Wzzard™ Intelligent Edge Node
With SmartMesh IP and Bluetooth LE

PRODUCT FEATURES

- Ultra low power 802.15.4e SmartMesh IP technology
- Communicates with Spectre Network Gateway via highly scalable and reliable wireless mesh networks
- Connect to industry standard analog or digital sensors
- Wzzard app lets you read or configure the nodes using Android tablets and smart phones
- Rugged, IP66-rated, fiber reinforced polyester PBT enclosure
- MQTT and JSON IoT protocol to application platform
- Class 1 DIV 2 approved for hazardous locations

Wireless Connectivity Where You Need It

The Wzzard™ intelligent wireless sensor platform creates a complete, quick and easy connectivity stack between your sensors and your application, on your network or on the Internet. The platform uses Intelligent Edge Nodes, a wireless 802.15.4e SmartMesh IP network to transmit sensor data to the Spectre Network Gateway. The Spectre Network Gateway can connect to the Internet via wired connections or the cellular data networks and communicate with application platforms using the MQTT IoT protocol and JSON data formats.

The Wzzard Intelligent Edge Nodes nodes accommodate virtually any industry-standard external sensors. Connections can be made via conduit fitting, cable gland or an M12 connector. The Nodes provide a wide variety of sensor interface options, including general purpose analog inputs, digital input/output and thermocouple. They can also contain internal sensors like an accelerometer, depending upon the model number. All 802.15.4e Wzzard Intelligent Edge Nodes contain an internal temperature sensor.

Secure, Reliable and Highly Scalable Wireless Networking

The Wzzard platform uses mesh networking and time-synchronized channel hopping to provide up to 99.999% connectivity, even in the most demanding RF environments. New nodes may be added at any time, and the SmartMesh IP network will dynamically self-configure as new nodes are added or removed. This is a function of the mesh network itself, and does not need to be controlled by the network gateway.

Easy Configuration and Installation

Configuration of the Wzzard sensor platform is easy via Android smart phones or tablets. Using the Wzzard app, your handheld devices can configure the Wzzard Intelligent Edge Nodes over their Bluetooth LE connections. The Wzzard Intelligent Edge Nodes can be configured with calibration and scaling information, eng. units, friendly names, geolocation and other descriptive information.

The platform simplifies physical installation as well. The Wzzard Intelligent Edge Nodes can be attached to any surface using screws or their embedded magnetic bases. The IP66-rated, fiber reinforced polyester PBT housing makes the units deployable in virtually any industrial or commercial environment.

Intelligence at the Network Edge

The Wzzard wireless platform places intelligence at the network edge. The Wzzard Intelligent Edge Nodes can be configured to communicate data only when specified threshold or alert levels are exceeded. When reporting, they can associate useful information like geolocation, device name and uptime. This eliminates unnecessary network traffic, eases the processing burden on upstream resources, and cuts the cost of cellular data plans when the Gateway is using the cellular data network. Thanks to low-power wireless technology and programmable time synchronization, the Intelligent Edge Nodes can operate for multiple years on battery power

SPECIFICATIONS

POWER	
Internal	(2) 3.6V 2400 mAH Lithium Thionyl Chloride AA batteries
Battery Life	Multiyear based on 1 min sensor sampling and reporting
Optional External Input Voltage	3.3 VDC +/- 5%
MECHANICAL	
Physical Connection	M12 Connector 1/2" (12.7 mm) Conduit, sensor interface cable included; 8 wire, 26 gage, 6 ft. (1.8 m)
Sensor Inputs	Analog Input (0 - 5 VDC, 0 – 20 mA, 4 – 20 mA) Digital Input (0-48 VDC) Digital Input Frequency 1-1K Hz (Accuracy + or – 1 Hz) Digital Input Counter Integrated Accelerometer 3 Axis Integrated Temperature Thermocouple J, K Type Digital Output (0-30 VDC)
Optional External Antenna	RP-SMA, Omnidirectional, 3.8 dBi, 2.4 GHz Dimensions 7.64 inches (194 mm)
Mounting	Magnetic mounting via internal magnet Pull force 4.7 lbs (2.13 kg) (4) Mounting ears, M5 (#10)
Enclosure	IP66-rated, fiber reinforced polyester PBT
Weight	0.75 lbs (0.34 kg)
TECHNOLOGY	
Wireless	802.15.4e, SmartMesh IP
Protocols	MQTT-SN, MQTT, JSON
Bluetooth	Bluetooth 4.0 Low Energy (LE)
LED	Network Connectivity
ENVIRONMENTAL	
Installation	Indoor or outdoor
Operating Temperature	-40 to 80°C (-40 to 176°F)
Storage Temperature	-40 to 85°C
Operating Humidity	0 to 95% Non-condensing
WIRELESS SECURITY	
Device Authentication	
128 bit AES-based encryption with multiple keys	
Message integrity check (MIC)	
Synchronized key changeovers	
Customized key rotation	

B+B SMARTWORX

SENSOR INTERFACE SPECIFICATIONS

DIGITAL INPUTS

Voltage range	0 – 48 VDC
V_{IL}	0.97 V Maximum
V_{IH}	1.8 V Minimum
Pull up current	32uA
Type	Sourcing (PNP)/Sinking (NPN) Software selectable input
Isolation	None

RATE/FREQUENCY INPUTS

Frequency	Does a 1 second measurement at each measurement/publish interval
	Digital Input Frequency 1-1K Hz (Accuracy + or – 1 Hz)
	Uses the falling edge or rising edge based on the Invert Enabled setting

COUNTER INPUT

Channels	Actively counts either the falling edge (Invert enabled) or rising edge (Invert disabled)
	Can use a multiplier to convert to a unit type or count
	2 selectable/shared with Digital inputs
	Rolls over at 999999.9

ANALOG INPUTS

Input ranges	0 - 5 VDC, 0 – 20 mA, 4 – 20 mA
Resolution	12 bit
Input load resistance	100 Mega ohm (0-5VDC), 250 ohm (0 - 20 ma)
Accuracy	Voltage: 0.10% of full scale reading, 0.20% max.
	Current: 0.11% of full scale reading, 0.24% max.

THERMOCOUPLE INPUT

Types Supported	J and K
Ranges Supported	Type J -210 to +1,200 °C
	Type K -270 to +1,372 °C
Resolution	0.25 °C
Accuracy	Typical +/- 2 °C
	+/- 6 °C over the temperature range of -40 to 80 °C

DIGITAL OUTPUTS

Voltage range	0 - 30 VDC
Output Type	Open Drain
Output Current	Not to be less than 100ma
Protection	Current Limit Protection
Isolation	None

INTEGRATED SENSORS

TEMPERATURE	CONDITIONS	MIN	TYP	MAX	UNITS
Offset	Temperature Offset Error @ 25 °C		+/- 0.25		°C
Slope Error			+/- 0.033		°C/ °C
3 AXIS ACCELEROMETER					
Configurable measurement ranges	+/-2 g, resolution of 1 mg/LSB				
	+/-4 g				
	+/-8 g				
Configurable output data rates	12.5Hz, 5Hz, 50Hz, 100Hz, 200Hz, 400Hz				

SMARTMESH IP 802.15.4E RADIO SPECIFICATIONS

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Frequency Band		2,400		2,4835	GHz
Number of Channels			15		
Channel Separation			5		MHz
Channel Clear Frequency	Where k = 11 to 25, as defined by IEEE 802.4.15		2405 + 5*(k-11)		MHz
Modulation	IEEE 802.15.4 Direct Sequence Spread Spectrum (DSSS)				
Raw data rate			250		kbps
Range	25 °C, 50% RH, +2dBi Omni-Directional Antenna, Antenna 2 m above ground				
	Indoor		100		m
	Outdoor		300		m
Receiver Sensitivity	Packet Data Error Rate (PER) = 1%			-93	dBm
Receiver Sensitivity	PER = 50%			-95	dBm
Output Power	Delivered to a 50 Ω load			8	dBm

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BLUETOOTH LE RADIO SPECIFICATIONS

NO.	CHARACTERISTICS	CONDITIONS	MIN	TYP	MAX	BT SPEC.	UNIT
1	Operation Frequency Range		2402		2480		MHz
2	Channel Spacing			2			Mhz
3	Output Power	Maximum setting, measured at single ended 50ohm.		4			dBm
		Minimum setting, measured at single ended 50ohm.		-24			dBm
4	Sensitivity, High Gain Mode	High Gain Mode		-93.0	-70		dBm
		Standard Mode		-92.5	-70		dBm

THIONYL CHLORIDE LITHIUM BATTERIES (2 SUPPLIED WITH PRODUCT)

CHARACTERISTICS	CONDITIONS
Temperature Range	-40 to 85°C
Nominal Capacity	2.4 Ah
Nominal Voltage	3.6 V
Diameter	14.5 mm
Height	50.5 mm

*Potential hazard: Do not recharge, crush, disassemble or heat above 212°F (100°C)

ORDERING INFORMATION

MODEL NUMBER	THERMOCOUPLE INPUT
WSD2CTJ	Wireless Mesh 802.15.4e, 2 Thermocouple J-type inputs, 1 Digital Output; External Antenna, Conduit Connector
WSD1CTJ	Wireless Mesh 802.15.4e, 2 Thermocouple J-type inputs, 1 Digital Output; Internal Antenna, Conduit Connector
WSD2CTK	Wireless Mesh 802.15.4e, 2 Thermocouple K-type inputs, 1 Digital Output; External Antenna, Conduit Connector
WSD1CTK	Wireless Mesh 802.15.4e, 2 Thermocouple K-type inputs, 1 Digital Output; Internal Antenna, Conduit Connector
MODEL NUMBER	**ACCELEROMETER**
WSD2XV0	Wireless Mesh 802.15.4e Integrated Accelerometer; External Antenna
WSD1XV0	Wireless Mesh 802.15.4e Integrated Accelerometer; Internal Antenna
MODEL NUMBER	**ANALOG INPUT**
WSD2MA2	Wireless Mesh 802.15.4e; 2-Analog Inputs, 1 Digital Output; External Antenna, M12 Connector
WSD1MA2	Wireless Mesh 802.15.4e; 2-Analog Inputs, 1 Digital Output; Internal Antenna, M12 Connector
WSD2CA2	Wireless Mesh 802.15.4e; 2-Analog Inputs, 1 Digital Output; External Antenna, Conduit Connector
WSD1CA2	Wireless Mesh 802.15.4e; 2-Analog Inputs, 1 Digital Output; Internal Antenna, Conduit Connector
WSD2MA3	Wireless Mesh 802.15.4e; 3-Analog Inputs; External Antenna, M12 Connector
WSD1MA3	Wireless Mesh 802.15.4e; 3-Analog Inputs; Internal Antenna, M12 Connector
WSD2CA3	Wireless Mesh 802.15.4e; 3-Analog Inputs; External Antenna, Conduit Connector
WSD1CA3	Wireless Mesh 802.15.4e; 3-Analog Inputs; Internal Antenna, Conduit Connector
MODEL NUMBER	**DIGITAL INPUT**
WSD2MD2	Wireless Mesh 802.15.4e; 2 Digital Inputs, 2 Digital Outputs; External Antenna, M12 Connector
WSD1MD2	Wireless Mesh 802.15.4e; 2 Digital Inputs, 2 Digital Outputs; Internal Antenna, M12 Connector
WSD2CD2	Wireless Mesh 802.15.4e; 2 Digital Inputs, 2 Digital Outputs; External Antenna, Conduit Connector
WSD1CD2	Wireless Mesh 802.15.4e; 2 Digital Inputs, 2 Digital Outputs; Internal Antenna, Conduit Connector

ACCESSORIES

PART NUMBER	DESCRIPTION
ACH2-DBAT-DP003	External Antenna, 2.4 GHz, 2 dBi, Dipole, RP-SMA, hinged, 3.8 dBi
ACH2-AT-DP011	Magnetic Mount Antenna, 2.4 GHz, 3.8 dBi
WSCAC0-6	Pigtail Cable 6 ft (1.8m)
WSCAM12-6	M12 Wiring harness cable, 8 pin, 6 ft (1.8 m)
ZXTMT	Cable Gland/Conduit Kit

APPROVALS AND CERTIFICATIONS

CE	
EN55022	CISPR (EN55022) Class A
EN 61000-6-2:2005	Generic immunity standard for (heavy) industrial environments
EN 61000-6-4:2006+A1:2011	Emission standard for (heavy) industrial environments
EN61000-4-2	ESD +/- 8kV air, +/- 4kV contact
EN61000-4-3	RFI
EN61000-4-4	EFT
EN61000-4-5	Surge
EN61000-4-6	CI
EN60255-21-1	Vibration, 2g, 10-500Hz 0.3mm displacement
EN60255-21-2	Shock, 50g, 11ms half sine wave, 18 shocks
ENVIRONMENTAL	
IEC 60068-2-6:2007	Vibration, 2g, 10-500 Hz,1.5mm displacement
IEC 60068-2-27:2008	Shock, 50g, 11ms half sine wave, 18 shocks
FCC/IC	
FCC Part 15 Class A	
FCC - Part 15.247	
Industry Canada - RSS210	
SAFETY	
UL/CSA Class 1, Division 2 Group A, B, C, D	
REGULATORY APPROVALS	
ROHS and WEEE Compliant	

MECHANICAL DIAGRAM

[Millimeters]
Ø Inches