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PRODUCT INFORMATION

Zlinx Wireless I/O
Peer-to-Peer and Modbus I/O

✓ **Modular, Customizable Wire Replacement**

✓ **128 / 256 Bit AES Encryption**

✓ **Software Selectable RF Transmit Power**

✓ **Software Selectable Over-the-air Data Rate**

✓ **Modbus ASCII /RTU Compatible**

✓ **Wide Operating Temperature**

✓ **Active Repeater Functionality**

✓ **10 to 40 VDC & 24 VAC Input Power**

Zlinx™ Wireless Modbus I/O - flexible enough to fit your applications. These plug-n-play units from B&B Electronics combine traditional Modbus RTU remote analog and discrete I/O with built-in wireless connectivity. Wireless RTU serves as Modbus slave RTU in radio-based SCADA systems, or as a peer-to-peer communication platform.

Three Ranges Available - Short, Medium, Long range.

Active Repeaters - With built-in repeater functionality on -MR and 900 MHz -LR models, you can ensure vital signals get through.

Modular - Just snap on your I/O and you're ready to go.

Wide Temperature - Meets most indoor or outdoor applications. Rugged circuitry prevents signal degradation.

128 / 256 Bit AES Encryption – Secures your data.

Selectable RF Transmit Power – Allows you to optimize the transmitter power for your application.

Selectable Over-the-air Data Rate – Allows you to decrease the OTA Data Rate on –LR and –LR-AU versions, effectively increasing the radio transmitter's range.

Exception Reporting – In Modbus mode, allows the reporting of possible problems with connected devices.

Fail Safe – Allows you to set your I/O to a safe state in the event of a communications failure.

Calibration – Calculates correction factors to make I/O values better match your sensor.

**Communications Failure Alarm** – Allows the first DO to be configured as a COM failure alarm indicator.

Invert Output – You can invert the logic of all DO's in peer-to-peer mode.

Monitor – You can use the Zlinx™ Manager Software to monitor your I/O.


Wire Replacement (Peer-to-Peer Mode)

Replicate any analog or digital signal from a remote location-Wirelessly! Use a pair of Zlinx™ Wireless I/O modules to read sensor inputs or control actuators in hard-top-reach locations. Inputs and outputs of the paired Zlinx radios will mirror each other, making it easy to add wireless I/O to any application.
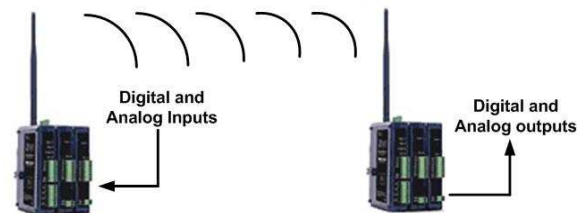
Modbus Peer-to-peer or Peer to Multi-peer

Seamlessly add wireless I/O to any Modbus application. Modbus is the most widely supported I/O protocol worldwide. With Zlinx Wireless I/O you can now bring wireless remote I/O into any Modbus system. Simply connect a Zlinx modem to and RS-232 or RS-485 port of the Modbus master and it can now poll up to 150 wireless I/O nodes – each node can be configured for 8 to 48 I/O points.

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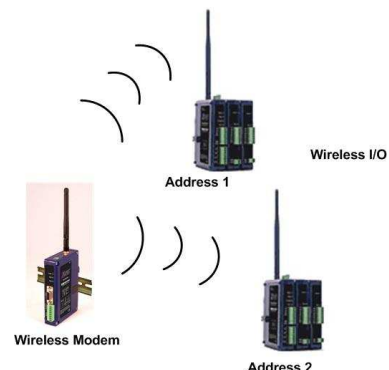
Base Module Radio Properties

Model No.	Frequency	Software Selectable RF Power Options	Factory RF Power Setting	AES Encryption	Over-the-air Data Rate
ZZ24D-Nx-SR	2.4 GHz	10mW, 16mW, 25mW, 40mW, 63mW	63mW	128 Bit	250 Kbps
ZZ24D-Nx-MR	2.4 GHz	Fixed 50mW	50mW	N/A	9.6 Kbps
ZZ9D-Nx-MR	900 MHz	Fixed 100mW	100mW	N/A	9.6 Kbps
ZZ9D-Nx-LR	900 MHz	1mW,10mW, 100mW, 500mW, 1000mW	1000mW	256 Bit	9.6 or 115.2 Kbps
ZZ9D-Nx-LR-AU	900 MHz	1mW, 10mW, 100mW, 500mW, 1000mW	1000mW	128 Bit	9.6 or 115.2 Kbps
ZZ8D-Nx-LR	868 MHz	1mW, 23mW, 100mW, 159mW, 316mW	316mW	128 Bit	24 Kbps

Note: ZZ9D-Nx-LR and ZZ9D-Nx-LR-AU have software selectable OTA data rates.

	Range w/Supplied Antenna (indoor / outdoor) Max	Range w/High Gain Antenna (Outdoor) Max
ZZ24D-Nx-SR	300 Feet (91 Meters) / 1 Mile (1.6 Kilometers)	N/A
ZZ24D-Nx-MR	600 Feet (183 Meters) / 3 Miles (5 Kilometers)	10 Miles (16 Kilometers)
ZZ9D-Nx-MR	1500 Feet (457 Meters) / 7 Miles (11 Kilometers)	10 Miles (16 Kilometers)
ZZ9D-Nx-LR	3000 Feet (914 Meters) / 14 Miles (23 Kilometers)	40 Miles (64 Kilometers)
ZZ9D-Nx-LR-AU	3000 Feet (914 Meters) / 14 Miles (23 Kilometers)	40 Miles (64 Kilometers)
ZZ8D-Nx-LR	1800 Feet (549 Meters) / 25 Miles (40 Kilometers)	25 Miles (40 Kilometers)

*Note: 900 MHz units are not sold in Europe
** Note: 868 MHz units are not sold in North America

Latency

Base Module	Modbus		Peer-to-Peer	
	Digital	Analog	Digital	Analog
ZZ24D-xx-SR	8mS	15mS	20mS	25mS
ZZxxD-xx-MR	56mS	365mS	827mS	643mS
ZZ9D-xx-LR	9mS	104mS	55mS	52mS

Latency times were measured in a clean RF environment with devices less than 3 feet apart.
Add 45mS per analog expansion module and 25mS per digital expansion module.
ZZ8D-Nx-LR radios have a 10% max duty cycle.

I/O Points

Model No.	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
ZZxD-NA-xx (Base)	2 (Pull-up, R)	2 (Sourcing)	2 (mA, V)	2 (V, mA, Sinking)
ZZxD-NB-xx (Base)	4 (Pull-up, R)	4 (Sourcing)	---	---
ZZxD-NC-xx (Base)	2 (Pull-up, R)	2(Sinking)	2 (mA, V)	2 (V, mA, Sinking)
ZZxD-ND-xx (Base)	4 (Pull-up, R)	4 (Sinking)	---	---
ZZ-8DI-DC	8 (Pull-up, R)	---	---	---
ZZ-8DO-T	---	8 (Sourcing)	---	---
ZZ-8DO-T1	---	8 (Sinking)	---	---
ZZ-4DI4DO-DCT	4 (Pull-up, R)	4 (Sourcing)	---	---
ZZ-4DI4DO-DCT1	4 (Pull-up, R)	4 (Sinking)	---	---
ZZ-4AI	---	---	4 (mA, V)	---
ZZ-4AO	---	---	---	4 (V, mA, Sinking)
ZZ-4A0-2	---	---	---	4 (V, mA, Sourcing)
ZZ-2AI2AO	---	---	2 (mA, V)	2 (V, mA, Sinking)
ZZ-8DO-R	---	8 (Relay)	---	---
ZZ-4RTD1	---	---	4 (RTD)	---

Software Programming Kits – Required to program your system

Model Number	Description
ZZ-PROG1-USB	Programming Module (USB Interface), USB cable and Software CD

Note: The Software CD is only available with the programming kit. Software and Firmware can also be downloaded at www.bb-elec.com

Specifications

Digital Inputs

Voltage Range:	0 to 48 VDC
Low Voltage (0):	0.8 V maximum
High Voltage (1):	4.0 V minimum
Pull Up Current:	38 micro-amps
Frequency Input:	2 DI inputs per module Software selectable as frequency counters, 0 to 5 KHz range.

Digital Outputs

Voltage Range:	10 to 40 VDC (Sourcing) 0 to 48 VDC (Sinking) 40 mA per output

Analog Inputs and Outputs

Ranges:	0 to 10 VDC or 0 to 20 mA ZZ-4AO-2 is an active current source. All others are passive
Resolution:	12 Bit
Input Accuracy:	0.2% full scale reading typical
Output Accuracy:	0.27% full scale reading typical
AI Load Resistance:	100 Mega Ohms when configured for voltage input 250 Ohms when configured for current input
AO Max Output Current:	1 mA when configured for voltage output.
AO Max Load	450 Ohms when configured For current output @ 12V

Relay Outputs

Number of Relays:	8
Type:	C -normally open & normally closed
Output Connection:	3.5mm removable terminal block (2 per output)
Common Connection:	3.5mm removable terminal block
Ratings:	250VAC @ 8A, 30VDC @5A (maximum per bank of 4 as grouped on the label)

RTD Inputs

Number of RTD:	4
Wire Configuration:	2, 3, and 4 wire
Type:	PT100, PT1000 (Optimized for temperature coefficient of 385 C), Cu10 (Optimized for temperature coefficient of 427 C)
Input Connection:	3.5mm removable terminal block (4 per output)
Temperature Range:	PT100 = (-) 200 to (+) 650 C PT1000 = (-) 200 to (+) 100 C Cu10 = (-) 100 to (+) 260 C
Resolution:	0.1C cross at (-) 40 to (+) 80 C
Accuracy @ 25 C:	(+/-) 0.5 C typical
Accuracy (-)40 to (+) 80C	(+/-) 2.0 C maximum

Radio Properties (SR Models)

Frequency:	2.4 GHz
Output Power :	100 mW
Receiver Sensitivity:	-102 dbm
Antenna:	The included antenna is a 4.25 inch omni-directional with RPSMA connector. (p/n ZZ24D-ANT1)

Radio Properties (2.4 GHz MR Models)

Frequency:	2.4 GHz
Output Power:	50mW
Receiver Sensitivity:	105 dbm @ 9.6K
Antenna:	The included antenna is a 4.25 inch omni-directional with RPSMA connector. p/n ZZ24D-ANT1

Radio Properties (900 MHz LR Models)

Frequency:	900 MHz
Output Power:	1W
Receiver Sensitivity:	-100 dbm @ 115.2 K, -110 dbm @ 9.6 K
Antenna:	The included antenna is a 6.5 inch omni-directional with RPSMA connector p/n ZZ9D-ANT1

Radio Properties (900 MHz MR Models)

Frequency:	900 MHz
Output Power:	100 mW
Receiver Sensitivity:	-100 @ 9.6K
Antenna:	The included antenna is a 6.5 inch omni-directional with RPSMA connector. p/n ZZ9D-ANT1

Radio Properties (868 MHz LR Models)

Frequency:	868 MHz
Output Power:	315 mW
Receiver Sensitivity:	-112 dbm
Antenna:	The included antenna is a 6.5 inch omni-directional with RPSMA connector p/n ZZ9D-ANT1

LED Indicators

Receive Signal Strength:	Tri-color – Off = No Signal Red = Weak Signal Yellow = Medium Signal Green = Strong Signal
RF Data:	Green – Blinks with TD or RD Off = No Data
Local Bus Data:	Green – Blinks with TD or RD Off = No Data
Power:	Red – On = Power applied Off = No Power

Environmental

Operating Temperature		
	ZZ-8DO-R	-40 to 55 ℃ (-40 to 131 ℉)
	All Others	-40 to 80 ℃ (-40 to 176 ℉)
Maximum Ambient Air Temp		
	ZZ-8DO-R	55 ℃ (131 ℉)
	All Others	80 ℃ (176 ℉)
Storage Temperature		-40 to 85 ℃ (-40 to 185 ℉)
Operating Humidity		0 to 95% Non-condensing
Enclosure		Plastic IP30
Mounting		35mm DIN Rail
Expansion		1 Base Module supports up to 6 Expansion Modules
Dimensions		1.2 x 3.7 x 5.0 in (2.9 x 9.3 x 12.7 cm)

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Software

Supported OS	Windows ME/98/2000/XP/Win7 A software CD is provided with the programming kits and contains the Zlinx Manager software, Users Manual and Quick Start Guide.

Agency Approvals

FCC Part 15 Class A	Download DoC at www.bb-elec.com
CE	Download DoC at www.bb-elec.com
UL/cUL	File Numbers E245458 (Class 1, Div 2) & E222870 (UL508)

Modules that are Class 1, Div 2 listed:

ZZ24D-Nx-SR (2.4GHz, Short range)
ZZ9D-Nx-LR (900 MHz, Long range)
ZZ-2AI2AO
ZZ-4AI
ZZ-4AO
ZZ-4AO-2
ZZ-4DI4DO-DCT
ZZ-4DI4DO-DCT1
ZZ-4RTD1
ZZ-8DI-DC
ZZ-8DO-R
ZZ-8DO-T
ZZ-8DO-T1
ZZ-PROG1-USB

Class 1, Div 2 exceptions:
ZZ-8DO-R is not UL508 listed
ZZxxD-Nx-MR, ZZxxD-Nx-xR-AU and
ZZ8D-Nx-xR models are not Class 1, Div
2 listed but are UL508 listed

MTBF(Hours)

Model	Hours	Model	Hours
ZZ24D-NA-SR	85547	ZZ24D-NB-SR	137106
ZZ24D-NC-SR	86247	ZZ24D-ND-SR	138362
ZZ24D-NA-MR	88006	ZZ24D-NB-MR	142946
ZZ24D-NC-MR	88746	ZZ24D-ND-MR	144909
ZZ9D-NA-MR	88006	ZZ9D-NB-MR	144746
ZZ9D-NC-MR	88746	ZZ9D-ND-MR	144909
ZZ9D-NA-LR	88195	ZZ9D-NB-LR	143446
ZZ9D-NC-LR	88938	ZZ9D-ND-LR	145422
ZZ8D-NA-LR	88195	ZZ8D-NB-LR	143446
ZZ8D-NC-LR	88938	ZZ8D-ND-LR	145422
ZZ-4AI	136050	ZZ-4AO	113996
ZZ-2AI2AO	119183	ZZ-8DI-T	317530
ZZ-8DO-T	313100	ZZ-8DO-T1	317530
ZZ-4DI4DO-DCT	197045	ZZ-4DI4DO-DCT1	200795
ZZ-8DO-R	40670	ZZ-4RTD1	243007
ZZ-4AO-2	113996		

Zlinx Radio Modem Compatibility

Radio Modem	Zlinx Base I/O Module
ZP24D-250RM-SR	ZZ24D-Nx-SR
ZP24D-96RM-MR	ZZ24D-Nx-SR
ZP9D-96RM-MR	ZZ9D-Nx-MR
ZP9D-115RM-LR	ZZ9D-Nx-LR / ZZ9D-Nx-LR-AU
ZP8D-24RM-LR	ZZ8D-Nx-LR

Power (Base Modules)

Source	An external power supply is required (not included)
Voltage	10-40 VDC, 24 VAC Class 2, (2.7A Maximum)
Power Connection	Removable Terminal Block, 3.81 mm spacing

Wiring Terminals

Wire Type	Copper Wire Only
Conductors	One Conductor Per Terminal
Wire Range	28 to 16 AWG
Tightening Torque	1.7 lb – in
Field Wiring Temp Rating	105°C Minimum (Sized for 60°C ampacity).

Power Consumption

SR Models	10.0 W
MR Models	9.5 W
900 MHz LR Models	13.1 W
868 MHz LR Models	12.0 W

Power (Expansion Modules)

Source	Class 2 Power Derived from Base modules Voltage and current listed on Product label.

Power Consumption

ZZ-4AI	1.0 W
ZZ-4AO	1.1 W
ZZ-2AI2AO	1.2 W
ZZ-8DI-DC	0.4 W
ZZ-8DO-T	15.8 W
ZZ-8DO-T1	1.1 W
ZZ-4DI4DO-DCT	8.1 W
ZZ-4DI4DO-DCT1	1.0 W
ZZ-8DO-R	3.2 W
ZZ-4RTD1	0.4 W
ZZ-4AO-2	6.0 W

Outputs

ZZ-8DO-R	Relay Output, 250VAC 2 A General Purpose/Point 8 A General Purpose Total
All Others	Low Voltage, Limited Energy Communications Protocol

Wiring Terminals

Wire Type	Copper Wire Only
Conductors	One Conductor Per Terminal
Wire Size	28 to 16 AWG
Tightening Torque	Tightening Torque

Replacement Parts

ZZ-DIN 1	Replacement DIN clip and spring For all ZZ products, also comes with spare screws for enclosure
ZZ-TB1	Replacement terminal block kit for ZZ products. Kit includes (1) Two position TB (3.81mm) (1) Four position TB (3.5mm) (1) Eight position TB (3.5mm) (1) Cover for local Bus
ZZ24D-ANT1	2.4 GHZ band antenna

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PRODUCT INFORMATION

Power In 16-48VDC or 18-30VAC @ 110W max.
Bus Power Output 5V @ 990mA max. 10-48VDC @ 2A max.

ZLINX™
Wireless Modbus

Wireless Modbus I/O
Model: ZZ9D-NA-MR

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RSSI = Signal Strength
Green = Strong
Yellow = Ok
Red = Weak

DI: 0-48VDC
DO: 10-45VDC
AI: 0-10V, 0-20mA
AO: 0-10V, 0-20mA

Power
RSSI
RF Data
Bus

DI1 DI2 DO1 DO2 COM COM AI1 + − AI2 + − AO1 + − AO2 + −

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