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CONTRACTUAL GUARANTEE

The equipment including all parts and spare parts, except vacuum tubes, batteries, rubber and material normally consumed in operation, is guaranteed for a period of one year from the date of delivery of the equipment to and acceptance by the Government with the understanding that all such items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f.o.b. any point within the continental limits of the United States designated by the Government, without delay and at no expense to the Government; provided that such guarantee will not obligate the Contractor to make repair or replacement of any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and the defect is not the result of normal expected shelf life deterioration.

To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design with the understanding that if ten per cent (10%) or more of any such said item, but not less than two of any such item, of the total quantity comprising such item furnished under the contract, are found to be defective as to design, such item will be conclusively presumed to be of defective design and subject to one hundred per cent (100%) correction or replacement by a suitably redesigned item.

All such defective items will be subject to ultimate return to the Contractor. In view of the fact that normal activities of the Naval Service may result in the use of equipment in such remote portions of the world or under such conditions as to preclude the return of the defective items for repair or replacement without jeopardizing the integrity of Naval communications, the exigencies of the Service, therefore, may necessitate expeditious repair of such items in order to prevent extended interruption of communications. In such cases the return of the defective items for examination by the Contractor prior to repair or replacement will not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure, will be acceptable as a basis for affecting expeditious adjustment under the provisions of this contractual guarantee.

The above one year period will not include any portion of time the equipment fails to perform satisfactorily due to any such defects, and any items repaired or replaced by the Contractor will be guaranteed anew under this provision.

REPORT OF FAILURES

Report of failure of any part of this equipment, during its service life, shall be made to the Bureau of Ships in accordance with current instructions. The report shall cover all details of the failure and give the date of installation of the equipment. For procedure in reporting failures see Chapter 67 of the "Bureau of Ships Manual," or superseding instructions.

INSTALLATION RECORD

Contacts: NXss—27551
NXsr—35824

Date of Contracts: 15 April 1943
13 August 1943

Serial number of equipment_____

Date of acceptance by the Navy_____

Date of delivery to contract destination_____

Date of completion of installation_____

Date placed in service_____

Blank spaces in this table shall be filled in at the time of installation.

PROCUREMENT OF PARTS

All requests or requisitions for replacement material should include the following data:

1. Navy stock number or, when ordering from an Army supply depot, the Army stock number.
2. Name of part.

If the Navy stock number has not been assigned, the requisitions should specify the following:

1. Equipment model designation.
2. Name of part and complete description.
3. Manufacturer's designation.
4. Contractor's drawing and part number.
5. AWS, JAN, or Navy Type designation.

SAFETY

THE ATTENTION OF OFFICERS AND OPERATING PERSONNEL IS DIRECTED TO BUREAU OF SHIPS MANUAL OF ENGINEERING INSTRUCTIONS CHAPTER 67 OR SUBSEQUENT REVISIONS THEREOF ON THE SUBJECT OF RADIO-SAFETY PRECAUTIONS TO BE OBSERVED.

WHILE EVERY PRACTICABLE SAFETY PRECAUTION HAS BEEN INCORPORATED IN THIS EQUIPMENT, THE FOLLOWING RULES MUST BE STRICTLY OBSERVED:

KEEP AWAY FROM LIVE CIRCUITS. Operating personnel must at all times observe all safety regulations. Do not change tubes or make adjustments inside equipment with high voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors. To avoid casualties always remove power and 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, no should reliance be placed upon the interlock switches for removing voltages from the equipment.

RESUSCITATION

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


DANGER
HIGH VOLTAGE
5000VOLTS
SCHEMA
Don't Look Now, But the Power IS on!
HE THOUGHT THE POWER WAS OFF
-BEAVER-

DESTRUCTION OF ABANDONED MATERIEL 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, or disposing of it in streams or other bodies of water, where possible and when time permits.

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!

Equipment. The cabinet is made from heavy steel and welded together, completely enclosed except for the open front end. The sides are not removable; this type of construction eliminates the use of frames. Both sides are louvered and screened for ventilation. Each side is equipped with a runner and track arrangement, permitting easy access and withdrawal of the Model BN Radio Equipment chassis. STOP assemblies are provided, one on each side, to prevent the chassis from being removed completely from cabinet. The bottom of the cabinet has four large shock mounts.

Overall size: Height 14⅜ inches, Width 20 1/16 inches, Length 17 7/16 inches, Weight (uncrated) 55 pounds. Refer to dimensional outline drawing, Figure 1-2, Page 1-2.

d. MODULATOR AND I-F TO VIDEO CONVERTER, NAVY TYPE CFN–43ACB.—This is the foundation unit incorporating the Model BN Radio Equipment chassis and front panel, the modulator and receiver intermediate-frequency to video sections, receiver gating circuit, receiver tuning indicator, interlock, blower-motor, and all power supplies. Power input is 105 to 125 volts, 50 to 425-cycles a-c (at 115/1/60 approximately 225 watts). This unit furnishes power to Transmitter R-F Oscillator, Navy Type CFN–52ACQ, and R-F to I-F Converter, Navy Type CFN–46ACW, has video output for visual indicator. Input impedance is 75 ohms (Sync. In); output impedance is 50 ohms (Video Out). Weight uncrated is 86 pounds. For dimensions, refer to Figure 7-6, Pages 7-11, 7-12. This section is designated in the photograph in Figure 1-3, Page 1-4. A bottom view showing the parts and wiring is shown in Figure 1-4, Page 1-5.

e. R-F TO I-F CONVERTER, NAVY TYPE CFN–46ACW (shown in Figure 7-6, Pages 7-11, 7-12) mounts on the Modulator and I-F to Video Converter, Navy Type CFN–43ACB from which it derives its power. Also it includes receiver tuning controls and delivers intermediate-frequency signal to the input of the modulator and the I-F to Video Converter, Navy Type CFN-43ACB. Input impedance is 50 ohms (Receiver Antenna). Output impedance is 1500 ohms. Weight is 7 pounds.

f. TRANSMITTER R-F OSCILLATOR, NAVY TYPE CFN-52ACQ (shown in Figure 7-7, Pages 7-13. 7-14), mounts on the modulator and I-F to Video Converter, Navy Type CFN–43ACB, from which it derives its power and modulation. Connects to transmitter tuning controls on type CFN–43ACB. Input impedance is determined by operating conditions. Output impedance is 50 ohms (Transmitter Antenna). Weight is 8 pounds.

7. POWER SUPPLY.

a. Model BN Radio Equipment operates from any 105 to 125 volts, 50 to 425-cycle a-c power supply. This permits its use on the standard 60 and 400-cycle frequencies. The equipment is shipped for use with 115 volts, a-c operation. Operation below 110 or above 120 volts a-c necessitates changing only one connecting lead on the power transformer.

8. FREQUENCY.

a. The Transmitter R-F Oscillator Unit, Navy Type CFN–52ACQ, and R-F to I-F Converter Unit, Navy Type CFN–46ACW, of the Navy Model BN Equipment can each be tuned to any predetermined frequency in the 157 to 187 megacycle band.

9. VACUUM TUBES.

a. The vacuum tubes used in the Model BN Equipment and their location are indicated in the photograph, Model BN Equipment top view, without cabinet, Figure 1-3, Page 1-4, which also shows the major sections of the equipment. The location of the related tube sockets are shown in the photograph of the Model BN, bottom view, Figure 1-4, Page 1-5.

b. The Vacuum tubes employed in and included with the Navy Model BN Radio Equipment are as follows:

One—Type 6J6 used as—
1st r-f amplifier (V1)
One—Type 6SH7 used as—
2nd r-f amplifier (V2)
One—Type 9006 used as—
1st detector (V3)
One—Type 6J5 used as—
Oscillator (Receiver) (V4)
Nine—Type 6AC7 used as—
1st i-f amplifier (V5)
2nd i-f amplifier (V6)
3rd i-f amplifier (V7)
4th i-f amplifier (V8)
5th i-f amplifier (V9)
Pulse amplifier and limiter (V15)
Multivibrator input (V16)
Multivibrator output (V17)
1st video amplifier (V13)
Three—Type 6H6 used as—
Gate pulse limiter (V10)
2nd detector and tuning indicator (V11)
Diode limiters (V22)
One—Type 6E5 used as—
Tuning indicator (V12)
One—Type 6AG7 used as—
2nd Video Amplifier (V14)
Two—Type 6SN7GT used as—
Pulse shaper and clipper (V18)
Gate pulse generator (V21)

Two—Type 6L6G used as—
Driver (V19)
Modulator (V20)

One—Type 3B24 used as—
High voltage rectifier (V24)
One—Type 5U4G used as—
300 volt rectifier (V25)
One—Type 15E used as—
Oscillator (Transmitter r-f) (V23)

VACUUM TUBE LOCATION

c. R-F to I-F Converter—Navy Type CFN–46ACW

Symbol	*Type*	*Function*
V1	6J6	1st r-f amplifer
V2	6SH7	2nd r-f amplifier
V3	9006	1st detector
V4	6J5	Oscillator (Receiver)

d. Modulator and I-F to Video Converter (Navy Type CFN–43ACB)

(I-F to Video Converter Section of Receiver)

V5	6AC7	1st i-f amplifier
V6	6AC7	2nd i-f amplifier
V7	6AC7	3rd i-f amplifier
V8	6AC7	4th i-f amplifier
V9	6AC7	5th i-f amplifier
V10	6H6	Gate pulse limiter
V11	6H6	2nd detector and tuning indicator
V12	6E5	Tuning indicator
V13	6AC7	1st video amplifier
V14	6AG7	2nd video amplifier

(Modulator Section of Transmitter)

V15	6AC7	Pulse amplifier and limiter
V16	6AC7	Multivibrator input
V17	6AC7	Multivibrator output
V18	6SN7GT	Pulse shaper and clipper
V19	6L6G	Driver
V20	6L6G	Modulator
V21	6SN7GT	Gate pulse generator
V22	6H6	Diode limiters

(Power Supply)

V24	3B24	High voltage rectifier
V25	5U4G	300 volt rectifier

e. Transmitter R-F Oscillator—Navy Type CFN–52ACQ

V23	15E	Oscillator (Transmitter r-f)

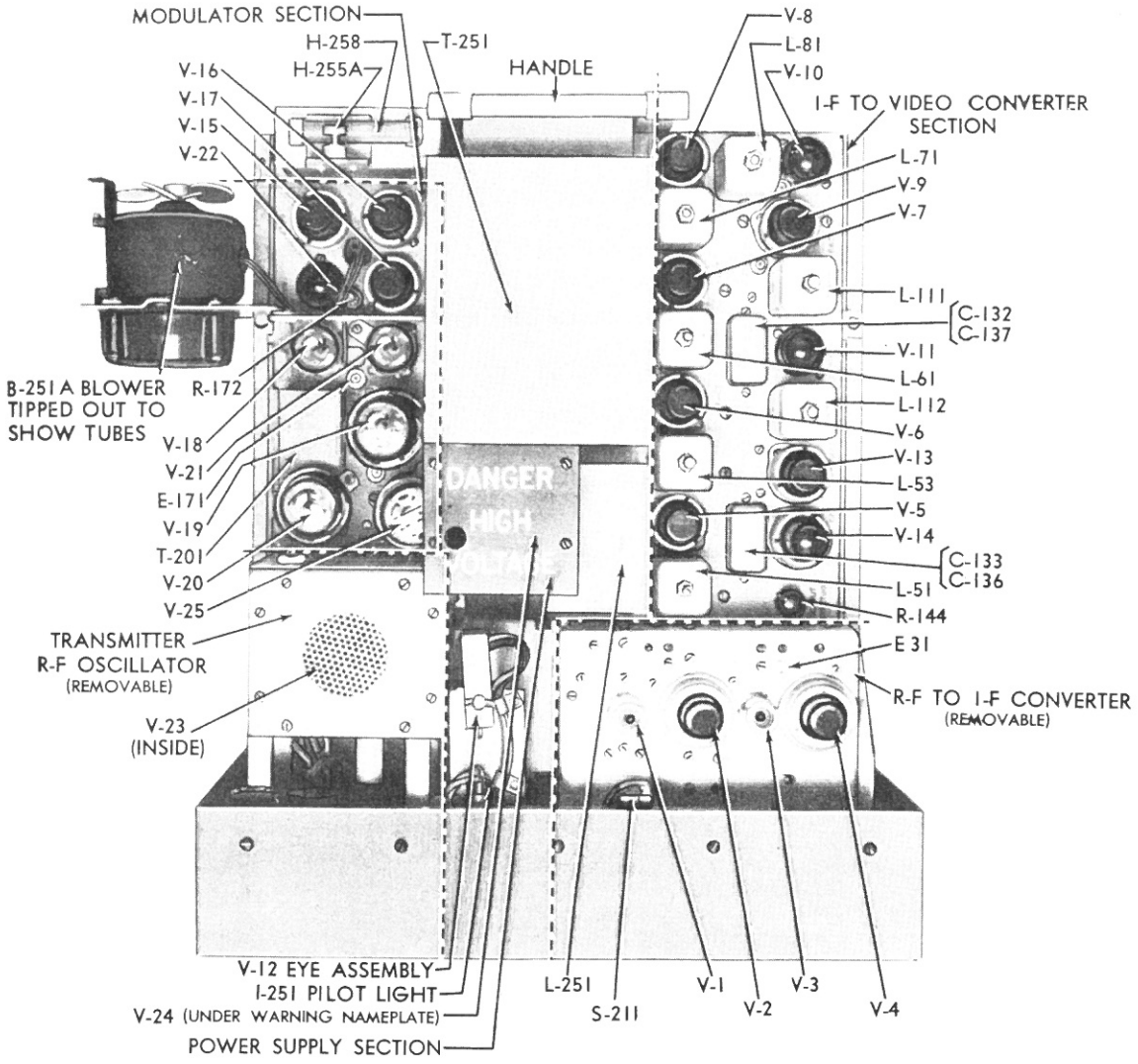


Figure 1-3—Model BN Equipment Removed from Cabinet Top View

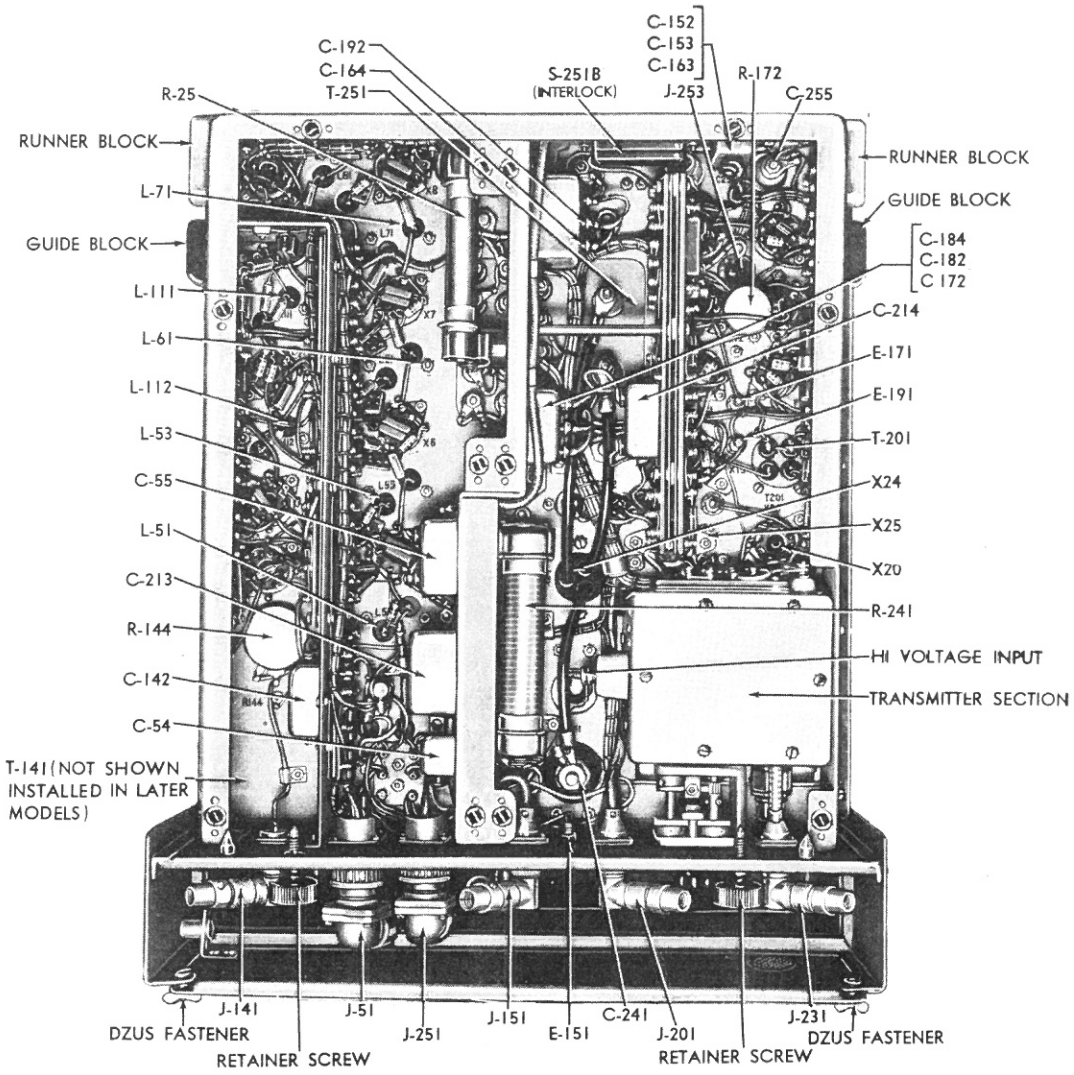


Figure 1-4—Model BN Equipment Bottom View Cover Removed

TABLE OF MAIN COMPONENTS

Quantity	Numerical Series of Reference Symbols	Name of Unit	Navy Type Designation	OVERALL DIMENSIONS						VOLUME		WEIGHT	
				Uncrated			Crated			Uncrated	Crated	Uncrated	Crated
				H	W	D	H	W	D				
*1		Navy Model BN Radio Equipment	CFN-46ACW CFN-43ACB CFN-52ACQ	14 3/8	20 1/16	20 11/16						156	
*1		Equip. Spares	— —	9	18	12	20 1/8	26 1/2	42			40	304
*1		Duplexer	CTZ-50ACW	4 5/8	21	4 3/4						18	
1		Tender Spares	— —	15	24	18	17 1/4	29 1/2	22 3/4			92	210
1		Stock Spares	— —	15 1/2	24 1/4	18 1/4	17 1/4	29 1/2	22 3/4			95	155
1		Ex. Equip. Spares	— —	9	18	12	11 1/4	23 1/2	16 11/16			40	70

* Shipped in one crate

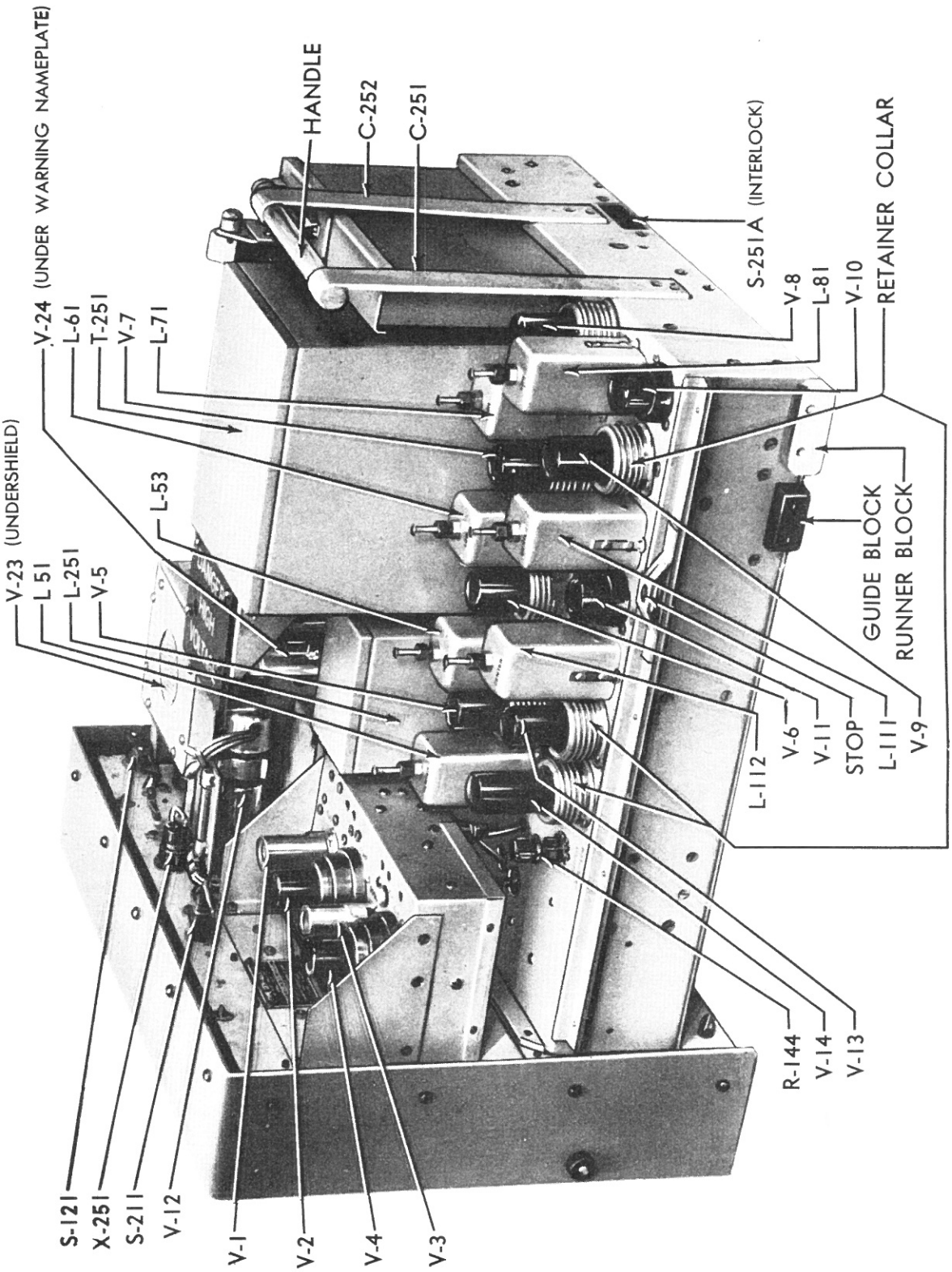


Figure 2-1—Navy Model BN Radio Equipment Oblique View

SECTION II

INSTALLATION AND ADJUSTMENT

1. UNPACKING BN RADIO EQUIPMENT.

a. In the unpacking and handling of the BN Radio Equipment during process of installation, care should be exercised to prevent damage to equipment. The following precautions should be observed:

(1) Keep boxes and crates containing equipment in the upright position at all times. The upright position is indicated by an arrow pointing upward, stenciled on each shipping container.

(2) Observe weights marked on shipping containers. As the BN Radio Equipment weighs approximately 300 pounds when packed, adequate transporting and lifting gear and sufficient handling personnel should be available to prevent equipment from being subjected to unwarranted shock.

(3) Remove nails from shipping container with a nail puller; do not use a hammer or pinch bar for this purpose.

b. Any components or wiring which may have been displaced during shipment should be replaced in their proper locations. The BN Radio Equipment, Duplexing Unit, Navy Type CTZ–50ACW, and the equipment spare parts will be shipped in the same shipping container.

c. The BN Radio Equipment is shipped from the factory completely wired and adjusted for the specified voltage (see Paragraph 7, Page 2-2), ready for installation. Therefore, the only installation connections which will be necessary will be those for the incoming power lines, antennas, and the connections necessary for the DUPLEXER unit.

d. The various units should be carefully unpacked and all wrappings removed in the following sequence:

(1) Remove the stapled steel bands from the packing box.

(2) Remove the waterproof envelope, containing the packing list, from the side of the packing box.

(3) Remove the cover from the packing box.

(4) Remove the Duplexing Unit from the packing box.

(5) Remove the special pads around the Duplexer.

(6) Remove the blocking, extracting nails carefully.

(7) Remove the moisture vapor barrier bag containing the Spare Parts Equipment.

(8) Open the moisture vapor barrier bag surrounding the BN Equipment.

(9) Remove the bags containing Dehydrating Agent from equipment.

(10) Remove the diagrams (Installation and Service) and Instruction Books from the equipment.

(11) Remove the washer, lockwasher, and nut from the bolts before attempting to remove the BN Equipment from the box.

(12) Remove the fiberboard cover surrounding the equipment.

(13) Remove the complete BN Equipment from the box.

(14) Remove the two large power and remote-control plugs.

(15) Remove the potentiometer tied to the equipment. This is the receiver remote gain-control.

(16) Remove the five coaxial adapter and plug assemblies.

2. INSTALLATION.

a. The major units comprising a complete installation include the following (excluding spare parts):

(1) One—Navy Model BN Radio Equipment.

(2) One—Duplexing Unit, Navy Type CTZ–50ACW.

(3) One—Antenna Equipment, Navy Type CTZ–66–ACG or CTZ–66–AFJ.

b. Accessories furnished with BN Radio Equipment and Remote Control components—comprised of:

(1) One—Potentiometer Receiver Gain Control [3,500 ohms (R–51)*].

(2) Five—Plugs, Navy Type C**–49195—Receiver Output (Video Out), Receiver (Antenna), Transmitter Sync (Sync-In), Transmitter (Antenna), External Pulse (Pulse Out).

(3) Five—Adapter Plugs, Navy Type C**–49192, used with each 90 degree angle Adapter.

(4) One—Plug Assembly, Navy Type AN–3108–16–10P(R–51)*, three-contact Remote Control.

(5) One—Plug Assembly, Navy Type AN–3108–16–11S (P–251)*, two-contact Power Unit (115 volt a-c input).

c. Suitable quantities of flexible cable are issued by the Navy installation office to meet the requirements of each particular installation. The kinds of cables and their location in the installation are shown in the cabling diagram, Figure 7-3 on Pages 7-5, 7-6.

3. LOCATION OF EQUIPMENT.

a. The Navy Model BN Radio Equipment should be installed near the Radar Equipment so that the interconnecting cables will be reasonably short and so that the panel is readily seen by either the active or stand-by

** Manufacturer optional.
* Refer to Figure 7-1, Pages 7-1, 7-2.

operators from their positions. The latter consideration is not essential for proper operation but is preferred if a choice of several locations exists.

(1) The equipment shall be adequately protected from bomb splinters, shell fragments, and weather.

(2) The BN equipment should be reasonably near the observing position of the associated equipment with which it operates so that the operator can see the screen of the associated equipment while adjusting the controls of the BN. If this arrangement cannot be provided, a location with convenient access should be chosen as near as practicable.

(3) Have the length of cable from the equipment to the antenna as short as possible to avoid unnecessary energy losses.

4. CLEARANCE.

a. The overall dimensions of the BN cabinet and the minimum clearance requirements are shown in Figure 7-4, Pages 7-7, 7-8. Since the cabinet is mounted on rubber shock insulators of great resilience, space should be allowed for necessary motion with shock.

b. A clearance of 30 inches is recommended in front of the equipment so that the chassis can be removed for service when necessary. Mechanically, 17 inches is sufficient space for chassis removal, but this does not allow space for a man. Since the Model BN radio chassis is particularly heavy (101 lbs.), it is essential that space is available to allow a positive hold on the unit.

c. The recommended clearance allows a man to stand in front of the equipment and grasp the chassis with one hand on either side. In this position chassis withdrawal is easily accomplished. If the front clearance is diminished to the point where it is no longer possible for a man to stand in front of the equipment, two men are necessary, one on either side; and the operation becomes somewhat awkward. However, if the space available does not allow the full clearance, this latter method of chassis removal is satisfactory. An absolute minimum of 17 inches must be observed in any event.

5. HANDLING BN CHASSIS.

a. To remove the Navy Model BN chassis from its cabinet, proceed in the following manner:

(1) Unfasten the hinged doors (held in place by four DZUS fasteners) on front of cabinet.

(2) Next, release (by turning counter-clockwise) the four RETAINING SCREWS, (finger grip controls, located on the front panel). Two of these retaining screws are located along the top of the front panel, the other two along the bottom of the panel.

(3) Grip the wraparound firmly with both hands, at the same time withdrawing* the Model BN chassis from the cabinet. Stop Assemblies (one located on each side of BN cabinet) will prevent the chassis from being removed completely from the cabinet.

(4) Grip the HANDLE of each Stop Assembly, lifting upward sufficiently to allow unimpeded complete removal of the BN chassis from its cabinet.

***NOTE**

It is suggested sufficient handling personnel be available to prevent the equipment from being subjected to unwarranted shock or damage.

Place the equipment on a bench or other flat surface; remove the wraparound by freeing the thirteen 8–32 round-head screws securing the wraparound to the chassis.

Because of the weight of this chassis, it is desirable to have two persons available, one on each side, as the unit is removed completely from the case.

To return the chassis to the cabinet, reverse the above procedure.

6. MOUNTING.

a. When the location for the equipment is accurately chosen, a rectangle should be marked on the shelf in the space to be occupied by the BN Radio Equipment. The dimensions of this rectangle should conform to the exact dimensions of the flexible shock mounting.

b. The location of the mounting holes should then be marked with reference to the dimensions given in Figure 7-4, Pages 7-7, 7-8. The shock mounting should then be bolted to its shelf. The cabinet should be electrically grounded. If the shelf is metal and electrically connected to the ship, the cabinet can be conveniently grounded by means of a flexible copper strap from the cabinet to one of the mounting bolts. All the contact surfaces involved on the bolt head, the nut, the mounting, and the shelf must be clean to insure good contact.

c. Sufficient cable length on each cable should be provided to allow withdrawal of the BN radio chassis approximately 10 inches, or to the STOP position, for servicing.

7. POWER SUPPLY FREQUENCY AND TYPE OF BLOWER-MOTOR.

a. The BN equipment is designed to operate from a 105–125 volt, 50–400-cycle single phase a-c power source.

b. The blower-motor in the equipment is for 60-cycle operation. If used with Radar provided with 400-cycle power supply,

(1) Remove the 60-cycle blower-motor.

(2) Replace by a 400-cycle blower-motor taken from the equipment's spare parts.

(3) The 60-cycle motor removed shall be exchanged for a 400-cycle motor in the stock or tender spare parts.

(4) The 400-cycle motors in the equipment's spare parts of all the BN radio equipments which are to operate in conjunction with Radar equipments other than those which operate from a 400-cycle source shall be exchanged for 60-cycle motors in the stock or tender spare parts.

8. CABLE INSTALLATION.

a. The cables constituting the external connections of the equipment are shown in Figure 7-3, Pages 7-5, 7-6. The type numbers of the cables are shown on the drawing. The plugs and cables which are used with the Model BN Radio Equipment are prepared as outlined in this section, Installation and Adjustment.

b. In arranging the installation each cable should be brought to its termination on the panel in a manner which will not interfere with controls or other cable terminations.

c. In all plug-and-cable assembly operations extreme care must be exercised at every step. A poor job of soldering, an improper assembly of a plug, a cut in the insulation, or a *"nick"* in a conductor might cause equipment failure.

d. Allow ample slack in all cables at the BN cabinet to permit full freedom of motion on the shock mounting. Reference is made to the cabling diagram shown in Figure 7-3, Pages 7-5, 7-6 as illustrating this point. Attach all plugs to the cables before the cables are put in place.

e. The reason for this procedure is that the attachment of some of these plugs is a delicate operation, and may have to be repeated once or twice with a spoilage of a short length of the cable. If the cable were already firmly secured to bulkheads, there might be a pull on the flexible mounting due to the short lengths, and a loosening and refastening of a considerable length of cable would be required.

f. Experience in cabling and plug attachment has brought out the following points to which attention should be paid in all installations.

(1) Each AN–RG–10/U cable bend shall have a radius of at least four inches.

NOTE

AN–RG–10/U is now the standard Navy Type Number for the coaxial conductor formerly referred to as Navy Type CASSF–50–1A and British Type PT–5.

(2) Antenna connections which involve ultra-high-frequency currents must use Polyethylene insulated cable throughout. Type AN–RG–10/U is suitable and also has the advantage of armor for protection against mechanical damage. Types AN–RG–10/U, AN–RG–8/U, CASSF–50–1A, and the British PT–5 are similar except that the AN–RG–8/U and PT–5 do not have armor. Cables with other dielectric materials are not suitable for these ultra-high frequencies.

(3) The woven-wire armor (provided on most cables for mechanical protection but serving no electrical function) should be cut off, taped, and left on open circuit at the first supporting clamp near the BN equipment mounting. Removal of this armor prevents its complicating the attachment of the plugs to the cables.

(4) The connector plugs are supplied fully assembled, and it is usually necessary to take them apart in order to attach the cables. If not familiar with the work, it is well to make written notes during all disassembling operations so that the connector can be correctly reassembled. Also, reference is made to Figures 2-6 to 2-8, inclusive.

(5) Insulating coverings should be removed without *"nicking"* or otherwise damaging the braided shielding or other conductors in the cable.

(6) Carefully remove any spatterings of solder or shreds of wire on insulation and the inner portions of all connectors to prevent trouble after the cable has been put into service.

(7) Take care, especially on short cable lengths, to give the plug its correct axial orientation on the cable during the assembly. Excessive twisting of the cable in order to line up plugs on the two ends of a cable can be avoided by proper advance planning.

(8) On completing the assembly of each plug, short-circuit together all conductors and shielding at the far end of the cable. Check for low resistance with an ohmmeter across each pair of all these electrical elements at the plug. Then remove the short-circuits at the far end and check for high resistance at the plug.

g. Plug Type AN–3108–16–10P and Cable Clamp Type AN–3057–B are assembled on Remote Control Cable, Type MCOP–4 as follows:

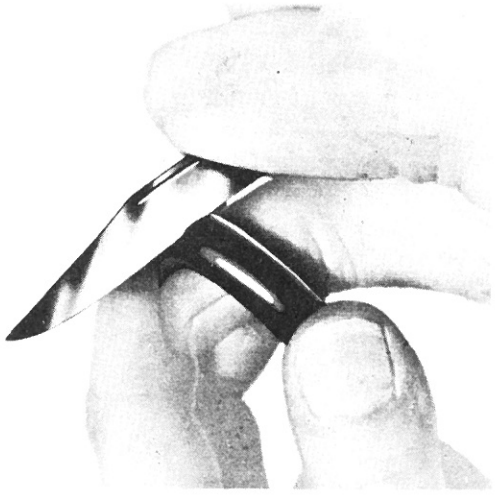


Figure 2-2—Cutting Rubber Cover

(1) Figure 2-2—Illustrates the method of cutting the outside rubber covering. The cut should be made one inch from the end. Bend the cable as shown and, using a sharp knife, cut on the outside of the bent portion, going all around the cable. It will be necessary to observe some caution in doing this so as not to cut into the insulated wires directly below.

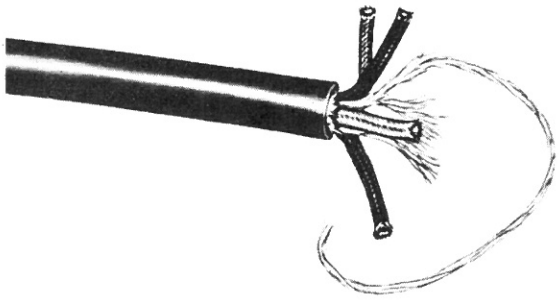


Figure 2-3—Cutting Jute and Cord Fillers

(2) Figure 2-3—Shows the four insulated wires and jute and cord fillers. Cut the jute and cord fillers and the brown colored insulated wire off even with the shoulder of the outer rubber covering.

Figure 2-4—Cable with Three Inner Conductors

(3) Figure 2-4—Illustrates how the cable should look at this time, showing the remaining three inner conductors.

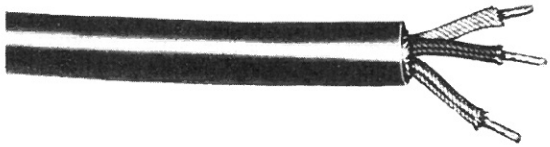


Figure 2-5—Cable with One-fourth Inch Insulation Removed

(4) Remove about one-fourth inch of the insulation covering each of these three wires, clean and tin the ends. The cable now appears as shown in Figure 2-5.

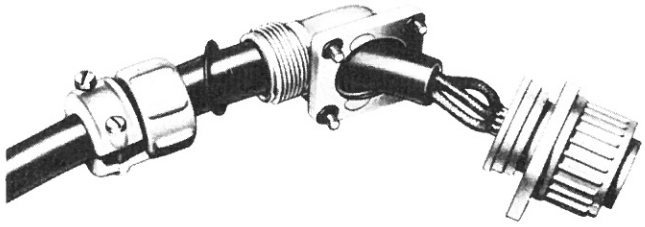


Figure 2-6—Remote Control Plug

(5) Disassemble the plug, Type AN–3108–16–10P, remove the four machine screws holding the plug body and elbow together, being careful not to lose the four small black washers. Then assemble the cable clamp, black washer, and elbow on the cable as shown in Figure 2-6.

(6) Insert the tinned end of the red wire in the contact marked "A" in the plug body and solder.

(7) Insert the tinned end of the yellow wire in the contact marked "B" in the plug body and solder.

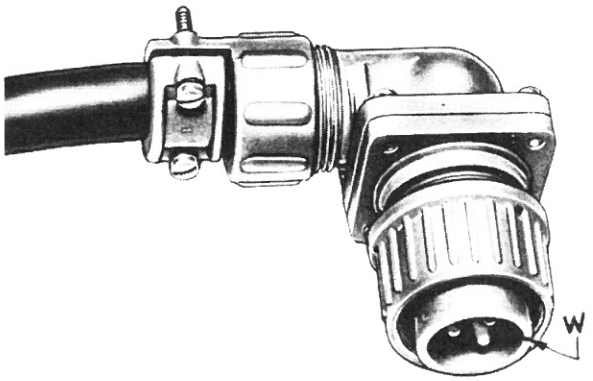


Figure 2-7—Elbow and Plug Body of Type AN-3108-16-10P Joined Together

(8) Insert the tinned end of the black wire in the contact marked "C" in the plug body and solder.

(9) Screw the cable clamp firmly into the elbow; fasten the elbow and plug body together with the four machine screws, making sure that the locating slot in the plug body is positioned as indicated by the letter "W" in Figure 2-7.

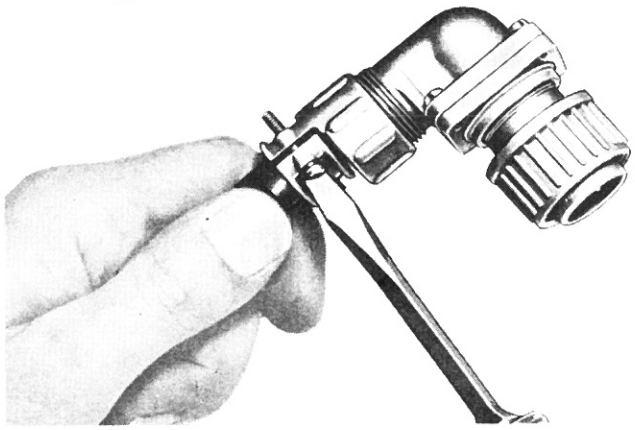


Figure 2-8—Tightening Two Screws in Cable Clamp

(10) Tighten the two machine screws in the cable clamp, as shown in Figure 2-8. This completes the assembly of this plug.

b. Plug, Type AN–3108–16–11S and Cable Clamp, Type AN–3057–B are assembled on Power Cable, Type DCOP–2 as follows:

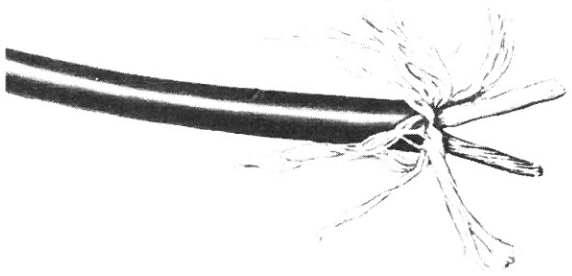


Figure 2-9—Cable with Covering Cut One Inch From End

(1) Cut through the rubber covering one-inch from the end as illustrated in Figure 2-2. The cable will then appear as shown in Figure 2-9.

Figure 2-10—Cable with Thread Binder and Jute Filler Cords Cut

(2) Cut off the thread binder and the jute filler cords even with the shoulder of the outer rubber covering. The cable will then be as shown in Figure 2-10.

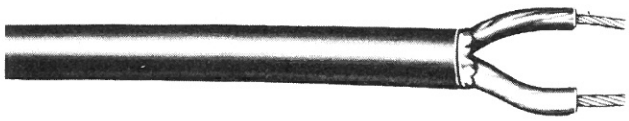


Figure 2-11—Cable Cleaned and Tinned

(3) Remove one-fourth inch of the insulation from the ends of the two inner conductors, clean, and tin. The cable as it now appears is shown in Figure 2-11.

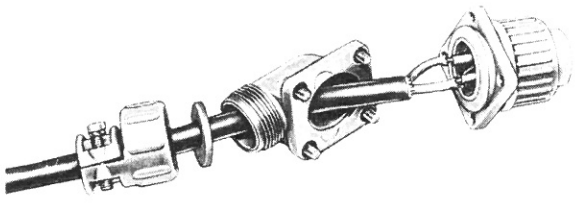


Figure 2-12—Power Plug

(4) Disassemble Plug, Type AN–3108–16–11S in the same manner as Type AN–3108–16–10P shown in Figure 2-6. Then assemble the cable clamp, black washer, and elbow on the end of the power cable as shown in Figure 2-12.

(5) Insert the tinned end of the white wire in the contact marked "A" in the plug body and solder.

(6) Insert the tinned end of the black wire in the contact marked "B" in the plug body and solder.

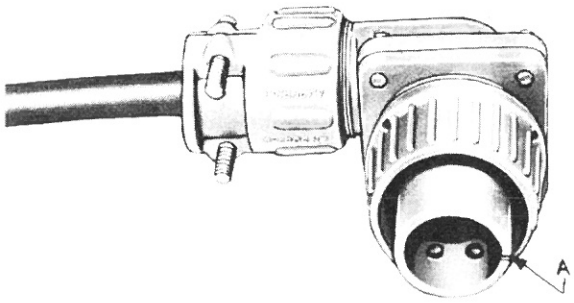


Figure 2-13—Elbow and Plug Body of Type AN-3108-16-11S Joined

(7) Screw the cable clamp into the elbow and fasten the elbow and plug body together with the four machine screws, making sure the locating notch or groove is positioned as shown by "A" in Figure 2-13.

(8) Tighten the two machine screws in the cable clamp as shown in Figure 2-8, Page 2-4.

i. The plug, Navy Type C**—49195, and adapter, Navy Type C**—49192 are assembled to the cable, Type AN–RG–10/U or its equivalent. This cable, plug, and adapter are used for connections to the following receptacles: Receiver Antenna (RCVR), Transmitter Antenna (TRANS), Synchronizing Pulse Input (SYNC. IN), Video Output (VIDEO OUT), Blanking Pulse Output (PULSE OUT).

Figure 2-14—Cable with One and One-eighth Inches Rubber Covering Removed

(1) If armored cable is used, remove armor for the required distance as explained in paragraph f(3), page 2-3. Using the same method as illustrated in Figure 2-2, Page 2-3, remove one and one-eighth inches of the rubber covering, being careful not to cut into the shield wires directly below. The cable now will look as shown in Figure 2-14.

(2) Unbraid the shielding wires for a distance of one-half inch from the end and cut off evenly as shown in Figure 2-15, Page 2-6. This will expose an additional synthetic covering over the inner conductor. Remove three-eighths of an inch of this by cutting around with a sharp knife and pulling the piece off. The end of the cable should now appear as in Figure 2-16, Page 2-6.

** Manufacturer optional.

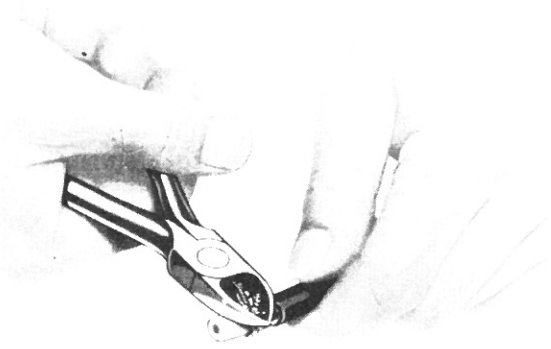


Figure 2-15—Cutting Shielding Wires

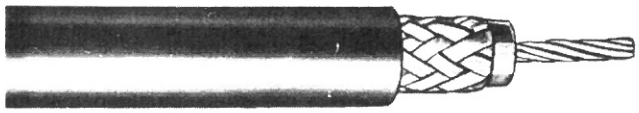


Figure 2-16—Cable with Synthetic Covering of Inner Conductor Removed

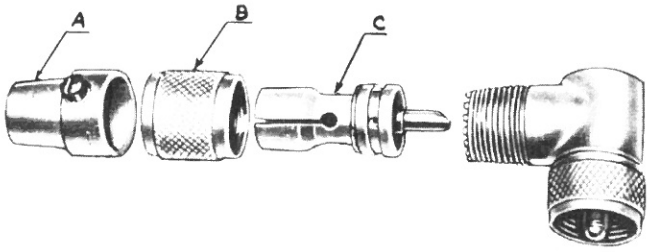


Figure 2-17—Plug Parts and Adapter

(3) Referring to Figure 2-17, it will be seen that the plug parts have been designated as follows: Plug Shell "A," Locking Ring "B," Plug Body "C." Care should be taken to see that the shell "A" and locking ring "B" are fitted over the cable in the proper order and with each in the proper direction. Begin by putting the shell on, narrow end first. Examination of the locking ring will reveal that one end has an internal shoulder. This end goes on first and therefore comes up against the wide end of the plug shell on the cable. These parts must be on the cable before it is inserted into the plug body. Corrugations of threaded form in the plug body make it possible now to screw this part onto the cable.

(4) The shield of the cable should now be soldered to the plug body, designated as "C" in Figure 2-17. The solder should be applied through the four holes in the waist of the plug body, taking care that no solder creeps up on either shoulder of the plug body. This is shown in Figure 2-18.

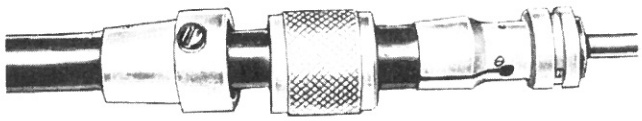


Figure 2-18—Plug Parts Assembled on Coaxial Cable

Figure 2-18—how the plug parts should be assembled on the coaxial cable.

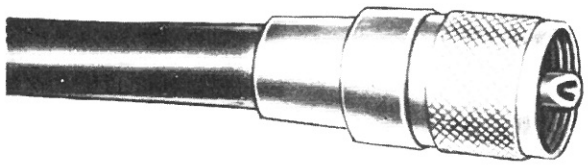


Figure 2-19—Plug and Cable with Set Screw in Plug Shell Tightened

Figure 2-19—completed plug and cable, after set screw in plug shell has been tightened.

(5) Finish the assembly of this plug by pulling the locking ring and the plug shell in place as shown in Figure 2-19 and tighten the set screw in the plug shell.

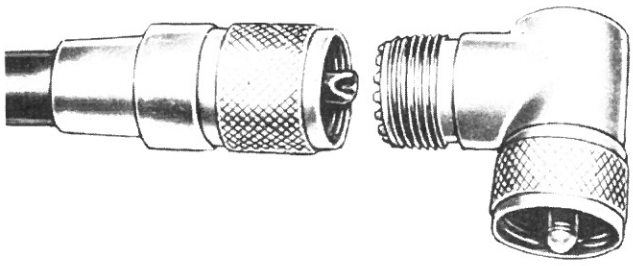


Figure 2-20—Plug, Cable and Adapter Previous to Joining

Figure 2-20 — completed plug and cable with the Adapter Type C**–49192 ready to be screwed together.

(6) The assembly is completed by screwing the plug to the adapter as shown in Figure 2-20.

** Manufacturer optional.

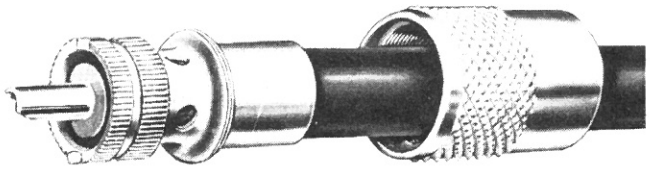


Figure 2-21—Assembling Plug

j. The plug Navy Type C**–49190 is different from the three piece plug Type C**–49195 in the fact that it is a two piece connector and has no set screw.

(1) The two piece connector is assembled onto the coaxial cable in a manner similar to that of the three piece plug.

(2) The coaxial cable is prepared exactly as outlined on Pages 2-5 and 2-6, the only difference being that the plug shell is tightened by its own threads in lieu of a set screw as in plug Navy Type C**–49195.

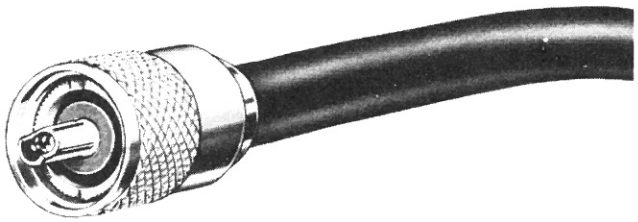


Figure 2-22—Plug Assembled on Coaxial Cable

(3) Figure 2-22 shows the completed two piece plug assembled into the coaxial cable after the plug shell has been tightened.

9. DUPLEXING UNIT.

a. INTRODUCTION.

(1) The Duplexing Unit Navy Type CTZ–50ACW is a device which permits a single antenna to be used for both transmitting and receiving in connection with associated radio equipment. Refer to Duplexing Unit Navy Type CTZ–50ACW dimensional outline photograph, Page 2-8, Figure 2-23.

(2) Duplexing Unit Navy Type 50AFH* has been specifically designed for use with the Model BN and similar type equipments. However, Duplexing Type CTZ–50ACW (supplied with Model BN equipment) may be used should the Type 50AFH not be available.

b. CHOICE OF LOCATION.

(1) The approximate overall dimensions of the duplexer are 21 inches long, four and five-eighths inches wide, and four and three-fourths inches high. Any location permitting space for the duplexer itself and accessibility to the four receptacles, two adjusting knobs and dials will be suitable. The adjusting knobs must be accessible to the operating personnel, and the dials must be seen for readings to be taken. The receptacle must be accessible in order to make the cable connections and to permit use of the special "TEST" terminal. Allowance for the bending of cables should be made therefore at all the four receptacles. Another factor in the choice of location of the duplexer is that the panel of the radio receiver should be visible to the person adjusting the duplexer. A very important consideration is that the lengths of the cables between the duplexer and the Model BN equipment should be kept as short as possible to avoid unnecessary power losses.

c. MOUNTING.

(1) The duplexer may be mounted in any position near the associated radio equipment. Three holes for mounting the duplexer case are provided—the single hole in the bracket at one end and two holes in the bracket at the other end. Bolts of one-fourth inch diameter should be used through these holes.

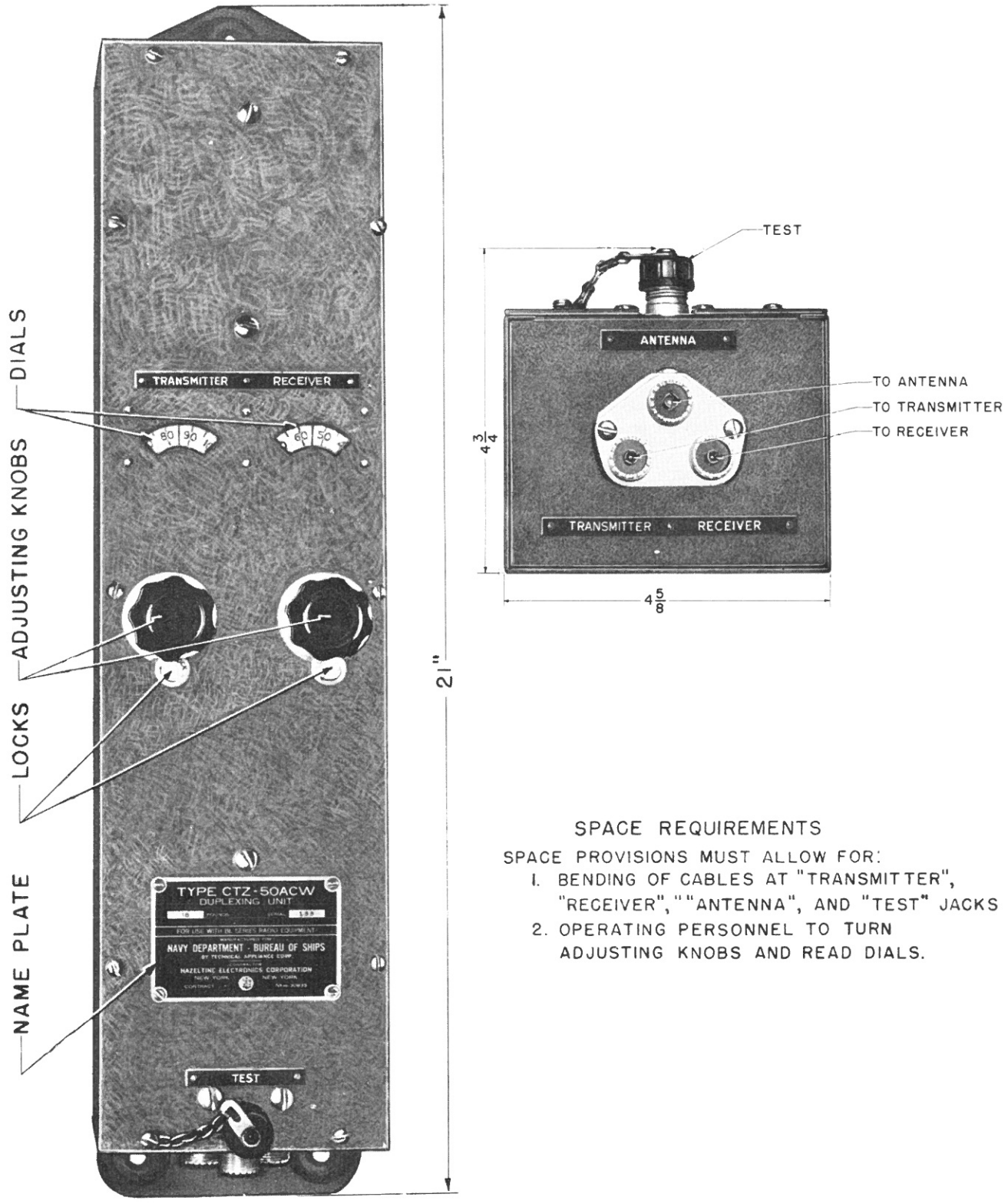
d. CONNECTIONS.

(1) The duplexer is supplied with three plugs Type C**–49195, which are ready to be attached to cable, Navy Type AN–RG–10/U for making the antenna, transmitter, and receiver connections. Refer to CABLE INSTALLATION, Paragraph 8, Pages 2-3 to 2-7.

e. TESTING.

(1) The central terminals of the three main receptacles are connected together as far as a direct-current test is concerned, and are insulated from the outer terminals and the case. A completed installation, with the three cables connected to the duplexer but disconnected at their other ends, should therefore show very high resistance between the central and outer conductors at any one of the remote ends of these three cables. This is a check against short-circuits. As a check for continuity, one of the remote cable ends should be shorted, after which very low resistance should be found at the other two cable ends.

** Manufacturer optional.
* These instructions are intended for both types.



SPACE REQUIREMENTS

SPACE PROVISIONS MUST ALLOW FOR:

1. BENDING OF CABLES AT "TRANSMITTER", "RECEIVER", ""ANTENNA", AND "TEST" JACKS
2. OPERATING PERSONNEL TO TURN ADJUSTING KNOBS AND READ DIALS.

Figure 2-23—Duplexing Unit Navy Type CTZ-50ACW dimensional outline photograph—Top and Front Views