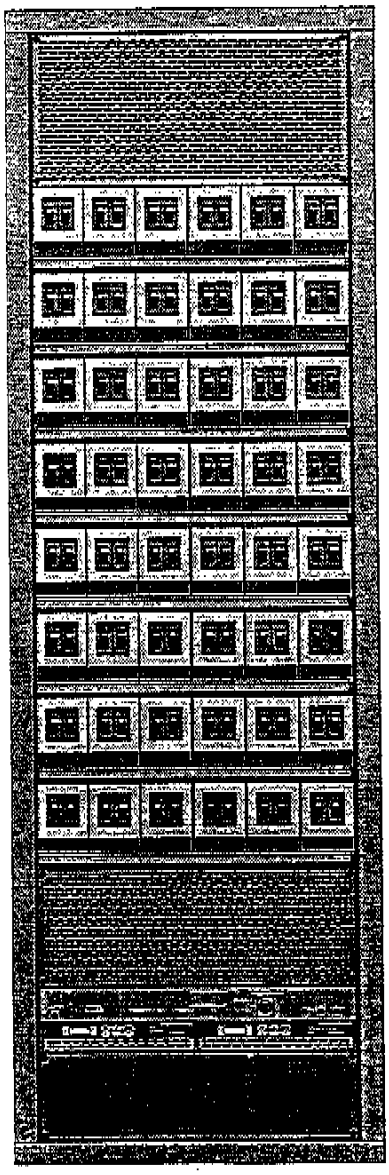

CD 80 SUPERVISOR

User's Manual

Strand LIGHTING

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Chapter 1
Introduction and Assistance

This manual provides information on the installation and operating procedures for CD80sv dimmer racks.

Manual Organization

This manual contains the chapters shown below, plus an Index.

Introduction and Assistance (chapter 1) - tells you about the organization of this manual, plus definitions and conventions used. Also tells you how to get technical help if necessary.

Operational Features (chapter 2) - gives an overview of the operational and programmable features of CD80sv dimmer racks.

Hardware Description (chapter 3) - gives an overview of the major hardware components in CD80sv dimmer racks.

Installation (chapter 4) - tells you about the installation requirements for the dimmer rack. This chapter shows pinouts for externally accessible connectors, cable types and lengths, and (where applicable) setup information.

Front Panel Programming (chapter 5) - tells you how to use the menus in the processor module to configure the system if necessary.

Event Reporting (chapter 6) - tells you how to set up and use event reporting for Reporter dimmers.

Basic Troubleshooting (chapter 7) - tells you how to begin troubleshooting if you have problems with dimmers or the rack.

Periodic Maintenance (chapter 8) - lists the steps which should be taken to keep the equipment running at its best.

Definitions

This manual uses the following definitions throughout:

channel Device controlling a dimmer or group of dimmers. Historically, there is a physical controller (such as a slider) for each channel. On most current control systems, channels are numbers accessed by a numeric keypad. Each channel can control multiple dimmers.

CIC (central interconnection board) The printed circuit board on which all contractor control wiring connections are made. It is located on the top of the electronics chassis.

circuit Connection device and wiring for powering a lighting fixture from a dimmer.

circuit ID A unique 4 digit number which you can assign to each dimmer. The circuit ID may be the same as the dimmer number, or may be used to indicate circuit location, phase, channel number, etc. This feature is useful for system wide control and Reporter PC™ functions.

crossfade A fade which contains both an up-fade and a down-fade. Also may refer to any fade where the levels of one cue are replaced by the levels of another cue.

cue The process of recalling a preset from its memory location and putting the result on stage.

> *Preset, memory, and cue are often used interchangeably.*

curve The relationship between a control level and the actual dimmer output. Also known as "dimmer law."

dimmer law See "curve."

dimmer Device controlling power to a lighting fixture. Two lights on the same dimmer cannot be separately controlled.

default The original factory settings.

fade A gradual change in stage levels from one set of intensities ("look") to another.

fade time The time it takes for dimmer levels to go from their current levels to the levels in the selected preset. Each preset has its own fade time.

hard fired dimmer Standard dimmers get power for their circuitry from the AC power input to the dimmer module. Hard fired dimmers get power for their circuitry from a separate power supply connected directly to the power mains. Hard fired dimmers provide more stable outputs when used with fluorescent ballasts, cold cathode lighting, and other inductive loads.

Level A numerical value used to express the "brightness" of a dimmer. Usually shown as %.

Mux Abbreviation of the word "Multiplex." Multiplex systems transmit data (usually dimmer information) from a lighting controller to a dimmer rack via a single cable rather than via a pair of wires for each dimmer.

patch Historically, the process of physically connecting circuits to dimmers. Now usually refers to electronic assignment of dimmers to channels.

phase The three phases of the mains supply to which the dimmers are connected are identified as phase 1, phase 2, and phase 3 in Europe and phase A, Phase B, and Phase C in the US.

power module A chassis containing one or two dimmers or contactors. This is sometimes referred to as a "dimmer." However, each CD80sv power module can have one or two dimmers or contactors in it, so this manual distinguishes between dimmers (individual power control circuits) and power modules (a collection of one or more power control circuits).

preset A pre-defined setup of intensities for a set of channels, stored in memory for later replay. For Outlook applications, the CD80sv processor module stores 8 programmable presets per room for up to 16 rooms. For SWC applications, the processor module stores 99 programmable presets. Preset 0 (ZERO) is always a blackout.

preset fade time See "Fade Time."

rack number A number used to uniquely identify each dimmer rack in a multiple rack system. Rack numbers are set from the front panel of the processor module, and are usually set by the installation engineer.

room An area separately defined for purposes of architectural lighting control (e.g., Outlook control stations). This is usually either a room in the traditional sense (an indoor enclosed area) or a portion of a room which can be partitioned off. Each room may be separately and simultaneously controlled by the system.

SSR (solid state relay) A power control device used in Strand dimmers that contains two silicon control rectifiers (SCRs), control circuitry, and optical isolation circuitry.

SWC (system wide control) A method of programming and controlling more than one dimmer rack simultaneously. A hand held controller lets you program and recall all 99 presets, and control individual dimmers. 8 and 16 channel pushbutton stations, and an A/V interface, let you recall any 8 or 16 of the 99 presets at each station. Please contact Strand Lighting or see the *System Wide Control Data Sheet* or *System Wide Control User's Manual* for details on how SWC works.

Reporter PC™ Software that runs under Microsoft Windows and lets you set up certain Strand Lighting dimming cabinets and racks (including CD80sv racks). Please contact Strand Lighting for details.

Conventions

The following additional conventions are used in this manual.

[ESC]	Shows the actual push-button labeled "ESC."
ON	(all capital text) shows the status of a function or switch, as in "Turn the switch ON."
Input	(text with first letter capitalized) shows the actual menu selection for menu displays with text selections (e.g., Fan speed can be set to Fixed or Variable).
Patch	(bold text with first letter capitalized) shows a menu name (e.g., Patch menu).
Operational Features	(italic text) refers to a specific chapter or section name, and to specific menu items. Also used for emphasis in notes.

Technical Assistance

CD80sv racks and dimmers require a minimum of maintenance and servicing. See chapter 7 for basic troubleshooting procedures, and chapter 8 for periodic maintenance procedures.

Problems

If equipment fails to operate properly upon installation, or under normal load and temperature conditions, and basic troubleshooting procedures are not effective, please contact Strand Lighting Field Service at the office serving your area.

Technical Questions

For technical questions regarding setup, operation, or maintenance of this equipment, please contact the Strand Lighting Field Service office serving your area.

Parts Purchases

For purchase of spare parts or documentation, please contact the Strand Lighting office serving your area.

Comments and Suggestions

For comments regarding equipment functions and/or possible improvements, or for comments on this manual, please call or write to the Marketing Department at the Strand Lighting office serving your area.

Addresses

Addresses for all of the Strand Lighting offices are shown on the reverse side of the manual title sheet.

Chapter 2
Operational Features

This chapter presents the basic operational features of the CD80sv rack.

Configuration

Large dimmer racks have provision for up to 48 power modules. Small dimmer racks have provisions for up to 24 power modules. Power modules contain one or two dimmers, and power module types can be mixed within a rack in any combination.

Processor modules are available with 48 or 96 dimmer control outputs to drive CD80sv dimmers. In a system with a 96 channel processor, a duplicate (backup) processor can be provided in the rack. 96 channel processors also have 12 analog outputs (0 to +10 volts at 1mA maximum) for auxiliary control (e.g. the electronic fluorescent ballast controller).

The following configuration items are usually programmed in the factory or during commissioning, but can also be reprogrammed by the user.

- Processor module display is set to English, French, German, or Spanish.
- Arrangement of dimmer module types for each module position is programmed. From this information, dimmers and analog outputs are given sequential dimmer numbers to simplify programming. The Auto Slot Type command lets the software scan the dimmer rack and determine any Reporter module slot types. Non-reporting module slot types must be set manually.
- Slot types for Reporter power modules are automatically updated if a Reporter module is replaced.

Programming Rack Functions

Several additional functions are generally accessed or programmed in the field by the user as required:

- Rack number (1-99) is set. This number is used by the Reporter PC software.
- Panic selection and configuration
- Maximum output voltage (per dimmer): 50-250 volts (e.g. set to 105V for extended lamp life).
- Minimum level (per dimmer): 0% - 100% (e.g. set to 10% for aisle lights or large lamp preheat).
- Room and channel Patching (for applications using Outlook and other Digital Network Control compatible stations).
- Each dimmer and analog output can be patched to any valid DMX512, AMX192, or D54 address number for the standard multiplex input A (Mux A). Dimmers can only be patched to valid DMX512 address numbers for multiplex input B (Mux B).
- Circuit ID--used by SWC and Reporter PC software.
- Response curve assignment (per dimmer): Linear, Square, S-Curve, Fluo El (for electronic fluorescent balasts) and FluoMag (for magnetic fluorescent balasts), and Non-Dim. The two fluorescent curves let you set the top end voltage and the bottom end cutoff voltage. The Non-Dim curve lets you set the turn-on threshold for the non-dim. An additional 5 user defined curves can be defined using the Rack Config menu, or downloaded from the Reporter PC software.
- Record and recall presets (1-8, ON and OFF per room for Outlook control, and 0-99 per rack for System Wide Control).
- Define Preset Number or "Hold" condition on Mux failure.
- Define power-up preset per rack for architectural presets.
- Calibrate top set between 7 and 13 volts for analog inputs.
- Calibrate top set between 0 and 10 volts for analog outputs.
- Set LCD contrast.
- Error log accessable from the processor module or Reporter software.
- Dimmer reporting enable/disable (load status reporting dimmers only).

Setting Dimmer Characteristics

Since the control electronics for all dimmers is in the processor module, several characteristics traditionally associated with the dimmer module can be set in the processor module.

- The output response curve can be set to Linear Power, Square, S-Curve, Fluo Elec (for electronic fluorescent ballasts), Fluo Mag (for magnetic fluorescent ballasts), and Non-Dim. The two fluorescent settings let you set the top end voltage and the bottom end cutoff voltage. The Non-Dim setting lets you set the turn-on threshold for the non-dim. 5 additional user programmable curves are available through the Rack Config menu or from the optional reporter software.
- Dimmer response (per dimmer): fast (30ms), normal (100ms) or slow (300ms). This determines a dimmer's rate of response to a change in control level. Slow is usually set for large tungsten loads to reduce filament inrush, medium or fast for small loads.

- Dimmer control assignment (per dimmer) to the "combined" levels of Outlook preset, SWC preset, Mux A, Mux B, and analog ("Input") or to a fixed level (0% - 99% or "Full"). The way in which the various input levels combine is also determined on a per dimmer basis by setting the dimmer Mux mode.
- A special smoothing algorithm is applied to small level changes to maintain smooth fades with long fade times.
- 5 user laws are set to 1:1 by default, and can be programmed from the Rack Config menu or from the Reporter PC.

Inputs

The following control inputs are available for CD80sv dimmer control.

- Multiplex A input, selectable for DMX512, AMX192, or D54 inputs.
- Multiplex B input for DMX512 only.
- 32 (96 channel processor) or 16 (48 channel processor) analog inputs patchable to any dimmer.
- Digital Network Control for Outlook™ and compatible architectural control stations.
- SWC™ (system wide control) for remote preset panels, A/V interface, and hand held programmer.
- Reporter PC™ software for supervision from a PC.
- Rack keypad and LCD display to program all functions.
- RS232 port for local PC running Reporter PC, enabling setup, playback, show memory storage, and operating software upgrades.
- External switch contacts for main/backup processor selection, MuxA/MuxB selection, PANIC enable/disable, "Go to Preset Zero," and "Go to Next Preset."

All control conections are in a single location for easy access, and are via 2-part plug-in screw terminal connectors for easy removal of the electronics chassis.

Outputs

The following outputs are available from the CD80sv processor module.

- 96 or 48 dimmer control signals.
- 12 Analog outputs (96 channel processor only) for external equipment.
- Variable fan speed control to minimize acoustic noise.

Load Status Reporting

All CD80sv dimmer modules, including contactor non-dims and hard fired dimmers, are available in load status reporting versions. Load status reporting versions of dimmers can be mixed in any combination with standard dimmers in CD80sv racks. These dimmers report many dimmer status items back to the processor. The processor can then determine a wide range of faults with diagnostic data. Reported items include:

- Dimmer type
- Dimmer output current
- Dimmer output voltage
- Dimmer temperature
- Excess DC output from dimmer

Security Features

In order to minimize the impact of failures to any part of the CD80sv racks, a number of security features are provided with, or are optional with, CD80sv racks.

Standard security features for CD80sv racks are:

- Convection cooling of all components with fan assist.
- 3 fans for redundancy in case of one fan failure.
- Rack overtemperature warning.
- Rack shutdown at 5° C above warning level.
- The processor module can be set to hold the last dimmer levels forever, or to fade to a specified SWC preset after a preset interval in cases of multiplex signal failure.
- Setup data is stored in non-volatile memory.
- Memory card can be easily moved on exchange of processors.
- 2500V opto-isolation of Mux A and Mux B DMX512 inputs, SWC input, Outlook input, Reporter input, and external switch contact inputs.
- Any of 96 dimmers and 12 analog outputs (96 channel processor only) can be assigned to PANIC with a mechanical switch. PANIC can be activated (full ON) from the dimmer rack front panel or from a remote momentary contact switch. This activation does not require processor intervention. It is strictly hardware activated.
- Automatic PANIC on removal or failure of processor module. In racks with two processor modules, both modules must be removed to activate PANIC.
- Keypad lock.

Optional security features for CD80sv racks include:

- Redundant tracking backup (requires a second processor module fitted to the rack).
- Backup processor activated automatically or by remote switching.
- Setup data is automatically transferred between processors if either processor is replaced.
- Reporter PC software lets you store setup data off-line.

SWC™ (System Wide Control)

SWC lets you control multiple CD80sv racks from a single location. A hand held controller lets you program and recall all 99 presets, and control individual dimmers. 8 and 16 channel pushbutton stations let you record or recall any 8 or 16 of the 99 presets at each station. An audio visual interface is also available to activate presets from external contacts. Contact Strand Lighting or see the *System Wide Control User's Manual* for details on how SWC works.

Outlook™

Outlook is a comprehensive family of control stations designed for architectural applications needing a simple, flexible control solution with minimal installation and cabling costs. These control stations can access, modify, and recall lighting levels stored in the CD80sv processor module. Outlook control station features and options include:

- Control up to 16 separate rooms, with up to 12 channels per room
- 8 preset scenes plus ON and OFF for each room
- Manual sliders (3, 6, 9, or 12 sliders per station) for direct control of individual circuits
- Record facility for saving slider levels for future pushbutton recall
- Programmable fade times between 0 and 4 minutes from Outlook control stations or 0 to 10 minutes from the processor module or Reporter software
- Record lockout facility for playback-only operation
- 1, 4, and 8 preset pushbutton stations
- Audio-visual interface
- Room combine stations for room partitioning

Reporter PC™ Software

Reporter software running on a PC under Microsoft Windows lets you control multiple CD80sv racks. This software lets you remotely program all processor features, plus lets you download an additional 5 user programmable dimmer curves.

Reporter software lets you access the raw load status information returned from the dimmers (see above), plus other information including:

- Dimmer Mux mode
- Dimmer level (%)
- Dimmer load (W), load deviation, no load, and overload conditions
- Control failure (dimmer SCR short circuit)
- Input line voltage per phase
- Mux A and Mux B input fail
- Rack overtemperature warning and shutdown

Reporter software also lets you access an error log for dimmers.

Contact Strand Lighting or see the *Reporter Software User's Manual* (Strand part # 85083) for more details on how this software works.

Servicing

CD80sv dimmer racks are designed to be easily serviced in the field. They incorporate:

- A single connector card for control connections for easy installation and maintenance
- Highly reliable, oversized power module contacts
- Replaceable processor module
- Rapidly replaceable SSR and SCR modules

Chapter 3

Hardware Description

The CD80sv dimmer rack is a UL and cUL listed, free standing, factory assembly of welded steel and aluminum construction finished in thermally set powder coat paint.

Dimmer Rack

Each CD80sv dimmer rack consists of an electronics chassis with one or two processor modules and one to three power supplies, a fan module, and up to 48 power modules (large rack) or 24 power modules (small rack). The dimmer connectors at the back of the rack provide for load wire connection. Power distribution is by three or four bus bars, depending on whether the rack is built for single-phase or three-phase power. The bus bars can be on the rear of the dimmer rack, or on the bottom to facilitate connecting multiple racks. A ground lug is provided in the rack. The connectors in the rack are polarized to prevent dimmer modules being plugged into the wrong wattage slots.

Construction

The rack is of welded steel and aluminum construction with bolt-on covers, and is finished in thermally set powder coat paint. The rack will accept eight removeable trays with guides for the dimmer modules, which are screwed in place. The rack and all modules are earth grounded. The electronics chassis and fan module are located at the bottom of the rack above the main power bus bars.

A hinged, locking door covers the front of the dimmer modules. A security plate, held in place with security screws, restricts access to the processor module. Rack components are designed for easy removal and installation so that the dimmer bank is open and empty during installation. Fixing holes are provided so that racks can be bolted together and to the floor.

Size & Weight (Approx.)

	Large Rack	Small Rack
Height	81	57
Width	24.5	24.5
Depth	19.5	19.5
Max weight (empty)	460 lb (205 Kg)	300lb (135 Kg)
Max weight (standard modules)	690 lb (310Kg)	415 lb (185 Kg)
Max weight (w/hi-rise chokes)	825 lb (370 Kg)	480 lb (215 Kg)

Contracting Access

Cable entry for power is through the bottom of rack, so as to provide access onto the bus bars. Contractor load wire connection for the live line is directly into the module connector. Load neutral connection is to the bus bar at the top of the rack. Feed neutral connection is to the bus bar at the bottom of the rack.

Rack Capacity

Rack capacity is 48 power modules in a large rack and 24 power modules in a small rack. When fully populated with dual power modules, a large rack contains 96 dimmers and a small rack contains 48 dimmers.

Any mixture of dimmer ratings and types can be included in each rack. Large racks cannot be fully populated with 12kW dimmers. Please consult Strand Lighting for details.

Power Distribution

The rack is provided with three phase plus neutral bus bar distribution, located in the bottom of the rack. The maximum power rating for this system is 800A per phase. Single phase operation is possible if the total per phase current is no more than 800A. The rack is available with both back bus and bottom bus configuration. Bussing across multiple racks is possible if bottom bussing is used and the bus bars are increased in section to handle the extra current.

Each bus bar is provided with a pair of Ilsco Soldering or crimp lugs for 500MCM cable. The contracting chamber is sized to meet both UL and cUL wiring space constraints.

All dimmers are protected by single pole fully magnetic circuit breakers.

All contractor connections for control lines are by 2-part plug-in screw terminal strips. For signals that must be bussed from rack to rack, two terminal block connections are provided, one for input, the other for output. Strand Lighting supplies appropriate jumpers for rack interconnection in multiple rack systems. All control connections are on a single central interconnect card (CIC) for easy contractor access.

Supply Voltage

CD80sv racks are available for use with 120VAC and 240VAC power. When ordering parts, the mains power for the system must be specified.

Phasing

Phasing within the rack is sequential across the dimmer trays, running in the phase sequence A, B, C, A, B, C for 3-phase systems and A, A, A, C, C, C, for single phase systems. All dimmers in a vertical stack down the rack are on the same phase. In dual power modules, both dimmers are on the same phase. The dimmer rack front panel software refers to phase A as L1, phase B as L2, and Phase C as L3.

Module Connectors

The modules will connect to the rack through a proprietary connector with turned and split brass female power pins and solid brass male power pins. The connector is self aligning when the module is inserted and includes an earth ground pin. Signal connection is through a 6-way connector incorporated into the main design.

All power and signal wiring to the connectors except for the load connection is performed at the factory. The aperture for load wire is suitable for wire gauge 6 AWG or smaller, and has a tapered entry hole to ease wire insertion. The wire is retained by Allen key screw. For 12kW module positions a brass adapter is provided to accept 2 AWG wire.

Control Input

The electronics chassis contains all terminals for control input, an RS485 port for connecting the optional Reporter PC for all racks, and a local RS232 port for connecting the Reporter PC for diagnostic and setup work on individual racks.

A second multiplex input port is included for systems which need to be controlled from two sources.

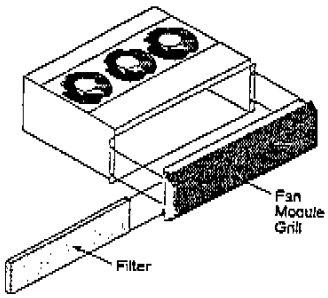
Control Circuit Isolation

Opto Isolation between high voltage and control electronics is rated at 2500VAC.

Control inputs listed above are also isolated from the processor at 2500VAC, offering double optical isolation between the controller and the high power circuits.

Fan Module

The dimmer racks are cooled by a set of three low noise variable speed fans in a fan module at the bottom of the rack. The cooling system is designed to let the rack continue functioning if any one of the three fans fail. Cooling air is pushed up through the dimmer stack and exhausted through venting at the top of the rack. These fans are for dimmer cooling only, and can be set to fixed or variable speeds.



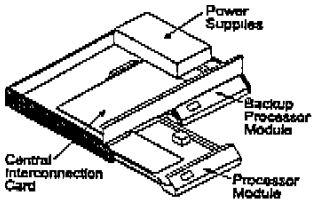
The fixed speed fan setting is for situations where changes in ambient noise are a problem. With this setting, the fans are always ON when the dimmer rack is ON.

The variable speed fan setting minimizes noise and maximizes fan life. With this setting, the fan speed is adjusted so that fans reach full when 24 dimmers are at full, or equivalent (e.g., 48 dimmers at 50%). Increases in fan speed take 1 minute with this setting, while decreases in fan speed take 5 minutes. Fans are turned OFF when no dimmers are in use.

The optional Reporter PC software will report the current fan speed setting ("FIXED" or "VARIABLE") and rack overtemperature status in addition to the temperature status of each dimmer equipped with load status reporting.

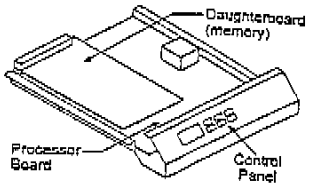
Electronics Chassis

Each CD80sv dimmer rack contains an electronics chassis with all of the control electronics for the rack. This chassis contains the processor module(s), control station power supplies, and central interconnection card (CIC) for the rack, and is shipped separately from the rack to minimize the possibility of damage.



This chassis can be equipped with one or two processor modules. The second processor module acts as a backup, and can be remotely activated by the Reporter software or by a switch contact. The configuration data from either processor can be transferred into the other processor. The currently inactive processor always tracks the currently active processor.

Processor Module



Each CD80sv rack contains one or two processor modules. Each processor module has an 8 character by 2 line backlit LCD display, a 6 key keypad, and 6 LEDs to report processor module and dimmer status and allow simple setup and control at the rack. This display normally shows the rack number and the OK message. If there are any rack or dimmer events reported, the display will show error messages.

Pressing the [>] key takes you into a series of setup menus to view and set up the more frequently used CD80sv features. See chapter 5, *Processor Module Programming* for details on accessing these functions.

All programmed data is held in battery maintained RAM on the processor module daughter board for up to 6 months without power to the rack.

Power Supplies

Each CD80sv rack can have up to three power supplies, depending on the accessories provided. These power supplies are mounted in the electronics chassis.

Central Interconnection Card (CIC)

The electronics chassis also contains the central interconnection card (CIC). This is where the contractor terminates all control wiring for the rack. All control terminal strips are 2-part plug-in strips so that the electronics chassis can be easily removed from the rack.

Power Modules

The power modules are the high power switching section of the CD80sv dimming system. The solid state relay (SSR) or control board and silicon controlled rectifier (SCR) block in this module is the interface between high power AC and low power control. It is driven by low level signals (5mA, 3-24V) and switches high level signals (up to 100A, 120/240VAC). High specification filtering, hard fired SCR dimming, contactor non-dims, and load status reporting electronics are available as options. All types of dimmers can be mixed in any combination in a rack. This lets you use the exact dimmer type needed for each circuit.

Power modules are constructed from aluminum sheet, folded to form three sides of the dimmer and to support the dimmer connector and heatsink. The fourth side of the dimmer is formed by the heatsink. The top and bottom of the dimmer are open for cooling.

A sturdy handle is provided below the circuit breakers.

A locking bar on the dimmer tray secures the dimmers in the rack.

Each reporting dimmer module contains a temperature sensor which will report its temperature to the rack and the Reporter PC, and force the fans to full speed if necessary.

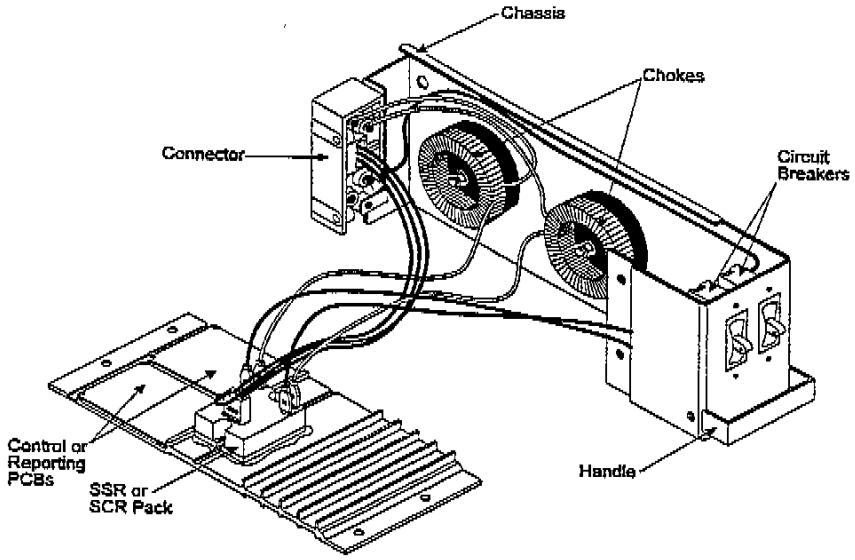


Figure 1. Typical Power Module

Weights & Sizes (Approx.)

- Height: 4.9 inches
- Width: 3.3 inches
- Depth: 18.0 inches
- Weight: 13 lb (2.4kW)

Dimmer Module Connectors

Power and control circuit connections are made through a proprietary connector. The module connector incorporates a ground pin longer than the power and control pins. This ensures that the module is always earth grounded when there is power to the dimmer.

All molded connector parts are made from a high temperature plastic used by SSR block manufacturers. It is V0 rated and self-extinguishing in case of fire. No softening or mechanical deformation will occur in the event of ventilation failure.

Circuit Protection

Each dimmer module is wired through to an appropriately sized fully magnetic circuit breaker of 10,000 AIC fault current rating.

Output Voltage

At full load under normal operating conditions, voltage loss in a dimmer will not exceed 3 volts. The maximum output voltage for each dimmer can be limited through a software setting.

Load Regulation

Dimmers will maintain their output within +/- 1% of the set output with load changes from 1kW to the maximum rating of the dimmer.

Line Compensation

The system will regulate the dimmer outputs to within 1V over operating voltage range. Each individual dimmer is separately regulated.

Efficiency

The power efficiency of the dimmer is a minimum of 97% at full load. Maximum full load dimmer loss is 3V RMS. The power efficiency of contactor non-dims is 100%.

DC Component of Output

Less than 1 volt with tungsten loads from 60w to the maximum rating of the dimmer, at all control levels.

CD80sv load status reporting dimmers include monitoring circuitry which will shut down the dimmer if DC of 5V or greater is detected.

Filter Rise Time

Filters (chokes) with rise times up to 800µsec are available in the CD80sv dimmer series. The standard 120VAC dimmer includes a filter with a rise time of 350µsec. The standard 220VAC dimmer includes a filter with a rise time of 175µsec.

Power Cube

CD80sv firm fired dimmers use solid state relays (SSRs). Each single SSR contains two SCRs mounted in an epoxy filled plastic case, with control circuitry and isolation components which provide a minimum of 2500V protection. Each dual SSR contains four SCRs. The SSR is mounted to the dimmer cover, which is an extruded heat sink.

CD80sv hard fired dimmers use an SCR block and separate control circuit board for power control. Unlike the SSR in firm fired dimmers, which gets its internal control power from the input power lead, hard fired dimmers get their control power from a separate power supply. Because the thyristors are fired independently of the load, hard fired dimmers are more suitable for use with loads that include transformers or ballasts.

Load status reporting (when provided) requires at least 60 watts (at 120VAC) on a 20A dimmer to distinguish between load and no load. Individual dimmers fitted with loads less than 60 watts can have their load status reporting disabled without affecting load status reporting for other dimmers.

Contactor

CD80sv contactor modules use a 20 Amp normally open contactor (Strand part # 1-377219-000). These units are intended for situations where SSR switching of loads is not acceptable.

Input Response Time

The response time (time between OFF and 100%) can be selected from the LCD keypad or optional Reporter PC. Selectable values are fast (30msec), medium (100msec), and slow (300msec). The default is medium (100msec).

Special Power Modules

CD80sv power modules are available in SSR dimmer/non-dim, contactor non-dim, and hard fired SCR versions for use in a variety of situations. All modules are available with load status reporting as an optional feature. Contactor non-dims can be used for motor loads, capacitive loads, HMI ballasts, or any other load that does not respond well to phase controlled dimming. Hard fired dimmers are particularly useful for fluorescent, cold cathode, and other inductive loads.

Power Module Types (120VAC)

Power modules are available in the following configurations for 120VAC.

- Dual 2.4kW, 350µsec, Reporter (SL #72311 - type A)
- Dual 2.4kW, 500µsec, Reporter (SL #72312 - type A)
- Dual 2.4kW, 800µsec, Reporter (SL #72313 - type A)
- Dual 2.4kW, 350µsec, standard (SL #72314 - type B)
- Dual 2.4kW, 500µsec, standard (SL #72315 - type B)
- Dual 2.4kW, 800µsec, standard (SL #72316 - type B)
- Dual 2.4kW, 350µsec, hard fired, Reporter (SL #72317 - type C)
- Dual 2.4kW, 350µsec, hard fired, standard (SL #72318 - type D)
- 6.0kW, 350µsec, Reporter (SL #72321 - type E)
- 6.0kW, 500µsec, Reporter (SL #72322 - type E)
- 6.0kW, 800µsec, Reporter (SL #72323 - type E)
- 6.0kW, 350µsec, standard (SL #72324 - type F)
- 6.0kW, 500µsec, standard (SL #72325 - type F)
- 6.0kW, 800µsec, standard (SL #72326 - type F)
- 12.0kW, 350µsec, Reporter (SL #72331 - type G)
- 12.0kW, 350µsec, standard (SL #72332 - type H)
- 2.4kW + contactor, 350µsec, Reporter (SL #72381 - type U)
- 2.4kW + contactor, 350µsec, standard (SL #72382 - type V)
- Contactor + 2.4kW, 350µsec, Reporter (SL #72383 - type W)
- Contactor + 2.4kW, 350µsec, standard (SL #72384 - type X)
- Dual 20A contactor, Reporter (SL #72385 - type Y)
- Dual 20A contactor, standard (SL #72386 - type Z)
- Blank module (S.L. #72301 - type none)
- Dual constant circuit, 2.4kW (SL #72302 - type "-")
- Dual test module (S.L. #72303)

Power Module Types (220VAC)

Power modules are available in the following configurations for 220VAC.

- Dual 3.3kW, 190µsec, Reporter (SL #72361 - type K)
- Dual 3.3kW, 435µsec, Reporter (SL #72363 - type K)
- Dual 3.3kW, 190µsec, standard (SL #72364 - type L)
- Dual 3.3kW, 435µsec, standard (SL #72366 - type L)
- Dual 3.3kW, 190µsec, hard fired, Reporter (SL #72367 - type M)
- Dual 3.3kW, 190µsec, hard fired, standard (SL #72368 - type N)
- Dual 5.5kW, 190µsec, Reporter (SL #72371 - type O)
- Dual 5.5kW, 190µsec, standard (SL #72373 - type P)
- 5.5kW, 435µsec, Reporter (SL #72374 - type Q)
- 5.5kW, 435µsec, standard (SL #72376 - type S)
- 11.0kW, 190µsec, Reporter (SL #72377 - type E)
- 11.0kW, 190µsec, standard (SL #72378 - type F)
- 4.4kW, 190µsec + 20A contactor, Reporter (SL #72391 - type U)
- 4.4kW, 190µsec + 20A contactor, standard (SL #72392 - type V)
- 20A contactor + 4.4kW, 190µsec, Reporter (SL #72393 - type W)
- 20A contactor + 4.4kW, 190µsec, standard (SL #72394 - type X)
- Dual 20A contactor, Reporter (SL #72395 - type Y)
- Dual 20A contactor, standard (SL #72396 - type Z)
- Blank module (S.L. #72301 - type none)
- Dual constant circuit, 2.4kW (SL #72302 - type "-")
- Dual test module (S.L. #72303)

220VAC power modules can be used for voltages as high as 240VAC without modification. However, the listed power rating will increase by a factor of 1.09 at 240VAC, so that a 3.3kW dimmer will be able to power a 3.6kW load. Dimmer risetimes will be reduced by a factor of .927 when used at 240VAC.

Chapter 4
Installation

Preparation

Before installing your CD80sv Racks, you should carefully consider the environment in which the equipment is to be installed, the power feeding the equipment, and the required conduit and/or cable runs.

Parts Supplied with Rack

A bag of screws (Strand Lighting part #3-199502-010) is supplied with each rack. Make sure that you have these screws before proceeding.

Environmental Considerations

To maximize equipment life, and minimize the chance of failures, the following environmental requirements should be met:

- Operating temperature: 0 to 40°C ambient
- Humidity: 5%-95% non-condensing
- Storage temperature: -40°C to 70°C
- Shock resistance in transit without damage: 40G 10mS in any of the X,Y,Z planes

Warning

This Equipment Is For Indoor Use Only!

Utilizer Dans Un Endroit A L'Abri!

Warning

AC Lighting Loads Only!

Caution

The short circuit current rating for this product is 10,000 RMS symmetrical amperes at 120/208 V, 3-phase.

Caution

Dimmer rack efficiency is at least 97%. Since the remainder of the energy is dissipated as heat, they should be installed in a room with adequate ventilation to dissipate a heat load equivalent to at least 3% of the maximum load the dimmer racks will handle.

Power Requirements

A 120-240VAC, 50/60Hz power source must be provided for processor module power. Processor modules operate on any power source in the listed range, but the power source must be correct for the dimmers and rack type used in the system. Dimmers are available in 120VAC and 220VAC models. Racks are available in 120VAC and 240VAC models, and in three phase and single phase configurations. Please consult Strand Lighting on the actual main feed size required for specific installations.

Because of electrical and RF noise generated by phase fired dimming equipment, Strand Lighting recommends that the dimmer rack power be a separate feed *and that no other equipment share the feed.* Transformers having a K-factor of 14 or more are recommended because of the high third harmonic content generated by dimming equipment.

Warning

Do not install this equipment with power applied. Make sure that your incoming power is disconnected before proceeding.

Conduit Layout

The location of conduit runs and their entrance to the dimmer rack is important and should be carefully planned before cutting holes or attaching conduit. Figure 2 shows entry areas for various types of wiring.

***Do not** run power feed or load wires in the same conduit or wireway as control and low voltage wiring.*

***Do not** run load cable trays and/or conduit in close proximity to any computer or CRT display equipment.*

***Do not** run wiring from other unrelated equipment in the same conduit with CD80sv wiring.*

***Do not** enter control wires from dimmer rack locations marked for load or power wires, and vice versa. These locations are chosen to minimize electrical interference between various sections of the system.*

***Do not** run wiring in ways other than shown on the system riser diagram or use alternative control cables to those specified by Strand Lighting. CD80sv systems are designed to be installed in a specific manner.*

***Do not** substitute plastic conduit for metal where conduit is called for. Metal conduit acts as a ground and shield.*

***Do not** substitute shielded wiring for unshielded wiring or conduit. Changes in transmission line capacitance can cause problems with the control signals.*

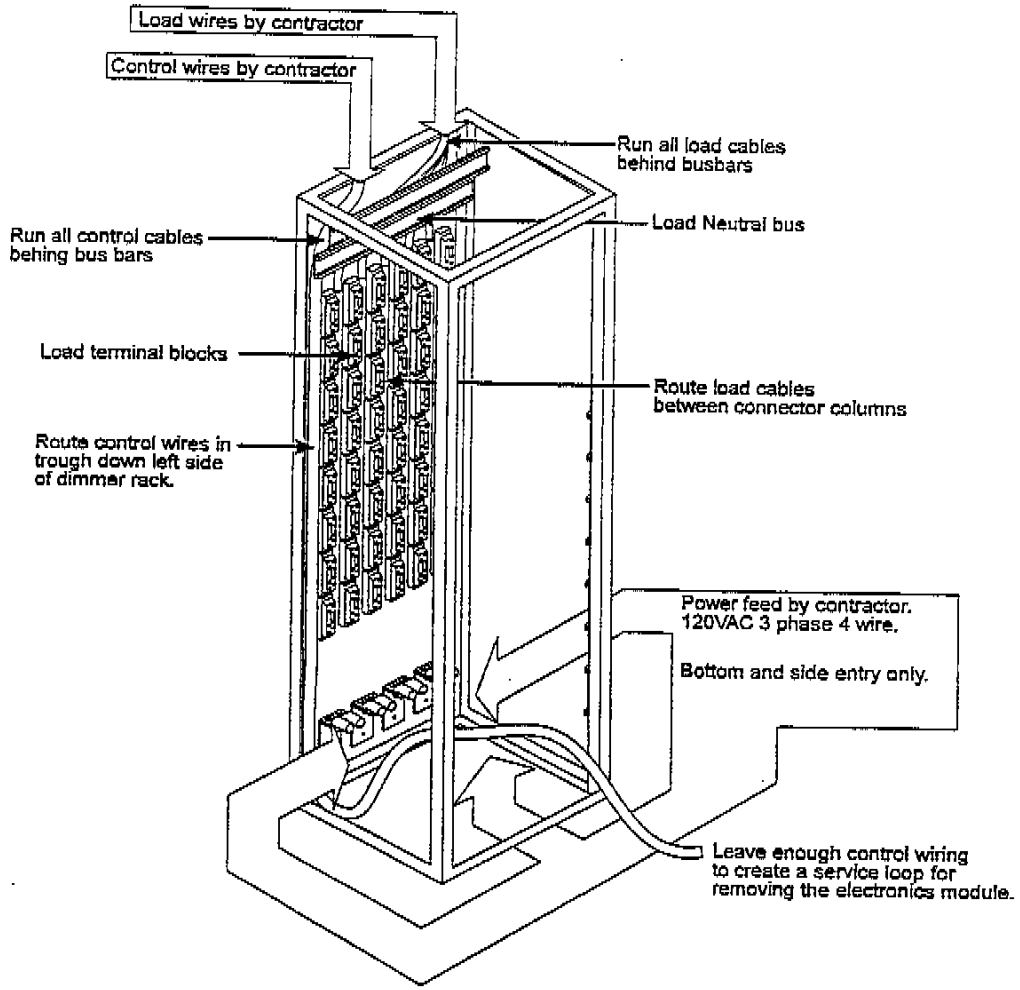


Figure 2. Conduit Entry Areas

Load Wiring

Load wiring is connected directly to the dimmer receptacle. Wires can be routed down channels next to the dimmer receptacles so that they are out of the way once the rack is assembled.

Warning

Hook up AC lighting loads only to this equipment.

Connect load wiring according to your system drawings. Set screws in the dimmer receptacles require a standard 1/8" Allen wrench (see figure 3).

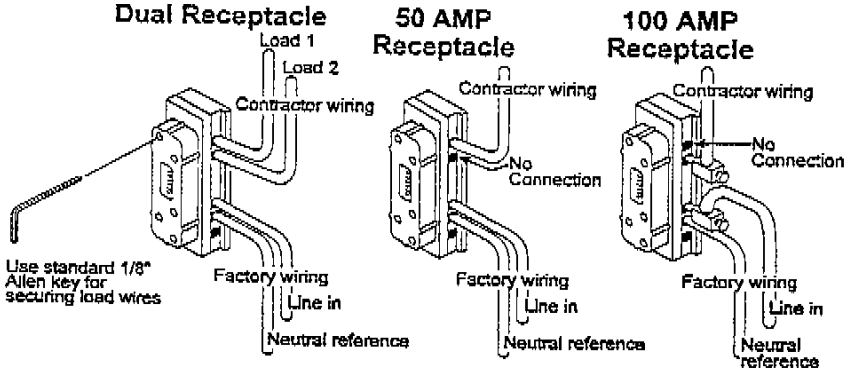


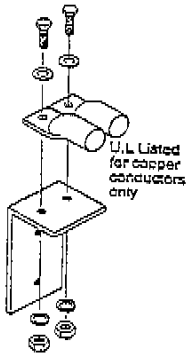
Figure 3. CD80sv Dimmer Receptacles

Dimmer connector load pins

Screw type: 1/4-20 brass
Wiregauge range: 14-6AWG
Maximum screw torque setting: 56 inch lbs.

Power Wiring

Connect all external power wiring to the dimmer rack. Internal power wiring between dimmer rack components is pre-wired at the factory.



(2) Square-D catalog #VHSC-500-12 (wire range 4/0 through 500MCM) compression lugs are provided per phase and neutral. (1) Square-D catalog #VHSC-1/0-14 compression lug (wire range #6AWG through 1/0) is provided for earth ground connection.

Caution

These lugs are U.L. listed for copper conductors only.

1. Connect system ground to ground lug provided.
2. Connect power neutral and feed wires as shown in system drawings.
3. Connect load neutrals to load neutral bus(es) at top(s) of dimmer rack(s), load ground (earth) wires to the ground bus at the top of the rack, and load wires directly to the appropriate dimmer receptacle at the back of the dimmer rack(s).

Earth/Neurtal bus connections

Screw type: 1/4-28 brass
Wire gauge range: 14-6AWG
Maximum screw torque setting: 70 inch lbs.

Control Wiring

Control wiring between dimmer rack components is pre-wired at the factory. Connections that go to the control interconnection card (CIC) are in a bundle and clearly labeled. External connections should be made at this time.

Installing Power Supplies

Install the optional power supplies if necessary. These instructions are included in case power supplies need to be installed after the initial rack installation.

If the electronics chassis is in the dimmer rack:

1. Use the security wrench mounted in the document bracket on the rack door to remove two security screws.
2. Remove the processor security cover.
3. Remove the two screws securing the electronics chassis to the rack.
4. Slide the electronics chassis out of the rack far enough so that the lexan power supply cover can be removed.

To install the Outlook PSU option (part #76462)

1. Remove 4 screws that secure the Lexan power supply cover.
2. Remove the power supply cover.
3. Remove the 2 rear standoffs that held the power supply cover. Do not remove the power supply insulator, or attempt to remove any of the lower standoffs. The power supplies will mount on these lower standoffs
4. Put the power supplies on the rear 8 lower standoffs with the AC input terminals (2 pins) towards the right hand side of the electronics chassis (as you face the front of the unit) and the DC output terminals (6 pins) towards the center of the electronics chassis.
5. Secure the power supplies with 6 screws and the 2 PSU cover standoffs you removed earlier.
6. Install the AC power input connector to the power supply inputs.
7. Connect the harness provided to the power supply outputs and to PL43 (OUTLOOK PSU OPTION) on the CIC.
8. Install the power supply cover using 4 screws.
9. Install the electronics chassis in the rack.

Install the Electronics Chassis

To install the Electronics Chassis in the dimmer rack:

1. Remove the cover from the cable chute on the left side of the rack by putting your fingers in the gripper holes and pulling up.
2. Run all control cables down the cable chute.
3. Replace the cable chute cover. The chute has been designed so that wires can be fished through it even with the cover and all dimmers installed in the rack.
4. Remove the processor security plate. The wrench for removing the security screws for this plate is in the document frame inside the door.
5. Slide the electronics chassis into the rack.
6. Connect the cables from the rack to the appropriate plugs on the CIC.
7. Slide the electronics chassis back out of the rack until it just barely rests in its slide brackets.
8. Make all control connections with the electronics chassis in this position.

Make sure that there is enough wire in a service loop for you to take the electronics module completely out of the rack and put it on the floor if necessary without disconnecting any of the control wiring.

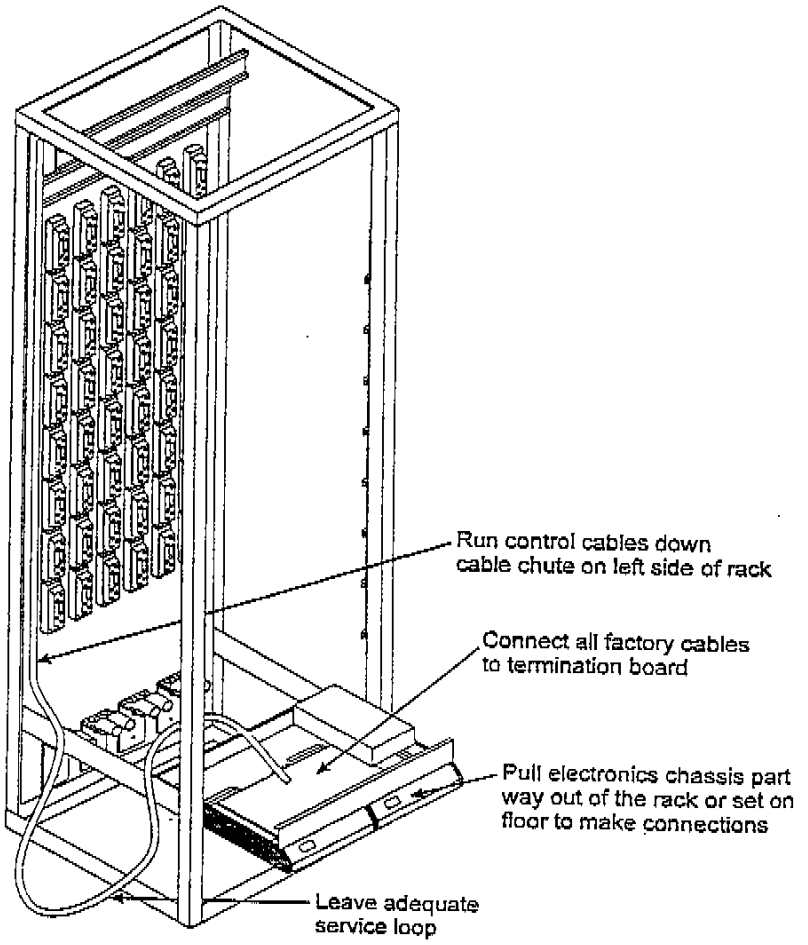


Figure 4. Install Electronics Chassis

CD80sv dimmer racks accept a variety of control signals as inputs, and provide several types of output signals. All contractor control signal wiring goes to the CIC located in the electronics chassis, and is made to 2-part plug-in terminal strips.

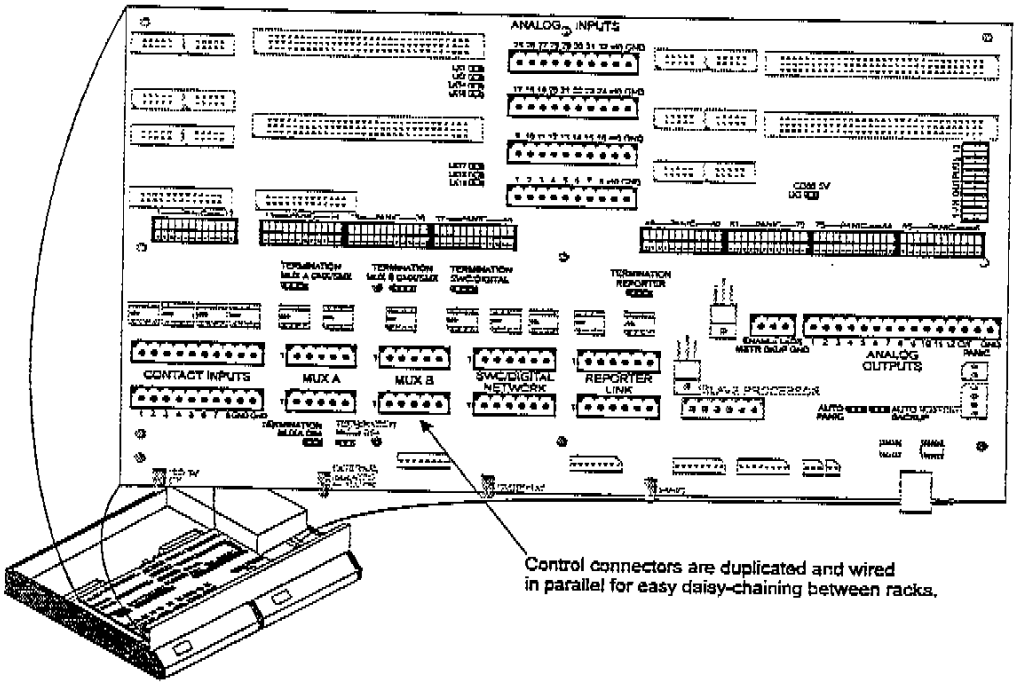


Figure 5. Central Interconnection Card

Rack Type

Make sure that the rack type link (LK3) is installed. This link is installed for all CD80sv racks. It is not used in the European versions (EC90) of these racks.

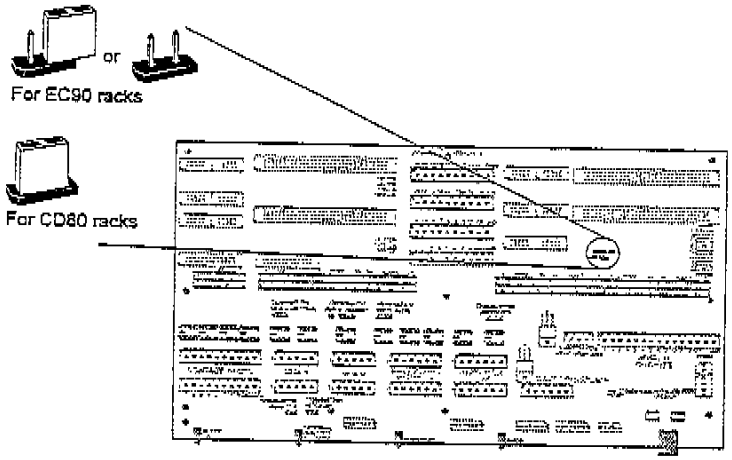


Figure 6. Rack Type

Rack Configuration

Check the fan module to make sure that the fans are for the same voltage as the incoming mains power. The fan voltage rating is visible from the top of the Fan module. If the fans are not for the correct voltage, contact Strand Lighting for replacements.

Set Voltage

For 240VAC operation, install LK1 on the CIC. For 120VAC operation, uninstall LK1. This jumper assures that the default settings for the rack appear correctly.

Set Phasing

For 3-phase racks (3-phase 4-wire), uninstall LK14 and set the *Current Report* item in the **Config** menu to "All."

For standard single phase racks(single-phase 3-wire), install LK14 and set the *Current Report* item in the **Config** menu to "All."

For strapped single phase operation (a single phase or three phase rack with all phase busses strapped together) uninstall LK14 and set the *Current Report* item in the **Config** menu to the single phase you are using in that rack.

Set Wiring Harness Type

For racks with dual-module wiring harnesses (most racks), uninstall LK2.

For racks with single-module wiring harnesses (some 6K and 12K racks), install LK2 on the CIC.

If you have questions about which type of harness was used in your rack, consult your system drawings.

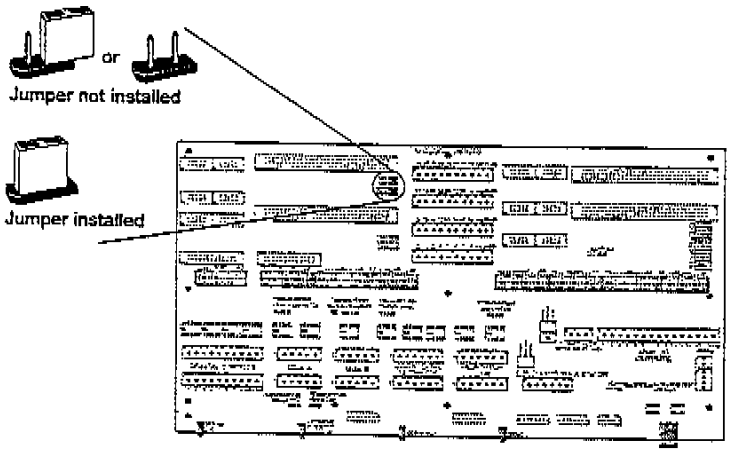


Figure 7. Rack Configuration

Auxiliary Wiring

Auxiliary wiring depends on the system configuration and is shown in the system drawings you received from Strand Lighting. CD80sv lets you hook up two separate consoles, multiple slider stations, a pushbutton control station, and a personal computer for running the Reporter software.

Connections Between Racks

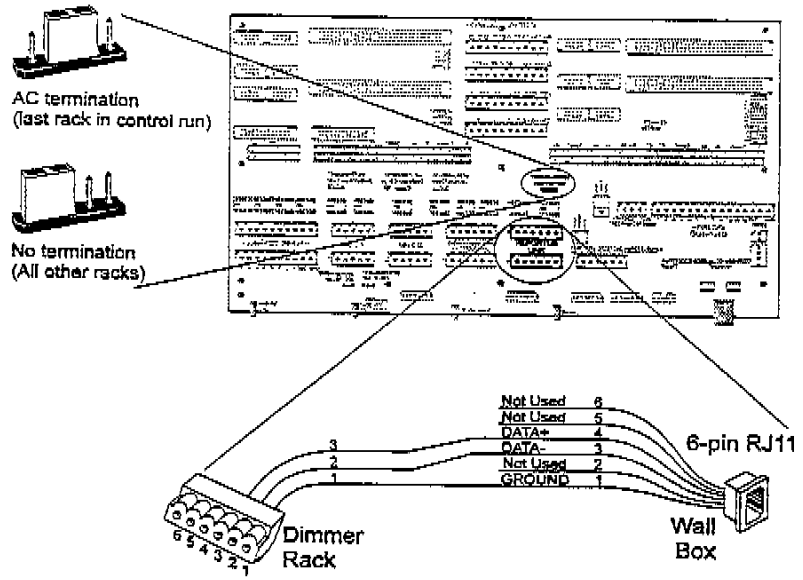
If a single control console output is to drive dimmers in more than one system, the multiplexed control signal must be daisy-chained to all of the systems in which it is to be used. Duplicate plugs wired in parallel are provided for these signals to make daisy chaining easier.

Each rack has its own overtemperature sensors. If there is a console overtemperature warning indicator, the individual rack signals are usually daisy-chained together so that activating any single sensor activates the console indicator. The overtemperature signal is the only signal normally daisy chained that does not have duplicate, paralled connections.

Reporter PC Control Wiring

Strand Lighting equipment uses standard 6-pin RJ11 telephone style connectors for wall boxes and extensions to connect the Reporter PC, and terminal block connections inside the CD80sv racks for data signals from the PC. The RS485 converter supplied with the Reporter software has a 6-pin RJ11 connector on its output. There are two pluggable terminal blocks wired in parallel on the CIC to allow easy daisy-chaining of signals to multiple racks.

The last rack in the control cable run should be AC terminated. All other racks should be unterminated.



Cable:	Belden 9829 or equal.
Max Length:	Standard RS485 electrical characteristics apply, including line driver and receiver characteristics, line loading, and multi-drop configurations.
Connector:	Dual parallel terminal blocks in rack, labeled REPORTER LINK. RJ11 6-pin connectors in wall boxes.

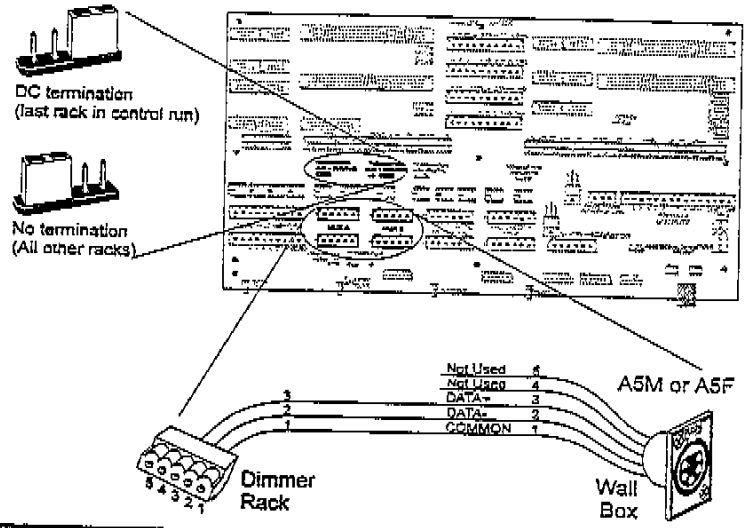
Terminal number	RJ11 pin #	Signal	Comments	Pairs	Wire color
1	1	COMMON	signal common (shield)		shield
2	3	DATA 1-	data signal complement	pair 1	black
3	4	DATA 1+	data signal true		red

Figure 8. Reporter PC Wiring and Termination

DMX512 Dimmer Control Wiring

The two types of connections provided in Strand Lighting equipment for DMX512 dimmer control signals are the XLR style connector and terminal blocks. CD80sv dimmer racks use pluggable terminal block connections. Wall boxes and consoles use XLR style connectors. There are two pluggable terminal blocks wired in parallel on the CIC to allow easy daisy-chaining of signals to multiple racks.

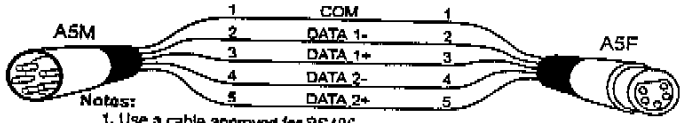
The last rack in the control cable run should be DC terminated. All other racks should be unterminated.



Cable:	Belden 9829 or equal.
Max Length:	RS485 electrical restrictions apply, including line driver/receiver chracteristics, line loading, and multi-drop configurations.
Connector:	Dual parallel terminal blocks in rack, labeled MUX A and MUX B. "XLR" style connectors in wall boxes and control consoles.

XLR Pin #	Terminal number	DMX Signal	Comments	Pairs	Wire Color
1	1	COMMON	dimmer common (shield)		shield
2	2	DATA 1-	dimmer drive complement	pair 1	black
3	3	DATA 1+	dimmer drive true		red

Figure 9. DMX512 Wiring and Termination



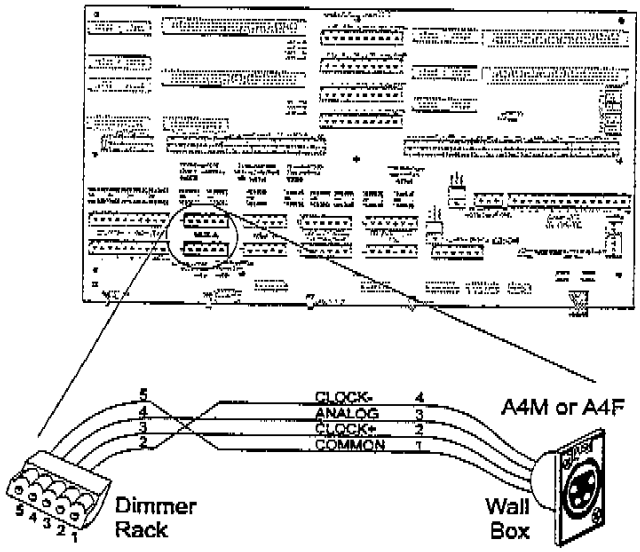
Length	SL Part Number
25 foot	95090
50 foot	95091
100 foot	95092

Figure 10. DMX512 Dimmer Control Extension Cable

AMX192 Control Wiring

The three types of connections provided in Strand Lighting equipment for the AMX192 signal are the XLR style connector, the TA4/TY4 Series mini-SwitchCraft connector, and terminal blocks. Unless otherwise specified, dimmer racks use terminal block connections and consoles use XLR style connectors.

AMX192 control lines are not terminated.



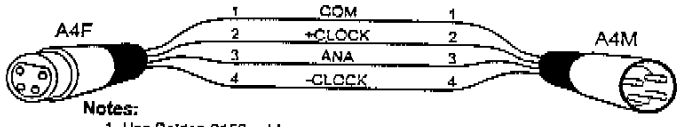
Cable:	Belden 9156 or equal. May use Belden 8723 for adapters under 100 feet (30m) long.
Max Length:	1000 feet (300m). must be Daisy chained - no branching runs.
Connector:	Dual parallel terminal blocks in rack, labeled MUX A. "XLR" style connector, or SwitchCraft TA4/TY4 series connector on control consoles.

XLR Pin #	TA4/TY4 Pin #	Terminal number	Signal	Comments	Belden 8723	Belden 9156
4	1	2	CLOCK -	clockcomplement	Green	Black
2	3	3	CLOCK +	clock true	White	White
1	2	5	COMMON	analog common	Black	Black
3	4	4	ANALOG	multiplexed analog	Red	Red

CLOCK+ and CLOCK- are one twisted pair. Analog and Common are one twisted pair.

Figure 11. AMX192 Wiring

AMX192 extension cables use Belden #9156 or equivalent cable (2 pairs of unshielded 18 gauge wire).

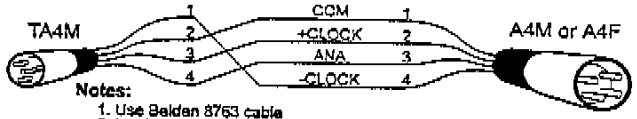


Notes:
1. Use Belden 9156 cable
2. Maximum extension length = 1000 ft. (300m) including all adapters

Length	SL Part Number
12 foot	95521
25 foot	95524
50 foot	95522
100 foot	95523

Figure 12. AMX192 Extension Cable

Connections between equipment with different plug types require adapter cables in which the plugs are not connected pin to pin (see Figure 13).



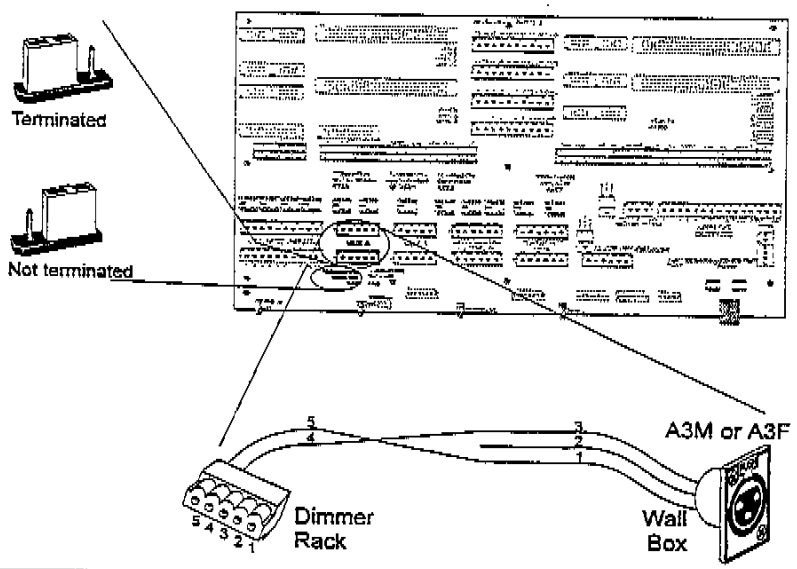
Notes:
1. Use Belden 8763 cable
2. Maximum adapter length = 100 ft. (30m)
3. Sex of "XLR" style connector varies with application

Figure 13. XLR to TA4 Series Adapter

D54 Control Wiring

The two types of connections provided in Strand Lighting equipment for the D54 signal are the XLR style connector and terminal blocks. Unless otherwise specified, dimmer racks use terminal block connections and consoles use XLR style connectors.

D54 control lines do not usually require termination. However, in installations with very long runs or significant electrical interference, the termination link may be fitted in the last rack in the control cable run.



Cable:	Belden 9156 or equal.
Max Length:	1000 feet (300m). must be Daisy chained - no branching runs.
Connector:	Terminal blocks in rack, labeled MUX A. "XLR" style connector on control consoles.

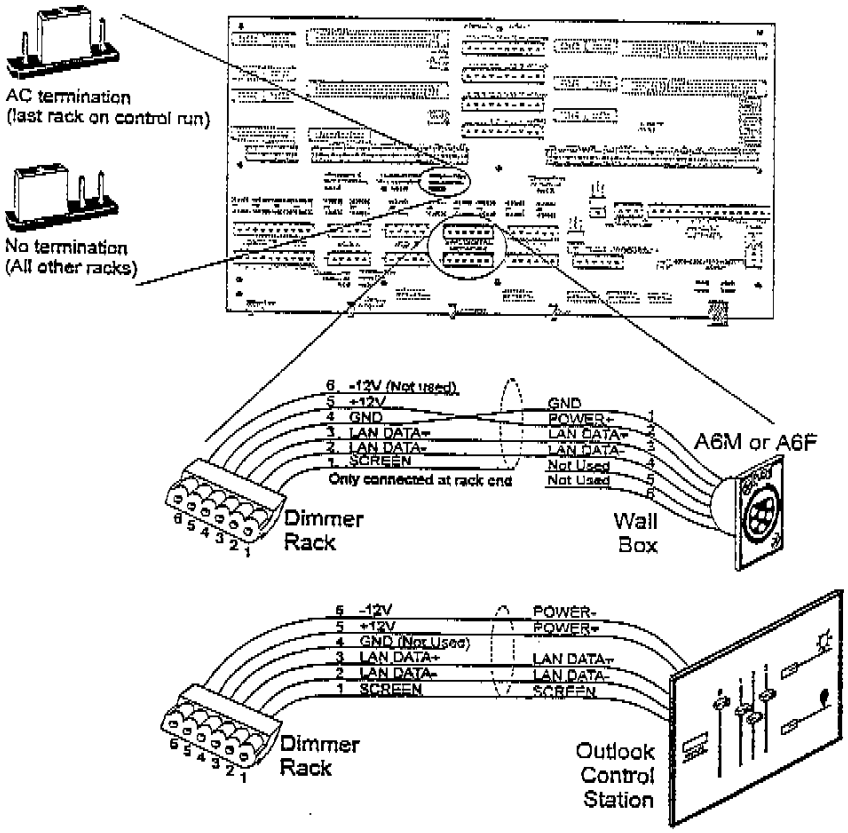
XLR Pin #	Terminal number	Signal	Comments	Wire color
1	5	GND	ground	Black
2			not used	White
3	4	SIGNAL	multiplexed analog signal	Red

Figure 14. D54 Wiring and Termination

SWC and Digital Network Control Wiring

Control wiring from SWC hand held controllers and stations such as Outlook is connected to the SWC/DIGITAL NETWORK connector on the CIC. Wiring instructions and appropriate wire gauge sizes are provided on the system riser diagram.

The last rack in the control cable run should be AC terminated. All other racks should be unterminated.



Cable:	Belden 9773 or equal.
Max Length:	1000 feet (300m - daisy chained runs only).
Connector:	Terminal blocks in rack, labeled SWC/DIGITAL NETWORK. Unpluggable terminal block on stations.

XLR Pin #	Rack Term #	Station Terminal Label	Signal Name	Comments	Belden 9773 Pairs	Cable Color
3	3	LAN +	LAN DATA+	network signal true	pair 1	black
4	2	LAN -	LAN DATA-	network signal complement		red
2	5	V +	POWER +	+12V	pair 2	black
N/C	6	V -	POWER -	-12V		white
1	4	N/C	GND	Ground	pair 3	black
1	N/C	N/C	GND	Ground		green
N/C	1	SCREEN	SCREEN		Screen wire	

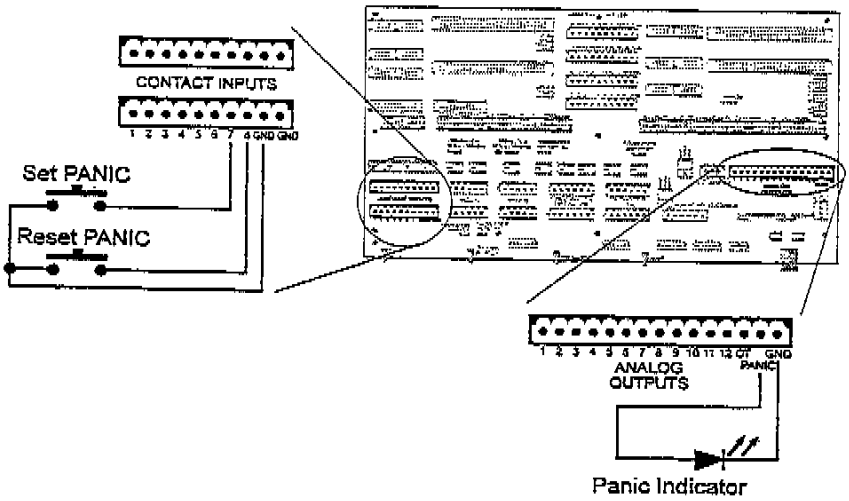
Pair 3 can be parallelled with pair 1 for long runs where there are no SWC outlets.

Figure 15. SWC/Outlook Wiring and Termination

Wherever possible, control station runs should be single pulls directly from the first control station in a daisy chained run. If connections must be made in a junction box due to length of run or other considerations, these connections must be soldered before installation of the wire nut. These are not power connections. They are electronic interconnections which feed data directly to a microprocessor in the processor module. Poor connections may cause problems by introducing electronic noise into the system, resulting in poor system operation.

Panic Control Wiring

Panic control wires are connected to the CONTACT INPUTS terminal block. Wiring instructions are included on the riser diagram or in your system drawing package. If you do not have a system drawing package, wire the PANIC and NORMAL switches as shown in figure 16.



Connecting more than one rack to an indicator

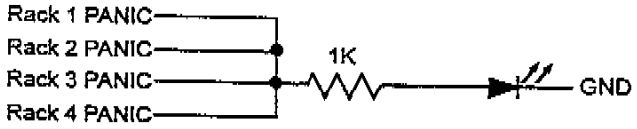


Figure 16. PANIC Wiring

In multiple rack systems you can connect panic contacts in parallel across more than one rack. All racks that are connected in parallel will then be activated by a single switch.

You can connect multiple panic contacts and/or LEDs in parallel for activation from multiple locations.

Automatic PANIC Setting

PANIC can be automatically activated when the processor (or both processors in a dual processor system) is removed, and automatically deactivated when a processor is reinstalled.

To activate automatic panic, install the jumper between pin 1 and pin 2 of link LK8. To deactivate automatic panic, install the jumper between pin 2 and pin 3 of link LK8. The CIC ships with automatic panic activated.

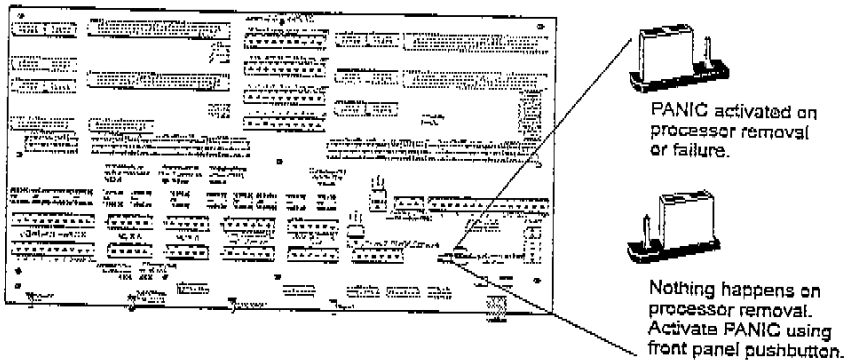


Figure 17. Automatic PANIC Setup

Backup Control Wiring

Backup activation contacts are wired to the CIC as shown below. This switch toggles the system between the main processor and the backup processor. The *Proc Control* item in the Rack Config menu must be "SelectBy Contact" for this switch to work.

You can remotely monitor which processor is currently enabled by wiring LEDs to connector PL49 on the CIC as shown below. This connector is only active when 96-way processors are fitted, since dual processors are not available in 48-way systems.

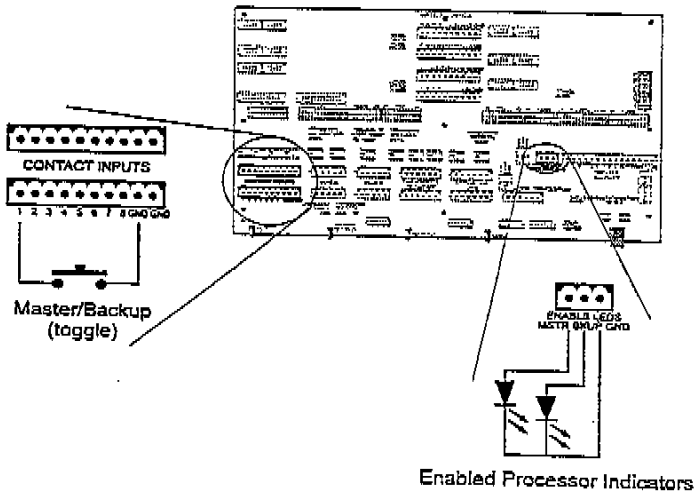


Figure 18. Backup Control Wiring

Automatic Backup Setting

Backup can be automatically activated if the currently enabled processor fails.

To turn automatic backup activation ON, install the jumper between pin 1 and pin 2 of link LK9 and set the *Proc Control* item in the **Rack Config** menu to "SelectBy Contact." To turn automatic backup activation OFF, install the jumper between pin 2 and pin 3 of link LK8. The CIC ships with automatic backup activation ON and the *Proc Control* item in the **Rack Config** menu set to "SelectBy Contact."

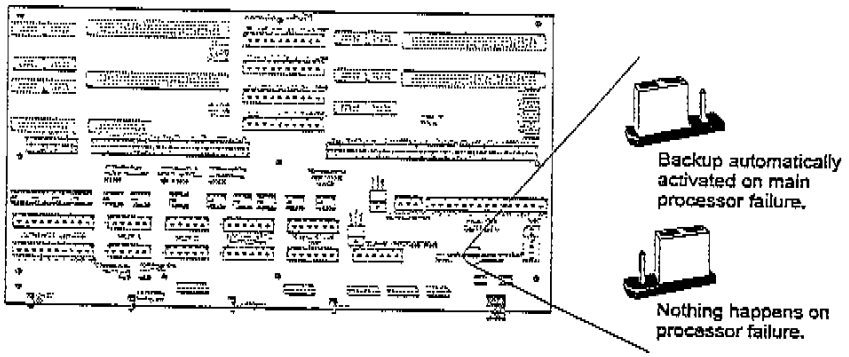


Figure 19. Automatic Backup Setting

Other Contact Connections

You can connect several other external contacts for controlling rack functions (see figure 20). These functions are then available remotely and instantly.

The Mux A/B switch is active only when Proc.Control in the Rack Config menu is set to Select by Contact.

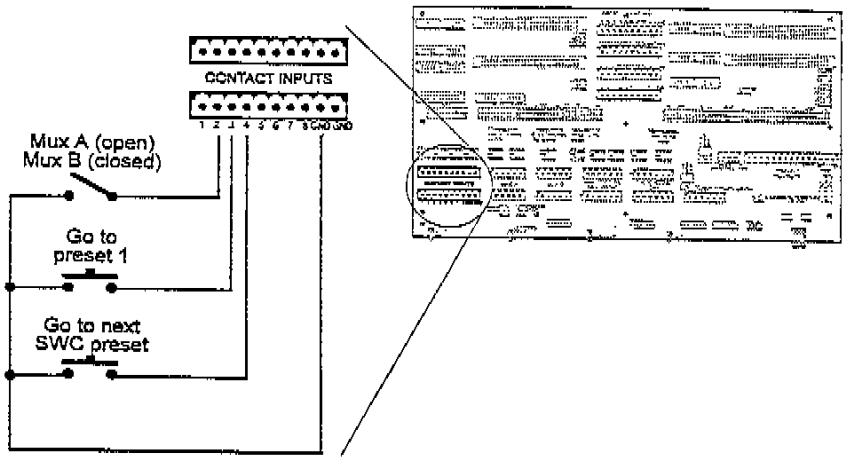
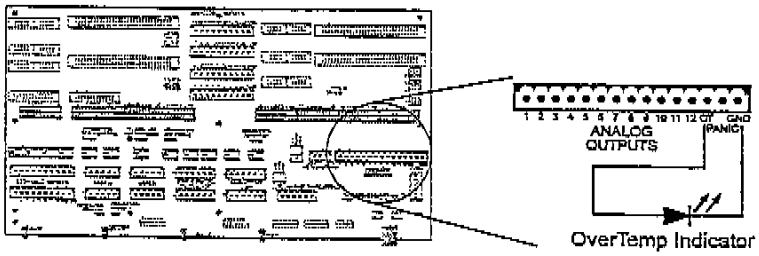


Figure 20. Other Contact Connections

Overtemperature Warning LED Wiring

You can connect an external overtemperature warning LED to the system if you wish. The external indicator is connected to the ANALOG OUTPUTS connector on the CIC (see figure 21). This LED is an indicator only and has no effect on system performance.



Connecting more than one rack to an indicator

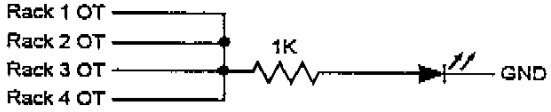


Figure 21. Overtemperature Warning LED Connection

Analog Control

CD80sv racks have 32 (96 channel processor) or 16 (48 channel processor) analog inputs.This control signal is combined with the other control signals according to the Dimmer Mux Mode selected for each dimmer. These signals are input through four pluggable terminal blocks on the CIC.

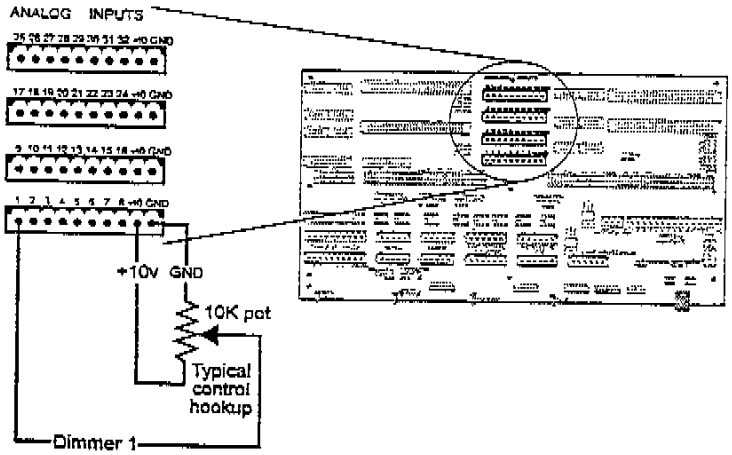
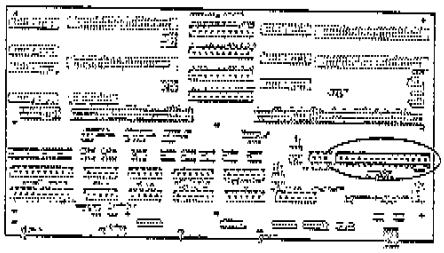


Figure 22. Typical Analog Control Hookup

Analog Output

96 channel processor modules have 12 analog outputs, which can source a maximum of 1mA into a high impedance input (minimum 10KΩ). The circuit shown below represents the driver circuit on the CIC.



Analog Output Location

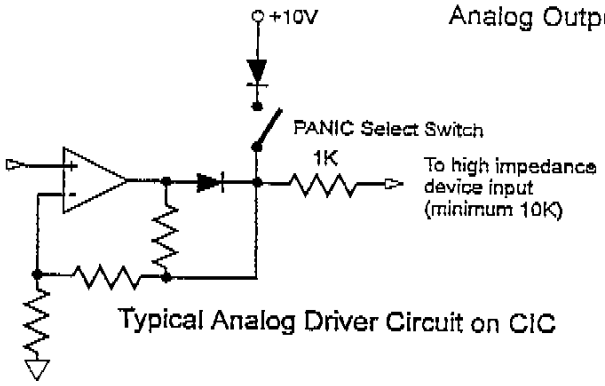


Figure 23. Analog Output Drivers

For programming purposes, analog outputs are numbered starting with the first number above the highest dimmer number in the rack. A rack with 96 dimmers has analog outputs numbered from 97 to 108. A rack with 80 dimmers has analog outputs numbered fron 81 to 92.

Hardware Setup

Once you have finished you must set up the system as required for proper phasing, Panic operation, etc.

Select Dimmers for Panic

Panic turns any single dimmer, combination of dimmers, or all dimmers ON, bypassing system electronics.

Select panic for a dimmer using DIP switches located on the CIC (see figure 5). Each rack has 96 panic switches. In addition, racks with 96 channel processors have 12 analog outputs that can be tied to PANIC with their own set of DIP switches (labeled AN OUTPUT on the CIC).

Not all racks have a direct numerical relationship between the PANIC selection switch number and the dimmer controlled by the switch. If a PANIC selection switch does not control the dimmer you think it should, use the View Panic Map *item in the* ***Rack Config*** *menu to see which dimmer the switch controls.*

Dimmers and analog outputs with switches ON are switched ON when you activate panic, regardless of their control station settings. Dimmers or analog outputs with panic select switches OFF are not affected when panic is activated. Analog output ON is +10VDC. Racks are shipped with all switches OFF.

When panic is activated, any analog output set for PANIC will be sent +10VDC, regardless of how the analog output scaling is set. Any dimmer with a maximum output level will be set to FULL regardless of how the maximum output voltage is set.

To activate panic:

1. If the processor module is installed, press PANIC on the rack to turn selected dimmers in the rack ON.
2. If you have a remote PANIC station, press PANIC on the station to turn selected dimmers in the rack ON.
3. If you have the automatic PANIC activation jumper (LK8) set to activate PANIC on processor removal, removing the processor module will turn selected dimmers in the rack ON. Systems with two processor modules must have both modules removed to activate PANIC. You should not use this method just to activate PANIC, since it will cause wear and tear on the processor module connectors.

To deactivate panic:

1. If the processor module is installed, press NORMAL on the rack or on a remote PANIC station to turn selected dimmers in the rack OFF.
2. If you have the automatic PANIC activation jumper (LK8) set to activate PANIC on processor removal, re-install the processor module to turn selected dimmers in the rack OFF.

Make sure that the reason for removing the processor module has been repaired before re-installing the module.

Set Door Direction

The locking door for the rack comes from the factory hinged on the left side of the rack. It can be reversed to hinge on the right if required.

1. Remove the two female hinges from the left rack frame column.
2. Reinstall the two female hinges to the right rack frame column.
3. Remove the two male hinges from the door.
4. Turn the two male hinges 180° and remount them on the door.
5. Invert the position of the circuit patch list and the security screw wrench in the door document frame.

Close the Rack

Once all internal settings are completed, and all wiring checked, you can finish installing the fan and dimmer modules.

1. Slide the electronics module into the rack and secure it.
2. Install and connect the fan module.
3. Install 8 dimmer trays.
4. Install power modules.
5. Install and connect the upper fan baffle assembly. This assembly contains the thermal sensors for the rack.
6. Install the locking door.

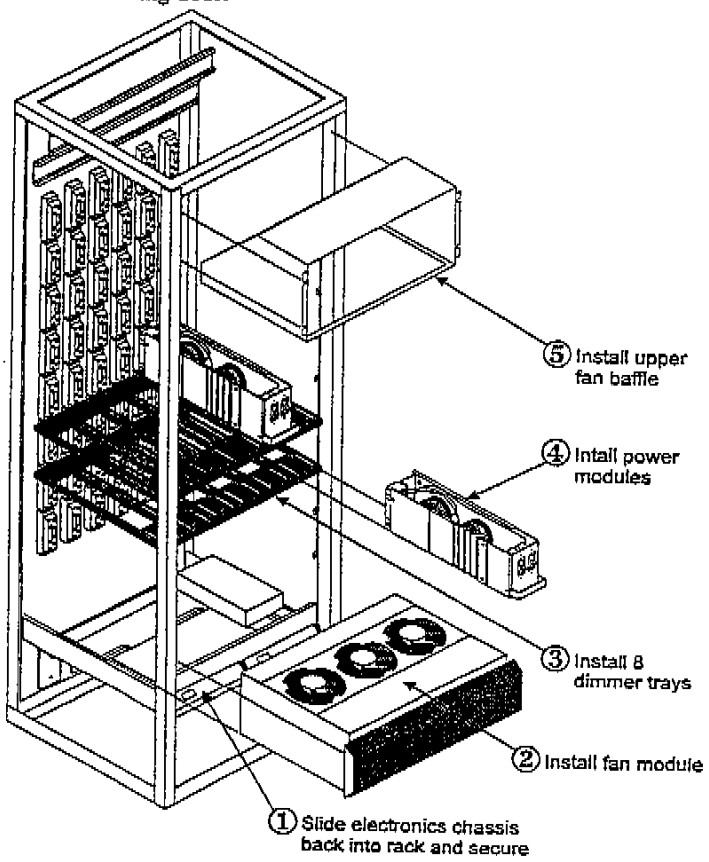


Figure 24. Final Module Installation

Check All Wiring

Before applying power to the system you should double-check all of your wiring.

1. Check that all terminals and mechanical fixings are secured.
2. Check for stray wire strands and make sure wires are correctly restrained and not in contact with metal edges or obstructing the power module ventilation paths.
3. Check earth ground connections.
4. Double-check Neutral connections and positively verify phase orientation at the input busbars. Ensure that Neutral has not been confused with a phase - connecting the unit "across the phases" will do severe damage.
5. Make a full safety inspection of all load wiring.

Apply System Power

Systems purchased without Field Service commissioning (turn-on) are now ready for system power. For such systems, follow the steps below. If commissioning is required, a notice appears on the riser diagram that the system should not be energized without a factory technician present. Call and request scheduling for commissioning as early as possible. Due to heavy scheduling requirements, the normal time required for proper scheduling is at least two weeks.

1. Check power to make certain that it is correctly rated per system riser. If not, correct before proceeding.
2. Apply power to system.
3. Make sure that the fans operate by turning 30 dimmers ON.
4. If the system does not function properly, follow the troubleshooting instructions in chapter 7, *Basic Troubleshooting*. If these steps fail, or for assistance with replacement parts, please call Strand Lighting directly.

Processor Configuration

Once you have applied power you need to make sure that the system is working correctly and the the processor modules are set properly for the installation. This step checks for any problems due to shipping or installation.

Startup

When the rack is switched ON, a number of self-tests are run. The system displays the rack number.

When the self tests are complete the SELF TEST OK LED on the front of the processor module will turn ON, and the default text will show in the LCD display.

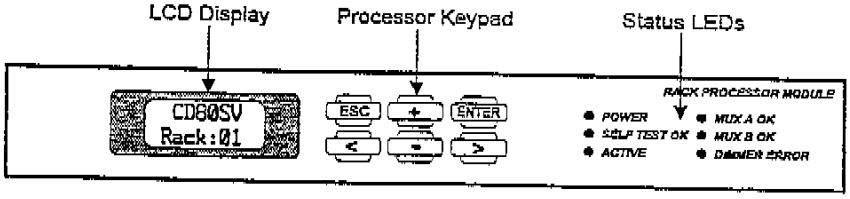


Figure 25. Processor Module Front Panel

If the DIMMER ERROR LED is ON, check the dimmer event log to see which dimmer is causing problems. If any other LED does not illuminate correctly, switch OFF the power immediately and check the installation again. If all wiring seems correct, call Strand Lighting.

***If the LCD display shows an error, see the* Error Log *section of chapter 7,* Basic Troubleshooting.**

After Startup

1. Make sure that all status indicators show the system operating correctly. The seven LEDs on the front of the electronics chassis show (from left to right):
   - Isolated +5V power supply OK (should be ON)
   - External isolated +12V power supply OK (should be ON if the rack contains an optional wall station power supply)
   - Overheat condition (should be OFF)
   - PANIC ON (should be OFF)
   - Phase A, B, and C (A and C should be ON. B should be ON in 3-phase systems)

   The LEDs on the front of each processor module show:
   - POWER (should be ON)
   - SELF TEST OK (should be ON)
   - ACTIVE PROCESSOR (should be ON in the active processor)
   - MUX A OK (should be ON if there is a signal on Mux A)
   - MUX B OK (should be ON if there is a signal on Mux B)
   - DIMMER ERROR (should be OFF)

2. Check the following items to make sure they are correctly set in the processor module:
   - Slot type (see *Rack Config Menu* in chapter 5, *Front Panel Programming*)
   - Rack number (see *Rack Config Menu* in chapter 5, *Front Panel Programming*)
   - Starting multiplex signal number and dimmer protocol (see *Patching Menu* in chapter 5, *Front Panel Programming*)
   - Time and date (see *Rack Config Menu* in chapter 5, *Front Panel Programming*)

   Other items you may wish to check at this time, depending on your system configuration, are:
   - Mux patch (see *Patching Menu* in chapter 5, *Front Panel Programming*)
   - Outlook patch (see *Patching Menu* in chapter 5, *Front Panel Programming*)
   - Language (see *Rack Config Menu* in chapter 5, *Front Panel Programming*)
   - Max Voltage (see *Rack Config Menu* in chapter 5, *Front Panel Programming*)
   - Min Level (see *Rack Config Menu* in chapter 5, *Front Panel Programming*)
3. Switch on all load circuit breakers.
4. Connect a suitable luminaire to each outlet and check every dimmer using the SET LEVEL control facility, a suitable control console, or an SWC hand held controller. Investigate and correct any malfunctions you find.

   If any dimmers do not work, stop and check the slot type for the dimmer. Dimmers will not work if their slot type is incorrectly assigned. Make sure that all of the modules are in their correct slots, and that the slot type for each dimmer is correctly set in the processor module.

5. Install the fan screens, door, and processor security panel (if required) to complete the system installation.

Chapter 5
Front Panel Programming

This chapter gives the basics of how to program the processsor module from its front panel. In general, it will be easier to do any setup with a PC running the Reporter software, but this interface lets you do simple programming at the rack without needing to drag a computer to the dimmer room. After the initial *Navigating the System* section, this chapter is organized by menu, in the order the menus appear in the processor module **Main** menu. Each section provides a menu diagram and gives details on how to select and program CD80sv programmable features using the processor module keypad and display.

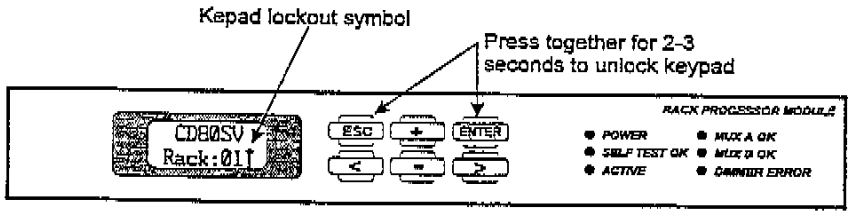
Navigating the System

You can access a range of programmable features through the use of the processor module's keypad and 16 character display. The menu system is designed to minimize multi-level menus and keep operation simple. Menus can be shown in French, German, Spanish, or English. English is the default language and this text assumes that English is selected.

Keypad Lock

To avoid tampering by unauthorized personnel, CD80sv includes a security mechanism indicated by a key (⚷) on the display. If this key appears, you must press [ESC] and [ENTER] simultaneously and hold them for about 2 seconds to unlock the system before any of the keys will respond.

This feature can be enabled and disabled from the **Rack Config** menu by using the *Set Key Lock* item. When this item is enabled, the processor is locked automatically after 10 minutes with no keyboard input. When this item is disabled, the system is always unlocked. The factory default setting for the *Set Key Lock* item is "Disabled."



The Keypad

The keypad has 6 buttons which let you navigate through the CD80sv menus.

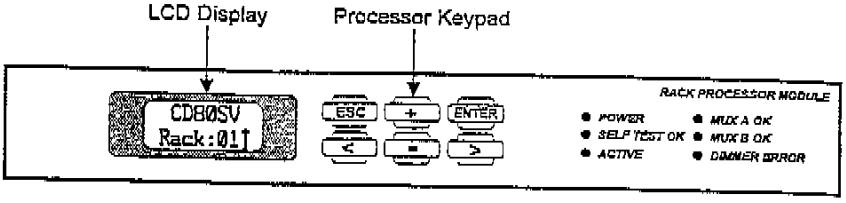
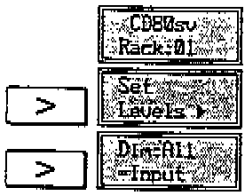


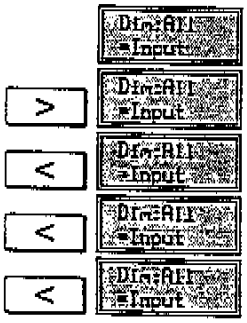
Figure 26. Keypad Layout

[<] and [>] let you go to a submenu, move between fields, or move along a large numeric field. An underline cursor shows which field or digit is selected.

Displays with submenus have an arrow in the lower right corner. Press [>] in these displays to go to the next menu level.

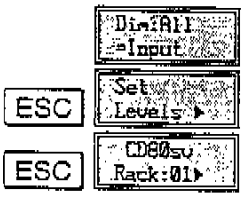


Once you are in a working menu, [>] sends you to the next field, or to the next number in a scrolling numeric field, and [<] sends you to the previous number in a scrolling numeric field, or to the previous field (see *Fields* below).



[+] and [-] are used to adjust a numeric field shown in the display or to scroll between options in a field.

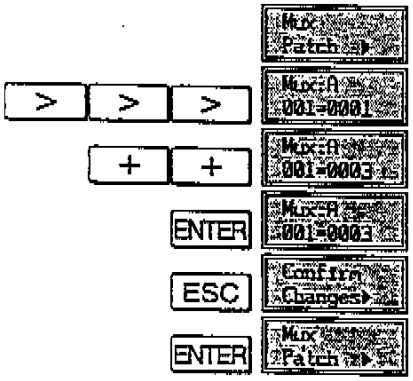
ESC leaves an option or menu and returns you to the previous menu level. Some options require positive confirmation with ENTER. You will be prompted if confirmation is required. Since we have made no changes to the dimmers in the examples so far, no confirmation is necessary to leave the menu.



ENTER lets you make changes to fields that are not changed live as you use + and - (not-Live fields). Displays with not-Live fields are shown in the menu trees as follows:

When a field displays "All," you must press ENTER to action a change. Fields with "All" as an option are shown in the menu trees as follows:

Finally, ENTER lets you confirm changes made in a not-Live field when you exit the display using ESC and get the "Confirm Changes" message. To cancel the operation once you get the message, press ESC.



Fields

There are three types of fields used in CD80sv displays.

- Display fields
- Selection fields
- Scrolling numeric fields

Display fields

Display fields are used as labels or to show data which cannot be changed. When you use [<] or [>] to move through a display, the cursor skips these fields.

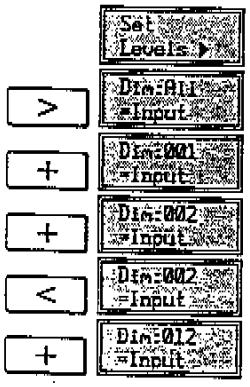
Selection fields

Selection fields let you scroll through a fixed list of options. When you use [<] or [>] to move through a display, the cursor lands on the first character or number of these fields. The only way to change the values in these fields is with [+] and [-].

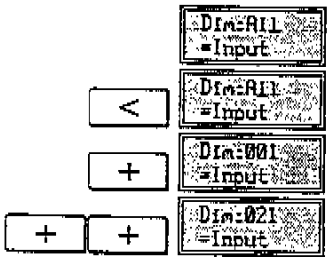
Selection fields can have text values, numeric values, or both. Some text values allowed in otherwise numeric selection fields are Off, Full, and dash ("-", meaning "none").

Scrolling numeric fields

Scrolling numeric fields let you scroll individual digits of the number to easily change numbers with multiple digits. Scrolling numeric fields can also have valid text values (e.g. "All"). When you use [<] or [>] to move through a display, the cursor lands on the ones digit. If the current value is a text value, the cursor lands on the letter that is in the ones digit position. Once in a scrolling field you can use [<] and [>] to select the digit you want to increment, and then use [+] or [-] to increment or decrement the selected digit. When a digit reaches 9, pressing [+] again will set that digit to 0 and increment the digit to its left.



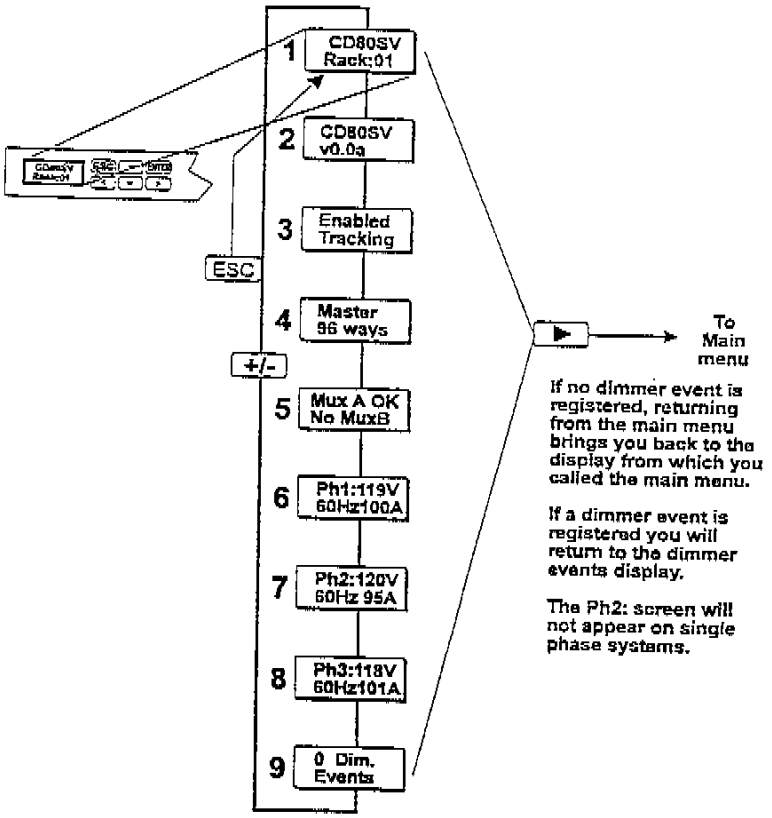
If you know you want to increment the tens digit only, you can move to the tens digit while the display still shows "All."



Some text values allowed in scrolling numeric fields are Off, Full, dash ("-", meaning "none"), and Hold.

Default Display

The default display lets you access a series of status displays using [+] and [-], and lets you access the **Main** menu by using [>]. The diagram below shows the status items you can access from the default display.



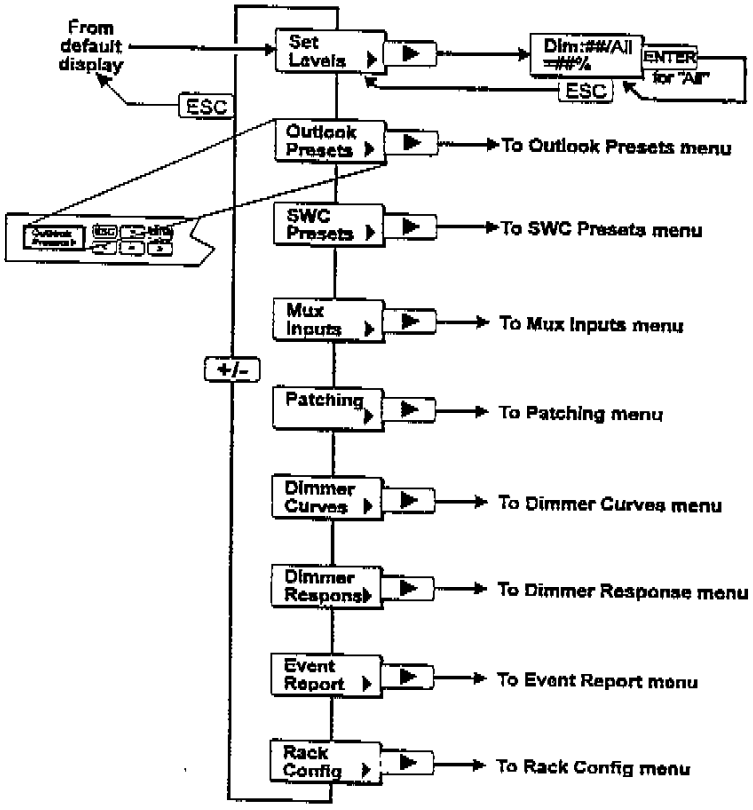
The default displays are information only displays which let you check several pieces of system information without needing to go through multiple menu levels. The description numbers below correspond to the numbers next to the display in the figure.

1. The Default display shows the dimmer rack type and rack number.
2. The Version display shows the dimmer rack type and the software version number.
3. The Backup display shows which processor is enabled, and whether or not there is a backup processor. The currently operating processor will show "Enabled," while the current backup processor shows "Disabled." "Tracking" in the second row shows that there is a backup processor, while "No Track" shows that ther is no backup processor. When the backup and main processor are functioning, both displays should say "Tracking." When the system is properly tracking, data is continuously copied from the "Enabled" processor (Master) to the "Disabled" processor (Backup).
4. The Size display shows whether the processor is "Master" or "Backup," and how many dimmers are fitted.

5. The Mux display shows whether Mux A is currently functioning, and shows whether Mux B is operational.
6. The Ph1 display shows the voltage, frequency, and current for phase 1. Current will always be 0 (zero) on the processor that is "Tracking," and on systems without Reporter dimmers.
7. The Ph2 display shows the voltage, frequency, and current for phase 2. Current will always be 0 (zero) on the processor that is "Tracking," and on systems without Reporter dimmers. This display will not appear in systems set up for single phase operation.
8. The Ph3 display shows the voltage, frequency, and current for phase 3. Current will always be 0 (zero) on the processor that is "Tracking," and on systems without Reporter dimmers.
9. The Events display shows number of dimmer events currently active and the nature of the events in a scrolling display.

Main Menu

The **Main** menu lets you access all of the other sub menus for configuring the CD80sv rack.



Set Dimmer Levels

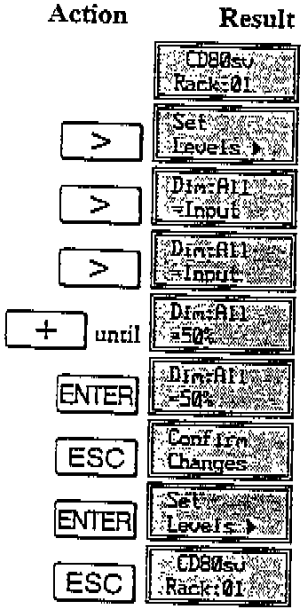
This function lets you test individual dimmers and loads directly from the keypad, regardless of the signals being received from presets and other inputs.

> ***Since this overrides the control inputs, including the presets, it is possible to completely disable any or all of the dimmers. Use this function carefully. It is easy to completely lose control of dimmers by forgetting to set them back to Input. Levels set here are remembered even if you shut power to the system OFF.***

Normally this control is set to All=Input, which lets the Mux inputs, analog inputs, and presets control the dimmer levels. The relationships of the inputs to each other are determined by the Dimmer Mux Mode setting.

This control may also be used to set dimmer levels to record SWC and Outlook presets where there is no conventional lighting control system.

To set all dimmers to 50% follow the steps below.



To set dimmers 5 and 8 to 90% follow the steps below.

Action	Result
	CD80su Rack:01
>	Set Levels
>	Dim:All =Input
+ until	Dim:05 =Input
>	Dim:05 =Input
+ until	Dim:05 =90%
<	Dim:05 =Input
+ until	Dim:08 =Input
>	Dim:08 =Input
+ until	Dim:08 =90%
ESC ESC	CD80su Rack:01

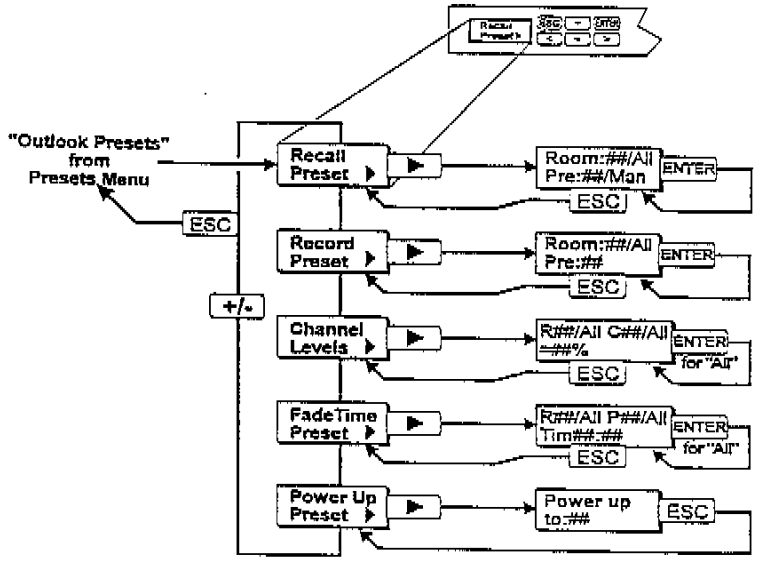
Outlook Presets Menu

Before using Outlook presets, ensure that the room/channel/dimmer assignment has been correctly set (see page 70).

There are 10 Outlook presets per room. Eight of them (1-8) are user programmable. Preset 0 is a non-recordable blackout state, preset 9 is all dimmers full ON, and MAN is the current slider settings being received from an active slider control station. When you record a preset, you record the actual dimmer levels as they appear in your room. Outlook presets and SWC presets are completely separated, and separately controlled, even though they can control the same dimmers. If you are using the SWC hand held controller, SWC pushbutton controllers, or SWC A/V interface, see *SWC Preset Menu* (page 61).

Outlook presets can be recalled and added to the dimmer output on a "highest takes precedence" (HTP) basis from the pocessor module keypad or from a control station. Selecting a preset crossfades the output of the Outlook preset processor from the previously selected preset to the new preset in the programmed fade time.

Don't forget that Outlook presets are not the only source of control in a CD80sv system. If a dimmer has control input from other sources, the Dimmer Mux Mode setting for each dimmer determines what signals appear at the dimmer. If a dimmer is ON from another source, you may not be able to fade it OFF using Outlook presets. In addition, the dimmer levels are affected by Max voltage and Min Level settings.



Recording and Recalling Presets

You can record the current dimmer output to any of the 8 recordable Outlook presets per room.

1. Set up the lighting state using any means of control.
2. Use the *Record Preset* menu item to select a room and preset number.
3. Press ENTER to record the current dimmer levels to the selected preset.
4. Repeat for any other presets.

You can activate any Outlook preset by using the *Recall Preset* menu item to select a room and preset number.

> *Don't forget--*Recall Preset *changes the lighting levels by activating the preset. It is not a "blind" viewing facility.*

Set Channel Levels

You can set channel levels directly from the keypad by selecting their room & channel number, and setting a level. This lets you test individual dimmers and loads regardless of the signals being received from the different inputs.

> ***Since this overrides the control inputs, including the presets, it is possible to completely disable any or all of the dimmers. Use this function carefully. It is easy to completely lose control of dimmers by forgetting to set them back to Input.***

Normally channel levels are set to All=Input, which lets the Mux inputs, analog inputs, and presets control the dimmer levels. The relationships of the inputs to each other are determined by the *Dimmer Mux Mode* setting.

This control may also be used to control dimmers recording into SWC and Outlook presets where there is no conventional lighting control system.

Set Fade Times

You can set the fade time (up to 10 minutes) for all Outlook presets in all rooms, for all presets in a specified room, or for one preset at a time by using the *Fade Time Preset* menu item.

To set a fade time for the manual faders, select the "Man" setting in the preset field. Manual fade time is set per room. The default for the manual preset is ZERO seconds. With a ZERO time set, when you press "Manual" or "Take Control" on an Outlook slider station the lighting instantly fades from the current level to the levels set on the sliders. If a manual fade time is programmed, the channels fade from their current levels to the slider levels in the programmed time.

Setting the fade times for all presets in all rooms or all presets in one room will not change the manual fade time. If you move any slider on the station that currently has control while a manual fade is in progress, the lighting levels will instantly conform to the current slider levels.

Set the Power Up Preset

You can select an Outlook preset that will always appear when the system is powered up (e.g., after a power failure). The default preset is ZERO, which sets the entire system to a blackout on power-up. Use the *Power Up Preset* menu item to select the preset number. This setting applies to all rooms in the system. For instance, if you select preset 1 then each room will fade to its own preset 1 on system power-up.

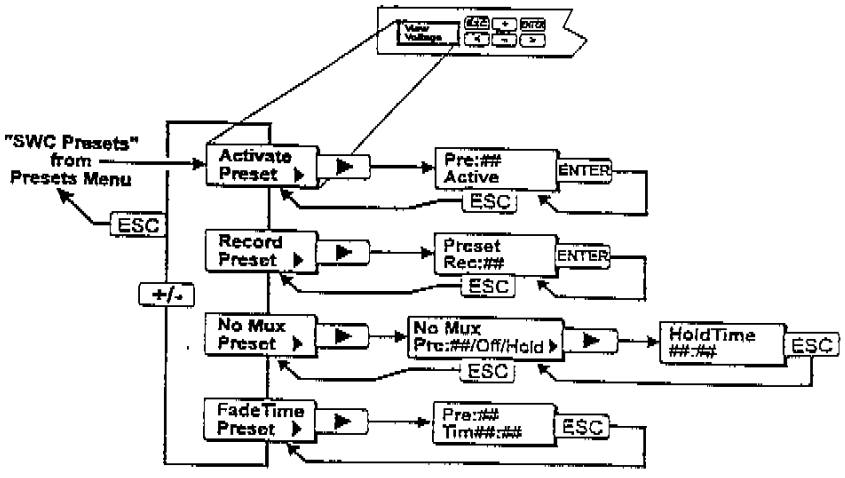
The NoMux SWC preset can act as an overall system power-up preset. If a NoMux preset and a Power Up preset are assigned, the dimmer levels are combined according to the *Dimmer Mux Mode* settings.

SWC Preset Menu

There are 99 user programmable system wide controller (SWC) presets per system. Preset 0 is a non-recordable blackout state. When you record a preset, you record the actual dimmer levels as they appear on stage or in your rooms. If you are using Outlook controllers, see *Outlook Preset Menu* (page 59). Outlook presets and SWC presets are stored and controlled separately, even though they can control the same dimmers.

Any SWC preset can be added to the dimmer output on a highest takes precedence (HTP) basis by activating it from the processor module keypad, from the SWC hand held controller, or from a PC running the Reporter software. When you activate an SWC preset, the system crossfades from any previously selected SWC preset (or from a blackout).

Don't forget that SWC presets are not the only source of control in a CD80sv system. If a dimmer has control input from other sources, the Dimmer Mux Mode setting for each dimmer determines what signals appear at the dimmer. If a dimmer is ON from another source, you may not be able to fade it OFF using SWC presets. In addition, the dimmer levels are affected by Max voltage and Min Level settings.

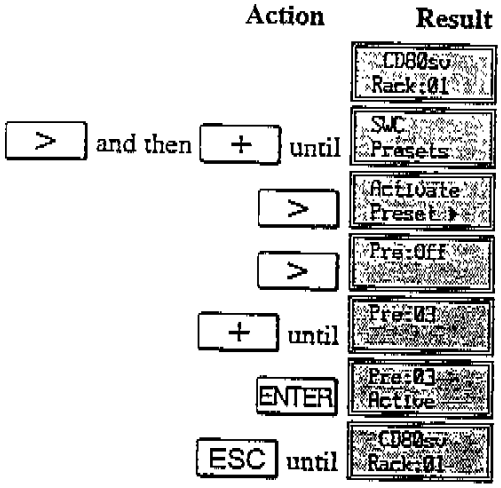


Activate a Preset

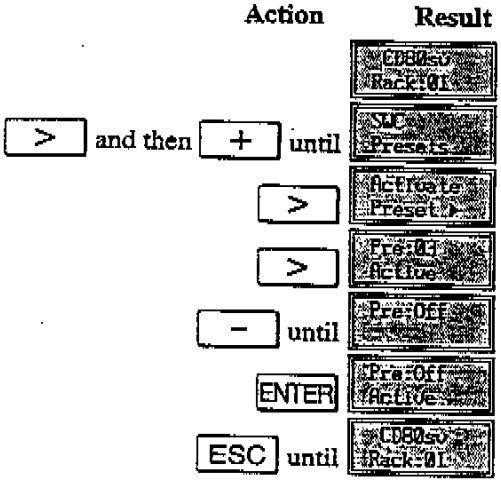
You can activate the dimmer levels of any SWC preset from the processor module control panel.

> *Don't forget--Activate Preset changes the lighting levels by activating the preset. It is not a "blind" viewing facility.*

To activate SWC preset 3, follow the steps below:



To turn off SWC presets, follow the steps below:

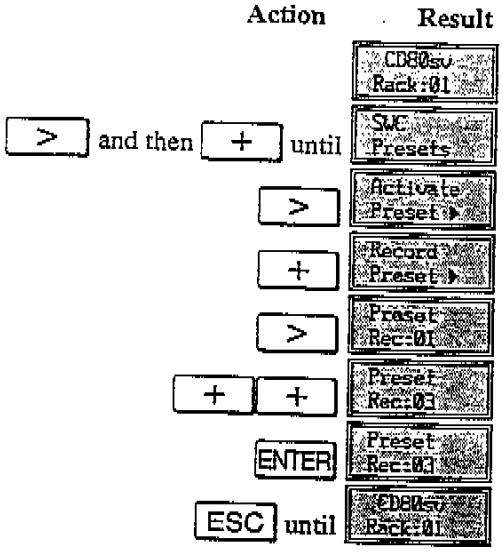


Record a Preset

You can record the current dimmer output to any of the 99 user programmable SWC presets.

1. Set up the lighting state using any means of control.
2. Follow the procedure as shown.
3. Repeat for any other presets.

To record the current dimmer output to preset 2 in room 2, follow the steps below:



Set the NoMux Preset

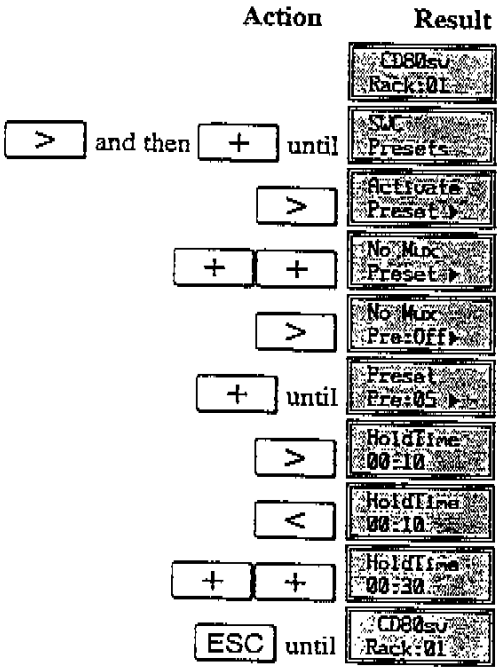
The NoMux preset is the preset the system will fade to if you lose the Mux signal. What happens to the dimmers if the Mux signal is lost depends on the NoMux setting.

Hold	System holds current levels on loss of Mux signal. HoldTime submenu is disabled if this option is selected.
Off	System fades to black on loss of Mux signal.
1-99	System fades to selected SWC preset on loss of Mux signal.

The default setting is No Mux=Off. No Mux=Hold is a useful safety feature in live performance situations.

> *Setting NoMux to Hold may cause problems if the dimmers are left ON after the control desk is turned OFF. Many desks produce unwanted signals as the power fails, and once the desk is turned OFF, the dimmers are susceptible to noise pickup on the Mux Input. This can leave the dimmers unexpectedly ON. If you set NoMux to Hold, make sure unattended dimmers are turned OFF.*

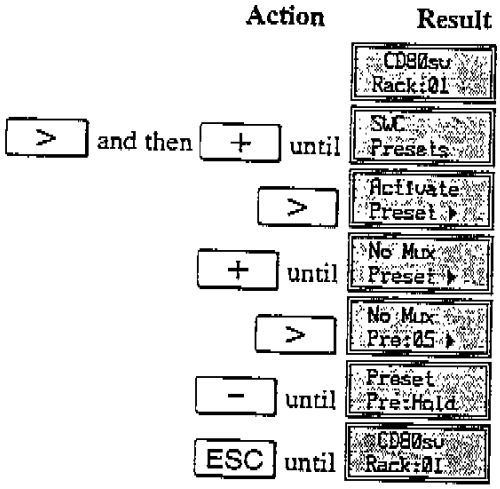
To assign preset 5 as the "backup" with a Hold Time of 30 seconds, follow the steps below.



In the above example, when both Muxes fail the system will hold the last levels for 30 seconds and then fade into SWC preset 5.

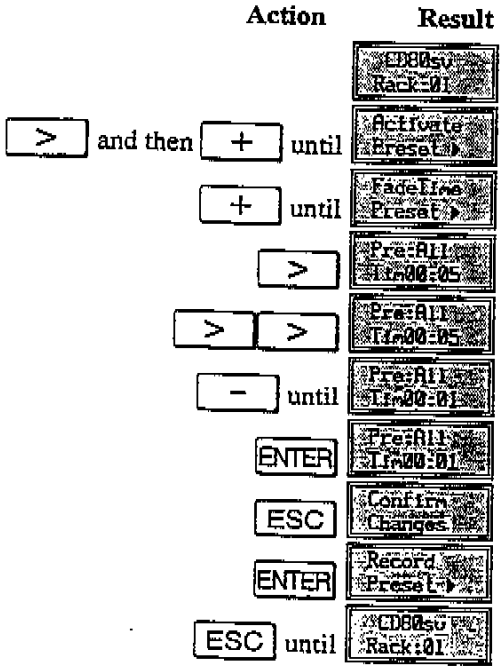
> *When you select a new preset for the No Mux preset, the hold time is automatically reset to 10 seconds.*

To set the system to hold levels on loss of Mux signal, follow the steps below.



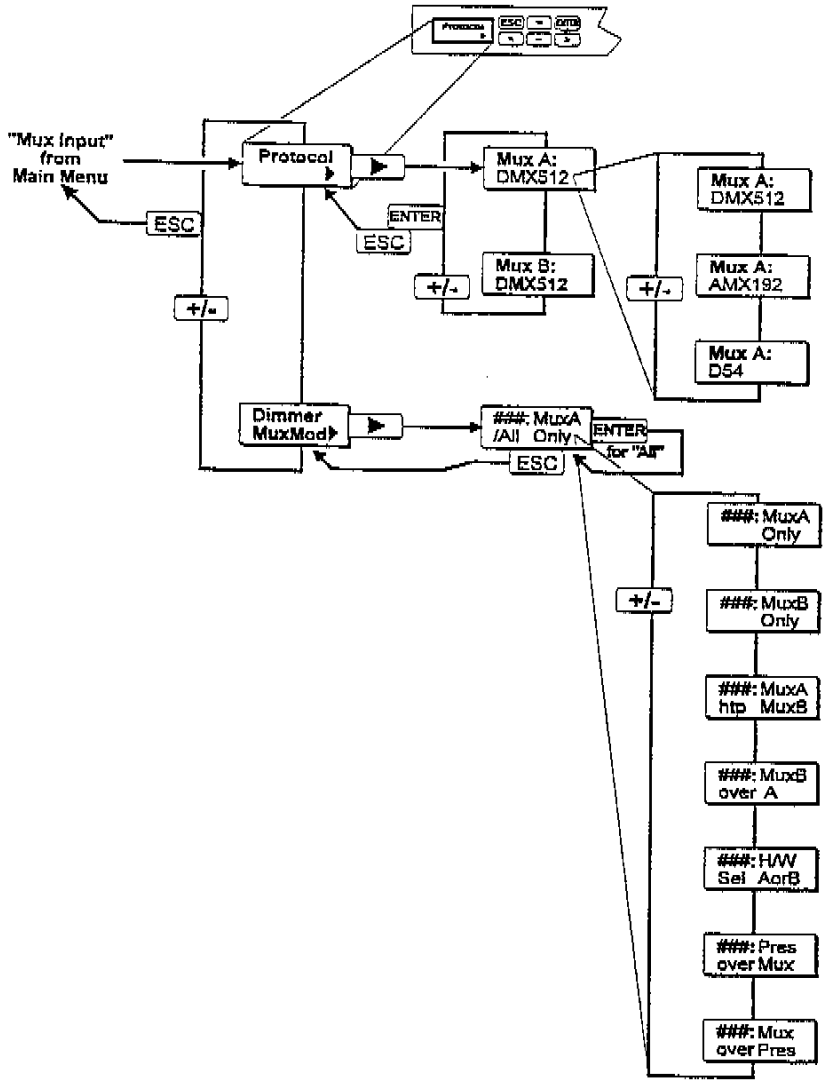
Set Fade Time

You can set the fade time for all SWC presets in the rack or for one preset at a time. To set the fade time for all presets to 1 second, follow the steps below.

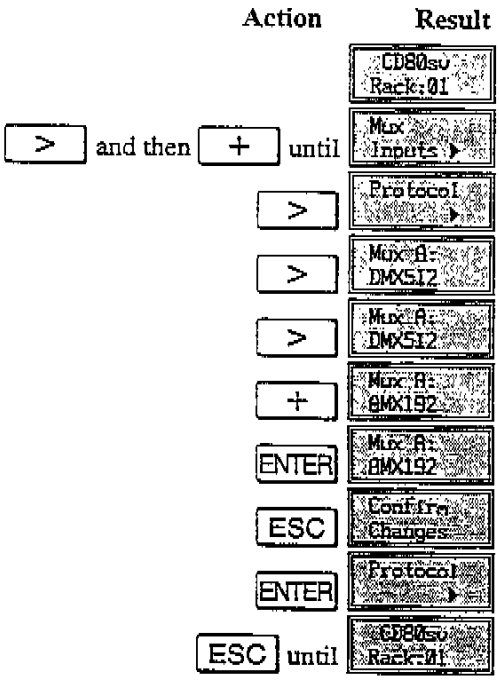


Mux Inputs Menu

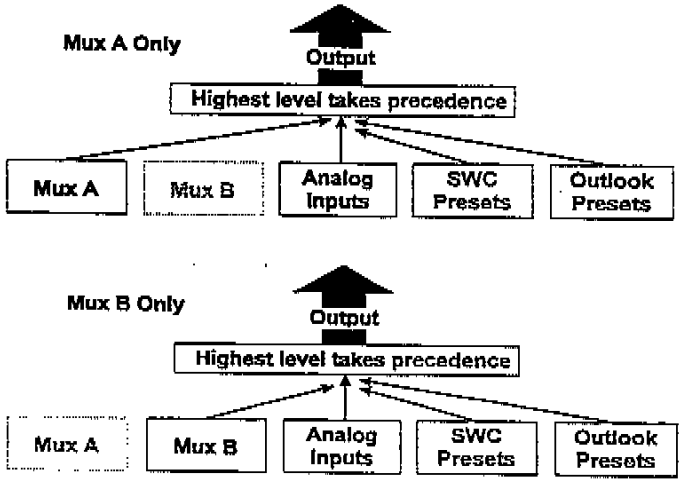
The Mux input protocol for Mux A can be set to DMX512, AMX192, or D54 formats. The Mux input protocol for Mux B is fixed at DMX512. In addition, you can set the way in which the input signals interact (called the Mux Mode) for each dimmer individually. This lets you split a single rack for use with more than one type of input if required, or use signals from more than one input to control the same sets of dimmers.

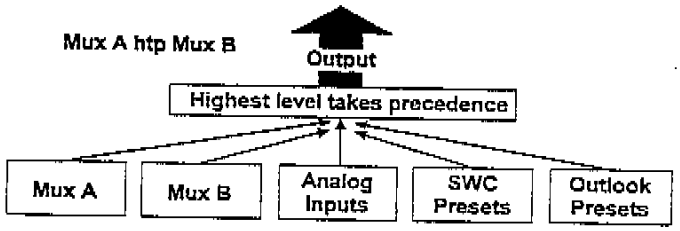


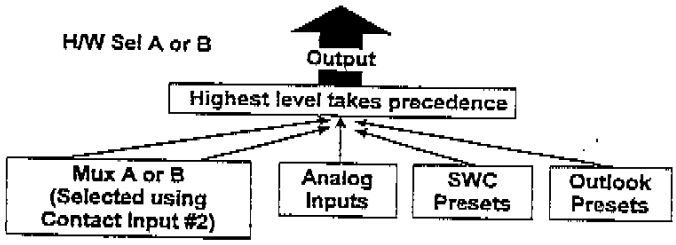
To set the protocol of Mux A to AMX192, follow the steps below.

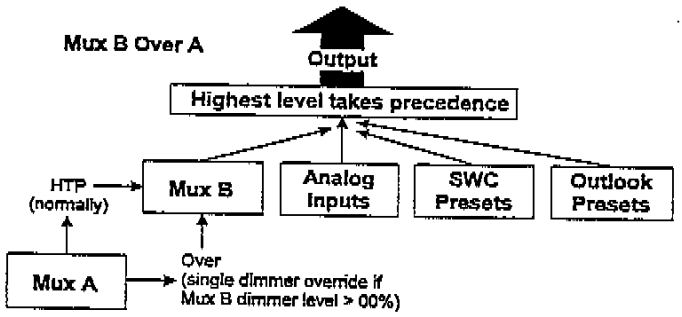


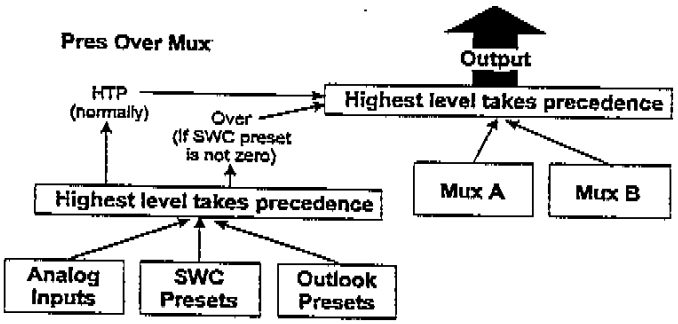
The way in which the various inputs interact to create a dimmer signal is determined by the *Dimmer Mux Mode* menu item. The diagrams below show what each of the options means in terms of signal processing. Remember that **these settings are on a per dimmer basis.**

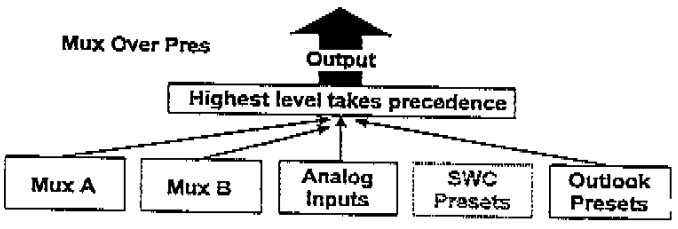



Mux A htp Mux B
Output
Highest level takes precedence
Mux A
Mux B
Analog Inputs
SWC Presets
Outlook Presets


H/W Sel A or B
Output
Highest level takes precedence
Mux A or B (Selected using Contact Input #2)
Analog Inputs
SWC Presets
Outlook Presets


Mux B Over A
Output
Highest level takes precedence
HTP (normally)
Mux B
Analog Inputs
SWC Presets
Outlook Presets
Mux A
Over
(single dimmer override if Mux B dimmer level > 00%)

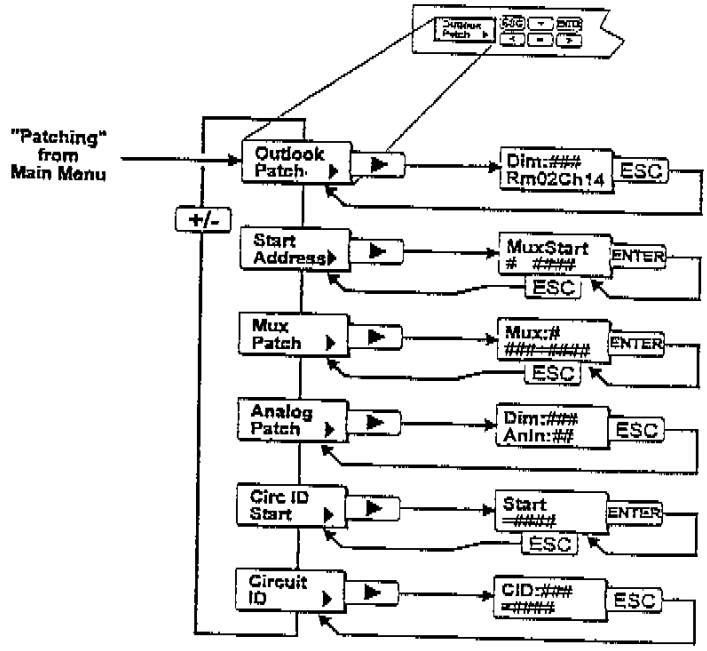

Pres Over Mux
Output
HTP (normally)
Over
(If SWC preset is not zero)
Highest level takes precedence
Highest level takes precedence
Mux A
Mux B
Analog Inputs
SWC Presets
Outlook Presets


Mux Over Pres
Output
Highest level takes precedence
Mux A
Mux B
Analog Inputs
SWC Presets
Outlook Presets

Patching Menu

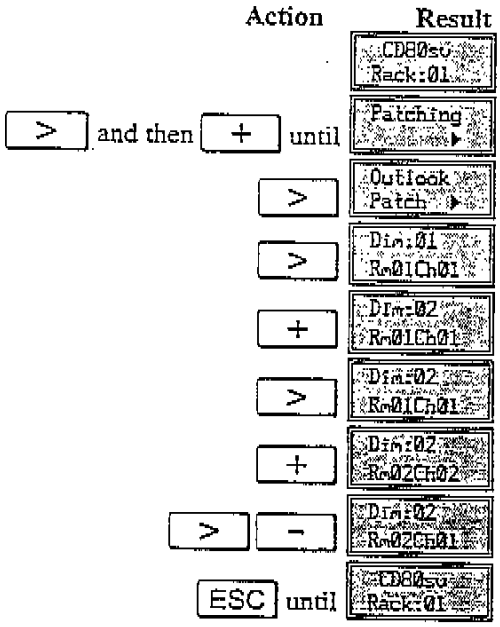
The **Patching** menu lets you allocate dimmer numbering according to your own requirements.

- The *Outlook Patch* option lets you assign each dimmer to a channel in a room.
- The *Start Address* option lets you patch all dimmers in the rack sequentially after the specified *Mux Start* number. This is an easy way to assign the Mux patch without going through the slow process of assigning each dimmer individually.
- The *Mux Patch* option lets you assign each dimmer to a specified multiplex number.
- The *Analog Patch* option lets you assign each dimmer to a specified analog input.
- The *CID Start Number* option lets you set a starting circuit ID for a rack and have the software automatically number the ramaining circuits in the rack from the CID start number. This is an easy way to set up a rack so that the cicuit IDs are offset by a fixed amount from the Mux adderesses.
- The *Circuit ID* option lets you assign your own dimmer numbers or names independently of the *Start Number* or *Dimmer patch*. It is important only for use with the SWC hand held controller or with the Reporter software. This facility lets you use your desk's channel numbering scheme, or even a geographic numbering scheme, (e.g. 100, 101, 102... 110, 111, 112 etc. when remotely controlling dimmers in a complete system.



Patch Dimmers to Rooms

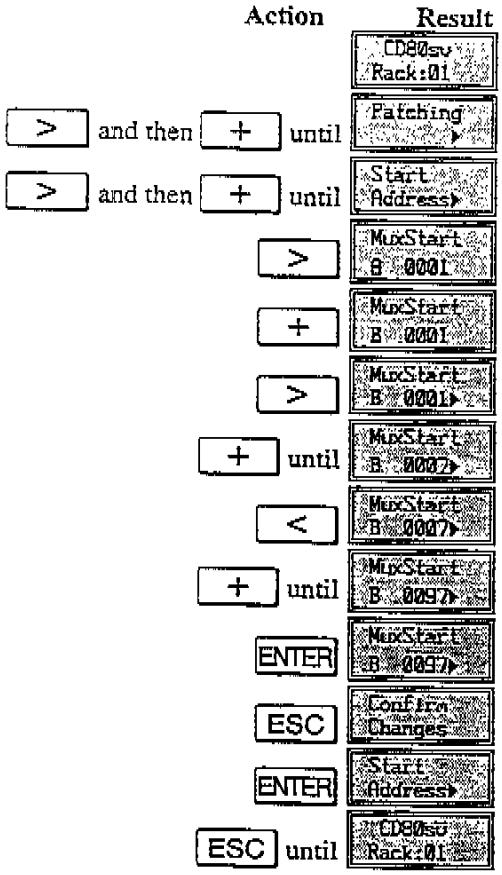
If you are using Outlook (or compatible) controllers you can patch dimmers to specific channels in specific rooms. To set dimmer 2 to channel 1 in room 2, follow the steps below.



Set the Starting Mux Address

In order to assure that all controls operate separate dimmers, multiple rack installations require that each rack is uniquely numbered and dimmers assigned accordingly.

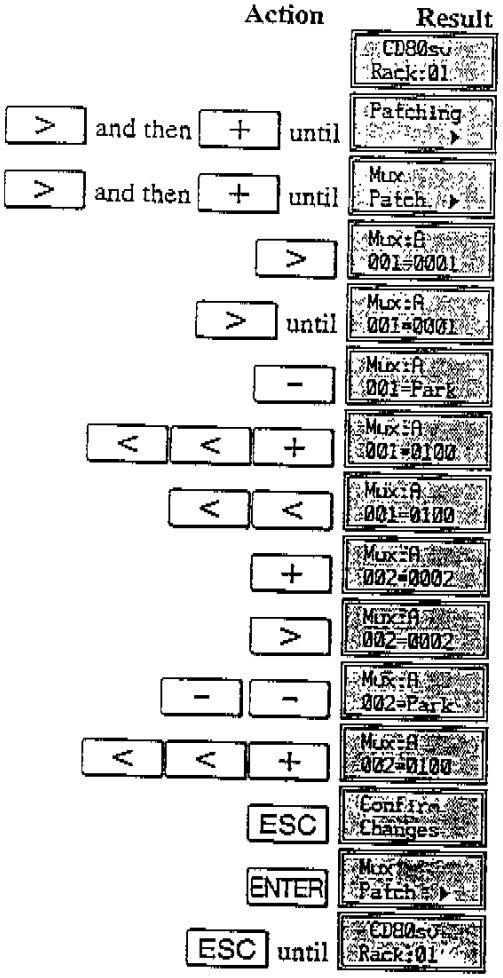
In most systems, dimmers are numbered consecutively through the dimmer racks. The first dimmer in a rack is set to one number higher than the last dimmer in the previous rack. The following example assumes that the first rack has 96 dimmers controlled by 96 consecutive Mux signals, and sets the first Mux B signal for the second rack to 97.



The Mux address will change as the dimmer number is changed showing the address that the dimmer is patched to. Remember that any changes to the patch will be seen on the lighting output as soon as you press ENTER.

Patch Dimmers to Mux Signals

You can patch one or more dimmers to be controlled by one Mux signal. This lets you reassign dimmers to different mux signals, or group various sets of lights. You can unpatch dimmers by setting them to Park, which is "below" channel 1. The following example patches dimmers 1 and 2 to Mux signal 100. Unless you patch some other dimmer to Mux signals 1 and 2, neither of these signals will control any dimmers.



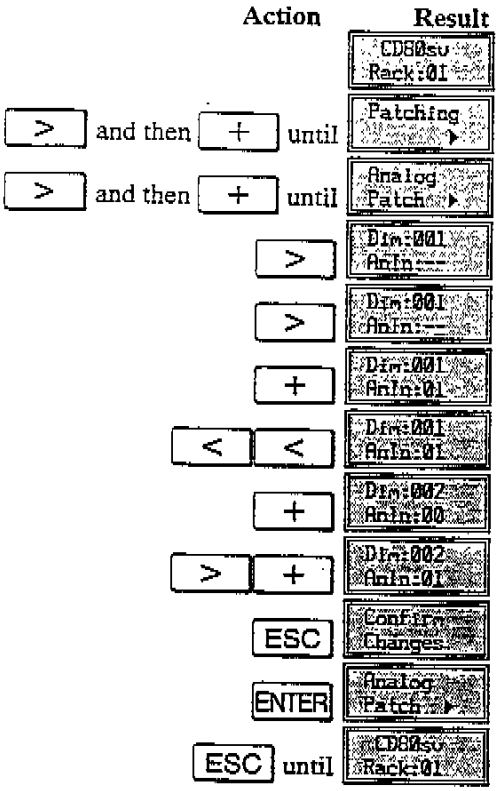
Patch Analog Outputs

Analog outputs can be patched just like analog dimmers (see above). Analog outputs are numbered starting with the first number above the highest dimmer number in the rack. A rack with 96 dimmers has analog outputs numbered from 97 to 108. A rack with 80 dimmers has analog outputs numbered fron 81 to 92.

You can patch one or more analog outputs to be controlled by one Mux signal. This lets you reassign analog outputs to different mux signals, or group various sets of outputs. You can unpatch analog outputs by setting them to Park, which is "below" channel 1.

Patch Dimmers to Analog Inputs

You can patch one or more dimmers to be controlled by any of the 32 analog inputs (or 16 inputs for 48 channel processor modules). Dimmers patched to analog signals can also be patched to Mux signals. The following example patches dimmers 1 and 2 to analog signal 1. Patching a dimmer to an analog signal does not unpatch it from any Mux signals. These two dimmers will now be patched to Mux signal 100 and analog signal 1.

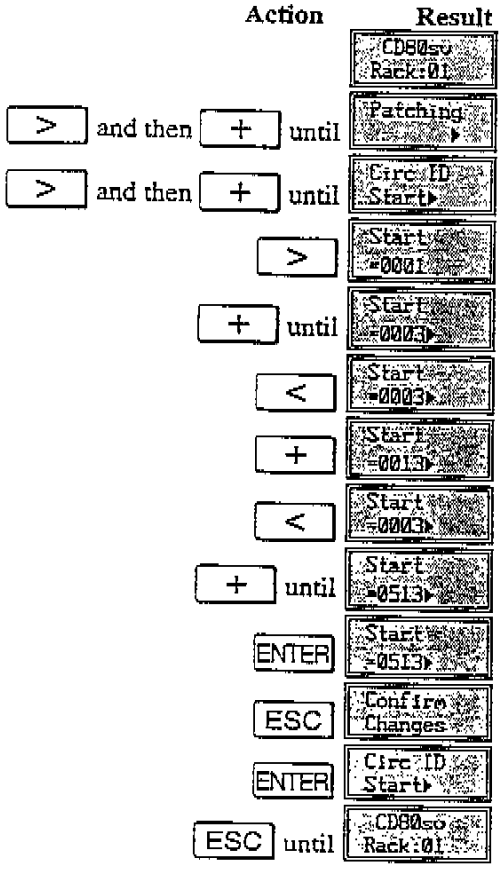


Set the Starting Circuit Number

The circuit ID feature lets you give 4-number identifications to dimmers, which lets you control dimmers from multiple sources, even if those sources do not call the dimmers by the same numbers. Circuit ID's are useful when using the optional SWC hand held controller or a PC running the Reporter software, both of which let you control large numbers of dimmers easily and remotely.

In the following example, a 48 dimmer rack is being added to an existing 512 dimmer installation. Since the system (now 560 dimmers) exceeds the capacity of one DMX512 link, the control console's second Mux output must be used to control dimmers 513-1024. However, to the rack this signal appears as 1-512 again.

If you set the starting circuit ID for the new rack to 513 and its Mux Start number to 1, the dimmers can be controlled by the main control console as 1-48 in the second DMX cable and from the SWC hand held controller or the CD80sv processor front panel as circuits 513-560.

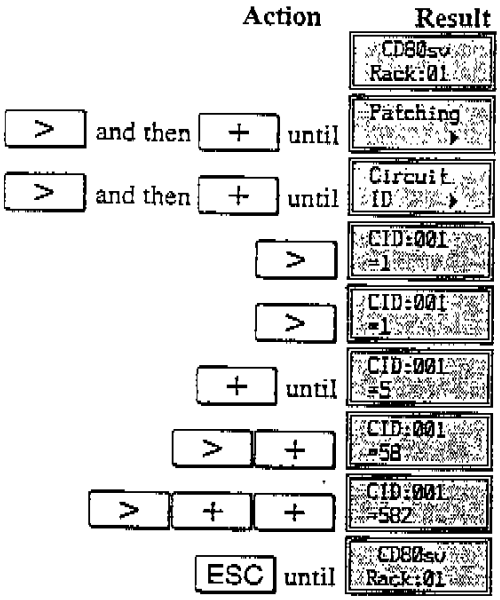


This procedure creates Circuit IDs sequentially for all dimmers in the new rack, starting with the number you specify.

Set Individual Circuit IDs

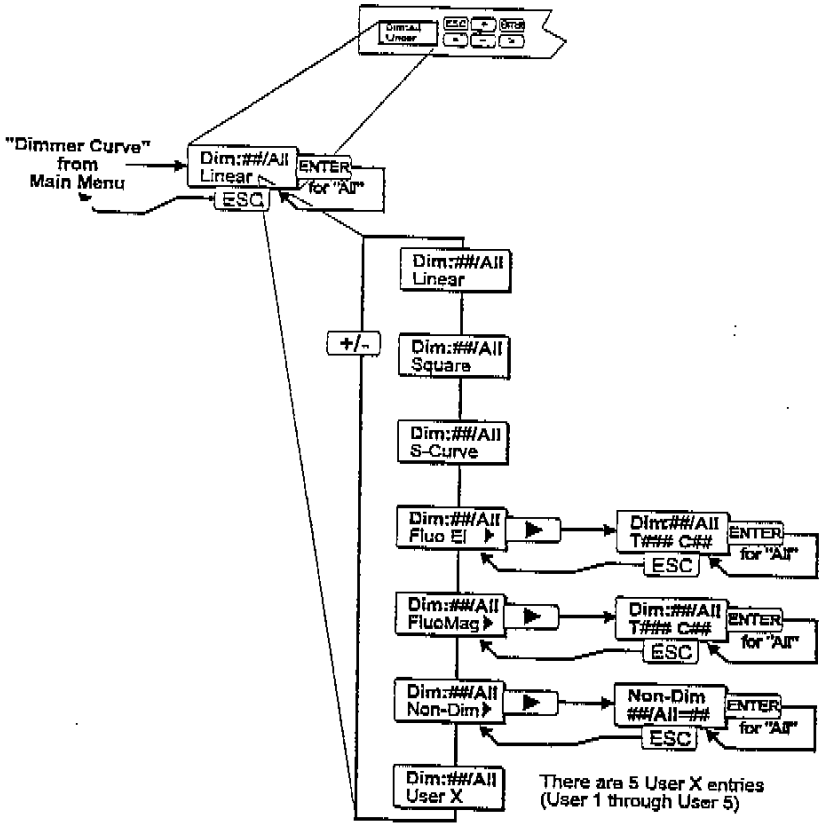
Although it is generally easier to set circuit IDs using the Circ ID Start menu, you can also set a single circuit ID if necessary.

To set a Circuit ID for dimmer 6, follow the steps below;



Dimmer Curves Menu

There are 3 incandescent, 2 fluorescent, and one Non-Dim curve programmed into CD80sv which you can assign to dimmers for compatibility with other dimmers or specific application requirements. You can download 5 additional user defined curves from the optional Reporter PC, or you can program them from the rack using the Rack Config menu. The factory default is "Square."



If you put an incandescent power module in a slot set for a contactor module (U, V, W, X, Y, Z) and change the slot type accordingly, the dimmer curve is reset automatically to "Square." If you put a contactor module in a slot set for an incandescent power module and change the slot type accordingly, the dimmer curve is reset automatically to "Non-Dim." Reporting dimmers and contactors automatically set their slot types correctly.

Set Incandescent Dimmer Curves

The following graph illustrates the relationship between input signal and output voltages for the incandescent curves. In general, you can use Square for TV requirements, Linear for theatre use, and S-Curve for architectural installations or when you need to match older dimmers.

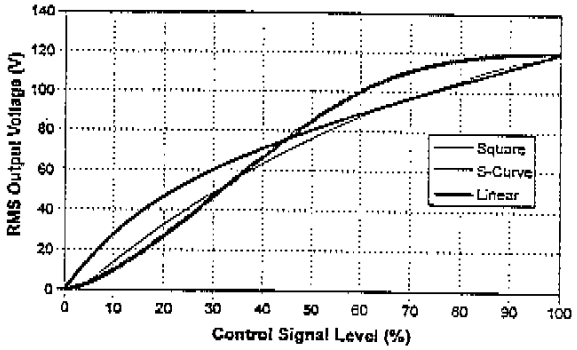


Figure 27. Incandescent Dimming Curves (with 120V nominal supply)

Separate dimming curves are supplied for use with magnetic and incandescent fluorescent fixtures. You should set these correctly for best results from your installed fixtures.

To get to curve settings from the default screen, follow the steps below.

Action	Result
	CD80sv Rack:01
> and then + until	Dimmer Curves ▸
>	Dim-01 Square
+	Dim-01 S-Curve
ENTER	Dim-01 S-Curve
ESC	Confirm Changes ?
ENTER	Dimmer Curves ▸
ESC until	CD80sv Rack:01

If you put an incandescent power module in a slot set for a contactor module and change the slot type accordingly, the dimmer curve is reset automatically to "Square." If you put a contactor module in a slot set for an incandescent power module and change the slot type accordingly, the dimmer curve is reset automatically to "Non-Dim." Reporting dimmers and contactors automatically set their slot types correctly.

Set Fluorescent Dimmer Curves

The CD80sv rack supports both magnetic and electronic (phase controlled) fluorescent ballasts. For optimum performance you should set the appropriate fluorescent curve for each of your fluorescent dimmers. The settings for top end voltage and cutoff voltage are done the same way for magnetic and electronic balast curves.

Fluorescent lamps operate best when the dimmer response is set to "Slow" (see page 80 for setting dimmer response).

For additional information on Fluorescent Dimming refer to the Strand Lighting fact sheet *A Guide to Fluorescent Dimming*.

To set a dimmer to "Magnetic" with a top voltage ("T") of 100 and a cutoff voltage ("C") of 35V, follow the steps below.

Action	Result
	CD80sv Rack:01
> and then + until	Dimmer Curves
>	Dim:ALL S-Curve
+ <	Dim:001 S-Curve
+ +	Dim:21 S-Curve
> > +	Dim:21 FluoMag
>	Dim:21 T120C040
<	Dim:21 T120C040
- -	Dim:21 T100C040
> >	Dim:21 T100C040
+ 5 times	Dim:21 T100C035
< -	Dim:21 T100C035
ESC until	CD80sv Rack:01

If the fluorescent ballasts require a heater circuit, you will need to connect the heater circuit to a separate non-dim or contactor, and then patch the non-dim to the same control channel as the fluorescent dimming circuit. The FluoMag setting delays the startup of the dimmed circuit to allow for a separate heater circuit to turn ON first.

Set Dimmers to Non-Dim

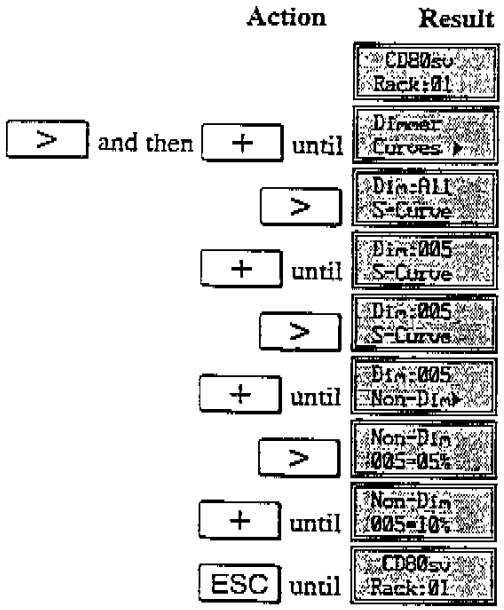
You can also assign dimmers a Non-Dim curve. When you assign a Non-Dim curve you also have the option of setting the threshold percentage. Non-dims remain at ZERO when the controller is below the set threshold percentage, and at FULL when the controller is above the threshold.

> *In order to keep dimmers from turning ON and OFF with slight voltage fluctuations if the control is set to the threshold value, non-dims are acutally turned ON about 2% above the threshold voltage, and not turned OFF until about 2% below the threshold voltage.*

Dimmers that are set to a contactor slot type will automatically be set to the Non-dim curve.

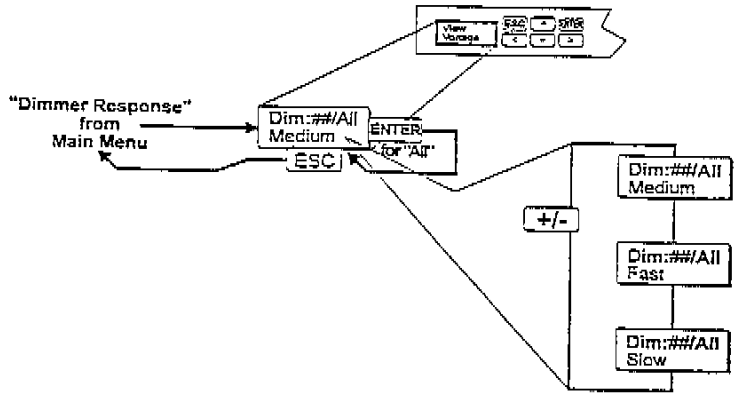
There is a slight difference between the way contactors act and the way dimmers act when set to Non-Dim. When dimmers are set to Non-Dim, they are still affected by the *Max Voltage*, *Min Level*, and *Response Time* settings. When set as contactors, these settings are not applied.

The example below sets dimmer 5 to Non-Dim with a threshold of 40%.



Dimmer Response Menu

The response speed is the rate at which a dimmer responds to an increase or decrease in its control level. CD80sv provides "Medium" (100mS), "Fast" (30mS) and "Slow (300mS) response times which you can assign to all dimmers or to any single dimmer. "Slow" is generally used for large lamp loads (e.g. 5kW fittings such as QuartzColor Pollux), while "Fast" is used for the small lamp loads that you might use in a chase effect.



The following example sets the response of all dimmers to "Fast."

Action	Result
	CD80sv Rack:01
> and then + until	Dimmer Respons
>	DIM:All Medium
>	DIM:All Medium
+	DIM:All Fast
ENTER	DIM:All Fast
ESC	Confirm Changes
ENTER	Dimmer Respons
ESC until	CD80sv Rack:01

Caution

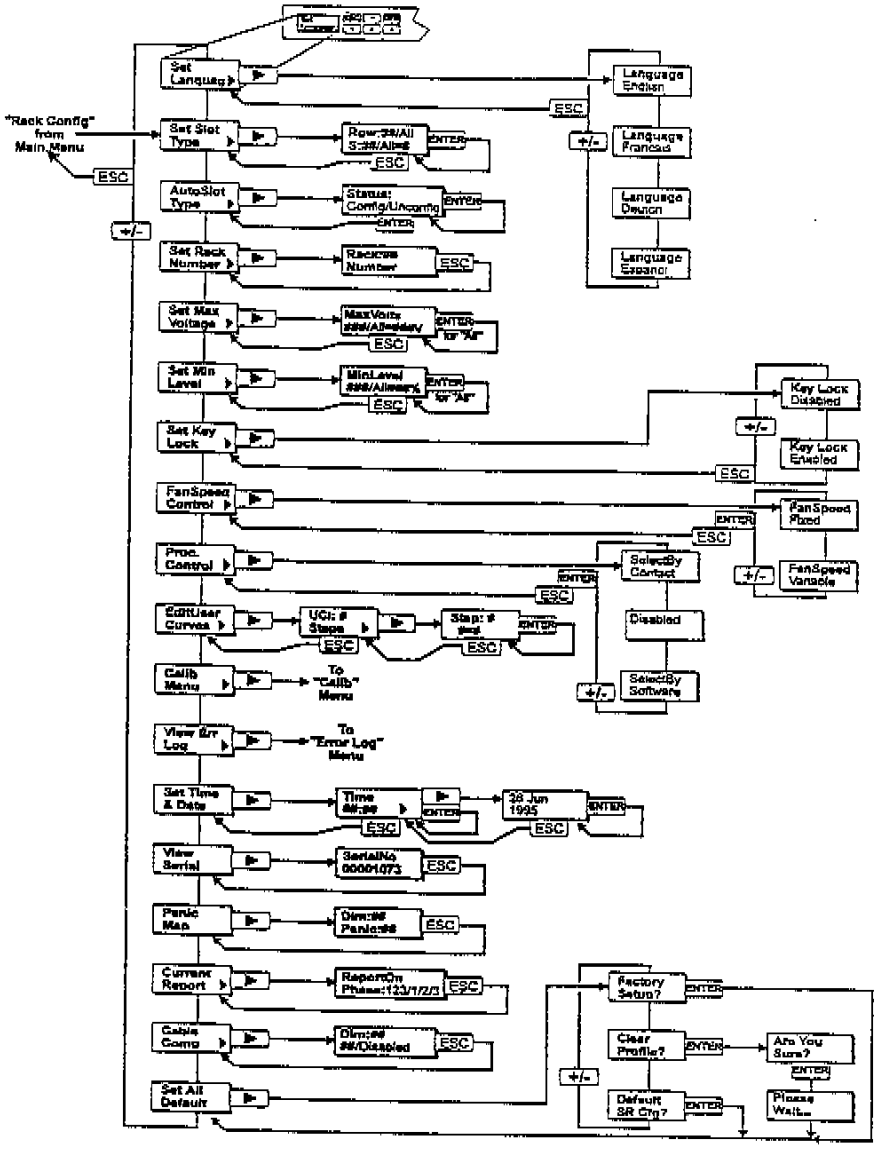
The "Fast" setting together with the accuracy of digital dimmers can cause very high inrush currents to flow. These may damage large lamp filaments and cause circuit breakers to trip. Only set dimmers to FAST if necessary for a particular effect.

Event Report Menu

The **Event Report** menu lets you turn dimmer status reporting ON or OFF (per dimmer), "Learn" the characteristics of load status reporting dimmers, and see the current events for each dimmer (see chapter 6, *Event Reports*).

Rack Config Menu

The **Rack Config** menu lets you access system functions for initial setup.



Set Language

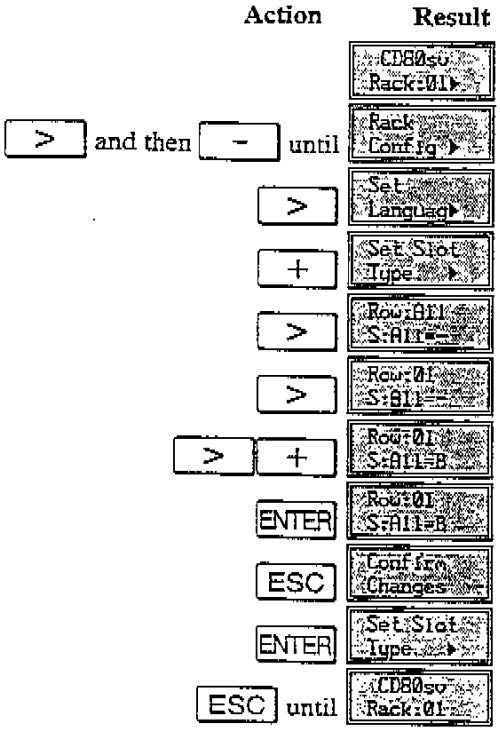
The language used for messages can be set to English, French, German, and Spanish. Once changed, all subsequent messages will be displayed in the selected language. The factory default setting is English.

Set Slot Type

Before you can control dimmers, the processor module must know what types of power modules are installed in the rack. The defaults are "-" (none) for slot type. Since the slot type is usually set at the factory or during commissioning, you should need this function only if you move dimmers around or get new power modules. The dimmer type designation (a letter) is printed on the front of each dimmer. Constant modules are type "-" (none), and will be skipped when dimmers are patched.

> ***Dimmers will not work properly without the correct slot type setting. You should at least spot check these settings during installation. If you are having problems with dimmers during installation, check this setting first. If you add or move dimmers, check this setting.***

The following example sets all dimmers in the rack to type B.

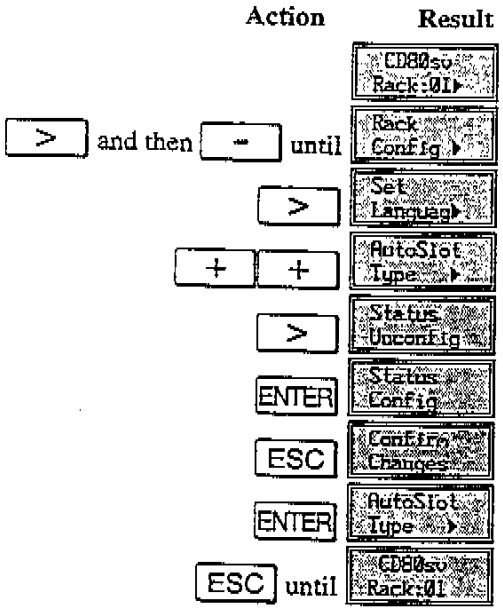


When you set a slot to a contactor type (U, V, W, X, Y, Z) the dimmer curve is automatically adjusted to Non-Dim. If you reset the slot to an incandescent dimmer type, the curve will be set back to Square.

If you change a dimmer type from single to dual dimmer, or vice versa, the patching for every dimmer after the newly changed slot will be repatched to accomodate the change in number of dimmers.

Set Slot Types Automatically

For systems with Reporter power modules, you can automatically configure the slot types when you set up the system, when new modules are added, or when modules are moved. This feature will only add modules to the map or change the types for existing Reporter modules. To remove modules from the map or to change the type for a non-reporting module you must use the Slot Type menu.



This feature is for initial setup, and if you change a module from a reporting to non-reporting type, or vice versa. Slots identified by this procedure as Reporter modules are constantly scanned, and their slot type changed automatically if you change the module. Slots identified as non-reporting modules are not scanned by the system for type or for dimmer status data.

Set Rack Number

For multiple rack installations which will be using the reporter software or the SWC hand held controller, you must set a unique rack number for each dimmer rack so that you can identify racks from the controller.

Set Maximum Output Voltage

You can set a maximum output voltage for any or all dimmers. For instance, you can set the maximum voltage lower than the rated voltage of your lamps for improved lamp life. If you have lamps or equipment that cannot tolerate the line voltage, you can use this feature to set the voltage output from the dimmer to an appropriate voltage for the device. The maximum output voltage is applied to all dimmers and dimmers assigned as non-dims. It is not applied to contactor non-dims. You cannot use contactor non-dims for devices which need a maximum output voltage setting. For analog outputs, which are the dimmer numbers above the actual number of dimmers in the rack, a setting of 250V will give +10VDC at the output.

This sets the maximum dimmer output voltage, not the maximum control level applied to the dimmer.

Be careful when using a maximum output voltage with dimmers set for PANIC. When panic is activated, full output voltage appears at the output of any dimmer or non-dim set for PANIC, regardless of how the maximum output voltage is set.

Set Minimum Dimmer Levels

You can set a minimum level for any or all dimmers. This can be used for security/safety lighting in locations where you always want at least some light. It can also be used as a preheat for large lamps. Minimum dimmers levels are shown in percentage.

Set Key Lock Status

To avoid tampering by unauthorized personnel, the CD80sv processor module includes a security mechanism indicated by a key (⚷) on the right side of the display. If this key is present, you must press ESC and ENTER simultaneously and hold them for about 2 seconds to unlock the system before any of the keys will respond.

The *Set Key Lock* item in the **Rack Config** menu lets you Enable or Disable the automatic locking function. When Enabled, the processor automatically locks if there has been no input for 10 minutes. When Disabled, the processor is always unlocked.

Set Fan Speed Control

The cooling fans in the rack can be set to Fixed or Variable speeds

Use the Fixed setting where rack room cooling is a problem. With this setting, the fans are always ON when the dimmer rack is ON.

Use the Variable setting to minimize noise and maximizes fan life. With this setting, the fan speed is adjusted such that it is at full speed when the sum of the dimmer control levels is 2400 (e.g., 24 dimmers at full or 48 dimmers at 50%). As the sum of control levels decreases below 2400, the fan speed is reduced proportionally. Increases in fan speed take 1 minute, while decreases in fan speed take 5 minutes. Fans are turned OFF when no dimmers are in use.

Set the Active Processor

In racks with dual processors, the currently active processor can be selected automatically, by contact, or by software. The default for this feature is Select By Contact, which lets you select the current processor manually with an external switch or automatically by setting the Auto Backup link (LK9 on the CIC).

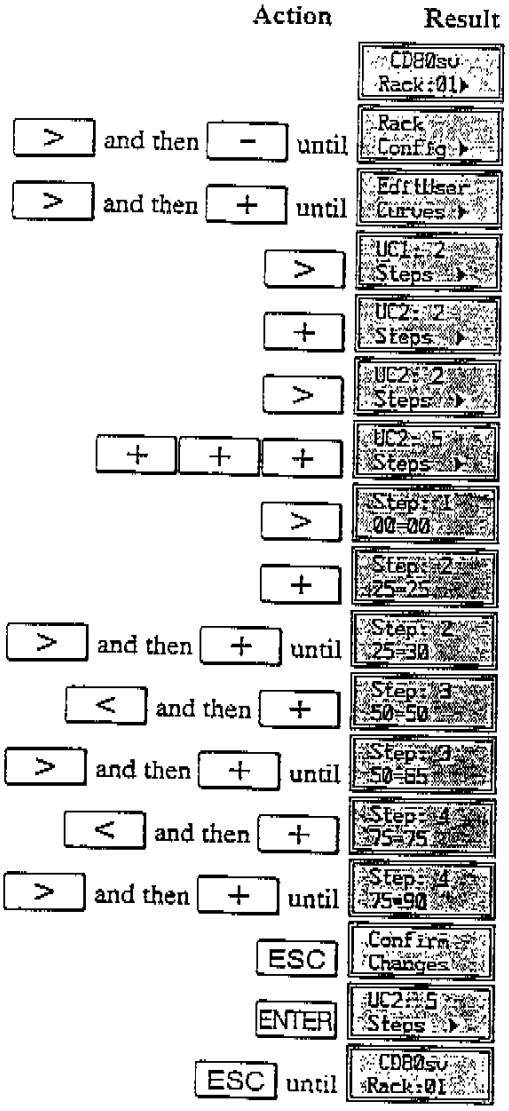
The Select By Software setting is provided for older CIC boards without automatic backup selection, and emulates this feature in software. You should not use this setting with new CIC cards. To identify new CIC cards, look for connector PL49, which is a 3-pin connector labelled "ENABLE LEDS." This connector did not exist on older CIC boards.

The Disabled setting makes a processor completely passive. It continues to send the "I'm alive" signals to the CIC. This setting is useful mainly for disabling the backup processor while loading new software.

Edit User Curves

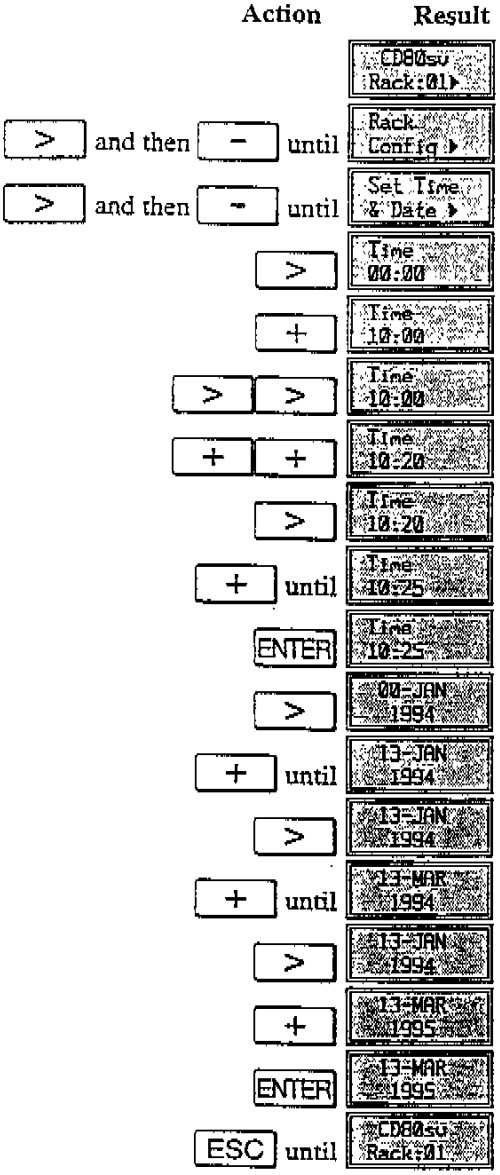
Using the Edit User Curves item in the Rack Config menu, you can edit the 5 user curves for the rack. These curves initially contain 2 steps, at 0% and at 100%. To change a user curve from its default, specify the curve number, then the number of steps, then edit the value for each of the steps.

When you first specify the number of steps the software creates the steps spaced evenly between 0% and 100%. That both 0% and 100% are counted as steps. To create a curve divided equally into 4 parts you need to specify 5 steps. As you enter new values, the software linearly interpolates between each pair of adjoining steps. To get a smooth curve, you will need to enter a considerable number of steps.



Set Time and Date

This menu item lets you set the system time and date. System time is set in 24 hour mode (hh.mm.ss). The main reason for setting this correctly is to ensure that all system reporting is time-stamped correctly.



View Serial Number

You can find the serial number for your rack processor module from the **Rack Config** menu. This is a view only entry, and cannot be changed.

View Panic Map

The panic map lets you see which PANIC switch controls which dimmer. PANIC switches are numbered 1-96 in every rack, but the dimmer numbering depends on the numbers and types of dimmers installed. This display is a view only display.

Set Current Reporting Phase

This menu option lets you set current reporting mode in cases where all three phases are "strapped" together or phases are connected in a different order. You can set the value to 123, 1, 2, or 3, and 5 other phase ordering combinations.

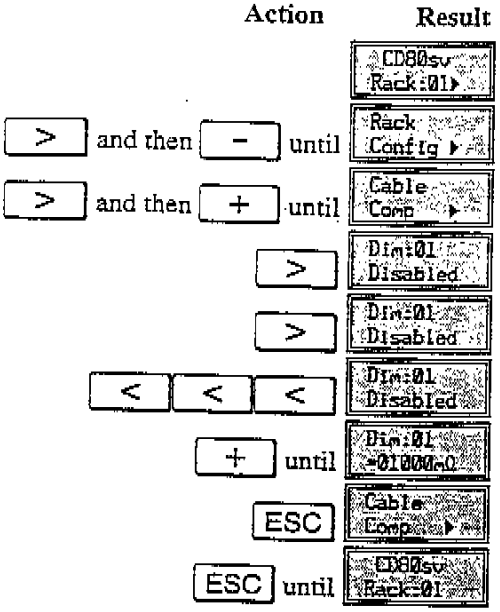
For 3-phase racks (3-phase 4-wire), set this value to "123" or to one of the other possibilities depending on the actual phase arrangement, and uninstall LK14 on the CIC.

For standard single phase racks(single-phase 3-wire), set this value to "All" and install LK14 on the CIC.

For strapped single phase operation (a single phase or three phase rack with all phase busses strapped together), set this value to the single phase you are using in that rack and uninstall LK14 on the CIC.

Set Cable Compensation Values

The Cable Comp menu lets you set cable resistance (in milliohms) for each circuit. To activate cable compensation, the you must learn the dimmer loads so that the system knows what current will be drawn at each specified dimmer level, and therefore what voltage to add to the dimmer output. You must have Reporter dimmers to use this function.



Return the Rack to Default Values

You can return the entire system to its default values, clear all of the learnt load profiles, or clear event report config limits by using the Set All Default menu.

Factory Defaults

This menu option sets all values throughout the system to their factory settings. Since some of the defaults may not be correct for your system, check all settings after you use this function.

Important

Be careful. This setting returns all programmed settings to their factory defaults, including setting the slot type for all dimmers back to "none". If you use this feature, dimmers will not work until the slot type for each dimmer is reset.

Table 1. Factory Default Values for Dimmers

Slot Type	All module slot types are cleared. On 96 channel processors you still have 12 analog outputs.
Dimmer Level	All=Input. Dimmers take levels from control inputs.
Curve	All dimmers = Square
Response	All dimmers = Medium
Max Voltage	120V for 120VAC racks. 230V for 240VAC racks.
Min Level	Off
Fluorescent Topset	120V for 120VAC racks, 195V for 240V racks.
Fluorescent Cutoff	40V for 120VAC racks, 80V for 240V racks.
Non-Dim Threshold	5%
Dimmer Mux Mode	A hip B
Load profiles	Cleared
MCBTrip mode	O/P=ON
Cable compensation	Disabled
Status reporting config values	Defaults

Table 2. Factory Default Values for Rack

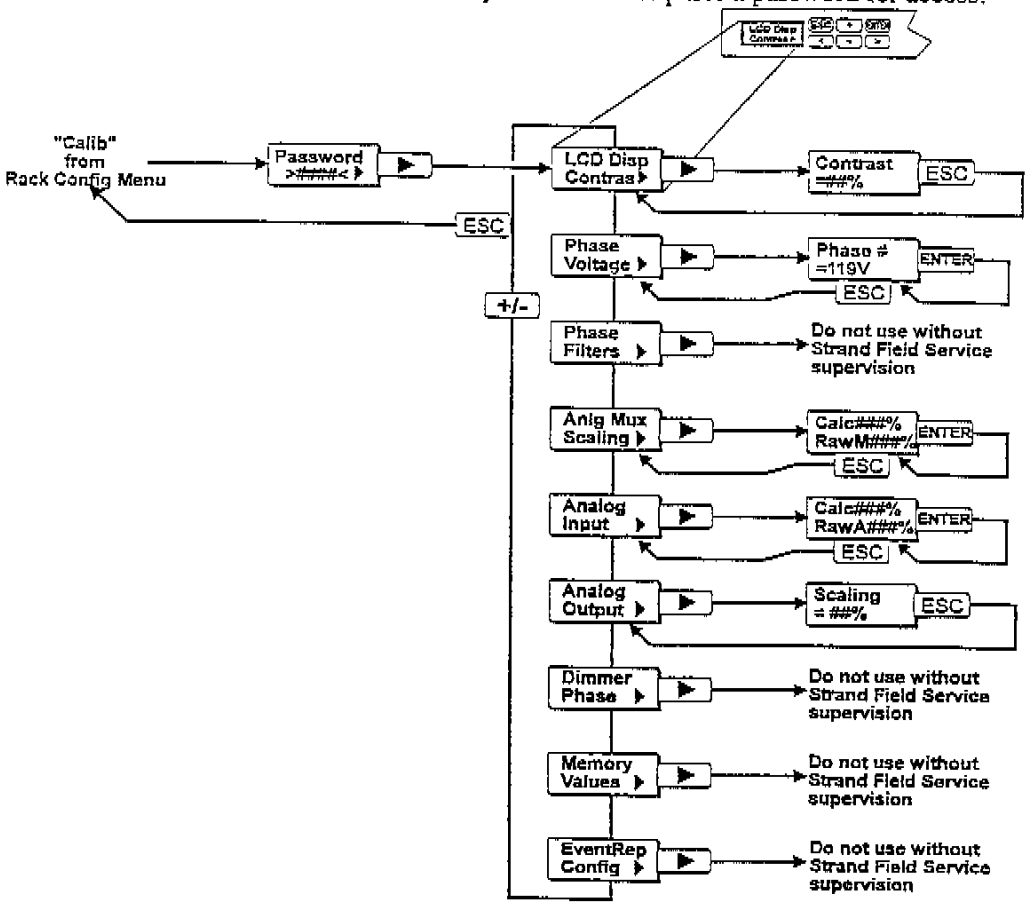
Rack Number	1
Rack Language	English
Fan Speed	Variable
Processor Enable Mode	Contact
Processor Enabled	Yes
Mux Fail Preset	Off. On Mux fail, dimmers fade OFF after 10 seconds.
Mux Fail Hold Time	10 seconds
Keypad Lock Enable	OFF
Mux Protocol	DMX512 (Mux A and Mux b)
Mux Patch	1...n sequential (Mux A and Mux B)
User Curves	1:1 exact linear
Analog Patch	All inputs disbled and unpatched.
Circuit ID Patch	1, 2, 3,...n for both Mux A and Mux B
SWC Fade Time	5 seconds
SWC Preset levels	0
SWC Preset Number	0 (blackout)
SWC manual Levels	0
Outlook Fade Time	5 seconds except ON preset, which is 0 seconds. Manual fade time default is also 0 seconds.
Outlook Preset levels	P1=All dimmers 100%, P2=85%, P3=70%, P4=60%, P5=50%, P6=40%, P7=30%, P8=20%
Outlook PowerUp	Preset 0. On power-up, no Outlook preset activated.
Outlook Patch	dimmers 1-12 = room 1, channels 1-12, dimmers 13-24 = room 2, channels 1-12, dimmers 25-36 = room 3, channels 1-12, dimmers 37-48 = room 4, channels 1-12, etc.
Outlook Room Links	All rooms unlinked

Clear Profile This menu option clears all of the learnt load profiles. This can be handy if you have decided that learning profiles is too much work due to frequently changing loads, and want to return the system to a simple load/no load sensing mode.

Default SR Config This menu option clears all of the event report configuration limits to their factory defaults.

Calib Menu

The **Calib** (calibration) menu is accessed through the **Rack Config** menu, and lets you calibrate the various voltages in the rack. The functions in this menu should rarely need to be accessed, since initial calibration is done at the factory. This menu requires a password for access.



Set LCD Display Contrast

This feature sets the contrast for the LCD display screen on the processor module.

Action	Result
	CD80sv Rack:01
> and then − until	Rack Config
> and then + until	Calib Menu
>	Password 0000
Enter the password	Password ####
ENTER	LCD Disp Contras
>	Contrast 70%
− until 60%	Contrast 60%
ESC until	CD80sv Rack:01

Set Phase Voltage

This option sets the scaling factor the processor uses to adjust for changes in the incoming mains voltage. It is factory set, and should not need to be reset. Please consult Strand Lighting field service before using this function.

When you first enter the Phase Voltage display, the voltage shown is the current incoming voltage multiplied by the current scaling factor. The current scaling factor is an internal variable and cannot be directly displayed or set. You can indirectly set the scaling factor for each phase. To set a new scaling factor for phase B, follow the steps below.

You must use a true RMS reading DMM for this calibration.

Action	Result
	CD80sv Rack:01
[>] and then [−] until	Rack Config
[>] and then [+] until	Calib Menu
[>]	Password ▸0000◂
Enter the password	Password ▸####◂
[ENTER]	LCD Disp Contrast
[+]	Phase Voltage
[>]	Phase B =119V
[+]	Phase B =119V
[>]	Phase B =119V
Read actual phase voltage with DMM	Phase B =119V
Adjust display voltage to match DMM	Phase B =121V
[ENTER]	Phase B =121V
[ESC]	Confirm Changes
[ENTER]	Phase Voltage
[ESC] until	CD80sv Rack:01

Set Phase Filters

This ensures that the processor module zero crossover time is synchronized with the mains. Please contact Strand Lighting before attempting to recalibrate the mains phasing.

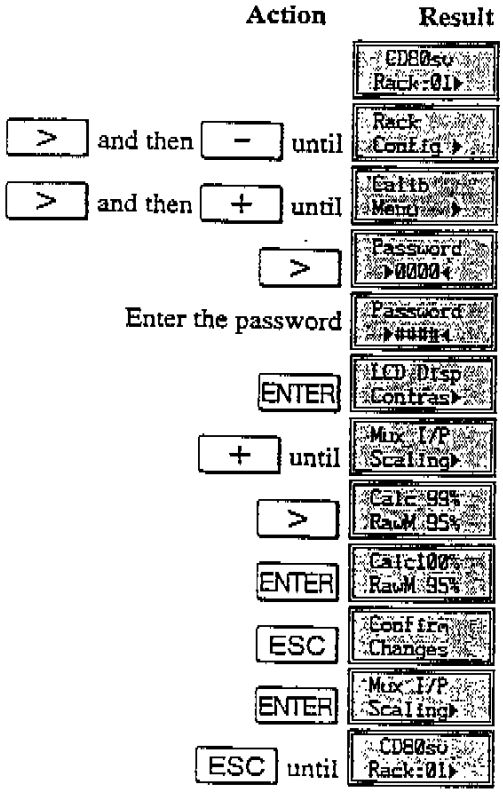
Set Analog Mux Input Scaling

This option lets you set the analog Mux input (AMX192 or D54) scaling factor so that a 100% output from the control console will be correctly read as 100% by the processor. It may need to be reset if you plug in a new console with D54 or AMX192 outputs, or if you move the console so that the length of the cable run to the dimmer rack changes drastically.

This menu displays shows two values if Mux A is configured for D54 or AMX192 Mux input.

- "RawM" is the unscaled average of Mux A input channels 1 and 2.
- "Calc" is the RawM value scaled by the current Mux input scaling factor.

To recalculate the Mux input scaling factor, set console channels 1 and 2 to FULL, and follow the steps below.



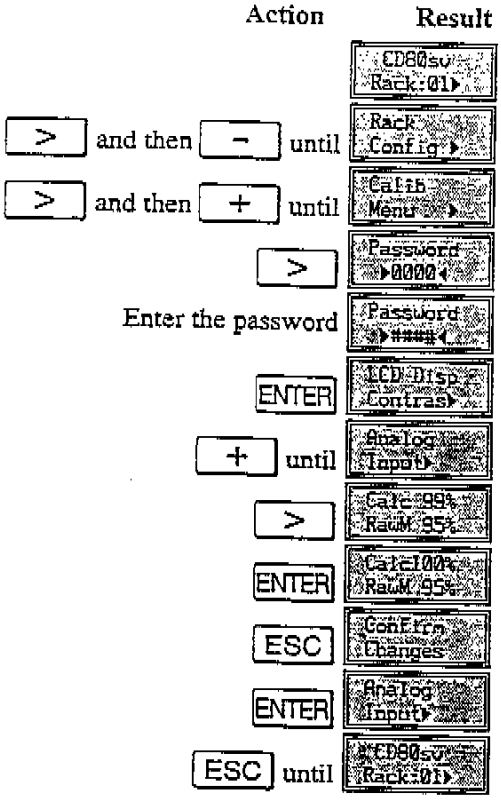
Set Analog Input Scaling

This option lets you set the analog input scaling factor so that a 100% output from analog controls will be correctly read as 100% by the processor. It needs to be set on-site during commissioning.

This menu displays shows two values.

- "RawM" is the unscaled average of analog input channels 1 and 2.
- "Calc" is the RawM value scaled by the current analog input scaling factor.

To recalculate the analog input scaling factor, set analog inputs 1 and 2 to FULL, and follow the steps below.



Set Analog Output Scaling

This lets you set the analog output voltage. The maximum analog output voltage can be set from 0V to about 10.5V. To adjust the analog output voltage, put a digital voltmeter between ground and analog output #1. Then adjust the scaling factor until the DMM shows the correct voltage. To reset the analog output scaling factor, follow the steps below.

Action	Result
	CD80sv Rack:01
> and then - until	Rack Config
> and then + until	Calib Menu
>	Password ▶0000◀
Enter the password	Password ▶####◀
ENTER	LCD Disp Contrast
- -	Analog Output
>	Scaling =75%
put DMM on analog output #1	Scaling =75%
adjust until DMM voltage is correct	Scaling =82%
ESC	Analog Output
ESC until	CD80sv Rack:01

When panic is activated, any analog output set for PANIC will be sent +10VDC, regardless of how the analog output scaling is set.

Set Dimmer Phase

This lets you specify non-standard phasing for the dimmers in the rack. If you reset any dimmer incorrectly with this option, the dimmer will not work correctly. Please consult Strand Lighting field service before using this function.

Check Memory Values

This lets a technician interrogate the SRAM memory values for troubleshooting. Please consult Strand Lighting field service before using this function.

Change the Event Reporting Configuration

This lets you change the values the rack uses for determining event reporting thresholds. Please consult Strand Lighting field service before using this function.

Error Log

Sometimes, the software may produce an unexpected message, due to external or internal reasons. Each "Error" has a unique error number and is time stamped and logged internally in non-volatile memory. If a message appears, write down the error number, time, and date, and call your Strand Lighting service agent or dealer. Press [+] or [-] to view all entries in the log. Press [ESC] to exit from the error log. You will be prompted to clear the error log or leave it intact.

The error log is discussed in more detail in the *Error Log* section of chapter 7, *Basic Troubleshooting*.

Chapter 6

Event Reporting

This chapter provides information on the event reporting functions of CD80sv racks with Reporting dimmers. Trouble-shooting guidelines for Reporting dimmers are included in the *Reporting Dimmer Problems* section of chapter 7, *Basic Troubleshooting*.

All CD80sv dimmer modules, including contactor non-dims and hard fired dimmers, are available in load status reporting versions. Load status reporting versions of dimmers can be mixed in any combination with standard dimmers in CD80sv racks. These dimmers report many dimmer status items back to the processor. The information can be accessed using the optional Reporter PC doftware, or through various menu items. Using this data, the processor can detect a wide range of dimmer and load faults with comprehensive diagnostic data.

Reporter PC™ Software

Reporter PC software, running under Microsoft Windows lets you log the following *dimmer* events with full diagnostic information and time stamp.

- No load
- Load error
- Overload
- CB trip
- Overheat
- Thyristor or Contactor short circuit
- Thyristor or Contactor open circuit
- High DC
- Module swap (Slot type changed)
- SRP fault
-

The following *rack* events or data are detected with time stamps

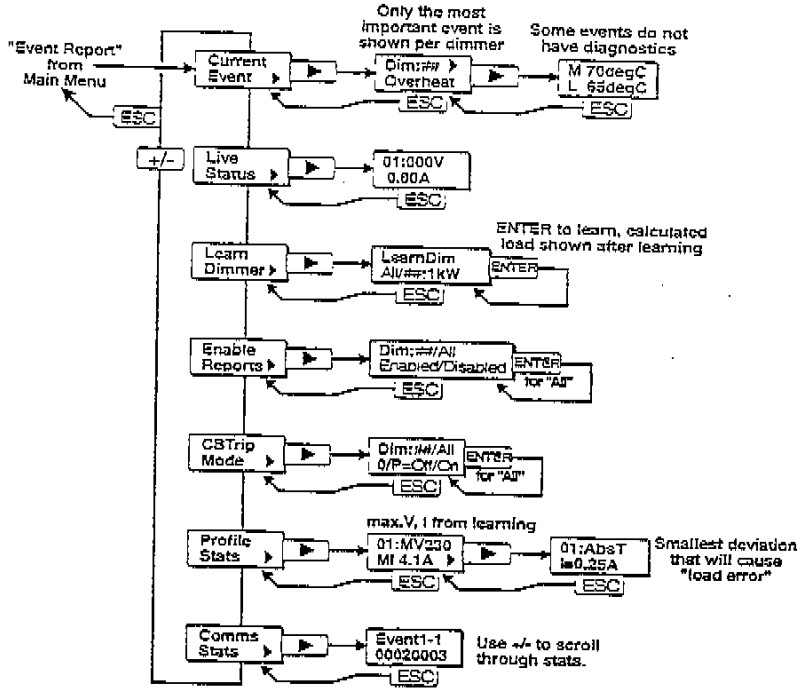
- Fan Failure (one or both fans)
- Mux fail A or B
- Phase fail A, B or C
- Panic mode activated
- Processor Enabled (Master or Backup)
- Tracking (Master or Backup)
- Earth Leakage Fault (special CD80sv systems only)
- Input line RMS voltage per phase
- Total RMS load current per phase

Contact Strand Lighting or see the *ReporterPC Software User's Manual* (part number 85083) for more details on how this software works.

Event Report Menu

The **Event Report** menu lets you see the current events for each dimmer, the dimmer load profile statistics, and communications statistics, lets the system "Learn" the load characteristics of installed Reporting dimmers, lets you turn event reporting ON or OFF for any or all Reporting dimmers, and lets you turn ON or OFF the the automatic disabling of dimmers which show a CBTrip event. In addition you can examine the live load current, and output voltage, DC level, and temperature of any dimmer.

The figure below shows the basic **Event Report** menu structure.



Normally the default display shows the rack number:

If there are any dimmer events logged the display shows the number of events and scrolls to give the Circuit ID and 1 line indication of the event type. As the event list changes, the event count will be updated.

To see full details of the events with their diagnostic data, use the *Current Event* menu item in the **Event Report** menu.

Dimmer Events

The defined dimmer events, in priority order, are shown below. The persistence rating is the length of time an event must remain in order to be reported. This minimizes false event reports. The settings for the various thresholds are under the *EventRep Config* item in the **Calib** menu. Please contact Strand Field Service if you think any of these values need to be changed.

Table 3. Dimmer Events and Fault Codes

Event	Description	Diagnostics	Persistence
CBTrip	Dimmer is not responding to commands or is not present. Circuit breaker is assumed to be tripped.	None. Dimmer is automatically disabled if CBTrip Mode is set to OFF.	3 sec
High DC	DC voltage > threshold was detected.	DC level in volts, and the action being taken by the rack to fix the problem.	2 sec
Overheat	Dimmer temperature > 65°C.	Measured temperature in degrees C.	3 sec
Thyr S/C	Dimmer output voltage > Voltage Profile Max. Threshold and current is not flowing. Short circuit is assumed.	Measured and expected RMS voltages.	3 sec
Cont S/C	Contactor output voltage > Voltage Profile Max. Threshold and current is not flowing. Short circuit is assumed.	Measured and expected RMS voltages.	3 sec
Thyr O/C	Dimmer output voltage < Voltage Profile Min. Threshold and current is flowing. Open circuit is assumed.	Measured and expected RMS voltages.	3 sec
Cont O/C	Contactor output voltage < Voltage Profile Min. Threshold and current is flowing. Open circuit is assumed.	Measured and expected RMS voltages.	3 sec
Overload	Output current > Overload Threshold. Default for Overload Threshold is 110% of breaker rating.	Measured and expected RMS current in Amps.	10 sec
No Load	Load < No Load Threshold.	Measured and expected RMS current in Amps.	3 sec
Load Err	Output current > Load Profile Max. Threshold or < Load Profile Min. Threshold.	Measured and expected RMS current in Amps.	10 sec
SRP Fault	Internal error code returned by module.	Fault codes as follows: 1 = ROM checksum failure 2 = Dimmer/SRP type mismatch 4 = Invalid SRP type A/D value 8 = Invalid dimmer type A/D value 16 = Unassigned 32 = Firing PSU failure (HF dimmers) 64 = General error Fault codes are additive, since more than one can be active at the same time.	3 sec
OK	No problems at this time		

Learning Dimmer Loads

Some things that the rack processor reports about load status reporting dimmers (e.g., Load Err) require a baseline measurement by the system. This is called "Learning" the load. You can learn any or all of the load status reporting dimmers in a rack by using the *Learn Dimmer* menu item in the **Event Report** menu.

If you do not learn a load, the software will not be able to detect deviations from the learned "baseline" measurement, and you will not be able to use cable compensation. All other dimmer events will still be properly detected.

> *Changing a dimmer to a contactor, or changing the fluorescent topset or cutoff values will invalidate the load profile created when the dimmer was learned. Dimmer wattage will then show as "Fail," and you will need to relearn the load.*

To learn a load, follow the procedure below:

Action	Result
	CD80su Rack-01
>	Set Levels▸
+ until	Event Report▸
>	Current Event ▸
+ until	Learn Dimmer▸
>	Learn All-sets
ENTER (this will take about 10 mins)	Learn 1/4:99%
ESC until	CD80su Rack-01

When you learn a single dimmer, the processor takes control of the load, takes it to full, and then fades it down to zero over about 2 minutes.The processor then uses the voltage and current recorded at 100% to give the calculated wattage of the load. The same procedure is used with contactors. If the load is smaller than the no load current setting the load is recorded as "<min," and load profiling is not applied.

When you learn by sets, as in the example, the rack takes control of 1/4 of the dimmer load in the rack at a time. When those dimmers have finished their fade, it goes to the next 1/4 of a rack. This is to limit the total current drawn by a fully loaded rack.

> ***You cannot exit learning once it is in progress. Learning the whole rack will take about 10 minutes.***

When to Learn Loads

Learning the loads can be very beneficial in a fixed environment where the loads are not moved around very much (such as in a long-running show or a saturated rig in a TV studio), as it gives you the ability to detect a failure of 1 lamp in 10 in a parrallel arrangement, but it requires considerable operational discipline to use the feature in a situation where loads are moved around, such as REP theatre.

Without learning the loads, all reporting features are available with the exception of load error detection and cable compensation. You will get the majority of the benefit of this advanced reporting system even if you do not learn loads.

Live Status

You can see the values for output current, output RMS voltage, output DC voltage, and dimmer temperature for any reporting dimmers in a rack by using the *Live Status* menu item in the **Event Report** menu.

Enable/Disable Reporting

You can enable or disable reporting for any dimmers in a rack by using the *Enable Reports* menu item in the **Event Report** menu. This lets you turn off reporting for dimmers that you already know have problems.

CBTrip Mode

Normally, dimmers returning an CBTrip message are left enabled. However, you can set a dimmer so that a CBTrip message automatically disables the dimmer. To do this, use the *CBTrip Mode* menu item in the **Event Report** menu to turn the CBTrip Mode for the dimmer to O/P=OFF. This setting can be used to minimize burning of the load contacts on insertion of a replacement module.

Profile Statistics

You can see but not edit the current profile statistics, determined when you use *Learn Dimmer*, by using the *Profile Stats* menu item in the **Event Report** menu. The first entry shows MV (maximum voltage) and MI (maximum current). Using ▸ from this display to see the AbsT (absolute tolerance of the current used for calculation allowable load deviations).

AbsT is a percentage of MI (default is 5%), so this tells you the minimum current deviation that the dimmer will detect. For example, if MI is 10A and the AbsT percentage is 5%, then the minimum current deviation the dimmer will detect is 500mA.

Communications Statistics

You can see but not edit the current communications statistics a rack by using the *Comms Stats* menu item in the **Event Report** menu. This menu item gives a live indication of activity on the communications between the modules and rack processor (Event 1 through Event 4), the master/backup processors (Backup), and the Reporter PC (Reporter).

You can scroll through the various events by using [+] and [-], the data shown on the second line is of the format XXXXYYYY where XXXX is the error count since power-up and YYYY is the number of successful messages.

Errors can be produced if modules are moved around, or if you swap between master and backup processors.

Chapter 7

Basic Troubleshooting

This chapter provides basic troubleshooting procedures for CD80sv racks. It does not provide comprehensive maintenance data, but allows you to solve simple problems, and helps provide Strand Lighting with initial data when these procedures are not effective.

For best system operation, do a routine check and cleaning once each year unless the operating environment is unusually harsh or dirty. Please consult Strand Lighting field Service if you are in doubt about the frequency of maintenance required for your system. Service and maintenance operations other than this cleaning are seldom required. In case of problems, and in order to save time and aggravation, follow the procedures outlined here before calling Strand Lighting. Observe what happens at each step. These steps answer the first questions a Strand Lighting service representative will ask. The person actually doing the tests should call Strand Lighting in order to avoid miscommunication. All service except dimmer and mechanical components should be performed by subassembly replacement.

This chapter contains the following main sections:

Understanding the Control Signal Path

The following diagram illustrates the control signal flow through the CD80sv rack. It is included here to show how each of the programmable settings interrelates.

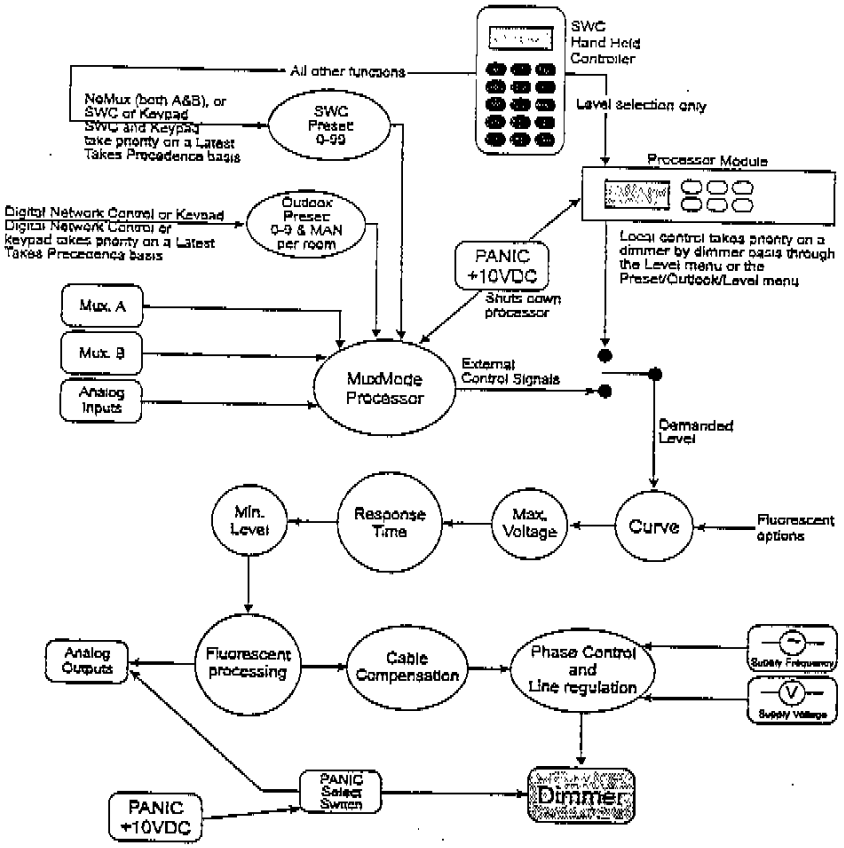


Figure 28. Control Signal Path Diagram

There are several important features of the above diagram:

1. The Outlook presets, SWC presets, Mux A, Mux B, and analog inputs are all active at the same time. The *Dimmer MuxMode* setting in the **Mux Input** menu determines how these inputs interrelate. See chapter 5, *Processor Module Programming* for more details.
2. The local processor module keypad overrides all external control signals.
3. For analog outputs a Max Voltage setting of 250V results in +10V output.
4. Panic switches override everything, providing a signal directly to the selected dimmers when PANIC is ON. The PANIC signal also forces the processor to stop driving dimmers.
5. The cycle-by-cycle voltage and frequency compensation built into the system software.

Failure & Status LEDs

These are the first level of diagnostics, and provide an immediate visual status indication. There are LEDs for the system that are mounted on the upper front of the Electronics Chassis, and LEDs specific to processor functions on the front of each processor module.

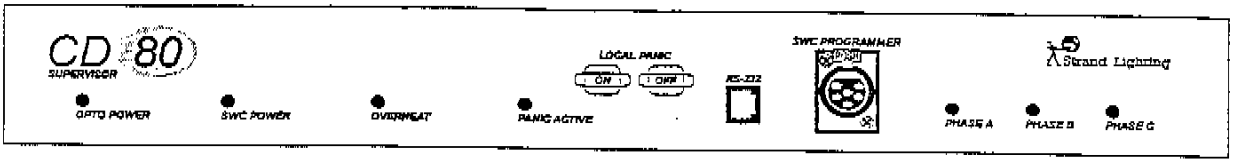


Figure 29. Electronic Chassis Indicators

The LEDs on the front of the electronics chassis show (from left to right):

- OPTO POWER (isolated +5V power supply) OK (should be ON)
- SWC POWER (external isolated +12V power supply) OK (should be ON if the rack contains an optional wall station power supply)
- OVERHEAT (should be OFF)
- PANIC ACTIVE (should be OFF)
- Phase A, B, and C (A and C should be ON. B should be ON in 3-phase systems)

If the Overheat indicator is ON when you first start the system, contact Strand Lighting for further instructions.

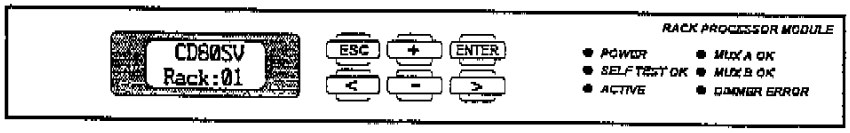


Figure 30. Processor Module Indicators

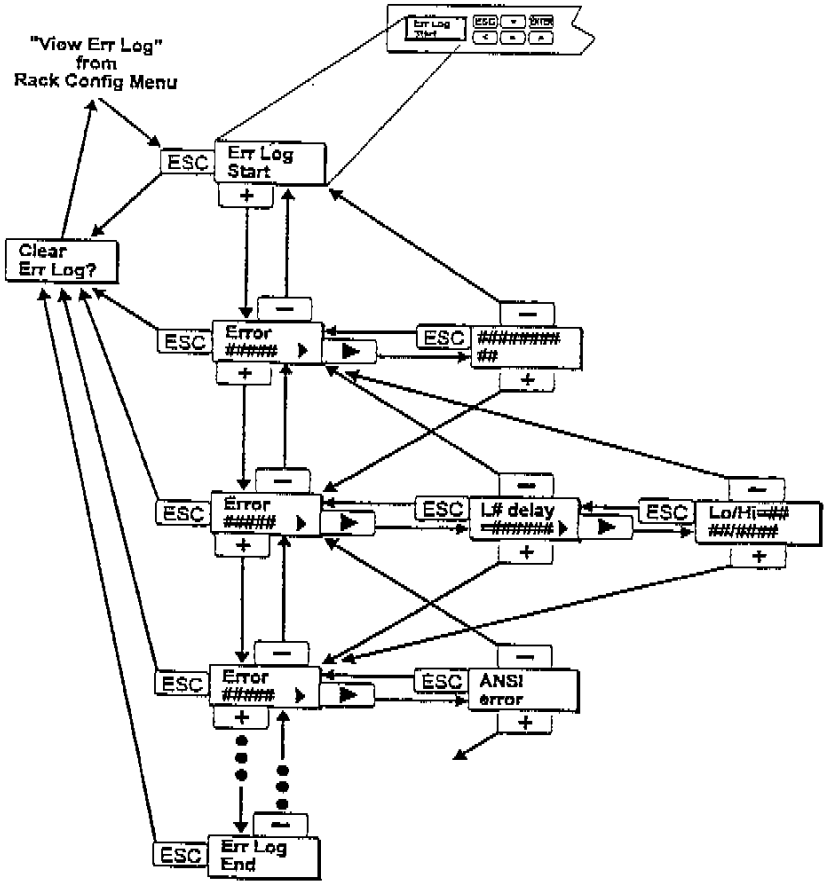
The LEDs on the front of each processor module show:

- POWER (should be ON)
- SELF TEST OK (should be ON)
- ACTIVE PROCESSOR (should be ON in the active processor)
- MUX A OK (should be ON if there is a signal on Mux A)
- MUX B OK (should be ON if there is a signal on Mux B)
- DIMMER ERROR (should be OFF)

Error Log

Sometimes, the software may produce an unexpected message, due to external or internal reasons. Each "Error" has a unique error number and is logged internally in non-volatile memory.

An error appearing in the error log indicates a serious problem which should be reported to Strand Lighting. Do not just ignore error log entries. Write down the error number, find he software version, and call your Strand Lighting service agent or dealer. Press ESC *to exit from the error log.*



If there are any new software or hardware errors the Error Log display, with the latest error number, appears when you use ESC to leave any other display.

Startup Errors

If you are installing a system that has been on-site for a long period of time (more than 5 months), have gotten a new processor module which has been on the shelf at StrandLighting, or have had the dimmer rack turned OFF for a long period of time, the battery may be low. You may get an error #06065 (battery empty), or this error with an additional error #06058 (bad NVRAM checksum).

Battery Empty (error #06065)

This error by itself tells you that the battery is low (less than 3.5VDC). If you do not also have error #06058, no information has been lost. Clear the message and leave the dimmer rack ON for at least 12 hours.

Bad NVRAM Checksum (error #06058)

This message tells you that the data stored in Non-Volatile RAM on the processor daughterboard has been corrupted. It will appear if the battery voltage drops below 2.2VDC, and data cannot be maintained. When the system is powered up, the memory is checked to make sure it has not changed. If it has, the system automatically resets all data to default values. You will need to reprogram the rack, including slot type information, if this message appears.

Other Errors

If any other error messages appear, write down the error number and contact Strand Lighting for more information.

Loading New Software

CD80sv software is stored in Flash EPROM and can be updated on site from a PC running MS-DOS. In order to perform a software reload, you will need the following items:

- An EC90sv or CD80sv processor module, installed in a rack.
- An IBM compatible PC, preferably 80386 or better, with COM1, COM2, COM3, or COM4 serial port.
- An RS232 serial reload cable.

The following files must be in the same directory on the PC:

- RELOAD.EXE
- MAINLOAD.HEX
- FLASH.DEV
- The CD80sv software (name will vary with version number)

The procedure for single processor racks involves only three steps. Detailed instructions for each step are in the folowing sections.

1. Insert the reload cable into the processor.
2. Put the processor into Reload mode.
3. Load the software into the processor.

The procedure for dual processor racks is a bit more involved. A processor's RS232 port is automatically enabled when the processor goes in to Reload mode. If a dual processor rack has been set for Auto Backup, putting the main processor into Reload mode will automatically transfer the rack to backup and enable the backup processor's RS-232 port, causing conflicts. To avoid this, you must do the following:

1. Disable the active processor ("main") by setting the *Proc Control* item in the **Rack Config** menu to "Disabled."
2. Insert the reload cable.
3. Put the backup processor into Reload mode (see below).
4. Load the software into the backup processor (see below).
5. Disable the backup processor by setting the *Proc Control* item in the **Rack Config** menu to "Disabled."
6. Put the main processor into Reload mode (see below).
7. Load the software into the main processor (see below).
8. Reset the Proc Control values for the two processors as required.

To insure that some lights remain ON while you are reloading, you can use PANIC to turn the lights ON.

Connect the PC to the rack

Connect a 9 way female "D" type connector to COM1 on the PC, with an RJ11 telephone style connector. This cable can be purchased as part of the Download Adapter Kit (Strand part # 76454).

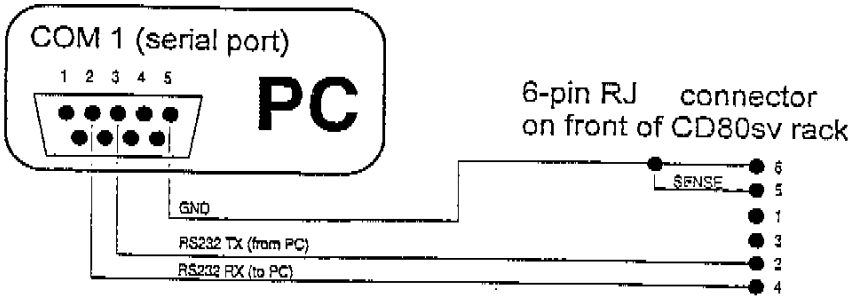


Figure 31. Software Reload Cable

Put the processor Into Reload mode

Press [<] + [>] + [+], starting with [<] and ending with all three keys pressed. Once the LCD display is blank, the processor is in Reload mode and the RS-232 port is active. You can enter Reload mode any time the processor is powered up. The process is entirely hardware driven.

> *The most usual reason for not entering reload mode successfully is the lack of an RS232 SENSE connection (pins 5/6 of the RJ11 connector).*

Run the Reload software

1. Turn the PC ON and make sure you are in DOS.
2. Switch to the directory that contains the reloader software.
3. Type "Reload /COM*n* /*baudrate* /c *filename*" where:
   - *n* is the COM port to which the system is connected (1, 2, 3 or 4),
   - *Baudrate* is the data transfer rate. (e.g. 38400, 19200, 9600). Note that some slow PCs may only support 9600 baud. 386 or better PCs should support 38400, and this speed is recommended for fastest reload.
   - The /c flag suppresses confirm prompts. You can skip this flag if you want to watch the progress of the reload more carefully.

> *For online instructions, type "Reload" and press* [Enter].

4. Press [Enter]. The reload starts. At 38400 baud it will take less than 1 minute.

> *If any error messages appear, write them down and contact your nearest Strand Lighting service department.*
>
> *You can run the reload program in a DOS window under Microsoft Windows. However, the program will run somewhat slower than if you run it directly under DOS.*

Replacing Major Parts

The modular design of CD80sv dimmers and the immediate visual identification of a faulty module using the rack LEDs and the LCD display allows for very rapid replacement of a suspect dimmer while the system is in operation. The system is designed so that any failure will usually disable, at most, a single dimmer or processor module.

Servicing Power Modules

Power modules may be removed after turning OFF the circuit breaker(s) for that module, without the need to turn OFF the rack, and without exposing any live components. You can use another power module of the same type to verify that the problem is in the power module and not in the rack, lamp, or load wiring.

To replace a power module:

1. Turn OFF the circuit breaker(s) on the defective power module.
2. Loosen the locking bar in front of the power module and slide it so that the power module can be removed.
3. Pull the power module straight out of the dimmer rack.
4. Troubleshoot and repair the power module as required.
5. Firmly push the power module back into its slot.
6. Slide the locking bar back into place and tighten it down again.

Replacing a Processor Module

Processor modules may be unplugged live and replacements inserted in an emergency, but the rack should normally be turned OFF to do this.

- If you have only a single processor per rack, but have more than one rack, you may be able to use a processor module from a less important rack to replace a failure in a critical rack. Otherwise you will need to request a replacement from Strand Lighting. When you remove the defective processor, remove the memory daughter board from it, and use this board to replace the memory daughter board in the good unit. This way you will not loose the setup information for the rack.
- If you have a Reporter PC and have saved the configuration information for the rack, and were unable to recover the rack configuration by swapping the memory daughter board, you can download the configuration information from the Reporter PC to the rack.

To remove a processor module, remove the security panel if installed and unscrew two thumbscrews on the front of the module. It may then be pulled straight out of the dimmer rack.

Replacement is the reverse of removal.

Reconfiguring a Processor Module

If you have saved the configuration information with the optional Reporter software, you can replace the processor and reload the configuration using the Reporter software.

If the configuration has not been saved, you can reconfigure the new processor module by swapping the daughter board with the one on the defective processor.

The daughter board is static sensitive. Do not attempt removal and replacement without using proven anti-static precautions, such as a grounded wrist strap and grounded anti-static working surface. You can ground yourself and the working surface to the dimmer rack earth ground bus. If you are in doubt, do not proceed.

1. Remove four (4) screws that hold the daughter board to the defective processor module and unplug the daughter board.
2. Remove four (4) screws that hold the daughter board to the new processor module and unplug the daughter board.
3. Swap the daughter boards and plug them back into the processor modules.
4. Secure both daughter boards with the screws you removed earlier.

Isolating Parts

In case of failures in the system, you can expedite fault isolation by considering the following categories of malfunctions:

- Major system problems common to all dimmers or to a whole phase.
- Dimmer problems common to a single rack.
- Dimmer problems not related by phase or rack.

Establish fault location by interchanging Power modules as required. You can swap modules between racks or within a rack. Correct the problem by module replacement once you have identified the defective component.

System Problems

None of the lights will come ON throughout the system.

- Rack power is turned OFF.
- Rack is in overtemperature shutdown mode.
- If power is ON and no MUX OK light is ON in any rack the Mux cable is probably at fault. Check the connectors at each end, and, using a ohmmeter, check that the signal(s) and shield are not shorted. If they are not shorted, then the most likely cause is an open circuit somewhere along the line.
- Dimmer slot types have been cleared or incorrectly set.
- Mux protocol is incorrectly set.
- Mux start number and/or patch are incorrectly set.

Some lights can't be turned off.

Since CD80sv dimmers take their level control signal from multiple locations, you need to make sure that none of the control signals are present. Some possible control sources follow:

- The PANIC switch is ON.
- Presets are being called up from a handheld control or wall station.
- Dimmer level has been set from a handheld control or from the processor keyboard.
- An Outlook or SWC preset may be ON.
- MIN LEVEL may be set for a particular dimmer. There is no way to turn OFF a dimmer with a min level set.
- Mux has been lost and the system has gone into its backup preset.
- Outlook power-up preset is active.

If all control signals appear to be OFF the problem may be a bad SSR in a power module. Check using the rack keypad **Set Level** menu to isolate the module from all external control. Swap the power module or SSR to verify the problem.

Some dimmers act like non-dims.

If the problem is confined to one dimmer, it is probably an SSR or SCR block failure.

If the problem is in several columns of dimmers, the phase jumper (LK14) or the harness type jumper (LK2) on the CIC is probably set incorrectly.

For single phase racks, LK14 should be installed. For three phase racks, this link should not be installed.

For racks wired with single module harnesses, LK2 should be installed. For racks wired with dual module harnesses, this link should not be installed. To find out if you have a rack wired for single modules only, please consult your system drawings or Strand Field Service.

The lights flash or become erratic. The MUX OK LED goes ON and OFF erratically.

This problem may be caused by one Mux signal wire being loose or disconnected. It is most often seen with DMX512 installations. Both DMX512 signal connections and ground (screen) must be connected to all dimmer racks and the control desk. A common installation fault with DMX512 is the reversal of the two signal connections, or a signal connection and screen. Check that all cables have the correct wiring.

Problems can also be caused by over-terminating the line, or not terminating the line at all. Make sure that the last rack in the control run, and only this rack, is terminated.

The lights occasionally flash or misbehave.

This may be caused by interaction with other systems. Try to isolate the occurrence of the problem and tie it in with activity in other parts of the building. Arc welding or unsuppressed motors (elevators, other large motors, etc.) can cause mains disturbances or corruption of control signals. The CD80sv processor module is highly immune to such problems, but in extreme cases interference can occur.

If you can leave all dimmers ON long enough for one of the disturbances to happen, use *Set Level* in the **Main** menu to set All dimmers to a given (low) level from the processor module keypad. This isolates the external control signals and allows observation of the dimmers alone. If the problem still occurs, then it is a mains-borne interference. The solution will be to re-route the feeder cables to another supply (if at all possible), or suppress the offending equipment. If, however, the problem goes away, then it may be in the signal wiring (see above), the routing of the wiring (make sure it is not near noisy equipment), or a fault in the control desk.

The handheld control or wall station operates erratically.

The wiring between the dimmer racks and control system is similar to the handheld or wall station wiring. The same rules as above apply.

PANIC is not working.

- No DIP switches are in the "ON" position. Turn ON the appropriate DIP switches.
- Improper Panic station wiring. Check wiring from Panic station.

Cooling fans are not working.

- Make sure that the fans are correctly rated for your incoming line voltage.
- Check the fans by setting *Fan Speed Control* in the **Rack Config** menu to Fixed. The fans should come ON immediately. When this setting is Variable, the fan speed is FULL when the sum of the control setting is 2400 (e.g., 24 dimmers are FULL or 48 dimmers at 50%). Fan speed is adjusted proportionately lower as the sum of control settings decreases below 2400.
- Make sure that the fan connector is firmly connected.

Cannot control dimmers from a single control station.

- Incorrectly wired control station. Check wiring from the control station to the rack.
- Defective control station. Swap control station with a known good control station to verify problem. Replace the defective station.
- Defective processor module. Replace the processor module.

Cannot control dimmers, but PANIC is working.

- Incorrectly seated processor module. Reseat the processor module.
- Possible bent pin on the processor module rear connectors if unit has been removed or replaced.
- Defective processor module. Replace the processor module.

One rack doesn't work properly, the others do.

This can be caused by the wiring faults as described above. It may also be caused by incorrect programming. It is quite easy to set a dimmer to a level from the keypad, and in so doing disable Mux control. Setting the level from the keypad verifies electrical operation of the dimmer regardless of control system.

An extreme example of a wiring fault is a loose power connection to the rack. Loose neutral connections in particular cause havoc!

Some dimmers don't appear to work.

Check the Slot Type setting for the dimmer. Dimmers will not operate correctly if the Slot Type is not set right. They will not operate at all if the Slot Type has never been set, or has been cleared (set to "-").

Use the **Set Level** menu to check dimmer operation.

- If the dimmer fails to work, and all load wiring and connected load has been tested, then the power module will require service.
- If the dimmer works from the keypad, but not from the control desk, check that the START NUMBER or PATCH are set correctly.

Check the dimmer patch in the control desk. If you are using AMX output from your control desk, make sure that any 6K/12K assignments you may have made in the control desk patch are cleared. The 6K/12K assignments in analog output consoles treat two adjacent dimmer numbers as a single dimmer, and each such assignment will offset the dimmer numbers above it by one dimmer number.

Make sure that the Dimmer Mux Mode and Curve settings for the dimmer are correct.

Lights don't appear to track each other in fades.

This can be caused by using different dimming curves on each dimmer or setting dimmers to different max. output voltages. The keypad can be used to set ALL dimmers in a rack to the same curve and voltage (see above) to rectify the problem.

Lights don't reach 100% intensity.

MaxVoltage is set incorrectly. See *Rack Config Menu* in chapter 5, *Front Panel Programming* for how to change this setting.

Individual Dimmer Problems

Problems related to individual dimmers are due to one of the following:

- Dimmer Circuit Breaker is OFF
- Load wiring is disconnected
- Burned out lamp in fixture
- Too much load on dimmer caused circuit breaker to trip
- Short circuit in load wiring or fixture caused circuit breaker to trip
- Defective dimmer (probably the SSR or SCR block)
- Incorrect slot type or other incorrect software setting
- Reporter PCB defective.
- Defective processor module (probably the output driver section)

Load circuits are protected by single pole, fully magnetic circuit breakers in the dimmer module. These safeguard the SSRs and SCRs in case of a dimmer overload or short-circuit in the load. Although you can quickly reset a circuit breaker to turn a circuit back ON, you should always first determine what caused the circuit breaker to trip.

> *Although the circuit breakers are rated for continuous operation at full nominal current, occasional "nuisance" tripping may occur when running a dimmer close to or at its rated maximum load, especially in improperly ventilated dimmer rooms.*

Make sure that the problem is not in the load or load wiring by shifting the load to another dimmer.

Set all PANIC select switches OFF except for the suspect dimmer, and enable PANIC. This puts a signal directly to the SSR input of the dimmer. If the dimmer stays OFF, it is probably bad.

Verify the bad power module by swapping it with an identical known good unit. If the problem moves, replace or repair the power module.

Make sure that all of the connectors between the dimmer rack and the processor module are seated correctly.

Check for bent pins on the rear connectors of the processor module.

Check for problems in any external analog circuitry by measuring the DC voltage from the suspected analog input to GND. When the dimmer is supposed to be at 100%, this voltage should be about +10VDC (subject to the calibration programmed for that input).

Reporter Dimmer Problems

Before troubleshooting for specific troubles which may be encountered with Reporter dimmers, all other power module problem categories should be investigated.

Reporter dimmer won't produce any events.

Slot type is incorrect or Reporter PCB is defective.

Reporter dimmer keeps generating load profile errors.

The load profile % and abs tolerances have probably been set too tight. Set them back to default by using the "Default SR Config" option in the *Set All Default* item of the **Rack Config** menu. If this fails, try widening these variables a little at a time until the problem goes away. Please consult Strand Field Service for how to adjust these variables.

Reporter dimmer keeps generating Thyristor O/C or S/C messages.

The voltage % and abs tolerances have probably been set too tight. Set them back to default by using the "Default SR Config" option in the *Set All Default* item of the **Rack Config** menu. If this fails, try widening these variables a little at a time until the problem goes away. Please consult Strand Field Service for how to adjust these variables.

Can't control a Reporter dimmer, though it has output

The dimmer is currently being learnt, or has detected excess DC and disabled itself.

No output from a Reporter dimmer. Event menu says "MCBTrip" but circuit breaker is OK.

Power cycle the dimmer by turning the circuit breaker OFF and ON If the dimmer still fails to respond, the Status Reporting Processor is faulty. Swap module and send it to be repaired or replaced.

Fluorescent Dimmer Problems

Before troubleshooting for specific troubles which may be encountered with fluorescent circuits, all other power module problem categories should be investigated.

Fluorescent lamps operate best on hard fired dimmers, and when the dimmer response is set to "Slow." See *Dimmer Curves Menu* in chapter 5, *Front Panel Programming* for how to change this setting.

For any additional information on fluorescent dimming, please refer to the Strand Lighting fact sheet *A Guide to Fluorescent Dimming*.

Parts Drawings

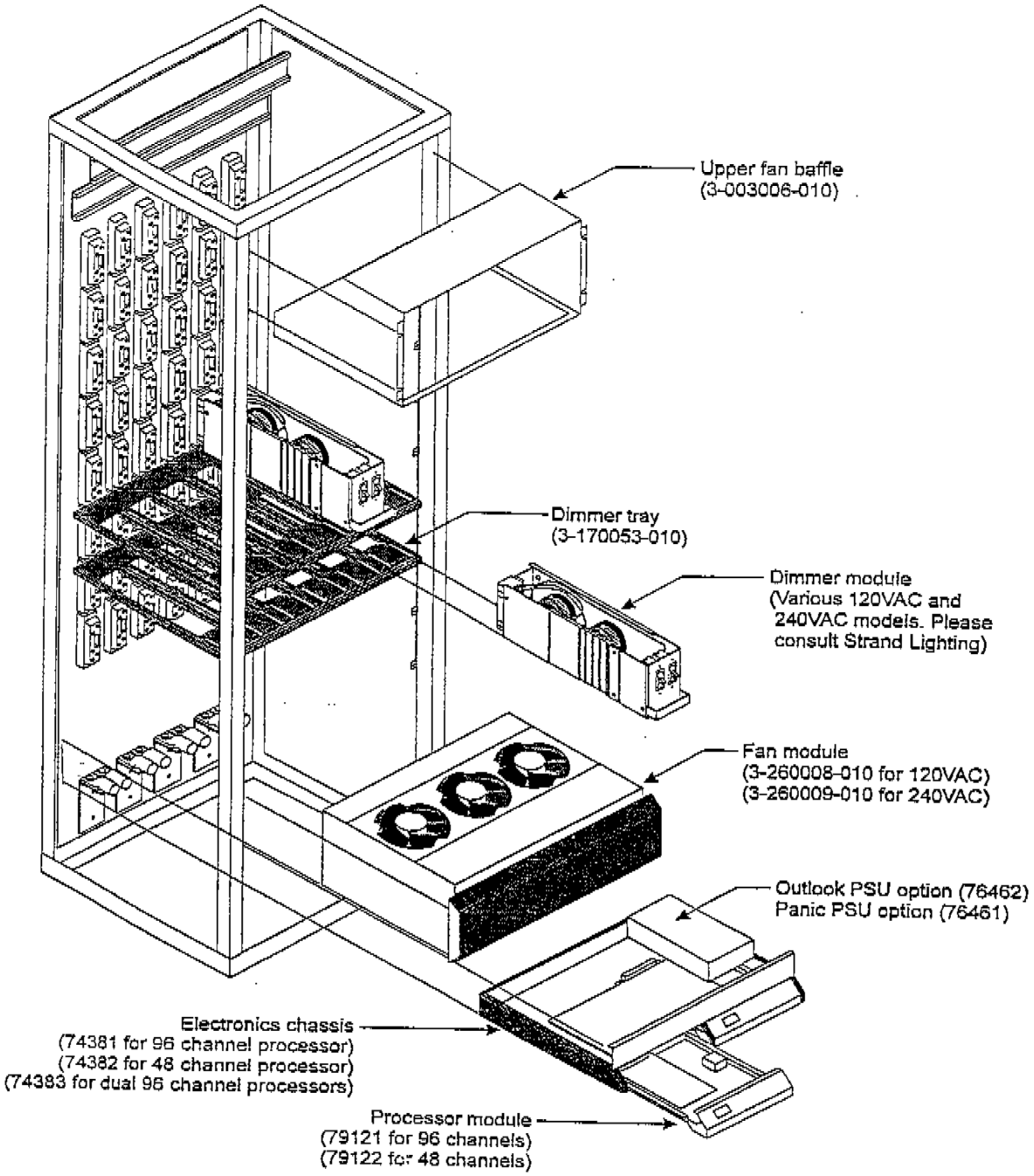


Figure 32. Dimmer Rack Parts

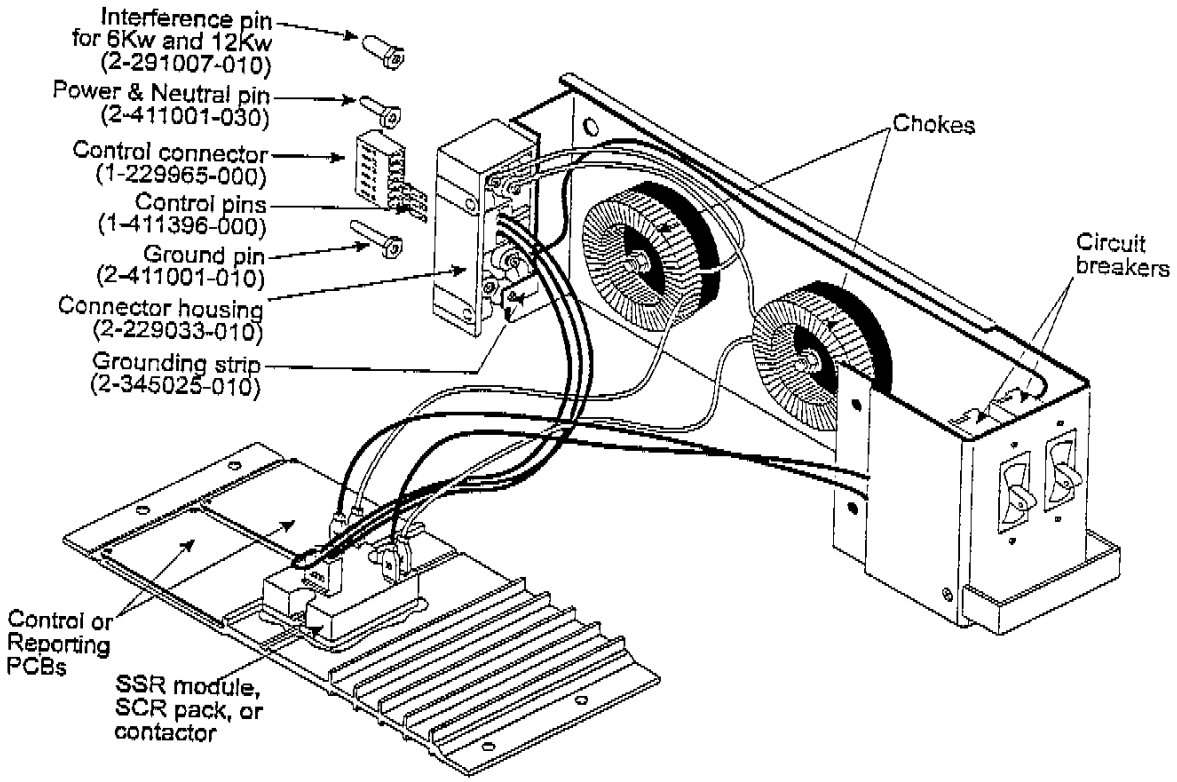


Figure 33. Basic Power Module Parts

The following part numbers are listed for convenience. The part numbers you use will depend on the dimmer module. Please consult Strand Lighting if you have any questions about the correct part number.

Printed Circuit Boards	
Part #	**Description**
3-723180-TAB	12kW standard SCR controller
3-723180-020	Contactor driver board (for 2 contactors)
3-723180-030	Contactor driver board (for 1 contactor)
1-723038-000	Load Status Reporting PCB

Power Control	
Part #	**Description**
1-377213-000	Dual 40A SSR module
1-377219-000	20A contactor
2-377013-010	90A SSR module
1-377212-000	100A SCR pack

Circuit Breakers	
Part #	**Description**
1-132232-000	10A (120/240V)
1-132233-000	15A (120/240V)
1-132283-000	20A (120V)
1-132235-000	25A (120/240V)
1-132239-000	50A (120/240V)
1-132241-000	100A (120/240V)

Chokes	
Part #	**Description**
2-169057-010	20A 350µsec @120V, 175µsec @240V
2-169058-010	20A 500µsec @120V, 250µsec @240V
2-169059-010	20A 800µsec @120V, 400µsec @240V
2-169060-010	50A 350µsec @120V, 175µsec @240V
2-169061-010	50A 500µsec @120V, 250µsec @240V
2-169062-010	50A 800µsec @120V, 400µsec @240V
2-169063-010	2 x 50A 350µsec @120V, 175µsec @240V

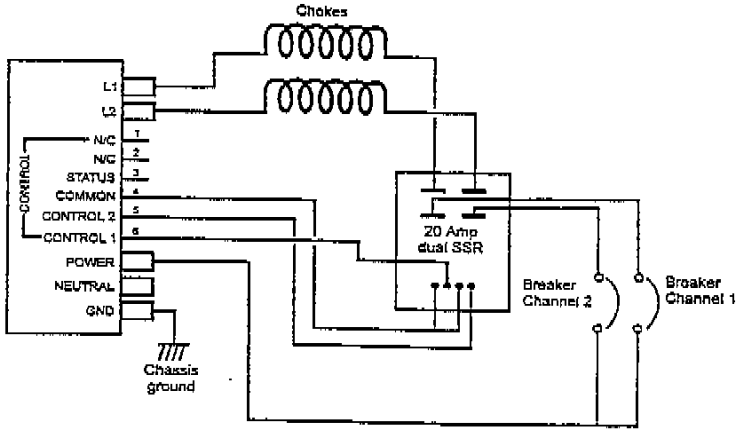


Figure 34. Dual Power Module Schematic

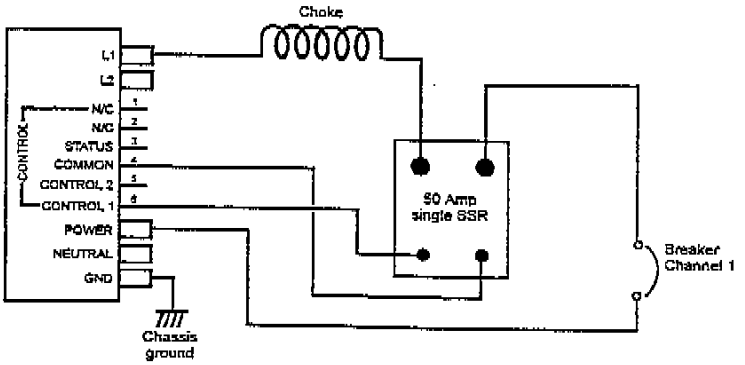


Figure 35. Single 50A Power Module Schematic

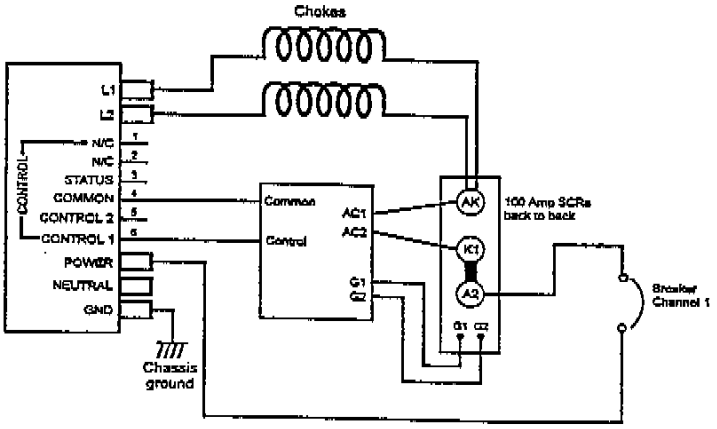


Figure 36. Single 100A Power Module Schematic

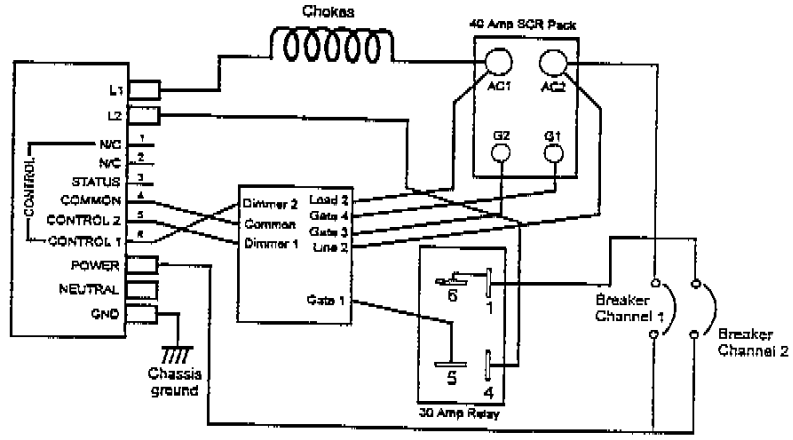


Figure 37. Dimmer/Contactor Power Module Schematic

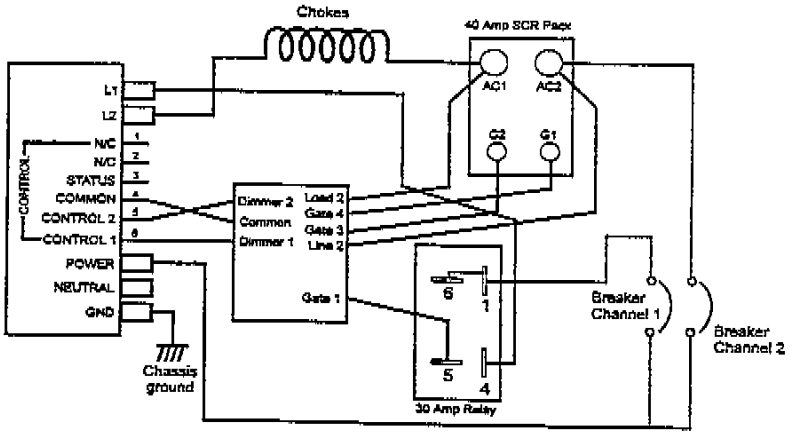


Figure 38. Contactor/Dimmer Power Module Schematic

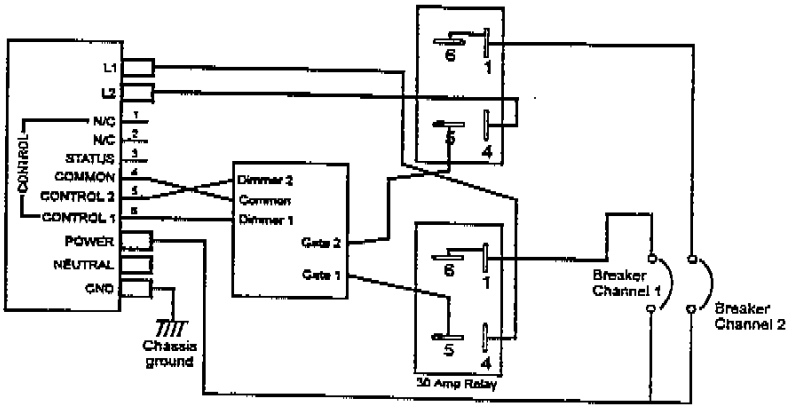


Figure 39. Contactor/Contactor Power Module Schematic

Chapter 8

Periodic Maintenance

Periodic maintenance should be done every six (6) to twelve (12) months, depending on the environmental conditions. Although a detailed discussion of this procedure is beyond the scope of this manual, a basic checklist is provided to show what is involved. Users wishing to do these procedures on their own should consult Strand Lighting Field Service.

1. Disconnect the rack from power or turn OFF power to the rack .
2. Inspect the dimmer rack for loose connections and build-up of dust which may impede air flow. Tighten any loose connections found at this time.
3. Vacuum out any excessive dust build-up in the dimmer rack while power to the rack is shut down.
4. Remove the fan module grill and slide the filter out. Wash the filter element with mild soap and water, and let it dry thoroughly before replacing it.
5. Reconnect the rack, turn ON power to the rack, and make sure all dimmers work correctly. Check the Panic switches on the CIC to make sure they turn ON the selected dimmers.
6. Make sure that the fan(s) are operational. If not, trouble-shoot as necessary and replace or repair the defective fan or electronics.
7. Make sure that ventilation to the rack has not been blocked. Fully loaded dimmers produce 2%-4% of their rated capacity as waste heat while in operation. If the dimmer rack overheats, the overtemperature sensors will first turn ON the overtemperature warning indicator, then shut the system down when the temperature rises 5° C higher.
8. Exercise all circuit breakers by turning them ON and OFF several times. The arc produced when the circuit breakers engage and disengage will clean corrosion and dust off of the contacts.

   For best effect the lights for the dimmers should be ON when you do this.

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