

Introduction

This manual provides information on the installation and operating procedures for the LD90 Dimmer System

Manual Organisation

This manual contains the following chapters plus an index:

Introduction	Tells you about the organisation of this manual and explains the typographical conventions and terms used. It also tells you how to get technical help if necessary.
Product Features	Describes the main features of the LD90 product.
Physical Description	Shows how the dimmer is constructed and details the major parts.
Installation	This section tells the contractor how to install the system, and includes important safety information. It describes basic rack setup.
Reference	Gives detailed information about configuring the LD90 dimmer to the user's requirements.
Maintenance and Trouble-shooting	This section details user maintenance and straightforward trouble-shooting procedures.
Appendix	Gives details on: <ul style="list-style-type: none">• Control Signal Path Diagram• Power Block wiring• Summary of LD90 parameters• Fluorescent relay wiring• Mux B processor fitment • SWC Remote Programmer• 8/16 Button Preset Panel

The LD90 Dimmer

The LD90 is a fully digital, semi-modular dimmer, suitable for fixed installations. It is designed to give the user an affordable system with a high degree of flexibility.

This is achieved by using the latest microprocessor technology together with sixty years of dimmer design and manufacturing experience for the entertainment industry.

Standard features include simultaneous multiplex and analogue control signals, outputs to control auxiliary dimmers, multi-language configuration menus, diagnostic messages and the storage and playback of preset lighting scenes.

The LD90 system offers a user-configurable mixture of dimmer ratings in one cabinet. Standard options include earth leakage circuit breakers (RCDs) and System Wide Control of all racks, using a Handheld Programmer, Preset Station, or Personal Computer.

The LD90 offers these and many more features designed to give the user the greatest flexibility.

Glossary and Abbreviations

	The following terminology is used throughout this manual for consistency:
Default	The original factory settings.
Dimmer Curve (Law)	The relationship between a control level and actual dimmer output level.
HTP	Highest Takes Precedence, whereby channel levels when combined will give priority to the one with the highest level.
Level	A numerical value used to express the 'brightness' of a dimmer. Usually shown as %.
Maximum O/P Voltage	The maximum output voltage which may be set for each dimmer or group of dimmers.
MUX	Abbreviation of the word Multiplex. Multiplex systems transmit data (usually dimmer information) from a lighting controller to a dimmer rack via means of a single signal cable. There are various types of multiplex systems as shown below: <ul style="list-style-type: none">• DMX 512: A USITT Standard system for digital transmission of a maximum 512 dimmer levels.• D54: Strand Lighting multiplexed analogue system for transmission of 384 dimmer levels.• SMX: A lighting standard for digital transmission including error checking and recovery.
No MUX State	This defines which of the 99 preset states (or blackout) dimmers should fade to when the both the A & B mux inputs have failed. State 0 is fixed and is always blackout (the default), the other 99 states are user programmable.
Name (Circuit Identifier)	The Name is a unique identification string containing up to five upper case letters or numbers which you can assign to each dimmer. The dimmer number may be the same as the Name, or may be a string used to indicate circuit location, phase, etc. This feature is useful for SWC or SV90.
NON-DIM	A mode in which the dimmer circuit responds to its control signal as a switch.
Patch	A way of allocating a logical dimmer to a multiplex signal address.
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 as phase A, phase B, and phase C in the U.S.

Preset Every circuit within a rack has associated with it 99 programmable preset lighting states and a blackout state (backup state 0). Backup states are recalled by user input from the keypad, SV90, SWC Remote or Preset Station. Backup state 0 is a blackout.

Preset Fade Time Every preset has an associated fade time which is the time over which the dimmer output level will change when fading from the current level to the selected preset.

Preset levels are programmable per dimmer, but preset fade times are programmable per preset state.

Rack Number Rack numbers are set up on the front panel of the LD90 dimmer. They will usually be set up by the installation engineer. They are used identify physical units within the system.

Response This parameter determines how quickly a dimmer responds to an instantaneous increase in its control input. Fast response is required for effects, but reduces lamp life, 'SLOW' can be used to protect large lamp loads.

RCD Residual Current Device, commonly known as an Earth Leakage Circuit Breaker.

SV90 An MS-DOS software package for setting up and reporting the status of EC90, CD90 and LD90 dimmers

SWC System Wide Control - A method of programming and controlling more than one dimmer rack simultaneously. Three SWC controllers are currently available: simple 8 or 16 button preset panels, and a hand-held remote.

USITT United States Institute of Theater Technology

Technical Assistance

The LD90 system is designed for simple installation and easy configuration via simple menus.

Problems If you have problems installing or operating this system, in the first instance refer to the section on Maintenance and Trouble-shooting, but if you have further problems please contact Strand Lighting Field Service, at the office serving your area.

Technical Questions For technical questions regarding dimmer setup or operation, 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. A list of first line maintenance parts is contained in the section on Maintenance and Trouble-shooting.

Comments and Suggestions For comments regarding equipment functions and/or possible improvements, or for comments on this manual, please call or write to the Product Manager, Controls and Dimmers, at Strand Lighting, Isleworth.

Addresses Addresses for all of the Strand Lighting offices are shown at the front of this manual.

Manual Applicability

This manual applies to LD90 software versions B1 and later. The following new functions are available in version B1 and later:

- Support for System Wide Controls - Remote programmer & pushbutton panels.
- Support for the SV90 supervisor software.

The following new functions are available in version C1 and later:

- Support for Outlook™ architectural control stations.
- Support for the Mux B processor.

It is possible to upgrade the software in any existing rack, see the section on "First Line Maintenance", and refer to your nearest Strand Lighting office.

Product Features

The LD90 dimmer is designed to provide a large number of programmable features, whilst being easy to configure. The following are the basic system features:

- All digital system with analogue interfaces
- Mux and analogue control input as standard
- Second DMX/SMX control input option
- System Wide Control (SWC) by handheld remote, preset panel, or PC
- Optional RCD (Earth Leakage Breaker) option per phase
- Smooth Fade - eight times smoother than DMX
- Complies with mandatory European EMC directive and regulations
- Fluorescent control modes - magnetic and HF electronic
- Convection cooled - no fans - quiet and maintenance free

Power Circuits

- Up to 24 internal dimmers in Power Blocks of 8 x 2.5kW or 4 x 5kW.
- Blank Power Blocks enabling cost efficient depopulation and user specified branch breaker design
- Single Pole, Single Pole with Neutral disconnect (SPN) or Double Pole MCB protection
- Optional neutral disconnect
- 2.5mm² (multi-stranded) or 4mm² (solid) load terminals on 8 x 2.5kW Power Blocks, 6mm² bridging connector also supplied
- 4mm² (multi-stranded) or 6mm² (solid) load terminals on 4 x 5kW Power Blocks
- 16mm² terminating kit per 4x5kW Power Block option

General Dimmer Features

- 2000 step fade resolution at 50Hz voltage input
- Easy installation and service access
- Service and self test modes with diagnostics and reporting
- Data security - dimmer setup can be stored on a PC (with SV90 software)

Power Input

- Power voltage input: 1, or 2, or 3 phase and neutral supplies, nominally 100 - 240Vac 50/60Hz
- Input voltage measurement and automatic compensation
- Built in ripple rejection (to reduce mains signalling disturbances)
- Internal temperature detection, cutting off drive to the relevant Power Block in case of overtemperature

Control Inputs

- Maximum of 26 analogue (+ or - 10V) control inputs for up to 24 internal dimmers and two auxiliary dimmers or other devices via a pair of analogue +10V outputs
- Multiplex input signals: DMX-512 (1990), SMX or D54
- Analogue and multiplex control signal inputs work on highest level takes precedence basis (HTP) with other inputs
- Optional 2nd multiplex input: DMX-512 (1990) or SMX on HTP basis
- 99 Programmable preset states activated by rack keypad or by System Wide Control remote control unit on HTP basis

User Interface

- Keypad on front of rack with security code
- Liquid Crystal Display for programming and diagnostic reporting
- Status LEDs on front of rack: A-Mux ok; Processor ok, Phase 1, 2, 3 present; Over temperature; B fitted and ok; B Mux ok
- Remote control port to allow System Wide Control using an optional handheld remote control unit or PC with SV90 software

Programmable Features per rack

- 99 Programmable presets
- Preset mode selection on failure of mux input: hold forever or fade to a nominated preset after a 10 second delay
- Calibration of analogue control input signals over range of +/- 7 to +/-13V for signal matching
- Calibration of D54 analogue mux signal
- Calibration of the two +10V analogue out signals for aux dimmers
- English, French or German language menu system

Programmable Features per Mux Input

- Rack start address
- Two individual dimmer patches (one for each Mux. input)

Programmable Features per dimmer

- Set dimmer level to 0% (disable), XX% or INPUT
- Max Output voltage setting
- Set minimum level
- Non-dim programming of at any trigger level
- Fast, Standard and Slow dimmer response times
- Linear power, square, S-Curve selection
- Fluorescent electronic or magnetic ballast mode with programmable top set and bottom cut-off points and "kick-start" mode.

Building Blocks and Accessories

LD90 may be purchased either as a complete unit or as a set of building blocks for assembly on site. The following is a list of the available parts, including accessories.

Product Codes

05 001 01	Empty rack with processor unit
05-002-03	8 x 2.5kW Single Pole Power Block
05 002 04	8 x 2.5kW Single Pole Block with Neutral Disconnect Terminal (NDT)
05 002 06	8 x 2.5kW SPN Block with Neutral Disconnect Terminal (NDT)
05 002 05	4 x 5kW Single Pole Power Block
05 002 07	4 x 5kW Double Pole Power Block
05 002 08	Custom (Blanking) Block
07 001 02	SWC Remote
05 003 09	2nd Mux Kit
05 003 10	RCD Option; one per power block
05 003 11	Analogue Input Connector Set
05 003 12	16 mm ² Termination kit for 4 dimmers
05 003 13	Single Phase Strapping Kit
05 003 14	Wall bracket (requires 10mm fixings)
62951	8 Preset Push-button Panel (formerly 05 003 15)
62952	16 Preset push-button panel (formerly 05 003 16)
66074	Remote socket box, XLR 6 (formerly 05 003 20)
66800	Flush mounting back box for 8 Preset Push-button Panel
66801	Flush mounting back box for 16 Preset Push-button Panel

