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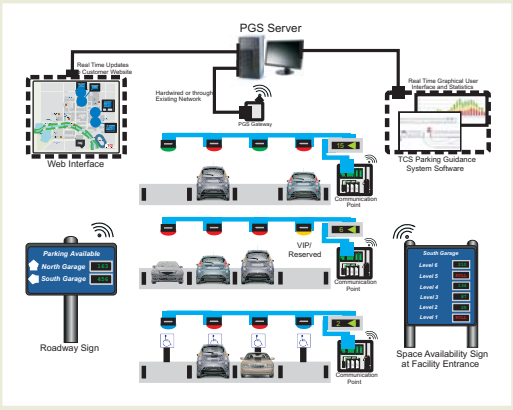
TCS Wireless Technology

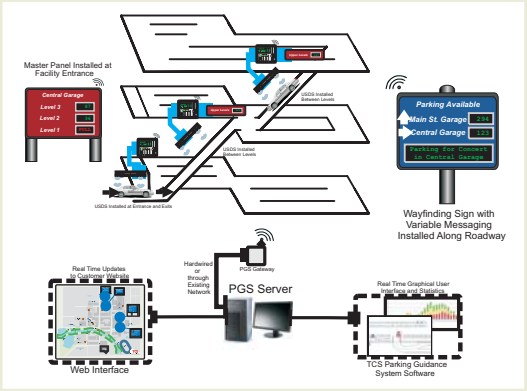
The TCS wireless communication solution takes advantage of ZigBee's wireless mesh technology allowing end devices such as sensors and signs to communicate through multiple wireless pathways without the cost of cable and installation associated with parking guidance systems. Each device or group of devices is wired locally to a modem. This modem transfers the device information through other modems or directly to the PGS gateway wirelessly. The gateway is connected directly or through a network to the PGS computer where the TCS Visual Control Center software manages the whole system and provides a graphical user interface.



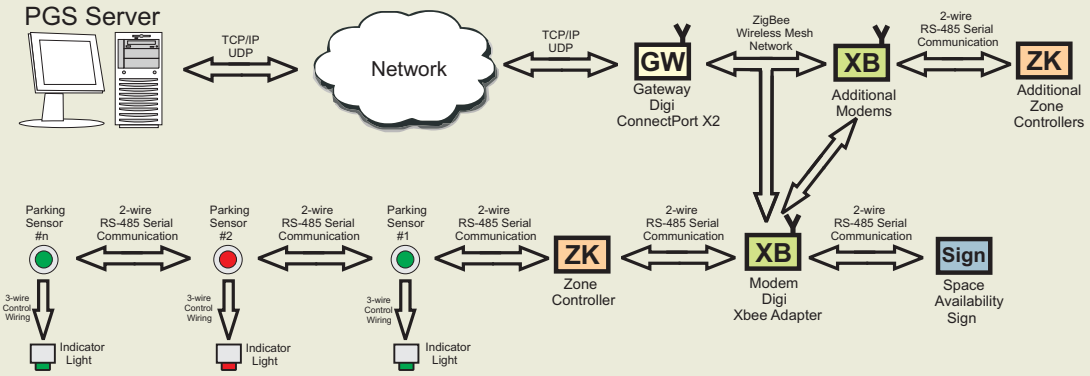
Example of Wireless Single Space Sensor System

Product Highlights

- Wireless Mesh Technology
- Reduce Cable and Installation Costs
- Multiple Gateway Connection Options



Example of Wireless Directional Sensor System



Communication Flow Diagram of Wireless Single Space Sensor System

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PGS Gateway

Specifications	X8	X4	X2
General			
Management	HTTP/HTTPS web interface, Password access control, IP service port control		
Protocols	UDP/TCP, DHCP, SNMPv1		
LEDs	Ethernet status, power, cellular link/activity, signal strength (4 bars), ZigBee link/activity, Wi-Fi link/activity		Ethernet status, power, ZigBee link/activity
Security	SSL tunnels, SSHv2, FIPS 197 (serial port)		SSL tunnels
VPN	IPsec with IKE/ISAKMP, multiple tunnel support, DES, 3DES and up to 256-bit AES encryption, VPN pass-through, GRE forwarding		–
Dimensions (L x W x H)	7.70 in x 4.11 in x 1.30 in (19.5 cm x 10.40 cm x 3.30 cm)	5.25 in x 3.35 in x 1.00 in (13.33 cm x 8.50 cm x 2.54 cm)	5.50 in x 2.75 in x 1.13 in (13.9 cm x 7.0 cm x 2.9 cm)
Weight	1.50 lb (0.68 kg)	0.75 lb (0.34 g)	0.44 lb (0.20 kg)
Antenna			
XBee Antenna	4” dipole with 2’ cable, tabletop mountable	4” dipole (Ethernet models), 4” dipole with 2’ cable, tabletop mountable (GPRS models)	4” dipole
Wi-Fi (optional)	4" dipole with 2' cable, tabletop mountable		
Cellular (optional)	7” dipole		–
Interfaces			
USB	2 powered USB Type A connectors (Host)	1 powered USB Type A connector (Host)	–
Sensor	1 RJ-45 port	–	–
Cellular	EV-DO/1xRTT or HSDPA/EDGE/GPRS PCI Express modules (2)	EV-DO/1xRTT or HSDPA/EDGE/GPRS PCI Express modules (1)	–
Optional (via PCIe Module)	Global Positioning System (GPS), local storage (up to 1 GB)		–
Serial			
Ports	1 RS-232 DB-9M serial port		–
Throughput	Up to 230 Kbps		–
Signal Support	TXD, RXD, RTS, CTS, DTR, DSR and DCD		–
Ethernet			
Ports	1 RJ-45 port		
Physical Layer	10/100Base-T		
Data Rate	10/100 Mbps (auto-sensing)		
Mode	Full or half duplex (auto-sensing)		

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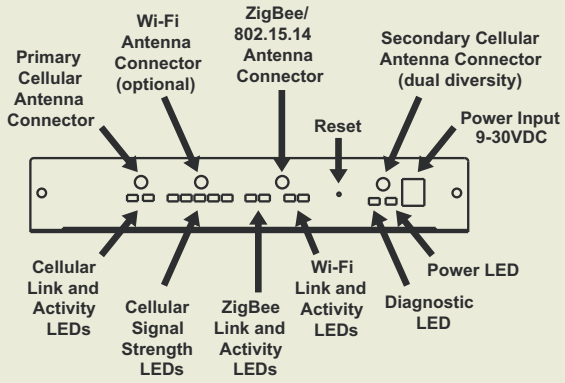
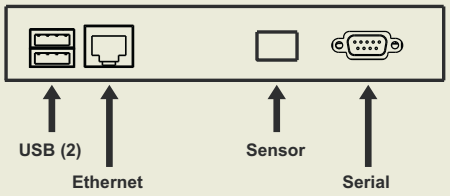
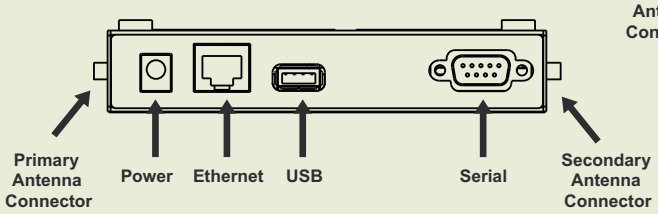
X8 - Front



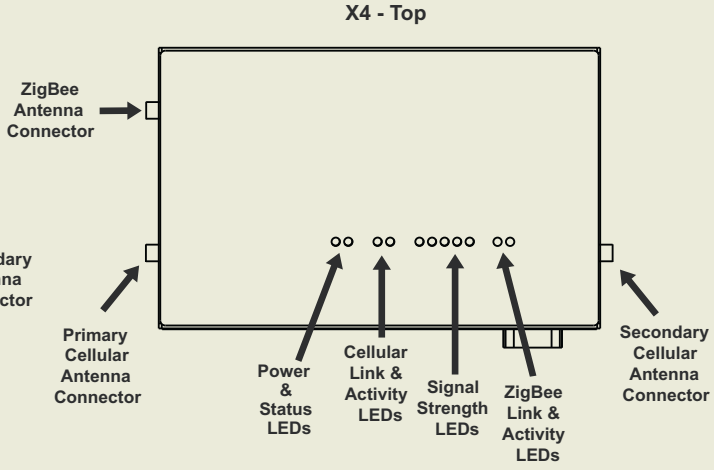
X8 - Back



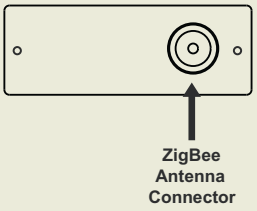
X4 - Front



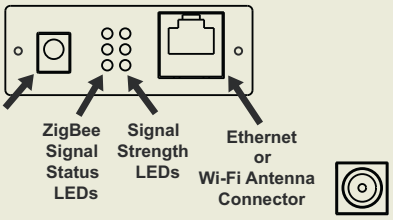
X4 - Top



X2 - Side



X2 - Side



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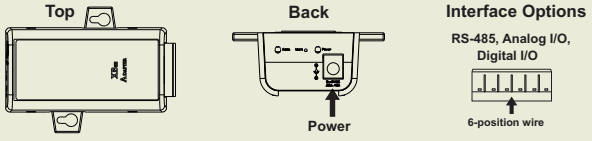
PGS Modem

Modem - 485 Adapter

Performance	
RF Data Rate	250 kbps
Indoor/Urban Range	Up to 300 ft (90 m)/ 200 ft (60 m) Int'l variant
Outdoor/RF Line-of-Sight Range	Up to 1 mile (1.6 km) / 2500 ft (750 m) Int'l variant
Transmit Power	50 mW (+17 dBm) / 10 mW (+10 dBm) Int'l version
Receiver Sensitivity (1% PER)	-102 dBm
Features	
Antenna Type	XBee ZB Adapters: Internal Antenna; XBee-PRO ZB Adapters: External RPSMA Antenna
Frequency Band	2.4 GHz
Serial Data Interface	RS-232 DB9M/DTE or RS-485 (6-position wire terminal block) switch selectable between RS-422 half-duplex, RS-422 full duplex and RS-485
USB Data Interface	USB 2.0 Full Speed (with ESD protection); connects to host via captive 1-meter cable
Analog IO (AIO) & Digital IO (DIO)	6-position wire terminal block; Analog IO: 0 - 10V, 4 - 20 mA, or +/- 2VDC Differential; Digital IO: Digital Input or sinking driver output
NEMA 4X/IP66 Enclosure (Optional)	Fully protected from water, dust and dirt: Internal metal mounting plate; 1 cable inlet with water-tight grommet Dimensions: 7.50 in x 4.50 in x 3.25 in (19.05 cm x 11.43 cm x 8.25 cm)
Networking & Security	
Network Topologies	Point-to-point, Point-to-multipoint, Mesh
Number of Channels	14
Spread Spectrum Type	Direct Sequence Spread Spectrum
Filtration Options	PAN ID, 64-bit MAC, channel
Addressing	65,000 available addresses for each channel
Other	
LEDs	Power: Glows green when external power is supplied (not active when battery powered to limit power drain) Associate: Blinks when unit is connected and associated on an RF network
Controls	Device reset (internal push button); Identifcation (internal push button) – relays ID to gateway
Dimensions (L x W x H) & Weight	RS-232, RS-485, AIO, DIO models: 3.60 in x 1.90 in x 1.20 in (9.14 cm x 4.82 cm x 3.04 cm) 2.29 oz (64.92 g) USB models: 2.87 in x 1.80 in x 0.83 in (7.29 cm x 4.57 cm x 2.10 cm) 1.60 oz (45.36 g)
Operating Temperature	-40° C to +70° C
Power Requirements	
Input Voltage	3-6VDC
Power Supply (RS-232, RS-485, AIO, DIO)	120VAC/240VAC to 5VDC power supply, internal lithium battery pack, or external 6-cell D battery holder (all sold separately)
Power Consumption	USB: 70 mA Rx and 250 mA Tx (normal operation) / 200 uA (suspend mode)
USB Model	Bus powered (+5V)
Regulatory Approvals	
Emissions	FCC Part 15.247, IC, ETSI/CE, Telec, EN55022 (Class B)
Safety	UL60950, CAN/CSA C22.2 No.60950
RoHS	Yes

RS-232, RS-485, Analog I/O, Digital I/O Models (ZB)



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