

415U-2-Cx wireless I/O gateway

Secure Industrial Cellular and WiFi connectivity for IIoT applications



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-2-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-2-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-2-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-2-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.

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

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 User configurable Web dashboard to display local I/O and Diagnostic registers
- IO Plus Logic engine for basic I/O controlling
- 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
- DNP3 I/O gateway, including internal status registers
- IoT connectivity with MQTT Sparkplug B Gateway
- 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
- Centralised Encryption Key Rotation for automated over the air management/rotation of system encryption keys
- System Firmware Upgrade: Centralise management of firmware patch updates and over the air deployment
- Radio Access Control: Extension of existing MAC/IP filtering to include black/whitelist filtering based on MAC or Serial number.
- Port Forwarding (NAT): Advanced network Port Forward configuration for connected Ethernet devices.

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			
User configuration	Network access: USB or Ethernet			
	Remote access: over the air, Access Control List			
Security	WPA2-PSK, AES 256 bit, multilevel password protected configuration Auto Encryption Key Rotation			
IP filtering	IP address, MAC address, ARP filtering whitelist/blacklist & Serial Number, Access Control List			

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		
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	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	8 digital I/O (1–4 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	
		Analog inputs	4 AI (2 differential, 2 single ended) Current range: 0–24 mA Voltage input range: AI 1/2: 0–25 V, AI 3/4: 0–5 V Accuracy: 0.1% Resolution: 14 bits
			Analog output
Analog loop power	+24 Vdc output provided to power loop devices Max. Current 100 mA—current limited		
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, under voltage/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			

SPECIFICATION	DESCRIPTION
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 non condensing
Weight	1.6 lb. (0.7 kg)

Ordering

DESCRIPTION	BAND	RF POWER	PRODUCT CODE
Wireless IO/gateway	148 - 174 MHz	10 mW-5 W	415U-2-C1
Base/repeater/remote, 96 kbps	340 - 400 MHz	10 mW-10 W	415U-2-C3
	400 - 480 MHz	10 mW-10 W	415U-2-C4
	470 - 520 MHz	10 mW-10 W	415U-2-C5
QAM, 10.4-30 Vdc, 10 W, 6.25/12.5/25 kHz	928 - 960 MHz	10 mW-5 W	415U-2-C9
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415U-2 wireless I/O modem/gateway including Class 1 Div 2 for hazardous area use	148 - 174 MHz	10 mW-2.5 W	415U-2-C1-EX
	340 - 400 MHz	10 mW-2.5 W	415U-2-C3-EX
	400 - 480 MHz	10 mW-2.5 W	415U-2-C4-EX
	470 - 520 MHz	10 mW-2.5 W	415U-2-C5-EX
	928 - 960 MHz	10 mW-2.5 W	415U-2-C9-EX

Related products

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

- 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



ELPRO Technologies
29 Lathe St
Virginia, QLD 4014
Australia
www.elprotech.com

Telephone:
Global:+61 7 3352 8600

ELPRO Technologies Inc
2028 East Ben White Blvd,
#240-5656 Austin, TX 78741-6931
USA

Telephone:
USA: +1 855 443 5776

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