

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL

FIELD AND DEPOT MAINTENANCE MANUAL

ANTENNA COUPLER

CU-168/FRR

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1960

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., 30 December 1960

TM 11-5985-212-15 (a reprint of Navy publication NAVSHIPS 91697A, 10 September 1952) is published for the use of Army personnel.

By Order of *Wilber M. Brucker*, Secretary of the Army:

G. H. DECKER,
General, United States Army,
Chief of Staff

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

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| EUSA (2) | 11-592 |
| Units organized under following TOE's: | 11-597 |
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NG: None.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

Changes in force: C 2 and C 3

Change }
No. 3 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 16 October 1973

**Operator's, Organizational, Direct Support, General Support, and Depot
Maintenance Manual (Including Repair Parts Lists)
ANTENNA COUPLER CU-168/FRR**

TM 11-5985-212-15, 30 December 1960, is changed as follows:

The title of this manual is changed as shown above.

Page 1-1. Paragraph 1.1 is superseded as follows:

1.1. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

Paragraph 1.2 is superseded follows:

1.2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at a maintenance levels are listed in and prescribed by TM 38-750.

1.4. Items Comprising an Operable Antenna Coupler CU-168/FRR

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 714 (Air Force)/and MCO P4030.29 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army)/NAVSUP PUB 459 (Navy) /AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

1.3. Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C Fort Monmouth, NJ 07703.

| <i>FSN</i> | <i>Qty</i> | <i>Nomenclature part No., and mfr. code</i> | <i>Usable on code</i> |
|------------|------------|---|---------------------------|
|------------|------------|---|---------------------------|

NOTE

The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government agency, etc.

NOTE

Number 1 in the usable on code column refers to order No. NOBSR-64811; number 2 refers to order No. NOBSR-71854.

| <i>FSN</i> | <i>Qty</i> | <i>Nomenclature part No., and mfr code</i> | <i>Usable on code</i> |
|---------------|------------|---|-----------------------|
| 5985-510-0006 | | Antenna Coupler CU-168/FRR including: | |
| 5935-280-2195 | 1 | Adapter, cable to connector, AN 3057-6A, 81348 | 1,2 |
| 5935-148-9378 | 1 | Connector, Plug, Electrical, AN3106A-14S-7S, 81349 | 1.2 |
| 5935-2584598 | 6 | Connector, Plug, Electrical, UG-21D/U 81349 | 1,2 |

Page 7-12. Appendix B is deleted.

By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-50, Organizational maintenance requirements for AN/FRT-52, AN/FRT-53 and AN/FRT-54.

☆ U. S. Government Printing Office: 1983 - 664-028/6056

Changes in force: C 2

Organizational, DS, GS, and Depot Maintenance Manual (Including Repair Parts Lists)
ANTENNA COUPLER CU-168/FRR

CHANGE }
No. 2 }

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 16 August 1967

TM 11-5985-212-15, 30 December 1960, is changed as follows:
The title of the manual is changed as shown above.

Page 1-1. (As added by C1, 21 July 1963) Add paragraphs 1.1 and 1.2 after paragraph 1.

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is a current index of technical manuals, technical bulletins, supply manuals (types 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc) and the latest changes to the revisions of each equipment publication.

1.2. Forms and Records

a. *Reports of Maintenance and Unsatisfactory Equipment.* Use equipment forms and records in

accordance with instructions in TM 38-750.

b. *Report of Damaged or Improper Shipment.* Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. *Reporting of Equipment Manual Improvements.* Report of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-MR-NMP-AD, Fort Monmouth, N.J., 07703.

Page 5-0, Section 5. (As changed by C1 (24 July 1963) Delete section 5 and substitute:

Section 5. OPERATOR'S MAINTENANCE

1. Scope of Operator's Maintenance

a. *General.*

(1) Operator's maintenance consists of first echelon preventive maintenance. Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to maintain the equipment in serviceable conditions. Operator's maintenance is

performed daily (para 2 below) and weekly (para 3 below).

(2) Paragraph 2 below specifies checks and services that must be accomplished daily and under the special conditions listed below.

(a) When the equipment is initially installed.

(b) When the equipment is reinstalled after removal for any reason.

***This change supersedes C 1, 24 July 1963 and TM 11-5985-212-12P, 11 June 1959 including C 1, 4 February 1963 and TM 11-5985-212-35P, 11 June 1959 including C 2, 23 January 1963.**

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- (c) At least once each week if the equipment is maintained in standby condition.
- (3) Paragraph 3 below specifies additional checks and services that must be performed once each week.
- (4) The preventive maintenance checks and services provided in paragraphs 2 and 3 below outline inspections to be made at specific intervals. They are designed to help maintain equipment in serviceable condition. They indicate what items should be checked and how they should be checked. Also included are procedures for authorized repairs and references to text, illustration, and other manuals that contain supplementary information.
- (5) Defects that cannot be corrected must be reported to higher echelon maintenance personnel. Records and reports of repair and preventive maintenance must be made in accordance with procedures given in TM 38-750.

b. Cleaning.

Warning: Cleaning compound is flammable and its fumes are toxic. Provide adequate ventilation; do not use near a flame.

- (1) Use a dry, clean, lint-free cloth or brush to remove dust and dirt. If necessary, moisten the cloth or brush with cleaning compound (Federal stock No. 7930-395-9542). After cleaning, wipe dry with a cloth.

Warning: Compressed air is dangerous and can cause serious bodily harm. It can also cause mechanical damage to the equipment. Do not use compressed air to dry parts where cleaning compound has been used.

- (2) Dry, compressed air, not to exceed 60 pounds per square inch, may be used to remove dirt and dust from inaccessible places.

2. Daily Preventive Maintenance Checks and Services Chart

| Sequence No. | Item | Procedure | Reference |
|--------------|--|---|-------------------------------|
| 1 | End item equipment: a. Inventory ----- b. Publications ----- | a. Inventory equipment; requisition missing spare parts. b. Requisition all operator and organizational technical manuals and all parts manuals not on hand or in usable condition (including all current Changes publications). | a. App B. b. DA Pam 310-4. |
| 2 | Front panel ----- | Remove dirt and moisture from front panel ----- | Para 1b and fig. 1-1. |
| 3 | Cables and cords ----- | Inspect cables and cords for cracked or gouged jackets, fraying, bad bruises, and kinks. | None. |
| 4 | Indicator light ----- | Observe indicator for glow and replace if necessary ----- | Fig. 4-1. |
| 5 | Fuses ----- | Check fuses for proper current rating and replace if necessary. | Fig. 4-1. |

3. Weekly Preventive Maintenance Checks and Services Chart

| Sequence No. | Item | Procedure | Reference |
|--------------|----------------------------------|---|-----------------------|
| 1 | Front panel ----- | Clean and tighten mounting screws ----- | Para 1b and Fig. 1-1. |
| 2 | Exposed metal surfaces ---- | Inspect for rust and corrosion ----- | None. |
| 3 | Switch and connectors ---- | Inspect for looseness ----- | Figs. 1-2 and 4-7. |
| 4 | Plug-in electrolytic capacitors. | Inspect for bulges and leaks and replace if necessary. | Fig. 7-7. |
| 5 | Rectifier tube ----- | Inspect for gas (purple or blue glow) and replace if necessary. | Fig. 1-2. |

| Sequence No. | Item | Procedure | Reference |
|--------------|-----------------|--|----------------------|
| 6 | Operation ----- | a. Check receiver performance for each antenna coupler output, in turn. b. Operate receiver directly from antenna, bypassing antenna couplers. Compare performance. | a. None. b. None. |

Page 6-1, section 6. (As changed by C1, 24 July 1963) Delete section 6 and substitute:

Section 6. ORGANIZATION PREVENTIVE MAINTENANCE

1. Scope of Organizational Preventive Maintenance

a. *General.* Organizational maintenance consists of second echelon preventive maintenance (para 2 below), troubleshooting (paras 7-1 through 7-3), and replacement of authorized repair parts (app D). Second echelon preventive maintenance is performed on a monthly basis; specific procedures are provided in

paragraph 2 below.

b. *Touchup Painting.* Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of the proper paint on bare metal to protect it from further corrosion. Refer to applicable cleaning and refinishing practices specified in TM 9-213.

2. Monthly Preventive Maintenance Checks and Services Chart

| Sequence No. | Item | Procedure | References |
|--------------|------------------------------|---|--|
| 1 | Exposed metal surfaces ----- | Remove rust and corrosion and paint as required | Para 1b above. |
| 2 | Subassemblies ----- | Remove subassemblies and look for evidence of overheating, loose or dirty pins and connections, and fungus. Replace subassemblies, authorized in maintenance allocation chart, that indicate only marginal reliability. | Figs. 7-3 through 7-7. |
| 3 | Wiring and parts ----- | a. Check wiring for cracked or gouged jackets, fraying, bad bruises, and kinks. b. Inspect parts for swelling and discoloration due to overheating. | a. Figs. 7-6 and 7-7. b. Figs. 7-6 and 7-7. |

Page 7-12. (As added by C 1, 24 July 1963) Add appendix A after table 7-6.

APPENDIX A REFERENCES

The following references are applicable for the operator and repairman of Antenna Coupler CU-168/FRR.

| | |
|--------------|---|
| AR 70-10 | Army Materiel Testing. |
| AR 320-5 | Dictionary of United States Army Terms. |
| AR 320-50 | Authorized Abbreviations and Brevity Codes. |
| AR 750-5 | Organization, Policies, and Responsibilities for Maintenance Operation. |
| DA Pam 108-1 | Index of Army Films, Transparencies, GTA Charts, and Recordings. |

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| | |
|--------------|---|
| DA Pam 310-4 | Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9) Supply Bulletins, Lubrication Orders, and Modification Work Orders. |
| FM 21-5 | Military Training Management. |
| FM 21-6 | Techniques of Military Instruction. |
| FM 21-30 | Military Symbols. |
| SB 11-573 | Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment. |
| TB SIG 364 | Field Instructions for Painting and Preserving Electronics Command Equipment. |
| TM 9-213 | Painting Instructions for Field Use. |
| TM 38-750 | Army Equipment Record Procedures. |

Add appendixes B, C, and D after appendix A.

APPENDIX B BASIC ISSUE ITEMS

Section I. INTRODUCTION

B1. General

This appendix lists items for Antenna Coupler CU-168/FRR, the component items comprising it, and the items which accompany it, or are required for installation, operation, or operator's maintenance.

B-2. Explanation of Columns

An explanation of the columns in section II is given below.

a. Source, Maintenance, and Recover ability Codes, column 1.

- (1) Source code, column 1a. The selection status and source for the listed item is noted here. The source code used is:

| <i>Code</i> | <i>Explanation</i> |
|-------------|---|
| <i>P</i> | Applies to repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories. |

- (2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here. The maintenance code used is as follows:

| Code | Explanation |
|------|-----------------------------|
| O | Organizational Maintenance. |

- (3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation are as follows:

Note. When there is no code indicated in the recoverability column, the part will be considered expendable.

| <i>Code</i> | <i>Explanation</i> |
|-------------|--|
| <i>R</i> | Applies to repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis. |

b. Federal Stock Number, Column 2. The Federal stock number for the item is indicated in this column.

c. Description, Column 3. The Federal item name, a five digit manufacturer's code, a part number, and when required, the model designator (*), which indicates different models of the end equipment, are included in this column.

d. Unit of Issue, Column 4. The unit used as a basis of issue (e.g., ea, pr, ft, yd, etc) is noted in this column.

e. Quantity Incorporated in Unit Pack, Column 5. Not used.

f. Quantity Incorporated in Unit, Column 6. The total quantity of the item used in the equipment is given in this column.

g. Quantity Authorized, Column 7. The total quantity of an item required to be on hand and necessary for the operation and maintenance of the equipment is given in this column.

h. Illustration, Column 8.

- (1) *Figure number, column 8a.* The number of the illustration in which the item is shown is indicated in this column.
- (2) *Item or symbol number, column 8b.* The call out number used to reference the item in the illustration appears in this column.

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SECTION II. BASIC ISSUE ITEMS LIST

| (1) | | | BASIC ISSUE ITEMS LIST | | | | | | (4) | (5) | (6) | (7) | (8) | | |
|-----------------|-----------------|----------------|-----------------------------|--------------------|---|--|--|--|--|---------------|----------------------|-----------------|----------|----------------------|------------------------------|
| (A) SOURCECD | (B) MAINT.CD | (C) REC. CD | (2) FEDERAL STOCK NUMBER | (3) DESCRIPTION | | | | | | UNIT OF ISSUE | QTY INC IN UNIT PACK | QTY INC IN UNIT | QTY AUTH | ILLUSTRATIONS | |
| | | | | MODEL | | | | | | | | | | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER |
| | | | | | | | | | | | | | | | |
| | | R | 5965-510-0006 | | | | | | | | | | | | |
| | | | | | | | | | ANTENNA COUPLER CU-168/FRR | | | | | | |
| | | | | | | | | | ANTENNA COUPLER CU-168/FRR: Provides means for coupling up to 5 communications receivers to a single receiving antenna for simultaneous operation; for general use in fixed shore receiving stations free range 2 to 32 mc; 19" lg x 11-13/16" w x 8-23/32"H o/a | ea | | | | | |
| | | | | | | | | | NOTE: Model column 1 refer to order No. NOBSR-64811;- column 2 refers to order No. NOBSR-71854. | | | | | | |
| | | | | | | | | | ITEMS COMPRISING AN OPERABLE EQUIPMENT | | | | | | |
| | | | | | | | | | TECHNICAL MANUAL, TM 11-5985-212-15 | ea | 1 | 1 | | | |
| | | | | | | | | | Requisition through pinpoint account number if assigned; otherwise through nearest Adjutant General facility. | | | | | | |
| | | | | | | | | | NOTE: For technical manuals the quantity indicates the maximum number of copies authorized for packing (or issue) with the equipment. Where a number of these equipments are concentrated in a small area, the quantity on hand may be reduced to practical levels. Excess publications must be returned to publication supply centers through AG channels. | | | | | | |
| | | | 5935-280-2195 | * | * | | | | ADAPTER, CABLE TO CONNECTOR: 81348; AN3057-6A | ea | 1 | 1 | 1-1 | | |
| | | | 5935-148-9378 | * | * | | | | CONNECTOR, PLUG, ELECTRICAL: 81349; AN3106A-14S-7S | ea | | 1 | 1-1 | P201 | |
| | | | 5935-258-4598 | * | * | | | | CONNECTOR, PLUG, ELECTRICAL: 81349; UG-21D/U | ea | 6 | 6 | 1-1 | P101 | |
| | | | | | | | | | RUNNING SPARE ITEMS | | | | | | |
| P | 0 | | 5960-188-3948 | * | * | | | | ELECTRON TUBE 5U4G: 81349; 5U4G | ea | 1 | 1 | 7-7 | V301 | |
| P | 0 | | 5960-166-7663 | * | * | | | | ELECTRON TUBE 81349; 12AU7 | ea | 20 | 5 | 7-6 | V101 thru V104 | |

AMSEL-MR Form 6010

1 Jan 64

(Supersedes edition of 1 Dec 64, which is obsolete)

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**APPENDIX C
MAINTENANCE ALLOCATION**

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Antenna Coupler CU-168/ FRR. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Explanation of Format for Maintenance Allocation Chart

a. Group Number. Not used.

b. Component Assembly Nomenclature. This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

| <i>Code</i> | <i>Maintenance Category</i> |
|-------------|-----------------------------|
| C | Operator/Crew |
| O | Organizational Maintenance |
| F | Direct Support Maintenance |
| H | General Support Maintenance |
| D | Depot Maintenance |

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in section III.

e. Remarks. Self explanatory.

C-3. Explanation of Format for Tool and Test Equipment Requirements

The columns in the tool and test equipment requirements chart are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number.

e. Tool Number. Not used.

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SECTION II. MAINTENANCE ALLOCATION CHART

| MAINTENANCE ALLOCATION CHART | | | | | | | | | | | | | | | | |
|------------------------------|---|------------------------------|------|---------|--------|-------|-----------|---------|---------|--------|----------|---------|-------------------------------|----------------|--|--|
| (1) GROUP NUMBER | (2) COMPONENT ASSEMBLY NOMENCLATURE | (3) MAINTENANCE FUNCTIONS | | | | | | | | | | | (4) TOOLS AND EQUIPMENT | (5) REMARKS | | |
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | | | |
| | COUPLER, ANTENNA CU-168/FRR | O | O | | | | | | | | | O | D | | 6,7,8 1,2,3,4,5, 6,7,8 8 1,2,8 | |

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

| TOOL OR TEST EQUIPMENT REF CODE | MAINTENANCE CATEGORY | NOMENCLATURE | FEDERAL STOCK NUMBER | TOOL NUMBER |
|---------------------------------------|-------------------------|---|----------------------------|----------------|
| | | CU-165/FRR (continued) | | |
| 1 | O | MULTIMETER AN/URM-105 | 6625-581-2036 | |
| 2 | | MULTIMETER ME-26/U | 6625-646-9409 | |
| 3 | O | RF SIGNAL GENERATOR AN/URM-25D | 6625-649-5193 | |
| 4 | D | TEST SET, ELECTRON TUBE TV-2/U | 6625-669-0263 | |
| 5 | O | TOOL KIT, ELECTRON EQUIPMENT TK-100/G | 5180-605-0079 | |
| 6 | O | TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G | 5180-610-8177 | |
| 7 | O (ONLY) | TOOL KIT, RADIO REPAIRMAN TK-115/U | 5180-856-1578 | |
| 8 | O | TUBE TESTER, ELECTRON TUBE TV-7/U | 6625-820-0064 | |

AMSEL-MR Form 6013

1 Jan 66 (Supersedes edition of 1 Jan 65, which is obsolete)

CU-168/FRR

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**APPENDIX D
ORGANIZATIONAL, DS, GS, AND DEPOT REPAIR PARTS**

Section I. INTRODUCTION

D-1. General

This appendix contains a list of repair parts required for the performance of organizational maintenance and a list covering the corresponding requirements for direct support, general support, and depot maintenance for Antenna Coupler CU-168/FRR.

Note. No special tools, test, or support equipment are required for the CU-168/FRR.

D-2. Explanation of Sections

This repair parts list is divided into four principal parts:

a. Prescribed Load Allowance List (PLA) Section II. The PLA is a consolidated listing of repair parts allocated for initial stockage at organizational maintenance. This is a mandatory minimum stockage allowance.

b. Repair Parts for Organizational Maintenance-Section III. Repair parts authorized for organizational maintenance is included in this section.

c. Repair Parts, DS, GS, and Depot Maintenance-Section IV. This chart lists repair parts authorized for maintenance performance at direct support, general support and depot categories.

d. Federal Stock Number Index-Section V. This is a cross-reference index of Federal stock numbers to illustrations by figure and item number.

D-3. Explanation of Columns

An explanation of the columns in sections II through IV is given below.

a. Source, Maintenance, and Recoverability Codes, Column 1, Sections III and IV.

(1) *Source code, column 1a.* The selection status and source for the listed item is noted here. Source codes and their explanations are as follows:

| Code | Explanation |
|------|--|
| P | Applies to repair parts that are stocked in or supplied from the GSA/ DSA, or Army supply system, and authorized for |

use at indicated maintenance categories.

A Applies to assemblies that are not procured or stocked as such but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.

(2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here.

| Code | Explanation |
|------|----------------------------|
| O | Organizational Maintenance |
| F | Direct Support Maintenance |

(3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation are as follows:

Note. When no code is indicated in the recoverability column, the part will be considered expendable.

| Code | Explanation |
|------|---|
| R | Applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis. |

b. Stock Number, Column 1, Section II; Column 2, Sections III and IV. The Federal stock number for the item is indicated in this column.

c. Description, Column 2, Section II; Column 3, Sections III and IV. The model designator, Federal item name, a five-digit manufacturer's code, and a part

number are included in this column. The designator (*) indicates the different models of the end equipment.

d. *Unit of Issue, Column 4, Sections III and IV.* The unit used as a basis of issue (e.g. ea, pr, ft, yd, etc) is noted in this column.

e. *Quantity Incorporated in Unit Pack, Column 4, Section II; Column 5, Sections III and IV.* Not used.

f. *Quantity Incorporated in Unit, Column 6, Sections III and IV.* The quantity of repair parts in an assembly is given in this column.

g. *Maintenance Allowance, Column 3, Section II; Column 7, Sections III and IV.*

- (1) The allowance columns are divided into subcolumns. The total quantity of items authorized for the number of equipments supported is indicated in each subcolumn. Items authorized for use as required but not for initial stockage are identified with an asterisk (*) in the allowance column.
- (2) The quantitative allowances for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.
- (3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-MR-NMP-CT, Fort Monmouth, N.J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point

based upon engineering experience, demand data, or TAERS information.

- (4) The quantitative allowances for DS/ GS categories of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

h. *One-Year Allowances Per 100 Equipments/Contingency Planning Purposes, Column 8, Section IV.* Opposite the first appearance of each item, the total quantity required for distribution and contingency planning purposes is indicated. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for one year.

i. *Illustration, Column 8, Section III; Column 10, Section IV.*

(1) *Figure number, column 8a.* The number of the illustration in which the item is shown is indicated in this column.

(2) *Item or symbol number, column 8b.* The callout number used to reference the item in the illustration is indicated in this column.

j. *Depot Maintenance Allowance Per 100 Equipments, Column 9, Section IV.* This column indicates the total quantity of each item authorized depot maintenance for 100 equipments.

D-4. Location of Repair Parts

a. When the Federal stock number is unknown, follow the procedures given in (1) through (4) below.

- (1) Locate the appropriate appendix of the repair parts list.
- (2) If the item or symbol number is available, locate the item by scrutiny of columns 8b and/or 10b of the repair parts list.
- (3) If the item, symbol, and figure number is not known, check the description column (column 3) in the repair parts list to locate the part. The parts in this column are arranged in alphabetical order.
- (4) Locate the applicable illustration in this manual and note the figure number and item number. Use the repair parts listing

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and locate the figure number and item number as noted on the illustration.

b. When the Federal stock number is known, use the repair part listing to find the repair part and the figure and item numbers as noted in the Federal stock number index.

D-5. Federal Supply Codes

This paragraph lists the Federal supply code and the associated manufacturer's name.

| Code Number | Manufacturer's Name |
|-------------|---|
| 02230 | Electronics of Clearfield |
| 04867 | Jones Hiram Electronics Co |
| 07387 | The Birtcher Corp |
| 12755 | Clearfield Machine Co |
| 13499 | Collins Radio Co Cedar Rapids Division |
| 42498 | National Co. Inc. |
| Code Number | Manufacturer's Name |
| 71400 | Bussmann Mfg Division of |

| | |
|-------|---|
| | McGraw-Edison Co. |
| 72765 | Drake Mfg Co |
| 72825 | Eby Hugh H Inc |
| 74970 | Johnson, E.F. Co |
| 75353 | E.R. Klemm Co |
| 78553 | Tinnerman Products Inc |
| 80063 | Army Electronics Command Procurement and Production Directorate. |
| 81348 | Federal Specifications Promulgated by General Services Administration. |
| 81349 | Military Specifications |
| 81350 | Joint Army-Navy Specifications Promulgated by Standardization Div Directorate of Logistic Services DSA. |
| 91506 | Augat Inc |
| 95104 | Collins Radio Co |
| 96906 | Military Standard Promulgated by Standardization Div Directorate of Logistics Services DSA. |

SECTION II. PRESCRIBED LOAD ALLOWANCE LIST

| PRESCRIBED LOAD ALLOWANCE | | | | | | | | | | |
|-----------------------------------|---|------------------------|---|---|----|---------------------------------------|-------------|--------------|---------------|-------------------------------------|
| (1) FEDERAL STOCK NUMBER | (2) DESCRIPTION | MODELS USABLE ON | | | | (3) 15-DAY ORG MAINT. ALLOWANCE | | | | (4) QTY INC IN UN PK |
| | | | | | | (A) 1-5 | (B) 6-20 | (C) 21-50 | (D) 51-100 | |
| | NOTE: Model column 1 refer to order No. NOBSR-64811; column 2 refers to order No. NOBSR-71854. | | | | | | | | | |
| 5340-634-6880 | CLAMP, LOOP: 78553; C3044A-2-92 | * | | | * | * | * | 2 | | |
| 5820-698-9995 | SPRING FLAT: 95104; 134 | * | | | * | * | * | 2 | | |
| 5910-227-0264 | CAPACITOR, FIXED, ELECTROLYTIC: 81349; CE51C151M | * | * | | * | * | * | 2 | | |
| 5910-615-9695 | CAPACITOR, FIXED, ELECTROLYTIC: 81349; CE51C250M | * | * | | * | * | * | 2 | | |
| 5920-280-5027 | FUSE, CARTRIDGE: 81349; FOLG2ROOA | * | | | 2 | 2 | 3 | 6 | | |
| 5920-474-6125 | FUSE; CARTRIDGE: 81349; FO2G2ROOA | * | | | 2 | 2 | 3 | 6 | | |
| 5935-148-9378 | CONNECTOR, PLUG, ELECTRICAL: 81349; AN3106A-14S-7S | * | * | | * | * | * | 2 | | |
| 5960-166-7663 | ELECTRON TUBE 81349; 12AU7 | * | * | | 11 | 39 | 92 | 179 | | |
| 5960-188-3948 | ELECTRON TUBE: 81350; 5U4 | * | * | | 2 | 2 | 2 | 2 | | |
| 5960-249-4973 | RETAINER, ELECTRON TUBE: 80063; SM-D-349110-4 | * | * | | * | * | * | 2 | | |
| 5960-265-7577 | CLAMP, ELECTRICAL: 02230; A-393 | | * | | * | * | * | 2 | | |
| 5960-270-3326 | RETAINER, ELECTRON TUBE: 07387; 926C-44 | * | | | * | * | * | 2 | | |
| 5960-273-2477 | RETAINER, ELECTRON TUBE: 07387; 926A-26 | | * | | * | * | * | 2 | | |
| 5960-591-4748 | RETAINER, ELECTRON TUBE: 72825; 168-30F | * | | | * | * | * | 2 | | |
| 5360-591-8150 | RETAINER, CAPACITOR: 91506; 150W1-183H | * | | * | * | * | 2 | | | |
| 5985-543-0800 | DUMMY LOAD, ELECTRICAL: 72825; 168-409 | * | * | | * | * | * | 2 | | |
| 6210-247-1777 | LENS, INDICATOR LIGHT: 72765; 25REDFACSB | * | | | * | * | * | 2 | | |
| 6210-299-5802 | LENS, INDICATOR LIGHT 72765; 25 GREEN | | * | * | * | * | 2 | | | |
| 6240-155-8706 | LAMP: INCANDESCENT: 96906 MS15571-2 TYPE TB-14 | * | * | | * | 2 | 2 | 3 | | |

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ESC-FM 2465-66

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SECTION III. REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

| (1) | | | REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE | | | | | | (4) | (5) | (6) | (7) 15 DAY ORG MAINTENANCE ALLOWANCE | | | | (10) ILLUSTRATIONS | | | |
|-------------------|-------------------|------------------|--|-------|---|---|---|---|-----|--|---------------------|---|--------------------------|-----|------|-----------------------|--------|-------------------------|------------------------------------|
| (A) SRCE CD | (B) MNTC CD | (C) REC CD | (2) FEDERAL STOCK NUMBER | MODEL | | | | | | (3) DESCRIPTION | UNIT OF ISSUE | QTY INC IN UN PK | QTY INC IN UNIT | (A) | (B) | (C) | (D) | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | 1-5 | 6-20 | 21-50 | 51-100 | | |
| A | O | R | 5985-510-0006 | | | | | | | ANTENNA, COUPLER CU-168/FRR ANTENNA COUPLER CU-168/FRR; provides means for coupling up to 10 communications receiver to single receiving antenna for simultaneous operation; for general use in fixed shore receiving station; freq range 2 to 32 mc; 19 in 1g x 11-13/16 in w x 8-23/32 in h o/a NOTE: Model column 1 refers to order No. NOBSR-64811; column 2 refers to order No. NOBSR-71854 | | | | | | | 1-1 | | |
| P | O | | 5910-615-9695 | * | * | | | | | CAPACITOR, FIXED, ELECTROLYTIC: 81349; CE51C250M | ea | 1 | * | * | * | 2 | 7-7 | C301 | |
| P | O | | 5910-227-0264 | * | * | | | | | CAPACITOR, FIXED, ELECTROLYTIC: 81349; CE51C151M | ea | 1 | * | * | * | 2 | 7-6 | C302 | |
| P | O | | 5960-265-7577 | | | * | | | | CLAMP, ELECTRICAL: 02230; A-393 | ea | 1 | * | * | * | 2 | 7-5 | E-101 | |
| P | O | | 5340-634-6880 | * | * | | | | | CLAMP, LOOP: 78553; C3044A-2-92 | ea | 1 | * | * | * | 2 | 7-4 | E210 | |
| P | O | | 5935-148-9378 | * | * | | | | | CONNECTOR, PLUG, ELECTRICAL: 81349; AN3106A-14S-7S | ea | 1 | * | * | * | 2 | 1-1 | P201 | |
| P | O | | 5985-543-0800 | * | * | | | | | DUMMY LOAD, ELECTRICAL: 72825; 168-409 | ea | 1 | * | * | * | 2 | 7-4 | P201 | |
| P | O | | 5960-188-3948 | * | * | | | | | ELECTRON TUBE: 81350-5U4 | ea | 1 | 2 | 2 | 2 | 2 | 7-7 | V301 | |
| P | O | | 5960-166-7663 | * | * | | | | | ELECTRON TUBE 81349; 12AU7 | em | 20 | 11 | 39 | 92 | 179 | 7-6 | V101 thru V104 | |
| P | O | | 5920-474-6125 | * | * | | | | | FUSE, CARTRIDGE: 81349; FO2G2ROOA | ea | 2 | 2 | 2 | 3 | 6 | 7-4 | F201, F202 | |
| P | O | | 5920-280-5027 | * | * | | | | | FUSE, CARTRIDGE: 81349; FO1G2ROOA | ea | 2 | 2 | 2 | 3 | 6 | 7-4 | F201, F202 | |
| P | O | | 6240-155-8706 | * | * | | | | | LAMP: INCANDESCENT; 96906 MS15571-2 type TB-14 | ea | 1 | * | 2 | 2 | 3 | 4-1 | I201 | |
| P | O | | 6210-299-5802 | * | * | | | | | LENS, INDICATOR LIGHT; 72765; 25 GREEN | ea | 1 | * | * | * | 2 | 7-4 | E208 | |
| P | O | | 6210-247-1777 | * | * | | | | | LENS, INDICATOR LIGHT: 72765; 25REDFACSB | ea | 1 | * | * | * | 2 | 7-4 | E208 | |
| P | O | | 5960-591-8150 | * | * | | | | | RETAINER, CAPACITOR: 91506; 15OW1-183H | ea | 1 | * | * | * | 2 | 7-7 | E301 | |

| (1) | | | REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE | | | | | | (4) | (5) | (6) | (7) 15 DAY ORG. MAINTENANCE ALLOWANCE | | | | (10) ILLUSTRATIONS | | | |
|-------------------|-------------------|------------------|--|-------|---|---|---|---|---|--------------------|---------------|--|-----------------|------------|-------------|-----------------------|---------------|----------------------|------------------------------|
| (A) SRCE CD | (B) MNTC CD | (C) REC CD | (2) FEDERAL STOCK NUMBER | MODEL | | | | | | (3) DESCRIPTION | UNIT OF ISSUE | QTY INC IN UN PK | QTY INC IN UNIT | | | | | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | (A) 1-5 | (B) 6-20 | (C) 21-50 | (D) 51-100 | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | CU-168/FRR (continued) | | | | | | | | | | |
| P | 0 | | 5960-591-4748 | * | | | | | RETAINER, ELECTRON TUBE: 72825; 168-30F | ea | 5 | * | * | * | 2 | 7-5 | 101 | | |
| P | 0 | | 5960-270-3326 | * | | | | | RETAINER, ELECTRON TUBE: 07387; 926C-44 | ea | 1 | * | * | * | 2 | 7-7 | E303 | | |
| P | 0 | | 5960-273-2477 | | * | | | | RETAINER, ELECTRON TUBE: 07387; 926A-26 | ea | 1 | * | * | * | 2 | 7-7 | E301 | | |
| P | 0 | | 5960-249-4973 | * | * | | | | RETAINER, ELECTRON TUBE: 80063; SM-D-349110-4 | ea | 2 | * | * | * | 2 | 7-7 | E302, E303 | | |
| P | 0 | | 5820-698-9995 | * | | | | | SPRING FLAT: 9510; 134 | ea | 2 | * | * | * | 2 | 7-4 | E202, E203 | | |

SECTION IV. REPAIR PARTS, DS, GS, AND DEPOT MAINTENANCE

| (1) | | | REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE | | | | | | | | | | (4) | (5) | (6) | (7) (30 DAYS) SITE STOCKAGE ALLOWANCE | | | | | | (8) | (9) | (10) ILLUSTRATIONS | |
|-------------------|-------------------|------------------|--|-------|---|---|---|---|---|---|---------------------|------------------------------|--------------------------|------|-------|--|------|-------|--------|---|---|-------------------------|------------------------------------|-----------------------|--|
| (A) SRCE CD | (B) MNTC CD | (C) REC CD | (2) FEDERAL STOCK NUMBER | MODEL | | | | | | (3) DESCRIPTION | UNIT OF ISSUE | QTY INC IN UN PK | QTY INC IN UNIT | (A) | (B) | (C) | (A) | (B) | (C) | 1 YR ALW PER 100 EQUIP CNTGNCY PL | DEPOT MAINT. ALW. PER 100 EQUIP. | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER | | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | 1-20 | 21-50 | 51-100 | 1-20 | 21-50 | 51-100 | | | | | | |
| A | 0 | R | 5985-510-0006 | | | | | | | ANTENNA COUPLER CU-168/FRR ANTENNA COUPLER CU-168/FRR: provides means for coupling up to 10 communications receiver to single receiving antenna for simultaneous operation; for general use in fixed shore receiving station; freq range 2 to 32 mc; 19 in lg x 11-13/16 in w x 8-23/32 in h o/a | ea | | | | | | | | | | | 1-1 | | | |
| | | | | | | | | | | NOTE: Model column 1 refers to order No. NOBSR-64811; column 2 refers to order No. NOBSR-71854 | | | | | | | | | | | | | | | |
| P | F | | 5910-100-5764 | * | * | | | | | CAPACITOR, FIXED, CERAMIC DIELECTRIC: 81349; CC20CK010C | ea | 20 | 2 | 4 | 7 | 2 | 2 | 2 | 77 | 60 | 7-6 | C107 thru C110 | | | |
| P | F | | 5910-666-7406 | * | * | | | | | CAPACITOR, FIXED, CERAMIC DIELECTRIC: 81349; CC20CK070C | ea | 10 | 2 | 3 | 5 | * | 2 | 2 | 40 | 30 | 7-6 | C101, C102 | | | |
| P | 0 | | 5910-615-9695 | * | * | | | | | CAPACITOR, FIXED, ELECTROLYTIC: 81349, CE51C250M | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | C301 | | | |
| P | 0 | | 5910-227-0264 | * | * | | | | | CAPACITOR, FDIXED, ELECTROLYTIC: 81349; CE51C151M | ea | 1 | * | * | * | * | 2 | * | 8 | 3 | 7-6 | C302 | | | |
| P | F | | 5910-100-8150 | * | * | | | | | CAPACITOR, FIXED, MICA DELECTRIC: 81349; CM35B103M | ea | 20 | 2 | 4 | 7 | 2 | 3 | 5 | 77 | 60 | 7-6 | C103 thru C106 | | | |
| P | 0 | | 5960-265-7577 | * | * | | | | | CLAMP, ELECTRICAL: 02230; A-393 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-5 | E-101 | | | |
| P | 0 | | 5340-634-6880 | * | * | | | | | CLAMP, LOOP: 78553; C3044A-2-92 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-4 | E-210 | | | |
| P | F | | 5950-387-0392 | * | * | | | | | COIL RADIO FREQUENCY: 95104; 240-9003-009 | ea | 8 | 2 | 2 | 2 | * | 2 | 2 | 40 | 24 | 7-4 | L201 thru L208 | | | |
| P | F | | 5950-246-4377 | * | * | | | | | COIL, RADIO FREQUENCY: 95104; 240-9004-008 p/o 081-0066-85 | ea | 10 | 2 | 3 | 5 | * | 2 | 2 | 46 | 30 | 7-6 | L101, L102 | | | |

| (1) | | | REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE | | | | | | (4) | (5) | (6) | (7) (30 DAYS) SITE STOCKAGE ALLOWANCE | | | | | | (10) ILLUSTRATIONS | | | | |
|-------------------|-------------------|------------------|--|-------|---|---|---|---|-----|--|---------------------|---|--------------------------|------|-------|--------|------|-----------------------|--------|-------------------------|------------------------------------|-------------------------------|
| (A) SRCE CD | (B) MNTC CD | (C) REC CD | (2) FEDERAL STOCK NUMBER | MODEL | | | | | | (3) DESCRIPTION | UNIT OF ISSUE | QTY INC IN UN PK | QTY INC IN UNIT | (A) | (B) | (C) | (A) | (B) | (C) | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | 1-20 | 21-50 | 51-100 | 1-20 | 21-50 | 51-100 | | | |
| P | F | | 5950-698-2074 | * | * | | | | | CU-168/FRR (continued) COIL, RADIO FREQUENCY 95104; 240-9001-009 | ea | 10 | 2 | 3 | 5 | * | 2 | 2 | 46 | 30 | 7-6 | L105, L106 |
| P | F | | 5950-255-2958 | * | * | | | | | COIL, RADIO FREQUENCY: 95104; 240-9002-009 | ea | 14 | 2 | 3 | 5 | 2 | 2 | 3 | 54 | 42 | 7-6 7-4 | L103, L104 L 209 thru L212 |
| P | F | | 5935-258-4598 | * | * | | | | | CONNECTOR, PLUG, ELECTRICAL RF-UG-210/U: 81349; UG-21D/U | ea | 6 | * | 2 | 2 | * | * | 2 | 13 | 6 | 1-1 | P101 |
| P | 0 | | 5935-148-9378 | * | * | | | | | CONNECTOR, PLUG, ELECTRICAL: 81349; AN3106A-14S-7S | ea | 1 | * | * | * | * | * | * | 4 | 1 | 1-1 | P201 |
| P | F | | 5820-629-9474 | * | * | | | | | CONNECTOR, RECEPTACLE, ELECTRICAL: 12755; A-396 | ea | 5 | * | 2 | 2 | * | * | 2 | 12 | 5 | 7-3 | J204 |
| P | F | | 5935-149-3483 | * | * | | | | | CONNECTOR, RECEPTACLE, ELECTRICAL: 81349; UG-58A | ea | 7 | * | 2 | 2 | * | * | 2 | 15 | 7 | 7-3 | J101, J202, J203 |
| P | F | | 5935-161-9791 | * | * | | | | | CONNECTOR, RECEPTACLE, ELECTRICAL: 04867; P-406-AB-1/16 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-7 | P301 |
| P | F | | 5935-149-2886 | * | * | | | | | CONNECTOR, RECEPTACLE, ELECTRICAL: 04867; S-406-B | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-3 | J209 |
| P | F | | 5935-149-3419 | * | * | | | | | CONNECTOR, RECEPTACLE, ELECTRICAL: 81349; AN3102A-14S-7P | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-3 | J201 |
| P | 0 | | 5985-543-0800 | * | * | | | | | DUMMY LOAD, ELECTRICAL: 72825; 163-409 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-4 | E201 |
| P | 0 | | 5960-188-3948 | * | * | | | | | ELECTRON TUBE: 81350; 5U4 | ea | 1 | 3 | 2 | 3 | 2 | 2 | 2 | 160 | 125 | 7-7 | V301 |
| P | 0 | | 5960-166-7663 | * | * | | | | | ELECTRON TUBE 81349; 12AU7 | ea | 20 | 70 | 167 | 327 | 39 | 92 | 179 | 4189 | 3600 | 7-6 | V101 thru V104 |
| P | F | | 5915-376-9027 | * | * | | | | | FILTER, RADIO INTERFERENCE: 13499; 2409000009 | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-4 | Z201 |

| (1) | | | REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE | | | | | | (4) | (5) | (6) | (7) (30 DAYS) SITE STOCKAGE ALLOWANCE | | | | | | (10) ILLUSTRATIONS | | | | |
|-------------------|-------------------|------------------|--|-------|---|---|---|---|-----|--|---------------------|---|--------------------------|------|-------|--------|------|-----------------------|--------|-------------------------|------------------------------------|----------------|
| (A) SRCE CD | (B) MNTC CD | (C) REC CD | (2) FEDERAL STOCK NUMBER | MODEL | | | | | | (3) DESCRIPTION | UNIT OF ISSUE | QTY INC IN UN PK | QTY INC IN UNIT | (A) | (B) | (C) | (A) | (B) | (C) | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | 1-20 | 21-50 | 51-100 | 1-20 | 21-50 | 51-100 | | | |
| P | 0 | | 5920-474-6125 | * | | | | | | CU-168/FRR (continued) | ea | 2 | 2 | 6 | 11 | 2 | 3 | 6 | 130 | 100 | 7-4 | F201, F202 |
| P | 0 | | 5920-280-5027 | | * | | | | | FUSE, CARTRIDGE: 81349; FO2G2R30A | ea | 2 | 2 | 6 | 11 | 2 | 3 | 6 | 130 | 100 | 7-4 | F201, F202 |
| P | F | | 5920-247-3801 | | | * | | | | FUSE, CARTRIDGE: 81349; FO1G2ROOA | ea | 2 | * | * | * | * | * | * | 4 | 1 | 7-4 | XF201, XF202 |
| P | F | | 5920-543-0914 | * | | | | | | FUSE HOLDER: 71400; HKP-JR | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-4 | XF201, XF202 |
| P | 0 | | 6240-155-8706 | * | * | | | | | FUSE HOLDER: 72825; 168-80A | ea | 1 | 2 | 3 | 6 | 2 | 2 | 3 | 71 | 50 | 4-1 | 1201 |
| P | 0 | | 6210-299-5802 | | * | | | | | LAMP: INCANDESCENT: 96906 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-4 | E208 |
| P | 0 | | 6210-247-1777 | * | | | | | | MS15571-2 type TB-14 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-4 | E208 |
| P | F | | 6210-299-6719 | * | | | | | | LENS, INDICATOR LIGHT: 72765; 25 GREEN | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-4 | X1-201 |
| P | F | | 6210-231-4682 | | * | | | | | LENS, INDICATOR LIGHT: 72765; 25REDFACSB | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-4 | X1-201 |
| P | F | | 5935-542-8194 | | | | | | | LIGHT, INDICATOR: 72765; 50 less lens | ea | 5 | * | 2 | 2 | * | * | 2 | 12 | 5 | 7-5 | P102 |
| P | F | | 5950-645-1356 | * | * | | | | | 168-201G | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | Z301 |
| P | F | | 5905-279-1686 | * | * | | | | | REACTOR: 81349; TF1A06YY | ea | 5 | * | 2 | 2 | * | 2 | 2 | 27 | 15 | 7-6 | R103 |
| P | F | | 5905-279-3525 | * | * | | | | | RESISTOR, FIXED, COMPOSITION: 81349; RC32GF560J | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-4 | R203 |
| P | F | | 5905-197-6263 | * | * | | | | | RESISTOR, FIXED, COMPOSITION: 81349; RC42GF680J | ea | 4 | * | 2 | 2 | * | 2 | 2 | 20 | 12 | 7-4 | R204 thru R207 |
| P | F | | 5905-256-0409 | * | * | | | | | RESISTOR, FIXED, COMPOSITION: 81349; RC20GF820J | ea | 10 | 2 | 2 | 3 | * | 2 | 2 | 46 | 30 | 7-6 | R104, R105 |
| | | | | | | | | | | RESISTOR, FIXED, COMPOSITION: 81349; RC20GF221K | | | | | | | | | | | | |

| (1) | | | REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE | | | | | | (4) | (5) | (6) | (7) (30 DAYS) SITE STOCKAGE ALLOWANCE | | | | | | (10) ILLUSTRATIONS | | | | |
|-------------------|-------------------|------------------|--|-------|---|---|---|---|-----|--|---------------------|---|--------------------------|------|-------|--------|------|-----------------------|--------|-------------------------|------------------------------------|------------------------|
| (A) SRCE CD | (B) MNTC CD | (C) REC CD | (2) FEDERAL STOCK NUMBER | MODEL | | | | | | (3) DESCRIPTION | UNIT OF ISSUE | QTY INC IN UN PK | QTY INC IN UNIT | (A) | (B) | (C) | (A) | (B) | (C) | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | 1-20 | 21-50 | 51-100 | 1-20 | 21-50 | 51-100 | | | |
| P | F | | 5905-186-2968 | * | * | | | | | CU-168/FRR (continued) RESISTOR, FIXED, COMPOSITION: 81349; RC42GF471K | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-6 | R107 |
| P | F | | 5905-299-2045 | * | * | | | | | RESISTOR, FIXED, COMPOSITION: 81349; RC32GF1I2K | ea | 10 | 2 | 2 | 3 | * | 2 | 2 | 46 | 30 | 7-6 | R101 |
| P | F | | 5905-195-9453 | * | * | | | | | RESISTOR, FIXED, COMPOSITION: 81349; RC20GF152J | ea | 2 | * | 2 | 2 | * | * | 2 | 13 | 6 | 7-4 | R201, R202 |
| P | F | | 5905-174-2254 | | | * | | | | RESISTOR, FIXED, WIREWOUND: 81349; RW33G103 | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | R301 |
| P | F | | 5905-174-2663 | * | | | | | | RESISTOR, FIXED, WIREWOUND: 81349; RW22G103 | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | R301 |
| P | O | | 5960-591-8150 | * | | | | | | RETAINER, CAPACITOR; 91506; 150W1-183H | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-7 | E301 |
| P | O | | 5960-591-4748 | * | | | | | | RETAINER, ELECTRON TUBE: 72825; 168-30F | ea | 5 | * | 2 | 2 | * | * | 2 | 12 | 5 | 7-5 | E101 |
| P | O | | 5960-270-3326 | * | | | | | | RETAINER, ELECTRON TUBE: 07387; 926C-44 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-7 | E303 |
| P | O | | 5960-273-2477 | * | | | | | | RETAINER, ELECTRON TUBE: 07387; 926A-26 | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-7 | E301 |
| P | O | | 5960-249-4973 | * | * | | | | | RETAINER, ELECTRON TUBE: 80063; SM-D-349110-4 | ea | 2 | * | * | 2 | * | * | * | 5 | 2 | 7-7 | E302, E303 |
| P | F | | 5935-129-9358 | | | * | | | | SOCKET, ELECTRON TUBE: 81349; | ea | 3 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | XC-301, XC- |
| 302, XV-302 | | | | | | | | | | TS101PO2 | | | | | | | | | | | | |
| P | F | | 5935-160-1365 | | * | | | | | SOCKET, ELECTRON TUBE: 81349; | ea | 20 | 2 | 2 | 3 | * | 2 | 2 | 33 | 20 | 7-6 | XV101thruXV104 |
| P | F | | 5935-549-7763 | * | | | | | | TS-103PO1 | | | | | | | | | | | | |
| | | | | | | | | | | SOCKET, ELECTRON TUBE: 74970; | ea | 3 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | XC301, XC302, XC303 |
| | | | | | | | | | | 122-228 | | | | | | | | | | | | |

| (1) | | | REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE | | | | | | | | | | (4) | (5) | (6) | (7) (30 DAYS) SITE STOCKAGE ALLOWANCE | | | | | | (10) ILLUSTRATIONS | |
|-------------|-------------|------------|--|-------|---|---|---|---|---|--------------------|---|------------------------------|--------------------------|------|-------|--|------|-------|--------|-------------------------|------------------------------------|-----------------------|---------------------|
| (A) SRCE | (B) MNTC | (C) REC | (2) FEDERAL STOCK NUMBER | MODEL | | | | | | (3) DESCRIPTION | UNIT OF ISSUE | QTY INC IN UN PK | QTY INC IN UNIT | (A) | (B) | (C) | (A) | (B) | (C) | (A) FIGURE NUMBER | (B) ITEM OR SYMBOL NUMBER | | |
| CD | CD | CD | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | 1-20 | 21-50 | 51-100 | 1-20 | 21-50 | 51-100 | | | | |
| P | F | | 5935-222-9820 | * | | | | | | | SOCKET, ELECTRON TUBE: 42498; | ea | 20 | 2 | 2 | 3 | * | 2 | 2 | 33 | 20 | 7-6 | XV101 thru XV104 |
| P | F | | 5940-542-9849 | * | | | | | | | XOA SOCKET, TRANSFORMER: 72825; 168-201E | ea | 1 | * | * | * | * | * | * | 4 | 1 | 7-6 | XT101 |
| P | F | | 5935-655-1245 | * | * | | | | | | SOCKET, TRANSFORMER: 02230; | ea | 5 | * | 2 | 2 | * | * | 2 | 12 | 5 | 7-6 | XT101 |
| P | O | | 5820-698-9995 | * | * | | | | | | SPRING FLAT: 95104; 134 | ea | 2 | * | * | * | * | * | * | 5 | 2 | 7-4 | E202, E203 |
| P | F | | 5930-050-2635 | * | * | | | | | | SWITCH, TOGGLE: 81349; ST-22K | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 4-1 | S201 |
| P | F | | 5940-556-6295 | * | * | | | | | | SWITCH SUBASSEMBLY 72825; 168-301A | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | S301 |
| P | F | | 5820-629-9471 | * | * | | | | | | SWITCH, KNIFE: 75353; A-115A102 | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | S301 |
| P | F | | 5950-504-7392 | * | * | | | | | | TRANSFORMER, POWER, STEP-DOWN AND STEP-UP: 95104; 664-9000-009 | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | T301 |
| P | F | | 5950-647-5071 | * | * | | | | | | TRANSFORMER, POWER, STEP-DOWN AND STEP-UP: 81349; TF1AO3YY | ea | 1 | * | * | 2 | * | * | * | 8 | 3 | 7-7 | T301 |
| P | F | | 5950-648-0668 | * | * | | | | | | TRANSFORMER, RADIO FREQUENCY 95104: 596-0712-003 | ea | 2 | * | 2 | 2 | * | * | 2 | 13 | 6 | 7-4 | T201, T202 |
| P | F | | 5950-511-5753 | * | * | | | | | | TRANSFORMER, RADIO FREQUENCY 95104; 596-0715-003 | ea | 5 | * | 2 | 2 | * | 2 | 2 | 27 | 15 | 7-6 | T101 |
| P | F | | 5950-510-0800 | * | * | | | | | | TRANSFORMER, RADIO FREQUENCY 72825; 168-403E | ea | 2 | * | 2 | 2 | * | * | 2 | 13 | 6 | 7-4 | T201, T202 |

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| 5340-634-6880 | 7-4 | E210 | 5935-222-9820 | 7-6 | XV101 thru XV104 |
| 5820-629-9474 | 7-3 | J204 | 5935-258-4594 | 1-1 | P101 |
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| 5905-174-2254 | 7-7 | R301 | 5935-549-7763 | 7-7 | XC301, XC302, XC303 |
| 5905-174-2663 | 7-7 | R301 | | | |
| 5905-186-2968 | 7-6 | R107 | 5935-655-1245 | 7-6 | XT101 |
| 5905-195-9453 | 7-4 | R201, P202 | 5940-542-9849 | 7-6 | XT101 |
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| 5905-256-0409 | 7-6 | R104, R105 | 5820-629-9471 | 7-7 | S301 |
| 5905-279-1686 | 7-6 | R103 | 5950-246-4377 | 7-6 | L101, L102 |
| 5905-279-3525 | 7-4 | R203 | 5950-255-2958 | 7-6 | L103, L104 |
| 5905-299-2045 | 7-6 | R101 | 5950-387-0392 | 7-4 | L209 thru L212 |
| 5910-100-5764 | 7-6 | C107 thru C110 | 5950-504-7392 | 7-4 | L201 thru L208 |
| 5910-100-8150 | 7-6 | C103 thru C106 | 5950-510-0800 | 7-7 | T301 |
| 5910-227-0264 | 7-6 | C302 | 5950-511-5753 | 7-4 | T201, T202 |
| 5910-615-9695 | 7-7 | C301 | 5950-645- 1356 | 7-6 | T101 |
| 5910-666-7406 | 7-6 | C101, C102 | 5950-647-5071 | 7-7 | Z301 |
| 5915-376-9027 | 7-4 | Z201 | 5950-648-0668 | 7-7 | T301 |
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| 5920-280-5027 | 7-4 | F201, F202 | 5950-698-2074 | 7-6 | L105, L136 |
| 5920-474-6125 | 7-4 | F201, F202 | 5960-166-7663 | 7-6 | V101 thru V104 |
| 5920-543-0914 | 7-4 | XF201, XF202 | 5960-188-3948 | 7-7 | V301 |
| 5930-050-2635 | 4-1 | S201 | 5960-249-4973 | 7-7 | E302, E303 |
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| | | | 5960-270-3326 | 7-7 | E303 |
| | | | 5960-273-2477 | 7-7 | E301 |
| 5935-148-9378 | 1-1 | P201 | 5960-591-4748 | 7-5 | E101 |
| 5935-149-2886 | 7-3 | J209 | 5960-591-8150 | 7-7 | E301 |
| 5935-149-3419 | 7-3 | J201 | 5985-543-0800 | 7-4 | E201 |
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FIGURE AND ITEM NUMBER OR REFERENCE SYMBOL**

| STOCK NUMBER | FIG. NO. | ITEM NO. REF SYMBOL | STOCK NUMBER | FIG. NO. | ITEM REF. SYMBOL |
|---------------|----------|------------------------|--------------|----------|---------------------|
| 6210-299-6719 | 7-4 | X1-201 | | | |
| 6240-155-8706 | 4-1 | I201 | | | |

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

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USACDCCBRA (1)
USACDCCEA (1)
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USACDCTA (1)
USACDCADA (1)
USACDCARMA (1)
USACDCAVNA (1)
USACDCARTYA (1)
USACDCSWA (1)
USACDOCEA (Ft Huachuca) (1)
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USAMC (5)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OC Maj Comd (4)
LOGCOMD (2)
USAMICOM (4)
USASTRATCOM (4)
USAESC (70)
MDW (1)
Armies (2)
Corps (2)
USAC (3)
52d USASA Sp Op Comd (5)
104th USASA Det (5)
177th USASA Co (5)
182d USASA Co (5)
183rd USASA Co (5)
184th USASA Co (5)
9th USASA Fld Sta (5)
12th USASA Fld Sta (5)
14th USASA Fld Sta (5)
507th USASA Gp (5)
USATC (2)
WRAMC (1)

Army Pic Cen (2)
USACDCEC (10)
Svc Colleges (2)
USASESCS (5)
USAADS (2)
USAAMS (2)
USAARMS (2)
USAIS (2)
USAES (2)
Instl (2) except
Ft Hancock (4)
Ft Gordon (10)
Ft Huachuca (10)
Ft Carson (25)
Ft Knox (12)
WSMR (5)
Army Dep (2) except
LBAD (14)
SAAD (30)
TOAD (14)
LEAD (7)
SHAD (3)
NAAD (5)
SVAD (5)
CHAD (3)
ATAD (10)
Gen Dep (2)
Sig Sec, Gen Dep (5)
Sig Dep (12)
Sig FLDMS (2)
AMS (1)
USAERDAA (2)
USAERDAW (13)
USACRREL (2)
MAAG (2)
USARMIS (2)
Units org under fol TOE (2 ea):
11-57 11-158
11-97 11-500(AA-AC)
11-98 32-56
11-117 32-57
11-127 32-67
11-155 32-78
11-157 32-500

NG: State AG (3); Units-Same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used see AR 320-50.

Change }
No. 3 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 16 October 1973

**Operator's, Organizational, Direct Support, General Support, and Depot
Maintenance Manual (Including Repair Parts Lists)
ANTENNA COUPLER CU-168/FRR**

TM 11-5985-212-15, 30 December 1960, is changed as follows:

The title of this manual is changed as shown above.

Page 1-1. Paragraph 1.1 is superseded as follows:

1.1. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification, work orders (MWO's) pertaining to the equipment.

Paragraph 1.2 is superseded as follows:

1.2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records and reports which are to be used by maintenance personnel at all maintenance 1 are in and prescribed by TM 38-750.

1.4. Items Comprising an Operable Antenna Coupler CU-168/FRR

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army)/NAVSUP PUB 459 (Navy) /AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

1.3. Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C Fort Monmouth, NJ 07703.

| <i>FSN</i> | <i>Qty</i> | <i>Nomenclature, part No., and mfr code</i> | <i>Usable on code</i> |
|------------|------------|---|---------------------------|
|------------|------------|---|---------------------------|

NOTE

The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and, used to identify manufacturer, distributor, or Government agency, etc.

NOTE

Number 1 in the usable on code column refers to order No. NOBSR-64811; number 2 refers to order No. NOBSR-71854.

| <i>FSN</i> | <i>Qty</i> | <i>Nomenclature part No., and mfr code</i> | <i>Usable on code</i> |
|---------------|------------|---|-----------------------|
| 5985-510-0006 | | Antenna Coupler CU-168/FRR including: | |
| 5935-280-2195 | 1 | Adapter, cable to connector, AN 30576A, 81348 | 1,2 |
| 5935-148-9378 | 1 | Connector, Plug, Electrical, AN3106A-14S-7S, 81349 | 1,2 |
| 5935258-4598 | 6 | Connector, Plug, Electrical, UG-21D/U 81349 | 1,2 |

Page 7-12. Appendix B is deleted.

By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-50, Organizational maintenance requirements for AN/FRT-52. AN/FRT-53 and AN/FRT-54.

☆U. S. GOVERNMENT PRINTING OFFICE: 1983 - 664-028/6056

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ORIGINAL

SAFETY NOTICE

This equipment employs voltage which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

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

KEEP AWAY FROM LIVE CIRCUITS:

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

DON'T SERVICE OR ADJUST ALONE:

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

DON'T TAMPER WITH INTERLOCKS:

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

DESTRUCTION OF ABANDONED MATERIAL IN THE COMBAT ZONE

In case it should become necessary to prevent the capture of this equipment, and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED, OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper or wood.
4. Grenades and shots from available firearms.
5. Burying all debris, where possible and when time permits.
6. Throwing overboard or disposing of in streams or other bodies of water.

Procedure:

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch and instrument boards.
3. Destroy all controls, switches, relays, connections and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil, and water cooling systems in gas engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING!

ORIGINAL

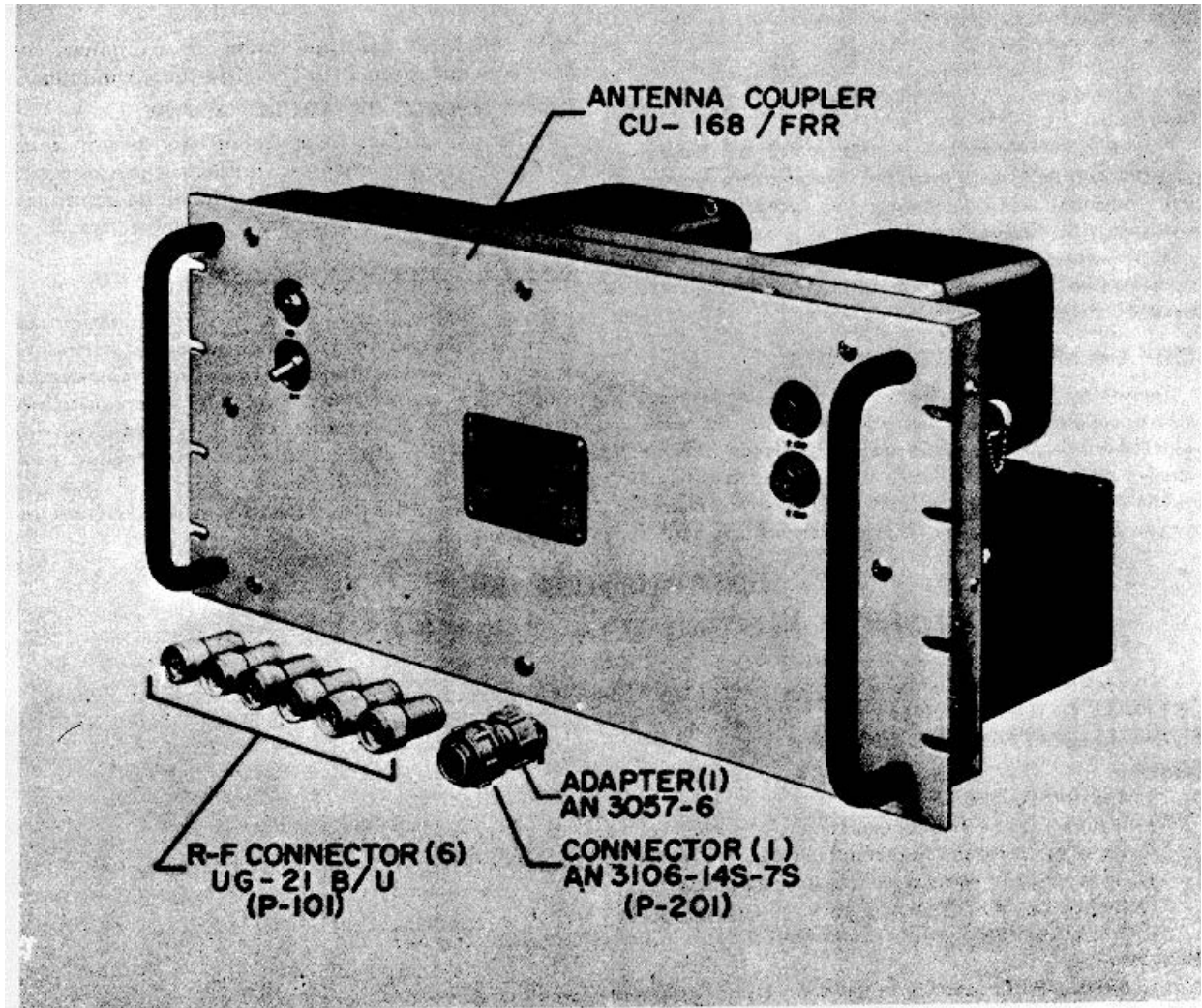


Figure 1-1. Antenna Coupler CU-168/FRR and Accessories

ORIGINAL

SECTION 1
GENERAL DESCRIPTION

1. PURPOSE AND PRINCIPLES.

Antenna Coupler CU-168/FRR (see figure 1-1) is a shore station equipment which provides means for operating up to five Navy communications receivers from a single receiving antenna. Additional antenna couplers may be connected in tandem in order to provide antenna inputs for additional receivers. The equipment is intended for installation and use in Navy shore receiving stations. The equipment is complete with power supply and contains all necessary parts and circuitry to provide the specified performance. The primary power source can be either 105, 115, or 125 volts, at any frequency from 50 to 400 cps, singlephase. The input circuit to which the antenna is connected is designed for operation from an unbalanced antenna transmission line having a nominal impedance of 70 ohms. Outputs to receivers are also nominal 70 ohms. This equipment permits operation over the frequency range of 2 to 32 megacycles per second. No adjustment or tuning is required.

2. DESCRIPTION OF UNITS.

a. The antenna coupler is mounted on a standard 19-inch rack panel, is 8-3/4 inches high, and is equipped with two pull handles for inserting and removing the

equipment. The front of the panel is finished in standard Navy gray enamel. Other chassis parts, with the exception of the r-f amplifiers, are finished in clear waterdip lacquer. The panel forms the cover of the main chassis, which in turn supports a number of plug-in subassemblies (see figure 1-2).

b. Each of the five r-f amplifiers (see figure 1-2) contains four type 12AU7 double-triode amplifier tubes and related components. Electrical connections are made when the amplifiers are mounted on the main chassis and secured with two captive screws. Connections to the communications receivers are made through the r-f connectors on the rear of each amplifier. Each amplifier has a dust cover which can be removed without interrupting operation of the equipment. The covers are finished in dull black lacquer. They are secured by two dzus fasteners located near jack J-101. The covers may be removed without interrupting operation of the equipment.

c. The power supply subassembly (see figure 1-2) contains a power transformer, type 5U4G rectifier tube, filter, and related components. The subassembly is retained on the main chassis by means of six captive screws. Electrical connections are completed when the power supply is mounted.

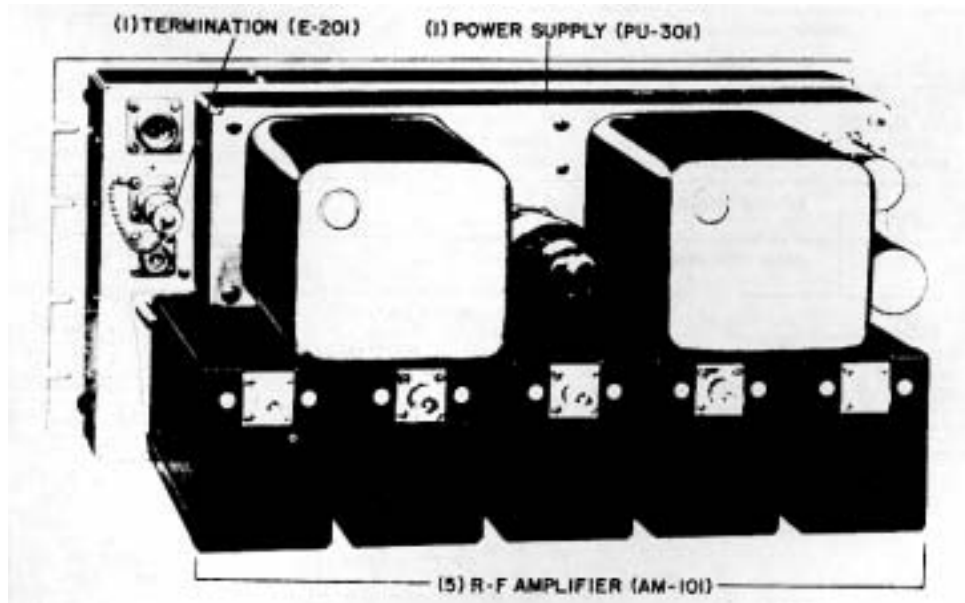


Figure 1-2. Antenna Coupler CU-168/FRR, Rear Oblique View

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**1 Section
Paragraph 3**

**CU-168/FRR.
GENERAL DESCRIPTION**

3. REFERENCE DATA.

- a. Nomenclature: Antenna Coupler
- b. Contract numbers: NOBSR 49175, 2 June 1950, and NObsr 52727, 29 June 1951.
- c. Contractor: Collins Radio Co., Cedar Rapids, Iowa.
- d. Cognizant Naval Inspector: Inspector of Naval Material, Los Angeles, California.
- e. Number of packages involved including equipment spares: 1.
- f. Total cubical contents, including equipment spares. Crated: 2.6 cu. ft. Uncrated: 1.2 cu. ft.

- g. Total weight, including equipment spares: Crated: 52 lbs. Uncrated: 43 lbs.
- h. Frequency of equipment: 2 to 32 megacycles per second.
- i. Power requirements: 105, 115, or 125 volts, at any frequency from 50 to 400 cps, single-phase, 125 watts.
- j. Input impedance from antenna): 70 ohms, nominal.
- k. Output impedance (to receivers and tandem antenna coupler): 70 ohms, nominal.
- l. Number of outputs: 5 (to receivers); 1 (to tandem antenna coupler, if used).

TABLE 1-1. EQUIPMENT SUPPLIED

| QUAN- TITY PER EQUIP- MENT | NAME OF UNIT | NAVY TYPE DESIGNATION | OVER-ALL DIMENSIONS | | | VOLUME | WEIGHT |
|--|--------------------------|--------------------------|-------------------------|-------|-------|--------|--------|
| | | | HEIGHT | WIDTH | DEPTH | | |
| 1 | Antenna Coupler | CU-168/FRR | 8-3/4 | 19 | 12 | 1.2 | 41 |
| 1 | Accessories Connector | AN3106-14S-7S | 1-1/8 diam x 1-7/16 lg | | | | 0.055 |
| 1 | Adapter | AN3057-6 | 15/16 diam x 1-5/64 lg | | | | 0.029 |
| 6 | Connector | UG-21B/U | 25/32 diam x 1-13/16 lg | | | | 0.123 |

Unless otherwise stated, dimensions are inches, volume cubic feet, weight pounds.

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

| QUAN- TITY PER EQUIP- MENT | NAME OF UNIT | NAVY TYPE DESIGNATION | REQUIRED CHARACTERISTICS |
|-------------------------------------|-----------------|--------------------------|---|
| 1 | Antenna System | | 70-ohm coaxial transmission line. |
| 1 to 5 | Radio Receivers | | 70-ohm (nominal) antenna input facilities |

TABLE 1-3. SHIPPING DATA

| SHIPPING BOX NO | CONTENTS | | OVER-ALL DIMENSIONS | | | | |
|--------------------|-----------------|--------------------------|------------------------|-------|-------|--------|--------|
| | NAME OF UNIT | NAVY TYPE DESIGNATION | HEIGHT | WIDTH | DEPTH | VOLUME | WEIGHT |
| 1 of 1 | Antenna Coupler | CU-168/FRR | 23 | 12 | 16 | 2.6 | 52 |

Unless otherwise stated, dimensions are inches, volume cubic feet, weight pounds.

TABLE 1-4. ELECTRON TUBE COMPLEMENT

| UNIT | NUMBER OF TUBES OF TYPE INDICATED | | TOTAL NO. OF TUBES |
|----------------------------|--------------------------------------|------|-----------------------|
| | 12AU7 | 5U4G | |
| Antenna Coupler CU-168/FRR | 20 | 1 | 21 |

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SECTION 2
THEORY OF OPERATION

1. GENERAL.

Antenna Coupler CU-168/FRR is a device which couples up to five independently operating receivers to a single receiving antenna. For accommodation of additional receivers, two or more antenna couplers may be connected in tandem by removing a terminating resistance, and substituting another antenna coupler. The complete schematic diagram is shown in figure 7-8. The antenna coupler receives and passes to the connected equipment all signals within the range 2 to 32 megacycles per second.

2. GENERAL CIRCUITRY. (See figure 2-1.)

Signals from an unbalanced 70-ohm transmission line are introduced through an impedance matching transformer to a balanced, 1,000-ohm, artificial transmission line. The artificial transmission line is terminated through an impedance matching transformer to a 70-ohm load. Five identical isolating r-f amplifiers are connected to this transmission line at points along its length and independently supply signal voltages to the respective receivers. These five r-f amplifiers may be interchanged without affecting overall performance.

Plate voltages for the r-f amplifiers are furnished by the d-c power supply.

3. CIRCUIT ANALYSES. (see figure 7-8.)

a. TRANSFORMER. (See figure 2-2.) The 70-ohm primary winding of input transformer T-201 accepts signals from an unbalanced, 70-ohm, coaxial transmission line from either an antenna or a preceding antenna coupler. The secondary of T-201 is wound for a nominal impedance of 1,000 ohms and is balanced with respect to chassis ground by means of a center tap. Output transformer T-202 is identical with T-201 but with its electrical functions reversed. A dummy winding on the primary of r-201 (the secondary of T-202) compensates for the unbalanced capacitances between the primary and secondary windings. (See Table 7-6, Winding Data.) The dummy winding is connected to ground at the center tap of the balanced winding. Balancing the distributed capacitances of the transformer in this manner prevents introduction of unbalanced signals into the secondary winding and transmission line. Reference to figure 2-2 should clarify the construction and theory of operation of transformer T-201.

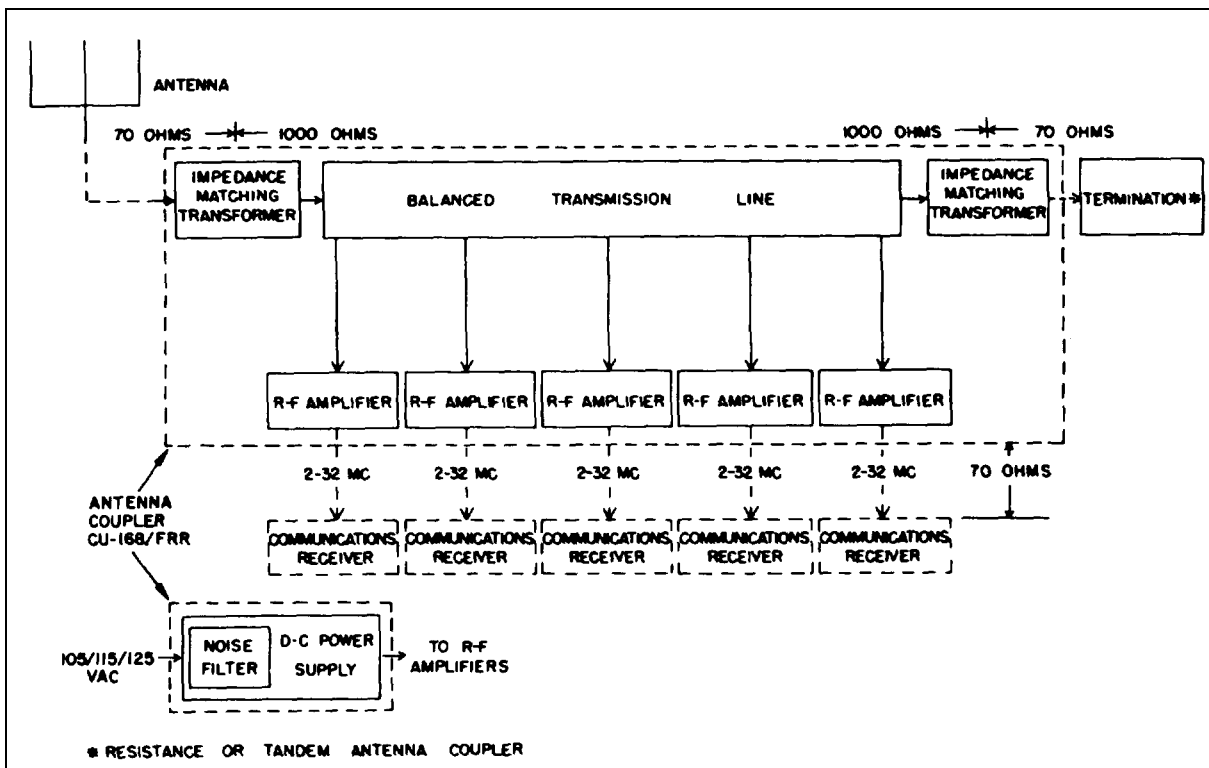


Figure 2-1. Antenna Coupler CU-168/FRR, Block Diagram

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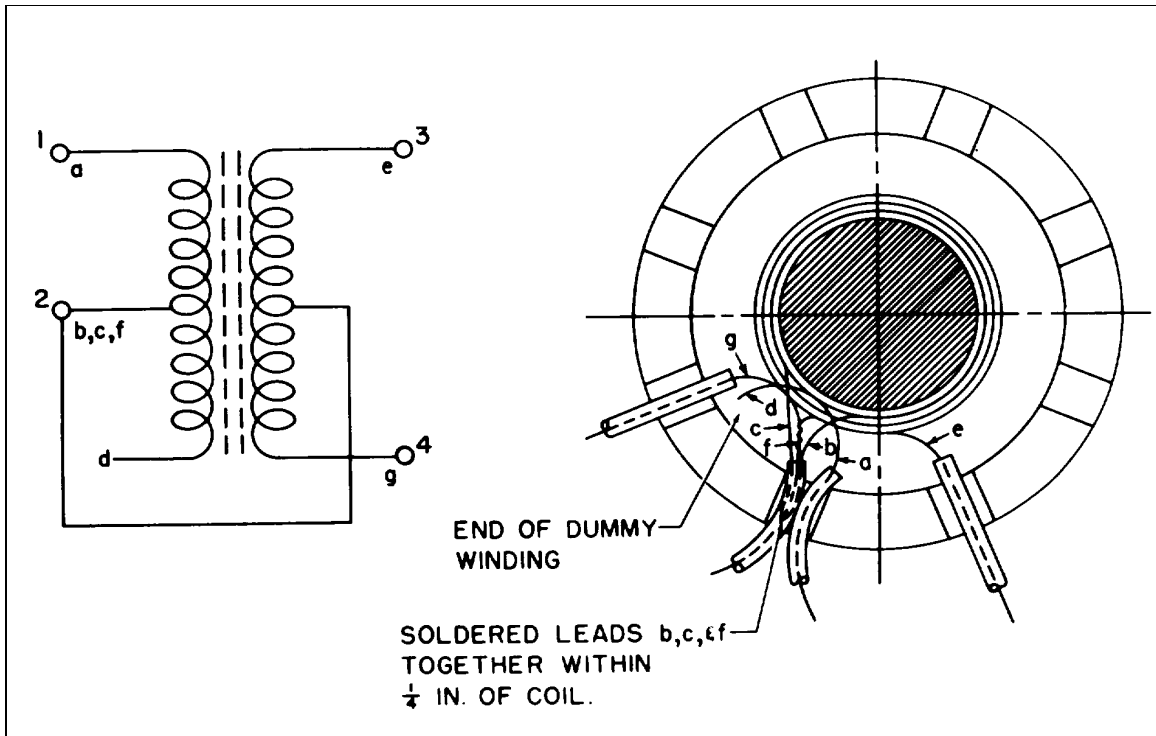


Figure 2-2. Construction of Transformer T-201.

Shielding of the transformer is secured by the powdered iron cup cores, which virtually enclose the windings.

b. ARTIFICIAL TRANSMISSION LINE. (See figure 7-8.) The artificial transmission line provides a multiple source of balanced, high impedance signals to the string of r-f amplifiers. Balanced operation is desirable to reduce spurious response and utilize advantages of push-pull circuitry in the r-f amplifiers. The transmission line has a nominal characteristic impedance of 1,000 ohms and consists of inductances, connected in series with a portion of the line, and shunting capacitances. The shunting capacitances are supplied by input circuits of the r-f amplifiers rather than by the line itself. Resistors P-204 through R-207 are the series elements of an H-pad which compensates for any unbalanced condition which might exist in transformer T-202.

c. TERMINATION. (See figure 7-8.) Termination of the artificial transmission line is made through impedance-matching transformer T-202 and 70-ohm load. This load may be supplied by resistor R-203, located in detachable plug E-201, or by connecting another antenna coupler at receptacle J-203. In the latter case, resistor R-203 of the second antenna coupler supplies the ultimate termination of the artificial transmission line.

d. R-F AMPLIFIERS. (See figure 7-8.)

(1) Each of the five r-f amplifiers are identical, detachable subassemblies of Antenna Coupler CU-168/FRR. Each contains two push-pull amplification stages with transformer output. The primary function is to isolate the receivers, which form the amplifier loads, from each other and from the antenna. Amplification within these stages compensates for insertion losses inherent in antenna coupler circuits. The low-gain circuit design provides an extremely high degree of linearity and stability over the frequency range of 2 to 32 mc.

(2) The first stage consists of double triodes V-101 and V-102, with both triode sections in each tube connected in parallel. The tubes are cathode-biased for class A, push-pull, cathode-coupled operation by a common cathode resistor R-103. The grids are connected to the balanced, artificial line, and the stray capacitances of these circuits provide the complementary reactances required by the line. During operation, the balanced signals from the line are impressed upon the grids of V-101 and V-102 180 degrees out of phase with respect to each other. The r-f outputs of the tubes are developed across inductors L-101 and L-102 and coupled to the cathodes of the following stages through inductors L-105 and L-106. L-105 and L-106 offer high impedance to high-frequency interference, while passing signals up to 32 megacycles per second. Neutralizing capacitors C-107 and C-108 improve the stability of this stage.

(3) The second stage consists of grounded-grid, push-pull amplifiers V-103 and V-104. These amplifiers operate through the variations in cathode potential with respect to the grid. Cathode-biasing for class A operation is provided by R-103 in common with the first stage. Over the low and mid-range of frequencies the plate load of both tubes consists of the primary of output transformer T-101, center-tapped to r-f ground through C-105. The high range is extended by means of peaking coils L-103 and L-104 and R-C networks consisting of R-104 and C-101 and R-105 and C-102. Plate potential is introduced to the tubes through power-supply decoupling resistor R-107 and the center tap of T-101. Application of the power supply voltage to the secondary winding, as well as the primary, reduces the insulation requirements between windings and makes very high coupling possible. Capacitor C-106 blocks the high voltage d-c from the amplifier output. The stability of the grounded-grid stage is improved by neutralizing capacitors C-109 and C-110.

(4) The cathode-coupled design of the first stage and the grounded-grid design of the second provide the wide frequency response required. In addition, the push-pull operation inherently results in cancellation of even-order harmonics generated within the antenna coupler.

e. POWER SUPPLY. (See figure 7-8.) The d-c power supply consists of power transformer T-301, with three secondary windings: 250-0-250-volt power, 5-volt CT rectifier filament, and 12.6-volt CT for heaters and indicator light. Rectifier tube V-301 is connected for full-wave rectification. The output is filtered by a choke-input filter network consisting of inductor Z-301, and electrolytic capacitors C-301 and C-302. Resistor R-301 bleeds the power supply. The primary of T-301 is protected by two-ampere fuses F-201 and F-202. Noise and r-f coupling to and from the a-c power source are reduced by noise filter Z-201, which in addition establishes a balanced a-c ground for hum reduction.

SECTION 3
INSTALLATION

1. UNPACKING.

There are no special features of this equipment which will be damaged if ordinary care is exercised during unpacking. To check that all parts of the equipment are supplied, refer to Figure 1-1 and Table 1-1.

2. INSTALLATION. (See figure 3-1.)

a. Antenna Coupler CU-168/FRR will usually be mounted in a Navy CY-597A/G or similar cabinet and secured with eight cup washers and eight machine screws.

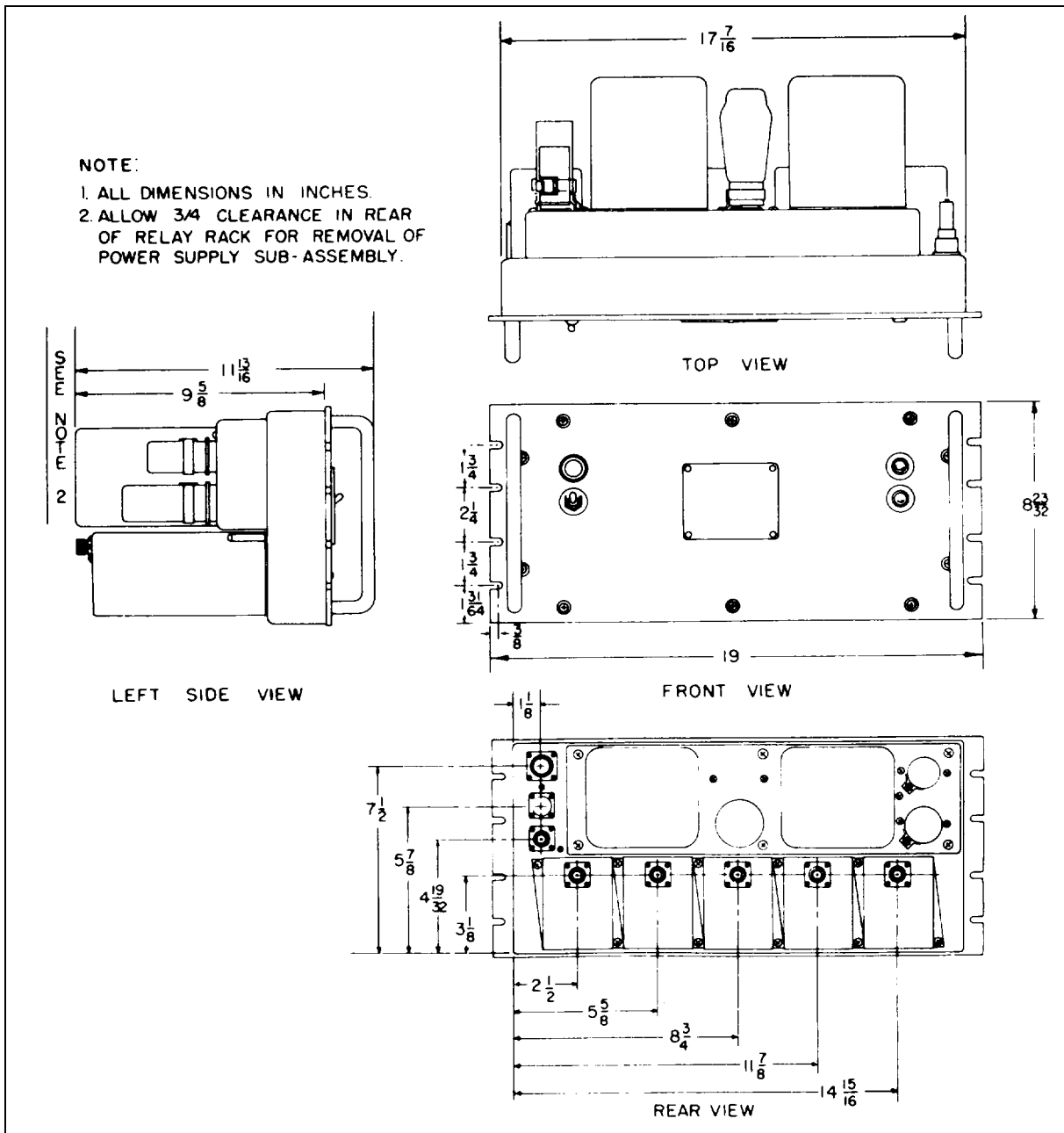


Figure 3-1. Antenna Coupler CU-168/FRR, Dimensional Outline Diagram

b. If several units (5 or more) are installed in one cabinet, a means of forced ventilation should be provided to prevent overheating.

c. Whether installed in CY-597A/G Cabinet or open racks, a 1-3/4' space (size A panel) should be left between units to facilitate air circulation.

d. If they are to be located in non-occupied spaces of air-conditioned buildings, installation may be made in floor-to-overhead open racks.

3. INITIAL ADJUSTMENTS.

a. Measure the a-c rms line voltage between the lines of the single phase source from which the antenna coupler is to be operated. This voltage must be 105, 115, or 125 volts, plus or minus 10 per cent. The power line frequency must be between 50 and 400 cycles.

b. Back out (until loose) the six captive screws which retain the power supply subassembly on the main chassis.

A. Slide nut, washer, and rubber gasket over end of cable. Cut off 1/2 in. of outside Jacket. DO NOT NICK OR CUT BRAID.

B. Draw slack in braid over end of cable and pinch together so that burrs do not extend out. Slide clamping sleeve over braid. Cut off 1/4 in. of braid and dielectric. DO NOT NICK OR CUT CONDUCTOR.

C. Hold clamping sleeve snugly against cable jacket and fan out all braid wires evenly against conical portion of clamping sleeve. Trim off ends of braid wires which extend beyond conical portion. Solder braid wires to clamping sleeve. USE HOT SOLDERING IRON, HIGHEST QUALITY ROSINCORE SOLDER. AVOID EXCESS SOLDER AND PROLONGED HEAT ON DIELECTRIC AND OUTSIDE JACKET.

D. Tin end of conductor and fit into contact pin. Hold soldering iron against side of contact pin and apply slight amount of solder to holes in contact pin. Wipe off excess solder.

E. Slide rubber gasket, washer, and nut against clamping sleeve. Slide connector over contact pin. Tighten nut in barrel. Check insulation between contact pin and barrel. Check continuity between contact pins and between connector barrels of both ends of cable.

Figure 3-2. Fabrication Instructions for UG-21B/U to RG-11/U

Withdraw the power supply subassembly carefully so as not to bend the electrical connectors. Inspect the position of the link of switch S-301 (see figure 7-7); it should be in a marked position corresponding to the measured a-c line voltage. Change to correct position if necessary.

CAUTION

Do not connect Antenna Coupler CU-168/FRR to an a-c source until switch S-301 has been adjusted for the correct line voltage.

4. POWER CONNECTION.

Connect the two conductors of the a-c supply cable to pins "A" and "C" of connector AN3106-14S-7S (P-201). Antenna coupler ground is available through pin "B". Install adapter AN3057-6 on the cable and connector. Connect the cable at power receptacle J-201 and secure by turning the plug retaining collar clockwise.

5. ANTENNA CONNECTION.

Refer to Navships 91047 for a description of the r-f and a-f signal distribution unit. Mount r-f connector UG-21B/U (P-202) on the end of the antenna cable (RG-12/U or equivalent) according to figure 3-2. Insert the plug in receptacle J-202 on the antenna coupler and secure by turning the plug retaining collar clockwise. Connect the other end to jack panel J-239/G in the r-f distribution panel.

6. CONNECTION TO SYSTEM.

Refer to Navships 91047 for a description of the r-f and a-f signal distribution unit. See figure 3-3 for typical installation. Mount r-f connectors UG-21B/U (P-101) on one end of each output cable (RG-12/U or equivalent) and connect the opposite ends to jack panel 3-237/G or J-239/G on the r-f distribution panel, depending on whether through line lifts or terminations are desired. Further routing will depend on the individual installation. Secure UG-21B/U plug to the amplifier output jacks.

7. TERMINATION.

a. SINGLE ANTENNA COUPLER. Install termination subassembly E-201 in receptacle J-203 (see figure 1-2). Secure by turning the plug retaining collar clockwise.

b. TANDEM ANTENNA COUPLER.-Mount r-f connector UG-21B/U (P-203, not supplied by contractor) on RG-12/U or equivalent coaxial cable. Secure the connector to jack J-203 on the antenna coupler, in place of termination E-201. Where tandeming is permanent, run the other end to the input of the following antenna coupler. If a line lift is desired, run through jack panel J-239/G. Where tandem requirements vary, run the line to jack panel J-237/G and devise a new 70-ohm line termination in N.T. 49121A plug.

**SECTION 4
OPERATION**

1. CAPABILITIES AND LIMITATIONS.

Antenna Coupler CU-168/FRR provides operation of up to five Navy communications receivers from the same antenna. No operator attention or adjustment is required. The equipment passes all antenna signals in between 2 and 32 mc with minimum frequency discrimination, distortion, noise generation, cross-talk, or response to spurious signals.

2. OPERATION. (See figure 4-1.)

To place the equipment in operation, place power switch S-201 to the "ON" position. The indicator light 1-201 indicates that the equipment is in operation. To remove the equipment from operation, throw power switch S-201 to the "OFF" position.

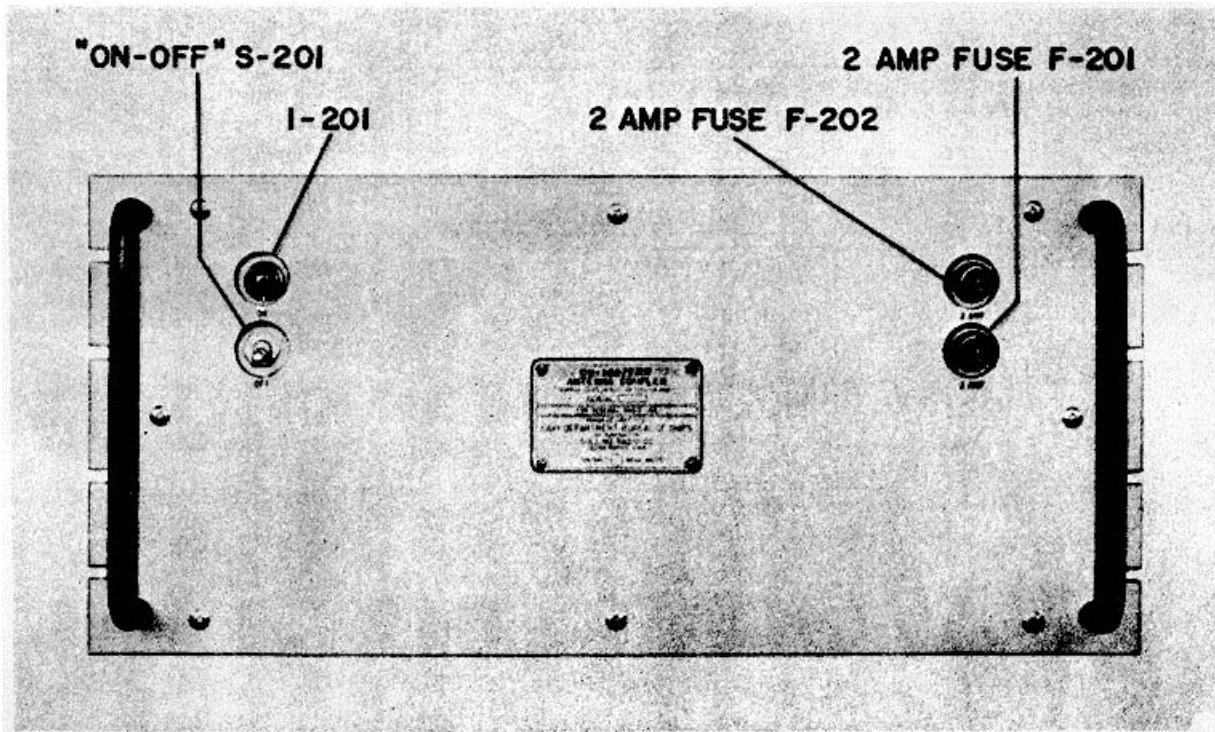


Figure 4-1. Antenna Coupler CU-168/FRR, Panel, Front View

**SECTION 5
OPERATOR'S MAINTENANCE**

1. ROUTINE CHECK CHART.

2. EMERGENCY MAINTENANCE.

Failure of the antenna coupler to function is probably a symptom of tube or fuse failure.

and check all tubes on a standard tube tester such as Tube Tester TV-3/U series, Navy Model OZ series or equivalent. For tube locations, see figures 1-2 and 7-5. For fuse locations, see figure 4-1.

NOTICE TO OPERATORS

Operators shall not perform any of the following emergency maintenance procedures without proper authorization.

- a. REPLACEMENT OF TUBES AND FUSES.-
When tube failure is indicated, replace each tube in turn with a new or tested tube of the same type, or remove

WARNING

Never replace a fuse with one of higher rating unless continued operation of the equipment is more important than probable damage. If a fuse burns out immediately after replacement, do not replace it a second time until the cause has been corrected.

*TABLE 5-1. ROUTINE CHECK CHART
WHEN IN USE - EACH WATCH*

| WHAT TO CHECK | HOW TO CHECK | PRECAUTIONS |
|--|---------------------|--|
| 1. Indicator light and rectifier tube. | a. Observe glow. | a. If rectifier tube is gassy (purple or blue glow) it must be replaced. |

WHEN IN USE - WEEKLY

| | | |
|-------------------------|---|--|
| 1. Overall performance. | <ul style="list-style-type: none"> a. Compare receiver performance for each antenna coupler output in turn. b. Operate receiver directly from antenna, bypassing antenna coupler(s). Compare performance. | <ul style="list-style-type: none"> a. Test with reception of several types of emission at various frequencies in the 2-to-32 mc band. a. Test with reception of several types of emission at various frequencies in the 2-to-32 mc band. |
|-------------------------|---|--|

**SECTION 6
PREVENTIVE MAINTENANCE**

1. ROUTINE MAINTENANCE CHECK CHART.

NOTE

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 OF THE BUREAU OF SHIPS MANUAL, OF THE LATEST ISSUE.

2. LUBRICATION.

No lubrication is required.

*TABLE 6-1. ROUTINE MAINTENANCE CHECK CHART
WHEN IN USE - MONTHLY*

| WHAT TO CHECK | HOW TO CHECK | PRECAUTIONS |
|------------------------|--|-----------------------------------|
| 1. Overall conditions. | Remove subassemblies and look for evidences of overheating, loose or dirty pins and connections, corrosion, fungus, etc. | Disconnect from a-c power source. |

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**SECTION 7
CORRECTIVE MAINTENANCE**

1. THEORY OF LOCALIZATION.

During the normal service life of any piece of equipment, some faults are expected to develop. Any circuit component in the entire system may be at fault, so, before searching for the defective part, it is necessary that a systematic method be used to localize the trouble and determine what part of the system is the source of the trouble. Before undertaking the job of localizing a faulty component, the technician must be thoroughly familiar with the complete system he is dealing with. The instruction books on the various units used in the system should be consulted until a good working knowledge of the equipment is attained. The theory of operation of Antenna Coupler CU-168/FRR will be found in Section 2 of this book and it is recommended that this section be consulted if the trouble has been isolated to the antenna coupler. A schematic diagram of the antenna coupler is shown in figure 7-8.

A method of localizing the trouble to a certain unit, if that unit happens to be the antenna coupler, is discussed in the next paragraph.

2. SYSTEM TROUBLE SHOOTING.

The entire system, with which Antenna Coupler CU-168/FRR is used, consists of an antenna and 70-ohm coaxial lead in, the antenna coupler, one or more communications receivers having a nominal 70-ohm input impedance, and the associated cables and connectors.

a. **LOCATING FAULTY UNIT.**-The initial step in system trouble shooting consists of isolating the unit of the system which is at fault. Faulty operation of a unit is indicated by the appearance of an unsatisfactory signal at the output of a properly tuned receiver. The trouble can be localized by the following procedure:

NOTE

UNSATISFACTORY SIGNAL, AS DISCUSSED HERE, IS A SIGNAL WHICH IS WEAK NOISY, DISTORTED OR OTHERWISE DEGRADED IN QUALITY. UNSATISFACTORY SIGNAL MAY EVEN BE THE ENTIRE ABSENCE OF SIGNAL.

(1) Tune to other stations near the same frequency as the one which provides unsatisfactory operation. If the other stations provide satisfactory reception, the trouble probably is NOT in the receiving installation. If other stations cannot be received satisfactorily, proceed to step (2).

(2) By-pass the antenna coupler at the rf-af distribution panel. Unsatisfactory reception indicates that the trouble is not in the antenna coupler. If this is the case, consult the applicable instruction books for the auxiliary equipments. Check all r-f connectors to determine if they are making good connection. Check all cabling. Satisfactory operation (when the antenna ORIGINAL coupler has been by-passed) indicates that the

fault is probably in the antenna coupler. If the trouble has been localized to the antenna coupler, the next step is to isolate the fault to some particular part of this unit. Proceed to step (3).

(3) Consecutively switch the receiver input to each of the five antenna-coupler amplifier outputs. If only one amplifier produces an unsatisfactory output, the fault probably lies in that amplifier. It is wise to try another amplifier in this position to be sure the fault is in the amplifier and not in its connector. If the output of two or more of the amplifiers is found to be unsatisfactory, proceed to step (4).

(4) Remove E-201 from J-203. Connect a receiver, known to be in good operating condition, to J-203. Good reception here indicates that the 1,000-ohm transmission line is in good condition. The reception of an unsatisfactory signal indicates a defective transmission line. Remember that a serious trouble such as a shorted input in one of the amplifiers can produce the same effect as a shorted transmission line. If the reception here indicates that the transmission line is good, but unsatisfactory signal is still received from the amplifiers, the power supply is probably defective. Refer to the next subsection for unit trouble shooting and repair.

3. UNIT TROUBLE SHOOTING AND REPAIR.

Antenna Coupler CU-168/FRR consists of only one major unit and its various subassemblies. After isolation of trouble to the antenna coupler, trouble shooting and repair of the antenna coupler itself may be performed as outlined in the succeeding paragraphs.

a. **PRECAUTIONS.**-While performing repairs of any nature on the antenna coupler, certain basic precautions must be observed.

(1) Every effort should be made to duplicate the exact original condition of the equipment. Standard replacement parts, such as supplied with the equipment, or taken from stock, should be used.

(2) Replaced wires and parts must be installed in exactly the same position as the original items. If this is not done, improper operation may occur. Stray capacitance between wiring and parts is utilized to provide proper circuit balance.

(3) All soldering should be done with resin core solder only. A good mechanical connection, as well as a satisfactory electrical connection, should be made at all times. Be careful not to allow solder to drip down into the chassis. This could easily cause a short circuit which might damage some parts of the equipment, requiring additional expense and valuable time to repair.

(4) Equipment which has been temporarily repaired in an emergency should be clearly marked or tagged

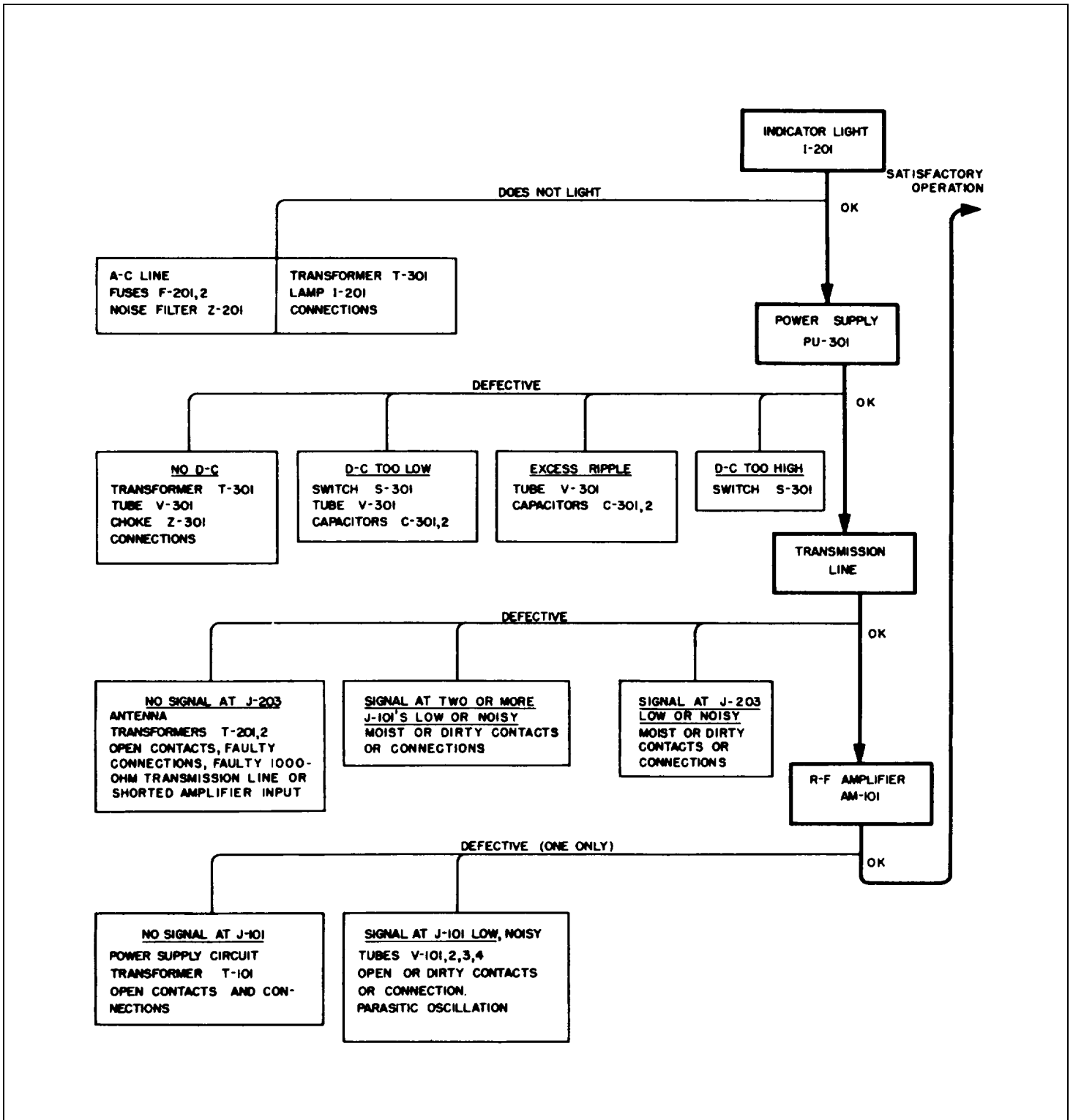


Table 7-1. Trouble Shooting Chart

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indicating the nature of the repair. It should be restored to its original condition at the first possible opportunity.

b. TROUBLE SHOOTING.-The trouble is first localized as discussed in sub-section 3. Table 7-1 shows a logical approach to unit trouble shooting and lists typical troubles which may appear. The following paragraphs describe troubles which may occur in each subassembly. Remedies are given for typical faults.

(1) If the trouble has been localized in an amplifier unit, proceed as follows:

(a) Remove dust cover and see if all tube filaments are lit. Replace any tubes whose filaments are not lit. If all filaments are lit, proceed to step (b).

(b) Check tubes; preferably by replacing the tubes, one at a time, with a tube known to be good. Replace any tubes found to be defective. If all tubes are good, proceed to step (c).

(c) Check voltages to see if they are as shown in table 7-2. Measure these voltages by removing the amplifier dust covers, leaving the amplifiers in place on the chassis. Remove the power unit from the chassis in order to obtain greater accessibility. Fabricate locally a jumper cable of sufficient length to connect the power supply to the chassis. If these voltages are the wrong values, the faulty component can probably be located by the following resistance checks.

(d) Make resistance checks as shown in table 7-3. Replace defective components. These resistance checks should be made even if the voltages check out right, because a resistance check will often point out a faulty component which was not indicated by a voltage check.

NOTE

IT MAY BE NECESSARY TO REMOVE AND TEST INDIVIDUAL COMPONENTS IN RARE INSTANCES.

(2) If the trouble has been localized in the power unit, proceed as follows:

(a) Check rectifier tube V-301 visually for indications of overloading (red plates), or burned out filaments. If filaments are burned out, replace the tube. If tube shows evidence of overloading, replace capacitors C-301 and C-302 before trying a new tube. If rectifier tube appears normal, proceed to step (b).

(b) Remove the power supply from antenna coupler chassis. Check line voltage between pins 7 and 8 of power input jack J-209. If there is no voltage at this point, proceed as follows. Check fuses F-201 and F-202. Check continuity of filter Z-201. Check operation of switch S-201. Replace any parts found to be defective. If proper voltage exists at jack J-209, proceed to step (c).

(c) Check resistances to see if they are as shown in table 7-3. Replace any defective components indicated by the results of these tests. If all resistances are correct, proceed to step (d).

(d) Apply the correct line voltage between pins 7 and 8 of plug P-301. Check voltages per table 7-2. Replace any faulty components indicated by these results.

(3) If the trouble is localized in the transmission line, proceed as follows:

(a) Remove front panel from main chassis. Remove all subassemblies from main chassis. Check resistance values as given in table 7-3. Replace any component found to be defective. If resistances check out correctly, proceed to step (b).

(b) Reassemble antenna coupler except for the front panel. Check voltages in the main chassis per table 7-2. Replace any defective components as indicated by the checks.

c. REPAIR.

(1) No electrical adjustments are required for the antenna coupler other than that described in section 3, paragraph 3. However, the unit may be checked for satisfactory operation as follows:

(a) (See figure 7-2.) Connect a signal generator, such as R-F Signal Generator Set AN/URM-25 Series with a 2-to-32 megacycle frequency coverage, to antenna input jack J-202. Connect a receiver with a 70-ohm input impedance to an output jack. Set the output level of the generator to less than 0.1 volt. Connect an output meter to the receiver. Adjust the receiver for a convenient level on the output meter, being careful that receiver does not block. Then remove the antenna coupler and connect the signal generator directly to the receiver. Adjust the output of the signal generator to give the same reading on the meter without changing any of the receiver controls. The output voltage of the generator, with the coupler in the circuit, must be less than 1.6 times the output voltage, with the antenna coupler removed. This test may be run on any output jack and at any frequency between 2 and 32 megacycles.

(2) MECHANICAL ADJUSTMENTS.-There are no mechanical adjustments other than those listed in section 3.

(3) COMPONENT CHARACTERISTICS.

(a) ELECTRON TUBES.-Tube operating voltages and currents are tabulated in table 7-4. Table 7-5 lists characteristics of all tubes used in Antenna Coupler CU-168/FRR.

(b) WINDING DATA.-table 7-6 gives winding data for all coils, transformers and r-f chokes used in this equipment. The information listed in this table includes the schematic diagram, wire size, number of turns and d-c resistance of each coil.

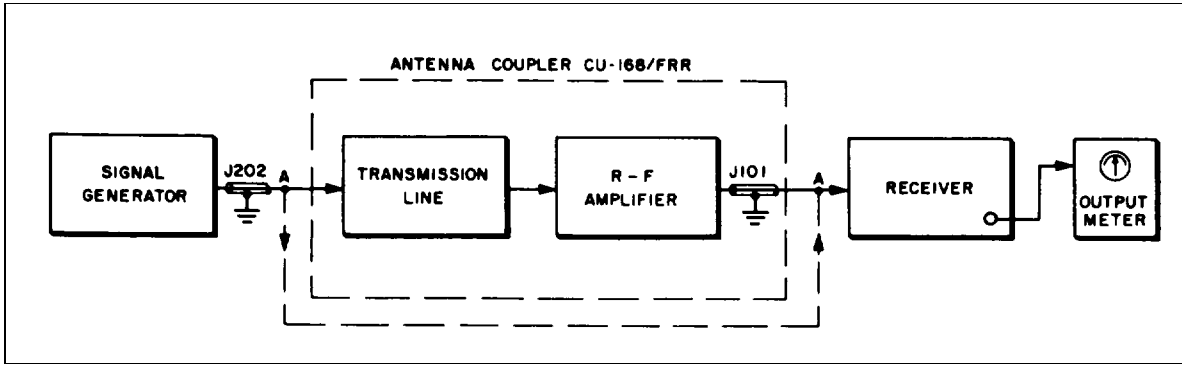


Figure 7-2. Method of Measuring Gain

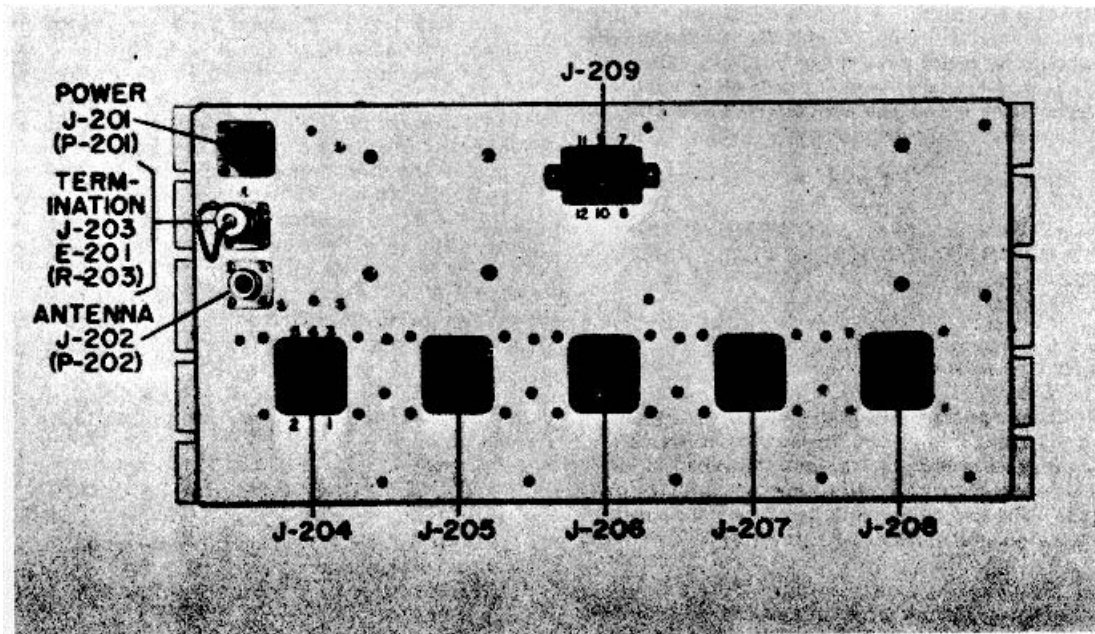


Figure 7-3. Main Chassis, Rear View

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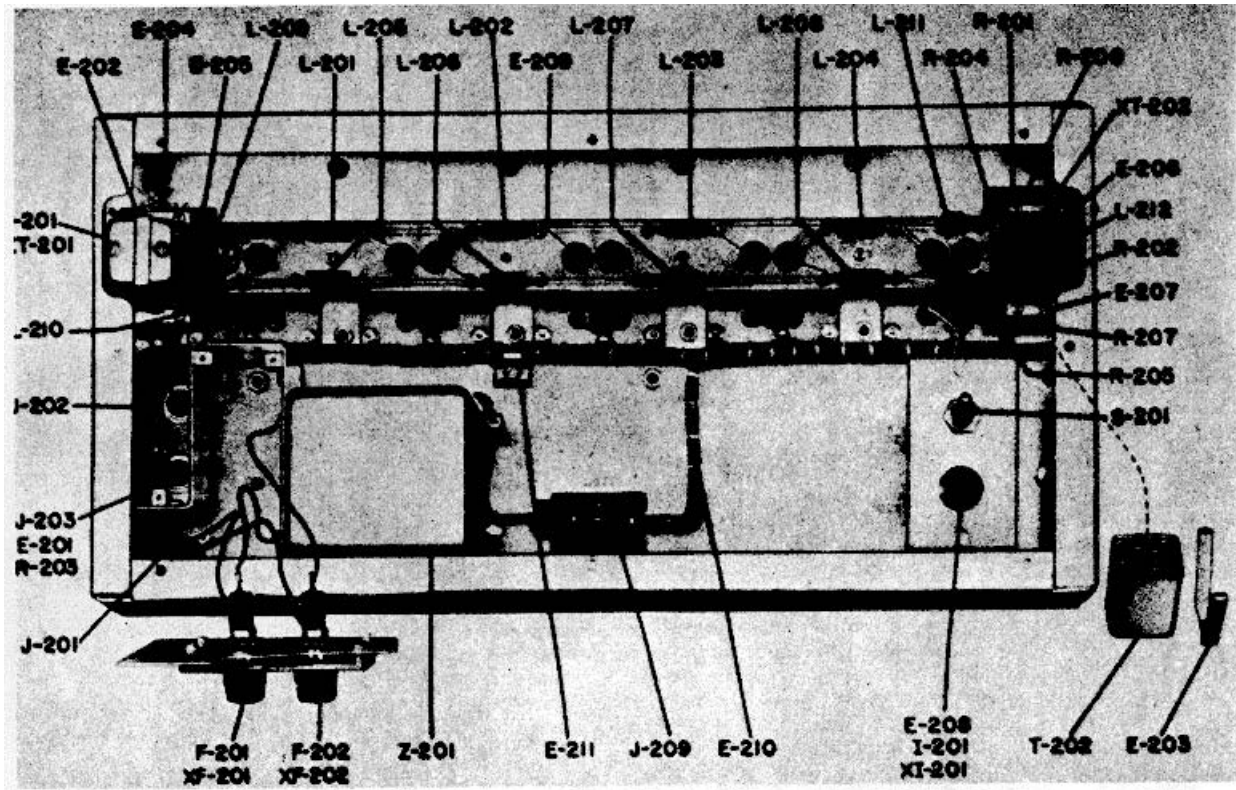


Figure 7-4. Main Chassis, Front Internal View

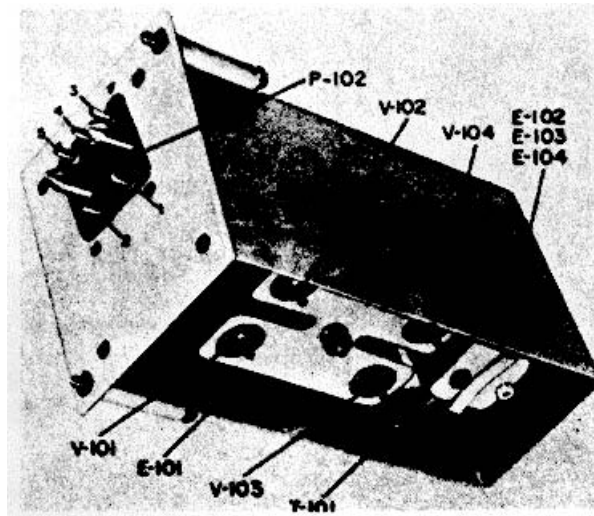


Figure 7-5. R-F Amplifier (AM-101), Bottom Oblique Interior View
(Dust Cover Removed)

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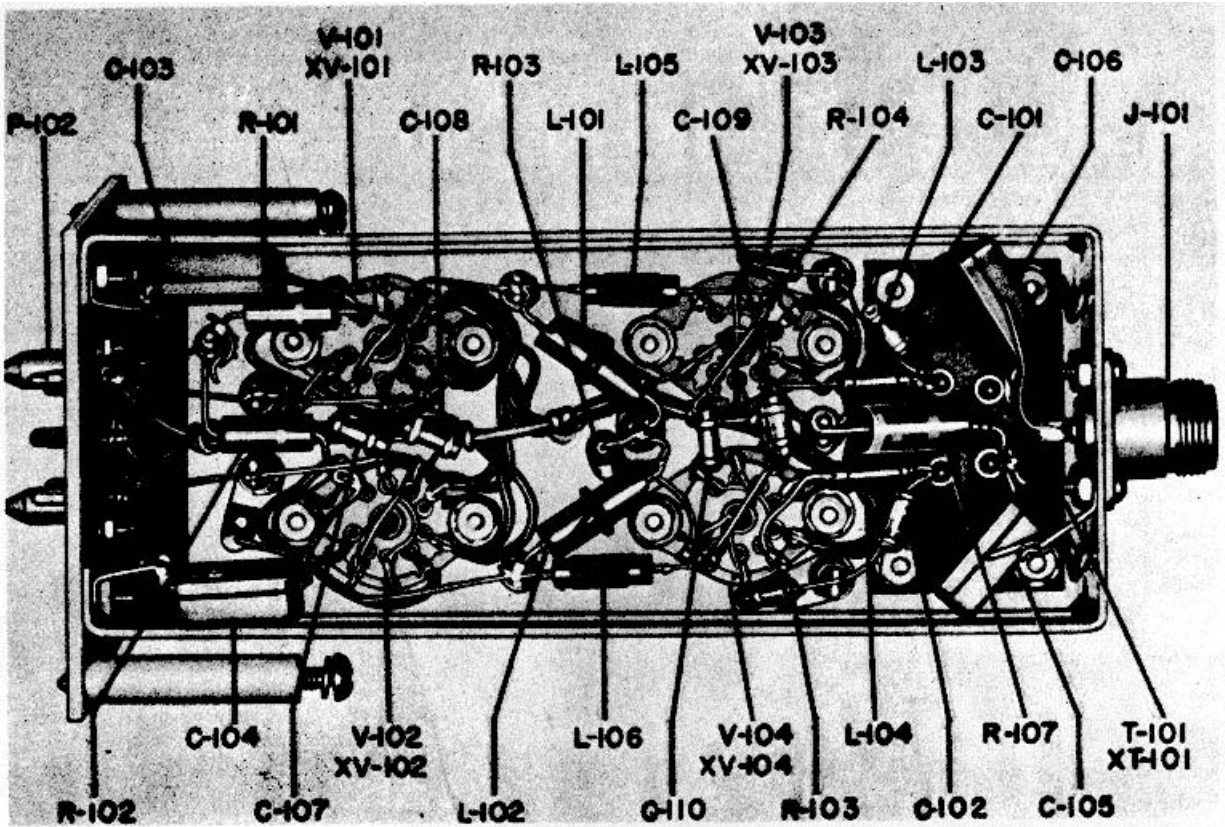


Figure 7-6. R-F Amplifier (AM-101), Top Interior View

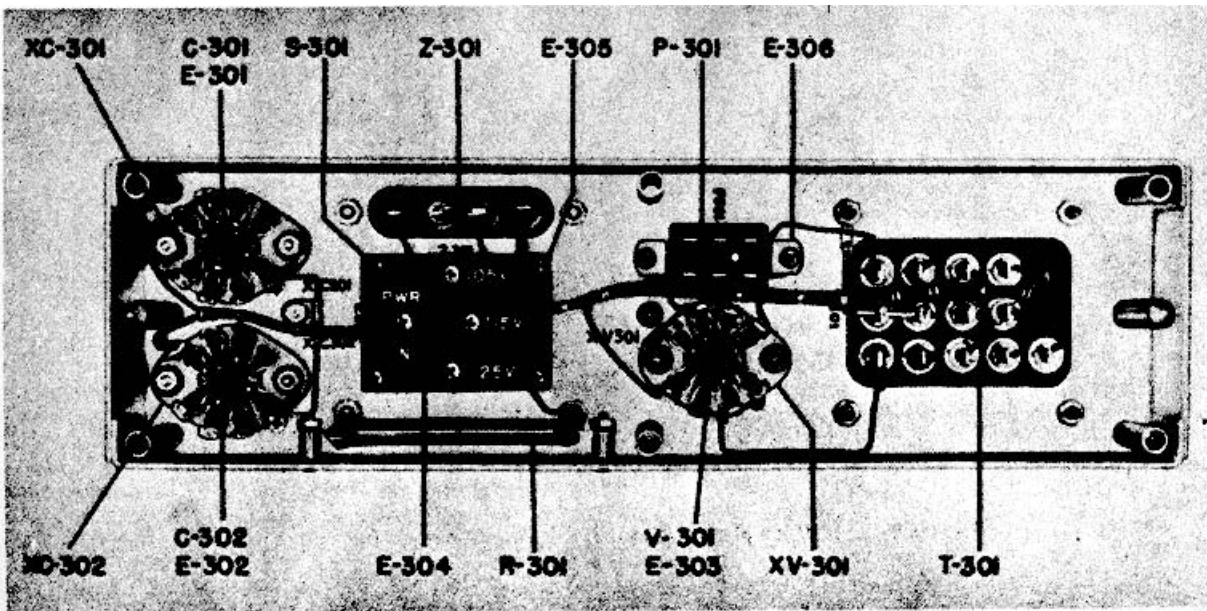


Figure 7-7. Power Supply (PU-301), Front Interior View

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TABLE 7-2. TERMINAL VOLTAGE CHART

Unless otherwise indicated, all voltage measurements have been taken with respect to chassis ground; a-c voltages have been measured with a 1,000-ohm-per-volt voltmeter; d-c voltages have been measured with a 20,000-ohm-per-volt voltmeter; PWR IN switch S-301 at "115 V"; 115 volts ac at 60 cps input to "PWR" receptacle J-201; all units in place and connected for operation; no signal input.

R-F AMPLIFIER (AM-101)

| Component | Terminal | Voltage | Remarks or Precautions |
|---------------------|----------|---------|--|
| XV-101, XV-102 | 1 | 120 DC | |
| | 2 | 0.0 | |
| | 3 | 3.0 DC | |
| | 4 | 6.0 AC | |
| | 5 | 6.0 AC | |
| | 6 | 120 DC | |
| | 7 | 0.0 | |
| | 8 | 3.0 DC | |
| | 9 | 0.0 | |
| XV-103, XV-104 | 1 | 120 DC | |
| | 2 | 0.0 | |
| | 3 | 3.0 DC | |
| | 4 | 6.0 AC | |
| | 5 | 6.0 AC | |
| | 6 | 120 AC | |
| | 7 | 0.0 | |
| | 8 | 3.0 DC | |
| | 9 | 0.0 | |
| P-102 1 | 1 | 0.0 | |
| | 2 | 0.0 | |
| | 3 | 130 DC | |
| | 4 | 6.0 AC | |
| | 5 | 6.0 AC | |
| XT-101 | 1 | 120 DC | |
| | 2 | 120 DC | |
| | 3 | 120 DC | |
| | 4 | 120 DC | |
| MAIN CHASSIS | | | |
| J-204 to J-208 | 1 | 0.0 | |
| | 2 | 0.0 | |
| | 3 | 130 DC | |
| | 4 | 6.0 AC | |
| | 5 | 6.0 AC | |
| J-209 | 7 | 6.0 AC | Chassis not grounded to a-c line Chassis not grounded to a-c line |
| | 8 | 60 AC | |
| | 9 | 130 DC | |
| | 10 | 6.0 AC | |
| | 11 | 6.0 AC | |
| | 12 | 0.0 | |

TABLE 7-2. TERMINAL VOLTAGE CHART (Cont)

MAIN CHASSIS (Cont)

| Component | Terminal | Voltage | Remarks or Precautions |
|------------------------------|----------|----------------------------------|--|
| XT-201 | 1 | 0.0 | Negligibly small |
| | 2 | 0.0 | |
| | 3 | 0.0 | |
| | 4 | 0.0 | |
| XT-202 | | | Same as T-201 |
| Z-201 1 | 60 AC | Chassis not grounded to a-c line | Chassis not grounded to a-c line Chassis not grounded to a-c line Chassis not grounded to a-c line |
| | 2 | 60 AC | |
| | 3 | 60 AC | |
| | 4 | 60 AC | |
| J-201 | A | 60 AC | Chassis not grounded to a-c line Chassis not grounded to a-c line Chassis not grounded to a-c line |
| | B | 0.0 | |
| | C | 60 AC | |
| POWER SUPPLY (PU-301) | | | |
| XV-301 | 1 | 0.0 | |
| | 2 | 135 DC | |
| | 3 | 0.0 | |
| | 4 | 215 AC | |
| | 5 | 0.0 | |
| | 6 | 215 AC | |
| | 7 | 0.0 | |
| | 8 | 135 DC | |
| T-301 | 1 | 60 AC | Chassis not grounded to a-c line Chassis not grounded to a-c line Chassis not grounded to a-c line Chassis not grounded to a-c line |
| | 2 | 45 AC | |
| | 3 | 60 AC | |
| | 4 | 70 AC | |
| | 5 | 135 DC | |
| | 6 | 135 DC | |
| | 8 | 60 AC | |
| | 9 | 0.0 | |
| | 10 | 6.0 AC | |
| | 11 | 215 AC | |
| | 12 | 0.0 | |
| | 13 | 215 AC | |
| | Z-301 | 1 | |
| 2 | | 135 DC | |
| 3 | | 135 DC | |
| 4 | | 135 DC | |
| XC-301, XC-302 | 1 | 0.0 | |
| | 5 | 135 DC | |
| P-301 | 7 | 60 AC | Chassis not grounded to a-c line Chassis not grounded to a-c line |
| | 8 | 60 AC | |
| | 9 | 130 DC | |
| | 10 | 6.0 AC | |
| | 11 | 6.0 AC | |
| | 12 | 0.0 | |

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TABLE 7-3. TERMINAL RESISTANCE CHART

Unless otherwise indicated, all resistance measurements have been taken with respect to chassis ground; power/input cable has been removed from "PWR" receptacle 3-201; antenna lead-in disconnected from jack 1-202; termination E-201 disconnected from jack 1-203; PWR IN switch S-301 at "115 V"; all subassemblies removed from main chassis.

CAUTION

Make sure that the power-input cable has been removed from jack 3-201 and that all capacitors in B-plus circuits have been fully discharged before making resistance readings.

R-F AMPLIFIER (AM-101)

| Component | Terminal | Resistance |
|-------------------|----------|------------|
| XV-101, XV-102 | 1 | Infinite |
| | 2 | Infinite |
| | 3 | 60 |
| | 4 | 1.7 |
| | 5 | 1.7 |
| | 6 | Infinite |
| | 7 | Infinite |
| | 8 | 60 |
| | 9 | 0.0 |
| XV-103, XV-104 | 1 | Infinite |
| | 2 | 0.0 |
| | 3 | 60 |
| | 4 | 1.7 |
| | 5 | 1.7 |
| | 6 | Infinite |
| | 7 | 0.0 |
| | 8 | 60 |
| | 9 | 0.0 |
| P-102 | 1 | Infinite |
| | 2 | Infinite |
| | 3 | Infinite |
| | 4 | 1.7 |
| | 5 | 1.7 |
| XT-101 | 1 | Infinite |
| | 2 | Infinite |
| | 3 | Infinite |
| | 4 | Infinite |

MAIN CHASSIS

| | | |
|-------|---|----------|
| J-204 | 1 | 2.5 |
| | 2 | 2.5 |
| | 3 | Infinite |
| | 4 | Infinite |
| | 5 | 17 |

| Component | Terminal | Resistance |
|-----------|----------|------------|
| J-205 | 1 | 2.8 |
| | 2 | 2.8 |
| | 3 | Infinite |
| | 4 | Infinite |
| | 5 | 17 |
| J-206 | 1 | 3.0 |
| | 2 | 3.0 |
| | 3 | Infinite |
| | 4 | Infinite |
| | 5 | 17 |
| J-207 | 1 | 3.1 |
| | 2 | 3.1 |
| | 3 | Infinite |
| | 4 | Infinite |
| | 5 | 17 |
| J-208 | 1 | 3.3 |
| | 2 | 3.3 |
| | 3 | Infinite |
| | 4 | Infinite |
| | 5 | 17 |
| J-209 | 7 | Infinite |
| | 8 | Infinite |
| | 9 | Infinite |
| | 10 | Infinite |
| | 11 | 17 |
| XT-201° | 12 | 0.0 |
| | 1 | 0.2 |
| | 2 | 0.0 |
| | 3 | 2.2 |
| | 4 | 2.2 |

*See also Winding Data, Table 7-6

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TABLE 7-3. TERMINAL RESISTANCE CHART (Cont)

MAIN CHASSIS (Cont)

| Component | Terminal | Resistance |
|-----------|----------|------------|
| XT-202° | 1 | 0.2 |
| | 2 | 0.0 |
| | 3 | 2.3 |
| | 4 | 2.3 |
| Z-201# 1 | 1 | Infinite |
| | 2 | Infinite |
| | 3 | Infinite |
| | 4 | Infinite |
| J-201# | A | Infinite |
| | B | 0.0 |
| | C | Infinite |

POWER SUPPLY (PU-301)

| | | |
|--------|---|----------|
| XV-301 | 1 | Infinite |
| | 2 | 10,000 |
| | 3 | Infinite |
| | 4 | 30 |
| | 5 | Infinite |
| | 6 | 32 |
| | 7 | Infinite |
| | 8 | 10,000 |
| T-301° | 1 | Infinite |
| | 2 | Infinite |

°See also Winding Data, Table 7-6
"ON-OFF" switch S-201 "OFF"

| Component | Terminal | Resistance | |
|-----------|----------|------------|--------|
| | 3 | Infinite | |
| | 4 | Infinite | |
| | 5 | 10,000 | |
| | 6 | 10,000 | |
| | 7 | 10,000 | |
| | 8 | 0.0 | |
| | 9 | 0.0 | |
| | 10 | 0.0 | |
| | 11 | 30 | |
| | 12 | 0.0 | |
| | 13 | 32 | |
| | Z-301° | 1 | 10,000 |
| | | 2 | 10,000 |
| 3 | | 10,000 | |
| 4 | | 10,000 | |
| XC-301° | 1 | 0.0 | |
| XC-302 | 5 | 10,000 | |
| P-301 | 7 | Infinite | |
| | 8 | Infinite | |
| | 9 | 10,000 | |
| | 10 | 0.0 | |
| | 11 | 0.0 | |
| | 12 | 0.0 | |

°See also Winding Data, Table 7-6

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TABLE 7-4. TUBE OPERATING VOLTAGES AND CURRENTS

| FUNCTION | ¹ V-101, V-102 Cathode- coupled r-f amplifier | V-103, V-104 Grounded- grid r-f amplifier | V-301 Full- wave rectifier |
|-----------------------------------|--|---|---|
| TUBE TYPE | 12AU7 | 12AU7 | 5U4G |
| ³ FILAMENT VOLTAGE (V) | ² 6.3 (4,5) | ² 6.3 (4,5) | ⁴ 5.0(2, 8) |
| FILAMENT CURRENT (A) | 0.15 | 0.15 | 3.0 |
| ³ PLATE VOLTAGE (V) | 117 (1,6) | 119 (1,6) | - |
| GRID VOLTAGE (V) | 0.0 (2,7) | 0 (2,7) | - |
| ³ CATHODE VOLTAGE (V) | 2.8 (3,8) | 2.8 (3,8) | - |
| PLATE CURRENT (MA) | 12.5 | 12.5 | - |

¹ Both sections are tied together; numbers in parenthesis indicate pins.

² 6.3 volts ac to ground from pins indicated; 12.6 v across filament.

³ Voltage to ground from pin indicated.

TABLE 7-5. TUBE CHARACTERISTICS



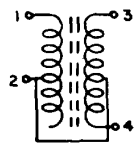


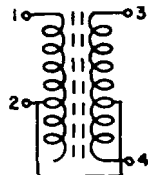
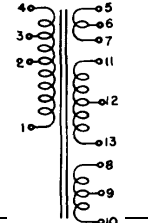

| TUBE TYPE | 12AU7 | 5U4G |
|-----------------------------------|-------------------|--|
| FILAMENT VOLTAGE (V) | ¹ 12.6 | 5.0 |
| FILAMENT CURRENT (A) | ¹ 0.15 | 3.0 |
| PLATE VOLTAGE (V) | ² 250 | ³ 900 (rms plate-to-plate) |
| GRID BIAS (V) | ² -8.5 | - |
| PLATE CURRENT (MA) | ² 10.5 | ³ 225 (a-c output) |
| A-C PLATE RESISTANCE (OHMS) | ² 7700 | - |
| VOLTAGE AMPLIFICATION FACTOR (MU) | ² 17 | - |
| TRANSCONDUCTANCE (MICROMHOS) | ² 2200 | - |

¹ Series connected.

² Typical.

³ Typical design-center values for full-wave rectifier.

TABLE 7-6. WINDING DATA

| DESIG- NATION SYMBOL | COLLINS PART NUMBER | DIAGRAM | WINDING | WIRE SIZE (AWG) | TURNS (OHMS) | RESIS- TANCE |
|---|---------------------------|---|---|-----------------------|--------------------------------------|-----------------------------|
| L-101 L-102 (34uh) | 240-9004-009 |  | Choke | No. 40 | 59 | 5 |
| L-103 L-104 L-209 L-210 L-211 L-212 (3.2uh) | 240-9002-009 |  | Choke | No. 34 | 34 | 0.5 |
| T-101 | 596-0715-003 |  | Pri. Sec. | No. 32 No. 40 | 8 & 8 ± 1/8 39 CT ± 1/8 | 5.4 0.2 |
| L-201 L-202 L-203 L-204 L-205 L-206 L-207 L-208 (4uh) | 240-9003-009 |  | Choke | No. 30 | 34 | 0.4 |
| L-105 L-106 (1.4 uh) | 240-9001-009 |  | Choke | No. 30 | 22 | 0.14 |
| T-201 T-202 | 596-0712-003 |  | Pri. Sec. | No. 32 No. 40 | 8 & 8 ± 1/8 31 CT ± 1/8 | 0.2 4.6 |
| T-301 | 672-9000-00 |  | Pri Sec. No. 1 Sec. No. 2 Sec. No. 3 | | | 2.0 60 01 0.16 |
| Z-301 | 678-9000-00 |  | Choke No. 1 Choke No. 2 | | | 3.2 12 |

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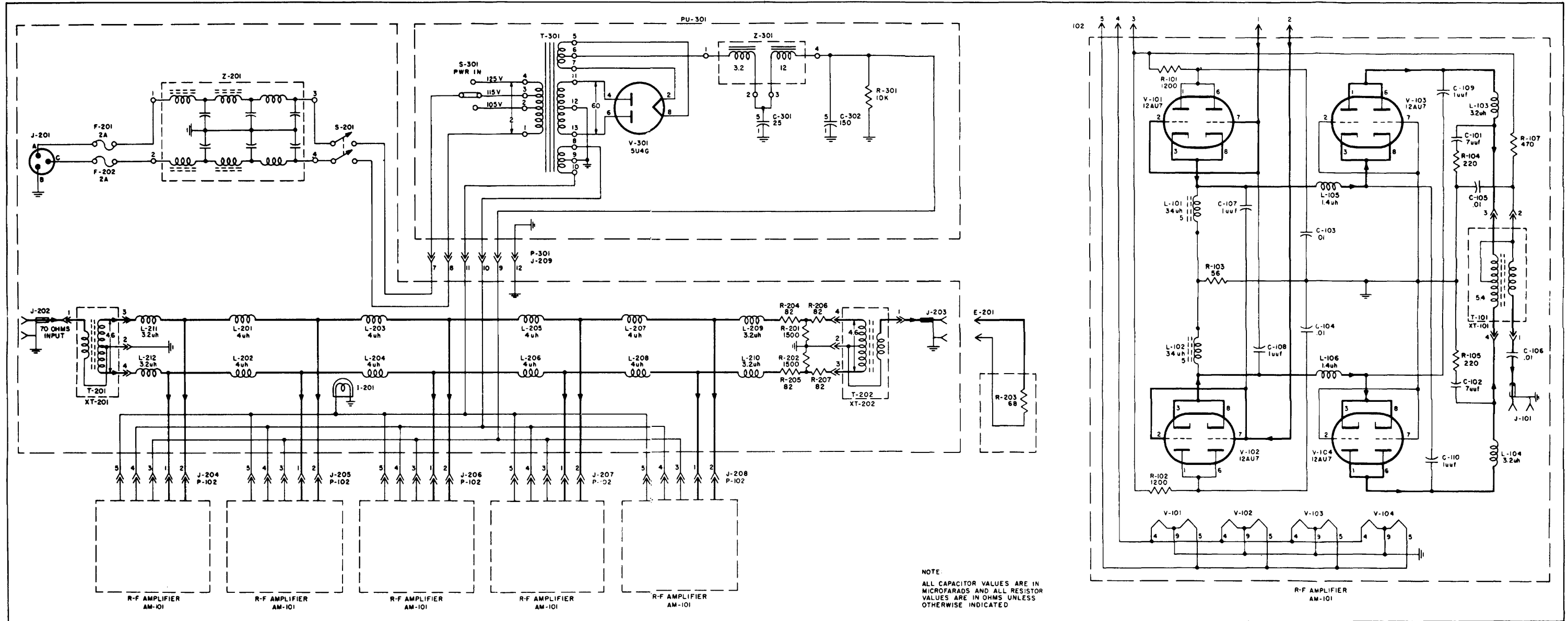


Figure 7-8. Antenna Coupler CU-168/FRR, Schematic Diagram

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