

Tadiran GRC-2000

Frequency-Hopping Multi-Channel Radio Relay with Powerful Anti-Jamming Capabilities



Elbit Systems

Land and C⁴I



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State-of-the-art, field-proven, ECCM Line-of-Sight multi-channel radio

Ready to meet the challenges of the modern battlefield, the Tadiran GRC-2000 is a state-of-the-art, field-proven, ECCM line-of-sight (LOS) multi-channel radio (MCR). This advanced radio relay operates in a high-frequency band and delivers powerful anti-jamming capabilities. Enhanced error correction and interleaving ensure optimal jamming immunity. These features are integrated with a highly efficient differential 8PSK modem containing soft-decision capabilities.

Simultaneous, interference-free communication

Incorporating extensive experience in orthogonal frequency-hopping ensures that multiple MCRs can operate simultaneously from the same site with interference-free communication. An external GPS receiver provides the synchronization required for fast orthogonal frequency-hopping.

Rapid deployment and link establishment

An optional antenna positioning unit can be utilized for rapid tactical deployment as well as optimal and automatic link establishment. The GRC-2000 complies with the strictest environmental conditions and includes a powerful built-in test.

Key Benefits

- Powerful anti-jamming capabilities
- Simultaneous interference-free communications
- Rapid deployment and link establishment
- High quality communications
- Operational efficiency
- Field-proven

Key Features

- Full band IV orthogonal fast frequency-hopping
- Built-in reliable error correction and interleaver
- Combined time and frequency division multiple access (TFDMA)
- User-friendly interface



Full Band Fast Frequency-Hopping to Withstand Jammers

The GRC-2000 features wide frequency bandwidth coverage totaling 600 MHz in Band C. In order to effectively combat any potential jamming, frequency-hopping is performed on seven sub-bands providing several degrees of processing gain.

Orthogonality Supports Co-Site MCR Communications

Orthogonality provides an effective mechanism to utilize the scarce RF spectrum and is based on a precise internal 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.

Time and Frequency Division Multiple Access (TFDMA) Eliminates Interference

Channel access is performed by combining time division with frequency division multiple access. When employed in conjunction with orthogonality, TFDMA completely 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 is proven to be the most effective way to eliminate jamming and fading effects on communications.

Modulation Efficiency and Spectral Purity for Adjacent Channel Selectivity

Tadiran GRC-2000's spectrally efficient bandwidth modulation of the differential 8PSK is significantly more efficient than conventional modulations, enabling three data bits per one transmitted symbol (compared with one bit per symbol for FSK or PSK modulations). Tadiran GRC-2000 provides excellent adjacent channel selectivity. The exceptional band limited signal spectral purity combined with power amplifier linearity ensures a very low spurious level of frequency side bands.

Built-in Automatic Power Control (APC)

Operating in a closed loop between radios, the APC continuously adjusts 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 other anti-jamming properties. The mutually adaptive APC is performed continuously.

Efficient and User-Friendly Interface with Full Remote Control

Local control is implemented via an efficient and easy-to-use interface utilizing alphanumeric and software-definable keys on a bright and clear display on the front panel. Both a local and remote PC-based system configuration for control and monitoring offers similar operational functionality as the local manual interface.

Antenna Positioning (optional)

Rapid deployment and link establishment is enabled with the use of the automatic antenna positioning unit (APU). Digitally controlled and monitored from the radio, the APU performs an automatic dual axis (rotation and tilting) search process, automatically detecting the link's correct azimuth and elevation. Actual antenna position and received signal power are shown on the radio display.

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TECHNICAL SPECIFICATIONS

Frequency Ranges	
Band IV (C-Band)	4400 to 5000 MHz
Channel Access	
Time and Frequency Division Multiple Access Protocol (TFDMA)	
Transmission Rates	
Eurocom	256/512/1024/2048 kbps
System Threshold (sensitivity)	
Threshold (dBm) @ BER = 10 ⁻⁴	-91/-91/-88/-82
for Transmission Rates (kbps)	256/512/1024/2048
Baseband Interfaces	
Eurocom	AMI (HDB3 - optional)
NATO (optional)	NRZ
(Other interfaces available upon request)	
Transmitter	
Modulation type	Differential 8PSK
	Linear
Output power	High power - 5W
	Low power - 1W
Power control	
Manual	Low/High
	APC - automatic power
Automatic	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-hop set	
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 and 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 and reflected power	
Power supply status	
GPS position (optional)	
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 character 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 terminals 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 Positioning Unit - APU (optional)	
APU with automatic direction search and acquisition algorithm	
APU weight	17 kg
Interface to GRC-2000	RS-422, 9.6 kbps