



FGR2-IOS-CE-U

# FGR2 IO Series

900 MHz Remote I/O Solutions



IOEX-4422



FGR2-IOS-C-U



FGRIO-M

The FGR2-IO radios are available as standalone board-level or enclosed devices, as well as in an expandable format to meet any wireless I/O need.

All models can operate in one of two modes: Modbus and Wire Replacement.

- In the Modbus mode, all models can be directly connected as an I/O peripheral to a SCADA network.
- For wireless replacement mode, FGR2-IOS and FGR2-IOE can operate as a slave connected to an FGRIIO-M master.

The enclosed version also includes switchable and protected resistors for convenience when using 4-20 mA sensors.

- All AIs are reported as integers and floating points.
- Pulse counting DIs allow detection and accumulation of pulses up to 1 kHz.
- Data port allows simultaneous operation as a Modbus I/O device and radio slave or repeater.
- Single register access to 16-bit AI value, two-register access for full 20-bit accuracy.
- Protect systems in event of communication loss with programmable failsafe output states.
- DOs control up to 60 W each and have optional pulse-output protection intermittent rated loads.

These products are also expandable with the IOE-4422 I/O Series. The FGR2-IOS is UL Class I, Division 2 approved.

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

## Key Features

**User Configurable:** I/O Digital or Analog

**Long Range:** 97 km (60 miles) with clear line of sight with the ability to extend through Endpoint/Repeater; Modbus Gateway can be any FGR Series radio

**Noise Immunity:** Superior performance in noise congested environments

**Error Free Communications:** 32-bit CRC with automatic retransmissions

**Low Power Consumption:** Ideal for solar-powered applications

**Industrial Grade:** Operating temperature from -40°C to +75°C

## Information to Order

Model Number	Description
FGR2-IOS-C-U	Board Level
FGR2-IOS-CE-U	Enclosed
FGR2-IO-IOE	Expandable I/O
FGRIO-M	Wire replacement master
IOEX-4422	IO Expansion module: 4 universal points, 4 input points, 2 discrete relay input points, 2 discrete relay output points
IOEX-4404	IO Expansion module: 4 universal points, 4 input points, 4 discrete relay output points
IOEX-4440	IO Expansion module: 4 universal points, 4 input points, 4 discrete relay input points

Transmitter	
Frequency Range	902 to 928 MHz
Output Power	Up to 1 W
Range	Up to 97 km (60 miles) with clear line of sight
Channel Spacing	230 kHz
RF Data Rate	115.2 kbps standard speed 153.6 kbps, high speed User-selectable

Receiver	
Sensitivity	-107 dBm @ 115.2 for BER 10 <sup>-6</sup> -109 dBm @ 153.6 kbps BER 10 <sup>-4</sup>
Selectivity	20 dB at fc +/- 115 kHz 60 dB at fc +/- 145 kHz
System Gain	140 dB

Data Transmission <sup>1</sup>	
Modulation	2 level GFSK
Data Throughput	115.2 kbps or 153.6 kbps
Error Detection	32-bit CRC, retransmit on error
Hopping Zones	16 zones, user-selectable
Hopping Bands	7, user-selectable
Hopping Channels	50 to 112, user-selectable
Hopping Patterns	15 per band, 105 total, user-selectable
Protocol	RS232 / RS422 / RS485

**Notes**

1. Data port not operative in Wire Replacement mode.

Power Requirements				
Operating Voltage	+6 VDC to +30 VDC			
Current Consumption	Voltage	Transmit	Receive	Idle
	+6 VDC	800 mA	90 mA	24 mA
	+12 VDC	380 mA	55 mA	16 mA
	+30 VDC	170 mA	40 mA	8 mA

Interfaces	
Data Interface	10-pin header with locking ramp for power and data 2.5 mm (0.1 in) pin spacing Separate 20-pin PCB header
Diagnostics Interface	Serial
RF Connector	FGR2-IO-CE-U

General Information	
Operating Temperature	-40°C to +75°C (-40°F to +167°F)
Humidity	0 to 95%, non-condensing
Dimensions	<b>FGR2-IO-CE-U:</b> 127 L x 62 W x 16 H (mm) 5.0 L x 2.4 W x 0.63 H (in) <b>FGR2-IO-CE-U:</b> 173 L x 96 W x 35 H (mm) 6.8 L x 3.8 W x 1.4 H (in) <b>FGR2-IO-IOE:</b> 181 L x 80 W x 35 H (mm) 7.1 L x 3.2 W x 1.4 H (in)
Weight	<b>FGR2-IO-CE-U:</b> 60 g (0.13 lbs) <b>FGR2-IO-CE-U:</b> 500 g (1.1 lbs) <b>FGR2-IO-IOE:</b> 163 g (0.36 lbs)

	Wire Replacement Master	Wire Replacement Slave	Modbus I/O Slave	Universal Channels	Input-Only Channels	Analog Input	Analog Output	Discrete Only Input	Discrete/Pulse Input	Discrete Output	Relay Output	Relay Input	Notes
FGRIO-M	X						4	4		4			Only for use in wire replacement applications
FGR2-IO-CE-U		X	X		2	2	2			2			-
FGR2-IO-IOE		X	X		2	2	2			2			Supports up to 15 IOEX modules
IOEX-4422			X	4	4						2	2	Requires FGR2-IO-IOE or wired IOE module
IOEX-4404			X	4	4							4	Requires FGR2-IO-IOE or wired IOE module
IOEX-4440			X	4	4						4		Requires FGR2-IO-IOE or wired IOE module



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