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RESTRICTED

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SERIAL NO.

INSTRUCTION BOOK (PRELIMINARY)
FREQUENCY MONITORING ASSEMBLY
FOR
AN/FGC-1A RADIO EQUIPMENT
for RBP Receivers



AWAMM-37
Antique Wireless Museum, Bloomfield, NY

MANUFACTURED BY
WESTERN ELECTRIC CO.
NEW YORK, N. Y.
ORDER NO- NXss-20953

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AN/FGC-1A RADIO EQUIPMENT

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SECTION I - DESCRIPTION

1-1 INTRODUCTION

1.01 These instructions describe the Frequency Monitoring and the Receiver Control Equipment of AN/FGC-1A Radio Equipment and contain directions for installation, operation, and maintenance. They cover the modification of the radio receivers which are necessary for the connection of this equipment but do not cover the radio receiver itself except in so far as is necessary to explain the operation of the telegraph terminal equipment. Other instructions are available for the radio receivers and other components of the circuit.

1-2 DESCRIPTION

2.01 General Description. This equipment forms part of a two-tone radio telegraph system, the general circuit arrangement of which is indicated in Fig. 1. The receiving circuit is indicated schematically in the block diagram of Fig. 2. The radio transmitter sends out its normal frequency plus 425 cycles for dots or dashes (marks)* and its normal frequency minus 425 cycles for spaces. These signals are received and amplified in the radio receiver and pass to the first intermediate frequency amplifier as 450 kilocycles \pm 425 cycles. They are then converted to 50 kilocycles \pm 425 cycles and amplified in the second intermediate frequency

*See the Glossary for definitions of unusual terms.

SECTION I - DESCRIPTION

amplifier. From the second intermediate frequency stage the signals pass through a converter which changes them to 2550 \pm 425 cycles. The order of the frequencies is now inverted, the marking frequency being 2125 cycles and the spacing frequency 2975 cycles. These voice frequency signals are rectified and passed to a tone keyer, from which they go to the receiving teletypewriter equipment as ordinary single-tone audio signals over an intermediate link, which may be either a land line or a radio circuit.

2.02 Signals are usually sent by telegraph printer keyboard or automatically by transmitter-distributor at 60 words per minute. They are received by printer or by typing reperforator. Other sending and receiving mechanisms may be used at speeds up to 200 words per minute if radio conditions permit.

2.03 The effect of radio fading is minimized by employing space diversity; two sets of receiving equipment are associated with two receiving antennas which are spaced several wavelengths apart, and thus the reliability of reception is greatly increased.

2.04 A 50 or 60 cycle, 103-126 volt a-c power supply is required. The additional power required for the Frequency Monitoring Bay and Receiver Control Unit CW-50136 is about 180 watts.

2.05 A location free from abnormal vibration and protected from outside weather conditions is necessary.

2.06 Major Units. The equipment for one radio circuit consists of a receiver control unit (CW-50136) which is mounted in one of the RBP receiver cabinets and a separate frequency-monitoring assembly cabinet containing the following major items of voice-frequency equipment:

2 - Current Limiters	CW-50132
1 - Frequency Indicator	CW-60061
1 - Control Panel	CW-23364
2 - Detector Panels	CW-50133
1 - Keyer Control	CW-23365
2 - Frequency Control Panels	CW-50135
1 - Fuse Panel	CW-28015
1 - Regulated Tube Rectifier	CW-20216
1 - Alarm Panel	CW-10201
1 - Outlet and Heater Box	CW-10202

Where there is only one frequency-monitoring bay, two receiver-control panels are mounted in the spaces normally filled with blank panels between the RF and IF units of RBP receiver No. 1. The upper control unit is spare. When two frequency-monitoring bays are used, one receiver-control panel is mounted in the lower position only of RBP Bay No. 1 and a second in the corresponding position of Bay No. 7. A third is furnished, in this case, as a shelf spare.

2.07 The first additional cabinet containing the radio teletype terminal equipment is located adjacent to

Par. 1-2

RBP Receiver Cabinet No. 1 and the second cabinet, when supplied, adjacent to RBP Receiver Cabinet No. 7.

2.08 Weight and Dimensions. The cabinet of frequency-monitoring equipment weights approximately lbs., and the control panel CW-50136 approximately lbs., not crated. The cabinet dimensions are 82-3/4" high, 21-3/4" wide, and 14-3/16" deep. It has doors in front and rear similar to those of the radio receiver cabinet. The receiver-control panel is 10-15/32" high, 19" wide, and 9" deep (measured from the face of the panel).

2-3 OVER-ALL RECEIVING CIRCUIT

3.01 A block diagram of the receiving circuit is shown in Fig. 2. Two of the three RBP receivers Nos. 1, 2 and 3 (or 4, 5, and 6) and the frequency-monitoring assembly, contained in the one cabinet, are associated in a dual space-diversity receiving circuit. The radio signal is received in the radio frequency amplifier stage of a receiver as a carrier ± 425 cycles. In the first intermediate stage this becomes 450 kilocycles ± 425 cycles and in the second stage 50 kilocycles ± 425 cycles. To save extensive modification of the receivers, the receiver control panel is supplied with two 400 kilocycle oscillators and a 52,550 cycle oscillator. The 50 kc ± 425 cycle signals are modulated by means of the 52,550-cycle oscillator and converted to 2550 ± 425 cycles, the marking frequency being 2125 and the spacing frequency 2975 cycles. From the output of the receiver control circuit, they pass into a filter which has a pass band broad enough to transmit both the marking and spacing signals and which eliminates noise frequencies outside of this range. At the output of the filter is a limiter in which the signals are amplified and the action of the limiter is such that it delivers a substantially constant output for wide variations of the input level, thus compensating for variations due to radio fading.

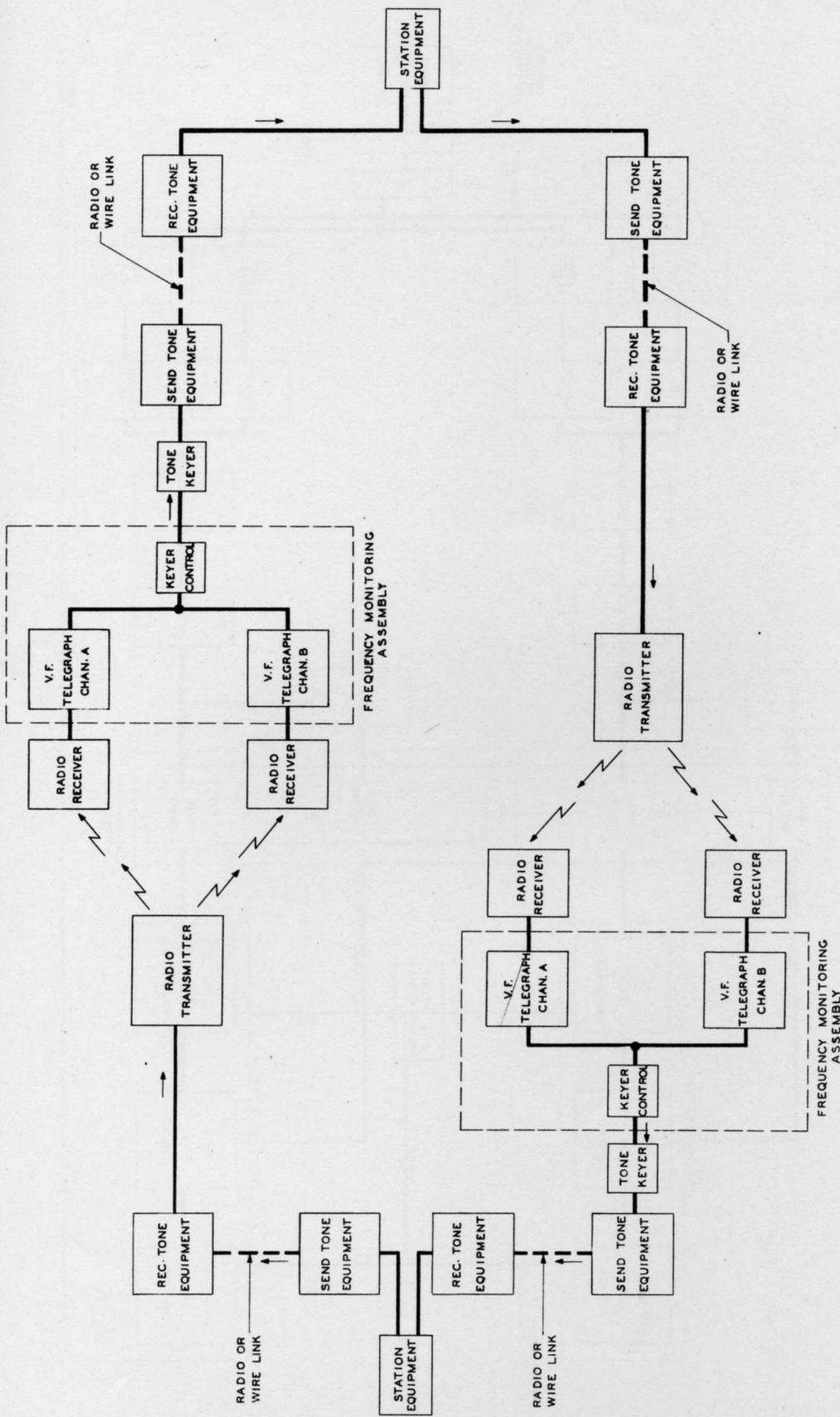


Figure 1 - System Block Diagram

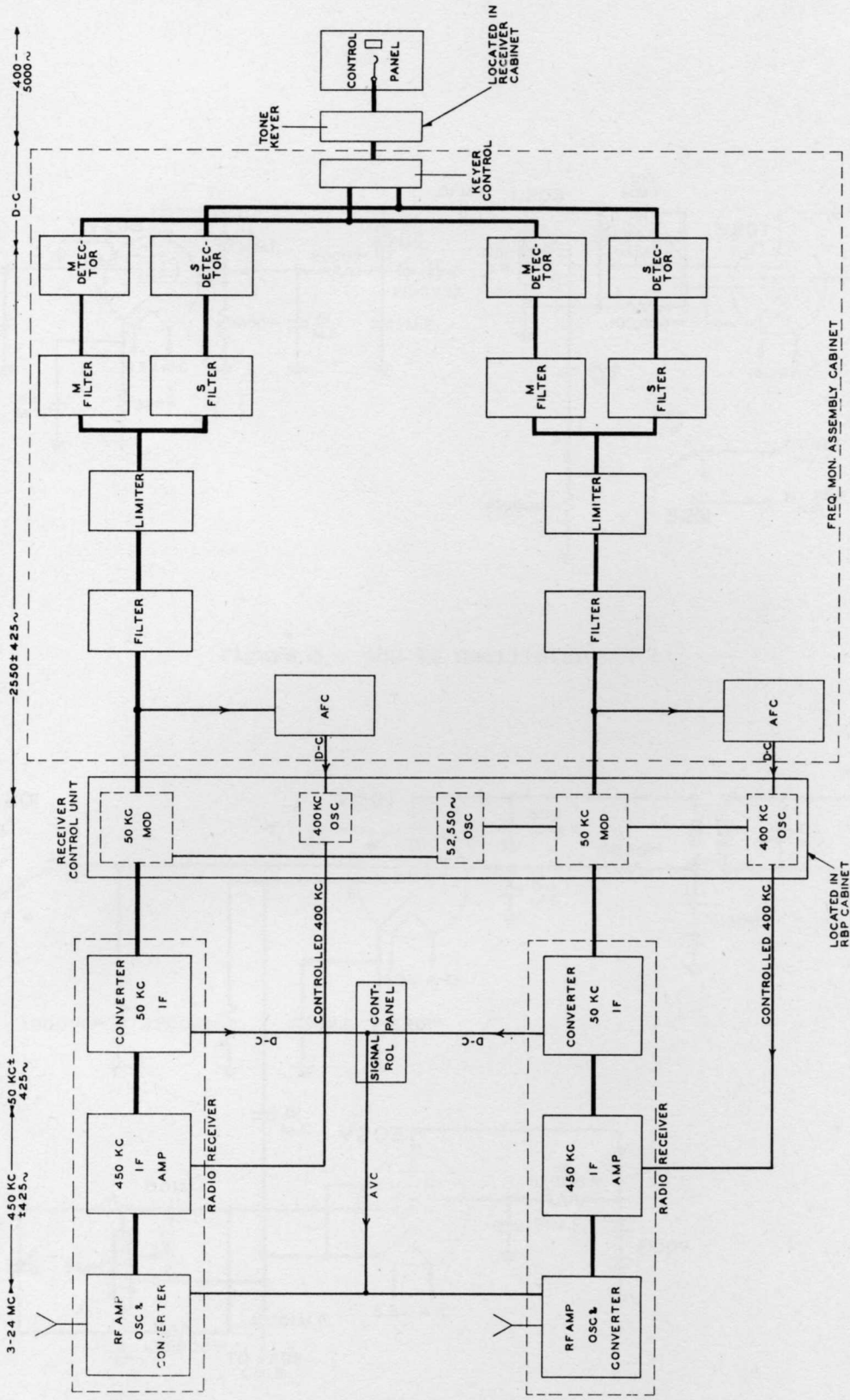


Figure 2 - Receiving Circuit Block Diagram