



# JUGGLER OPERATING MANUAL

If a portable or temporary three phase mains supply is used to power this desk, we recommend that the desk mains plug is removed before connecting or disconnecting the supply. Serious damage will occur if the desk is connected across two phases.

This equipment is designed for use as a lighting control desk only, and is unsuitable for any other purpose. It should only be used by, or under the supervision of, an appropriately qualified or trained person.

Zero 88 reserves the right to make changes to the equipment described in this manual without prior notice.  
E & OE.

## Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause unacceptable interference in which case the user will be required to correct the interference at the operators expense.

## Issue 1 – November 2005

**Manual Stock No 73-404-00**  
**Software Version 1.0**

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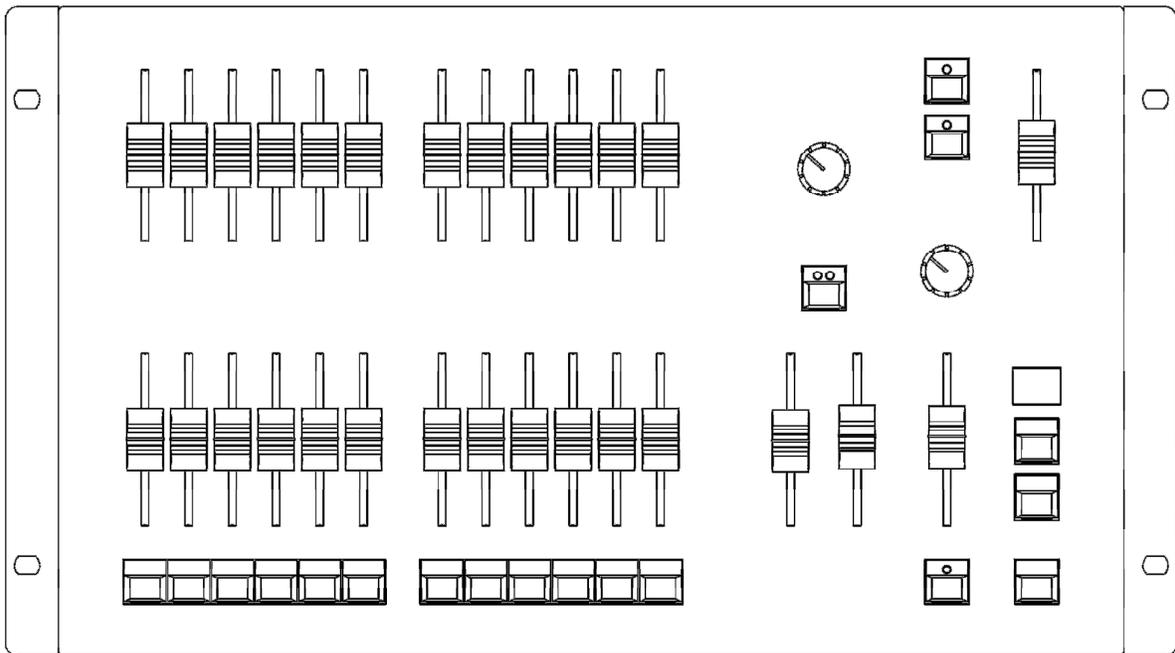
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# Introduction



## This Manual

This manual describes the operation and programming of the Juggler lighting desk.

Throughout this manual all references to controls, buttons and lights on the front panel appear in capital letters, eg GRAND MASTER, PRESET CONTROL, WIDE etc.

## The Juggler Lighting Desk

The Juggler lighting desk is a two preset 12 channel desk. The wide mode feature allows a single preset 24 channel operation. Crossfades between scenes can be manual or timed. Individual channels may be flashed.

Up to 12 sequences of 99 steps each can be recorded on the desk. One sequence can be output at a time. The sequence can be played back manually or automatically at the required speed.

The output from the desk is DMX 512 only (channels 1-24).

# Preset Operation

## Introduction

The Juggler desk can be operated as either two 12 channel presets controlling 12 channels, or a single wide preset controlling 24 channels.

In **Two Preset** operation, separate scenes are set up on PRESET A and PRESET B faders. The A MASTER and B MASTER faders are used to crossfade between the two different scenes.

In **Wide Mode**, the first scene is set up on the PRESET A and PRESET B faders and is stored temporarily using the PRESET CONTROL button. Once stored, another scene can be set up on the PRESET A and PRESET B faders. The A MASTER and B MASTER faders are then used to crossfade between the stored scene and the scene on the PRESET faders.

In Two Preset and Wide Modes crossfades between scenes can be manual or timed.

Overall output is under the control of the GRAND MASTER fader.

## Two Preset Operation

The PRESET A and PRESET B faders, the A MASTER and B MASTER faders and the GRAND MASTER fader are used to control the output levels from the desk. The FADE TIME control is used to determine the crossfade time between scenes.

## Outputting Scenes

To Output a Scene from Preset A - Set the required levels for each channel on the PRESET A faders. Set the A MASTER to full and the B MASTER to zero. The scene set up on PRESET A is output live.

To Output a Scene from Preset B - Set the required levels for each channel on the PRESET B faders. Set the A MASTER to zero and the B MASTER to full. The scene set up on PRESET B is output live.

## Manual Fades

Ensure the FADE TIME control is set to Manual. Set up a scene using the PRESET A faders. Set up a different scene on the PRESET B faders.

Set the A MASTER to full, and the B MASTER to zero. The scene set on the PRESET A faders is output.

To crossfade to the scene set up on PRESET B, simultaneously move the A MASTER to zero and the B MASTER to full. You have direct control over the speed of the scene change. As the two master faders are moved in tandem the scene set up on PRESET B will fade in and the scene set on PRESET A will fade out.

A new scene can then be set up on PRESET A without affecting the outputs.

To crossfade to the new scene on PRESET A, simultaneously move the A MASTER to full and the B MASTER to zero.

As the two master faders are moved in tandem the scene set up on PRESET B will fade out and the scene set on PRESET A will fade in.

## Timed Crossfades

Set the A MASTER and B MASTER faders to zero. Set up a scene using the PRESET A faders. Set up a different scene on the PRESET B faders.

Set the FADE TIME control to the required crossfade time.

Quickly move the A MASTER fader to full. The scene on the PRESET A faders will fade in and be output live. The time taken for the fade to complete is determined by the value set on the FADE TIME control.

To crossfade to the scene on PRESET B, quickly move the A MASTER fader to zero and the B MASTER fader to full. The scene on PRESET B will fade in and the scene on PRESET A will fade out in the selected time. While the crossfade is in progress the LEDs in the PRESET CONTROL button flash. They go out when the fade is complete.

A new scene can then be set up on PRESET A without affecting the outputs.

To crossfade to the scene on PRESET A, quickly move the A MASTER to full and the B MASTER to zero. The scene on PRESET A will fade in and the scene on PRESET B will fade out in the selected time.

## Flashing Channels

Ensure that the flash function is active (LED in FLASH button is on).

Press and hold down an individual CHANNEL FLASH button. The channel is then added to the scene at the level set on the GRAND MASTER.

Release the CHANNEL FLASH button. The channel returns to its previous level.

## Wide Mode Operation

In Wide Mode you are able to crossfade between, or combine two scenes which are 24 channels wide.

A scene is set up using both the PRESET A and PRESET B faders (PRESET A faders control channels 1 -12, PRESET B faders control channels 13 - 24). This scene is then stored temporarily by pressing the PRESET CONTROL button.

A second scene can then be set up on the PRESET A and PRESET B faders. The A MASTER and B MASTER faders can then be used to crossfade between the two scenes.

The PRESET CONTROL button is used to control which of the master faders has control of the PRESET channel faders and the stored scene. The GRAND MASTER is used to control the final output levels from the desk. The FADE TIME control is used to determine the crossfade time between the two scenes.

## Storing and Outputting Scenes

Ensure that the desk is in Wide Mode (LED in WIDE button is on). On first entering Wide Mode or re-entering Wide Mode, the PRESET faders will be assigned to the A MASTER, and the stored scene assigned to the B MASTER. The lights in the PRESET CONTROL button indicate this (A FADERS, B STORED).

Set the A MASTER and GRAND MASTER faders to full and the B MASTER fader to zero.

Ensure that the lights in the PRESET CONTROL button indicate A FADERS, B STORED

Set up a scene using the PRESET A and PRESET B faders. This scene will be output.

To store the scene press the PRESET CONTROL button. The output levels are temporarily stored and the lights in the PRESET CONTROL button change to B FADERS, A STORED. The A MASTER is now assigned to the stored scene and the B MASTER assigned to the PRESET faders, so the outputs remain the same.

Set up the next scene using the PRESET A and PRESET B faders. The outputs are not affected since the B MASTER is currently at zero.

To crossfade between the stored scene and the scene on the PRESET faders, simultaneously move the A MASTER to zero and the B MASTER to full.

Press the PRESET CONTROL button. The output levels are saved into the temporary store (overwriting the previous values) and the lights in the PRESET CONTROL button change to indicate A FADERS, B STORED. The B MASTER is now assigned to the stored scene and the A MASTER to the PRESET faders, so the outputs remain the same.

Repeat the operations described above to set up a new scene on the preset faders, crossfade to the new scene, and save it to a temporary store etc..

## Manual and Timed Fades

Crossfading between the scene set up on the preset faders and the stored scene is achieved by moving the A MASTER and B MASTER faders in tandem.

If the FADE TIME control is set to Manual, the crossfade time is determined by the speed at which the A MASTER and B MASTER faders are moved. The operator has direct control over the speed of the scene change.

If the FADE TIME control is not set to manual, the crossfade time will be the time indicated on the front panel of the desk. While a timed crossfade is in progress using the A and B MASTER faders, the LEDs in the PRESET CONTROL button flash.

## Flashing Channels

Use the FLASH button to select the required flash mode as follows:

When the LED in the FLASH button is off - the CHANNEL FLASH buttons are disabled.

When the LED in the FLASH button is on - the CHANNEL FLASH buttons will flash channels 1-12.

When the LED in the FLASH button is flashing - the CHANNEL FLASH buttons will flash channels 13-24.

Press and hold down an individual CHANNEL FLASH button. The channel is then added to the scene at the level set on the GRAND MASTER.

Release the CHANNEL FLASH button. The channel returns to its previous level.

# Sequences

## Introduction

A sequence is a series of up to 99 states which are stored in the desk and can be played back sequentially. Up to 12 sequences may be programmed and stored on the Juggler.

Only one programmed sequence may be played back at a time. A sequence can be played back manually or automatically. Transitions between the steps can be snap or fade.

The SEQUENCE MASTER fader controls the maximum output level of the sequence.

The LED in the SEQUENCE button indicates the 'mode' as follows:

Off = No Sequence Running      On = Program Mode      Flashing = Playback Mode

The seven segment display shows the selected step number in the sequence. When the SHIFT key is held down the seven segment display shows the sequence number. The UP and DOWN buttons are used to change the selected step or sequence number.

If no sequence is being output the seven segment display shows "—" as an indication that the desk is powered (there is no separate power LED on the desk).

## Programming Sequences

To enter Program Mode – hold down the SEQUENCE button for about two seconds. The LED in the SEQUENCE button comes on.

Hold down the SHIFT button and use the UP and DOWN buttons to select the required sequence number (1 – 12). Release the SHIFT button. The seven segment display now indicates the step number.

Use the UP and DOWN buttons to select the required step number ( 1 – 99).

Use the PRESET A and PRESET B faders to set up the required output levels for the step.

Press the SEQUENCE button to program the selected step. The selected step will automatically increment to the next step and the LED in the SEQUENCE button will flash momentarily to indicate that the step was programmed.

Repeat the above procedure for each step to be programmed in the sequence.

Set the SEQUENCE SPEED and FADE TIME controls to the required values for the sequence.

To exit Program Mode hold down the SEQUENCE button for about two seconds.

The desk returns to Playback Mode and the last selected sequence is started and output.

## Editing Sequences

Hold down the SEQUENCE button for about two seconds to enter Program Mode. The LED in the SEQUENCE button comes on.

Hold down the SHIFT button and use the UP and DOWN buttons to select the required sequence number to edit. Release the SHIFT button. The seven segment display now indicates the step number.

Use the UP and DOWN buttons to select the required step number.

**To program a new step** – Use the PRESET A and PRESET B faders to set up the required output levels for the step. Press the SEQUENCE button to program the step.

**To edit a programmed step** – Use the PRESET A and PRESET B faders to set up the required output levels for the step. Note that the PRESET CHANNEL faders must be moved to their programmed levels before they become active. Press the SEQUENCE button to re-program the step.

**To clear a step** – Hold down the SHIFT button and press the SEQUENCE button.

**To clear all the steps in the sequence** – Hold down the SHIFT button and press and hold down the SEQUENCE button for about two seconds.

### **Notes – Programming and Editing Sequences**

*Any of the 12 programmable sequences can be selected by holding down the SHIFT button and using the UP and DOWN buttons or by holding down the SHIFT button and pressing one of the CHANNEL FLASH buttons.*

*Holding down the SHIFT button and pressing the UP and DOWN buttons together selects sequence 1.*

*If the selected sequence is unprogrammed a dot is displayed after the sequence number.*

*Any of the 99 steps can be selected using the UP and DOWN buttons.*

*Pressing the UP and DOWN buttons together selects step 1.*

*If the selected step is unprogrammed a dot is displayed after the step number.*

*For unprogrammed steps, the PRESET CHANNEL faders are immediately active.*

*For programmed steps, the programmed levels are output and the PRESET CHANNEL faders must be moved to their programmed levels before they become active.*

## Playing Back Sequences

The simplest way to play back a programmed sequence is to hold down the SHIFT button and press the CHANNEL FLASH button corresponding to the sequence number (1 – 12).

Alternatively, you can press the SEQUENCE button to enter Playback mode. The last selected sequence is started. To select a different sequence to be output - hold down the SHIFT key and use the UP and DOWN buttons to select the required sequence number.

The FADE TIME and SEQUENCE SPEED controls are then used to determine how the selected sequence is output as described below.

Press and hold down the SEQUENCE button for about two seconds to stop the sequence.

## Manual Playback

Set the SEQUENCE SPEED control to Manual.

Use the UP and DOWN buttons to select the step to be output (if different to the one indicated by the seven segment display)

Press the SEQUENCE button to output the selected step. The selected step will automatically increment to the next programmed step in the sequence.

Use the FADE TIME control to determine whether the outputs snap to their programmed levels or fade to them.

## Automatic Playback

Set the SEQUENCE SPEED control to the required speed.

Use the FADE TIME control to determine whether the outputs snap to their programmed levels or fade to them.

### **Notes – Playing Back Sequences**

*If no sequence is being output, then the 7-segment display will show '--' as an indication that the desk is powered (since there is no separate power LED).*

*Only programmed sequences can be selected and output.*

*In Manual Playback only programmed steps can be selected.*

*Pressing the UP and DOWN buttons together resets the selected step to the first programmed step in the sequence.*

*If the selected step is the current step, then a dot is displayed after the step number.*

*All 24 programmed channels are played back regardless of the Wide setting on the desk.*

*The settings of the SEQUENCE SPEED and FADE TIME controls are stored for the sequence when it is programmed, but they can be overridden live when playing back the sequence. The controls must be moved to their stored settings before they become active.*

## Glossary

<b>A Master</b>	The A MASTER fader controls the maximum output level from the PRESET A faders. In wide mode, this fader controls the maximum output level from all 24 preset channel faders or the stored scene.
<b>Analogue</b>	A control standard which existed before the invention of DMX. 10 Volt control signals provide the dimmer with level information. DMX can be converted to Analogue via the use of a Demux.
<b>B Master</b>	The B MASTER fader controls the maximum output level from the PRESET B faders. In wide mode, this fader controls the maximum output level from all 24 preset channel faders or the stored scene. The B MASTER fader is reversed to facilitate crossfades when moving the A MASTER and B MASTER faders in tandem.
<b>Bump</b>	The American term for Flash.
<b>Bump Button</b>	The American term for a Flash Button.
<b>CE</b>	Conformité Européenne – A European product standard, displayed on all products on sale in the EU.
<b>Channel</b>	A term used to describe a single fader controlling a single light. Dimmers may have 6, 12, 24 or 48 channels. The Juggler can control either 12 or 24 channels (wide mode).
<b>Channel Flash</b>	The CHANNEL FLASH buttons are used to flash individual channels to the level of the GRAND MASTER fader. The actual channels flashed are determined by the FLASH button.
<b>Crossfade</b>	A transition between one scene and another, over a pre-defined time.
<b>Demux</b>	A device which splits a DMX signal into analogue control signals, for use with older generation dimmers.
<b>Desk</b>	A commonly used name for the lighting control equipment. Also sometimes known as Board or Console.
<b>Dimmer</b>	A device which takes a control signal and turns it into a dimmed mains voltage for controlling the brightness of a standard filament lamp.
<b>Dipless</b>	The fades on the Juggler are dipless, ie there will not be a 'dip' in the brightness on stage when crossfading from one scene to another.
<b>DMX-512</b>	Standard communications protocol for dimmers and moving heads. 512 channels of control are digitally multiplexed and sent down a cable to dimmers, which listen for their specific data, according to their start address.

<b>Fade Time</b>	The FADE TIME control determines the crossfade time between the presets A and B in Two Preset Mode or between the preset scene and the stored scene in Wide Mode.
<b>Fader</b>	A fader is used to control the intensity of a light. In addition to the PRESET CHANNEL faders, the Juggler has faders to control the overall output (GRAND MASTER), sequence output (SEQUENCE MASTER), and the level of the A and B presets (A MASTER, B MASTER). The faders on the Juggler can have any position from 0 to 100%. A fader is sometimes referred to as a Slider.
<b>FCC</b>	Federal Communications Commission. The US equivalent of CE.
<b>Flash Button</b>	The FLASH button determines the operation of the CHANNEL FLASH buttons on the desk (disabled, channels 1-12 or channels 13-24).
<b>Grand Master</b>	The GRAND MASTER fader controls the overall output of the desk.
<b>HTP</b>	Highest Takes Precedence. The mixing method used on the Juggler. The various brightness sources (A Preset, B Preset, Channel Flash buttons and Sequence) are mixed on a HTP basis.
<b>IEC320-C14</b>	The type of mains input connector on the inline PSU, sometimes shortened to simply IEC, or referred to as a kettle plug.
<b>Intensity</b>	How bright a light is. Also known as Dimmer.
<b>Key</b>	Another name for a Button.
<b>Law</b>	The curve of the dimmer, which is normally set on the dimmer itself. The Juggler does not allow you to control the fade law.
<b>LED</b>	Light Emitting Diode. A small electrical component which emits light when a current is passed through it in a particular direction. These are used on certain Juggler buttons to indicate selections or presses.
<b>Output</b>	A single desk channel, which is controlled by the Juggler.
<b>Patch</b>	The Juggler desk has a fixed patch. Channels 1 - 24 are patched to DMX output channels 1 – 24.
<b>Pot</b>	A potentiometer, which can be turned to set various values in a given range. The two Pots on the Juggler desk are the FADE TIME and SEQUENCE SPEED controls.
<b>Preset A Faders</b>	The PRESET A faders control the output levels of channels 1 – 12 in association with the A MASTER and GRAND MASTER faders.
<b>Preset B Faders</b>	The PRESET B faders control the output levels of channels 1 – 12 (two preset mode) or channels 13 – 24 (Wide Mode) in association with the B MASTER and GRAND MASTER faders.
<b>Preset Control</b>	The PRESET CONTROL button is only applicable in Wide Mode. The PRESET CONTROL button and the accompanying LEDs are used to control and indicate which master (A MASTER or B MASTER) has control of the preset channel faders, and which master has control of the 'stored' scene. While a timed crossfade is in progress the LED(s) in the PRESET CONTROL button flash.

<b>PSU</b>	Power Supply Unit. The external box of electronics which alter the supplied power voltage into the correct settings for the Juggler.
<b>Rate</b>	Another name for Speed. How fast a sequence is running.
<b>Sequence</b>	A sequence is a series of up to 99 states which are played back sequentially. A programmed sequence can be played back manually or automatically. Up to 12 different sequences may be programmed on the Juggler desk.
<b>Sequence Button</b>	The SEQUENCE Button has several functions depending on the operating mode (see Sequence section for further details).
<b>Sequence Master</b>	The SEQUENCE MASTER fader is used to control the maximum output level from the sequence during playback.
<b>Sequence Speed</b>	The SEQUENCE SPEED control is used for setting the speed of sequences on the Juggler. When the control is set to Manual, the sequence is only advanced when the SEQUENCE Button is pressed.
<b>Seven Segment</b>	The Seven Segment display shows the step number in the current sequence or the sequence number if the SHIFT button is held down.
<b>Shift Button</b>	The SHIFT button has a number of functions relating to Sequences (see Sequence section for further details).
<b>Slider</b>	See Fader.
<b>Snap</b>	A fade which happens instantly.
<b>Speed Pot</b>	See Sequence Speed control.
<b>Terminator</b>	A 120Ω ½ Watt resistor soldered between pins 2+3 of a male XLR, which provides protection against signal 'bounce'. This should be placed at the end of a DMX signal chain.
<b>Up/Down Buttons</b>	The UP and DOWN buttons below the seven segment display are used to select the sequence number or step number.
<b>Wide Button</b>	The WIDE button is used to switch the desk between two preset operation (12 channel) or wide mode operation (24 channel).
<b>X-fade</b>	Another name for Crossfade. A fade from one scene to another.
<b>XLR</b>	The connector range used for the DMX output and Power connectors on the back of the Juggler. There are various different XLR connectors available, primarily 3-pin (used for Audio and some cheap DMX devices), 4-pin (used for power and colour scrollers) and 5-pin (used for DMX devices). Note that you should never connect a device with a 4 pin XLR to any other device unless they were built to be used together. Different manufacturers use different voltages on these pins, and misuse could result in damage to one or both devices.
<b>Zero 88</b>	The manufacturer of the Juggler desk.

## Technical Specification

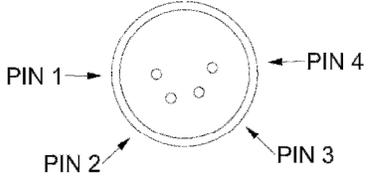
### External Power Supply

In-line external power supply.

Mains voltage 90-253V, 47-63Hz (CEE22 inlet).

Power consumption < 20W.

4 pin male XLR connector on desk:

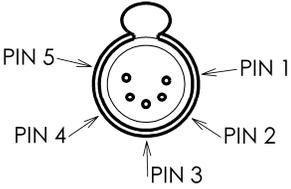
Connector	Pin Number	Power
	1	0V
	2	+5V DC @200mA
	3	+12V DC (not used by desk)
	4	Not Connected
	Shell	GND

### DMX Output

5 pin female XLR, unisolated with voltage protection.

Data on DMX channels 1-24 only.

DMX-RDM Hardware Ready.

Connector	Pin Number	DMX Output
	1	Signal Ground (0V)
	2	DMX Drive Complement (1-)
	3	DMX Drive True (1+)
	4	Not Connected
	5	Not Connected





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