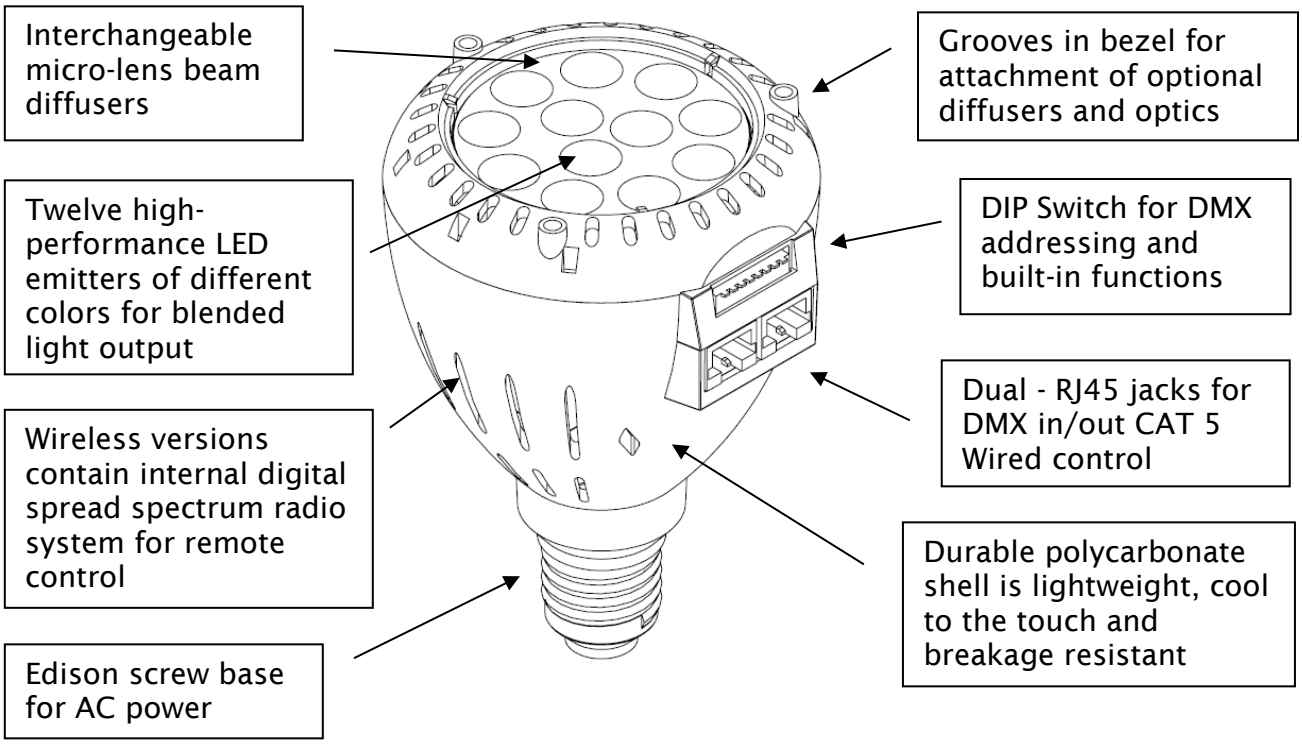
ZR30

Adaptable LED DMX Lamps

OVERVIEW:

The Luxium ™ ZR30 lamps are a family of versatile and compact 'screw-in' retrofit PAR30 LED lamps that have the performance of professional stage instruments. They are capable of DMX512 or stand-alone operation and have a unique ability to output a full range of bright, calibrated colors or pre-defined white CCT's with high color-rendering effect.

The ZR30 may be connected to a DMX512 controller via a wireless DMX transmitter or with wired control using the RJ45 jack on the side of the lamp. Lamps may be controlled individually or in groups depending on an assigned DMX address. Multiple ZR30s may be daisy-chained onto a single DMX512 cable. The DMX address or a set of pre-defined ZR30 operating modes and sequences are selected via an 8-position DIP switch on the side of the lamp.



The ZR30 Series of DMX LED Lamps:

This document covers the basic operation of the ZR30 family of DMX lamps that includes:

ZR30-AX – Adaptable-Color with wireless DMX: (full color gamut and calibrated white CCTs)
ZR30-DX – Adaptable-Color with wired DMX: (full color gamut and calibrated white CCTs)
ZR30-AW – Selectable-White with wireless DMX: (adjustable CCTs)
ZR30-DW – Selectable-White with wired DMX: (adjustable CCTs)

CONNECTING POWER:

To supply power just screw the ZR30 into any E26 socket. The ZR30 has a wide input power supply, so will operate on any voltage that your likely to find on an E26/E27 "medium screw base" lamp socket. See appendix for full specs.

> ***WARNING**: The ZR30 is powered by a switching power supply and is not intended to be dimmed by a line-voltage dimmer. Please connect directly to the power-line mains.*

CONNTECTING DMX512:

The ZR30 products can be connected to a DMX512 control system by either wired or wireless connection depending on the model being used.

A wired ZR30 (models DX1 or DW1) receives DMX512 via an RJ-45 connector as detailed in the DMX512 standard and include two RJ-45 connectors that are wired identically. Either may be used as the input. The other jack may be used to daisy-chain the DMX512 wiring too additional ZR30 lamps. Adaptors are commercially available to convert the DMX512 5-pin XLR cable to an RJ45 connector on CAT5 cable.

The pin-out of the RJ-45 is as follows:

Pin	Wire Color	Signal
1	White w/ Orange	Data 1 '+'
2	Orange	Data 1 '–'
3	White w/ Green	Data 2 '+' (passed thru only)
4	Blue	Unused
5	White w/ Blue	Unused
6	Green	Data 2 '–' (passed thru only)
7	White w/ Brown	Signal Common 1
8	Brown	Signal Common 2

> ***NOTE**: The ZR30 does not include electrical termination of the DMX512 line. In many instances, DMX512 works perfectly well without electrical termination of the cable. If termination is found to be necessary, an external termination plug must be used.*
>
> ***Warning:** Accidental connection too non-DMX512 equipment (e.g., an Ethernet Hub at a patch bay) may result in damage to equipment. Pins 4 and 5 may carry voltages outside the EIA- 485 range in telecom applications (e.g., telephone ringing). Pins 4 and 7 may carry voltages outside the EIA-485 range in other applications (e.g., some manufacturers whose distributed DMX512 buffering products require low voltage DC power may use these wires).* ***Plugging into non-DMX systems could cause serious damage to the ZR30***

A wireless ZR30 (models AX1 and AW1) receives a DMX512 signal via a spread-spectrum radio transmission. (available from Luxium). The transmitter is connected to a DMX console or computer and then synchronized with the ZR30 lamps for a secure wireless connection that works the same way as a wired DMX system. Note that the wireless ZR30 models also include an RJ-45 connector that can be used to interface with additional wired DMX products. (see wireless user instruction sheet for more details)

SWITCH FUNCTIONS (all models):

Operating modes for the ZR30 are set via an 8-position switch on the side of the lamp.

When 1 is ON the switches 2 – 8 are used for setting static colors and modes.

When 1 is OFF the switches 2 – 8 are used for setting unique DMX addresses for control of single lamps or groups of lamps.

Orientation

If you hold the ZR30 lamp with the lens up and the screw base down, the switch will be correctly oriented. In the following discussion, a switch shown with the value of '1' is a switch that is in the up position (toward the lens) and a switch that is shown with a value of '0' is a switch that is in the down position (toward the screw base).

Switch Summary

The following table summarizes the ZR30 switch functionality.

SWITCHES	MODES	SETTINGS
0uuu uuuu	Blended-Color - 4-ch DMX512 mode*	uuu uuuu = zero-based number (0…127)
1010 uuuu	Color-Mixer - 6-channel DMX512 mode*	uuuu = zero-based unit number (1…15)
1000 cccc	Selectable-White - Static CCT mode	cccc = CCT selector (0…15) from table
1001 cccc	Selectable-Color - Static RGBW mode	cccc = Color selector (0…15) from table
1011 0bbb	Ballyhoo mode	bbb = Ballyhoo pattern selector (0…7)

Other switch settings are for factory use only.

**The DMX512 modes requires a control signal from a source such as a mobile app, computer program or lighting console. The source creates a DMX signal that is used by the lamp to blend the desired output color and produce the desired brightness level. Other modes use only the DIP switch for control.*

For wireless DMX systems there is a way to (UNPAIR) using the DIP switch.

1. Begin with the light powered off
2. Set DIP switch to 1011 1100
3. Turn power on to the light
    a. Light should flash lime-green-lime-green repeatedly
4. Change the DIP switch to 1011 1101 (flip right most switch up)
    a. The light will rapidly flash red color, 5 seconds later the red flashing will stop
    b. use the DIP to set the desired DMX address value
5. The light is now ready to pair with a wireless DMX transmitter

The following paragraphs describe each operating mode in detail.

DMX MODES:

DMX modes are used to control single lamps or groups of lamps which are set up with a DMX address and controlled using a wired or wireless connection to a DMX controller.

Blended-Color - 4-channel DMX512 (ZR30 – AX1 or DX1)

DMX is an abbreviation for DMX512-A, the ESTA Standard for controlling lighting equipment where up to 512 channels of information are sent one by one from a controller source to many different lamps.

In DMX mode each ZR30 receives four channels of DMX information over a wired or wireless interface. The channels are assigned too Red, Green, Blue, and White (RGBW) in that order. Lamp output is based on the request implied by the DMX512 RGBW channel inputs. A colored beam is created by combing the four channels of DMX into an expertly blended and calibrated output using Luxium's advanced lighting engine.

Each lamp is given a user-selected address that represents a sequence of four DMX channels that will be dedicated to that lamp in the DMX universe. The lamp address is set by DIP switches on the side of the lamp. Because the lamp has 7 switches available for address assignments it is possible to have up to 128 different lamp addresses, which use 4 DMX channels each, in a DMX512 universe (128 sets of RGBW channels). Note that more than one lamp may have the same address setting so that lamps can be "grouped".

The switch setting on the lamp represents a sequential group of four DMX channels that a lamp will use for generating light output. The DMX sequences can be calculated as: First DMX channel in an RGBW set = [(position x 4) + 1]. For example; with the DIP switches set to 'zero' the red channel will be at [(0x4) + 1 = 1]. The green channel will be at 2, blue at 3, and white address will be 4.

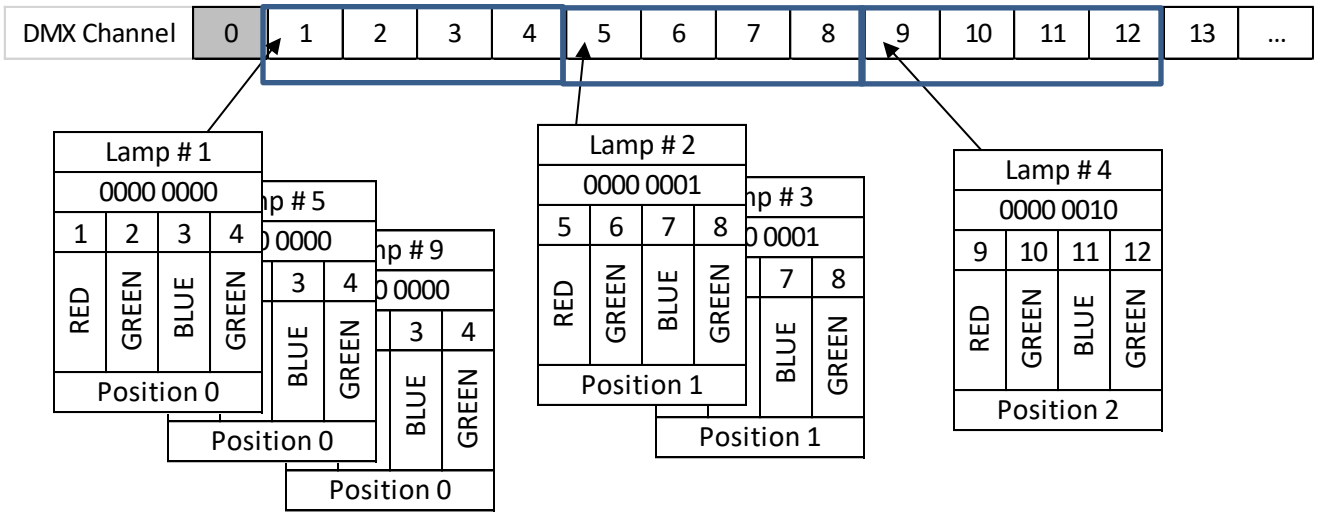
Setting the DIP switches to 0000 0010 will create a binary value equal to (decimal) 2. So, with this switch setting the red channel will be controlled by DMX channel 5. A complete table is included at the back of the user guide to assist in setting the DIP switches.

Switches: 0uuu uuuu

Multiple lamps can be set up with different address assignments depending on the desired operation and control plan. It is important to keep track of lamp designations and locations and switch settings. Below is an example of how lamp information might be organized by a designer who is setting up a show or display area.

Lamp #	Position	DIP Switch	DMX Channels
1, 5, 9	0	0000 0000	1- 4
2, 3	1	0000 0001	5 – 8
4	2	0000 0010	9 – 12
6	3	0000 0011	13 – 16
8	4	0000 0100	17 - 20
-	-	-	-
7, 10	9	0000 1001	37 - 40

Each lamp in the system is set to listen to a unique set of DMX channels



Color-Mixer - 6-channel DMX512

In Color-Mixer mode the lamp assigns each internal LED string to a DMX channel. Normal color blending algorithms are bypassed so each available color may be adjusted individually. However, heat compensation routines are still operational to prevent color drift. Six address are decoded so that all output PWMs are supported with direct control of each LED string. A small range of unit addresses are supported so that multiple units may be used for different color blends.

The DMX address for the lamp is computed as: Address = ((unit x 6) +1).

Switches: 1010 uuuu

STATIC MODES:

Static modes are used for applications where a lamp or group of lamps needs to show a pre-selected color or white CCT. The lamp output is factory calibrated to display a specific point on the gamut to ensure repeatability and consistency across multiple lamps. When the lamps are set to a specific switch setting all of them will show the same color. The lamps can be operated in either a Selectable-White mode or a Selectable-Color mode.

Selectable-White

In static Selectable-White mode the lamp displays one of 16 pre-defined LED combinations to produce a single pre-calibrated CCT at full intensity. Selectable-White mode is used for applications where a calibrated white light of a specific color temperature is required. When in this mode Lamp does not respond to DMX512 input.

Switches: 1000 cccc

cccc settings

0000 = No output
0001 = 2400K
0010 = 2700K
0011 = 2850K
0100 = 3000K
0101 = 3250K
0110 = 3500K
0111 = 3850K
1000 = 4000K
1001 = 4500K
1010 = 5000K
1011 = 5600K
1100 = 6500K
1101 = Half Red
1110 = Half Blue
1111 = Max White (all on)

Selectable-Color

In static Selectable-Color mode the lamp displays one of 16 pre-defined color at full intensity. Static Full-color mode is used for applications where a lamp or group of lamps needs to show a consistent pre-selected color. The colors are calibrated to display a specific point on the gamut and are factory calibrated so all lamps will show the same color when set to a specific switch setting. When in this mode the lamp does not respond to DMX512 input.

Switches: 1001 cccc

cccc settings

0000 = No output
0001 = Red
0010 = Green
0011 = Yellow
0100 = Blue
0101 = Magenta
0110 = Cyan
0111 = Blended White from RGBY (This setting matches DMX RGB=On, W=Off, 6500K)
1000 = B.A. (Bastard Amber)
1001 = Special Lavender
1010 = Steel Blue
1011 = Violet
1100 = Blue-Green
1101 = Orange
1110 = Tungsten (2700K, high CRI)
1111 = All White, RGBW
(This setting matches DMX RGBW fully on, CCT~4000K

Ballyhoo

Ballyhoo mode is used for putting the lamp into an automatic operation mode that is able to show a repeating range of color and intensities. In this mode the ZR30 will run one of 8 user-selectable color sequences. These sequences are pre-defined by an internal program stored inside the lamp system. When in this mode the ZR30 does not respond to the DMX512 input.

Switches: 1011 0bbb (bbb = Ballyhoo pattern selector as follows)

0bbb settings

0000 = six-color cycle: [magenta, blue, cyan, green, yellow, red] medium-speed fades.
0001 = six-color cycle: As above. slow-speed fades.
0010 = seven-color cycle: As above with white interspersed, medium-speed fades.
0011 = salsa: pseudo-random bounce of saturated colors.

0100 = traffic: [blue-green, yellow, red] snap to each color.
0101 = x-mas: [red, tungsten, blue-green, tungsten] slow fade.
0110 = winter wonderland: [cyan, steel-blue, white, steel-blue, blue] slow fade.
0111 = sunset: [special-lavender, amber, orange, violet, blue, black, tungsten], slow fade.

ENVIRONMENTAL:

The ZR30 is specified to operate in ambient temperatures from 5 to 40 degrees C and relative humidity from 10 to 90%, non-condensing. Operation beyond these limits is not guaranteed.

The ZR30 contains a low-noise fan to move air through the unit housing. Fan operation is driven by the temperature measured on the LED heat-sink. Leave at least ½ inch (12mm) of clear space surrounding the ZR30 housing to facilitate air flow.

Temperature Errors:

The ZR30 will not operate if the temperature is below 5C or if the temperature sensor is missing or damaged. In the case of a low temperature error, the blue emitter will blink once per second. When the internally-measured temperature rises above this minimum value, normal operation will resume automatically.

If the temperature on the LED heatsink reaches 90C, the ZR30 will shut down its output to prevent internal damage. The outputs will stay off until the temperature on the heatsink is seen to drop to 50C. A low-level Red glow is the indication that the ZR30 has entered over-temperature shutdown.

Wireless Setup (models AX1 and AW1):

Before a ZR30 wireless lamp can be operated with DMX it must be paired with a transmitter. Multiple lamps can be paired with the same transmitter and a lamp can only be paired with one transmitter at a time. To switch to another transmitter a lamp must first by un-paired before pairing with a different transmitter. See the separate wireless instruction sheet for details.

Appendix I. Specifications*:

Voltage: 90VAC … 250VAC, 50/60Hz

Power: 25W (at maximum output)

Environmental: 5C … 45C, 10-90%RH non-condensing.

Control Input: DMX512-A on RJ45 connector as described in ANSI E1.11-2008

Warning: *Accidental connection to non-DMX512 equipment (e.g., an Ethernet Hub at a patch bay) may result in damage to equipment. Pins 4 and 5 may carry voltages outside the EIA- 485 range in telecom applications (e.g., telephone ringing). Pins 4 and 7 may carry voltages outside the EIA-485 range in other applications (e.g., some manufacturers whose distributed DMX512 buffering products require low voltage DC power may use these wires for this purpose). Plugging into nonconforming systems could cause serious damage.*

Typical Light Output (measured at 1 meter, center-beam-candlepower CBCP) in lux:

RGB White:	6100	CCT = 6500K +/- 200K
RGB+White:	6800	CCT = 4500K +/- 500K
White (warm):	3190	CCT = 2700K +/- 300K
Red:	1700	
Green:	2980	
Blue:	570	
Yellow:	2250	

Beam Angle (Built-in Diffuser): 23 degrees

Static Colors: 15, switch selectable

Static Whites: 12 selectable CCTs from 2700K to 6500K, with high CRI (typically >94)

Auto color-sequencing patterns: 8, switch selectable

DMX512 modes: RGBW with expert color blending – full DMX512 address range

RGBW with expert color blending – full DMX512 address range

RGBLW – 6 channel control mode allows individual LED emitter control

For full product specifications see appropriate product datasheet.

Appendix II. 4-channel DMX512 Address Settings:

ZR30 occupies 4 slots on the DMX512 network, starting at the address shown in this chart.

Switch	DMX
0000 0000	1
0000 0001	5
0000 0010	9
0000 0011	13
0000 0100	17
0000 0101	21
0000 0110	25
0000 0111	29
0000 1000	33
0000 1001	37
0000 1010	41
0000 1011	45
0000 1100	49
0000 1101	53
0000 1110	57
0000 1111	61
0001 0000	65
0001 0001	69
0001 0010	73
0001 0011	77
0001 0100	81
0001 0101	85
0001 0110	89
0001 0111	93
0001 1000	97
0001 1001	101
0001 1010	105
0001 1011	109
0001 1100	113
0001 1101	117
0001 1110	121
0001 1111	125

Switch	DMX
0010 0000	129
0010 0001	133
0010 0010	137
0010 0011	141
0010 0100	145
0010 0101	149
0010 0110	153
0010 0111	157
0010 1000	161
0010 1001	165
0010 1010	169
0010 1011	173
0010 1100	177
0010 1101	181
0010 1110	185
0010 1111	189
0011 0000	193
0011 0001	197
0011 0010	201
0011 0011	205
0011 0100	209
0011 0101	213
0011 0110	217
0011 0111	221
0011 1000	225
0011 1001	229
0011 1010	233
0011 1011	237
0011 1100	241
0011 1101	245
0011 1110	249
0011 1111	253

Switch	DMX
0100 0000	257
0100 0001	261
0100 0010	265
0100 0011	269
0100 0100	273
0100 0101	277
0100 0110	281
0100 0111	285
0100 1000	289
0100 1001	293
0100 1010	297
0100 1011	301
0100 1100	305
0100 1101	309
0100 1110	313
0100 1111	317
0101 0000	321
0101 0001	325
0101 0010	329
0101 0011	333
0101 0100	337
0101 0101	341
0101 0110	345
0101 0111	349
0101 1000	353
0101 1001	357
0101 1010	361
0101 1011	365
0101 1100	369
0101 1101	373
0101 1110	377
0101 1111	381

Switch	DMX
0110 0000	385
0110 0001	389
0110 0010	393
0110 0011	397
0110 0100	401
0110 0101	405
0110 0110	409
0110 0111	413
0110 1000	417
0110 1001	421
0110 1010	425
0110 1011	429
0110 1100	433
0110 1101	437
0110 1110	441
0110 1111	445
0111 0000	449
0111 0001	453
0111 0010	457
0111 0011	461
0111 0100	465
0111 0101	469
0111 0110	473
0111 0111	477
0111 1000	481
0111 1001	485
0111 1010	489
0111 1011	493
0111 1100	497
0111 1101	501
0111 1110	505
0111 1111	509

For DMX geeks:

The dip switch sets the zero-based unit number. The DMX base address is computed as:

DMX512 Address = ((unit_number x 4) + 1)