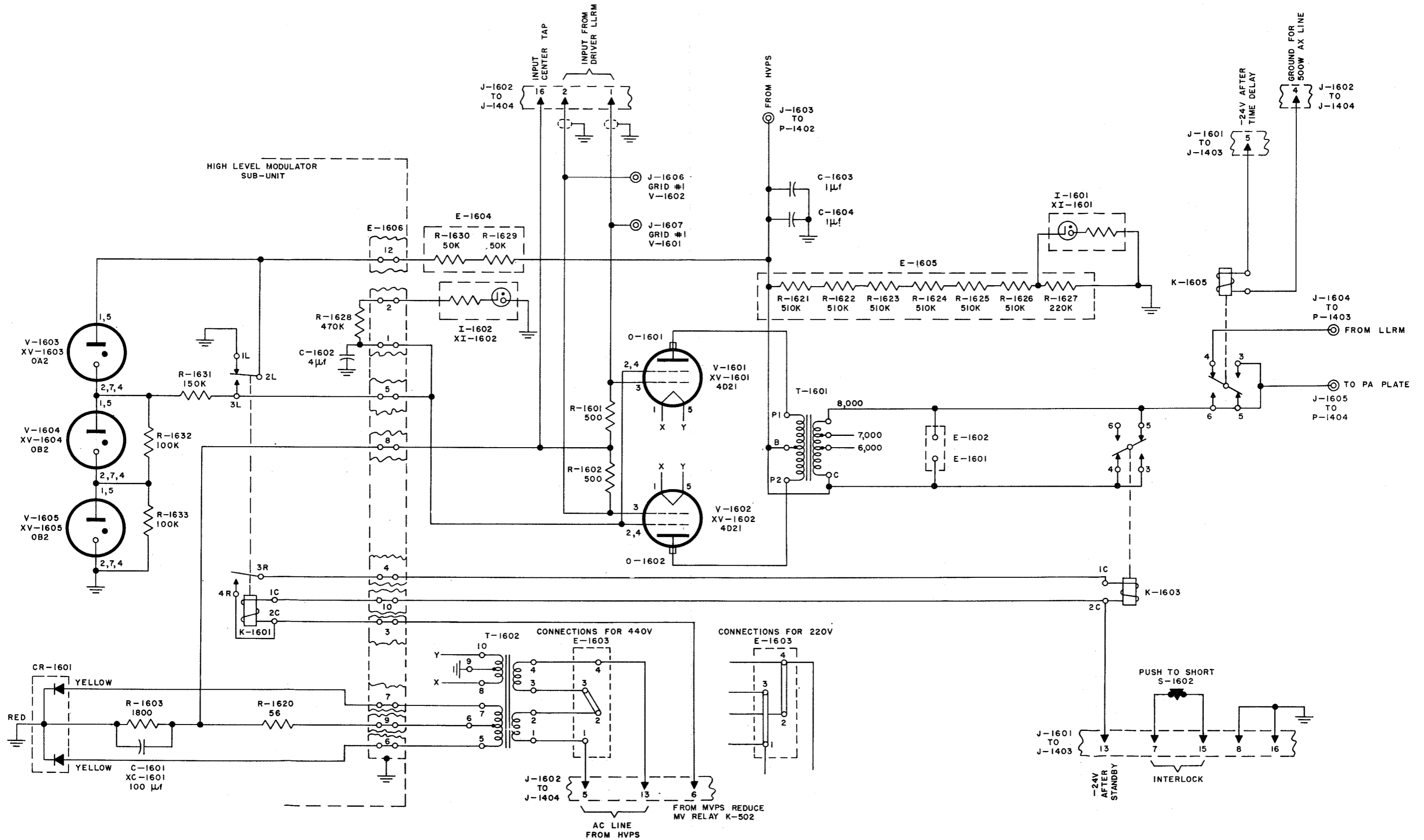
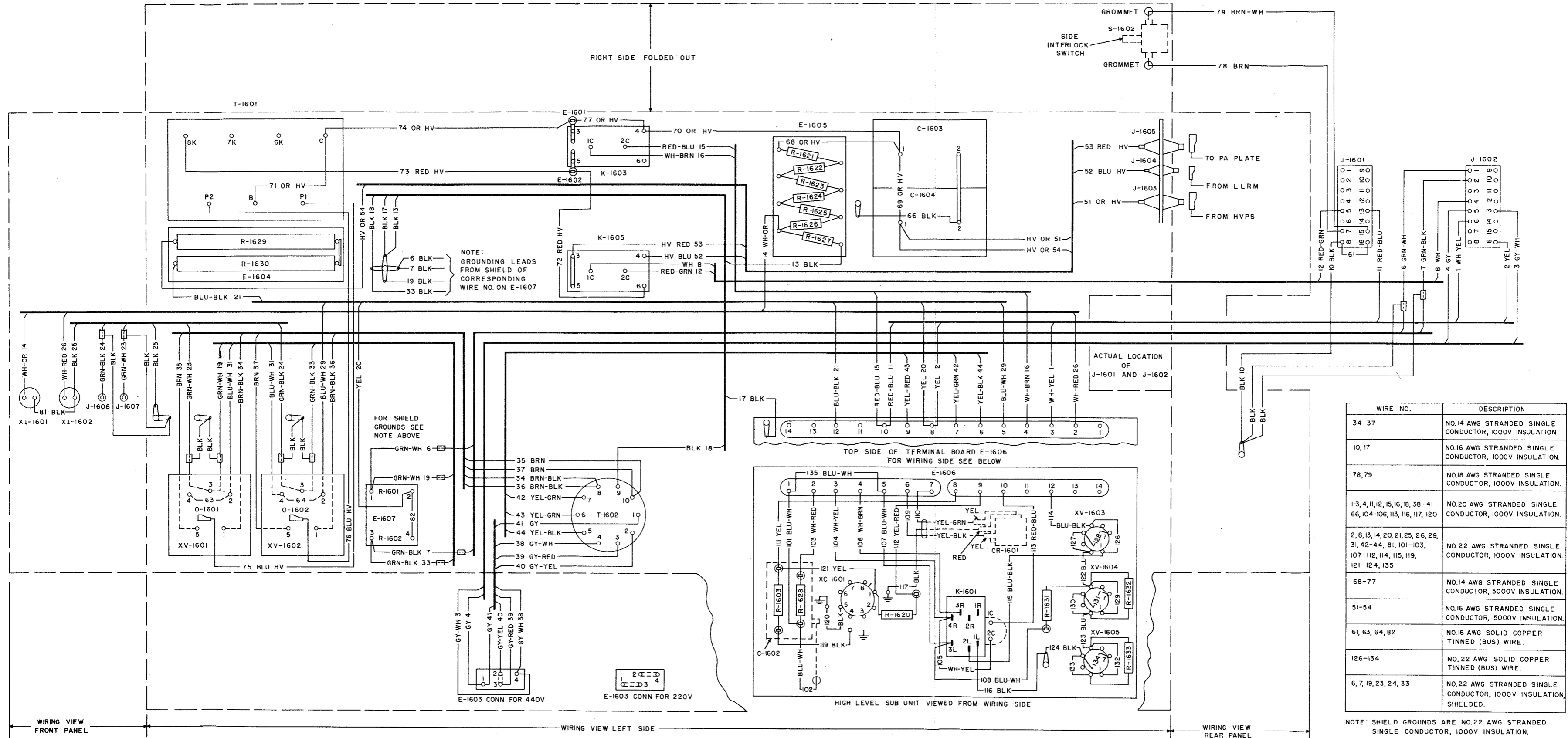


Figure 7-156. Radio Modulator MD-230/SRT (HLRM), Schematic Diagram

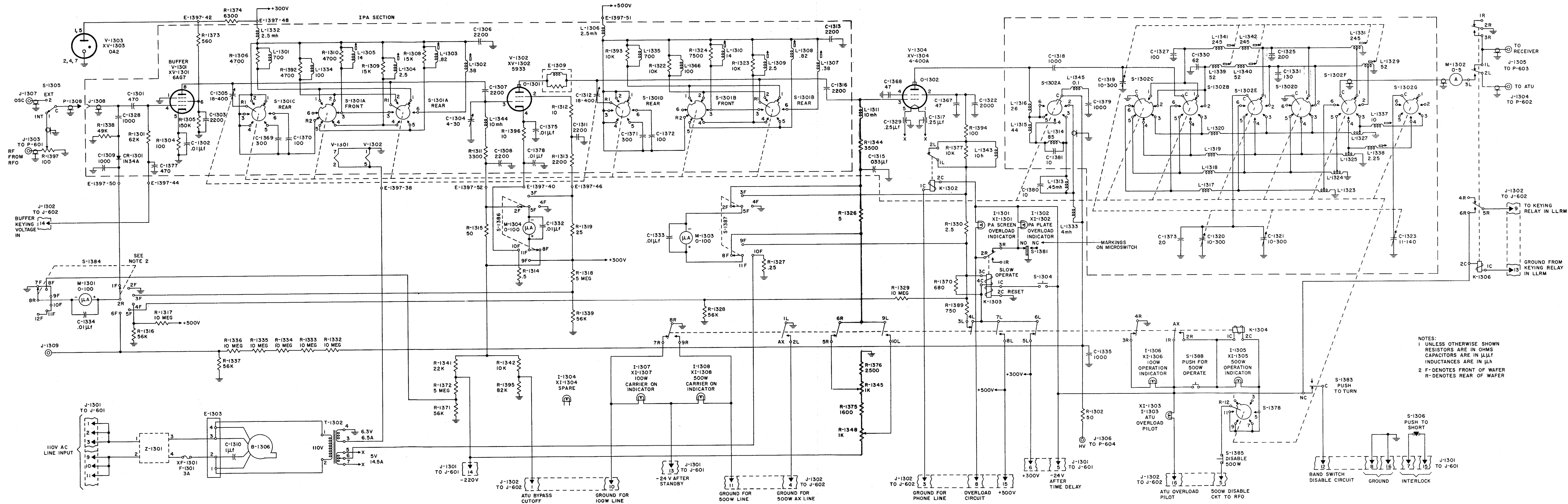




| WIRE NO.   | DESCRIPTION  |
|--|--|
| 34-37  | NO.14 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.           |
| 10, 17   | NO.16 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.           |
| 78, 79   | NO.18 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.           |
| 1-3, 4, 11, 12, 15, 16, 18, 38-41, 66, 104-106, 113, 116, 117, 120                             | NO.20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.           |
| 2, 8, 13, 14, 20, 21, 25, 26, 29, 31, 42-44, 81, 101-103, 107-112, 114, 115, 119, 121-124, 135 | NO.22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.           |
| 68-77  | NO.14 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION.           |
| 51-54  | NO.16 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION.           |
| 61, 63, 64, 82   | NO.18 AWG SOLID COPPER TINNED (BUS) WIRE.                        |
| 126-134  | NO.22 AWG SOLID COPPER TINNED (BUS) WIRE.                        |
| 6, 7, 19, 23, 24, 33   | NO.22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION, SHIELDED. |

NOTE: SHIELD GROUNDS ARE NO.22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.

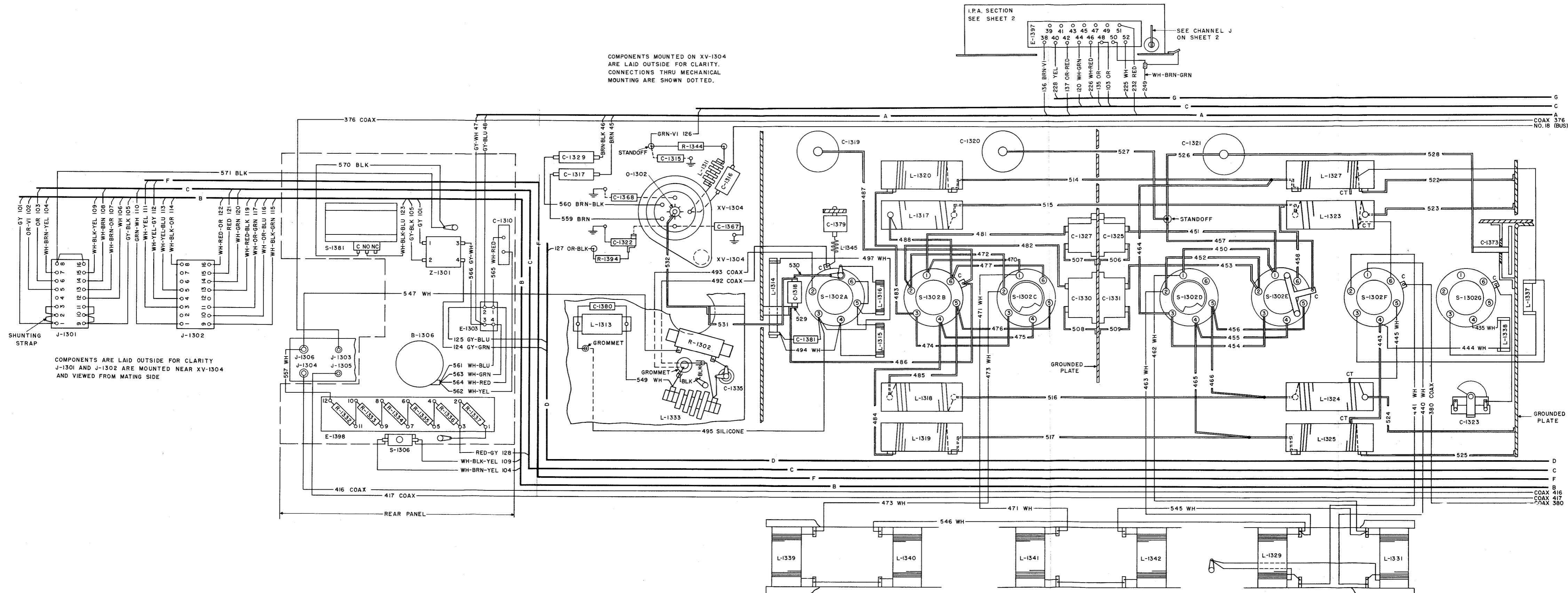
Figure 7-157. Radio Modulator MD-230/SRT (HLRM), Wiring Diagram



NOTES:  
 1 UNLESS OTHERWISE SHOWN RESISTORS ARE IN OHMS CAPACITORS ARE IN  $\mu$ Lf INDUCTANCES ARE IN  $\mu$ LH  
 2 F- DENOTES FRONT OF WAFER R- DENOTES REAR OF WAFER

Figure 7-158. Radio Frequency Amplifier AM-1008/SRT (RFA), Schematic Diagram

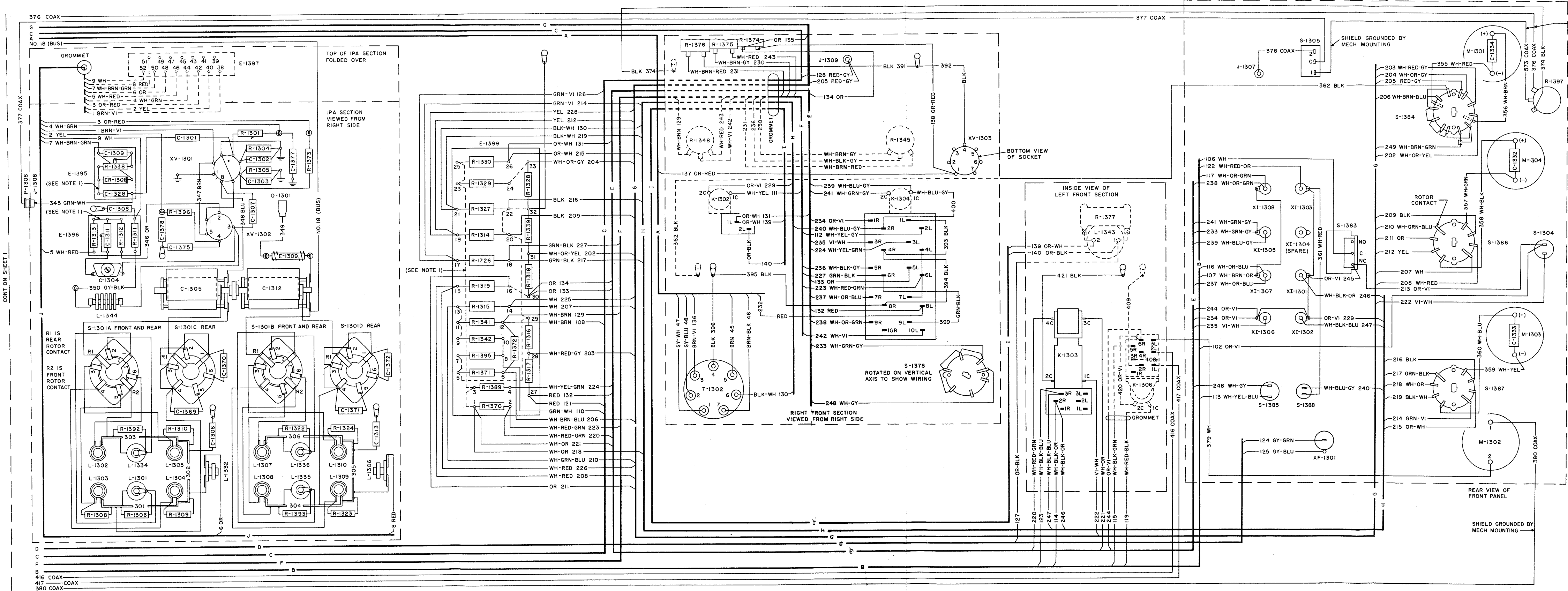
COMPONENTS MOUNTED ON XV-1304  
ARE LAID OUTSIDE FOR CLARITY.  
CONNECTIONS THRU MECHANICAL  
MOUNTING ARE SHOWN DOTTED.



COMPONENTS ARE LAID OUTSIDE FOR CLARITY  
J-1301 AND J-1302 ARE MOUNTED NEAR XV-1304  
AND VIEWED FROM MATING SIDE

ORIGINAL

Figure 7-159. Radio Frequency Amplifier AM-1008/SRT (RFA), Wiring Diagram (Sheet 1 of 2)



| WIRE NO.   | DESCRIPTION   |
|--|---|
| 45, 46, 559, 560   | NO. 12 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION          |
| 104, 109   | NO. 16 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION          |
| 19, 47, 48, 102, 106, 112, 113, 123, 130, 136, 213, 229, 248, 345, 348, 350, 374, 391-396, 421, 570, 571                         | NO. 18 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION          |
| 101, 105, 114, 116, 117, 124, 125, 237, 238, 400   | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION          |
| 103, 107, 108, 110, 111, 115, 119-122, 126-129, 131-135, 137-140, 202-212, 214-228, 230-236, 239-247, 355-362, 399, 420, 561-566 | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION          |
| 249  | NO. 22 AWG STRANDED SINGLE CONDUCTOR 1000V INSULATION, SHIELDED |
| 376-378, 380, 416, 417, 492, 493, 573  | RG-141/U COAX   |
| 379, 435, 440, 441, 444, 445, 462, 463, 471, 473, 494, 497, 545-547, 549, 557  | NO. 19 AWG SOLID SINGLE CONDUCTOR, TEFLON INSULATED             |
| 349, 408, 409  | TINNED COPPER BRAID   |
| 443, 450-456, 464-466, 470, 472, 474-477, 481-486, 506-509, 514-517, 522-530, 532  | SOFT COPPER STRAP   |
| 457, 458, 487, 488   | COPPER TUBING   |
| 531  | NO. 10 AWG SOLID BARE COPPER TINNED                             |
| 301-306  | NO. 14 AWG SOLID BARE COPPER TINNED                             |
| ALL OTHERS (SEE NOTES BELOW)   | NO. 18 AWG SOLID BARE COPPER TINNED                             |

NOTES:  
 1 POINT TO POINT WIRING ON TERMINAL BOARDS ARE NO. 20 AWG SOLID BARE COPPER TINNED WIRE.  
 2 SHIELD GROUNDS ARE NO. 22 AWG STRANDED SINGLE CONDUCTOR, BLACK, 1000V INSULATION, EXCEPT GROUND FOR LEADS 492 AND 493 THESE ARE NO 18.

Figure 7-159. Radio Frequency Amplifier AM-1008 (SRT) (RFA), Wiring Diagram (Sheet 2 of 2)

CORRECTIVE MAINTENANCE

NAVSHIPS 92121(A)  
AN/SRT-14, 14A, 15, 15A, 16, 16A

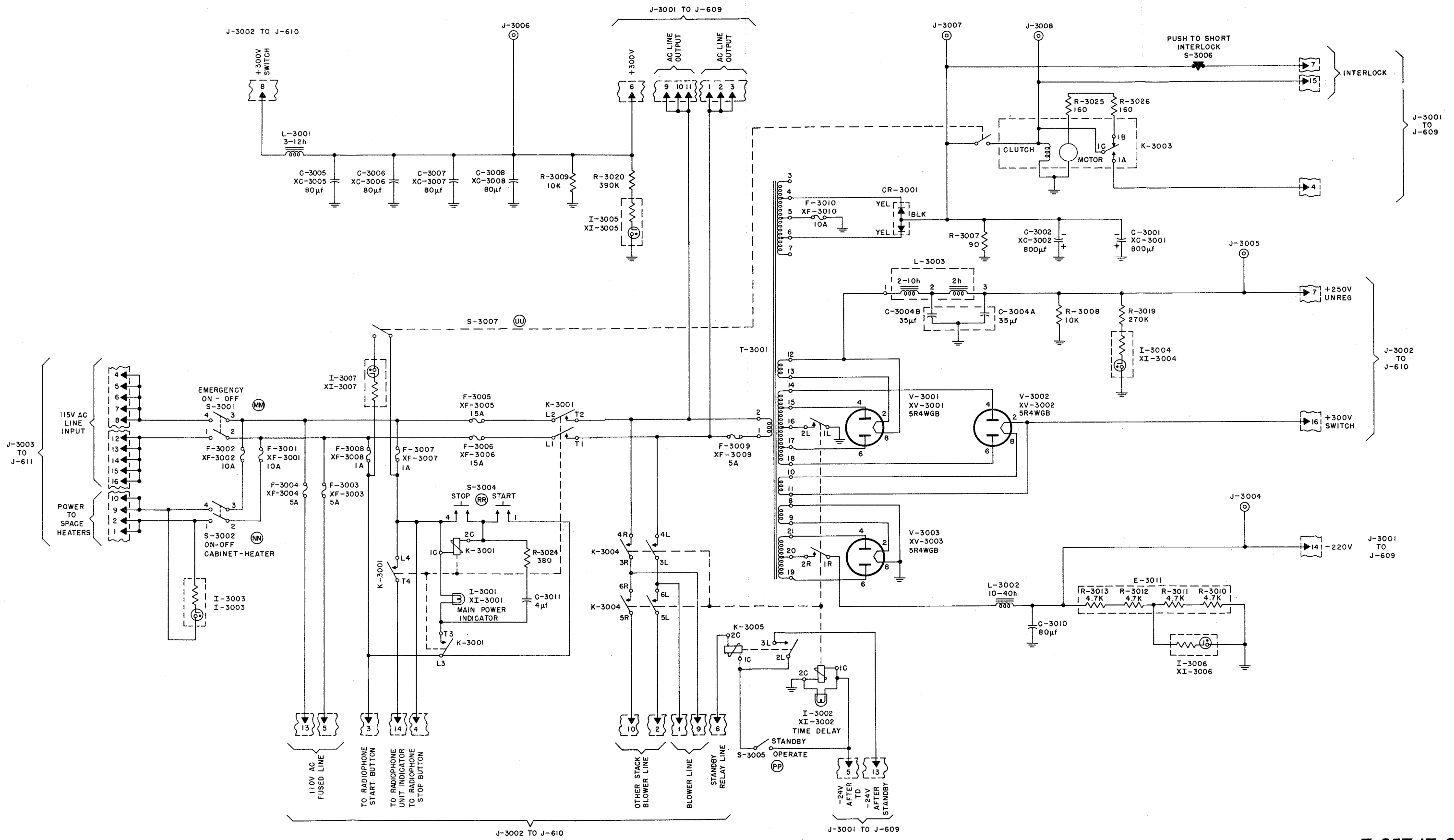
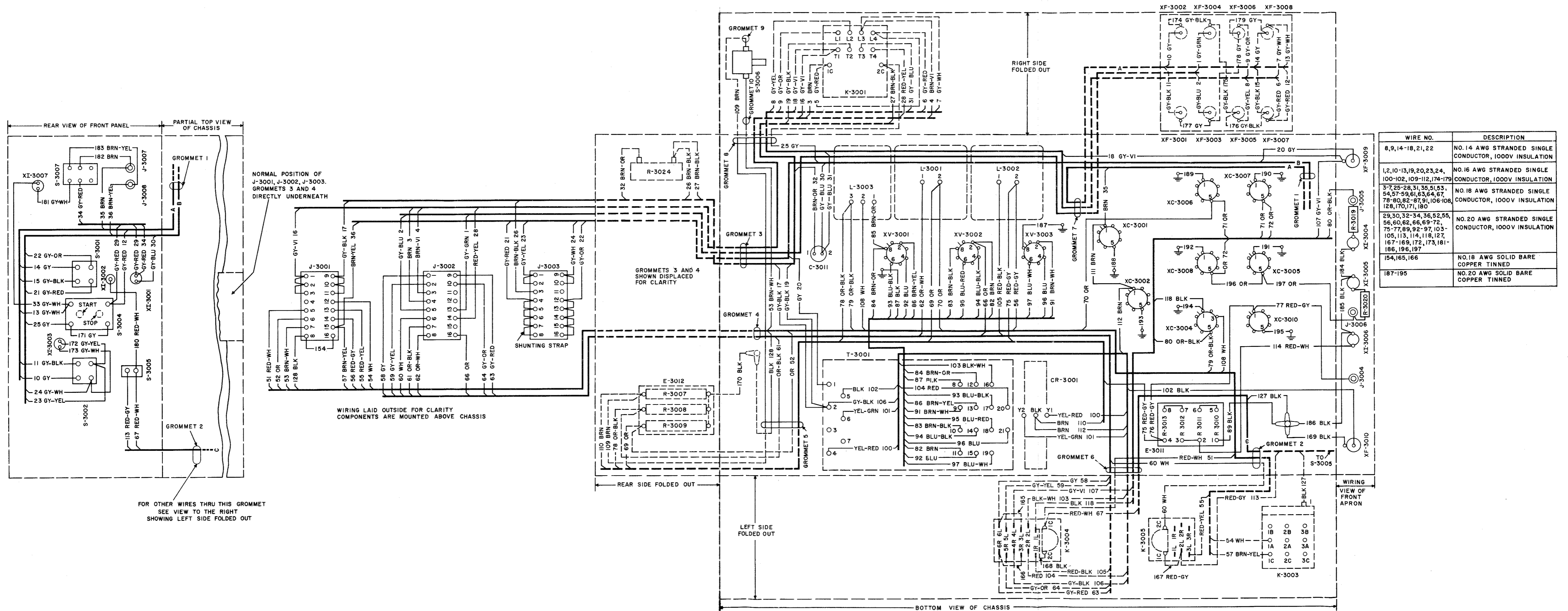


Figure 7-160. Power Supply PP-1094/SRT (LVPS), Schematic Diagram

ORIGINAL



ORIGINAL

Figure 7-161. Power Supply PP-1094/SRT (LVPS), Wiring Diagram

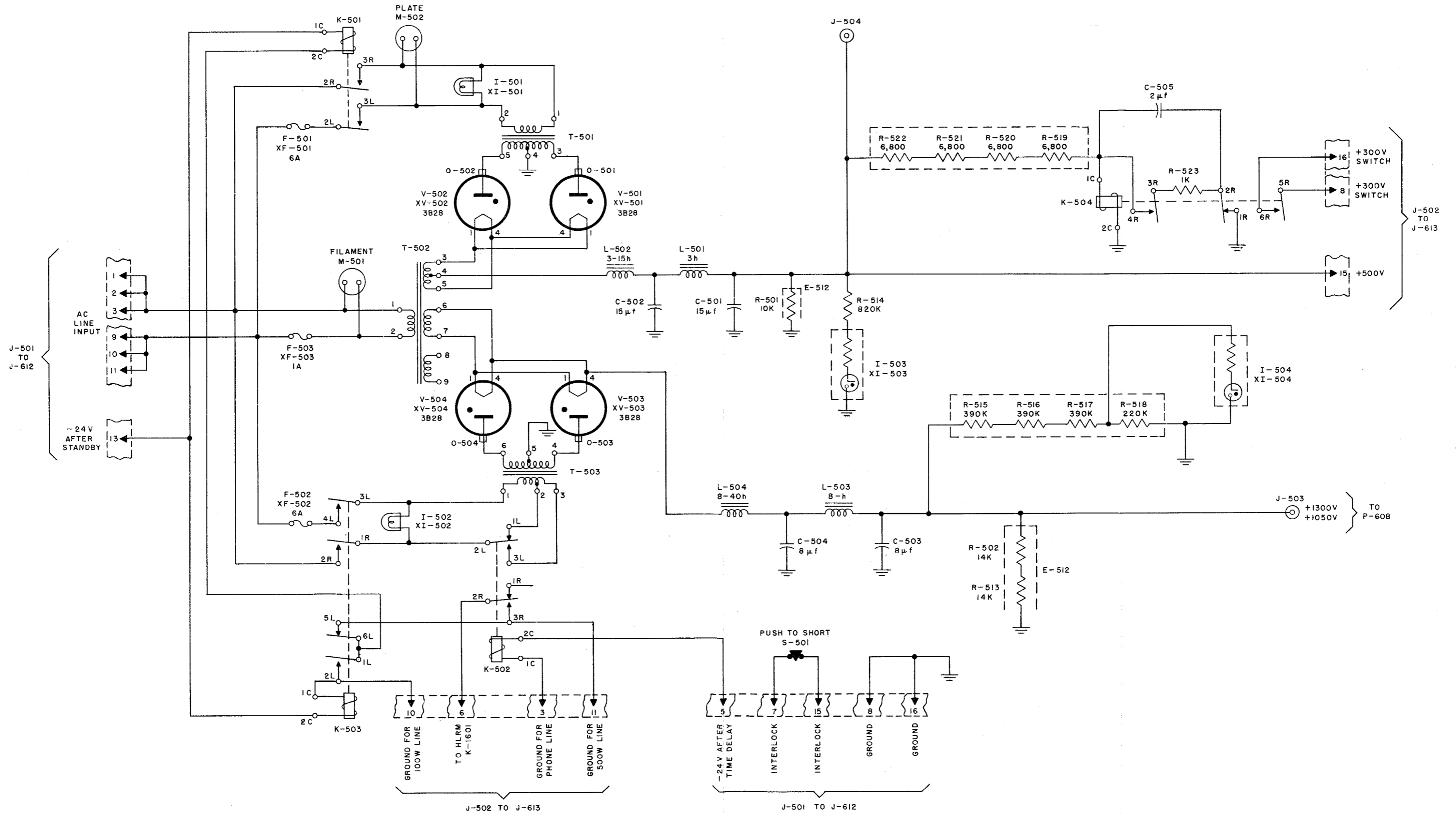


Figure 7-162. Power Supply PP-1095/SRT (MVPs), Schematic Diagram

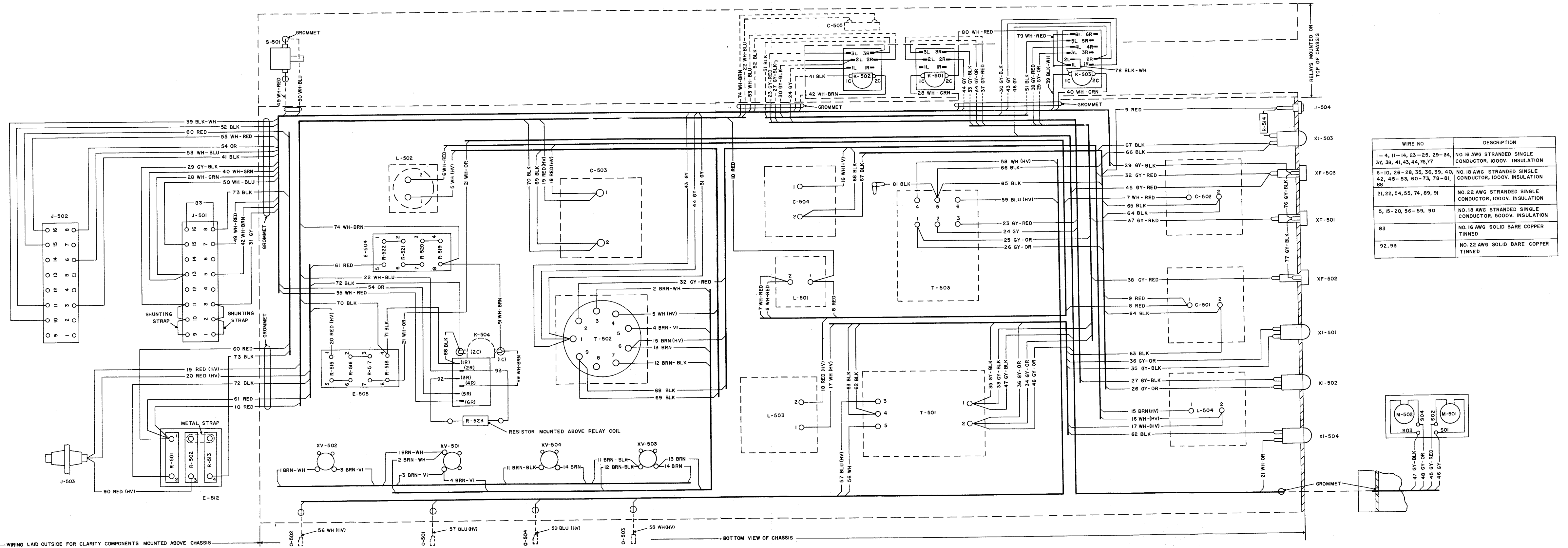
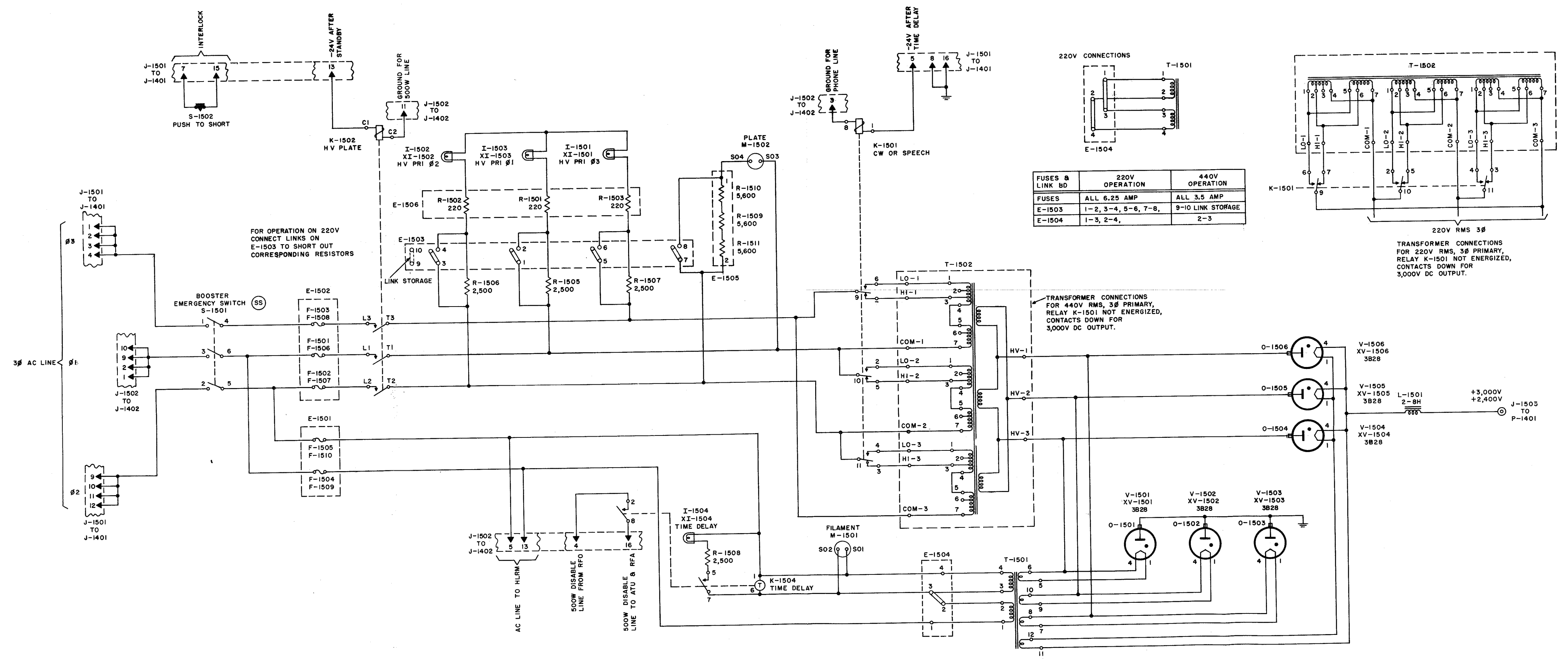


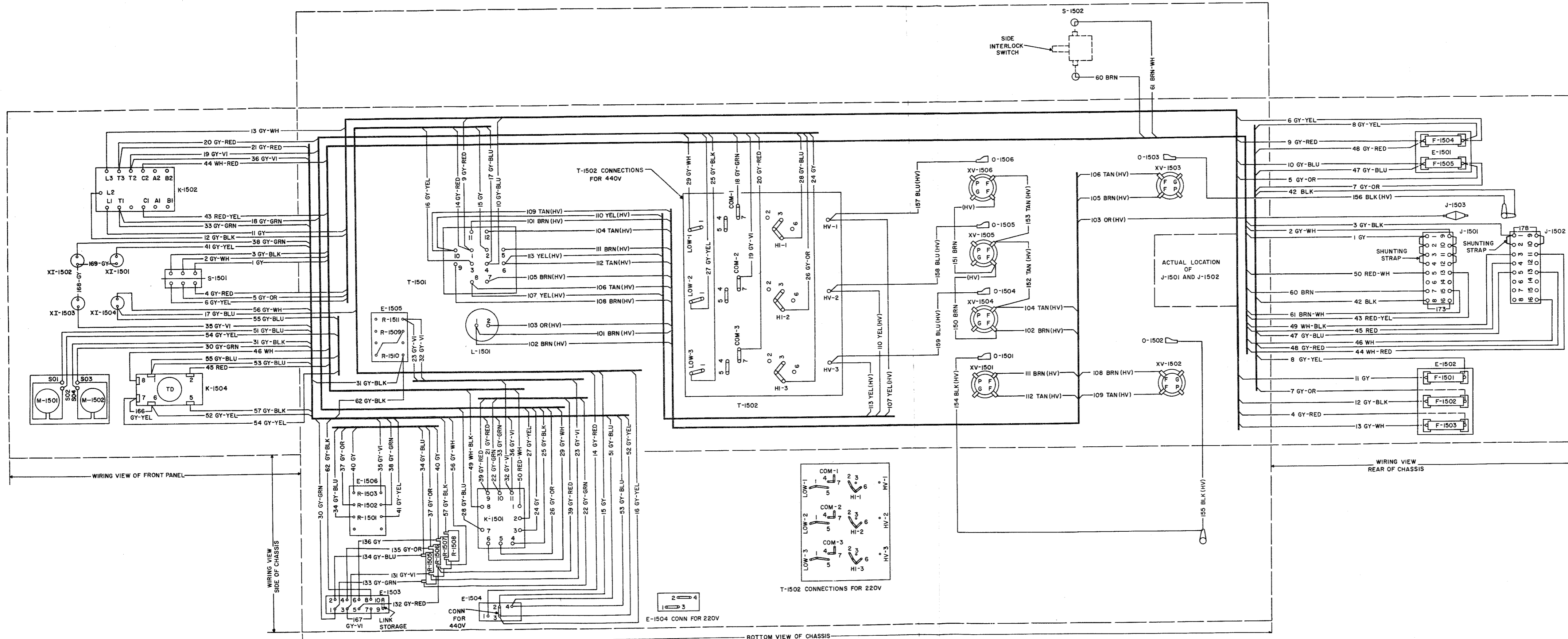
Figure 7-163. Power Supply PP-1095/SRT (MVPS), Wiring Diagram





ORIGINAL

Figure 7-164. Power Supply PP-1096/SRT (HVPS), Schematic Diagram



| WIRE NO.  | DESCRIPTION  |
|---|--|
| 1-8, 11-13, 18-21, 24-29, 33, 36, 42                                    | NO. 16 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION |
| 60, 61  | NO. 18 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION |
| 9, 10, 14-17, 22, 23, 30-32, 34, 35, 37-41, 43-57, 62, 131-136, 166-169 | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION |
| 101, 102, 104, 150-153  | NO. 14 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION |
| 103, 105-113, 157-159   | NO. 16 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION |
| 154-156   | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION |
| 173, 178  | NO. 18 AWG SOLID BARE COPPER TINNED                    |

Figure 7-165. Power Supply PP-1096/SRT (HVPS), Wiring Diagram

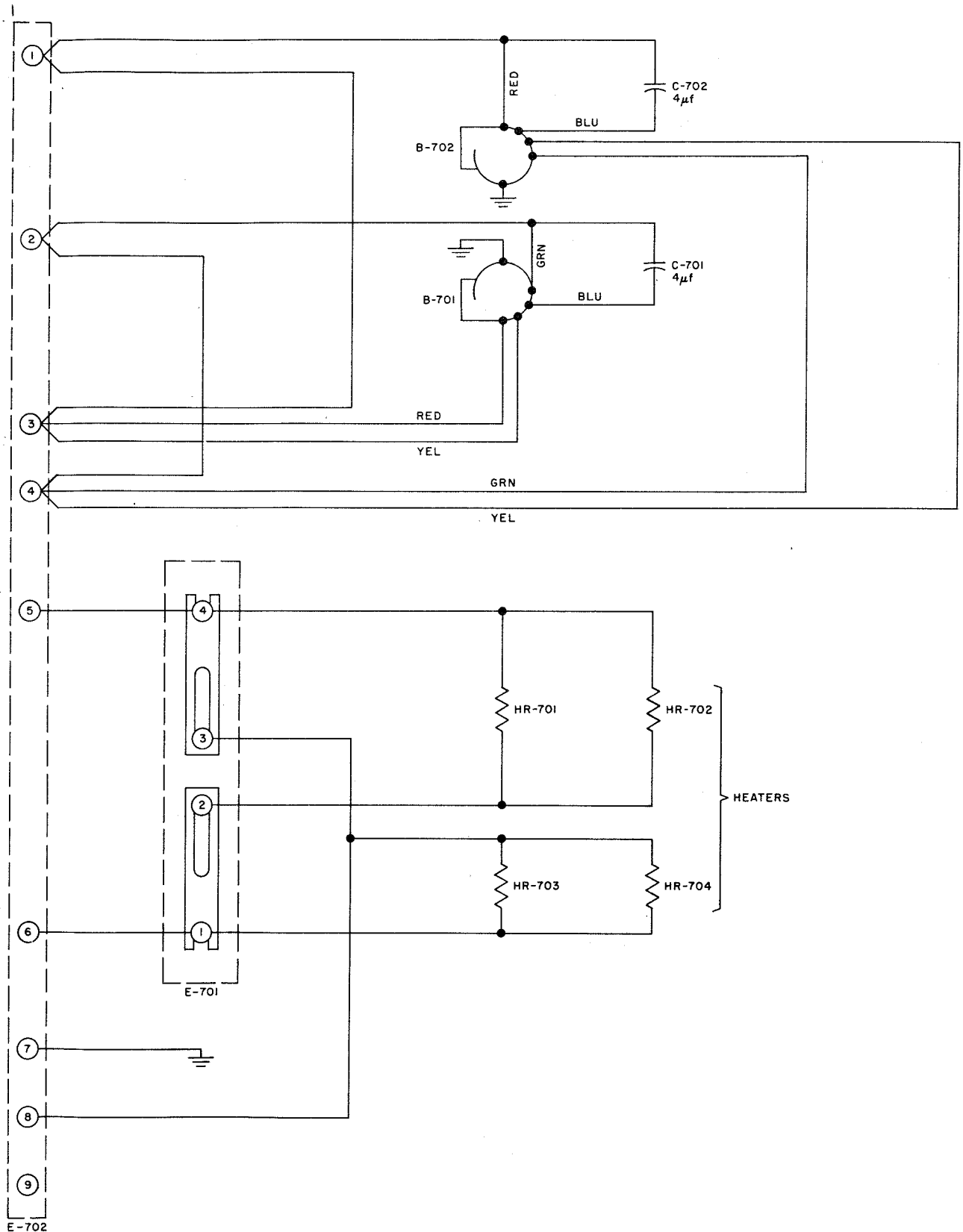
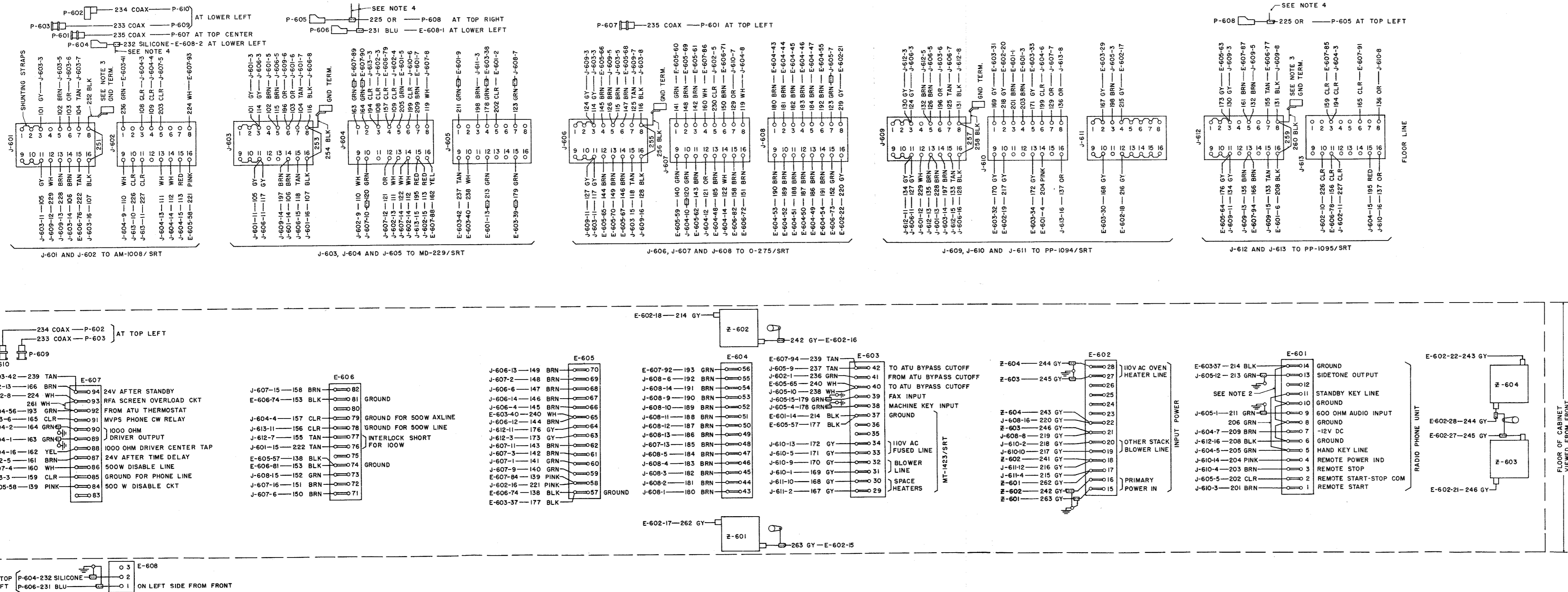


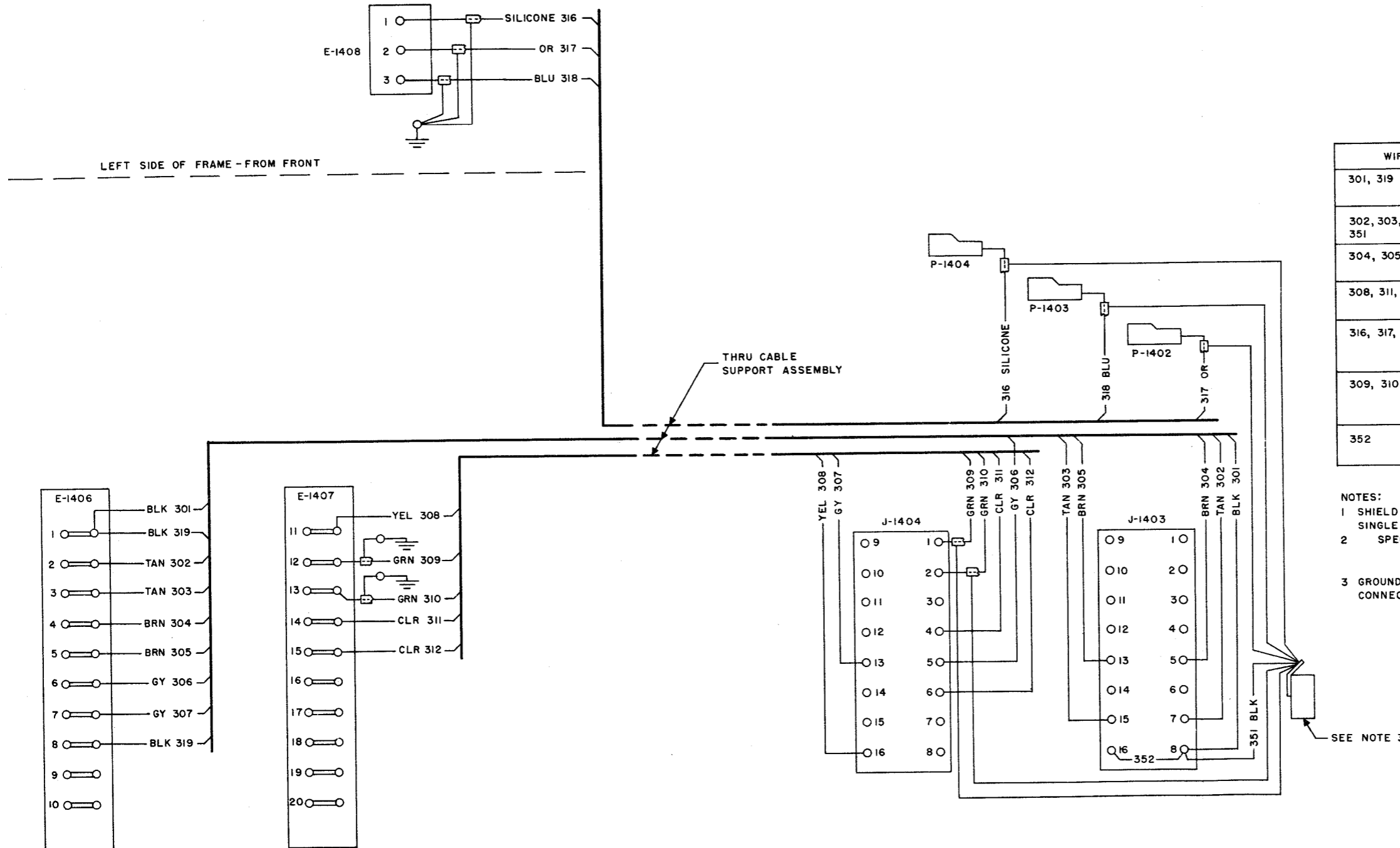
Figure 7-166. Mounting MT-1423/SRT, Schematic Diagram



| WIRE NO.   | DESCRIPTION  |
|--|--|
| 130, 134, 215, 216, 241, 262   | NO.14 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 107, 116, 128, 131, 138, 153, 167, 168, 177, 208, 214  | NO.16 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 101, 104, 105, 114, 117, 118, 124, 125, 127, 133, 144, 145, 155, 158, 171-173, 176, 198, 201-204, 222, 229, 237-240, 252, 254, 256, 258, 260           | NO.18 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 102, 106, 115, 126, 132, 135, 143, 146, 147, 149-151, 161, 166, 169, 170, 180-193, 217-220, 228, 243, 246, 261   | NO.20 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 103, 108-113, 119, 121, 122, 129, 136, 137, 139-142, 148, 152, 156, 157, 159, 160, 162, 165, 194-197, 199, 205, 206, 209, 221, 224, 226, 227, 230, 236 | NO.22 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 242, 263   | NO.14 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION (SHIELDED) |
| 225, 231, 232  | NO.16 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION (SHIELDED) |
| 244, 245   | NO.20 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION (SHIELDED) |
| 120, 123, 163, 164, 178, 179, 211, 213   | NO.22 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION (SHIELDED) |
| 233-235  | TEFLON COAX RG-U/141   |
| 251, 253, 255, 257, 259  | NO.18 AWG SOLID COPPER, TINNED (BUS) WIRE                        |

- NOTES:
- SHIELD GROUNDS ARE NO.20 AWG STRANDED SINGLE CONDUCTOR, BLACK, 2500V INSULATION.
  - POINT TO POINT WIRING ON E-601 IS NO.16 AWG STRANDED SINGLE CONDUCTOR, BLACK, 2500V INSULATION.
  - ALL GROUND LEADS AT EACH CONNECTOR ASSEMBLY ARE CONNECTED TO THE GROUND TERMINAL FOR EACH ASSEMBLY.
  - GROUND LEADS OF P-604, P-605, P-606 AND P-608 CONNECT TO THE NEAREST GROUND TERMINAL OF CORRESPONDING CONNECTOR ASSEMBLY.
  - SPECIAL COLOR ABBREVIATION  
CLEAR CLR  
TAN TAN  
PINK PINK

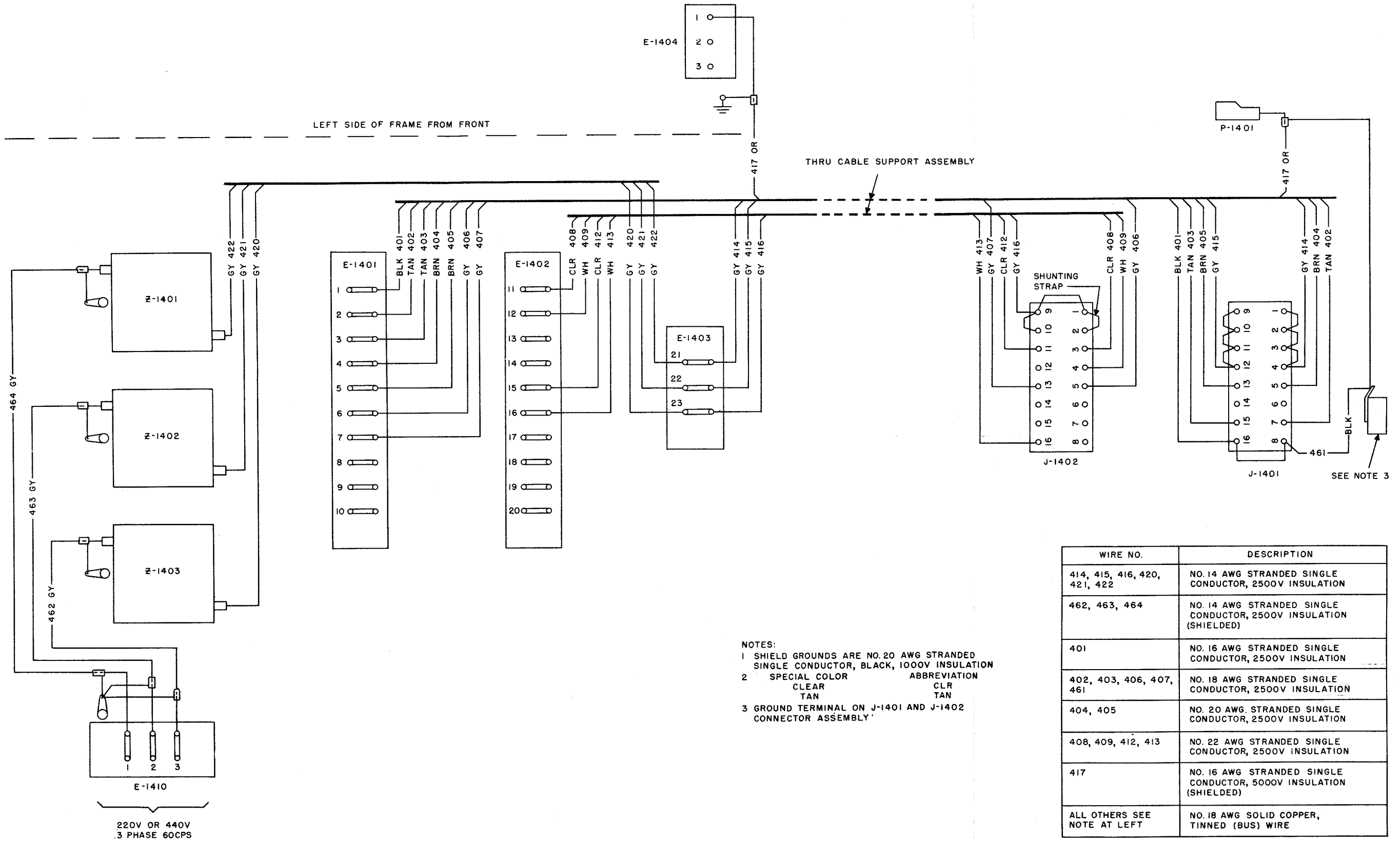
Figure 7-167. Electrical Equipment Cabinet CY-1571/SRT (100 W. Frame), Wiring Diagram



| WIRE NO.                | DESCRIPTION   |
|-------------------------|---|
| 301, 319                | NO. 16 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 302, 303, 306, 307, 351 | NO. 18 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 304, 305                | NO. 20 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 308, 311, 312           | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 316, 317, 318           | NO. 16 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION (SHIELDED) |
| 309, 310                | NO. 22 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION (SHIELDED) |
| 352                     | NO. 18 AWG SOLID COPPER, TINNED (BUS) WIRE                        |

NOTES:

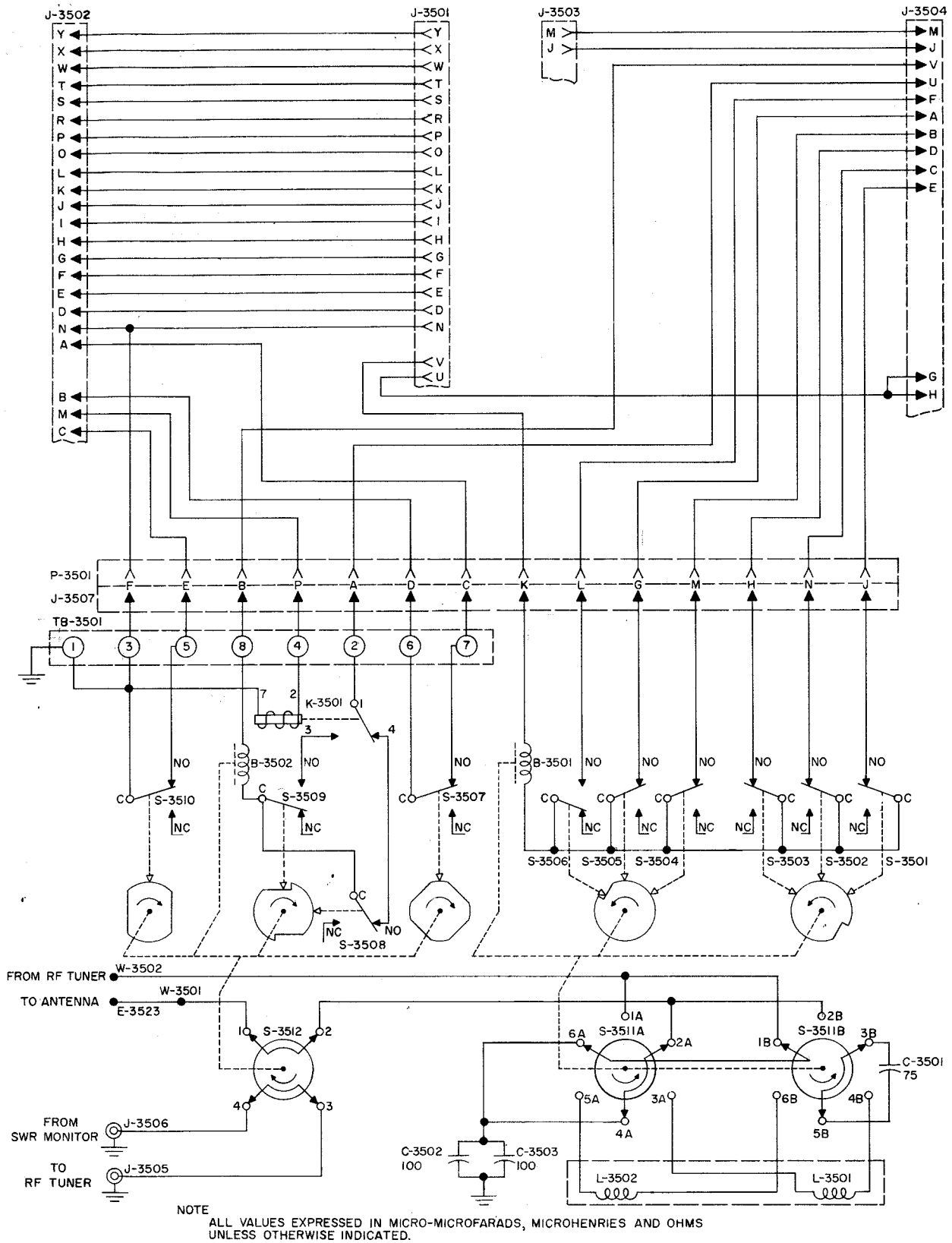
- 1 SHIELD GROUNDS ARE NO. 20 AWG STRANDED SINGLE CONDUCTOR, BLACK, 1000V INSULATION.
- 2 SPECIAL COLOR ABBREVIATION  
CLEAR CLR  
TAN TAN
- 3 GROUND TERMINAL ON J-1403 AND J-1404 CONNECTOR ASSEMBLY.



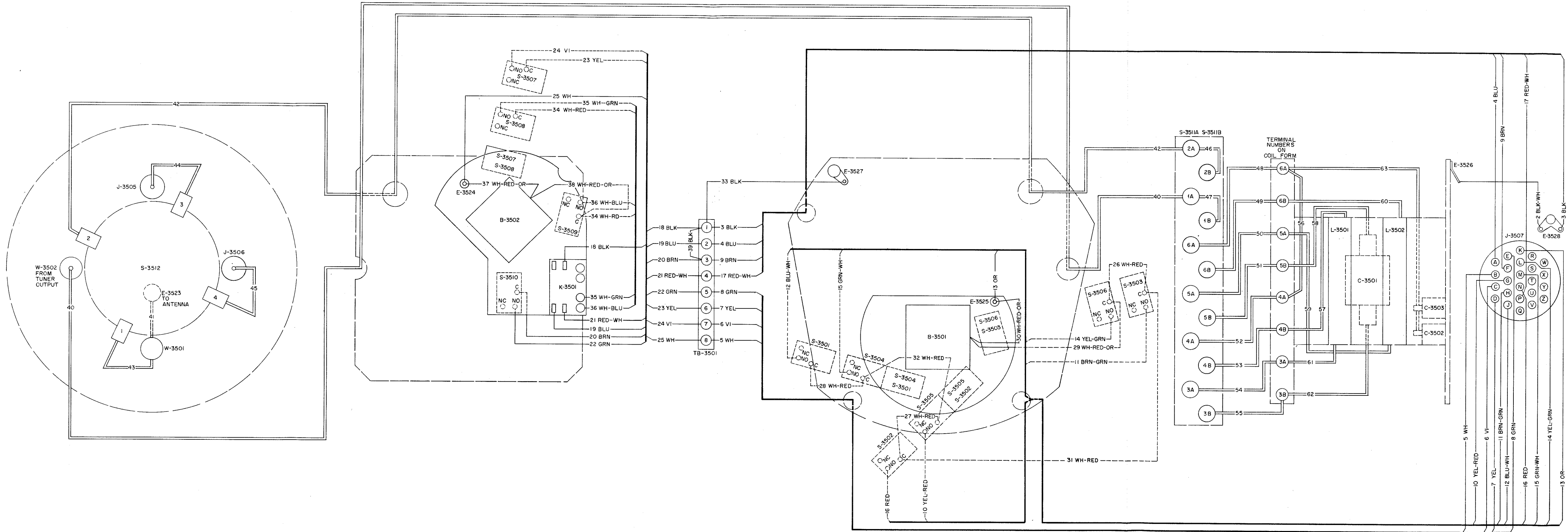
- NOTES:  
 1 SHIELD GROUNDS ARE NO.20 AWG STRANDED SINGLE CONDUCTOR, BLACK, 1000V INSULATION  
 2 SPECIAL COLOR ABBREVIATION  
 CLEAR CLR  
 TAN TAN  
 3 GROUND TERMINAL ON J-1401 AND J-1402 CONNECTOR ASSEMBLY

| WIRE NO.                     | DESCRIPTION  |
|------------------------------|--|
| 414, 415, 416, 420, 421, 422 | NO.14 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 462, 463, 464                | NO.14 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION (SHIELDED) |
| 401                          | NO.16 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 402, 403, 406, 407, 461      | NO.18 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 404, 405                     | NO.20 AWG. STRANDED SINGLE CONDUCTOR, 2500V INSULATION           |
| 408, 409, 412, 413           | NO.22 AWG STRANDED SINGLE CONDUCTOR, 2500V INSULATION            |
| 417                          | NO.16 AWG STRANDED SINGLE CONDUCTOR, 5000V INSULATION (SHIELDED) |
| ALL OTHERS SEE NOTE AT LEFT  | NO.18 AWG SOLID COPPER, TINNED (BUS) WIRE                        |

Figure 7-169. Electrical Equipment Cabinet CY-1573/SRT (HVPS Frame), Wiring Diagram



**Figure 7-170. Antenna Coupler CU-372/SRT, Schematic Diagram**



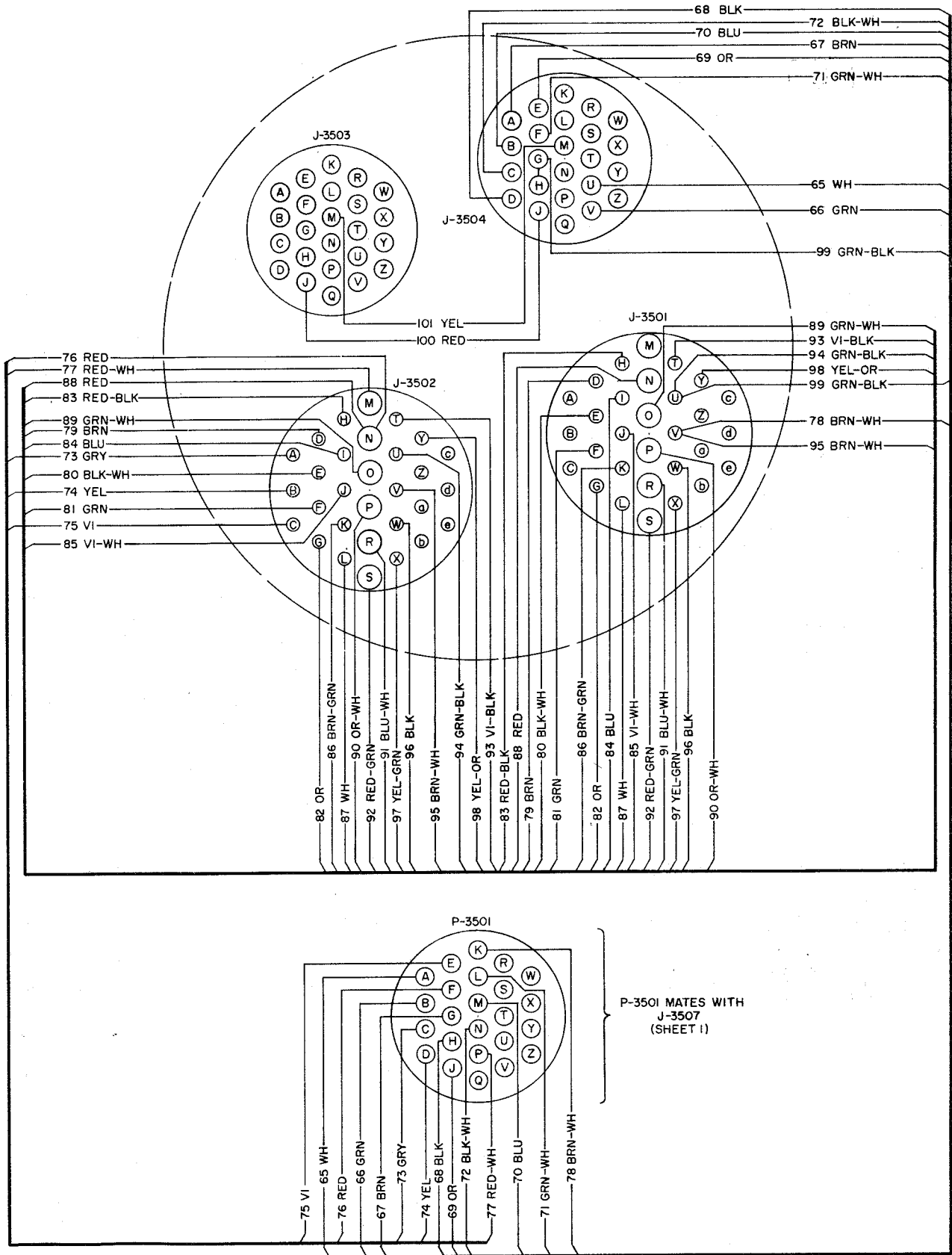
J-3507 MATES WITH P-3501  
IN  
JUNCTION BOX ASSEMBLY  
(SHEET 2)

| WIRE NO.     | DESCRIPTION   |
|--------------|---|
| 2-39, 65-101 | NO. 16 AWG STRANDED SINGLE CONDUCTOR, 1000V INSULATION.                 |
| 40           | HV CONDUCTOR, RG-19/U (LESS OUTER COVER AND WIRE BRAID), OR EQUIVALENT. |
| 41           | NO. 5 AWG SILVER CLAD COPPER CONDUCTOR.                                 |
| 42-61        | NO. 7 AWG SILVER CLAD COPPER CONDUCTOR.                                 |
| 62, 63       | NO. 8 AWG SILVER CLAD COPPER CONDUCTOR.                                 |

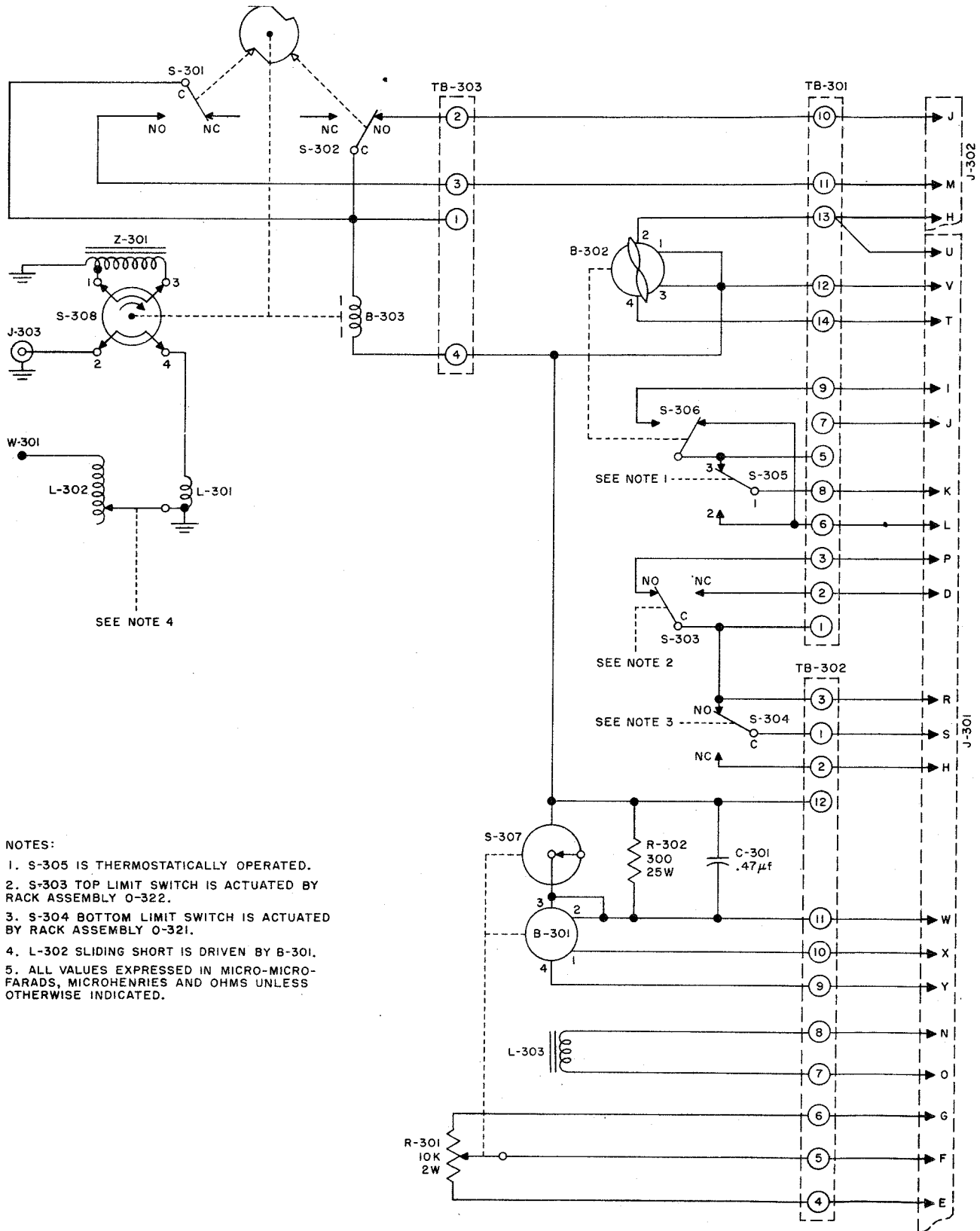
ORIGINAL

Figure 7-171. Antenna Coupler CU-372/SRT, Wiring Diagram (Sheet 1 of 2)



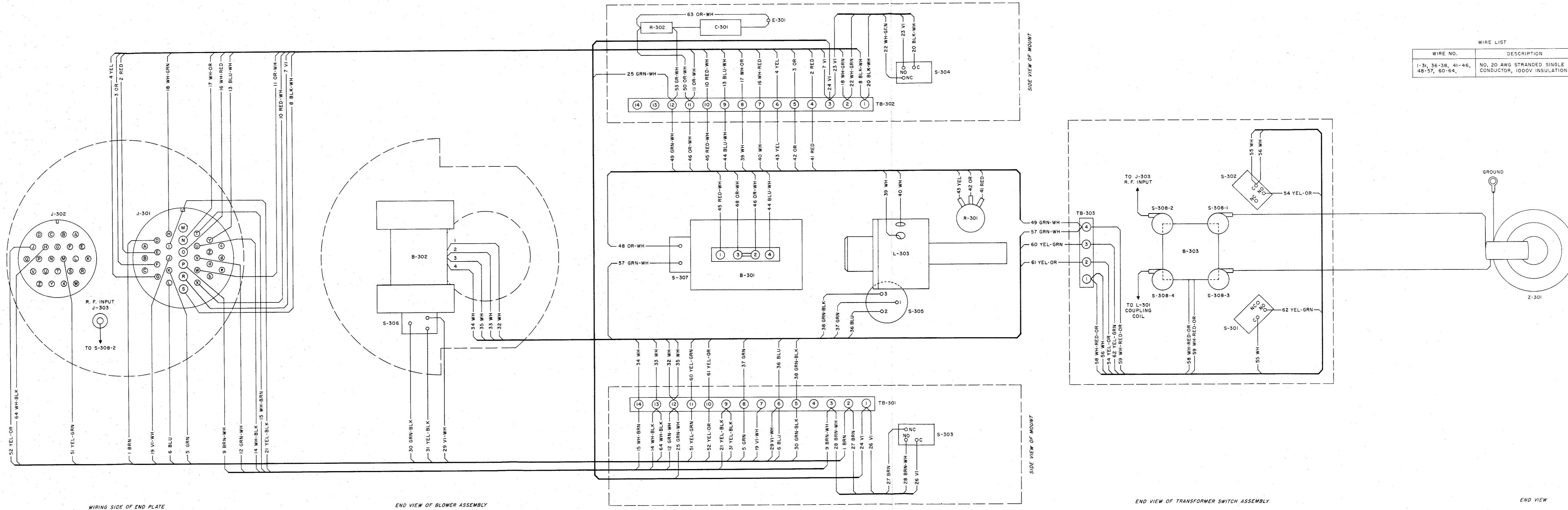


**Figure 7-171. Antenna Coupler CU-372/SRT, Wiring Diagram (Sheet 2 of 2)**



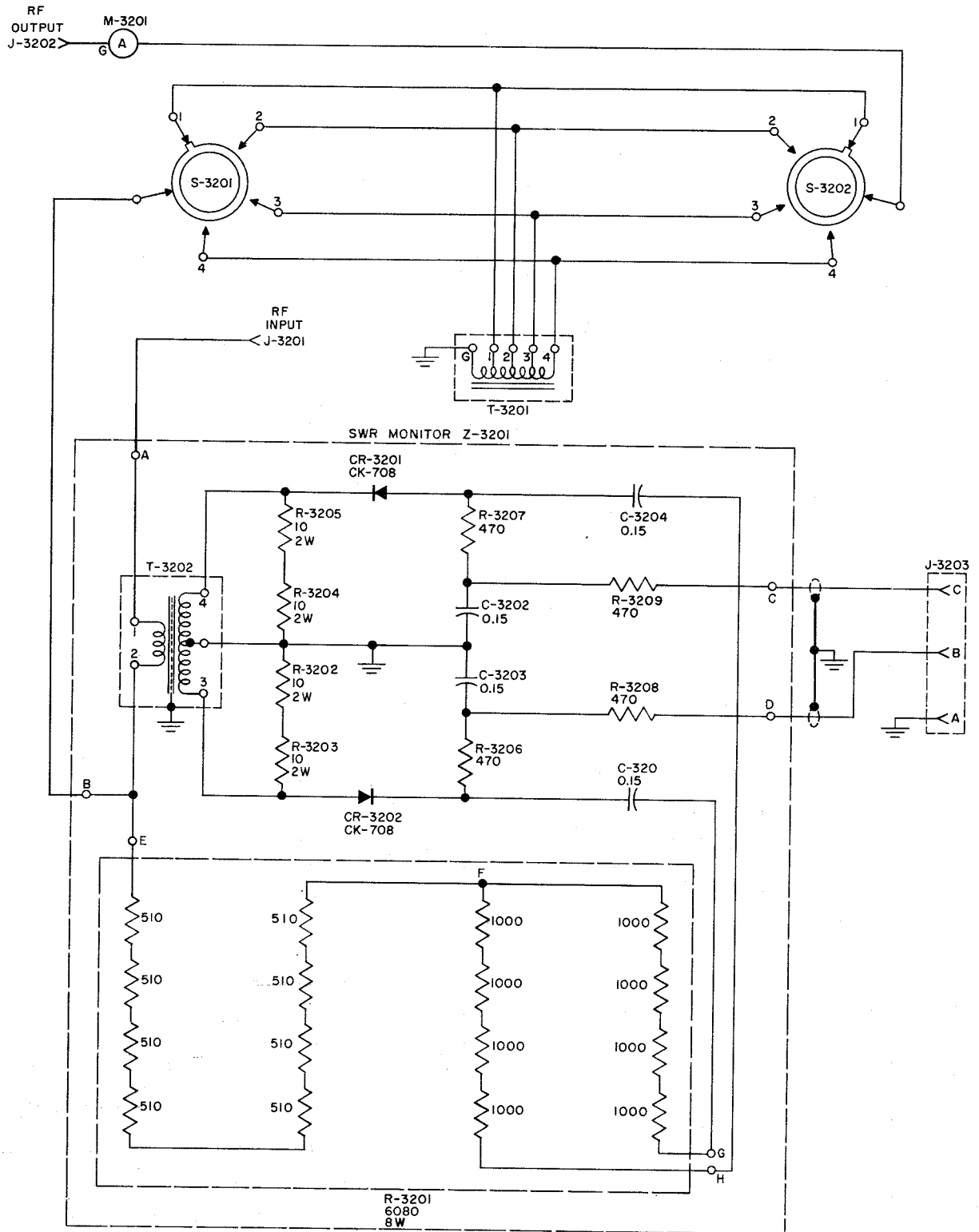
- NOTES:
1. S-305 IS THERMOSTATICALLY OPERATED.
  2. S-303 TOP LIMIT SWITCH IS ACTUATED BY RACK ASSEMBLY O-322.
  3. S-304 BOTTOM LIMIT SWITCH IS ACTUATED BY RACK ASSEMBLY O-321.
  4. L-302 SLIDING SHORT IS DRIVEN BY B-301.
  5. ALL VALUES EXPRESSED IN MICRO-MICRO-FARADS, MICROHENRIES AND OHMS UNLESS OTHERWISE INDICATED.

Figure 7-172. R-F Tuner TN-229/SRT, Schematic Diagram



ORIGINAL

Figure 7-173. R-F Tuner TN-229/SRT, Wiring Diagram



NOTE:  
RESISTANCE IN OHMS, CAPACITANCE IN MICROFARADS,  
UNLESS OTHERWISE INDICATED.

Figure 7-174. Transmitter Coupler CU-402/SRT, Schematic Diagram

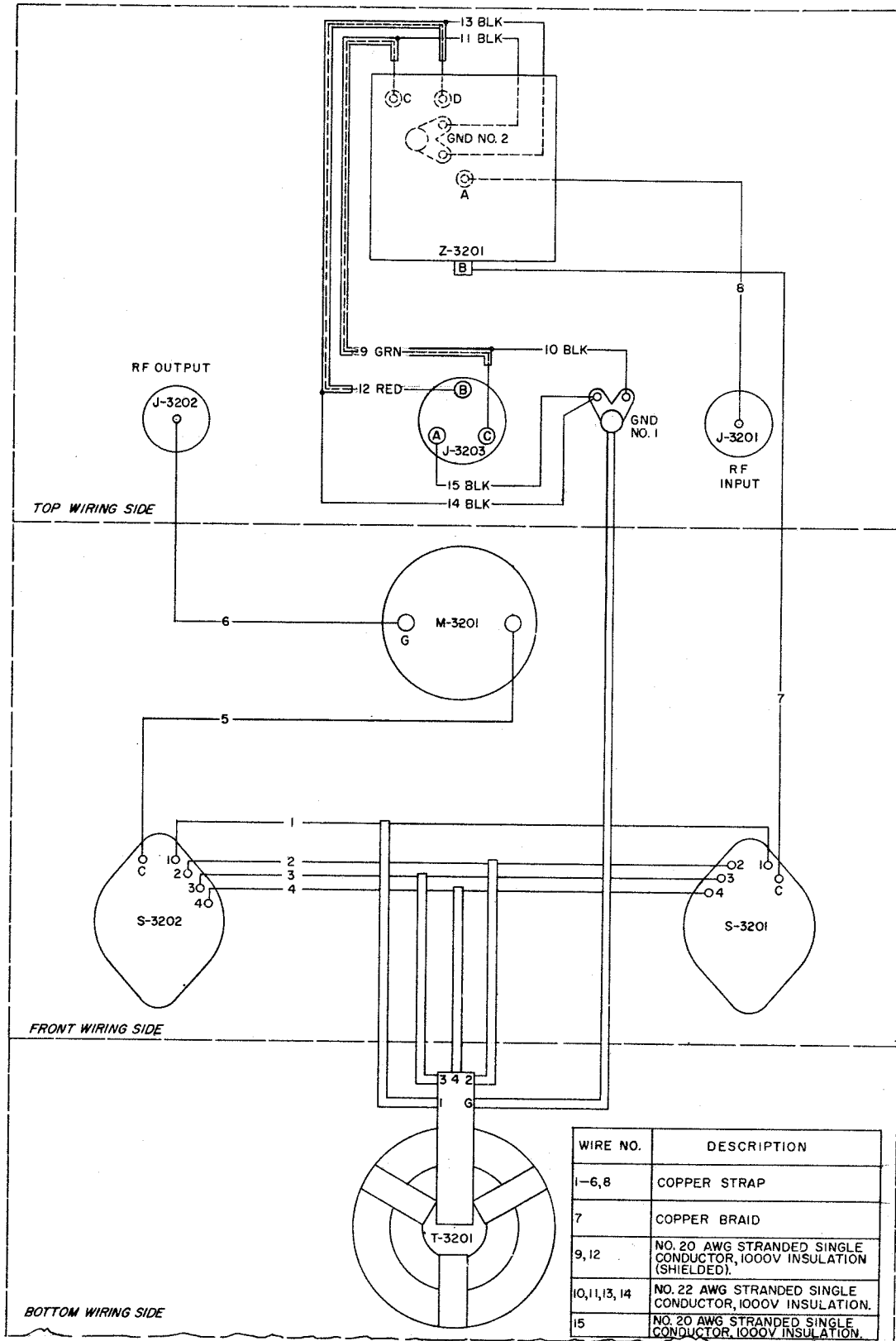


Figure 7-175. Transmitter Coupler CU-402/SRT, Wiring Diagram