

NAVSHIPS 93137 A

INSTRUCTION BOOK

*for*

ANTENNA  
AS-768/GR  
AND  
AS-768A/GR

LIECO, INC.  
3610 Oceanside Road  
Oceanside, New York

DEPARTMENT OF THE NAVY  
BUREAU OF SHIPS

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ii to vi	Original	4-1	Original
1-0 to 1-1	Original	5-0 to 5-3	Original
2-0 to 2-3	Original	6-0 to 6-9	Original

NAVSHIPS 93137A  
AS-768/GR AND AS-768A/GR



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

IN REPLY REFER TO  
Code 993-100

From: Chief, Bureau of Ships  
To: All Activities concerned with the Installation,  
Operation, and Maintenance of the Subject Equipment  
Subj: Technical Manual for Antennas AS-768/GR and AS-768A/GR,  
NAVSHIPS 93137A

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A. G. MUMMA  
Chief of Bureau



**TABLE OF CONTENTS**

<b>SECTION 1—GENERAL DESCRIPTION</b>		<b>SECTION 4—PREVENTIVE MAINTENANCE</b>	
<i>Paragraph</i>	<i>Page</i>	<i>Paragraph</i>	<i>Page</i>
1. Introduction .....	1-1	1. Introduction .....	4-1
2. Purpose .....	1-1	2. Routine Maintenance Chart .....	4-1
3. Description .....	1-1		
4. Reference Data .....	1-1		
<b>SECTION 2—THEORY OF OPERATION</b>		<b>SECTION 5—CORRECTIVE MAINTENANCE</b>	
1. Introduction .....	2-0	1. Introduction .....	5-1
2. Basic Antenna Theory .....	2-0	2. Trouble Shooting .....	5-1
<i>a.</i> General .....	2-0	3. Removal and Repair .....	5-1
<i>b.</i> Basic Half-Wave Antenna .....	2-0	<i>a.</i> Connector P-101 (UG-154/U) .....	5-1
<i>c.</i> Radiation Pattern .....	2-0	<i>b.</i> Coaxial Fittings E-117 through E-122 ..	5-1
3. Antenna AS-768/GR .....	2-0	<i>c.</i> Transformer Assemblies T-101, T-102	
<i>a.</i> General .....	2-0	and T-103 .....	5-1
<i>b.</i> Antenna Feed System .....	2-0	<i>d.</i> Feed lines W-101 through W-104 .....	5-1
<i>c.</i> Radiating System .....	2-1	<i>e.</i> Antenna Plate Feeds W-105 through	
		W-108 .....	5-1
		<i>f.</i> Miscellaneous Parts .....	5-1
<b>SECTION 3—INSTALLATION</b>		<b>SECTION 6—PARTS LISTS</b>	
1. Unpacking .....	3-0		
2. Installation .....	3-0		

## LIST OF ILLUSTRATIONS

<b>SECTION 1—GENERAL DESCRIPTION</b>			<b>SECTION 3—INSTALLATION</b>		
<i>Figure</i>	<i>Title</i>	<i>Page</i>	<i>Figure</i>	<i>Title</i>	<i>Page</i>
1-1	Antenna AS-768/GR .....	1-0	3-1	Antenna AS-768/GR, Installation Drawing .....	3-1
<b>SECTION 2—THEORY OF OPERATION</b>			3-2	Installation of Connector UG-154/U on RG-18/U Cable .....	3-2
2-1	Current and Voltage Distribution on a Half-Wave Antenna .....	2-0	<b>SECTION 5—CORRECTIVE MAINTENANCE</b>		
2-2	Radiation Pattern of Vertical Half-Wave Antenna .....	2-1	5-1	Antenna AS-768/GR, Location of Parts	5-2
2-3	Antenna Feed System .....	2-2	5-2	Installation of Connector UG-21B/U on RG-8/U Cable .....	5-3
2-4	Antenna Feed System, Block Diagram ..	2-2			
2-5	Radiation Pattern of Antenna AS-768/GR .....	2-3			

## LIST OF TABLES

<b>SECTION 1—GENERAL DESCRIPTION</b>		<b>SECTION 6—PARTS LIST</b>			
1-1.	Equipment Supplied .....	1-1	6-1	Table of Replaceable Parts .....	6-0
1-2	Shipping Data .....	1-1	6-2	Cross Reference Parts List .....	6-9
<b>SECTION 4—PREVENTIVE MAINTENANCE</b>					
4-1	Routine Maintenance Chart .....	4-1			

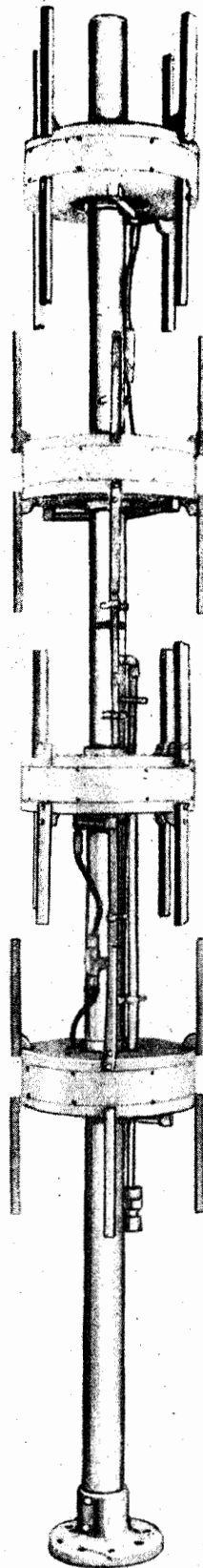


Figure 1-1. Antenna AS-768/GR

## SECTION 1 GENERAL DESCRIPTION

### 1. INTRODUCTION

This instruction book covers the theory, installation and maintenance of Antenna AS-768/GR, and applies equally to Antenna AS-768A/GR except as specified.

### 2. PURPOSE.

Antenna AS-768/GR (figure 1—1) is a vertically stacked antenna array designed for radio transmission and reception in the frequency range of 225 to 400 mc (megacycles). It is used for communication with aircraft at Naval air stations. This vertically stacked antenna array gives a circular radiation pattern in the horizontal plane with the point of maximum radiation four degrees above the optical line of sight.

### 3. DESCRIPTION.

Antenna AS-768/GR is made up of 16 center-fed Hertz antennas (dipoles) mounted vertically, with four dipoles on each level. The four dipoles are mounted on circular antenna plates and are 90° apart. Each set of four dipoles is displaced 45° in order to give complete antenna coverage for 360°.

The r-f power from the communication equipment is fed to the antenna input via RG-18/U cable (not supplied with the equipment) terminated with a UG-154/U connector and connected to the antenna feed. The r-f power is then fed through impedance

matching coaxial transformers, feed lines and antenna plate feeds to the dipoles.

The four sets of dipoles mounted on the antenna plates are mounted approximately an equal distance apart on a mast. A mounting flange at the bottom of the mast permits mounting of the antenna.

### 4. REFERENCE DATA.

- a. Nomenclature . . . . . Antenna AS-768/GR
- b. Contract number and date . . . . . NObsr 75025
- c. Contractor . . . . . Lieco, Inc.  
Oceanside, New York
- d. Cognizant Naval Inspector . . . . . Inspector of Naval Material  
Garden City, New York
- e. Number of packages per complete shipment . . . . . 1
- f. Total cubical contents  
Crated . . . . . 33.7 cubic ft.  
Uncrated . . . . . 12.7 cubic ft.
- g. Total weight  
Crated . . . . . 275 lbs.  
Uncrated . . . . . 120 lbs.
- h. Frequency range . . . . . 225 to 400 mc.
- i. Input impedance . . . . . 50 ohms at 300 mc.
- j. Radiation pattern  
Horizontal . . . . . Circular, 0 to 360°  
Vertical . . . . . 15° at 300 mc. Point of maximum radiation 4° above optical line of sight
- k. Standing wave ratio . . . . . 2 to 1 maximum
- l. Table 1—1 lists the equipment supplied.
- m. Table 1—2 lists the shipping data for the equipment.

**TABLE 1—1. EQUIPMENT SUPPLIED**

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	OVER-ALL DIMENSIONS		VOLUME	WEIGHT
			HEIGHT	DIAMETER		
1	Antenna	AS-768/GR	126-5/8	14-7/8	12.7	120
2	Instruction Book	NAVSHIPS 92489				

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

**TABLE 1—2. SHIPPING DATA**

SHIPPING BOX NO.	CONTENTS	OVER-ALL DIMENSIONS			VOLUME	WEIGHT
		HEIGHT	WIDTH	DEPTH		
1 of 1	Antenna AS-768/GR	132	21	21	33.7	275

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



## SECTION 2 THEORY OF OPERATION

### 1. INTRODUCTION.

Antenna AS-768/GR uses 16 center-fed Hertz antennas (dipoles) mounted vertically. Each dipole comprises two radiators each one-quarter wavelength long. The antenna is used for transmission and reception of radio frequencies in the range of 225 to 400 mc.

### 2. BASIC ANTENNA PRINCIPLES.

a. GENERAL—During transmission an r-f current in a conductor produces an electromagnetic field which is radiated into space. During reception an electromagnetic field which is cut by a conductor will cause a current flow in the conductor. If the length of the conductor is equal to half the wavelength of the electromagnetic wave, the result is a half-wave antenna.

b. BASIC HALF-WAVE ANTENNA.—In a half-wave antenna current is always maximum at the center and minimum at the ends, while voltage is minimum at the center and maximum at the ends (figure 2-1). Impedance is minimum at the center and maximum at the ends. The current distribution in the antenna is always the same regardless of the amount of current flow, but the amplitude of the current at any point on the antenna varies with the amplitude of signal voltage.

c. RADIATION PATTERN.—Maximum radiation occurs at the center of a half-wave antenna, since the current is greatest at that point. Conversely, since the current is minimum at the ends, little radiation takes place there. Ideally, the radiation is at right angles to the plane of the antenna conductor and encircles the conductor completely. The resulting antenna pattern, therefore, can be compared to a doughnut with the radiator passing through its center (figure 2-2A). A vertical half-wave antenna radiates equally in all directions in the horizontal plane (figure 2-2B). The field pattern is a circle and the field strength is the same in any horizontal direction from the antenna. Although there is no vertical radiation along the direct line of the axis of the vertical half-wave antenna, there are different amounts of radiation at different angles to the line of the antenna axis. It is readily seen that along the line OA (figure 2-2C) there is little radiation, while there is some radiation along line OB, and even more along line OC.

### 3. ANTENNA AS-768/GR

a. GENERAL.—Antenna AS-768/GR consists of an antenna feed system and a radiating system. The antenna feed system receives the r-f signal from the

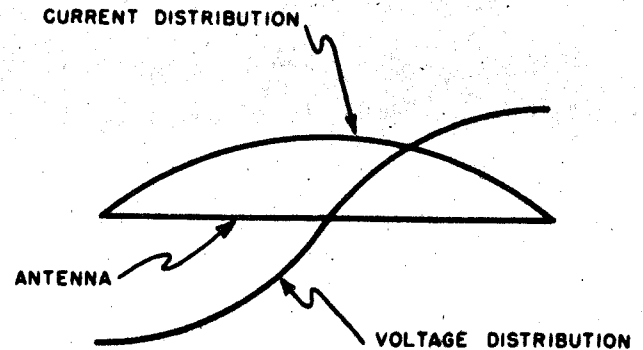


Figure 2-1. Current and Voltage Distribution on a Half-Wave Antenna

r-f equipment during transmission and feeds the 16 dipoles with the proper phase and impedance. During reception the r-f signal induced in the radiators is coupled by the antenna feed system to the r-f equipment with the proper impedance. The radiating system receives the r-f signal from the antenna feed system during transmission and radiates a vertically polarized electromagnetic wave into space. During reception an electromagnetic wave will induce an r-f signal in the radiators and it will be fed to the impedance matched antenna feed system.

b. ANTENNA FEED SYSTEM.—The antenna feed system, comprising coaxial sections and fittings, impedance matches the r-f equipment to the radiators and feeds the radiators with the r-f signal in the proper phase and amplitude.

(1) During transmission, r-f energy from the r-f equipment is fed to the antenna via RG-18/U cable terminated with a UG-154/U connector P-101. (See figure 2-3.) This connector is connected to main transformer assembly T-101 (antenna input) and it couples the r-f signal to coaxial fitting E-117, modified elbow UG-97A, and through it to E-118, modified tee UG-555/U. The tee splits the r-f signal and couples the two signals to interplate transformer assemblies T-102 and T-103 for feeding the upper two and lower two antenna bays. The r-f signal from T-102 and T-103 is fed through E-119 and E-120, modified ells UG-27B/U, to E-121 and E-122, modified tees UG-28A/U. The tees split the r-f signal and couple them to feed lines W-101 through W-104 which feed the antenna plate feeds W-105 through W-108. The feed lines consist of different lengths of RG-8/U cable and cause the phase of the r-f signal in the upper antenna bay to lag

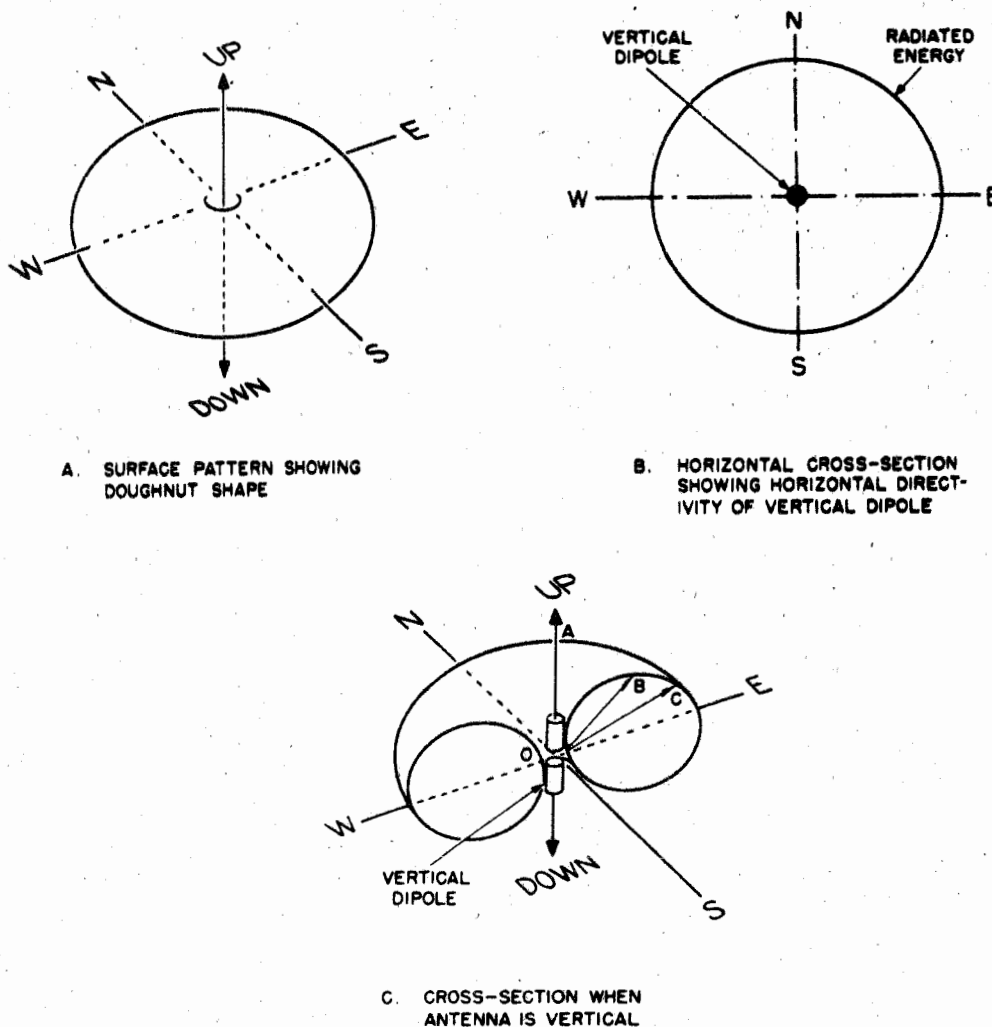


Figure 2-2. Radiation Pattern of Vertical Half-Wave Antenna

the r-f signal in the antenna bay below it. This causes the radiation pattern to have its point of maximum radiation  $4^\circ$  above the optical line of sight. The antenna plate feed is connected to the antenna plates that mount the radiators. The outer conductor of the antenna plate feed is coupled to the lower antenna plate at two points and the inner conductor is coupled to the upper antenna plate at two points. During reception, the r-f signal induced in the radiators follows the reverse path of a transmitted signal.

(2) The antenna feed system impedance matches the antenna input to the radiators for a maximum transfer of r-f energy. Starting at the antenna plate feed, the matched impedances are as follows: (See figure 2-4.)

Each arm of the antenna plate feed has a characteristic impedance of 100 ohms. These arms appear in parallel with each other and give a total impedance of 50 ohms at the center of the antenna plate feed. The feed line connected to the antenna

plate feed is impedance matched to the 50-ohm impedance of the antenna plate feed by using RG-8/U cable which has a characteristic impedance of 50 ohms. The two feed lines are connected to a tee and appear in parallel giving an impedance of 25 ohms at the other end of the tee. This impedance is matched to the 50-ohm impedance at the output of the main tee by using the interplate transformer assembly, a coaxial transformer. The 50-ohm ends of the interplate transformer assemblies are connected to a tee and appear in parallel giving an impedance of 25 ohms at the other end of the tee. This impedance is matched to the 50-ohm impedance at the antenna input by using the main transformer assembly, another coaxial transformer.

c. RADIATING SYSTEM.—The radiating system consists of 16 half-wave dipoles E-101 through E-116 mounted vertically in four arrays, with four dipoles in each array. The four dipoles in each array are mounted  $90^\circ$  apart on circular antenna plates. Each

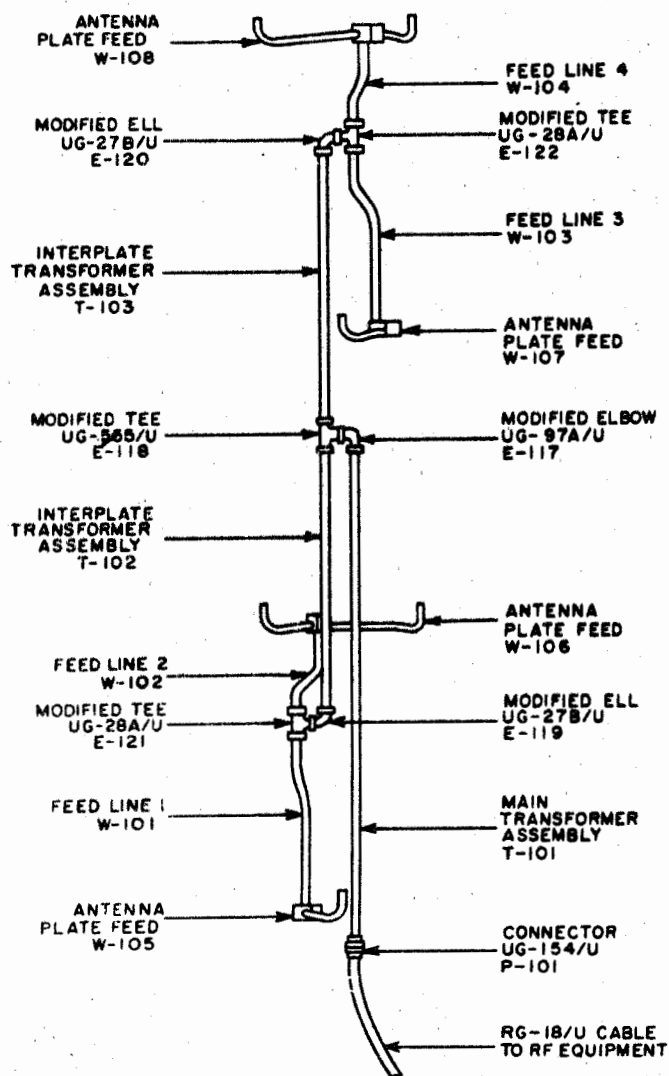


Figure 2-3. Antenna Feed System

array is displaced 45° in order to give complete antenna coverage for 360°. This arrangement of dipoles will give a radiation pattern that is a circle

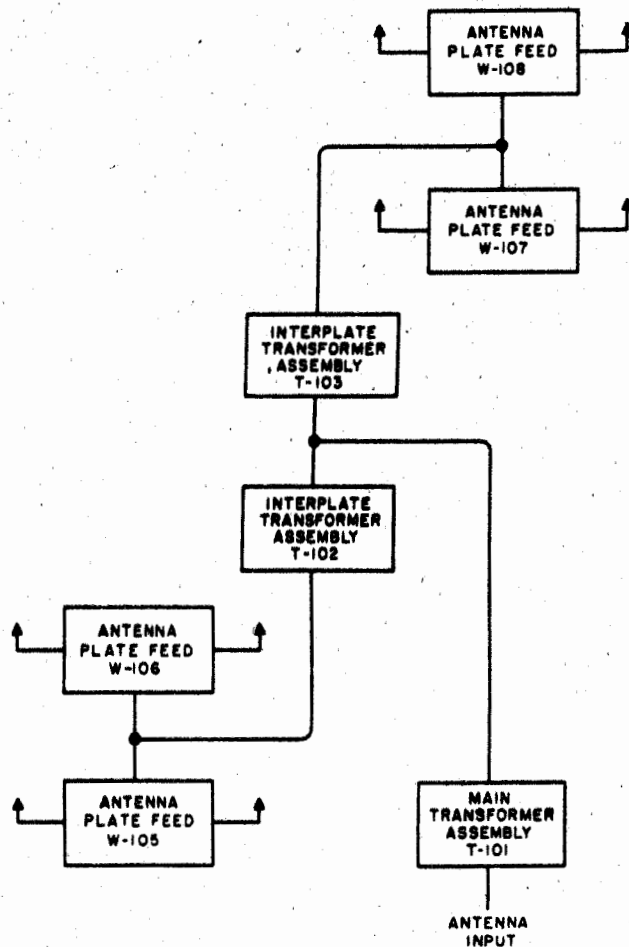


Figure 2-4. Antenna Feed System, Block Diagram

in the horizontal plane (figure 2-5A). The r-f signals fed to the four arrays are each a few degrees out of phase with each other due to the different lengths of feed lines used. The phase of the r-f signal in each array lags the phase of the r-f signal in the array beneath it by a few degrees. This causes the radiation pattern to be lifted four degrees in the vertical plane (figure 2-5B).

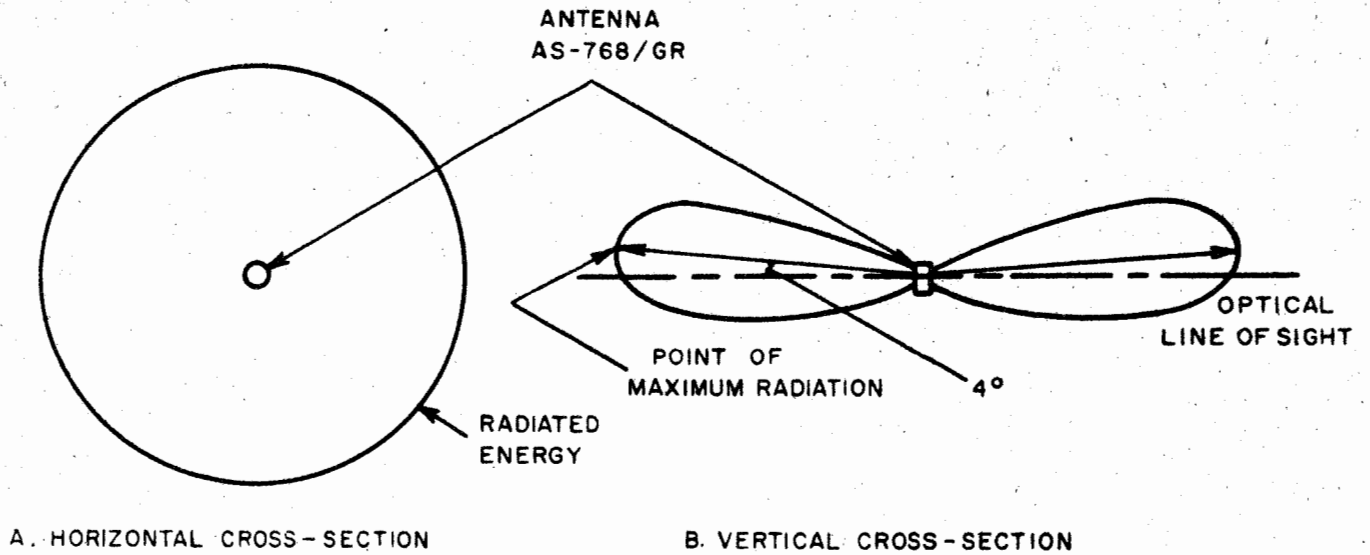


Figure 2-5. Radiation Pattern of Antenna AS-768/GR

## SECTION 3 INSTALLATION

### 1. UNPACKING.

When unpacking the equipment, proceed as follows:

- Step 1. Cut the steel straps that bind the crate.
- Step 2. Remove the nails from the top of the wooden crate and remove the cover.
- Step 3. Remove cardboard fillers from crate.
- Step 4. Tear open waterproof barrier.
- Step 5. Lift antenna out of wooden crate.

**CAUTION**

Do not lift the antenna by using the radiators as handles. Lift the antenna by the mast only.

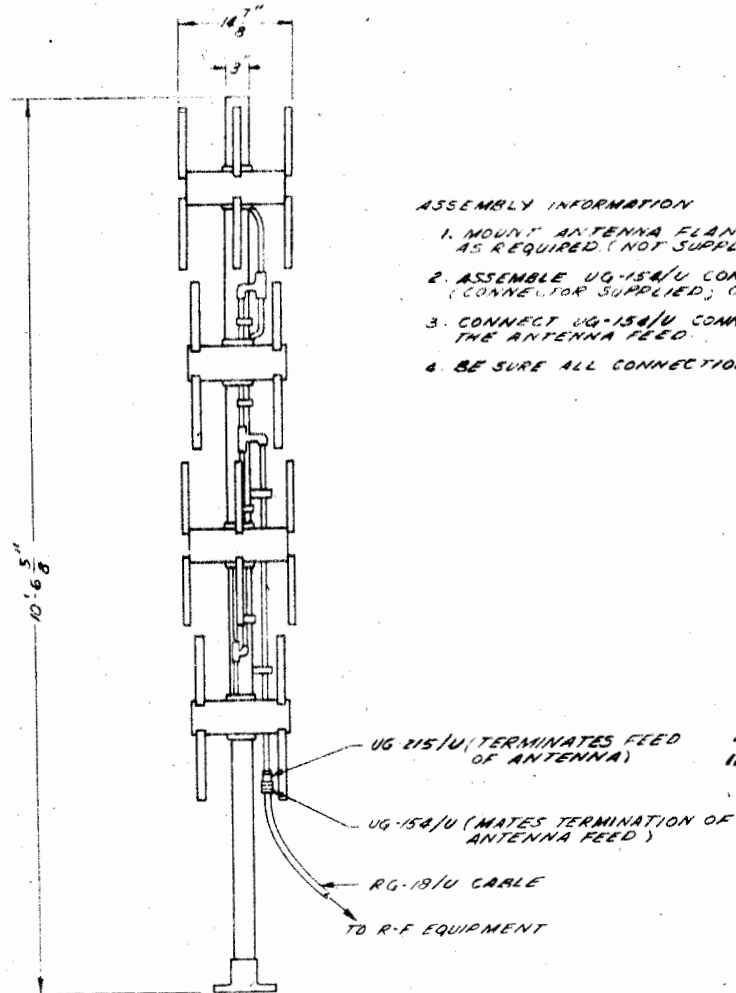
- Step 6. Check the antenna for bent or broken radiators.
- Step 7. Check all coaxial fittings for tightness.

### 2. INSTALLATION.

The antenna should be mounted in the clear at a height of approximately 35 feet above ground. This has been found to be the optimum height for the most gapless vertical coverage at stations with relatively low horizons. To mount and install the antenna, proceed as follows:

- Step 1. Determine location of antenna.
- Step 2. Drill eight, equally-spaced, 9/16-inch holes on a bolt circle diameter of 6.5 inches. (See figure 3-1.)
- Step 3. Mount the antenna using stainless steel hardware.
- Step 4. Remove and discard the plastic cap on the antenna input.
- Step 5. Remove the UG-154/U connector from the enclosed container.
- Step 6. Install the UG-154/U connector on the RG-18/U cable as shown in figure 3-2.
- Step 7. Connect the UG-154/U connector to the antenna input.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



**ASSEMBLY INFORMATION**

1. MOUNT ANTENNA FLANGE USING STAINLESS STEEL HARDWARE AS REQUIRED. (NOT SUPPLIED BY MFG.)
2. ASSEMBLE UG-158/U CONNECTOR TO RG-18/U CABLE. (CONNECTOR SUPPLIED; CABLE NOT SUPPLIED)
3. CONNECT UG-158/U CONNECTOR ONTO UG-215/U WHICH TERMINATES THE ANTENNA FEED.
4. BE SURE ALL CONNECTIONS ARE TIGHT.

**ANTENNA AS-768A/GR IS TERMINATED IN UG-217/U**

- NOTES-**
1. WEIGHT - 275 LBS. CRATED  
120 LBS. UNCRATED
  2. DIMENSIONS CRATED - 11" LONG  
21" HIGH  
21" WIDE
  3. VOLUME OF CRATE - 33.7 CU. FT.

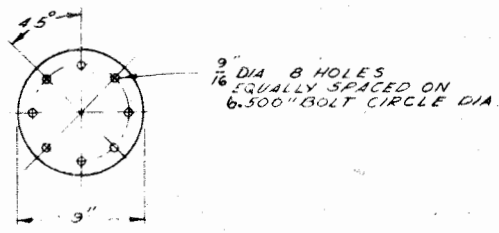
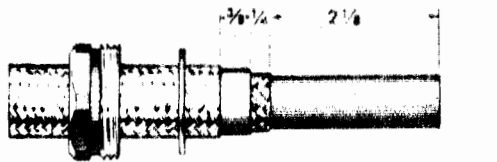
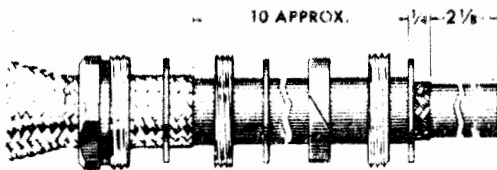


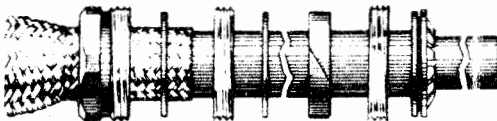
Figure 3-1. Antenna AS-768/GR and AS-768A/GR, Installation Drawing



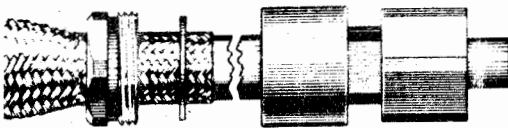
Slide armor nut and washer 3 over armor. Cut off armor  $2\frac{3}{4}$ " from end. Cut vinyl jacket  $2\frac{1}{8}$ " from end. Cut copper braid  $2\frac{1}{8}$ " from end.



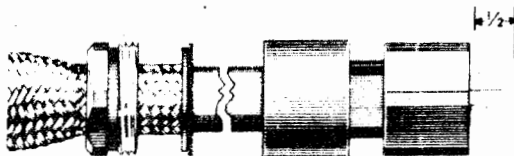
Push armor back approx.  $12\frac{1}{2}$ " from end. Slide spanner nut 2, washer 2, gasket and spanner nut 1 over vinyl jacket. Carefully slide washer 1 over copper braid as shown.



Fan out copper braid radially, trim any loose or ragged edges with cutters or scissors. All metal particles must be cleaned off dielectric. Slide clamp over dielectric (prongs toward connector as shown) and press it against copper braid.



Insert formed end of cable into plug body. With a spanner wrench screw spanner nut 1 very tight against washer 1. This locks the copper braid and forces the clamp into the dielectric. Sufficient pressure should be applied to insure clamp is pressed into dielectric and is flattened to provide good contact with braid. Slide washer 2 against gasket. Screw spanner nut 2 tight against washer 2.



Turn up armor  $\frac{1}{4}$ " (radially). Push armor into body by squeezing bulge. Push washer 3 against armor. Screw up armor nut tight against washer 3. With sharp knife cut dielectric flush with forward edge of coupling ring. Pry off cut dielectric. Cut off center conductor  $\frac{1}{2}$ " from forward edge of coupling ring. File end of center conductor round and clean off all filings.

Figure 3-2. Installation of Connector UG-154/U on RG-18/U Cable

## SECTION 4 PREVENTIVE MAINTENANCE

### 1. INTRODUCTION.

Preventive maintenance is work performed on equipment (usually when not in operation) to keep it in good working order so that breakdowns and needless interruptions in service will be kept to a minimum. Preventive maintenance differs from cor-

rective maintenance in that its object is to prevent certain troubles from occurring.

### 2. ROUTINE MAINTENANCE CHART.

Table 4-1 lists the routine maintenance checks that should be made on Antenna AS-768/GR.

TABLE 4-1. ROUTINE MAINTENANCE CHART

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

It is presumed that all maintenance operations will be scheduled by the Electronics Officer. The following table is given as a basis for such a schedule.

### WARNING

The associated equipment must be shut down before attempting any maintenance on the antenna. Severe r-f burns may result from handling the antenna while energy is being radiated.

#### DAILY

- a. Visually inspect the antenna from the nearest vantage point for any obvious looseness or breakage.
- b. Check the lead-in cable for tightness and for cracked, cut or frayed insulation.

#### MONTHLY

- a. Check all coaxial fittings for tightness.
- b. Check radiators and antenna plate feeds for tightness.
- c. Check feed lines for cracked, cut or frayed insulation.
- d. Check fiberglass coverings for cracks.
- e. Check mounting for tightness.
- f. Check feed line clamps for tightness.
- g. Check the mast and antenna arrays for corrosion. Clean and touch up with paint as required.



# FAILURE REPORTS

"Report each failure of the equipment, whether caused by a defective part, wear, improper operation, or an external cause. Use ELECTRONIC FAILURE REPORT form DD 787. Each pad of the forms includes full instructions for filling out the forms and forwarding them to the Bureau of Ships. However, the importance of providing complete information cannot be emphasized too much. Be sure that you include the model designation and serial number of the equipment (from the equipment nameplate), the type number of the major unit (from the major unit nameplate), and the type number and reference designation of the particular defective part (from the instruction book). Describe the cause of the failure completely, continuing on the back of the form if necessary. Do not substitute brevity for clarity. And remember — there are two sides to the failure report . . . .

## "YOUR SIDE"

Every FAILURE REPORT is a boost for you:

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

## "BUREAU SIDE"

The Bureau of Ships uses the information to:

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

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

## SECTION 5

### CORRECTIVE MAINTENANCE

#### 1. INTRODUCTION.

Open or short circuits or bad connections in the antenna feed system are the only sources of equipment failure likely to occur in this equipment.

#### 2. TROUBLE SHOOTING

Troubles in the antenna will result in weak or no signal output during transmission and weak or no signal during reception. When this occurs, the coaxial fittings in the antenna feed system should first be checked for tightness. If all fittings and connections are tight and there is still a weak or no signal make a part by part continuity check of the coaxial sections and fittings in the antenna feed system and replace the defective part.

#### 3. REMOVAL AND REPAIR.

If a part of the antenna is found to be defective, repair or replace as follows. (See figure 5-1.)

*a.* CONNECTOR P-101 (UG-154/U).—Replacement instructions for this connector are the same as the installation instructions. (See figure 3-2.)

*b.* COAXIAL FITTINGS E-117 THROUGH E-122.—The elbow, ell and tee fittings used in the antenna feed system are removed by loosening the coupling nuts on the connecting assemblies and disconnecting these assemblies from the fittings.

##### Note

To remove modified tee E-118, the two feed line clamps holding both of the interplate transformer assemblies T-102 or T-103 must be loosened so that the assembly may be disconnected from the tee.

To remove modified elbow E-117, the two feed line clamps on main transformer assembly T-101 must be loosened so that the assembly may be disconnected from the elbow.

*c.* TRANSFORMER ASSEMBLIES T-101, T-102 AND T-103.—The main and interplate transformer assemblies are removed by removing the two feed line clamps holding the particular transformer assembly and loosening the coupling nuts on the coaxial fittings at each end of the assembly.

*d.* FEED LINES W-101 THROUGH W-104.—The feed lines are removed by disconnecting the cable clamp and the coupling nut at each end of the feed line. To remove feed lines W-101 and W-103, antenna plate feeds W-105 and W-107, respectively, must be loosened and lowered to make the coupling nut more accessible. When a feed line is to be replaced, it must be fabricated using the proper length of RG-8/U cable and two UG-21B/U connectors. Figure 5-2 gives instructions for installing the connectors on the cable. The length of cable required for feed lines W-101 through W-104 is as follows:

- (1) W-101; 11- $\frac{3}{4}$  inches.
- (2) W-102; 13- $\frac{1}{2}$  inches.
- (3) W-103; 15- $\frac{1}{4}$  inches.
- (4) W-104; 17 inches.

##### Note

Feed lines W-101 through W-104 are not interchangeable because of the different length of cable used for each feed line. When fabricating any one of the feed lines cut the cable exactly to the length given above.

*e.* ANTENNA PLATE FEEDS W-105 THROUGH W-108.—The antenna plate feeds are removed as follows:

Step 1. Loosen the two set screws holding the antenna plate feed in the lower antenna plate.

Step 2. Remove the hex head bolt holding the antenna plate feed onto the antenna plate.

Step 3. Disconnect the feed line connected to the center of the antenna plate feed.

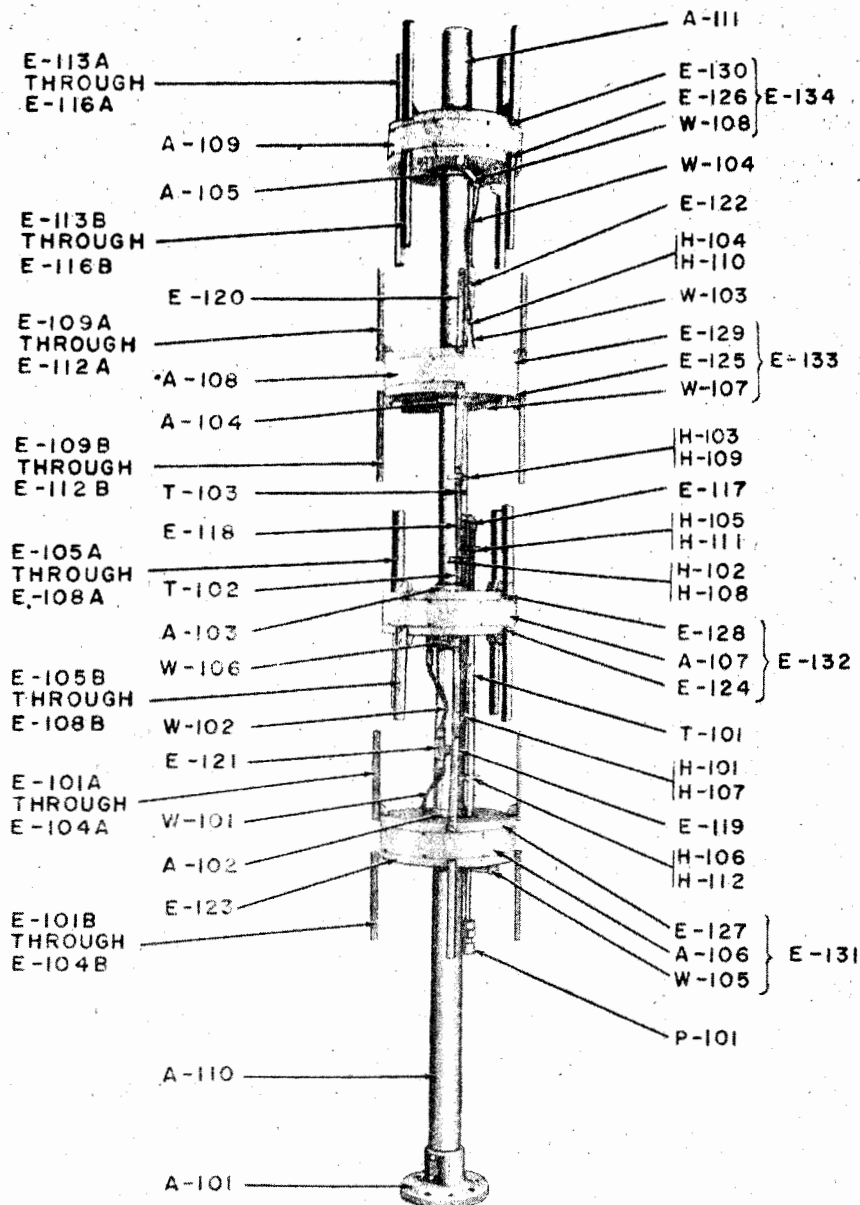
Step 4. Remove the antenna plate feed.

#### *f.* MISCELLANEOUS PARTS.

(1) Removal of any radiator E-101A or B through E-116A or B is accomplished by removing the two hex head bolts mounting it to the antenna plate.

(2) Mounting flange A-101 is removed by removing the three nuts and lockwashers and unscrewing the three hex head bolts that mount the flange to the mast.

(3) Each fiberglass covering A-106 through A-109 is removed by removing the 18 machine screws and lockwashers fastening it to the antenna plates.

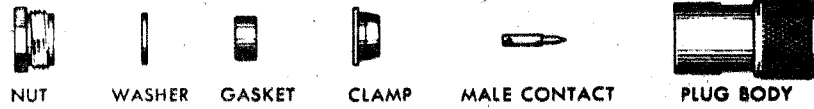


- A-101 Mounting flange
- A-102 through A-105  
Hub
- A-106 through A-109  
Fibreglass covering
- A-110 Mast
- A-111 Mast cap
- E-101 through E-116  
Radiator
- E-117 Main elbow
- E-118 Main tee
- E-119 Lower interplate ell
- E-120 Upper interplate ell

- E-121 Lower interplate tee
- E-122 Upper interplate tee
- E-123 through E-126  
Lower antenna plate
- E-127 through E-130  
Upper antenna plate
- E-131 Antenna bay 1
- E-132 Antenna bay 2
- E-133 Antenna bay 3
- E-134 Antenna bay 4
- H-101 through H-106  
Feed line clamp cap
- H-107 through H-112  
Feed line clamp base

- P-101 Connector
- T-101 Main transformer assembly
- T-102 Lower interplate transformer  
assembly
- T-103 Upper interplate transformer  
assembly
- W-101 Feed line 1
- W-102 Feed line 2
- W-103 Feed line 3
- W-104 Feed line 4
- W-105 through W-108  
Antenna plate feed

Figure 5-1. Antenna AS-768/GR, Location of Parts



Components for UG-21B/U



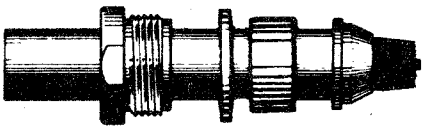
Components for UG-21D/U



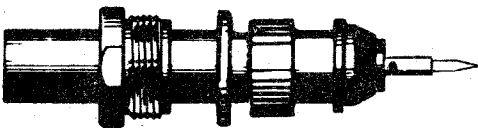
Remove  $\frac{1}{2}$ " of vinyl jacket. When using double shielded cable, remove  $\frac{3}{16}$ " of vinyl jacket.



Comb out copper braid as shown. Cut off dielectric  $\frac{1}{4}$ " from end. Tin center conductor.



Taper braid as shown. Slide nut, washer and gasket over vinyl jacket. Slide clamp over braid with internal shoulder of clamp flush against end of vinyl jacket.



Smooth braid back over clamp and trim. Soft solder contact to center conductor. Avoid use of excessive heat and solder. See that end of dielectric is clean. Contact must be flush against dielectric. Outside of contact must be free of solder.

Slide body into place carefully so that contact enters hole in insulator. Face of dielectric must be flush against insulator. Slide completed assembly into body by pushing nut. When nut is in place, tighten with wrenches until sufficiently tight.

Figure 5-2. Installation of Connector UG-21B/U or UG-21D/U on RG-8/U, RG-8A/U or RG-11A/U Cable.

"New Stock Number Identification Tables (SNIT's) issued by the Electronics Supply Office include Federal Stock Numbers and Source, Maintenance and Recoverability Codes. Therefore, reference shall be made to the SNIT for this information."

## SECTION 6 PARTS LIST

TABLE 6-1. TABLE OF REPLACEABLE PARTS

SYMBOL DESIGNATION	USED ON AS-786/GR	USED ON AS-768A/GR	STANDARD NAVY STOCK NUMBER	NAME OF PART AND DESCRIPTION	FUNCTION	ALL SYMBOL DESIG. INVOLVED	NO. OF TIMES IN UNIT
A-101	yes	yes	N16-B150221-0189	FLANGE, mounting: aluminum alloy casting, painted light gray, disk shape with cylindrical protrusion, 5 in. high by 9 in. OD, mounted to the mast by three 13/32 in. dia. through holes spaced 60° to each other, Lieco Inc. DWG. No. 345-NA-011.	Antenna mount		1
A-102	yes	yes	N16-S8502 81-0208	HUB: aluminum alloy casting, painted light gray, 6 in. lg. by 6.245 in. OD by 3.015 in. ID, mounted to mast by four holes, Lieco Inc. DWG. No. 345-NA-005.	Mounts antenna bay	A-102, A-103 A-104, A-105	4
A-106	yes	yes	N16-C6500 02-0180	CLOTH, textile: fiberglas type No. 162 w/resin, painted light gray, 44-17/32 in. lg. by 2-3/4 in. wide by 0.041 in. thick, mounted by wrapping and use of twenty 7/32 in. dia. holes, Lieco Inc. DWG. No. 345-NA-003.	Cover for antenna bay	A-106, A-107 A-108, A-109	4

NAVSHIPS 93137A  
AS-768/GR AND AS-768A/GR

PARTS LIST

TABLE 6-1. TABLE OF REPLACEABLE PARTS (CONT'D)

A-110	yes	yes	Low failure item- if required re-quisition from ESO referencing NavShips 900, 180A	MAST, antenna support: type 61 ST-6 aluminum pipe, deburred and degreased, iridite finish; 10½ ft lg. by 3 in. OD by 2½ in. ID over-all, mounts in flange, has three thru radial holes for mating with holes in flange, has holes for mounting antenna bays and miscellaneous antenna components, Lieco Inc. Dwg. No. 345-NA-010.	Mount for antenna bays		1
A-111	yes	yes	Low failure item- if required re-quisition from ESO, referencing NavShips 900, 180A	CAP: for antenna mast, 16S-T6 aluminum, iridite finish; round, flanged, 3 in. dia. by ¼ in. thk flange, 2-15/32 in. dia. hub, 1 in. high over-all, Lieco Inc. Dwg. No. 345-NA-004.	Mast Cap		1
E-101A	yes	yes	N16-A061838-3081	ELEMENT, antenna: dipole straight type, MBCA Ref. Dwg. Group 11, 225 mc to 400 mc frequency range coaxial feed, straight dipole construction, 2 elements, 10 in. lg. by ¾ in wide by ¾ in. high, mounted by two 17/64 in. dia. holes spaced 1-3/16 in. center to center, Lieco Inc. Dwg. No. 345-NA-004	Radiator	E-101A, E-109A E-101B, E-109B E-102A, E-110A E-102B, E-110B E-103A, E-111A E-103B, E-111B E-104A, E-112A E-104B, E-112B E-105A, E-113A E-105B, E-113B E-106A, E-114A E-106B, E-114B E-107A, E-115A E-107B, E-115B E-108A, E-116A E-108B, E-116B	32
E-117	yes	no	N17-C068238-4383	CONNECTOR, adapter: 1 round male and 1 round female contact, 90° angle type, 1.708 in. lg. by 0.850 in. wide by 1.487 in. high, phosphor bronze, locking body, teflon insert, modified from Mil Adapter Connector Type UG-97A/U by Product Development Co., Dwg. No. ZB-1-3849, stamped GRMI 5229.	Main elbow		1

SYMBOL DESIG- NATION	USED ON AS-786/GR	USED ON AS-768A/GR	STANDARD NAVY STOCK NUMBER	NAME OF PART AND DESCRIPTION	FUNCTION	ALL SYMBOL DESIG. INVOLVED	NO. OF TIMES IN UNIT
E-118	yes	no see E-121	N17-C0679 90-4595	CONNECTOR, adapter: three round female contacts, "T" type, 3/4 in. lg. by 3/4 in. wide by 1-5/8 in. high, phosphor bronze, locking body, teflon insert, modified from Mil Adapter Connector Type UG-555/U by Product Development Co. DWG. No. ZB-1-3843, stamped GRMI 5228.	Main Tee		1
E-119	yes	no	N17-C0682 44-2546	CONNECTOR, adapter: 1 round male and 1 round female contact, 90° angle type, 1-3/8 in. lg. by 3/4 in. dia. approx. by 1-7/16 in. high, 50 ohms nominal impedance, brass silver plated locking body, teflon insert, modified from Mil-C-71A Connector UG-27B/U by Product Development Co. DWG. No. ZB-1-3815, stamped GRMI 5227.	Interplate ell	E-119, E-120	2
E-121	yes	yes see func- tion	N17-C0677 27-5567	CONNECTOR, adapter: 3 round female contacts, tee shape, 1-3/4 in. lg. by 5/8 in. wide by 1-7/32 in. high, 50 ohms nominal impedance, brass, silver plate, locking body, teflon insert, modified from Mil-C-71A Connector UG-28A/U by Lleco Inc. DWG. No. 345-NA-7-A, stamped CBZS 7A.	Interplate tee AS-768A/GR Main Tee	E-121, E-122	2 1
E-123	yes	yes	Low failure item if required requisition from ESO referencing Navships 900, 180A	PLATE, antenna: aluminum alloy sand casting iridite finish, 13-7/8 in. OD by 5-3/8 in. ID by 2-7/8 in. high over-all, eight 9/32 in. dia. mounting holes equally spaced on 5.812 in. dia. bolt circle, two 3/4 in. dia. holes spaced 180° apart on 12.484 in. dia. bolt circle for antenna plate feed coupling, four protusions on bottom w/two 1/4-20 tapped holes spaced 1.187 in. c to c in each for mounting antenna radiators, Lleco Inc. DWG. No. 345-NA-001.	Lower plate for antenna bay	E-123, E-124 E-125, E-126	4

TABLE 6-1. TABLE OF REPLACEABLE PARTS (CONT'D)

NAVSHIPS 93137 A  
AS-768/GR AND AS-768A/GR

PARTS LIST

6 Section

TABLE 6-1. TABLE OF REPLACEABLE PARTS (Cont'd)

E-127	yes	yes	Low failure item- if required re- quisition from ESO referencing Navships 900, 180A	PLATE, antenna: aluminum alloy sand casting, iri- dite finish, 13-7/8 in. OD by 5-3/8 in. ID by 2-7/8 in. high over-all, eight 9/32 in. dia. mounting holes equally spaced on 5.812 in. dia. bolt circle, two 3/8 in. dia. holes spaced 180° apart on 12.484 in. dia. bolt circle for anten- na plate feed coupling, four protusions on top w/two 1/4-20 tapped holes spaced 1.187 in. c to c in each for mounting antenna radiators, Lieco Inc. DWG. No. 345-NA-002.	Upper plate for antenna bay	E-127, E-128 E-129, E-130	4
E-131	yes	no see E-931	N16-A070501-1177	ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-123, 1 upper antenna plate E-127, 8 radiators E-101A, E-101B, E-102A, E-102B, E-103A, E-103B, E-104A, E-104B; 1 hub A-102, 1 fiberglass cover- ing A-106, 1 antenna plate feed W-105, 1 feed line W-101, 16 in. dia. by 23-1/2 in. high over- all including radiators, feed line extends up- ward, Product Development Co. DWG. No. ZB-3-3935.	Antenna bay 1		1
E-132	yes	no see E-932	N16-A070501-1176	ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-124, 1 upper antenna plate E-128, 8 radi- ators E-105A, E-105B, E-106A, E-106B, E-107A, E-107B, E-108A, E-108B; 1 hub A-103, 1 fiberglass covering A-107, 1 antenna plate feed W-106, 1 feed line W-102, 16 in. dia. by 23-1/2 in. high over-all including radiators, feed line extends downward, Product Development Co. DWG. No. ZB- 3-3934.	Antenna bay 2		1
E-133	yes	no see E-933	N16-A070501-1178	ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-125, 1 upper antenna plate E-129, 8 radi- ators E-109A, E-109B, E-110A, E-110B, E-111A, E-111B, E-112A, E-112B; 1 hub A-104, 1 fiber- glas covering A-108, 1 antenna plate feed W-107, 1 feed line W-103, 16 in. dia. by 23-1/2 in. high over-all including radiators, feed line extends upward, Product Development Co. DWG. No. ZB-3-3952.	Antenna bay 3		1



SYMBOL DESIGNATION	USED ON AS-786/GR	USED ON AS-788A/GR	STANDARD NAVY STOCK NUMBER	NAME OF PART AND DESCRIPTION	FUNCTION	ALL SYMBOL DESIG. INVOLVED	NO. OF TIMES IN UNIT
E-134	yes	no see E-934	N16-A0705 01-1179	ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-126, 1 upper antenna plate E-130, 8 radiators E-113A, E-113B, E-114A, E-114B, E-115A, E-115B, E-116A, E-116B; 1 hub A-105, 1 fiber-glas covering A-109, 1 antenna plate feed W-108, 1 feed line W-104, 16 in. dia. by 23-1/2 in. high over-all including radiators, feed line extends downward, Product Development Co. DWG. No. ZB-3-3953.	Antenna bay 4		1
E-921	no see E-121	yes		CONNECTOR, adapter: 3 round female contacts, tee shape, 1-3/4 in. lg. by 5/8 in. wide by 1-7/32 in. high, 50 ohms nominal impedance, brass, silver plated, locking body, teflon insert. Standard Mil-C-71A Connector UG-28A/U, Lieco Inc. DWG. No. 345-NA-006.	Interplate tee	E-921, E-922	2
E-931	no see E-131	yes		ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-123, 1 upper antenna plate E-127, 8 radiators E-101A, E-101B, E-102A, E-102B, E-103A, E-103B, E-104A, E-104B; 1 hub A-102, 1 fiberglass covering A-106; 1 antenna plate feed W-905, 1 feed line W-901, 16 in. dia. by 23-1/2 in. high over-all including radiators, feed line extends upward, Lieco Inc. DWG. No. 345-NA-1-A.	Antenna bay 1		1
E-932	no see E-132	yes		ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-124, 1 upper antenna plate E-128, 8 radiators E-105A, E-105B, E-106A, E-106B, E-107A, E-107B, E-108A, E-108B; 1 hub A-103, 1 fiberglass covering A-107, 1 antenna plate feed W-906, 1 feed line W-902, 16 in. dia. by 23-1/2 in. high over-all including radiators, feed line extends downward, Lieco Inc. DWG. No. 345-NA-2-A.	Antenna bay 2		1

TABLE 6-1. TABLE OF REPLACEABLE PARTS (Cont'd)

E-933	no see E-133	yes		ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-125, 1 upper antenna plate E-129, 8 radiators E-109A, E-109B, E-110A, E-110B, E-111A, E-111B, E-112A, E-112B, 1 hub A-104, 1 fiberglass covering A-108, 1 antenna plate feed W-907, 1 feed line W-903, 16 in. dia. by 23-1/2 in. high overall including radiators, feed line extends upward, Lieco Inc. DWG. No. 345-NA-1-A.	Antenna bay 3			1
E-934	no see E-134	yes		ANTENNA SUBASSEMBLY: c/o 1 lower antenna plate E-126, 1 upper antenna plate E-130, 8 radiators E-113A, E-113B, E-114A, E-114B, E-115A, E-115B, E-116A, E-116B; 1 hub A-105, 1 fiberglass covering A-109, 1 antenna plate feed W-908, 1 feed line W-904, 16 in. dia. by 23-1/2 in. high overall including radiators, feed line extends downward, Lieco Inc. DWG. No. 345-NA-2-A.	Antenna bay 4			1
H-101	yes	no	Shop manufacture	CLAMP: feed line, brass, 1-3/4 in. lg. by 1/2 in. wide by 5/8 in. high, two 13/64 in. dia. mounting holes thru height spaced 1-1/4 in. c to c, designed to hold material 5/8 in. dia., Product Development Co. DWG. No. ZM-1-3877-1.	Feed line clamp cap	H-101, H-102 H-103, H-104		4
H-105	yes see H-901	no	Shop manufacture	CLAMP: feed line, brass, 1-3/4 in. lg. by 1/2 in. wide by 11/16 in. high, two 13/64 in. dia. mounting holes thru height spaced 1-1/4 in. c to c, designed to hold material 3/4 in. dia., Product Development Co., DWG. No. ZM-1-3877-2.	Feed line clamp cap	H-105, H-106		2
H-107	yes	no	Shop manufacture	CLAMP: feed line, brass, 1-3/4 in. lg. by 1/2 in. wide by 15/16 in. high, two 13/64 in. dia. mounting holes thru height spaced 1-1/4 in. c to c, designed to hold material 5/8 in. dia., base cut out on 1-1/2 in. radius to fit against antenna mast, Product Development Co. DWG. No. ZM-1-3878-1.	Feed line clamp base	H-107, H-108 H-109, H-110		4

TABLE 6-1. TABLE OF REPLACEABLE PARTS (CONT'D)

SYMBOL DESIGNATION	USED ON AS-786/GR	USED ON AS-768A/GR	STANDARD NAVY STOCK NUMBER	NAME OF PART AND DESCRIPTION	FUNCTION	ALL SYMBOL DESIG. INVOLVED	NO. OF TIMES IN UNIT
H-111	yes	no see H-903	Shop manufacture	CLAMP: feed line, brass, 1-3/4 in. lg. by 1/2 in. wide by 1 in. high, two 13/64 in. dia. mounting holes thru height spaced 1-1/4 in. c to c designed to hold material 3/4 in. dia., base cut out on 1-1/2 in. radius to fit against antenna mast, Product Development Co., DWG. No. ZM-1-3878-2.	Feed line clamp base u/w H-105		1
H-112	yes	no see H-904	Shop manufacture	CLAMP: feed line, brass, 1-3/4 in. lg. by 1/2 in. wide by 1-3/32 in. high, two 13/64 in. dia. mounting holes thru height spaced 1-1/4 in. c to c, designed to hold material 3/4 in. dia., base cut out on 1-1/2 in. radius to fit against antenna mast, Product Development Co. DWG. No. ZM-1-3878-3.	Feed line clamp base u/w H-106		1
H-901	no see H-105	yes	Shop manufacture	CLAMP: feed line, brass 1-3/4 in. lg. by 1/2 in. wide by 5/8 in. high, two 13/64 in. dia. mounting holes thru height spaced 1-1/4 in. c to c, designed to hold material 5/8 in. dia., Lieco Inc. DWG. No. 345-NA-008.	Feed line clamp cap	H-901, H-902	2
H-903	no see H-111 H-112	yes	Shop manufacture	CLAMP: feed line, brass 1-3/4 in. lg. by 1/2 in. wide by 1-1/8 in. high, two 13/64 in. dia. mounting holes thru height spaced 1 1/4 in. c to c, designed to hold material 5/8 in. dia., base cut out on 1 1/2 in. radius to fit against antenna mast, Lieco Inc. DWG. No. 345-NA-009.	Feed line clamp base	H-903, H-904	2
H-905	no	yes		CLAMP: feedline, aluminum, rubber covered, 1-7/32 in. lg. 37/64 in. wide, 13/64 in. dia. mounting hole, designed to hold RG-8A/U cable, Lieco Inc. DWG. No. 345-NA-007, stamped ADEL 432-7-8.	Feed Line clamp	H-905, H-906 H-907, H-908 H-909, H-910 H-911, H-912 H-913, H-914 H-915, H-916	12

TABLE 6-1. TABLE OF REPLACEABLE PARTS (Cont'd)

P-101	yes	yes	N17-C071422-3137	CONNECTOR, plug, electrical: coax., one round male contact, straight, metal body, 3 in. lg. by 1½ in. OD, type UG-154/U, Gremar Mfg. Co., Part No. 154-1, per RE49F284.	Antenna input		1
P-102	yes	no see P-902	N17-C071416-2550	CONNECTOR, plug electrical: coax., 1 round male contact, straight, metal body, 1-7/8 in. lg. by 13/16 in. dia., type UG-21B/U per MIL-C-71.	Plug for cable assy's W-101, W-102 W-103, W-104	P-102, P-103 P-104, P-105 P-106, P-107 P-108, P-109	8
P-901	no	yes		CONNECTOR, adapter, electrical: coax, 2 round female contacts, straight, metal body, 2-13/64 in. lg. by 1-7/32 in. dia. over-all, type UG-217/U per RE49F346.	Mates P-101 to antenna input		1
P-902	no see P-102	yes	N17-C071412-8748	CONNECTOR, plug electrical: coax, 1 round male contact, straight, metal body, 1-7/8 in. lg. by 13/16 in. dia., type UG-21D/U per MS91236.	Plug for cable assy's W-901, W-902 W-903, W-904 W-909, W-910	P-902, P-903 P-904, P-905 P-906, P-907 P-908, P-909 P-910, P-911 P-912, P-913	12
T-101	yes	no see T-901	N16-C091733-5157	TRANSFORMER, radio frequency: coaxial, 225 mc to 400 mc frequency range, 44-3/4 in. lg. by 1.282 in. OD, beryllium copper inner conductor, phosphor bronze outer conductor, Product Development Co. DWG. No. ZB-2-3856.	Main transformer assembly		1
T-102	yes	no see W-909	N16-C096047-6535	TRANSFORMER, radio frequency: coaxial, 225 mc to 400 mc frequency range, 24-3/4 in. lg. by 7/8 in. OD, beryllium copper inner conductor, phosphor bronze outer conductor, Product Development Co. DWG. No. ZB-2-3824.	Interplate transformer assembly	T-102, T-103	2
T-901	no see T-101	yes		TRANSFORMER, radio frequency: coaxial, 225 mc to 400 mc frequency range, 24-3/4 in. lg. by 13/16 in. OD, beryllium copper inner conductor, phosphor bronze outer conductor, Lieco Inc. DWG. No. 345-NA-8-A.	Main transformer		1

TABLE 6-1. TABLE OF REPLACEABLE PARTS (Cont'd)

SYMBOL DESIGNATION	USED ON AS-786/GR	USED ON AS-768A/GR	STANDARD NAVY STOCK NUMBER	NAME OF PART AND DESCRIPTION	FUNCTION	ALL SYMBOL DESIG. INVOLVED	NO. OF TIMES IN UNIT
W-101	yes	no see W-901	Assemble from component parts	CABLE ASSEMBLY, radio frequency: c/o 11-41/64 in. lg. coaxial Cable Type RG-8/U, W-109, 2 Plug Connectors Type UG-21B/U, P-102 and P-103, one on each end, 12-23/32 in. lg. over-all, Product Development Co. Dwg. No. ZB-1-3888.	Feed line 1		1
W-102	yes	no see W-902	Assemble from component parts	CABLE ASSEMBLY, radio frequency: c/o 13-25/64 in. lg. Coaxial Cable Type RG-8/U, W-109, 2 Plug Connectors Type UG-21B/U, P-104 and P-105, one on each end, 14-15/32 in. lg. over-all, Product Development Co. Dwg. No. ZB-1-3889.	Feed line 2		1
W-103	yes	no see W-903	Assemble from component parts	CABLE ASSEMBLY, radio frequency: c/o 15-9/64 in. lg. Coaxial Cable Type RG-8/U, W-109, 2 Plug Connectors Type UG-21B/U, P-106 and P-107, one on each end, 16-7/32 in. lg. over-all, Product Development Co. Dwg. No. ZB-1-3890.	Feed line 3		1
W-104	yes	no see W-904	Assemble from component parts	CABLE ASSEMBLY, radio frequency: c/o 16-57/64 in. lg. Coaxial Cable Type RG-8/U, W-109, 2 Plug Connectors Type UG-21B/U, P-108 and P-109, one on each end, 17-31/32 in. lg. over-all, Product Development Co. Dwg. No. ZB-1-3891.	Feed line 4		1
W-105	yes	no see W-905	N16-A070501-1180	CABLE ASSEMBLY, radio frequency: c/o 1 "T" Product Development Co., Dwg. No. ZB-3-3879, 2 antenna plate feed No. ZM-1-3903, one at each end, Product Development Co., Dwg. No. ZB-3-3879.	Antenna plate feed	W-105, W-106 W-107, W-108	4
W-109	yes	no	N15-C012200-0600	CABLE, radio frequency: coaxial, 0.405 in. dia., type RG-8/U per JAN-C-17A, 57-1/16 total length required.	Used on W-101, W-102 W-103, W-104		1 length
W-901	no see W-101	yes		CABLE ASSEMBLY, radio frequency: c/o 11-41/64 in. lg. Coaxial Cable Type RG-11A/U, W-912, 2 Plug Connectors Type UG-21D/U, P-902 and P-903, one at each end, 12-23/32 in. lg. over-all, Lieco Inc. Dwg. No. 345-NA-3-A.	Feed line 1		1

TABLE 6-1. TABLE OF REPLACEABLE PARTS (Cont'd)

W-902	no see W-100	yes	CABLE ASSEMBLY, radio frequency: c/o 13-25/32 in. lg. Coaxial Cable Type RG-11A/U, W-912, 2 Plug Connectors Type UG-21D/U, P-904 and P-905, one at each end, 14-15/32 in. lg. over-all, Lieco Inc. DWG. No. 345-NA-4-A.	Feed line 2		1
W-903	no see W-103	yes	CABLE ASSEMBLY, radio frequency: c/o 11-41/64 in. lg. Coaxial Cable Type RG-11A/U, W-912, 2 Plug Connectors Type UG-21D/U, P-906 and P-907, one at each end, 12-23/32 in. lg. over-all, Lieco Inc. DWG. No. 345-NA-3-A.	Feed line 3		1
W-904	no see W-104	yes	CABLE ASSEMBLY, radio frequency: c/o 13-25/32 in. lg. Coaxial Cable Type RG-11A/U, W-912, 2 Plug Connectors Type UG-21D/U, P-906 and P-907, one at each end, 14-15/32 in. lg. over-all, Lieco Inc. DWG. No. 345-NA-4-A.	Feed line 4		1
W-905	no see W-105	yes	CABLE ASSEMBLY, radio frequency: c/o 1 "T" Lieco Inc., DWG. No. 345-NA-1-B1, two antenna plate feeds Lieco Inc. DWG. No. 345-NA-1-B2, one at each end, Lieco Inc. DWG. No. 345-NA-1-B.	Antenna plate feed	W-905, W-906 W-907, W-908	4
W-909	no see T-102	yes	CABLE ASSEMBLY, radio frequency: c/o 56-11/64 in. lg. Coaxial Cable Type RG-8A/U, W-913, 2 Plug Connectors Type UG-21D/U, P-910 and P-911, one on each end, 57 1/4 in. lg. over-all, Lieco Inc. DWG. No. 345-NA-5-A.	Lower inter-plate cable assembly		1
W-910	no see T-103	yes	CABLE ASSEMBLY, radio frequency: c/o 59-43/64 in. lg. Coaxial Cable Type RG-8A/U, W-913, 2 Plug Connectors Type UG-21D/U, P-912 and P-913, one on each end, 60-3/4 in. lg. over-all, Lieco Inc. DWG. No. 345-NA-6-A.	Upper inter-plate cable assembly		1
W-911	no	yes	CABLE, radio frequency: coaxial, 0.405 in. dia. type RG-63B/U per JAN-C-17A, 81.04 in. total length required, cut and prepared per Lieco Inc. DWG. No. 345-NA-021,	Used on	W-905, W-906 W-907, W-908	1 length
W-912	no	yes	CABLE, radio frequency: coaxial, 0.405 in. dia. type RG-11A/U per JAN-C-17A, 50-1/16 in. total length required.	Used on	W-901, W-902 W-903, W-904	1 length
W-913	no	yes	CABLE, radio frequency: coaxial, 0.405 in. dia. type RG-8A/U per JAN-C-17A, 115-27/32 in. total length required.	Used on	W-909, W-910	1 length

TABLE 6-1. TABLE OF REPLACEABLE PARTS (Cont'd)