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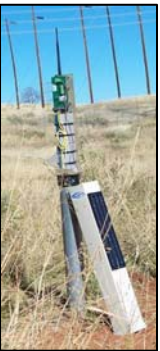
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IM-CP 2.4 GHz

Cathodic Protection Remote Monitoring

The FreeWave® Technologies IM-CP Cathodic Protection remote monitoring radio is a multi-purpose, spread spectrum, board level product 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 IM-CP is ideal for pipeline and tank companies wishing to extend their investment in telemetry automation to Cathodic Protection structures as well.

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



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



IM-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 FreeWave® 2.4 GHz 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 1940's.
- High Speed Communications: 115.2 Kbps true data throughput.
- Long Range: Up to 20 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 IM-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 IM-CP main communication port.
- Separate RS232 Serial Port: Allows the IM-CP radio to simultaneously communicate to the CP monitoring points and to auxiliary PLC's, EFM's, RTU's, 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.

FreeWave CP Data Logger

Company Name Here
Company Address Here

Connect Print

Read Latest Measurements Force and Read CP Measurements Automated Rectifier Interruption Measurement

#	CP RMI Station ID Number	CP RMI Station Description	Select Devices	Rectifier Input Power Status	Rectifier Shunt Voltage (mVDC)	Rectifier Amperage	Rectifier Voltage (VDC)	Pipe-Soil Potential (mVDC)	CP RMI Temp (°F)	CP RMI Battery Voltage (VDC)	Discrete Output Control	Analog Input Value	CP RMI 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		
2	2		<input type="checkbox"/>	OFF	117.910	11.79	0.000	225.21	89.60	15.18	<input type="checkbox"/>	0.01		
3	3		<input type="checkbox"/>	OFF	118.760	11.88	0.000	225.21	93.20	15.50	<input type="checkbox"/>	0.01		
4	4		<input type="checkbox"/>	OFF	117.800	11.75	0.000	225.74	95.00	15.45	<input type="checkbox"/>	0.01		

Cathodic Protection Remote Monitoring Unit
Data Collection Software
1880 S. Flatiron Court, Suite F, Boulder, CO 80301
www.freewave.com Version 1.0 BETA 13
Automated Rectifier Interruption Measurement

CP DataLogger Software (optional)

IM-CP 2.4 GHz

Cathodic Protection Remote Monitoring Technical Specifications

IM-CP Specifications		Transmitter			
Rectifier Output Monitoring	Voltage: 12 to + 112 VDC Current Sense: -0.156 to +0.156 VDC	Frequency Range	2.4 - 2.483 GHz (FHSS)		
Rectifier Status Monitoring	Inlet power status monitoring: 13 VAC or VDC	Output Power	5mW to 500mW		
Rectifier Interruption	12 VDC, DO relay output, user selectable	Range - Line of Sight	20 miles (32 km) with clear line of sight		
Pipe-to-Soil Monitoring	Potential: -8 to +8 volt VDC	Modulation	2 level GFSK, 115.2 Kbps or 153.6 Kbps		
Auxiliary Discrete Output	Used for rectifier interruption or remote control of field equipment	Hopping Patterns	15 per Band, 105 total, user selectable		
Auxiliary Analog Input	1-5 VDC or 4-20 mA (250 ohm)	Hopping Channels	75 to 80, user selectable		
Integrated Solar Charging	12 or 24 VDC, up to 50 watt Charging circuit and regulator, controller	Frequency Zones	16 Zones, 5 Channels per zone		
Soil (Input) Impedance	Optional high soil input impedance available	Occupied Bandwidth	230 kHz		
		RF Connector	SMA straight, or reversed SMA, or none		
Receiver					
		Sensitivity	-107 dBm for BER of 10 ⁻⁴ ; -105 dBm for BER of 10 ⁻⁶		
		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	Dynamic Key Substitution				
Link Throughput	115.2 Kbps standard speed, 80 Kbps low speed. <i>Uncompressed; measured assuming 75% frequency availability.</i>				
Data Interface	RS232 / 485 / 422 or TTL				
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	LineMarker Test Station: Fully loaded I/O - 18 days with 1.25 safety factor				
General Information					
Operating Temperature Range	-40° C to +75° C				
Dimensions	Board-Level Radio: 6.5" high x 3.5" wide x 2" deep LineMarker Test Station: 30" high x 4" high x 4" deep				
Weight	Board-Level Radio: 160 grams LineMarker Test Station: 12 pounds				
Mounting	Board-Level Radio: Standoffs available or FGRCB bracket mount LineMarker Test Station: 3" conduit riser pipe or 8x8 surface mount, flat adapter bracket				
Humidity	0 to 95% non-condensing				

7.31.09

FreeWave® Radios Require Professional Installation. Specifications may change at any time without notice. ©2009 FreeWave® Technologies, Inc.



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