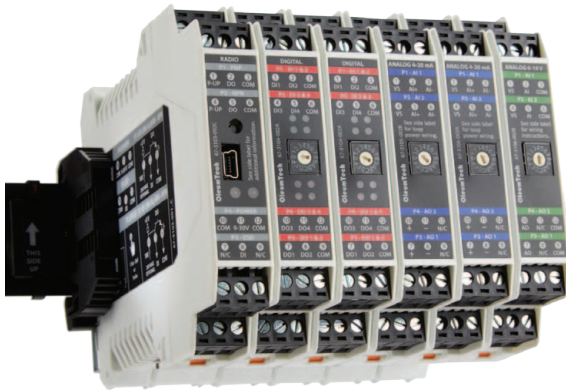


DATASHEET

RM1K



### Highlights

- Wireless I/O mirroring system
- Replicate raw signals in either direction
- Fully customizable modular I/O solution
- Supports 0-10 V, 4-20 mA, and discrete I/O
- No software programming required
- Mounts onto 35 mm DIN rails
- Class I, Division 2 (Zone 2)
- -40 °C to 80 °C
- 868 MHz, 900 MHz, or 2.4 GHz radio option
- Secure AES encryption



US Patent #8,811,459 B1

## Modular, Point-to-Point Wireless Signal Replication Solution

### Custom-Tailor I/O Mix, Bi-Directional

The OleumTech® WIO® Modular Wireless I/O System provides instant I/O connectivity and is one of the easiest and most cost-effective solutions for solving a vast number of point-to-point I/O and stranded asset monitoring and control challenges. Each Radio Kit can be fully customized using available 0-10 Vdc, 4-20 mA, and Digital I/O Modules. The bi-directional connectivity gives you the flexibility to connect third-party equipment such as a PLC or RTU to either side of the radio link.

### No Programming Required

Not having to learn or program any software is what makes the WIO System so easy to use. And although this system does not require any programming, an Advanced User Interface (UI) for PCs is available to take full advantage of the entire feature set. Through the Advanced UI, you can view and optimize RF strength; view input and output status; set analog fail-safe output values; locally force outputs for diagnostic testing; and more.

### Just Add I/O Modules

Constructing a Modular Wireless I/O System begins with a WIO Radio Kit. The Kit includes a factory-paired Radio set and all the mounting hardware necessary for installation onto 35 mm DIN rails. Then, simply add matching pairs of I/O Modules to get just the right mix of I/O. There are three available I/O Modules to choose from: Analog 4-20 mA, Analog 0-10 Vdc, and Digital. Each paired Radio System provides a secure I/O link using AES encryption. You can safely and reliably run multiple radio pairs in close proximity.

### Fail-Safe Output Protection

You can set the predetermined value for each output in case of an RF or I/O failure. DIP switches are used for the Digital I/O Module to control the fail-safe output settings. The Analog I/O Modules default to 0 V or 4 mA. Advanced UI can be utilized for setting any other desired value. The system's RF and I/O health can be remotely monitored by tying the NPN outputs on the Radio Modules to a third-party monitoring system.

### HARDWARE & SYSTEM

Unique System Features	Bi-Directional, Paired, Wireless I/O Communication System No Software or Programming Required
Maximum Network Capacity	Max Capacity Depends on I/O Combination Impacting Power
When Using More Than 5 Modules	Use Power Budget Calculator <a href="http://goo.gl/t67r3k">http://goo.gl/t67r3k</a>
DIN Rail Mounting Compatibility	35 mm x 7.5 mm DIN Rail
DataRail® (2x Included with Radio Kit)	6.1" / 156 mm - Supports Up to Five (5) I/O Modules Other Lengths Also Available
I/O Module Slave ID Selection	16-Position Rotary Switch
DataRail Mounting Hardware	4-Claw Attachment to 35 mm DIN Rail with End Terminal Bracket
Built-In Mounting Hardware	Spring-Loaded Clip-On System
Wire Gauge	Solid / Stranded (AWG) 28-12 Gauge
Wire Rating	UL: 300 V RMS, 80 °C and 300 V, 105 °C CSA: 300 V RMS, 105 °C
Warranty	2-Year Limited

### RADIO MODULE - 868 MHz, 900 MHz or 2.4 GHz ISM Bands

Frequency	868-870 MHz   902-928 MHz   915-928 MHz   2.4 GHz
Antenna Connector Type	SMA (Female Connector)
Default Transmit Speed / Update	1 Second
Turbo Tx Speed Based on	1=100 ms, 2-3=200 ms, 4= 250 ms, 5-6=333 ms,
Number of I/O Modules	7-11=500 ms, 12-16=1 second
Outdoor / Line of Sight Max Range	868 MHz: 5.2 Miles (8.4 Km) / 900 MHz: 6.3 Miles (10.1 Km) / 2.4 GHz: 5.7 Miles (9.2 Km)
Indoor / Urban Range	868 MHz 370 ft (113 m) / 900 MHz: 1000 ft (305 m) / 2.4 GHz: 300 ft (90 m)
Maximum Transmit Power (Adjustable with Advanced UI)	868 MHz: 25 mW (14 dBm) / 900 MHz: 250 mW (24 dBm) 2.4 GHz: 63 mW (18 dBm)
Receiver Sensitivity	868 MHz: -101 dBm / 900 MHz: -101 dBm / 2.4 GHz: -100 dBm
Spread Spectrum	868 MHz: FHSS / 900 MHz: FHSS / 2.4 GHz DSSS
RF Security	128-bit AES Encryption
Controlled Local Shutdown (ESD)	Yes, via Provided Dry Contact Input
RF Link Alarm Digital Output	Adjustable 2 to 10-Second RF Timeout Trigger (NPN)
I/O Link Alarm Digital Output	I/O Mismatch, Bus or Module Failure (NPN)
RF Link Diagnostics (Left LED)	Green = RF Traffic / Yellow = RF Link Fail
I/O Link Diagnostics (Right LED)	Green = I/O OK, Modules Detected / Red = I/O Link Fail
Supply Voltage Range	9-30 Vdc (±5 %)
Reverse Polarity Protection	Yes
Advanced User Interface Features	Test RSSI, Tx Power Adjustment, Force Local Output(s), Set Fail-Safe Parameters, and Additional Diagnostics
Power Consumption	35 mA @ 12 V AVG (10% Duty Cycle)
Packaging Dimensions (WxHxD)	5.5 x 10.1 x 2.8-in / 140 x 257 x 72 mm
Net Dimensions	0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114 mm
Packaging Weight	1.3 lbs / 590 g
Net Weight (Single Radio)	0.3 lbs / 136 g

### SAFETY & COMPLIANCE

Operational Temperature	-40 °C to 80 °C / -40 °F to 176 °F
Ambient Temperature	-20 °C to 80 °C / -4 °F to 176 °F
Humidity	0 to 99 %, Non-condensing
Degree of Protection	IP20 / Plastic
Hazardous Locations Classifications	Class I; Division 2 (Zone 2): CSA, ATEX, IECEx
RF Emissions	FCC Part 15/IC



<sup>1</sup>Response time based on number of I/O Modules.

<sup>2</sup>The maximum RF range data was collected under optimal test conditions, including a clear line of sight between antennas. Actual wireless RF range may vary depending on location, RF interference, weather, antenna type, cable type, and line of sight.

<sup>3</sup>Requires WIO System Advanced User Interface to set a specific value on Analog I/O Modules.

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### ANALOG 0-10 V I/O MODULE

Number of Inputs	2 (24-bit Resolution)
Number of Outputs	2 (16-bit Resolution)
Signal Range	0 Vdc to 10 Vdc (10.5 V Max)
Isolation Voltage	2500 V r.m.s.
Accuracy	< 0.1 % of Full Scale
Fail-Safe Output Modes	Last Known Value (Def.) or Any Value on Scale <sup>3</sup>
AI Input Impedance	40 K ohm
AO Output Impedance	10 ohm
Power Consumption	Typical: 40 mA / Max: 45 mA @ 12 Vdc
Packaging Dimensions	(WxHxD) 4.8 x 5.1 x 2.8-in / 123 x 129 x 72 mm
Net Dimensions	0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114 mm
Packaging Weight	Single: 0.5 lbs / 227 g; Double: 0.8 lbs / 363 g
Net Weight (Single)	0.3 lbs / 136 g



### ANALOG 4-20 mA I/O MODULE

Number of Inputs	2 (24-bit Resolution)
Number of Outputs	2 (16-bit Resolution)
Signal Range	4 mA to 20 mA
Isolation Voltage	2500 V r.m.s.
Accuracy	< 0.2 % of Full Scale
Internal Loop Power	+13.5 Vdc
Maximum Current	84 mA @ 12 Vdc
Fail-Safe Output Modes	Last Known Value (Def.) or Any Value on Scale <sup>3</sup>
AI Input Impedance (loop)	128 ohm
AO Terminal Voltage Range	10 Vdc Min. / 31.5 Vdc Max.
Power Consumption	Typical: 50 mA / Max: 75 mA @ 12 Vdc
Packaging Dimensions	(WxHxD) 4.8 x 5.1 x 2.8-in / 123 x 129 x 72 mm
Net Dimensions	0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114 mm
Packaging Weight	Single: 0.5 lbs / 227 g; Double: 0.8 lbs / 363 g
Net Weight (Single)	0.3 lbs / 136 g



### DIGITAL I/O MODULE

Number of Inputs	4
Number of Outputs	4
Input Voltage Range	3-30 Vdc
Isolation Voltage	2500 V r.m.s.
Input Voltage Threshold	Signal ("H"): > 2.3 Vdc 0 Signal ("L"): < 1.1 Vdc
Output Rating	1 A Sink Current for Open-Drain Outputs / NPN
Fail-Safe Output Modes	On, Off, or Last Known Value (Default)
Green LEDs	Line-Driven Input Indicators
Red LEDs	Output Indicators
Power Consumption	Typical: 18 mA / Max: 26 mA @ 12 Vdc
Packaging Dimensions	(WxHxD) 4.8 x 5.1 x 2.8-in / 123 x 129 x 72 mm
Net Dimensions	0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114 mm
Packaging Weight	Single: 0.5 lbs / 227 g; Double: 0.8 lbs / 363 g
Net Weight (Single)	0.3 lbs / 136 g



### ORDERING INFORMATION

WIO Modular Radio Kit	868 MHz: BM-0868-RM1K (Europe) 900 MHz: BM-0900-RM1K (N. America) 915 MHz: BM-0915-RM1K (Australia/NZ) 2.4 GHz: BM-2400-RM1K (N. America/ME)
0-10 V I/O Modules	2-Pack: BM-A010-122D
4-20 mA I/O Modules	2-Pack: BM-A420-122D
Digital I/O Modules	2-Pack: BM-D100-144D

