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# I/O Expansion

## Overview:

FreeWave Technologies' I/O Expansion module offers a reliable, safe and easy way to meet the growing measurement and control demands of your automation system. I/O Expansion builds on existing communications systems and controller infrastructure to extend the useful life of your automation system. The Expansion Modules snap easily on to a radio base to provide 188 I/O points over a single wireless link. The Serial Base features a wired serial interface to provide up to 192 I/O points to an existing PLC, RTU or other device with serial communications.

## Expansion Module Features:

- **Modular:** Up to 15 Expansion Modules can be added to a Serial Base or Radio Base
- **Flexible:** Can be added to Radio Base for wireless I/O or Serial Base for wired I/O
- **Low Latency:** Bus communications provide access times as fast as 11 milliseconds to 1st Expansion Module, 15th Expansion Module and every module in between
- **Custom Applications:** 3 different ordering options:
  1. IOEX-4440 (4 isolated DI, 0 relay DO)
  2. IOEX-4422 (2 isolated DI, 2 relay DO)
  3. IOEX-4404 (0 isolated DI, 4 relay DO)

## Serial Base Features:

- **Common Interfaces:** Provides wired 232, 422 and 485 serial communications
- **Easy Installation:** Support for 2-wire 485 allows a common 4 conductor cable to provide data and power
- **Custom Applications:** 3 different ordering options:
  1. IOE-4440 (4 isolated DI, 0 relay DO)
  2. IOE-4422 (2 isolated DI, 2 relay DO)
  3. IOE-4404 (0 isolated DI, 4 relay DO)

## Common Features:

- **Powerful:** Each universal channel can be configured as a Digital Input, Digital Output, Analog Input, Analog Output or Sensor Power
- **Reliable:** Fail-Safe settings are user configurable for DO and AO channels
- **Easy Configuration:** Tool Suite configuration software contains all tools
- **Easy Sensor Selection:** Native support for 4 to 20 mA, 1 to 5 v and 0 to 10 V transducers with loop power
- **High Accuracy:** Maximum reading error of 0.10% for AI channels across entire operating temperature
- **Low Power:** Suitable for solar powered installations
- **Safe:** UL approved for Class 1 Division 2, Groups A, B, C and D
- **Industrial Grade:** All devices are tested and tuned across full operating temperature range from -40° to +75° C

Serial Base with 15  
Expansion Modules



# I/O Expansion Module

Part Number Summary			
<b>Serial Base</b>	IOE-4440	IOE-4422	IOE-4404
<b>Expansion Module</b>	IOEX-4440	IOEX-4422	IOEX-4404
Number of Universal Channels	4	4	4
Number of Input-Only Channels	4	4	4
Number of Isolated Digital Input Channels	4	2	0
Number of Isolated Digital Output Channels	0	2	4
Technical Specifications			
Digital Input	Universal Channels	Input-Only Channels	Isolated Channels
Input ON voltage	>3.0 V	>3.0 V	>3.2 V
Input OFF voltage	<2.5 V	<2.5 V	<1.2 V
Pulse-counting frequency, standard	100 Hz or 4 ms	100 Hz or 4 ms	100 Hz or 4 ms
Pulse-counting frequency, high	-	10 kHz or 40 $\mu$ s	10 kHz or 40 $\mu$ s
Pull-up resistor	1 k $\Omega$ to 3 V	1 k $\Omega$ to 3 V	-
Pull-down resistor	10 k $\Omega$ to ground	10 k $\Omega$ to ground	-
Digital Output	Universal Channels	Input-Only Channels	Isolated Channels
Output ON current	1 A to ground	-	2 A
Output ON impedance	0.2 $\Omega$ to ground, plus diode	-	0.120 $\Omega$
Output OFF impedance	234 k $\Omega$ to ground	-	10 M $\Omega$
External voltage connection	V <sub>BAT</sub>	-	250 V
Analog Input	Universal Channels	Input-Only Channels	Isolated Channels
Resolution	20 bits	20 bits	-
Maximum Reading Error	0.10%	0.10%	-
Voltage Input Range	-2.5 to 12.5 V	-2.5 to 12.5 V	-
Current input range	0 to 22 mA	0 to 22 mA	-
Current sense resistor	250 $\Omega$	250 $\Omega$	-
Analog Output	Universal Channels	Input-Only Channels	Isolated Channels
Current output range	0 to 22 mA	-	-
Maximum output error	0.25%	-	-
Sensor Power	Universal Channels	Input-Only Channels	Isolated Channels
Voltage output	0.5 V below V <sub>BAT</sub>	-	-
Current output	Up to 50 mA	-	-
Power Supply			
Operating Supply Voltage	7.5 to 28 VDC		
Current Consumption 12V	DI 17 mA, DO 18 mA, AI voltage, 17 mA, AI current 25 mA, AO 0 mA 17 mA, AO 4x 20 mA 98 mA		
Physical Information			
Housing	High-impact plastic		
Mounting	Integrated 35 mm DIN rail clip		
Dimensions	Height = 7 1/8; Width = 3 1/8; Depth = 1 (inches)		
Weight	0.35 lbs		
Temperature	-40° C to +75° C		
Humidity	0 to 95% non-condensing		

10.11.11 FreeWave Radios Require Professional Installation. Specifications may change at any time without notice. ©2011 FreeWave Technologies, Inc.



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