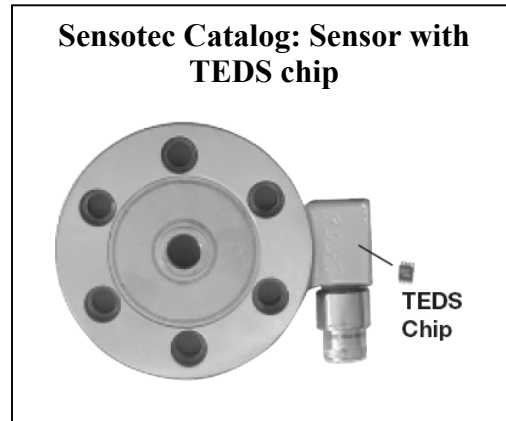


## The Status of IEEE 1451.4 Plug and Play

A year ago, the preliminary standard IEEE P1451.4 was heralded as the new era in sensors with TEDS becoming an industry protocol, promising to enable the implementation of plug and play in your signal conditioning environment and thereby simplify the tasks of configuring and using automatic measurement systems. Huge strides have been made over the course of the past year; and it is time to revisit IEEE P1451.4 to determine the progress that has been made, as well as project the publishing of the final version. Also appropriate is a discussion of the availability of sensors, data acquisition hardware, software, and related tools incorporating IEEE P1451.4 (P represents the preliminary standard).

### A Quick Overview

Plug and play is a data acquisition technology that can simplify the configuration of automated measuring systems by making a sensor's unique identification data available electronically. As implemented according to IEEE P1451.4, data in the form of a transducer electronic data sheet (TEDS) is burned on an electrically erasable programmable read-only memory (EEPROM) chip located on the sensor, so when a properly adapted signal conditioner interrogates the sensor, it can interpret the self-identification data. This technology provides a great benefit by eliminating the need for paper calibration sheets. In addition, it can simplify labeling and cabling problems, as well as inventory control issues, by letting you burn location data onto the chip when installing a sensor. And because all sensors produced according to the standard will carry the same basic identically formatted self-identification information, you will be able to mix and match sensors and applicable signal conditioners across manufacturers.



For more information about the technology, see the white papers “Good News for Sensor Users: IEEE P1451.4 Meets Plug and Play” and “Before You Plug and Play: Things to Consider” on the Honeywell Sensotec Web site: <http://www.sensotec.com/idtechnology.shtml>.

### IEEE P1451.4 Update

Since the preliminary introduction at the Sensors show in October 2002, there have been many advances in the proposed IEEE P1451.4 standard. A ballot in May 2003 conditionally approved the much changed and extensive content. Another vote is scheduled in September to validate the final version that has incorporated a number of comments offered following the spring ballot. The goal is to approve a final version of the standard by the end of 2003.

## Sensors

Many sensor manufacturers have moved ahead, making the preliminary standard part of their current offering. Honeywell Sensotec, for example, is building sensors to the proposed standard. For example, the Honeywell Sensotec ... [product] + link.

The IEEE P1451.4 standard does not create specifications for sensor connectors. Honeywell Sensotec and other key sensor manufacturers are working with National Instruments to address connectivity. A DB-9 or 10-pin RJ50 or modular-jack connector is expected to become the industry standard. NI has chosen this on initial products, and it may become "a" standard but BNC's are the 'de facto' standard with IEPE transducers. National Instruments is currently beta testing the BNC 2096 TEDS interface module, which it demonstrated at NIWeek 2003 this August. Moreover, pin assignments are not standardized at this time. Again National Instruments and leading sensor manufacturers, including Honeywell Sensotec, hope to make them part of the specification at a later date.

## Data Acquisition Hardware

Honeywell Sensotec is one of the only manufacturers to have a signal conditioner that can interrogate a bridge-based sensor and interpret self-identification information using the preliminary standard IEEE P1451.4. A number of manufacturers have compatible instruments available for accelerometers.



**Honeywell Sensotec SC 2000**

initial products will typically function as "add-on" products that bring the benefit of plug and play to existing measurement systems. National Instruments offers different platforms for transducer measurements, including the SCC and SCXI signal conditioning systems that handle a variety of sensor types.

National Instruments plans to introduce products that add IEEE P1451.4 capabilities to their existing data acquisition and signal conditioning platforms. These



**SCC and SCXI**

## Software

Whereas Honeywell Sensotec's data acquisition hardware, models SC2000 and SC3004, have software running on embedded processors and digital displays that provide sensor data, National Instruments products present measurements via a software interface. LabVIEW, the National Instruments core application software for engineers, has a TEDS library that incorporates the

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IEEE P1451.4 standard and is available free at <http://www.ni.com/sensors>. With this library, LabVIEW users can read and parse TEDS data from sensors, as well as edit and write TEDS. This technology will enable computer-based measurement systems to become more and more automated, easier to setup and configure, and more robust.

## **Virtual TEDS**

Virtual TEDS is the process of acquiring TEDS data from a participating sensor manufacturer and delivering to data acquisition software via a Web site hosted by National Instruments. (National Instruments has become the clearinghouse for the entire test and measurement industry's virtual TEDS activity.) As of mid August 2003 TEDS data from fifteen manufacturers can be downloaded from this site. Four companies, including Honeywell Sensotec, supply serial number TEDS—calibration data specific to individual serial numbers. You can access Virtual TEDS information at <http://www.ni.com/sensors>. A library of VI's are available on the NI website that takes this binary data and enables it to be translated for use in LabVIEW.

## **PDA Devices**

The personal digital assistant (PDA) has become a valuable tool in data acquisition environments, so it is no surprise that for several years a number of manufactures have offered Accelerometer (and other two wire devices) TEDS readers and writers for PDAs based on IEEE1451.2 or preliminary versions of IEEE1451.4. National Instruments now provides LabVIEW VI's for PDA's to customers who wish to read and write TEDS data based on the preliminary standard IEEE1451.4. TEDS read/write PDA units for two wire (accelerometers and microphones) and 4 wire (bridge based sensors) will be available to customers from a number of manufacturers including Honeywell Sensotec as early as the fourth Quarter 2003. These will be based on the preliminary specification IEEE P1451.4 and on the first release of the standard once it is approved.