TraffiClair

ClairPLC Presentation

Power Line Communication Extender

Kevin Gu

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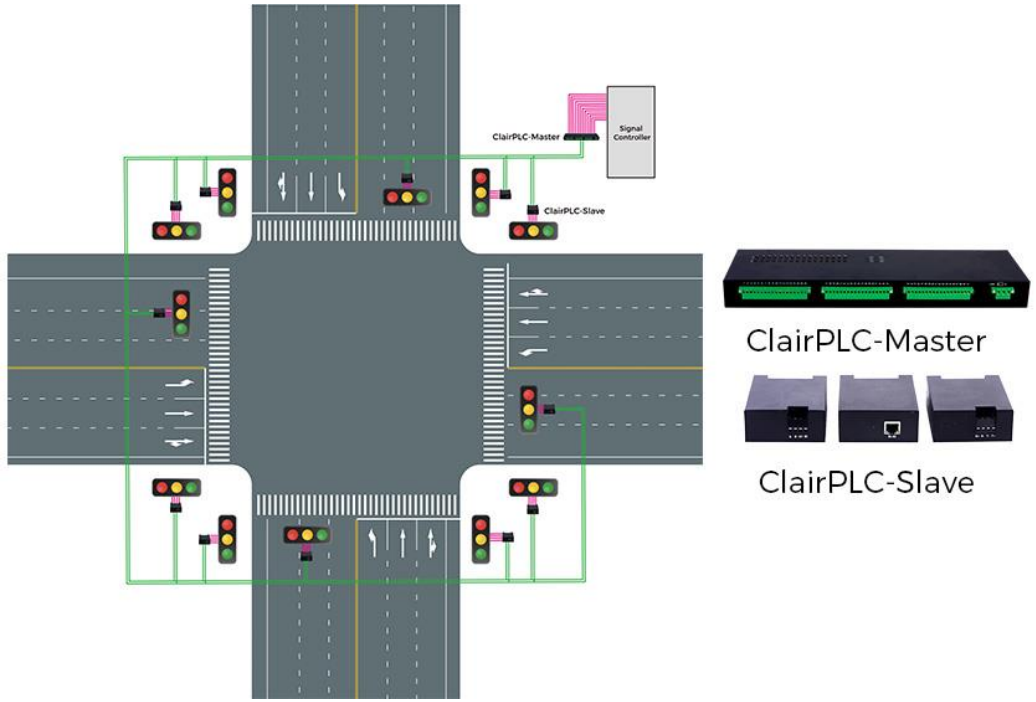
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PLC Technology: Save 70% on Wiring Effort!
Say goodbye to the hassle of wiring and conduit installation.

ClairPLC Overview

Saving 70% on wiring effort with power line communication solutions



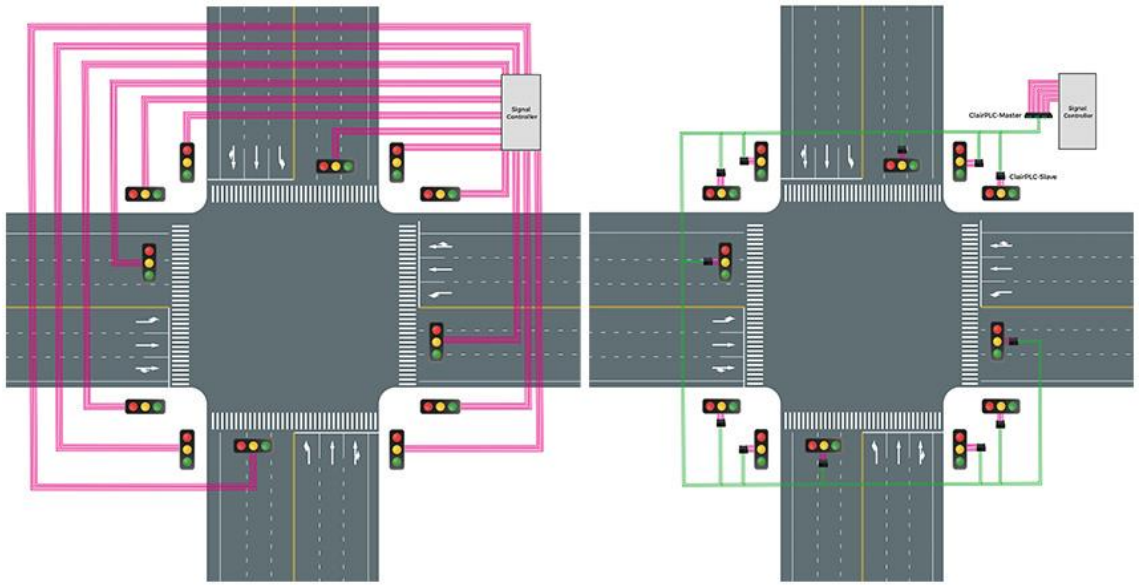
ClairPLC Power Line Communication Extenders utilize High-speed Power Line Communication (HPLC) technology combined with IoT capabilities to transmit traffic signal control signals and monitor their status over two-core power lines. This upgrades traditional star topology power line signal control systems into intelligent bus-network-based control solutions, significantly reducing cabling costs by 70% and shortening installation time by 25%. For older systems where trenching and conduit installation are not feasible, this solution enables the expansion of lighting and equipment without additional cabling.

- Reduced Cabling and Construction Costs
- High Security and Reliability with Dual Communication Redundancy
- Enhanced Scalability and Compatibility for Traffic Signal Systems

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ClairPLC Application Scenario 1

Streamlined bus wiring for signal lights with independent control



ClairPLC Power Line Communication Extenders simplify traffic signal systems by using High-speed Power Line Communication (HPLC) technology to control lights over two-core power lines.

1. All signal lights are connected in series using two-core cables, enabling individual control output for each light.

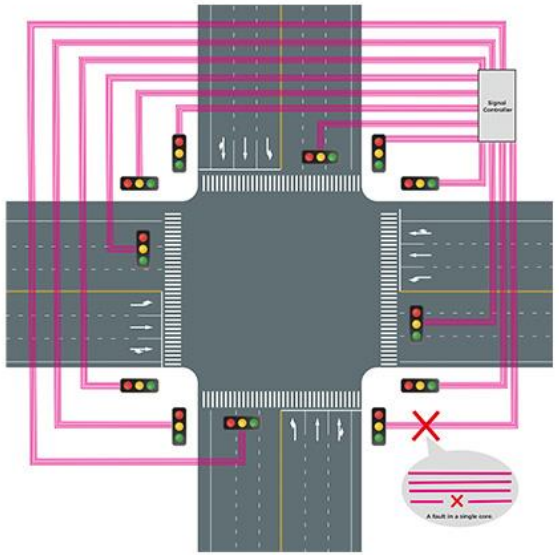
2. By transforming the signal cable wiring from a radial layout to a bus-type layout, the system enables faster installation and significantly reduces cable usage. Reducing cabling costs by 70% and shortening installation time by 25%.

3. Achieves individual control of each light, previously only possible with a radial wiring structure (star topology).

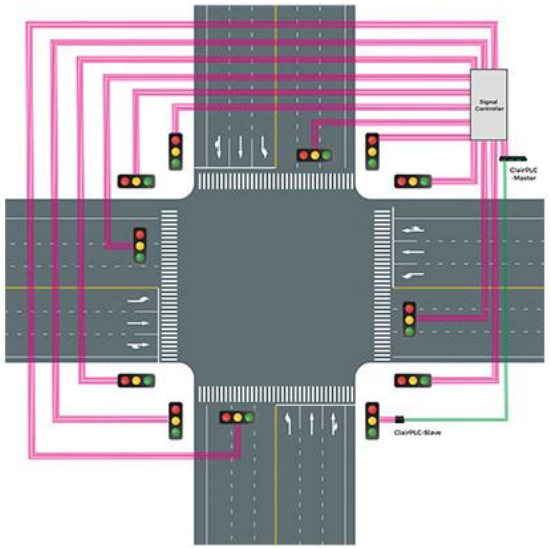
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ClairPLC Application Scenario 2

Quick repairs for signal light cable faults



Fault in the cable



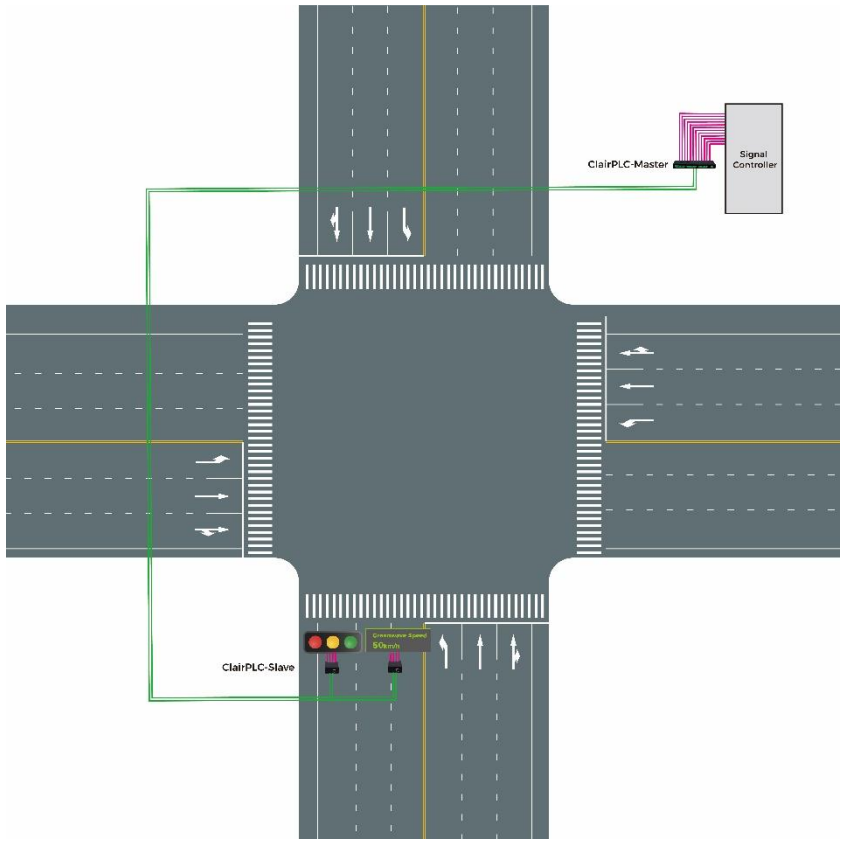
Fixed by PLC

Signal light faults at intersections often arise from specific issues, such as a single core failure causing individual light outages or conduit damage leading to multiple light failures. Traditional repair methods like temporary fly wiring, slot cutting for new cables, or re-excavation are time-consuming and disruptive. ClairPLC provides a seamless solution by leveraging existing cables for communication and control, enabling rapid fault resolution without the need for extensive infrastructure work. This approach ensures minimal downtime and cost-effective repairs.

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ClairPLC Application Scenario 3

Reusing existing signal light cables enables data transmission



By utilizing the two-core cables from the original power supply lines as data communication lines, and adding an ClairPLC-Master unit along with two slave units, the system can parse and identify the corresponding signals of the signal lights. This enables individual control of the green light for straight-through traffic and the collection and publishing of the signal status for green wave control. This method significantly expands the scalability of the signal control system and reduces the hassle of roadwork and construction.

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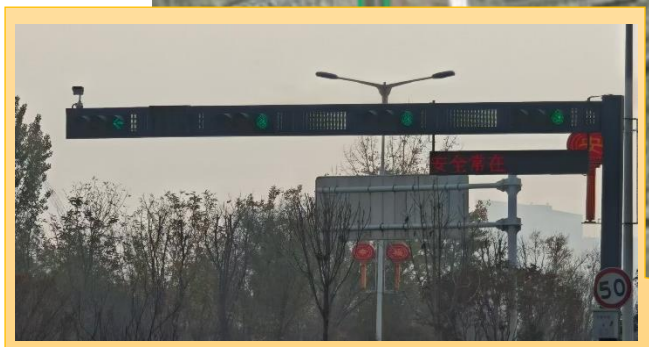
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ClairPLC Case Study 1

Separating Left-Turn and Straight-Through Signal Lights Without Additional Wiring

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Phase Splitting Demands



North-South Direction
Left-Turn and Straight-Through sharing the same phase for wire limitation

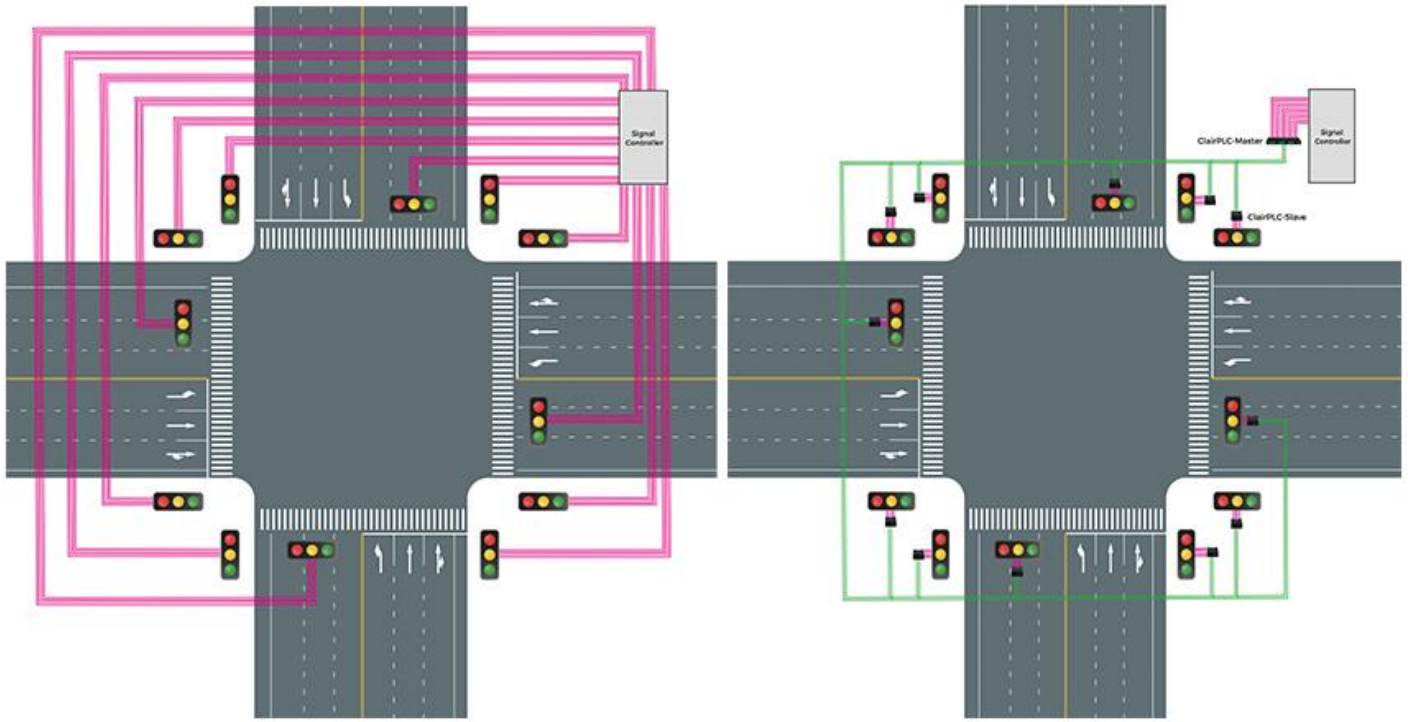


East-West Direction
Left-Turn and Straight-Through sharing the same phase for wire limitation

1. The intersection near Xi'an North Station and a local market experiences uneven traffic flow due to multiple nearby attractors, requiring phase optimization to address increasing directional traffic demands.

2. However, aging infrastructure prevents phase splitting without extensive road excavation and rewiring, leading to prolonged construction and significant traffic disruption.

Power Line Communication



Standard Wiring

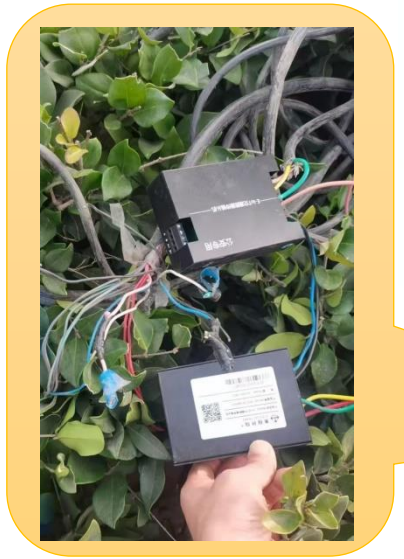
PLC Wiring

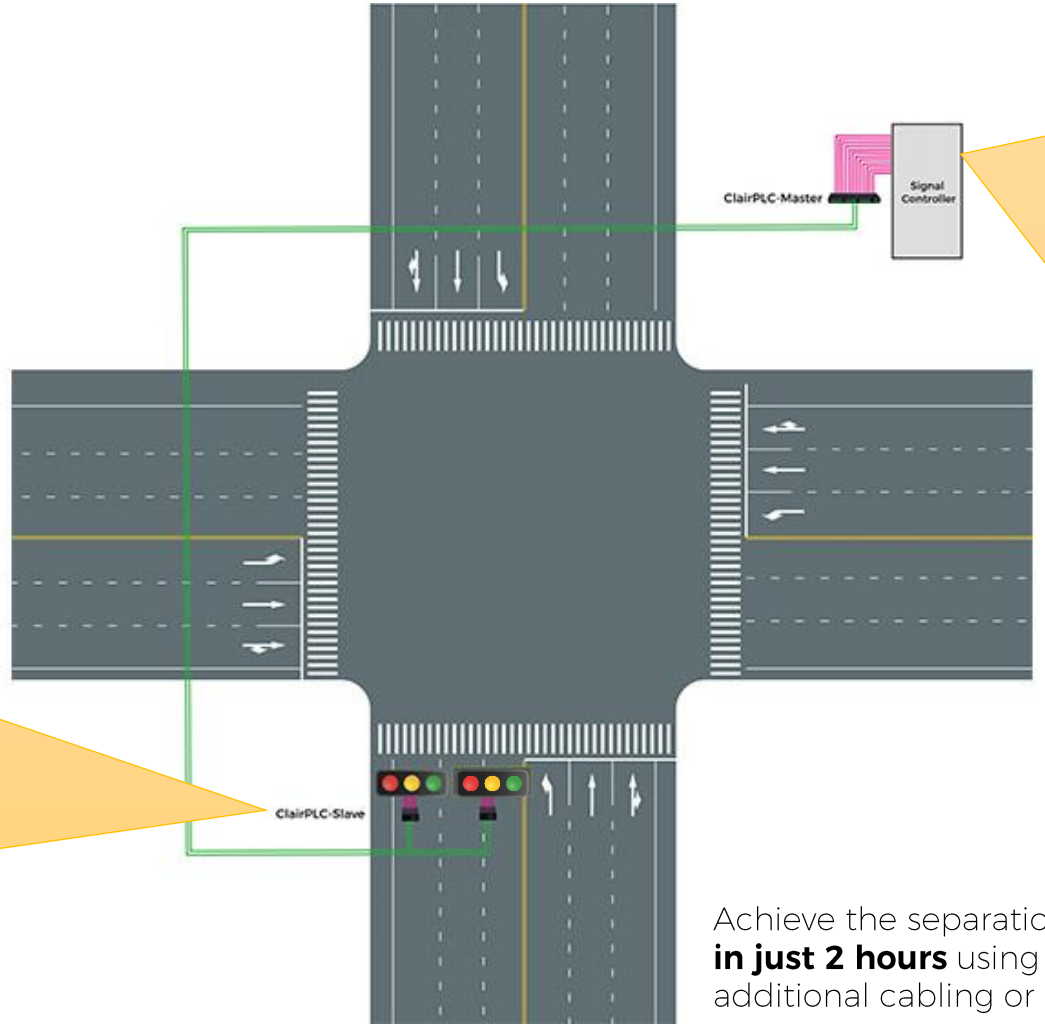


ClairPLC Power Line Communication Extenders simplify traffic signal systems by using High-speed Power Line Communication (HPLC) technology to control lights over two-core power lines.

1. All signal lights are connected in series using two-core cables, enabling individual control output for each light.
2. By transforming the signal cable wiring from a radial layout to a bus-type layout, the system enables faster installation and significantly reduces cable usage. Reducing cabling costs by 70% and shortening installation time by 25%.
3. Achieves individual control of each light, previously only possible with a radial wiring structure (star topology).

ClairPLC Solution







Achieve the separation of left-turn and straight-through phases **in just 2 hours** using existing wiring, eliminating the need for additional cabling or extensive installation work.

Result

After Optimization



North-South



East-West

The traffic speed at the intersection ↑	5.17%
The congestion index ↓	4.45%
The intersection throughput capacity ↑	4.32%

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ClairPLC Case Study 2

Guangzhou’s "Black Tech" Triumph: Overhead Wires Vanish at Key Intersection!

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ClairPLC Case Study

Guangzhou’s "Black Tech" Triumph: Overhead Wires Vanish at Key Intersection!



In Guangzhou’s historic Yuexiu District, the iconic banyan trees and arcades tell stories of the past—but so do the tangled overhead cables, long a headache for urban aesthetics and safety. With limited underground space, new traffic signals often relied on these "spider webs," especially at the busy Dabei Overpass intersection (Jiefang North Rd. & Huanshi Middle Rd.).

This crucial hub connects major east-west and north-south routes, serving heavy pedestrian, bike, and vehicle traffic near Yuexiu Park (a 4A-grade scenic spot) and shopping districts. Adding bike signals seemed impossible without more overhead clutter—until ClairPLC’s two-wire solution came in.

By transmitting signal data through existing power lines (no extra cables or road digging!), the tech cleared the skies, boosting safety and visual appeal. A win for smart cities!

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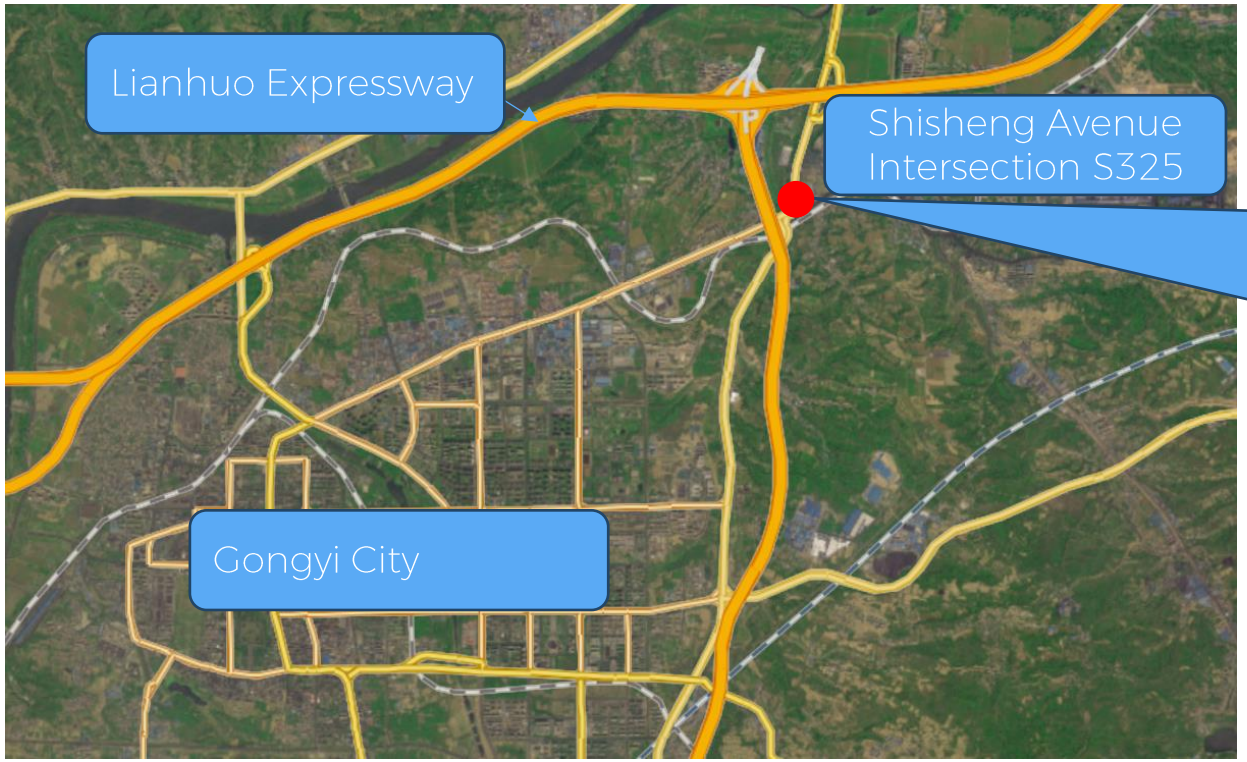
ClairPLC Case Study 3

ClairPLC solves critical cable faults at Gongyi's key intersections while traditional repairs were impossible.

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Challenges

1. The Shisheng Avenue-S235 intersection is Gongyi's northern gateway, linking the Lianhuo Expressway to the city. It has heavy traffic, particularly large trucks, with the east-west direction being the busiest. **Reliable traffic signal operation here is critical for safety.**





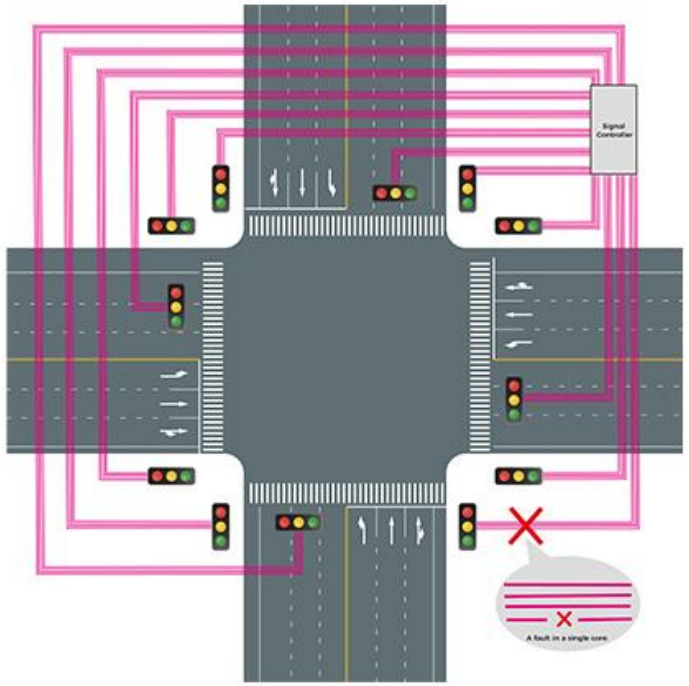
2. The Shisheng Avenue-S325 intersection has two closely spaced crossings controlled by one signal controller, with a bridge in between. **The signal cables were badly damaged during the 7.20 Zhengzhou floods and could not be fixed, causing failures in multiple traffic lights and disrupting signal control.**

Solution

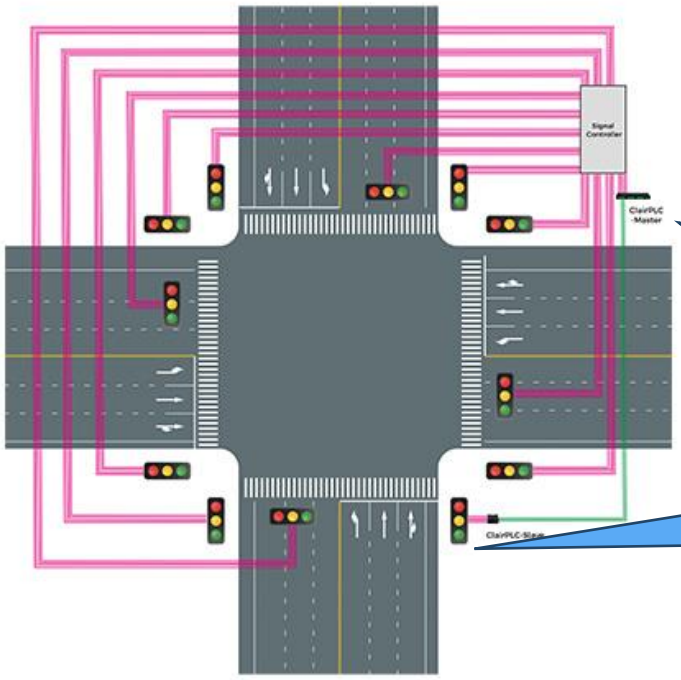
The Gongyi Traffic Management Department upgraded the intersection's traditional wired signal system to an PLC (Power Line Communication) solution using ClairPLC Extender. By repurposing two intact wires from the existing bundled cables for both power and data transmission, they installed:

1. A ClairPLC-Master at the signal controller to encode control signals.
2. ClairPLC-Slave units at each signal light to decode the commands.

This approach successfully restored all malfunctioning traffic lights without requiring cable replacement.



Fault in the cable



Fixed by PLC

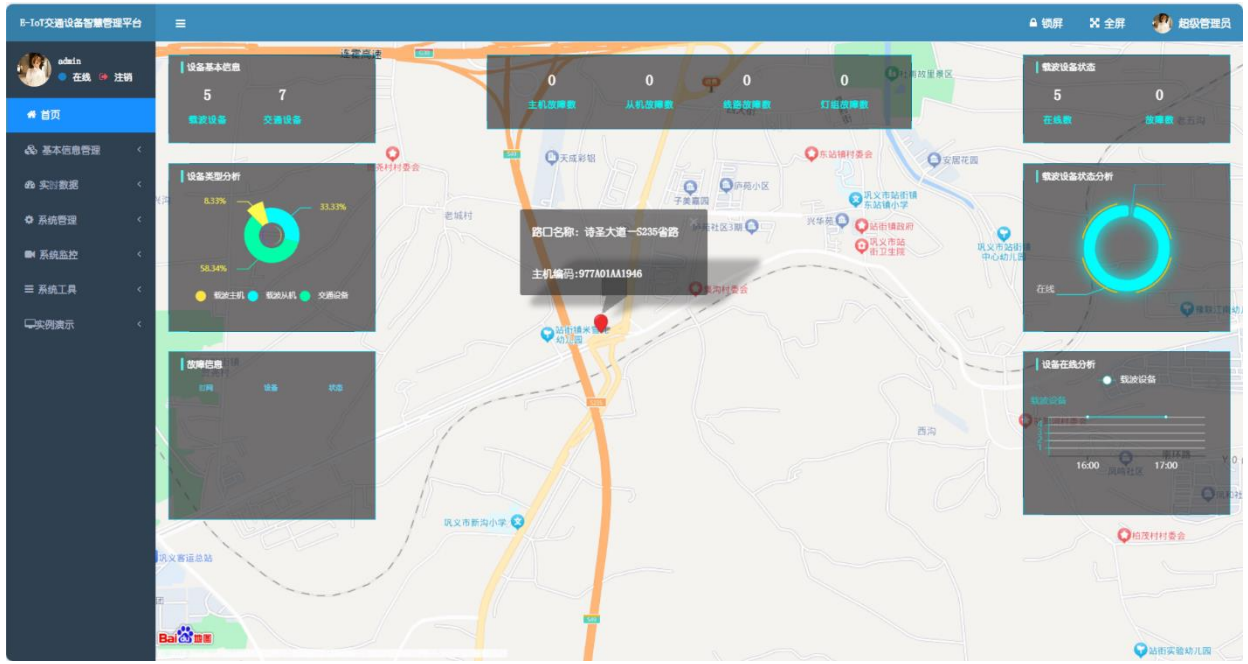


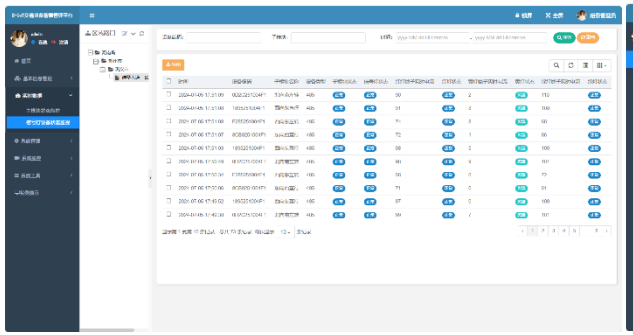


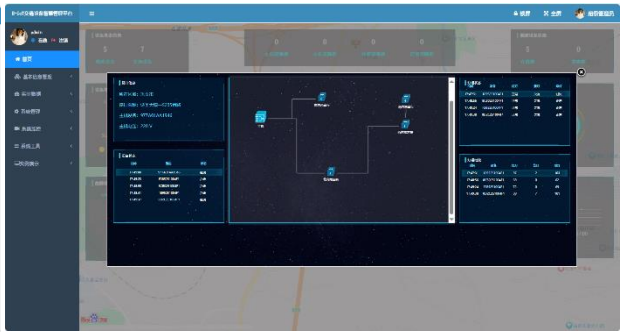
Key Points:

- Replaced traditional wiring with ClairPLC technology
- Utilized existing undamaged cables for dual power/data transmission.
- Deployed master/slave units to encode/decode signals.
- Fully repaired signal lights despite infrastructure constraints.

One more thing...







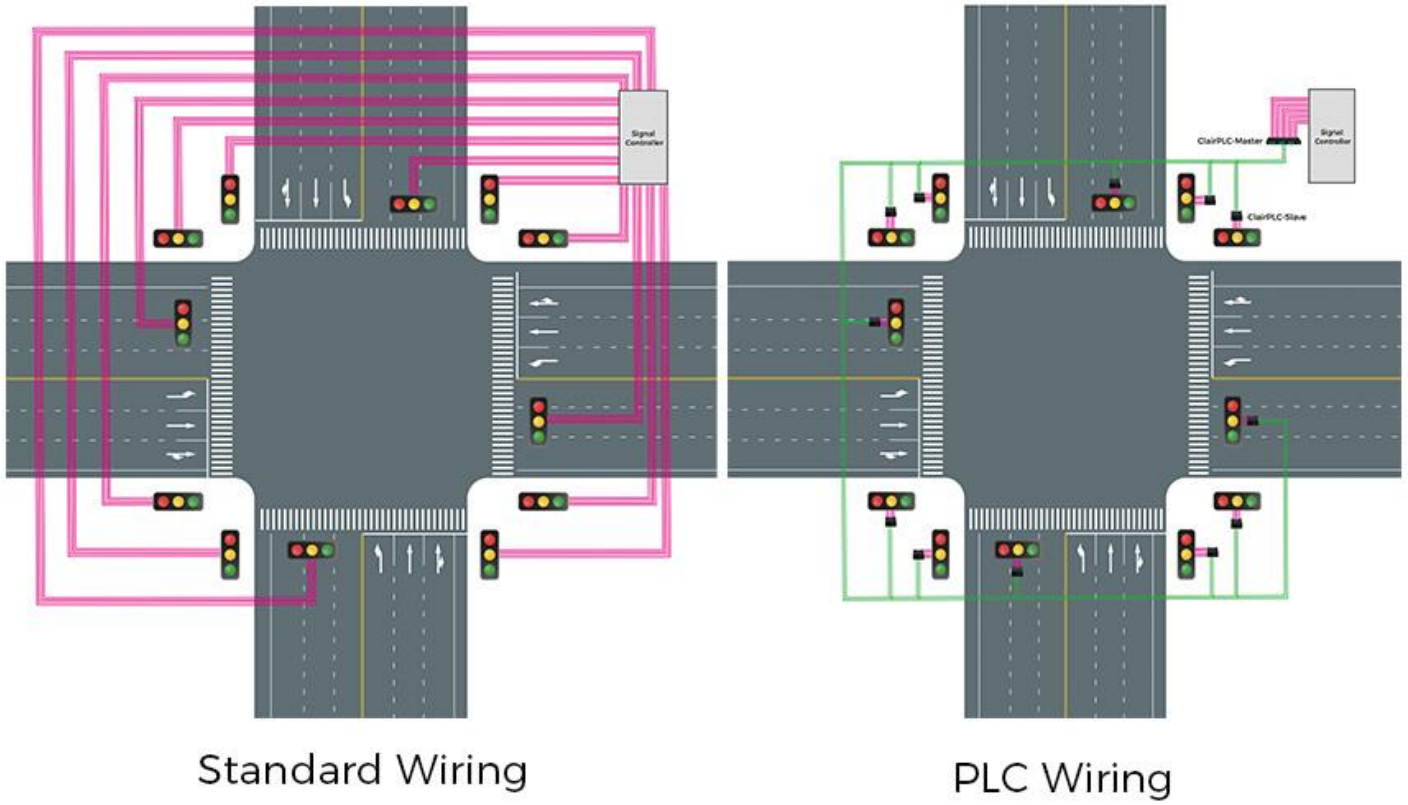
The ClairPLC not only resolves traffic signal failures **but also monitors the operation of signal lights and control cables at intersections**. Its slave unit incorporates a current monitoring module to detect anomalies in each light panel by analyzing real-time current output fluctuations. The master device employs a handshake mechanism with the slave unit for real-time monitoring, enabling assessment of control cable status. Fault data is aggregated by the master and transmitted via an internal network to the Traffic Management Platform, which displays and alerts on faults. Gongyi traffic authorities can then dispatch repairs promptly, significantly improving maintenance efficiency. **This system achieves precise management of every light and cable in the signal control network.**

Key Points

- Multi-Functional Solution – Resolves traffic signal faults while monitoring signal lights and control cables in real time.
- Current Monitoring – The slave unit detects light panel abnormalities by tracking real-time current fluctuations.
- Cable Status Detection – The host uses a handshake mechanism with slave units to assess control cable conditions.
- Smart Platform Integration – Fault data is aggregated and sent to the Smart Traffic Management Platform for alerts and visualization.
- Efficient Maintenance – Enables quick dispatch of repair teams based on alerts, improving operational efficiency.
- Precision Management – Ensures granular control over every signal light and cable.

Detail Story **Product Page**

Power Line Communication



Standard Wiring

PLC Wiring



ClairPLC Power Line Communication Extenders simplify traffic signal systems by using High-speed Power Line Communication (HPLC) technology to control lights over two-core power lines.

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ClairPLC Case Study 4

The Traffic Lights That Heal Themselves: A Tech Revolution in Yiyang

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ClairPLC Case Study 3

The Traffic Lights That Heal Themselves: A Tech Revolution in Yiyang









TraffiClair PLC Extender Solution revolutionizes traditional traffic light maintenance by enabling simultaneous power delivery and data communication through a two-core power cable. This system not only resolves signal failures efficiently, but also continuously monitors the operational status of each signal light and its connecting cables—effectively equipping the infrastructure with a "digital nervous system".

Without interfering with existing signal transmission, the solution transforms every traffic light into a smart IoT device. It collects real-time key parameters such as current and voltage from individual lamp assemblies, automatically analyzes equipment health, and accurately pinpoints abnormalities. Once a fault is detected, the system transmits diagnostic data via the power line to a gateway unit in the control cabinet, which then instantly reports the issue to the management platform.

This shift to proactive sensing and maintenance marks a dramatic departure from conventional reactive repair models. It upgrades urban traffic signal systems from being "passively reported" to "actively self-monitoring"—ensuring faster response, minimal downtime, and smoother city traffic flow.

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Thanks

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