

Case Study

Music and Movement into the Digital Age

To take advantage of potential new markets, Cadac Electronics Ltd, a well established provider of high quality analogue sound systems has developed a technical knowledge base and established a Teaching Company scheme to exploit the advantages of digital technologies.



Cadac Electronics Ltd is a long established company (1968) which designs and manufactures high quality analogue sound mixing consoles. Cadac consoles have an impressive track record when it comes to delivering faultless performances night after night, year after year, for almost every imaginable type of production including those at the world's most prestigious theatres and opera houses.

Cadac solutions are used for major awards ceremonies, international musicals, touring productions and other live events such as broadcast TV. Recent users include the Rolling Stones, Brian Adams, The Verve and 'Luciano Pavarotti and Friends'.

In one respect the company has become a victim of its own success: its high quality designs last for many years with the result that the replacement market in the high quality niche sector is insufficient to sustain company profitability.

The Challenge

To address new market segments and to meet the evolving needs of current markets, Cadac had to satisfy the following challenge:

- A smaller mixer size to maximise audience seating space in small theatres.
- Optimised sound control surfaces.
- Optimised portability.

Moving towards digital (DSP) technology would provide these features in new systems and, in conjunction with modular cost profiling, would meet the needs of both current and new market sectors. Within the industry, however, the conventional wisdom is that digital 'sound paths' are not as good when compared with the best that analogue systems have to offer.

The challenge for Cadac's Managing Director, Clive Green, was to fill the market gap with systems based on DSP technology without compromising sound quality, Senior Design Engineer Philip Jones was tasked with finding the right way to achieve these next generation products.



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Audio mixing desks can be broadly divided into two sections, each with the option of using analogue or digital technology or a mix of the two. These two main sections comprise:

- A control surface which includes knobs, slider controls and switches.
- Sound paths or channels linkage of sources such as microphones to shaping electronics and amplifiers, to speaker systems.

Cadac was already working on digital control surfaces which would help separate small space envelope control desks from the audio system itself. The investigation of the use of digital technology for the sound path was facilitated by the relationship with the University of Hertfordshire's Electronic Design Support Centre.

This investigation required:

- Use of time domain equalisation filtering to achieve audio performance with imperceptibly the same sound quality as analogue systems. (sound purity, stable stereo image etc.)
- The creation of a system of identical and configurable sound boards with multiple channels and the ability to produce multiple sound paths to an arbitrary limit.
- The ability to provide an 'add on system' of additional channels to existing analogue systems where space was a limiting factor.
- The creation of small low-cost, all-digital systems for small theatres and halls.

Solutions for the Next Generation of Performance Mixer

An important issue for Cadac was the establishment of a skilled engineering base in both digital audio software and associated DSP hardware development. As a result of contact networking, Cadac's needs were brought to the attention of the Electronics Support Centre at the University of Hertfordshire, leading to a company visit by Support Centre staff and the DTI Business Advisor.

The company's primary need to establish a technical knowledge base via a new team dedicated to digital audio systems has led to the establishment of a TCS (Teaching Company Scheme). A TCS associate (Iain Quarmby) has already established new digital filter algorithms and selected a DSP hardware family as a basis for the next generation systems for the identified new market sectors.

The hardware family is based on Analogue Devices SHARC DSP processors, results are encouraging and the architecture for multiple, multi-channel sound paths has been established. Full trials of the solution commence in the second quarter of 2002.

Cadac are delighted with the working relationship with the University of Hertfordshire and are gaining benefit from their early initiatives in the digital audio field. Lead academic Phil Shakeshaft acknowledges that the positive nature of the relationship is due in no small part to the DTI Electronics Design (ED) programme which has helped to establish vital linkages between companies and the services they need at the outset of new endeavours.



Further Information on the web:

<http://strc.herts.ac.uk/ttt/ttt.htm>

<http://www.cadac-sound.com/>