

NAVSHIPS 900,719



RESTRICTED

INSTRUCTION BOOK

for

NAVY MODEL

MAR

RADIO TRANSMITTING AND
RECEIVING EQUIPMENT



RCA VICTOR DIVISION

of

RADIO CORPORATION OF AMERICA

Camden, New Jersey, U. S. A.

NAVY DEPARTMENT

BUREAU OF SHIPS

NAVSHIPS 900,719

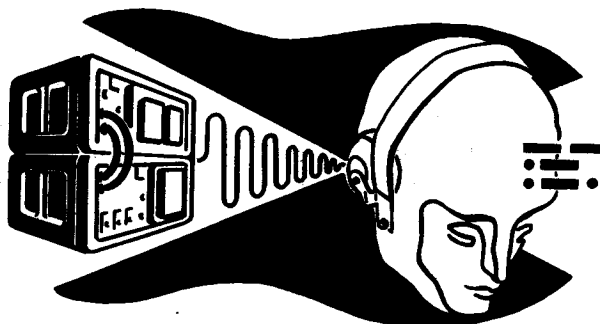
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M-A-R

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Extracts from this publication may be made to facilitate the preparation of other Navy instruction books and handbooks.

Copies of this publication should be obtained from the nearest Radio Material Officer.

(s) J. B. DOW
By direction

RECORD OF CORRECTIONS MADE

CHANGE No.	DATE	SIGNATURE OF OFFICE MAKING CORRECTION

NOTICE

This set of equipment spares has no crystal oven included in this shipment. This item is required to complete the equipment spares.

Requisition the crystal oven from:

Supply Officer (Electronics)
Naval Supply Depot
Mechanicsburg, Pennsylvania

1 Crystal Oven Navy Type CFT-40148

ERRATA
TO
INSTRUCTION BOOK NAVSHIPS 900,719
FOR
MODEL MAR RADIO TRANSMITTING AND RECEIVING EQUIPMENT

DISPOSITION: To be inserted in NAVSHIPS 900,719. This errata supersedes previously issued errata, IB-38370-b.

The scale of the meter which is mounted on the front panel of the Navy type CRV-43067 Transmitter-Receiver Unit is calibrated in arbitrary units. The basic range of all such meters is one milliamperere and although some scales are marked "DC Milliampères" this marking should be disregarded. Some of these meter scales are marked 0-5-10; others are marked 0-.5-1.0. For either calibration, the deflection referred to in the MAR Instruction Book (NAVSHIPS 900,719) should be used as though the meter scale read 0-5-10.

The changes described below should be made with pen and ink, wherever possible, in this copy of NAVSHIPS 900,719.

THEORY OF OPERATION SECTION 2

Page 2-24 and 2-37, 38 - Add resistor R-703, 2.2 megohms, between terminal 1 of R701 and capacitors C701 and C702. Add capacitor C734, 330 mmf, across terminals 2 and 4 of modulation transformer T702. These components are shown in the schematic diagram on page 7-63, 64.

AC-DC POWER SUPPLY

Navy Type CIG-20379

The following changes have been made in the CIG-20379 AC-DC Power Supply, bearing Serial No. 501 and up, and will affect the circuit diagrams of that unit in this preliminary instruction book NAVSHIPS 900,719.

These changes have been made to reduce radiated noise when the CIG-20379 AC-DC Power Supply is operated from an a-c source and do not otherwise affect the operation of the unit.

Schematic Diagram, 618857, Pages 2-39,40; 7-75,76
Simplified Schematic, 443795, Page 7-155
Connection Diagram, 728999, Page 7-161,162

1. Z901, 115/230 V AC/DC INPUT connector removed.

RADIC CORPORATION OF AMERICA - RCA VICTOR DIVISION
Camden, New Jersey, U.S.A.

CONTRACT NXsr-60008

IB-38370-c
2-12-47

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Replaced by J902, conn ctor, and C964, Filterett assembly consisting of two 2 mf capacitors (C964) in a common cas . One terminal of each capacitor is grounded.

Connections for J902

- Term. A - to F905 or F906
- Term. B - to F902 and one terminal of C964
- Term. C - Not connected
- Term. D - to F903 or F904 and other terminal of C964

2. I915 A/B, dual choke added. Choke consists of two windings, one winding is connected to terminals 1 and 3 and the other to terminals 2 and 4 of the assembly. The choke assembly is connected into the plat leads of the rectifier tubes V901 and V902 in the following manner:

Choke Terminal	Connected to
1	Cap, V901
2	Cap, V902
3	Movable contactor of A3 on S903A
4	Movable contactor of A1 on S903A

3. S902, AC-DC switch; 3 wafer; nine point, double throw, has been converted to a 4 wafer, twelve point, double throw switch. The extra wafer provides three single pole, double throw switches, D1, D2, and D3 which are used to connect C963 A/B into the circuit as described in 4.

4. C963 A/B, 0.25-0.25 mf capacitor added. The common terminal of C963 A/B is connected to pin 1 of X901 and X902.

C963 and extra wafer of S902 (3) are connected as follows:

Switch S902	
D1	Not connected
D2	Movable contact to one terminal of C963 Contact for AC position to terminal 4 of I915 Contact for DC position, not connected
D3	Movable contact to other terminal of C963 Contact for AC position to terminal 3 of I915 Contact for DC position, not connected

Both sections of C963 are connected into the circuit when S902 is in th AC position.

5. F907, 1000 V, 1 Amp. Fuse added. This fuse is mounted in clips on a t rminal board E906. This terminal board is located on the under side of the chassis. The fuse is connected into the lead to Pins B of Z902 and Z903 in the following manner.

- One clip is connect d to C968 of Z903 and C982 of Z902
- One clip is conn ct d to movable contact A3 and B3 of S902

6. 1916, RF choke, added. This choke is mounted on E902 (5) and connected in series with the lead from the movable contact (K3) of S901 to C954 of Z902.

PARTS AND SPARE PARTS

SECTION 8

TABLE 8-2

- Page 8-5 C-109 - Change Desc. to - ... 500 v d.c.w.c., 31/64" diam x 3/4" lg
- Page 8-6 C-121 and C-122 - Delete from Desc. - "except 24 mmf $\frac{1}{20\%}$ "
- /Page 8-17 E-110F - All Symbol Desig. column - Delete O-1003 and add O-608
- /Page 8-20 E-135 - Change Desc. to - ... one brass tube cap 1/4" OD x ...
Change Dwg. No. to - 882612-504
- /Page 8-21 E-210 - All Symbol Desig. column - Delete E-501 and add E-518
- /Page 8-23 E-411 - Change Symbol E-411 to E-413
- /Page 8-24 E-501 - Change Desc. to - Terminal board: two nickel-plated brass term, 5/16" between terminal centers, black molded bakelite board 1-3/8" lg x 7/8" wd x approx 1/2" thk o/a; four 0.160" diam mtg holes on 1-3/8" x 5/16" mtg/c, stenciled "E-501"
Change Function to - Term Board Multiplier
Change ASN to - 2Z9402.10
Mfr. - 334
Mfr. Desig. - 2-140
Dwg. No. - 430764-1
All Symbol Column - E-501
Total No. per Equip. - 1
- /Page 8-25 Add E-516 - Desc. - Terminal board; eight post type term, 1-1/8" between terminal centers, laminated phenolic board, 2" lg x 1-1/2" wd x approx 3/4" thk o/a; two 0.136" diam holes on 3/16" x 1.625" mtg/c, stenciled "E-516"
Function - Terminal Board Multiplier
Mfr. - 1
Dwg. No. - 429668-504
All Symbol Column - E-516
Total No. per Equip. - 1
- /Page 8-25 Add E-517 - Desc. - Terminal board: four post type term, 1-1/8" between terminal centers, laminated phenolic board, 1-1/2" lg x 1-1/4" wd x approx 3/4" thk o/a; two 0.136" diam holes on 3/16" x 0.875" mtg/c, stenciled "E-517"
Function - Terminal Board Multiplier
Mfr. - 1
Dwg. No. - 429668-505
All Symbol Column - E-517
Total No. per Equip. - 1

- /Page 8-25 Add E-518 - Desc. - Same as E-210
 Function - Shi ld Tube V-502
 Navy Type No. - JAN SOS6
 ASN - 228320-13
- Pag 8-26 E-607 - Change Navy Type No. to -61578
- Page 8-26 H-104 - Change ASN to - 224868.353
- /Page 8-27 H-108, 109 - Change Desc. to - ... $\frac{1}{5}$, cross section ...
- /Pag 8-27 H-115 - Change Desc. to - ... 1.7185" lg, 0.252" diam hol
 through center, counterbored 19/32" diam from rear
 face to within 0.108" $\frac{1}{16}$ of outside front face,
 15/32"-32 thd, ...
- /Page 8-27 H-117, 118 - Change Desc. to - ... $\frac{1}{5}$, cross section ...
- /Pag 8-28 H-119, 120 and 123 - Change Desc. to - ... $\frac{1}{5}$, cross section ...
- /Page 8-30 H-415 - Change Desc. to - ... water seal, 0.958" OD x 0.750" ID
 x 19/64" thk o/a, hole in top 0.375" diam
- /Page 8-30 H-416 - Change Dwg. No. to - 887546-2
- /Page 8-32 H-607 - Change Desc. to - ... durometer 50 $\frac{1}{5}$, cross ...
- /Page 8-33 Add H-613 - Desc. - Wrench: Allen short series steel, Marine
 Corps green enameled finish, "L" shaped, 3/16"
 hex x 2-27/32" lg x 1-1/32" wd, for 3/8" set
 and 1/4" Allen cap screws
 Function - Wrench
 Mfr. - 731
 Dwg. No. - 8881007-2
 All Sym. Column - H-613
 Total No. per Equip. - 1
- /Page 8-33 Add H-614 - Desc. - Wrench: Allen short series steel, Marine
 Corps green enameled finish, "L" shaped, 0.050"
 hex x 1-27/32" lg x 21/32" wd, for #4 Allen
 set screws
 Function - Wrench
 Mfr. - 731
 Dwg. No. - 8881007-5
 All Sym. Column - H-614
 Total No. per Equip. - 1
- /Pag 8-33 Add H-615 - Desc. - Wrench: Allen short series steel, Marine
 Corps green enameled finish, "L" shaped, 1/16"
 hex x 1-27/32" lg x 21/32" wd, for #6 Allen
 set screws
 Function - Wrench
 Mfr. - 731
 Dwg. No. - 8881007-4
 All Sym. Column - H-615
 Total No. per Equip. - 1
- /Pag 8-33 Add H-616 - Desc. - Wrench: Allen short series steel, Marin
 Corps green enameled finish, "L" shaped, 5/64"
 hex x 1-31/32" lg x 45/64" wd, for #8 Allen
 set screws
 Function - Wrench
 Mfr. - 731
 Dwg. No. - 8881007-3
 All Sym. Column - H-616
 Total No. per Equip. - 1

/Page 8-33 Add H-617 - Desc. - Wrench: All n short seri s steel, light zinc plat d, "L" shap d, 5/32" hex x 2-19/32" lg x 3/8" wd, for 5/16" Allen set and #10 cap screws

Function - Wrench
Mfr. - 731
Dwg. No. - 8881760-1
All Symbol Column - H-617
Total No. per Equip. - 1

/Page 8-33 Add H-618 - Desc. - Wrench: Allen short series steel, Marine Corps green enameled finish, "L" shaped, 3/32" hex x 2-3/32" lg x 3/4" wd, for Allen #10 and #12 set and #6 cap screws

Function - Wrench
Mfr. - 731
Dwg. No. - 8881007-7
All Sym. Column - H-618
Total No. per Equip. - 1

/Page 8-34 K-101 - Change Desc. to - Relay assembly: ...

/Page 8-34 L-106 - Change Desc. to - Connector assembly: male and female contact, silver-plated copper tubing, 0.125" OD, silver-plated beryllium connectors, assem to withstand high-pot voltage of 500 volts DC appli d between inner conductor and outer conductor, inner connector to withstand a pull of 10 lbs min, approx 5-19/64" lg x 5/8" wd x 1-17/64" h o/a, coil approx 1/2 turn, one mica insulator 0.492" OD x 0.094" thk, inner surface 1.305" from curved end of tubing, second mica insulator 0.433" o/a OD x 3/32" thk, innerface 3.947" from first insulator, each insulator held in place by two brass collars soldered to tubing

Change Function to - Fil. and Grid Line for 2C39 Tub
Change Navy Type No. to - 49884A
Change ASN to - 226894-3
Change Dwg. No. to - 272699-501

/Page 8-35 L-107 - Change Desc. to - Connector assembly: male and female contact, silver-plated copper tubing 0.109" OD, silver-plated beryllium connectors, assem to withstand high-pot voltage of 500 volts DC applied b - tween inner conductor and outer conductor, inner connector to withstand a pull of 10 lbs min, approx 5-1/2" lg x 5/8" wd x 1-7/8" h o/a, coil approx 3 turns, one mica insulator 0.492" OD x 0.094" thk, inner surface 0.450" from coil, second mica insulator 0.433" o/a OD x 3/32" thk, innerface 2-5/8" from first insulator, each insulator held in plac by two brass collars soldered to tubing

Change Function to - Fil. and Grid Line for 2C39 Tube
Change Navy Type No. to - 49883A
Chang Dwg. No. to - 736431-501

Pag 8-38 L-507 - Chang ASN to - 3C1084H-23

Page 8-38 L-510 - Add Equip. spare quantity 1, box #1; Tender spare quantity 2, box #2; Stock spare quantity 3, box #4

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- /Page 8-38 M-101 - Change Desc. to - ... whit marking, scale calibrated
0-5-10 in arbitrary units
- /Page 8-40 O-124 - Change ASN to - 224872-83
- /Page 8-41 Add O-208 - Desc. - Shaft: stainless steel, PS-521; 1-17/64"
lg x 0.2496" diam o/a, 1/64" x 45° chamfer both
ends 9/64" lg x 0.187" left end, one undercut
of 1/32" wd x 0.101" d. 17/64" from small end
Function - To Connect Front Panel Knob with Capa-
citor C-201
Mfr. - 1
Dwg. No. - 887214-4
All Symbol Column - C-208
Total No. per Equip. - 1
- /Page 8-41 Add O-209 - Desc. - Gear drive assembly: consisting of follow-
ing parts: coupling O-201, shaft assem O-202,
gear assem O-203, and shaft O-208
Function - C-201 Tuning
Mfr. - 1
Dwg. No. - 446661-501
All Symbol Column - O-209
Total No. per Equip. - 1
- Pag 8-42 O-503 - Change Desc. to - ... angle, hub 7/16" diam, bore
0.1878" ...
- Pag 8-42 O-604 - Delete entire item
- Page 8-43 O-606 - Change ASN to - 2A1178.1-24
- Page 8-44 P-102 to P-105 incl. - Add ASN - 2Z7390-85
- Page 8-44 P-106 - Change ASN to - 2Z7226-P242
- Page 8-44 P-107 - Change Navy Type No. to - AN-3106-20-6S and add ASN-
2Z7226-P242
- /Page 8-46 R-201 - Delete Mfr. 1 from Mfr. column
- Page 8-46 R-206 - Add ASN - 3RC20BF224K
- Page 8-49 R-415 - Change Navy Type No. to - 633033-5
- Page 8-50 R-422 - Change Navy Type No. to - 633033-5
- /Page 8-51 R-504 - Change JAN Type No. to - JAN RC40BF103K
Change ASN to - 3RC40BF103K
- /Page 8-52 R-507 - Change JAN Type No. to - JAN RC40BF103K
Change ASN to - 3RC40BF103K
- Pag 8-53 R-527 and R-528 - Change JAN Type No. to - JAN RC40BF103K
Add ASN - 3RC40BF103K
- Page 8-53 R-529 - Change Desc. to - ... 47 ohms ...
- Page 8-54 S-401 - Change Function to - Noise Limiter
- Page 8-54 S-402 - Change ASN to - 3Z9825-82.28
- /Page 8-56 W-101 - Change Navy Type No. to - AN-CG-451/U(-'10")
Change ASN to - IF425-58.8.5
- /Page 8-56 W-102 - Change Desc. to - ... type UG281/U on one end, 22-3/4"
lg overall
Change Navy Type No. to - AN-CG-434/U(1'-10-3/4")
- /Pag 8-56 W-103 - Change Navy Type No. to - AN-CG-450/U(-'11-1/2")
- /Page 8-57 W-201 - Change Navy Type No. to - AN-CG-451/U(1'-11-1/2")
- Page 8-58 Y-502 to Y-510 incl. - Add Navy Type No. -40163
- /Page 8-62 Modulator Dynamotor CRV-50248 - Change ASN on Sub H adings to -
AS-2C2519

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- Page 8-64 C-806 - Change ASN to - 3K3015211
- Pag 8-64 C-807A - Chang Stock spare quantity to - 3
- Page 8-65 D-801C and D-801D - Chang ASN to = 3H550-27
- Page 8-66 E-801 - Change Desc. to - HOLDER, fuse: block type; for singl
13/16" diam x 3" lg fuse; 3/8" thk brown bakelit
base w/bronze clips; fuse rated 40 amp 250 v; 3-1/4"
lg x 1-3/8" wd x 1-9/16" h o/a; three 0.199" diam
holes on 2-1/2" x 11/16" mtg/c w/odd hole on 11/16"
x 1-1/4" center w/other two; two brass conn cting
plate term
- /Page 8-68 H-714 - Change Desc. to - ..., durometer 50 /5, ...
- Page 8-68 H-805 - Change ASN to - 221612.8
- /Page 8-68 Add H-806 - Desc. - Washer: flat, neoprene, durometer 45-55,
1" OD x 3/8" ID x 1/16" thk
Function - Cushioning Washer for Dynamotor Vibration
Mounts
Add ASN - 6154006-13
Mfr. - 1
Dwg. No. - 8881753-1
Total No. per Equipment - 8
Equipment spare quantity 8, box #1
Tender spare quantity 32, box #2
Stock spare quantity 32, box #1
- /Page 8-69 K-702 - Add Mfr. - 713
- /Page 8-69 O-801 - Change Desc. to - Bearing: ball, steel, singl row
radial, single shield, 0.4998" OD x 0.18735" ...
- Page 8-69 Add O-802 - Desc. - Bearing: ball, steel, single row radial,
single shield, bore 0.2362" x 0.7480" x 0.2362"
wd o/a
Function - For D-801
ASN - 3H1787A/6
Mfr. - 439
Mfr. Desig. - Brg. 7036
Dwg. No. - 885824-3
All Sym. Desig. - O-802
Total No. per Equip. - 1
Equip. spare quantity 2, box #1
Tender spare quantity 2, box #2
Stock spare quantity 2, box #4
- Page 8-70 P-803 - Change Navy Type No. to - AN-3106-22-16S
- /Page 8-70 R-703 - Change Desc. to - ... /10%, 1/2 watt, ...
- Page 8-71 R-710 and R-712 - Add JAN Type No. - JAN RC20EF104J
- Page 8-71 R-715 - Change Navy Type No. to -635320-5
- /Page 8-72 R-722 - Change Navy Type No. to -633237 or 633238
- /Page 8-73 R-804 - Change Desc. to - ... /5%, 4 watt, vitreous ...
- Page 8-74 S-703 - Change Desc. to - Switch: lever, three positions, ...
Change Function to - IC, Tune, Radio
- /Page 8-75 T-703 - Change Desc. to - ... impedance 130 ohms max, 87 ohms
min at 3V, 60 ...
- Pag 8-80 C-930 - Change JAN Type No. to - JAN C75/16
- Pag 8-80 C-931 - Change Stock spare box # to - 7
- Pag 8-80 C-936 and C-937 - Change ASN to - 3DA2.400-12

/Page 8-82 - Add *C-963A/B - Desc. - Capacitor: fix d, paper dielectric, two sections, each 250,000 mmf ~~15%~~, 800 vdcw; hermetically sealed in metal case, 2" lg x 2" wd x 1-3/16" h; mineral oil-filled and impr; three insulated solder lug term approx 9/16" lg, located one and spaced 1/2" between centers, no int gnd connections; two integral mtg feed w/3/16" diam holes on 2-3/8" mtg/c

Function - A-C Noise Limiter

Navy Type No. -484663-15

Mfr. - 794

Mfr. Desig. - #ELL8225-3

Dwg. No. - 8884291-3

All Sym. Desig. - C-963A/B

Total No. per Equip. - 1

/Page 8-82 - Add *C-964A/B - Desc. - Capacitor: fixed, paper dielectric, two sections, each 2 mfd ~~15%~~, 275 vacw; hermetically sealed metal case, 2-1/2" lg x 1-3/16" wd x 2-7/8" h; mineral oil-filled and impr; two solder lug term on top, both sect internally gnd, special mtg bracket 4-5/8" h w/1-9/16" sq base and 1-1/8" lg "L" shaped extension one side at top; four #6-32 holes in base on 1-5/32" mtg/c, slot 0.204" wd x 0.4145" d in extension

Function - R-F Filter

Navy Type No. -484664-15

Mfr. - 794

Mfr. - Desig. - Type #1277, Dwg. #8747

Dwg. No. - 8884291-5

All Sym. Desig. - C-964A/B

Total No. per Equip. - 1

Pag 8-82 E-905 - Add Mfr. - 204

/Pag 8-82 - *E-906 - Desc. - Terminal board: general purpose; two copper cadmium-plated fuse clips w/tinned copper solder lugs, two brass silver-plated solder lug term; fuse clips spaced 2-3/4" between centers, solder lug term spaced 1/2" between centers, two holes 0.203" diam for additional clips spaced 4-15/16" between centers, 3/16" thk paper base bakelite board 5-9/16" lg x 2-1/8" wd x 1" max thk incl term; two holes 0.203" diam on 2-3/4" x 7/16" mtg/c; fungus proofed

Function - For F-907, L-916, R-914

Mfr. - 204

Mfr. Desig. - A-2214

Dwg. No. - 8884291-7

All Sym. Desig. - E-906

Total No. p r Equip. - 1

/Page 8-82 - Add footnote - *Used in Equipm nts bearing Serial No. 501 and upwards.

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- /Page 8-82 F-901 - Change Desc. to - ... rated 25 amp, 250 v, body 2" lg ...
Change Navy Type No. to -28044-25
- /Pag 8-82 F-902 - Change Desc. to - ... rated 10 amp, 250 v, body 1-1/2"
lg ...
Change Function to - For AC and DC Circuit
Change Navy Type No. to -28039-10
- /Page 8-82 F-903 - Change Navy Type No. to -28039-10
- /Page 8-83 F-904 - Change Desc. to - ... rated 5 amp, 250 v, body 1-1/2"
lg ...
Change Function to - For HV AC Circuit
Change Navy Type No. to -28039-5
- /Page 8-83 F-905 - Change Function to - For DC Circuit
Change Navy Type No. to -28039-10
- /Page 8-83 F-906 - Change Navy Type No. to -28039-5
- /Page 8-83 Add *F-907 - Desc. - Fuse: cartridge, rated 1 amp, 1000 v; on
time; fiber body ferrule term; 3" lg x 13/32"
diam o/a
Function - HV Output
Navy Type No. -28057-1
ASN - 321918
Mfr. - 784
Mfr. Desig. - 2104
Dwg. No. - 8884291-1
All Sym. Desig. - F-907
Total No. per Equip. - 1
- /Page 8-83 - Add footnote *Used in Equipments bearing Serial No. 501 and
upwards.
- Page 8-85 J-901 - Change Navy Type No. to - ... PR-24-9P
Change Mfr. Desig. to - ... PR-24-9
- /Page 8-85 Add *J-902 - Desc. - Connector: male, four-pin, body 1-9/32"
lg, 1-1/2" sq flange with four 0.156" diam
holes on 1-5/32" x 1-5/32" mtg/c, 1-1/4"-18
thd one end, 1-1/8" diam other end
Function - HV Input
Navy Type - AN-3102-PR-20-4P
ASN - 223029-10
Mfr. - 30
Mfr. Desig. - AN-3102-PR-20-4
Dwg. No. - 8884291-6
All Sym. Desig. - J-902
Total No. per Equip. - 1
- Page 8-85 J-903 - Change Navy Type No. to - ... PR-22-16P
Change Mfr. Desig. to - ... PR-22-16
- Page 8-85 J-904 - Change Navy Type No. to - ... PR-22-16P
Add ASN - 223022-36
- Page 8-85 K-901 and K-902 - Change Stock spare box # to - 7
- /Page 8-85 - Add footnote *Used in Equipments bearing Serial No. 501 and
upwards.

/Page 8-87 - Add *L-915A/B - Desc. - Coil, R-F: dual choke, two windings on same cor; hermetically sealed metal cas; inductance ea winding 60 mh min at 1000 cyc., DC resistance one winding 1.61 ohms, other winding 1.98 ohms; 2-1/4" lg x 1-7/8" wd x 2-1/8" h; laminated silicon steel core, two integral mtg bkt, one on rear extends 1/2" ea side w/two slots 5/32" wd x 25/64" d on 2-7/16" mtg/c, one on bottom extends 1" w/slot 1/4" wd x 5/8" d; four solder lug term located one on each side; case marked "L-915" and "CIG-472029"

Function - Noise Filter
 Navy Type No. -472029
 Mfr. - 204
 Mfr. Desig. - TA-3420
 Dwg. No. - 8884291-2
 All Sym. Desig. - L-915A/B
 Total No. per Equip. - 1

/Page 8-87 - Add *L-916 - Desc. - Coil, R-F: single winding, universal wound; unshielded; inductance 1.4 mh min, DC resistance 3.5 ohms max; 1-3/16" max diam x 5/8" lg; wood dowel form, varnish impr; 0.156" diam mtg hole through center of form, two wire leads approx 2" lg; tropicalized

Function - R-F Filter
 Navy Type No. -472028
 Mfr. - 204
 Mfr. Desig. - T1378
 Dwg. No. - 8884291-4
 All Symbol Desig. - L-916
 Total No. per Equip. - 1

/Page 8-87 - Add footnote - *Used in Equipments bearing Serial No. 501 and upwards.

Page 8-89 0-926 - Change Total No. per Equip. to - 32

Page 8-89 P-901 - Change Navy Type No. to - AN-3106-24-9S
 Change Mfr. Desig. to - AN-3106-24-9S

Page 8-89 P-902 - Change Navy Type No. to - AN-3106-20-4S
 Change Mfr. Desig. to - AN-3106-20-4S

Pag 8-89 - Add * to Symbol R-901

/Pag 8-90 - Add * to Symbols R-904, 908, 912 and 913

/Page 8-89 - Add footnote - *Rating may be indicated as 14 watts rather than 15 watts.

/Pag 8-90 - Add footnote - *Rating may be indicated as 14 watts rather than 15 watts.

Page 8-90 R-907 - Add ASN 3RC20BF470K

TABLE 8-5

/Pag 8-89 - Add Code No. - 794
 Mfr. Prefix - CTD
 Tobe Deutschmann Corp.
 Canton, Mass.

NAVSHIPS 900,719

/Page 8-91 - Add S-902 - Desc. - Switch, rotary: 12 pole, two positions, four section; 5-27/32" lg x 2" wd x 2-13/16" h o/a; two mtg screws 3/8"-32 thds ea end on 2-7/16" mtg/c, 1/4" shaft extends 9/16" from mtg surface

Function - AC-DC Selector

Mfr. - 204

Mfr. Desig. - E-168

Dwg. No. - 8884291-8

All Symbol Desig. - S-902

Total No. per Equip. - 1

/Page 8-91 S-902A - Add *S-902D to All Symbol Desig. column

/Page 8-91 - Add *S-902D - Desc. - Same as S-902A

Function - Part of S-902

ASN - 3Z9903E-24.2

Total No. per Equip. - *1

/Page 8-91 - Add footnote - *Used in Equipments bearing Serial No. 501 and upwards.

Page 8-92 T-901 and T-902 - Change Stock spare box # to - 8

Page 8-93 W-901 - Change Stock spare box # to - 7

Page 8-93 Y-901 - Change Stock spare box # to - 7

Page 8-94 Z-901 and Z-902 - Change Stock spare box # to - 7

Page 8-94 Z-903 - Change Stock spare box # to - 7

Change Stock spare quantity to - 3

Page 8-94 - Spare parts Box #3 - Change Desc. to - Spare parts box #3 and #4

Change Tender spare quantity to - 2

Page 8-96 H-1004 - Change ASN to - 613504-28-5M

/Page 8-96 J-1001 - Change Desc. to - ... 0.264" thk, brass, silv r-plat d plate 1" sq. x 0.075" thk, with one 0.578" diam hole in center, and four 0.120" diam mtg holes on 23/32" x 23/32" centers and ...

Change Dwg. No. - 438110-507

Page 8-96 Z-1000 - Delete Equip. spare box no. and quantity

Change Tender spare quantity to 1 and Stock spar quantity to - 2

Page 8-96 Add Z-1001 - Desc. - Filter: low pass, 400-megacycles cut-off point, enclosed in metal case, rectangular base with seven cylindrical tubes from top of base to flat rectangular support, 7-7/16" lg x 5-3/4" h x 1-5/16" wd o/a, 50-watt capacity for continuous operation, insertion loss less than 1 db in pass band, for use with 50-ohm impedance coaxial cable, one UG-21/U connector each end

Function - Antenna Filter

Navy Type No. - 53349

Mfr. - Govt. Supplied

Dwg. No. - 445586-1

All Symbol Column - Z-1001

Total No. per Equip. - 1

- Pag 8-96 - Spar parts box, Dwg. No. 618948-504 - Change Tender spar quantity to - 2
- /Page 8-101 A-1502 - Change Desc. to - ... with four 35 to 40 lb load rating cup ...
- /Page 8-101 A-1503 - Change Desc. to - ... with four 35 to 40 lb load rating cup ...
Change Stock spare quantity to - 2
- /Page 8-101 A-1504 - Add Navy Type No. -10592
- /Page 8-101 A-1506 - Add Navy Type No. -62250
- /Page 8-101 A-1507 - Change Mfr. to - 1
Change Dwg. No. to - 894399-3
Change Equipment, Tender and Stock spare quantities to - 2, 6 and 10 respectively
Change Stock spare box # to - 4
- /Page 8-101 A-1508 - Change Mfr. to - 1
Change Dwg. No. to - 894399-4
Change Equipment, Tender and Stock spare quantities to - 1, 4 and 4 respectively
- /Page 8-101 A-1509 - Add Navy Type No. -10594
Change Total No. per Equip. to - 4
- /Page 8-102 A-1510 - Add Navy Type No. -10593
Change Total No. per Equip. to - 4
- /Page 8-102 A-1511 - Change Total No. per Equip. to - 4
- /Page 8-102 A-1512 - Add Mfr. - 1
Add Dwg. No. - 727653-502
Add A-1512 to All Symbol Desig.
Add quantity 4 to Total No. per Equip.
- /Page 8-102 A-1513 - Change Total No. per Equip. to - 16
Add Stock spare box #2 and quantity - 4
- /Page 8-102 A-1517 - Change Mfr. to - 1
Change Dwg. No. to - 894399-5
Change Total No. per Equip. to - 8
Change Equipment, Tender and Stock spare quantities to - 2, 8 and 8 respectively
- /Page 8-102 Add A-1518 - Desc. - Mount: vibration, rectangular base, approx 19-3/4" lg x 14-7/8" wd x 3-19/64" h ov rall, load rating 50 to 60 lbs, rubber cushion 3" diam x 1-1/2" free height, mtd by sq. plate 3" x 3" (shock mount purchased from L.N. Barry, type #C2060) assem has four 1/2" diam mtg holes on 11.750" x 15.50" mtg/c, approx weight 28 lbs, similar to Navy Type No. -10592 shock mount but less two stabilizing mounts
Function - Shock Mount for Receiver
Navy Type No. -10629
Mfr. - 1
Dwg. No. - 618931-506
All Symbol Desig. - A-1518
Total No. per Equip. - 1
Stock spare box #4, and quantity - 2

NAVSEIPS 900,719

- /Page 8-103 H-1505 - Change Total N . per Equip. to - 8
- /Page 8-103 H-1506 - Change Total No. per Equip. to - 8
Add Stock spare box #2, and quantity - 4
- /Page 8-103 H-1507 - Change Total No. per Equip. to - 8
- /Page 8-103 H-1508 - Change Total No. per Equip. to - 16
Add Stock spare box #2, and quantity - 4
- /Page 8-103 H-1509 - Change Total No. per Equip. to - 24
Add Stock spare box #2, and quantity - 4
- /Page 8-103 Add H-1514 - Desc. - Washer, lock: stainless steel, 0.334"
max ID x 0.584" max OD x 1/16" thk o/a; non-
linking type fits 5/16" screw
Function - For H-1506
Mfr. - 1
Dwg. No. - 895001-2
All Symbol Desig. - H-1514
Total No. per Equip. - 24
Stock spare box #2, and quantity - 4
- /Page 8-104 J-1502 - Add Navy Type No. -49025-A
- /Page 8-104 O-1502 - Change Dwg. No. to - 887546-2
- /Page 8-104 O-1503 - Change Desc. to - Gasket: neoprene, grade FR,
water seal 0.958" OD x 0.750" ID x 19/64" thk
o/a, hole in top 0.375" diam
- /Page 8-105 S-1501 - Add Navy Type No. -24989
- /Page 8-105 W-1501 - Add Navy Type No. -49989
- /Page 8-105 W-1502 - Add Navy Type No. -49990
- /Page 8-108 A-1014 - Add Navy Type No. -10591
- /Page 8-112 O-1202 - Change Dwg. No. to - 887546-2
- Page 8-113 W-1101 - Add Navy Type No. -62344
Change ASN to -3E4400-24



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CONTRACTUAL GUARANTEE

(a) The Contractor guarantees that at the time of delivery thereof the articles provided for under this contract will be free from any defects in material or workmanship and will conform to the requirements of this contract. Except as to vacuum tubes, batteries, rubber and material normally consumed in operation, the equipment, including all spare parts, is guaranteed for a period of one (1) year from the date of its delivery to and acceptance by the Government, with the understanding that all 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 shall not obligate the Contractor to repair or replace 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 unless the defect is not the result of normal expected shelf life deterioration. This guarantee shall then continue as to corrected or replacing articles or, if only parts of such articles are corrected or replaced, to such corrected or replacing parts, until one year after the date of redelivery.

(b) 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 the total quantity comprising such item furnished under the contract (but not less than two thereof) is found to be defective as to design, the entire item will be conclusively presumed to be of defective design and shall be subject to one hundred per cent (100%) correction or replacement by a suitably redesigned item.

(c) All defective items will be subject to ultimate return to the Contractor except that the exigencies of the naval service may necessitate expeditious repair of certain items in order to prevent extended interruption of communications and in such cases the return of the defective items for examination by the Contractor prior to repair or replacement shall not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure, will be acceptable as a basis for effecting expeditious adjustment under the provisions of this contractual guarantee.

(d) If the Government does not require correction or replacement of a defective or nonconforming article, the Contractor, if required by the contracting officer within a reasonable time after the notice of defect or nonconformance, shall repay such portion of the contract price as is equitable in the circumstances. Equitable in the circumstances is to be determined by mutual agreement between the Contractor and the contracting officer. Failure to agree to such adjustment shall be a dispute concerning a question of fact within the meaning of the section of this contract entitled "Disputes".

() Section 9 of the General Provisions, entitled "Guaranty" is hereby superseded and deleted, except as to vibrators, and as to which the terms of said section 9, limited to 90 days, shall apply.

INSTALLATION RECORDS

Contract No. NXsr 60008

4 May 1944

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 book shall be filled in at the time of installation. Operating personnel shall also mark the "date placed in service" on the date plate located on the equipment, using suitable methods and care to avoid damaging the equipment.

ORDERING 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.

FAILURE REPORTS

NAVY DEPARTMENT
BUREAU OF SHIPS
WASHINGTON, D. C.
OFFICIAL BUSINESS

NAVY DEPARTMENT
BUREAU OF SHIPS
ELECTRONICS DIVISION, CODE 900
WASHINGTON 25, D. C.

FAILURE REPORT—ELECTRONIC EQUIPMENT

NAVY DEPARTMENT
BUREAU OF SHIPS
WASHINGTON, D. C.

DATE: 7 OCT., 44

REPORT MADE BY: A. L. ABBOT, RAD. ELECT.

ELECTRONIC EQUIPMENT INVOLVED: **RESISTOR**

SHIP NAME: **USS ATTO (CVE 102)**

SHIP TYPE: **TBM-5**

CONTRACT NO.: **MS88 12747**

DATE CONTRACT INITIATED: **6/30/44**

ITEM WHICH FAILED: **RESISTOR**

DESCRIPTION OF FAILURE: **LOW PWR, MOLDED, PSEUDIC WIRE WOUND, 100 OHMS; 1/2 W. INSULATED PARTIAL OPEN, INCREASED RES. TO 18000 OHMS.**

TIME SINCE FAILURE: **3 MONTHS**

FAILURE OCCURRED IN: STOWAGE OPERATION HANDLING OTHER (CHECK OFF)

REASON OF FAILURE AND REMEDY (IF KNOWN):

REMARKS (Continued)

RECEIVER DEAD. SUBSEQUENT TESTS SHOWED A-432 TO READ 18000 OHMS INSTEAD OF 100 OHMS. THIS MAY HAVE BEEN DUE TO OVERHEATING, BUT SUBJECT A DEFECTIVE RESISTOR. THIS INCREASED RESISTANCE CAUSED THE FINAL STAGE TO BE BIASED BEYOND CUT-OFF, RESULTING IN A DEAD RECEIVER. REPLACED FROM STOCK; RECEIVER THEN NORMAL.

1. This form supersedes previous versions of Navy Form NBS 383 and 383. Previous instructions pertaining to the preparation and submission of these report forms are hereby cancelled to conform to current procedures.

2. This completed report form should be used to report immediately all failures (whatever the causal of electronic equipment parts (fuses and components) in Bureau of Ships, Code 900, Washington 25, D. C. No copies are required, fill in with TYPEWRITER, PEN, or PENCIL.

The purpose of this report is to indicate the cause and rate of failures, it will form the basis for improvements in design, and for contractual adjustments, and the latter action be in order. Adjustments of contractual matters will be made between authorized representatives of the Bureau and the contractor.

CONFIDENTIAL information is included in this report, mail in accordance with SECURITY REGULATIONS. TYPE and MODEL DESIGNATION is NOT confidential.

If appropriate NUMBER from table below to describe TYPE OF FAILURE. (This procedure will permit future analysis by IS machines.)

When by electrical means, a. a. shall be described.

When due to shock, a. a. shall be described.

When due to vibration, a. a. shall be described.

When due to mechanical failure, a. a. shall be described.

When due to chemical failure, a. a. shall be described.

When due to other causes, a. a. shall be described.

When number and number of hours overhauled are stamped on the body or base of guaranteed tubes. The date of acceptance by the ship's representative can be obtained from the Service, when it does not appear on a form accompanying the tube, and should be reported if not reported.

Non-guaranteed tubes are not marked as above, hence the date need not be stamped.

OF MATERIAL. All components or tubes failing should be disposed of in accordance with existing Safety and Security Regulations. Special action will be taken by the Bureau, depending on instructions or orders to comply. In the case of electronic equipment, any special action will be taken by the Bureau.

A FAILURE REPORT must be filled out for the failure of any part of the equipment (except tubes) whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NBS-383 (Rev. 3-45), which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS in the franked envelope which is provided. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example, under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as T-803, in the case of a transformer, or R-207, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of the failure and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from any RMO.

SAFETY NOTICE

WARNING

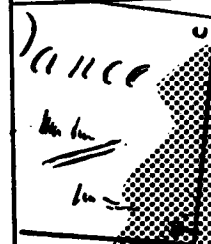
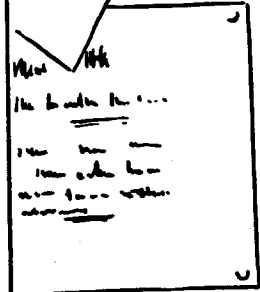
This equipment employs voltages which are dangerous if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

DONT change tubes or make adjustments inside the equipment with high voltage supply on. Do not depend upon switches for protection but always shut off power supply. Dangerous potentials may exist in the circuits with power controls in the off position. To avoid casualties always remove power, discharge and ground circuits prior to touching them.

DONT service or adjust alone. Under no circumstances should the equipment be serviced without the immediate presence of another person capable of rendering aid. In testing circuits, check for continuity and resistance in preference to checking voltages.

ATTENTION

Officers and operating personnel are directed to Chapter 67 of Bureau of Ships or superseding instructions on the subject of "Radio Precautions to be Observed."



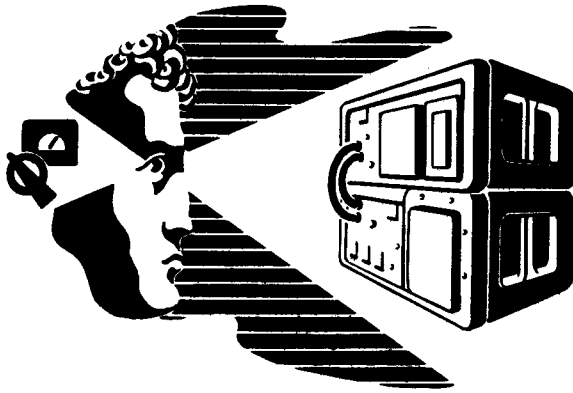
NOTICE:
An approved poster illustrating the rules for resuscitation by the prone pressure method shall be prominently displayed in each radio, radar or sonar enclosure. Posters may be obtained upon request to the Bureau of Medicine and Surgery.



NAVSHIPS 900,719

GENERAL DESCRIPTION

SECTION 1



M-A-R

RADIO TRANSMITTING AND
RECEIVING EQUIPMENT

RESTRICTED

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

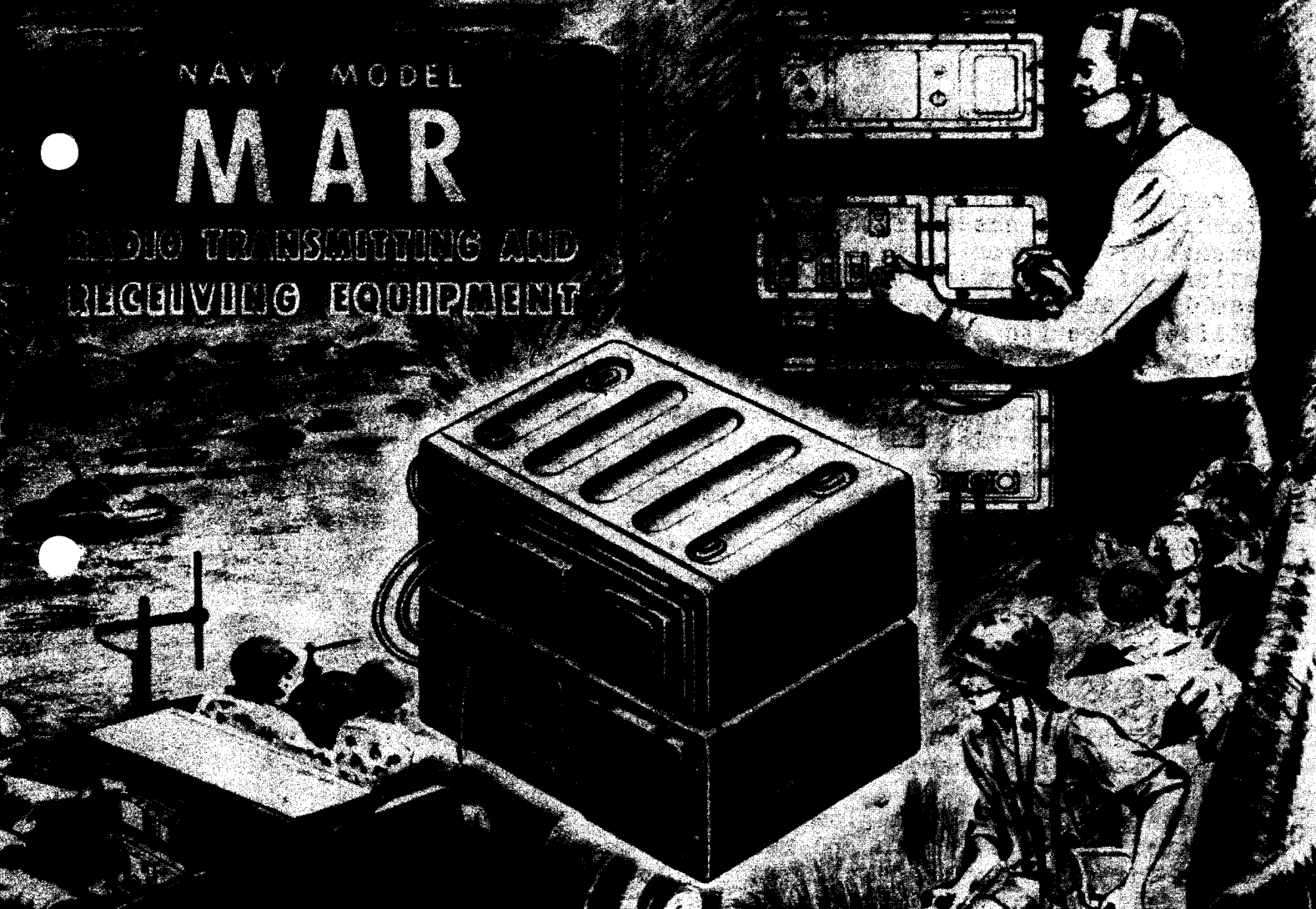
PHYSICS 435

1962-63

NAVY MODEL

MAR

RADIO TRANSMITTING AND RECEIVING EQUIPMENT



The MAR Radio Communication System has been developed as a general purpose transmitter and receiver, adaptable to a wide range of operating conditions and power supply characteristics. The equipment operates on any one of ten pre-set frequencies within the 225 to 390 megacycle band and provides both phone and MCW communication as desired. Rapid change of operating frequency is possible, requiring only the rotation of a channel selector switch on the panel of the transmitter unit. Both transmitter and receiver are tuned automatically to the selected frequency channel by a motor driven mechanism.

Two distinct types of installations are made possible by suitable application kits. One kit is used with shipboard installations, the other for field applications.

Remote operation of the equipment in field applications is possible with a remote control box that is connected to the radio equipment by a twisted pair of standard telephone wires. Both phone and keyed MCW communication may be carried on from the remote control box with distances up to a mile separating the control box and radio equipment. All components of the equipment are waterproof during shipment and splashproof during operation.

COMPONENTS OF BASIC MAR EQUIPMENT

The radio components of the equipment are assembled in two watertight metal cases of the same form and size. The Transmitter-Receiver case contains the radio frequency sections of the transmitter and the complete receiver assembly. The Modulator-Dynamotor case contains the speech amplifier circuits for modulating the transmitter and a dynamotor to provide the high voltage plate current for the operation of the transmitter and receiver from a 13 volt d-c source. A compartment at the right of the modulator-dynamotor case carries spare tubes and the operating accessories. Both cases have metal covers fitted with rubber gaskets to assure the units remaining watertight and buoyant upon complete immersion.

The transmitting and receiving equipment may be operated directly from a 13 volt d-c source. Thus, where such current is available the apparatus may be connected directly to the source of power. In other installations where 26, 110/220 v. d-c or 110/220 v. a-c must be utilized as the source of power, a Universal Power Supply having the same form as the radio units is employed to provide current of the correct characteristic for operating the equipment.

The cases are formed from aluminum, with the sides and ends corrugated to add strength and keep down the weight factor. Handles for carrying the equipment are located on the ends of the radio components. A wrench and screwdriver are clipped to the ends of the cases for removing covers of the cases. The entire equipment is finished in dull Marine green.

The illustration to the right shows the basic units of the MAR equipment as they would be grouped in a shipboard installation. The units making up the basic equipment are tabulated on page 1-4 with a list of the accessories furnished with the basic equipment. These include the operating accessories shown in the illustration and operating spare parts.

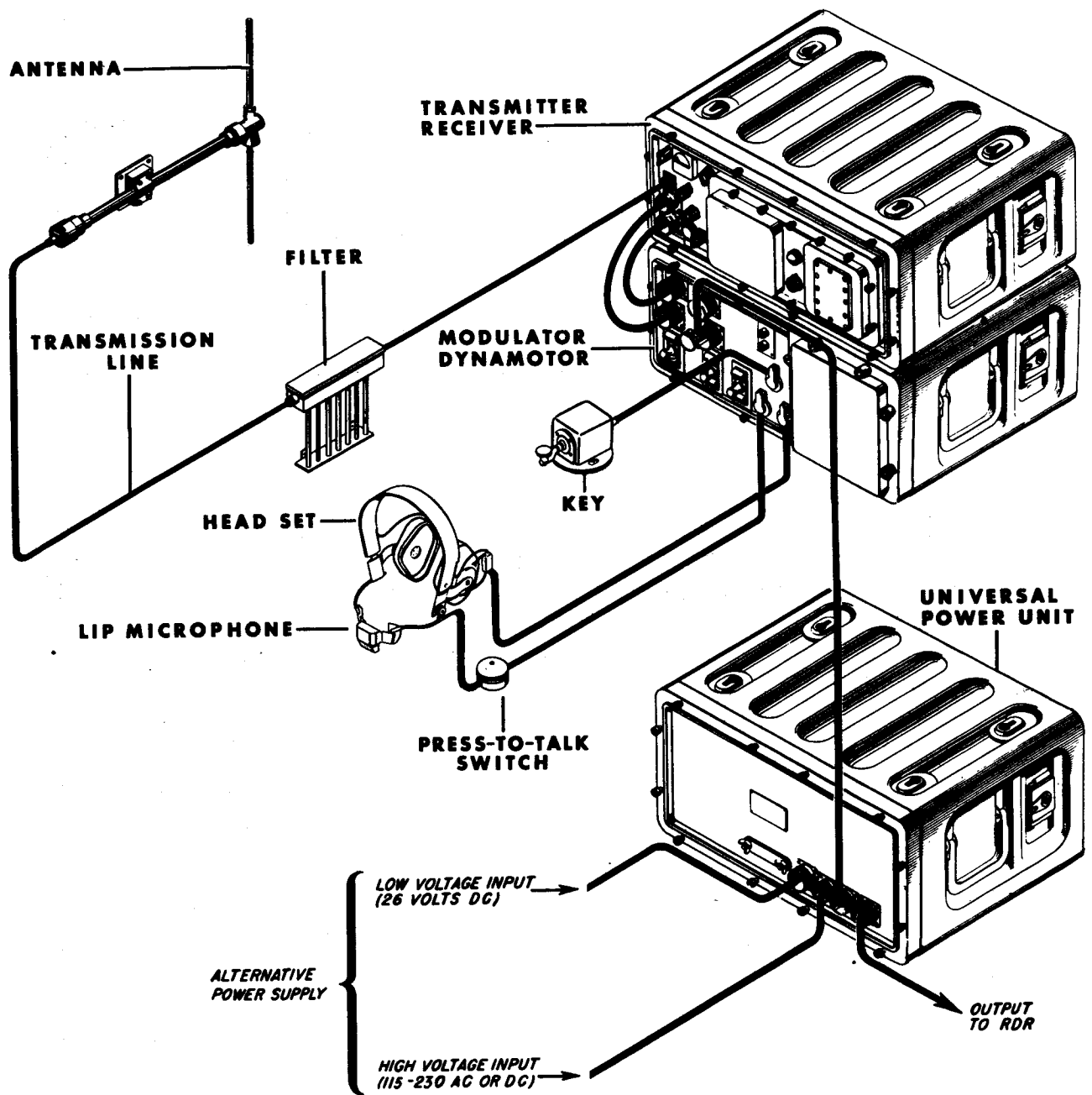
SHIPBOARD INSTALLATION KIT

The shipboard installation, listed on page 1-5, consists of the equipment required to install the basic units in any permanent location. It comprises the shock mounts necessary to protect the units from shock and vibration encountered on shipboard. Two junction boxes are included in the kit to permit extension of the operating control (voice transmission and reception) to locations remote from the radio equipment proper.

EQUIPMENT REQUIRED BUT NOT FURNISHED

Transmission Line cable, coaxial, Type RG 8/U or RG 10/U
Power Supply cable to Universal Power Supply
Transmission Line Filter furnished by Government

SHIPBOARD INSTALLATION



MAR BASIC UNITS

(Uncrated)

QUAN.	NAVY TYPE NO.	UNIT	WIDTH INCHES	DEPTH INCHES	HEIGHT INCHES	WEIGHT POUNDS
1	CRV-43067	Transmitter-Receiver	21-1/4	16-1/4	9-1/2	45
1	CRV-50248	Modulator-Dynamotor	21-1/4	16-1/4	9-1/2	45
1	CLG-20379	Universal Power Supply	21-1/4	16-1/4	10-7/8	100
1	CRV-66147	Antenna		25	22	3-1/2

BASIC ACCESSORIES

<p>IN MODULATOR-DYNAMOTOR COMPARTMENT</p> <p>1 Set of operating spare tubes - 1 of each type used</p> <p>1 Headset Navy Type CW-49507</p> <p>1 Headset extension cord Navy Type CW-49534</p> <p>1 Lip microphone Navy Type CW-51071</p> <p>1 Microphone extension cord Navy Type CW-49561</p> <p>1 Telegraph key without knee clamp Navy Type CAQZ-26026</p>	<p>WITH ANTENNA</p> <p>1 Shipboard clamp</p> <p>2 Transmission line connectors (loose) (UG 21/U)</p> <p>1 Coupling adaptor unit</p> <hr/> <p>IN ACCESSORY BOX</p> <p>2 Interconnecting cables for radio equipment</p> <p>1 Battery cable, with clips</p> <p>1 Input power cable from Universal power supply</p> <p>1 Set operating spares, less tubes</p> <p>2 Plugs for power supply cable</p>
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COMPONENTS OF SHIPBOARD KIT

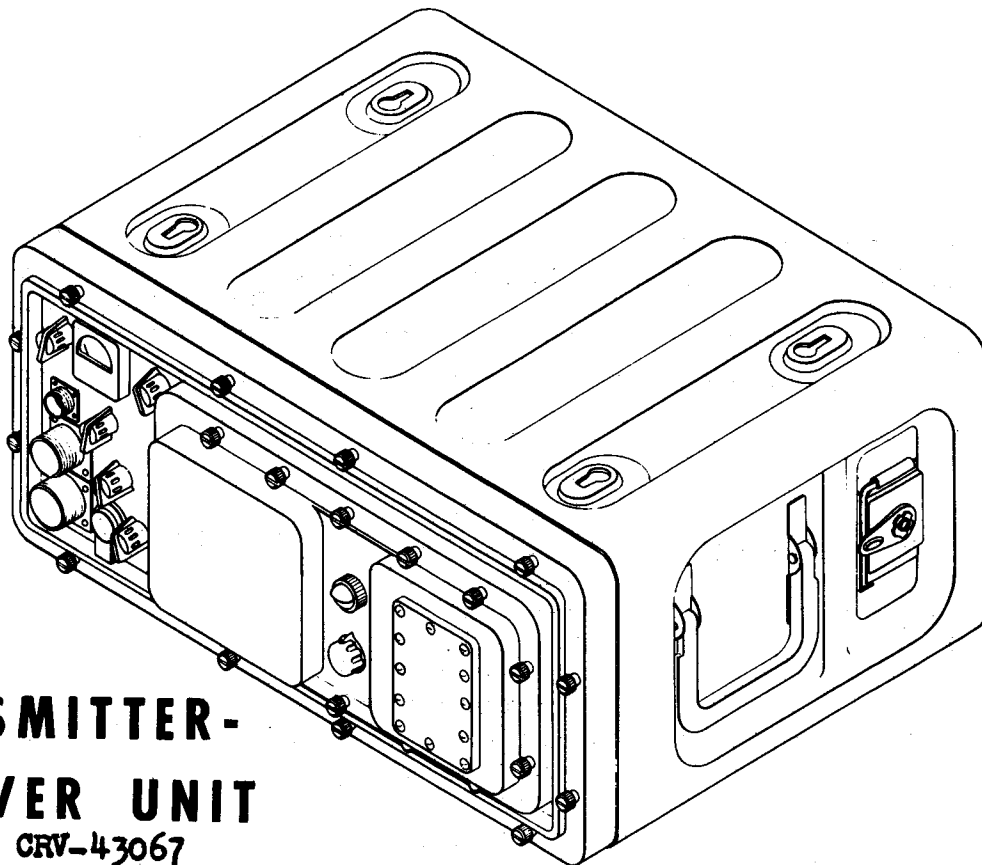
(Uncrated)

QUAN.	NAVY TYPE NO.	UNIT	WIDTH INCHES	DEPTH INCHES	HEIGHT INCHES	WEIGHT POUNDS
1	CRV-10507	*Shockmount Assembly for MAR Modulator-Dynamotor	19-3/4	14-7/8	3-5/16	32
2	CRV-10508	*Shockmount Assembly for MAR Transmitter-Receiver and RDR receiver	19-3/4	14-7/8	3-5/16	32
1	CRV-10592	*Shockmount Assembly for Universal Power Supply	19-3/4	14-7/8	3-5/16	32
2	CRV-62250	Junction Box	8	4-15/16	10-1/8	7

* Includes complete set of hardware for attaching to equipment cases

ACCESSORIES

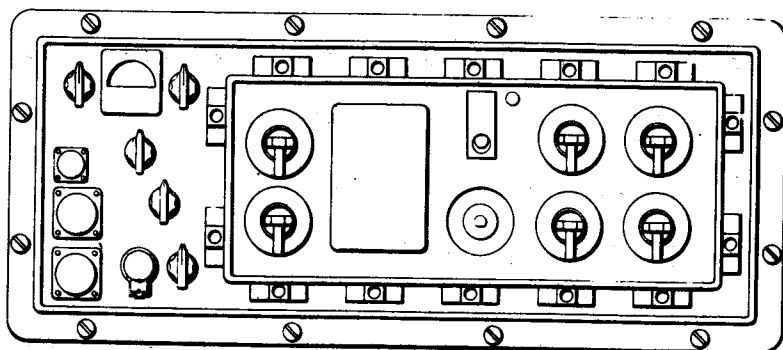
1	5 ft phone cord and plug (PL-55)
1	5 ft microphone cord and plug (PL-58)
1	type UG-23/U jack assembly
2	type UG-167/U reducing connectors
1	type UG-29/U coupling
1	type UG-21/U connector
1	pin for type UG-21/U plug



TRANSMITTER- RECEIVER UNIT

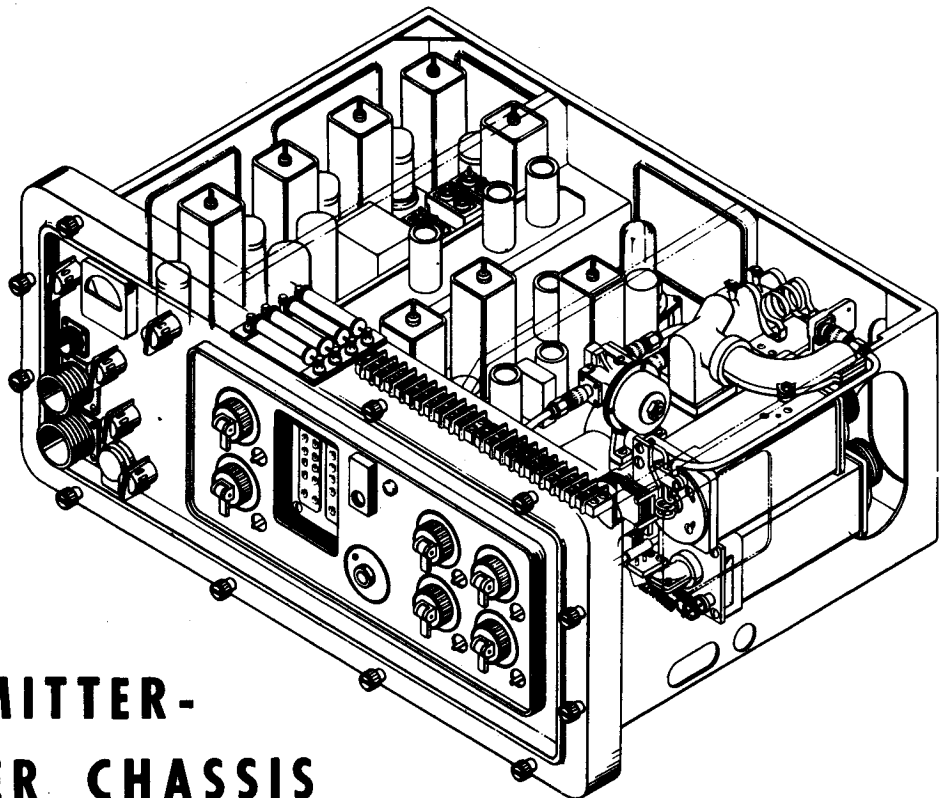
Navy Type CRV-43067

The radio frequency components of the transmitter and the radio receiver of the Basic MAR are contained in the unit shown. When the outer watertight cover of the transmitter-receiver is removed by means of the wrench or screwdriver attached to end of the unit it will be found that the operating controls are mounted on an exposed panel at the left as well as receptacles for cables to antenna and modulator-dynamotor unit. Tuning selectors and crystal oven are protected by a second cover fitted with a knob for operating the Channel Selector switch and a hooded panel light. Removal of this second panel is necessary only when tuning adjustments are to be made or the crystal oven is to be changed. Any one of the pre-set operating frequencies may be selected by manual operation of the Channel Selector switch.



Selection of channels of both the transmitter and receiver is accomplished by a motor driven automatic tuning mechanism under control of the Channel Selector switch. The tuning controls on the right-hand panel are really a group of mechanical selector mechanisms that can be set by means of an unlocking, tuning, locking sequence to preselect the ten different frequencies. After the selectors have been adjusted they require no further attention unless tubes or parts are replaced, when the settings may need rechecking. For this reason, the cover is left on the selector panel for normal operation.

The panel pilot light cap may be rotated to control the amount of illumination or eliminate it entirely.



TRANSMITTER- RECEIVER CHASSIS

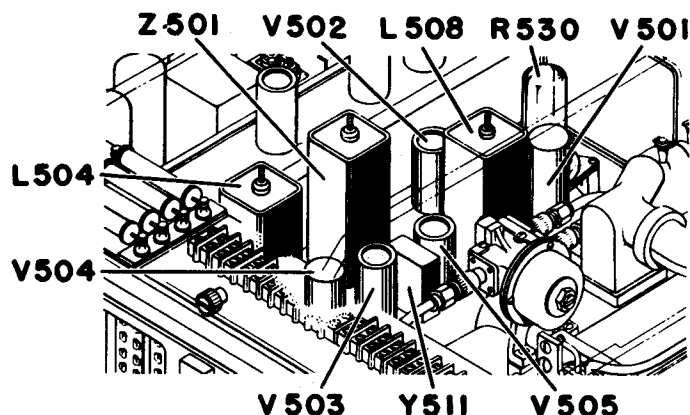
The chassis of the Transmitter-Receiver is divided mechanically and shielded electrically into six major sections as indicated in the view of the chassis shown above. These are known in the order they are to be discussed as:

Frequency Multiplier Section - Navy Type CRV-35093
Receiver Radio Frequency Section - Navy Type CRV-46269

Receiver Intermediate Frequency Section
Receiver Audio Frequency Section
Transmitter Section
Automatic Channel Selector

FREQUENCY MULTIPLIER SECTION

Navy Type CRV-35093



The purpose of this section is to provide the proper operating frequencies for the transmitter and the heterodyning frequency in the receiver section. It accomplishes this by utilizing a crystal in the crystal oven on the panel, as selected by the selector switch, as the control for the fundamental frequency of the oscillating circuit in one section of the tube V504. This frequency is doubled in the other section of V504 and tripled twice by tubes V503 and V502. The output of V502 is divided, a portion being fed into a third tripler located in the receiver radio frequency amplifier section, thus providing the heterodyning frequency for the receiver.

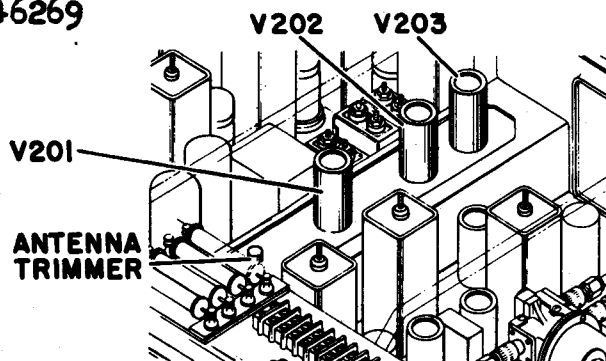
The other portion of the output from V502 is combined with the output of the fixed beat oscillating tube V505 by means of the converter tube V501. The fixed oscillator is controlled by crystal Y511 to operate at a frequency of 10.066 megacycles. The difference component, of the two frequencies fed into the converter tube V501, is selected in its output and fed to the power amplifier. The frequency is again tripled in the transmitter section to obtain the channel frequency for transmission. This method of obtaining both transmitter and receiver heterodyning frequencies results in an appreciable saving in the number of crystals required for a given number of operating channels.

The three adjustable-core coupling transformers for the multiplying stages are shown on top of the chassis. The variable capacitors for tuning the frequency multiplying circuits are ganged and mounted inside the case of the unit. The capacitors are coupled to the selector on the panel by means of a coupling on the shaft extending from the end of the casing of the unit.

A filament ballast tube R530 is connected into the heater circuits of the tripler tubes V502 and V503 to maintain essentially constant voltage across the heaters. This assures proper operation of these tubes over the permissible variation of equipment input voltage.

RECEIVER RADIO FREQUENCY SECTION

Navy Type CRV-46269



The radio frequency section of the receiver, consists of one radio frequency stage tuned to signal frequency, V201, the third tripler for the heterodyning frequency, V203, and the 1st detector or mixing tube V202.

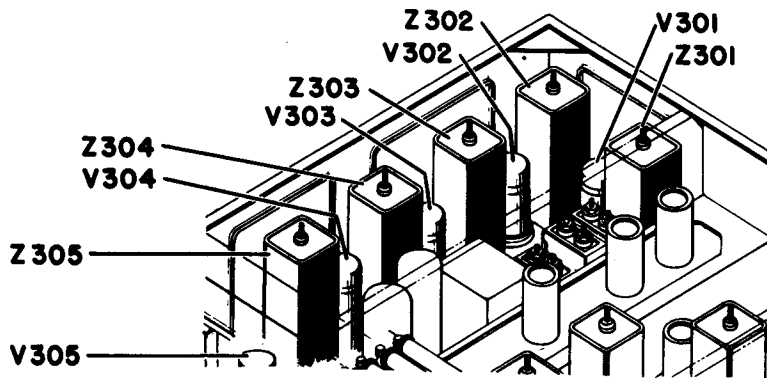
The above tubes are mounted on the top of the metal case that carries in its interior a gang of ten variable capacitors and associated tuning inductances. The capacitors are grouped in five pairs, each pair forming the tuning element of one of the five resonant circuits involved.

A tuned antenna circuit is inductively coupled to the tuned input circuit of the radio frequency amplifier tube V201. The coupling is such as to provide maximum signal gain consistent with good selectivity. The output circuit of the RF amplifier stage is tuned and likewise coupled inductively to the tuned input circuit of the first detector. This second tuned coupling arrangement acts to improve the signal to noise ratio and maintain selectivity against image and other spurious responses.

Another pair of variable capacitors is used to tune the plate circuit of the heterodyning frequency tripler, V203, the output of which is inductively coupled into the 1st detector to obtain the heterodyning action in the latter tube.

The ganged capacitors in the unit are driven through a shaft that extends from the end of the assembly and couples to the selector marked RF on the selector panel.

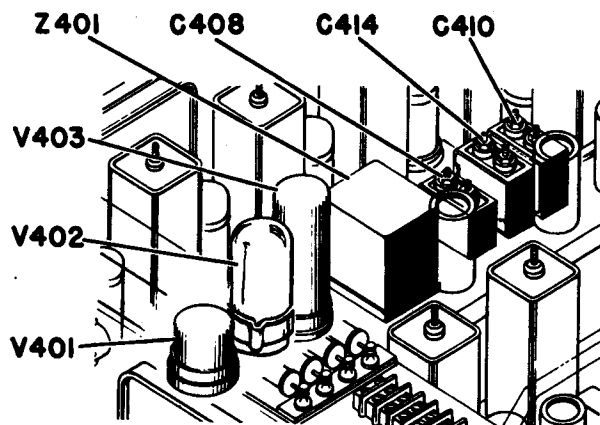
RECEIVER INTERMEDIATE FREQUENCY SECTION



The inverted L section at the left of the chassis contains the transformers and tubes of the intermediate frequency amplifier, and second detector. Five fixed tuned transformers, fitted with adjustable cores and fixed capacitors, serve to couple the four stages of amplification and diode detector V305.

From the components of output current of the 1st detector in the RF section, the transformer Z301 selects the 30.2 megacycle frequency for amplification. Four tubes, V301, V302, V303 and V304 coupled by the associated transformers, provide high amplification to feed the 2nd detector V305. V305 is a double diode, provides AVC control and acts as a detector. Necessary by-pass capacitors, biasing and filter resistors for the amplifier are mounted beneath the chassis, readily accessible from the bottom when the cover plate is removed.

RECEIVER AUDIO FREQUENCY SECTION



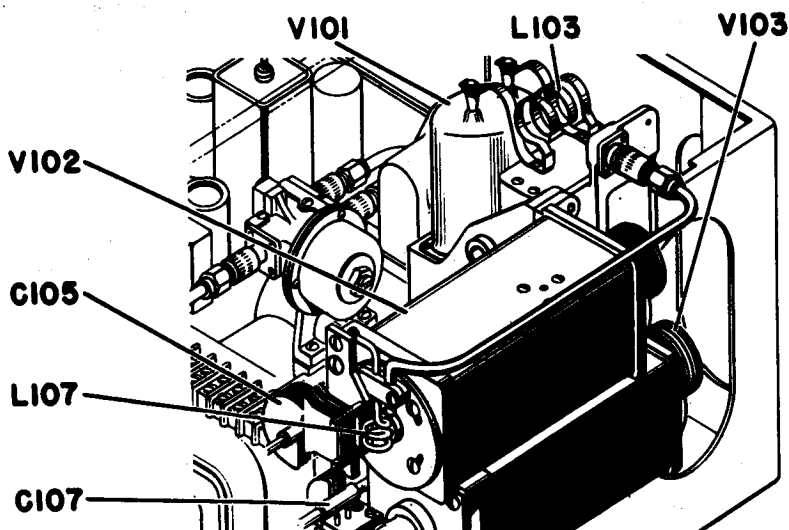
The three tubes in the audio frequency section of the receiver function as noise peak eliminator, meter rectifier and noise silencer, in addition to providing two stages of audio frequency amplification. The equipment is designed for headset reception, but one-watt output is available for loudspeaker operation if desired.

The first tube in this section, V401, is a double diode, one section being connected to act as a rectifier in the panel meter circuit when readings are taken with a-c supply. The second section of the tube acts as a noise peak eliminator, cutting off signals during noise peaks.

The second tube in this section, V402, is a double triode, one section acting as the "silencer" amplifier, the other as the first stage of audio amplification. The silencer section of the tube functions to control the bias on the grid of the amplifying section of the tube to render it inoperative and the receiver silent during no signal periods.

The final stage of audio amplification is obtained in tube V403. Its output is coupled through the filtering network to the output circuits of the equipment.

TRANSMITTER SECTION



At the right of the chassis is assembled the transmitter section which employs three tubes. In this compartment is mounted the antenna transfer relay, tuning motor relay, and a small blower for cooling the tubes.

The input of the amplifier tube V101 is coupled to the output of the converter tube in the multiplier section by means of a link circuit. This first amplifier is of double pentode construction and works push-pull with its center-tapped plate inductance shown at L103. Tuning of input and output circuits of V101 is accomplished by means of variable capacitors coupled to the 1st IPA selector on the panel. The output is coupled through a link circuit, with a one-turn loop at each end, to the input of the tripler tube V102.

The tripler tube V102 is mounted in a metal housing with an inner metal tube attached to one end as indicated in the schematic circuit at end of section 2, in heavy lines around the tube.

The metal housing and inner metal sleeve form a modified form of resonant tank circuit, the grid acting as a shield between cathode and plate circuits. The resonant frequencies of the grid-plate and grid-cathode tank are adjustable by variable capacitors controlled by the selector, 2nd IPA, on the tuning panel.

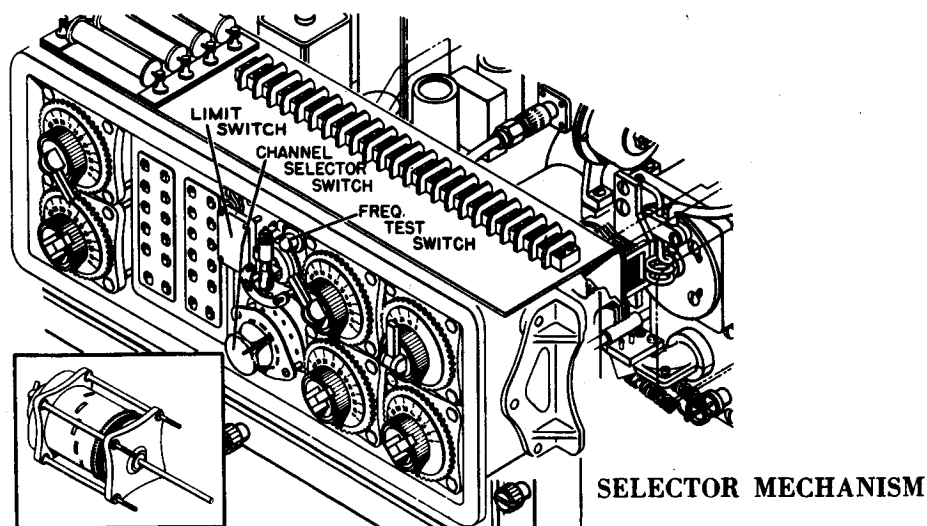
The power amplifier tube V103 is mounted in a manner similar to that employed with the tripling amplifier V102. The resonant concentric grid-plate tank circuit of this tube is adjusted by means of capacitors controlled by a common shaft coupled to the PA selector dial on the panel.

Output to the antenna is through a small coupling loop in the case forming the grid-plate circuit of the power amplifier, the loop being adjustable so the proper load impedance may be reflected back on the tube for maximum radio frequency output with permissible plate load. The coupling to the antenna is controlled by the Ant. selector dial on the selector panel.

AUTOMATIC CHANNEL SELECTOR

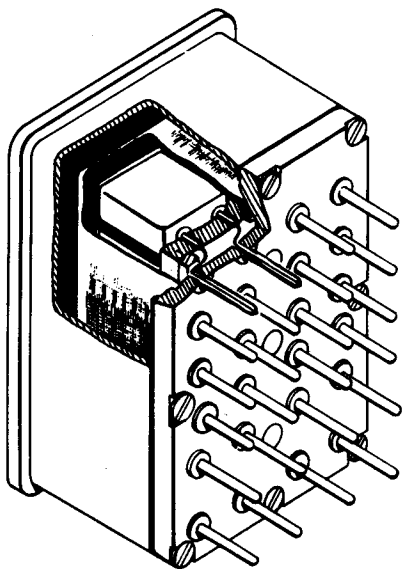
The automatic tuning or channel selector mechanism is a compact motor driven device occupying the space behind the panel at the right of the chassis. The illustration shows the appearance of the unit with front panel removed. An additional view shows a selector with its shaft extending at the rear for coupling to the driven tuning components.

The selectors can be set to a series of ten frequencies as required for the crystals provided, by a sequence of adjustments. This involves the setting of the channel selector switch on the first point, the tuning mechanism driving a switch that connects a crystal from the bank of ten in the crystal oven into the oscillator circuit. The selector dials are unlocked by raising the lever on the dials, the equipment tuned to the frequency selected, using the panel meter to determine resonance points and the dials relocked by depressing the levers. A setting of the channel selector switch is made for another frequency, and the process of unlocking, tuning, and locking the dials repeated. In this manner it is possible to pre-tune the equipment for ten frequencies within the 225 to 390 megacycle band, any of which being then available for use by simply rotating the selector switch to the channel frequency desired.



The mechanism is driven by a small motor in the rear, visible in the top view of the chassis. The sequence of operation is as follows: When the Channel Selector switch is moved to change the frequency, a section of the switch operates a relay to close the motor circuit. The motor turns all the selectors and the crystal selecting switch to a new position by means of worm and spur gears. The rotating mechanism drives a homing switch which acts to open the relay circuit when it reaches a point corresponding to the position of the selector switch. The opening of the relay circuit causes the relay armature to drop back and another set of contacts are closed. This causes the motor rotation to be reversed. The motor continues running in the reverse direction until the driving mechanism has returned to its original position. When the original position is reached, the limit switch is opened by a cam, the motor stops, and the mechanism is ready for another tuning excursion.

The selectors operate as follows. In the forward direction the motor drives an outer drum on each selector that has ten slots. Each slot corresponds to one of the positions of the homing switch. Thus the slot corresponding to the position selected will stop in the proper location. A pawl for the position selected will be cocked and when the motor reverses its direction, the pawl will drop into a slot in an associated disc on the tuning shaft which will hold the capacitor or other driven device at the desired position. As the motor drive continues in the reverse direction, a slipping clutch permits the driven mechanism to remain correctly positioned with the pawl latched into the proper slot. The reversing mechanism strikes a limit switch and the motor stops. In this position the pawls will be locked in and the equipment tuned to the new frequency.



CRYSTAL OVEN

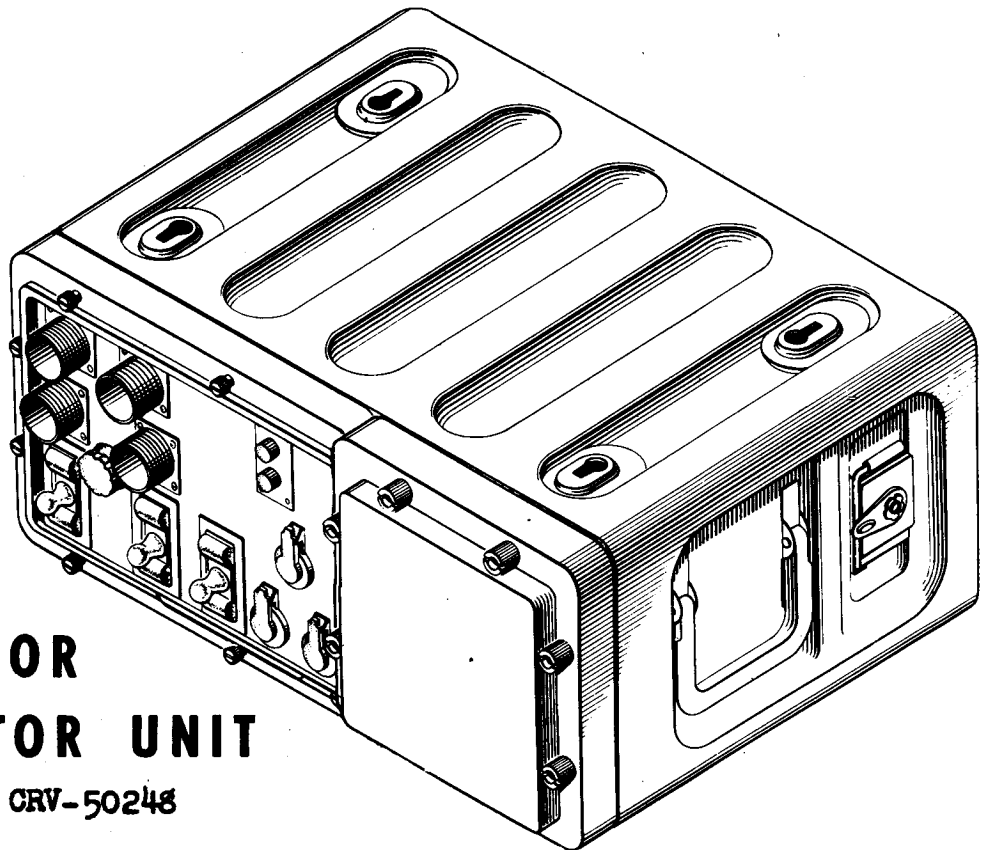
Navy Type CFT-40148

The ten crystals controlling the basic frequency generated in the oscillator section of V504 are grouped and mounted in the compact unit shown in the illustration. The crystals are of the hermetically sealed miniature type CR-7E/U and the terminal pins of the individual crystal holders fit into jacks inside the unit, that connect to pins on the rear of the unit. The cover may be removed from the unit for the replacement or installation of individual crystal holders.

The unit has two built-in, thermostatically-controlled heating units to maintain the crystals at a fixed temperature. This prevents any shift in frequency that might occur with changes in the crystal temperature.

Of the two heating units provided, one is a booster unit intended to bring the temperature of the oven to operating temperatures as rapidly as possible when the equipment is first switched on. When the proper temperature has been reached, the booster heater cuts off and the second heating unit functions to take care of any further fluctuations of temperature.

The crystal oven is fitted with twenty-four pins at the rear, twenty of the pins connecting to the ten crystal terminals while the other four pins are the heating unit terminals. The Crystal Oven plugs into a jack panel in the receiver selector unit to make the necessary connections to the switching mechanism behind the jack panel. The crystal switching mechanism is coupled to the tuning-motor gear-train and functions to connect the proper crystal into the circuit for any setting of the selector dials.



MODULATOR DYNAMOTOR UNIT

Navy Type CRV-50248

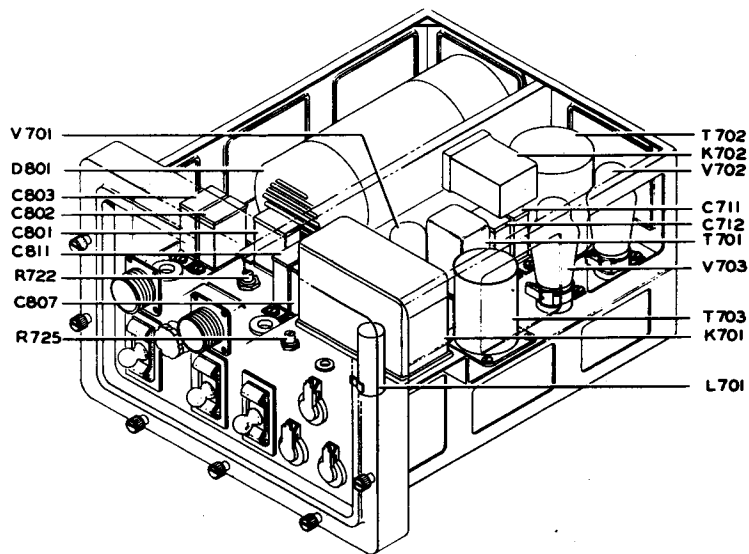
The partitioned metal case of the Modulator-Dynamotor Unit shown, houses in the left-hand section, the audio amplifier used to modulate the carrier wave of the transmitter unit and the 13 V dynamotor unit. The circuit of the amplifier includes a switching arrangement that causes the generation of the 1200 cycle modulating frequency current used to modulate the transmitter for the MCW transmission.

The panel mounts the switches necessary for the control of the equipment, jacks and receptacles for the attachment of power supply and interconnecting cables, as well as jacks for the microphone, headset and telegraph key. Terminals are likewise provided for the attachment of the line wires to the remote control unit used in field application.

The right-hand section of the case provides a storage space for the accessories and a spare tube of each type used in the equipment.

Individual covers are provided for the two sections of the case. These covers are fitted with rubber gaskets to make a watertight seal when the covers are fastened in place with the thumbscrews. With the cover removed, the equipment is still splash-proof in that switches are protected with a flexible rubber sheath and the jacks are fitted with hinged covers which must be raised to insert the plugs on the operating accessories.

The dynamotor housed in this unit furnishes the high voltage d-c for the tube plate circuits and other purposes in the equipment where such current is necessary. The unit consists of a 13V d-c motor and 375V d-c generator in a common housing, shockmounted to prevent vibration from being transmitted and affecting other parts of the equipment. Fuses are provided in the input and output circuits of the dynamotor to prevent damage to the unit from excessive overload or short circuits.



MODULATOR- DYNAMOTOR CHASSIS

The chassis of the Modulator-Dynamotor unit is divided into two sections lengthwise as shown above in the top view of the chassis. The right-hand section contains the speech amplifying circuit for modulating the transmitter. The dynamotor is mounted in the left-hand compartment.

On top of the chassis in the speech amplifying section are mounted the three tubes and necessary transformers. Associated resistors and by-pass condensers are located below the chassis. The speech input transformer T703 has two primary windings, one to match the local microphone to the tube input impedance, the other to match the line input to the tube. The secondary of the transformer is connected across a potentiometer mounted on the chassis to permit adjustment of the audio input to one section of the double triode tube V701. By means of a phase inverting circuit, the second section of V701 is activated to form the other half of a push-pull stage to drive the modulator tubes.

The output of tube V701 is resistance-coupled into a push-pull modulator stage consisting of V702 and V703. The plate circuits of the latter are coupled by modulation transformer T702 into the plate circuit of the power amplifier to provide carrier modulation.

A switching system controlled by the MCW-Phone switch is arranged to connect the windings of transformer T701 into the grid and plate circuits of the speech input section of V701. The audio oscillations thus generated serve to modulate the transmitter output when a key plugged into the jack on the panel is operated.

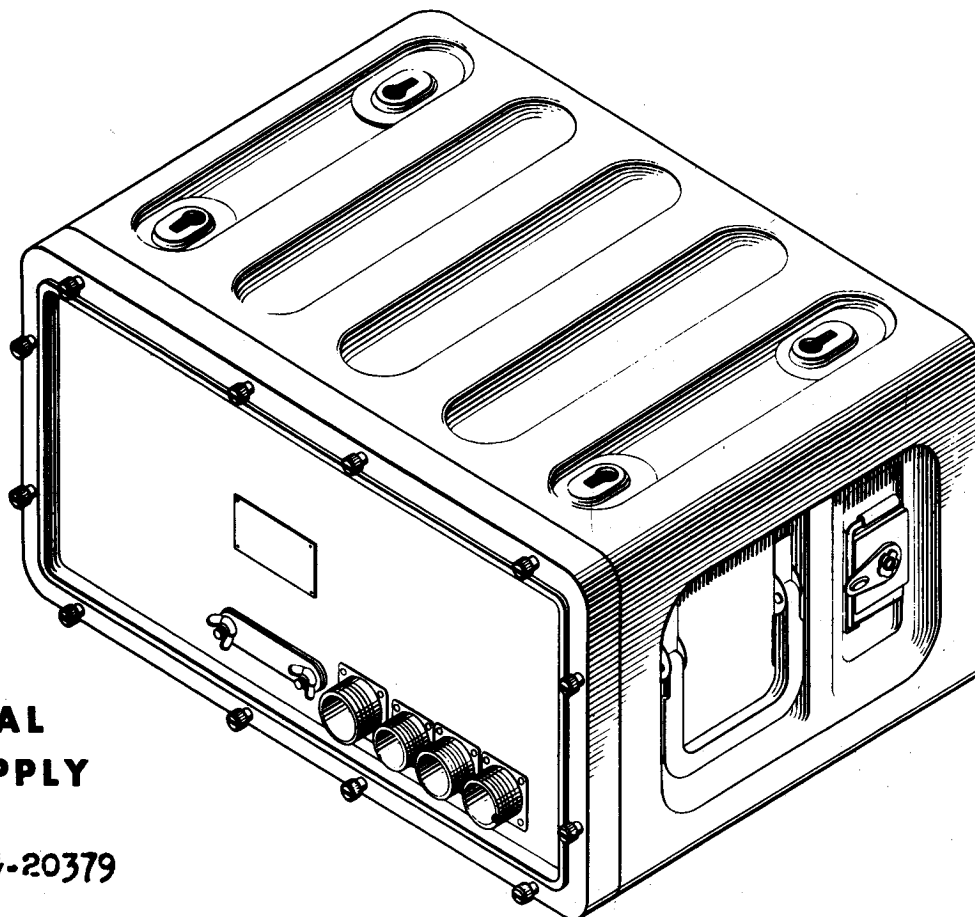
The dynamotor in the other section of the chassis is essentially a motor generator, the motor end being driven by the 13V direct current supply. The generator end is capable of delivering 375 volts, 500 ma output. This high voltage current is used for the plate supply for the tubes in both transmitter and receiver and operation of the tuning mechanism. The current for the heaters of the tubes is obtained direct from the 13 volt supply. Necessary capacitors and filters are included to smooth out any ripples in the generator current and to prevent interference from brush action in the generator.

UNIVERSAL POWER SUPPLY

For shipboard installations, where the primary source of power is other than 13V d-c, a universal power supply unit is furnished. The unit is mounted on a chassis contained in a watertight case with gasketed cover similar in appearance to the radio units but slightly larger in dimensions. The front panel is fitted with four receptacles as shown, the two at left for 26V d-c input and 110-220V input of either a-c or d-c. The other two receptacles are for output to the MAR transmitter-receiver and for a RDR receiver when combined with the equipment.

Switches, adjustable from the rear of the chassis and accessible only on withdrawal of the chassis from the case, permit the setting of the supply unit to operate on 26V dc, 115-230V dc or 115-230V ac. Normal variations from these voltages are compensated for by a Hi-Med-Low switch.

When operating on d-c, a system of vibrators is used to convert the input current to square wave a-c for operating transformers that supply both the 13V output for the filament circuits of the radio equipment and the 370V for plate circuits. Two gas-filled rectifier tubes rectify the transformer output and a filter system attenuates the a-c components of the output to a level inaudible in the receiver.



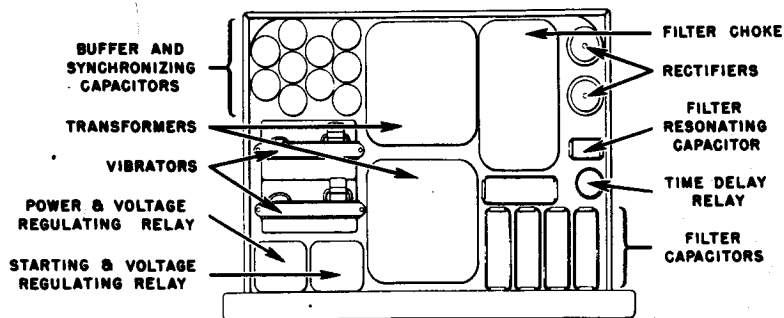
**UNIVERSAL
POWER SUPPLY**

Navy Type CLG-20379

The components of the unit, including vibrators, transformers, rectifier tubes and filter system are mounted on top of the chassis as shown below. The smaller items, such as resistors, switches and capacitors, are beneath the chassis.

There are two 13V a-c outputs. The first, for the MAR, is capable of delivering 110 watts; the second, for the RDR, will furnish up to 50 watts. The nominal plate voltage output is 370V d-c with a load capacity of 225 watts.

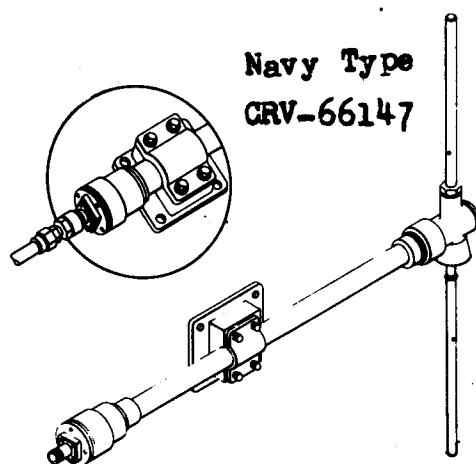
NOTE: The Universal Power Supply is also referenced as the AC-DC Power Supply.



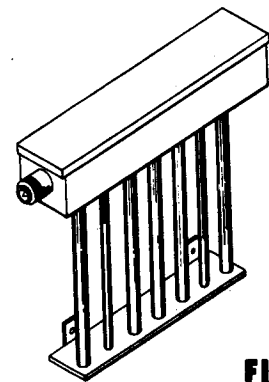
ANTENNA

The antenna is of the halfwave, center-fed dipole type and is furnished complete with bracket, as shown in the illustration, for shipboard installations. The two radiating rods extend at right angles from the end of the tubular mounting member and are screwed into threaded studs for assembly. One rod is grounded to the supporting tube and outer conductor of the coaxial transmission line. The "live" rod, extending downward, is supported by an insulated stud; and is connected to the center lead of the antenna.

The antenna is designed to have an impedance of approximately 50 ohms with characteristics that result in good matching with the transmission line over the full frequency range of 225 to 390 megacycles used in the equipment. No adjustments of the antenna are necessary when frequency changes are made. Antenna transmission line cable is not furnished for shipboard installations but two UG 21/U plugs are included for making up the line from stock RG 8/U coaxial cable.



Navy Type
CRV-66147



FILTER

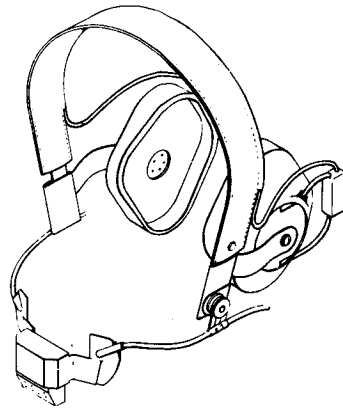
Navy Type ---53349

TRANSMISSION LINE FILTER

The filter assembly is shown in the illustration and consists of a series of tubular resonators that prevent the passage of frequencies above 400 megacycles. It is connected into the transmission line by means of UG 58/U receptacles at the ends of the top section of the assembly. The UG 21/U plugs furnished with the MAR accessories and shipboard installation kit are fitted to stock coaxial cable, cut to suitable lengths, and connected to the receptacles on the filter assembly. The filter is mounted as close to the radio equipment as conditions permit. After installation, the filter requires only routine inspection for mechanical damage.

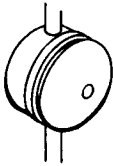
HEADSET-LIP MICROPHONE

Headset Navy type-CW-49507
 Headset extension cord .. Navy type-CW-49534
 Lip Microphone Navy type-CW-51071



The headset and lip microphone are clipped together to form a unit when in use. A leather covered headband, adjustable as to length, supports the waterproof ear pieces which have a combined resistance of 600 ohms. An extension cord fitted with a plug and jack serves to connect the headset to the equipment. The headband is fitted with snap fasteners, onto which the microphone may be clipped.

The microphone, of the noise-cancelling, single-button, carbon type is to be fitted over the lip. Two flexible cords, fitted with fasteners, provide for clipping the cords to matching fasteners on the headband. The supporting cords of the microphone permit fitting the microphone snugly in place.



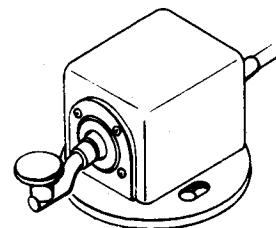
PRESS-TO-TALK SWITCH

Navy Type CW-49561

An extension cord, fitted with a waterproof press-to-talk switch, is used to connect the microphone to the radio equipment. Operation of the press-to-talk switch controls the operation of the transmitter and receiver.

TELEGRAPH KEY

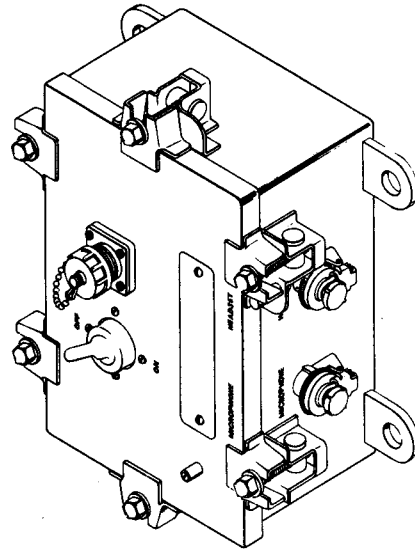
Key, Navy Type CAQZ-26026
 Leg Clip, Navy Type CAQZ-10531
 Key and Leg Clip, Navy Type CAQZ-26022



The key used is also of the waterproof type, with contact mechanism in a metal case. The lever of the key is fitted with a rubber sheath where it extends from the rectangular case. A cord is permanently attached to key with a plug to connect the key to the equipment.

JUNCTION BOX

Navy Type CRV-62250



Two junction boxes are furnished with the shipboard installation kit as shown in the illustration. These boxes, in conjunction with a microphone cord fitted with a SC type PL-58 plug and a phone cord fitted with a SC type PL-55 plug are used to provide remote operation of the equipment.

The box consists of a rectangular metal housing, fitted with four ears for mounting on a bulkhead or other convenient structure. The interior of the box has two terminal strips for making connections to the electrical fittings on the box and to external wiring. The side of the box mounts splashproof phone jacks for plugging in the headset and lip microphone extension cords.

The outer edge of the box supports six pivoted capscrews for attaching the waterproof cover. The cover of the box has 6 slotted ears around the edge and a recessed rubber gasket on the back. This arrangement permits the cover being assembled on the box to make a watertight joint by swinging the capscrews into the slotted ears on the cover and tightening.

The cover is fitted with a five contact receptacle, covered when not in use by a metal cap, for attaching a handset. A splashproof switch on the cover can be connected to control any of the circuits or a local loudspeaker, if one is added to the installation. The entire box is finished inside and out in Marine Corp Green.

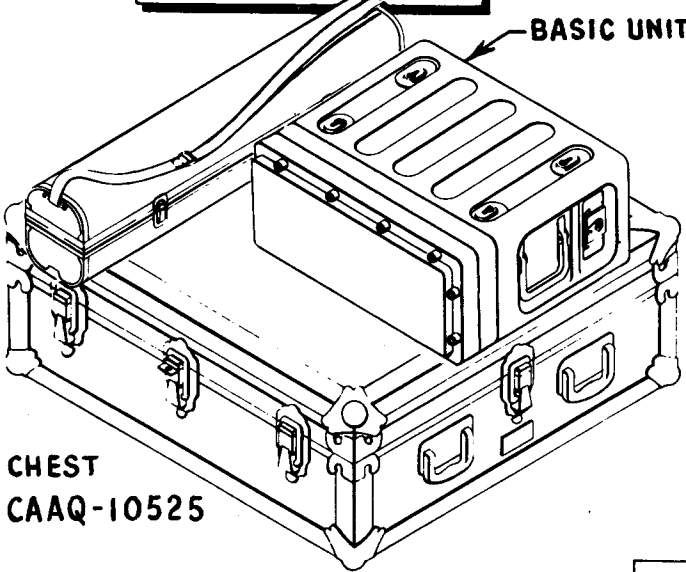
Details of such remote control circuits will vary with conditions of installation but by their use it is possible to plug in a headset and microphone or a handset at either junction box for operating the radio equipment for voice communication. No provision is made for CW signaling from such remote stations.

MAR FIELD EQUIPMENT
WITH BASIC
UNITS

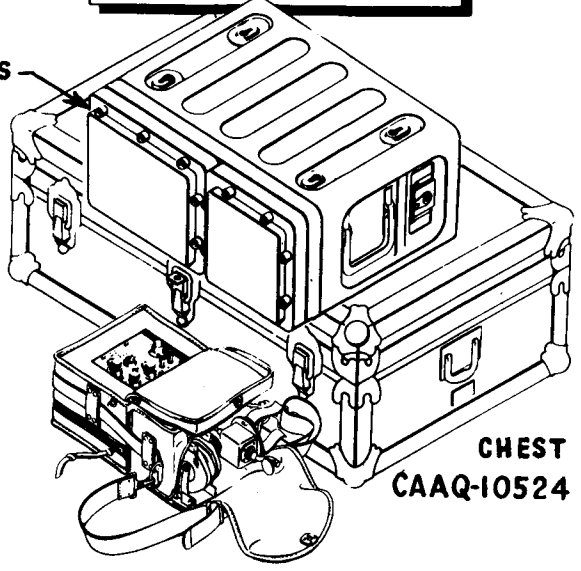
TRANSMITTER RECEIVER
OR
RDR RECEIVER
ANTENNA CARRYING CASE

MODULATOR-DYNAMOTOR
REMOTE CONTROL

BASIC UNITS



CHEST
CAAQ-10525

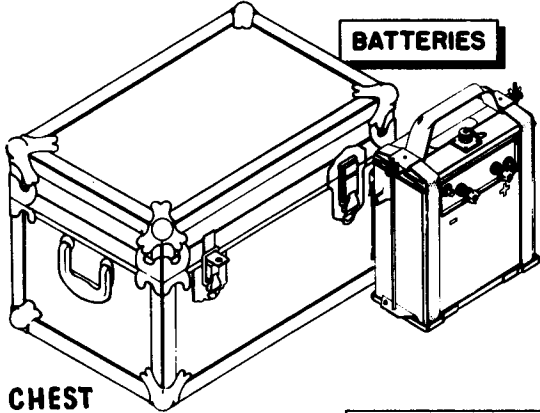


CHEST
CAAQ-10524

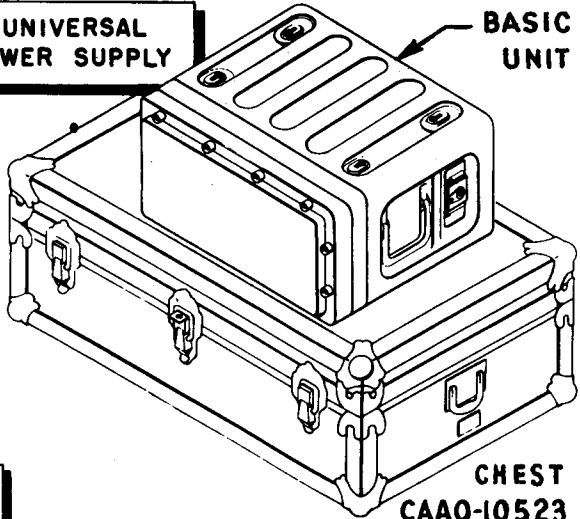
BATTERIES

UNIVERSAL
POWER SUPPLY

BASIC
UNIT



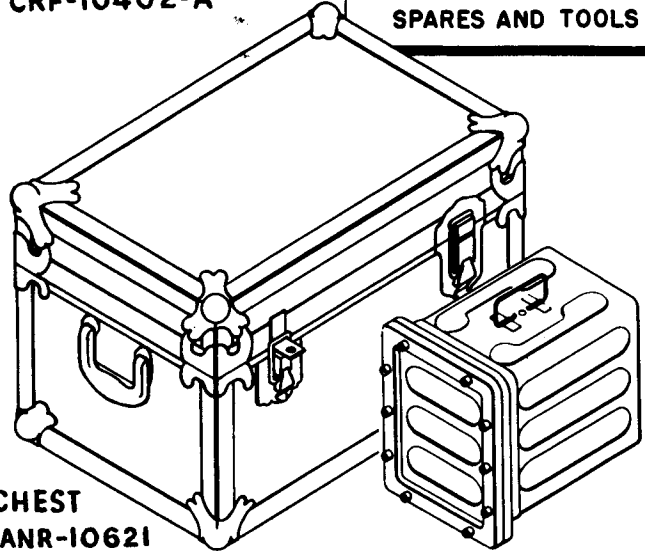
CHEST
CRF-10402-A



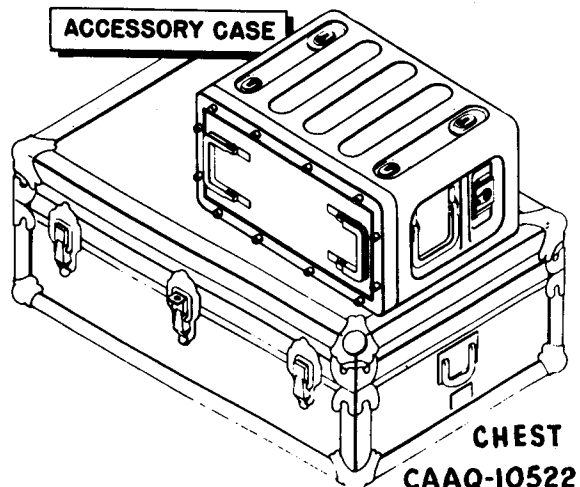
CHEST
CAAQ-10523

GAS ENGINE GENERATOR
SPARES AND TOOLS

ACCESSORY CASE



CHEST
CANR-10621



CHEST
CAAQ-10522

FIELD APPLICATION KIT

To facilitate transportation and use of the MAR equipment in the field, a field application kit is furnished. A set of heavy luggage type chests are provided to store and transport the equipment. These chests provide space for the basic MAR units and the complete assembly of the chests with the equipment, including the basic units, for field operation is shown properly grouped on the opposite page. On page 1-25 is shown a diagrammatic view of the MAR equipment as set up for field use.

COMPONENTS OF FIELD APPLICATION KIT

Quan.	Navy Type No.	Description
1	CAAQ-10522	Shipping Chest, containing; 1 CRV-10485 Accessory box 1 50' Antenna cable 12 Silica gel dryer assemblies 1 Battery interconnecting cable 1 CAQZ-10531 Telegraph key with knee clamp 4 CRV-10505 Cabinet fasteners
1	CAAQ-10523	Shipping Chest only for shipping AC-DC Power Supply
1	CAAQ-10524	Shipping Chest, containing; 1 CAVO-10486 Canvas case 1 CRV-23485 Remote Control Unit 1 CW-49507 Headset 1 CW-49534 Headset extension cord 1 CW-51071 Lip Microphone 1 CW-49561 Microphone extension cord 1 CAQZ-26022 Telegraph key knee clamp Space is provided for the following which must be obtained from basic MAR equipment 1 CRV-50248 Modulator-Dynamotor
1	CAAQ-10525	Shipping Chest, containing; 1 Antenna carrying case 1 Chain Clamp 1 10' Antenna cable 1 Wrench 2 Rubber plugs 1 Cap assembly Space is provided for either one of the following which must be obtained from basic MAR or RDR equipment 1 CRV-43067 Transmitter-Receiver 1 CRV-46283 RDR Receiver

COMPONENTS OF FIELD APPLICATION KIT (Continued)

Quan.	Navy Type No.	Description
1	CRF-10402-A	Shipping Chest, containing; 2 CRF-19017 Storage batteries (Government Furnished)
1	CANR-10621	1 Filler Syringe Shipping Chest, containing; 1 CBDV-10602 Metal case 1 CCW-73037 Gas Engine Generator 1 -----62251 2 conductor cable 1 Can, 1 qt, oil 1 Can, 1 gal, gasoline 1 Set operating spares and tools

FIELD APPLICATION KIT

Chest Dimensions and Weight (Uncrated)

Quan.	Navy Type No.	Length Inches	Width Inches	Height Inches	*Weight Pounds
1	CRF-10402-A	23	16	14-3/4	108
1	CAAQ-10522	31-1/4	20-1/2	14-5/8	96
1	CAAQ-10523	31-1/4	20-1/2	14-5/8	61
1	CAAQ-10524	38-1/8	20-1/2	13-1/4	80
1	CAAQ-10525	37-1/4	30-3/4	13-1/4	106
1	CANR-10621	28-1/4	21-7/8	20	

* Weight Includes Chests and Contents

BASIC MAR EQUIPMENT

Required with Field Application Kit for Field Operation

Quan.	Navy Type No.	Description	To be Placed in Shipping Chest
1	CRV-43067	*Transmitter-Receiver	CAAQ-10525
1	CRV-66147	Antenna	CAAQ-10525
1	CRV-50248	Modulator-Dynamotor	CAAQ-10524
1	CLG-20379	Universal Power Supply	CAAQ-10523

* NOTE: RDR receiver, Navy Type CRV-46283, may be shipped in place of MAR Transmitter-Receiver

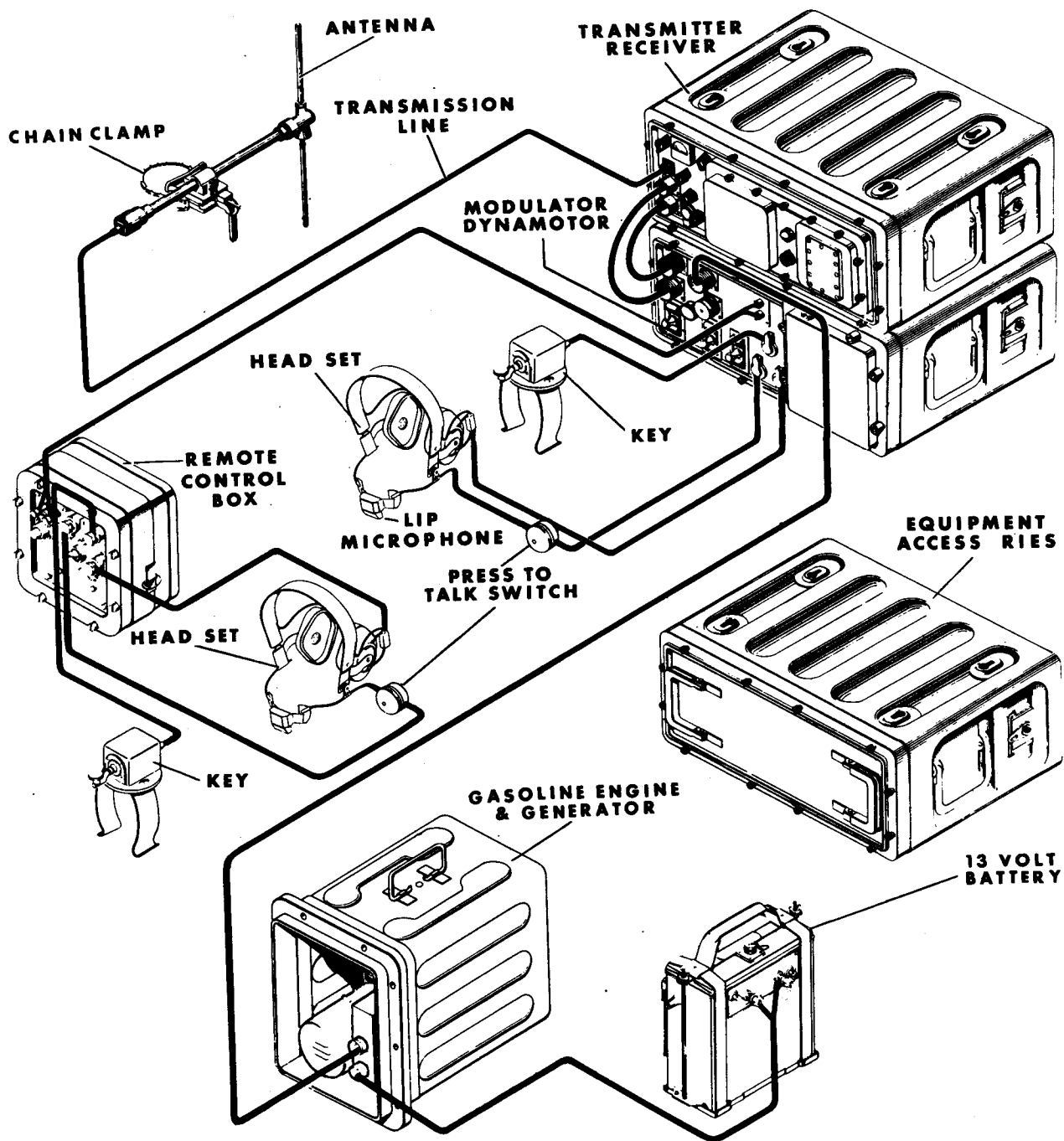
EQUIPMENT REQUIRED - NOT FURNISHED

3 Flashlight cells (BA30 or Navy type C) for remote control box
Telephone wire (type W110-B) for line to remote control box

SHIPPING CHESTS

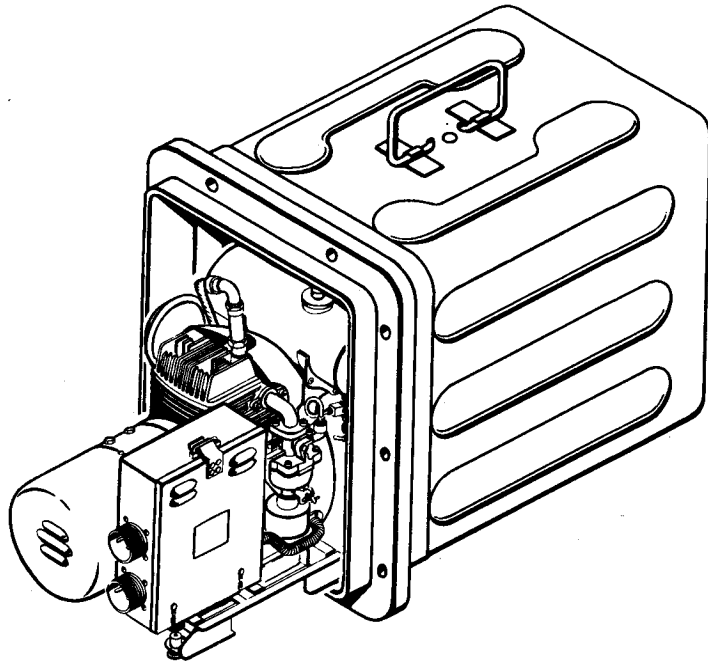
The shipping chests for the Field Application Kit are all of the heavy luggage type. The chests have metal faced edges and corners and the cover is held with latches which have provisions for applying padlocks to prevent tampering or loss of equipment. Carrying handles are attached to the ends of the chests. The chests are finished in dull Marine Corps green and stenciled to indicate contents.

FIELD APPLICATION



NOTE: A shipping chest is provided in the Field Application Kit for the Universal Power Supply Unit. When the power supply unit is used, it should be connected to the radio equipment in the manner shown for the shipboard installation.

GAS ENGINE GENERATOR



A self contained generating unit consisting of a four cycle gas engine directly connected to a direct current generator is used as a source of power when the MAR or RDR equipment is used in the field or other isolated position where other sources of power are not available.

The power unit fits into a light weight metal carrying case having corrugated sides and a gasketed end cover held in place by eight thumbscrews. The entire assembly forms a light-weight, portable power plant, rugged enough to stand the hard usage given portable equipment. The unit in its case is completely waterproof and buoyant in fresh water. With the unit removed from its case for operation, it is splash-proof and is capable of outdoor operation under all weather conditions.

As shown in the illustration, the engine is a single cylinder, four cycle, air cooled unit capable of delivering 0.9 HP under continuous duty. It is complete with fuel tank of sufficient capacity to operate the engine for two hours under full load conditions. It is fitted with a special muffler and a high tension ignition system. A switch for controlling the ignition is mounted on the flywheel housing.

Intended for operation under all conditions of dust, dirt, shock, humidity, and extremes of temperature it is fitted with readily serviced air intake filter of the dry type and shielded ignition leads and plug. Provisions are also made to allow the unit to be transported in a tilted or inverted position without danger of the fuel or oil leaking or spilling.

The generator with a nominal rating of 29 amperes at 13.7 volts has an output of 13.3 volts direct current under a continuous load of 300 watts and sufficient overload capacity to carry a maximum load of 400 watts for several hours in case of emergency, without damage.

Both mechanical and electrical regulation are provided to regulate the output of the unit. The gas engine is fitted with a mechanical governor to maintain a constant engine speed of 4200 R.P.M. Since the unit is to be used both as a source of current for the operation of portable radio equipment and for battery charging, two types of regulation on the output of the generator are used.

A control box alongside the generator contains the reverse current relay and regulator elements. A toggle switch on the box is arranged to select the type of operation desired and its two positions are marked Radio and Battery Charge. The control box also contains the two output connectors for the connection of cables to the radio equipment and to storage batteries if the latter are employed with the engine driven unit.

The shielding of the ignition prevents radio frequency interference with the radio equipment. The storage batteries, when available, aid the filtering action by floating on the line and act as stand-by for short operating periods.

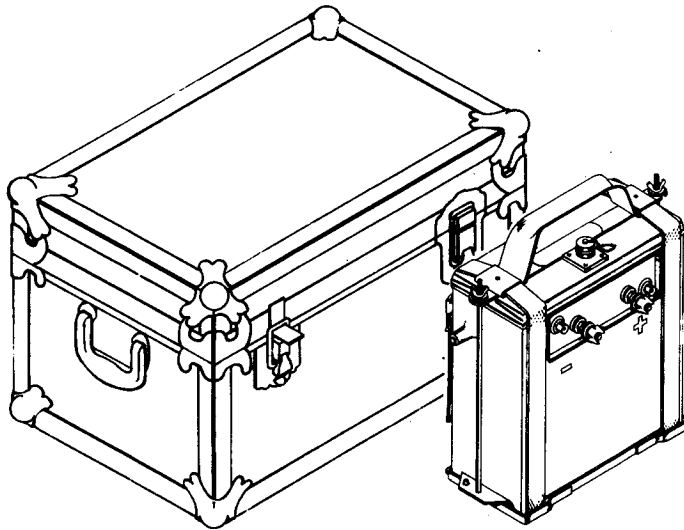
The gas engine generator, in its light weight metal case, is packed in a heavy luggage type shipping chest which contains the operating spares, servicing tools, containers for oil and fuel, and the 25-foot cable for connecting the generator to the radio equipment.

STORAGE BATTERIES

A storage battery chest, fitted with two, twelve volt airplane type storage batteries (government furnished) and filling syringe is made a part of the field application kit when facilities permit the use of such an auxiliary power source for use with the gas engine driven generator unit.

The chest itself is of the heavy luggage type, fitted with handles for carrying and sturdy enough to protect the batteries from damage.

The batteries are clamped rigidly in an upright position in the luggage chest to prevent movement or damage during transit. Necessary padded blocks and fittings are attached to the inside of the case.

**CHEST**

Navy Type CRF-10402A

BATTERY

Navy Type CRF-19017

Each battery, consisting of six cells in a molded case, has a nominal rating of 12 volts and $3\frac{1}{4}$ ampere-hours.

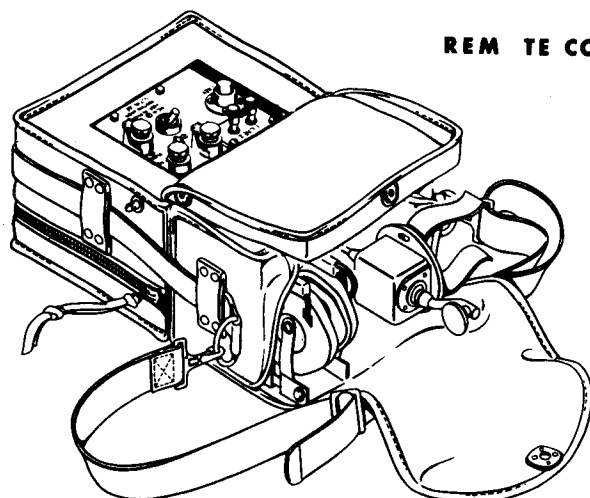
The batteries are shipped dry and must be filled with electrolyte before being put into service as described under installation.

When put into use, the batteries are removed from the chest by loosening the clips holding them in place. Short cables with spade lugs are used to connect them in parallel. To attach these cables and the cable leading to the gas engine generator or to radio equipment it is necessary to remove the battery terminal boxes and discard them. The cable lugs are attached to the large terminals by means of wing nuts.

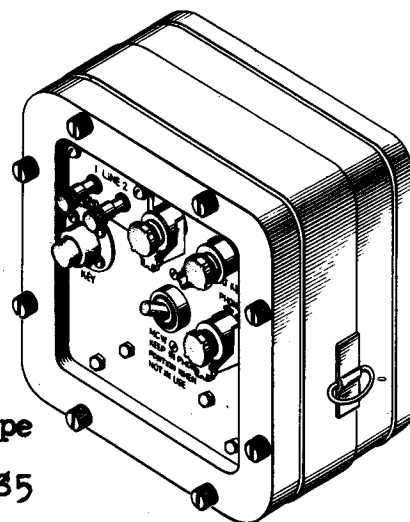
The batteries are only designed to operate the equipment for very limited periods without recharging and should be considered as an auxiliary to the gas engine driven unit.

REMOTE CONTROL BOX

The remote control box is a small portable unit, enclosed in a canvas carrying bag that is slung over the shoulder in use, and permits operation of the radio equipment from remote locations up to one mile from the main installation. The canvas bag has a compartment for carrying the headset and extension cord, lip microphone and extension cord with press-to-talk switch, and a telegraph key fitted with knee clamp that is used at the remote station. The only connection required between the remote box and radio equipment is a twisted pair telephone wire, type W110-B, which is not furnished by the contractor.



REM TE CONTROL BOX

Navy Type
CRV-23485

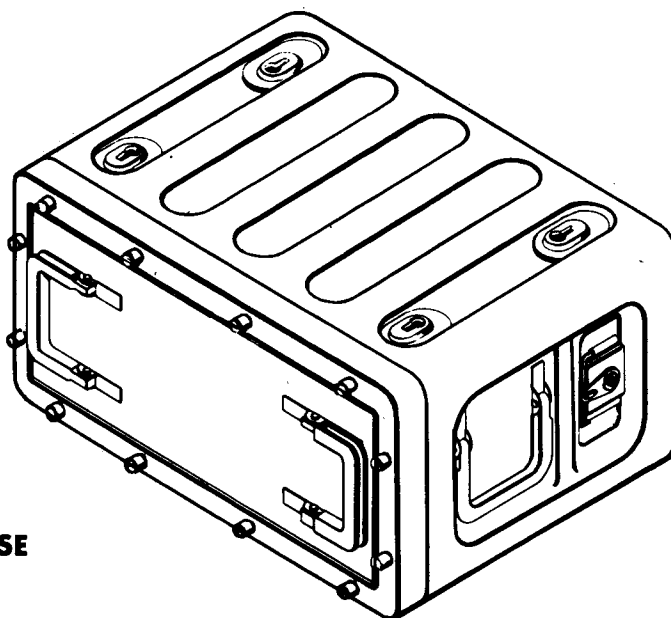
The remote control unit permits both phone and MCW transmission and reception, a switch permitting the changeover while jacks accommodate the microphone and headset cords. A waterproof key is built into the box for MCW operation. A jack is provided for plugging in the external key. However, change in operating frequency is not possible by remote control. The unit is practically waterproof in operation since the jacks and switches are protected by flexible rubber fittings.

The circuit components of the remote control box are mounted on the rear of the panel. For the operation of the unit there are required three dry cells (not furnished) which are clipped into the compartments at the bottom of the unit.

With the MCW-Phone switch on the panel in the Phone position, the equipment is controlled by the press-to-talk switch built into the microphone extension cord. This switch closes the battery circuits to the microphone and places the battery in series with the line to assist in the operation of the relay in the transmitter which switches the radio apparatus from receiving to transmitting condition. This switch should be kept in the Phone position when equipment is not in use to conserve the battery.

With the MCW-Phone switch in the MCW position the battery operates a hummer, the audio frequency impulses of which are keyed into the line to modulate the radio transmitter through the voice circuits for MCW transmission.

A switch on the panel of the modulator-dynamotor unit of the radio equipment is used to disconnect the remote control box input from the radio equipment and connect it to the headset and microphone plugged into the modulator-dynamotor panel. The operator at the radio equipment can then communicate with the operator at the remote box without causing radio emission.



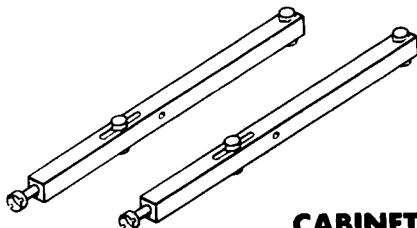
ACCESSORY CASE

Navy Type CRV-10485

In field applications a metal case of the same form and size as the radio units, fitted with a drawer attached to the cover, is furnished to carry the operating spare parts for the radio equipment. A chest is provided for shipment of this accessory case.

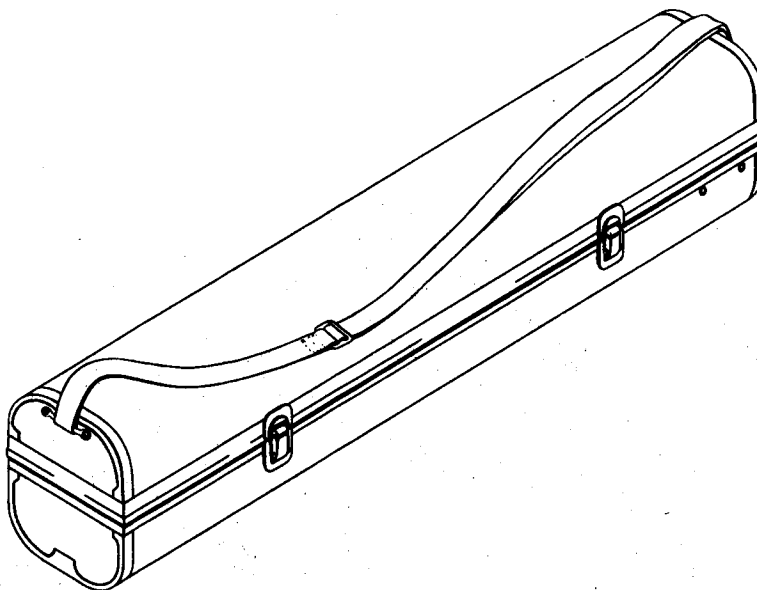
In addition, the case contains the accessories tabulated on page 24 that are required for field operation. The cabinet fasteners furnished fit the key hole slots in the metal cases of the various units so they may be stacked in any desired grouping and rigidly clamped together. Such stacking and use of the fasteners is only to be done when the equipment is not subject to vibration. The fasteners also fit the case of the RDR receiver when it is included in the equipment.

The accessory case is fitted with a gasketed cover and contains silica gel dryer units to protect its contents from moisture, and is completely watertight and bouyant when the cover is tightened by the thumbscrews.



CABINET FASTENERS

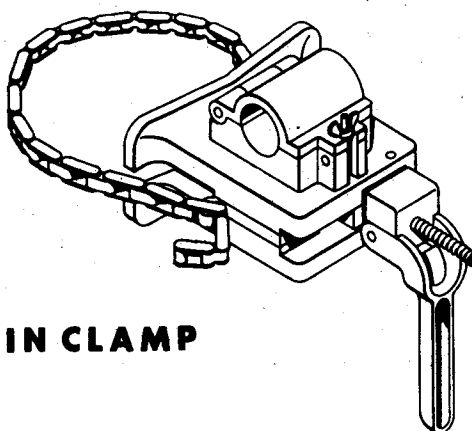
NAVY TYPE CRV-10505



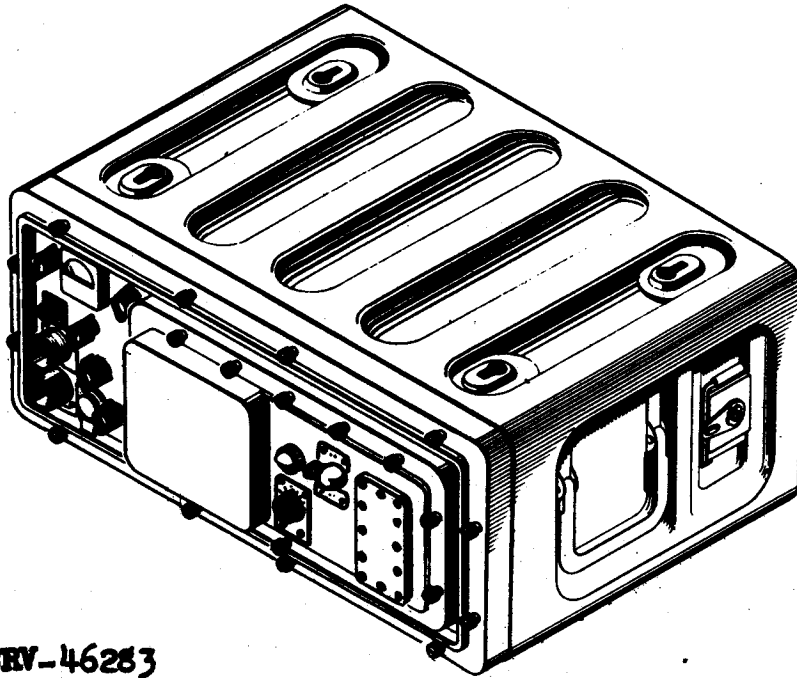
ANTENNA CASE

A carrying case is provided for the antenna and its accessories. This case is packed in a heavy luggage shipping chest which provides space for a MAR transmitter-receiver or a RDR receiver unit. The antenna accessories in the carrying case consist of a chain clamp for attaching the antenna to a convenient support, and a 10 foot antenna cable complete with connectors, for connecting the antenna to the radio equipment.

The carrying case, as shown in the illustration, is fitted with a shoulder strap. It is not of waterproof construction, but is buoyant in fresh water. Rubber plugs and a screw cap protect the antenna body from the effects of moisture in case of immersion. The antenna cable is protected under similar conditions by plugs screwed into the connectors.



CHAIN CLAMP



Navy Type CRV-46283

RDR RECEIVER

The RDR receiver is not a part of the MAR equipment but in many installations will be used with the MAR. For that reason, provisions are usually made for the mounting of this receiver when shipboard installations are being made. The power supply unit used on shipboard is fitted with a special receptacle for furnishing power to the receiver.

The RDR equipment is similar in design and operation to the receiver section of the MAR equipment and is assembled in a case of the same physical characteristics. The grouping of the two equipments is thus greatly simplified and readily provided for. Full details for installation of the RDR receiving equipment will be furnished with it but the illustration of the receiver given above will clarify any references made to it in this book and assist in making any preparations for its future inclusion with MAR equipment.

QUICK REFERENCE DATA**TECHNICAL SUMMARY****TRANSMITTER-RECEIVER NAVY TYPE CRV-43067**

CHARACTERISTIC	MAR TRANSMITTER	MAR-RDR RECEIVER
Frequency Range	225-390 mc	225-390 mc
Frequency Stability	$\pm 0.007\%$	$\pm 0.007\%$
Tuning Bands	1	1
Pre-set Frequencies	10	10
Type of Circuit	Crystal controlled Oscillator	Superheterodyne
Sensitivity		8 Microvolts
Selectivity		220 kc bandwidth at 6 db
Silencer Circuit		Operates 6 db change
Input Power*	270 watts	145 watts
Input Voltage	13V d-c or 13V a-c and 375V d-c	13V d-c or 13V a-c and 375V d-c
Output Power	8-10 watts R-F	1 watt Audio
R-F Impedance	50 ohm output	50 ohm input
A-F Impedance (Input)	100 ohms Mic. 600 ohms Remote	300 and 600 ohm output
Audio Frequency Response	300-3000 cycles	300-3000 cycles
	10 Channel Frequency crystals 1 Beat Oscillator crystal (10.066 Megacycles)	

*Varies with change in input voltage. Intermittent load of crystal oven (15 watts) not included.

MODULATOR-DYNAMOTOR

NAVY TYPE CRV-50248

CHARACTERISTIC	
Types of Modulation	MCW and Phone
Modulation Capability	100%
A-F Input Impedance	100 ohms
A-F Output Impedance	8800 ohms
Input Voltage	13V d-c or 13V a-c and 375V d-c

CONTRACT REFERENCE DATA

Equipment	Model MAR Radio Transmitting and Receiving Equipment
Contract	NXsr-60008
Contractor	RCA Victor Division of the Radio Corporation of America, Camden, N.J.
Cognizant Naval Inspector	Inspector of Naval Material, U.S.N. RCA, Front and Cooper Streets, Camden, N. J.

UNIVERSAL POWER SUPPLY

Navy Type CLG-20379

ELECTRICAL CHARACTERISTICS

POWER FACTOR 85 to 100

INPUT IN AMPERES

LOAD CONDITIONS		POWER SOURCE VOLTAGE		
MAR	RDR	26V. dc	115V. ac/dc	230V. ac/dc
RECEIVE	OFF	10.8	2.4	1.2
TRANSMIT	OFF	16.2	3.6	1.8
SELECT	OFF	16.5	3.7	1.9
OFF	RECEIVE	8.1	1.8	0.9
OFF	SELECT	13.5	3.0	1.5
RECEIVE	RECEIVE	14.6	3.3	1.7
TRANSMIT	RECEIVE	20	4.5	2.3
SELECT	RECEIVE	20	4.5	2.3
RECEIVE	SELECT	18.5	4.2	2.1
TRANSMIT	SELECT	23.8	5.4	2.7

ALL MEASUREMENTS $\pm 15\%$.

Hi-Med-Low SWITCH SET AT "MED" FOR ABOVE READINGS.

OUTPUT

LOAD CONDITIONS		VOLTS		PLATE AMPERES			FILAMENT AMPERES		
MAR	RDR	PLATE	FIL. (ac)	MAR	RDR	TOTAL	MAR	RDR	TOTAL
RECEIVE	OFF	370	13.5	0.12	-	0.12	7.4	-	7.4
TRANSMIT	OFF	365	13	0.47	-	0.47	7.7	-	7.7
SELECT	OFF	365	13	0.52	-	0.52	7.7	-	7.7
OFF	RECEIVE	370	13.5	-	0.12	0.12	-	3.3	3.3
OFF	SELECT	360	12.8	-	0.42	0.42	-	3.5	3.5
RECEIVE	RECEIVE	370	13.5	0.12	0.12	0.24	7.4	3.3	10.7
TRANSMIT	RECEIVE	365	13	0.47	0.12	0.59	7.7	3.5	11.2
SELECT	RECEIVE	360	12.8	0.53	0.13	0.66	7.8	3.5	11.3
RECEIVE	SELECT	325	12.5	0.11	0.47	0.58	8.0	3.6	11.6
TRANSMIT	SELECT	330	12.6	0.46	0.46	0.92	7.9	3.6	11.5

ALL MEASUREMENTS $\pm 15\%$.

ON D.C. INPUTS, A.C. FILAMENT VOLTAGE MEASUREMENTS MUST BE MADE WITH THERMAL-TYPE METER DUE TO SQUARE WAVE OUTPUT.

NORMAL INTERMITTENT (2-5 CYCLES PER MINUTE) CRYSTAL OVEN LOAD OF 1.25 AMPERES (APPROX.) INCLUDED IN FILAMENT LOAD.

ADDITIONAL 1.25 AMPERES FILAMENT LOAD BY BOOSTER HEATER, WHICH OCCURS FOR FIRST TEN MINUTES OF OPERATION, IS NOT INCLUDED.

Transmit and Select are intermittent conditions. Normal operating load cycle is Transmit 1/3 and Receive 2/3 of the time. "Select" conditions are applied at infrequent intervals for duration of 10 seconds or less.

MAR TUBE COMPLEMENT

TRANSMITTER-RECEIVER

SYMBOL	TYPE	FUNCTION	USE
V101	829B	IPA	T
V102	2C39	Tripler	T
V103	2C39	PA	T
V201	9003	R-F Amplifier	R
V202	6AK5	1st Detector	R
V203	6J6	3rd Tripler	R
V301	12SG7	1st L-F Amplifier	R
V302	12SG7	2nd L-F Amplifier	R
V303	12SG7	3rd L-F Amplifier	R
V304	12SG7	4th L-F Amplifier	R
V305	12H6	2nd Det. & AVC	R
V401	12H6	Noise Peak Limiter and Meter Rectifier	R
V402	12SL7GT	Silencer Amplifier and 1st Audio Amplifier	R
V403	12A6	A-F Output (power amp.)	R
V501	6AG7Y	Converter	T
V502	6C4	2nd Tripler	T-R
V503	6C4	1st Tripler	T-R
V504	6AG7	Crystal Osc. and Doubler (channel)	T-R
V505	6C4	Beat Crystal Osc. (10.066 mc)	T

MODULATOR-DYNAMOTOR

SYMBOL	TYPE	FUNCTION	USE
V701	12SL7GT	Sp. Amp. and Phase Inverter	T
V702	6L6GA	Modulator	T
V703	6L6GA	Modulator	T

UNIVERSAL POWER SUPPLY

SYMBOL	TYPE	FUNCTION	USE
V901	3B25 *	Rectifier	T-R
V902	3B25 *	Rectifier	T-R

T -- Used in Transmitter Circuit. R -- Used in Receiver Circuit

* NOTE: The 3B25 tubes are furnished with the Universal Power Supply. Tubes of this type in the Equipment spares should be used for replacements until the supply is exhausted. Further replacements should then be made with 3B28 tubes from Service Stores. Do not use the two types of tubes together, replace both tubes when changing from the 3B25 tubes to the 3B28 tubes.

CABLES FURNISHED WITH MAR EQUIPMENT

BASIC UNITS	Navy Type No.	Number Cond.	Active Cond.	Length in feet
Power Cable Modulator-Dynamotor to Transmitter-Receiver	62224	9	8	2
Mod. Cable Modulator-Dynamotor to Transmitter-Receiver	62222	3	3	2
Power Cable Power Supply Unit to Modulator-Dynamotor	62225	9	6	8
Battery Cable* Battery to Modulator- Dynamotor or Gas Engine Generator	62223	2	2	5

*Fitted with clips on one end.

FIELD APPLICATION KIT

Antenna Cable	RG-8/U	coaxial	2	10
Antenna Cable	RG-8/U	coaxial	2	50
Gas Engine Generator to Modulator-Dynamotor	62251	2	2	25
Battery inter-connection Cable*	CRV-62344	2	2	2

Fitted with spade lugs on both ends. All other cables furnished complete and fitted with plugs on both ends.

CONNECTORS FURNISHED WITH SHIPBOARD INSTALLATION KIT

Following plugs and connectors are furnished to make up 1 w loss transmission line from stock RG-18/U cable.

- 1 - UG-23/U Jack Assembly
- 2 - UG-167/U Reducing Connectors
- 1 - UG-29/U Coupling
- 1 - UG-21/U Connector
- 1 - Pin for UG-21/U Connector

TYPICAL SHIPMENTS

BASIC MAR EQUIPMENT

CASE NO.	CONTENTS	NO. OF CASES	CRATED DIMENSIONS IN INCHES	GROSS WEIGHT IN POUNDS	NET WEIGHT IN POUNDS	CUBIC CONTENTS IN FEET
	<u>MAR BASIC EQUIPMENT</u>					
1	Transmitter-Receiver, Modulator-Dynamotor, and Accessories.	1	27x20 $\frac{1}{2}$ x24	177	100	8.0
2	AC-DC Power Supply Unit.	1	26x20x14	133	101	4.2
3	Antenna Assembly and Set of Equipment Accessories.	1	30- $\frac{3}{4}$ x19x9 $\frac{1}{2}$	62	29	3.6
4	Equipment Spares	1	41x21x22 $\frac{1}{2}$	229	164	11.7
5	Equipment Spares for Power Supply Unit	1	29x23x14 $\frac{1}{2}$	187	143	4.9
TOTAL		5		788		32.4

SHIPBOARD INSTALLATION KIT

1	3 Shockmount Assemblies	1	20x24x18	144	93	5.0
2	Set of Equipment Accessories: Junction Box Kit: Shockmount Assembly (Power Unit).	1	25 $\frac{1}{2}$ x18x14	94	59	3.6
3	Set of Equipment Spares	1	17x13x9	36	18	1.3
TOTAL		3		274		9.9

FIELD APPLICATION KIT
TYPICAL SHIPMENTS
(CON'T)

Case No.	Contents	No. of Cases	Crated Dimensions in Inches	Gross Weight in Pounds	Net Weight in Pounds	Cubic Contents in Feet
1	Gas Engine Generator and Chest Assembly	1				
2	Remote Control Unit and Chest Assembly	1	16½x25x41	157	80	9.8
3	Chest and Battery Assembly	1	25x24x34	232	108	11.2
4	Chest (For Power Supply Unit).	1	37x24½x18	129	61	9.6
5	Set of Field Application Kit Accessories	1	18x25x36½	168	96	10.1
6	Antenna Accessories and Chest Assembly	1	43x35x17	208	106	15.0
7	Set of Equipment Spares	1	23½x17x12	72	38	2.8
TOTAL		7				

FIELD APPLICATION KIT WITH BASIC UNITS

Ready for use in the field

Weights in pounds

Chest	Contents	Weight
CANR-10621	Gas Engine Generator and Spares	
CAAQ-10524	MAR Modulator-Dynamotor and Control Units	135
GRF-10402-A	2 Storage batteries and syringe	118
CAAQ-10523	AC-DC Power Supply Unit	161
CAAQ-10522	Field Accessories	106
CAAQ-10525	Antenna Units and MAR Transmitter-Receiver or RDR Receiver	155