

# 945U-E Wireless Ethernet Modem

## Long Range Wireless Ethernet for High-Speed and Reliable Connectivity



### Description

The ELPRO 945U-E Wireless Ethernet Modem is a robust, license-free wireless transceiver capable of long range and high bandwidth communications. Operating at 900MHz and up to 1W, the 802.11 standards-based ELPRO 945U-E is optimized for throughputs of up to 54Mbps which provides robust and secure two-way wireless communications in challenging outdoor environments typical of industrial monitoring and control applications.

Capable of operating in Access Point/Client configuration, functioning as a network Bridge/Router, or serving as a Serial Server (RS232/485), the ELPRO 945U-E offers node to node deterministic mesh network repeatability for further range and multiple channel spacing options to increase network scalability. Integrated Modbus server capability allows seamless I/O expansion through the use of ELPRO 115S Expansion modules.

### Features

- 902 – 928MHz Frequency and 250 – 1W RF Power
- 802.11 DSSS to 54Mbps Data Throughput
- 1.25/2.5/5/10/20MHz Channel Spacing Options
- Transmit and Receive Antenna Diversity
- Access Point/Client and Bridge/Router Configuration
- Serial Client/Server/Multicast Modbus TCP to RTU Gateway
- 10/100baseT IEEE 802.3 Ethernet
- Spanning Tree (Self Healing) Support
- Deterministic AP to AP Mesh Network Repeatability
- AP to AP Fast Roaming for movable Machinery
- IEEE 802.11i Secure 128bit AES Encryption (WPA2)
- MAC and IP Address Filtering
- Digital I/O Channel Transfer
- Configurable Settings for High Noise Environments
- Over-The-Air Network Diagnostics and Configuration
- VLAN Tagging Supported for Bridging and Routing Modes

### Applications

- Remote Well Head Monitoring
- Pipeline Leak Detection
- Mining Operations Infrastructure
- Water Treatment Facilities
- Video Surveillance and Security
- Facilities Management
- Automated Vehicle Control
- Tank Farm Monitoring
- Networking Wind Turbines and Solar Collectors

Specifications	
Transmitter/Receiver	
Frequency	902 – 928MHz <sup>(1)</sup> 915 – 928MHz <sup>(2)</sup>
Transmit Power	250mW (+24dBm) to 1W (+30dBm)
Transmission	Direct Sequence Spread Spectrum (DSSS)
Modulation	802.11g Orthogonal Frequency Data Modulation (OFDM)
Receiver Sensitivity	-95dBm @ 0.25Mbps - 71dBm @ 54Mbps (8% FER)
Channel Spacing	9 x 1.25MHz; 9 x 2.5MHz; 4 x 5MHz; 4 x 10MHz; 2 x 20MHz
Data Rate	1 – 54Mbps <sup>(1)</sup> 0.25 – 27Mbps <sup>(2)</sup> "Auto Mode" selects fastest rate possible relative to RSSI
Range (LoS)	30Km (18mi.) @ 1W <sup>(3)</sup>
Antenna Connector	2 x Female SMA Standard Polarity <sup>(4)</sup> Use CSD-SMA-2500 Surge Diverter
Input/Output	
Discrete I/O	Input Voltage-Free Contact <sup>(5)</sup> Output FET 30Vdc 500mA <sup>(5)</sup>
Ethernet Port	
Ethernet Port	10/100baseT; RJ45 Connector – IEEE 802.3
Link Activity	Link, 100baseT via LED
Serial Port	
RS232	DB9 Female DCE; RTS/CTS/DTR/DCD
RS485	2-Pin Terminal Block – Non-Isolated <sup>(6)</sup>
Data Rate (Bps)	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 76800, 115200, 230400 Bps
Serial Settings	7/8 Data Bits; Stop/Start/Parity (Configurable)
<b>Note:</b> Specifications subject to change. 1) Configured for US 2) Configured for Australia, Brazil 3) Typical Maximum Line of Sight Range 4) Supports Signal Diversity or High Gain Antenna 5) Can be used to transfer I/O status or Communications Failure Output 6) Maximum Distance 1200 Meters	
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Specifications	
<b>Protocols and Configuration</b>	
System Address	ESSID; 1 – 31 Character Text String
Protocols Supported	TCP/IP, UDP, ARP, SNMP, RADIUS/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, MODBUS and MODBUS-TCP
User Configuration	User Configurable Parameters via HTTPS Embedded Web Server
Configurable Parameters	Access Point/Client/Bridge/Router/VLAN Point-to-Point, Point-to-Multi-point Wireless Distribution System (AP - AP repeater) Modbus TCP/RTU Gateway Serial Client/Server/Multicast Simultaneous RS232/485 connection Embedded Modbus Master/Slave for I/O transfer
Security	Data Encryption – 802.11i With CCMP 128bit AES Support for 802.1x Radius Server Secure HTTP Protocol
Bandwidth Protection	MAC Address – Whitelist/Blacklist IP Filtering – Whitelist/Blacklist ARP/GARP Filtering – Whitelist/Blacklist
<b>LED Indication</b>	
LED Indication	Power/OK; RX; TX/Link; Link/100bT, RS232; LAN; RS485; Digital I/O status
Reported Diagnostics	RSSI Measurements (dBm) Connectivity Information/Statistics System Log file
Network Management	Optional Network Management System
<b>Compliance</b>	
EMC	FCC Part 15; EN 301 489 – 17; AS/NZS CISPR22
RF (Radio)	EN 300 328; FCC Part 15; RSS 210
Hazardous Area	CSA Class I, Division 2; ATEX; IECEx NA IIC (1)
Safety	IEC 60950 (RoHS Compliant)
UL	UL Listed
<b>General</b>	
Size	114 x 168 x 30mm (4.5" x 6.7" x 1.2")
Housing	Powder-Coated Aluminum
Mounting	DIN Rail
Terminal Blocks	Removable; Max conductor 12AWG (2.5 mm <sup>2</sup> )
Temperature Rating	-40 to +60°C ; -40 to +140°F
Humidity Rating	0 – 99% RH Non-condensing
Weight	0.5kg (1.1lb)
<b>Power Supply</b>	
Nominal Supply	9 to 30Vdc; Under/ Over Voltage Protection
Average Current Draw	300mA @ 12V (Idle); 160mA @ 24V (Idle)
Transmit Current Draw	500mA @ 12V (+30dBm), 250mA @ 24V (+30dBm)
<b>Note:</b> Specifications subject to change. 1) Certifications pending for 945U-E-H (1W).	

### Ordering

To order, select product code from the table and specify country of application.

Product Code	Description	Frequency	RF Power
945U-E	Ethernet 802.11g, 900MHz High Speed	902 – 928MHz DSSS	630mW
945U-E-H	Ethernet 802.11, 900MHz High Speed	902 – 928MHz DSSS	1W
<b>Note:</b> Available RF power and frequency may vary depending on country of application.			

### Accessories

The following accessories can assist with compatibility when commissioning.

Product Code	Description	Data Sheet #
<b>Antennas - 900MHz</b>		
DG900	Whip Antenna - SMA Male, angle bracket, -2dB gain, 1m (3') coaxial cable	7942
WH900	Whip Antenna - SMA Male	7942
CFD890EL	Dipole Antenna - SMA Male, mounting bracket, 5m (16') Coaxial cable	7942
SG900EL	Collinear Antenna - N-type Female, 5dB gain	7942
SG900-6	Collinear Antenna - N-type Female, 8dB gain	7942
YU6-900	Yagi Antenna - N-type Female, 10dB gain	7942
YU16-900	Yagi antenna - N-type Female, 15dB gain	7942
<b>Cables</b>		
CC3/10/20-SMA	Coaxial Cable Kit - 3m (9.8')/10m (32')/20m (65'), N-type to SMA	7932
CCTAIL-SMA-F/M	Coaxial Cable Tail - 600mm (24"), SMA to N-type Female or Male	7932
ETH-C5X	Ethernet Cable - 1.8m (6'), crossover, RJ45 to RJ45	7932
ETH-C5A	Ethernet Cable - 1.8m (6'), direct, RJ45 to RJ45	7932
SER-DB9	RS232 Serial Cable - DB9 Male to DB9 Female	7932
SER-RJ45	RS232 Serial Cable - DB9 Female to RJ45	7932
<b>Surge Diverters</b>		
CSD-SMA-2500	SMA Surge Diverter for use with CC10, CC20 - SMA	7936
CSD-N-6000	Coaxial Surge Diverter, Bulkhead N Female to N Female	7936
MA15/D/1/SI	Power Supply Surge Diverter, 110Vac/15A	7936
IOP32D	Signal surge diverter, 2 x 2-wire/1 x 4-wire	7936
<b>Power Supplies</b>		
PS-DINAC-12DC-OK	DIN Rail Power Supply, 100 - 250Vac, 12Vdc/2.5A	7935
PS-DINAC-24DC-OK	DIN Rail Power Supply, 100 - 250Vac, 24Vdc/2	7935
<b>Mounting Brackets</b>		
BR-COL-KIT	Mounting Bracket Kit for Collinear Antenna	7933
BR-YAG-KIT	Mounting Bracket Kit for Yagi Antenna	7933

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