NAVSHIPS 900,613

INSTRUCTION BOOK

for

FREQUENCY SHIFT RECEIVER CONVERTER EQUIPMENT NAVY MODEL FRA

RCA VICTOR DIVISION, RADIO CORPORATION OF AMERICA
Camden, New Jersey

NAVY DEPARTMENT

BUREAU OF SHIPS

Contract N5sr 7266

Approved 8 January 1946

Frequency Shift Receiver Converting Equipment, Navy Model FRA

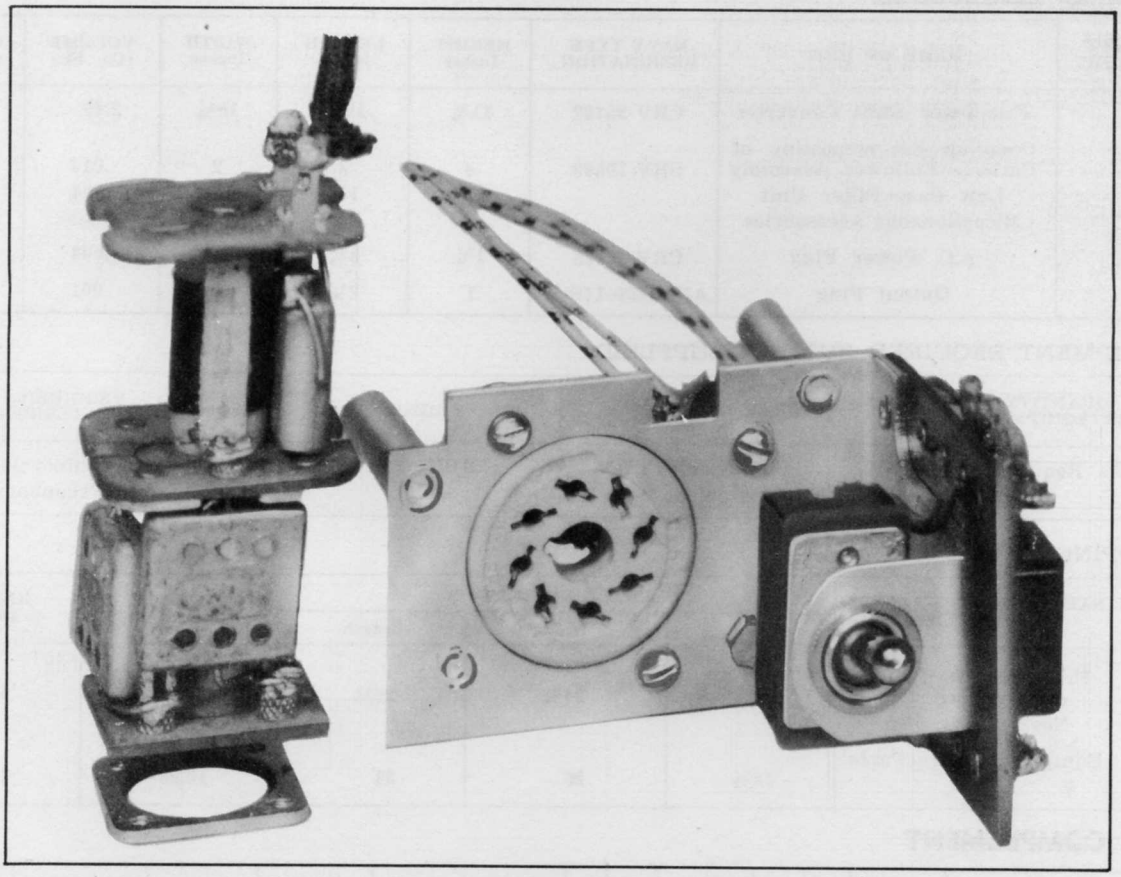
SECTION 1
GENERAL DESCRIPTION

1. PURPOSE

The Navy Model FRA Frequency Shift Receiver Converter Equipment has been designed to permit the reception of frequency shift telegraph signals on receivers such as the Navy Model RBB/RBC or other similar types. It is capable of converting these signals as received by the receivers into polar or neutral d.c. signals suitable for the operation of teleprinters or other suitable recording devices. Keyed tone output is also supplied when required. Frequency shift transmission differs from "on-off" keying insomuch as in the former the transition from "mark" to "space" pulses is achieved by shifting the carrier a small amount in frequency, instead of turning it on and off as in the latter. This shift in frequency may be of any magnitude from 100 (±50) cycles to 1000 (±500) cycles although at present 850 (±425) cycles is the most commonly used. When the higher values of shift are used (above 500 cycles) 200 cycles phase modulation up to 1 radian is sometimes superimposed on the regular frequency shift signal.

2. GENERAL OPERATION

The general operation of the Model FRA Converter is as follows. The I.F. signal from the receiver is fed through a coupling adapter to the converter, where it is amplified, limited by a locked oscillator used as a limiter and detected in a discriminator. The audio pulses thus obtained are passed through locking circuits which amplify them to the point where they are suitable for the operation of teleprinters and similar recording devices. Tone output is also obtained simultaneously with the d.c. output. Features of this Converter are a very high degree of limiting due to the locked oscillator, variable selectivity provided by the type of coupling to the locked oscillator, freedom from drift troubles due to the absence of direct coupled stages following the discriminator, operation at various degrees of shift and keying speeds and removable I.F. chassis to facilitate changing to a new I.F. frequency when using different type receivers.



Coupling Kit Navy Type CRV-10563

3. COUPLING KIT

The Coupling Kit type CRV-10563 is intended to adapt any RBB/RBC series of Radio Receiving Equipment for use with an FRA Frequency Shift Receiver Converter. When installed in a Model RBB/RBC Radio Receiver as described in this book, the coupling kit provides a means for feeding signals to the Model FRA Frequency Shift Converter. The kit has been designed for field installation. The Coupling Kit consists of two sub-assemblies, a cathode follower assembly, and a low pass filter unit, together with the necessary mounting accessories and cables. When properly installed, the circuits are such as to prevent interaction between the receiver and the converter and to minimize interference from local transmitters. The low pass filter is designed to pass the receiver intermediate frequency (400 k.c., ± 100 k.c.) with minimum attenuation.

4. QUICK REFERENCE DATA

a. Nomenclature ---------- Navy Model FRA
b. Contract No. and Date------ N5sr 7266, 12 June 1945
c. Contractor---------- RCA Victor Division
Radio Corporation of America
Camden, N.J., U.S.A.
d. Cognizant Naval
Inspector----- Resident Inspector of Naval Material
Front and Cooper Streets
Camden, N.J., U.S.A.
e. Number of packages in Complete Shipment------ two
f. Total Cubical Contents Crated---------- 18.1 cu. ft.
Uncrated---------- 6.4 cu. ft.
g. Total Weight Crated---------- 335 lbs.
Uncrated---------- 175 lbs.
h. Intermediate Frequency---------- 400 kc.
i. Polar Direct Current Output-------- 25 milliamperes
j. Neutral Direct Current Output------ 60 milliamperes
k. Direct Current Load Impedance---- 130 to 1800 ohms
l. Tone Output (1000 cycles)---------- 24 milliwatts
m. Tone Output Impedance---------- 600 ohms
n. Power Supply------ 110, 115, 120 volts 60 cycle A.C. single phase
o. Power Input---------- 135 watts
p. Squelch Circuit Characteristics------ With no carrier applied for a period of 200 milliseconds the output shall revert to "mark" output.

5. EQUIPMENT SUPPLIED

a. OVERALL DIMENSIONS.

QUANTITY PER EQUIP.	NAME OF UNIT	NAVY TYPE DESIGNATION	HEIGHT Inches	LENGTH Inches	WIDTH Inches	VOLUME (Cu. Ft.)	WEIGHT (pounds)
1	Frequency Shift Converter	CRV-35122	11¾	19¾	18¼	2.45	98
1	Coupling Kit consisting of						
	Cathode Follower Assembly	CRV-10563	4	3	2	.014	0.3
	Low Pass Filter Unit		3½	1⅜	1⅜	.004	0.25
	Miscellaneous Accessories		—	—	—	—	0.45
1	A.C. Power Plug	CRV-49125	1¾	3¼	1¾	.004	0.35
1	Output Plug	AN 3106-14S-5P	1	2¼	1	.001	0.15

b. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY DESIGNATION	REQUIRED CHARACTERISTICS
As Required	Radio Receiving Equipment	RBB or RBC	400 kilocycle I.F. Frequency

c. SHIPPING DATA.

SHIPPING BOX NO.	NAME AND DESIGNATION OF CONTENTS	OVERALL DIMENSIONS			VOLUME (cu. ft.)	HEIGHT (lbs.)
		Height	Width	Length		
1	Frequency Shift Receiver Converter Navy Model FRA	18½	24¾	26½	7.02	155
2	Equipment Spare Parts Box	22½	25	31	10.09	180

6. TUBE COMPLEMENT

NAME OF UNIT	6H6	6J5	6SA7	6SG7	6SJ7	6L6GA	6AB7	5Y3GT/G	VR75/043	VR150/ODE	TOTAL
I.F. Chassis	1		1	1	1						4
Main Chassis		1			5	2		3	1	4	16
Coupling Kit							1				1
Total	1	1	1	1	6	2	1	3	1	4	21