Systems For Environmental Stress Screening and Halt/Hass Applications

Keithey Instruments introduced two new systems designed to improve measurement performance while reducing the cost of environmental stress screening (ESS) in product development, QA/QC, and production applications. Both systems provide the lowest per-channel cost for the acquisition of thermocouple temperature data with automatic cold junction compensation (CJC). In addition, these systems also supply superior temperature measurement accuracy and channel-to-channel repeatability, acquire vibration data, and provide control outputs. Both come with Keithley's &quotUp and Running&quot software for easy system configuration, data logging, and analysis, making them ideal for Highly Accelerated Life Testing (HALT) in product development and Highly Accelerated Stress Screening (HASS) during production.

The Model 7708 is the latest addition to Keithley's Integra Series of flexible measurement/control solutions built around the company's Model 2700 Multimeter/Data Acquisition System. The Model 7708 plugs into the Model 2700, providing 40 channels of differential multiplexing with automatic CJC for temperature measurements with J, K, N, T, E, R, S, and B thermocouples. Moreover, the Model 7708 accommodates mixed signal measurements, making it well suited for multipoint monitoring in ESS applications. By using two Model 7708 modules in the Model 2700, up to 80 channels of data can be simultaneously acquired. Together, the 2700/7708 combination supports up to 11 electrical and physical measurement functions with built-in signal conditioning,. With its automatic CJC, this system provides &#177 1 &#176 C thermocouple accuracy and less than &#177 0.5 &#176 C variation from channel to channel. In addition to thermocouple inputs, the Model 7708 accepts analog signals up to 300 V with 300 V isolation from chassis ground. Oversize screw terminal connectors simplify wiring.

Features such as programmable scan lists and limits, a 50,000 point memory buffer, built-in scaling, and digital I/O, enable the user to optimize system throughput in many ESS applications. Communication with a PC controller can be through either a GPIB or RS-232 interface. The free Xlinx&#153 ActiveX-based start-up software available for the Models 2700/7708 greatly simplifies PC-based measurements by eliminating the need for programming &#151 simply point and click to configure the system and make the measurements, then send data to disk or a Microsoft Excel&reg spreadsheet. LabVIEW&#153 and TestPoint&#153 drivers are included with Xlinx, which runs on any Pentium-class PC that supports Windows 95 or later, or Windows NT. The latest version of Xlinx, with off-line data logging capability, can be downloaded from Keithley's website.

For users who want to conduct ESS with PCI plug-in data acquisition boards, Keithley supplies the Model STP-36CJC thermocouple accessory and the easy-to-use ExceLINX software with thermocouple data logging capability. When the Model STP-36CJC is connected to the input of a Keithley Model KPCI-3107 or -3108, this single plug-in system establishes a multifunctional ESS capability. The resulting system provides automatic cold junction compensation for the same types of

thermocouple inputs listed above for the Model 7708. The Models KPCI-3107/8 are distinguished by the exceptionally wide gains that are available on a single board. The 12 unipolar and 12 bipolar gains of 1, 2, 4, 8, 10, 20, 40, 80, 100, 200, 400 and 800 eliminate the need to purchase a separate low- or high-gain board to meet different ESS signal requirements.

These PCI boards feature an onboard FIFO buffer to enable continuous acquisition of large amounts of data and accommodate analog input speeds up to 100 Ksamples/s. Both boards offer 16 single-ended or 8 differential inputs, expandable to 256 channels, and have 32 digital I/O channels (sinking 64 mA and sourcing 15 mA) for a wide variety of ESS control functions. The Model 3108 has two waveform quality 16-bit analog outputs with speeds up to 100KHz, which can be used to excite external ESS sensors and control setpoints. With either board, the system allows relay control and sensing for ESS power cycling. Built-in counter/timer capabilities can be used for ESS encoder inputs, such as those that monitor fan speeds and fixture motion.

The AUTOZERO capability built into the KPCI-3107/8 boards and DriverLINX&#153 device drivers compensate for inherent measurement drifts in the system. Each channel, gain, and voltage range is individually calibrated. Along with 16-bit resolution, these features provide the superior accuracy in mixed temperature/vibration/voltage measurements that ESS applications need. The ExceLINX software package provides dynamic data logging within Excel along with temperature linearization and automatic CJC. Moreover, filtering functions are designed into the software for smooth and accurate thermocouple readings.

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