

# Strand Lighting Specification

## I. 310 SERIES SHOW CONTROL SYSTEM

### A. 310- SHOW CONTROL SYSTEM

#### 1. Hardware Overview

- a. The lighting control shall be a Strand 310 series ShowController. All controls shall be microprocessor based and specifically designed to provide complete control of stage, studio and entertainment lighting systems in a show control environment.
- b. All equipment shall be designed and manufactured by a company operating a quality system approved to ISO9001. It shall be CE, UL& cUL listed.
- c. The controller shall consist of a rack mounting processor enclosure. The design shall permit Interconnection of all components via Category 5 cable with RJ45 connectors operating a high speed data bus, SBus, using an industry standard system. 24 External contact closure inputs, Ethernet, SMPTE and other control sources shall be fully supported.
- d. The Processor will be network enabled.
- e. Systems that do not provide the following capabilities shall not be acceptable.

#### 2. Capacities

- a. The controller shall provide direct control of up to 1024 DMX512 (1536 with ShowNet) devices via a maximum of up to 600 (400,250,125) intensity and 400 (400, 200, 125) attribute channels. Attributes shall be units of control dedicated to color scrollers and moving lights. For maximum flexibility in configuration and future upgradability controller hardware and software shall be available separately.
- b. A maximum of 600 cues, 24 submasters x 5 pages, 500 groups, 300 effects, 3000 macros and 1 patch may be stored in internal non-volatile memory and archived to 3.5" MS-DOS formatted floppy disks. Show files and Back ups shall be stored in internal non-volatile memory and on Floppy disk. Industry standard Intel Pentium microprocessors shall be employed.

#### 3. Control Interface

- a. The main controls shall consist of a backlit touchscreen featuring dedicated control keys, context sensitive soft keys with on-panel LCD labels. A removable key shall be provided for the purpose of locking the main controls, with the exception of the "Panic" button. A "Panic" button shall be provided to take the controllers outputs to a safe and known state. Control commands shall be accepted as either command line or direct entry as a user option.
- b. Two playbacks shall be provided, Interaction between each playback shall be user programmable as highest level or latest action takes precedence. Each playback shall operate in automatic or manual fade modes

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executing cues while following links, loops and subroutines. The system shall support two fully independent cue sheets, one for each playback. A control wheel shall provide rate override of fades or effects. Tracking and Cue Only modes of operation shall be supported. Up to 100 simultaneous fades may be run as needed.

- c. Each submaster shall be individually programmable as normal, inhibitive or independent with programmable split up/down fade times, attribute times, and text labels recordable per page.
  - d. Supermaster functions may be assigned to the submasters, providing mastering of effects, submasters, flash level and DMX input.
  - e. 1 high-resolution monitor/LCD port shall be provided for the display of levels, cues, submasters, groups, effects, set-up & patch screens selectable from direct on panel keys. There shall be an option to fit a second monitor/LCD port.
  - f. Attributes shall be excluded from inappropriate masters and shall combine on a latest action takes precedence basis.
  - g. An optional detachable alpha numeric keypad for text labeling and software and hardware for dimmer reporting, remote faders and switches, remote video, MIDI/SMPTE & Ethernet networking shall be available.
  - h. Support for an optional digitizer shall be provided to give access to all system commands and functions through programmable macros.
  - i. A mouse port shall be provided to access all moving light functionality. Supported features include X/Y axis for positioning, Attribute access via left and right mouse buttons and attribute adjustment via scrolling wheel.
4. Software System Overview
- a. Operating Software updates shall be user installable from 3.5" floppy disks.
  - b. English, French, German, Spanish, Swedish, Russian, Italian & Dutch language support shall be built-in as shall on-screen help.
  - c. Channel and attribute capacity shall be software upgradable at any time to the maximum capacity of the controller.
5. Processor Housing Interface List. The following controller interfaces shall be provided:
- a. VGA/LCD-panel link Output 1 and 2
  - b. Keyboard
  - c. Serial COM1
  - d. Printer (Parallel LPT1)

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- e. Auxiliary 1 (Focus Remote)
- f. Universal DMX 512 Dimmer Mux Output 1
- g. Universal DMX 512 Dimmer Mux I/O 2 (Output or Input)
- h. Auxiliary 2 (Remote dimmer supervisor)
- i. Sbus 1
- j. SBus 2
- k. SBus 3
- l. SBus 4
- m. MIDI Input
- n. MIDI Through
- o. MIDI Output
- p. SMPTE Input
- q. 24 Contact closure inputs
- r. Mains Power Input
- s. Ethernet 10/100BaseT

### 6. Controller Physical & Electrical

- a. The controller electronics shall be rack or desk top mounting and shall use an Intel Pentium microprocessor.
- b. The controller shall be constructed of a protected steel enclosure with an ABS front facia. An integral LCD touchscreen display shall provide an extensive user control interface. Remote controller Modules may be connected to the processor by up to 330 feet (100 meters) and interconnected using standard Category 5 Cable with RJ 45 connectors. Communication between remote panels and the system processor shall be SBus high speed secure communications with full error checking. Remote Panels may be hinged and folded for easy and secure storage. A mouse port shall be provided. Each controller shall be shipped from the factory fully assembled.
- c. The controller shall be designed for table, tower, wall or rack mount operation. Each processor shall include SBus connectors for interconnection of system components, DMX, Ethernet, Printer and Auxiliary device connectors. An integral floppy disk drive shall provide archive/library storage of show files.

### 7. Operational Environment

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- a. The acceptable ambient operating temperature shall be 0° to 40°C (32° to 104°F) and the ambient storage temperature shall be -40° to 70°C (-40° to 158°F)
- b. The acceptable operation location shall be the equivalent of a good office environment, without excessive dust.
- c. Acceptable humidity levels for operation shall be 5% - 95%, non-condensing.

### 8. Standards Compliance

- a. All equipment shall be designed and manufactured by a company operating a quality system approved to ISO9001.
- b. The controller shall be CE, UL & cUL listed.

## B. GENIUSPRO/LIGHTPALETTE OPERATING SOFTWARE

### 1. Operating System

- a. The system software shall be a true 32 bit multi-tasking operating system. Programs using a 16-bit operating system shall not be acceptable. The software shall be user selectable for Lightpalette Tracking style operation or Preset/Whole cue operations using GeniusPro software. Either operating mode shall be user selectable in set up.

### 2. Channel Control

- a. Selection: Channel control lists shall be composed of any combination of control channels, cues, submasters, effects or groups using the +, -, Thru & Thru-on (shift Thru) syntax. Any one selection shall be capable of being manipulated for level, color scroller & moving light control without the need to re-select.
- b. Intensity Control: Intensity levels can be set using the @ key and adjusted using the level wheel. Proportional or shaft mastering of selected channel levels on the wheel shall be a user option as well as sensitivity of wheel response. Context sensitive soft keys with on panel LCD labels shall be provided for Full, DMX level, up%, down%, Off & Copy From. An On key with per channel user definable levels shall be provided, as shall a Remainder Dim key.
- c. Color Frame Control: Full color frames shall be selected using the @ATT key followed by the frame number. Part frames may be adjusted using the rotary encoder on the mouse. Dedicated displays shall be provided to show color frame attributes of control channels. Preset focus groups shall be available to permit the recall of specific colors from scrollers or moving lights with different configurations. Selecting the @ATT key shall provide additional softkey access attribute filters.
- d. Commands: Command entry shall be user selectable between command line (e.g. RECORD CUE 1 \* [enter]) and direct entry (e.g. CUE 1 RECORD). Omitted parts of abbreviated commands shall be

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displayed on the command line. The text label associated with cue, group, effects & attribute page numbers shall be displayed on the command line.

### 3. Cues

- a. The controller shall default to tracking cue recording (Lightpalette) or preset recording (GeniusPro). Q Only operation shall be available as a user selected option for Lightpalette and Tracking shall be an option for GeniusPro operation.
- b. Each cue may have split fade & delay times, a wait time, link & loop parameters, calls for macros & effects, a text label and may be assigned to either playback.
- c. Cue zero shall always be an intensity only blackout cue.
- d. Cues shall have up to 6 parts.
- e. Intensity only and attribute only cues and parts shall be supported.

### 4. Recording & Updating

- a. Cues, groups, submasters, macros, & effects shall be recorded or updated from the keypad. Channel lists may be copied between cues using the Update command key.

### 5. Playbacks

- a. Two playbacks shall be provided capable of supporting up to 100 simultaneous fades. Interaction between each playback shall be user programmable as highest level or latest action takes precedence operating from either a common or separate cue sheet (sequence list). Each playback shall operate in automatic or manual fade modes executing fades while following links, loops and subroutines.
- b. The system control wheel shall provide rate override of fades or effects.
- c. Q Only and Tracking modes of operation shall be supported.
- d. Auto-Preheat shall provide an optional automatic means of fading intensity channels to a user defined preheat level before the channels are needed without the need to record extra cues.

### 6. Effects

- a. Up to 300 text labeled effects containing up to 99 steps may be stored with each show. Up to 12 simultaneous effects may be played back from cues, submasters, and macros or directly from panel keys.
- b. Chase and build effect types shall be supported as shall forward, reverse, bounce and random directions.

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- c. Levels and attributes shall be recorded in every step or shall be randomly generated or inverted or alternatively normal and inverted every cycle.
  - d. Discrete in, dwell, out and attribute fade times shall be programmable on a per step basis. Default in, dwell, out & attribute fade times and low & hi levels shall be provided per effect.
  - e. Effects shall be chain-able and have overall fade in and out times.
  - f. Step control shall be timed, manual or, with optional hardware: MIDI, SMPTE or external contact closure controlled. Effects may be programmed to start or stop from a cue, run a defined number of cycles, run for a defined period of time or stop only after the last step has completed. Effects may also be loaded and run from submasters.
  - g. Effects may be programmed as Last action or Highest takes precedence pile on events.
  - h. Direct control of a running effect type & direction shall be provided from a set of effects playback keys. The rate wheel may be used to adjust the step or fade in and out times.
  - i. Modifications to running effects may be returned back to the effects memory for re-recording.
7. **Cue, Submaster and Effect Previews & Cross Reference Screen**
- a. Cue, submaster and effect preview modes shall be supported to permit blind changes to be made to these entities using channel control syntax.
  - b. A Cross Reference screen shall provide an alternative view of cues by showing levels recorded in a range of cues.
  - c. Changes may be tracked or restricted to one cue using the Cue Only soft key.
8. **Submasters and Supermasters**
- a. Five pages of 24 fully overlapping “electronic” submasters shall each be provided.
  - b. Each submaster shall be individually programmable as normal, inhibitive, and exclusive or independent with programmable split up/down fade times, attribute times, and text labels recordable per page.
  - c. Supermaster functions may be assigned to the submasters, providing mastering of effects, submasters, midi rate, flash level and DMX input.
  - d. Bump functions may be individually enabled, disabled, latching or in solo mode.
  - e. Submaster pages shall be automatically held on a per submaster basis until a submaster leaves the home position.

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- f. Submasters shall be loadable (and gang-loadable) with the contents of cues, groups, other submasters or channel lists. Effects may be loaded and run from submasters.

### 9. Groups

- a. A maximum of 500 Groups may be recorded for fast recall of commonly used stage looks. Groups can be independently recorded or directly recorded from the stage output. All 500 groups may be used as preset focus groups. Cues recorded using preset focus groups may be easily edited and changed by simply updating the focus groups.
- b. Each group may be assigned a text label.
- c. Attribute groups can also be created to allow grouping of luminaire functions.

### 10. Display Formats

- a. User programmable channel display formats shall be provided to show channel levels, colors, and attribute information. User programmable channel formats shall be provided to show channels in show, defined channels or active channels.
- b. Automatic paging and shifting between standard and attribute formats shall be supported with Tracker software.

### 11. Patch

- a. A proportional soft patch shall be provided.
- b. Dimmers may be profiled, set with a non-dim trigger value, or unpatched at a level.
- c. Tracker software shall incorporate a library of luminaires to simplify patching.
- d. Patch displays shall be ordered by channel or by mux output.

### 12. Profiles

- a. Up to 99 text labeled profiles shall be supported per show. Point resolution shall be a maximum of 256 steps.
- b. Profiles may be applied to dimmers or up/down fades in cues or parts.
- c. Intermediate levels between any two points shall be automatically calculated when defined.
- d. Profiles shall include a graphical editing screen.

### 13. Set-up

Comprehensive set-up screens shall be provided to configure external communications and operation of the controller.

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### 14. Macros

- a. Up to 3000 macros each of up to 120 key presses may be recorded
- a. Macros may be activated by number, direct action soft key, from a cue or submaster, external switch contact, remote control, controller power-up or at pre-programmed times.
- b. Macros numbered from 1001 may be used to map commands to an optional digitizer tablet.

### 15. Archive

- a. Show archive shall be supported to floppy disk or optional file server with (Networker software).
- b. The archive screen shall provide a means to select the current show from the floppy disk or file server (with Networker) and to copy a show (or any part of a show) to or from a floppy disk, or the file server (with Networker).
- c. Shows shall have text labels and a time and date stamp.
- d. Show files shall be maintained within the controller in non-volatile memory.

### 16. Printing

- a. The system shall support a wide range of dot matrix and HP compatible laser and ink jet printers. Color printing shall be specifically supported.
- b. The following printouts may be requested: Patch, Cues , Groups, Subs, Profiles, Macros, Fixtures, Channels in Use, Channels not in use.
- c. All printouts may have user definable ranges.

## B. PERIPHERALS

1. Support shall be provided, as standard, for the connection of up to two handheld remote controls, a digitizer tablet and several different types of printer including HP LaserJet & InkJet and compatibles.
2. Additional peripherals, such as remote video, and remote DMX stations shall be supported through the integration of additional optional equipment.

## C. SYSTEM SOFTWARE

1. Channel Capacity Software Upgrades



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- a. Channel and attribute capacity shall be upgradable via software to the maximum capacity of the controller in 50 or 200 channel increments.

### 2. Tracker Application Software

- a. The Tracker application software package shall be an enhancement to the Genius Pro/Lightpalette software package. It shall provide intelligent control of any DMX moving lights as detailed below:
- b. All attributes of a moving light fixture (intensity, color, gobo, focus, X-Y position, effects, CMY, RGB, etc.) shall be accessed by typing one channel number.
- c. Individual attributes shall also be selected from left and right mouse buttons and scrolling wheel in conjunction with on screen displays showing attribute names.
- d. Displays shall be provided which show all attributes of a channel, and shall be capable of automatically switching between condensed intensity only or intensity and color scroll or full attribute displays.
- e. Attributes shall be excluded from inappropriate masters and normally operate in latest action takes precedence fashion within submasters, playbacks and effects.
- f. When attributes and levels are recorded in a submaster the levels shall be mastered by the fader but the attributes shall go to their recorded value in the recorded time in a latest takes precedence basis to ensure that scenes played back on submasters can be faded in and out with recorded colors and positions. When attributes only are recorded into a submaster, the attributes values within the submaster shall be mastered by the fader and operate in a highest takes precedence basis to allow attributes to be manual adjusted.
- g. Cue tracking shall be supported for attribute channels.
- h. Channel and attribute cross reference screen shall be provided for blind plotting and viewing of cues.
- i. Auto-Move-When-Dark shall provide an optional automatic means of moving fixtures to the next required position (pan, tilt, color, gobo, etc.) after the previous fade has completed and when the fixture intensity is zero without the need to record extra cues.
- j. A library of common moving fixtures with text labels shall be provided to facilitate fast patching. Additional fixtures may be added to the library by the user at any time. Full user patching of all attributes shall also be provided to allow fixtures not currently included in the library to be used.
- k. 500 preset focus groups shall be provided to simplify the programming of moving lights.

### 3. CommuniquéPro Application Software

- a. The CommuniquéPro application software package shall be an enhancement to the Genius Pro/Lightpalette software package. It shall provide an range of remote control facilities as detailed below:

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- b. A SMPTE event cue sheet shall be provided to support full SMPTE time code operation, when using the optional add-in hardware.
- c. Up to three sequential bytes per user programmable macro trigger shall be provided for MIDI & RS232.
- d. A single DMX-512 input shall be available for patching direct-to-output dimmers or for assignment to a Supermaster so that incoming 'dimmer' levels are interpreted as control channels up to the maximum channel size loaded. Supermasters may be configured to master either type of DMX-512 input.
- e. Full remote control of all controller keys shall be available by RS232 character strings.
- f. A programmable RS232 or RS 485 remote cue go output shall be available for triggering external devices. Output format shall be standard ASCII format for interfacing to a wide range of external devices and computers..
- g. The following MIDI functions shall be provided, when using the optional add-in hardware:
  - User programmable MIDI channels 1 to 16. MIDI note on / note off for bumping submasters.
  - MIDI note on / note velocity for flash level.
  - MIDI configurable general purpose controllers.
  - MIDI Show Control (MSC): Go, Go Cue X, Load Cue X, Stop, Resume, User Macro Fire, and Reset. MIDI for tracking backup or slaving controllers together. MIDI Control Change message for all controls.
- h. The controller shall support cue execution via SMPTE time code events. A SMPTE input shall be supported on the controller's audio input connector. The following SMPTE functions shall be supported:
  - SMPTE events may be recorded and edited Live (learn mode) or blind
  - A separate SMPTE cue sheet shall be provided.
  - The controller shall support full rehearsal operation allowing operators to "Go to" any time code location.
  - Up to 3000 SMPTE events shall be supported.
  - 24, 25 and 30 FPS plus drop frame 30FPS shall be available
- i. Contact closure inputs shall be provided for remote access to a wide range of system functions.

### 4. Networker Application Software

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- a. The Networker application package shall consist of Ethernet network enhancement software for the 300 series controller and SN10X using the built in Ethernet port on the controller.
  - b. It shall support industry standard 10BaseT cables, connectors, hubs, concentrators and bridges. It shall support the following features:
  - c. Remote DMX
    - i. Up to 2 remote DMX ports at each SN100 and SN102 node, and up to 4 DMX ports on each SN103 and SN104 node, shall be user configurable as inputs or outputs.
    - ii. DMX distribution between any SN10X series node shall be supported without routing via a controller.
  - d. Remote Video: VGA outputs shall be available at every SN100 and SN102 on the network.
  - e. Remote Connections
    - i. Printouts may be redirected over the network to any compatible printer connected to any other console or SN100.
    - ii. Up to 2 handheld remote controls may be connected to any SN100, or SN102.
    - iii. Faders and switches on any SN100 may be used to trigger macros or master faders on any console on the network.
  - f. Tracking Backup: Two controllers may be operated as main and full tracking backup.
5. Reporter Software
- a. The system shall support dimmer and dimmer rack processor status reporting. Processor status reporting shall include processor status, over temp, and DMX operation. Dimmer status shall include load and load change data when combined with CD80 and EC 90 supervisor dimmer modules.
  - b. This link shall also support record and playback of system wide control presets.
  - c. Controllers with Networker software shall support direct connection over our Reporter link or via a ShowNet Ethernet Network.
6. Off-Line Editor Software
- a. A DOS hosted off-line editor shall be available which shall enable show files to be edited and simulated in real time on Pentium PC equipped with a VGA display, 8M bytes of memory and DOS 6 or later.

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- b. All facilities of the controller, including patching, channel control, playbacks, submasters, effects & set-up shall be supported on the off-line editor.
- c. Show files shall be portable between all configurations of Genius Pro, Lightpalette and off-line editor.

### 7. Wired Handheld Remote Focus Unit

- a. The Wired Handheld Remote shall consist of a handheld terminal. The remote shall be complete with 34 key keypad and 4 X 20 Character supertwist LCD Display. The controller shall include a 25 foot cable and connect to the RS232 handheld remote input on the controller or any handheld remote receptacle station.
- b. The remote shall support channel addressing and direct dimmer access as well as Cue recall and playback.
- c. All equipment shall be designed and manufactured by a company operating a quality system approved to ISO9001.

### 8. VGA Color Video Monitors

- a. The controller and SN nodes shall support computer industry standard VGA color video monitors.

### 9. Printer

- a. The system shall support a variety of computer industry standard printers, including, but not limited to, LaserJet, DeskJet, Color DeskJet, Epson FX, and IBM ProPrinter.

### 10. ASCII Keyboard

- a. Color coordinated Mini Keyboards, and Full Sized Keyboards, both computer industry standard shall be available.

#### D. THE CONTROLLER SHALL BE SUPPLIED WITH:

1. Power cord
2. 25' DMX control cable
3. Microsoft Intelli-Trackball Mouse

#### E. PROVIDE THE FOLLOWING:

Qty. Cat. No. Description

# 95708 controller with 125 channels, includes the following:

- Genius Pro/Lightpalette software with 125 channels and 125 attributes

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- Tracker, Networker, and CommuniquéPro software
- # 95709 controller with 250 channels, includes the following:
  - Genius Pro/Lightpalette software with 250 channels and 250 attributes
  - Tracker, Networker, and CommuniquéPro software
- # 95710 controller with 400 channels, includes the following:
  - Genius Pro/Lightpalette software with 400 channels and 250 attributes
  - Tracker, Networker, and CommuniquéPro software
- # 95711 controller with 600 channels, includes the following:
  - Genius Pro/Lightpalette software with 600 channels and 400 attributes
  - Tracker, Networker, and CommuniquéPro software
- # 66011 VGA 14" Monitor 110V (Larger displays available, consult factory)
- # 66041 Handheld Remote
- # 66210 Mini keyboard
- # 66021 Printer, Inkjet (120V)
- # 66023 Printer, LaserJet (120V)
- # 66025 Printer, Color Inkjet (120V)
- # 66032 Dust cover, 14" monitor
- # 66052 Touring case, 14" monitor
- # 66071 Cable Extension for hand held remote -30' (10m)
- # 66072 Cable Extension for hand held remote - 80' (24m)
- # 95090 DMX output cable, A5M/A5F, 25' (7.6m)
- # 95091 DMX output cable, A5M/A5F, 50' (15m)

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- # 95092 DMX output cable, A5M/A5F, 100' (30m)
- # 66300 Fader module
- # 66304 VGA LCD card