LIGHTING MENU

The Synthesis Lighting entry/editing/processing system is designed to allow easy access to analog control channels used for lighting cues, using keyboard or fader input for **PERCENTAGES** for precise scene settings, at **TIMES** that will sync to the show SMPTE time code. Most entry fields are free-form, and context sensitive options or prompts are displayed on the screen for the entry mode or menu that is currently active.

An important concept in the Synthesis lighting subsystem is that only **changes** to the **current** light levels are entered or stored. The direction (up or down) and actual step changes are computed automatically based on the existing levels, so that once a final look and time are entered, the **changes** will occur to specified channels, no matter where the levels **were** at the time of the cue's execution. Also unique is the concept that an unlimited number of lighting cues may be executing concurrently and independently. A cue is initiated by an EVENT *time* or external event *trigger*, and continues running until its completion or another cue alters all or some of the target levels or rates for specific channels. Lighting cues may be performed concurrently with up to 32 animation (real-time) programs, and with time based or externally triggered "events". Lighting may **also** be programmed in real time using a programming console.

Those familiar with traditional lighting consoles may at first find the operation quite different than their used to, however the results that can be achieved are essentially the same if not far more powerful and faster in the context of total ride/show control combined with all other elements. By eliminated the need for one (or more!) lighting boards, the show quality, reliability and cost savings in many cases make this system a better alternative for specific installations.

The lighting control system is an option that must be configured into the hardware and software of Synthesis. To enter the lighting subsystem, select "L" (L.ighting) from the MAIN menu.

LEVELS

The normal digital and analog display windows will be replaced by a specially formatted lighting display, which shows all channels as percentages rather than binary values. For both display and entry, some special level designations exist:

--	Full off, or 0.0% level
hl	half (50%) level
fl	full level (99.4%, or almost!)
FL	Full Level (100%) (Use the <shift> key when entering)

Levels may be entered directly as a number from the keyboard, or ramped using the up and down arrow keys while in a level entry field. If a programming console is connected, levels may also be set using the linear faders on the console (S.et Levels).

- Starting with release 90.1, there are five "hot keys" to quickly set levels:

  F1="--"(off) F2= 25% F3=50% F4=75% F5=FL (full level) Thanks, ML!

Note: Due to the fact that the values are always stored and processed as full 8 bit numbers internally (giving a precision of 256 actual steps), the percentage display may appear to change erratically during a fade or to "skip" when the arrow keys are used. This happens because there may be several internal steps before the crossover to the next whole integer percent display occurs.

TIME

Although only one absolute start time may be entered into the lighting cue, any cue can be called for as many times as needed from the EVENT file, linked from another lighting cue, from special events (such as *RESET*, *START*, or *ABORT* show), or from external triggers armed in the Events system. The show time is entered (and resolves) to the minutes, seconds, and frames of the incoming SMPTE time code. The format is fairly free-form; only one digit is required to fill each part of the time, and any separator may be used. Thus entering:

```
1 0 2
01:00:02
01,0,2
```

are all equivalent. In many cases, no absolute show time will be entered, as the cue may be initiated from an external event trigger or from an animation cue subroutine.

CHANNEL/GROUPS

Lighting circuits are referenced by a relative analog channel number (currently 1 through 208), and may be entered into a cue in three forms:

1,2,3,4,66	As individual channel numbers, separated by commas.
1-44	As a range, meaning all channels 1 through 44.
A ... P	As a group letter, the group being channels or ranges.

A typical channel/group line of a cue may contain any or all of the above:

1-12,14,C	References channels 1 through 12 **plus** channel 14 **and** all channels defined in group 'C'.

Up to eight such **lines**, each with an independent target level, can be defined in a single cue (remember, multiple cues can occur at the same time), and up to twelve channels or group names may be entered on a single line.

While the cue is being entered or edited (channels and levels assigned), the initial level given to a line also becomes a **ratio**, so that the entire scene level can be raised or lowered, while maintaining the same relative balance. Relative or master levels may also be set by using a programming console equipped with eight individual faders, as well as one (or more) master faders. Each line (channel list) is automatically assigned to sequential faders and a corresponding level on the programmer console.

Note: Many analog channels in the system may used for audio level control, animation, and other effects that do not relate to lighting cues. Although they can be addressed through lighting cues, please exercise care not to include channels that are not in use for lighting in any cue!

- With release 7.04, the lighting channel numbers may be offset within the physical analog function map, so that physical I/O numbers 0-127 may still be used for animation and other control, in addition to up to 256 lighting channels. The PATCH BAY may be used to cross-assign or move animation (real-time) channels into the lighting channels, and vice-versa.

- In release 9.10, the total number of analogs was increased to 512. Thus, the offset may not be required, as all analogs CAN be reached directly from lighting. BE CAREFUL NOT TO TOUCH ANALOGS THAT ARE NOT CONNECTED TO DIMMERS, as you may be hitting animation, effects, or audio levels!

SCREEN DISPLAY

The left window normally shows the current channels, groups, and levels that are indicated to change when the displayed cue is entered or performed.

BEFORE	Indicates that the stage is set prior to the cue's execution
DURING	A cue is in process, and the stage is being updated
AFTER	Indicates that the stage reflects the levels after the current cue has finished.

The right window displays up to 200 channels of the current stage levels as percentages. Again note that channels within the system may also be used for audio, animation, and other effects, and should not necessarily be set by the lighting system.

- To scroll up or down the 512 possible channels, use CTRL-PGUP and CTRL-PGDN. To return the display starting at the first channel, press CTRL-HOME.

CUE NAMES

Associated with each light cue is an eight character free-form name, which may be letters, numbers, or both, useful for referencing cues to a script; a cue start time, which automatically establishes the sequence and first use of the cue within the show; and a rate, expressed as 0 (take) to 127 seconds, in .5 second increments.

CUE STORAGE

Internally, lighting cues are stored in sequential "records", numbered from 0-199. The first record (0) is reserved primarily for an initial setup (on: RESET event or as a preset after the end of the previous show) and for testing, and should not be used in the normal sequence. For clarity and ease of use, new cues may be INS.erted (actually bumping up all higher cues), DEL.eted, C.opied from other cues, or M.erged with another file from disk. As the cue N.ame is arbitrary, this permits a more logical flow (with the script), without worrying about "links" or sub-cues that can cause the cues to get out of sequence, while still retaining the original cue reference.

Caution: As the INS.ert function physically moves all higher numbered cues up by one, cue 199 falls off the end and is lost!

The contents of all cues and group assignments in memory may be S.aved, L.oaded, or M.erged from the disk using named files, and any number of files can be stored up to the capacity of the disk.

- Note: The lighting system will often ask if it should "save changes" to a cue. This implies that the channels or levels of a cue have been altered and it needs to know if this was a temporary or permanent change. Type "y" or <enter> to save changes, "n" or <escape> to abandon the changes. In any case, the cues are only in RAM memory until saved to a disk file. Back-up Often!

MOVEMENT

To move from cue to cue, use the PgDn key (*#3 on the numeric keypad*) for the next sequential cue, or PgUp (*#9 on the numeric pad*) for the last (previous) cue. If any changes have made to the current cue, you will first be asked if you want to save them. By responding with "Y" or the <enter> key, the changes (to the channels, levels, rate, name, or time) will replace the previously stored cue in memory. If you press any other key, all changes to the current cue will be aborted, and will revert to its previous entries. (The same thing happens if you select any other menu or option which would otherwise cause the changes to the cue to be lost.)

By pressing the "home" key, any cue number (00-199) may be entered, and that cue will be immediately displayed.

Selecting "F.ind" will allow all or part of a cue name to be found by matching characters in the name field. A "*" may be used as a wild-card for partial lookups.

PRINTING CUES

Another feature is the ability to print the contents of a single cue, all cues, or the group assignments. A printer is connected to either the COM2: serial port, or the parallel port.

The contents of the channel assignments, target levels, name, rate, time, and a dump of the stage level display will be printed. Note that since the listing shows the levels after a cue has completed, levels from previous cues will appear as they will be at the conclusion of their execution, and not as they may actually be at that point (during a transition) in time. Only by watching the status while running with time code can all of the dynamics be observed. (This is a result of the complexity in which cues may be overlapped, piled on, linked, or altered mid-way while running.)

INTERFACE

The **SYNTHESIS** Show Control System may be interfaced to lighting dimmers several different ways. Traditionally, we have used 0-10 analog signals per dimmer, normally requiring a large number of analog output channels and the associated wiring. As of release 89.04, we are able to "talk" directly to dimmers that follow the industry-standard, USITT DMX-512 protocol.

This is accomplished with a TC-560 Transmitter Interface, which requires one full-length, 16 bit PC/AT compatible card slot in the host PC. As it was not practical to use an A5 Cannon connector on the interface adapter, the DMX signal is available from the upper DB-9F connector on the TC-560.

NON-DIMS

Non-dim circuits may be connected in two ways. If enough spare analog channels exist, they may be used to control a non-dim circuit. Most dimming systems follow a convention of <50% being off and =>50% being on. During programming, we recommend that a level of 99 or FL (full level) should be used for "on", and -- or 00 for off.

Using the DMX-512 protocol, many systems allow a dimmer channel to be interpreted as a non-dim. Refer to the dimmer manufacturers' specifications for configuration and levels required for non-dim operation.

Non-dim circuits may also be wired to digital control channels and must be programmed as real-time animation cues (with the programmer console), or as time or trigger based Events.

FOCUS REMOTE

When operating with the TC-560 Transmitter Interface, it is possible to connect a 'dumb' serial terminal or emulator directly to the interface card to allow direct access to any or all of the dimmer channels for testing and focusing of the lighting circuits and instruments. Please refer to the reference section for information on the TechTerm terminal. It is NOT necessary for the host computer to be running the Synthesis program in order to use this focus-remote capability. Refer to the TC-560 documentation for further information regarding the focus remote system.

SYNTHESIS LIGHTING SYSTEM COMMAND SUMMARY

The following commands and what they should do are summarized below. Some examples are included; however, the best way to learn the system is to get "hands on" experience and work with the various functions.

MAIN LIGHTING MENU OPTIONS

E.dit Places the cursor in the light cue group/channel assignment window, ready to edit the first line of the channel list. Use the UP or DOWN arrow keys to move to the line you wish to edit, or press <return> to advance to the next field. The FORWARD arrow key may be used to copy over existing characters (up to the point you wish to change), then enter or delete channels, ranges, or groups as required. The BACK arrow or BACKSPACE key will move the cursor back without erasing entries, although be sure you are at the end of the line you want to save before pressing the <enter> key. All characters to the right of the cursor are cleared (unless you were at the beginning of the line). The TAB key may be used to copy the remainder of the channel/group line intact, and advance to the level field.

The cursor then moves to the level/ratio field. Either enter a new level (two digits) and press <return>, or just press <return> to leave the current level unchanged. If a new level is entered, the editor will stay at the current level field, so that new levels may be entered, either as numeric digits, or using the cursor keys as described below.

You may also change the level/ratio of channels on the current line using the Up Arrow [8] key to increase, or the Down Arrow [2] key to decrease the current level. Holding the key down will cause an auto-repeat of the function and both the display and actual levels will respond to the current setting.

The HOME key will take you back to the channel/group list for the current line, so that the list may be edited.

The ESC.ape key will exit the editor (back to the menu) if used at the beginning of any field; otherwise it can be used to cancel any changes made and restore the cursor to the start of the field.

If any changes to the current cue were made (channels, groups, or levels), the question "SAVE CHANGES TO THIS CUE?" will be asked prior to performing any operation that would lose the changes made to the cue. Respond with "y" or just <enter> to ACCEPT the changes; or press "n" or escape to ABANDON the changes (lost forever in the bit bucket!)

F.ind Moves the cursor to the CUE NAME field, allowing entry of the cue to find. The name must be entered in exactly the same format as the target cue, otherwise a CUE NOT FOUND message will appear. If a cue matching the entry is found, the screen will display the contents of the cue. Use U.pdate to bring all lighting channels up to date, and E.dit or P.erform the cue as desired. Wildcards may also be used to find a cue. Use "?" to match any single character, and "*" to match the remainder of characters in the name.

N.ame Allows entry of an eight character, free-form cue name. The cursor will move to the first position in the name field. Type in a (new) cue name, and press the <return> key. This name is used only for script reference and identification, and the F.ind option. All other internal references are made to the relative cue record number, which constantly changes as cues are INS.erted or DEL.eted.

PgUp Steps back to the previous cue.

PgDn Advances forward to the next cue.

In either case, a roll-over will occur from the highest to lowest cue number.

CTRL-PgUp Advances the stage display to the next page.

CTRL-PgDn Decrements the stage display to the previous page.

O.ther Selects a submenu of more fun things you can do with Mr. Computer. Less frequently used functions are provided here. To return to the main lighting options menu, use M.ain menu option, or press ESC.ape.

B.lind Same as using O.perator B.lind from the Main menu.

G.roup Opens a window into a named list of channels and channel ranges, which may then be referenced as a whole (group) by a single letter. Use the UP and DOWN arrow keys to move to the line of the group you wish to enter or edit, and enter (or -> copy) the channels to be included in the group reference. Currently, groups range from "A" to "P", a total of 16. Once entered, the group list must remain assigned for any cues that still reference it. In this way, global group reassignments may be made only once to reflect all cues that use an assigned group.

L.oad Used to LOAD a new set of lighting cues from disk. The entire contents of memory will be overwritten, so an "Are You Sure?" prompt is given prior to requesting the name of the file to load. Upon starting the Synthesis Show Control system, a default file of LIGHT.LGT is loaded into memory unless otherwise specified. The associated group assignments are loaded automatically with lighting cues, and will replace any previous assignments.

O.ther Returns you to the main Lighting menu.

C.opy Permits replicating another cue (channels, groups, and levels) into the current cue. This is normally used after an INS.ert, but may be used anywhere. To avoid ambiguity caused by duplicate or unnamed cues, you are prompted for the absolute cue number to copy from. Enter the physical cue number (0-199), or ESC.ape to abort the copy function. After the clone of the cue has been made, the cursor will move to the "Cue Name:" field, ready for you to specify a name for the new cue, followed by the time (if known) and rate.

P.rint Activates a submenu of print options, allowing hard copy output of groups, cues, and the current levels of all analog output channels. The levels printed reflect the status after each cue has finished executing, and do not necessarily reflect the instantaneous level of channels fading during an overlapped cue sequence.

The printer is connected to the serial or parallel port of the computer. To change the port, use the S.etup window under O.perator D.iagnostics.

Note: The default printer is now stored in the DEFAULT.DFL file, and is the PARALLEL printer port as supplied.

S.ave Saves all lighting cues and group assignments to disk from RAM (random access memory). A window will open prompting for the name of the file to save the cues to; either enter <return> to accept the default name or key in a new name and press <return>. The filename follows DOS conventions of up to eight letters, a "." and a 3 letter extension. We recommend using the extension .LGT, or something that will indicate the type of data the file contains.

BE SURE THAT A NON WRITE-PROTECTED, FORMATTED DISK is in the specified disk drive, and that there is adequate space to save the entire file. Otherwise, an error

message will appear -the file will not be saved, and most likely the old file (if named the same) may be corrupted. For safety, keep blank, formatted disks handy, as it is currently not possible to format disks within the Synthesis system!

If you receive an error message followed by "Abort, Ignore, or Retry", place a formatted disk in the drive and press "R". Pressing Abort will drop you back to MS-DOS and ALL WORK (animation, lighting, and events editing) will be LOST, and the system MUST BE REBOOTED to restart the system.

ESC.ape Return to previous menu.

E.vents Opens the Event editor.

p.atch Same as doing A.ssign P.atch from the main menu.

I.nhibit Temporarily inhibits **execution of lighting cues** linked to the events file during normal show playback or editing. This is a toggle, and a flashing red 'LB' (light cues blind) will appear on the top status line when in effect. Lighting cues may still be executed manually, and all analog outputs remain active in this mode. Output channels may be blinded from reaching the stage globally using O.perator B.lind, or individual channels under O.perator C.hannel blind.

U.pt from Update from allows you to set a base cue for quick and update operations.

[1]-[8] (from the top row of numeric keys) Allows direct access to the specific line of the current cue, and enters E.dit mode.

[Home] Allows you to move to a specific cue (by cue number).

CTRL-Home Sets the stage display to start at channel 1.

G.imme Forces an immediate update of all lighting channels affected by this cue to their target value.

P.form Simulates a real time performance of the final look of this cue, using the specified rate. Only the channels (groups) entered in the current cue are affected, even if other cues are scheduled for the same time.

R.ate Permits changing or entering the duration of all fades within this cue. (Remember, multiple cues may start at the same time, and each can have a unique rate!) Enter a number between 0 [take] and 127.5 seconds, in .5 second intervals. The Up and Down arrow keys may be used to change the rate.

- Beginning with release 9.10, the rate is split into two fields, the UP rate and DOWN rate. The down rate will default to the same time as the up rate first entered, but may be changed if desired. The system will assign the correct rate based on whether the new target level is greater (up) or less (down) than the current level.

INSert Creates space for a new cue by moving all higher numbered cues up by one. The cue names remain unaffected, only the relative position within the cue file is changed.

DELete Asks "Are you Sure?", and upon an affirmative ('y') response, wipes out the current cue and moves all higher cues down.

C.hnFnd Channel Find allows you to search for a specific channel in all cues.

Q.uick Similar to U.pdate, but all target levels are updated immediately as if the rates were all "0.0". Note that as with U.pdate, the levels displayed reflect a sequential scan of the cues starting at cue 000, and is valid ONLY if the cues are entered in chronological order (within a specific show).

U.pdte Scans the cue file sequentially starting at cue 0, up to just before the current cue, so that all lighting will be set as it would be if the cues were executed in sequence. All target levels will be reached based on the most recent level and rate encountered.

T.ime Specifies the show code time that this cue shall execute. Time is entered in the form of MM:SS.FF, where minutes and seconds are From 00 to 59, and frames from 00 to 14 (23 or 29). Internally, a link to the cue is made in the events file, which is automatically updated and sorted when you ESC.ape the lighting subsystem. Although cues may execute in any order (based on the times entered), I strongly urge the programmer to enter cues in chronological order within a given scene (using insert and copy as necessary) so that sequential and/or concurrent cues may be easily observed during entry and editing.

As in E.vents, it is possible to use +/- (frame count) in the TIME field to slide a cue a few frames ahead or back. If a "?" is entered in the time field, a link will be made into the events system, but with the time undefined. If the "mark" key is pressed while running the show with time code, the time will be filled in automatically in the events editor, but NOT UPDATED IN THE LIGHTING CUE.

Multiple lighting cues may be set to mark in real time, and will do so in ascending cue order.

S.et Lvls Allows the relative levels of a lighting cue to be set using the linear slide pots on the programmer console. Each pot represents the corresponding line of the current cue, while the master fader controls the relative level of the entire scene. Once the levels are set (press ESC.ape), new ratios are computed so that the entire scene level (balance maintained) may be changed as described below.

Up Arrow Increases the overall level of all channels within the current cue, based on the relative balance established by the percentages entered on each cue line. Each key press increments the levels by a maximum of one (1/256) unit, which may not necessarily display as a change in percent. The PgUp key may be held down, causing the steps to repeat automatically.

Down Arrow Performs a ratiometric decrease of the lighting levels specified in the current cue. Complement to the Up Arrow key.

Wait Not displayed in menu. Sets a wait time in seconds and tenths of seconds for automatic, deferred cue execution or linking. When the cue is performed, an internal timer is started which will execute the cue specified in the "DO:" field when the time has elapsed. Note that the cue to "do:" does not require (and should NOT have) a TIME associated with it.

Do: Not displayed in menu. Specifies the lighting cue to perform after the wait time has elapsed. Use caution not to cross-link cues without specifying a loop count! Particularly avoid linking a cue back to itself!

Loop: Not displayed in menu. Allows cues to be cross-linked and repeat in sequence for the loop count number of times. The loop count is normally specified in the last cue of a looped sequence, and that cue will be the last to be performed when the loop count is exhausted.

ESC.ape Gets you out of this mess, returning to the main options menu. The show time events file is internally updated and sorted to reflect the first reference to each cue. However, neither the light nor event data files are saved to disk! BE SURE TO BACKUP OFTEN, using different filenames if desired, to avoid losing a day (or night) of work!

OPERATIONAL HINTS, NOTES, OBSERVATIONS AND SUGGESTIONS

- Always keep cues in sequential order in relation to show code wherever practical. Using INS.ert and DEL.ete, it is always possible to add new cues at any point in the show, while keeping the cue NAMES the same. (The cue number displayed is used internally by the EVENTS system to create the time-link event.)

As this is a "living" program, undergoing continuous updates, additions, bug-fixes, and hopefully improvements, user input and requirements generated during actual use is the key to determining priorities. Current developments include:

- Currently the printout will only show the first 199 channels; we need to fix the print routine to show the entire stage up to the number of dimmers actually used.

- Expanding the total number of cues upwards of 1000 or so.

- Allowing ratiometric GROUPS. This is both a bit sticky and confusing (at least for the programmer!). The idea is to be able to specify ratios for channels in a group; then reference the whole GROUP to a relative level on a single line of a cue.

- Allowing multiple cue times for the same cue to be entered directly from within the lighting system. Currently, additional EVENTS are required for each multiple reference to a cue.

REVISIONS AND CHANGES

86.01 An installation-dependent global OFFSET may be used to displace all lighting channels in the physical analog channel map. This allows lighting channels (in the LIGHT subsystem) to be referenced starting with channel 1 = dimmer 1, above absolute (physical D/A outputs) starting with analog output/channel 1 used for animation, audio, or other effects.

86.02 The default PATCH BAY assignments and default levels for a R.eset may now be saved using the M.ake default and S.ave options in the O.perator D.iagnostics menu. Note that ALL analog and digital presets are affected at the same time. Previously, a R.eset would clear all channels, and it was necessary to execute all lighting PRESET cues from the ON:RESET event macro. Patches were also normalized, and events were required to rewire the patch bay.

86.09 The number of addressable lighting channels has been increased to 208. The on-screen lighting display shows all 208 channels. A programmable offset may still be applied, partitioned as required for a specific show.

86.09 Added B.lind mode to main lighting cue menu, although it doesn't say so. This is a toggle to inhibit light cue execution.

86.10 As in E.vents, it is now possible to use +/- (frame count) in the TIME field to slide a cue a few frames ahead or back. If you enter a "?" in the time field, you will see a Strange number like "60:60:15". This creates a special event entry which allows to you mark (and execute) the lighting cue during normal playback mode using the "M" (mark) key. Note that currently the times are marked only in the events file and not into the actual lighting cue.

Multiple lighting cues may be set to mark in real time, and will do so in ascending cue order.

86.12 The default printer port is now the parallel port.

87.02 All references to frame numbers actually refer to the current system frame resolution (15/24/30). Note that times and rates are automatically calculated for the frame rate in use.

89.04 Added wildcards * and ? to F.ind cue

Switched references and function of PgUp/PgDn and UP/DOWN arrow keys for improved mouse handling. Arrow keys are now used for levels, the page keys for cue "pages" and to move within a cue.

Changed function of Lighting Blind to inhibit light events during show PLAYBACK.

89.10 Added display fields for Wait: SS:FF, DO: cue, and Loop: nnn. These fields are used to create links to other cues, after a selected time. If cues are cross-linked, a loop counter may be used to limit the number of iterations, allowing complex chase sequences to be entered directly in the lighting system.

Internal changes to setup for 512 analog channels. Up and Running!

90.01 Added function keys for quick setting of --, 25, 50, 75, and FL.

90.04 Added Ctrl-PGUP/PGDN selection for the stage display.
Fixed display offset problem when the scrolling keys are used.