LIGHT PALETTE 90 SPECIFICATIONS
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I. DESCRIPTION

The Light Palette 90 control system shall be a micro-computer based lighting system designed and manufactured by Strand Lighting specifically for the control of theatrical and television dimming systems. The system shall support the processing of up 4032 dimmers on 4032 control channels, arrayed in incremental dimmer processing cards of 512 DMX512 controlled dimmers, or 576 AMX192 controlled dimmers.

Dimmer processor cards shall provide the ability to utilize only the processing power required for a particular need. At any time, processing power shall be easily expandable to drive additional dimmers by simply adding additional dimmer processing cards. Output protocols shall operate simultaneously and shall be individually programmable to dimmers.

All major electronic components shall be plug-in and housed within a rugged processing tower in an easily accessible manner.

The processing tower shall be engineered for tower style floor mounting or 19" rack mounting and can be located a substantial distance from the control console.

Communication with the console surface shall occur via a high speed auto-baud serial communications network.

The system shall be designed to support 3 desktop or furniture mounted consoles with 2 high resolution detachable CRTs each, and 3 handheld focus remotes simultaneously. Each console and designer's remote shall have an individual command line, displays and wheel control. The displays of separate consoles shall not be dependent upon each other during operation. Each handheld focus remote shall contain a distinct command line and LCD display. CRTs shall be high resolution EGA standard graphics quality color monitors with user adjustable controls.

Within the standard console surface shall be command keypads, playback controls, one or two submaster modules, and disk drives. Auxiliary control panels shall be available on the standard surface. A outrigger console shall be provided to split the submaster control surface from the standard console if desired. Submaster panels shall be remotable from the standard console.

The operative data processing program shall be a non-volatile read-only memory. The system shall not require the use of any peripheral storage/retrieval device to function. In case of power failure, the random access memory shall be retained by a 30 day battery.

II. STANDARD FEATURES

The system shall provide, but not be limited to:

1. Console keyboard. The main console keyboard shall consist of logically grouped keypads, level wheel, keyswitches, and on/off switch. The keypad groups containing 125 rugged ergonometrically spaced keys include display, edit, macro, function, control, alpha, record, level, and numeric keys.

2. Playback Controls. The playback controls shall be located to the left of the console keyboard with a set of positive action "Go" and "Stop/Back" buttons protected by shields on each side, 8 playback faders logically grouped in pairs, 8 fader manual override buttons, and a rate wheel with associated take control button.

3. Submaster Controls. The system shall support a maximum of 2 submaster modules which consist of 24 linear potentiometers or 12 continuous wheels each, (48 submasters total). Each submaster shall have an associated bump button and shall be individually programmable by the user.

4. Disk Drives. The main console shall contain (2) 3 1/2" high density disk drives, one linked to the main electronics and one linked to the reserve electronics.

5. Color Videos. Each console shall drive two detached color videos, utilizing the EGA standard, each with screens supporting up to 25 lines by 80 characters of information. Each console shall also drive two detached remote color videos utilizing the EGA standard.

6. Electronics Tower. The electronics tower shall provide, but not be limited to:

1. Central Processor Unit.
2. Memory Card.
3. Serial Input/Output Card.
4. Dimmer Processor Card (up to 7 supported).
5. Serial Transfer Module.
6. Dimmer Transfer Module. (up to 4 supported).
7. Central battery backup.
8. Duplication of 1-7 for full tracking backup reserve electronics (includes 4 independent power supplies).

III. OPERATING FUNCTIONS

The system shall provide, but not be limited to:

A. SETUP

0. The **Main** setup display allows access to sub menu routines. The title of a show may be entered via the alpha keypad.

1. The **System Parameters** menu shall allow definition of the number of dimmers and channels in the system. Changing these definitions shall not erase memory.

2. The **Console Definition** menu allows the operator to identify the use of the Serial Transfer Module Ports (consoles and handhelds) and assign them various levels of system access. Any peripheral equipment may be fully locked out, record locked out, playback locked out, given display access only, or be fully enabled within the definition of a particular port. The main console port #1 is the only port allowed to assign access to other ports.

3. The **Dimmer Output Configuration** menu allows the identification of the Dimmer Transfer Module between AMX192 and DMX512 protocols or a combination of both protocols operating simultaneously with programmable dimmer numeric ranges being specified. Percentages of available memory remaining in the system shall be displayed in this menu.

4. The **Submasters** menu shall provide the means to define an individual submaster as pile-on or inhibitive, normal or over range, and the bump button as bump up, out, or bump off. The bump button can also be a dependent/ independent action alternative where a submaster designated as independent will retain control over channels manipulated by the level wheel. If the submaster is a wheel the bump button can be an active level or rate action alternative.

5. The **Defaults** menu defines the operator selectable system parameters including Track vs. Q-Only, "SET" level value, default profile and fade time.

6. The **Disk and Reserve** menu accesses disk procedures where disk initialization and transfer procedures are enacted. It shall be possible to load the entire system, cue information only, patch information only, group information only, effect information only, submaster information only, or profile information only. Individual information items or information range shall be able to be

loaded into an active system without overwriting the system information and cues shall be able to be renumber offsetted.

7. The **Clear Functions** menu provides system clear functions where individual cues, patch or the entire system can be cleared.

8. The **Printer Requests** menu shall access individual print routines for the cue sheet, cues, groups, effects, submasters, patch, profile, and note information. During a print operation the system shall remain operative for other commands.

9. The **Channel Format** option shall allow display of only the active channels used in the cue list.

B. PATCHING

1. Each dimmer may be assigned an alpha numeric name of up to 5 characters and shall be addressable by this alpha numeric string through direct dimmer address.

2. The patch information may be ordered by dimmer number, name, or channel number. The display of the dimmer number, name, or channel number may be individually suppressed when required.

3. Any dimmer may be assigned a profile number to adjust both the end level (proportional patch) and the dimmer output curves. This shall allow assignment of dimmers as an artificial non-dim or any curve desired by the user.

4. 64 dimmer output and cue progress Profiles are provided. Both the curve endpoints (0% and 100%) may be specified as well as the 19 intervening points (05% and 95%). The system shall automatically calculate intermediate levels between any two points when required and shall also reset any curve to a linear setting when desired. These profiles will be displayed in a "PROFILES" display screen.

5. In "LIVE" mode any numbers of dimmers may be isolated from their channel assignment for direct access where they will be held at a specified level until returned to channel control. These dimmers will be displayed in an "UNPATCHED DIMMERS" display screen when required. Unpatched dimmers shall not be recorded into cues when placed at a level.

C. LEVEL SETTING AND RECORDING

1. Control lists may be constructed using the "AND" and "THRU" keys in combinations of channels, groups, submasters, cue end states, and effects. Channel levels are collected on a highest level takes precedence basis with an immediate level "=" key provided for individual parameter mastering and an "@" key provided for proportional master level setting. Control list elements may be removed using the "MINUS" key. Level information will not execute until an "*" key is pressed.

2. Control lists may be edited using the "HOME", ")" and "<" keys. Entries may be modified, deleted, or inserted. The control list may be changed at any time, without affecting stage levels.

3. Control lists may be modified proportionally by the level wheel. The level wheel shall be a velocity sensitive device.

4. Control lists may be taken to a default level or zero with a single keystroke using "SET" and "OUT". A control list may also be proportionally raised and lowered a point at a time with the "+10%" and "-10%" keys. "SET",

"OUT", "+10%", and "-10%" inherently assume an "@" key preceding and an "*" key following the key.

5. A control list may be set at a level or held at current levels while all other channels are driven to zero using "REMAINDER DIM".

6. A selected channel or dimmer may be isolated and flagged between 15% and Full for immediate identification.

7. "RETURN" may be used to restore a control list to established levels immediately prior to the last command entered.

8. "TAKE CONTROL" shall allow the console to rob channel control from another console or handheld remote if required. Channels directly under control from another
console or handheld remote shall not be available for control at a local console unless "TAKE CONTROL" is initiated.

9. A maximum of 999 Groups may be recorded for fast recall of commonly used stage looks. Groups can be independently recorded or directly recorded from the stage output. Each group may be assigned an alpha numeric label which will track through to PLAYBACK SUBS when groups are assigned to submasters.

10. Cues may be recorded in any order. Up to 9 cues may be inserted between any two numerically sequential cues. Each cue may contain 8 parts and may be recorded with an alpha numeric label. Cues shall be able to initiate effects, profiles, macros, and automated fixture console cues.

11. Each cue may be recorded with the following command line information:
    a. Fade time up to 999 seconds with split up/down times.
    b. Delay time up to 999 seconds with split up/down times.
    c. Manual fade times.
    d. Default fade times.
    e. Special effects assignment.
    f. Profile assignment.
    g. Link-to-Q command.
    h. Auto-follow of next cue with wait up to 999 seconds.
    i. Automated console go cue assignment.
    j. Macro go assignment.

12. Individual channel levels may be requested to track or to relate to the current cue only. In addition a "BLOCK-Q" command is provided to isolate cue sequences.

13. A Channel Path display shall be provided where an individual channel's "Path" through a show can be viewed and manipulated using cursor keys to quickly scan through a cue list.

14. A Cuesheet display shall be provided where color will identify actively fading channels and the most recent cue. The cue sheet shall be independent of the Playback Cues listing and information in the display can be manipulated similar to Channel Path.

15. A Channels in Use display shall be provided to indicate the number of cues in which a channel is used.

16. A Control display shall be provided to indicate origin of current channel levels. Level source may be identified a cue number, individual submaster number or level wheel (independent) control. The last origin of a channel shall be the

displayed parameter.

17. 8 function keys are provided which change definition, depending on which display is active. This feature shall allow swift command sequences to be enacted.

18. COPY TO CUE and COPY FROM CUE function keys shall be available in the PREVIEW display.

19. RECORD WITHOUT SUBS and SEARCH shall be available in the LIVE display.

20. UPDATE SUB and UPDATE SUB+GROUP shall be available in the SUBMASTER display.

21. A NOTEPAD shall be available at any time for recording of notes through the alpha keyboard. The notes will be retained in system memory and can be printed through a hard copy printer.

D. PLAYBACK

1. One key shall be able to start an entire cue, comprised of up to eight parts. Manual override and rate control shall be immediately available.

2. The system shall allow up to 128 simultaneous fades, including those on the 8 playback faders, phantom fades, and fades within effects.

3. Cues assigned to faders may be stopped, reversed, or converted to manual at any time. The recorded time value may be proportionally adjusted with the rate wheel.

4. Groups, effects or individual channel assignments may be assigned to the submasters for playback. It shall be possible to assign the submasters individually, in a command string, or via the Macro keys. Stage levels may be immediately assigned to a submaster using "RECORD" "SUB" "#" "*". Active submasters shall not load with pending information until a submaster handle is brought to 0. The status of information present on submasters and the level of submasters shall be available on a PLAYBACK SUBS display.

5. 999 user programmable Macros are provided which can contain up to 32 command line keystrokes. This feature allows automatic execution of a group of commonly used features or of cue/submaster sequences. Macros can be initiated from cues.

E. SPECIAL EFFECTS

1. Up to 999 special effects may be recorded. Any effect may be assigned to a cue for automatic playback or it may be loaded to a submaster for manual operation.

2. Each effect can contain 99 steps with a combination of cue end states, groups, submasters, other effects, and channels in each step with independent levels. The control list may contain up to 50 elements.

3. Each step can contain individual step time, fade in, dwell, fade out times and overall high and low level settings. Default times and values are operator programmable for swift effect recording.

4. Step control list elements can be edited using the ">", "<", and "HOME" keys. Entries may be modified, deleted, or inserted.

5. Each effect can be assigned with any combination of attributes, including

positive, negative, reverse, bounce, build, and random. Effects can also be recorded with alpha numeric labels for fast identification when reviewing or when loaded onto a submaster.

6. A Test Function is provided to instantly stop and start an effect for composition and preview purposes.

F. BACKUP AND DIAGNOSTICS

1. The system shall include, as standard, a full tracking reserve backup with duplicate electronics- including power supply and disk drive. Two facilities are supplied:
   1) duplicate electronics in the main console which are switched with a keyswitch on the console surface and
   2) duplicate electronics in the tower which are switched automatically if a failure is detected in the active computer or manually by keyswitch on the tower.

The automatic switchover can be disenabled if required. The reserve systems may be switched at any time with no change in operation.

2. In the event that any key on the console, including fader manual and submaster bump buttons, becomes damaged or inoperative, its action can be assigned to one of the eight macro keys.
The code for this may be entered at any time, even after the button has ceased operation.

3. The memory diagnostic shall sequentially write and read all locations in memory with various test patterns.

4. The disk diagnostic shall write and read all locations on disk with test data.

5. The video diagnostic shall test all dot positions for visibility, viability of character locations, and legibility. Two test patterns are used, verifying pixels and overall clarity.

6. A Dimmer Overtemp LED indicator shall be located on main console surfaces to allow potential overtemp monitoring of Strand supplied dimming systems.

IV. PERIPHERAL EQUIPMENT

Optional equipment may be added to an existing system at any time. All wiring and software provisions for optional equipment are furnished with a standard system.

1. High Speed Hard Copy Printer - Provides a printed record of cue, group, effect, patch, submaster, and note pad information. Printing shall be a background function and other commands shall be available on the console surface while printing is occurring.

2. Designer's Remote Console - This console shall be self contained with all operator keypads and playback facilities present on the main console, including submaster controls if desired. The designer's remote shares the memory of the main tower, but has distinct command line, display control, and wheel control. A "TAKE CONTROL" feature shall be provided to rob channel control from another device if required. Varying degrees of system lockout are provided by the main console. Up to 2 designer's remotes can be added to a system in addition to the main console.

3. Handheld Focus Remote - The handheld focus remote is provided with a 14

character LCD display. It has distinct command line and level control, but shares system resources with the main console(s). It shall facilitate patching, channel address, recording, cue execution, and macro key commands. A "TAKE CONTROL" feature shall be provided to rob channel control from another device if required. Varying degrees of system lockout are provided by the main console. up to 3 handheld focus remotes can be added to a system in addition to designer remote consoles.

4. Auxiliary Control - Space shall be provided to allow an auxiliary control panel for houselight, worklight, or transfer take control.

V. POWER REQUIREMENTS

The system requires 10 amps of 120 VAC, 60HZ, 2 Wire and ground AC power. 220/240 VAC, 50HZ input power is also available.