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TECHNICAL MANUAL  
FOR  
RADIO RECEIVING SYSTEM  
MODEL DDR-7W



THE TECHNICAL MATERIEL CORPORATION  
MAMARONECK, N.Y. OTTAWA, ONTARIO

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UNCLASSIFIED

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OTTAWA, CANADA

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## FOREWORD

Radio Receiver Model DDR-7W is a medium- and high-frequency receiving system consisting of six modular units in a rack-mounted configuration. An individual manual is provided for each modular unit in the DDR-7W; detailed information concerning a particular unit may be found in the manual for that unit.

The DDR-7W manual discusses each modular unit only in terms of its relation to the entire DDR-7W system.

## SECTION 1

### GENERAL INFORMATION

#### 1-1. GENERAL DESCRIPTION.

TMC Model DDR-7W Radio Receiver is a receiving system covering the frequency range of .54 mHz to 31.5 mHz in six bands, and capable of receiving SSB, ISB, AM, AME, CW, MCW, and FSK signals with any degree of carrier insertion.

Continuous tuning is provided, with full electrical bandspread. In addition, ten switch-selectable crystal-controlled HFO frequencies are available, with a stability of better than 1 part in  $10^6$  per day.

Sensitivity of the DDR-7W averages better than one microvolt for a 10 db signal-plus-noise-to-noise ratio, with a front-end noise figure of better than 6 db.

IF (intermediate frequency) bandpass is variable in six switch-selectable steps, and bandpass-tuning controls permit easy and accurate tuning of CW, SSB, and ISB signals.

#### 1-2. DESCRIPTION OF UNITS.

a. GENERAL.-The following paragraphs give a brief description of the component units of the DDR-7W.

b. COMMUNICATIONS RECEIVER, MODEL GPR-90 RXDS.-The Communications Receiver Model GPR-90 RXDS is the receiving component of the DDR-7W, and serves as the system's front end. The GPR covers 0.54-to 31.5 mHz in six bands, employing dual conversion in the upper three frequency ranges. The GPR is independently capable of receiving SSB, AM, CW, MCW, and FSK signals, and provides the DDR-7W system with these capabilities.

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Continuous tuning with full electrical bandwidth is provided, and a 100-kHz crystal-controlled calibration oscillator generates markers at 100-kHz intervals throughout the frequency range.

Sensitivity averages better than one microvolt for a 10 db signal-plus-noise-to-noise ratio. A front-panel S-meter indicates relative signal strength and permits accurate tuning.

IF bandpass is switch-selectable in six steps from 0.25-kHz to 7-kHz. In addition, three degrees of audio selectivity are available.

c. STABILIZED CRYSTAL OSCILLATOR, MODEL TRX.-Stabilized Crystal Oscillator Model TRX provides the DDR-7W system with 13 oven-regulated crystal-controlled frequencies, each with a stability of better than 1 part in  $10^6$  per day. Of the 13 possible outputs, ten are switch-selectable HFO outputs, two are selectable BFO outputs, and one is an IFO output. The TRX finds use in the system when critical stability and control of a fixed frequency becomes necessary or desirable.

d. MODE SELECTOR RECEIVING MODEL MSR.-Two Mode Selector Receiving units, Model MSR are used with the DDR-7W system. The MSR units improve and simplify operation in the various reception modes, and provide the system with ISB capability, when used together in conjunction with the GPR front end. This is accomplished by the combination of a specially designed filter circuit and a bandwidth oscillator in each unit which enables sharp discrimination between a desired signal and adjacent interference.

A front panel control on each unit tunes over the IF bandpass, and allows the system to easily tune SSB, AME, and exalted-carrier AM within cycles of correct tone. Either sideband is selectable by using the bandpass tuning feature or by inverting oscillator separation. In addition, the MSR permits ISB reception by tuning one unit to the upper sideband and tuning the other unit to the lower sideband of an ISB signal. CW, MCW, and FSK signals are likewise

easily tunable using the MSR's bandspread feature.

Each MSR unit also contains AM and SSB (product) detectors, a high-stability BFO, and an audio output system having both high- and low-level outputs capable of driving 8-ohm and/or 600-ohm loads.

e. LOUDSPEAKER PANEL MODEL LSP.-The DDR-7W system uses one Model LSP Loudspeaker Panel as its output monitor. The LSP consists of two panel-mounted four-inch PM speakers, each with its own volume control, also panel-mounted. In its normal configuration within the DDR-7W system, each speaker monitors the output of one MSR. Thus, during ISB operation, either sideband can be monitored simply by advancing the appropriate volume control; or, both sidebands can be monitored simultaneously by leaving both volume controls advanced.

f. POWER CONTROL PANEL MODEL DCP.-Power Control Panel Model DCP provides a-c line voltage to three non-controlled but fused convenience outlets. In addition, a front-panel mounted main circuit breaker controls a-c line voltage to a chassis-mounted output terminal board, and may be used as main power switch for the DDR-7W system. A main power indicator lamp is also provided, operating in conjunction with the main power circuit breaker.

Supplied with the DDR-7W system is a rack Model RAK-99B Cabinet, Electrical Equipment. The rack is supplied with cables, slides, and a-c power strip pre-mounted and ready for equipment installation.

SECTION 2  
INSTALLATION

2-1. UNPACKING AND HANDLING.

The DDR-7W was carefully inspected and packed before leaving the factory to ensure maximum protection in transit; however, it is wise to inspect all boxes upon arrival for signs of possible damage. With respect to equipment damage for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair, and in the furnishing of replacement parts.

Carefully unpack RAK-99B and the various modular units. Inspect the contents of each box for possible damage and inspect the packing material for parts that may have been shipped as loose items.

2-2. POWER REQUIREMENTS.

The DDR-7W requires either 115-volt or 230 volt, 50/60-cycle a-c power for operation. Consult the installation section of the individual modular-unit manuals to determine if a wiring change will be necessary. The individual unit manuals also contain the proper procedures for effecting such change.

CAUTION

To assure adequate circuit protection, all line fuses must be changed whenever a-c input voltage is changed. To change from 115 VAC to 230 VAC operation, replace all line fuses with fuses of one-half the current rating of the original units; to change from 230 VAC to 115 VAC operation, replace all line fuses with fuses of twice the current rating of the original units.

Power consumption of the DDR-7W is approximately 325 watts; power cabling of sufficient size to carry this power continuously at 115 VAC, single phase, should be adequate.



### 2-3. INSTALLATION.

a. ANTENNA.—The DDR-7W requires a 75-ohm unbalanced input. Many antennas can be adapted to this 75-ohm input by means of appropriate antenna couplers such as TMC Model RAC Rhombic Antenna Coupler.

b. LOCATION OF RECEIVER.—Choice of an operating location for the DDR-7W should be determined mainly by availability of suitable power, space, and noise level. Adequate power as noted above (paragraph 2-2) must be available at the operating site. Also, ensure that sufficient space surrounds the DDR-7W to permit proper ventilation; check all ventilation grilles on the DDR cabinet for obstruction and see that they have adequate free-air access. Sufficient space should also be reserved to the rear of the cabinet to allow opening of the rear door. The receiver should ideally be situated in the most electrically-quiet location possible, consistent with adequate power and ventilation. Especially avoid such noise-generating equipment as: motors (particularly DC motors), cyclic switches (such as flashers, thermostats, etc.), high-voltage intermittent-duty devices (such as neon signs, automotive ignition systems, or oil burners), and high-frequency and/or harmonically-rich devices (TV receivers, diathermy equipment).

After unpacking and inspecting the DDR cabinet (RAK-99B), place the cabinet in the selected location. It is advisable to do this before installing the modular units, to permit easy movement of rack.

c. INSTALLATION OF MODULAR UNITS.—With the exception of Loudspeaker Panel LSP and Power Control Panel DCP all modular units are slide-mounted. To mount LSP and DCP simply place the unit in the rack and secure the front panel to RAK-99B with screws.

The compartments of RAK-99B are equipped with tracks that attach to the slide mechanisms of the associated units. To mount any of these modular units, proceed as follow:

(1) Untape or unstrap cable assemblies, retractors, and all other components secured to the RAK-99B frame for shipment.

(2) Pull center section of associated compartment track out until it locks in extended position.

(3) Position slide mechanism of modular unit in tracks, and ease modular unit into rack until lock buttons engage hole in track.

(4) Make the necessary cable and electrical connections as described in paragraph 2-3d.

(5) Depress forward lock buttons, and slide modular unit completely into compartment.

(6) Secure front panel of unit to RAK-99B with screws.

d. CABLING. - Be sure that all cable assemblies, retractors, and other components secured to the RAK-99B frame have been untaped or unstrapped as outlined in step 1 of paragraph 2-3c above. Proceed as follows:

(1) CABLE ENTRY. - Cable entry is accomplished through openings with removable covers. These openings are located on both sides of the cabinet near the bottom, on the rear of the cabinet near the bottom, and on the bottom.

Antenna cabling should be RG-11/U, RG-59/U, RG-164/U or equivalent 70-75-ohm coaxial cable. External audio cabling may vary with the particular installation, and should be so suited. For low-impedance leads, standard audio pairs will be adequate; for higher (600-ohm) impedance loads, suitable shielded audio cable should be used.

(2) CABLING CONNECTIONS. - Figure 2-1 illustrates the cabling and inter-connection of the various DDR-7W units. Refer to figure 2-1, connect as indicated, and secure cables to cable retractors.

#### CAUTION

Position all cables and electrical wiring to prevent snagging or catching as units slide in or out of RAK. Be sure that cable retractors are functioning properly.