ELPRO Technologies DS-EL-415U-2-Cx Wireless Ethernet Gateway Instructions

Contents

ELPRO Technologies DS-EL-415U-2-Cx Wireless Ethernet Gateway

- 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 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**				
Transmitter and receiver					
Frequency a	148 – 174MHz, 340 – 400 MHz, 400 – 480 MHz 470 – 520 MHz, 928 – 960 MHz				

Transmit power—peak a	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 b	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				
Protocols and configuration					
System address	ESSID; 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				g

SPECIFICATION	**DESCRIPTION**
LED indications and diagnostics	
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, connecti vity information/statistics available Web/Modbus reg
Logging	Optional internal data logging for I/O and events. Logging memory 1 MB
Connections	
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
Operation	
Modes—topology	Point to multipoint
	Base, repeater, remote unit types
	ProMesh automatic path selection or fixed links
	Manual mode for advanced configuration
Input and output	
Discrete input c	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 c	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
Compliance	
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
Power supply	
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)
General	
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 IO/gateway	148 – 174 MHz 340 – 400 MHz 400 – 480 MHz 470 – 520 MHz 928 – 960 MHz	10 mW – 5 W 10 mW–10 W 10 mW–10 W 10 mW–10 W 10 mW–6.3 W	**415U-E-C1** **415U-E-C3** **415U-E-C4** **415U-E-C5** **415U-E-C9**
Base/repeater/remote, 96 kbps			
QAM, 10.4–30 Vdc, 10 W, 6.25/12.5/25 kHz			
415U-E-Cx wireless I/O modem/ gateway including Class 1 Div 2 for hazardous area use	148 – 174 MHz 340–400 MHz 400 – 480 MHz 470 – 520 MHz 928 – 960 MHz	10 mW–10 W 10 mW–10 W 10 mW–10 W 10 mW–10 W 10 mW–6.3 W	**415U-E-C1-EX** **415U-E-C3-EX** **415U-E-C4-EX** **415U-E-C5-EX** **415U-E-C9-EX**

Related products

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

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

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Documents / Resources

	ELPRO Technologies DS-EL-415U-2-Cx Wireless Ethernet Gateway [pdf] Instructions DS-EL-415U-2-Cx, 415U-E-Cx, DS-EL-415U-2-Cx Wireless Ethernet Gateway, Wireless Ethernet Gateway, Ethernet Gateway, Gateway

References

- ELPRO Technologies – Industrial Wireless Communications