



REN SERIES: POWERING RESILIENT MICROGRIDS AND SMART ENERGY MANAGEMENT

Overview:

Microgrids are reshaping energy systems by decentralising distribution, enhancing resilience and integrating renewable resources. From powering remote communities to supporting critical infrastructure, these systems require adaptable and dependable platforms to manage the complexities of modern energy challenges.

The REN Series provides engineers with a rugged, configurable foundation for microgrid development. Its robust design and edge-processing capabilities make it well-suited for tasks such as real-time data monitoring, energy optimisation and supporting diverse power sources. Designed to accommodate evolving system requirements, REN empowers engineers to create practical and resilient energy solutions, even in the most demanding environments.

Applications and Use Case Scenarios:

1. Remote, Off-Grid Microgrids: Supporting Isolated Communities and Facilities

Scenario: Remote regions without access to conventional grids rely on microgrids powered by renewable energy sources. Managing energy availability and balancing supply with demand are key challenges.

Use Case:

- **Real-Time Monitoring:** REN systems can be configured to process local energy generation and usage data, helping to monitor and optimise operations.
- **Basic Load Balancing:** With the right setup, REN can support load balancing to improve energy availability during peak times.
- **Environmental Resilience:** The rugged design of REN ensures it can continue functioning in remote or harsh environments.

2. Industrial Microgrids: Enhancing Efficiency and Reducing Costs

Scenario: Industrial facilities adopt microgrids to control energy costs and reduce reliance on external grids. Effective integration of multiple energy sources is critical.

Use Case:

- **Energy Source Integration:** REN systems, when configured appropriately, can assist in synchronising renewable sources with traditional generators.
- **Monitoring and Fault Detection:** By processing sensor data, REN could help identify potential system issues, supporting proactive maintenance.
- **Stable Energy Supply:** Configurable options allow for improved energy quality management to protect sensitive equipment.

3. Critical Infrastructure: Supporting Reliable Power for Essential Services

Scenario: Facilities such as hospitals or emergency centres require uninterrupted power and reliable backup systems.

Use Case:

- **Backup Power Switching:** Configured with suitable hardware, REN can assist in transitions to backup power sources during outages.
- **Basic Resource Allocation:** REN systems can be set up to prioritise critical systems during energy shortages.
- **Environmental Monitoring:** Additional modules could enable REN to support protocols during adverse weather conditions.

4. Urban Microgrids: Supporting Smart Energy Management

Scenario: Urban microgrids integrate renewable energy sources to reduce grid dependence and improve sustainability.

Use Case:

- **Demand Shifting:** REN helps optimise energy use by shifting loads to off-peak hours, easing pressure on the grid and maximising use of renewable sources.
- **IoT Integration:** REN systems could process data from IoT devices, helping improve energy flow and device management..
- **Emergency Response Support:** Configured correctly, REN may assist in stabilising the grid during high-demand periods.

Key Features for Microgrid Applications

1. **Flexible Configuration:** Compatible with various EPU, VPX, and ESU cards, enabling tailored solutions for specific applications.
2. **Rugged Design:** Built to withstand challenging environments, with features such as tamper-proof seals and weather resistance.
3. **Scalable Architecture:** Designed to support upgrades and evolving system requirements.
4. **Edge Processing Capability:** Enables on-site data processing for improved response times and reduced reliance on central systems.

Potential Expansion Areas

- **Enhanced Analytics:** Future configurations could support advanced predictive algorithms for energy optimisation.
- **Demand Response Support:** Potential to assist microgrids in adapting to grid demands during peak usage periods.
- **Community Energy Sharing:** Configurations could support secure energy sharing or trading within local networks.

Summary

The REN Series provides a solid foundation for developing microgrid management systems. With its rugged construction, configurable design and edge-processing capabilities, REN is a versatile option for engineers seeking to address diverse energy challenges.



Disclaimer:

The scenarios and applications described in this document are hypothetical in nature and intended solely for informational and illustrative purposes. Actual deployment, performance and results of the REN Series in Microgrid applications may vary depending on specific configurations, environmental conditions and integration with other systems. The REN Series is provided as a customisable edge processing platform, not as a finished product; therefore, end users may need to modify, configure and integrate REN components to meet their specific requirements. All users should perform thorough testing and consult with qualified engineers to determine suitability for their intended use. Unitronix disclaims any liability for direct, indirect or consequential damages arising from the use or reliance on this document or the products described herein.



About Us

Unitronix are an innovative engineering-capable distributor and manufacturer of rugged, embedded computing solutions for military, aerospace and high-end industrial applications. Our own innovative Rugged Embedded Nodes - REN are reusable, reconfigurable, recyclable, cutting carbon footprint and saving cost.

Unitronix Systems Head Office

Unit 9,
37 Currans Road,
Cooranbong,
NSW 2265,
Australia.

T: +61 (0)2 4977 3511
www.unitronix.com.au

Unitronix Systems Queensland Office

Unit 7, 229 Junction Road
Cannon Hill,
Brisbane
QLD 4170,
Australia.

T: +61 (0)438 274333
www.unitronix.com.au

Unitronix UK

Office 102 Milton Keynes Business Centre
Hayley Court, Foxhunter Drive,
Linford Wood,
Milton Keynes
MK14 6GD
United Kingdom

T: +44 (0)1908 698810
www.unitronix.co.uk