

GENERAL PURPOSE RECEIVER

GPR-110



The GPR-110 is a highly sophisticated receiver with a basic range of 100 KHz to 30 MHz. It is solid state and stable to approximately one part in 10^6 without synthesis. A variety of options make it possible to accommodate the most exacting requirements of the user:

- FREQUENCY SYNTHESIS IN 100 HZ STEPS
- ONE PART IN 10^8 STABILITY
- INDEPENDENT SIDEBAND OPERATION
- DIGITAL REMOTE CONTROL
- FREQUENCY OR SPACE DIVERSITY OPERATION
- TWENTY FREQUENCY CHANNELIZATION

The GPR-110 is a truly versatile and reliable communications receiver. Advanced designs, products of many years development of the widely accepted GPR-90 and DDR-5 series, coupled with the knowledge TMC engineers have gained of the requirements of professional communicators has resulted in the GPR-110, the finest in the TMC line of quality general purpose communications receivers.

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GENERAL FEATURES

The GPR-110 is essentially a triple conversion device employing the latest design techniques such as a completely passive front end relatively insensitive to overload and the "hot carrier" mixer for low noise. Image response and jitter are practically non-existent and re-radiation is held to a very low level. The IF chain is phase locked and VFO tuning is accomplished with direct frequency readout. Filtering is accomplished in the last IF

The standard model is installed in a 7-inch table model cabinet and features phase-locking; upper or lower sideband with choice of bandwidths; fixed and variable BFO, automatic noise limiter full automatic gain control and direct frequency readout. It operates from a 10 to 40 volt DC source at very low drain or a 70 to 280 volt AC, 50/60 Hz, single phase source. AC stability of the receiver is excellent and at ambient will approximate one part in 10^6 per day without synthesis.

SYNTHESIS

Provision has been made in the receiver for frequency synthesis by the addition of a plug-in module. The stability of the receiver is thereby elevated to that of the one MHz frequency standard which is one part in 10^8 per day

CHANNELIZATION

This optional feature greatly expands the capability of the receiver. A twenty position module is added to the basic receiver. By turning the bandswitch on the receiver front panel to EXT OSC, the VFO becomes disabled and frequency control is transferred to the crystal position indicated by the external switch. Up to 20 channels may be programmed using this technique in addition to sweep coverage inherent in the basic receiver. Accurate digital readout of the tuned frequency is provided whether the receiver is channelized or not.

INDEPENDENT SIDEBAND

The addition of an IF channel is all that is needed to provide independent sideband operation thereby enabling reception of different intelligence in each sideband. When ISB is used, however a change in filter requirements is also necessary since separate upper and lower sideband filters must be used to ensure high quality reception at all times.

REMOTE CONTROL

Remote digital control of the receiver is optional. Simple techniques are used to control mode, frequency and other receiver features at considerable distances from the actual receiver site. The TMC Model ADC-2 control system provides the necessary interface tone equipment for meeting the exact requirements of more sophisticated systems. Since control systems vary with users, care must be taken in selecting the proper remote equipment for the job.

FREQUENCY INFORMATION

Range

100 KHz to 30 MHz, continuous
When synthesized, tuning in 100 Hz increments with vernier control for fine tuning within 100 Hz interval.

Stability and Control

One part in $10^6/^{\circ}\text{C}$
OPTIONAL.
One part in 10^6 over range using TCXO; synthesized or unsynthesized.
One part in 10^8 over range using High Stability Standard; synthesized or unsynthesized.

Presentation

Front panel, six-position digital readout

OPERATING PARAMETERS

Modes

CW(A1), AM(A3) A3E(A3H) LSB;
USB(A3A,A3J) NB-FM
OPTIONAL. ISB(A3B)
FSK/FAX(A7J)

Tuning

Manual, front panel control using a RF Tuning Control with MHz selection switch. Readout indicator gives frequency to 100 Hz increment.
Readout can be turned off or controlled by the squelch circuit to reduce battery drain in mobile operations.
Remote Tuning available on request.

Metering

Front panel RF/Audio level meter

BFO/Clarifier

Selection of Fixed or Variable.
In variable position: ± 1000 Hz.
SSB: ± 50 Hz.

Squelch

Threshold is variable according to the operating environment. Squelch control of battery power-miser circuit.

Automatic Gain Control

Switchable:
FAST Attack 20 ms
Decay 100 ms
SLOW Attack 40 ms
Decay 2 seconds

Threshold:

Nominal 1 μv input signal, SSB 3 KHz passband.

Loop Error:

Less than 6db change in audio output for a 1 μv to 500mv variation in the input signal.

Input Impedance

50 ohms nominal, unbalanced.
Additional values with RF matching units are available for LF/MF antennas

Controls

Power ON/OFF/STANDBY
Mode Switch
Bandswitch
MHz Selector Switch
Main RF Tuning Control
Bandwidth Selection
BFO FIXED/VARIABLE Switch
Variable BFO Control
AGC FAST/SLOW Selection Switch
Automatic Noise Limiter Switch
Meter RF/AF Switch
AGC/RF Gain Control
AF GAIN Control
SQUELCH ON/OFF with Threshold
Headphone jack, Monitor Speaker

AUDIO

IF Selectivity

SSB: 300-3000 Hz at 3db points
OPTIONAL.
250-3040 Hz (CCIR)
250-6080 Hz (CCIR)

AM: Nominal 12 KHz symmetrical at 3db points in wideband. Optional push-button selection of the 6, 3, 1 and 0.4 KHz passbands.

IF Ripple Response

SSB: Within 3db absolute

Independent IF AGC

In ISB mode, each sideband IF section has a partially independent AGC system to minimize cross-channel AGC capture problems potentially brought on by significantly different varying levels between channels.

Outputs

Internal Monitor Speaker
Switchable LSB or USB/AM
External Monitor Speaker Output
3 watts power output; less than 1% distortion at one watt.
600-ohm Balanced Output
Adjustable to +10dbm
Second 600-ohm Balanced Output
Provided with ISB option only.
Headphone Jack
Mutes speaker when connected.

CHARACTERISTICS

Sensitivity

SSB/3 KHz Passband
0.5 μv from 400KHz to 30 MHz for 10db [S+N] /N
AM/10 KHz Passband
4.0 μv from 400KHz to 30 MHz for 10db [S+N] /N
CW/1 KHz Passband
0.5 μv from 400KHz to 30 MHz for 10db [S+N] /N

Image Rejection

First Image: 100db
Second Image: 70db

IF Rejection

100 db.

Intermodulation

Min. 35db meeting CCIR recommendations

Opposite Sideband Rejection

Greater than 50db at 300 Hz.

ENVIRONMENTAL AND INSTALLATION

Primary Power

DC Input
10-40 VDC, negative ground. Provided with reverse polarity protection.
AC Input
70-280 VAC, 48-450 Hz, single phase

Input Power Requirement

45 watts for synthesized ISB version.
20 watts with battery power-miser circuit

Operating Conditions

Storage:
-40 to +65 $^{\circ}\text{C}$; up to 95% relative humidity
Operation:
-20 to +52 $^{\circ}\text{C}$; up to 95% relative humidity
Designed for mobile and base station use.

Size and Weight

7" high X 15" wide X 13" deep with cabinet
Approximately 40 lbs.
Rack-mounted version is 19" wide.

OPTIONAL ACCESSORIES

Model CFA-2 Audio Tone Converter

Sales Bulletin 4008A
Enables reception of FSK and FAX signals transmitted in A7J mode.

Series AMC Receiving Antenna Multicoupler

Sales Bulletin 4033
Provides 8, 16 or 32 outputs from one antenna input.

Series BSP/LSP Remote Monitor Loudspeakers

Sales Bulletin 6005
Used for monitoring outputs from up to four receivers for one panel.

Model CAB-22

Desk top mounted cabinet.

Model CAB-40

4-foot relay rack cabinet. 19" wide panel space.

Model TOC-7

Transit operating carrying case for mobile operations.

Model ADC-2 Receiver Remote Control System

Technical Bulletin 6011 1
Enables real-time control of various receiver functions from remote terminals.

Series VRA Vertical Receiving Antenna

Sales Bulletin 4045
16, 18 and 35-foot aluminum collapsible or fiberglass free-standing antennas.

Model LMC-32 LF Receiving Antenna Multicoupler

Sales Bulletin 4033
Provides 32 outputs from one LF/MF antenna input.

Series HP Headphones

Battery Power-Miser Kit

KIT O-3011 1 Operating Spare Parts Kit

KIT M-3011 1 Maintenance Spare Parts Kit

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