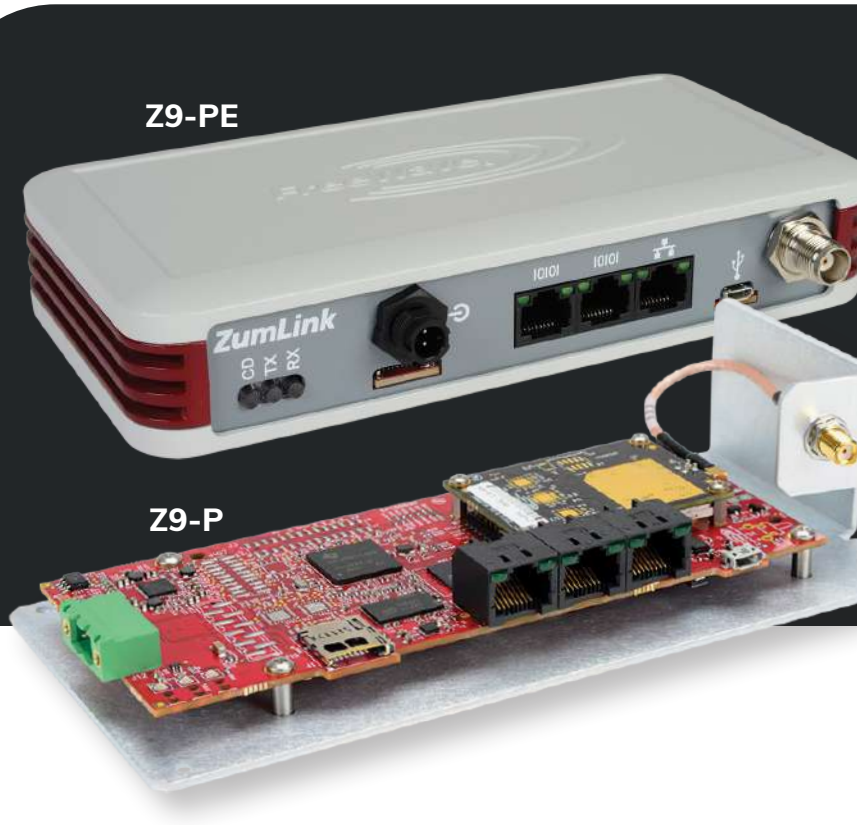
FREEWAVE

ZumLink™

900 Series



Future-Ready Industrial Ethernet Radio

FreeWave's ZumLink™ 900 Series is made for secure collection, transport, and control of data in rugged industrial environments, providing a long-range, low-power solution for remote wireless communications—with capabilities that can be seamlessly added as IIoT requirements evolve.

The ZumLink Z9-PE and Z9-P operate in the unlicensed 900 MHz spectrum and utilize Frequency Hopping Spread Spectrum (FHSS) technology for cybersecure data transfer with RF link rates up to 4 Mbps. Performance is further enhanced by FreeWave's Network Accelerators, which utilize techniques such as packet compression, packet aggregation, forward error correction, and Adaptive Spectrum Learning to maximize network throughput, efficiency, and reliability.

ZumLink radios are ideal in field area networks, systems, and devices such as those used by oil and gas, precision agriculture, water / wastewater, smart cities, and utilities, and deliver advanced features to maximize performance of virtually any M2M, SCADA, or IIoT application used today or in future operations.

In fact, the ZumLink 900 Series is software upgradable to include FreeWave's IQ Application Environment, a Linux-based operating system for developing and deploying third-party applications.

Key Features

Operates in the Unlicensed 900 MHz Spectrum: Cost-effective, easy to deploy

High Speed Data Rates: Five RF link rates supporting from 80 kbps to 4 Mbps

Long Range: Up to 97 km (60 miles) with clear line of sight

Safe for Hazardous Locations: Class I, Division 2 certified to board level

Leverages FreeWave's Network Accelerators: to maximize network efficiency

- **Packet Compression:** Minimizes packet transmission
- **Packet Aggregation:** Increases throughput
- **Forward Error Correction:** Improves network reliability
- **Adaptive Spectrum Learning:** Reduces the impact of interferences

Low Current Consumptions: 358 mA @ 12 V in transmit; 146 mA @ 12 V in receive

Secure: SSH, SNMP, 128- and 256-bit AES counter mode encryption

Reliable Communication: CRC, ARQ, FEC

Upgradable with the IQ Application Environment: Linux-based operating system and storage for applications built in any Linux-compatible language

Designed, Manufactured, and Tested in Boulder, CO

Made in USA

Transmitter

Frequency Range*	902 to 928 MHz
Output Power*	10 mW to 1 W; user selectable
Range	97 km (60 miles) with clear line of sight
Channel Spacing	230.4, 345.6, 691.2, 1382.4, 1612.8 (Beta) and 3225.6 kHz
RF Data Rate	115.2, 250, 500 kbps, 1, 1.5 (Beta), & 4 Mbps; user selectable

Receiver

IF Selectivity	> 40 dB		
System Gain	135 dB		
Sensitivity	**RF Data Rates**	**Without FEC**	**With FEC**
	115.2 kbps	-105 dBm	-108 dBm
	250 kbps	-102 dBm	-105 dBm
	500 kbps	-99 dBm	-102 dBm
	1 Mbps	-95 dBm	-98 dBm
	1.5 Mbps (Beta)	-90 dBm	-93 dBm
	4 Mbps	-83 dBm	-86 dBm

Data Transmission

Type	Frequency Hopping Spread Spectrum
Modulation	2 level GFSK 4- and 8-ary FSK
Topology	Point to Point, Point to Multipoint, Pseudo-Mesh
Link Throughput	Up to 1.6 Mbps; 4 Mbps with Compression
Error Detection	ARQ and CRC, retransmit on error, FEC
Hopping Rates	400, 200, 100, 50, 25 ms
Hopping Channels*	Up to 110; RF Data Rate Dependent
Hopping Patterns	Up to 16; RF Data Rate Dependent
Protocol	Adaptive Spectrum Learning (ASL)
User Interface Rates	Ethernet Rate: 10/100 Mbps Serial Rate: up to 250 kbps
Serial Protocols	Asynchronous Byte Oriented Protocols, Modbus, DNP3.0, DF1, X.28 and others
Data Encryption	128-bit and 256-bit AES CCM
Advanced Features	Packet Compression and Aggregation

Computing Resources (OPTIONAL UPGRADE)**

CPU	ARM Cortex-A8 1 GHz
CPU	512 MB
Storage	1 GB
OS	Debian-based Linux

Management

Management	HTTP, SSH SNMPv1/v2c/v3, MIB-II, Enterprise MIB, Modbus

Networking

VLAN	802.1Q
Serial	TCP server, Modbus/TCP, Modbus RTU, TCP client
Traffic Filtering	Netmask filter, ARP filter

Interfaces

Data Connectors	Three RJ-45, 1 Ethernet, 2 Serial (RS232/485)
USB Connector	Micro USB
RF Connector	**Z9-P:** SMA , 50 Ohms Impedance **Z9-PE:** TNC, 50 Ohms Impedance
Power Connectors	**Z9-P:** Phoenix Contact (#1776692) **Z9-PE:** Switchcraft (#17282-2PG-300)

Power Requirements

Operating Voltage	+6 to +30 VDC			
Current Consumption	**Voltage**	**Transmit**	**Receive**	**Idle**
	12 VDC	358 mA	146 mA	118 mA

General Information

Operating Temperature	**Z9-P:** -40°C to +85°C (-40°F to +185°F) **Z9-PE:** -40°C to +75°C (-40°F to +167°F)
Humidity	0 to 95% non-condensing
Dimensions	**Z9-P:** 177.29 L x 83.06 W x 40.89 H (mm) 7.0 L x 3.3 W x 1.6 H (in) **Z9-PE:** 191.00 L x 109.47 W x 41.91 H (mm) 7.52 L x 4.31 W x 1.65 H (in)
Weight	**Z9-P:** 172.37 g (0.38 lbs) **Z9-PE:** 750 g (1.7 lbs)
Reliability	MTBF 206,186
Safety	Class I, Division 2, Groups A-D
UL	**Z9-P:** c UL us **Z9-PE:** c UL us LISTED

Information to Order

Model Number	
Z9-P	Board Level Unit, 902 to 928 MHz
Z9-PE	Enclosed Unit, 902 to 928 MHz
Z9-PE-GREY	Grey Enclosed Unit, 902 to 928 MHz
Z9-PE-DEVKIT	Includes 2 Z9-PE units and accessories

*Country-specific models and information are available. Contact FreeWave Sales for information.

**Requires licensing. Contact FreeWave Sales for information.

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