

MEASUREMENT TIPS

Volume 3, Number 1

Improve Your Data Logging Productivity Using Advanced Limit Testing



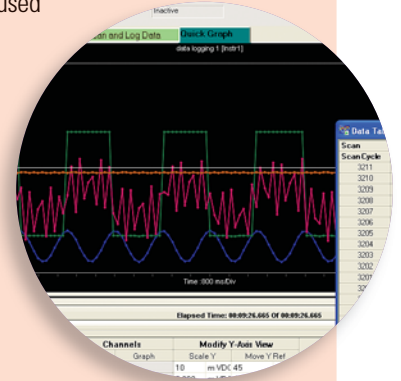
Data logging hardware and software is used to collect and interpret data for design validation in a wide variety of applications. For example, environmental testing is required for many new products. During environmental testing, you subject a product to extreme changes in temperature, pressure and humidity to prove it can safely function in various environments. Automated data logging is ideal for these extensive and often time-consuming tests. You can configure different channels of your data logger to make assorted measurements, such as temperature, voltage, resistance or pressure throughout the duration of the test so the data can be collected and analyzed. Creating a program or using software such as Agilent's BenchLink Data Logger Pro can be helpful in setting up your experiment, and adding limit testing to your experiment can help you quickly determine whether the design has performed as you expected.

ADVANCED LIMIT TESTING

Snapshot: Product Qualification

Understanding how temperature changes can affect the performance of a product is a requirement for most designers. One electronics designer needed to qualify the performance of a vacuum pump by performing tests over a wide range of temperatures. As computer hard drives become larger and more affordable, the designer wanted to capture all the data while the tests were running, then go back and analyze the data to focus on areas of destabilization.

To make the analysis more efficient, the designer used Agilent BenchLink Data Logger Pro and set up floating limits to indicate when the performance of the vacuum pump became unstable, making it easier to zero in on the problem areas. This solution improved the designer's productivity by eliminating programming, setting up and configuring the automated test more quickly, and reducing the analysis time.



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Limit testing using fixed ranges

When your application calls for a fixed limit, introducing limit testing to your data logging program is very straightforward. The measurement is compared to the limit:

- Exceeds high level:
measurement > high level
- Exceeds low level:
measurement < low level
- Out of range:
measurement > high level or
measurement < low level
- Within range:
measurement < high level and
measurement > low level

When you write a data logging program, you can apply these tests to indicate whether the measurements fall within the limits. Agilent's BenchLink Data Logger Pro software will automatically flag readings in red (or another color you choose) to indicate failed limits on the graph or on the limit light panel. When you export the data for analysis, BenchLink Data Logger Pro will also indicate failed limits for easy identification to aid in your investigation.

MEASUREMENT TIP

Looking for successive failures can be helpful in the early stages of testing where noise or spurs falsely indicate intermittent failures. When you are developing a custom program, use variables or loops to look for successive failures. When using Agilent's BenchLink Data Logger Pro, you can set the number of successive failures when you set your limits.

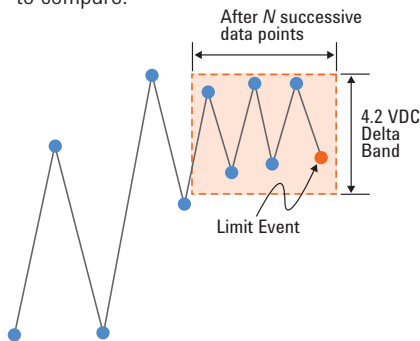
Limit testing using floating ranges

For some applications, it can be difficult to determine the absolute limits.

When you are looking for an oscillator, temperature, or reference to stabilize within a band (or to be alerted when destabilization has occurred), floating limits can be a better fit.

When you write your own program, you can analyze the most recent values and determine if the difference between the minimum and maximum reading fits within a specified range. For example, if you use a Java array to store the last N readings, the function `java.util.Arrays.sort()` will order the array so the minimum and maximum (first and last) values in the array can be compared.

When you use Agilent's BenchLink Data Logger Pro, the channel limit settings allow you to simply select whether you are looking for the readings to stabilize or you want to be warned when the readings destabilize. Then you can set the delta for the band and the number of data points to compare.



Example of using floating limits to find stabilization by looking for six successive readings within the specified delta band.

Summary

Limit testing can help you focus your analysis on problem areas and validate new designs more efficiently. We have reviewed limit testing techniques with fixed and floating ranges, and shown how Agilent's BenchLink Data Logger Pro simplifies this process by providing an easy way to configure and run tests without programming.

See how easy it is to collect and analyze your data with no programming required. View these short videos:

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Learn more about the 34970A data acquisition switch unit (TOP LEFT)

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Learn more about the 34980A multifunction switch measure unit (LOWER RIGHT)

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