

PLS-NC1

Network Node V2.0



Applications

Upgrade of existing street lights for control, dimming and energy monitoring from a remote SCADA terminal using existing power lines without the need for any new wired or wireless infrastructure.

Control of architectural lighting from a remote SCADA terminal using the built in DALI controller.

Micro grid/distributed energy resource control and monitoring using the built in RS232/RS485 interfaces along with the patent pending transparent communications pipeline allowing existing infrastructure to be upgraded to remote monitoring and control without any field upgrades to equipment or the installation of new wired or wireless networks.

Weather and environmental sensor network without having to resort to cellular data for every single sensor node

Safety and emergency lighting network using a combination of existing power lines and built in Bluetooth low energy radio to send public service announcements to Bluetooth enabled cell phones or emergency beacons in the area.

Traffic and pedestrian monitoring using add on millimeter wave sensor to monitor traffic intersections and pedestrian traffic without having to install cameras that need extensive wireless or wired infrastructure and introduce privacy concerns.

Remote motion and intrusion monitoring using add on microwave motion detection units combined with a local camera to watch and photograph any intrusion into a secure perimeter without having to install extensive wireless or wired infrastructure.

Remote load control using the built-in relay control channel for control of large loads using external relays/contactors.

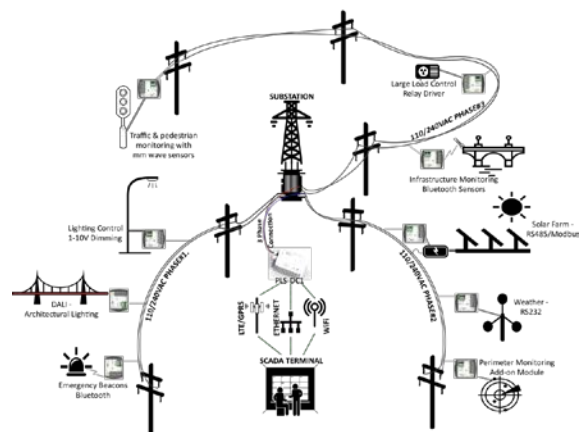
Remote infrastructure monitoring using commercial off-the-shelf sensors and the built in RS232/RS485 or Bluetooth channels to monitor bridges and roadways without having to equip each sensor with a cellular data connection.

Key Features

- A highly secure, transparent, patent pending multi-protocol communications pipeline to remote devices using existing power lines
- Open source API – allowing end users to write their own front end SCADA or modify existing ones.
- Server independent – allowing users to connect directly to a terminal using local Ethernet from the DC – independent of external networks.
- Removes the need for any new wired or wireless infrastructure and works over long distances and in areas where installing regular wired or wireless networks would be cost prohibitive.
- Industry leading 256-bit Elliptic Curve Cryptographic security, along with the isolation from the internet, provides a very secure, private control and communications network
- Multiple communications channels – RS232, RS485, CAN, USB Host, DALI, and Bluetooth LE.
- Load control and energy monitoring up to 4KVA.
- Two external relay/contacter controls for larger loads

Architecture

- Power Line Systems network, based on G3-PLC (ITU-T G.9903) architecture, consists of multiple NC1 network nodes and a single network data concentrator- DC1.
- The network nodes can exist on any of the three phases of the low voltage (80 – 305VAC) side of the power grid.
- **The network automatically installs and is self-healing;** there is no field installation necessary other than mounting and wiring of the NC1 node.
- Each NC1 can be as far as **3 miles** out from the nearest NC1 and maintain network connectivity.
- The data concentrator, **DC1**, connects to **all three phases** of the power grid – again on the low voltage side, at a suitable location. This is typically either the substation for the neighborhood or a pole mount medium voltage to low voltage transformer.
- The data communications can **jump medium voltage to low voltage transformers** allowing communications to take place between nodes that are not all on the same side of the low voltage transformer
- Each DC1 can support up to **255 network nodes**.
- Each DC1 has the capability to communicate with the central SCADA terminal via secure **ethernet, WIFI or LTE /CDMA/GSM cellular network**.



Technical

- Network
- G3-PLC (ITU-T G.9903) standards based and certified.
 - OFDM based IPV6 Auto Connect / Auto Healing Mesh network
 - 98.4 - 121.9KHz CENELEC Band
 - 40Kbps minimum data rate
 - 3-mile range between nodes
 - 255 nodes per cluster with one DC1 data concentrator
 - PLS-DC1 can connect directly to the SCADA system via local Ethernet
 - Alternative Cellular or WIFI connection supported by PLS-DC1
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- Security
- 256-bit Elliptic Curve Cryptographic security between nodes and data concentrator
 - Secure TLS/SSL based connection between data concentrator and operator terminal (SCADA)
 - Biometric and two factor authentications at the operator terminal
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- Power
- 80 – 305VAC, 50-60Hz, Single phase via screw terminal block
 - ANSI C136.37 surge requirements compliant
 - Fully protected against transients and brownouts with EN55022 Class B isolation
 - Screw terminal block for Line in and Load out connections
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- Load Control & Metering
- IEC 600335-1 compliant latching relay
 - Nominal switching capacity: 16A, 277VAC, inrush capable
 - Max switching power (resistive load): 4.432KVA
 - Single phase line & neutral screw terminal block
 - 0.1% accurate energy metering
 - Active power, true RMS current, RMS voltage, Line frequency and power factor metering
 - 2x relay/contactors drivers. 12V, 150mA Open Drain for external load control
 - 2x TTL inputs for logic level sensors like PIR motion or dry contact closure
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- Lighting Control
- 0/1-10V analog dimming output
 - DALI control for clusters of lighting loads – all device types supported
 - Built-in energy metering of connected loads
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- Communication Channels
- **RS232**: variable up to 115Kbps. EIA-RS232 levels, transient and surge protected
 - **RS485**: 15Mbps, 5V tolerant, Half duplex, -7 to 12V common mode range, ±15KV ESD protection
 - **CAN**: 2.0B compliant, 1Mbps, 3 Tx and 2Rx buffers, six available filters and 2 masks, ±8KV ESD protection. Suitable for 12 and 24V systems
 - **Bluetooth** Low Energy 4.2 – 100m effective range, 8x simultaneous connections, Beacon/Broadcast modes
 - Tool less cage clamp connector for all signals
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- Mechanical
- 3.05 x 3.05 x 1.56 in [77.5 x 77.5 x 39.6 mm]
 - IP66 protection level
 - -40°C to +75°C Operating temperature
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