Reference

This section gives details on how to select and program all the LD90 programmable features, using the rack keypad and display. To fully appreciate how all the programmable functions interact, refer to the Control Signal Path Diagram in the Appendix.

Navigating the System

The following sections describe in detail the keypad, keypad operation, the LED indicators, and the system's default (factory) settings.

The Keypad and Display

It is possible to access a range of programmable features through the use of the dimmer rack's keypad and 16 character display. Programming is designed so that operation is kept simple and multi-level menus are minimised. Multi-level menus are generally used for advanced functions covered later in this section. English is the default language and this text assumes that English is selected.

The six keys, MUX INPUT, NON-DIM, CURVE, PATCH, RESPONSE, PRESET on the left of the control module and the LEVEL key on the right are functions which can be controlled by the parameter keys listed below.

Keypad Lock symbol
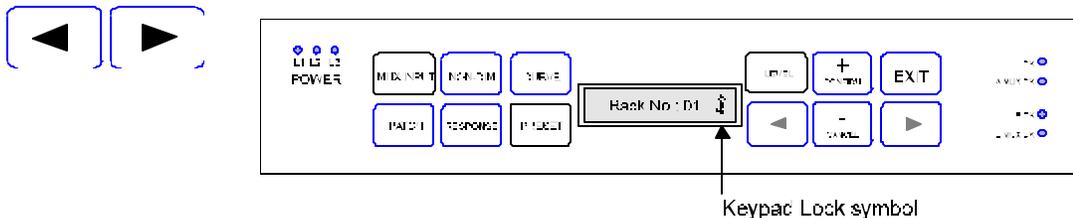
These keys are always used to go to a sub-menu, to move between fields or to move along a large numeric field. A flashing cursor will signify which field is selected.
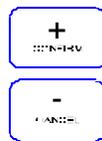
Unless otherwise specified, the + and - keys are always used to adjust a numeric field shown in the display or to scroll between possible fixed options. For CONFIRM /CANCEL operations see EXIT key. **Note:** By holding down the + or - key at the top level of the menu system (i.e. when Rack 01 is shown, as above), the display contrast may be adjusted.

The EXIT key, when pressed, will leave an option or menu and generally record any changed data immediately in non-volatile memory. Some options require positive confirmation via the +/CONFIRM or -/CANCEL key. A prompt will be produced if confirmation is required.

Keypad Lock

The keypad has a lock facility, requiring the key combination MUX. INPUT and RESPONSE to be held down for 2-3 secs. to activate / deactivate it. When locked, a lock symbol is displayed as shown below. The lock will be automatically re-enabled after 10 minutes.
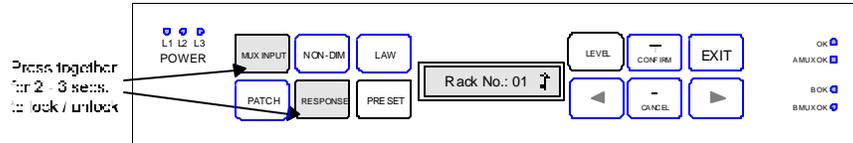

Power up Display

When the rack is switched on, a number of self-tests are run and the system displays the following message for a few seconds
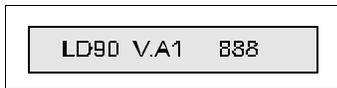
It checks and shows the rack configuration and version of software, A1 in this case; and number of dimmers fitted to each phase (**888** in this case). Other configurations are shown below.

000   No POWER BLOCKS fitted.

444   4 dimmers fitted to each phase (3 x 5kW usually).

888   8 dimmers fitted to each phase (3 x 2.5kW usually)

884   8 dimmers fitted to L1 and L2 phases, 4 dimmers fitted to L3.

Any other configurations will display accordingly.
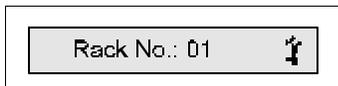
The default display, shown left, appears as soon as this software check is complete.

Indicators

LD90 has 7 green LED indicators to indicate its status. LED's associated with MUX B are part of the optional MUX B processor.

L1, L2, L3   Phase Power present at Processor Unit

O.K.   Main processor is running. A flashing condition indicates that over temperature has been detected in one or more Power Blocks.

B OK   Optional multiplex receiver B processor fitted and running.

MUX A OK / MUX B OK   Shows that valid multiplex signals are being received at the Mux A or Mux B input.

System Default Settings   When first switched on from new, or when set to defaults, the following functions will be set to the following states:

MUX INPUT A & B	DMX 512
NON-DIM	
CURVE	All dimmers = Square
PATCH	Start address of dimmer 01=0001
RESPONSE	All dimmers = Medium
PRESET	Preset 0 = Should a mux failure occur all dimmers will fade to blackout after a period of 10 seconds.
LEVEL	Dimmers take levels from control inputs (MUX, analogue etc). Note that every time the dimmer system is switched on, even if a LEVEL was set previously, it will always respond to the control inputs.

Function Keys & Menu Levels

The following tree diagram gives an outline of the menu system. Generally the first line of each menu is the most commonly required function.

LEVEL → Set Level: All → Set Level: Dimmer

LAW → Law: All → Law: Dimmer

PRESET → Preset View = Off → Preset Rec = Off → Preset NoMux =00

NON DIM → Non Dim:01 –DIM

RESPONSE → Response: All → Response: Dimmer

MUX INPUT → Input: A → Input: B

PATCH → Mux Start No → Mux: Dim Patch → Mux:Dimmer Name
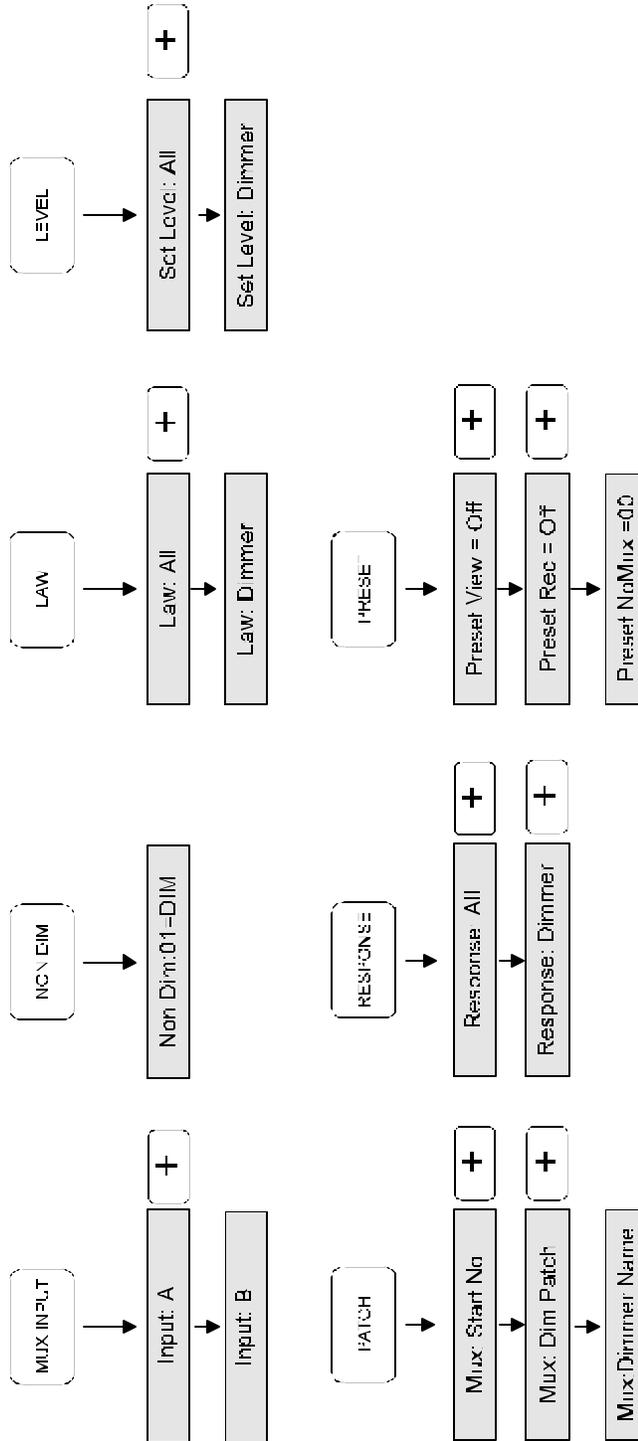
Checking Default (Factory) Settings

The procedure illustrated below shows how to check all default settings. After unlocking the keypad pressing the appropriate keys as shown will step through each default in turn. The ▶ symbol indicates that there is another menu level available.

> *Note that for menus that control ALL dimmers, a confirmation will be requested on EXIT. Pressing +/CONFIRM will ensure that all dimmers are set to the specified value. Pressing -/CANCEL will leave them as programmed.*

	Rack No.: 01	
MUX INPUT	Input A : DMX512	EXIT
NON DIM	Non Dim : 01=Dim	EXIT
LAW	Law : All ▶	▶
	Law : All=Square	EXIT Press Three times
PATCH	Mux : Start No ▶	▶
	Mux A : Start=0001	EXIT Press Three times
RESPONSE	Response: All ▶	▶
	Res : All=Medium	EXIT Press Three times
PRESET	Preset View=Off	EXIT
LEVEL	Set Level : All ▶	▶
	Set : All=Input	EXIT Press Twice
	Rack No.: 01	
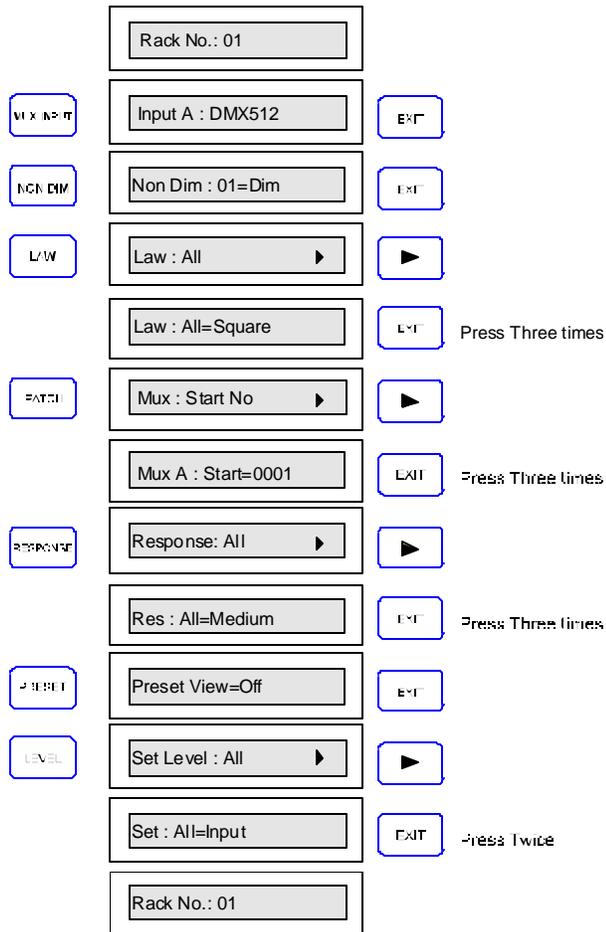
The Mux Input Key Protocols can be changed to any of the following options shown in the procedure below. The Input B parameters are not available unless the optional 2nd mux processor is fitted.

Rack No.: 01	MUX INPUT
Input A : DMX512	►
Input A : DMX512	CANCEL
Input A : D54	CANCEL
Input A : SMX2k4	CANCEL
Input A : SMX9k6	CANCEL
Input A : SMX19k2	CANCEL
Input A : SMX62k5	CANCEL
Input A : SMX250k	CANCEL
Input A : DMX512	EXIT — Press EXIT in any of the above options to confirm selected setting
Rack No : 01	

The $\boxed{+ \text{ CONFIRM}}$ key may also be used to step through these options.

The Non-Dim Key

This key allows dimmers to be assigned as "Non-Dims", i.e. they will remain at zero below the set threshold (%) and at full if above the threshold

Basic Operation

Example: Dimmer 05 to 50%, Dimmer 06 to 90%. (Max. setting)

Display	Key	Note
Rack No.: 01	NON DIM	
Non Dim : <u>01</u> = DIM	+ CONFIRM	Press 4 times
Non Dim : 0<u>5</u> = DIM	▶	
Non Dim : 05 = <u>DI</u>M	+ CONFIRM	Hold down/Step thru to 50%
Non Dim : 05 = 5<u>0</u>%	◀	
Non Dim : 0<u>5</u> = 50%	+ CONFIRM	
Non Dim : <u>0</u>6 = DIM	▶	
Non Dim : 06 = DI<u>M</u>	+ CONFIRM	Hold down/Step thru to 90%
Non Dim : 06 = <u>9</u>0%	EXIT	
Rack No.: 01		
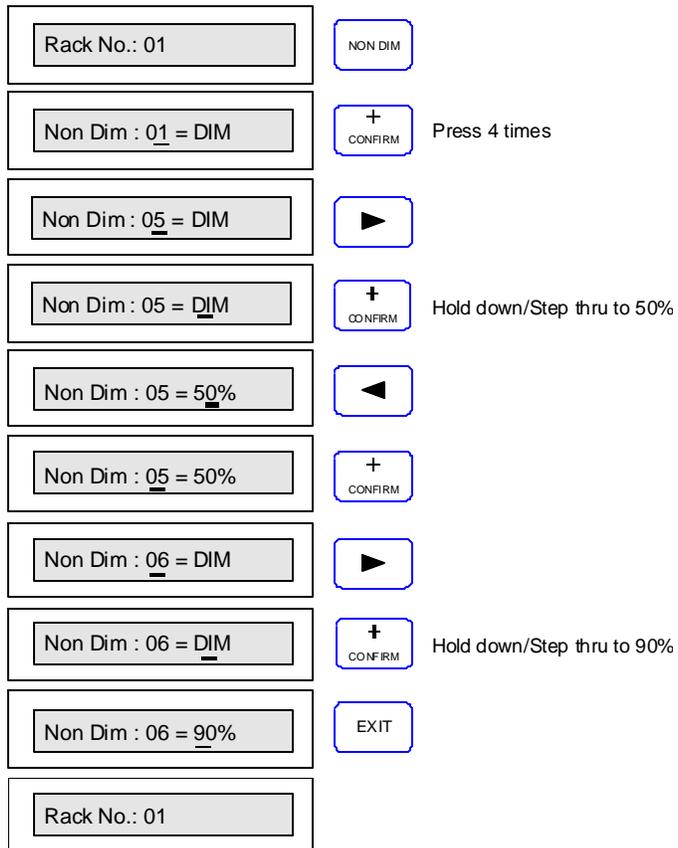
The Curve Key There are 3 dimmer curves available, these are supplied for compatibility purposes with other dimmers or applications. T.V. requirements generally use SQUARE whilst the S-curve allows matching with older dimmers. LINEAR is most suitable for theatre use. SQUARE is the default.

The following graphs illustrate the relationship between input signal and output voltages for the different curves.
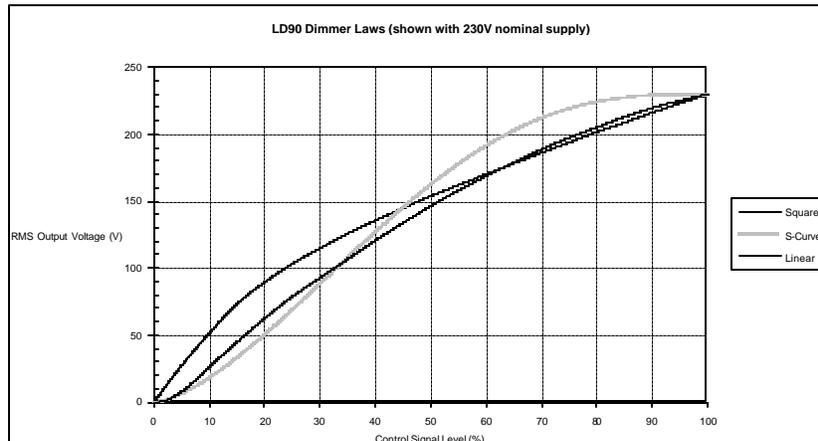
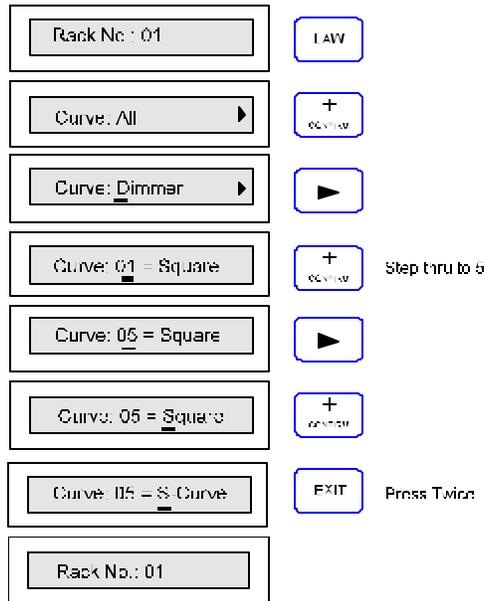**Note:** Separate curves apply to fluorescent fittings, these are selected automatically with the FLUORESCENT DIMMER SETUP in the SETUP menu.

Basic Operation

Example: Set ALL dimmers to LINEAR

Example:- Set Dimmer 05 to S-Curve

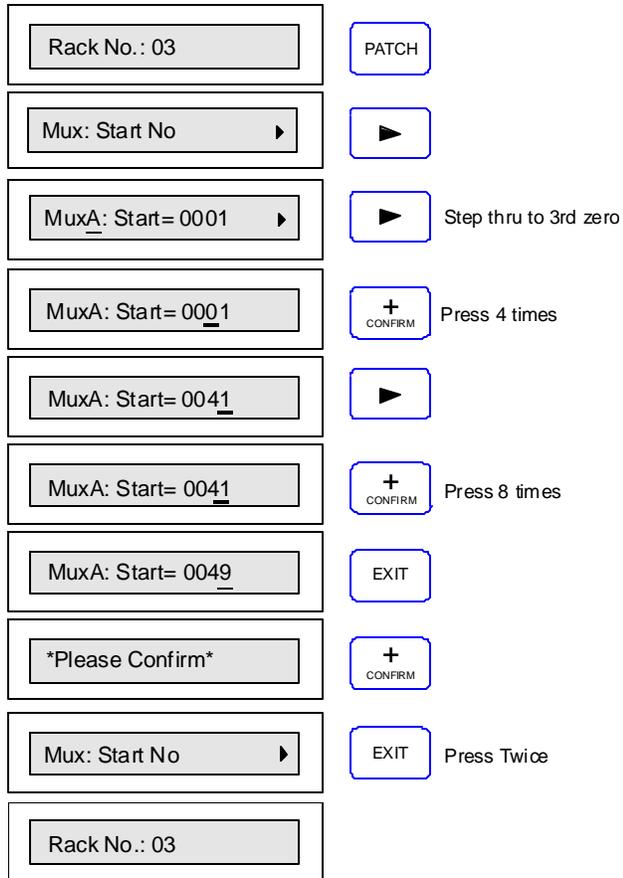| Rack No : 01 | | LAW |
Curve: All ▶		+ overview
Curve: Dimmer ▶		▶
Curve: 01 = Square		+ overview — Step thru to 5
Curve: 05 = Square		▶
Curve: 05 = Square		+ overview
Curve: 05 = S-Curve		EXIT — Press Twice
Rack No.: 01		

The Patch Key The PATCH function allows you to allocate dimmer numbering according to your own requirements.

- The **Mux: Start** option is the most basic facility, allowing you to patch all dimmers in the rack sequentially after the specified *Start Number*.
- The **Mux:Dimmer** option allows you to assign each dimmer to a specified multiplex number. Note that D54 protocol has a maximum spread of 52 dimmers, starting at the **Mux: Start** number.
- The **Mux:Circuit** option allows you to assign your own dimmer numbers or names independently of the *Start Number* or *Dimmer patch*. It is an important facility but only for use with SWC or SV90. The facility allows you to 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. (See ADVANCED OPERATION for an example).

Basic Operation

Example 1: On a 3 rack system where all POWER BLOCKS are 2.5kW dimmers (24 per rack) the third rack would normally start at dimmer number 49. To set this, follow the procedure below:

Note: It is not recommended to alter PATCH with dimmers on, as patching operations will directly affect light output.

Rack No.: 03	PATCH
Mux: Start No ▶	▶
Mux<u>A</u>: Start= 0001 ▶	▶ Step thru to 3rd zero
MuxA: Start= 00<u>0</u>1	+ CONFIRM Press 4 times
MuxA: Start= 004<u>1</u>	▶
MuxA: Start= 004<u>1</u>	+ CONFIRM Press 8 times
MuxA: Start= 0049	EXIT
Please Confirm	+ CONFIRM
Mux: Start No ▶	EXIT Press Twice
Rack No.: 03	

Note: 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 immediately.

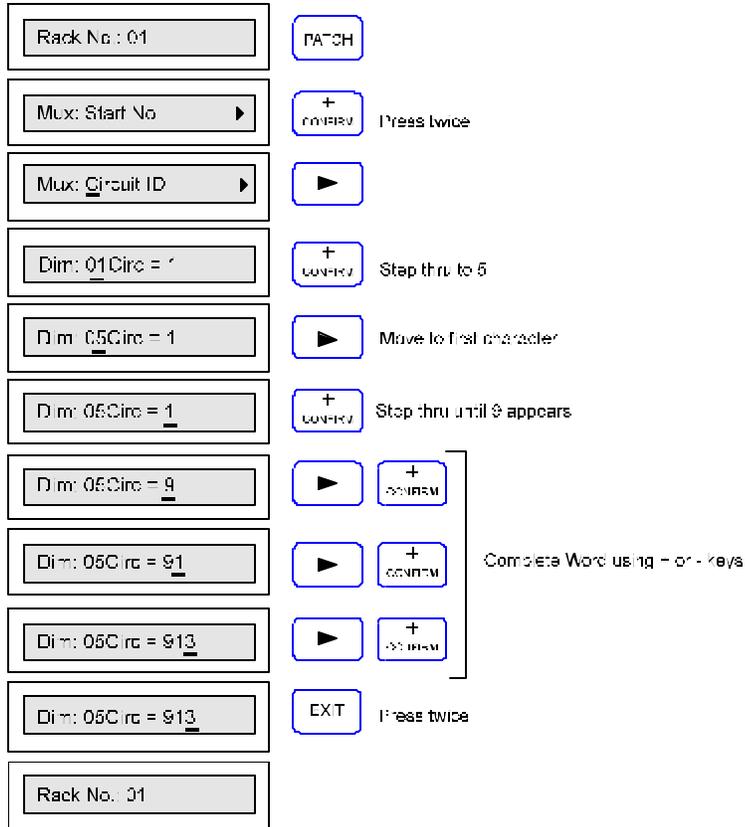Example 2: Dimmers 1-2 are both to be assigned to mux number 100.

> **When using the D54 protocol, you must set the Mux: Start Number to the lowest Mux address that you want to patch any dimmer to. When using the Mux:Patch facility, the software will not allow you to set any dimmer to respond to an address more than 52 higher than this number.**

Display	Key	Action
Rack No.: 01	PATCH	
Mux: Start No ▶	+ CONFIRM	
Mux: Dim. Patch ▶	▶	
MuxA: Dim 01= 0001	▶	
MuxA: Dim 01= 0001	▶	Press twice
MuxA: Dim 01= 0001	+ CONFIRM	
MuxA: Dim 01= 0101	▶	Press twice
MuxA: Dim 01= 0101	- CANCEL	
MuxA: Dim 01= 0100	◀	Press 4 times
MuxA: Dim 01= 0100	+ CONFIRM	
MuxA: Dim 02= 0002	▶	Press twice
MuxA: Dim 02= 0002	+ CONFIRM	
MuxA: Dim 02= 0102	▶	Press twice
MuxA: Dim 02= 0102	- CANCEL	Press twice
MuxA: Dim 02= 0100	EXIT	Press twice
Rack No.: 01		

Example 3: By utilising the **Circuit** feature on LD90 it is possible to give dimmers 5 character identification names or numbers, for instance Dimmer 5 is to be called 913. Giving dimmers **Circuit** numbers will prove useful when LD90 is used with the optional SWC Remote or the SV90 Programming Terminal which may be used to control significant numbers of dimmers.
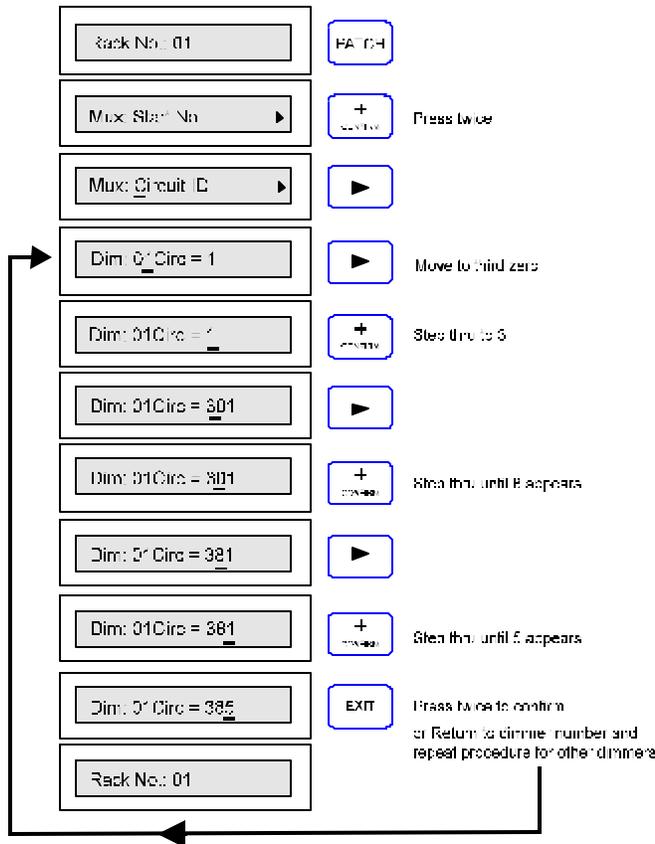
Note that the Circuit ID must be a 4 digit numeric value only to be used with the SWC Programmer, as the unit only has numeric keys.

Rack No : 01	PATCH	
Mux: Start No ▶	+ CONFIRM	Press twice
Mux: Circuit ID ▶	▶	
Dim: 01 Circ = 1	+ CONFIRM	Step thru to 5
Dim: 05 Circ = 1	▶	Move to first character
Dim: 05 Circ = 1	+ CONFIRM	Step thru until 9 appears
Dim: 05 Circ = 9	▶ + CONFIRM	
Dim: 05 Circ = 91	▶ + CONFIRM	Complete Word using ▶ or + keys
Dim: 05 Circ = 913	▶ + CONFIRM	
Dim: 05 Circ = 913	EXIT	Press twice
Rack No. 01		

Advanced Operation

Example: A 24 dimmer LD90 is being added to an existing installation of 16 Permus racks (dimmer capacity 384) driven by a Galaxy console. The total number of dimmers is 408, so exceeding the capacity of one D54 Mux link. The Galaxy's second mux output must be used, driving dimmers 385-768. However, there is no implicit number carried in the D54 Mux signal to tell the new dimmer rack that it is receiving 385-768. To the dimmers it appears as 1-384 again.

By setting the dimmer **Circuit ID's** to 385-408 and the start number to 1, the dimmer can be controlled both by the Galaxy **and** SWC Programmer or SV90 as dimmers 385-408. The **Circuit ID** feature will allow us to do this as shown in the diagrams overleaf.
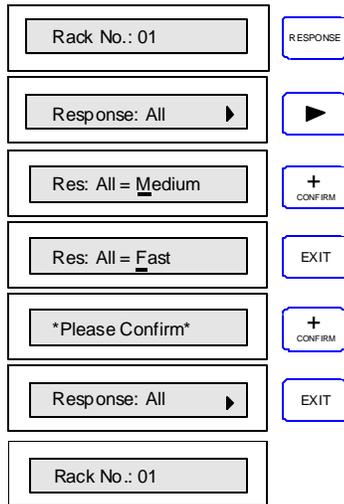
GALAXY

PERMUS
Rack no.1

PERMUS
Rack no.16

LD 90
Rack no.17

SV90
or SWC

D54 OUTPUT 1

Mux no. 1-24

Mux no. 360-384

D54 OUTPUT 2

Set Mux Start No = 1
Set Circuit ID's = 385 - 405
Set Rack No = 17

Rack No.: 01   PATCH

Mux: Start No ▶   +   Press twice

Mux: Circuit ID ▶   ▶

Dim: 01 Circ = 1   ▶   Move to third zero

Dim: 01Circ = 1   +   Step thru to 3

Dim: 01Circ = 301   ▶

Dim: 01Circ = 301   +   Step thru until 8 appears

Dim: 01 Circ = 381   ▶

Dim: 01Circ = 381   +   Step thru until 5 appears

Dim: 01 Circ = 385   EXIT   Press twice to confirm
or Return to dimmer number and repeat procedure for other dimmers

Rack No.: 01

The Response Key

The response speed of a dimmer is the rate at which it responds to an increase or decrease in its control level. Three speeds are available, MEDIUM, FAST and SLOW, corresponding to 100mS, 30mS and 300mS. SLOW is generally used for large lamp loads e.g. 5kW fittings such as QUARTZCOLOR POLLUX, whilst FAST is used for small lamp loads such as those used in a chase effect
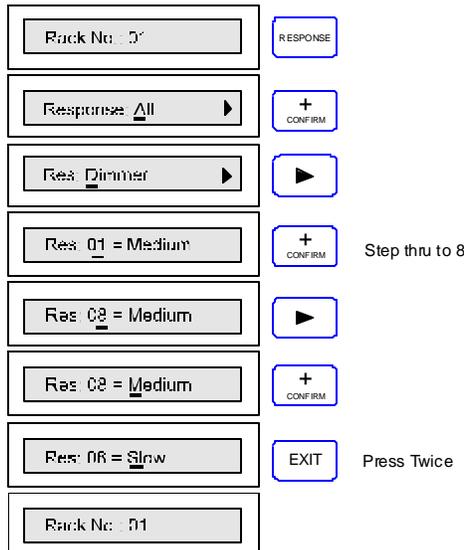
Basic Operation

Example: Set all dimmers to FAST

Rack No.: 01	RESPONSE
Response: All ▶	▶
Res: All = Medium	+ CONFIRM
Res: All = Fast	EXIT
Please Confirm	+ CONFIRM
Response: All ▶	EXIT
Rack No.: 01	

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.

⚠ Caution

Advanced Operation

Example: Set dimmer 8 to SLOW

Rack No.: 01	RESPONSE	
Response: All ▶	+ CONFIRM	
Res: Dimmer ▶	▶	
Res: 01 = Medium	+ CONFIRM	Step thru to 8
Res: 08 = Medium	▶	
Res: 08 = Medium	+ CONFIRM	
Res: 08 = Slow	EXIT	Press Twice
Rack No.: 01		

The Preset Key There are 99 user programmable Presets. PRESET 0 is a non-recordable blackout state.

It is possible to record your own preset states and assign any one of them as a 'backup' state that will fade in 10 seconds after the Mux. signal has failed (the NoMux preset). The dimmer always records total output into the selected PRESET.

Any of the Presets may be called up and added to the dimmer output in a 'Highest Takes Precedence' (HTP) manner from the rack keypad, or, remotely by SWC or SV90. This is the PRESET VIEW facility. When selected, the preset will crossfade at the default time of 10s, or if using SWC or SV90, a recorded time, from any previously selected preset.
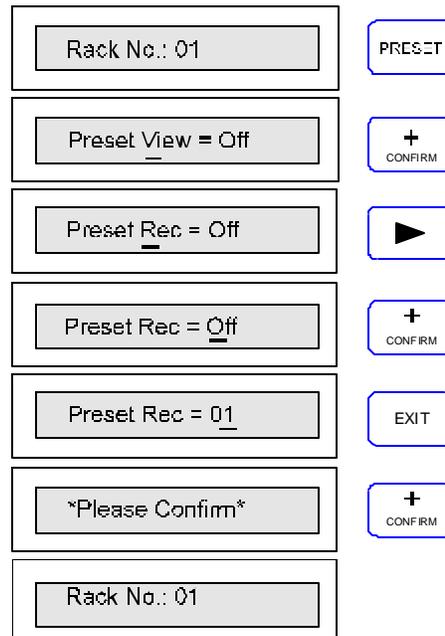
> *Since PRESET VIEW operates on a Highest Takes Precedence (HTP) basis with other control inputs (e.g. the multiplexed signal from a lighting desk), if a preset has been left 'on view' it will not be possible to subsequently fade down the dimmers from the lighting desk. To avoid problems, always turn off the preset after use.*

Basic Operation

Example: Record dimmer output into preset 1

1. Set up the desired lighting state first using any control means.
2. Follow the procedure as shown.
3. Repeat for any other Presets that are required.

Rack No.: 01	PRESET
Preset View = Off	+ CONFIRM
Preset Rec = Off	►
Preset Rec = Off	+ CONFIRM
Preset Rec = 01	EXIT
Please Confirm	+ CONFIRM
Rack No.: 01	

Advanced Operation

NoMux=0 is the default setting, causing a fade to blackout when the Mux signal from the control desk ceases. Setting NoMux to any of the Presets 1-99 causes the selected preset to be faded up instead.
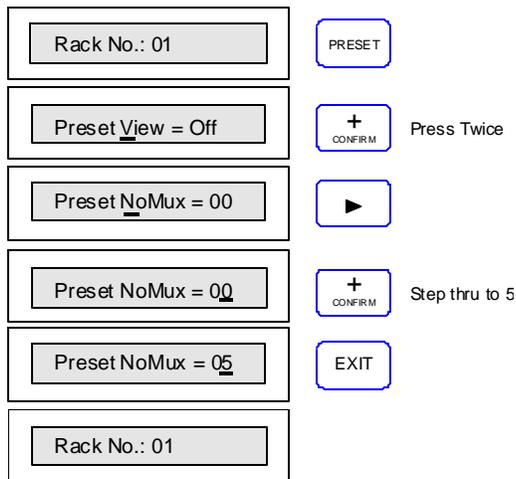
Setting NoMux to HOLD (HLD) will allow the current lighting state to remain in the event of a Mux failure. This is useful as a safety feature in live performance situations.
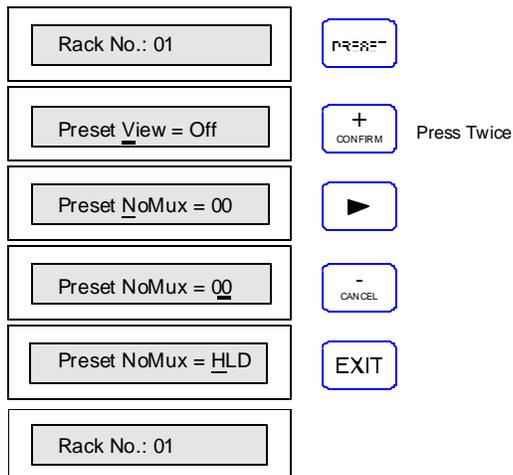
⚠️ **Caution**

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.

Example:- Assign preset 5 as the 'backup 'state

Rack No.: 01	PRESET
Preset View = Off	+ CONFIRM — Press Twice
Preset NoMux = 00	►
Preset NoMux = 00	+ CONFIRM — Step thru to 5
Preset NoMux = 05	EXIT
Rack No.: 01	

Example: Set NoMux to HOLD

Rack No.: 01	PRESET
Preset View = Off	+ CONFIRM — Press Twice
Preset NoMux = 00	►
Preset NoMux = 00	- CANCEL
Preset NoMux = HLD	EXIT
Rack No.: 01	

The Level Key

This function allows dimmers and loads to be tested directly from the keypad, regardless of the signals, Mux or otherwise that are being received from inputs. Either ALL or individual dimmers may be set to any % level.

> *Note: Since this control overrides the control inputs, including the Presets, it is possible to completely disable any or all of the dimmers. This is __not__ a safety switch off mechanism however. It is easy to forget to set the dimmers back to INPUT, giving rise to unexpected lack of control.*
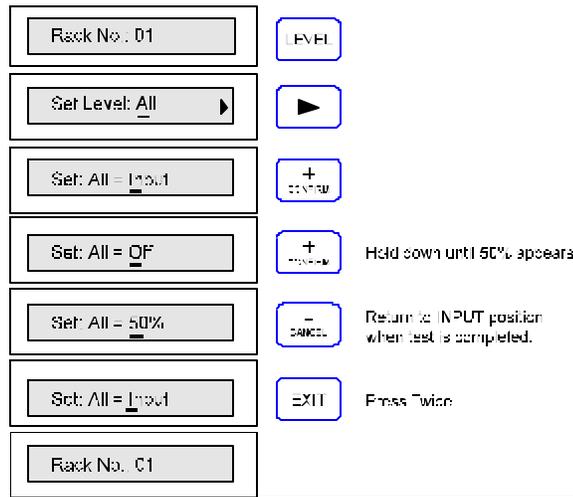
Normally this control is set to ALL=INPUT whereby all dimmers will be controlled by the Mux generated by a lighting console, analogue inputs and Presets.

This control may also be used to set up states for recording into Presets in architectural situations where there is no conventional lighting desk available.

The lighting console is overridden by this key but the MINIMUM DIMMER LEVEL and MAXIMUM VOLTAGE set in the RACK SETUP procedure still take overall precedence. This should be borne in mind when using the facility.

Basic Operation

Example: Set all dimmers to 50%

Rack No . 01	LEVEL
Set Level: All ▶	▶
Set: All = Input	+ CONFIRM
Set: All = OFF	+ CONFIRM Hold down until 50% appears
Set: All = 50%	– CANCEL Return to INPUT position when test is completed.
Set: All = Input	EXIT Press Twice
Rack No. 01	

Advanced Operation

Example: Dimmer numbers 5 and 8 are to set to 90%

Rack No.: 01	LEVEL	
Set Level: All ▶	+ CONFIRM	
Set Level: Dimmer ▶	▶	
Set: 01 = Input	+ CONFIRM	Hold down until 5 appears
Set: 05 = Input	▶	
Set: 05 = Input	+ CONFIRM	Hold down until 90% appears
Set: 05 = 90%	◀	
Set: 05 = 90%	+ CONFIRM	Step thru to no. 8
Set: 08 = Input	▶	
Set: 08 = Input	+ CONFIRM	Hold down until 90% appears
Set: 08 = 90%		Return both dimmers to INPUT position when test is completed. then press EXIT twice
Rack No.: 01		
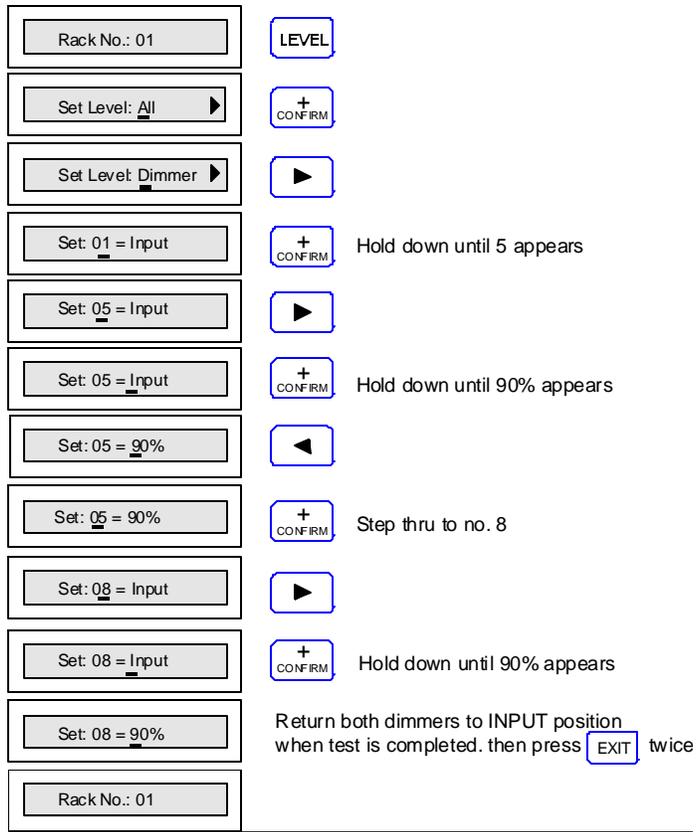
User Messages

Sometimes, the software may produce an unexpected message, due to external or internal reasons. Each "Error" has a unique number and is logged internally in non-volatile memory. If a message should appear, then its number should be written down and referred to your Strand Lighting service agent or dealer. The message can be cleared by pressing EXIT.