The Tinker's Toolbox - Valerie Rothermel-Nelson of Honeywell on Ambient Environmental Sensing

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Hosted by Alix Paultre, the Tinker's Toolbox is the Advantage Design Group's web-based interview show where we talk about the latest technology, components, and design issues for the electronic design engineering community.

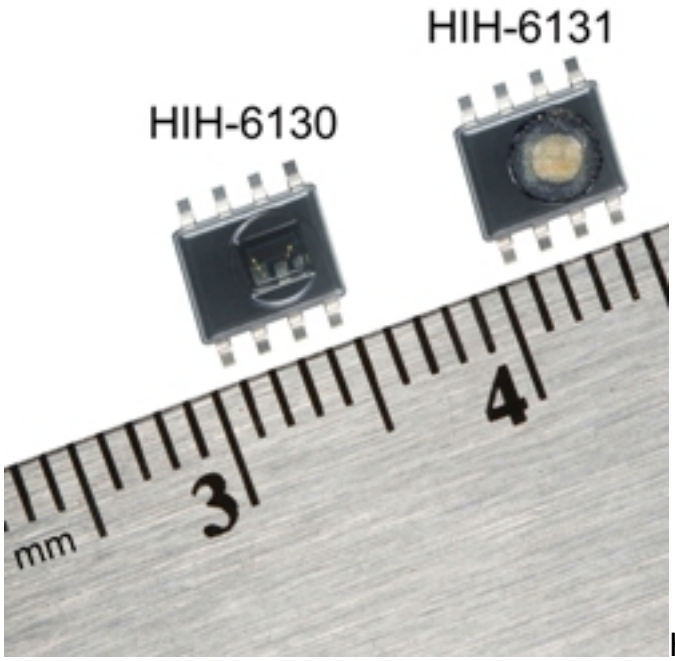
In this podcast we talk to Valerie Rothermel-Nelson, Senior Global Product Marketing Manager, Thermal Products, of Honeywell Sensing and Control about Ambient Environmental Sensing and the challenges to the design engineer. Honeywell HumidIcon Digital Humidity/Temperature Sensors combine digital relative humidity and temperature sensing with high stability and Total Error Band accuracy to address industrial and medical applications.

Right-click to download the podcast [1]

Here is a link to the podcast in case the playback button is inoperative: Honeywell Interview [1]

Here is a link to a presentation on Honeywell Humidicon technology: Honeywell Humidicon Presentation [2]

Here is the release on the products:



Honeywell introduced their new HumidIcon Digital Humidity/Temperature Sensors, HIH-6130/6131 Series [3], offering industry-leading accuracy, stability, and energy efficiency in a lowest total cost solution that combines digital output relative humidity and temperature sensing. This new product is designed for potential use in HVAC-refrigeration, respiratory therapy, medical incubators, and medical microenvironment applications.

Honeywell HumidIcon Digital Humidity/Temperature Sensors have an industry-leading Total Error Band that provides the sensor's true accuracy of ±5 %RH over a compensated temperature range of 5 °C to 50 °C [41 °F to 122 °F] and 10 %RH to 90 %RH. Total Error Band, which includes all sources of error that a sensor might see, effectively eliminates individual sensor testing and calibration, supports system accuracy and warranty requirements, helps to optimize system uptime, and provides excellent sensor interchangeability.

"The Honeywell HumidIcon Series' industry-leading features and Total Error Band accuracy provide our customers with a real competitive advantage," said Valerie Rothermel-Nelson, Global Product Marketing Manager for Honeywell Sensing and Control. "When you also consider its ultra small SOIC8-pin package and low energy use, this sensor simplifies installation and offers the lowest total cost of ownership."

The new series offers industry-leading long-term stability of 1.2 %RH over five years. Many competitive humidity sensors need to go through a 12-hour at 75 %RH rehydration process (which requires special equipment chambers) to correct reflow temperature offset. The Honeywell HumidIcon™ device only requires a 5-hour rehydration process under ambient conditions (>50 %RH). This long term stability minimizes system performance issues, helps support system uptime by eliminating the need to service or replace the sensor during its application life, and eliminates the need to regularly recalibrate the sensor in the application, which can be inconvenient and costly.

The laser trimmed, thermoset polymer capacitive sensing element, and the element's multilayer construction (which provides resistance to most application

hazards such as condensation, dust, dirt, oils and common environmental chemicals), help provide industry-leading stability and reliability.

Potential applications for the Honeywell HumidIcon Digital Humidity/Temperature Sensor include providing precision relative humidity and temperature measurement for:

- HVAC/R systems, thermostats, humidifiers/de-humidifiers, and humidistats to maintain occupant comfort and ideal storage humidity/temperature while achieving low energy consumption, supporting system accuracy and warranty requirements, maximizing system uptime, and improving overall system quality.
- Respiratory therapy such as sleep apnea machines and ventilators, to enhance patient comfort, safety, and treatment effectiveness with warm and humidified air.
- Incubators/microenvironments to support critical processes and experiments, enhancing process efficiency with desired climate conditions.
- Compressed air lines condensation removal; dry compressed air is critical for customer process control measurement.
- Ground-based and airborne weather stations, allowing real time and highly accurate monitoring and reporting of actual weather conditions.

The true, temperature-compensated digital I^2C output typically allows the customer to remove the components associated with signal conditioning from the PCB to free up space and reduce costs associated with those components, which also can eliminate problems that could occur from having multiple signal conditioning components across the PCB. This simplifies integration to the microprocessor, eliminating the need for customer-implemented, complex signal conditioning.

The Honeywell HumidIcon sensor can operate down to 2.3 Vdc, which allows for use in low energy and wireless-compatible applications to enhance energy savings and prolong system battery life. This low operating voltage also means low power consumption: the sensor goes into sleep mode when not taking a measurement within the application, consuming only 1 µA of power versus 650 µA in full operation in a battery operated system. Sleep mode maximizes battery life, reduces power supply size, and reduces the application’s overall weight. Optional one or two %RH level alarm outputs provide the user the ability to monitor whether the RH level has exceeded or fallen below pre-determined and critical levels within the application

Multi-function ASIC provides flexibility within the application by lowering or eliminating the risk and cost of OEM calibration. The high 14-bit humidity sensor resolution and 14-bit temperature sensor resolution within the application help the user’s system detect minute relative humidity and temperature changes.

The ultra-small SOIC-8 SMD (Surface Mount Device) package comes in two configurations: the HIH-6130 (no filter, non-condensing) and the HIH-6131 (hydrophobic filter and condensation-resistant), which allow for use in many condensing environments. Cost-effective tape-and-reel packaging allows for use in

high volume, automated pick-and-place manufacturing, eliminating lead misalignment to the PCB and helping the customer to reduce manufacturing costs.

Get more information on this product:

http://sensing.honeywell.com/index.cfm/ci_id/158535/la_id/1.htm [3]

Related Materials:

Honeywell HumidIcon™
Webpage: http://sensing.honeywell.com/index.cfm/ci_id/158535/la_id/1.htm [3]

Honeywell HumidIcon™ product data sheet:
http://sensing.honeywell.com/index.cfm/ci_id/158177/la_id/1/document/1/re_id/0 [4]

Honeywell HumidIcon™ application note:
http://sensing.honeywell.com/index.cfm/ci_id/158179/la_id/1/document/1/re_id/0 [5]

Honeywell HumidIcon™ installation instructions:
http://sensing.honeywell.com/index.cfm/ci_id/158178/la_id/1/document/1/re_id/0 [6]

Honeywell Humidity Sensors Line Guide:
http://sensing.honeywell.com/index.cfm/ci_id/147516/la_id/1/document/1/re_id/0 [7]

Honeywell Thermal Sensors Product Range Guide:
http://sensing.honeywell.com/index.cfm/ci_id/156871/la_id/1/document/1/re_id/0 [8]

I^2C Communication Technical Note:
http://sensing.honeywell.com/index.cfm/ci_id/158183/la_id/1/document/1/re_id/0 [9]

Total Error Band Specification Technical Note:
http://sensing.honeywell.com/index.cfm/ci_id/158180/la_id/1/document/1/re_id/0 [10]

Using Alarms Technical Note:
http://sensing.honeywell.com/index.cfm/ci_id/158181/la_id/1/document/1/re_id/0 [11]

Using Command Mode:

http://sensing.honeywell.com/index.cfm/ci_id/158182/la_id/1/document/1/re_id/0
[12]

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http://www.ecnmag.com/podcasts/2011/12/tinkers-toolbox-valerie-rothermel-nelson-honeywell-ambient-environmental-sensing

Links:
[1] http://www.ecnmag.com/sites/ecnmag.com/files/legacyfiles/ECN/Multimedia/Audio/2011/12/honeywell.MP3
[2] http://www.ecnmag.com/sites/ecnmag.com/files/legacyfiles/ECN/Multimedia/Audio/2011/12/Honeywell HumidIcon Digital Humidity-Temp Sensor End-user Presentation Final 110411.pdf
[3] http://sensing.honeywell.com/index.cfm/ci_id/158535/la_id/1.htm
[4] http://sensing.honeywell.com/index.cfm/ci_id/158177/la_id/1/document/1/re_id/0
[5] http://sensing.honeywell.com/index.cfm/ci_id/158179/la_id/1/document/1/re_id/0
[6] http://sensing.honeywell.com/index.cfm/ci_id/158178/la_id/1/document/1/re_id/0
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[12] http://sensing.honeywell.com/index.cfm/ci_id/158182/la_id/1/document/1/re_id/0