



Pro Lighting Equipment

LP-2000 INSTRUCTION MANUAL

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LP-2000 FEATURES	4
INTRODUCTION	6
SETTING UP THE LP-2000	7
CONNECTING TO AC POWER	7
USING THE LITLITE CONSOLE LIGHTS.....	7
CONNECTING THE LP-2000 TO DIGITAL DIMMERS	8
CONNECTING THE LP-2000 TO ANALOG DIMMERS	8
BASIC MANUAL OPERATION OF THE LP-2000	9
X AND Y CHANNEL FADERS	9
X AND Y CROSSFADERS	9
DELAY TIMERS	9
MASTER FADER.....	10
BLACKOUT SWITCH	10
SOLO AND ADD BUMP BUTTONS, SOLO AND ADD SWITCHES, BUMP FADER	10
OPERATING THE LP-2000 AS A MANUAL CONSOLE.....	11
USING THE MEMORY FEATURES OF THE LP-2000	12
PRESETS AND PAGES	12
PREVIEWING PRESETS	12
RECORDING PRESETS INTO MEMORY	13
RECORDING PRESETS	14
EDITING PRESETS.....	14
EDITING PRESETS PRIOR TO A SHOW.....	15
EDITING PRESETS WHILE AN X SCENE IS ACTIVE	16
RUNNING A SHOW USING PRESETS	16
CHASE SECTION	17
CHASE BUTTONS, 1-8	17
CHASE OFF SWITCH.....	18
CHASE RUN SWITCH.....	18
CHASE STOP/STEP SWITCH	18
CHASE RATE SLIDER	18
CHASE SELECT BUTTON	18
FORWARD (FWD) AND REVERSE (REV) BUTTONS	19
INSERT (INS) BUTTON	19
DELETE (DEL) BUTTON.....	19
END BUTTON	20
PROGRAMMING A CHASE	21
LP-2000 WITH SOFTPATCH OPTION & LP-2000 CUE PLUS: FRONT PANEL CONTROLS	22
LP-2000 WITH SOFTPATCH OPTION & LP-2000 CUE PLUS: USING THE SOFTPATCH	23
SELECTING THE ACTIVE PATCH ASSIGNMENT, NAMING CUSTOM SOFTPATCHES.....	23
CREATING A CUSTOM SOFTPATCH	24
IDENTIFYING CIRCUITS WITH DIMMERFIND	25
LP-2000 CUE PLUS: USING THE CUE STACK	26
CUE STACK LINK MODE	27
CUE STACK CONTROL.....	27
CUE STACK CONTROL: SEQUENTIAL MODE.....	27

CUE STACK CONTROL: SCRIPTED MODE	28
USING CUE STACK SCRIPTED MODE FOR MANUAL OPERATION	30
STORING SCENES INTO THE CUE STACK	30
RECORDING CUE STACK SCENES	31
EDITING SCENES IN THE CUE STACK.....	31
PREVIEWING CUE STACK SCENES	32
CUE STACK SEQUENTIAL CROSSFADE TIMES.....	32
CONTROLLING COLOR CHANGERS	34
COLOR PALETTES	34
SETTING CONSOLE CHANNELS TO COLOR CONTROL	35
CONTROLLING COLOR CHANGERS MANUALLY	36
STORING COLOR SCENES	36
COLOR CHANGE RATES	37
TRIGGERS	38
LP-2000 CUE PLUS: LOADING AND SAVING CUES WITH THE DISK DRIVE.....	39
FORMATTING DISKS.....	39
SAVING CONSOLE MEMORY TO DISK.....	40
LOADING CUES FROM THE DISK DRIVE.....	40
LP-2000 CUE PLUS: ERASING CUES AND CLEARING MEMORY.....	42
ERASING AND RESETTING CONSOLE FUNCTIONS	42
MAINTENANCE AND REPAIR OF THE LP-2000	44
MECHANICAL SHOCK AND VIBRATION	44
DUST AND DIRT	44
SPILLED DRINKS	44
EXTREME TEMPERATURES	44
BREAKDOWNS.....	45
FUSE LOCATION AND REPLACEMENT.....	45
BATTERY REPLACEMENT	46
ANALOG OUTPUT TRIM (ANALOG OPTION ONLY).....	46
WARRANTY INFORMATION	47

LP-2000 FEATURES

Manual Capacity: Two-scene preset with 24, 48, 72, 96, or 120 channels. Add and solo bump buttons for each channel. Dipless crossfade between manual scenes with delay timer and progress meters.

Memory Capacity: 12 or 24 (on 48-channel and larger consoles) real-time preset faders with add and solo bump buttons for each preset. Presets are assigned to one of eight memory pages by means of an eight-sided page roller, offering a total of 96 or 192 presets. An additional memory fader, preset 0, has no page location, and remains constant on all pages. Presets may be previewed without bringing up the fader. Editing of an existing preset may be done with the manual scene faders without re-recording the entire preset.

Chase: Eight programmable patterns of up to 32 steps each are provided, and any number of chases can be run concurrently. Each chase step can be any combination of manual scenes and presets, and steps are recorded, previewed, and edited as easily as the preset scenes. The direction and rate of each pattern may be saved with the chase. The chase may also be advanced one step at a time manually, or halted momentarily.

Dimmer Outputs: USITT standard DMX 512 digital output, or optional analog 0-10 volt output. Analog voltages are trimmable over a range of 5 to 12 volts at maximum, 0 to 3 volts at minimum. Available analog output connectors include 27-pin Cinch-Jones and 37-pin Socapex.

Construction: All aluminum chassis and panels, with modular construction of console subassemblies. Panels are hinged for quick access to all internal components.

Accessories: Littlelites with power supply and dimmer are standard.

Options: Analog 0-10 volt control with Socapex or Cinch-Jones output; Penny & Giles faders; SoftPatch with 4 programmable dimmer-to-control-channel assignments. The LP-2000 Cue Plus includes the SoftPatch, programmable Cue Stack with 999 scene memory, manual or automatic cue advance, color changer control, and built-in 3.5-inch disk drive.

INTRODUCTION

The LP-2000 and LP-2000 Cue Plus are powerful and versatile lighting consoles, yet are very straightforward to operate. Using these consoles in a manual mode is simple, yet with just a bit of time spent learning some additional features, the powerful memory capabilities will be at your disposal. The LP-2000 with the SoftPatch and the LP-2000 Cue Plus contain extra features that the standard LP-2000 does not have, but aside from those features, their operation is identical. Thus, whenever this manual refers to the LP-2000, that reference applies to the Cue Plus consoles as well. There are sections at the end of this manual that deal specifically with the SoftPatch and Cue Plus options; those sections do not apply to the standard LP-2000.

Before getting started, it is important to recognize a few facts about the LP-2000. First of all, the console is microprocessor-based, and can be thought of essentially as a computer (actually several computers) with some faders and extra hardware attached to it. Like all computers, it has a display screen to give the operator information about what it is doing, it has a certain amount of memory where it can store information (presets, chases, and such), and it uses "operating system" software to tell it how to operate. Every time the console is powered up, this operating system is loaded from internal chips into memory, and the computer then gives itself a quick checkup; this is why it takes the LP-2000 a few seconds to "boot up." The display that shows on the screen for these first few seconds tells what version of the operating system is currently installed in the console. One of the main advantages of such a setup is that a new operating system can be easily installed at some later time, perhaps making the console easier to operate as well as adding some new features.

The main display screen always tells what the LP-2000 is doing at the moment. (LP-2000s with the SoftPatch option and Cue Plus consoles have a second somewhat larger display screen that handles the optional functions.) The three buttons to the left of the main display are important, for they determine what "mode" the console is in. The LP-2000 is always in one of three modes: Run, Record, or Edit. Run mode is the most common, and is used to run shows in a normal fashion. Record mode is used to set up and record preset scenes and chases. Edit mode is used when existing presets or chases need to be modified. To leave Record or Edit mode, you simply go back into Run mode; you cannot jump from Record directly to Edit, or vice versa. Always be aware of what mode the console is in, because certain switches on the LP-2000's panel have different functions, depending on which mode is currently selected.

Finally, to prevent the inadvertent erasing of important cues, a Memory keyswitch has been provided so that the memory can be Locked. That is, once scenes and chases are programmed, the keyswitch can be set to the Locked position, and these stored cues can no longer be altered until the key is used to Unlock the memory. Active scenes and chases can always be modified, but cannot be saved into memory with the keyswitch locked. The key is removable in either the Locked or

Unlocked position. Note that a spare key has been hidden on the bottom of the console under the lower left edge; a Phillips screwdriver is needed to remove it.

Before proceeding with this manual, please note that words written in UPPERCASE letters refer to a specific switch or fader on the console. BUMP, for example, refers specifically to the fader labeled "BUMP," and not to the bump buttons, which have other labels.

SETTING UP THE LP-2000

Connecting to AC Power

The LP-2000 console must be connected to a 120 volt, 60 Hertz AC power source. This is the standard for most electrical outlets in the United States. (The console can easily be modified to operate on 220 volt, 50 Hertz power, commonly used in Europe. Contact Leprecon for information on this conversion.) A detachable line cord, similar to that used on most personal computers, is used to bring power into the console. The LP-2000 draws less than two amps of current; this allows extension cords as small as 18 gauge to be used for board power.

Because temporary power distribution is usually set up for portable lighting systems, it is possible to accidentally connect the console to a higher line voltage, or to a source where two of the three line wires (for example, the hot wire and the ground wire) have been swapped. Some protection from such accidents has been designed into the LP-2000, but serious damage to the board and operator can result from incorrect power connections. It is recommended that when the console is used in a touring system, the power feed should be checked before the board is plugged in.

The LP-2000 is a microprocessor-based console. Like all digital equipment, it can be affected by electrical noise and spikes on the power lines. For this reason, it is recommended that the console be plugged into a separate circuit from other devices. This also prevents other equipment from tripping the breaker that supplies power to the console. It is suggested as well that the LP-2000 be plugged into a line filter/surge suppressor of the type commonly used for personal computers.

Using the Littlite Console Lights

To illuminate the console in a darkened venue, gooseneck Littlelites are provided with the LP-2000, along with a built-in dimmer. The Littlelites clip onto the console's rear panel for storage; to use them, plug the base of each light into one of the 3-pin XLR connectors on the top rear edge of the console. The knob next to the main power switch on the console's rear panel controls the brightness of these

lights.

Connecting the LP-2000 to Digital Dimmers

The LP-2000 is designed to be used with a wide range of dimmer systems. The two 5-pin DMX 512 digital outputs on the rear panel offer a fast and reliable way of sending control information to the stage. Simply connect a standard 5-wire control cable from either console jack to the DMX connector on the dimmer. Additional dimmers can either be connected to the second DMX output on the console, or can be "daisy-chained" to the first dimmer, by running additional cables between the dimmers.

The LP-2000 complies fully with the USITT standard, and should pose no compatibility problems with DMX 512 dimmers from Leprecon or from other manufacturers. Should any incompatibilities be encountered, please contact Leprecon with the specific dimmer model and manufacturer.

Connecting the LP-2000 to Analog Dimmers

Even with the advent of digital control standards, most portable lighting systems still use analog control lines between the console and the dimmer racks. The LP-2000 is available with optional 0-10 volt analog outputs, using either a 27-pin Cinch-Jones connector or a 37-pin Socapex connector. The range of the analog control voltage can be adjusted from 0 to 3 volts at minimum position (faders off), and from 5 to 12 volts at maximum. See "Analog Output Trim" (page [43]) for details on how to adjust this.

BASIC MANUAL OPERATION OF THE LP-2000

X and Y Channel Faders

The most basic control of the LP-2000 console is provided by the rows of faders for the two manual scenes, labeled "X" and "Y." Each of these faders controls a single console channel, which may translate into one or more dimmer channels. The green output LED above each channel normally indicates that channel's intensity within each scene. (In some cases, scenes and chases can be "previewed," where the scene or chase is not actually controlling stage lights, but where the individual channel intensities are indicated by the channel LEDs.)

X and Y Crossfaders

The X and Y Crossfaders, just to the right of the MASTER fader, control the overall level of each of the X and Y scenes; these levels are indicated by the green LED above each Crossfader, and by green LEDs spaced throughout the individual channel faders. The two Crossfaders operate in opposing directions; to bring up the X scene, the X Crossfader should be moved to the top of its travel, and to bring up the Y scene, the Y fader should be moved to the bottom of its travel. This allows both faders to be moved together to crossfade between the two scenes.

Typically, a scene might be set up with the X channel faders in advance, and when that cue is called, the X and Y Crossfaders are moved upward together, to the X position. This leaves the Y scene to be set up with the next cue, and at the appropriate time, the Crossfaders are pulled down to the Y position while the X scene is then reset for the third cue, and so on.

DELAY Timers

Above the X and Y Crossfaders is a pair of DELAY timers that may be used to set a fade rate for either or both manual scenes. The timer for each scene is activated by pressing the blue ON/OFF button located above the rotary pot. A yellow LED will indicate that the delay timer is active, and the time selected with the rotary pot (5 to 100 seconds) will be the time taken to crossfade fully from one scene to the other once the Crossfaders are moved to change scenes. Moving the Crossfaders less than full travel will result in a partial crossfade; the crossfade speed is the same, hence the fade takes a proportionally shorter time.

If the Delay ON/OFF switch is turned off in the middle of a crossfade, the master level will jump to match the Crossfader's current position.

To alleviate any problems, a ten-step LED bar graph is located next to each Crossfader; aligning the fader with the LEDs on the meter before switching off the delay timer will minimize any jump in level.

MASTER Fader

The MASTER fader, located on the panel just left of the preset faders, is used to set the level for the console's entire output. If this fader is down, nothing will be output from the X and Y manual scenes or the preset faders. The intensity of the LED above the MASTER fader indicates the fader's position.

Bump buttons and chases will operate independently of the MASTER fader. On LP-2000 Cue Plus consoles, color channels and Cue Stack scenes are independent of the Master fader as well.

BLACKout Switch

The red BLACKout switch has the same effect as bringing down the MASTER fader, and is handy for blacking out the entire stage suddenly. The BLACKout switch affects only those functions which are normally controlled by the MASTER fader; it will not affect chases, channels which are "bumped," or color channels or scenes on the LP-2000 Cue Plus. Note that this is a latching pushbutton switch; pressing it once blacks out the board, and a second press returns the board to normal operation. A yellow LED above the BLACKout switch indicates its status; when lit, the console is blacked out.

SOLO and ADD Bump Buttons, SOLO and ADD Switches, BUMP Fader

The LP-2000 has, below most faders, a pair of buttons used to momentarily "bump" a channel, preset, or chase to full intensity. Pressing the top SOLO button will black out the rest of the console, leaving up only that particular channel, preset, or chase. Releasing the button restores normal operation. SOLO buttons always bump to maximum level. In order for these buttons to be active, the gray SOLO On/Off switch (to the lower right of the key switch) must be turned on, indicated by a yellow LED above the switch.

Pressing the lower ADD button below most faders has the same effect as bringing up that particular channel, preset, or chase fader, without affecting the other channels or presets. In order for these buttons to be active, the gray ADD On/Off switch (to the lower right of the key switch) must be turned on, indicated by a yellow LED above the switch.

The maximum level for the ADD buttons is set with the BUMP fader, located below the SOLO and ADD On/Off switches. The intensity of the LED above the BUMP fader indicates this maximum Add level.

Operating the LP-2000 as a Manual Console

- (1) Set all X and Y channel faders, and the PRESET master fader to zero.
- (2) Set both X and Y Crossfaders fully downward, to the Y scene position.
- (3) Bring the MASTER fader up to full. No stage lights should come on.
- (4) Set up the first scene on the X channel faders. The X scene is currently inactive, so the stage should remain dark.
- (5) Push the X and Y Crossfaders up to the X position, and the X scene should now light the stage.
- (6) Set up the next scene on the inactive Y channel faders, while the X scene is still lighting the stage, then switch to the Y scene by moving the X and Y Crossfaders to the Y position.
- (7) Continue to set up subsequent scenes in this manner, by alternating between the X and the Y groups.

USING THE MEMORY FEATURES OF THE LP-2000

Presets and Pages

The LP-2000 stores in its memory a complete scene, or preset, for each of the preset faders located in the lower section of the console. These presets operate in a "pile-on" mode, allowing more than one preset to be up at any one time. Momentary SOLO and ADD bump buttons and an LED indicator are provided for each preset fader.

The master PRESET fader, to the right of the X and Y Crossfaders, controls the overall level of all the presets. An LED located directly above it, and LEDs spaced throughout the individual preset faders, indicate the level of the master PRESET fader.

An eight-sided PAGE roller above the preset faders selects any of eight "pages" of presets that will be active; when the console is in Run mode, the current page is indicated on the display screen. For each of the eight pages, a different scene can be recorded to each fader, therefore each preset fader can call up eight different scenes. A 24-channel LP-2000 thus holds 96 presets, and the 48- through 120-channel consoles hold 192 presets. The roller is designed to hold tape strips to label the preset faders for each page.

When the roller is moved to a new page, only the preset faders that are at zero level will be loaded with new scenes. Any fader that is not at zero will be in "page hold", and will retain its current preset assignment until the fader is returned to zero. Faders that are holding presets from a previous page will be identified by the level LED glowing red. As soon as the fader is moved to zero, the preset for the currently selected page is automatically loaded and the LED will return to its normal green color.

Preset 0 is an extra preset that has no page location, therefore it always contains the same scene, regardless of which page is selected.

Previewing Presets

Any preset entered in the LP-2000 can be instantly previewed whenever the board is in "Run" mode (selected by pressing the green RUN button to the right of the keyswitch). Pressing the numbered black Select button above a preset fader will produce a message on the display screen such as "PREVIEW PRESET 10" and the relative levels of the stage lights will be indicated on the output LEDs above the channel faders. Another preset can be previewed by pressing another numbered Select button, or the preview mode can be cancelled by pressing the green RUN button. Otherwise, the preview will be automatically cancelled after approximately ten seconds. (Note: Software versions prior to 1.10 did not implement this cancel feature.)

Recording Presets Into Memory

Recording and editing presets on the LP-2000 is quick and simple. First of all, note that any operation that affects the LP-2000's memory requires that the keyswitch be in the Unlocked position.

Presets on the LP-2000 are recorded from the console's current output. In other words, the levels of all lights, whether they are controlled from the X scene, the Y scene, another preset, the Cue Stack (LP-2000 Cue Plus only), or any combination of these, will be recorded as the new preset. In general, what you see on stage is what you will get as a preset. Thus, when the MASTER fader and the PRESET Master are at maximum, raising a particular preset fader to maximum will recreate the exact output of the console at the moment that preset was recorded.

To record a preset, first set the PAGE roller to the desired page, make sure the keyswitch is in the Unlocked position, and press the red RECORD button, located to the right of the keyswitch. (If the keyswitch is Locked, pressing the RECORD button elicits the message, "CANNOT RECORD - KEY LOCKED." This message will remain on the display screen until the RUN button is pressed, or until the switch is Unlocked and RECORD is pressed once again.) This puts the console in Record mode, indicated by a "RECORD MODE" message on the display, and by flashing yellow LEDs in the row of numbered preset Select switches. (Note that the console must first be in Run mode before entering Record.)

Set up the desired scene by using either the X or Y channel faders and/or any combination of presets. When the desired new scene has been achieved, press the numbered preset Select switch to record the new scene to that preset location. The display will then indicate which preset has just been recorded. Use a tape strip on the roller to label the new presets, and return the keyswitch to the Locked position after all preset recording has been completed.

Preset faders which are in "page hold", marked by red LEDs, can also be recorded; the new scene will be stored in place of the preset which is currently active, not the preset location indicated by the PAGE roller. In other words, if the roller is on page 5 and preset 1 is brought up, then the roller is moved to page 6 (at which point, the LED over preset fader 1 turns red), pressing the Select switch numbered "1" will record the onstage scene into preset 1 of page 5, not page 6.

Preset 0 does not change when a new page is selected, therefore it can be recorded at any time.

Recording Presets

- (1) Set the page roller to the desired preset page.
- (2) Make sure the keyswitch is in the Unlocked position, and press the red RECORD button to enter Record mode.
- (3) Set up the desired scene, using any combination of X and Y faders and other presets.
- (4) Press the numbered black SELECT button over the preset fader that you wish to hold the new scene.

Editing Presets

The LP-2000 allows for easy editing of a previously recorded preset. When the console is in Edit mode, it is possible to quickly modify an existing preset, even while a show is being run. With all of the preset faders down, make sure the keyswitch is set to Unlocked, and press the red EDIT button (to the right of the keyswitch) to go into Edit mode. (Note that the console must first be in Run mode before entering Edit.) The yellow LED next to the EDIT button will light, and the display screen will show:

```
EDIT MODE
SELECT SCENE
```

Choose which preset you want to edit either by pressing one of the numbered black preset Select buttons above the faders, or simply by moving a preset fader up past half intensity (if no other faders are up). If a single preset fader is up when Edit mode is entered, that preset will automatically be selected for editing. The display will then show:

```
ACTIVE EDIT
PRESET XX
```

where "XX" is the preset number which was selected. At this point, the output LEDs above the channel faders will no longer display the actual output of the board, but instead will show the contents of the preset being edited, as if the MASTER fader, PRESET Master, and the selected preset fader were all at maximum. The faders in the Y scene are now used to make changes to the preset, and the Y scene LEDs will flash to indicate this. If the preset fader is up while editing is being done, the changes being made will appear on stage as the channel faders are moved.

To change the level of any channel in the preset, that channel's Y-scene fader must be moved past the value stored in memory; this will transfer control for that channel from the stored value to the actual

setting of the fader. In other words, if the level of channel 3 is set at 80 percent within the stored preset, in order to edit that level, the channel 3 fader of the Y scene must first be moved through the 80 percent position to "grab" manual control of the channel, then it can be set at the desired new level. Any number of channels in the selected preset may be edited at the same time.

While a preset is being edited, the X-scene faders are still active for onstage control, just as in Run mode, though the output LEDs will no longer indicate these levels. The LEDs spaced throughout the X-scene channel faders will indicate, as normal, the overall level of the X-scene Crossfader. If the Y Crossfader is up, however, any channels which are controlled by it will go off when Edit mode is entered, as if the Y Crossfader were suddenly set at zero. Similarly, when Run mode is re-entered, the Y-scene level will jump back to the level set with the Y Crossfader and the MASTER fader. Therefore, it is recommended that the Y Crossfader be set to zero before entering or leaving Edit mode.

As mentioned earlier, it is possible to edit a preset which is in "page hold," but there will be nothing to indicate which page of the roller the preset is from.

When a preset edit is completed, it must be saved into memory for later recall. Press the green RUN button next to the keyswitch to save the new preset and return the console to normal operation. Alternatively, to remain in the Edit mode, simply press a second preset select button. This will automatically save the first edit, and start the edit process for the newly selected preset. To abort an edit and discard any changes made to the preset, simply turn the keyswitch to the Locked position before exiting the Edit mode.

Editing Presets Prior To a Show

- (1) Turn all preset faders down, make sure the keyswitch is set to Unlocked, and press the red EDIT button to enter Edit mode.
- (2) Make sure the X Crossfader is set to zero.
- (3) Select the desired page of the roller, then move the fader of the preset you wish to edit fully upward.
- (4) Use the Y scene channel faders to edit the levels of each channel in the preset. A fader must be moved through its stored position before any changes will register. The scene will be seen on stage, and levels will also be indicated by the channel LEDs above the X scene faders.
- (5) Press the green RUN button to store the edited preset.

Editing Presets While An X Scene Is Active

- (1) Make sure the Y Crossfader is set to zero (fully upward).
- (2) Turn all preset faders down, make sure the keyswitch is set to Unlocked, and press the red EDIT button to enter Edit mode.
- (3) Select the desired page of the roller, then select the preset you wish to edit by pressing its black select button.
- (4) Use the Y scene channel faders to edit the levels of each channel in the preset. A fader must be moved through its stored position before any changes will register. Channel levels are indicated by the channel LEDs above the X scene faders.
- (5) Press the green RUN button to store the edited preset.

Running a Show Using Presets

- (1) Make sure the console is in Run mode, by pressing the green RUN button.
- (2) Set the MASTER and PRESET master faders fully on.
- (3) Set the PAGE roller to the page with the desired preset(s).
- (4) Bring up the individual preset faders as needed.
- (5) Change the PAGE roller as needed. Any preset fader that is up as the PAGE roller is turned will hold the current preset until it is faded down; this "page hold" is indicated by the preset level LED turning red, and prevents unwanted changes in the lights on stage.

CHASE SECTION

The LP-2000 can store eight different chase patterns, of up to 32 steps each. (Note: Software versions prior to 2.10 would only accommodate 20 steps per chase.) Each chase step can be composed of any combination of X and Y and preset scenes. The chase memory is non-volatile, so once a chase is stored, it is preserved in memory after the chase is turned off and even after the console is powered down.

Before proceeding, be sure you understand the nomenclature that is used to describe chases. If a chase is "running," then it is cycling normally through its pattern of steps, and - assuming the CHASE fader is up - the associated lights will be coming up on stage. If the chase is "stopped," then this cycling stops, but the chase is still on, remaining on the current step with the lights still up. Only when the chase is turned "off" will the lights go off. (Of course, pulling down the CHASE fader will turn the lights off as well.)

When chases are edited, chase steps that have been recorded are designated by numbers in the two-digit chase display. The step following the last recorded step will always show as a flashing number. In other words, when stepping through a 14-step chase, the display will show steps 1 through 14 as unblinking numbers; when advanced one more step, the display will show a flashing "15" indicating that this is the next step to be recorded. A chase which has no recorded information will only show a flashing "1."

CHASE Buttons, 1-8

Pressing one of the numbered gray CHASE buttons will turn the chase section on, and select the chase pattern that will be active, indicated by a flashing yellow LED above the selected button. Any number of chases can be running at once. When more than one chase is on, only the chase which is currently active will have its LED flashing; this is the chase that will be under the control of the panel buttons and the RATE slider. Other chases which are running at the time will have their LEDs on but not blinking.

When one chase is running, and another is selected, the new chase becomes active, and the first chase keeps running exactly as it was.

To turn an individual chase off while several chases are running, that chase must first be selected as the currently active chase by pressing its numbered button; the accompanying LED will then begin flashing. Hitting the numbered button a second time will turn the selected chase off.

Chase OFF Switch

Once chases are turned on, they can be turned off by pressing the blue Chase OFF switch. Unlike turning off individual chases with the numbered CHASE buttons, pressing OFF will turn off all chases that are currently running. (Note: On earlier consoles, this button was labelled as "ON/OFF.")

Chase RUN Switch

When a chase is selected, it automatically begins running, and the LED next to the green chase RUN switch lights up. Pressing the RUN switch while a chase is running will stop the chase at its current step (the lights will remain on). Pressing RUN once again will cause the chase to resume running.

Chase STOP/STEP Switch

The red STOP/STEP switch has two functions, depending on whether the chase is running or stopped. If the chase is running, pressing STOP/STEP will hold the chase on its current step for as long as the switch is held down. If the chase is not running, pressing STOP/STEP will advance the chase one step.

Chase RATE Slider

The Chase RATE slider is used to adjust the speed at which a chase sequences through its pattern, from one step every two seconds up to 18 steps per second. A chase which has been stored with a set rate will run at that stored rate when recalled, regardless of the current position of the RATE slider. To adjust this rate while the chase is running, the RATE slider must be moved through the stored position; at that point, the RATE slider will take over, and the chase speed will be under manual control. This adjustment will not affect the rate of the chase stored in memory unless the chase is then resaved to memory (see INSERT Button, page [18]).

Chase SELECT Button

The black Chase SELECT button will either preview or record chase steps, depending upon which mode the LP-2000 is currently in. When the console is in Run mode, pressing the Chase SELECT button will preview the currently selected chase on the channel output LEDs; if the CHASE fader is down, as it should be to preview, the chase will not be seen on stage. Preview is also possible while the chase is stopped; the STOP/STEP button can be used to preview steps

individually.

If the LP-2000 is in Record mode, pressing the Chase SELECT button while INSert is on stores the current channel and preset levels as a chase step. Even the channels that are up from another chase running concurrently will be stored in the current step, so it is a good idea to turn the CHASE fader off when recording chase steps. Previewing, recording, and editing of chase steps is very similar to previewing, recording, and editing presets.

(Note: On earlier consoles, the Chase SELECT button was labeled as RECORD.)

FORWARD (FWD) and REVERSE (REV) Buttons

The green FORWARD and red REVERSE buttons are used to set the direction of the chase sequence, either by increasing (FWD) or decreasing (REV) step number. Pressing FORWARD will cancel the effect of the REVERSE switch, and vice versa. The selected direction applies not only when the chase is running, but also when stepping through the chase steps with the STOP/STEP switch.

INSERT (INS) Button

The gray INSert button has two functions, depending upon whether the chase is running or stopped. When the chase is stopped and the console is in Record mode, pressing INSert will allow a chase step to be recorded using the SELECT button, and inserted at the current location in the pattern. This will shift all the higher-numbered steps back one step, thus increasing the overall length of the chase pattern by one step. Any steps above the maximum of 32 will be lost.

While a chase is running, pressing INSert will save the position of the RATE slider and the chase direction, if either have been changed, with the current chase. The console does not have to be in Record or Edit mode to do this. Whenever the chase is again selected, the stored rate and direction will be recalled, regardless of the current settings of the RATE slider and direction switches.

Since the INSert button affects what is stored in the memory of the LP-2000, it is nonfunctional when the keyswitch is in the Locked position. It is wise to keep the console memory Locked, unless programming is being done, to protect chase steps from accidental alteration.

DELETE (DEL) Button

As with other chase buttons, DElete serves two different functions, depending upon whether the chase is running or stopped. With a

stopped chase, DELEte is used to shorten the chase sequence and remove unwanted steps. Pressing DELEte discards the current step the chase is on. All steps beyond the current step are moved forward, so that no hole is left in the chase pattern.

It is possible to delete all of the steps in this way, clearing the chase pattern. (When the last existing chase step is deleted, the number "1" will flash in the display.) Of course, a zero- or one-step chase can never advance, so nothing will appear to be moving, even if the chase is running. Since deleting chase steps affects what is stored in the memory of the LP-2000, this cannot be done unless the keyswitch is in the Unlocked position.

The DELEte button has a second function when the chase is running. Tapping DEL at a fixed tempo will automatically reset the rate of the chase to match the tapped tempo. Remember, the chase must be running to use this tap tempo feature; otherwise, chase steps will be unintentionally deleted.

END Button

While a chase is running, pressing END will immediately send the chase back to step 1, essentially restarting it.

However, if a chase is stopped, and INSert has been pressed (indicated by the yellow Insert LED), pressing END will force the current step to be the last step in the pattern, discarding any subsequent steps in the chase. In other words, if the chase is stopped on step 2 of a 20-step pattern, pressing INSert followed by END will discard steps 3 through 20, saving the chase as a two-step pattern.

Programming a Chase

Note: If a chase is already cleared (i.e. no steps are currently programmed), then steps 4-6 are unnecessary.

- (1) Set the CHASE level fader to zero.
- (2) Select and turn on the desired chase by pressing one of the eight numbered CHASE switches.
- (3) Make sure the keyswitch is set to the Unlocked position, and press the red RECORD button to the right of the keyswitch to enable programming.
- (4) Halt the chase by pressing the RUN switch, and return the chase to step 1 by pressing the END button.
- (5) Press the INSert button to enable editing of the chase.
- (6) Clear all chase steps by pressing END, then DElete. A "1" should be flashing in the chase display.
- (7) Press the INSert button to enable editing once more.
- (8) Set the channel levels for the first chase step using the X and Y channel faders and/or presets.
- (9) Press the black chase SELECT button on the chase panel to store the first step. The chase will automatically advance to step 2.
- (10) Record additional chase steps by repeating (8) through (9).
- (11) When the pattern is completed, press END.
- (12) Return the keyswitch to the Locked position.

LP-2000 WITH SOFTPATCH OPTION & LP-2000 CUE PLUS: FRONT PANEL CONTROLS

The extra panel of the LP-2000 console with the SoftPatch option consists of a second display screen with cursor control buttons and a numeric keypad. Additionally, the LP-2000 Cue Plus adds to this panel a Cue Stack section with MASTER and CROSSFADE sliders, along with SELECT and GO buttons, as well as a Color Scene section with SELECT and ADVANCE buttons. This portion of the manual does not apply to the standard LP-2000 that is not equipped with this panel.

This additional board panel contains its own microprocessor, and the various control features are accessed through a menu system similar to many personal computer programs. You can think of the menu structure as branches of a tree, where the display only shows a small portion of the tree at a time. The main menu screen only shows the trunk and the main branches, for instance, but scrolling to the right takes you out along a particular branch, which itself might branch out, and so on. To move along another branch, you must first return back, by scrolling to the left, until that branch is reached. Scrolling far enough to the left will return the display to the main menu. A quicker way to do this is to simply press the blue MENU button to the left of the display. This returns the display to the last menu page that was accessed, so it may be necessary to press it twice to return back to the main menu.

The main menu screen presents a list of options that can be addressed: Cue Stack, SoftPatch, Load/Save, or **ERASE**. By using the UP and DOWN (DN) buttons to the right of the keypad, you can reposition the arrow in the display next to each of these. When you have selected the desired option, pressing the right SCROLL button will move the menu screen of that particular option into the display. Repeatedly pressing this button will move through the screens to the right, until the last screen along that "branch" is reached. Holding down this button will allow scrolling through the screens quickly. (On the LP-2000 without the Cue Plus option, if CueScript or Load/Save is selected, pressing the right SCROLL button will give a message that the selected option is not installed.)

Aside from the main menu screen and the second-level menu screens for each of the options, all screens show certain parameters which may be altered. Within each screen or "page" of the display, the two CURSOR buttons, with left and right arrows, are used to move the cursor around to select these parameters. Even when the cursor is to be moved to a higher or lower line of the display, this is still done by pressing the appropriate CURSOR button. In these screens, the UP and DOWN buttons are used only for incrementing and decrementing the values of the selected parameter; they are not used for moving the cursor. (On menu screens where the cursor appears under an arrow, the UP and DOWN buttons will be used to move the arrow to a new selection.) Additionally, the keypad can be used to enter parameter values directly, or to enter alphanumeric titles.

LP-2000 WITH SOFTPATCH OPTION & LP-2000 CUE PLUS: USING THE SOFTPATCH

With the SoftPatch or Cue Plus options, the LP-2000 console has been enhanced to include a patching feature where four custom assignments of dimmer circuits to console channels, in addition to the "straight" patching assignment, are stored for instant recall. Consoles may be purchased with this feature installed, or the option may be added to a standard LP-2000 with minimal hardware changes.

Each of the four custom softpatches allows the assignment of each dimmer circuit to a specific console channel. Up to 512 DMX dimmer channels can be assigned. (Note: With software versions prior to 2.0, only 256 DMX channels could be addressed.) For LP-2000s with the analog output option, the number of addressable dimmer channels is limited by the number of output decoder cards that are installed in the console; this is something that the customer specifies when the analog option is ordered. The output decoder cards address a specific number of dimmer channels, and this number is not necessarily the same as the number of console channels.

More than one dimmer circuit may be assigned to a single console channel; in other words, the channel 8 fader on the console might bring up dimmer circuits 8, 16, and 32. However, a dimmer circuit can be controlled by only one console channel. In the above example, dimmer circuits 8, 16, and 32 can only be controlled by channel 8 of the console. A dimmer can be disconnected from the system by assigning it to the non-existent channel 0.

To access the softpatch features, go to the main menu and use the UP and DOWN arrows to select "SoftPatch." Pressing the right SCROLL button then moves the display to the SoftPatch menu.

Selecting the Active Patch Assignment, Naming Custom SoftPatches

The first item of the SoftPatch menu is "Select." Choosing this, and scrolling to the right, allows the selection of the active patch, or the one that is currently controlling the dimmer network. This can be the "straight" patch, where console channel 1 controls dimmer circuit 1, channel 2 controls dimmer circuit 2, and so on, or any of the four custom softpatches, with the default names of "PATCH_1_" through "PATCH_4_." (Note that there are five lines of options on this screen, but only four lines of display; the UP and DOWN arrows will scroll the display to access all of these, though they cannot all be seen simultaneously.)

This screen also allows for the naming of each patch assignment. Names are limited to eight characters in length. To edit a name, first select the patch with the UP and DOWN buttons, then use the

CURSOR buttons to position the cursor under each letter that is to be changed. Upper and lowercase letters, numerals, and punctuation marks can be selected with the UP and DOWN buttons. Additionally, the keypad can be used to enter numerals and uppercase letters. To enter a "V," for instance, press the key labeled "8 VWX" twice, to enter a "W," press the same key three times, and for an "X," press it four times.

Creating a Custom SoftPatch

The second item in the SoftPatch menu is "Edit/View." Selecting this and pressing the right SCROLL button will display the listing of all 512 dimmer circuits and their patching for the custom softpatch named at the upper right of the screen. If that particular custom softpatch is the currently active patch, alterations will immediately be seen in the onstage lighting, and the word "LIVE" will appear in the upper left of the display. Of course, all 512 dimmer patches cannot be seen at once; the screen only shows three at a time, in sequential order, with the center line of these editable.

The number listed in the left column is the dimmer circuit (labeled "dim"), ranging from 1 to 512. This is not really an editable parameter; by entering a new value, you merely jump to that position in the dimmer circuit list. The desired circuit number can be accessed by either incrementing or decrementing with the UP and DOWN buttons, or by typing in the desired number with the keypad. Once a number is typed in, press the YES button of the keypad to jump immediately to that circuit number. If YES is not pressed, the console will wait a few seconds (to see if other digits are entered), then it will jump to the newly-typed circuit number on its own.

The second column of numbers represents the console channel that controls the selected dimmer circuit. This number can be any of the available channels of the console - 1 through 24 on a 24-channel console, 1 through 48 on a 48-channel board, and so on. In addition, 0 can be entered as the channel number, which effectively turns off that particular dimmer circuit.

Hint: When entering long lists of softpatches, it is frequently quicker to select the dimmer circuit, move the cursor to the console channel number, type the appropriate channel, then hit the left CURSOR button, rather than YES. This stores the new value immediately, similar to YES, but also moves the cursor back to the dimmer circuit column in the same keystroke. This is a quick way to move through long lists, as you are then ready to select the next dimmer circuit immediately.

The third column of numbers in the dimmer list is used to assign "proportional patching" to each circuit, so that a particular dimmer circuit can be restricted to 50 percent intensity, for instance, even when the console fader for that circuit is fully on. This allows for the matching of different lamps, the limiting of circuit loads, etc. These values are edited in the usual way, by positioning the cursor with the CURSOR button, then changing the value with the UP and DOWN

buttons, or entering the value directly with the keypad. The allowable range of values is from 0 to 100 percent, where 100 percent is normal patching, and 0 percent effectively leaves the circuit turned off.

Identifying Circuits With DimmerFind

The third item in the SoftPatch menu is "DimmerFnd." DimmerFind is a feature that allows the console operator to visually identify the lamps that are controlled by a single dimmer circuit. To access this option, set the cursor arrow to "DimmerFnd," and press the right SCROLL button. The DimmerFind menu then appears on the display, listing the options of DISABLED, PULSING, 100% ON, or 50% ON. For the dimmer circuit number that is currently selected on the Edit/View page, this allows the operator to pulse the lamps once per second (PULSING), turn the lamp on at full brightness (100% ON), turn the lamps on at half brightness (50% ON), or disable the DimmerFind function. The steady levels (100% and 50%) are very helpful for focusing a lighting system.

Once the DimmerFind function is turned on, it is simple to view the lamps on each dimmer circuit individually. Simply return to the Edit/View page, and increment or decrement through each circuit number, or type in circuit numbers in a random order. As each new dimmer circuit is selected, its lamps will turn on accordingly, and the lamps from the previous dimmer circuit will turn off.

LP-2000 CUE PLUS: USING THE CUE STACK

The Cue Stack features of the LP-2000 Cue Plus offer a powerful arrangement of color-changer controls with programmable change rates, automated cue-to-cue fades triggered by the operator in a sequential order, automated cue-to-cue fades in any scripted order with programmed delay times (the show essentially runs itself), and even the capability of programming "triggers," where moving preset fader 3, for instance, will start a chase, crossfade into a new scene, and scroll color changers simultaneously. These lists of cues are called a "Cue Stack."

Even though "Cue Stack" is an option in the main menu of the standard LP-2000 with the SoftPatch option, an error message will appear when this is selected since these features require the Cue Plus hardware to operate. This section of the manual only applies to LP-2000 consoles with the Cue Plus option installed.

When the cue stack is being used, scene changes and color changes are run concurrently, but independently. In other words, there are always two cue lists operating at once, one controlling the intensity of lamps, the other controlling the scrolling of color changers. A specific command initiates a scene change (pressing the GO button), and a separate command initiates a color change (pressing the ADVANCE button). Note that when operating in Scripted mode (see page [27]), these separate cues can be programmed to occur simultaneously.

In the Cue Stack section of the panel, the CROSSFADE slider offers manual control of scene-to-scene transitions, and the accompanying column of LEDs acts as a bar graph for displaying the progress of crossfades. The green GO button initiates the automatic control of crossfades with programmed fade times. The MASTER slider controls the overall brightness level of the scenes, indicated by the green LED above the fader. Scenes are recorded into cue memory by using the black SELECT button; the LED next to it flashes when the console is in Record mode.

In the Color Scene section, the gray ADVANCE button is used to step through color changer presets. Color settings are recorded into the Color Scene memory using the black SELECT button; the LED next to it flashes when the console is in Record mode.

From the main menu of the Cue Plus panel, selecting "Cue Stack" then pressing the right SCROLL button will display the Cue Stack menu. The available options here are: Mode, Control, Seq Times, Script, Colors, and Triggers.

Cue Stack Link Mode

The Cue Plus section of the console always operates in one of two "link" modes: Sequential, for stepping through cues using the GO button or CROSSFADE slider, or Scripted, where the console automatically moves from cue to cue on its own, with preprogrammed delay times. Additionally, the link mode can be turned off, disabling the Cue Plus section.

By selecting "Mode" in the Cue Stack menu, then pressing the right SCROLL button, the Link Mode page is displayed. Operation of the cue stack is simplest in Sequential mode, where cues are linked in a sequential order. In this mode, the first cue brings up Scene 1, pressing GO or crossfading manually then brings up Scene 2, and so on. Additionally, the color changer cues proceed sequentially as well, independently of the scene changes; color changes are initiated by pressing the gray Color Scene ADVANCE button. At any point, it is possible to type in a new scene or color number, but subsequent cues will always proceed sequentially from that new number.

Selecting Scripted for the Link Mode allows for more flexible operation, in that a script list is devised to perform scene and color cues, as well as chases, in any random order. See page [27] for instructions on programming a cue script.

If the Link Mode is set to "(off)," the Cue Stack and Color Scene sections of the panel will have no effect.

Cue Stack Control

From the Cue Stack menu, selecting "Control" then pressing the right SCROLL button displays the Cue Stack Control page. The configuration of this display screen will vary depending upon the setting of the Link Mode.

When the Link Mode is off, there is no Control page. (If Control is selected with the Link Mode off, then a diagnostics page is displayed. This is a special display used in the repair and testing of the console.)

Cue Stack Control: Sequential Mode

When the Link Mode is set to Sequential, the Control page designates this by showing "SEQ" in the upper left corner. Three columns of numbers are listed: the scene number (0 through 999), the crossfade time (0:00 through 9:59, in minutes and seconds), and the color number (0 through 999). These are listed in two rows, one for "now," or the current scene, and one for "next," or the upcoming scene. Only the values for the "next" scene are editable; you cannot, of course,

change the scene, color, or crossfade time, for the scene that is already active on stage.

Pressing the Color Scene ADVANCE button steps to the next color number, causing color changers to scroll to their programmed gel positions. Pressing the green GO button initiates the automatic timed crossfade from the current to the next scene, and moving the CROSSFADE slider allows a manual crossfade between scenes. While a crossfade is in progress, a new line appears above the "now" line, which lists the crossfading scene ("cross"), and, for automatic crossfades, the time which has elapsed since the fade began. The blinking colon designates that an automatic crossfade is in progress. Once the crossfade has been completed, this new "cross" line disappears.

While a crossfade is in progress, the LED "bar graph" next to the CROSSFADE slider shows its progress. The slider can be used to "grab" manual control of the fade by moving it through the current position of the LEDs; once this is done, the colon in the progress time display stops blinking, and the LED bar graph begins blinking until the crossfade is completed. Alternately, a crossfade under manual control can be put under timer control by simply pressing the GO button. The colon in the display will then start flashing, while the LED bargraph stays on without blinking.

A manually controlled crossfade may be reversed by returning the fader to the originating end of the bargraph. This fades back to the original scene, cancels the fade, and returns the screen to its state before the fade started. The crossfade can then be reinitiated, or a different "next" scene or fade time can be entered. A timed crossfade can be canceled by "grabbing" the fade with the CROSSFADE slider, thus putting it under manual control, then reversing and canceling the fade as above. Even though color changes are made immediately when a crossfade begins, the original color scene is restored when a fade is canceled.

As outlined in the Link Mode section, in Sequential mode, all of the scene and color numbers are listed in a sequential order. It is possible, however, to enter new values for these parameters that are out of sequence; the next scene or color number will then restart a sequence that begins with the current number. In other words, if you are currently on Scene 20, you can change the "next" scene from 21 to 43. Then, once the scene crossfade occurs, the new "next" scene automatically becomes 44.

Cue Stack Control: Scripted Mode

When the Link Mode is set to Scripted, the Control page designates this with "SCP" in the upper left corner of the display. Three columns of numbers list the script line number, the scene number, and the color number for the current ("now") and the next scene. A second page (accessed by pressing the right SCROLL button) displays the scene number, its crossfade time, and the color number once again.

When the "Script" option is selected in the Cue Stack menu, two pages

of the display allow the operator to compile or edit the list of cues that will be performed when the console is operated in "Scripted" mode. You can think of the script as a listing, up to 999 lines long, of cues that will be performed automatically, once the green GO button is pressed. Each line of the script contains a scene number that will be brought up, a crossfade time for that scene, a color change number, a color change rate, a chase number, and a delay time. Note that a script line does not have to contain all of these parameters; a line can, for instance, only specify a color change, but no scene change, etc.

Only one script line can be edited at a time. The first display page shows this line number in the upper left of the screen, and any line number can be selected by positioning the cursor under this value and changing it with the Up and Down buttons, or by entering a new number with the keypad.

To the right of the line number is the "next" line number that the script will automatically go to when running. Normally, this "next" number will be one greater than the current line number, and the script will run in sequential order. However, once a long script list is entered, it is possible to use the "next" number to stop the script, to create endless loops in the script, or to leave out portions of the script.

Designating "0" as the "next" line number will cause the script to stop running when it reaches that line. To restart the script, a new line number must be entered on the Control page, followed by a press of the GO button. (Alternately, a trigger can restart the script; see page [35].)

To cause a script to loop, set the "next" line number to be some value less than the current-line-plus-one. For example, suppose a script has been programmed with 100 steps, each proceeding in a sequential order (i.e. each "next" line is one number greater than the current line). To cause the script to loop repeatedly on lines 65 through 88, you would go to line 88 in the script, and set the "next" value to 65.

To cause a script to skip lines, set the "next" line number to be some value greater than the current-line-plus-one. Let's say we want to skip over cues 20 through 30 in our above example. Simply go to line 20 in the script, and set the "next" line to 31.

The next parameter displayed on the screen is the scene number ("scn") that the script line will call up. This can be any of the 999 programmed scenes. Below the scene number is the time it will take that scene to crossfade in. Note that this time overrides any crossfade time set for the scene in the Seq Times menu (i.e. when the Cue Stack is run in Sequential mode).

On the right side of the display screen is shown the color change number ("clr") that will be called up by the script line. A setting of 0 causes no color change to take place. Underneath this is shown the rate at which the color changers will scroll. This value, in minutes and seconds, is the time it would take the color changer to scroll from one extreme of its gel string to the other. Scrolling shorter distances will, of course, take less time. Note that this

rate is independent of the manual color change rate in Sequential mode, designated in the Colors menu (see page [35]).

The second page of the Script menu contains, once again, the current and "next" line numbers (these may be edited here as well), followed by the chase number that will be called up with this cue, and the delay time that will elapse before the cue is begun. To turn one of the chases on with the cue, enter any chase number between 1 and 8. To keep the chase status as is (i.e. a chase already running will keep running), enter 0 for the chase number. To turn a running chase off with the cue, enter its negative number by using the Down button. In other words, if chase 6 is running from a previous cue, turn it off by entering "-6" as the chase number.

The delay time is the interval, in minutes and seconds, that will pass between the current cue line and the "next" cue line. This value can range from one second to 9 minutes and 59 seconds. Large two-digit values will automatically be converted to minutes and seconds. For example, typing in 74 will show 1:14 on the display. The delay can also be set to infinite ("inf") by entering "0" and then pressing the Down button. A delay set to "inf" causes the console to wait for a press of the GO button to start the next line's cue. Alternately, the CROSSFADE slider can be used to manually fade in the next cue scene.

Note that a Cue Script does not have to be started from the beginning cue; by typing in a line number on the Control page, a script can be started from that line.

Using Cue Stack Scripted Mode for Manual Operation

- (1) With the Link Mode set to Scripted, set up a script of all desired cues, as outlined above.
- (2) Set the delay times of all cues to "inf" by entering 0, then pressing the Down button, or by entering 999 from the keypad.
- (3) From the Cue Stack Control page, the show can now be run by triggering each line of the script manually with either the GO button or the CROSSFADE slider. This single move will initiate whatever scene change, color change, and chase are programmed for that script line.

Storing Scenes Into the Cue Stack

The LP-2000 Cue Plus can store 999 scenes in the cue stack memory. The cue stack memory is essentially an extension to the preset memory; the first memory locations are the presets. In other words, on a 24-channel console, cue stack scenes 1 through 96 are the same as presets 1 through 96, and on the 48- to 120-channel consoles, cue stack scenes 1 through 192 are identical to those presets. Storing a new scene to cue stack scene 30, for instance, will store that scene to preset 30 (preset 6 on page 3 of the roller) as well. This allows a show to be

worked up using the preset faders. The show can then be performed manually, and - if the scene changes are basically in sequential order - it can also be performed by stepping through the cue stack with the GO button or with the CROSSFADE slider. This allows for precisely timed dipless crossfades between scenes, which is not possible with the preset faders alone.

Even though cue stack scenes correspond to the presets of the same number, cue stack scene 0 does not correspond to Preset 0. When operating the cue stack in Sequential mode, scene 0 can be used as a fade to black. In Scripted mode, scene 0 is used to designate no change in lamp intensity from the previous scene.

Scenes are always recorded as the "next" scene in the display. To record into a given scene number, enter that number as the "next" scene in the Control page. Make sure that the console is in Record mode (the LED next to the red RECORD button is illuminated), and set up the desired scene, exactly as if recording a preset scene. Again, what you see on stage will be recorded as the scene; you can use the X and Y scene faders, presets, or any combination of these to create the scene. When the desired look has been achieved, press the black Cue Stack SELECT button to store it. The new scene immediately becomes the "now" scene, the main display screen will read

```
RECORDED
SCENE    X
```

and the next scene number in the sequence will appear as the "next" scene.

Recording Cue Stack Scenes

- (1) With the Cue Plus in Sequential or Scripted mode, go to the Control page of the Cue Stack menu.
- (2) Select the scene number you wish to record as the "next" scene.
- (3) Make sure the keyswitch is in the Unlocked position, and press the red RECORD button to enter Record mode.
- (4) Set up the desired scene, using any combination of X and Y faders and other presets.
- (5) Press the black Cue Stack SELECT button to store the scene into memory.

Editing Scenes in the Cue Stack

The "now" scene in the cue stack can be edited exactly as if one were

editing a preset scene or a chase step. With the console in Edit mode, pressing the Cue Stack SELECT button allows the "now" scene to be edited, with the changes appearing on stage as they are made if the Cue Stack MASTER is up.

Edits cannot be performed while a crossfade is in progress.

Previewing Cue Stack Scenes

When the console is in Run mode, the "next" scene in the cue stack can be previewed on the channel LEDs above the X-scene faders by simply pressing the Cue Stack SELECT button. The Select LED turns on while this is being done, and the main display screen reads

```
PREVIEW
SCENE  X
```

where "X" is the scene number. This is a useful feature for seeing which scene is coming up next when the Cue Plus display is not showing the Control screen. After a few seconds, the preview turns off automatically.

Previewing a scene has no effect on the output or memory of the board, so it will not disrupt any show that is in progress or in memory.

Cue Stack Sequential Crossfade Times

The third option on the Cue Stack menu allows the selection of crossfade times between scenes for when the Link Mode is set to Sequential. (When the Link Mode is set to Scripted, this page has no bearing on crossfade times. Scripted fade times are accessed through the Script menu, outlined on page [27].) By selecting "Seq Times" and pressing the right SCROLL button, the display presents a list of all the scenes and the accompanying crossfade times. Only three of the scenes can fit on the display at once, and the middle scene is the one which can be edited. The cursor selects either the scene number for editing, or its crossfade time. The scene number can be chosen either by incrementing or decrementing with the UP and DOWN buttons, or by typing it in directly with the keypad, then hitting YES or one of the cursor keys.

The crossfade times can be entered in the same way. Times are listed in minutes and seconds. It is not necessary to enter a colon to separate minutes from seconds; to enter a crossfade time of 1 minute and 15 seconds, for example, simply type "115" then hit YES. If only one or two digits are entered, this is assumed to be the seconds value. Again, large two-digit values are converted to minutes and seconds. For instance, typing 82 then hitting YES enters a time of 1:22, or one minute, 22 seconds.

Hint: To enter a long random list of crossfade times, use the CURSOR buttons rather than the YES key to store the typed values.

Type in the scene number, then hit the right CURSOR button, and the cursor is moved to the Time column as scene number is stored, saving a keystroke. Type in the crossfade time, then hit the left CURSOR button, and the cursor moves back to the Scene column as the time value is stored, saving another keystroke.

Controlling Color Changers

The LP-2000 Cue Plus can control color changers by allowing any console channel to operate as a "color channel." These color channels are handled differently by the console than the normal channels - they are not affected by master levels, blackouts, solos, or any other board activity.

Any channel may be assigned to color control; some prefer to control the intensity of a lamp with one fader and the color changer of that instrument with an adjoining fader, others prefer to assign lamps to one section of the console and color changers to another. The channel fader is used to select the color from a palette of 16 colors assigned to that channel. Each color in the palette corresponds to an output value of the channel, and the output level of the channel will step between these. These steps do not have to be in a sequential order; the Cue Plus maps in its software the output levels to the correct color.

Each palette can be given a name to help the operator or designer to remember the colors.

Color Palettes

An LP-2000 "palette" is a list of 16 different color positions within a gel string. Many changers only accommodate 11 different gels, however the remaining positions can be programmed either as duplicates or as split colors on gel boundaries. Each color position in the palette is, in reality, a numerical DMX value, ranging from 0 to 255, that tells the color scroller exactly where to land. Each color position can also be given a name. Typically, a different palette is used for each different type of color changer that is being used. However, separate palettes can also be used for different gel strings on the same type of color changer.

A given palette may be assigned to more than one console channel. The channels will still act independently; they merely use the same map for looking up color positions. Additionally, palettes can be reprogrammed to accommodate for the stretching of gel strings. In this way, numerous color channels that use the same palette can be "fixed" in a single operation.

Color palettes are set up in the LP-2000 by selecting "Colors" in the Cue Stack menu, then pressing the SCREEN RIGHT button once. This page of the display shows the palette number, the palette name, then a listing of the different colors in the palette along with the DMX assignment for each. To select a particular palette, position the cursor under the palette number on the top row of the screen, and use the Up and Down buttons to scroll to the appropriate number, or simply enter the number with the keypad. The LP-2000 stores 16 different color palettes, numbered 0 through 15.

Palettes are named in the normal fashion, by positioning the cursor under each letter or space in the name, and using the Up and Down buttons or the keypad to enter the desired letter, number, or punctuation. Palette names can be a maximum of nine characters in length.

Below the palette number and name is a listing of the 16 color positions that make up the gel string of the color changer, with the appropriate DMX address for each gel. (Only three color positions can be shown in the display screen at once.) The color names can be up to nine characters in length, and can be used to list the general colors (lite blue), the actual gel colors (Daylt Blu), the gel numbers (Lux 65), or any name you desire. To the right of the color name is the DMX address, which can be set roughly by knowing how many positions are in the gel string and dividing that number into the 255 DMX addresses. In practice, it will probably be necessary to use a "trial and error" method for fine tuning, as the exact values will depend on the length of the gel segments, the amount they might have stretched during use, and the type of color changer itself. A DMX value of 0 will represent one end of the gel string, while a value of 255 will represent the other extreme.

To select the color you wish to edit, position the cursor under the arrow on the left side of the screen, and use the Up and Down buttons to scroll through the color list. Once the desired color is selected, you can move the cursor under the name characters to edit the color name in the normal fashion, and the cursor can also be moved under the DMX value to edit it as well. Note that it is not necessary to enter the colors in the same order they appear in the gel string; they may be entered in a completely random fashion if desired. Note also that DMX values can be entered which will position two gels in a "split" fashion in front of the instrument. This can be an interesting and useful effect, and since most color changers only allow 11 gel segments in a string, this leaves five extra color positions in the palette that can be used for such effects.

Hint: By setting color position values only to 0 or 255, the palette can be used for controlling motors or other devices that operate only on 117 volts on or off. By plugging a motor into a dimmer channel that is controlled by a color fader, a DMX value of 255 will turn the motor on, and a DMX value of 0 will turn it off. Be sure when doing this that the color change rate is set to 0, so that no intermediate voltage values are sent to the motor.

Setting Console Channels to Color Control

The LP-2000 controls color changers by removing particular console channels from the normal control of lamp intensity, and reassigning them to output DMX values directly to the color changers. In other words, the output of these "color channels" is not affected by the MASTER fader, the BLACKout button, etc. Moving a color channel's fader will change the DMX value that it is sending to the color

changer, which will cause the changer to scroll through the gel string. Thus, the setting of the fader determines the color that is selected.

To assign a console channel to color control, go to the second Colors page of the Cue Stack menu (select "Colors," then press the right SCROLL button twice). The display should read "Set Channel Types," and below this is a listing of all console channels, and the assignment of each. Only three channels can be shown in the display screen at once. To select a particular channel, position the cursor under the channel number, and use the Up and Down arrows to scroll to the desired channel, or enter the channel number directly with the keypad, followed by YES.

Once the desired channel has been selected, positioning the cursor under the arrow to the right of the channel number will allow the selection of the channel type. Normally, a channel is set to "(intensity)" for normal control of lamp brightness. For color control, the channel can be assigned to any of the 16 color palettes by scrolling with the Up and Down buttons. At this point, the channel fader will output only the specific DMX values stored in the assigned color palette.

Controlling Color Changers Manually

Channel faders can be used to manually control color changers; when a channel is under manual control, it will not be affected by Color Scene changes.

To take manual control over a color changer, press the ADD button under the console channel that controls that changer. The output LED above that channel will become illuminated. The color output can then be "grabbed" by holding down the ADD button and moving the Y-scene fader through the current value of the color output. When the channel has been "grabbed," the output LED will begin flashing, and manual changes can be made without holding down the ADD button any longer. Note that you cannot grab manual control of a color channel using the X-scene fader.

To release the manual control of a color channel, press the SOLO button under the channel fader, and the output LED will stop flashing.

Storing Color Scenes

A group of color changer settings may be stored and recalled in a fashion similar to the Cue Stack scenes. Each group of settings is called a "color change." The LP-2000 Cue Plus will store 999 color changes in memory. Unlike normal scenes, with faders controlling the intensity of lights, color scenes cannot be "piled on." Only one color scene can be active at a time.

To set up a color scene for recording, go to the Control page of the

Cue Stack menu (the Cue Plus must be in either Sequential or Scripted mode; see page [23]). Put the color channels you wish to alter under manual control as outlined above; their channel output LEDs will begin flashing. Other color channels may be active from a prior color change, in which case their output LEDs will be illuminated. Finally, a color channel may be made active by pressing its ADD button. Active channels - those with their LEDs on or flashing - will have their current color value stored as part of the color scene. Color channels which are not active - their LEDs are off - will be stored in the color scene as having "no change" from their prior position.

Place the console in Record mode, and the Select LED on the Color Scene panel will begin flashing. Set up the desired colors, then press the Color Scene SELECT button; this stores the color scene into the "now" color change on the Cue Plus display, and the main display screen will show

```
RECORDED  
COLOR CHANGE XX
```

where "XX" is the color change number. The color change automatically steps to "next" on the Control screen.

Color Change Rates

Color changers which scroll gel strings in front of a lamp can often produce objectionable noise when changing colors - particularly if many of them are changing colors simultaneously. To help minimize this noise, the LP-2000 Cue Plus allows you to set the color change rate to a slower speed, so that gel scrolling is quieter. There are two pages of the display that allow color change rate to be set: one is for manual color changes, the other sets the rate for each color scene individually. These pages are found by selecting "Colors" in the Cue Stack menu, then pressing the SCREEN RIGHT button three times (for manual rate) or four times (for color scene rates).

The Manual Color Change Rate can be set to the desired value by using the Up and Down buttons, or by entering the value directly with the keypad. Values range from 0:00 (as fast a scroll as possible) to 0:59 (59 seconds). This is the time it will take the color changer to scroll from one end of the gel string to the other (from DMX value 0 to 255). To move from one gel to the adjacent gel, the time will, of course, be proportionally shorter.

The next page to the right in the display shows the list of Color Change Rates for color scenes 1 to 999. As usual, only three lines are shown on the screen at once, and the middle line can be edited. Select the desired color change by placing the cursor on the left number, and using the UP and DOWN arrows or the keypad to enter the appropriate number. Then move the cursor to the right column of time values, and enter the desired time, from 0 to 59 seconds, exactly similar to the Manual Color Change Rates.

Triggers

A "trigger" is a command that will carry out any single line in the cue script. A trigger is executed simply by moving an assigned preset fader, and all of the presets on all of the eight roller pages can be assigned different triggers. (Thus a 24-channel LP-2000 can store 96 triggers, while the larger consoles will store 192.) A single move of the preset slider can then initiate a scene fade, a color change, start a chase, and select a new "next" scene simultaneously.

To set up triggers, select the Triggers line of the Cue Stack menu, and press the SCREEN RIGHT button. The display should then read "Preset Triggers." The first value shown is the page number for the preset roller, and following that is a list of the preset sliders (12 or 24, depending on the console) and the cue script line that the preset fader will trigger. As usual, only three lines of the preset list are shown on the screen at a time; positioning the cursor under the preset number allows the selection of the desired preset with the Up and Down buttons, or by direct entry from the keypad. Positioning the cursor under the cue script line number to the right allows the entry of any line number, from 1 to 999. Additionally, a line number of 0 can be entered, which turns triggering off for that fader.

When the console is running a cue script, simply moving an assigned fader even a small amount will initiate the trigger. Note that a preset fader can be assigned to control a preset scene as well as act as a trigger, and both functions can occur simultaneously. The fader can be set up as a trigger only if it is programmed with a blank scene (i.e. all channel levels at zero). If the console is operating in Sequenced mode, or if the Cue Plus panel is not being used at all, triggering will not take place when the preset faders are moved.

Hint: Cue script line 1 can be set up with an infinite delay time. It can thus be triggered at any time to stop a script which is in progress.

LP-2000 CUE PLUS: LOADING AND SAVING CUES WITH THE DISK DRIVE

The LP-2000 Cue Plus console provides a 3.5-inch floppy disk drive with which the entire memory of the console, including scenes, chases, CueScripts, etc., can be saved to disk. This is an excellent way to back up your show data, as well as to save it for future use. Once cues are saved to disk, the console can be completely reprogrammed with new cues, which can then be saved as well. At any time, an old set of cues can be re-loaded into the console for immediate use. Please note, however, that loading in cues from disk will replace those cues that are currently in the console. Always be sure that the current cues are saved to disk before new ones are loaded in.

Note that the disks have a write-protect tab in their lower left corner. When this tab is slid upward (i.e. the hole is closed), data can be written to the disk. When the tab is downward (i.e. the hole is open), data cannot be written to the disk, nor can the disk be formatted. This is to protect valuable data that you want to save; opening the write-protect tab avoids the risk of accidental erasure.

Floppy disks are a magnetic medium, and must be cared for in the same way as audio tapes. Exposing disks to strong magnetic fields (such as electric motors, etc.) can erase or corrupt data, even when the write-protect tab is open. Keep disks in a safe place, away from magnets, excessive heat, etc., and always make back-up disks of important data.

Formatting Disks

The LP-2000 Cue Plus uses 3.5-inch double-sided, double density floppy 720K disks, which are available from any computer supply store. Before the console can read from or write to a disk, however, the disk must first be "formatted" so that the console knows exactly where to store and look for information on that disk. So when a new disk is being used, first select "Load/Save" in the main menu, then go to the "Format Disk" screen, by pressing the right SCROLL button three times. Insert the disk into the drive, and answer the screen's "PROCEED?" prompt by pressing the YES button of the keypad. The disk drive light will come on for several minutes while the disk is being formatted, and the display will show "FORMATTING" in the lower right corner. Once the format procedure is complete, a "Format OK" message will appear in the second line of the display, and the disk may be used in the normal fashion to store cues.

The disk drive light signifies that the drive is reading from or writing to the disk. DO NOT REMOVE THE DISK WHEN THIS LIGHT IS ON, otherwise damage to the drive head could occur. When the drive light turns off, you can safely remove the disk by pressing the eject button on the drive itself.

Saving Console Memory to Disk

To save the cue memory of the console onto disk, select "Load/Save" from the main menu, then press the right SCROLL button twice to display the "Save to Disk" page. Here, the cursor is positioned under the file name (which defaults as "BACKUP") under which the data will be saved. You can use the keypad or Up and Down buttons to rename the file; the maximum name length is eight characters.

Once the file name has been entered, you can use the CURSOR buttons, or press YES, to position the cursor under the "SAVE?" prompt. Then, pressing YES will cause the console to begin transferring the data. The display will show "SAVING" in the lower right corner, while the second line of the display shows what data is currently being transferred. Once the transfer is complete, the display will read "show sent" and the disk drive light will come on while the data is being written to disk. This whole procedure should take about ___ minutes.

Note that up to three files can be saved to the same disk. However, each must be given its own unique name. If a disk contains a file named NEWSHOW, for instance, saving a different set of cues also named NEWSHOW will write over the original cues on the disk, and they will be lost. Naming the new cues NEWSHOW2 will allow them to be saved as a new file, keeping the old cues intact as well.

Loading Cues from the Disk Drive

When a disk containing cue data is inserted into the disk drive, these cues can be loaded into the console memory for immediate use. Note that loading in new cues replaces all of the cues that are currently in the console memory. If you want to keep the current cues, be sure and save them to disk before loading in new cues. The only exception to this is that Preset 0 is not overwritten.

To load in cues from a disk, insert the disk in the drive, select "Load/Save" on the main menu, and press the right SCROLL button to go to the display labeled "Load from Disk." Selecting this page causes the console to display a list of files that are stored on that particular disk; the display will show "names recd" followed by a listing of the file names on that disk. Note that only two file names are visible in the display at once. Use the Up and Down arrows to position the cursor arrow next to the file you wish to load, then press the CURSOR button to move the cursor underneath the "LOAD?" prompt. Press YES to begin the operation. The drive light will come on for a short while, and the display will show "LOADING" in the lower right corner. Once the drive is finished reading, the display will show what data is currently being transferred into the console's memory. When the load is finished, the display will show "recd file," and the new cues will be in the LP-2000's memory, ready for use.

The LP-2000 Cue Plus can actually load in cues while a show is being

run. The current page of presets remains intact while new cues are loaded from disk into a buffer. Only when the page roller is turned will the new cues become active.

LP-2000 CUE PLUS: ERASING CUES AND CLEARING MEMORY

From the main menu of the LP-2000 Cue Plus, the "***ERASE***" option can be selected to clear and reset cues and memory. This function allows individual groups to be reset, such as all of the scenes, or all of the triggers, or it allows the complete memory of the console to be reset to its factory defaults.

Selecting "***ERASE***" and then pressing the right SCROLL button first displays a page where default parameters can be set. Here, values can be entered for default crossfade times ("Fades"), delay times ("Dly."), and color changer rates ("Changes"). When a CueScript is then cleared, for example, all crossfade times, delay times, and color changer rates will become the selected default values.

From the Default Times page, pressing the right SCROLL button displays a list of console functions that can be erased or reset: Link Mode, CueScript, Triggers, Color Sets, Chan. Types, All Patches, All Scenes, All Chases, and EVERYTHING. As usual, only part of this list is visible in the display at one time; the Up and Down buttons will allow scrolling through the entire list.

Once the cursor arrow is moved to the desired selection, pressing the right SCROLL button displays a screen that allows the selection to be confirmed. For example, if "Chan. Types" is selected, pressing the right SCROLL button displays a screen asking

Do you wish to clear
(reset) Chan. Types?

Press [YES] or [NO]

Pressing the YES button of the keypad will then erase or reset that function. Pressing the NO button abandons the operation, and returns the display to the previous page.

Erasing and Resetting Console Functions

CueScript - Clearing the CueScript assigns all line numbers to scenes and color changes of the same number (line 1 is assigned scene 1 and color change 1, line 2 is assigned scene 2 and color change 2, etc.). Crossfade times, delay times, and color changer rates are all set to their default values assigned in the Default Times page (see above). The "next" lines are always sequential (i.e. line 1 has line 2 for the "next" line, etc.). Chase entries are all blank.

Triggers - Resetting Triggers sets them all to line 0, which effectively disables triggering in all Link modes.

Color Sets - Resetting Color Sets, or Palettes, sets all to default values, which should give the user a good starting point from which to program custom palettes.

Chan. Types - Resetting Channel Types returns every console channel to normal intensity control.

All Patches - Erasing all SoftPatches resets all patch names to factory defaults, and sets each dimmer circuit to the console channel of the same number. Other dimmer circuits are assigned to console channel 0, thus disabling all output levels.

All Scenes - Erasing All Scenes returns all channel levels in each scene to zero intensity. Note that if a channel is set to control color changers, it will not be affected by erasing All Scenes. To clear this data as well, first reset Chan. Types, then erase All Scenes.

All Chases - Erasing All Chases sets the levels in each chase step to zero intensity. The chase lengths are set to 0 steps, the chase rate is set to a medium speed, and the chase direction is set to Reverse.

EVERYTHING - Erasing EVERYTHING performs all of the above functions, returning the console completely to its factory defaults.

MAINTENANCE AND REPAIR OF THE LP-2000

The LP-2000 was designed and built for touring use. With a little care in handling and storage, it will live a long and healthy life. If repairs are ever needed, the modular design of the console makes troubleshooting and service easy. But the best policy is to avoid the need for repairs by protecting the console from hazards.

Mechanical Shock and Vibration

It is a good idea to invest in a properly designed flight case. Your Leprecon dealer can provide a factory approved case, and several well-known case manufacturers have specs on hand for Leprecon consoles. The case should be sturdy enough to resist punctures, and contain at least one inch of foam padding around the console.

Dust and Dirt

Dust and dirt will give the faders on the board a gritty, nasty feel, and shorten the life of the console considerably. It is very difficult to restore a fader to new condition once it has been contaminated with dirt. Keep the board covered, or in its case, when it is not actually in use. If faders do get dirty, a silicone spray for cleaning and lubricating switches may be used to relubricate them. Do not use TV tuner spray containing abrasives!

Spilled Drinks

One of the worst things that can happen to a console is having a drink spilled into the faders. Leprecon consoles have a layer of fabric to deflect dust and liquid, but this cannot stop a 22-ounce Slurpee! It is a good policy to keep drinks away from the console. If a spill does happen, immediately turn off the console and clean up all the liquid from the front panel. When things dry out, if the faders feel sticky, contact Leprecon about repairing the damaged faders. The syrup left behind from a soft drink can be removed from a printed circuit board by washing the board in clean water, but it is recommended that this be done by a qualified service technician.

Extreme Temperatures

Touring gear is often exposed to temperatures ranging from -70 degrees to well over 110 degrees Fahrenheit. While these temperatures will

not damage the LP-2000, it is a good idea to allow the console to reach a reasonable temperature before turning it on. Very cold weather will cause condensation to form when the console is brought into a warmer room. In this case, simply let the board warm up before turning it on; this will allow the moisture from condensation to evaporate before power is applied. In extreme heat and sunlight, it is best to keep the console shaded from direct sunlight, and under cover when not in use. Internal temperatures in excess of 100 degrees Fahrenheit may cause erratic operation, and direct sunlight will make the lighted display screen all but unreadable.

Breakdowns

Like any piece of electronic equipment, the LP-2000 is subject to breakdowns under extreme conditions. Problems can result from mechanical wear, such as broken faders and buttons. These can be easily replaced by a competent service technician. Spare parts are available from your dealer, or directly from Leprecon.

If other problems seem to exist, first make sure that you understand the normal operation of the console. Production updates and software revisions may change the features of the console somewhat. Review the manual and read any update notes that may have been issued with software changes.

Microprocessor crashes can result from electrical line noise, static electricity, or other transient occurrences. These can be cleared by pressing the red Reset switch on the back panel of the LP-2000. As the console resets, the processor will test the memory chips. Watch the display during this time; if any chips are bad, a message will alert you to this fact. If pressing the reset button does not restore normal operation, try turning the power off, waiting about five seconds, then turning the power back on.

If damage from rough handling is suspected, for example if the console works fine one night, but won't even turn on the next, carefully open the console and look for loose ribbon cable connectors. It is essential that the power cord be removed from the console whenever the front panels are opened.

Troubleshooting failures in the electronics of the console is much more of a challenge. The entire front panel can be removed, and transferred to a bench for servicing of the printed circuit boards. It is important that anyone working on the electronics of the LP-2000 be familiar with the repair of digital equipment.

Fuse Location and Replacement

The LP-2000 uses a 5x20 mm miniature fuse of a 2-amp rating. The fuse is located within the AC inlet on the back of the console. To change the fuse, remove the power cord and pry out the small fuse drawer located in the lower part of the inlet. A spare fuse is stored in the

drawer. Fuses that blow repeatedly are a sign of trouble that needs to be fixed. Do not replace the fuse with one of a higher rating!

Battery Replacement

The LP-2000 uses a lithium battery to retain its memory while the console power is off. This battery should last at least one year. The console automatically performs a battery test each time the power is turned on. A low battery message on the display means that the battery should be replaced as soon as possible.

It is possible to replace the battery with the console power on. Otherwise, removing the battery will clear all of the LP-2000's memory, so any stored presets and chases will be lost. The best solution, with an LP-2000 Cue Plus, is to save this data to disk before the battery is removed.

The battery is located in a holder on the main CPU circuit board, located on the left side of the console under the panel containing the Master fader and display screen. Remove the dark gray trim strip cutting across the center of the console, and remove the screws holding down the master panel and the panel immediately to its left (either the chase, SoftPatch/Cue Plus, or a blank panel). Tip back the panels to reveal the silver, quarter-sized battery. With a small plastic prying tool, push the battery up and out of the socket. The new battery should be installed without touching it with your bare fingers. Make sure that the positive (+) side is on the top. Slide the new cell into the holder, and close up the console.

After a low battery has been replaced, the low battery warning will still be shown one more time on the display screen. Turning the board off and on a second time will clear this message.

Analog Output Trim (Analog Option Only)

If your LP-2000 is equipped with the optional analog output, it was calibrated at the factory to a 0-10 volt trim. It is possible to readjust this trim to allow the console to be used with non-standard dimmers, within the range of 0-3 volts at minimum and 5-12 volts at maximum. Re-trimming the board requires a DC voltmeter and a small flat-blade screwdriver.

To readjust the trim:

- (1) Attach the DC voltmeter to the output connector. The common (black) lead should connect to pin 27 on the Cinch-Jones connector, or to pin 37 on the Socapex connector. Attach the red lead of the voltmeter to pin 1, which is output channel 1.
- (2) Remove the dark gray trim strip in the middle of the console. Remove the screws in the top edge of the panel where the X and Y channel faders are located, and tip the panel forward.

- (3) In the bottom of the console are the analog output decoder cards. The printed circuit board closer to the power supply is the UART board, and it contains two trim pots labelled TR1 and TR2. TR2 is the adjustment for the minimum output voltage, which should be adjusted with the channel 1 fader fully down. Likewise, TR1 is used to adjust the maximum level, and should be adjusted with the channel 1 fader and Master fader fully on.
- (4) When adjustments have been completed, reassemble the console and replace the trim strip.

WARRANTY INFORMATION

CAE will repair any defects in materials or workmanship on the LP-2000 and LP-2000 Cue Plus consoles for a period of one year from the date of sale. The equipment must be returned postpaid to the factory, and CAE will pay return shipping charges. CAE is not responsible for incidental damages, or for damage as a result of misuse or abuse. It is the responsibility of the owner to determine the suitability of the console for any specific application.

Any return to the factory must be authorized by our service department. Do not return any equipment without first calling for an authorization number. The CAE service department may be reached at (313) 231-9373 during business hours, or a message may be left after hours. Our fax number is (313) 231-1631.