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DIGITAL EDITION

National Treasure

40 Years of Tech . . .

National Theatre

plasamedia

classic gear

Strand DDM | by Rob Halliday . . .

Before 1970, memory lighting controls - machines able to instantaneously record then later replay lighting states, like Strand's IDM and Thorn's Q-File - weren't computers as we now think of them. Rather, they were specialist lighting machines created entirely in hardware. To change a single function meant changing the electronics . . .

For their new system, DDM - Digital Dimmer Memory - Strand's Advanced Development Group, led by Alan Payne, took a different approach: software. "An instructional programme fed into the computer instead of rigid circuitry joined together with a soldering iron," as Strand's Fred Bentham wrote in the system's original specification, adding that this flexibility "could lead to anarchy; everyone who believes he has an idea can have it indulged!" That software would run on an existing, industry-standard computer, DEC's PDP11/05.

All this was radically new to Strand, and required new skills. David Baker was brought in from the British Blue Streak missile project as chief engineer, with an outside consultant working with a team led by Strand's Ron Eason.

By mid 1970, this team had created a 16-channel prototype that demonstrated the DDM's principal interface: illuminated rocker keys, each adjusting one channel up or down or, by pushing the centre, showing the channel's level on a meter. These controls, nicknamed 'fried eggs' within Strand presumably for their central amber pilot lamp, had been created by design engineer Morgan McLeod (also responsible for many of Strand's classic designs, including the Patt 23 spotlight), initially for the earlier IDM/R console. For an operator of a memory console, these controls solved the problem of manual faders not matching the output once a cue had been played back while retaining the familiarity of a separate controller for each channel. For the console's designers, they had the advantage of being a digital device.

⬆ Fred Bentham driving the first DDM at the Strand demo theatre in King Street

The prototype then had to be scaled up to a 240-channel version for DDM's first customer, the Royal Shakespeare Company and their Stratford home. This presented new Strand recruits Mike Day (mechanical design), Tony Payne (development) and Dick Gascoigne (software) with quite a challenge, particularly calculating data quickly enough during fades. Their approach was to take the difference between a channel's current and target levels, then add 1/256th of this value on each tick of a pulse generator, the speed of this controlled by the console's time fader which offered a one second to 10 minute range. This meant they were using fast addition instead of slow multiplication; this approach was included in Strand's patent covering DDM.

The final console consisted of the main playback/control panel, the separate wing of channel rockers plus the computer/electronics rack. All of the console's functionality, including novelties such as AutoMod, was accomplished with just 16KB of ferrite core memory for program and data storage, a clock cycle time of just 3ns, and with all of the software developed in DEC assembler using a paper tape system that took 30 minutes to build the software. It was a remarkable achievement.

18 DDM systems were delivered around the world, starting with the RSC's in 1972, with the console proving particularly popular in Germany and Australia. It evolved into DDM/2, trios of buttons replacing the rocker keys and a numeric keypad replacing the numeric columns for memory selection; later, the level wheel from MMS was added. And the name plates of the original Galaxies allegedly carried DDM/3 on the reverse as Strand dithered over the name of their next console . . . ⊗

DDM at Theatrecrafts:
◤ //plasa.me/ddm
"A Revolution in Lighting Control":
◤ //plasa.me/6ela0
DDM Patent:
◤ /plasa.me/biky5

Rob has been working in and writing about lighting for more than 25 years, on shows around the world. He wonders if this makes him a classic... or just old!