

WI-I/O-9-U3: Wireless Mesh Networking I/O and Gateway

Combines multi I/O, modem and gateway functionality into a single device



Introduction

Weidmüller's WI-I/O-9-U3 combines multi I/O and/or gateway functionality with the reliability of secure, scalable mesh distance communication. The WI-I/O-9-U3 extends communications to sensors in local, remote and difficult-to-reach locations.

The WI-I/O-9-U3 IP-based addressing provides mesh/self-healing of network communications, multihop repeating and remote over the air configuration and diagnosis. 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 native Ethernet support provides solutions to connectivity challenges of legacy devices and IIoT devices. WI-I/O-9-U3 provides Ethernet and serial gateway support for industrial protocols including Modbus TCP/RTU and DNP3 I/O, MQTT +Sparkplug B.

Compatibility with the legacy WI-I/O-9-U2 is available with a firmware upgrade.

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, smokestacks, filters
- Mining infrastructure: conveyor, reclaimer, pumps

Approvals

- cULus Listed; UL/CSA Class I, Division 2; ATEX; IECEx Na IIC; CE



Ordering data

Band	RF power	Type	Order number
902 - 928MHz a	10mW - 1W	WH/O-9-U3-900	2914860000
869.XXXMHz a	500mW/5mW a	WH/O-9-U3-869	2914850000

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WI-I/O-9-U3: Wireless Mesh Networking I/O and Gateway

Long-range, scalable, industrial multiple I/O node and gateway

Technical data

Transmitter / receiver	
Frequency	902-928 MHz abd, 869.525 MHz c, 869.875 MHz c
Transmit power	1 mW (+0 dBm) to 1W (+30 dBm) b d; 1 mW (+0 dBm) to 500 mW (+27 dBm) c
Radio transceiver/modulation	Frequency hopping spread spectrum (FHSS) b d, Single frequency c; Frequency shift keying (FSK)
Receiver sensitivity	-109 dBm @ 19.2 kbps (3% FER) b d; -109 dBm @ 14.4 kbps (3% FER) c
Protocol	CSMA/CA with 32 bit CRC and auto-correction
Channel spacing	50 x 250 kHz b d, single 250 kHz c
Data rates	19.2-115.2 kbps b d, 14.4-76.8 kbps c
Typical radio range (los) note: range may be extended using repeater features	20 miles (32 km) @ 4W EIRP b 9.3 miles (15 km) @ 1W EIRP d 6 miles (10 km) @ 500 mW EIRP c
Antenna connection	SMA female standard polarity
Protocols & configuration	
System address	ESSID; 1 to 31-character text string
Network embedded protocols	TCP/IP, UDP, ARP, DHCP, DNS, ICMP, HTTP, PPP, FTP, TFTP, TELNET, SNMP, VLAN 802.1Q, IPv6 pass through
Industrial protocols	Gateway: Modbus RTU Master/Slave, Modbus-TCP Client/Server, DNP3 I/O, MQTT +SparkplugB; Pass-through: EtherNet/IP, Profinet, DNP3, IEC 61850, others
Configuration parameters	Unit details, I/O mappings, I/O parameters, radio settings, Dashboard, IO Plus logic; DNP3 I/O and gateway (level 2+); Promesh™ - automatic selection of radio paths, traffic flow prioritization, Modbus TCP/RTU gateway; MQTT Client +SparkplugB; bandwidth utilization & efficiency features, redundancy, routing, bridging, VLAN Embedded Modbus master/slave-I/O transfer
User configuration	Network access: USB or Ethernet; Remote access: over the air HTTPS with remote configuration via wireless link
Security	WPA2-PSK, AES 256 bit, multilevel password protected configuration; MAC Filtering; IP Filtering; ARP Filtering
IP filtering	IP address, MAC address, ARP filtering whitelist/blacklist
LEDs & diagnostics	
LED indication	Power/OK, Radio TX/RX/Link, Serial Activity RS-232, RS-485, Digital I/O, analog I/O status, LAN 10/100Mbit Link
Reported diagnostics	RSSI measurements (dBm), BER connectivity information/statistics, system log file
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
Connections	
LAN	x 10/100Base-T auto-MDIX RJ45
Serial	1 x RS-232, 1 x RS-485 f, 1200-230400 bps, Serial over IP modem support
RS232 v.24 DCE	1.2 to 230.4 Kb/s
RS485	1.2 to 230.4 Kb/s; Serial server, PPP, Modbus to Modbus TCP conversion
Operation	
Modes – topology	Point to multipoint; Base, repeater, remote unit type; ProMesh automatic path selection or fixed links; Manual mode for advanced configuration
Ethernet	10/100 BaseT RJ45, IEEE 802.3 compliant. Bridge/router functions work with all Ethernet protocols
Networking	Configurable as Access Point or Client, Bridge or Router, Point-to-point, Point-to-multipoint, Repeater functionality
Discrete I/O	
Digital inputs	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
Digital outputs	8 digital I/O (1-4 configurable as PI or PO); Working voltage max.: 30 Vdc; Working current max.: 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: 0-25V, AI 3/4: 0-5V; Accuracy: 0.1%; Resolution: 14 bits
Analog outputs	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
Thermocouple input	Supported type Type J, K and T. (optional plug-in)
Expansion	Possible using -EX series Modbus I/O modules via Serial or Ethernet ports; Modbus TCP Remote I/O
Power requirements	
Nominal supply	10.8-30 Vdc, undervoltage/overvoltage protection
Battery charger circuit	Lead-acid or gel cell backup, 500 mA charge
Average current draw	220 mA @ 12V (idle), 110 mA @ 24V (idle)
Transmit current draw	500 mA @ 12V (1W), 250 mA @ 24V (1W)
Compliance & approvals	
EMC	FCC Part 15; EN 301 489; AS 3548
RF (radio)	FCC Part 15.247; EN 300 220; AS 4268.2; RFS29 NZ
Safety	IEC 60950 (RoHS compliant)
Hazardous area	cULus Class I, Division 2; ATEX; IECEx Na IIC
General data	
Dimensions in. (mm) (h x w x d)	5.91" x 7.09" x 1.38" (180 mm x 150 mm x 35 mm)
Housing	IP20 rated high-density thermoplastic
Terminal blocks	Removable, max. conductor 12 AWG 0.1 in2 (2.5 mm ²)
Operating temperature	-40 to 60°C (-40 to 140°F)
Humidity	0-90% RH non-condensing
Mounting	DIN rail mounting
Weight	1.1lb (0.5 kg)

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