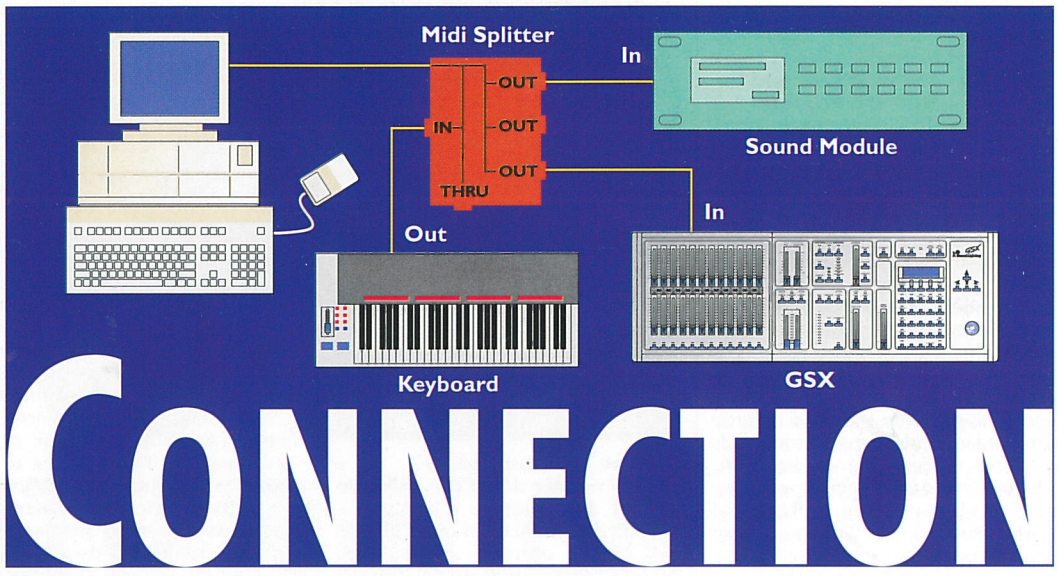
THE MIDI CONNECTION



MIDI - an acronym for Musical Instrument Digital Interface - has been not so much a 'thing' more a way of life for musicians since about 1984. It is a communications protocol (a code by which equipment can transmit and receive messages) which enables electronic instruments to be connected together and controlled from either a central timing computer, or linked directly to each other.

The protocol describes specific messages that are transmitted to say a particular musical note has been hit, or released, or to say that a switch or keyboard control has been altered. If several instruments are linked together (synthesiser, electric piano, drum machine etc), the protocol enables these messages to be addressed to each instrument individually so that a 'master' instrument can control the others directly.

Thus it is possible for a single musician to 'play' many keyboards, each with a different voice and tone, by playing one keyboard only and using the MIDI linking system to play the other instruments at the same time. If a computer is part of the system all the key depressions and volume changes can be recorded as a sequence of instructions while the music is played, and the MIDI system expands to the point where the computer (or, sequencer as it is known) can reproduce the effect with typically computerised precision. This is not intended to replace the human element of live music, but simply to augment the sound as played live by the musicians.

But what has this to do with lighting? The data transmitted back and forth along the MIDI link is related to the information needed by a lighting control to function. Keyboard notes are analogous to faders; voice switches are similar to push buttons; instrument addresses can be thought of as control desks. In other words, it looks like a compatible system. But that is not quite the case.

Although the MIDI protocol defines each musical note as a code (middle C is 3C in HEX for example), and although an International MIDI Association (IMA) and MIDI Manufacturers' Association (MMA) exist, regrettably there is no communality in MIDI lighting codes from different control desks. Strand, as a member of MMA, is involved in discussions to create a standard for defining control functions, but for now, each manufacturer makes its own decisions of which code means what.

So we have a system which enables the MIDI link to do just about everything except talk between MIDI-equipped lighting desks of different manufacturers. This is but a small limitation in comparison with the power of MIDI for lighting. Systems have been developed which use the output of a sequencer to control dimmers directly. This has many uses in the special effects market, but the limitation of 128 dimmed levels (MIDI has an 8-bit protocol, 7 bits of which are available as 'levels', whereas Strand's consoles calculate to 32 bits, rationalised to 8 bits or 256 levels), and the relative complexity of programming the sequencer will limit the effectiveness of this system. The use of MIDI in lighting control has grown into remote fade execution, the synchronised control of bump buttons, control of special effects and automated, repetitive audio-visual controls.

All of Strand's recent control consoles are equipped with MIDI capability. Starting with the MX , the basic manual/memory console range for 12 to 48 channels, the 125 channel GSX, LBX right through to the new Strand 430, 530 and Strand 550 high capability, mid range memory consoles.

Desks with so many capabilities as the Strand range become really interesting both back stage, and ON-stage when a MIDI capability is added to the equation.

MIDI is a means to an end rather than an end in itself, and this is one of the reasons why some users find it difficult to understand. So let's take a look at the main functions of MIDI with lighting consoles today.

LIVE CONTROL

Each control fader, switch, push button on a lighting console can have a MIDI code. So if another MIDI compatible product is sending the correct codes out through the MIDI link, and the console is set to MIDI IN mode, it will receive the instructions in real time, and act accordingly. For example, a MIDI sequencer computer could be controlling a series of music sequencers, and simultaneously instruct the lighting console to flash some of the submasters at a point in the music sequence.

RECORDED LIGHTING CHANGES

If the process of controlling a lighting console from a sequencer is reversed, and the console transmits MIDI data to the computer, it is possible for the sequencer to record each fader movement, and button press, as a parallel track to the music or sound effect. In rehearsal, the sound effect is run, and the board operator runs through a series of cues in 'real time'. The MIDI settings are then changed in performance, and the sequencer outputs MIDI, the console inputs the signal and reproduces the exact board operation, synchronised to the rehearsed effect.

SYSTEM EXPANSION

A lighting system can also use MIDI as a stand-alone communication system. In its simplest form, MIDI is used to expand a lighting system if there are insufficient channels on a single console. For example, take the case of an MX 48 which is the largest capacity console in the range. To gain an extra 12 channels and dimmers, for example, would usually involve changing the desk to a GSX with the nearest level of software, which is 75 channels. But by connecting an MX 12 to the MX 48 through the MIDI link, the second desk becomes a 'slave' of the first, and the master controls of the MX 48 can control both desks at the same time.

BACKUP

One of the greatest hidden benefits of MIDI in a lighting system is the ability for two consoles to be linked together for the second one to track every action of the first. As the master desk is used, each and every action is transmitted through MIDI to the slave desk which meticulously copies the master. Thus at any time the slave desk has the same memories recorded, the same patching, and is in the same state as the master desk. If anything happens to cause the master desk to fail, the backup is ready to take over simply by swapping the dimmer cables over.

SYSTEM INTEGRATION

With the current expansion in the use of DMX to control colour, movement and sophisticated scanner units, the use of multiple desks is becoming more common for the larger shows. Time is critical, and it is often faster to have a group of operators, each responsible for a section of the lighting control, during the plotting sessions. It is the plotting that requires the large number of operators, because the performance is usually reduced to repeated, and accurately timed, button presses. To simplify the performance, a modification of the MIDI sequencer idea is used to synchronise all of the lighting and stage systems. These 'Show Control' computers use MIDI amongst other protocols to orchestrate performance, which in many cases has to be timed to a fraction of a second. Recent advances have led to the definition of MIDI Show Control (MSC) a new protocol which transmits complete instructions to lighting consoles, rather than a string of individual actions. For example, to fade in cue 23.5 with MIDI, the instruction would look like this in text form: "Press CUE, press 23.5, press TRANSFER to playback, press GO", whereas in MSC terms it is simply "GO CUE 23.5".

MSC is now fully integrated into the GSX, LBX and Strand 430, 530 and 550 consoles. But the best way to learn more about the capabilities of MIDI and MSC is simply to experiment!