SMX A NEW PROTOCOL FOR PROFESSIONAL LIGHTING

A debate is taking place amongst an elite group of research and development specialists, concerning the future of communications standards for professional entertainment lighting equipment.

To many interested lighting enthusiasts, the talk of data transmission speeds, refresh rates and the use of various acronyms, may suggest the issue is merely of academic interest.

But ever since Strand's David Bertenshaw presented his SMX paper, proposing a new digital protocol to the 1989 USITT conference in Calgary, Alberta, the question of communications standards has taken on a new importance. So what is SMX and why do we need it?

SMX stands for Strand MultipleX, a new protocol devised by Strand's British and American R+D experts and published openly as a specification for the entertainment lighting industry to implement. In simple terms, it enables equipment such as dimmers, control desks and automated luminaires from diverse suppliers to communicate or 'talk' to each other. But why a new standard?

INTENSITY

To understand this, consider how lighting control desks enable us to adjust intensity levels at all. At its simplest, an analogue system comprises a manual control desk, wired by signal cable to a dimmer pack, in turn putting out a variable voltage to power luminaires.

Moving a fader on the control desk will create a DC voltage output between 0 and 10 volts to control directly the firing angle of the dimmer's thyristor and the energy to the lamp.

It follows that each output will require its own dedicated wire to the dimmer pack. Fine for the smaller stage and studio situations or for basic manual architectural control, but very clumsy for large numbers of channels. Enter the multiplex solution.

Multiplexing is a technique which allows many electrical signals to be transmitted along a single wire in sequence. Signals representing different dimmer levels can be transmitted one after the other many times a second along the same wire. The potential wiring nightmare is elegantly resolved.

With multiplex control, fader levels are converted into multiplexed signals by sampling each fader such that each sample represents the intensity of the light. These samples of each signal in turn are transmitted along the control wire.

At the dimmer, a demultiplexer decodes the signals and routes the correct control voltage to each dimmer sequentially. The rapid sampling of the dimmer signals ensures that lighting levels keep up with the changes, as they are required; for example, for a fade or when a potentiometer is moved.

Between signals, the demultiplexer holds the levels so there is no flicker. Inevitably, the evolution of multiplexing has resulted in different and generally incompatible standards between manufacturers. Strand has used systems such as D54 and AMX 192 for example.

UNIVERSAL

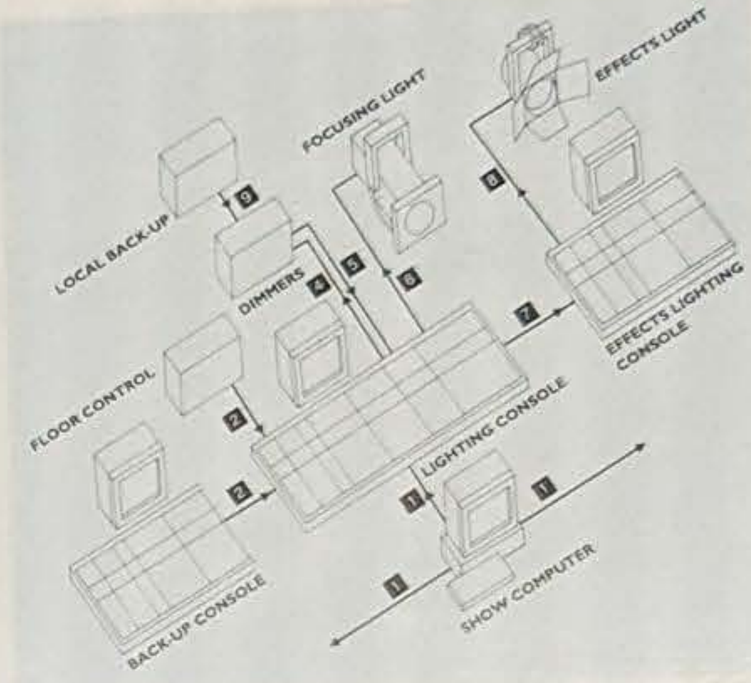
A move to regularise this potentially chaotic situation and provide a universal standard for multiplex communication resulted in the USITT Dimmer Standards Committee publishing DMX 512.

The ready acceptance of DMX 512, particularly in the USA, has demonstrated the benefit of a common standard but its limitations are perhaps inherent in its intention of providing a lowest common denominator solution to digital communications.

Its original purpose, to provide a digital alternative to the analogue multiplex scheme described above has been well met. DMX 512 benefits have been an easier and more stable system to install with greater immunity to noise interference.

However, despite the original designers leaving a 'window' open for expansion, its very focused goal as a console to dimmer link has caused several technical inadequacies, leaving it unable to be developed for the changing needs of the market.

Its degree of precision, error checking capability and security of communication, bandwidth options, bi-directional communication, logical room on the data link and message intelligence are all found lacking for various reasons.



PROGRESS

The need to overcome such shortcomings are found in progress with lighting equipment itself. We are no longer concerned solely with light intensity control — a single parameter. Motion control for equipment such as Strand's award winning PALS System demonstrates the need to control not only intensity, but pan, tilt, focus and colour. And for automation to evolve, control capabilities must inevitably extend to more functions.

Strand engineers have already publicly demonstrated the technical feasibility of bi-directional communication for PALS using the new SMX protocol. Increasingly the need to communicate back to the operator will be demanded in order to liberate the full performance of new equipment such as Strand's EC90 digital dimmers (see *Lights!* volume 1 issue 2).

In short, there is a need to communicate considerably more data; both commands to the lighting equipment and status and confirmation reports back. Such communication requires rigorous standardisation in the protocols to carry the data, separated from extensible protocols which allow current and future data needs to be addressed.

A standard which can handle this now and still be expanded for data requirements as yet unforeseen is the reason for SMX. As the debate continues to Britain's PLASA conference, the universal adoption of SMX represents an opportunity to bring order to the future development of the entertainment lighting industry.