



FGR2-CP 900 MHz

Cathodic Protection Remote Monitoring

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Overview:

FreeWave Technologies, Inc's FGR2-CP Cathodic Protection remote monitoring radio is a multi-purpose, spread spectrum radio with specific inputs and outputs for monitoring and reporting operational values on pipelines, tanks, structures and other underground facilities subject to environmental corrosion. Designed to be compatible with other FreeWave radio products, the FGR2-CP is ideal for pipeline and tank companies wishing to extend their investment in telemetry automation to Cathodic Protection structures as well.

The FGR2-CP Cathodic Protection remote monitoring radio products monitor pipe-to-soil test stations, rectifier stations, pipeline pressure stations and pipeline scrubbing stations. The FGR2-CP board level radio is available in a pre-assembled LineMarker Test Station complete with solar power system (one or two panels), antenna and conduit mounting bracket. The FGR2-CP has no recurring monthly costs or fees.

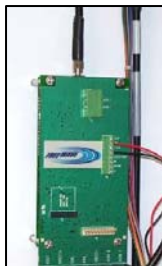
All radios are designed, manufactured and tested in Boulder, CO



FGR2-CP LineMarker Test Station Available with one or two solar panels.



FGR2-CP Board Level Radio



Features:

- Multi-Purpose, All-in-One Radio Modem: Monitor rectifiers, pipe-to-soil test stations, pressure and pipeline scrubbing operations.
- Enhanced Lightning Surge Isolation: Full CP isolation protection from field structures.
- Open Protocol Communications: Uses open Modbus and Extended Modbus.
- No Obsolescence: 100% backwards compatibility with all legacy FreeWave 900 MHz products.
- No Recurring Monthly Costs: You own your own communication network.
- Enhanced Security: Retains all data within company firewall protection.
- Easily Integrates into existing radio networks leveraging existing investments in supervisory control and data acquisition systems using open Extended Modbus network addressing.
- Frequency Hopping Spread Spectrum: Invented for military use in 1940s.
- High Speed Communications: 115.2 Kbps true data throughput.
- Long Range: Up to 60 miles line of sight with ability to extend range by repeating from station to station to station or to existing FreeWave radio products.
- Error Free Communications: 32 bit CRC with automatic retransmission.
- Repeater Capabilities: Each FGR2-CP can perform as a Slave radio, a Repeater and simultaneous Slave/Repeater.
- Wide Supply Voltage Range: Supply voltage +10 to +30 VDC.
- Ultra Low Power Consumption: Current draw is less than 8 mA, 12 VDC in linked idle mode, and less than 60 mA in receive mode.
- Separate Diagnostics Serial Port: Allows real time simultaneous diagnostics and setup without tying up the FGR2-CP main communication port.
- Separate RS232 Serial Port: Allows the FGR2-CP radio to simultaneously communicate to the CP monitoring points and to auxiliary PLCs, EFMs, RTUs, etc.
- Enhanced Diagnostics: Including signal level in dBm and transmit current.
- RS232/RS485/RS422 Interface available with user programmability.
- Noise Immunity: Robust communication performance in noisy, congested areas.
- Secure: Proprietary spread spectrum technology and user programmable security features prevent detection or unauthorized access.

CP DataLogger Software (optional)

#	CP RMU Station ID Number	CP RMU Station Description	Select Devices	Rectifier Input Power Status	Rectifier Shunt Voltage (mVDC)	Rectifier Amperage	Rectifier Voltage (VDC)	Pipe-Soil Potential (mVDC)	CP RMU Temp (°F)	CP RMU Battery Voltage (VDC)	Discrete Output Control	Analog Input Value	CP RMU Polling Status	Comments
1			<input checked="" type="checkbox"/>	off	117.080	11.71	0.000	6.88	80.60	15.75	<input checked="" type="checkbox"/>	0.01	Green	
2			<input type="checkbox"/>	off	117.910	11.79	0.000	225.21	89.60	15.18	<input type="checkbox"/>	0.01	Green	
3			<input type="checkbox"/>	off	118.760	11.88	0.000	225.21	93.20	15.50	<input type="checkbox"/>	0.01	Green	
4			<input type="checkbox"/>	off	117.500	11.75	0.000	225.74	95.00	15.45	<input type="checkbox"/>	0.01	Green	

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Cathodic Protection Remote Monitoring Technical Specifications

FGR2-CP Specifications		Transmitter		
Rectifier Output Monitoring	Voltage: 0 to + 112 VDC Current Sense: -0.156 to +0.156 VDC	Frequency Range	902-928 MHz (FHSS)	
		Output Power	1 Watt	
Rectifier Status Monitoring	Inlet power status monitoring: 115 VAC to 480 VAC w/available Transformer	Range - Line of Sight	60 miles (100 km) with clear line of sight	
		Modulation	2 level GFSK, 115.2 Kbps or 153.6 Kbps	
Rectifier Interruption	12 VDC, DO relay output, user selectable	Hopping Patterns	15 per Band, 105 total, user selectable	
Pipe-to-Soil Monitoring	Potential: -8 to +8 VDC	Hopping Channels	75 to 80, user selectable	
		Frequency Zones	16 Zones, 5 Channels per zone	
Auxiliary Discrete Output	Used for rectifier interruption or remote control of field equipment	Occupied Bandwidth	230 kHz	
Auxiliary Analog Input	+1 to +5 VDC or 4-20 mA (250 ohm)	RF Connector	SMA straight, or reversed SMA	
Integrated Solar Charging, Including Solar Charger Negates UL Approval	+12 or +24 VDC, up to 50 watt Charging circuit and regulator, controller	Receiver		
		Sensitivity (board Level Only)	-107 dBm for BER 1x10 ⁻⁶ , -109 dBm for BER 1-10 ⁻⁴	
Soil (Input) Impedance	Optional high soil input impedance available	Selectivity	20 dB at fc +/- 230 kHz 60 dB at fc +/- 290 kHz	
		System Gain	134 dB	
Data Transmission				
Error Detection	32 bit CRC, Retransmit on error			
Data Encryption	Proprietary Spread Spectrum Technology			
Link Throughput	115.2 Kbps standard speed, 80 Kbps low speed. <i>Uncompressed; measured assuming 75% frequency availability.</i>			
Data Interface	RS232 / 485 / 422			
Data & Diagnostics Connector	10-pin header with locking ramp, 0.1 inch spacing power/data connector. Separate 20 pin header diagnostics connector.			
Antenna Connector	Board Level Radio: SMA, threaded LineMarker Test Station: Antenna included			
Power Requirements				
Operating Voltage	+10 to +30 VDC			
Current (mA)	Mode	+10 VDC	+12 VDC	+30 VDC
	Transmit	400	325	150
	Receive	155	123	51
	Sleep	16	13	5
Solar Autonomy of LineMarker Test Station - Fully Loaded I/O	One solar panel (2 batteries) - 18 days with 1.25 safety factor Two solar panels (1 battery) - 9 days with 1.25 safety factor			
General Information				
Operating Temperature Range	-40° C to +75° C			
Dimensions	Board Level Radio: 6.5 in L x 3.5 in W x 2 in H LineMarker Test Station: 30 in L x 4 in W x 4 in H			
Weight	Board Level Radio: 160 grams LineMarker Test Station: 12 pounds			
Mounting	Board Level Radio: Standoffs available or FGR2-CP bracket mount LineMarker Test Station: 3 in conduit riser pipe or 8x8 inch surface mount, flat adapter bracket			
Humidity	0 to 95% non-condensing			
UL Information				
FGR2-CP	UL approved for Non-Hazardous conditions without solar charger			
FGR2-CP-S	Non-UL required application with Embedded Solar Charger			

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FreeWave Radios Require Professional Installation. Specifications may change at any time without notice. ©2012 FreeWave Technologies, Inc.



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