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IO Series

FGR2-IOS Industrial 900 MHz Radio

The 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 Modbus mode, the FGR2-IOS can be directly connected as an IO 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 4-20mA sensors. The FGR2-IOS is Class 1, Division 2 approved.

Features—Modbus:

- User configurable IO counts - digital & analog.
- Up to 65,535 Slave Radios.
- Hundreds of thousands of AI's, DI's, AO's and DO's 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 (FGR2-IOS UL approval is pending).
- Extends range and coverage to other FGR-family radios by slave/repeater operation.
- Supply rated to 30V.
- All AI's reported as 16-bit integers or 32-bit floating points.
- Voltage and temperature monitoring reduces surprise outages.
- Pulse counting (32 bit) DI's 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 4-20mA AO's with programmable offsets and comm-loss setpoints.
- DO's 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 DI's and sensor power inputs of the FGRIO-M as DO's. The DO's are protected and have optional pulse-output to protect intermittent-rated loads.



Enclosure also available with a mounting shoe



Enclosure with din rail mount

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Specifications

Transmitter		Receiver	
Frequency Range	902-928 MHz (FHSS)	Sensitivity	-108 dBm for BER 10 ⁻⁶ , -110 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 Repl
2: Precision AI's (20 bits, 0-5.625 V, 0.1% FS Accuracy), also act as exact-threshold DI's	x	x
2: DI's with counters (32 bits, 1000 Hz), also act as aux. AI's (10 bits, 0-3.5 V, 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) DO's 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 to +70°C, 4°C accuracy	x	
Diagnostics Interface		
Connector: Separate 20-pin PCB header	x	x
Power Requirement		
Operating Voltage: 6 to 30 VDC	x	x

Average Current Update [mA]	Mode	6 VDC	12 VDC	30 VDC
	Transmit		800	380
Receive		90	50	26
Idle		24	15	8
Modbus Linked Lowpower = 4		10	7	5
Wire Replacement Linked		30	15	8

Example Modbus Configurations				
	AI's	DI's	AO's	DO's
#1	2	2	2	2
#2	0	4	2	2
#3	4	0	2	2
#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.
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: 58 g Enclosure: 1.2 lbs
Humidity	0 to 95% non-condensing

Notes:

- (1) Data port not operative in wire replacement mode.
- (2) DI's operative, but there are no counters in wire replacement mode.
- (3) No current sensing in wire replacement.

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FreeWave Radios Require Professional Installation. Specifications may change at any time without notice. ©2008 FreeWave Technologies, Inc.



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