

# REWINS

Reconfigurable Wireless Interface  
for Networking Sensors

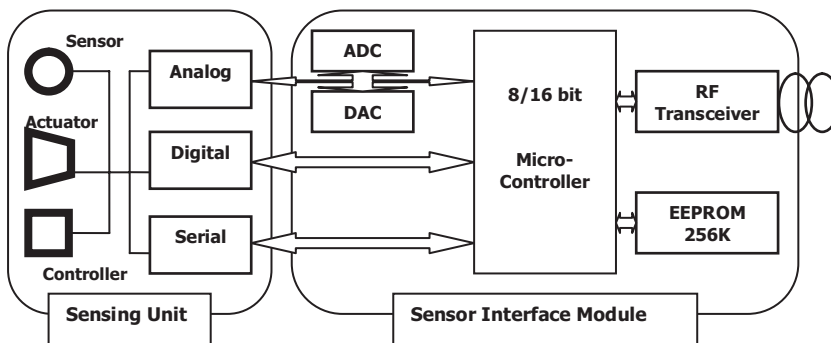


## Overview

ReWINS is a scalable, robust, fault-tolerant wireless solution that can be used at various resource-aware data collection, aggregation and processing applications. The solution is built on two components – first, a remote data collection-actuation unit and second, an application intergration platform at the central control unit (CCU) for data processing.

The first component, the data collection/actuation unit (sensors-actuators-controllers) is a generic reconfigurable wireless interface. The smart-wireless interface is reconfigurable using the Over-the-Air (OTA) paradigm. The RF link and the interface-firmware is reconfigurable to accommodate a variety of RF modules (Zigbee, Bluetooth, 802.11 or RFID), sensors, actuators, and controllers.

The second component, control architecture is based on JavaBeans, supports services such as naming, locationization, etc.. The use of Java Beans allows a to be maintenance of a component level description of the system, providing flexibility for implementing complex systems.



REWINS Smart Sensor Board Architecture

## Applications

Industrial Automation Applications

- Health Monitoring Systems: Periodic equipment assessment applications using RFID.
- Instrumentation Systems

M2M Applications – Remote Data Monitoring for Utility Industries

- Energy Distribution Systems, such as remote meter reading
- Health Maintenance Systems, such as pipeline monitoring

Patient monitoring in healthcare

- Prompt and accurate patient medical data collection utilizing using a variety of sensors to measure temperatue, blood pressure, CO<sub>2</sub>, respiration rate, etc.
- Different sensor node network deployment using variety of wireless radios (Bluetooth, WiFi, Motes, Zigbee, GPRS) as required by the enviroment and application - data rates, communication range, etc.

Real-Time Location and Tracking for Transportation Management

- Integration with mobile RFID network (as in the case of trailers, containers, and other cargo environments) through the WinRFID middleware.
- Integrated GPS and sensor support
- Simultaneous support of nodes in the network with different radios - Bluetooth, WiFi, GPRS, and extendible to Satellite communications

## Features

**Multi-Sensor Interface** – Different sensors, employing different protocols for data exchange, can be interfaced using the same smart sensor board.

**Multi-RF Interface** – Different application scenario requirements like bandwidth, jitter, range etc. can be met by choosing the appropriate wireless interface.

**Over-the-Air Reconfigurability** - The run-time parameters of the device and smart upgrade the firmware of the system can be done over the air (OTA).

**Fault Tolerance** – Multi-hop networking support helps achieve fault tolerant communication

**Security** – Use of RF interfaces like Bluetooth, WiFi etc., which have in-built support for secure communication channels, helps support secure delivery of data

**Plug-n-play Design** - The smart sensor board can be tailored to suit application needs and configurations

**Calibration** - Sensors can be calibrated accurately without significant user intervention.

**RFID Support** - Integrates with mobile RFID network through the WinRFID middleware.

For more information about WINMEC:  
<http://www.winmec.ucla.edu>  
[info@winmec.ucla.edu](mailto:info@winmec.ucla.edu)

For more information about REWINS  
<http://www.winmec.ucla.edu/rewins>  
[rewins@winmec.ucla.edu](mailto:rewins@winmec.ucla.edu)

For more information about WinRFID Middleware  
<http://www.winmec.ucla.edu/winrfid/>  
[rfid@winmec.ucla.edu](mailto:rfid@winmec.ucla.edu)