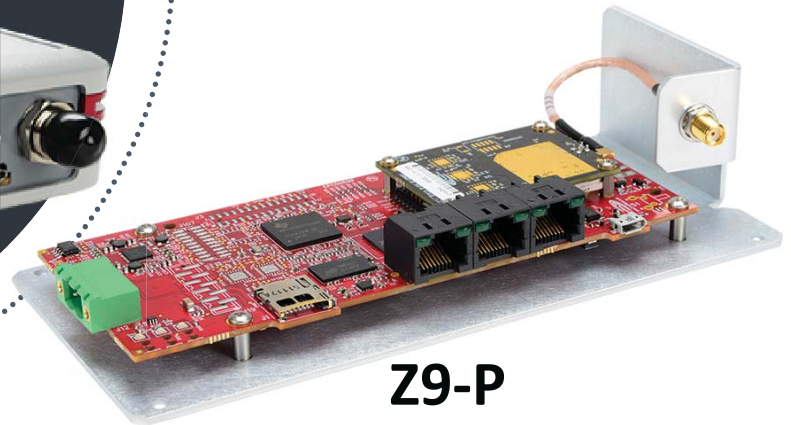# ZUMLINK™
900 Series Ethernet Radio

FREEWAVE

Z9-PE

Z9-P

KEY FEATURES

Multi-High Speed Data Rates™:
Five RF Link Rates supporting throughputs from 80 kbps to 4 Mbps.

Programmability:
Flexible user configuration along with acceptance of 3rd party applications.

ZumBoost™ Network Acceleration Pack:

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

Security: 128-bit and 256-bit AES counter mode encryption.

Long Range: Up to 60 miles line of sight.

User Selectable Channels:
Manipulate channel settings to assure highest performance.

Low Current Consumption:
355 mA @ 12V in transmit
100 mA @ 12V in receive

Reliable Communication:
CRC, FEC, and ARQ

OVERVIEW

FreeWave's new ZumLink™ 900 series platform, part of our Sensor-2-Server™ solution delivers secure collection, transport and control of data. The ZumLink 900 Series currently operates in the unlicensed 900 MHz spectrum supporting link rates up to 4 Mbps and is user configurable.

This cost effective, high-speed, rugged communication platform is specifically designed for outdoor industrial locations and is reliable under extreme environmental conditions. Its advanced technology makes it ideal in field area networks for oil and gas, utilities, mining, facility automation, municipalities, disaster recovery, or any industrial application that needs extremely reliable communications.

ZumLink's flexible, high speed, low power consumption radios also leverages FreeWave's ZumBoost™ Network Acceleration Pack to assure the most efficient network platform possible. ZumBoost introduces techniques such as compression, packet aggregation, forward error correction, and patent-pending Adaptive Spectrum Learning technology to ensure maximum throughput to meet the demands of today's wireless applications.

Virtually any M2M, SCADA, or Industrial IoT application can benefit from the enhanced features provided by our ZumLink products. The products support SSH, SNMP, and AES encryption.

Industry's 1st Programmable Radio
A very powerful new break-through technology – ZumLink includes the ZumIQ Application Environment which allows the development and deployment of third-party applications and puts intelligence at the edge. ZumIQ provides a Linux-based Debian operating system and storage for applications built in Node-RED, JavaScript, Java, Python and C++.

FreeWave's ZumLink 900 Series and Sensor-2-Server communication solutions have been designed to provide the performance, reliability, and quality that our customers have come to know and expect in our products.

All radios are designed, manufactured, and tested in Boulder, CO.

TECHNICAL SPECIFICATIONS

TRANSMITTER

Frequency Range	902 to 928 MHz
Output Power	Up to 1W; user selectable
Data Link Range	60 miles
Modulation	GFSK and 8-ary FSK
Channel Sizes	230.4, 345.6, 691.2, 1382.4, 3225.6 kHz
RF Data Rates	115.2, 250, 500 kbps, 1 & 4 Mbps
Hopping Channels	Up to 112; RF Data Rate Dependent
Hopping Patterns	Up to 16, RF Data Rate Dependent
Hopping Rates	400ms, 200ms, 100ms, 50ms, 25ms
Protocol	Adaptive Spectrum Learning

RECEIVER

IF Selectivity	> 40 dB
System Gain	136 dB

Sensitivity

RF Data Rate	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
4 Mbps	-83 dBm	-86 dBm

DATA TRANSMISSION

Error Detection	CRC, FEC, and ARQ	
Link Throughput	Up to 1.6 Mbps; 4 Mbps with Compression	
User Interface Rates	Ethernet Rate	10/100 Mbps
	Serial Rate	up to 250 kbps
Data Encryption	128-bit and 256-bit AES CCM	
Advanced Features	Packet Compression and Packet Aggregation	

THIRD PARTY APPLICATIONS

Storage	1 GB
RAM	512 MB

INTERFACES

Data Connectors	Three RJ-45 (1 Ethernet, 2 Serial)
USB Connector	Micro USB
RF Connector	**Z9-P**: SMA **Z9-PE**: TNC
Power Connectors	**Z9-P**: Phoenix (#1776692) **Z9-PE**: Circular (#CRD-021717-02-A)

POWER REQUIREMENTS

Operating Voltage	+6 to +30 VDC (± 10%)
Transmit Current	355 mA @ 12 VDC
Receive/Idle Current	100 mA @ 12 VDC

GENERAL INFORMATION

Operating Temperature		
Z9-P:	-40°C to +85°C	
Z9-PE:	-40°C to +75°C	
Dimensions		
Z9-P:	177.29mm L x 83.06mm W x 40.89mm H	
Z9-PE:	191.04mm L x 109.47mm W x 41.91mm H	
Weight		
Z9-P:	172.37g	
Z9-PE:	750g	
Humidity	0 to 95%, non-condensing	
Reliability	62,000 hour MTBF	
Safety	Class 1 Div 2 Groups A-D	
UL	Z9-P	Z9-PE

INFORMATION TO ORDER

Model Number	Description
Z9-P	Board Level Unit, 902-928 MHz
Z9-PE	Enclosed Unit, 902-928 MHz
Z9-PE-AUS	Enclosed Unit – Australia, 915-928 MHz
Z9-PE-DEV	Enclosed Unit for lab/development
Z9-PE-DEVKIT	Includes 2 Z9-PE-DEV units and accessories

SOLUTIONS

DRONES & ROBOTICS   EARTH MONITORING   GOV & DEFENSE   IRRIGATION & PRECISION   ASSET TRACKING   OIL & GAS   WATER & WASTEWATER   SMART CITIES   UTILITIES

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