ELPRO Technologies

CONDOR II

ELPRO EL-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 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 and SparkplugB Gateway
- DNP3 I/O gateway, including internal status registers
- Support for MTL HART MUX communciations
- 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-topeer 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.

Order Codes		
EL-415U-2-C1	Wireless I/O Gateway	148-174Mhz
EL-415U-2-C3	Wireless I/O Gateway	340-400Mhz
EL-415U-2-C4	Wireless I/O Gateway	400-480Mhz
EL-415U-2-C5	Wireless I/O Gateway	470-520Mhz
EL-415U-2-C8	Wireless I/O Gateway	894-902Mhz
EL-415U-2-C9	Wireless I/O Gateway	828-960Mhz

SPECIFICATIONS

CONDOR

Transmitter and receiver

Frequency[a]	148-174 MHz, 340-400 MHz, 400-480 MHz 470-520 MHz, 894-902 MHz, 928-960 MHz	
Transmit power – peak[a]	10 mW-10 W (+40 dBm) configurable	
Transmit power QPSK 16/64-QAM 2-FSK, 4-FSK	Model -C1,3,4,5 4 W (+36 dBm) 2.5 W (+34 dBm) 10 W (+40 dBm)	Model C9 2.5 W (+34 dBm) 1.6 W (+32 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: MQTT, SparkplugB, Modbus RTU, Modbus TCP, DNP3 I/O, HART to Modbus 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 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, Access Control List
IP filtering	IP address, MAC address, ARP filtering whitelist/ blacklist & serial number, Access Control List

LED Indications & 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, connectivity information/ statistics available Web/Modbus reg
Logging	Optional internal data logging for I/O and events. Logging memory 1 MB

CONTACT

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WIRELESS I/O GATEWAY

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 Specs range: AI 1/2: 0–25 V, AI 3/4: 0–5 V Accuracy: 0.1% Resolution: 14 bits
Analog output	2 AO (sourcing) Current range: 0-24 mA Current resolution: 13 bits Accuracy (current): 0.1%
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, 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)

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

HOW TO ORDER

Simply send us an email at **sales@elprotech.com,** contact your local distributor, or phone **+61 7 3352 8600**

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