

Developing Comprehensive Hardware and Firmware for a Remote Power Monitoring System

The Client

An entrenched player in high power segments with over two decades experience, our customer serves the distributed, mobile, programmable, residential, commercial and industrial markets with products including resilient, lightweight and intelligent battery chargers, invertors, backup power, DC power supplies, charge controllers and accessories.

The Challenge

The customer's new remote, residential power monitoring system communicates with various power generation devices such as invertors, battery chargers, and so on using a proprietary protocol. Providing a unified view of all power monitoring devices in the system is the customer's gateway mounted on an inverter module external to the system. On one side, the gateway communicated with all power generation devices via the proprietary protocol, and on the other, with an 802.11 plug-in module through Modbus protocol to provide a Wi-Fi interface to monitor power generation. Additionally, the gateway needed to support ZigBee interfaces using a ZigBee dongle through Modbus RTU to provide a low power, wireless monitoring capability. The customer surveyed the competitive business-scape for an optimal partner to develop complete ZigBee dongle hardware and firmware, and homed in on Mindteck after satisfying several stringent criteria.

The Solution

Our team chose LCD displays and appropriate RF modules to operate on the 2.4GHz spectrum. On completion of hardware design including schematics and layouts, we transmitted the reference designs to the customer in Orcad format. The customer followed through by redoing printed circuit boards for form and mechanical design factors. A customer-specified Modbus protocol was used to communicate with the gateway that connected via Modbus remote terminal units (RTU). Acting as the master device to the gateway, the ZigBee dongle gleaned requisite data periodically from the device and then stored it locally. The dongle doubled as a ZigBee coordinator transmitting data to the remote panel on demand.

The Benefits

Apart from cost arbitrage, the customer benefited from:

- IEEE 802.15.4 compliant, ZigBee certified implementation
- Firmware that totally complied with the customer's coding standards and configuration management practices
- Mindteck's offshore development center offering reduced time-to-market, cost competitiveness and support from good talent pools with deep domain and technology expertise
- Mindteck's ZigBee Center of Excellence, a technology hothouse, with rich experience in ZigBee modules and dedicated toward understanding and interpreting changes in the ZigBee landscape (including protocol specification changes, new application profile definitions and commissioning tool specifications)