ECTRONICS

Issue 1, May 2008

What's Inside

From the CEO:

Greetings and salutation to the entire Ectron Sales Team. I am pleased to announce the creation of *Ectronics*, a quarterly newsletter designed for all of you. Each quarter we will furnish you with product news and application design-in information, along with updates on project wins, technical tips to sharpen your salesmanship, and some worthwhile technical topics to keep you ahead of the competition. It won't be all business, because we will share with you news about our company's team such as anniversaries, birthdays, and other worthy topics. We invite you to submit input to the Editor for each future edition, so it can be included before press time. Let me thank all of you for your collective endeavor on Ectron's behalf. We can't succeed without you. Now go sell something.

Sincerely,

E. Earl Cunningham, President and CEO

Announcing the new Model 1140A Thermocouple Simulator-Calibrator

Ectron proudly announces the first product shipments of its Model 1140A, the newest and most advanced Thermocouple Simulator-Calibrator.

Ectron has made over thirty-five years of technology contributions to the Thermocouple Simulator-Calibrator product category, and the Model 1140A becomes its most advanced third-generation product. Used extensively as a calibrator for temperature measuring instrumentation, this unit will enable a new level of performance in this specialty field.

The Model 1140A has the highest accuracy and most economical price of all the models ever released by Ectron. The Model 1140A has 0.06°C accuracy for common thermocouple types including cold-junction compensation. Moreover, the 1140A offers dc accuracy of 0.0025% + 2.0 µV for 6 months, in both source and measure modes with up to 7-digit resolution.

According to Ectron founder and CEO, E. Earl Cunningham, "the 1140A is the finest thermocouple simulator-calibrator in the industry, bar none. The price-performance point of this unit surpasses all others in the marketplace today, including our own previous models. Many customers have asked us for a higher-accuracy simulator and we now have one. It is simply a major advancement in this product category."

New Product Spotlight:
Model 491 Overspeed Monitor

The Model 491 Overspeed Monitor offers protection for mechanical devices that may be damaged by excessive speed. Any device, usually a gas turbine engine, that produces a frequency output can use this instrument for protection by using its relay signals to initiate a shut-down process. High reliability and high accuracy plus millisecond reaction time are key features of this new product from Ectron.

Tech Tips: Did you know...?

Bessel filter – A variety of linear filter with a linear phase response. Bessel filters are often used in instrumentation amplifiers to provide maximally flat response in the passband. Bessel filters are characterized by almost constant group delay across the entire passband, thus preserving the wave shape of filtered signals.

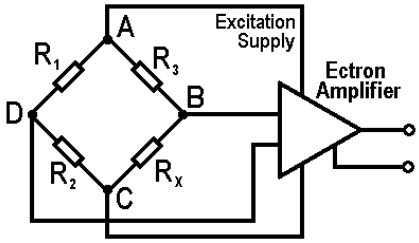
Chopper – A type of circuit used in some Ectron amplifiers. Dc amplifiers that need very high gain are much harder to build with low offset and 1/*f* noise as well as reasonable stability and bandwidth. It's much easier to build an ac amplifier instead. A chopper circuit is used to break up the input signal so that it can be processed as if it were an ac signal, then integrated back to a dc signal at the output. In this way, extremely small dc signals can be amplified with great stability and accuracy. (Used in the Ectron Models 428 and 416. However, when higher bandwidth is required, the best design is a direct-coupled amplifier such as the Model 560H, 563H, 751ELN, 753A, or 778.)

Common-mode rejection (CMR) – A measure of how well a differential amplifier ignores a signal that appears simultaneously and in phase at both input terminals. Also, a measure of the ratio between differential-mode gain and common-mode gain.

Differential amplifier – An amplifier designed to respond to the difference between two voltages and effectively ignore voltages that are alike.

Wheatstone bridge – A type of bridge used to measure an unknown electrical resistance by balancing two legs of a bridge circuit, one leg of which includes the unknown component (the sensing element, typically a strain gage). Of course, the strain gage can be a two-arm or four-arm (full bridge).

In the circuit shown, R_x is the unknown resistance to be measured while R_1, R_2, and R_3 are resistors of known resistance. If the ratio of the two resistances in the known leg (R_2 / R_1) is equal to the ratio of the two in the unknown leg (R_x / R_3), then the voltage between the two midpoints (B and D) will be zero and the amplifier sees zero volts. At high gain a precision amplifier can detect minute variations of resistance.



Wheatstone Bridge Circuit with Ectron Amplifier

At the point of balance, R_1 / R_2 = R_3 / R_x.

Personnel Announcements

Ectron Employment Anniversaries
Alonso Peña – Quality, 23 years
Ruth Garcia – Purchasing, 25 years
Carol Morris Smith – Accounting, 17 years

New Hires
Michael Lascu, Technical Support

Births
Joel Elijah Fontes, 3/3/2008
(Michael's first grandchild)

Sales Representative Awards, Calendar Year 2007

U.S. Rep of the Year
Wallace Technical Sales – Southwest U.S.
Dave Wallace sold $211,500

International Rep of the Year
Enertest – France
Mathieu Ratard sold $93,952

What Happened to Accuracy Specifications?

A few years ago when a test instrument was characterized the specifications were given in precise terms. Although still true for precision calibration equipment especially from the leading companies, many lower quality measuring and calibration equipment have very brief and incomplete specifications. Many customers buy from these brief data sheets.

For instance, gain accuracy was given as the maximum percent deviation from perfect over a period of 90 days or one year with a temperature coefficient to allow calculation of the contribution from gain to the error budget. Similarly, zero drift was stated as the maximum change in zero over time and temperature.

However, today it seems that most manufacturers of test instrumentation use the term "typical" to define the accuracy of their product or overall accuracy is omitted entirely.

Consider for example the current literature describing a particular thermocouple simulator. The data sheet gives accuracy as good as 0.015°C, a claim even better than the Ectron Model 1140A which can reach 0.06°C for some T/C types. Nothing is said about other factors such as conformance to NIST, drift with temperature, or cold-junction compensation (CJC, needed to convert T/C wires to copper). What is most important is the last, CJC. Ectron has devoted lots of engineering and parts cost to the CJC in the Model 1140A. Almost everyone using these instruments uses the CJC in their calibration work.

After buying this simulator it is only after referring to page 80 of the manual that the customer finds out that with CJC the accuracies are reduced by an additional 0.1°C. This means the customer must use an expensive, precision ice-point reference plus calibrated thermocouples to be able to do somewhat better than 0.1°C.

ABOUT ECTRON SPECIFICATIONS

All Ectron specifications are guaranteed as the maximum deviation from ideal unless otherwise specified and most of these specifications are 100% tested. This is in contrast to many manufacturers that state only typical performance and do little testing. Thus, typically Ectron products perform better than what we specify so a user is assured of proper performance despite adverse conditions. Furthermore, the Model 1140A's specifications are stated including the CJC.