

# EKO

## DIMMING SYSTEM

### OPERATOR MANUAL

Version 2.3

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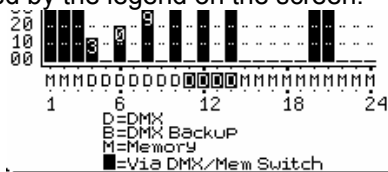
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# 1 EKO QUICK REFERENCE

The **control source** for each EKO dimmer channel can be *individually configured* to be controlled by either:

1. **Memories** stored in the EKO and recalled by ePlates (wall plate controllers).
2. **DMX** from a DMX lighting controller. If DMX is lost, a "Backup Memory" can be automatically recalled.
3. **DMX/MEM Switch.** All channels that are configured to "switch" can be switched between *DMX* or *Memory* control from either a suitably programmed ePlate button or from the EKO touch screen. If "**Auto Switch**" is ON, channels set to "switch" will be *automatically* switched to *DMX* whenever a valid DMX signal is connected.
4. **Touch Screen.** Dimmer channels can also be manually controlled from the EKO front panel touch screen for testing purposes.

The row of characters below the level bar graph on the main EKO screen shows the current **control source** for each dimmer channel as described by the legend on the screen.



In this example, channels 4 to 14 are all controlled by DMX but 11 to 14 are via the DMX/Mem Switch and can therefore be switched to Memory. All other channels are controlled by Memories

### 1.1.1 Memory Control

When a dimmer channel is set to "**Memory**", it is always controlled by the EKO memories *created* via the LCD touch screen or by taking "snapshots" of a DMX input signal or a combination of both. The memories are saved in the EKO and are recalled using the buttons or faders on ePlates.

To set a dimmer channel to "Memory", press; **[Menu] [Dimmer Channels] [Setup]**.

The screen shows the "Control Source" for each dimmer channel.

To change the "Control Source" of a dimmer channel(s), **highlight** the required dimmer channel(s) by touching them, then press; **[Control Source]**.

The three choices for dimmer channel control source are;



Press:

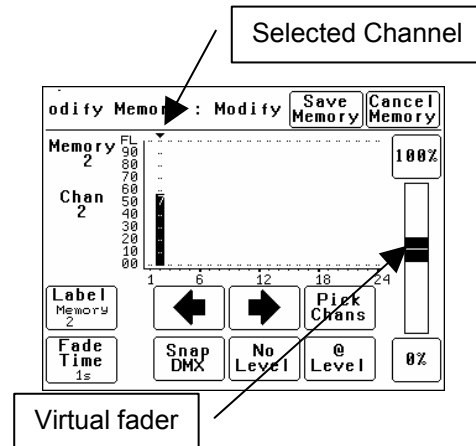
**[Memory Control] [Save Setup] [Done] [Done]**.

### 1.1.2 Create or Edit memories

To Create or edit a memory press;

**[Menu] [Memories] [Record Memory]** or **[Edit Memory]**. Select a memory number then press **[Pick]**.

You can either create your own memory using the controls on the screen or press **[Snap DMX]** to take a copy of the current DMX input signal. When a channel(s) is selected (indicated by a small triangle (▼) above the channel) it can be faded up or down by sliding your finger over the virtual fader or instantly set to off or full using the **[0%]** or **[100%]** buttons.



When the channel levels of the memory are correct, press; **[Save Memory] [Done]**.

To recall a memory, use a ePlate button or fader that has been programmed to control that memory.

### 1.1.3 DMX Control

When a dimmer channel is set to "**DMX Control**" it is always controlled by the DMX signal from a lighting console or other DMX device and it responds to the DMX slot number to which it has been patched in the EKO patch menu.

To set a dimmer channel to "DMX control", on the LCD touch screen press;

**[Menu] [Dimmer Channels] [Setup]**.

The screen shows the "Control Source" for each dimmer channel. To change the "Control Source" of a dimmer channel(s), **highlight** the required dimmer channel(s) by touching them, then press; **[Control Source]**.

The three choices for dimmer channel control source are;



Press **[DMX Control]**.

Press; **[Save Setup] [Done] [Done]**.

#### 1.1.3.1 DMX PATCHING

To **Patch** an EKO dimmer channel to a DMX slot press; **[Menu] [DMX Input] [Patch]**

The "1 to 1 patch" provides a rapid method of patching all of the dimmers in one **EKO** frame to sequential DMX slots, starting from a DMX slot that you select.

Press [**1:1 Patch**] then type in the DMX start slot number (0 to 512) for dimmer channel 1 in this **EKO** frame, then press;  
[**Patch Series**] [**Save Patch**] [**Done**] [**Done**].

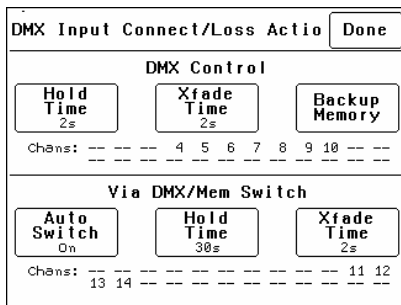
The “**User Patch**” allows you to *individually* patch each **EKO** dimmer channel to a DMX slot of your choice. Press [**User Patch**]. To select a channel, press that **channel number** then press [**Patch**]. Type in the DMX slot number (0 to 512) for the selected channel then press [**Patch @ Slot**]. When all patches have been made, press; [**Done**] [**Save Patch**] [**Done**] [**Done**].

**1.1.3.2 DMX BACKUP MEMORY**

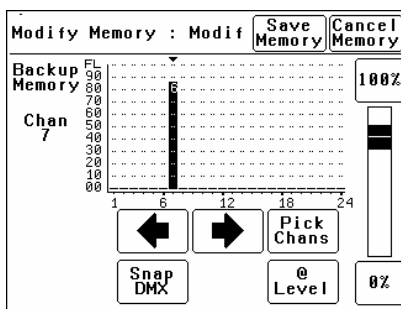
To create or edit the DMX “Backup Memory”, press; [**Menu**] [**DMX Input**] [**Connect Loss Action**].

Set the [**Hold Time**] to any time other than “Infinite” then press [**Set**].

To *replace the current EKO output* with the Backup Memory press; [**Backup Memory**].



The Backup memory screen appears;



You can either create your own memory using the controls on the screen or press [**Snap DMX**] to take a copy of the current DMX input signal. When a channel(s) is selected (indicated by a small triangle (▼) above the channel) it can be faded up or down by sliding your finger over the virtual fader or instantly set to off or full using the [**0%**] or [**100%**] buttons. When the channel levels are correct, press; [**Save Memory**]. Normal output is restored.

**1.1.4 SWITCH Control**

All channels set to “DMX/MEM SWITCH” can be switched between **Memory** or **DMX** control. The “switch” can be operated from either the **LCD**

**touch screen** or from a suitably programmed **ePlate**.

To set a dimmer channel to “SWITCH” control, press; [**Menu**] [**Dimmer Channels**] [**Setup**].

The screen shows the “Control Source” for each dimmer channel.

To change the “Control Source” of a dimmer channel(s), **highlight** the required dimmer channel(s) by touching them, then press; [**Control Source**]. The three choices for dimmer channel control source are;



Press [**DMX/MEM Switch**].

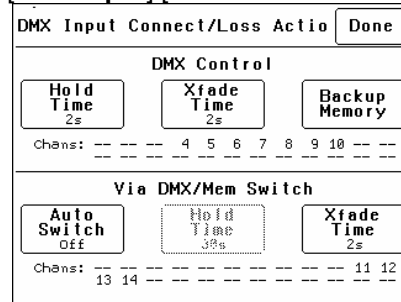
Press; [**Save Setup**] [**Done**] [**Done**].

To operate the switch use either a suitably programmed ePlate button or from the LCD touch screen press: [**Menu**], [**Net Setup**] [**DMX/MEM Switch**]. Select either; [**DMX**] or [**Memory**] then press [**Set**].

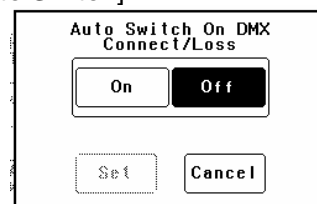
**1.1.5 AUTO Switch**

To configure the “Switch” (above) to **automatically** switch to DMX whenever a valid DMX signal is connected to the EKO press;

[**Menu**] [**DMX Input**] [**Connect Loss Action**].



Press; [**Auto Switch**]



Press; [**On**] [**Set**] [**Done**] [**Done**] [**Done**].

**1.1.6 TOUCH SCREEN Control**

EKO dimmer channels can also be controlled from the EKO’s front panel **LCD touch screen**. This method of control is primarily used for testing dimmer circuits.

To test a dimmer channel(s) press; [**Menu**] [**Dimmer Channels**] [**Chan Test**]. Select a channel(s) then fade the channel(s) up or down with the virtual fader on the LCD screen or instantly set them to off or full using the [**0%**] or [**100%**] buttons

Channel test only allows one level to be set for all selected channels. To set individual channels levels use the “**DMX Backup Memory**” above.

## 2 PRODUCT DESCRIPTION

### 2.1 ABOUT THIS MANUAL

This manual describes the installation, configuration and operation of the **EKO** range of slimline wall mount installation digital dimmers and associated “ePlate” wall controllers manufactured by LSC Lighting Systems.

### 2.2 EKO MODELS

The **EKO** dimmer is available in 4 models offering a choice of dimmer channel quantities and power output ratings.



**EKO 606**  
6 x 25 Amp Dimmer Channels

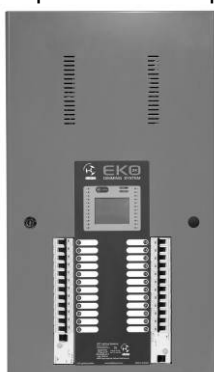
All models can be controlled remotely via DMX 512 from a lighting console or from LSC ePlates connected via LSCnet or locally from their front panel LCD Touch Screen



**EKO 612/R**  
12 x 25 Amp Dimmer Channels  
(shown with optional RCD Input Breakers)



**EKO 312/R**  
12 x 13 Amp Dimmer Channels  
(shown with optional RCD Input Breaker)



**EKO 324/R**  
24 x 13 Amp Dimmer Channels  
(shown with optional RCD Input Breakers)

### 2.3 EPLATES

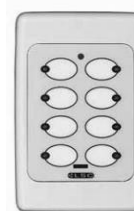
**ePlates**™ – Remote wall station controllers for the EKO, allow users to recall internal memories from the EKO for replay at a pre-programmed level and with a selected fade time.

**Note:** *The EKO dimmer must be fitted with the LSCnet option to enable operation of ePlates.*

**ePlates** are available in the following configurations;



4 Faders  
2 Faders  
1 Fader



8 Buttons  
4 Buttons  
2 Buttons

ePlates are connected to the EKO Dimmers via LSCnet which uses industry standard Cat5 cables and connectors. The ePlate buttons and faders can be programmed to recall lighting memories stored in the dimmers or to operate various EKO functions.

For example, a button might recall an EKO memory. Another button might switch certain dimmer channels between DMX control and Memory (ePlate) control.

### 2.4 EKO CONTROL PHILOSOPHY

The EKO is an “ARCHI-TAINMENT” dimmer with architectural control of EKO memories by ePlates connected via LSCnet and entertainment control by your lighting controller connected via DMX-512A.

The **control source** attribute for each EKO dimmer channel can be *individually configured* to control the channel from either:

**2.5 MEMORY CONTROL**

When configured for “**memory**” a dimmer channel is controlled from ePlates (wall controllers) that are used to recall memories stored in the EKO dimmer.  
See section 7.2.1.1 **Control Source**.

**2.6 DMX CONTROL**

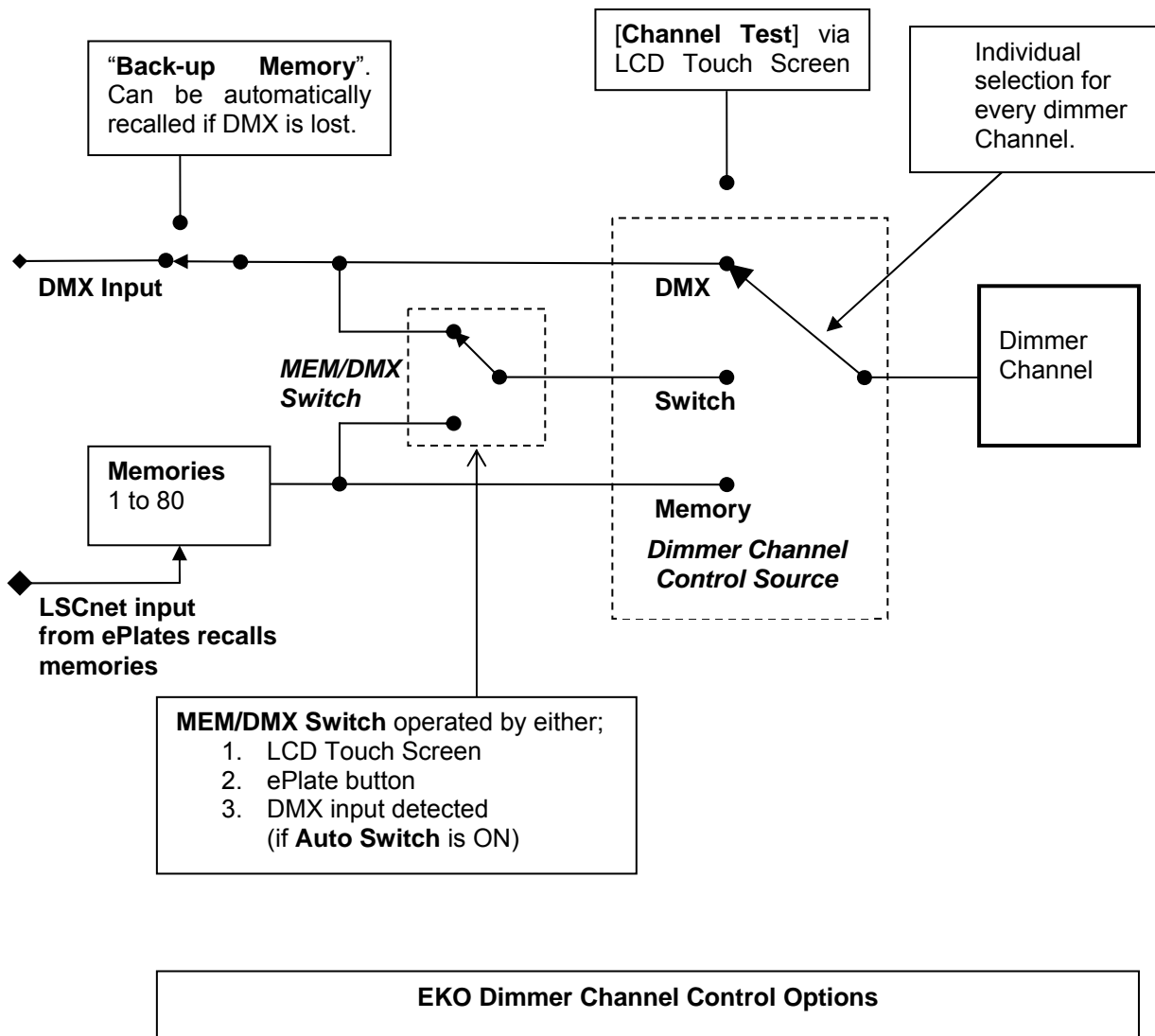
When configured for “**DMX**” a dimmer channel is controlled from a DMX lighting controller. If DMX fails, the DMX levels can be held indefinitely or the channels can fade to a “Backup Memory” previously stored in the EKO.  
See section 7.2.1.1 **Control Source** and section 7.3.1 **Patching**.

**2.7 SWITCHED CONTROL**

When configured to “**Switch**”, a dimmer channel can be switched between *Memory* or *DMX*. Operation of the **Switch** is controlled from either a suitably programmed ePlate button or from the EKO touch screen or if **Auto Switch** is set to **ON** it will be *automatically* switched to *DMX* whenever a valid DMX signal is connected to the EKO.  
See section 7.2.1.1 **Control Source**.

**2.8 LOCAL CONTROL**

Dimmer channels can be manually controlled from the EKO front panel touch screen for testing purposes.  
See section 7.2.2 **Channel Test**.





## 2.9 OPTIONS

The following options are available;

### 2.9.1 LSCnet

LSCnet is a control and monitoring network connecting the EKO to other devices such as ePlates (wall controllers) and PCs running LSC's "Houston" monitoring software (see below). LSCnet uses industry standard Cat5 cable and RJ45 connectors for the interconnection of devices. The EKO LSCnet option also supplies the power for up to 4 ePlates via the Cat5 cable.

### 2.9.2 RCD Input Breaker

The EKO dimmers can be supplied with optional *factory fitted* three phase input RCD (Residual Current Device) protection. EKO models fitted with RCD's are identified by "/R" in the model number.

The EKO324/R and EKO612/R are fitted with two 63A 30mA RCD's.

The EKO3312/R and EKO606/R are fitted with one 63A 30mA RCD.

### 2.9.3 Single Phase Input

The EKO dimmers can be supplied to operate from a single phase power input.

### 2.9.4 Switched Output Channels

The EKO can be supplied with outputs that only **switch** between OFF and ON. These outputs are suitable for controlling non resistive loads.

### 2.9.5 RCD Output Breakers

The EKO dimmers can be supplied with optional *factory fitted* RCD output breakers. RCD breakers are larger than normal MCB's and hence the maximum number of dimmer channels is reduced.

### 2.9.6 "Houston" Monitoring Software

Houston is an optional Windows PC application that allows the remote monitoring of all LSCnet enabled products. This includes the EKO dimmers and ePlate wall controllers.

Any operational faults such as input phase failure, loss of DMX, over temperature are all sent over the LSCnet from all of the devices to one or more PCs running the Houston software. The user is immediately notified of a fault when the normally GREEN status indicator starts flashing RED. A quick glance at the screen then gives all the detailed information about the device affected and the nature of the fault.

This information is invaluable for the fast diagnosis of any problems in all situations. Large stadium concerts or installations with dimmers in different locations such as distant plant rooms are now easily monitored from a central location. Installers can see the status of a remote venue such as a school, church or theme park from their office via a Wi-Fi link or an internet connection.

Houston also keeps a permanent log of all system events for later viewing. These are stored with the time and date of the fault, allowing further diagnosis of a problem, even if it is not reported until weeks later.

## 2.10 FEATURES

### 2.10.1 Installation Frame.

The EKO dimmers incorporate a cleverly designed installation frame that can be fixed in position without the dimmer being present. Screw terminals on the installation frame allow the **load** and **control** wiring to be terminated on the frame in a clear and unhindered manner. This allows the majority of the installation work to be performed without the dimmer present. The dimmer is therefore not subjected to possible building site dust, water or damage.

When the installation is ready for commissioning, the dimmer can be hung on the installation frame and the dimmers and control are then **plugged** into the special terminals on the installation frame. To complete the installation, the supply is connected to the dimmers and the dimmers are configured. This method allows the largest 24 channel dimmer to be easily installed onto the frame and made fully operational in less than 5 minutes.

### 2.10.2 LCD Touch Screen.

Dimmer configuration, patching and local control is achieved via a backlit touch screen graphical LCD on the front panel. A lock code can be used to prevent unauthorised tampering.

### 2.10.3 Reversible Door.

The lockable hinged front door allows easy access for servicing. The door has been designed with reversible hinges and lock that allows it to be customised to suit the installation environment.

### 2.10.4 Low Noise Operation.

The dimmers are designed for 100% duty cycle operation across all channels simultaneously. The EKO features variable speed fan cooling to minimise noise. The fan only operates when required.

High quality toroidal inductors limit the rise time to 300 micro seconds to minimise electrical interference.

### 2.10.5 Variety of Output Loads.

Using LSC's Pulse Transformer Fired Dimmer (PTFD™) output circuitry means that virtually any load can be controlled perfectly. Pin spots, ELV lamps, transformers, strobes and even a 5w pilot lamp can all be smoothly controlled without the need for dummy loads.

### 2.10.6 Fully Approved.

The EKO dimmers are CE and C tick approved.

## 3 EKO Quick Tour

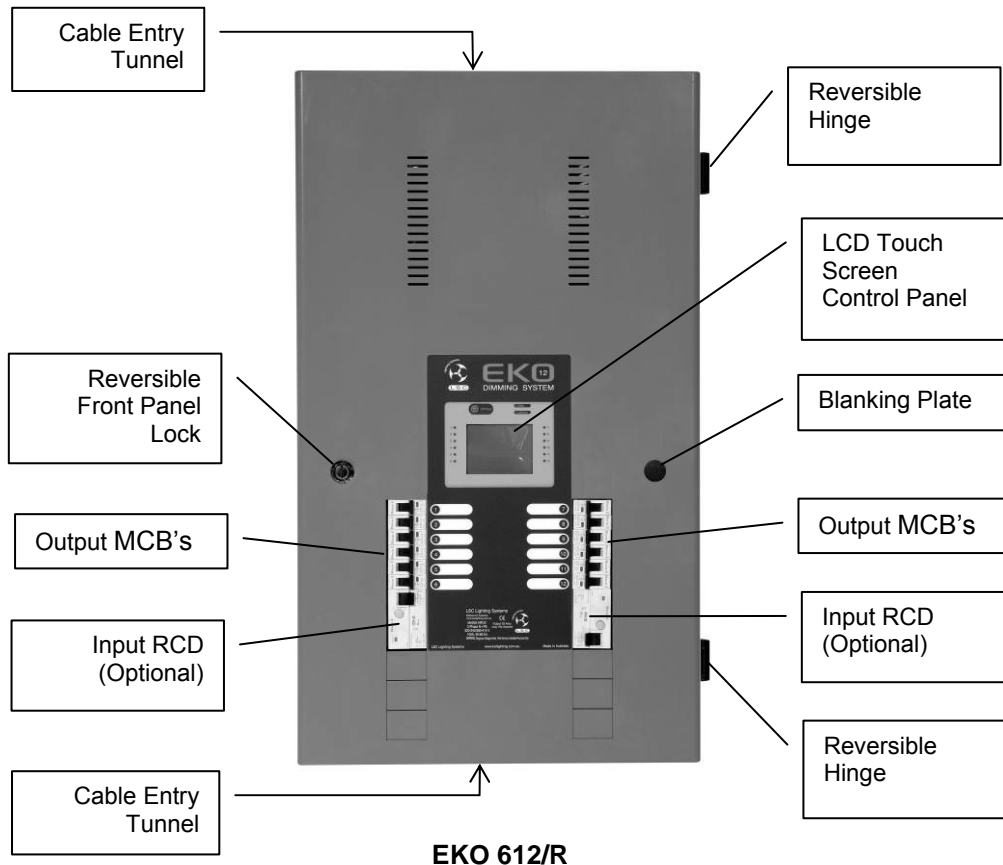
### 3.1 INTRODUCTION

All **EKO** models are constructed using two basic cabinet sizes. Both cabinets have the same width and depth, varying only in height.

- The tall cabinet is used for the **EKO 612** and **EKO 324**.
- The short cabinet is used for the **EKO312** and **EKO606**

The front panel contains the input RCD circuit breaker(s) (optional), load circuit breakers and control panel that includes the status indicators and LCD touch screen. The lockable front panel provides internal access for installation and maintenance. The front panel lock and hinges can be reversed to swing the door in the opposite direction.

No user serviceable parts are located inside.



#### 3.1.1 Input RCD (Optional)

The optional three phase input RCD (Residual Current Device) will cut the power to the **EKO** dimmer if the residual current to earth at the input exceeds 30 milliamps. It does not protect against current overload. The input to the **EKO** must always be connected to a suitably ratted **external** circuit breaker even if the optional RCD is fitted. See the specifications at the end of this manual for the input ratings.

#### 3.1.2 Output (Load) MCB's

The load connected to each dimmer channel output is protected by a numbered MCB (Miniature Circuit Breaker). An area beside each load MCB is provided to write the name of the load.

### 3.2 CONTROL PANEL

The Control Panel contains the indicators for status and channel levels and the LCD touch screen.

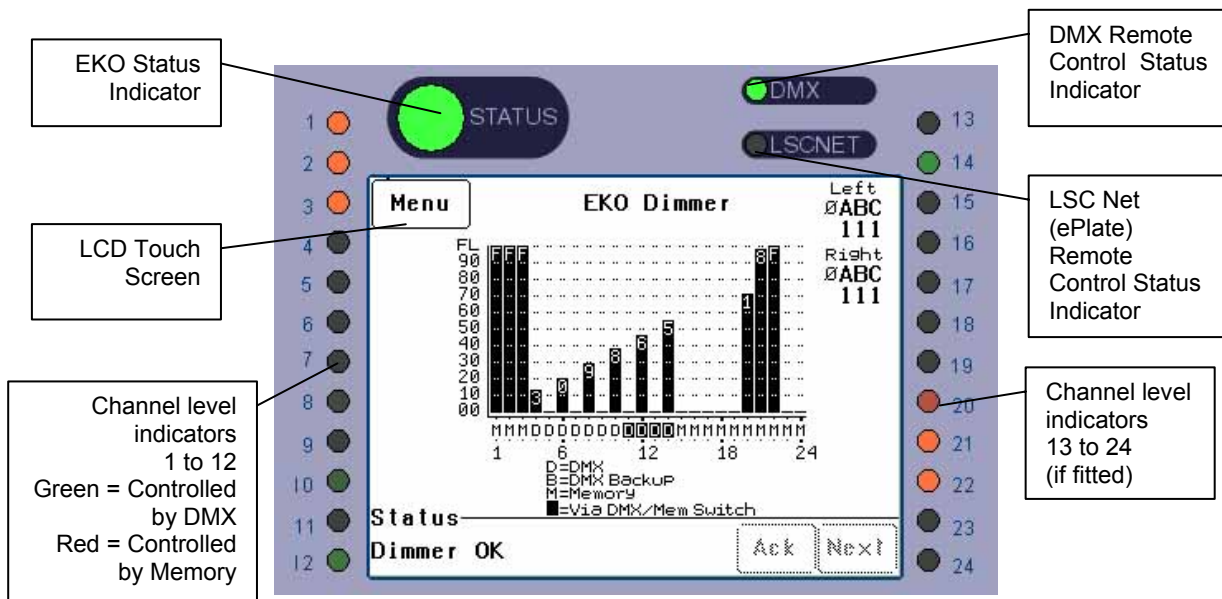


Illustration shows an EKO 324 Control Panel. Control panels on other models vary only in the quantity of channel level indicators.

#### 3.2.1 Indicators

The indicators located around the touch screen are multi coloured and light or flash to indicate their current condition as described below;

##### EKO STATUS

- **Green** = Normal operation.
- **Red (flashing)** = Alarm. See status message on LCD screen.
- **Red (steady)** = Alarm is acknowledged but the problem still exists.

##### DMX

- **Green** = Valid DMX control signal connected.
- **Green (flashing)** = Loss of DMX control signal.
- **Red (flashing)** = Error on DMX control signal.

##### LSCnet

- **Green** = Valid LSCnet control signal connected (from ePlates).
- **Green (flashing)** = Data traffic detected on LSCnet.

##### CHANNELS

- **Green** = The channel is ON via **DMX** control.
- **Red** = The channel is ON via **memory** (ePlate) or channel test control.

The brightness of the channel indicator is proportional to the channel level.

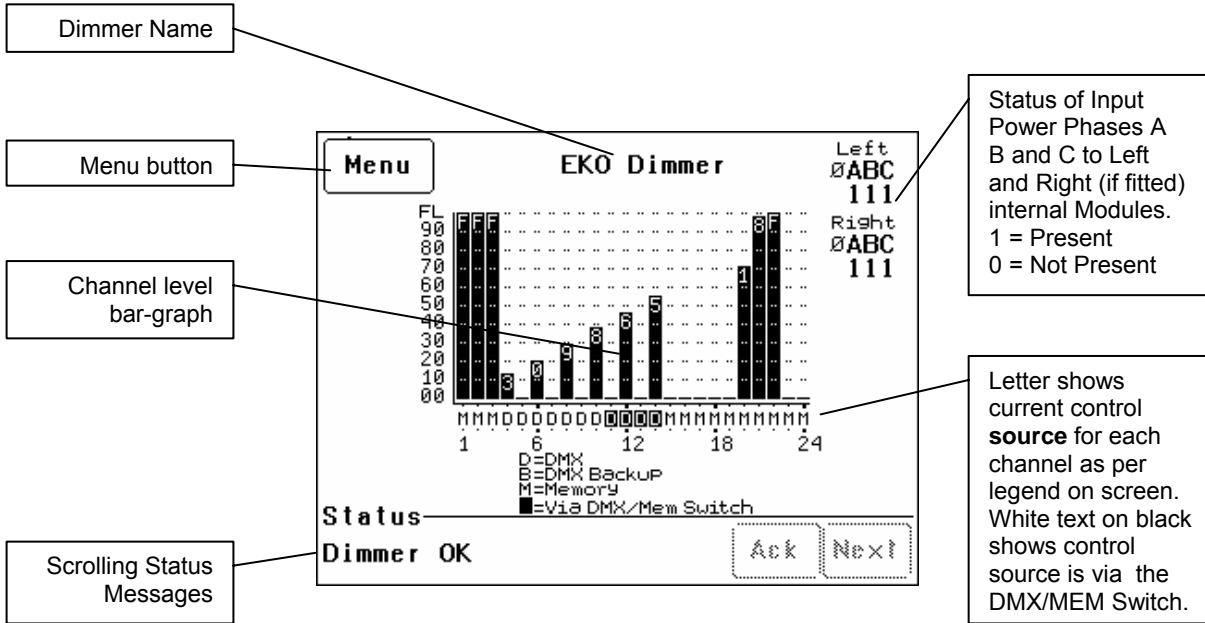
See the, "Maintenance and Alarms" section for further details on alarms.

### 3.2.2 Touch Screen

The touch screen may be operated by touching the virtual buttons with your finger. The home page of the touch screen shows the current level of each dimmer channel in a bar graph display. If the **EKO** has been “locked”, the **[Menu]** button is replaced by the **[Unlock]** button. Touching the

**[Unlock]** button and entering your code number unlocks the **EKO** and reveals the **[Menu]** button.

Pressing **[Menu]** allows you to access a range of functions, setups and tests via sub-menus. Each sub-menu screen has help information in the top left corner. The menus are fully described in **Section 7 “Menus”**.



At the top of the screen is the **name** of this EKO dimmer. The default name is “EKO Dimmer” but you can enter a name of your choice from the options menu. Names are useful in identifying each EKO dimmer in installations containing more than one EKO and can also be used by the “Houston” monitoring software.

The middle of the screen is a bar-graph display of the channel levels with channels numbers shown across the bottom.

The levels from 00 to FL (Full) are shown on the left scale in increments of ten, whilst the units of each channel are shown on the individual channel bars.

In the example above, channel 12 has a level of 46.

Channels can be individually configured to be controlled from either “Memory” (ePlates), “DMX” or “MEM/DMX Switch”. The letters below the bargraphs show the control source for each channel. The legend below the channel numbers explains the meaning of the letters.

In the example above;

Channels 1 to 3 and channels 15 to 24 are controlled by **M** (Memories recalled by ePlates).

Channels 4 to 10 are controlled by **D** (DMX).

Channels 11 to 14 (white letter on black background) are also controlled by DMX but

control is via the MEM/DMX switch. Therefore the switch is obviously in the DMX position. If the switch was changed over to Memory, then channels 11 to 14 would come under Memory control.

If the switch has been set to “Auto Switch” to DMX (if a DMX signal is present), then if the DMX signal is lost, channels 11 to 14 would automatically switch to Memory control.

See section 2.4 “EKO Control Philosophy” for more details.

Depending upon the model of your **EKO**, it might be fitted with one or two dimmer modules. The **EKO312** and **EKO 606** only have a “Left” module whilst the **EKO324** and **EKO612** have both “Left” and “Right” modules.

The right hand side of the screen indicates the presence of the 3 phases (Ø A B C) of input power at the “Left” and “Right” dimmer modules inside the **EKO**.

“1” below a phase letter indicates the presence of that phase

“Ø” below a phase letter indicates a loss of that phase.

The bottom of the screen displays scrolling messages about the status of the **EKO** dimmer. These are described in the “Maintenance and Alarms” section.

## 4 EKO Dimmer Installation

### 4.1 INSTALLATION CONCEPT

Each **EKO** dimmer comprises of two parts;

- **Installation Frame**
- **Dimmer Cabinet**

The **EKO** installation is carried out in three stages:

- **Stage 1.** The “Installation Frame” is mounted on the wall and the load and control circuits are connected to the installation frame.
- **Stage 2.** The “Dimmer Cabinet” is hung on the Installation Frame and plugged into the load and control connectors on the installation frame. The three phase supply is then connected to the dimmer cabinet.
- **Stage 3.** The **EKO** is configured for its application.

This method allows the majority of the dimmer installation work to be performed in stage 1, without the dimmer cabinet present. All load circuitry can be tested for correct connection on the Installation Frame. The dimmer cabinet is therefore not subjected to possible damage from building site dust or debris or incorrect connections.

### 4.2 SAFETY

All electrical work must be carried out by suitably qualified persons.

The **EKO** dimmer is heavy. Ensure that the wall mounting can support the weight. Use the correct lifting procedures when handling the **EKO**. Refer to the specifications below for the weight of your **EKO** model.

The **EKO** dimmer system must be fed from a suitable external three phase circuit breaker. The optional RCD input breaker provides Residual Current Protection only. It does not protect the input circuit from current overloads.

Normal operation does not require the access door to be opened. To avoid the risk of electric shock, disconnect the supply before opening the **EKO** for servicing. Refer any servicing to qualified personnel.

### 4.3 UNPACKING

The **EKO** is fully tested and inspected before leaving the factory. Upon delivery, inspect the

**EKO** for signs of damage or mishandling. In the event of any damage, contact your LSC agent.

The **EKO** dimming system consists of two parts, the **EKO** Installation Frame and the **EKO** dimmer. The Installation Frame can be removed from the **EKO** dimmer and given to the electrical contractor to connect all load and control data wiring. Whilst awaiting final commissioning of the system, store the **EKO** dimmer in its original carton in a clean and dry environment.

### 4.4 STAGE 1. INSTALLATION FRAME & CABLING

#### 4.4.1 Mounting the Installation Frame

The **EKO** is primarily designed for wall mounting on a solid flat vertical surface.

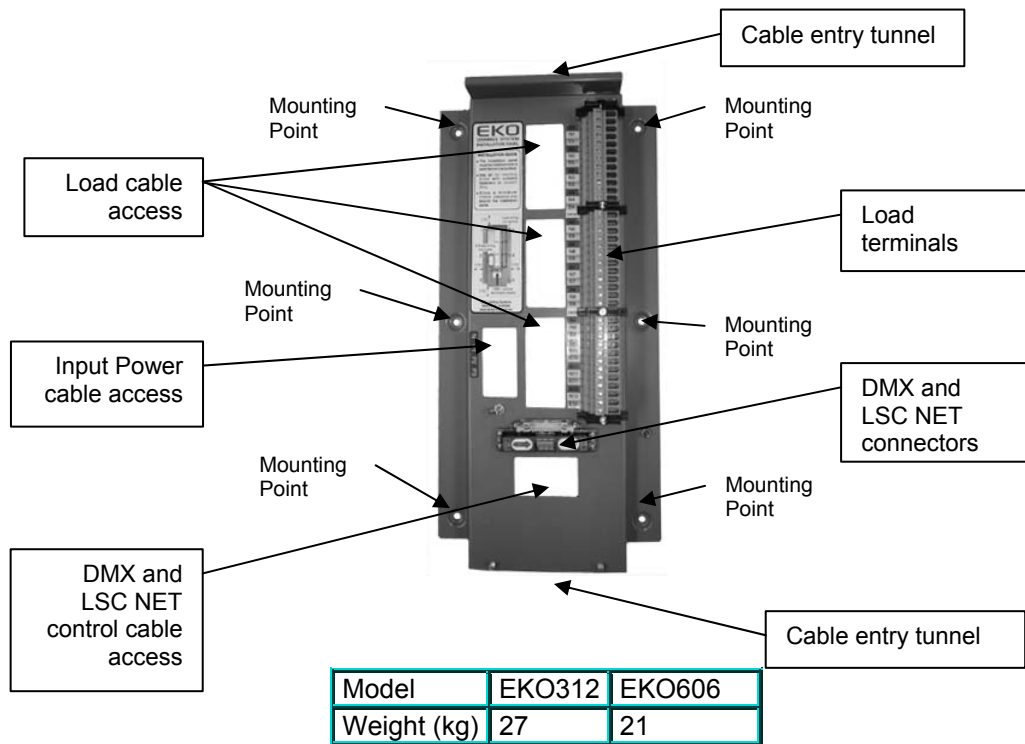
Cable entry can be from above or below via the cable entry tunnels or directly through the wall cavity. If either the top or bottom cable entry tunnels are not used they should be covered by fitting the blanking plates to the Dimmer Cabinet.

Attach the Installation Frame with suitable fixings using all 6 mounting points shown below. Ensure that the fixings can accommodate the weight of the **EKO** (see below).

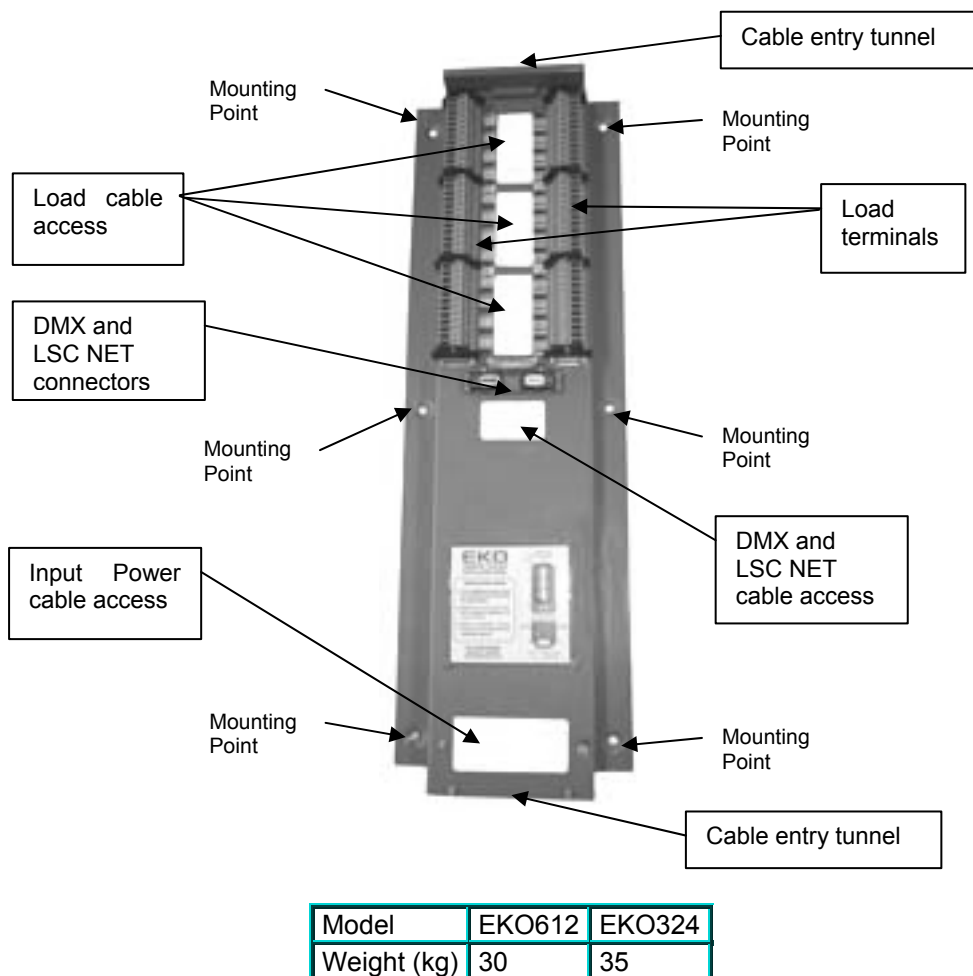
The **Installation Frame** contains the terminals for the **load** and **control** cables. The power **input** cable terminals are located on the dimmer cabinet and are only connected in stage 2 when the dimmer cabinet is hung on the installation frame.

The mounting points, cable entry tunnels and load cable access are similar for all models, however the “three phase input” and DMX / LSC Net cable access holes vary as shown in the following illustrations.

The **EKO312** Installation Frame is shown below. The Installation **EKO606** Frame has the same dimensions and cable access holes but is fitted with different load terminals.

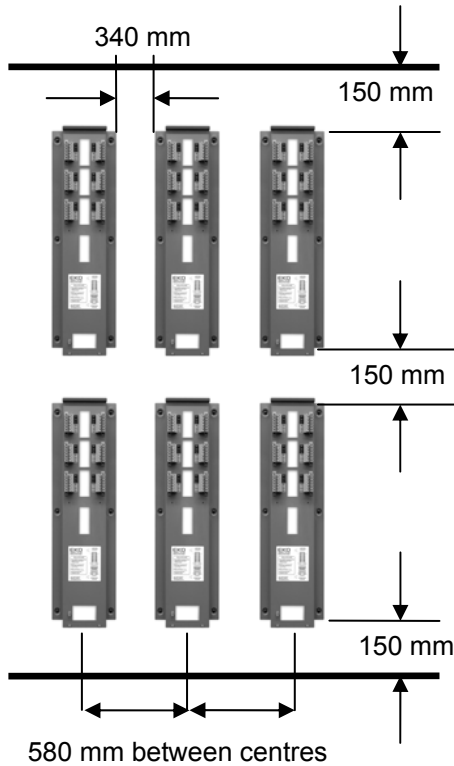


The **EKO324** Installation Frame is shown below. The **EKO612** Installation Frame has the same dimensions and cable access holes but is fitted with different load terminals.



#### 4.4.2 Installation Frame Spacing

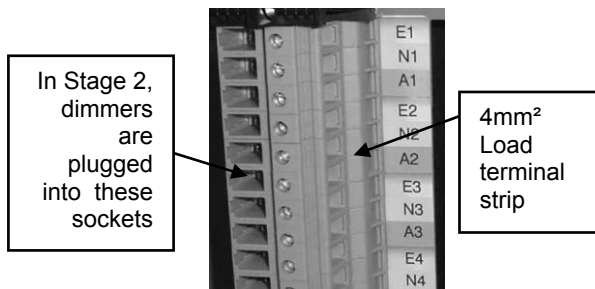
When mounting the Installation Frames, observe the minimum gaps between adjacent frames and walls to allow sufficient ventilation.



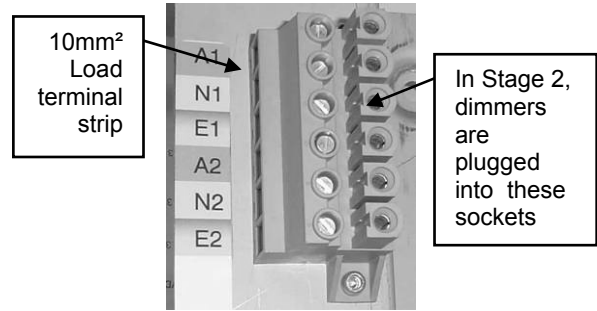
#### 4.4.3 Connecting the Load Circuits to the Installation Frame

Active (A), Neutral (N) and Earth (E) connections are provided for each load circuit. Connect the load circuits to the numbered “load terminal strip” screw connections. The terminals are suitable for stranded or single conductor cables with the following sizes;

Model	EKO 324	EKO 312	EKO 612	EKO 606
Load Terminal Sizes	4mm <sup>2</sup>	4mm <sup>2</sup>	10mm <sup>2</sup>	10mm <sup>2</sup>



EKO 324 and 312 Load Terminals



EKO 612 and 606 Load Terminals

#### 4.4.4 Connecting Control Signals to the Installation Frame

The EKO dimmer can be remotely controlled by DMX512/1990-A or by LSC ePlates via the LSCnet.

##### 4.4.4.1 CONNECTING DMX512

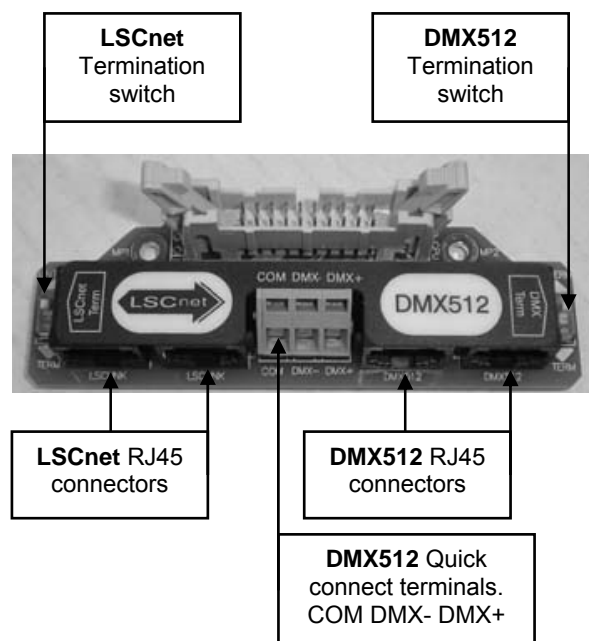
DMX 512 is the industry standard for the transmission of digital control signals between lighting equipment.

DMX is usually “looped” from one piece of equipment to the next. See “DMX Explained and Typical Installations” for more information.

DMX 512 can be connected to the EKO by using either the RJ45 connectors or the quick connect terminals located on the connector board on the Installation frame.

All DMX512 connectors are high impedance and wired in parallel, allowing the DMX512 to be fed into one connector and looped out of another. The RJ45 DMX sockets can be used for either DMX input or DMX output.

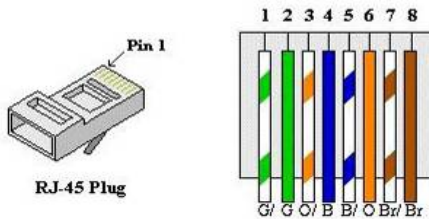
If using the quick connect terminals, connect both the DMX input and output cables in parallel into the same connectors.



Installation Frame “Control Connector Board”

**DMX RJ45 Pin Numbers**

RJ45 Pin Number	DMX512
1	DMX +
2	DMX -
3,4,5 & 6	Not Used
7 & 8	DMX Common



The **end** of the DMX line must be **terminated**. A DMX Terminator switch is located on the Installation Frame “Control Connector Board”.

If the DMX line is looped out from an **EKO** dimmer to another **EKO** or other DMX equipment, then the termination switch must be set to the **UNTERM** position.

If the DMX line is NOT looped out from an **EKO** dimmer, then the termination switch must be set to the **TERM** position.

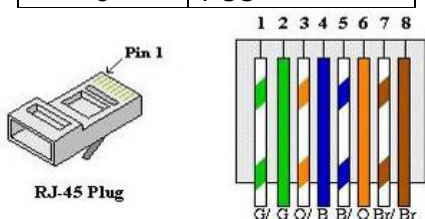
**4.4.4.2 CONNECTING LSCNET TO THE INSTALLATION FRAME**

The **EKO** dimmer can be remotely controlled from LSC ePlates via the LSCnet.

Connection between devices on the LSCnet is via RJ45 connectors using CAT5 cable. The cable is run in a daisy chain that loops from device to device. The cable carries both data and power. The maximum total length of the cable is 800 metres. If longer cable runs are required, a data repeater must be used to regenerate the data. Contact your LSC agent for details on data repeaters.

**LSCnet RJ45 Pin Numbers**

Pin Number	LSCnet Function
1	Spare
2	Spare
3	LSC Net +
4	PSU +
5	PSU +
6	LSC Net -
7	PSU -
8	PSU -



Each device on the LSCnet has two RJ45 sockets allowing the LSCnet cable to be looped from device to device. It is essential for correct network operation that the **first** and **last device** in the network be **terminated** and that all other devices are not terminated. See section **5.4 LSCnet Cabling** for more details.

If an EKO dimmer or ePlate has **both** of its **RJ45** sockets connected to the **LSCnet** then the termination switch on that device must be set to **UNTERM**.

If an EKO dimmer or ePlate has only **one** of its **RJ45** sockets connected to the **LSCnet** then the termination switch on that device must be set to **TERM**.

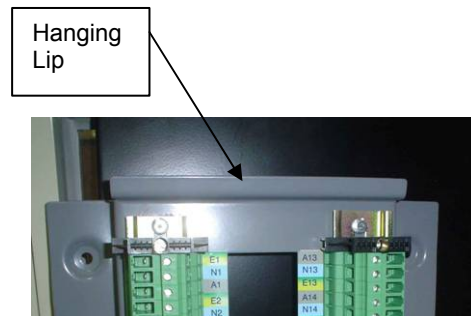
**The first stage of the installation process is now complete.**

**4.5 STAGE 2. INSTALLING THE EKO DIMMER CABINET**

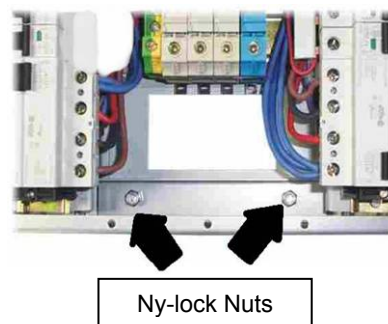
**4.5.1 Hanging the Dimmer Cabinet on the Installation Frame**

When the load and control circuits have been connected to the Installation Frame, the **EKO** Dimmer cabinet can be hung on the Installation Frame.

Remove the two ny-lock nuts from the bottom of the Installation Frame and put them aside. Pick up the Dimmer Cabinet and hang it on the hanging lip at the top of the Installation Frame.



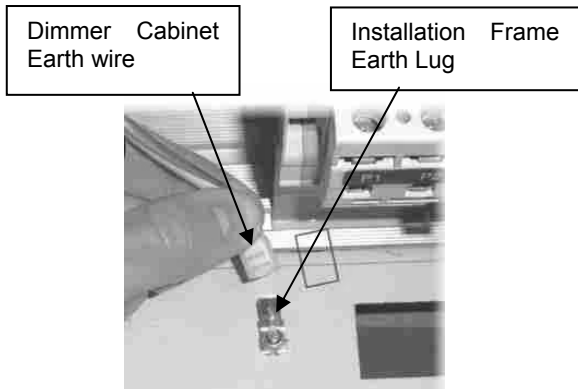
Secure the Dimmer Cabinet to the bottom of the Installation Frame using the two “ny-lock” nuts that were previously removed.





#### 4.5.2 Earthing the Dimmer Cabinet

Locate the earth wire spade connector on the Dimmer Cabinet and connect it to the earth lug on the Installation Frame.



#### 4.5.3 Hinging the EKO Door

The door of the **EKO** Dimmer can be hinged from either side allowing easy access to the inside of the dimmer in tight installation spaces. To change the hinging, remove the door from the **EKO** then move the hinges to the other side of the door. Move the lock to the other side of the door by swapping it with the blanking plug. Refit the door. Ensure that the doors earth wire is connected to the terminal on the EKO dimmer.

#### 4.5.4 Plugging the Dimmers into the Installation Frame

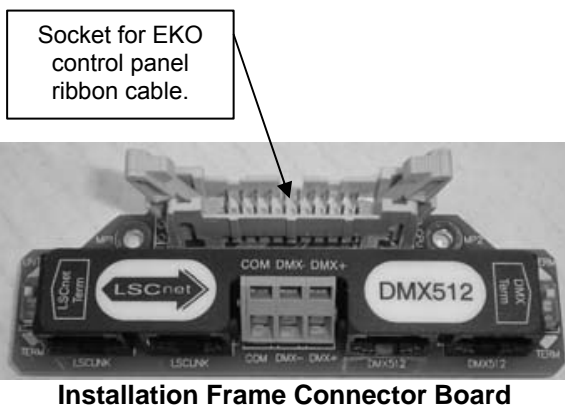
The output circuits of the **EKO** Dimmers are terminated in the factory with special plugs that fit directly into the load terminal strips of the Installation Frame.



Plug the dimmers into their matching load sockets.

#### 4.5.5 Plug the DMX Control into the Installation Frame

Plug the ribbon cable connector attached to the **EKO** "Control Panel" into the "Installation Frame Connector Board".



#### 4.5.6 Connecting the Supply to the Dimmers

Disconnect the power supply at the source before terminating the supply cable in the **EKO**. Depending upon the model of **EKO**, the three phase supply is connected to either the input screw terminals on the Dimmer Cabinet or directly onto the optional "Input RCD" breaker on the Dimmer Cabinet.

Model	EKO 324	EKO 312	EKO 612	EKO 606
Three phase current capacity (per phase)	104 Amps	52 Amps	100 Amps	50 Amps
Supply Terminal Sizes	35mm <sup>2</sup>	16mm <sup>2</sup>	35mm <sup>2</sup>	16mm <sup>2</sup>

**Note:** The **EKO** Dimmer and the supply cable feeding it must always be protected by a suitable circuit breaker. Even if the **EKO** Dimmer is fitted with the optional input RCD (Residual Current Device) circuit breaker(s) an external circuit breaker must be used because the **EKO** RCD breaker(s) do not protect against overload currents.

#### 4.5.7 Single Phase Input Option

The **EKO** can be *factory wired* for a single phase input.

Disconnect the power supply at the source before terminating the supply cable to the input screw terminals on the Dimmer Cabinet.

The **EKO612** and **EKO324** require TWO single phase cables to be connected. This is because a single cable capable of carrying the maximum load current has a large bending radius that cannot be accommodated by the **EKO**.

## 5 ePlate & LSCnet Installation

ePlates are the remote wall station controllers for the EKO dimmers or other LSCnet enabled products. The ePlates allow you to recall internal memories from the EKO for replay at a pre-programmed level and fade time. ePlates can also be programmed to perform other functions such as selecting memory or DMX operation or locking out other ePlates. ePlates are connected to the EKO dimmers via a communications bus called LSCnet.

### 5.1 SPECIFICATIONS

The initial ePlate wall stations are all based on the Australian standard single gang electrical switch plate.

The dimensions of the current ePlate are :

- 116mm High
- 76mm Wide
- 40mm Deep

To install the ePlate a hole is required in the surface or wall where the ePlate is to be mounted.

Cut Out Dimensions :

- 70mm High
- 50mm Wide
- 25mm Deep

In the future LSC will be offering units to suit most countries standard switch plates.

### 5.2 MODELS

ePlates are available with either buttons or faders.

#### 5.2.1 eButton



**Available with 2, 4 or 8 buttons.**

Each button can be programmed to control up to 4 independent events, allowing complex functions to be easily operated by a novice.

Each button has an associated indicator that is independently programmable.

Buttons can be programmed for any of the following functions:

- Fade an individual memory to a specific level in a specific fade time.
- Fade multiple memories to a specific level in a specific fade time.
- Lock or Unlock other ePlates.

- Turn off all memories.
- Switch specific channels between Memory or DMX control.

#### 5.2.2 eFader



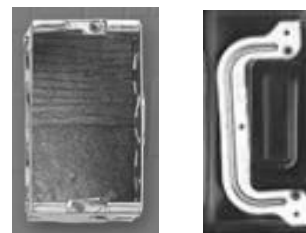
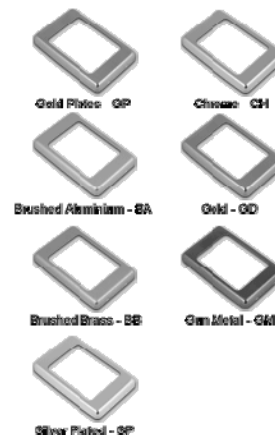
**Available with 1, 2 or 4 faders.**

Each fader can be programmed for any of the following functions:

- Control the level of an individual memory.
- Control the level of multiple memories.
- Act as a MASTER level control over a group of channels (zone).
- Manual control of a single channel.
- Live fade time control.

#### 5.2.3 Installation Accessories

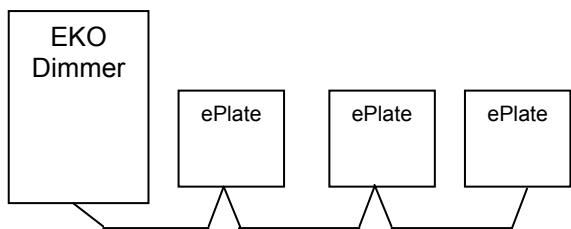
A range of decorative surrounds are available to suit the ePlates.



Masonry mount metal wall box (fire rated) and Plasterboard Clip mount

### 5.3 LSC NET CABLING

LSCnet uses Cat5 cable for the interconnection of devices and all devices are connected in a daisy chain fashion. All connections are via industry standard RJ45 connectors.



Cat5 cable daisy chained between devices.

The LSCnet cable is used to carry both **data** and **power** for the ePlates. LSCnet uses a modified version of CAN bus, which guarantees that EVERY command message arrives at its destination, no matter how busy the network becomes. Architectural systems based on RS-485 cannot offer this promise, messages can (and do) get lost, causing the system to miss important buttons presses.

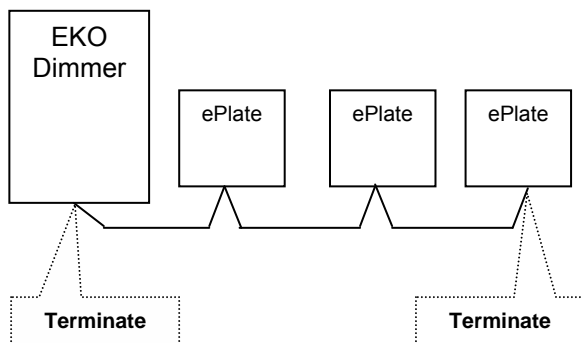
Each LSCnet enabled product (EKO dimmer, ePlates, e24 dimmer, TEKO dimmer) is known as a “device”. Each device has two LSCnet connectors allowing the Cat5 cable to be looped from device to device. The **EKO** can be located anywhere in the LSCnet network.

The normal **rules** for data cabling apply.

- You must allow a minimum of 30cm separation from mains power (or more if required by local regulations).
- If you must cross over a mains power cable, always do this at 90 degrees to the power cable.
- LSCnet cabling must always be a daisy chain. No Y-splits or T junctions are allowed.

### 5.4 LSCNET TERMINATION

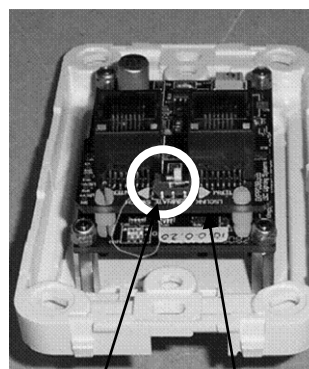
The LSCnet must be correctly **terminated**. Termination is required at BOTH ends of the data cabling.



- If the LSCnet cable run **ends** (terminates) at a device then the termination switch on that device must be set to **TERM**.
- If the LSCnet cable run **loops** through a device then the termination switch on that device must be set to **UNTERM**.

Each ePlate has a main processor board with a small “LSC Net Connection Board” plugged into the back of it. This “LSC Net Connection Board” contains the two network RJ45 connectors and the “LSCnet TERMINATE SWITCH”.

Rear view of ePlate



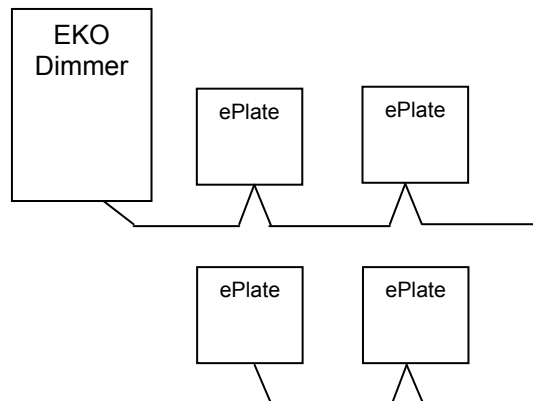
If an ePlate needs to be removed for service or testing, the LSC Net Connection Board can be left in circuit, thus maintaining the network integrity.

### 5.5 LSCNET LIMITS

There are limits to the number of devices that can be powered by the system and limits to the total length of cable in the network. However, these limits can be extended by adding power supply boosters and data repeaters.

#### 5.5.1 Power Limits

The power for the ePlates is supplied from the EKO dimmer via the Cat5 cable.



A single EKO can power up to 4 ePlates

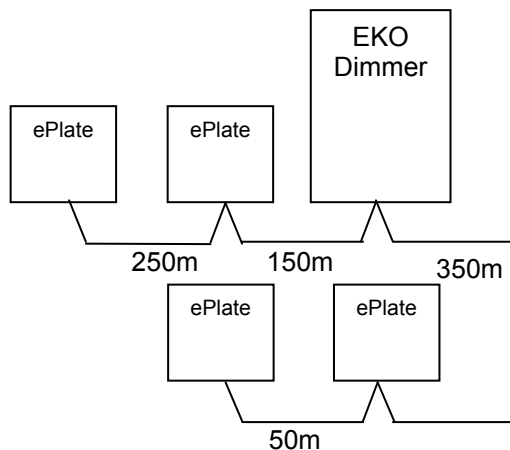
Each additional EKO dimmer allows an additional 4 ePlates to be powered (i.e. the power supplies add together).

- 2 EKO Dimmers can power up to 8 ePlates.
- 3 EKO Dimmers can power up to 12 ePlates

If your installation exceeds the limits you will need to add a “power booster”. Contact your LSC agent for details.

### 5.5.2 Cable Limits

Up to 800 meters of Cat5 can be installed before a data repeater is needed.



Maximum total of 800 metres of Cat5 cable.

If an installation requires more than 800m of cabling then an LSCnet data repeater is required. Contact your LSC agent for details.

### 5.5.3 Device Limits

In an EKO installation, every EKO dimmer and every ePlate is known as a *device*.

A maximum of 32 *devices* can be connected to a network before a data repeater is required.

Up to 65,535 *devices* can exist on an LSCnet installation.

### 5.6 PROGRAMMING EPLATES

The functions of the buttons and faders on ePlates can be programmed by a separate computer program however ePlates are shipped from the factory with pre-programmed standard configurations that suit most requirements

See section 8; **Memory (ePlate) Control**, for details on pre programmed ePlates and how to customise the buttons and faders for special requirements.

### 5.7 COMMISSIONING LSCNET

The best approach to commission a network is to activate it a small part at a time, and then build on the working system. This ensures that each device is working correctly before the next device is added.

Start at the EKO dimmers, as they contain the LSC Net Power Supply. Before installing the

ePlates in their remote locations, connect them to the EKO via short Cat5 cables so you can observe all devices on the network correctly operating.

When all of the devices are working correctly, disconnect the short Cat5 cables then gradually build up the network by connecting the actual network cabling, one ePlate at a time.

Connect the first ePlate and switch its “terminate” switch to TERM. Check the ePlate operation then switch its “terminate” switch to UNTERM and connect the Cat5 cable that loops onto the next (terminated) ePlate.

When that ePlate operates correctly, un-terminate it then connect and test the next ePlate.

When you are satisfied that the system works correctly, screw in the ePlates.

### 5.8 REMOVING EPLATES

Each ePlate has a main processor board with a small “LSC Net Connection Board” plugged into the back of it. This “LSC Net Connection Board” contains the two network RJ45 connectors and the network termination switch.

If an ePlate needs to be removed for service or testing, the LSC Net Connection Board can be left in circuit, thus maintaining the network integrity.

This feature also allows you to run all the network cabling and join the cables using the LSC Net Connection Boards without installing all of the actual ePlates.

## 6 Testing and Configuring the EKO Dimmer

When an **EKO** dimmer is installed, it needs to be configured to suit its particular installation and application.

This involves the following operations which are achieved via the touch screen menus. The menu system is fully described in section 7.

### 6.1 TESTING

**Testing** the operation of each dimmer circuit. See section 7.2.2 **Channel Test**.

### 6.2 DIMMER CONTROL SOURCE

Each dimmer channel needs to be configured for the "**Control Source**" that will control it. This could be either; **DMX, Memory** or **SWITCH** (switch-able between Memory or DMX). See section 7.2.1.1 **Control Source**.

The **SWITCH** (above) can be *manually* operated either locally from the LCD touch screen or remotely from an ePlate. See section 7.5.1 **DMX/MEM Switch Operation** and section 7.5.2 **Switch Group**.

The **SWITCH** can be *automatically* operated by the presence or absence of DMX. See section 7.3.6.2 **DMX/MEM Switch Connect Loss Action**.

**Note:** If "**Control Source**" is not available on the menu then either "**Net Playback**" has been disabled from the "**Options**" menu or your EKO is not fitted with the "**LSCnet**" circuitry. Contact your LSC agent for details on how to upgrade your EKO to include LSCnet.

### 6.3 PATCHING

Dimmer channels set to **DMX** or **Switch** Mode, may need to be patched to the DMX slot number that is to control them. See section 7.3.1 **Patching**.

### 6.4 RECORDING MEMORIES

Dimmer channels set to **Memory** Mode, are controlled by the memories (up to 80 memories) saved in each EKO. These memories must be created and saved in the EKO. You can also create memories by taking a snapshot of the DMX input. See section 6.4 **Recording Memories**.

The ePlates (wall plates) must also be programmed to recall the required memories. See section 8 **Memory (ePlate) Control**.

### 6.5 OPTIONAL SETTINGS

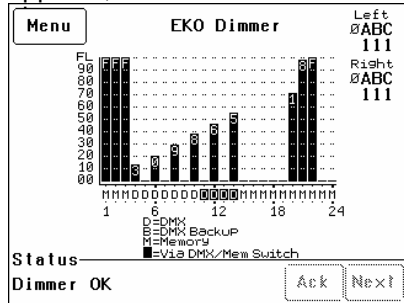
In addition to these settings you can also set the following *optional* parameters;

- Selecting the dimmer reaction of DMX controlled channels when the DMX signal is connected or lost including the saving of a **Backup Memory**. See section 7.3.6 **Connect Loss Action**
- Selecting minimum and maximum levels for each dimmer. See section 7.2.1.2 **Min and Max Levels**
- Selecting a fade curve for each dimmer. See section 7.2.1.3 **Fade Curve**
- Setting each dimmer to either Dim (dimmer) or Switch (between OFF or fully ON). See section 7.2.1.3 **Fade Curve**
- Setting a "lock code" to prevent unauthorised access to the EKO menu system. See section 7.6.4 **EKO Lock / Unlock**
- Naming the Dimmer. Useful in large installations to identify each EKO. See section 7.6.6 **Name**
- Setting the date and time (for the EKO status log). See section 7.6.7 **Time and Date**
- If the EKO is not connected to ePlates and is **ONLY** to be controlled by **DMX** then the Memory control by ePlates via LSC net can be disabled. This simplifies the menu system and forces all dimmer channels to DMX control. See section 7.6.8 **Net Playback**
- The DMX alarm delay time can be set or the alarm can be disabled. Disabling the alarm is useful when the EKO is only controlled by ePlates. See section 7.3.7 **DMX Alarm**.

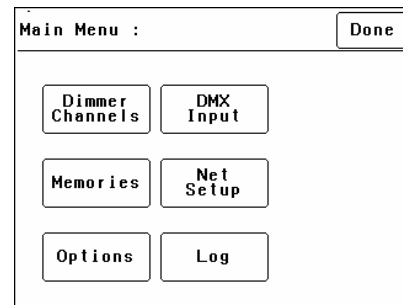
## 7 MENU SYSTEM

### 7.1 TOUCH SCREEN MENUS

When the EKO is switched ON, after briefly showing the opening screen, the top level screen appears;



Pressing [Menu] reveals the “Main Menu”.



The six buttons on the “Main Menu” provide access to the Sub-Menus and functions which are described in detail on the following pages. Each sub menu has a description of its function at the top of its screen.

#### 7.1.1 EKO Menu Structure

Each main menu button accesses the following sub menu functions;

Dimmer Channels	
<b>Set-up</b>	<b>Chan Test</b>
Control Source. (DMX, Memory or Switch)	Manual channel(s) level test  Channel test sequencer
Min Level	
Max Level	
Fade Curve	
Net Group Master.	

DMX Input	
<b>Patch</b>	<b>View Levels</b>
1:1 Patch	Raw levels
User Patch	Percentage
Clear Patch	
<b>Connect Loss Action</b>	<b>DMX Alarm</b>
DMX Control Hold Time Xfade Time Backup Memory	Alarm Enable/Disable  Alarm Delay Time
Via DMX/MEM Switch Auto Switch On/Off Hold Time Xfade Time	

Memories		
<b>Record Memory</b>	<b>Edit Memory</b>	<b>Copy Memory</b>
		<b>Delete Memory</b>

Net Setup	
<b>MEM/DMX Switch</b> Manually operate the “MEM/DMX Switch”.	<b>Switch Group</b> Set Switch Group Number or None for ePlate control of MEM/DMX Switch.

Options		
<b>Module Status</b>	<b>Beeper</b>	<b>About</b>
Input Phases A B C	On or Off	Software Version
Temperature		Model type
Fan Speed		Voltage
<b>Lock Dimmer</b> 4 digit code to lock	<b>Change Lock Code</b> Default = 0000	<b>Dimmer Name</b> Enter a name
<b>Date and Time</b> Set Time	<b>Net Playback</b> Enable or Disable Memory playback from ePlates	<b>Reset</b> System Reset
Set Date		Total Reset

Log
Displays Log
<b>Clear Log</b>

Select a menu by touching the appropriate button on the touch screen.

To step back through the menus, press the button in the top right of the screen.

The choices will be either;

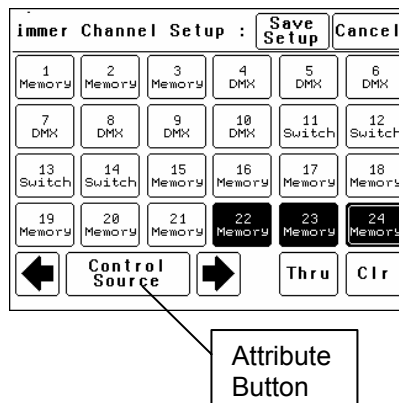
**[Done]** (Exits to previous menu)

or, if changes have been made;

**[Save]** (Exits to previous menu and saves changes)

or

**[Cancel]** (Exits to previous menu and restores previous settings).



In this example, channels 22, 23 and 24 are selected.

To de-select a channel, touch that channel again.

To de-select **all** channels press **[Clr]**.

To select a range of channels, press a channel, then **[Thru]** then another channel.

When any channels are selected, the attribute button becomes active. Pressing the attribute button allows you to change the attribute of the selected channel(s) as described below.

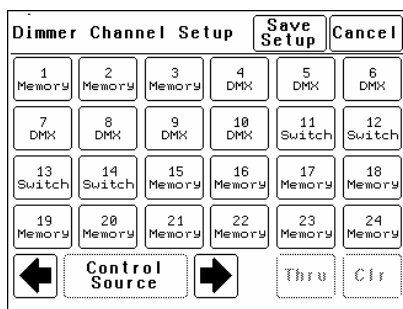
## 7.2 DIMMER CHANNELS MENU

Selecting **[Menu] [Dimmer Channels]** provides menus for;

- Setup (of channel attributes)
- Channel Testing

### 7.2.1 Set-Up

Selecting **[Menu] [Dimmer Channels] [Setup]** reveals the following screen;



The **←** and **→** buttons at the bottom left of the screen step through the attributes that can be set for each individual dimmer channel.

The available attributes are;

- Control Source
- Min Level
- Max Level
- Fade Curve
- Net Master Group

As each attribute is selected, the screen shows the setting of that attribute for every channel.

In the example above of a 24 channel EKO, the “Control Source” attribute for every channel is shown.

- Channels 1 to 3 and 15 to 24 are controlled by EKO **memories** (recalled from ePlates).
- Channels 5 to 10 are controlled by **DMX**.
- Channels 11 to 14 can have their control “switched” between either Memory or DMX.

To change the selected attribute of a channel(s), select the channel(s) by touching them.

Selected channels have white text on a black background.

The default settings for channel attributes are;

ATTRIBUTE	DEFAULT SETTING
Control Source	Switch
Min Level	0%
Max Level	100%
Fade Curve	S Law
Net Master Group	None

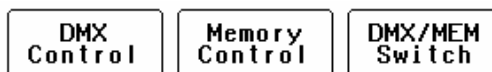
Descriptions of each attribute and how to set them are described below.

When the all attributes are correct for all channels press **[Save Setup]**, or to cancel the changes that you have made and return to the previous settings press **[Cancel]**.

#### 7.2.1.1 CONTROL SOURCE

The “Control Source” attribute selects the signal that will control the level of a dimmer channel.

Press; **[Menu] [Dimmer Channels] [Setup]**. The screen shows the control source for every channel. To change the control source, select a channel(s) (by touching them) then press **[Control Source]**. You can select the following sources;



**1. DMX Control.** When configured for “DMX Control” a dimmer channel is only controlled from the DMX signal from a lighting controller.

**Note: If a dimmer channel is controlled by DMX, it might need to be patched. See Error!**

Reference source not found. **“Patching” for details.**

**2. Memory Control.** When configured for “Memory Control” a dimmer channel is controlled from ePlates (wall plates) that are used to recall memories stored in the EKO dimmer. These memories can be created and edited via the LCD touch screen.

**3. DMX/MEM Switch.** When configured to “Switch”, a dimmer channel can be manually or automatically switched between DMX or Memory control.

**Manual** operation of the “DMX/MEM Switch” is controlled either “remotely” from a suitably programmed button on an ePlate or “locally” from the **EKO** touch screen. See section **Error! Reference source not found.** “DMX/MEM Switch Operation” for details on how to manually operate the “DMX/MEM Switch” from the touch screen.

**Automatic** operation of the “Switch” is controlled by the presence or absence of a valid DMX signal from a DMX lighting controller. When DMX is present it will be automatically connected to any channels that are set to “Switch”. See 7.3.6.2 “DMX/MEM Switch Connect Loss Action” for details on how to set the “DMX/MEM Switch” to “Auto Switch” to DMX. When finished press **[Save Setup] [Done] [Done]**.

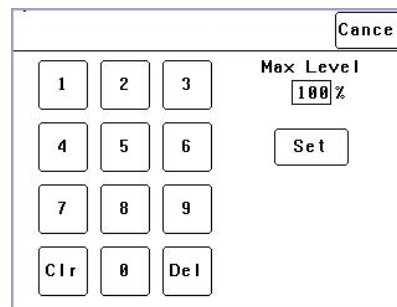
**7.2.1.2 MIN AND MAX LEVEL**

The “Min Level” attribute sets the level of the dimmer output when the control signal is set to minimum. Setting this value slightly above zero is useful to “Pre-Heat” lamp filaments.

“Max Level” sets the level of the dimmer output when its control signal is set to maximum.

Press; **[Menu] [Dimmer Channels] [Setup]** then use the **←** and **→** buttons to select “Min Level” or “Max Level”.

When you select a channel(s) (by touching it) then press **[Min Level]** or **[Max Level]**, you can use the keypad that appears to enter the required percentage level for the selected channels, then press **[Set]**.



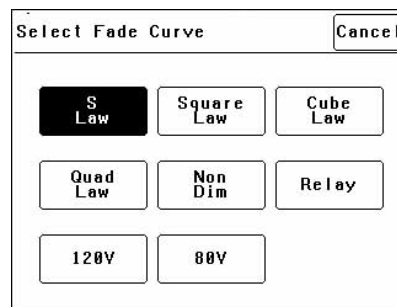
When finished press **[Save Setup] [Done] [Done]**.

**7.2.1.3 FADE CURVE**

Fade Curve is the curve or “transfer characteristic” between input control signal and dimmer output. The following curves are available;

- S Law
- Square Law
- Cube Law
- Quad Law
- Non Dim
- Relay
- 120V (Volt)
- 80V (Volt)

Press; **[Menu] [Dimmer Channels] [Setup]** then use the **←** and **→** buttons to select “Fade Curve”. When you select a channel(s) (by touching it) then press **[Fade Curve]**, you can select the required curve for the selected channel(s).



“S Law” is the default law and provides a normal dimmer response.

“Square”, “Cube” and “Quad” laws can be selected to better match the transfer characteristic of existing dimmer installations or to provide the response that you require. Try the different curves to find the best curve for your needs.

“Non Dim” is used for devices that do not fade, but need to be switched OFF or ON such as motors or discharge lamps.

When set to “Non Dim”, when the control signal is raised above 60%, the dimmer will switch from OFF to full ON and when the level drops below 40%, the dimmer will switch OFF.



“Relay” is used for devices that need to be switched OFF or ON. It is similar to “Non Dim” but uses different thresholds for switching.

When set to “Relay”, if the level is raised above 4%, the dimmer will switch to full ON and when the level drops below 2%, the dimmer will switch OFF.

Relay mode is particularly useful when long fade times are used as the “Relay” channel will switch on at the *start* of the up fade and switch off at the *end* of the down fade.

“120V” limits the maximum output voltage of the selected channels to 120 Volts. Use this setting for 120Volts lamps.

“80V” limits the maximum output voltage of the selected channels to 80 Volts. Use this setting for 80Volts lamps.

When finished press **[Save Setup]** **[Done]** **[Done]**.

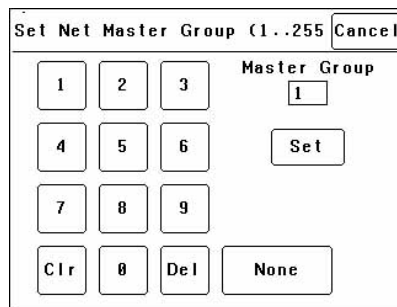
#### 7.2.1.4 NET MASTER GROUP

ePlate fader panels can be programmed so that a fader acts as level “Group Master” over specified dimmer channels that are under memory control. Any dimmer channels that are assigned to a “Group Master” will still be controlled by the playback of memories, but the ePlate Group Master will have master level control.

For example, if a channel is played back from a memory with a level of 50% and its Group Master is set to 50% then the channels level will be 25%.

**[Net Master Group]** allows you to assign each dimmer channel to a group number so that the channels overall level is controlled by an ePlate “Group Master fader” with the same group number.

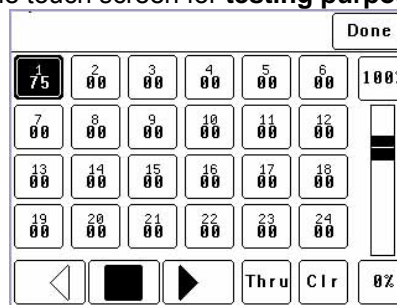
Press; **[Menu]** **[Dimmer Channels]** **[Setup]** then use the ◀ and ▶ buttons to select “Net master Group”. When you select a channel(s) (by touching it) then press **[Net Group Master]**, you can select the group number of the ePlate group fader that is to be a group master over that channel(s) or for no group master press **[None]**. When you have made your selection press; **[Set]**.



When finished press **[Save Setup]** **[Done]** **[Done]**.

#### 7.2.2 Channel Test

Pressing **[Menu]** **[Dimmer Channels]** **[Chan Test]** provides **local control** of dimmer levels from the touch screen for **testing purposes**.



The screen shows the current level of each dimmer channel. This level might be coming from the DMX control input or a memory recalled from an ePlate.

To test a dimmer channel(s), press the dimmers channel number(s). Selected channels have white text on a black background. In the example above, channel 1 is selected. You can add further channels to your selection by pressing their channel numbers.

To deselect a channel, press it again.

To select a range of channels, press a channel, then **[Thru]** then another channel.

To clear **all** selections, press **[Clr]**.

When a channel(s) is selected it is disconnected from either the DMX or Memory control signal and connected to the virtual fader on the right of the touch screen. It can be faded up or down by sliding your finger on the virtual fader.

To instantly set the fader to 0% press the button at the bottom of the fader.

To instantly set the fader to 100% press the button at the top of the fader.

When a channel is deselected, it is disconnected from the virtual fader and returns to its previous DMX or memory control.

#### 7.2.3 Test Sequencer

The Channel Test screen provides a simple sequencer that will automatically step through the channels. As each channel(s) is selected it is disconnected from either the DMX or Memory

control signal and connected to the virtual fader on the right of the touch screen

- Select a channel (or several channels).
- Set a level on the virtual fader.
- To start the sequencer, press [▶](forward).
- To stop the sequencer press [■] (stop).
- To manually step the stopped sequence to the next channel press [■]
- To play the sequence in the opposite direction press [◀] (reverse).

When finished testing channels press; [Done] [Done] [Done].

All dimmers return to normal control.

**Hint: When testing lamps locally from the EKO control panel, the test sequencer is especially useful if the lamps are in a different location to the EKO dimmer. You can start the sequencer then go and check that each lamp is working as the EKO automatically sequences through the dimmer channels.**

### 7.3 DMX INPUT MENU

Selecting [Menu] [DMX Input] provides menus for;

- Patching.
- Viewing DMX Levels.
- Dimmer reaction to connection and loss of DMX signal.
- DMX alarm settings.

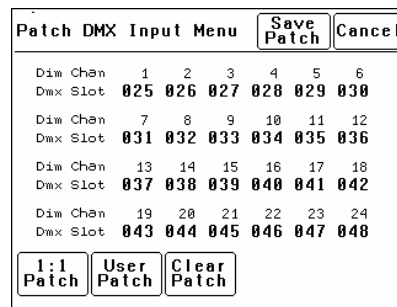
#### 7.3.1 Patching

The patch allows you to patch (connect) DMX slots (addresses) from your DMX lighting controller to EKO dimmer channel numbers. Each EKO dimmer cabinet numbers its dimmer channels from channel 1 through to channel 6 or 12 or 24, depending upon the quantity of dimmer channels in the model of EKO.

Patches are required when;

- A particular DMX slot number from the lighting controller is to control an EKO dimmer with a different dimmer channel number.
- A single DMX slot number is to control multiple EKO dimmer channel numbers.

To patch EKO dimmers to DMX slots or to examine the current patches, press; [Menu] [DMX Input] [Patch].

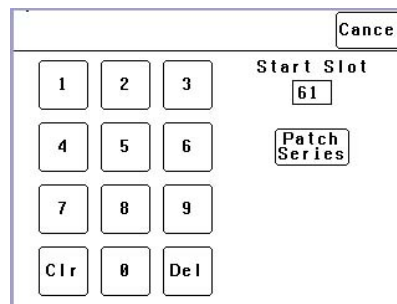


In this example, “Dim Chans” 1 to 24 are patched to “DMX Slots” 025 to 048 respectively.

#### 7.3.2 1 to 1 Patch

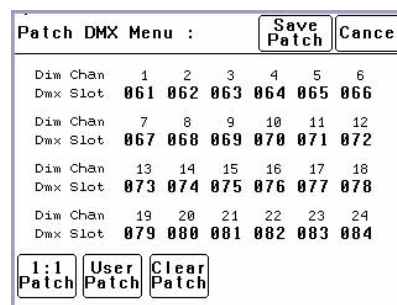
Patches are often performed in contiguous blocks of addresses. The 1 to 1 patch provides a rapid method of patching all of the dimmers in one EKO frame to sequential DMX slots, starting from a DMX slot that you can select.

Press [Menu] [DMX Input] [Patch] [1:1 Patch].



Type in the DMX start slot number (0 to 512) for dimmer channel 1 in this EKO frame then press [Patch Series].

In this example, the starting DMX slot number is 61. Each EKO dimmer is automatically patched to the next higher DMX slot number.

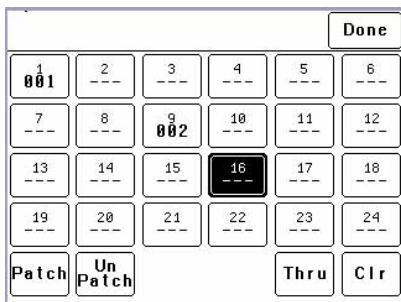


To save the patch, press [Save Patch] or, to cancel the changes that you have made and return to the previous patch, press [Cancel].

#### 7.3.3 User Patch

The User Patch allows you to individually patch each EKO dimmer channel to a DMX slot of your choice.

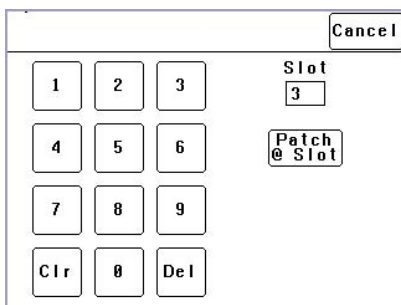
Press [Menu] [DMX Input] [Patch] [User Patch].



To select a channel, press that channel number.  
You can add further channels to your selection by pressing their channel numbers.  
To deselect a channel, press it again.  
To select a range of channels, press a channel, then **[Thru]** then another channel.  
To clear **all** selections, press **[Clr]**.

In the example above, dimmer 1 is patched to DMX slot 1 and dimmer 9 is patched to DMX slot 2. Dimmer 16 is currently selected (white text on black background) ready to be patched.

To make a patch, select the dimmer channel(s) as described above then press **[Patch]**.



Type in the DMX slot number then press; **[Patch @ Slot]**.  
All of the selected dimmer channels are patched to the selected DMX slot number.  
Select other dimmers and patch them as required.  
To Un-patch a dimmer(s) select the dimmer(s) then press **[UnPatch]**.  
When all patches have been made, press **[Done]**.

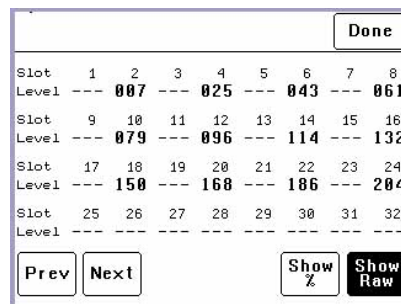
To save the patch, press **[Save Patch]** or to cancel the changes that you have made and return to the previous patch, press **[Cancel]**.

### 7.3.4 Clear Patch

To remove **all** patches in a single operation, press **[Menu] [DMX Input] [Patch] [Clear Patch] [Yes]**.

### 7.3.5 View Levels

The "View Levels" menu allows you to see the levels of the DMX control signals that are connected to the EKO dimmer.  
Press **[Menu] [DMX Input] [View Levels]**.



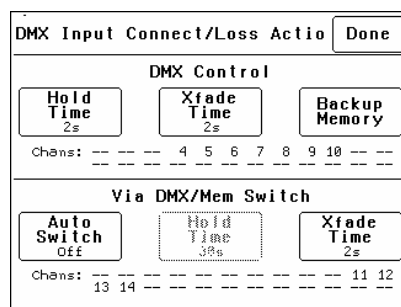
The screen shows 32 (of the 512) DMX slots and the level for each slot. Press **[Next]** or **[Prev]** to change to the next or previous page of 32 DMX slots. The DMX values can be displayed as a "%" (percentage), (0-100%) or as "raw data" levels (0-255) by selecting the relevant button at the bottom of the screen.  
When finished, press **[Done]**.

### 7.3.6 Connect Loss Action

This menu allows you to set the actions that the EKO will take when a DMX signal is connected (or restored after a loss). There are separate settings for

- Dimmer channels whose "Control Source" is **DMX**.
- Dimmer channels whose "Control Source" is the output of the **DMX/MEM Switch**. See "Control Source" earlier in this section for details.

Press;  
**[Menu] [DMX Input] [Connect Loss Action]**.



The screen is divided into two sections;

- The top section sets the action for dimmer channels under "DMX Control". These settings are described below. The screen also shows the channels that are under "DMX Control". In the example above it is channels 4 to 10.
- The bottom section sets the action for dimmer channels controlled "via DMX/MEM Switch". These settings are described on the next page. The screen also shows which

channels are under “DMXMEM Switch” control. In the example above it is channels 11 through 14.

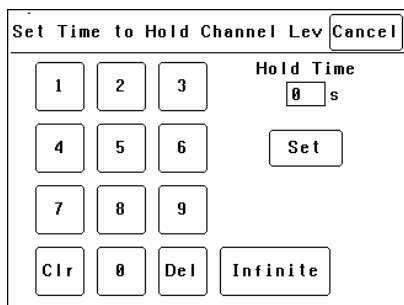
**7.3.6.1 “DMX CONTROL” CONNECT LOSS ACTION AND BACKUP MEMORY**

In the event that the DMX input signal is lost, the DMX controlled channels in the EKO can be configured to respond in different ways.

The EKO can either **HOLD** the last valid DMX levels indefinitely or, after a programmable (hold) time, it can crossfade (Xfade) to a “Backup Memory” stored in the EKO.

When DMX is restored, the EKO will immediately crossfade (in the Xfade time) back to the DMX signal.

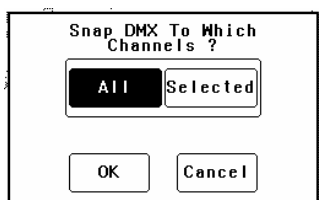
Pressing [Hold Time] brings up a keypad screen where you can enter a DMX hold time from 0 to 300 seconds (5 minutes) or you can select an [Infinite] DMX hold time. After making your selection press [Set].



If a “Hold Time” other than “Infinite” has been set, pressing [Xfade Time] allows you to enter a time from 0 to 300 seconds (5 minutes) in which the DMX channels will crossfade to the “Backup Memory” (and back to DMX when it is restored).

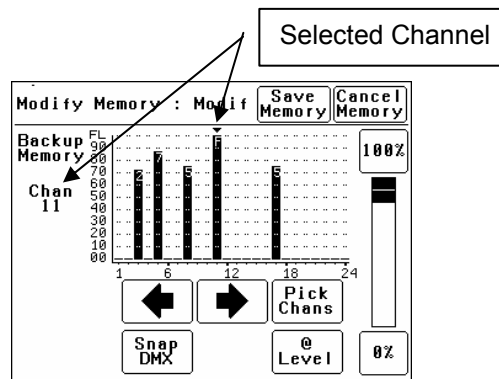
Pressing; [Backup Memory] instantly replaces the current output of all dimmer channels with the contents of the Backup Memory. This is irrespective of the “Control Source” settings for the dimmer channels. The “Backup Memory” screen allows you to either create your own memory using the controls on the screen or take a “snap” (copy) of the current DMX input signal by pressing [Snap DMX].

If you press [Snap DMX] you must then choose to take a snapshot of either “All” DMX channels or only “Selected” channels. See below for details on how to select channels.



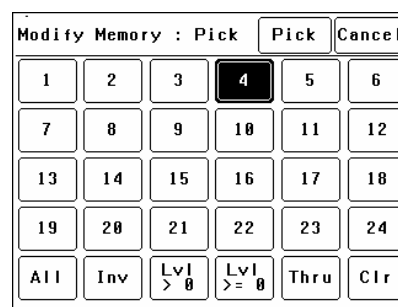
After taking a snap you can still use the controls on the screen to edit the “snapped” channel levels as described below.

To set the level of a channel(s) it must be selected. The selected channel(s) are indicated by a small triangle (▼) at the top of the screen above the channel bargraph and are also listed on the left of the screen. In the example below, channel 11 is selected.



There are two ways to select channels:

- Press [◀] or [▶] to step the small triangle (▼) through the channels.
- Press [Pick Chans] to reveal the channel pick screen.



To select a channel, press that channel number. Selected channels have white text on a black background.

You can add further channels to your selection by pressing their channel numbers.

To deselect a channel, press it again.

To select a range of channels, press a channel, then [Thru] then another channel.

To invert your selection(s) press [Inv]

To select all channels whose level is greater than zero press [Lvl>0].

To clear all selections, press [Clr].

When the required selections have been made press [Pick] and the screen returns to the “Modify Memory” screen.

When a channel(s) is selected it can be faded up or down by sliding your finger on the virtual fader.

To instantly set the fader to 0% press the [0%] button below the fader.

To instantly set the fader to 100% press the [100%] button above the fader.

To quickly set the selected channel(s) to a specific level press [@ Level]. Enter the level on the keypad that appears then press [Set].

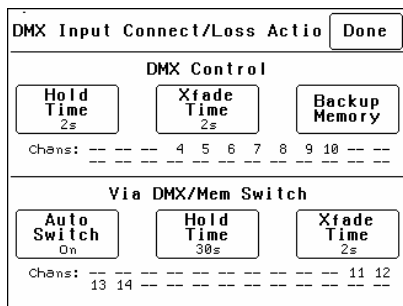
When the channel levels of the “Backup Memory” are correct, press [Save Memory], or to cancel the changes that you have made and return to the previous Backup memory, press [Cancel Memory].

When finished press; [Done] [Done] [Done].

### 7.3.6.2 DMX/MEM SWITCH CONNECT LOSS ACTION

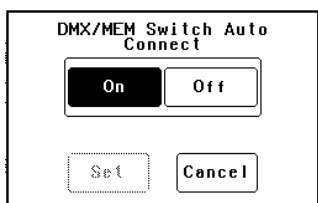
In the event that the DMX input signal is lost, the “DMX/MEM Switch” can be configured to respond in different ways.

Press; [Menu] [DMX Input] [Connect Loss Action].



**Note:** If [Auto Switch] is greyed out (not available), then playback via LSCnet has been disabled from the options menu. This option can be selected when the EKO is ONLY to be controlled by DMX. See “Options Menu” for details.

Pressing [Auto Switch] allows you to turn “Auto Switch” On or Off.



Make your choice then press [Set]. If Auto switch is On, then if a valid DMX signal is connected to the EKO, the DMX/MEM Switch will operate and all dimmer channels whose control source is set to “switch” will cross fade to DMX control in the time set by the [Xfade Time] button. This crossfade can be from 0 to 300 seconds (5 minutes).

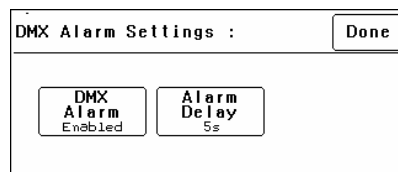
**Note:** The DMX/MEM Switch can also be manually operated from either a suitably programmed ePlate button or from the LCD

touch screen by pressing [Menu] [Net Setup] [DMX/MEM Switch].

Pressing [Hold Time] allows you to set the time that the DMX/MEM Switch will remain in the DMX position if the DMX signal is lost (if it has been automatically operated by the presence of a DMX signal). The Hold Time can be set from 0 to 999 seconds (over 15 minutes) or to Infinite. If a “Hold Time” other than “Infinite” has been set, the channels will crossfade to their current “Memory” settings after the Hold Time expires.

### 7.3.7 DMX Alarm

Selecting [Menu] [DMX Input] [DMX Alarm] reveals the following screen.



Pressing [DMX Alarm] allows you to “Disable” or “Enable” the DMX alarm that occurs whenever there is no valid DMX signal present. The “DMX Alarm” is usually disabled in installations that do not have a DMX input.

Pressing [Alarm Delay] brings up a keypad screen where you can enter the delay time between when the EKO is turned ON and when the “No DMX alarm” occurs. The time can be set from 0 to 300 seconds or “infinite”. Setting the “Alarm Delay” time to be slightly longer than the “boot up” time of your DMX lighting controller will prevent unwanted alarms when both the EKO and Lighting Controller are switched on at the same time.

### 7.4 MEMORIES MENU

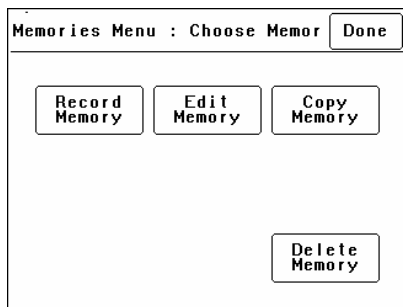
Selecting [Menu] [Memories] provides menus for;

- Recording Memories
- Editing Memories
- Copying Memories
- Deleting memories

An EKO dimmer can hold up to 80 memories. Each memory only contains the intensity levels for the dimmer channels that you select when you record (or edit) that memory. If a channel is not selected in a memory then recalling that memory will never affect that channel. Selected channels in a memory can have any level from 0% to 100%. Memories are recalled from ePlate wall stations.

### 7.4.1 Recording Memories

Press: [Menu], [Memories].



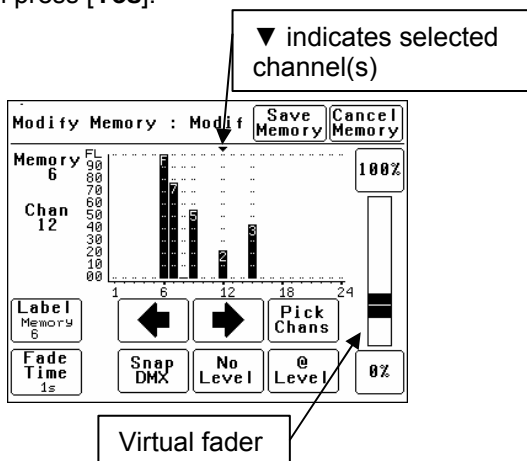
To record a memory press:  
**[Record Memory]**.



The current output of the **EKO** dimmer (if any) is blacked out.

The memories are organised in 4 banks of 20 memories. The buttons on the right select the banks. Select the bank and memory number to be recorded. When a memory is selected its contents are shown on the output of the **EKO** and also on the channel indicators. This allows you to preview the contents of memories on the output and either pick an empty or existing memory.

To confirm your selection press **[Pick]**.  
If the memory exists, it will be deleted. To confirm press **[Yes]**.

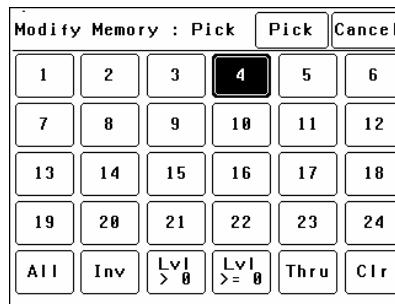


To vary the level of a channel it must be selected. The selected channel is shown below the memory number and also indicated by small triangle (▼) above the selected channel(s). In this example channel 12 is selected.

There are two method to select channels:

- Press **[←]** or **[→]** to step (▼) through the channels.

- Press **[Pick Chans]** to reveal the channel pick screen.



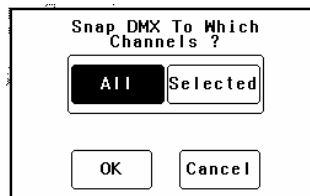
- To **select a channel**, press that channel number. Selected channels have white text on a black background.
- You can **add further channels** to your selection by pressing their channel numbers.
- To **deselect** a channel, press it again.
- To select a **range** of channels, press a channel, then **[Thru]** then another channel.
- To **invert** your selection(s) press **[Inv]**
- To select all channels with a level greater than zero press **[Lvl > 0]**.
- To select all included channels (including those with level of zero) press **[Lvl > = 0]**. See “How Memories Work” for details on included channels with a level of zero.
- To clear **all** selections, press **[Clr]**.

When the required selections have been made press **[Pick]** and the screen returns to the “Modify Memory” screen.

To set the level of the selected channel(s) either:

- Slide the virtual fader
- Press the **[0%]** or **[100%]** buttons.
- Press **[@ Level]** and enter a value.

Channel levels can also be set using the DMX input from a lighting controller. Press **[Snap DMX]** to take a snapshot of the DMX input signal.

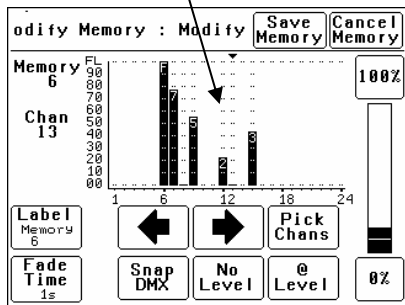


If you do not want to capture the level of all channels you can use the “selected” option to only include the levels of the channels that you have selected. See “Included Channels” below.

### 7.4.2 Included Channels

If a channel is **not included** in a memory then the channel is **not affected** when that memory is faded up or down.

Grid Marks show included channels



A memory only contains the channels that you select. Selected channels can have any level including zero.

When a memory is recalled, only channels that are in the memory are affected. If a channel is not in a memory, its current level (if any) will not be affected when that memory is recalled.

**Note: This is a very important concept. It is fully explained in section 8.3 How Memories and Zones Work.**

You can see which channels are included in a memory by the grid marks above the channels. In the example above, channel 6 to 9, 12, 13 and 15 are included. Note that channel 13 is included but has a level of 0%.

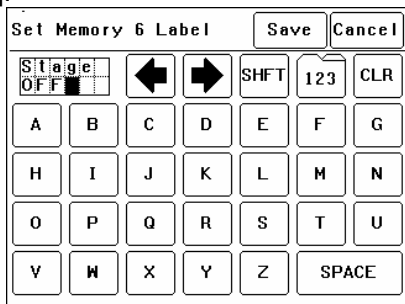
Channels 1 to 5, 10, 11 and 16 to 24 are not included in this memory.

If you have included a channel (by giving it a level) and then decide to remove it from the memory then you must select the channel and press **[No Level]**.

### 7.4.2.1 MEMORY LABELS

The default label for each memory is its number. For example, "Memory 6".

You can enter your own label by pressing **[Label]**.

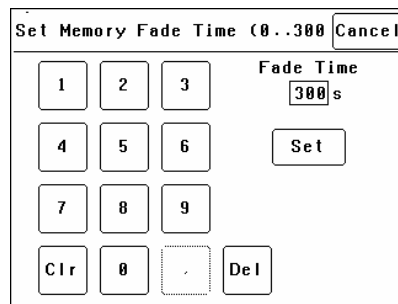


Pressing **[CLR]** clears the current label. Press **[←]** or **[→]** to move the flashing cursor then select the letters or press **[123]** to select numbers. Press **[Shift]** for uppercase letters or symbols instead of numbers. When finished press **[Save]**.

### 7.4.2.2 FADE TIME

The default Fade time for each memory is 1 second.

You can set your own fade time by pressing **[Fade Time]**.



A memory may have a fade time in the range 0 to 300 seconds (5 minutes). A time of less than 10 seconds may in the range 0.0 to 9.9 seconds. From 10s the time is in increments of 1second. When the fade time is correct press **[Set]**.

**Note: An ePlate button can be programmed to replay a memory using the time saved in the memory or the button can have its own specific fade time. In this case the memories fade time will be ignored.**

To save the memory press; **[Save Memory] [Exit]**.

The original dimmer output is restored.

### 7.4.3 Edit Memory

To edit a memory press:

Press: **[Menu], [Memories] [Edit Memory]**.

The current output of the EKO dimmer (if any) is blacked out.

Select the memory to be edited. As each memory is selected its contents are shown on the output of the EKO and also on the channel indicators. This allows you to preview the contents of each memory on the output.

To confirm your selection press **[Pick]**.

Editing a memory is the same as recording a memory.

See section **7.4.1 Recording Memories** for details.

### 7.4.4 Copy Memory

To copy a memory press:

Press: **[Menu], [Memories] [Copy Memory]**.

The current output of the EKO dimmer (if any) is blacked out.

Select a "source" memory to be copied. As each memory is selected its contents are shown on the output of the EKO and also on the channel indicators. This allows you to preview the contents of each memory on the output and make the correct choice.

When the correct source memory is selected press **[Pick]**.

Select a "destination" memory number then press **[Pick]**.

You can copy more memories or if finished press [Exit], [Done] [Done].

### 7.4.5 Delete Memory

To delete a memory press:

Press: [Menu], [Memories] [Delete Memory].

The current output of the EKO dimmer (if any) is blacked out.

Select a memory to be deleted. As each memory is selected its contents are shown on the output of the EKO and also on the channel indicators. This allows you to preview the contents of each memory on the output and make the correct choice.

When the correct memory to be deleted is selected, press [Pick]. To confirm, press [Yes].

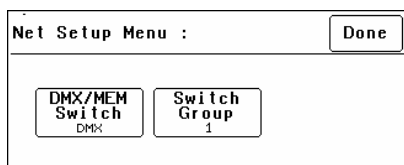
You can delete more memories or if finished press [Exit], [Done] [Done].

### 7.5 NET SETUP MENU

The “Net Setup” menu is used to control the manual operation of the DMX/MEM Switch.

Press; [Menu], [Net Setup].

**Note: If [Net Setup] is greyed out (not available), then playback via LSCnet has been disabled from the options menu. This option can be selected when the EKO is only to be controlled by DMX. See “Options menu” for details.**



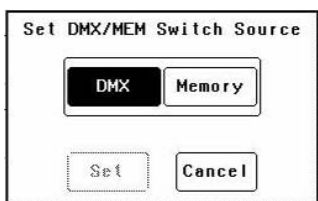
#### 7.5.1 DMX/MEM Switch Operation

All channels that have their “Control Source” attribute set to “Switch”, can be switched between either “DMX” control or “Memory” (ePlate) control.

The DMX/MEM Switch can be operated from a suitably programmed button on an ePlate or directly from the LCD touch screen on the EKO.

To manually operate the “DMX/MEM Switch” from the touch screen, press;

[Menu], [Net Setup] [DMX/MEM Switch].



Select either; [DMX] or [Memory] then press [Set].

#### 7.5.2 Switch Group

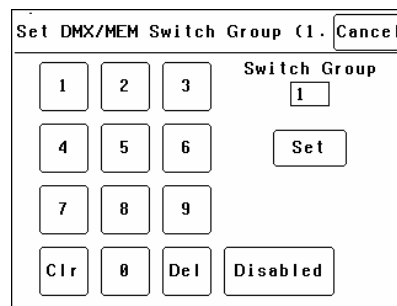
An ePlate button that has been programmed to operate the DMX/MEM Switch can also be programmed with a “Switch Group Number”.

You can set the DMX/MEM Switch in each EKO to only be operated by a particular “Switch Group Number”.

Therefore, in setups with more than one EKO, individual ePlate buttons can be programmed to only operate the DMX/MEM Switch in EKO dimmers with the matching “Switch Group Number”.

To set the “Switch Group Number”, from the “Net Setup” menu (above) press;

[Switch Group Number].



Enter the required Switch Group Number in the range from 001 to 255 (to match the required ePlate button) or for no Switch Group press [Disabled], then press [Set] [Done] [Done].

### 7.6 OPTIONS MENU

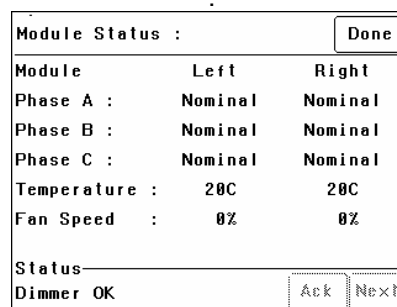
Selecting [Menu] [Options] provides menus for;

- Module Status
- Beeper
- About
- Lock Dimmer
- Change Lock Code
- Dimmer Name
- Date and Time
- Net Playback: Enable/Disable
- Reset

#### 7.6.1 Module Status

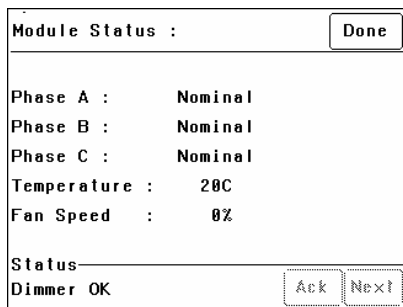
Depending upon the model of your EKO it may contain one or two internal modules.

Pressing [Menu] [Options] [Module Status] reveals information about the input power phases, temperature and fan speed of the internal dimmer module(s) of the EKO.



EKO model with 2 Modules.





EKO model with 1 Module.

### 7.6.2 Beeper

The **EKO** can be set to “Beep” in acknowledgment to every key press on the touch screen.

To switch off the beeper, press; **[Menu] [Options] [Beeper is On]**.

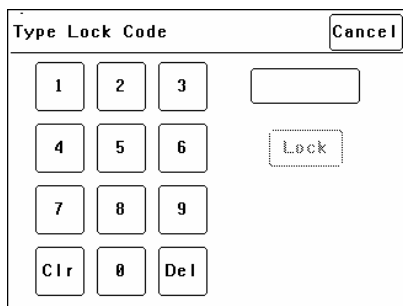
To switch on the beeper, press; **[Menu] [EKO] [Beeper is Off]**.

### 7.6.3 About

Pressing **[Menu] [Options] [About]** reveals information about the software version, model and voltage of the **EKO**.

### 7.6.4 Lock / Unlock

To **lock** the touch screen of the **EKO** and prevent unauthorised access press **[Menu] [Options] [Lock Dimmer]**.



Using the keypad, type in the current 4 digit lock code then press **[Lock]**. The **EKO** is shipped from the **factory** with the **lock code** set to **0000**. The menu returns to the home screen and the **[Unlock]** button appears instead of the **[Menu]** button.

To **unlock** the touch screen of the **EKO** press **[Unlock]** then type in the current 4 digit code then press **[Unlock]**.

### 7.6.5 Change Lock Code

To change the lock code, press **[Menu] [Options] [Change Lock Code]**.

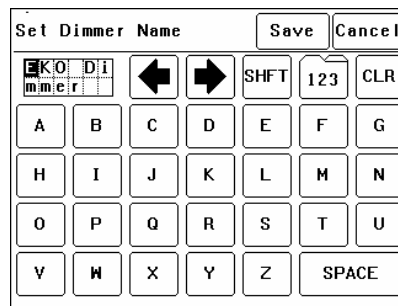
Type in the current 4 digit lock code then press **[Enter]**. (The **EKO** is shipped from the **factory** with the **lock code** set to **0000**).

Type in your new lock code then press **[Enter]**. To confirm, re type the new lock code then press **[Set Code]**.

### 7.6.6 Name

The name of each **EKO** dimmer is shown on the home screen of the LCD touch screen. The default name is **EKO Dimmer** but you can give the dimmer a name of your choice. Naming each dimmer is useful in installations of more than one **EKO**. To change the name of a dimmer press;

**[Menu] [Options] [Dimmer Name]**.



To start a new name press **[CLR]**. Use the **←** or **→** buttons to move the flashing cursor Type in your name. For numbers press **[123]**. When finished press **[Save] [Done] [Done]**.

### 7.6.7 Time and Date

The **EKO** keeps a log of its status that is time and date stamped. To set the time and date used by the log press;

**[Menu] [Options] [Date & Time]**.

The screen shows the current time and date settings.

To change the Time, press **[Time]**. Use the keypad that appears to enter the time in 24 hour format then press **[Set]**.

To change the Date, press **[Date]**. Use the keypad that appears to enter the date then press **[Set]**.

When finished press **[Done]**.

### 7.6.8 Net Playback

If the **EKO** is only to be controlled by DMX then it is possible to disable (dim out) all memory menus and other network functions and hence simplify the menu operations. In addition, when “Net Playback” is disabled, all dimmer channels are controlled by DMX, irrespective of their previous “Control Source” settings.

Press **[Menu] [Options] [Net Playback]**.

Choose either **[Enable]** or **[Disable]** then press **[Set]**.

### 7.6.9 Reset

The **EKO** provides two different types of reset function. SYSTEM reset and TOTAL reset.

#### 7.6.9.1 SYSTEM RESET

In the unlikely event that the **EKO** fails to respond, the operating system may be reset so that the software may initialise and recommence normal operation. Performing a system reset will **not** affect any of the settings or memory.

To perform a SYSTEM RESET press;  
**[Menu] [Options] [Reset] [System Reset]**  
**[Yes]**.

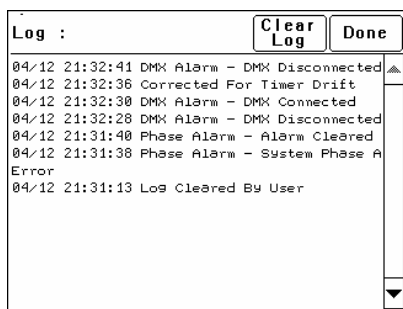
**7.6.9.2 TOTAL RESET**

Total Reset will **ERASE** all the settings and memory from the **EKO** and reset the operating system.

To perform a TOTAL RESET press;  
**[Menu] [Options] [Reset] [Total Reset] [Yes]**.  
The **EKO** asks you to confirm by pressing **[Yes]** again.

**7.7 LOG MENU**

Selecting **[Menu] [Log]** shows the status log showing time and date stamped operations and alarms.



The log can be used to analyse any problems you may have encountered such as loss of control signals, over temperature alarms or loss of input power phases etc.

## 8 Memory (ePlate) Control

**Note: If Net Playback functions are disabled, the Memories and Net Setup buttons in the EKO Menu are dimmed, and ePlates will not function. See section 7.6.8 Net Playback for details.**

### 8.1 EPLATES FUNCTIONS

There are two types of controls on an ePlate:



**Buttons**

**Faders**

ePlates are available with 2, 4 or 8 buttons or 1, 2 or 4 faders.

#### 8.1.1 Buttons

Each button has an associated indicator. The button and indicator can be independently configured.

A button can perform any of the following actions:

- Activate a memory with a specific fade time and level.

For example;

Button 1 might set memory 5, to 100% level with a fade time of 10 seconds.

Button 2 might set memory 5, to 50% level with a fade time of 5 seconds.

Button 3 might set memory 5, to 0% level with a fade time of 15 seconds.

- Control multiple memories from a single button.
- Switch dimmer channels between DMX and Memory (ePlate) control (if the channel's "control source" has been set to "switch").
- Lock / unlock the operation of other ePlates.
- A single button might perform multiple commands.

For example;

A button could be configured for "Emergency Evacuation". When pressed, it would change the EKO to Memory Mode, then turn all the lights on at 100% and then lock all other ePlate wall stations so that the lights cannot be turned off.

The indicators beside each button are independently programmed and can indicate any of the following:

- Memory # activated. Brightness of indicator shows level of memory.

- ePlate active or locked.
- DMX or Memory control selected.

#### 8.1.2 Faders

A fader can be configured to:

- Control the level of a memory (or channel).
- Act as a Grand Master over all channels.
- Act as Group Sub Master over the memory levels of channels in that group number.
- Set the Fade Time for a memory.

#### 8.2 MEMORIES:

Memories are recorded (or edited) from the EKO's LCD touch screen.

Memories are recalled from ePlate wall stations.

An EKO dimmer can hold up to 80 memories. Each memory only contains the intensity levels for the dimmer channels that you select when you record (or edit) that memory. If a channel is not selected in a memory then recalling that memory will never affect that channel. Selected channels in a memory can have any level from 0% to 100%.

Memories are recorded (or edited) by either;

- Selecting channels and giving them a level via the touch screen controls.

or

- Taking a 'snapshot' of the current DMX input levels. These levels can then be edited if required.

See section 7.4 Memories Menu for details on how to record memories.

Each memory controls the dimmer channels contained in that EKO (either 6, 12 or 24 channels, depending upon the EKO model). This allows each EKO dimmer to store different channel memory information whilst using the same memory numbers as other EKO dimmers in the same LSCnet system. Controlling a memory number via an ePlate will make each EKO dimmer on the LSCnet set its channels according to its own memory settings.

ePlate buttons send commands in the form of "Set Memory # to level # in # seconds".

For example, memory 2 contains channels 1 and 2 at 100% and channel 5 at 60%. It could be recalled in different ways by programming 3 ePlate buttons.

- A button programmed to Set Memory 2 to 100% level in 2 seconds will fade channels 1 and 2 to 100% and channel 5 to 60%
- A button programmed to Set Memory 2 to 0% level in 0 seconds will instantly turn off channels 1, 2 and 5.

- A button programmed to Set Memory 2 to 50% level in 10 seconds will slowly fade channels 1 and 2 to 50% and channel 5 to 30%

Memories can also be manually controlled by suitably programmed ePlate faders.

### 8.3 HOW MEMORIES & ZONES WORK

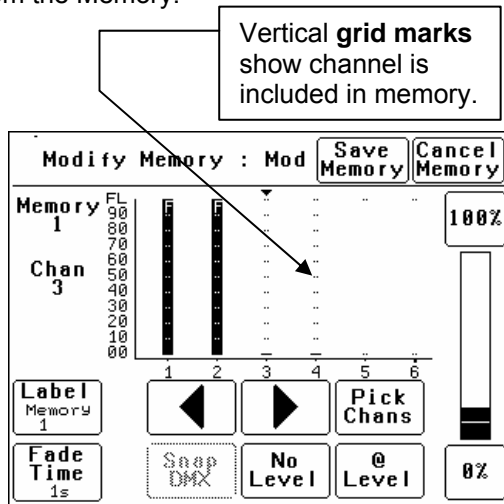
When a memory is recalled (faded up or down), it only affects the channels that are included in that memory.

A new (empty) memory does not contain any channels.

To include a channel in a memory, select the channel then give it a level (0% to 100%). Note that the level of an included channel can be 0%.

To remove a channel from a memory, select the channel then press [No Level].

Setting a channel to 0% does **NOT** remove it from the Memory.



This menu of a 6 channel EKO dimmer shows a Memory containing four channels. Channels 1 and 2 are at full. Channels 3 and 4 are at 0%. Channels 5 and 6 are not in the Memory. This is shown by the absence of “grid marks” above these channels.

If this memory was saved and faded up it would set 1 and 2 to full, 3 and 4 to 0% and have **no effect** on the current state of 5 and 6.

When this memory is faded down, channels 1, 2, 3 and 4 will all fade to 0% but channels 5 and 6 would not be affected.

If a channel is **not included** in a memory then the channel is **not affected** when that memory is faded up or down.

***This is an important concept.***

It means you have to decide whether or not you want a channel to be in a memory. Fading up a memory will not necessarily replace the current output of the dimmer with the memory you have

just faded up. Only the channels in the memory will change. Any channels that are not in the new memory will remain as they were.

**Note:** This is different to some lighting controllers that “crossfade” from one memory to another. In a “crossfade”, the incoming memory totally replaces the outgoing memory.

This method of memory operation makes the EKO very powerful as described below.

#### 8.3.1 Zones

The EKO’s method of memory operation allows for complete flexibility of zone control when recalling memories.

Each memory can contain any number of channels from 1 to 24. A zone is created by recording a memory that **only contains the channels located in that zone.**

For example;

**Zone 1** has channels 1 to 12 located in it. We might use memories 1 to 5 for zone 1. Memories 1 to 5 are recorded with only channels 1 to 12 in them.

**Zone 2** has channels 13 to 24 located in it. We might use memories 6 to 10 for zone 2. Memories 6 to 10 are recorded with only channels 13 to 24 in them.

The memories for each zone are totally separate. Recalling memories 1 to 5 will never affect zone 2 because channels 13 to 24 are not contained in these memories.

Likewise, recalling memories 6 to 10 will never affect zone 1 because channels 1 to 12 are not contained in these memories.

The EKO memory system is far more flexible than normal architectural zone systems, because it is also possible to have memories that control all the channels, thus creating a **master zone memory.**

For example; memories 11 to 14 might contain channel 1 to 24. These memories control all zones.

There is no limit to the number of ‘zones’ and ‘master zones’ that can be controlled in this manner.

#### 8.3.2 Controlling Memories

Memories are recalled by ePlates buttons or faders.

ePlates are configured by a software application so that each button or fader sends a specific command. ePlates are shipped from the factory with the most common commands pre-programmed into them.

See section 8.6 “Pre Programmed ePlates”.

The typical command to control a memory is.....

*"Fade Memory Number # to Level #% in Time #"*

When this message is received by the EKO, it will fade the channels listed in the *Memory Number* to the levels in that Memory, scaled by the *Level #%*. The time taken can be either a value in seconds or an instruction to use the time saved in the Memory.

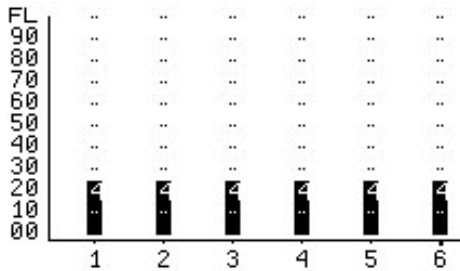
Therefore, the same memory can be recalled at different levels from different buttons.

- One button might fade up the memory to full level.
- Another might fade the same memory to half level.
- Yet another button might fade the same memory off. This would be achieved by sending a command to playback the memory with its *Level at 0%*.

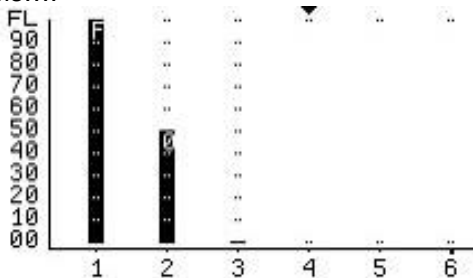
### 8.3.3 Simplified Memory Playback

#### Example:

Assume that the current output looks like this. All channels of a 6 channel dimmer are at 24%.



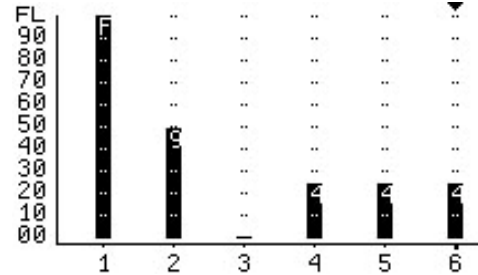
Lets playback Memory 1 which has the following levels....



Channel 1 is at 100%. Channel 2 is at 50%. Channel 3 is at 0%. Channels 4, 5 and 6 are not in the Memory (no grid lines above them).

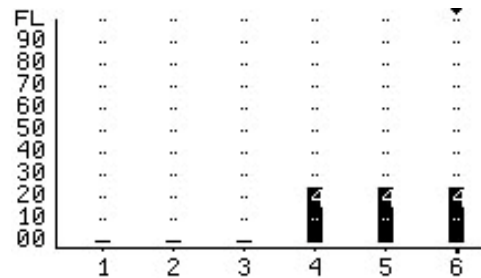
To fade UP memory 1, the message *"Fade Memory 1 to Level 100% in time 1s"* is sent from an ePlate. Channels 1,2 and 3 will fade to their recorded levels in 1 second. Channels 4 to 6 are not affected.

The result is:



To fade DOWN memory 1, the message *"Fade Memory 1 to Level 0% in time 1s"* is sent. Channels 1, 2 and 3 will fade to 0%.

The result is:



### 8.3.4 LTP (Latest Takes Precedence)

When a memory is played back, each dimmer channel contained in the memory is set to its level in that memory. When another memory is played back, if the same channel is in that memory, then it goes to its level in this latest memory, even if the previous memory is still faded up. The "latest" memory takes precedence.

### 8.3.5 Active Memories

When a memory is played back, the memory is marked as "Active" and a command is sent to the ePlates to light the relevant indicator in the button.

As other memories are recalled, they may turn off channels that were part of this "active" memory. There may come a point where none of the dimmer channels in the original memory are on, even though there has not been a command to turn off this memory. When this happens, the dimmer sends a message that the Memory has been "Released".

The result of this is that an indicator on an ePlate for a particular Memory will remain lit so long as at least one channel in that Memory is still active on an EKO.

### 8.4 FADE TIMES

When an button ePlate is configured, you can choose to set a fade time for that button or use the default time held in the memory.

Therefore different buttons can recall the same memory but use different fade time.

When an ePlate fader is moved, the memory it is controlling is told to fade to the level associated with the new fader position. The fader may be configured with a specific fade time, or to use

the fade time associated with the memory it is controlling. Setting a fade time of zero seconds results in the memory directly tracking the fader as it moves. LSC suggests that manual faders be programmed with a fade time of 0.5 seconds. This results in a much smoother fade as the fader is moved.

### 8.5 MEMORY RECOVERY AFTER POWER LOSS

When power is restored to an **EKO** after a power loss, channels controlled by DMX will immediately respond to the current DMX levels. However, channels controlled by Memories respond differently depending upon the duration of the power loss.

- If the power returns within 2 hours, the memory channels will return to their last memory levels.
- If the power returns after 2 hours, memory channels will remain OFF. To restore output you must recall the required memory.

### 8.6 PRE-PROGRAMMED EPLATES

ePlates are available from the factory with pre-programmed configurations to control memories or operate the “MEM/DMX” switch.

#### 8.6.1 Memory Control ePlates

Pre-programmed ePlates to control memories are available in the following configurations...

##### • 2 Button ePlates

Button 1 recalls Memory 1 at 100%  
 Button 2 recalls Memory 2 at 100%

##### • 4 Button ePlates

Button 1 recalls Memory 1 at 100%  
 Button 2 recalls Memory 2 at 100%  
 Button 3 recalls Memory 3 at 100%  
 Button 4 recalls Memory 4 at 100%

##### • 8 Button ePlates

Button 1 recalls Memory 1 at 100%  
 Button 2 recalls Memory 2 at 100%  
 Button 3 recalls Memory 3 at 100%  
 Button 4 recalls Memory 4 at 100%  
 Button 5 recalls Memory 5 at 100%  
 Button 6 recalls Memory 6 at 100%  
 Button 7 recalls Memory 7 at 100%  
 Button 8 recalls Memory 8 at 100%

##### • 1 Fader ePlates

Fader 1 controls Memory 1

##### • 2 Fader ePlates

Fader 1 controls Memory 1  
 Fader 2 controls Memory 2

##### • 4 Fader ePlates

Fader 1 controls Memory 1  
 Fader 2 controls Memory 2  
 Fader 3 controls Memory 3  
 Fader 4 controls Memory 4

#### 8.6.2 Memory/DMX Switch ePlates

A pre-programmed 2 button ePlate is available to control the operation of the Memory/DMX Switch.

Button 1 selects DMX

Button 2 selects Memory

### 8.7 RECORDING MEMORIES FOR PRE-PROGRAMMED EPLATES

The factory pre-programming of the ePlate buttons is designed for simple and predictable memory programming.

The buttons on the “Pre-Programmed” ePlates all recall a different memory number at full level.

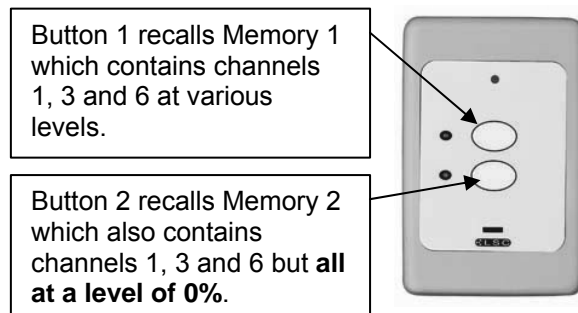
**Question:** If every button recalls a memory at full level, how do you turn a memory off?

**Answer:** You playback a different memory containing the same channels but with their levels set to 0% in that memory.

When a memory is recorded, it contains selected channel(s) at any level (including zero level). Therefore, if memory 1 contains channels at a level of 80%, pressing button 1 on an ePlate will fade up those channels to 80%.

If memory 2 contains the **same channels at a level of 0%**, pressing button 2 on an ePlate will fade those channels off.

For example;



Using this method, each pair of buttons on a pre-programmed ePlate are easily used as ON (fade up) and OFF (fade down) buttons. You record the odd numbered memories with the levels you require. You record the **even** numbered memories with the **same channels at a level of 0%**.

For example, after you record memory 1, record memory 2 with the same channels as used in memory 1 but with their levels set to 0%.

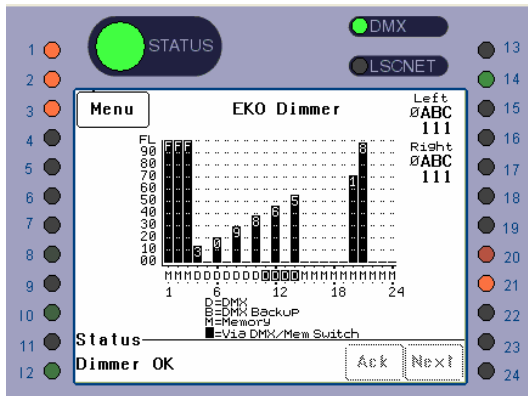
After you record memory 3, record memory 4 with the same channels as used in memory 3 but with their levels set to 0%.

Contact LSC or your LSC agent if you have special ePlate requirements that cannot be achieved with the pre-programmed ePlates. LSC will then custom program your ePlates for your specific requirements.

## 9 Alarms and Troubleshooting

**Warning.** No user controls or user serviceable parts are located inside the **EKO** Dimmer. Refer all servicing to suitably qualified personnel.

The only routine maintenance for the **EKO** Dimmer is to periodically ensure that the air vents at the top and bottom of the frame are free from dust.



If the **EKO** is not functioning correctly, check the LED indicators on the front panel and the status area at the bottom of the LCD screen for any messages.

### 9.1 STATUS LED

- Green = Normal operation.
- Red (flashing) = Alarm. See message on LCD touch screen.
- Red (steady) = Alarm is acknowledged but the problem still exists.

Possible causes of a flashing Status LED are;

- **Over Temperature.**

There is one temperature sensor for dimmers 1 to 12 and another temperature sensor for dimmers 13 to 24. If the temperature of the **EKO** is too high, the circuitry automatically switches off the bank of dimmers with the high temperature. All affected dimmer channels will flash red. Either reduce the load or increase the cooling to the **EKO**. When the temperature returns to normal, the **EKO** automatically returns to normal operation.

- **Temperature sensor failure.**

If either of the temperature sensors fail, the circuitry automatically switches off the affected bank of dimmers. All affected dimmer channels will flash red.

- **Loss of input power phase(s).**

If any of the input power phases are lost, the affected dimmer channel LEDs will flash red.

In the event of any alarm, read the message on the status area of the LCD screen. Press **[Ack]** on the touch screen to Acknowledge the alarm.

This stops the status LED from flashing but it remains red until the fault condition is rectified.

### 9.2 DMX LED

- Green = Valid DMX control signal connected.
- Red (flashing) = Error on DMX control signal.
- Green (flashing) = Loss of DMX control signal.

If the DMX LED is flashing RED, the **EKO** Dimmer has detected an error in the DMX control signal. Try connecting the **EKO** Dimmer to a known good DMX controller via the existing DMX distribution installation. If the LED turns green, the DMX controller is faulty.

If the DMX LED is flashing Green, the **EKO** Dimmer is not receiving a DMX control signal. Check that the lighting control desk is ON and sending a DMX output. Also check that any DMX splitters in the installation are working correctly and that all DMX cables are intact.

### 9.3 LSCNET LED

- **Green** = Valid LSCnet control signal connected (from ePlates).
- **Green (flashing)** = Data traffic detected on LSCnet.

### 9.4 CHANNEL LEDS

The numbered LED's around the perimeter of the control panel light when their respective dimmer channel is on. The brightness of the LED shows the channel level.

- They light green when under DMX control.
- They light red when under local control.

If a dimmer channel is not working check the MCB (Miniature Circuit Breaker) for that dimmer channel.

If the MCB has tripped (OFF), firstly try to determine the cause of the breaker tripping. It could be a blown lamp or a circuit overload. Rectify to problem (replace the lamp or reduce the load) then restore the MCB. If the MCB continues to trip, refer the problem to a suitably qualified person.

If the MCB has not tripped, you can test the operation of the dimmer from the local LCD touch screen. See section 3.1.1.2 "Channel Test" for details. If the dimmer is working from the touch screen but not via DMX (remote), check that the dimmer is patched to the correct DMX slot and correctly configured. See section 3.1.2.1 "Patching Basics" for details.

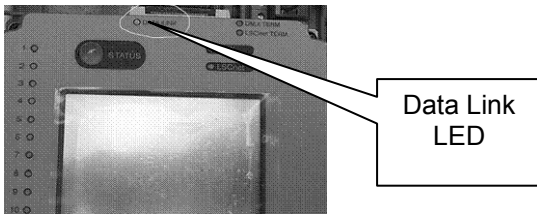
**9.5 TROUBLESHOOTING**

**Fault.** My ePlate is dead.

**Solution.** The ePlate receives its power via the LSCnet cable, so it could be a faulty cable or a faulty LSCnet PSU in the EKO dimmer rack.

To locate the problem check the status of the LSCnet Datalink LED's

On the EKO Dimmer, the led is marked Data Link, and is located just above the Touch Screen. The EKO door must be opened to see the LED

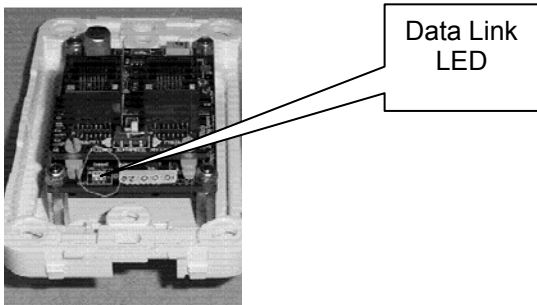


dimmer is still not reacting then it is a problem with the dimmer configuration.

Check the following;

- 1) Does the memory that is being recalled by the ePlate have the correct channels saved in it? If not, save the correct channel levels in the memory
- 2) Are the channels configured for Memory control? If not, change the dimmer channels control source to Memory.

On the ePlate the Data Link led is located on the back of the main circuit board. It will only be visible during installation.



With everything turned on, make sure that all of these LED's are GREEN. If any LED is not lit, then there is no power getting to that device. Check the cables for bad connections.

**Fault:** My ePlate is responding to button presses, but the EKO dimmer is not responding.

**Solution.** Check the LSCnet Datalink LED's on the ePlate (see above). Whenever you press a button the LED should flash Orange for a moment and then return to the normal Green state. If the LED always stays Green, then the ePlate is not operating correctly.

If the ePlate is working correctly then check the LSCnet Datalink LED on the EKO dimmer. It should also flash Orange whenever you press a button on the ePlate. If not then there is a cable fault between the dimmer and the ePlate. Check and repair the cable.

If the Datalink LED does flash orange, then dimmer is receiving the message ok. If the



## 10 DMX Explained

DMX512/1990-A is the industry standard for the transmission of digital control signals between lighting equipment. It utilises just a single pair of wires on which is transmitted the level information for the control of up to 512 DMX slots (addresses or channels).

The information for each slot is sent sequentially. The level of slot 1 is transmitted, then the level of slot 2, then 3, etc. up to a maximum of 512 slots. This stream of data containing the levels for all 512 DMX slots is repeated a minimum (generally) of 44 times per second. This provides sufficient updates of channel information for smooth fade transitions.

As the DMX512-A signal contains the level information for all slots, each piece of equipment needs to be able to read the level(s) of the slots(s) that apply only to that piece of equipment. To enable this, the **EKO** dimmer has a "DMX Patch" menu that allows you to patch (connect) each DMX slot (address) from your lighting controller to an **EKO** dimmer channel number or to multiple dimmer channel numbers.

When good quality data cables are used, DMX512 cable runs may be up to 1,000 metres in length. When several DMX feeds are required (to feed different locations), DMX512 splitters must be used. These provides multiple isolated DMX512 feeds.

The **EKO** uses a high impedance DMX input circuit allowing you to loop the DMX signal from one **EKO** to the next. The last **EKO** in the chain must have the "DMX Terminate switch" set to TERM to terminate the line.

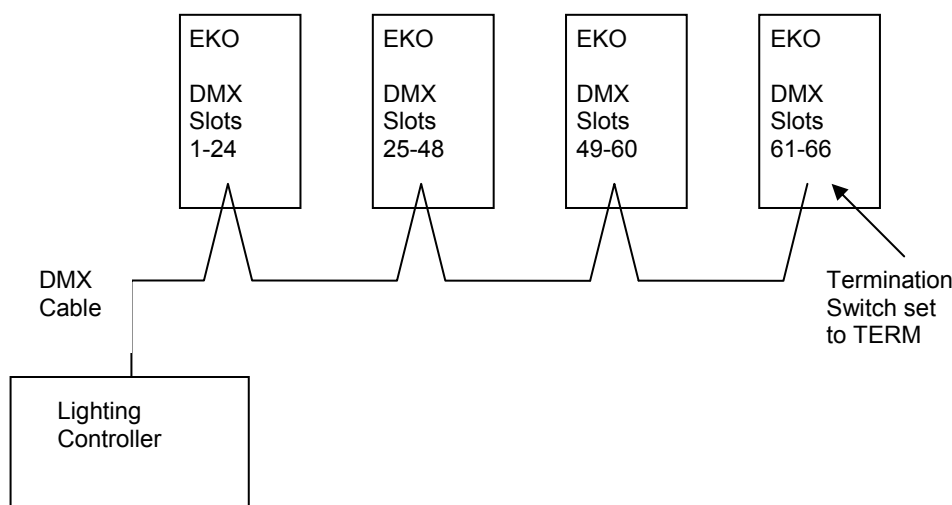
**Note:** Do not use unscreened microphone or low speed data cables for DMX. This can cause problems in the DMX network. Make sure the cable conforms to the EIA485 cable requirements by providing the following specifications:

- Low capacitance
- One or more twisted pairs
- Foil and braid shielded
- Impedance of 85 -150 Ohms, nominally 120 Ohms
- 22AWG gauge for continuous lengths over 300 metres

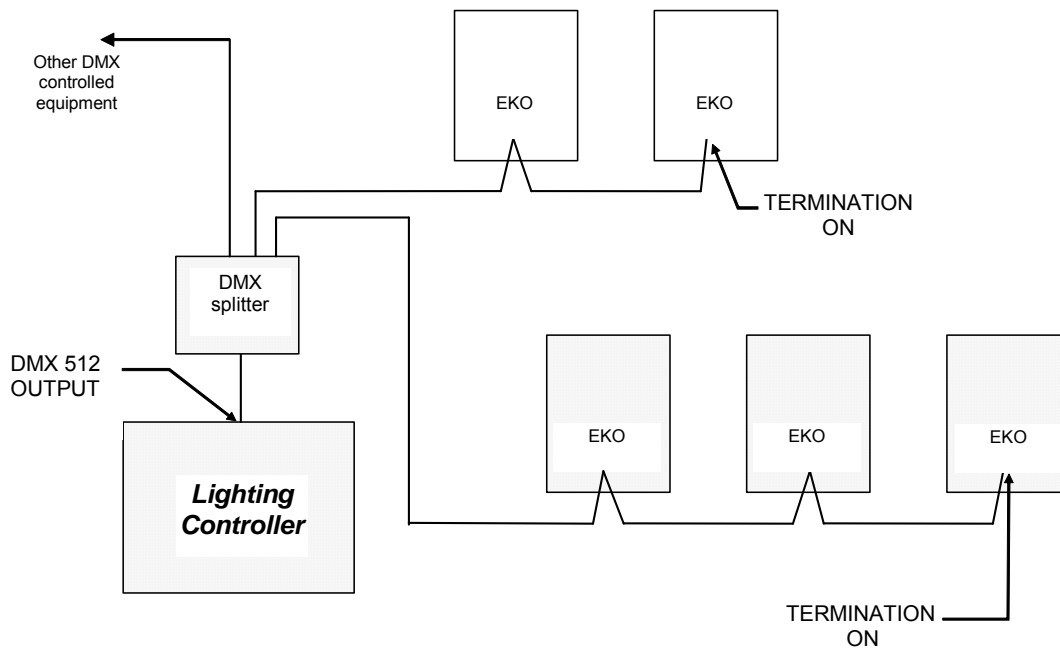
The following diagrams illustrate some simple setups utilising DMX512.

### 10.1 TYPICAL DMX INSTALLATIONS

In the following example, the DMX output signal from the lighting control desk is fed to the DMX connector of the first **EKO** dimmer. The DMX cable is then looped to the following **EKO** dimmers. The order of the daisy chaining is not important as each **EKO** dimmer channel can be patched to any DMX slot number. The end of the DMX line is terminated to prevent the signal reflecting back up the line and causing possible errors.



In the next example, the DMX is first fed to a DMX splitter which isolates the outputs. Separate DMX cables are then run to the various locations where the **EKO**'s are installed. In the event of a fault on one of the cables, the other outputs from the splitter will not be affected.



## 11 FAQ

### 11.1 FREQUENTLY ASKED QUESTIONS

**Q.** How do the EKO's go with a load such as a mirror balls. Is there any trickle?

**A.** No problems. We use a circuit called PTFD (Pulse Transformer Fired Dimming), which means that we can control virtually ANY type of load (Resistive, Inductive, Strobes, Motors, ELV, etc), without the need for dummy loads. This is one of the key differences between LSC and most other brands of dimmers.

**Q.** Do the dimmers work on HTP or LTP when the ePlate wall stations are connected.

**A.** The ePlates work in LTP mode. So if you activate Memory #3 it takes control. Then if another user activates Memory #7 and it contains the same channels saved in memory #3 then Memory #3 is de-activated.

Each Memory can contain any combinations of channels, so Memory #1 can turn all the lights on at full, whereas Memory #2 may only control the odd channels. This allows the client to have a very flexible configuration that is powerful, whilst remaining simple to use.

**Q.** Can you disable the ePlates so that no one plays with one while a console is in use?

**A.** Yes. You can setup a few different configurations for how DMX and the ePlates interact. The most common configuration is "Auto Switch". In this mode as soon as the dimmer sees DMX (after the console is turned on) then the ePlates are disabled, so no one can 'accidentally' turn the lights on/off whilst the console is in use. When the console is turned off there is a preset delay (1-999 seconds) and then the ePlates are re-enabled.

The other modes allow a button on a specified ePlate/s to be programmed to manually change between DMX and Memory (architectural) mode.

**Q.** How do the ePlates connect to the dimmers and how do the dimmers link to each other? Is it all your LSCnet?

**A.** The ePlate wall stations and EKO dimmers all connect in a daisy-chain, just like DMX. We use Cat5 cable, as it is cheap and easy to install. This Cat5 cable carries the LSCnet data and power to the ePlates.

**Q.** How many ePlate wall stations can I have in one system?

**A.** The limit is 65,535 "devices" on a network. These can be made up of EKO dimmers and/or ePlates. Depending on the physical distances

involved and the quantities of ePlates and EKO's you may need data repeaters and power supply boosters to make it work.

There are two simple rules

1) Data Limit. You can run up to 800m of Cat5 cable and 32 devices before a data repeater is needed.

2) Power Limit....A single EKO dimmer can provide enough power to run 4 ePlates. If you need more ePlates then you will need either another EKO dimmer or an LSCnet PSU booster.

**Q.** Is there a max cable length for the LSCnet?

**A.** No. You will need a data repeater every 800m, but there is no limit as to how many repeaters you run. If you need to cover very long distances (for example, greater than 2km) then you can use the LSCnet-ethernet bridge to convert the LSCnet data into standard TCP-IP ethernet and then use existing computer networks (including the internet) to carry the data.

**Q.** Will the following scenario work?

The client wants a single EKO324 installed in their theatre. The first 20 channels (stage lighting) need theatrical control via a DMX lighting console as well as control via 4 buttons of an 8 button wall plate downstairs (for replaying of internal memories of those 20 channels).

The last 4 channels are for Auditorium house lights and will be controlled only from the other 4 buttons of 8 button wall plate.

Can we stop the lighting console from accessing the 4 House light channels? (Can we tell channels 21 - 24 not to respond to DMX)?

**A.** The answer is YES! This complex scenario is actually quite common and the EKO is designed to handle this with ease. Each channel can be configured to ignore or respond to DMX, so channels 21-24 will be told to ignore DMX always. Channels 1-20 will be configured for Auto switch (to DMX), so that whenever the lighting console is turned ON and DMX is present these channels will only respond to DMX. When the lighting console is turned off there is a programmed delay (e.g. 30sec) and then the wall plate takes control.

In addition each button in a wall plate is completely independent of the other buttons. So a single 8 button plate can be programmed to talk to 2 separate groups of channels, as is required in this instance. Even when DMX takes control of channels 1-20, the last 4 channels (house lights) are still under control of the relevant wall plate buttons.

## 12 Specifications

### 12.1 MECHANICAL SPECIFICATIONS

	EKO324	EKO312	EKO612	EKO606
<b>Chassis style</b>	Wall mount installation dimmer with hinged front door			
<b>Dimensions (mm)</b>	<b>Width</b>	480	480	480
	<b>Height</b>	824	549	824
	<b>Depth</b>	135	135	135
<b>Weight (kg)</b>	42	31	36	25
<b>Construction</b>	Made from aluminium and corrosion resistant steel finish in powder coat with rear screened polycarbonate labels.			

### 12.2 TECHNICAL SPECIFICATIONS

	EKO324	EKO312	EKO612	EKO606
<b>Number of Dimmer channels</b>	24	12	12	6
<b>Channel output rating</b>	13 Amps		25 Amps	
<b>Three phase current requirements (per phase)</b>	104 Amps	52 Amps	100 Amps	50 Amps
<b>Three phase input screw terminals</b>	35mm <sup>2</sup>	16mm <sup>2</sup>	35mm <sup>2</sup>	16mm <sup>2</sup>
<b>Channel output screw terminals</b>	4mm <sup>2</sup>		10mm <sup>2</sup>	
<b>Channel MCB type</b>	1 Pole DIN style Electro-magnetic			
<b>Channel MCB breaking capacity</b>	6000 Amps			
<b>RCD input protection option (Qty)</b>	Yes (2)	Yes (1)	Yes (2)	Yes (1)
<b>Current control technology</b>	Yes			
<b>Dimmer curve selection per channel</b>	Yes			
<b>Memory storage</b>	80 memories + DMX backup memory			
<b>Power switching component</b>	Triac			
<b>Inductor rise time (peak to peak)</b>	300us			
<b>Channel output mimic LEDs (Qty)</b>	Yes (24)	Yes (12)	Yes (12)	Yes (6)
<b>DMX data and LSCnet indicator LEDs</b>	Yes			
<b>Operational STATUS indicator LED</b>	Yes			
<b>Number of cooling fans</b>	2	1	2	1
<b>Fan cooling control</b>	Variable			
<b>External software upgradeable</b>	Yes			
<b>50/60Hz frequency Auto-select</b>	Yes			

## 13 SOFTWARE UPGRADE

LSC Lighting Systems has a corporate policy of continuous improvement to its products. The **EKO** software (firmware) is subject to this policy as new features are added and existing features improved.

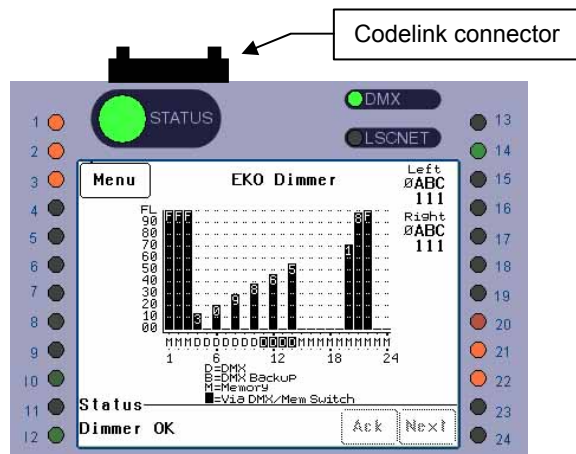
The software version of your **EKO** is momentarily displayed on the LCD touch screen when the **EKO** is switched on or at any time by pressing **[Menu]** **[Options]** **[About]**. The latest version of **EKO** software can be downloaded from the LSC web site, [www.lscighting.com.au](http://www.lscighting.com.au)

To upgrade your EKO software, the new software is loaded into the **EKO** via **CODELINK**. **CODELINK** is a communication program that runs on a PC based computer. The **CODELINK** program together with full instructions can be downloaded from the LSC website, [www.lscighting.com.au](http://www.lscighting.com.au) or you can contact LSC or your LSC dealer.

The **CODELINK** cable connects the personal computer (PC) comm port to the **EKO** Codelink connector which is located above the LCD control panel and is accessed by opening the EKO door.

**WARNING.** Dangerous voltages exist inside the EKO. Take extreme care.

LSC suggests that you turn off the power to the EKO before opening the door to connect the codelink cable. When the cable is connected, turn the power back on and perform the software upgrade. Turn the power off again before removing the cable then shut the door and turn on the power again.



## 14 COMPLIANCE STATEMENTS

### 14.1 C TICK COMPLIANCE STATEMENT

All LSC products with CE Compliance automatically comply with C-Tick requirements as per Section 182 of the Radiocommunications Act 1992. LSC Company Registration number is N921.

### 14.2 CE COMPLIANCE STATEMENT

The **EKO** Dimming System from LSC Lighting Systems (Aust) Pty. Ltd. has been designed and tested to the European Committee for Electrotechnical Standardization (CENELEC) standard– EN55022 (Information Technology Equipment).

### 14.3 DISCLAIMER

LSC Lighting Systems (Aust) Pty. Ltd. has a corporate policy of continuous improvement, covering areas such as product design and documentation. In light of this policy, some detail contained in this manual may not match the exact operation of your product.

In any event, LSC Lighting Systems (Aust) Pty. Ltd. can not be held liable for any direct, indirect, special, incidental, or consequential damages or loss whatsoever (including, without limitation, damages for loss of profits, business interruption, or other pecuniary loss) arising out the use or the inability to use this product for its intended purpose as expressed by the manufacturer and in conjunction with this operating manual.

Servicing of this product is recommended to be carried out by LSC Lighting Systems (Aust) Pty. Ltd. or its authorised service agents. No liability will be accepted whatsoever for any loss or damage caused by service, maintenance or repair by unauthorised personnel. In addition servicing by unauthorised personnel may void your warranty.

**15 COMPANY PROFILE**

The LSC name is synonymous within the Entertainment Lighting Industry for producing leading edge lighting control products that are innovative, stylish and functional.

Furthermore, its dedication to developing products that are inherently reliable and easily serviceable, has enhanced LSC's reputation with owners and operators alike. A great deal of pride is instilled in the people who design, manufacture and sell LSC products, whereas every sale is regarded as not just a purchase, but an important element in cementing a long term relationship with each customer.

The product range is diverse and covers control desks, digital dimmers and a comprehensive selection of DMX512 and power distribution equipment. LSC has forged a reputation for many years as a pioneer in DMX512 technology and this will be further enhanced with the release of new products in the future.

Our products are distributed through a worldwide sales network of over 52 Distributors in 36 Countries. Users of LSC equipment range from high profile corporate and professional clients to churches, museums, schools, amateur theatre groups, convention and exhibition industries, broadcast industry, production and rental companies; - basically anywhere good entertainment lighting is required.



**e-Series** – featuring the **ePAK**, **ePRO** and **e1220** rackmount 6 and 12 channel digital dimmers



**TEKO** – dimmers featuring DMX and LSCnet wallplate control.



**i-Series** – featuring the **iPAK** and **iPRO** range of professional installation dimmers.



**DELTA** – DMX512 data splitters and Power Distribution Products.



**maxim** – advanced lighting consoles in 6 models from 12 to 120 faders, up to 1024 DMX channels with moving light control



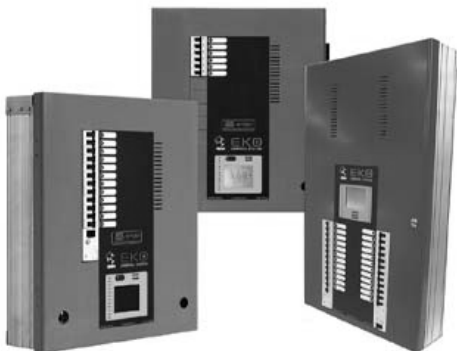
**MINIM** –entry level lighting console with manual/memory DMX512 control.



**monoPAK** – single unit portable dimmer



**DNA** – range of isolated inlets, outlets and power supply's for distributing DMX512.



**EKO** Installation dimmer in 6, 12 and 24 channel versions with DMX and LSCnet wallplate control.



**e24** – 24 channel dimming system with patch bay, monitoring and mains distribution featuring DMX and LSCnet wallplate control



**TDS** – 48 channel dimming system with patch bay, digital monitoring and mains distribution.