

Peer-to-Peer and Modbus I/O

Zlinx Standard Wireless I/O



PRODUCT FEATURES

- Modular, Customizable Wire Replacement
- Flexible configuration for multiple types of analog/digital I/Os
- Software Selectable RF Transmit Power
- Software Selectable Over-the-air Data Rate
- Modbus ASCII /RTU Compatible
- 900 MHz and 2.4 GHz Versions
- Wide Operating Temperature
- Active Repeater Functionality
- 10 to 40 VDC & 24 VAC Input Power
- AES Encryption

Zlinx™ Wireless Modbus I/O - flexible enough to fit your applications.

These plug-n-play units 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.

Two Ranges Available - Short, Long range.

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

Modular - Just snap on your I/O and you are ready to communicate.

Wide Temperature - Meets most indoor or outdoor applications.

Rugged circuitry - prevents signal degradation.

128 / 256 Bit AES Encryption - Secures 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 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 - Use the Zlinx™ Manager Software to monitor your I/O.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
ZZ8D-XX-LR Base Modules *	
ZZ8D-NA-LR	868MHz, 2 AI, 2 AO, 2 DI, 2 DO Sourcing, Long Range
ZZ8D-NB-LR	868MHz, 4 DI, 4 DO Sourcing, Long Range
ZZ8D-NC-LR	868MHz, 2 AI, 2 AO, 2 DI, 2 DO Sinking, Long Range
ZZ8D-ND-LR	868MHz, 4 DI, 4 DO Sinking, Long Range
ZZ9D-XX-LR Base Modules *	
ZZ9D-NA-LR	900MHz, 2 AI, 2 AO, 2 DI, 2 DO Sourcing, Long Range
ZZ9D-NA-LR-AU	900MHz, 2 AI, 2 AO, 2 DI, 2 DO Sourcing, Long Range
ZZ9D-NB-LR	900MHz, 4 DI, 4 DO Sourcing, Long Range
ZZ9D-NB-LR-AU	900MHz, 4 DI, 4 DO Sourcing, Long Range
ZZ9D-NC-LR	900MHz, 2 AI, 2 AO, 2 DI, 2 DO Sinking, Long Range
ZZ9D-NC-LR-AU	900MHz, 2 AI, 2 AO, 2 DI, 2 DO Sinking, Long Range
ZZ9D-ND-LR	900MHz, 4 DI, 4 DO Sinking, Long Range
ZZ9D-ND-LR-AU	900MHz, 4 DI, 4 DO Sinking, Long Range
ZZ24D-XX-SR Base Modules*	
ZZ24D-NA-SR	2.4GHz, 2 AI, 2 AO, 2 DI, 2 DO Sourcing, Short Range
ZZ24D-NB-SR	2.4GHz, 4 DI, 4 DO Sourcing, Short Range
ZZ24D-NC-SR	2.4GHz, 2 AI, 2 AO, 2 DI, 2 DO Sinking, Short Range
ZZ24D-ND-SR	2.4GHz, 4 DI, 4 DO Sinking, Short Range

World-wide.

Check with your local distributor for availability and options.

* Check wireless regulations/standards in your geographic area.

MODEL NUMBER	DESCRIPTION
Expansion Modules	
ZZ-8DI-DC	8 Digital Inputs, 10-48VDC
ZZ-8DO-T	8 Digital Outputs Sourcing
ZZ-8DO-T1	8 Digital Outputs Sinking
ZZ-8DO-R	8 Relay Outputs
ZZ-4AI	4 Analog Inputs
ZZ-4AO	4 Passive Source Analog Inputs, Requires Isolated External Power Supply
ZZ-4AO-2	4 Analog Output Sourcing
ZZ-4RTD1	4 RTD Input
ZZ-4DI4DO-DCT	4 Digital Inputs, 10-48VDC, 4 Digital Outputs Sourcing
ZZ-4DI4DO-DCT1	4 Digital Inputs, 10-48VDC, 4 Digital Outputs Sinking
ZZ-2AI2AO	2 Analog Inputs, 2 Analog Outputs

ACCESSORIES

ZZ-PROG1-USB	Zlinx USB Programming Module, Cable, Software CD
ZZ24D-ANT1	2.4 GHz Spare Antenna
ZZ9D-ANT1	900 MHz Spare Antenna
ZZ-DIN 1	Replacement DIN Clip and Spring
ZZ-TB1	Replacement Terminal Block Kit

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SPECIFICATIONS

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
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) maximum	Range w/High Gain Antenna (Outdoor) maximum
ZZ24D-Nx-SR	300 Feet (91 Meters) / 1 Mile (1.6 Kilometers)	N/A
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
ZZ9D-xx-LR	9mS	104mS	55mS	52mS

Latency times were measured in a clean RF environment with devices less than 3 feet (1m) apart.

Add 45mS per analog expansion module and 25mS per digital expansion module.

ZZ8D-Nx-LR radios have a 10% maximum duty cycle.

I/O POINTS

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

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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
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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)

RADIO PROPERTIES (2.4 GHZ - 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 (900 MHX - LR MODELS)

Frequency:	900 MHz
Output Power:	1W
Receiver Sensitivity:	100 dbm @ 115.2 K, 110 dbm @ 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

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

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

ENVIRONMENTAL

Operating Temperature

ZZ-8DO-R	-40 to 55°C (-40 to 131°F)
All Others	-40 to 80°C (-40 to 176°F)

MAXIMUM AMBIENT AIR TEMPERATURE

ZZ-8DO-R	55°C (131°F)
All Others	80°C (176°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
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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SPECIFICATIONS

SOFTWARE	
Supported OS	A software CD is provided with programming kits and contains Zlinx Manager software, Users Manual and Quick Start Guide.

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

UL/cUL	Models that are Class 1/Division 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, Division 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, Division 2 Listed but are UL508 listed.	

MTBF (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 & I/O COMPATIBILITY	
Radio Modem	Zlinx Base I/O Module
ZP24D-250RM-SR	ZZ24D-Nx-SR
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	10.0 W
SR Models	9.5 W
900 MHz LR Models	12.0 W
868 MHz LR Models	

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

Wire Type	
Conductors	Copper Wire Only
Wire Size	One Conductor Per Terminal 28 to 16 AWG
Tightening Torque	0.2 Nm (Newton-Meters)

REPLACEMENT PARTS	
ZZ-DIN1	Replacement DIN clip and spring for all ZZ products, also comes with spare screws for enclosure 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
ZZ-TB1	
ZZ24D-ANT1	2.4 GHz band antenna
ZZ9D-ANT1	900 MHz Spare Antenna