

# ML - MovingLED

Automated High Power LED Wash Luminaire

User's Manual

**Mushroom Lighting Technology Ltd**

3 Encon Ct, Owl Close,

Moulton Park,

Northampton,

NN3 6HZ.

TEL: 01604 790900

FAX: 01604 491118

[www.mushroomlightingtechnology.co.uk](http://www.mushroomlightingtechnology.co.uk)

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# 1 INTRODUCTION

Thank you for selecting the MovingLED. This intelligent moving-head LED color changer is fast, quiet, reliable and consumes very low power.

It delivers exceptionally bright colored light that instantly snaps or smoothly fades to virtually any color, at any intensity, anywhere on stage.

## 1.1 About this manual

This manual covers the features of MovingLED and the procedures using it.

This manual describes the features of software version 2.1. The latest MovingLED documentation are available from the MovingLED web site at <http://www.movingled.us>.

## 1.2 Safety precautions

**This product is for professional use only. It is not for household use.**

This product presents risks of lethal or severe injury due to electric shock and falls.

**Read this manual** before powering or installing the fixture, follow the safety precautions listed below and observe all warnings in this manual and printed on the fixture. If you have questions about how to operate the fixture safely, please

contact your MovingLED dealer.

### 1.2.1 To protect yourself and others from electric shock

- Disconnect the fixture from AC power before removing the exchangeable optics or any part, and when not in use.
- Always ground (earth) the fixture electrically.
- Never operate the fixture with missing or damaged covers.
- Use only a source of AC power that complies with local building and electrical codes and has both overload and ground-fault protection.
- Do not expose the fixture to rain or moisture.
- Refer any service operation not described in this manual to a qualified technician.
- Do not modify the fixture or install other than genuine MovingLED parts.
- Do not operate the fixture if the ambient temperature ( $T_a$ ) exceeds 40° C (104° F).

### 1.2.2 To protect yourself and others from injury due to falls

- When suspending the fixture, verify that the structure can hold at least 10 times the weight of all installed devices.
- Verify that all external covers and rigging hardware are securely fastened and use an approved means of secondary attachment such as a safety cable.
- Block access below the work area whenever installing or removing the fixture.
- Do not lift the fixture by its head or yoke.

## 2 SETUP

This section describes the simple steps required to prepare the MovingLED for operation.

### 2.1 Unpacking

The MovingLED package includes:

- MovingLED unit
- User's manual

The packing material is carefully designed to protect the fixture during shipment - always use it or a custom MovingLED flight case to transport the fixture.

### 2.2 Installation of the fixture

#### 2.2.1 Connecting to the electrical power supply

MovingLED unit has been designed to work with the European voltage and frequency. Your local AC power must match to the following conditions:

- **190 to 240V AC, 50-60Hz**

A separated lead of **ground protection** is **required**.

If the local power does not match these conditions, do not use the fixture with it.

#### **WARNING!**

**For protection from dangerous electric shock, the fixture must be grounded (earthed). The AC mains supply shall be fitted with a fuse or circuit breaker and ground-fault protection.**

#### 2.2.2 Using the power cord

The MovingLED has a built-on power cord and no needs any installations.

Connect the MovingLED directly to AC power.

*Do not connect it to a dimmer system; doing so may damage the fixture.*

#### 2.2.3 Rigging the fixture in place

#### **WARNING!**

**Use both clamps to rig the fixture. Lock each clamp with the fastener.  
The fasteners are locked only when turned fully clockwise.**

Attach an approved safety cable to the base.

The MovingLED can be placed directly on the stage floor or rigged parallelly on a truss. The integrated (foldable) C-Clamps enables quick and easy fastening on a truss.

1. Verify that the rigging C-clamps (included) are undamaged.
2. Tip: outfold the clamps while the fixture is in the flight case.
3. Verify that the structure can bear at least 10 times the weight of all installed fixtures, clamps, cables, auxiliary equipment, etc.
4. Working from a stable platform, hang the fixture on the truss.
5. Tighten the rigging clamps securely to the structure.
6. Install a safety wire that can bear at least 10 times the weight of the fixture. The attachment points are designed to fit a carabiner clamp.

***Never use the carrying handles for secondary attachment.***

7. Unsecure the yoke and head movement lock system by a push on the locking mechanism. The locking mechanism moves around a centimeter between the locked and unlocked position. Makes sure that both axis can move away from the secured position.

## 2.2.4 Connecting the serial link

### 2.2.4.1 Tips for building a serial link

**1. Use shielded twisted-pair cable designed for RS-485 devices.** Standard microphone cable cannot transmit control data reliably over long runs; use only cable designed for RS-485 applications. 24 AWG cable is suitable for runs up to 300 meters (1000 ft). Heavier gauge cable and/or an amplifier is recommended for longer runs.

**2. Never use a “Y” connector to split the link.** To split the serial link into branches use an active splitter/amplifier.

**3. Do not overload the link.** Up to 32 devices may be connected on a serial link.

**4. Terminate the link** by installing a termination plug in the output socket of the last fixture on the link.

The termination plug, which is simply a male XLR connector with a 120 ohm, 0.25 watt resistor soldered between pins 2 and 3, will not let the control signal to reflect back down the link causing interference. If a splitter is used, terminate each branch of the link.

### 2.2.4.2 Connecting fixtures

The MovingLED has locking 3-pin data input and output sockets that can be used with DMX Protocol controllers. **The pinout is configured according to the DMX-512 standard**, i.e., pin 1 to shield, pin 2 to signal (-) and pin 3 to signal (+).

**1.** Connect the controller’s data output to the MovingLED’s data input. For a

- **DMX controller with 5-pin output:** use a cable with 5-pin male and 3-pin female connectors.

- **DMX controller with 3-pin output:** use a cable with 3-pin male and female connectors such as the one supplied.

**2.** Continuing the link: connect the output of the fixture closest to the controller to the input of the next fixture.

**3.** Insert a male 120 Ohm XLR termination plug in the output of the last fixture on the link.

When the fixture has no or bad DMX (bad polarity) signal the DMX Error led (yellow) flashes on the front panel. This enables checking the DMX cabling when the fixture is already up on the truss.

### 2.2.4.3 Setting up fixture address

You will need to power up the device to set its address. After powering up the fixture the mechanical reset sequence will start. Wait until the display shows the age of the fixture.

Press the [Address] button. The address will be displayed. If the number showing the address flashes, you can select the desired address with the [Up] and [Down] keys.

Exit with the [Left] key in order to confirm the new address. **Powering down** the fixture **without exiting** from the address setup **will not store** the new address!

Refer to section 4 MENU STRUCTURE AND CHANNEL SETUP for a full description of Setup menu.

## 3. EFFECTS

This section describes the controllable features of MovingLED and the options for customizing them for your application.

Option selection is described in the next section.

### 3.1 Pan and Tilt

- Pan and tilt effects are reset to a “home” position when the fixture is powered up. The fixture can also be reset via pressing the [Reset] button when the fixture age is being displayed or via DMX. If DMX Reset Channel has been assigned in Channel Setup, holding the channel value above 240 for about 2 seconds will cause reset of the fixture mechanics. (See next section for full description of Channel Setup.)
- The moving head can be panned 540° and tilted 270°. The middle of the pan range is perpendicular to the front of the fixture. If only reduced panning and tilting area required, pan can be limited to 180°, 270° or 360° and tilt can be limited to 180° via Channel Setup.
- An on-the-fly position correction system automatically corrects the position of the pan and tilt. This feature can not be disabled.
- Movement has been optimized for speed. However it can be reduced by smaller values on the **Move speed channel** in order to operate more quietly. The speed channel must be assigned in Channel Setup to enable this function. The speed channel limits the achievable top speed of pan and tilt and not the responsibility in general.
- Setting the shutter channel to “blackout” in causes the light of the LEDs to go off while the head is moving.
- The pan and tilt DMX channels can be inverted for convenience using the Channel Setup.

### 3.2 RGBA additive color mixing

- Red, Green, Blue and Amber 8 bit DMX channels provided for additive color mixing.
- Each DMX channel is linear from 0 to 255 to provide 0 to 100 percent light output.
- Amber is provided to have richer colors. (LEDs spectral curve is narrower than CRTs for example.)

### 3.3 Dimmer

- The dimmer channel provides smooth, high-resolution 100 percent dimming of the color values.
- In MovingLED every color has true 16 bit resolution. This 16 bit is accessible by the 8 bit of the dimmer channel and 8 bit of each color channel.
- The dimmer channel has:
  - an off region from values 0 to 5
  - a 100 percent (on) region for values 248 to 255
  - between those regions (6 to 247) are the dimmer values linearly from 0 to 100 percent.

### 3.4 Shutter

- The shutter channel provides shutter function at far higher speed that a mechanical shutter can ever achieve. Light flashing frequency can be adjusted from 0.24 Hz up to 32.41 Hz as an exponential function of the DMX channel values between 8 and 239.
- From 0 to 7 and from 248 to 255 the shutter function is switched off (lights are on).
- From values between 240 and 247 the blackout function can be accessed. While the yoke or head moves the lights will be switched off.

### 3.5 Pulse Width and Lightning

Flashing of the shutter function adjusted by this channel.

- From DMX values between 0 and 100 the width of the flashing pulses can be adjusted from 100 to 0 percent of the flashing period.
- From values between 101 and 127 the Lightning changes the shutter function to provide the lightning effect. The lightning effect is a pseudo random chain of flashes.
  - Increasing the value on this channel enables more and more flashes from the sequence.
  - The pulse width of flashes and the wait times between flashes are being adjusted by the sequence.

- The frequency given by the shutter channel is still effective.
  - Starting the lightning effect on multiple fixtures with the same shutter frequency allows the units to provide random but synchronized flashes even with different lightning effect control values.
- From values between 128 and 255 the lights are on. These values are reserved for future functions.

### **3.6 Fading Time**

LEDs are switching extremely fast. Therefore all kinds of flashing made with them produces a very sharp effect that can cause high eyestrain. Also smooth light changes cannot be made by the relatively slow refresh of the DMX data.

- In order to allow smoother changes over dimmer values and smoother changes during flashing this channel provided to adjust the changing speed of the dimmer. Fading time can be adjusted from instant switching up to 4 seconds as an exponential function selecting DMX channel values from 0 to 255. The 4 seconds were given here is true for full switching between 0 to 100 percent of the light output.

## 4. MENU STRUCTURE AND CHANNEL SETUP

This section describes the menu structure of MovingLED and Channel Setup that controls the DMX channel assignment and the options of the effects to customize them for your application.

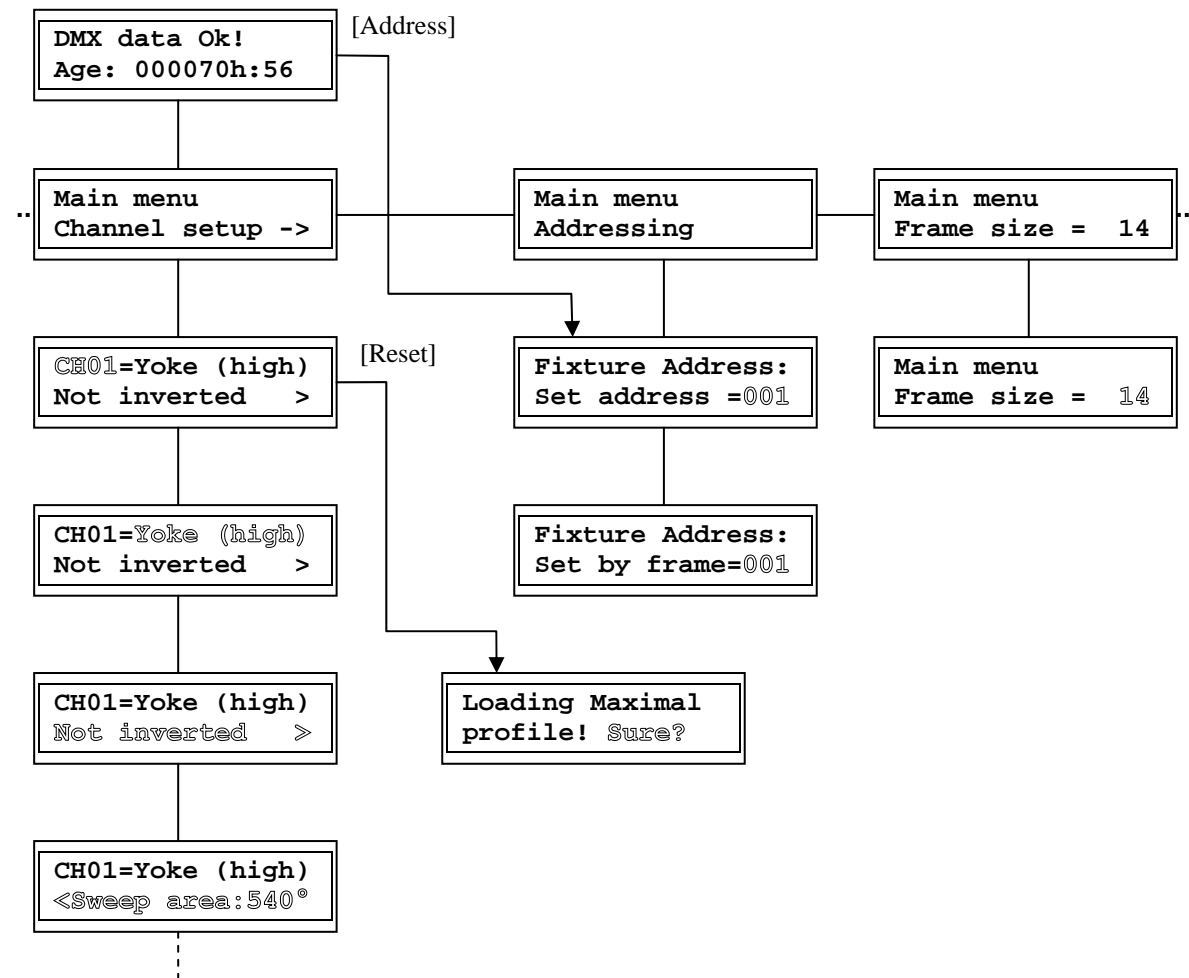
MovingLED has six keys to control its setup.

- [Address]: Go directly to set up the fixture address
- [Reset]: Resetting the fixture – Outside the menu  
Special functions – Inside the menu
- [Up]: Step up/incrementing value
- [Down]: Step down/decrementing value
- [Left]: Exiting from submenu (Getting one step out)/Answering “no”
- [Right]: Entering submenu (Getting one step in)/Answering “yes”

### 4.1 Menu structure

After powering up or resetting MovingLED the display shows the DMX status and the age of the fixture.

The following drawing represents the structure of the setup menu. The outlined characters represent flashing on the LCD.



### 4.2 Setting Frame size

Frame size value is being used for two purposes:

- To select the number of channels to display in the **Channel Setup**
- To select the steps to change the **Fixture Address** when the “Set by frame” mode is used.

Normally this value represent the number of DMX bytes the fixture uses for its effects.



Setting the frame size is possible when the number flashes.

- [Up] key increases the number,
- [Down] key decreases the number,
- [Left] key exits from setting frame size and saves the new value.

### 4.3.Changing Fixture Address

Fixture address represents the number of the DMX byte from where the fixture will start to use data.

There are two modes setting the fixture address:

- Increasing/decreasing by one
- Increasing/decreasing by **Frame size**

|   |
|---|
| <b>Fixture Address:</b><br>Set address =001 |
|---|

|   |
|---|
| <b>Fixture Address:</b><br>Set by frame=001 |
|---|

Entering the Fixture Address menu first always the “by one” mode is used. To select “by frame” mode push [Right] once.

Get back to “by one” mode by pushing [Left] once. Set by frame mode is provided to help avoid the miscalculation of the fixture address.

**The function of keys:**

- [Up]/[Down]      Increase/decrease address value.
- [Reset]            Set address value to 001.
- [Right]            Enter to “by frame” mode.
- [Left]             Exit from “by frame” mode/Exit from address setup and saving the new address value.

### 4.4.Channel setup

Channel setup used to select the used channels in any order you like. Also the option(s)/properties of the effect can be adjusted.

There are three main levels:

- Channel selection
- Effect selection
- Property change

The Property change level may contain more than one sublevels when an effect having more than one property.

**The function of keys:**

- [Right]            Get one level deeper.
- [Left]             Get one level up/Exit from Channel setup.
- [Up]/[Down]      Increase/Decrease value/Change selected effect or property setting.
- [Reset]            Loading a factory profile at the Channel selection level.

#### 4.4.1. Channel number selection level:

The channel number can be selected by [Up] and [Down]. It can be changed between 1 and the **Frame size** value.

By pressing [Reset] when the Channel selection is 01, 02 or 03 three factory predefined profiles can be loaded:

1. Maximal profile (This is the MovingLED default profile how the fixture is being shipped.)
2. Minimal profile
3. Empty profile

Pressing [Reset] with other Channel selection values has no effect.

Loading a profile means setting the Frame size to the corresponding default and the loading of the default property setting(s) for every effect too! (For example Yoke will have 540 degrees sweep area with not inverted movement.)

#### 4.4.1.1. Settings after a profile gets loaded:

| Channel number     | Maximal profile | Minimal profile | Empty profile    | Property defaults (by channel assignation of the Maximal profile) |
|--------------------|-----------------|-----------------|------------------|---|
| 01                 | Pan (high)      | Pan (high)      | Empty/unassigned | Sweep area:540°, not inverted                                     |
| 02                 | Pan low         | Pan (high)      | Empty/unassigned | (Always the same as Yoke high)                                    |
| 03                 | Tilt (high)     | Dimmer          | Empty/unassigned | Sweep area:270°, not inverted                                     |
| 04                 | Tilt low        | Shutter         | Empty/unassigned | (Always the same as Head high)                                    |
| 05                 | Dimmer          | Flash ratio     | Empty/unassigned | N/A (This effect has no property setting)                         |
| 06                 | Shutter         | Blue            | Empty/unassigned | N/A (This effect has no property setting)                         |
| 07                 | Flash ratio     | Green           | Empty/unassigned | N/A (This effect has no property setting)                         |
| 08                 | Fading time     | Amber           | Empty/unassigned | N/A (This effect has no property setting)                         |
| 09                 | Blue            | Red             | Empty/unassigned | N/A (This effect has no property setting)                         |
| 10                 | Green           | Reset           | Empty/unassigned | N/A (This effect has no property setting)                         |
| 11                 | Amber           | N/A             | Empty/unassigned | N/A (This effect has no property setting)                         |
| 12                 | Red             | N/A             | Empty/unassigned | N/A (This effect has no property setting)                         |
| 13                 | Move speed      | N/A             | Empty/unassigned | N/A (This effect has no property setting)                         |
| 14                 | Reset           | N/A             | Empty/unassigned | N/A (This effect has no property setting)                         |
| <b>Frame size:</b> | <b>14</b>       | <b>10</b>       | <b>14</b>        |   |

#### 4.4.2. Effect selection level:

The effect can be selected to the channel by [Up] and [Down].

- When the selected effect is assigned to the channel an equal sign between them marks this.
- When the selected effect is not yet assigned to the channel a “less than” sign between them marks this. Also in this case instead of displaying the first property in the bottom line the “[Set to channel]” text is being displayed.

The display samples below show the difference:

```
CH01=Yoke (high)
Not inverted >
```

```
CH01<Yoke (high)
[Set to channel]
```

There is one special item on the effect list: “—(empty)—”. It has the function to represent unassigned channels and to provide channel clear functionality. Look at the display samples below:

```
CH01=-- (empty) --
Unused channel
```

```
CH01<-- (empty) --
[Clear channel!]
```

#### The function of keys:

- [Up]/[Down] Selecting another effect
- [Reset] Clear channel
- [Left] Exit to channel selection (without storing effect selection)
- [Right] Get onto property selection level (effect already has been assigned)/ Store the effect selection (effect has not been assigned)

#### 4.4.3. Property selection level:

Only the **Pan** and **Tilt** effect have properties for personalization. Both effect having two properties.

#### The function of keys:

- [Up] and [Down] changes the property value. All changes take effect immediately.
- [Right] is used to get down to the second property level.
- [Left] exits to an upper level.

## 5. Maintenance

**IMPORTANT:** Isolate the fixture from the electrical power supply before commencing maintenance work of any description.

### 5.1. Cleaning

You should clean your MovingLED on a regular basis. Dust, fog, and smoke particles can accumulate and cause malfunctions.

To clean exterior surfaces, wipe with a soft lint-free polyester cloth or use a small vacuum to remove any built-up dust and dirt.

**Caution: Do not use a blower because it will force foreign particles into the fixture.**

**Mushroom Lighting Technology Ltd  
3 Encon Ct, Owl Close,  
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Northampton,  
NN3 6HZ.  
TEL: 01604 790900  
FAX: 01604 491118  
[www.mushroomlightingtechnology.co.uk](http://www.mushroomlightingtechnology.co.uk)**