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IO Series

FGR2-IOS Industrial 900 MHz Radio

Overview:

FreeWave Technologies, Inc's FGR2-IOS radio with embedded I/O functions is available either as a board level device or in an enclosure. Both versions can operate in one of two modes: Modbus and Wire Replacement. In the Modbus mode, FGR2-IOS can be directly connected as an I/O peripheral to a SCADA network. For Wire Replacement (wireless signal replication), the FGR2-IOS can operate as a Slave linked to an FGRIO-M (Master) radio. The enclosure version also includes switchable and protected resistors for convenience when using 4-20 mA sensors. The FGR2-IOS is Class 1, Division 2 approved by UL-US and C-UL. All radios are designed, manufactured and tested in Boulder, CO.

Features - Modbus:

- User Configurable I/O counts: Digital & analog.
- Up to 65,535 Slave radios.
- Hundreds of thousands of AIs, DIs, AOs and DOs on a single network.
- FGR Modbus IO Master can be any FGR family of radios - i.e., FGRSR, FGRM, FGR09CSU, FGRIO-M, FGR2-IOS or FGR115RC. All radios are UL approved except the FGR115RC.
- Extends range and coverage to other FGR-family radios by Slave/Repeater operation.
- Supply rated to +30 V.
- All AIs reported as 16-bit integers or 32-bit floating points.
- Voltage and temperature monitoring reduces surprise outages.
- Pulse counting (32 bit) DIs allow detection of 500 usec. pulses and count to 1000 Hz.
- Active data port allows extension by adding external devices.
- Single register access to 16 bit a/d; 2 register access for full 20 bits.
- Enhance proportional control by 4-20 mA AOs with programmable offsets and comm-loss set points.
- DOs control up to 60 Watts each and have optional pulse-output to protect intermittent-rated loads.

Features - Wire Replacement:

- Conveys the AI and DI states of 4 inputs to an FGRIO-M radio for signal replication.
- Replicates the states of the DIs and sensor power inputs of the FGRIO-M as DOs. The DOs are protected and have optional pulse-output to protect intermittent-rated loads.



Enclosure also available with a mounting shoe



Enclosure available with din rail mount

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FGR2-IO Industrial 900 MHz Radio Technical Specifications

Transmitter		Receiver							
Frequency Range	902-928 MHz (FHSS)	Sensitivity (board level only)	-107 dBm for BER 10 ⁻⁶ , -109 dBm for BER 10 ⁻⁴						
Output Power	1 Watt	Selectivity	20 dB at fc +/- 115 kHz, 60 dB at fc +/- 145 kHz						
Range - Line of Sight (LOS)	60 miles with clear LOS	System Gain	140 dB						
Modulation	2 level GFSK, 115.2 Kbps	Data Transmission ⁽¹⁾							
Occupied Bandwidth	230 kHz	Error Detection	32 bit CRC, retransmit on error						
Hopping Patterns	15 per Band, 105 total, user selectable	Link Throughput	115.2 Kbps						
Hopping Channels	50 to 112, user selectable	Data Interface	Serial						
Hopping Bands	7, user selectable	Protocol	RS232/485/422, 1200 baud - 115.2 Kbaud						
RF Connector	Type SMA, TNC (Female connectors)	Data Connector	10 pin header with locking ramp 0.1 inch spacing, power/data connector						
Input		Modbus	Wire Replacement						
2: Precision AIs (20 bits, 0-5.625 V, 0.1% FS Accuracy), also act as exact-threshold DIs		x	x						
2: DIs with counters (32 bits, 1000 Hz), also act as aux. AIs (10 bits, 0-3.5 V, 0.25% FS Accuracy)		x	(2)						
1: DI with pull down resistor (5 Kohm)		x							
1: DI with pulsed 50 mA pull-up for long-lines or high noise		x							
Output									
2: High Current (2 A sink to GND) DOs with current sensing and self-resetting protection		x	x ⁽³⁾						
1: AO - 15 bits, 4-22mA, 0.1% FS Accuracy, also acts as 50mA sensor power or DI		x							
1: AO - 16 bits, 4-22mA, 0.1% FS Accuracy		x							
Internal									
1: Battery/Supply Voltage - 10 bits, 0-30 V, 1% FS Accuracy		x							
1: Radio Temperature - 1° C units, -40° C to +70° C, 4° C accuracy		x							
Diagnostics Interface									
Connector: Separate 20-pin PCB header		x	x						
Power Requirements									
Operating Voltage: +6 to +30 VDC		*Currents shown w/no AO connections made	x						
Average Current Update [mA]	Mode	+6 VDC	+12 VDC	+30 VDC	Example Modbus Configurations				
	Transmit	800	380	170		AIs	DIs	AOs	DOs
	Receive	90	55	40	#1	2	2	2	2
	Idle	24	16	8	#2	0	4	2	2
	Modbus Linked Lowpower = 4	10	7	5	#3	4	0	2	2
	Wire Replacement Linked	30	15	8	#4	3	1	2	2
				#5	1	3	2	2	
General Information									
Operating Temperature Range	-40° C to +75° C. Every radio 100% factory tested over this range.				Notes: (1) Data port not operative in wire replacement mode. (2) DIs operative, but there are no counters in wire replacement mode. (3) No current sensing in wire.				
Dimensions	Board Level: 127 L x 62 W x 16 H (mm) Enclosure: 173 L x 96 W x 35 H (mm)								
Weight	Board Level: 60 g Enclosure: 509 g								
Humidity	0 to 95% non-condensing								

1.6.12

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



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