

DESCRIPTION AND DIRECTIONS

FOR USE OF

SHORT WAVE RECEIVERS

MANUFACTURED BY THE NATIONAL ELECTRICAL SUPPLY CO.

TYPES CN 113 AND CN 113A.

Range: 300 to 2500 Meters.

Approved:



Lieut. (j. g.) U. S. N.
Radio Officer.

Radio Test Shop,
U. S. Navy Yard,
Washington, D. C.

June, 1918.

DESCRIPTION AND DIRECTIONS

for use of

SHORT WAVE RECEIVERS

Manufactured by National Electrical Supply Co.,

Types CN 113 and CN 113A.

Range: 300 to 2500 meters.

This instrument is designed primarily for the reception of spark signals using a crystal detector, or for the reception of short, sustained waves, using an audion control box as a detector. A four pole, double throw switch in the receiver permits of the use of either audion or crystal detector, both of which may be permanently connected to the receiver.

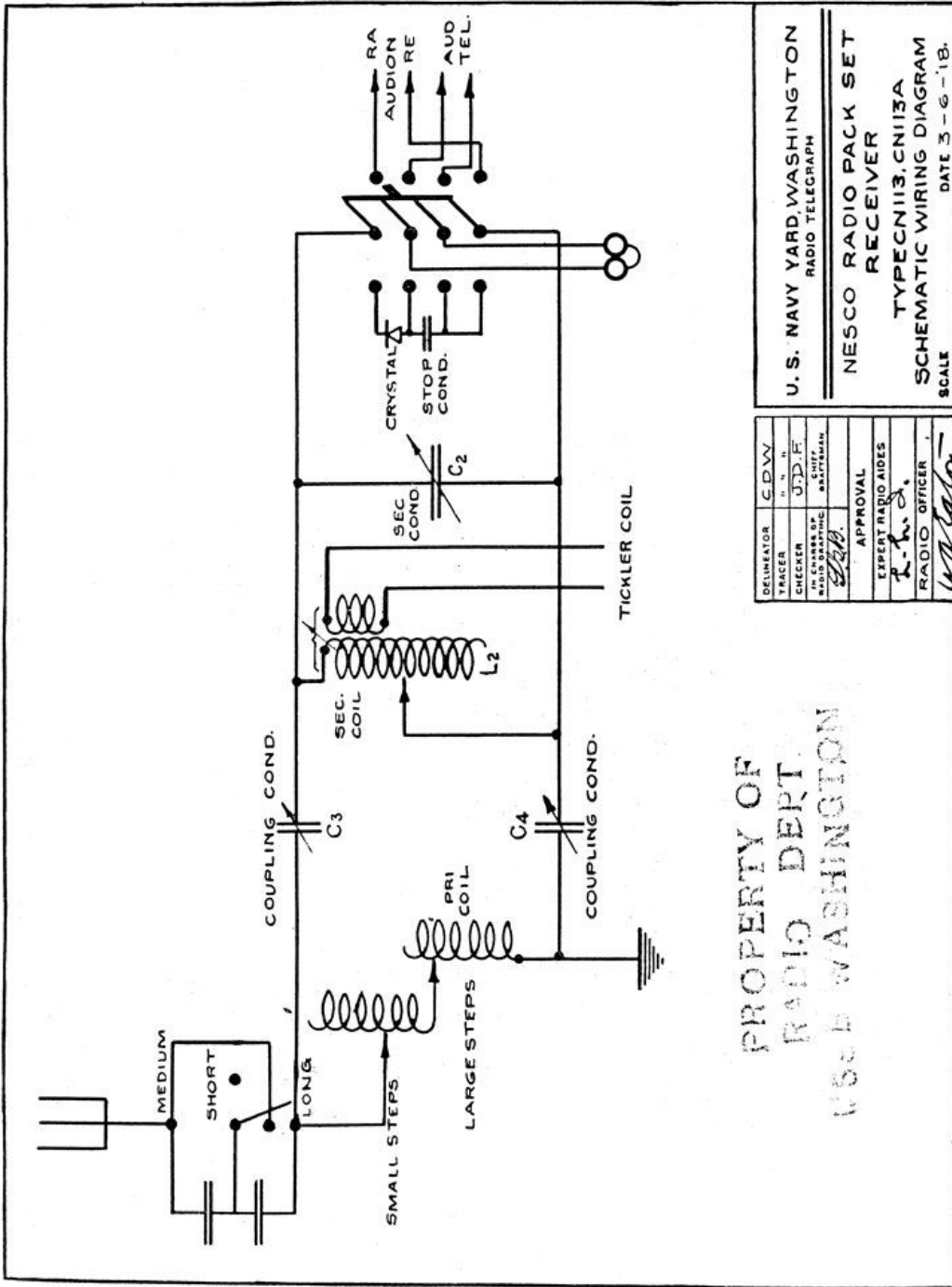
A schematic wiring diagram of the receiver is shown on sheet 2.

ANTENNA CIRCUIT:

The antenna circuit has three wavelength ranges, depending on the position of the condenser switch, S. When used with an antenna of 0.0006 mfd. capacity, the wavelength ranges are approximately as follows:

Switch on

SHORT	300 to 2100 meters.
MEDIUM	400 to 2300 meters.
LONG	500 to 2500 meters.



PROPERTY OF
 RADIO DEPT.
 U.S. NAVY WASHINGTON

DESIGNATOR	CDW
TRACER	"
CHECKER	JDF
IN CHARGE OF WORKSHOP	W. H. S.
APPROVAL	
EXPERT RADIO AIDES	R. A. S.
RADIO OFFICER	

U. S. NAVY YARD, WASHINGTON
 RADIO TELEGRAPH
 NESCO RADIO PACK SET
 RECEIVER
 TYPE CN113, CN13A
 SCHEMATIC WIRING DIAGRAM
 SCALE DATE 3-6-18.

RW96A441A

SECONDARY CIRCUIT:

The secondary circuit consists of an inductance, L_2 , variable in six (6) steps and a shunt variable condenser, C_2 . The wavelength range of the secondary circuit is 300 to 2500 meters.

COUPLING:

This receiver is provided only with capacitive coupling. This is obtained by means of two variable air dielectric condensers, C_3 , and C_4 , mounted on the same shaft and varied together; the knob marked "COUPLING CONDENSER" is fastened to the movable plate systems.

TICKLER COUPLING:

The tickler system of this receiver consists of a rectangular section coil coupled to the secondary circuit. The tickler coil is to be connected in series with the plate circuit of the audion and is coupled to the secondary at the short wave end of the coil to provide sufficient coupling to the secondary at short wavelengths.

BUZZER CIRCUIT:

The buzzer circuit consists of a battery, a buzzer and a push button switch all in series. From one terminal of the buzzer, a small coil (about 10 turns) is wound round the antenna lead. The buzzer is thus coupled capacitively to the antenna, and excites it into oscillation in its own natural period. Batteries are included in the receiver and are fastened by four nuts at lower left hand corner of the panel.

INSTALLATION AND WIRING:

This receiver should be kept as far as possible from metal bulkheads. The set should be placed at least 6" from all metal surfaces for best results and under no condition should it be placed closer than 2" to such surfaces.

Do not use lead covered wires except for battery and telephone leads.

SPARK RECEPTION:

Connect antenna, ground, telephones, and external detector (if one is provided) to binding posts so marked. To use this receiver with an Audion Control Box, connect terminals marked TICKLER on the receiver to tickler coil or to the binding posts marked TICKLER on the audion control box.

Connect terminals marked AUD. to the RA and RE binding posts of the audion control box.

Connect terminals marked AUD. TEL. on the receiver to the binding posts marked TELEPHONES on the audion control box.

OPERATION:

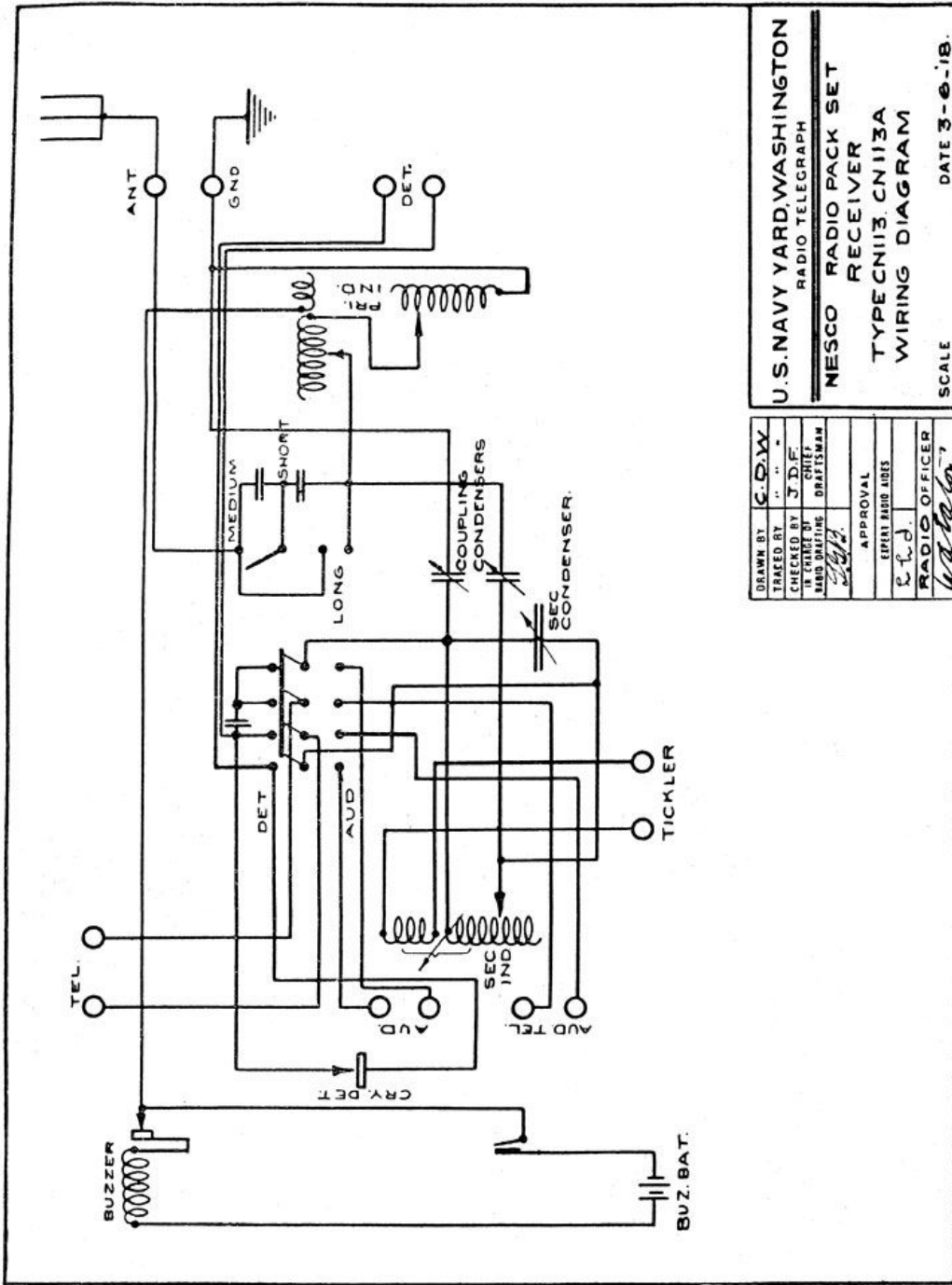
For pick up work,

- (1) Use close coupling between the antenna and secondary circuits (50° to 60° on the coupling condenser scale).
- (2) Set secondary condenser at zero.
- (3) For short wave pick up work set inductance switch on tap 2.
- (4) For long wave pick up work set inductance switch on tap 4.
- (5) Tune primary to resonance with incoming signal. (The tickler coupling should be set at MIN. if oscillating circuit is not used).

For selective work, use the smallest amount of capacitive coupling consistent with a readable signal. Tune primary and secondary to exact resonance with incoming signal.

A test buzzer is provided for testing the adjustment of the crystal detector.

A wiring diagram of the receiver is shown on sheet 6.



PROCEDURE FOR OBTAINING OSCILLATIONS:

- (1) Set switch blade of audion control box on OSCLR. A grid leak of 500,000 ohms should be connected between the grid and the positive terminal of the filament battery if not already installed.
- (2) Set stopping condenser switch blade so that about $\frac{1}{2}$ the capacity is in.
- (3) Do same with bridging condenser.
- (4) Set tickler coupling at about 45° .
- (5) Raise filament current to proper amount, (0.9 to 1.0 amp.) for most bulbs.
- (6) Raise plate voltage by turning the potentiometer handle clockwise.

TESTS FOR OSCILLATIONS:

Tests for oscillation are the following:

A clicking sound will be heard in the telephones if the bulb is oscillating:

- (1) When the momentary contact switch marked "TEST," (above tickler binding posts on audion panel) is pushed in.
- (2) When the RA binding post is touched.
- (3) When the antenna circuit is brought to resonance with the secondary, with tight coupling.
- (4) If buzzer is operated and the bulb is oscillating, a soft hissing note will be heard.

Failure to obtain oscillations may be due to:

- (1) Reversed "B" battery.
- (2) Reversed tickler leads.
- (3) Small stopping and bridging condenser.
- (4) Insufficient plate voltage, or too high a plate voltage; (hissing sound will be heard if voltage is too high).
- (5) Defective vacuum tube.

The dimensions of the CN 113 and CN 113A receivers are
Height = 7.00 inches
Width = 17.00 "
Depth = 5.00 " { to panel }
 = 6.50 " { over all }
The receiver weighs about 10 pounds.

