



The Use of Networking in Theatrical Lighting Applications

Background

With productions and events becoming increasingly more complex, demands and expectations of systems controlling the lighting have grown accordingly.

Moving lights are a recent development. Initially designed for use within the music sector of the Performing Arts industry, these have begun to find new uses. As costs and availability has changed, the use of moving lights within the theatre sector has grown.

Despite the expansion into new markets, control systems for these lights have largely remained oriented to the immediacy of the Music industry. The requirements in this sector being somewhat different to the repeatability and accuracy demanded by the Theatrical and Television Market.

In the past few years, control desks from the theatrical side of the industry have started to encompass these moving lights, giving the fine control and accuracy demanded. Even with this, the time demands of controlling moving lights compared with that of the generic fixed lighting has resulted in two consoles and two operators often being required during the preparation stages. Reducing this to a single operator and console for the run often being considered as a desirable advantage.

Other Developments

Within the commercial world, there have been significant developments in the use of computers, with price, performance and reliability having reached phenomenal levels.

These computers have revolutionised that ways in which individuals work within an organisation. Networked computers allowing groups of individuals to share resources and data simply, quickly and in a very efficient manner.

The Benefits

One of the key benefits from embracing this technology, are those seen every day, in a busy office environment. Shared resources. Combining the appropriate elements efficiently is the key. In the same way that many people may work on a presentation document, producing graphics, copy or data to be combined into a single document, the lighting of a performance has similar requirements.

In the office environment, e-mail or even local area networks may be used to transfer data to a single user who effectively combines all the parts. In the production environment the same is also now true, with data for the lighting of the production being seamless combined, allowing the show to be run simply and efficiently by just one operator.

Logistics of the show elements are not the only areas simplified. Once the components of the show are defined, there is a need to provide them with data needed during the show. Often this requires multiple cable types for the required data signals, being run to the various locations.

Using computer techniques, this data can be sent over an Ethernet network. Local decoders being used to interpret and instruct as appropriate. This reduces the cable cost dramatically, by ensuring that the data can be carried across the same low cost cable regardless of the function required. Further advantages then appear, with the ability to extract data; not originally required, at a later point in time.

All these aspects result in significant cost savings, either in terms of initial installation or in terms of resources required for the production run.



ShowNet - Networking the Strand Way

Keeping abreast with technology must always be an important goal for the modern day technician. The latest development within the lighting industry, is the employment of standard modern day, computer networks. This technology allows the distribution of professional lighting information in a highly structured and powerful medium.

ShowNet is the most comprehensive implementation of the Ethernet within the production lighting control community, enabling a wide range of control tasks over a single simple cable structure.

500i series consoles with Networker working with ShowNet 100 series nodes, provide limitless control options. This system supports tracking backup PCs and consoles, remote peripherals, multiple simultaneous users and configurable DMX input and output ports, all at an Ethernet point.

Dimmer Communications

At the simple level these tasks could be considered as communications with dimmer racks, sending control levels to a myriad of places at once, allowing significantly more data than that of DMX512. ShowNet has a capacity for up to 18,432 dimmer control circuits, the equivalent of 36 different DMX cables down the same piece of cable.

Once on the network, these different levels can be combined at a Network Node on one of three methods. Dedicated circuit, priority circuits and HTP circuits, allowing dimmers and other standard DMX devices to be controlled from a variety of locations. Using of these combination facilities removes the need for, often expensive, DMX splitters and Merge boxes.

Using the ShowNet configuration software, it is possible to remotely configure Network nodes to receive DMX from other sources, allowing it to be transported to a different part of the performance space using the ShowNet infrastructure.

Communication with dimmers to determine level is not the only use for ShowNet. Status reporting using the EC90sv and CD80 dimmer range is also possible using the same network. Using this mechanism, a single cable carries all the information needed for the highest specification dimmer installation.

Remote Information

Dimmer communications are only one level of the many control possibilities.

Communications are often needed between the control room and a production desk facility. Here facilities, such as being able to view the monitors of the control system are often required.

Again ShowNet enables video signals from the main control system to be sent to a Network Node, allowing it to be displayed locally. This feature does not stop at the production desk, as it is often useful to have this information at a number of other locations, including dimmer rooms and other technical areas.

With ShowNet, it is just a simple connection and the information is immediately available anywhere that there is a ShowNet connection.

Remote Users

In larger control systems, it is desirable to have multiple control surfaces working together on the production. With ShowNet, up to five consoles can be connected together to form a complete, multi-user system. Facilities such as channel partitioning allow specific consoles to have unique dedicated control over certain aspects of the lighting, such as moving lights.



Show File and System Management

Adding a file server for long term library storage and management is also possible. Using a Windows NT or '95 PC to act as a remote storage location for show files and other useful console information. From such a file server, it is even possible to copy files and other information between devices on the network, using an input/output File Transfer Protocol program (IOFTP). Linking the same file server to a wider building network allows off-line editing, in the comfort of the production office. The show file can then be placed on the Server ready to be loaded into the console for use when required.

The file server even makes it possible to upgrade software on all of the devices on the network from a central location, very quickly and easily.

User Logins and passwords allow a system to be tailored exactly to the needs of the installation. It also allows management control of what facilities are available to whom.

Security

Knowledge that the Show can go on is a comforting factor. ShowNet provides a fully automated Tracking Backup system, which can seamlessly take control in the even of a system failure. Nodes generating data for dimmers and moving lights switching between the active and reserve system, without the need for user intervention.

Ancillary Devices

It is not only the main devices of a system that connect together over ShowNet. Network nodes such as the SN100 and SN102 allow a number of different signals to be communicated from a remote location to the main system across the network.

The SN100 and SN102 have a variety of connection ports. These allow for connection of a wide range of devices, such as computer peripherals. These include two RS232 ports that allow various serial communications, such as Riggers Remote controls or Macro Tablets to be connected. It is even possible to send "Remote Go" commands to other control equipment using one of these ports.

Full system integration also often means the need to interface Analogue 0 - +10v signals as inputs into the console, either for remote triggering of macros, or even remote control of faders. Again in conjunction with the SN102 or SN100 and the ShowNet, these signals can be sent over the same cable system.

Remote printers, connected to the network via nodes allow a single printer to be used for a variety of tasks, without the need to exclusively dedicate it to the lighting control system.

MIDI information can even be connected into the system using network nodes.

Some typical uses and applications

- Resource Sharing (e.g. Remote Handheld Controls, printers etc)
- Dimmer Data Distribution
- Console Video Distribution
- Channel Partitioning
- Tracking Backup Solutions
- Remote Inputs and triggering
- Common Interface points for standard equipment
- File transfer and editing



As a scaleable system these features and facilities expand with the systems, providing the most flexible and comprehensive control system well into the future.

Summary

In summary, ShowNet provides a complete, comprehensive, communications system for lighting control systems. It gives complete integration of a host of equipment, ranging from the control surface, to simple peripherals such as printers and handheld remotes.

Larger systems can include a variety of control surfaces and backup systems, complimented by ShowNet network nodes.

As a cabling system, it is simple and can be expanded to add extra facilities just by connecting additional nodes to the existing cables.

All these aspects result in significant cost savings, either in terms of initial installation or in terms of resources required for the production run.