



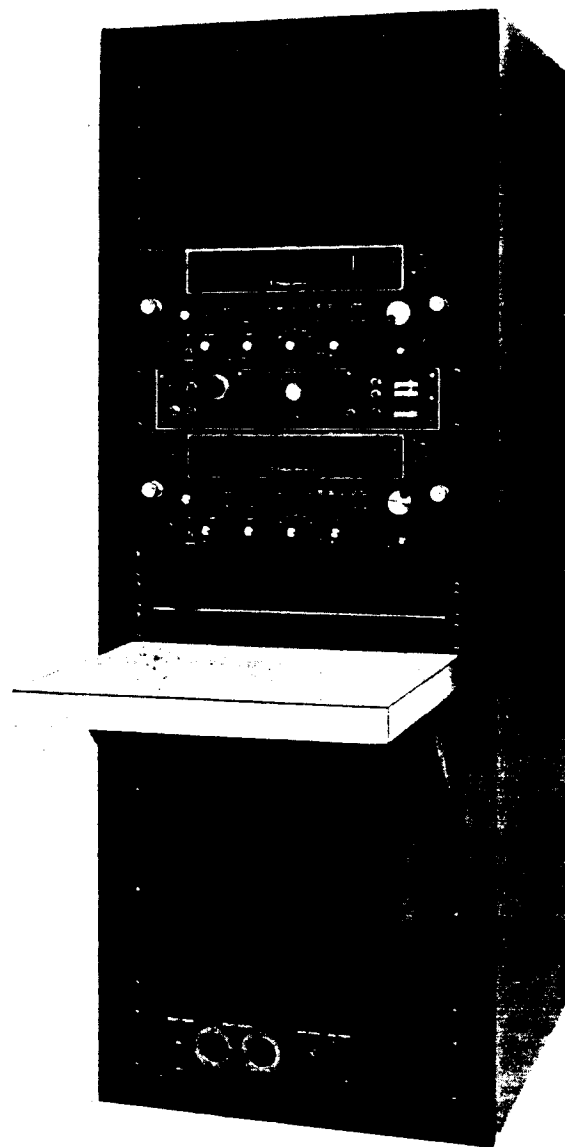
DIVERSITY RECEIVER SYSTEM

DDR-11

- * *Synthesized in 100Hz Steps*
- * *Vernier Clarifier And Fine Tune Control*
- * *Digital Electronic Display*
- * *Two or Four-Channel ISB Operation*
- * *Modular Design*
- * *Totally Solid-State*

The DDR-11 is a synthesized receiver system capable of operating in both space and frequency diversity from 100KHz to 29.9999MHz. All standard operating modes are provided including CW/MCW/AM/AME/USB/LSB/ISB and FSK/FAX with external converters such as the TMC Model CFA-2 Equalized filters are optional for high-speed data operation. The DDR-11 is equipped to operate in two-channel ISB and uses as an option the TMC Model DVC-4 for diversity voice combining (IF). The DDR-11 receiver is an outgrowth of the earlier U.S. Navy DDR-10 systems (AN/URR-63, 64). Advanced solid-state designs are employed to upgrade reliability and improve the technical characteristics of the receiver at considerable savings in cost.

The DDR-11 system is constructed from solid-state components to meet a wide variety of applications for high performance receivers used on point-to-point, air-to-ground, and mobile circuits. The versatility of each module provides many options to the system and enables conversion of the standard receiver system to a military grade



system with little effort. The performance of the DDR-11 receiver system exceeds that of other comparable equipment by consistently maintaining usable circuits for critical communications under the most severe signal conditions.

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The DDR-11 is equipped to operate two-channel ISB and uses major elements of the GPR-111 communication receiver. This reduces spare parts requirements and ensures that all receivers are in continuous service at installations carrying both types of equipment.

The DDR-11 system is mounted in a six-foot operating cabinet with the CFA-2 frequency shift converter. Audio patch panels, receiving antenna multicouplers, receiving notch filters, and other similar accessories are available to improve overall operation and technical parameters. Front panel operating controls are positioned in such a manner to eliminate confusion in the location and identification of all control settings.

DESIGN

The DDR-11 diversity receiver system use dual communication receivers each acting independently of the other. Each receiver is tuned to the operating frequency between 100KHz and 29.9999MHz by means of a single continuously-variable control. A fine tuning control enables vernier resolution with the 100Hz incremental tuning steps. A common 1MHz crystal oscillator standard internal to each receiver (or optionally common to both receivers in the system) is used to develop the basic signal frequencies. In addition, auxilliary controls are provided for monitoring RF or audio signals; setting AFC and squelch; for selecting IF bandwidths, AGC time constants, operating modes, and fixed/variable BFO; and for adjusting BFO, audio or RF levels. Visual alarms monitor AFC and synthesizer lock.

Each receiver contains two basic sections: the signal flow and digital logic/control sections. The signal flow section contains the RF/IF/Audio circuits while the digital section contains the circuits required to establish and maintain the

receiver at its selected frequency. In some cases, both the signal flow and digital sections use common circuits. A block diagram of the receiver is provided on the last page of this bulletin for clarification of the receiver's operation.

REMOTE CONTROL

The DDR-11 is fully capable of remote control with the addition of external digital processor control units. These control units, (Model DPC-11) are used to interface the receivers with either a single-unit RCR control; multiple-unit RCS control; multiple-unit RCS control; a standard TTY input device.

In any of these configurations, the DPC-11 is required for each single receiver to monitor and control frequency, mode, AFC, AGC, BFO, IF bandwidth, gain and power ON/OFF Standby. A change in receiver status is reflected instantly through to DPC-11 memory for display at the control site. As an option, the DPC-11 can be supplied with additional memory to program the DDR-11 receiver system for 8, 16, 32 or 48 channels. Channel programming can be completed at the factor or optionally at the receiver site by the operator.

TECHNICAL DATA

Additional information on the DDR-11 is available on request to TMC. Technical analyses, technical manuals and application notes are published to supplement the basic information presented in this technical bulletin.

TECHNICAL SPECIFICATIONS

DDR-11

FREQUENCY INFORMATION

RANGE 100KHz–29.9999MHz in synthesized 100Hz steps
STABILITY One part in 10^8 per day for a 15° C change in ambient, 0 to $+52^{\circ}$ C.
With AFC, residual error less than 1Hz from transmitted signal.
DISPLAY Six-digit, front-panel electronic display

OPERATING PARAMETERS

MODES A1/A2/A2H/A3/A3A/A3B/A3H/A3B
CW/MCW/AM/AME/USB/LSB/2ISB
Optional 4ISB with MSA-5 Multiple Sideband Adapter
Optional FSK with CFA-2/3/4 Frequency Shift Converter
TUNING Front panel control with provision for complete remote control
METERING Front panel monitoring of RF level, AF level, AFC tuning, F1 mode
DC loop voltage/current, F1 tuning indicator.
ALARMS Visual AFC lock and synthesizer lock
BFO/CLARIFIER Fixed or variable ± 1 KHz
SQUELCH Front-panel control with adjustable threshold
AGC Less than 6 db change for 90 db input signal change.
Switchable—Fast 20 ms attack/100 ms decay
—Slow 40 ms attack/2 sec decay
AFC Capture range ± 50 Hz.
INPUT IMPEDANCE 50-ohms nominal (BNC) unbalanced.
REMOTE CONTROL Optional with addition of interface circuits.

RECEIVER CHARACTERISTICS

NOISE FACTOR Maximum 7 db with provision for limiter.
SENSITIVITY SSB/3KHz 0.5 uv for 10 db (S+N)/N
AM/10KHz 4.0 uv for 10 db (S+N)/N
CW/1KHz 1.0 uv for 10 db (S+N)/N
IMAGE REJECTION Minimum 80 db referenced to 1.0 uv input
IF REJECTION Minimum 80 db referenced to 1.0 uv input
INTERMODULATION In Channel/Out-of-Channel: Minimum 60 db below desired tone
with two tones in unwanted sideband.
SPURIOUS RESPONSE Minimum 90 db down relative to a 1 uv external signal.
Minimum 1 uv relative to internal signals.

AUDIO PARAMETERS

IF SELECTIVITY Selectable by front-panel control
6 db points ± 0.20 0.5 1.5 3.0KHz
60 db points ± 1.25 2.0 6.0 12.0KHz
Standard 3KHz/SSB 250-3040Hz; Optional 6KHz/SSB 250-6080Hz
EQUALIZED FILTERS (OPTIONAL) 3 db bandwidth (SSB) 250-3040 Hz; Others on request.
Phase jitter: Less than 5 degrees in any two successive 10 milli-
second periods.
Envelope Delay: Less than 500 usec from 600-2900 Hz
Less than 150 usec for any 100Hz step, 500-3050Hz
OUTPUT LEVEL Adjustable -30 dbm to $+10$ dbm
OUTPUTS 1. 600-ohm balanced for each sideband or symmetrical channel.
2. External speaker - 3 watts
3. Headphone monitor jack - 0.1 watt
DISTORTION Less than one percent
HUM AND NOISE Less than 50 db at $+10$ dbm audio output/channel
CHANNEL CROSS-TALK Adjacent channel min. 50 db down from 0 dbm in desired channel.

ENVIRONMENTAL AND INSTALLATION

PRIMARY POWER 115 or 230 VAC, 50/60/400Hz, single-phase
INPUT POWER Maximum 45 watts
OPERATING 0 to $+50^{\circ}$ C; 90% relative humidity
STORAGE -20 to $+80^{\circ}$ C; 95% relative humidity
SIZE/WEIGHT 14" x 19" x 14" (35.6 cm x 48.3 cm x 35.6 cm)/80 lbs
(RACK-MOUNTING)

Specifications subject to change without notice.