

INSTRUCTION BOOK

MODELS OAH AND OAH-1 CODE PRACTICE EQUIPMENT

All information in this Instruction Book applies equally to
Models OAH and OAH-1

MAR 12 1947

MANUFACTURED FOR

NAVY DEPARTMENT
BUREAU OF SHIPS

BY

AUTOMATIC SIGNAL CORPORATION
EAST NORWALK, CONNECTICUT

CONTRACT NO. NX_{ss}-29645

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This instruction book is furnished for the information of commissioned, warrant, enlisted, and civilian personnel of the Navy, whose duties involve design, instruction, operation, or installation of radio and sound equipment. The word "RESTRICTED" as applied to this instruction book, signifies that it is to be read only by the above personnel, and that its contents should be made known only to persons connected with the Navy.

WARNING

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE THE EQUIPMENT WITH THE HIGH VOLTAGE SUPPLY ON.

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SECTION I

GENERAL

I.

1. PURPOSE:—Code Practice Equipment, Model OAH, is supplied to communication units for the training of telegraph and radiotelegraph operators, and for the continuing instruction necessary to increase the proficiency of those already designated as operators.

2. USES:—The equipment may be employed as follows:

- (a) Group instruction in receiving; one instructor and six students.
- (b) Individual practice in sending; seven students.
- (c) Net operation; one, two, or three nets.
- (d) Combinations of the above three methods; within the limited capabilities of the equipment.
- (e) Group instruction in the receiving of an external signal.

3. POWER SUPPLY:—The equipment is designed to operate from any of the three sources of power listed below:

- (a) 110 volt, 60 cycle, single phase, alternating current.
- (b) 110 volt direct current.
- (c) Dry batteries.

When dry batteries are used, they are contained within the carrying case which is a part of the equipment and are connected to the oscillator-amplifier unit by means of the battery power cable which is a part of the accessories and is located in the carrying case.

4. OSCILLATOR-AMPLIFIER UNIT:—This unit contains the AC-DC power supply, audio oscillator, driver stage, and audio amplifier stage. The amplifier is used to amplify the output of the oscillator and driver, but is not used in the case of an external signal. The chassis is contained in a metal box, from which it may be withdrawn without breaking any power or distribution connections. Fittings are built into the lid to contain the patching cords for the distribution panel. The front panel of the unit contains the power supply selector switch, volume control, tone control, pilot light, receiver-input jack, instructor's phone and key jacks, and the distribution panel. A cam attached to the cover automatically returns the power switch to the "off" position when the cover is closed. Sockets are provided on the chassis for 100% spare tubes, pilot light, and line fuses. The "battery-power" cable, "AC-DC power" cable, and the distribution cable plug into three re-

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ceptacles mounted on the rear of the chassis. Apertures are provided in the rear of the cabinet for access to these receptacles. The distribution panel contains six pairs of jacks for interconnecting the various positions, and one single jack which allows the instructor to connect his circuit with any or all of the student's positions. The two jacks associated with each student's position are in parallel. Nine single circuit patch cords equipped with banana plugs are provided for interconnecting between the jacks, six for use and three spares.

5. DISTRIBUTION UNIT:—This unit consists of a plug for attaching to the receptacle in the oscillator-amplifier unit, a rubber sheathed cable consisting of eight individually shielded conductors, and three distribution boxes, each box containing key jacks and telephone jacks for two positions. The cable passes through the two boxes providing positions one to four, and is terminated in the third box.

6. ACCESSORIES:—The accessories are supplied in a carrying case which is provided with a cover and two carrying handles. The interior of the carrying case is divided into two compartments, (a) the battery compartment and (b), the accessories compartment. The "battery power" cable contained in this box is equipped with terminal strips on one end and a plug for connecting to the oscillator-amplifier unit on the other end. The battery compartment is designed to allow the use of either No. 6 dry cells or Navy type 19010 filament batteries in addition to the plate batteries. The batteries should never be left in the carrying case as they have a tendency to swell due to corrosion. They should be stored in the space provided for them in the shipping chest when not being used. A slot allows the "battery power" cable to be led out of the box and the cover then closed over the cable. The accessory compartment holds the distribution unit, seven headsets of the single receiver type, seven hand keys, the "battery power" cable and the "AC-DC power" cable.

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SECTION II

INSTALLATION FOR SERVICE

II.

1. The equipment packed for shipment includes the following items:

(The accountable officer should check the equipment against the following list and ascertain the completeness of same. Any discrepancy should be promptly covered by requisitions through the normal chain of supply. The quartermaster assumes that all equipment is complete and in operating condition provided there are no requisitions indicating otherwise.)

- (a) Shipping Chest MCH-1.
- (b) Oscillator-amplifier Unit; consisting of chasis and cabinet; and containing on the chassis:
 - 2 Tubes 1G4G, 1 in use, 1 spare.
 - 2 Tubes 1A5G, 1 in use, 1 spare.
 - 2 Tubes 3Q5GT, 1 in use, 1 spare.
 - 2 Tubes 117Z6GT, 1 in use, 1 spare.
 - 2 Neon bulbs, $\frac{1}{4}$ -W, 1 in use, 1 spare.
 - 4 Instrument fuses, $\frac{1}{2}$ -A, 500-V, 2 in use, 2 spare.

In cover:

6 Patch cords.

- (c) Carrying Case, containing:
 - 1 AC-DC power cable with plugs.
 - 1 Distribution Unit consisting of one plug, one cable and three boxes.
 - 7 Keys with cord and plug.
 - 7 Headsets, 80-ohm, with cord and plug.
 - 2 Instruction Books.

Spare Parts consisting of:

- 1 Tone control.
- 1 Volume control.
- 1 Capacitor BR-1215.
- 1 Capacitor BR-4025
- 1 Capacitor BRL-8815.
- 1 Resistor DG-1000 ohms.
- 3 Patch Cords.

- (d) 4 Batteries type 19010.
- 4 Batteries type 19005.
- (All batteries packed in shipping chest).

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2. Immediately upon unpacking, the components received should be checked against the above list.

3. GENERAL INSTALLATION:—The equipment can be set up on the deck or any available table or bench which provides space for the students and a reasonably firm base for the operation of the keys. Because of the fact that both distribution system and power supply are self contained, no permanent installation is necessary and the equipment may be set up or secured in a few moments' time regardless of whether or not 110-volt mains are available.

4. PREPARATION FOR OPERATION:—The oscillator-amplifier unit should be placed facing the instructor's position and within easy reach. If battery power is to be used, two number six dry cells or batteries type 19010, and two batteries type 19005 are inserted in the battery compartment and connected to the terminals of the battery power cable. The carrying case may then be placed at any convenient point on the deck or table, the battery power cable led out, the distribution unit, keys and headsets removed, the cover closed. The battery power cable is then plugged into the proper receptacle on the rear of the oscillator-amplifier unit.

If AC-DC operation is desired the AC-DC power cable is removed from the carrying case and plugged into the proper receptacle on the rear of the oscillator-amplifier unit, and also into any convenient 110-volt 60-cycle AC, or 110-volt DC outlet. The output must be polarized for operation on 110 volts DC and therefore it may be necessary to turn the plug. Allow 15 or 20 seconds for the vacuum tube heaters to become hot.

The distribution unit is then plugged into the proper receptacle on the rear of the oscillator-amplifier unit, and the cable arranged to that the boxes are convenient to the various positions. The keys and headsets are then plugged into the jacks marked "Key" and "Phone" respectively, the patch cords inserted in the proper jacks on the distribution panel to give the desired netting, and the equipment is ready for operation.

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SECTION III OPERATION

III.

1. GENERAL:—After the equipment is connected as indicated above, it is ready for operation. Three controls are available on the oscillator-amplifier panel. Switch (S-101) marked "BATT-OFF-AC-DC" is the power supply selector switch. The control marked "TONE" (R-101) provides means of varying the frequency of the generated signal from approximately 100 to 1000 cycles per second. The control marked "VOLUME" (R-102) provides means of varying the strength of the signal over a wide range. By coupling on external signal in the jack marked "REC INPUT" (J-114), this signal is fed into the distribution system but is not amplified by the equipment. The panel also carries the instructor's phone and key jacks (J-115 and J-116). A neon bulb (I-101) is provided as a means of indicating that power is connected to the equipment. This bulb does not glow steadily but merely flashes intermittently.

2. INDIVIDUAL CODE PRACTICE:—Throw the power switch either to right or left depending on the type of power being used. Allow the vacuum tubes to heat and then key any position. Adjust volume control and tone control for desired pitch and volume. No patch cords should be used for individual keying. Any of the six student's positions and the instructor's position may now be keyed independently of the others without interaction.

3. NET OPERATION:—The patching jacks on the front panel are engraved to show the position to which they are connected. Two jacks in parallel are provided for each student's position, (J-101 to J-112), and one for the instructor (J-113). Positions are netted by interconnecting between jacks of positions concerned with the patch cords provided. All positions may be tied together in this manner. Keying any position will key all positions to which it is patched. The instructor may monitor any position or net by patching between his patch jack and the jack of the position concerned.

4. MASTER KEYING:—The instructor may key all positions by patching all together, including his own.

5. EXTERNAL SIGNAL:—To receive an external signal, such signal is introduced into the equipment by means of a two conductor plug inserted into Jack J-114, marked "REC INPUT". The external signal will then be audible in the instructor's phones. It is then necessary to patch all positions at which the external signal is desired, to the instructor's position.

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SECTION IV

DESCRIPTION OF CIRCUITS AND FUNCTION OF PARTS

IV.

1. OSCILLATOR-AMPLIFIER CIRCUIT:—When operated from 110-volt AC or DC supply, the 117Z6G tube (V-104), acts as a half wave rectifier and also supplies filament voltage for the other three tubes. The rectifier filament is supplied directly from the 110-volt supply. When operating from batteries, the rectifier tube is out of the circuit. The oscillator, driver, and amplifier filaments are in series for 110-volt AC or DC operation but for battery use, switch S-101 places the amplifier filament in parallel with the oscillator and driver filaments which remain in series. The audio oscillator stage is followed by a resistance coupled driver, which in turn is resistance coupled to the power amplifier. The output of the power amplifier is transformer coupled to the distribution system.

2. DISTRIBUTION SYSTEM:—The output of the oscillator-amplifier is fed, by means of receptacle X-103 on the rear of the unit, to the distribution unit. The unit is composed of three boxes, each equipped with jacks for phones and keys for two positions. The key and phone for each position are in series across the audio output. Netting is accomplished by patching the open side of the headsets together so that the closing of a key at any netted positions keys all phones so netted.

3. MASTER KEYING:—This is accomplished by netting all positions together.

4. RECEIVER INPUT:—The insertion of a plug bearing an external signal into the receiver input jack breaks the secondary circuit of the output transformer. All positions are netted to the instructor's position from which position the external signal is fed to all phones in parallel.

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SECTION V

MAINTENANCE AND REPAIRS

V.

1. GENERAL:—Batteries should only be left in the carrying case when the equipment is set up for battery operation. During storage, shipment, and when the equipment is to be idle for an extended period of time, the batteries should be removed from the carrying case and placed in the shipping chest. Making a practice of removing the patch cords and instructor's phone and key plugs, and then closing the cover of the oscillator-amplifier will insure the turning off of power on the set when the equipment is not in use.

2. CIRCUIT MEASUREMENTS:—With the power switch in the "AC-DC" position, volume and tone controls in the extreme clockwise position, the following approximate voltages should be obtained measuring from pin No. 7 of V-104 as a ground point:

Plate and Screen Voltages

V-101 Pin No. 3.....	47 volts.....	plate
V-102 Pin No. 3.....	72 volts.....	plate
V-103 Pin No. 3.....	80 volts.....	plate
V-103 Pin No. 4.....	82 volts.....	screen
V-104 Pin No. 4.....	108 volts.....	plate supply

Filament Voltage

Measured from V-103 Pin No. 7 to V-104 Pin No. 8 65 volts
(1000 ohms per volt voltmeter)

3. TEST PRECAUTIONS:—Under no condition should any tubes be removed or inserted in the operating circuits with the power supply selector switch turned on. Failure to observe this precaution will result in the burning out of the vacuum tubes.

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SECTION VI

TABLE I

LIST OF MAJOR UNITS

For Model OAH Code Practice Equipment

Quantity	Navy Type Designation	Name of Major Unit	Contractor's Part No.
1	COQ-10170	Carrying Case (Accessories Unit)	NA1-509
2	CNC-19005	Dry Battery, 45 V	NA1-B500
2	CNC-19010	Dry Battery, 1.5 V	NA1-B501
7	CJB-26001	Telegraph Key Assembly	NA1-512
1	COQ-35029	Oscillator-Amplifier Unit	NA1-502
7	CW-49230	Headset Assembly	NA1-511
1	COQ-62077	Distribution Unit	NA1-504

TABLE II
PARTS LIST — OSCILLATOR-AMPLIFIER UNIT

Symbol Desig.	Reqd.	F U N C T I O N	D E S C R I P T I O N	Mfgr.	Mfgr.'s Desig. No.	Contractor's Part No.
A-101	1		Case, Oscillator-Amplifier, complete			NA1-507
A-102	1		Front Panel			ND1-H118
A-103	1		Sub-Panel			ND1-A103
C-101	1	Bypass	Capacitor, fixed, .01 mfd., 400V (paper)	3	DT-4S1	ND1-C101
C-102	1	Part of oscillatory circuit	Capacitor, fixed .25 mfd., 400V (paper)	3	DT-4P25	ND1-C102
C-103	1	Controls pilot light	Capacitor, fixed, .2 mfd., 400 V (paper)	3	DT-4P2	ND1-C103
C-104	1	Blocking capacitor	Capacitor, fixed, .1 mfd., 400V (paper)	3	DT-4P1	ND1-C104
C-105	1	Filament supply filter	Capacitor, fixed, 40. mfd., 250V (dry electyc)	3	BR-4025	ND1-C105
C-106	1	Bypass	Same as C-101			ND1-C101
C-107	1	Plate supply filter	Same as C-105			ND1-C105
C-108	1	Filament supply filter	Capacitor, fixed 12. mfd., 150V (dry electyc)	3	BR-1215	ND1-C108
C-109 to C-110	1	Filter capacitor	Capacitor, fixed, 8-8 mfd., dual, 150V (dry electyc)	3	BRL-8815	ND1-C109
C-111	1	Blocking capacitor	Same as C-104			ND1-C104
E-101	1	Mounting resistors and capacitors	Panel, resistor	9		ND1-E101
F-101 to F-102	2	AC-DC power fuse	Fuse, 1/2A, 500V, glass cartridge type	11	3AG	ND1-F101
H-101		Part of A-101	Holder, patch cord			ND1-H101
H-107	1	Carrying	Strap, leather			ND1-H107
H-108 to H-111	4	Mounting feet	Bumpers, rubber	4	B-2067	ND1-H108 ^a

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TABLE II
PARTS LIST — OSCILLATOR-AMPLIFIER UNIT

Symbol Desig.	Reqd.	F U N C T I O N	D E S C R I P T I O N	Mfgr.	Mfgr.'s Desig. No.	Contractor's Part No.
H-114 to H-117	4	Secure chassis to case	Snapslides	7	2540-1	ND1-H114
H-118 to H-121	4	Retain chassis in case	Studs, snapslide			ND1-H118
H-126 to H-129	4	Resistor panel	Standoff			ND1-H126
H-142	2	Volume and tone controls	Knobs	2	K13053	ND1-H214
I-101	1	Pilot light	Neon bulb	17	T-4½	ND1-I101
J-101 to J-113	13	Patch jacks	Jacks, banana plug	6	Z74-J	ND1-J101
J-114	1	Receiver input jack	Jack, phone, 4 cond., 2 cct.	18	704-A	ND1-J114
J-115	1	Instructor's phone jack	Jack, phone, open cct.	18	Midget A-1	ND1-J117
J-116	1	Instructor's key jack	Same as J-115			ND1-J117
N-101	1	Type OAH	Nameplate	20		ND1-N101
N-102	1	Oscillator-amplifier	Nameplate	20		ND1-N102
P-101	1	Power cord termination	Plug, female, midget, parallel slot	1	MB	ND1-P101
P-105 to P-116		Terminals for W-103	Plug, banana	4	B-2378	ND1-P105
R-101	1	Tone control	Potentiometer, 50,000 ohms	18	Y-50M-P	ND1-R101
R-102	1	Volume control	Potentiometer, 100,000 ohms	18	Type L (100,000)	ND1-R102
R-103	1	Part of oscillatory circuit	Resistor, fixed, 5,000 ohms, 2 watts	8	BT-2	ND1-R103
R-104	1	Dropping resistor	Same as R-103			ND1-R103
R-105	1	Part of oscillatory circuit	Same as R-103			ND1-R103
R-106	1	Dropping resistor	Resistor, fixed, 25,000 ohms, 1 watt	8	BT-1	ND1-R106
R-107	1	Coupling resistor	Resistor, fixed, 1 megohm, ½ watt	8	BT-½	ND1-R107
R-108	1	Pilot light circuit	Resistor, fixed, 3 megohms, ½ watt	8	BT-½	ND1-R108

TABLE II
PARTS LIST — OSCILLATOR-AMPLIFIER UNIT

Symbol Desig.	Reqd.	F U N C T I O N	D E S C R I P T I O N	Mfgr.	Mfgr.'s Desig. No.	Contractor's Part No.
R-109	1	Filament droppng	Resistor, fixed, 50 ohms, 10 watts	8	AB-50	ND1-R109
R-110	1	Filament droppng	Resistor, fixed, 1,000 ohms, 20 watts	8	DG-1000	ND1-R110
R-111	1	Filament droppng	Resistor, fixed, 1,250 ohms, 20 watts	8	DG-1250	ND1-R111
R-112	1	Filter resistor	Resistor, fixed, 500 ohms, 10 watts	8	AB-500	ND1-R112
R-113	1	Filter resistor	Same as R-110			ND1-R110
S-101	1	Power selector switch	Switch, 4PDT, 3 position	5	1424-W	ND1-S101
T-101	1	Part of oscillatory circuit	Transformer, audio	16 Alt. 12	T13A34 A-53	ND1-T101
T-102	1	Output	Transformer, universal	16 Alt. 12	T13S38 A-3823	ND1-T102
V-101	1	Oscillator	Vacuum tube 1G4G	15	1G4G	ND1-V101
V-102	1	Driver	Vacuum tube 1A5G	15	1A5G	ND1-V102
V-103	1	Output	Vacuum tube 3Q5GT	15	3Q5GT	ND1-V103
V-104	1	Rectifier	Vacuum tube 117Z6G	15	117Z6G	ND1-V104
W-101	1		Cord, power, AC-DC, with rubber plug	10	1735 except 10' long	ND1-W101
W-103 to W-108	6	Netting positions	Cord, patch, complete with plugs	19		NA1-W103A
X-101	1	AC-DC power input	Receptacle, power	1	754	ND1-X101
X-102	1	Battery power	Receptacle, 3 cond.	9	P-303-RP	ND1-X102
X-103	1	Distribution system	Receptacle, 8 cond.	9	P-408-CB	ND1-X103
X-104	1	Pilot light socket	Receptacle, candelabra	2	80	ND1-X104
X-105	1	Spare pilot light	Socket, shell, candelabra	1	4647	ND1-X105
X-106	1	AC-DC power fuses	Fuse mounting, shielded, 2 pole	11	1237	ND1-X106
X-107 to X-110	4	Mounting spare fuses	Fuse clips	11	1011	ND1-X107
X-111 to X-118	8	For all tubes	Socket, octal, wafer type	2	K13127	ND1-X111

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**TABLE III
PARTS LIST — SHIPPING CHEST**

Symbol Desig.	Reqd.	F U N C T I O N	D E S C R I P T I O N	Mfgr.	Mfgr.'s Desig. No.	Contractor's Part No.
A-112	1	Holds all components	Chest, shipping MCH-1			ND1-A112
H-184	1		Padlock with keys Supplied to Contractory by Navy			
	*2		Batteries, 45 V	22	19005	NA1-B500
	*2		Batteries, 1½ V	22	19010	NA1-B501
	2		Books, instruction			NA1-501

*4 — 19005 "B" Batteries furnished, 2 operating, 2 spares.

4 — 19010 "A" Batteries furnished, 2 operating, 2 spares.

TABLE IV
PARTS LIST -- DISTRIBUTION UNIT

Symbol Desig.	Reqd.	F U N C T I O N	D E S C R I P T I O N	Mfgr.	Mfgr.'s Desig. No.	Contractor's Part No.
A-106	1	Provides jacks for 2 positions	Box, distribution MBX-1			NAI-A106A
A-107	1	Provides jacks for 2 positions	Box, distribution MBX-2			NAI-A106A
A-108	1	Provides jacks for 2 positions	Box, distribution MBX-3			NAI-A106B
E-114 to E-116	3	Interior of distribution boxes	Insulator, sheet fibre			NDI-E114
H-154 to H-159	6		Sleeve, cable			NDI-H154
H-160 to H-171	12		Washers, cable sleeve			NDI-H160
H-172 to H-183	12	For cable sleeves	Nuts, conduit 1/2"			NDI-H172
J-117 to J-128	12	Phones and keys	Jacks, 2 circuit	18	Midget A-1	NDI-J117
N-104	1	Distribution unit MBX-1	Nameplate, cover	20		NAI-N104
N-105	1	Distribution unit MBX-2	Nameplate, cover	20		NAI-N105
N-106	1	Distribution unit MBX-3	Nameplate, cover	20		NAI-N106
P-103	1	Connects distribution unit to oscillator-amplifier	Plug, 8 c., female	9	S-408-FHT	NDI-P103
W-124	7'-6"	Tone and key leads to distribution boxes	Cable, 8 cond., individually shielded	14		NDI-W124

TABLE V
PARTS LIST — ACCESSORIES UNIT

Symbol Desig.	Reqd.	FUNCTION	DESCRIPTION	Mfgr.	Mfgr.'s Desig. No.	Contractor's Part No.
A-104	1	Hold accessories	Carrying case			NA1-509
A-105	1	Spare parts	Holder			ND1-A105
E-107 to E-113	7	For phone	Headbands with pads	13	11A	ND1-E107
H-134 to H-135		Used in A-104	Straps, leather			ND1-H107
H-140 to H-143		Mounting Feet Part of A-104	Bumpers, rubber	4	B-2067	ND1-H108
H-144		Fastens spares to holder— Part of A-105	Clamp, capitor			ND1-H144
H-145		Fastens spares to holder— Part of A-105	Clamp, capitor			ND1-H145
H-146		Fastens spares to holder— Part of A-105	Clamp, resistor			ND1-H146
HT-101 to HT-107	7		Phone complete with cord, plug and headband			NA1-511
HT-101A to HT-107A		Used in HT-101	Receiver, 80 ohms	13	528	NA1-HT101
K-101 to K-107	7		Key complete with cord and plug			NA1-512
K-101A		Used in K-101	Key, less shorting switch	21	26001	NA1-K101
N-103	1	Carrying case	Nameplate	20		ND1-N103
P-102		Used in W-109	Plug, battery power	9	S-303-CCT	ND1-P102
P-117 to P-123		Used in K-101	Plug, 2 cond., radio	18	TC-75	ND1-P117
P-124 to P-130		Used in HT-101	Plug, 2 cond., radio	18	TC-75	ND1-P117
W-109	1		Cord, battery power, complete			NA1-W109A
W-110 to W-116		Used in K-101	Cord, 2 cond., 27" long	13	R2CR	NA1-W110A
W-117 to W-123		Used in HT-101	Cord, 2 cond., 48" long	13	R2CD	NA1-W117A

TABLE VI
PARTS LIST — STATION SPARE PARTS

Symbol Desig.	Reqd.	LOCATION	DESCRIPTION	Mfgr.	Mfgr.'s Desig. No.	Contractor's Part No.
	* 2	In shipping chest	Battery, 45 V	22	19005	NA1-B500
	* 2	In shipping chest	Battery, 1½ V	22	19010	NA1-B501
C-105	1	Mounted in carrying case	Capacitor, 40. mfd.	3	BR-4025	ND1-C105
C-108	1	Mounted in carrying case	Capacitor, 12. mfd.	3	BR-1215	ND1-C108
C-109 to C-110	1	Mounted in carrying case	Capacitor, 8-8 mfd.	3	BRL-8815	ND1-C109
F-101	2	Mounted on oscillator-amplifier sub-panel	Fuses ½ A	11	3AG	ND1-F101
I-101	1	Mounted on oscillator-amplifier sub-panel	Neon bulb	17	T-4½	ND1-I101
R-101	1	Mounted in carrying case	Potentiometer, 50,000 ohms	18	Y-50 M-P	ND1-R101
R-102	1	Mounted in carrying case	Potentiometer, 100,000 ohms	18	Type L (100,000)	ND1-R102
R-110	1	Mounted in carrying case	Resistor, fixed, 1,000 ohms	8	DG 1000	ND1-R110
V-101	1	Mounted on oscillator-amplifier sub-panel	Vacuum tube, 1G4G	15	1G4G	ND1-V101
V-102	1	Mounted on oscillator-amplifier sub-panel	Vacuum tube, 1A5G	15	1A5G	ND1-V102
V-103	1	Mounted on oscillator-amplifier sub-panel	Vacuum tube, 3Q5GT	15	3Q5GT	ND1-V103
V-104	1	Mounted on oscillator-amplifier sub-panel	Vacuum tube, 117Z6GT	15	117Z6GT	ND1-V104
W-103	3	In carrying case	Cords, patch			NA1-W103A

* 4 — 19005 "B" Batteries furnished, 2 operating, 2 spares.

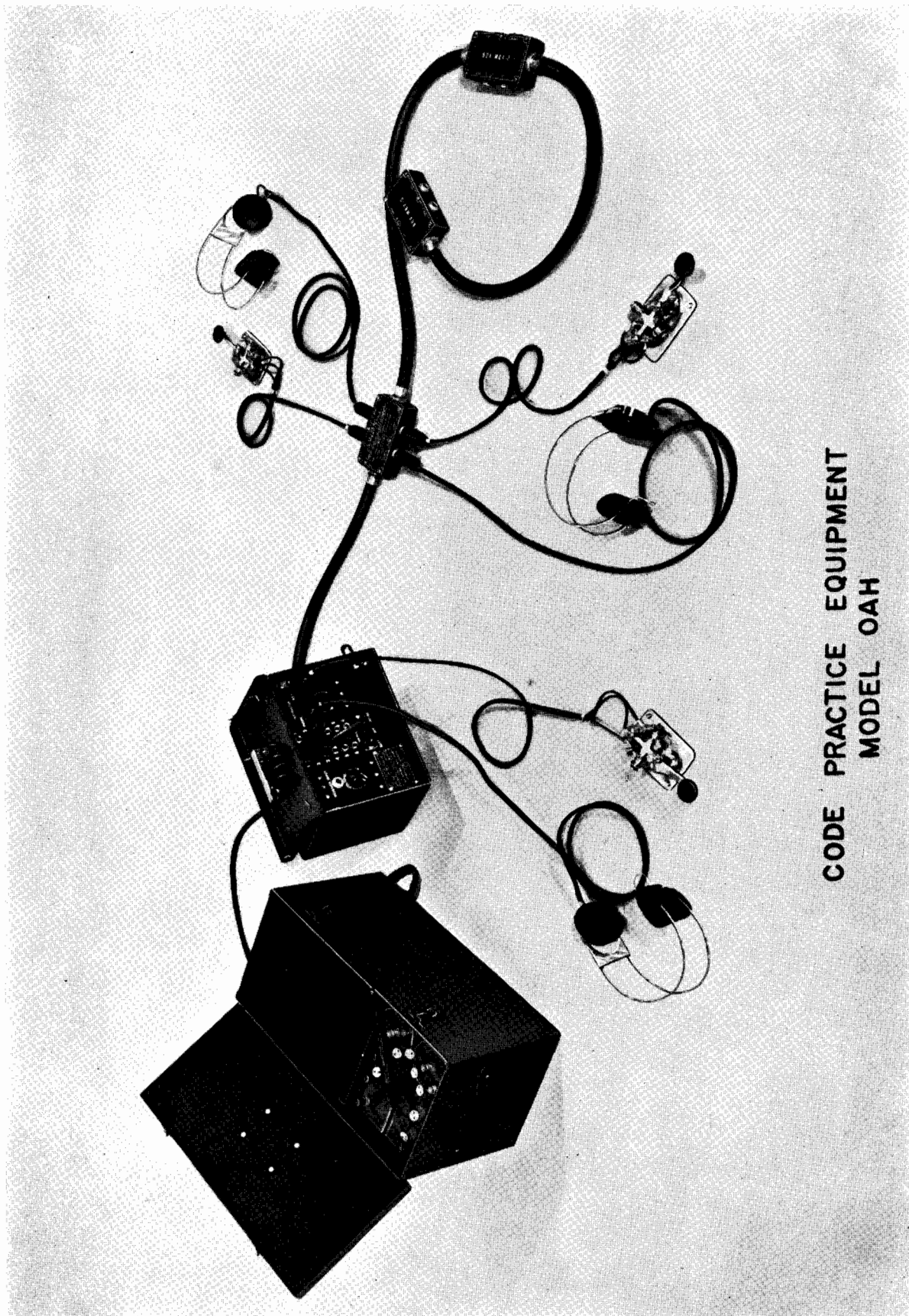
4 — 19010 "A" Batteries furnished, 2 operating, 2 spares.

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LIST OF MANUFACTURERS

1. Arrow-Hart & Hegeman Electric Company,
Hartford, Connecticut.
2. Radio Wire Television, Incorporated,
100 Sixth Avenue, New York, N. Y.
3. Cornell-Dubilier Electric Corporation,
333 Hamilton Boulevard, South Plainfield, N. J.
4. Burstein-Applebee Company,
1012-14 McGee Street, Kansas City, Mo.
5. Federal A-C Switch Corporation,
Buffalo, N. Y.
6. General Radio Company,
Cambridge, Mass.
7. Aircraft Radio Corporation,
Boonton, N. J.
8. International Resistance Company,
401 North Broad Street, Philadelphia, Pa.
9. Howard B. Jones,
2300 Wabansia Avenue, Chicago, Ill.
10. Belden Manufacturing Company,
4647 West Van Buren Street, Chicago, Ill.
11. Littelfuse, Incorporated,
4757 Ravenswood Avenue, Chicago, Ill.
12. Standard Transformer Corporation,
1500 N. Halsted Street, Chicago, Ill.
13. Western Electric Company,
Kearney, N. J.
14. Simplex Wire & Cable Company,
Cambridge, Mass.
15. RCA Victor Division, Radio Corporation of America,
151 West Side Street, Jersey City, N. J.
16. Thordarson Electric Manufacturing Company,
500 West Huron Street, Chicago, Ill.
17. Westinghouse Electric & Manufacturing Company,
Bloomfield, N. J.
18. Yaxley Manufacturing Company,
Division of P. R. Mallory & Company, Inc.,
Indianapolis, Ind.
19. American Radio Hardware Co.,
476 Broadway, New York, N. Y.
20. Mica Insulator Company,
200 Varick Street, New York, N. Y.
21. J. H. Bunnell & Co.,
81 Prospect Street, Brooklyn, N. Y.
22. National Carbon Co., Inc.,
30 East 42nd Street, New York, N. Y.

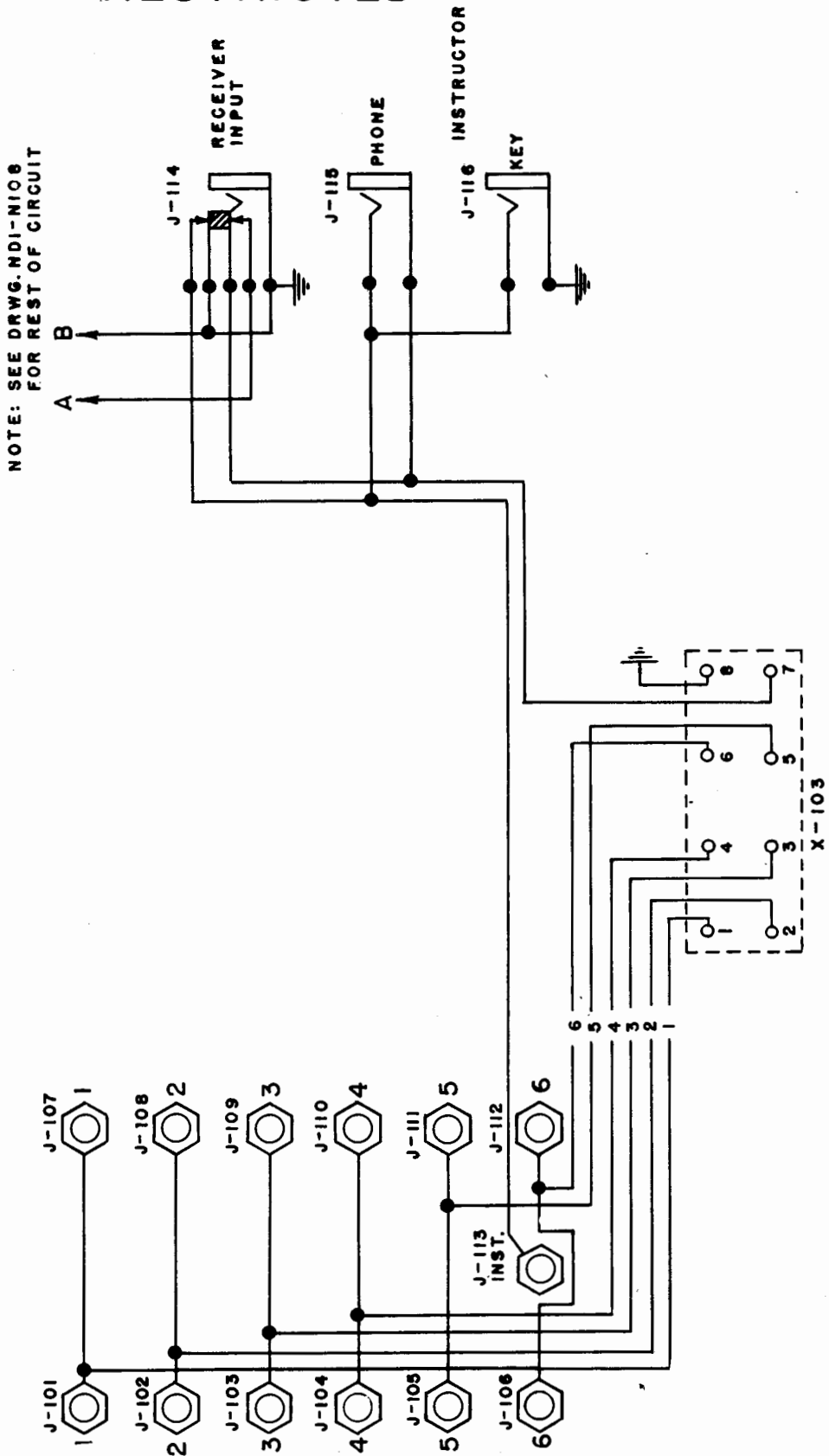
RESTRICTED



CODE PRACTICE EQUIPMENT
MODEL OAH

RESTRICTED

WIRING DIAGRAM OF DISTRIBUTION (SET PORTION)
CODE PRACTICE EQUIPMENT
MODEL OAH

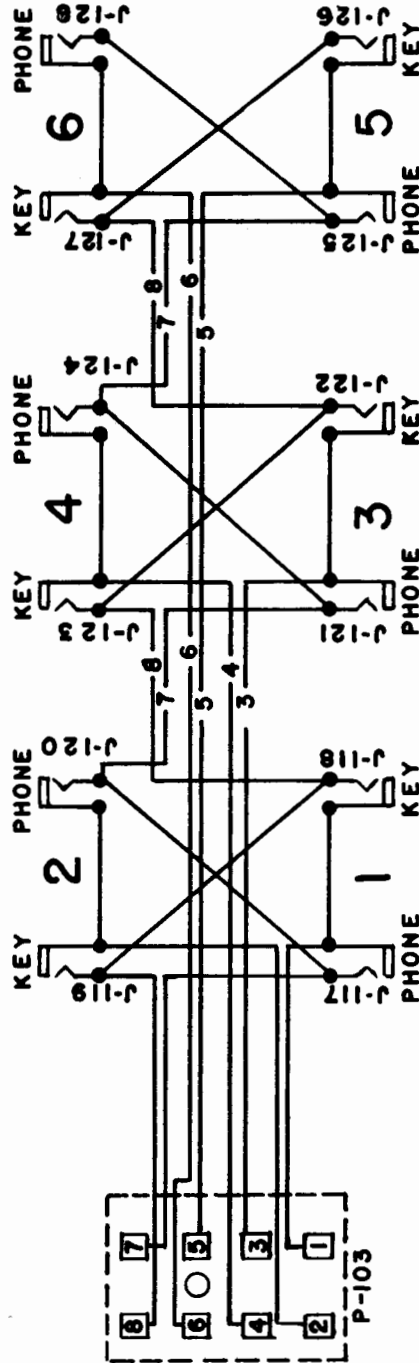


NDI-NIO9

RESTRICTED

CODE PRACTICE EQUIPMENT
MODEL OAH

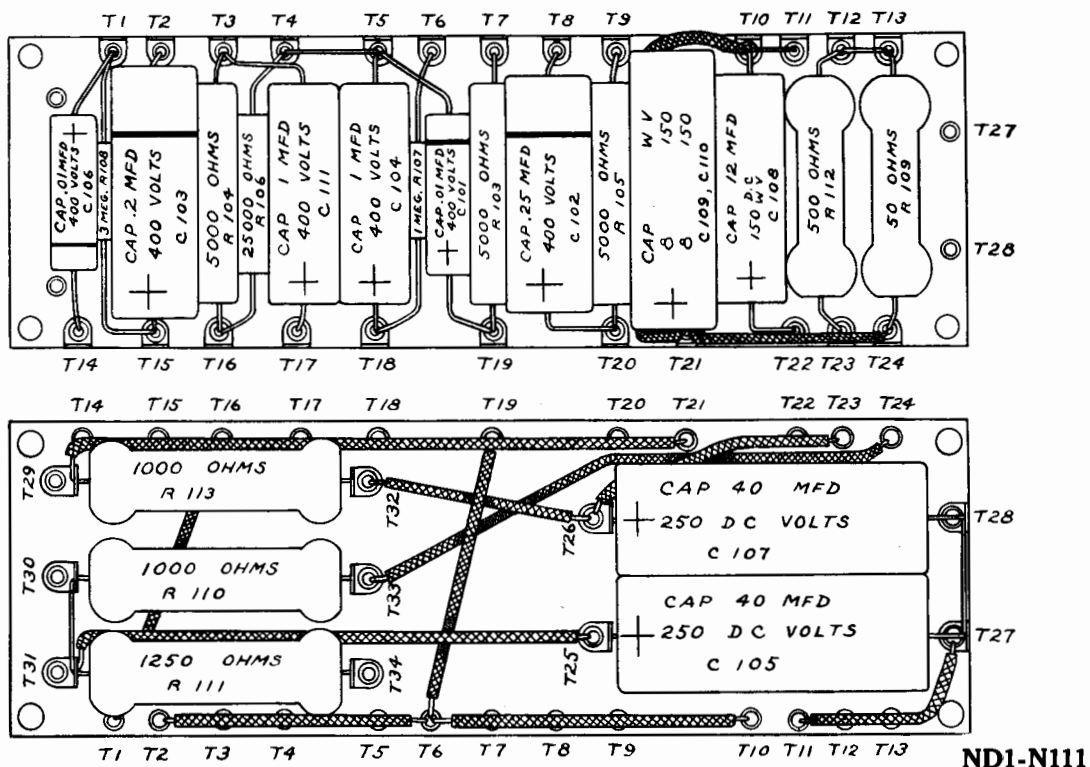
WIRING DIAGRAM OF DISTRIBUTION UNIT



NDI-NIIO

RESTRICTED

CONDENSER-RESISTOR PANEL



ND1-N111

ADDENDUM No. 1 (27 October 43)

Item 1: When Transformer T-101, as manufactured by Standard Transformer Company, is supplied with this equipment, the Capacitor C-101 is wired as shown in Figure 1. If Transformer T-101, as manufactured by Thordarson Electric Manufacturing Company, is supplied, Capacitor C-101 is wired as shown in Figure 2. (See page 21).

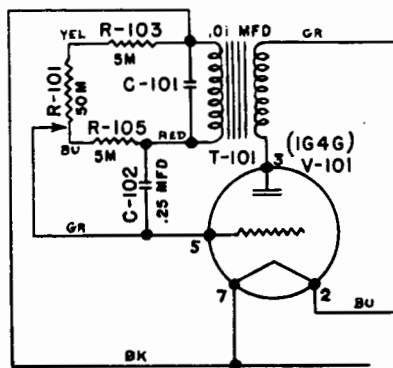


Fig. 1. Oscillator wired for Standard Transformer A-53

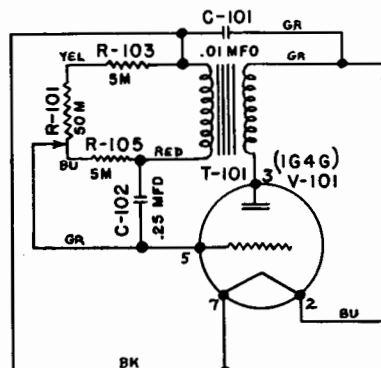


Fig. 2. Oscillator wired for Thor-darson Transformer T-13A34

Item 2: Headset Assembly CW-49230 or Headset Assembly COQ-49469 may be supplied. These units are completely interchangeable as far as operation of the equipment is concerned.