

# 415U-E-Cx wireless Ethernet gateway

Condor series long-range high-speed industrial wireless Ethernet



## Description

ELPRO's industrial wireless solutions have 30 years plus of expertise in solving critical industrial applications through our extensive knowledge in wireless I/O, modem and gateway applications. The 415U-E-Cx extends communications to sensors in local, remote, and difficult-to-reach locations.

Designed with the Condor series long-range, high data speed wireless transceiver which supports Ethernet based protocol over the air and gives the 415U-E-Cx the power and flexibility to perform reliably in sprawling harsh industrial environments.

Secure. AES encryption, advanced IP filtering, multilevel authentication, user access and change event logging features provide the user with the tools to ensure the highest level of data integrity and protection against malicious attacks.

Flexible. Ethernet native support provides solutions to connectivity challenges today and in the future. The ELPRO 415U-E-Cx also provides Ethernet and serial gateway support for industrial protocols including Modbus TCP/RTU and DNP3 I/O, MQTT +SparkplugB.

Reliable. The Condor series 415U-E-Cx ProMesh™ operates reliably with the challenges of obstructed paths by using automatic path selection and frequency agility to allow the communications network to adapt to changes easily with redundancy.

## Features

- Exceeding 140 kbps data throughput
- Secure data protection with WPA and AES256 encryption
- Full Ethernet protocol over the air provides a standards-based flexibility to support future and legacy devices
- ProMesh automatic path selection and network formation
- Internal Web dashboard for immediate view of local I/O
- IO Plus Logic engine for controlling I/O points
- User configurable dashboard to display I/O and Diagnostics
- Supports multiple data rates simultaneously for high performance over short and long communication links
- Frequency agility roaming provides reliability and flexibility within the network architecture
- Over-the-air context-based data compression and forward error correction provides maximum reliability and transmission efficiency
- Redundancy modes for base, repeater, and remote
- Wireless point-to-point or multipoint I/O and gateway functionality
- Modbus TCP and RTU I/O gateway
- IoT connectivity with MQTT Sparkplug B Gateway
- DNP3 I/O gateway, including internal status registers
- Standard Ethernet bridge default to allow modem function for external Ethernet host devices (full L2/ L3 network support)
- 148-174 MHz, 340–520 MHz, 894-960MHz model options
- 10 mW to 10 W RF power configurable, license or license-free
- Software configurable wireless channel bandwidth supporting 6.25, 12.5, 25.0 kHz
- Integrated digital, pulse, and analog I/O
- Gather-scatter/block mapping and integrity checking transmissions for efficient event triggered peer-to peer I/O
- Over-the-air network diagnostics and configuration
- Expandable I/O for local alarms and inputs/outputs

## Applications

- Water and wastewater: flows, levels, pumps
- Renewables—solar farms, wind turbines, hydro
- Irrigation: slew gate controls, levels
- Oil and gas networks: gas well production, lift pump
- Environmental: storm warning, smoke stacks, filters
- Mining infrastructure: conveyor, re-claimer, pumps

## Specifications

SPECIFICATION	DESCRIPTION	
<b>Transmitter and receiver</b>		
Frequency <sup>a</sup>	148 - 174MHz, 340 - 400 MHz, 400 - 480 MHz 470 - 520 MHz, 928 - 960 MHz	
Transmit power—peak <sup>a</sup>	10 mW–10 W (+40 dBm) configurable	
Transmit power	Model C1,3,4,5 C9	
	QPSK 4 W (+36 dBm) 2.5 W (+34 dBm)	
	16/64 QAM 2.5 W (+34 dBm) 1.6 W (+32 dBm)	
	2-FSK, 4-FSK 10 W (+40 dBm) 6.3 W (+38 dBm)	
Modulation	QPSK, 16-QAM, 64-QAM 2-FSK or 4-FSK (compatibility mode)	
Receiver sensitivity 6.25/12.5/25 kHz	Model C1,3,4,5 C9	
	QPSK-FEC -116 dBm -112 dBm	
	QPSK -113 dBm -109 dBm	
	16-QAM -104 dBm -100 dBm	
	64-QAM -97 dBm -93 dBm	
	2-FSK -110 dBm -106 dBm	
	4-FSK -102 dBm -98 dBm	
Channel spacing	6.25, 12.5, 25.0 kHz (software configurable)	
Data rate raw no compression <sup>b</sup>	Encoding Channel	
		6.25 kHz 12.5 kHz 25.0 kHz
	QPSK-FEC 4 kbps 8 kbps 16 kbps	
	QPSK 8 kbps 16 kbps 32 kbps	
	16-QAM 16 kbps 32 kbps 64 kbps	
	64-QAM 24 kbps 48 kbps 96 kbps	
	2-FSK 4.8 kbps 9.6 kbps	
	4-FSK 9.6 kbps 19.2 kbps	
Typical data throughput	64-QAM 45 kbps 80 kbps 140 kbps	
Typical range (LoS QPSK-FEC)	62 miles (100 km) at 4 W 10 miles (16 km) at 0.5 W	
Antenna connector	SMA female	
<b>Protocols and configuration</b>		
System address	SSID; 1 to 31-character text string	
Networking protocols	TCP/IP, UDP, ARP, DHCP, DNS, ICMP, HTTP, VLAN 802.1Q, IPv6 pass through	
Industrial protocols	Gateway: Modbus RTU, Modbus TCP, DNP3 I/O, MQTT Client +SparkplugB Pass through: EtherNet/IP, Profinet, DNP, IEC 61850, and others	
Configurable parameters	Unit details, I/O mappings, I/O parameters, radio settings, Dashboard, IO Plus logic	
	DNP3 I/O and gateway (level 2+)	
	Modbus TCP/RTU gateway	
	MQTT Client +SparkplugB	
	Embedded Modbus master/slave for I/O transfer	
	Frequency agility parameters for automatic selection of radio paths, prioritization of traffic flows, bandwidth efficiency features, bandwidth utilization, redundancy, routing, bridging, VLAN	
User configuration	Network access: USB or Ethernet	
	Remote access: over the air	
Security	WPA2-PSK, AES 256 bit, multilevel password protected configuration	
IP filtering	IP address, MAC address, ARP filtering whitelist/blacklist	

SPECIFICATION	DESCRIPTION		
<b>LED indications and diagnostics</b>			
LED indication	Power/OK, Radio TX/RX/Link, RS-232, RS-485, digital I/O, analog I/O status		
Reported diagnostics			
Network diagnostics	Diagnostic capture to Wireshark™ format file		
Radio diagnostics	Channel utilization, RSSI measurements (dBm), background noise, connectivity information/statistics available Web/Modbus reg		
Logging	Optional internal data logging for I/O and events. Logging memory 1 MB		
<b>Connections</b>			
LAN	1 x 10/100Base-T auto-MDIX RJ-45		
Serial	1 x RS-232, 1 x RS-485, 1200–230400 bps Serial over IP modem support		
<b>Operation</b>			
Modes—topology	Point to multipoint Base, repeater, remote unit types ProMesh automatic path selection or fixed links Manual mode for advanced configuration		
<b>Input and output</b>			
Discrete input <sup>c</sup>	2 digital I/O (configurable as PI or PO) On-state voltage: <2.1 Vdc Wetting current: 5 mA Max. I/P pulse rate—DI 1/2: 50 kHz, DI 3/4: 1 kHz Max. I/P pulse width—DI 1/2: 10 μs, PI 3/4: 0.2 ms		
	Discrete output <sup>c</sup>	8 digital I/O (1–4 configurable as PI or PO) Working voltage maximum: 30 Vdc Working current maximum: 200 mA Max. O/P pulse rate—PO max. rate: 1 kHz	
		Expansion	115S series Modbus I/O modules
		<b>Compliance</b>	
EMC	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5		
RF (radio)	FCC CFR47 Part 90; IC RSS 119; EN 300 113; EN 300 220; AS/NZS4295; AS/NZS4268		
Safety	EN/IEC 62368		
Hazardous area	Class I, Division 2 IEC EX Zone 2; ATEX Zone 2—pending		
<b>Power supply</b>			
Nominal supply	10.8-30 Vdc, undervoltage/overvoltage protection		
Battery charger	Lead-acid or gel cell backup, 500 mA charge		
Average current draw	220 mA at 13.8 V (idle), 130 mA at 24 V (idle)		
Transmit current draw	2.5 A at 13.8 V (10 W RF), 1.5 A at 24 V (10 W RF) 0.9 A at 13.8 V (500 mW RF), 0.5 A at 24 V (500 mW RF)		
<b>General</b>			
Size (H x W x D)	7.20 x 1.38 x 6.20 inches (183 x 35 x 156 mm)		
Housing	Powder-coated aluminum and high-density thermoplastic, IP20 rated		
Terminal blocks	Removable, max. conductor 12 AWG		
Mounting	DIN rail		
Temperature rating	-40 to +158 °F (-40 to +70 °C)		
Humidity rating	0–90% RH noncondensing		
Weight	1.6 lb (0.7 kg)		

## Ordering

DESCRIPTION	BAND	RF POWER	PRODUCT CODE
415U-E-Cx Wireless I/O/gateway Base/repeater/remote, 96 kbps QAM, 10.4–30 Vdc, 10 W, 6.25/12.5/25 kHz	148 - 174 MHz	10 mW - 5 W	<b>415U-E-C1</b>
	340 - 400 MHz	10 mW–10 W	<b>415U-E-C3</b>
	400 - 480 MHz	10 mW–10 W	<b>415U-E-C4</b>
	470 - 520 MHz	10 mW–10 W	<b>415U-E-C5</b>
415U-E-Cx wireless I/O modem/ gateway including Class 1 Div 2 for hazardous area use	148 - 174 MHz	10 mW–10 W	<b>415U-E-C1-EX</b>
	340–400 MHz	10 mW–10 W	<b>415U-E-C3-EX</b>
	400 - 480 MHz	10 mW–10 W	<b>415U-E-C4-EX</b>
	470 - 520 MHz	10 mW–10 W	<b>415U-E-C5-EX</b>
	928 - 960 MHz	10 mW–6.3 W	<b>415U-E-C9</b>
			<b>415U-E-C9-EX</b>

## Related products

DESCRIPTION	BAND	RF POWER	CODE
415U-2-Cx Wireless Ethernet & I/O Gateway Modem/gateway Base/repeater/remote, 96 kbps QAM, 10.4–30 Vdc, 10 W, 6.25/12.5/25 kHz	148 - 174 MHz	10 mW - 5 W	<b>415U-2-C1</b>
	340 - 400 MHz	10 mW–10 W	<b>415U-2-C3</b>
	400 - 480 MHz	10 mW–10 W	<b>415U-2-C4</b>
	470 - 520 MHz	10 mW–10 W	<b>415U-2-C5</b>
Redundant base station/ repeater QAM, 10.4–30 Vdc, 10 W, 6.25/12.5/25 kHz	928 - 960 MHz	10 mW–6.3 W	<b>415U-2-C9</b>
	148 - 174 MHz	10 mW - 5 W	<b>415U-BSR-C1</b>
	340 - 400 MHz	10 mW–10 W	<b>415U-BSR-C3</b>
	400 - 480 MHz	10 mW–10 W	<b>415U-BSR-C4</b>
	470 - 520 MHz	10 mW–10 W	<b>415U-BSR-C5</b>
	928 - 960 MHz	10 mW–6.3 W	<b>415U-BSR-C9</b>

- a Available RF power and frequency may vary depending on country and model selected. Please confirm with local regulatory body.
- b Data compression will provide an improvement in over-the-air data throughput of up to 50%, depending on data content..
- c Discrete input and output function shared for total of 8 discrete inputs and outputs.

Specifications subject to change



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