



How a coffee machine inspired improved railway signalling technology



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The concept of obsolescence is rarely taken as seriously as it should be in the world of electronic design for industry. Perhaps this is the result of the influence of the consumer electronics world where few modern designs need to have life spans of more than a few years.

It is little wonder then that when Bombardier decided that protection from obsolescence, as well as rugged build, functionality and proven design, were key factors in finding a data partner for its new range of track circuit receivers, it chose Datakey products supported by their exclusive UK, Ireland, Germany, Switzerland, Austria & Scandinavian distributor, Nexus (GB) Ltd.

Bombardier Transportation's objective is to assist railway operators in the operation of safe, efficient and cost-effective railway systems that easily cross national boundaries. Since 1915, it has applied its expertise to developing, engineering and installing advanced rail control and signalling systems to achieve exactly that. In such a safety critical industry as rail transportation, the demands that Bombardier places on itself and its suppliers are justifiably high. If anything fails it has to fail in a safe manner and the technology used must be reliable and proven.

At the start of the project, Bombardier attempted to produce a memory device in house – which proved difficult. The company also looked at alternatives, such as USBs and SD cards. However, it decided that the obsolescence factor inherent in these products was too much of a risk.

During this time, one of Bombardier's designers came across a story in the electronics press about Klix coffee machines using a Datakey memory key to create individual accounts for every user, so that they no longer needed to carry cash around in their pockets. As a result, Bombardier contacted Nexus, who quickly understood the requirements and provided the company with a range of options.



It was decided that the key with a locking action would be beneficial. Consequently, Nexus advised Bombardier on an appropriate Datakey development kit and provided the company with a number of samples to aid product development. Nexus also provided expert advice on how to achieve the necessary Electromagnetic compatibility.

The project was focused on the design of new equipment to monitor and manage the location of trains on the track. Put simply, it helps stop two trains trying to drive over the same area of track at the same time.

This is achieved using a transmitter in the track which generates an audio note which alternates between two signals. The receiver at the other end listens for these notes and drives the track circuit relay which in turn tells the signalling system that this particular area of track is clear.

Both the transmitter and receiver use a Datakey serial memory key and matching key receptacle. The rugged memory key holds the all-important frequency information as well as code data.

By using the Datakey rugged memory key in the patented EBI Track 400, every section of rail is made unique so the signal can never be falsely detected by the wrong receiver. This adds an extra level of safety and will also improve passenger convenience as the new device is expected to contribute to a reduction in delays.



“For me, it’s the fact that Datakey products have the same built-to-last philosophy as Bombardier which made them the ideal partner for this project”, said Kevin Stewart

In the UK, Network Rail are the main customer for these products, but they will also find a home in India, Korea, Australia, Spain and Portugal as well as in several other territories. It is predicted that demand will be very high, and if the product does find a home in all of these countries, it will have come a long way from the coffee machine that inspired it.