

LONG-RANGE

TACTICAL

LINE-OF-SIGHT

SYSTEMS

COMPUTERS

combat
PROVEN



GRC-2000C

FREQUENCY HOPPING
MULTI-CHANNEL RADIO RELAY

GRC-2000C

The most advanced Line-of-Sight frequency hopping, multi-channel radio relay system on the military market

Military Line-of-Sight frequency hopping multi-channel radio relay

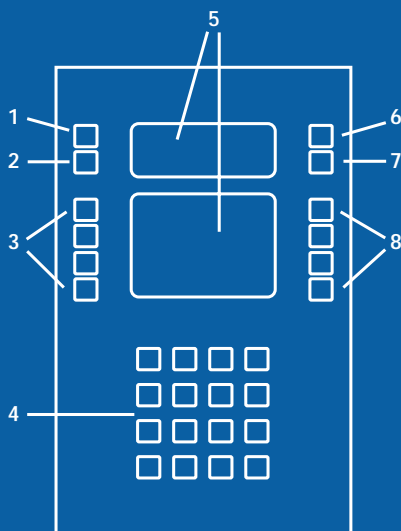
- Full band IV orthogonal fast frequency hopping for simultaneous, interference-free communications
- Built-in reliable error correction and interleaver for high quality communications
- User-friendly human interface for operations under stress of battle
- Field proven under harsh combat conditions

The GRC-2000C is a state-of-the-art, proven solution to the critical demand for an ECCM Line-of-Sight (LOS) Multichannel Radio (MCR) ready to meet the challenges of the battlefield of tomorrow. This advanced radio relay operates in a high frequency band, and delivers powerful anti-jamming capabilities. These features are fully integrated with enhanced Error Correction and Interleaving to ensure optimal jamming immunity, as well as with a highly efficient Differential 8PSK modem containing soft-decision capabilities.

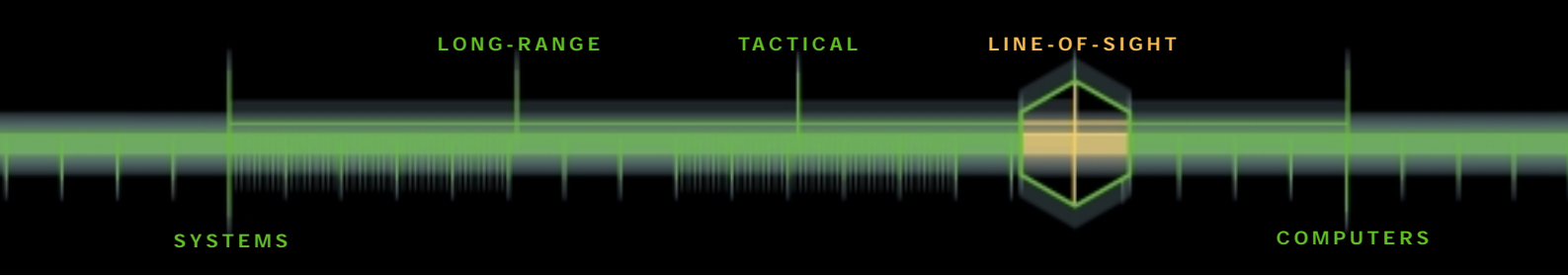
The use of orthogonal frequency hopping assures that many MCRs at the same site can operate simultaneously without interference. This vital benefit draws on Tadiran Communications' extensive, proven experience in implementing orthogonal frequency hopping in other types of fully deployed radios. A GPS provides the synchronization for the orthogonal fast frequency hopping.

The GRC-2000C complies with the strictest environmental conditions, and includes a powerful Built-in Test.

The GRC-2000C supports an optional antenna positioner unit utilized for fast tactical deployment and optimal and automatic link establishment.



- 1 Ringer push-button - EOW signaling.
- 2 Software definable key (optional).
- 3 Software keys - menu dependent (like 8).
- 4 4X4 detachable numerical keypad.
- 5 6 rows by 16 characters - bright LED display.
- 6 Mute push-button.
- 7 Fault list push-button.
- 8 Software keys - menu dependent (like 3).



STATE-OF-THE-ART ECCM FEATURES AND BENEFITS

Full Band Fast Frequency Hopping Combats Jammers

The GRC-2000C features wide frequency bandwidth coverage totaling 600 MHz in Band C. Frequency hopping is performed on seven sub-bands of C-Band frequency range to provide several degrees of Processing Gain-effectively combating any potential jammer.

Orthogonality Supports Co-Site MCR Communications

Orthogonality is based on an internal precise clock with an interface to an external GPS receiver. The system's superior orthogonality ensures that different links can operate simultaneously without mutual interference even when they are dwelling on the same set of frequencies. Orthogonality is the most efficient way to utilize a very expensive resource: the RF Spectrum.

Time and Frequency Division Multiple Access (TFDMA) Eliminates Interference

The "Air Access" is performed by combining Time Division with Frequency Division Multiple Access. The TFDMA technique, when employed in conjunction with orthogonality, totally eliminates co-site interference.

Built-In FEC and Interleaving overcome Jamming Effects

Forward Error Correction (FEC) is implemented with Convolutional Encoding and Viterbi Decoding, as well as soft decision combined with an interleaver/deinterleaver. The integration of these techniques has been proven as the most effective way to eliminate jamming and fading effects on communications.

Modulation Efficiency and Spectral Purity for Adjacent Channel Selectivity

Spectrally efficient modulation of the differential 8PSK enables 3 data bits per one transmitted symbol to be carried. For any given frequency bandwidth, this results in bandwidth modulation that is three times more efficient than conventional FSK or PSK modulations (1 bit per symbol). Excellent adjacent channel selectivity is provided by the GRC-2000C's exceptional band limited signal spectral purity combined with power amplifier linearity, which ensures a very low spurious level of frequency side bands.

Built-in Automatic Power Control (APC)

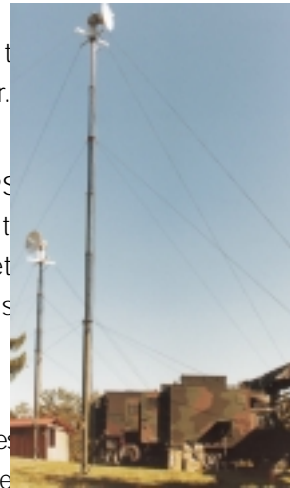
APC is a function operating in a closed loop within the link between two radios to continuously adjust the transmitted power to the minimum required level for error free communications. This assures a low probability of interception (LPI), a low probability of detection (LPD) and anti-jamming properties. The APC procedure is mutually adaptive and is performed continuously.

Efficient and User-Friendly Human Interface (HI) with Full Remote Control

Local control is implemented via an efficient and simple HI utilizing alphanumeric and software definable keys on a front panel with very bright and clear displays. There is both a Local and a Remote Syscon PC-based facility for control and monitoring. The Local and the Remote Syscon have similar operational functionality as the local manual HI.

Antenna Positioning (option)

The Automatic Antenna Positioner Unit (APU), which is interoperable with the GRC-2000C radio, is available for fast deployment and link establishment. The APU is digitally controlled and monitored from the radio and performs an automatic dual axis (rotation and tilting) search process to automatically find the link's correct azimuth and elevation. Actual antenna position and received signal power are available on the radio display.



TECHNICAL SPECIFICATIONS

Frequency Range

Band IV (C-Band): 4400 to 5000 MHz

Air access

Time and Frequency Division: TFDMA
Multiple Access protocol

Transmission Rates

Eurocom: 256/512/1024/2048 kbps

System threshold (sensitivity)

Threshold (dBm) @ BER = 10^{-4} for
-91/-91/-88/-82

Transmission Rates (kbps): 256/512/1024/2048

Baseband interfaces

Eurocom: AMI (HDB3-option)
NATO (option): NRZ
(other interfaces available upon request)

Transmitter

Modulation type: Differential 8PSK
Output Power: Linear
High Power - 5W
Low power - 1W

Power Control:

- Manual: Low/High
- Automatic: APC-Automatic Power Control is mutually performed in a closed loop within the radio link.

ECCM features

Jamming Immunity
Low Interception Probability

Frequency hopping

Orthogonal full band or partial band frequency hopping
Selectable frequency hopset

Built-in forward error correction - FEC

FEC rate (variable): 1/3, 2/3
Encoder: Convolutional
Decoder: Viterbi
Interleaver/Deinterleaver: Short/Long

Convolutional encoder and Viterbi decoder

Implemented with soft decision

Power Supply

DC Voltage: 24 nominal - 170W
AC Voltage: optional

Environmental conditions

Temperature:
• operating: -25°C to +55°C
• storage: -40°C to +70°C
Humidity: 94% (MIL-STD-810E)
Dynamic & Mechanical: MIL-STD-810E
Electromagnetic Compatibility: MIL-STD-461C

Physical parameters

Dimensions (HxWxD):# 280x444x393 mm
Weight: 38 kg
19" Rack Mount or Stack Mount (optional)

Radio performance monitoring

On-line monitoring and display of the following MCR characteristics:
Link synchronization status
Receive power level
Bit error rate of received data over link
TX & Reflected Power
Power supply status
GPS position (option)
Link direction azimuth/elevation (with APU option)

Radio Built-in Testing (BIT)

Loop Tests
Diagnostics
Display test
BER measurement

Manual Radio control

Menu-driven user-friendly unambiguously defined, simple and efficient radio operation
4X4 alphanumeric keypad with acknowledgeable push buttons
12 additional software definable keys

Displays and indications

Six rows of 16 characters LED displays
Very bright illumination (7.5 millicandles)
Bit results
Buzzer for Audio indications and signaling

Keygun loader interface

Simple Interface for downloading frequency hop sets and keying

External radio control (Syscon)

Enhanced remote control channel Local and remote radios can be controlled and monitored through the radio
Syscon connector from the external Facility Control.
Serial interfaces

Service channel

Enhanced Engineering Order Wire (EOW) Handset Support

Antenna positioner unit - APU (optional)

APU with automatic direction search and acquisition algorithm.
APU weight: 17 kg
Interface to GRC-2000C: RS-422, 9.6 kbps