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# IO - SERIES

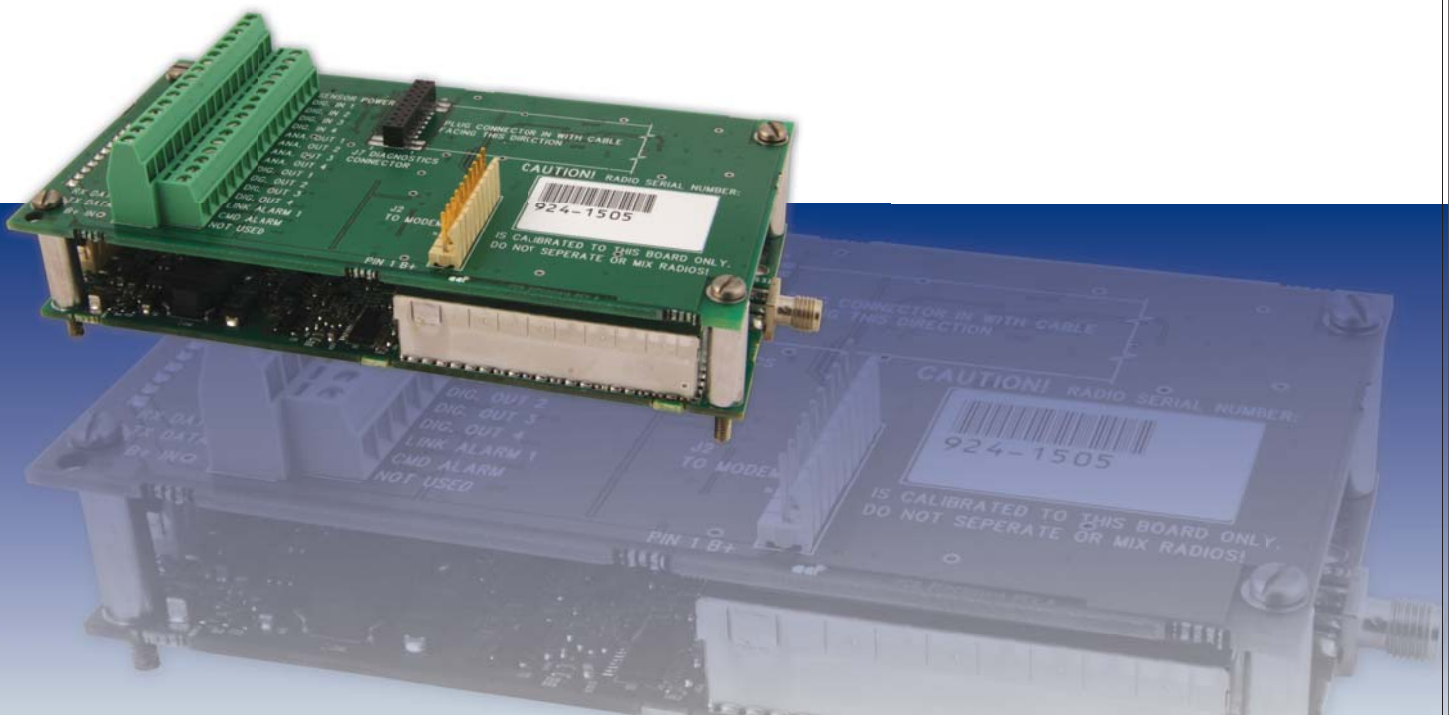
## FGRIO-M Industrial 900 MHz Radio

### Overview:

The FreeWave® Technologies FGRIOSystem provides outstanding performance and versatility in wireless transmission of process-control signals. FGRIO offers “transparent” acquisition, transport and reconstruction of analog, digital and power signals, eliminating the need for associated buried wiring. The RTU requires no altered programming. The FGRIO is Class 1 Division 2 Approved and is lower-cost and provides better signal integrity than vulnerable wiring.

### Features:

- Frequency Hopping - Communication and diagnostics between the IO Master and the IO Slaves.
- Affordable - Low installation and long-term maintenance costs.
- Low latency – Less than one second signal delay.
- High Accuracy – FGRIOSystem analog signal fidelity is factory calibrated and drift with time and temperature is much less than that of transducers.
- Short Range/Low power – Suitable for solar powered installations.
- Error Free Communications – 32 bit CRC with automatic retransmission.
- Industrial Grade Specifications – 100% tested for RF performance from -40° C to +75° C.
- Master Input voltage range - Input voltage range is 6-30 VDC at full RF output power.
- Noise Immunity – Superior performance in noise congested environments.
- Secure – proprietary spread spectrum technology prevents unauthorized access.
- Slave Radio – Accepts 2 Digital Inputs (DI), 2 Analog Inputs (AI) and switches 2 Digital Outputs (DO).
- Master Radio – Mirrors signals for up to 4 Slaves and provides Link and Command Alarm signals.
- Wire Replacement – FGRIOSystem accuracy is not diminished by distance as it may be in wired systems.



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Technical Specifications

Transmitter				
Frequency Range	902-928 MHz (FHSS)		Hopping Patterns	15 per Band, 105 total, user selectable
Output Power	5 mW to 1 Watt (+30 dBm)		Hopping Channels	50 to 112, user selectable
Range, Line of Sight	2 Miles with clear LOS to IO Slave, 60 miles to network Master		Hopping Bands	7, user selectable
Modulation	2 level GFSK		RF Connector	Type SMA
Occupied Bandwidth	230 kHz			
Master Receiver			Master Analog Outputs	
Sensitivity	For 10-6 BER -108 dBm, 10 <sup>-4</sup> BER -110 dBm		Number of Outputs	4, can be mapped to up to 4 slaves
Selectivity	20 dB at fc ± 115 kHz, 60 dB at fc ± 145 kHz		Accuracy, Resolution	+/- .1%, 16 bit
System Gain	140 dB		Output Range	.2-5.62V, >10 Kohm Load Resistance
Master Digital Outputs			Master Digital Inputs	
Number of Outputs	4 per Master, 1 Link, 1 Command Alarm		Number of Inputs	4
Output Connector	Mini Phoenix (3.55mm)		Master Input to Slave Output Delay	1 sec. Max
Slave Input to Master Output Delay	1 sec. Max		Voltage Range	0 - 30 V
Signal Output Voltage Range	0 - 4.6 V			
Data Transmission				
Error Detection	32 bit CRC, Retransmit on Error			
Data Encryption	Dynamic Key Substitution			
Link Throughput	115.2 Kbps			
Data Interface	Serial			
Protocol	RS232 / 485 / 422, 1200 Baud to 115.2 Kbaud			
Data Connector	10-pin header with locking ramp, 0.1 inch spacing, power/data connector.			
Diagnostics Interface				
Connector	Separate 20-pin PCB header			
Power Requirement				
Operating Voltage	6 to 30 VDC			
Current [mA]	<b>Mode</b>	<b>6VDC</b>	<b>12 VDC</b>	<b>30 VDC</b>
	Transmit	1A	500 mA	200 mA
	Receive	140 mA	86 mA	43 mA
	Idle	120 mA	70 mA	38 mA
General Information				
Operating Temperature Range	-40° C to +75° C			
Dimension	140 L x 70 W x 34 H (mm)			
Weight	137 g			
Humidity	0 to 95% non-condensing			

FreeWave® Radios Require Professional Installation.

Specifications may change at any time without notice. ©2009 FreeWave Technologies, Inc.



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