

USB Instrumentation Comes of Age

by Richard Hawkins, President, LadyBug Technologies LLC

It's startling to consider that 43 years have passed since Intel co-founder Gordon Moore enunciated what was to become known as "Moore's Law": that henceforth, the number of transistors on a chip would double approximately every two years.

In a testament to Dr. Moore's foresight, engineers today remain preoccupied with processes that can yield better and faster performance, in an ever-smaller package, at a lower price. Nowhere is this more apparent than in the area of test equipment, where a technology shift is under way.

USB: Changing the Face of Test

Today, Universal Serial Bus (USB) test instruments might be seen as a manifestation of Moore's Law: they leverage the best aspects of both test equipment and PCs, respectively, by placing measurement technology in the USB instrument, while reserving the data computing and processing functions for the personal computer.

To illustrate: prior to the advent of USB power meters, engineers would typically employ a standalone power meter and a selection of sensors, depending on the frequency and type of measurement desired. The smallest power meters occupied at least one rack height in a typical system cabinet, with associated costs of between \$3,000 and

\$7,000 for the power meter and an additional \$2,000 to \$3,000 for the power sensors.

And, if the engineer wanted to automate his/her measurements, in addition to the above components the test setup also required a PC or UNIX machine as the system controller.

In contrast, today's USB power meters combine the base unit and the sensor into one compact package that is, by itself, often smaller than older power sensors that attached to standalone power meters. These new units exceed the performance attributes of older "box" meters, require no incremental rack space, and represent a dramatic cost savings. Price tags are typically 50 to 80 percent lower than those of older, standalone products.

Smaller, Faster, Cheaper — and More Sophisticated

Smaller, cheaper measurement packages tell only part of the story, however. The advanced architecture offered by some of today's USB power meters enables a few brands in this space to deliver significantly faster measurement speeds, a greater variety of measurements, and simply more useful data — all in a miniaturized, more rugged package.

For example: LadyBug Technologies markets a line of pocket-sized USB power meter sensors that require no "zeroing" or calibration whatsoever

prior to each use. This "no-zero, no-cal" feature — unique among LadyBug's field of competitors — represents a big improvement in the working life of the test engineer or technician. It means that the time-consuming chores of disconnecting sensors from a DUT and performing zeroing as well as calibration are gone.

Our products can provide not only CW power measurements, but also average pulse power, peak pulse power, duty cycles, peak-to-average power ratio, and sophisticated time-domain analysis. This broad capability range is offered by a unit that fits in the palm of the hand, costs approximately one-third as much as older meter sensor setups, and provides measurements in milliseconds.

With some LadyBug units capable of measurement speeds of 2,000 settled readings per second, these new USB packages hold the promise of measuring options extending well beyond the power category. A host of more sophisticated real-time measurements will inevitably become available: active and passive multiport S-parameter scalar measurements; mixer measurements; gain compression, and so on.

In the traditionally conservative world of test equipment, USB instrumentation represents nothing less than a complete technology shift, with customers being the primary

IN MY OPINION



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beneficiaries. We predict that the popularity and deployment of USB packages will grow exponentially in the next few years, and that they will change the size, look, and feel of test equipment for many years to come. Gordon Moore's 1965 vision of ever-greater capability in smaller packages has broadened to encompass test and measurement, to the great benefit of those who work in this specialized, vital field.

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