FROM DATA LOGGERS TO HIGH-MEMORY ADAPTORS

Where Do We See RBR in the Future?

RBR Ltd has seen steady growth during the past eight years, especially in oceanography and environmental monitoring instruments. Each of these products has its own interesting story, but the genesis of the present RBR lies in its development of the first autonomous data-logging product in 1985.

Established in 1976 as a company offering contract R&D, RBR Ltd served government and education institutions for its first twenty years. Along the way it produced many products based upon collaboration with the customer institution. These included a unique bore-hole locator used in mining (the very first contract, and still being made), a plant fluorometer, radiation sensors and specialised measuring instruments for the communications industry.

Data logging

The first data-logging product dates from 1985. This early unit was a single-channel temperature logger with a 12-bit dual slope a/d and 56K of battery-backed up RAM. The concept was slowly extended and developed into a range of loggers that included a CTD with one extra channel, and numerous specialised instruments for dedicated applications. Notable among the latter was an instrument to record the acoustic pitch of a steel strain member embedded in the walls of a mine: the ‘plucking logger’, based on the same principle as the harpsichord. Another was a wonderful conglomerate of conductivity logger and car windscreen-washer pump that triggered the pump every time a sudden change in conductivity was observed. This instrument helped to catch a company that was dumping toxic waste into the Welland Canal in the early hours of the morning.

The hallmark of the data loggers of that period was robustness. There are still many users who are addicted to their yellow-tubed ‘Branckers’; Richard Brancker Research Ltd was the full name of the company at that time. These people express chagrin, if not disbelief, when told that the parts are no longer available to repair their instrument after twenty years of good service. The electronics industry moves very much faster than the users of data-logging equipment, and the marriage of the two disciplines is an interesting lesson in constant updating with a firm eye on not permitting obsolescence to overtake all the instruments in use.

Refocusing

In 1999 Richard Brancker retired and RBR focused its strategy on making world-class data-logging equipment for harsh environments. Calibration to modern standards was considered paramount, and RBR now has facilities for temperature calibration to 0.002°, pressure to 0.015%, and conductivity to 0.003 mS/cm, using the best available equipment and automated methods wherever possible. Calibration of DO, pH, ORP and turbidity is also carried out when required.

The refocusing also saw evolution of instruments, to include first an excellent 24-bit temperature recorder, then to extend this to other single-channel and dual-channel products, all with 24-bit a/d as standard. The power source for all of these instruments was a set of 3V-lithium cells used in cameras to remove the need for special sources for batteries. Memories have continued to fall in cost, with 2MB on introduction, then 4MB and now 8MB as standard for these instruments.

Multi-channel instruments were based on the same technology, but with an internal serial bus and modular construction The basis of the multi-channel instruments was the aim to provide a simple way to assemble a wide range of products using just a few fundamental components. The method employed was to use a set of interface cards tailored to individual measurement sensors. These could be combined in any number of ways; up to 255 channels is theoretically possible, providing great flexibility. The resulting series of instruments, known as the XR data loggers, has been an astonishing success.

The premise has been that customers want to purchase an instrument to do a specific job as well as possible, not a huge multi-channel instrument that does everything not very well, or at a high cost. Recent developments for this series have included cards for a large data memory (up to 2Gbyte is now feasible), a generic serial card that can accommodate almost any serial device or sensor, and a very high-resolution, low-power card to accept data from the resonant quartz gauges. The latter card was a result of longstanding collaboration with geophysicists interested in ocean-bottom pressure measurements over multi-year deployments.

Keeping Ahead

RBR has been able to extend the modular components to other applications. The MS-310 Salinometer is derived from a pair of inductive conductivity cells and is able to equal the performance of any salinometer commercially available. A second reorganisation of the modules permits us to put together a controller for a data buoy in a flexible manner, using the ability to support many channels of data acquisition, large memory and serial interfaces to any instrument. A final illustration of the flexibility of the approach is that the simple inductive conductivity cell may be adapted to a version with no external field. This uses a small extension to the interface for the inductive cell, and a full description may be found elsewhere.

Backwards compatibility in the equipment, or keeping ahead of technology without making instruments obsolete, is a constant challenge. Moving on to massive memory and USB, providing IP connectivity and yet still working within the constraints of RS-232 is one example. We rely on the availability of cheap adapters to transfer from one protocol to another (USB to RS-232; RS-232 to RS-485; RS-232 to IP address etc). Will there always be an adaptor for the scientific community? These are difficult questions to answer; a small company cannot simultaneously develop the plethora of interfaces being used at the moment, let alone keep up with a rapidly changing landscape.

All of these comments have been about the technical challenges for a small company moving into a competitive and demanding market. We have not yet mentioned the financial and administrative tasks that ensure the products we make are carried to market. We have relied upon focused advertising: selected scientific and technical meetings, visits to key customers, and a lot of hard work on the part of a group of international representatives that we consider second to none. RBR Ltd sells effectively in all corners of the world and it is fascinating to see how different technologies and instruments work well in the disparate markets. Keeping up with the ever changing international market is every bit as challenging as keeping ahead of technical developments.

View of the Future

Where do we see RBR in the future? There is no doubt that the demand for high-quality, long-term data will continue, as will the need for remote access to that data. Better integration of data derived from many sensors will be important, and there is always pressure to reduce costs and improve efficiency of manufacturing. A lot has been said about collaboration with research institutes and strategic alliances between companies. RBR has considerable experience in both and has found that there are good benefits, but also drawbacks and loss of flexibility. We are currently considering the possibility of collaboration with the Marine Hydrophysical Institute in Sebastopol, and discussions still continue with Guildline about whether the RBR Salinometer can sensibly be incorporated into its range of products or whether we market it separately. There are no final solutions or easy results to be obtained in such efforts; eventually a company will succeed on the basis of its own technical, production and marketing abilities. It is these areas and the people that make up RBR as it now exists, that are the key to the future.