

Smarter HVAC Systems with IoT and Digi Embedded Solutions

Introduction

The heating, ventilation, and air conditioning (HVAC) industry is undergoing a digital transformation driven by the Internet of Things (IoT). Traditional HVACs are evolving into intelligent, connected systems capable of optimizing comfort, energy usage, and maintenance through real-time data and remote control. This transformation hinges on reliable, secure, and scalable embedded connectivity — a domain where Digi International excels.

The Role of IoT in Modern HVAC

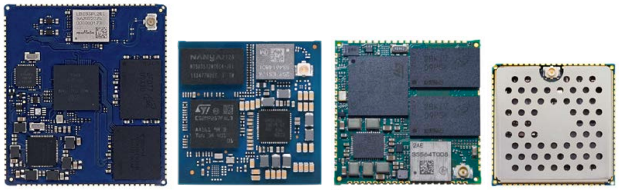
Modern HVAC systems are no longer standalone appliances. They are part of an integrated building management system (BMS), leveraging IoT technologies to deliver significant operational advantages:

- **Predictive maintenance**: Sensors continuously monitor equipment health metrics (such as vibration, temperature and airflow), enabling preemptive service before breakdowns occur.
- **Energy efficiency**: Smart thermostats and connected controllers adjust heating and cooling based on occupancy, weather, and user behavior, which reduces energy consumption.
- **Remote monitoring and control**: Facility managers can track and manage systems across sites using centralized dashboards and cloud connectivity.
- **Regulatory compliance**: Real-time reporting helps meet environmental and operational standards for energy usage and indoor air quality.

These capabilities rely on embedded computing and networking hardware that can operate reliably in harsh, variable environments, often with low power availability and high uptime requirements.

Digi Embedded Solutions for HVAC Applications

Digi offers a comprehensive portfolio of embedded solutions for the HVAC industry's IoT needs. These include:



1. **Digi ConnectCore® SOMs (System on Modules)**:
   Digi's ConnectCore platform provides high-performance embedded modules, a full suite of developer tools and documentation, and essential features for connected HVAC systems:
   - **Edge intelligence**: ARM Cortex-A-class processors capable of running machine learning algorithms locally for real-time decision making
   - **Connectivity**: Integrated Wi-Fi, Bluetooth, Ethernet, and optional cellular modules to support wired or wireless deployment scenarios
   - **Security**:
     - The integrated Digi TrustFence® security framework provides a layered approach including secure boot, encrypted storage, and secure device identity — essential for protecting critical infrastructure
     - Digi ConnectCore Security Services enable visibility into security status, and support a curated security analysis, SBOM analysis and CVE monitoring

For more information, visit:

www.digi.com

877-912-3444 | 952-912-3444

© 2025 Digi International Inc. All rights reserved.

- Digi ConnectCore Cloud Services offer remote monitoring and the ability to perform rapid mass security updates across your deployed network

✓ **Longevity and ruggedization**: Designed for extended life-cycles and harsh environmental conditions, with industrial temperature ratings and long-term availability

2. Digi XBee® Modules:

For wireless communication in distributed sensor applications, Digi XBee modules deliver:

✓ **Low-power operation**: Ideal for battery-operated wireless temperature, humidity, or airflow sensors

✓ **Mesh networking (Zigbee/DigiMesh® and Wi-SUN)**: Enables reliable, self-healing sensor networks across large commercial buildings

✓ **Cloud integration**: Easily bridge to cloud platforms via Digi gateways for data aggregation and control



3. Digi Embedded Yocto and Linux Tools:

Digi supports developers with robust software environments:

- Pre-certified images with Yocto Project and Debian
- Secure OTA updates with Digi Remote Manager®
- Developer kits, software libraries, and cloud connectors streamline time-to-market



Use Case Scenarios

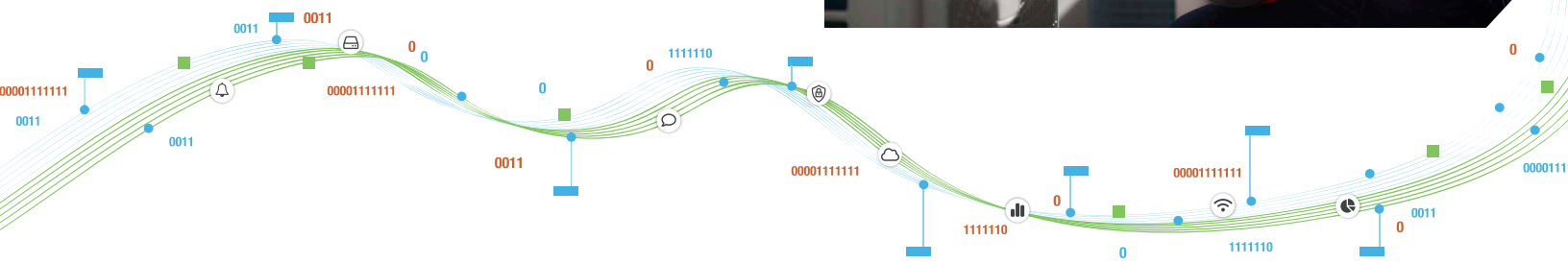
Digi offers a comprehensive portfolio of embedded solutions for the HVAC industry's IoT needs. These include:

Smart Commercial HVAC Retrofit

A building management firm retrofitted its HVAC units with Digi ConnectCore modules, enabling:

- Real-time analytics on temperature and motor health
- Remote diagnostics and firmware updates via Digi Remote Manager
- 20% energy reduction and improved tenant comfort





For more information, visit:

www.digi.com

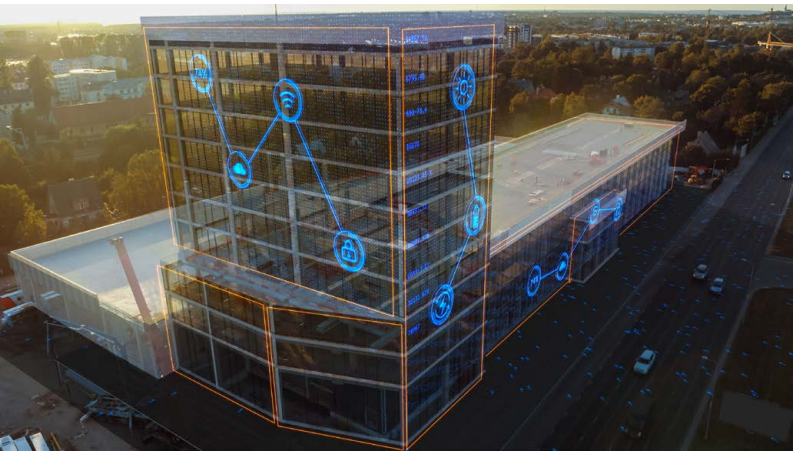
877-912-3444 | 952-912-3444

© 2025 Digi International Inc. All rights reserved.

Distributed Sensor Network in Multi-Zone Facility

A manufacturer deployed Digi XBee mesh networks to collect environmental data across a sprawling plant. Benefits included:

- Seamless data routing over mesh topology
- Long battery life for maintenance-free operation
- Integration with cloud analytics for indoor air quality management

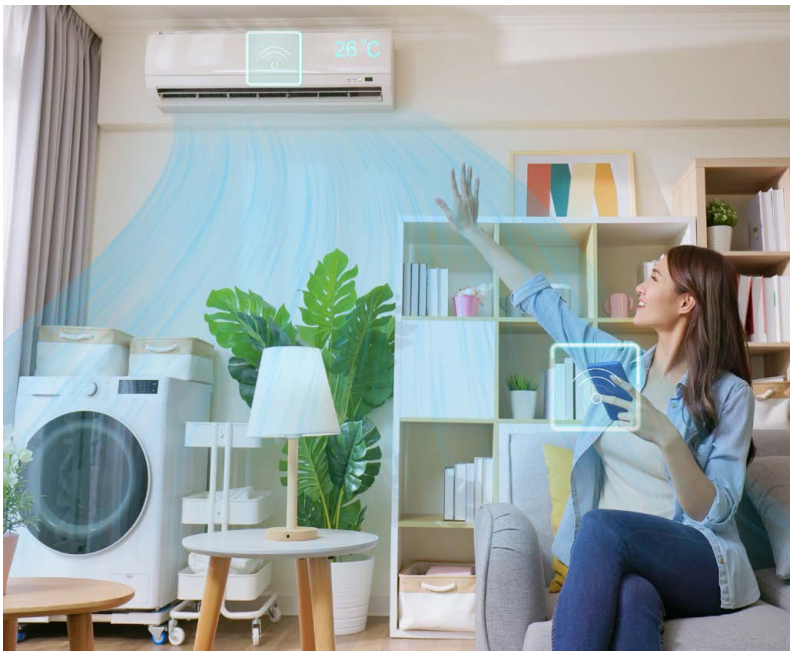


Why Digi for HVAC IoT?

Working with Digi International as a provider of embedded systems delivers significant advantages for smart HVAC applications. Digi's robust and reliable SOMs enable support seamless integration of HVAC components, as well as edge intelligence and efficient communication between devices and cloud platforms.

With expertise in industrial connectivity and scalable IoT solutions, Digi helps HVAC manufacturers and operators enhance system performance, optimize energy efficiency, and enable remote monitoring and management. This results in smarter, more responsive HVAC systems that reduce downtime, lower costs, and support sustainability initiatives. A few key benefits include:

- **Integrated ecosystem**: Hardware, software, and cloud management all under one roof — including integration with Digi XBee modules for wireless communication using a wide range of protocols
- **Global support and compliance**: Pre-certified solutions for faster deployment across geographies
- **Reliability**: Proven deployments in critical infrastructure and industrial environments
- **Security by design**: Integrated Digi TrustFence security reduces risk and enhances trust
- **Engineering services available**: When you need design, build, test and manufacturing readiness support, Digi Wireless Design Services can help



Conclusion

IoT is reshaping the HVAC landscape with unprecedented efficiency, intelligence, and user control. Digi International stands at the forefront of this transformation, delivering embedded solutions that meet the demanding needs of smart HVAC applications — today and into the future. Whether it's connecting distributed sensors or enabling edge intelligence in rooftop units, Digi ensures HVAC innovators can build with confidence.

Design, build, and deploy fast!

Get started with a **Digi ConnectCore developer kit**.

For more information, visit:

www.digi.com

877-912-3444 | 952-912-3444

© 2025 Digi International Inc. All rights reserved. 91004758 A2/925