

DATA LOGGER VS DAQ

KEY DIFFERENCES BETWEEN DATA LOGGING AND DATA ACQUISITION

What is the difference between a [Data Logger](#) and a [Data Acquisition System \(DAQ\)](#)?

A data logger is a type of data acquisition system, but a data acquisition system is not necessarily a datalogger. There are several key functional differences in how the market understands these two classes of instruments. While the differences between these two types of instruments have been reduced as technology has improved, there remain features that separate them.

SAMPLE RATE OR ANALOG TO DIGITAL CONVERSION RATE

Generally speaking, the instrumentation market understands a data logger to be a relatively slow sample rate device; typically, once per second and slower while a data acquisition system (or DAQ system) has sample rates that reach into the MHz or even GHz range. As the cost of high-speed [A/D's](#) has reduced, this feature has narrowed as more dataloggers with sub-second sampling are reaching the market. You will find DAQ systems with many variations on sample rate and options for simultaneous or synchronized sampling which are not typical for today's dataloggers.



STAND-ALONE OR PC TETHERED

A data logger is expected to be able to operate without a connection to a network or PC for data storage. Large internal memory which allows the datalogger to operate for extended periods of time is a basic trait of a data logger. Most data loggers can log data for months or even years before the internal memory is filled. A data logger will also be able to overwrite the oldest data and continue indefinitely.

A DAQ system, especially if a high-speed system, will require a direct connection to a PC using standard or proprietary communication busses to record at the higher speeds typically present. In most cases, both device types now feature Ethernet or Wi-Fi interfaces in today's products. A datalogger will typically store data in non-volatile flash-based memory. A DAQ system will utilize a connected PC, network storage device or direct hard disk drive.

I/O COUNT

Most DAQ systems will have the ability to record from dozens to hundreds of analog and digital inputs. Large scale DAQ systems are found in laboratories or test cells with rack based I/O which can reach I/O counts upwards of 1,500 channels. A data logger can have a little as one input channel and may reach dozens of inputs. There are dataloggers available which have expansion module options to allow higher channel counts, but battery power considerations typically keep the channel count in the under 100 range.

POWER SOURCE

A data logger, as noted earlier, is designed to operate in stand-alone mode; without connection to a PC or other system. Many data loggers are used in remote [environmental](#) applications where no wall power is available. Thus, they are designed with power saving or sleep modes to minimize power needs when not actively recording.

These designs will almost always include batteries with rechargeable batteries common. Most advanced data loggers will utilize switched excitation for sensors that require excitation to reduce energy consumption and extend the data logging time period. A DAQ system requires direct wall power continuously to operate and maintain the connection to the storage device. In some instances, you will find DAQ systems that can operate off large batteries, but the lack of charging circuitry and the fact that they are not designed with power efficiency in mind usually keeps them in the laboratory or test cell.

CONCLUSION

While there remain many similarities between dataloggers and data acquisition systems, the key operating features presented above are the generally understood differences. These differences usually define the application space where the devices are used. The needs of your application will usually dictate which type of solution is the best fit.

For further information on [data loggers](#) and [data acquisition systems](#), or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Application Specialist at (800) 956-4437 or www.DataLoggerInc.com.

