

# Case study: Science Museum Energy Ring



## Credits

Client: Science Museum, London  
Designer: Casson Mann  
Principal Contractor: Technographic Displays  
Software Design: SODA Creative  
Energy Gallery Principal Sponsor: BP

## The Project

The Energy Ring, commissioned in July 2004, is a dominant feature in the great East Hall of London's Science Museum. The Ring links to a new gallery on the second floor of the Museum, entitled Energy – fuelling the future. This is an interactive gallery where children age 7-14, their teachers and families, can explore how energy powers every aspect of their lives. The gallery is packed with computer-based exhibits and feels like an 'energy playground'. Visitors can play with novel interfaces from spinning drums and touch-screens to dance-floor footpads.

Technographic Displays was first asked to comment on the feasibility of the Ring in January 2004. A project team had already been partially assembled, but no company had been found that could readily construct the ring to the required specification. One of the main requirements was for the complete matrix of white light emitting diodes to be addressed as a bit-mapped display. Moreover, in order to create smooth, fast-moving effects, a frame-rate of 200Hz was desired. Where others had struggled with this concept, Technographic Displays already had a graphics control solution which could be readily adapted to meet the need.

Technographic Displays proceeded to design customised display electronics and to manufacture and assemble the Ring. The control solution was based on the ACTIV-Banner controller, originally developed by Technographic Displays to drive full-colour LED video panels in banner advertising and scoreboard applications. The standard controller takes the form of a PCI card with fibre-optic data outputs, installed in a computer running under the QNX real-time operating system. For the Energy Ring project, the QNX-based software was completely rewritten in order to provide a data-streaming input and ten fibre-optic outputs to drive the Ring electronics. The data-streaming interface gave SODA complete control of the frame-by-frame contents of the Ring. With 38,400 pixels to define 200 times per second, the required data rate was 8 million pixels per second, and this was accomplished over a 100Mbps local area network connection. In fact, tests showed that the system would have been capable of updating the display at 800 frames per second.

The aluminium alloy ring was fabricated in 16 sections. 6mm-thick aluminium alloy sheets were laser-cut and then welded to form the structural housing for the display. The 16 sections were bolted together within the East Hall to form a ring with an outer diameter of 13.7m. The installation work was carried out at night so that the Museum could remain open to visitors, and was completed in good time for the opening of the Energy Gallery on 23<sup>rd</sup> July 2004.

## Facts and Figures

The Energy Ring display contains 32,768 white LEDs in the circular section and a further 5,632 in the tangential linear section stretching towards the Energy Gallery. Data is carried from an ACTIV-Banner controller to the ring along 10 fibre optic cables. The display is bit-mapped, and the whole array of 4,800 x 8 pixels is updated at 200 frames per second. The whole structure weighs approximately 1 tonne, and the ring is suspended by four 8mm-diameter steel cables from the roof of the gallery.