

C-SERIES USER GUIDE

MODEL # C-30, C-75, C-200

©2000 Color Kinetics Incorporated. Color Kinetics is a registered trademark and Chromacore, ColorBlast, ColorPlay, iColor, iPlayer and SmartJuice are trademarks of Color Kinetics Incorporated.

Specifications subject to change without notice.

MAN-0008 Rev 03

COLOR KINETICS INCORPORATED

10 MILK STREET, SUITE 1100

BOSTON, MA 02109 USA

TEL 888 FULL RGB

TEL 617 423 9999

FAX 617 423 9998

INFO@COLORKINETICS.COM

WWW.COLORKINETICS.COM

GETTING STARTED

Congratulations on your purchase, not to mention your good taste. Welcome to a more colorful world brought to you by Color Kinetics and Chromacore™, our patented technology that generates colored light and effects using a microprocessor to control Red, Green and Blue LEDs. This guide contains important information not only on operating your new C-Series products, but also on using them safely. For your protection, please read it carefully before you embark on your colorful adventure. There are very few rules, but those that exist are there for your safety.

TALK THE TALK

For the most part, the language of Color Kinetics and Chromacore is oriented around three categories: Control, Effects, and Variations.

Control

“Control” refers to input; how you choose to control the C-Series in order to produce the desired Shows. The C-Series can operate via either of these control methods:

- Networked (externally directed control) or
- Stand Alone (“on-board” or built-in control)

You can set the C-Series to take external signal via either of the following methods of Networked control:

- DMX512 control
- PC control

Effects (For Stand Alone operation only.)

“Effects” refer to what type of output, or displays, are produced. With the C-Series you can select any of the following Effects in Stand Alone control:

- Fixed Color
- Color Wash
- Cross Fade
- Random Color
- Fixed Color Strobe
- Variable Color Strobe

Variations (For Stand Alone operation only.)

Once you have chosen the desired Effect, you can then choose different Variations which will further modify the Effect by adjusting factors such as:

- Color
- Speed
- Brightness
- Saturation
- Cycle Direction
- Strobe Rate

Not every Variation is available with every Effect. Each Effect has a unique combination of variables. But if you follow the Color Kinetics Easy Step Program you can start experimenting to your heart’s content:

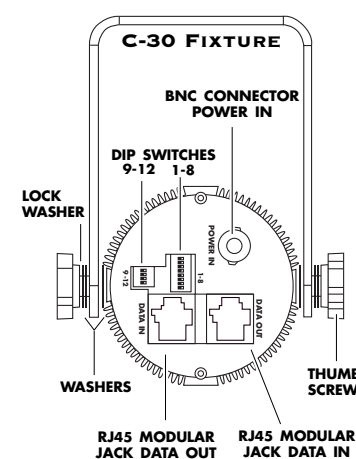
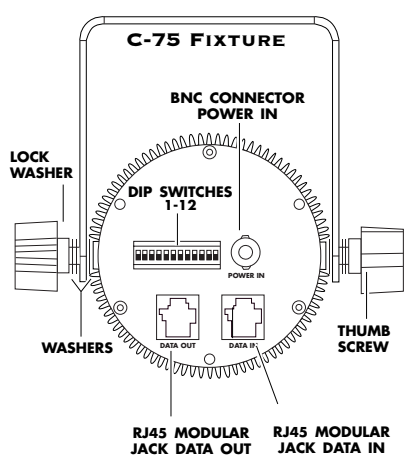
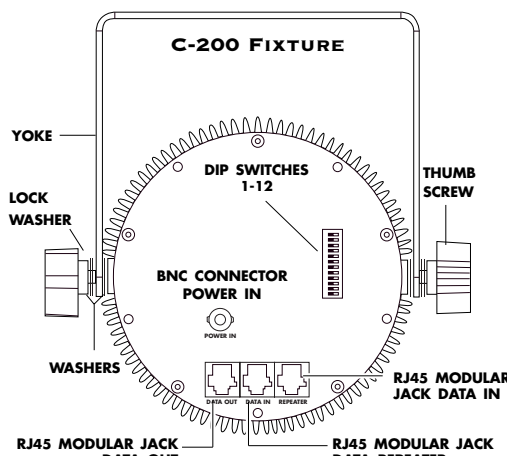
1. Choose a method of Control
2. If using Stand Alone control, pick a desired Effect
3. If using Stand Alone control, customize the Effect within the existing range of Variations
4. Sit back and enjoy the compliments—the C-Series isn’t the only thing with a brain!

IN THE BEGINNING Setting Up Your New System

This section examines how to find your way around the C-Series and how Chromacore tells the C-Series to “think.”

Lay of the Land

The following illustrations indicate the components of each C-Series fixture.



with a BNC connector to securely connect the power supply to the unit.

To power one C-Series fixture, you will need:

- C-Series Power Supply (This is a 24VDC unit with a BNC connector on the output.)
- International users need to furnish an appropriate power cord.

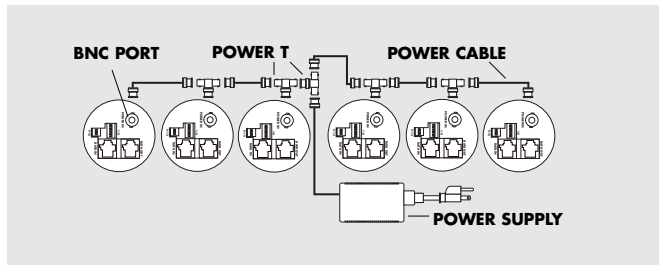
It is possible to run multiple C-Series lights, depending on model, from one C-Series Power Supply. This requires a few accessories to “chain” them together, as you will see below. Each C-Series Power Supply has the ability to run ten (10) C-30s, five (5) C-75s, or two (2) C-200s.

To power multiple C-Series fixtures, you will need:

- C-Series Power Supply (This is a 24VDC unit with a BNC connector on the output.)
- Power-T Splitters—used to connect BNC cables. These attach directly to BNC connector on C-Series.
- BNC-BNC Power Cables—Cables used in between each unit.
- International users need to furnish an appropriate power cord.

Here’s a typical example of powering six C-30s from one C-Series Power Supply.

DIAGRAM 1: EXAMPLE OF A “MULTI-UNIT” POWER NETWORK



Equipment used in Diagram 1:

- 6 C-30 fixtures
- 5 Power Cables (BNC-BNC)
- 5 Power T Splitters
- 1 C-Series Power Supply

Alternative power options such as a Multi Output Power Supply are available from Color Kinetics. Call Color Kinetics or a Color Kinetics Authorized Distributor for more information.

Do the Dip

Your C-Series has been pre-programmed with an assortment of Shows. The back of each C-Series light holds the key to setting your colorful world. Control, Effects, and Variations are all determined by setting the DIP switches. We suggest you reposition DIP switches with a blunt object such as a stylus or pen cap, not with a sharp object which may damage the units.

In order to select or change the Control, Effects, or Variations, disconnect the power to the C-Series unit, configure the DIP switches according to the desired Show, and then repower the unit. New Shows will not be displayed until the unit is repowered.

As we mentioned, the C-Series products generate colors through use of Control, Effects, and Variations. These in turn are communicated to the unit’s brain (its microprocessor) by setting the DIP switches on the reverse side of each unit to the prescribed positions. There are a total of 12 DIP switches on each unit. Master the switches or you master the product.

Keep in mind that in order to select or change the Control, Effects or Variations, you must disconnect the power to the C-Series unit, configure the DIP switches according to the desired Show, and then repower the unit. New Shows will not be displayed until the unit is repowered.

THE WORLD ACCORDING TO COLOR KINETICS

If you look at nothing else in this guide, don’t miss this Settings Table (Table 1). This table is the key to what each DIP switch setting governs. You’ll see from this table that in general, Dip Switches #10-12 determine the method of Control and the Effect. Dip Switches #1-9 govern the Variations.

Fade Effect differs from a Color Wash Effect in that a Cross Fade alternates between only two colors while the Wash cycles through the color spectrum. In Cross Fades, users will select a Starting Color and an Ending Color (don’t choose the same color!) and then select the desired Speed to go from the first to the second and back again.

CYCLE DIRECTION: The sequence in which colors move through the spectrum. The sequence can be in either clockwise (ROYGBIV) or counterclockwise (VIBGYOR) direction.

DMX AND DMX512: DMX is a shortened form of “digital multiplex.” It describes a standard method of data transmission that makes possible the interconnection of lighting control equipment by different manufacturers. The DMX512 protocol was developed in 1986 by a committee of the USITT (United States Institute for Theater Technology) to provide a standard interface with which to control dimmers from lighting consoles. In DMX512, each data link supports up to 512 dimmers (hence the name and number – clever, no?).

DIP SWITCH: Dip switches are tiny binary devices located on the back of each C-Series lighting fixture in banks of 12, signaling either ON or OFF. With a single dip switch there are two possible combinations or settings, with two dip switches there are 2^2 or 4 possible settings, and so on. With

nine switches, a total of 512 (remember DMX512), or 2^9, combinations are possible. Color Kinetics products use a “base zero” address where a given setting is determined by the sum of the value of the switches in the ON (or “up”) position, plus one.

ENDING COLOR: This Variation allows the user to define the Ending Color of the Cross Fade Effect. For instance, if a Cross Fade goes from red to blue, the Starting Color Variation would be set to red and the Ending Color would be set to blue.

FIXED COLOR: (aka, Constant Color) The Fixed Color Effect allows the static display of any ONE of 512 possible colors. Fixed Color is generated by blending (or independently displaying) any of the primary colors (Red–8 shades of red, Green–8 shades of green, and Blue–8 shades of blue). White light will be produced when all colors (Red, Green and Blue) are added together (remember additive color mixing, where all colors combine to white?).

LED: (Light Emitting Diode) The source of light used by the Color Kinetics™ C-Series and the secret to its ultra-long source life, LEDs have a predicted source life rated at 100,000 hours under normal operating conditions – that’s 11.4 years of continuous use! An LED is a p-n junction, solid-state diode that emits light through the combination of specially prepared high

CONTROL

Your C-Series can be set to either control itself or be controlled via an external source. If it controls itself, (Stand Alone operation,) it will repeat the same Show for as long as it is being powered. If externally controlled, (Networked operation,) it will run according to the data fed to it from the external controller.

Networked Operation

If you are using a DMX512 controller or a PC to control the C-Series, you need to set each C-Series unit to Networked mode. If this is your method of Control, you can skip directly to the “Wired” section.

Stand Alone Operation

If you’re using Stand Alone control, proceed directly to the next section to choose the desired Effect.

EFFECTS

Effects work in Stand Alone operation only. See the previous section on Control if you are externally directing the C-Series units from a networked controller.

There are six types of Effects possible in Stand Alone operation:

- Fixed Color
- Cross Fade
- Fixed Color Strobe
- Color Wash
- Random Color
- Variable Color Strobe

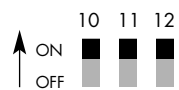
FIXED COLOR

Fixed Color allows the static display of any one of 512 possible colors. A Fixed Color Effect is generated by blending the primary colors of Red, Green and Blue.

To select Fixed Color, first set the switches for the Fixed Color Effect (remember that ON is the UP position).

CHOOSE THE EFFECT: FIXED COLOR

Switches #10, 11 and 12: ON



CHOOSE THE VARIATION: FIXED COLOR

The Variation on Fixed Color is choosing one of 512 discrete colors.

Discrete Color

Switches #1-3 control hues of Red. Switches #4-6 control hues of Green. Switches #7-9 control hues of Blue. To illustrate the principles behind the DIP switch configurations let’s look at Blue (display of Reds and Greens follow similar prin-

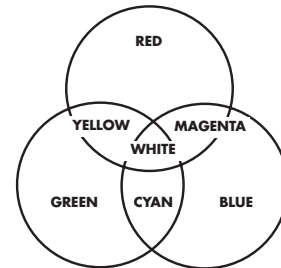
TABLE 1 SETTINGS TABLE													
SWITCH #	1	2	3	4	5	6	7	8	9	10	11	12	
FIXED COLOR	Add levels of Red			Add levels of Green			Add levels of Blue			On	On	On	
COLOR WASH	Speed .5 sec - 2 hrs						Satura-tion	Bright-ness	Cycle Direc-tion	On	On		
CROSS FADE	Ending Color red, green, blue, cyan, magenta, yellow, white, black			Starting Color red, green, blue, cyan, magenta, yellow, white, black			Speed from starting color to ending color and back again			On			
RANDOM COLOR	Speed .05 sec - 3 min					Satura-tion	Starting Color red, green, blue, cyan, magenta, yellow, white, black				On		
FIXED COLOR STROBE	Color red, green, blue, cyan, magenta, yellow, white, black						Strobe Rate 20/sec - 2/sec			On			
VARIABLE COLOR STROBE	Speed (color advance)					Cycle Direc-tion	Strobe Rate 20/sec - 2/sec			On		On	
PC-DMX	PC Address									On			
DMX512	DMX512 Address												

ciples). In general, the fewer switches in the ON position, the lighter the shade of color which is displayed. So, to get a very light “sky blue,” turn ON only Switch #7. The next hue would be Switch #8 only and so on.



Remember, throughout this guide, this symbol ■ indicates the switch should be ON.

With additive color mixing (thanks to Chromacore technology’s ability to think), you can mix Reds, Greens and Blues to produce secondary colors. The following illustration shows how secondary colors are produced:



In other words, if you want:

Desired Color

- Green
- Yellow
- Magenta
- Cyan
- White

Mix

- Green
- Green and Red
- Blue and Red
- Green and Blue
- Red, Green, Blue

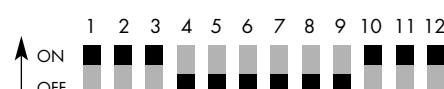
(Remember additive color mixing!)

Let’s look at one more example before we move on to the next Effect. Refer to the table below. If you’d like to produce purple (or “Magenta”) hues, you’ll need to mix Red (Switches #1-3) and Blue (Switches #7-9). That means that Switches #4-6 (the Greens) should remain in the OFF position.

TABLE 2 COLOR WASH SPEED									
SWITCH #	1	2	3	7	8	9			
0	No magenta								
1	Lightest	■							
2	A little more		■						
3	A bit more	■		■					
4	Still more		■		■				
5	Even more	■		■		■			
6	More intense		■		■		■		
7	Most intense	■		■		■			

EXAMPLE OF FIXED COLOR EFFECT

Full Intensity Red



COLOR WASH

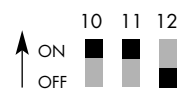
The Color Wash Effect moves sequentially around the spectrum of colors in either clockwise (ROYGBIV) or counter-clockwise (VIBGYOR) direction, repeating the same cycle over and over, at user-definable speeds. The Color Wash differs from Random Color which has no distinct or sequential pattern of color generation.

To select Color Wash, first set the switches for the Color Wash Effect (remember that ON is the UP position).

CHOOSE THE EFFECT: COLOR WASH

Switches #10 and 11: ON

Switch #12: OFF



CHOOSE THE VARIATIONS: COLOR WASH

The Color Wash can be varied by Speed, Saturation, Brightness and Cycle Direction.

Speed

In Color Wash, Speed is defined as the amount of time which elapses between the initial display of the Starting Color in Cycle One (Red in ROYGBIV, or Violet in VIBGY-OR), and its next display which begins Cycle Two. There are 64 different speeds which can be set in the Color Wash Effect, ranging from as fast as .5 seconds to as long as 2 hours to complete a single cycle. Switches #1-6 control the speed options. For the fastest speed (.5 sec.), all switches

TABLE 2 COLOR WASH SPEED						
SWITCH #	1	2	3	4	5	6
0	0.5 sec					
1	0.6 sec	■				
2	0.7 sec		■			
3	0.8 sec	■	■			
4	0.9 sec			■		
5	1.1 sec	■			■	
6	1.2 sec		■			■
7	1.4 sec	■	■			
8	1.6 sec			■		
9	1.9 sec	■			■	
10	2.2 sec		■			■
11	2.5 sec	■	■			
12	2.9 sec			■		
13	3.3 sec	■			■	
14	3.8 sec		■			■
15	4.4 sec	■	■			
16	5 sec			■		
17	5.8 sec	■			■	
18	6.7 sec		■			■
19	7.7 sec	■	■			
20	8.8 sec			■		
21	10.2 sec	■			■	
22	11.7 sec		■			■
23	13.4 sec	■	■			
24	15.4 sec			■		
25	18 sec	■			■	
26	20 sec		■			■
27	24 sec	■	■			
28	27 sec			■		■
29	30 sec	■			■	
30	35 sec		■			■
31	40 sec	■	■			
32	45 sec			■		■
33	50 sec	■			■	
34	1 min		■			■
35	1.1 min	■				
36	1.3 min		■			■
37	1.5 min	■	■			
38	1.8 min			■		■
39	2 min	■			■	
40	2.3 min		■			■
41	2.7 min	■			■	
42	3 min		■			■
43	3.5 min	■	■			
44	4 min			■		■
45	4.5 min	■			■	
46	5 min		■			■
47	5.5 min	■	■			
48	6 min			■		■
49	6.5 min	■			■	
50	7 min		■			■
51	8 min	■			■	
52	9 min		■			■
53	10 min	■	■			
54	12 min			■		■
55	15 min	■	■			■
56	20 min			■		■
57	25 min	■			■	
58	30 min		■			■
59	40 min	■	■			
60	50 min			■		■
61	1 hr	■			■	
62	1.5 hrs		■			■
63	2 hrs	■	■			

A GLOSSARY OF TERMS

BRIGHTNESS: aka (that’s detective talk for also known as) “intensity” or “luminance” of light. A measure of the rate of flow of light energy (luminous flux) per unit area leaving a surface in a particular direction. (For the purpose of this guide, a lower level of Brightness has nothing to do with being intellectually challenged.)

COLOR: Color specification can be described in many ways, but in general three qualities describe “color:” brightness (the intensity of the color), hue (the wavelength which determines how similar it is to one or a combination of the perceived colors red, yellow, green or blue), and saturation (the amount of white light mixed in). We can see approximately 200 hues with the naked eye. The other colors we can identify are due to variations in brightness and saturation.

COLOR WASH: A Color Wash Effect moves sequentially around the spectrum of colors in either clockwise (ROYGBIV) or counterclockwise (VIBGY-OR) Cycle Direction at user definable speeds. Color Wash differs from the Random Color Effect which has no distinct or sequential pattern of color generation.

CROSS FADE: Cross Fade Effects slowly increase the intensity of one color of light while simultaneously reducing the intensity of another color. A Cross

fade effect differs from a Color Wash Effect in that a Cross Fade alternates between only two colors while the Wash cycles through the color spectrum.

SATURATION: This Variation refers to the purity of color, or the amount of white light which has been mixed into a color. More technically, it describes how much of a color is near the dominant wavelength. Primary colors are fully saturated, while pastels are less saturated.

SHOW: In Stand Alone operation, a “Show” is the display generated by one complete cycle of an Effect. In Networked operation, a “Show” is determined by the controller being used.

SPEED: Determines the duration of an Effect. In Color Wash, Speed is defined as the amount of time which elapses between the initial display of the Starting Color in cycle one (red in ROYGBIV, or violet in VIBGYOR), and its next display which begins cycle two. In Cross Fade, Speed is defined as the amount of time which elapses between the initial display of the Starting Color to the display of the Ending Color and back again (round trip). In Random Color, Speed is defined as the amount of time a color is displayed before it “jumps” to the next color. In Variable Color Strobe, speed determines how fast the colors advance around the spectrum which in turn affects what color will be flashed at each strobe.

STAND ALONE: aka “built-in,” “on board,” or “automatic” (when auto-

matic mixes with magic). Refers to a method of Control. Stand Alone means that the unit is controlled by the built-in microprocessor, thus utilizing “on-board” Effects which are set via the unit’s dip switches. Stand Alone differs from Networked in that the unit is controlling itself versus taking direction from an external source such as a DMX512 controller or PC.

STARTING COLOR: Allows the user to define the beginning color of an Effect. For instance, if a Cross Fade goes from red to blue, the Starting Color Variation would be set to red and the Ending Color would be set to blue. Each time the unit is repowered with this Effect, it will begin with red.

STROBE: A “stop motion,” or rapid series of very short intense light flashes which can make actions seem intermittent. The Color Kinetics Variable Color Strobe Effect cycles through a sequence of colors, generating flashes of different color which can then be customized with various Speed, Cycle Direction or Strobe Rate settings. The Color Kinetics Fixed Color Strobe allows for a single color to be flashed which can then be customized by altering the Strobe Rate.

between #1-6 are OFF. For the slowest speed (2 hrs.), all switches between #1-6 are ON. *Table 2* (previous) illustrates the available options, switch settings and their binary equivalents.

Saturation
In the Color Wash Effect, you can vary the Saturation by choosing light Saturation (pastels) or full Saturation. Switch #7 controls Saturation. For light Saturation, set Switch #7 OFF. Full Saturation is achieved by setting Switch #7 ON.

Brightness
In the Color Wash Effect, Switch #8 controls the level of Brightness. The Brightness, or intensity, of the light can be set to either half intensity or full intensity. For half intensity, set Switch #8 OFF. For full intensity, set Switch #8 ON.

Cycle Direction
The direction of the sequential flow of colors can be controlled in the Color Wash Effect through Switch #9. When Switch #9 is OFF, the direction of the flow of colors is clockwise from Red to Violet (ROYGBIV). When Switch #9 is ON, the direction of the flow of colors is counterclockwise from Violet to Red (VIBGYOR).

EXAMPLE OF COLOR WASH EFFECT
Speed of 20 seconds, full Saturation, full Brightness, in a clockwise direction (ROYGBIV)



CROSS FADE
The Cross Fade allows you to set the C-Series to smoothly move from one color to another. The Cross Fade differs from a Color Wash in that it alternates between only two colors while the Color Wash cycles through the entire spectrum of colors. The Cross Fade slowly increases the intensity of one color of light while simultaneously reducing the intensity of another color. For example, a Cross Fade set to begin with red and end in blue will first display a fully intense red, then mix in a bit of blue (producing pinkish hues), then mix more blue (to produce magenta hues), then display fully intense blue, and reverse the process (magenta, pink, red) before beginning the next cycle (red-pink-magenta-blue-magenta-pink-red).

CHOOSE THE EFFECT: CROSS FADE
Switch #11: ON
Switches #10 and 12: OFF



CHOOSE THE VARIATIONS: CROSS FADE
The Cross Fade can be varied by choosing one of eight Starting Colors and one of eight Ending Colors at one of eight different speeds.

Starting Color
In the Cross Fade Effect, Switches #4-6 govern which color begins the fade. Choose one of the following eight colors: black, red, green, yellow, blue, magenta, cyan or white.

SWITCH #	4	5	6
0	Black		
1	Red	■	
2	Green		■
3	Yellow	■	■
4	Blue		■
5	Magenta	■	■
6	Cyan	■	■
7	White	■	■

Ending Color
In the Cross Fade Effect, Switches #1-3 govern which color to fade to before it reverses back to the Starting Color. Choose one of the following eight colors: black, red, green, magenta, blue, yellow, cyan or white.

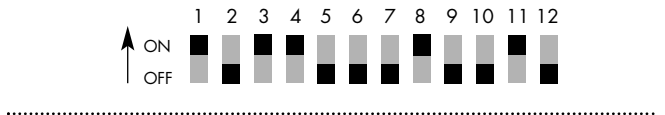
SWITCH #	1	2	3
0	Black		
1	Red	■	
2	Green		■
3	Yellow	■	■
4	Blue		■
5	Magenta	■	■
6	Cyan	■	■
7	White	■	■

Do not set your Starting Color and Ending Color to the same color. If you want a static color display, choose the Fixed Color Effect.

Speed
In Cross Fade, Speed is defined as the amount of time which elapses between the initial display of the Starting Color to the Ending Color and back again. There are eight different speeds which can be set for the Cross Fade Effect, ranging from as fast as 5 seconds for the round trip to as long as 1 hour to complete the round trip. Switches #7-9 control the speed options. For the fastest speed (5 sec.), all switches between #7-9 are OFF. For the slowest speed (1 hr.), all switches between #7-9 are ON. The table below illustrates all available speed options and their binary equivalents:

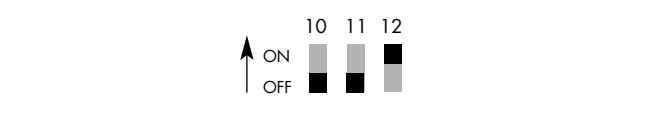
SWITCH #	7	8	9
0	5 sec		
1	10 sec	■	
2	30 sec		■
3	1 min	■	■
4	2 min		■
5	15 min	■	■
6	30 min	■	■
7	1 hr	■	■

EXAMPLE OF CROSS FADE EFFECT
Starting from red, fading to blue at a speed of 30 seconds round trip



RANDOM COLOR
Random Color or "step" produces a randomly generated set of colors at user definable speeds. Colors step in discrete increments from one hue to the next. This differs from a Color Wash, which sequentially and more gradually moves through the color spectrum.

CHOOSE THE EFFECT: RANDOM COLOR
Switches #10 and 11: OFF
Switch #12: ON



CHOOSE THE VARIATIONS: RANDOM COLOR
The Random Color Effect can be varied by Speed, Saturation and Starting Color.

Speed
In Random Color, Speed is defined as the amount of time a single color is displayed before it "jumps" to the next color. There are 32 different speeds which can be set for the Random Color Effect, ranging from as fast as .05 seconds to as long as 3 minutes before jumping to the next color. Switches #1-5 control speed. For the fastest speed (.05 sec.), all switches between #1-5 are OFF. For the slowest speed (3 min.), all switches between #1-5 are ON. *Table 3* below illustrates the available options, switch settings and their binary equivalents.

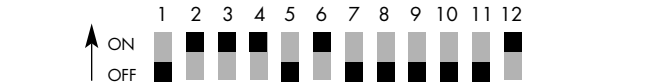
**TABLE 3
RANDOM COLOR SPEED**

SWITCH #	1	2	3	4	5
0	0.05 sec				
1	0.06 sec	■			
2	0.08 sec		■		
3	0.12 sec	■	■		
4	0.15 sec			■	
5	0.21 sec				■
6	0.25 sec	■			
7	0.3 sec	■	■		
8	0.4 sec				■
9	0.5 sec	■			
10	0.75 sec		■		
11	1 sec	■			
12	1.2 sec		■		
13	1.5 sec	■	■		
14	2 sec			■	
15	2.5 sec				■
16	3.5 sec	■			
17	4.5 sec	■	■		
18	5 sec			■	
19	7.5 sec	■			
20	10 sec		■		
21	12 sec	■	■		
22	15 sec			■	
23	20 sec				■
24	25 sec	■			
25	30 sec	■	■		
26	45 sec			■	
27	1 min	■			
28	1.5 min	■	■		
29	2 min			■	
30	2.5 min				■
31	3 min	■	■		

Saturation
In the Random Color Effect, you can vary the Saturation by choosing light Saturation (pastels) or full Saturation. Switch #6 controls the amount of Saturation. For light Saturation, set Switch #6 OFF. Full Saturation is achieved by setting Switch #6 ON.

Starting Color
You can choose from one of eight different starting colors in the Random Color Effect. From these eight different starting points it will cycle through a set of 128 colors which step in discrete increments of at least 25% of the color spectrum so no two colors in a row will have similar values. Switches #7-9 govern the Starting Color. The table above illustrates all available options and their binary equivalents:

EXAMPLE OF RANDOM COLOR EFFECT
At a speed of every 2 seconds, Fully Saturated, Starting with Color 1



In this example, if a second C-Series is set to the same settings as the example above except for Starting Color, each would change colors at the same rate but not follow the same color display.

FIXED COLOR STROBE
Strobes are a "stop action," or rapid series of very short intense light flashes which can make actions seem intermittent. In the Fixed Color Strobe Effect, the same color is strobed at each flash.

CHOOSE THE EFFECT: FIXED COLOR STROBE
Switch #11: ON
Switches #10 and 12: OFF



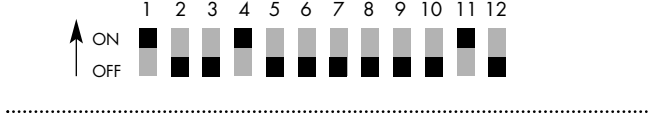
CHOOSE THE VARIATIONS: FIXED COLOR STROBE
The Fixed Strobe Effect can be varied by Color and Strobe Rate.

Color
In the Fixed Color Strobe Effect, switches #1-3 AND #4-6 govern which single color will be displayed during the flash. Choose one of the following eight colors: black, red, green, yellow, blue, magenta, cyan, or white. Both Switches #1-3 AND #4-6 must be configured in exactly the same way. The following table illustrates the available colors and their settings:

SWITCH #	1	2	3	4	5	6
0	Black					
1	Red	■				
2	Green		■			
3	Yellow	■	■			
4	Blue			■		
5	Magenta	■			■	
6	Cyan		■			■
7	White	■	■	■	■	■

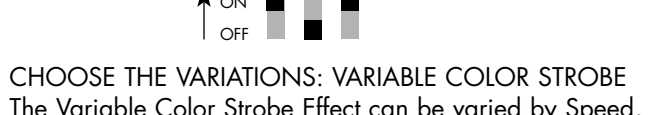
Strobe Rate
In the Fixed Color Strobe Effect, Switches #7-9 govern the strobe rate which can be set from as fast as 20 flashes per second to as slow as 2 flashes per second. For the fastest speed (20/sec.), all switches between #7-9 are OFF. For the slowest speed (2/sec), all switches between #7-9 are ON. The table above illustrates all available options and their binary equivalents:

EXAMPLE OF FIXED COLOR STROBE EFFECT
Strobing Red at a rate of 20 flashes/second



VARIABLE COLOR STROBE
Strobes are a "stop motion," or rapid series of very short intense light flashes which can make actions seem intermittent. The Variable Color Strobe Effect cycles through a sequence of colors, generating strobes of different colors.

CHOOSE THE EFFECT: VARIABLE COLOR STROBE
Switches #10 and 12: ON
Switch #11: OFF



CHOOSE THE VARIATIONS: VARIABLE COLOR STROBE
The Variable Color Strobe Effect can be varied by Speed, Cycle Direction and Strobe Rate.

Speed
In the Variable Color Strobe Effect, Switches #1-5 govern the pattern of colors displayed during the flash of the strobe. The pattern of colors displayed depends on how fast the colors are advancing through the spectrum. This advance is measured as a percentage around the spectrum. At the lower Speeds, each strobe will flash sequential colors since it is slowly advancing through the spectrum. Faster Speeds will flash colors further apart in the spectrum, with the fastest Speed flashing complementary colors. *Table 4* illustrates all available Speed options and their binary equivalents.

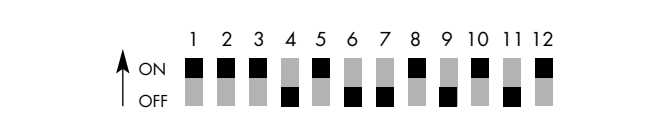
**TABLE 4
VARIABLE STROBE SPEED**

SWITCH #	1	2	3	4	5
0	0.07%				
1	0.13%	■			
2	0.20%		■		
3	0.26%	■	■		
4	0.33%			■	
5	0.39%				■
6	0.46%	■			
7	0.52%	■	■		
8	0.65%			■	
9	0.78%				■
10	1.00%	■	■		
11	1.20%			■	
12	1.40%				■
13	1.60%	■			
14	2.00%	■	■		
15	2.30%			■	
16	2.90%				■
17	3.60%	■			
18	4.20%	■	■		
19	4.90%			■	
20	5.90%				■
21	7.20%	■			
22	8.50%	■	■		
23	10%			■	
24	12%				■
25	15%	■			
26	18%	■	■		
27	22%			■	
28	26%	■			■
29	32%			■	■
30	38%	■			■
31	49%	■	■		■

Cycle Direction
The direction of the flow of colors can be controlled in the Variable Color Strobe through Switch #6. When Switch #6 is OFF, the direction of the flow of colors is clockwise from Red to Violet (ROYGBIV). When Switch #6 is ON, the direction the flow of colors is counterclockwise from Violet to Red (VIBGYOR).

Strobe Rate
In the Variable Color Strobe Effect, Switches #7-9 govern the strobe rate which can be set from as fast as 20 flashes per second to as slow as 2 flashes per second. For the fastest speed (20/sec.), Switches #7-9 are OFF. For the slowest speed (2/sec), Switches #7-9 are ON. The following table illustrates all available options and their binary equivalents:

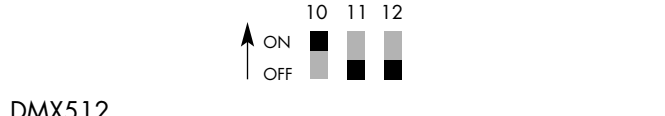
EXAMPLE OF VARIABLE COLOR STROBE EFFECT
Speed of 10% advance, Clockwise Direction, Strobe Rate of 10/sec



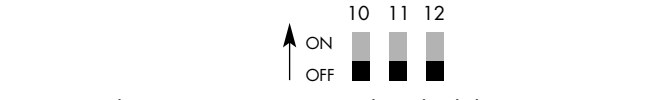
This Speed will display advancing complementary colors.

WIRED
The C-Series can be operated via either Stand Alone or Networked control. Networked control will allow you to utilize either a DMX512 controller or a PC to operate any connected units. If you are using an external control source, you must set the DIP switches to receive external data.

PC
To make the C-Series take external direction from a PC, set Switch #10 to ON and Switches #11 and 12 to OFF.



DMX512
To make the C-Series take external direction from a DMX512 controller, Switches #10, 11 and 12 should be in the OFF position.

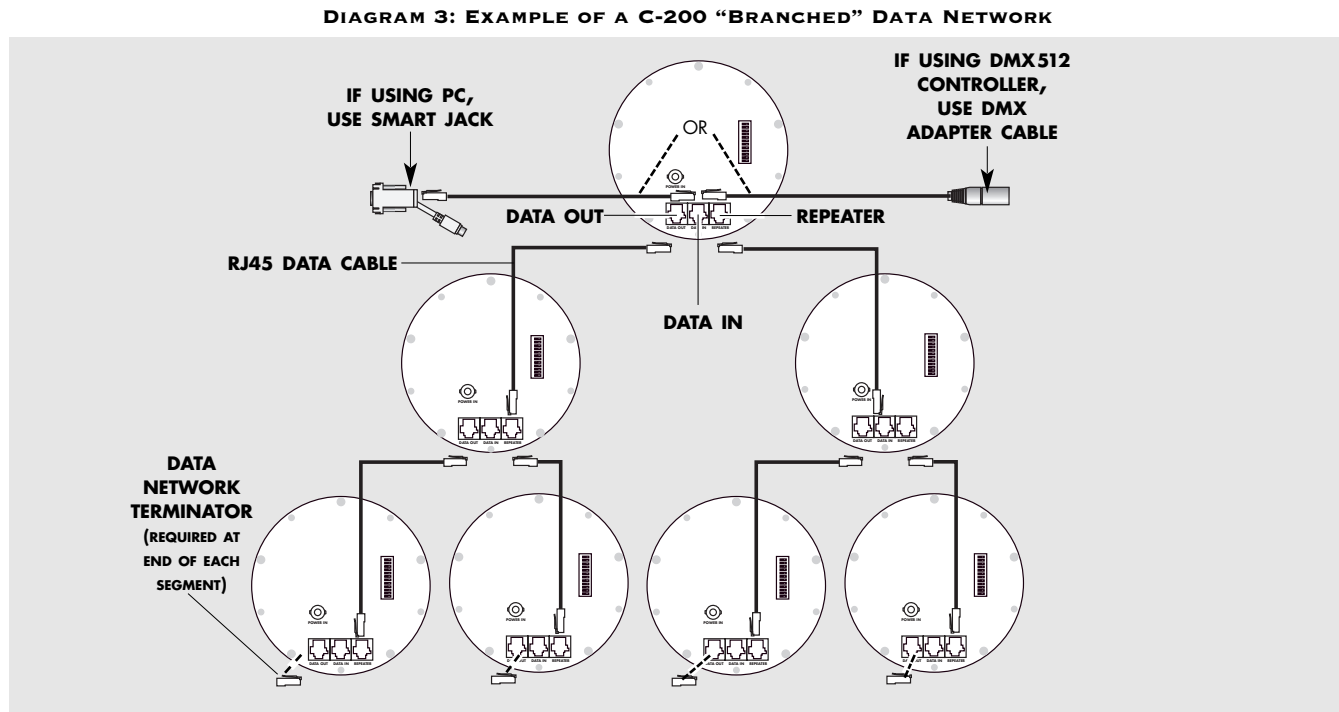


PC control operates at 115,200 baud while DMX512 operates at 250,000 baud. C-Series use a base zero system to set the channel address. Switches #1-9 set the starting channel address. Switch #9 is the most significant bit and controls the highest binary digit (256). The C-Series requires 3 channels corresponding to Red, Green and Blue channels.

If using an external controller such as a PC or a DMX512 board, the power setup remains the same. *Diagrams 2* and *3* show examples of linear and branched network configurations. Refer to the Recommended Practice for DMX512 guide for additional wiring configuration guidelines. This guide is available from PLASA and USITT.

PLASA Ltd.
7 Highlight House St. Leonard's Road
Eastbourne, East Sussex BN21 3WH
United Kingdom
Tel 01 323 410335
Fax 01 323 646905
www.plasa.org.uk

USITT Inc.
6443 Ridings Road
Syracuse, NY 13206
USA
Tel 800 93 USITT (938 7488)
Tel 315 463 6463
Fax 315 463 6525
www.ffa.ucalrny.ca/usitt



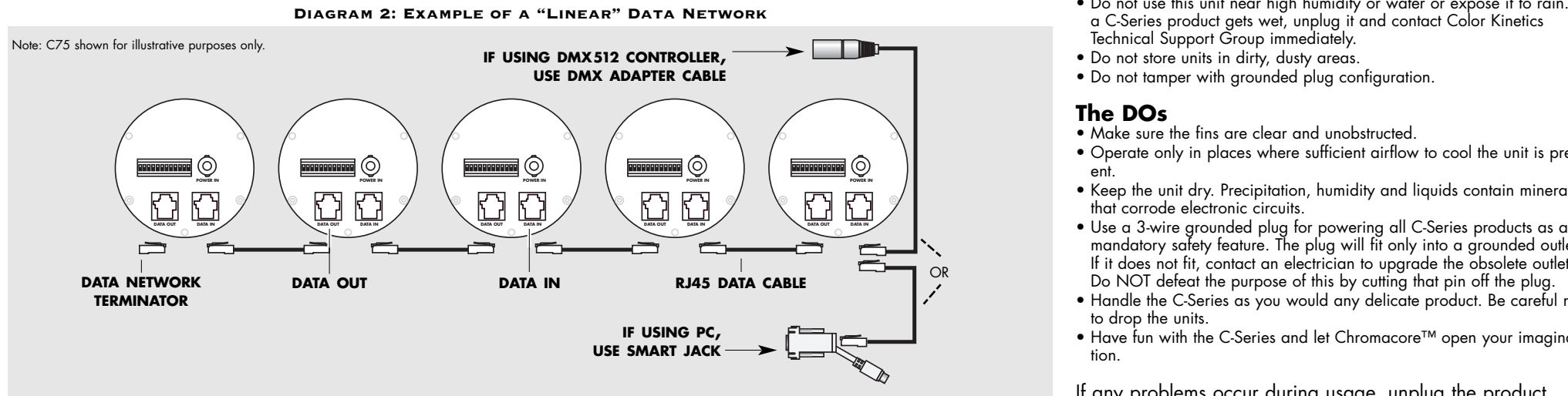
- Equipment used in Diagram 3**
- 6 C-200 fixtures
 - 7 C-Series CAT5 RJ45 Data Cables
 - 4 RJ45 Data Network Terminators
 - 1 Smart Jack (for use with a PC) plus one additional RJ45 Data Cable
 - OR
 - 1 DMX512 Adapter Cable (for use with a DMX512 Controller)

C- SERIES MODEL	C-200	C-75	C-30
WEIGHT	2 lbs 12 oz (1.2 kg)	15.5 oz (439g)	5.8 oz (164 g)
DATA	RJ45 data input, output and repeater ports	RJ45 connector data input and output ports	RJ45 connector data input and output ports
POWER CONNECTOR	BNC connector – female	BNC connector – female	BNC connector – female
POWER REQUIREMENTS	975 mA@24 VDC (24 w)	400 mA@24 VDC (10 w)	200 mA @ 24 VDC (5 w)
DIMENSIONS			
TOP OF YOKE TO CENTER OF FIXTURE	5.0" (127 mm)	3.5" (89 mm)	3.2" (81 mm)
DIAMETER	5.9" (150 mm)	3.5" (89 mm)	2.4" (61 mm)
DEPTH	4.5" (114 mm)	3.6" (91 mm)	2.5" (64 mm)
TOP OF YOKE TO BOTTOM OF FIXTURE	7.9" (198 mm)	5.2" (133 mm)	4.4" (112 mm)
THUMB SCREW TO THUMB SCREW	8.2" (208 mm)	5.5" (140 mm)	3.6" (91 mm)

C SERIES SPECIFICATIONS
Color Range: 16.7 million (24bit) additive RGB colors
Continuously variable intensity output range
Source: Variable intensity colored LEDs
Data Interface: DMX512 (RS485) compatible; serial port compatible with Smart Jack Adapter
Control: Stand Alone, DMX512, or PC
Housing: Black anodized aluminum
Connectors: RJ45 data connectors; BNC power connector
Listings: UL

SOURCE LIFE
The illumination generated by the C-Series is based on LEDs whose predicted source life is rated at 100,000 elapsed time hours under normal operating conditions. [Temperature: -4°F – 104°F (-20°C – 40°C), Humidity: 0-95% non-condensing humidity]. This equates to 11.4 years of continuous 24 hour a day usage. In addition, because the C-Series utilizes solid state technology with no moving parts, the possibilities of mechanical failure are reduced.

U.S. AND FOREIGN PATENTS AND PATENTS PENDING
Color Kinetics Incorporated grants the purchaser of its lighting products and controllers a personal and non-transferable license to use Chromacore™, its patented technology for networkable control of LED-based color changing lighting fixtures for illumination, display and design. This license is granted only by Color Kinetics Incorporated, and may not



- Equipment used in Diagram 2**
- 5 C-75 fixtures
 - 4 C-Series CAT5 RJ45 Data Cables
 - 1 RJ45 Data Network Terminator
 - 1 Smart Jack (for use with a PC) plus one additional RJ45 Data Cable
 - OR
 - 1 DMX512 Adapter Cable (for use with a DMX512 Controller)

be transferred except by the grantor. The design, duplication, manufacture, or sale of other products using networkable control of LED-based color changing lighting may be prohibited and is not licensed hereunder. Other patents pending.

SAFETY PRECAUTIONS
Important Information
Please read all instructions before using C-Series products. This manual is based on the production models manufactured after July 1998. Subsequent changes to products may occur after this guide was printed.

Warning
Do not open, alter or tamper with the product case. This will void the manufacturer's warranty. Follow all instructions in user guide, and observe all warnings carefully. To avoid electrical shock, never open the C-Series case. Do not attempt to service the electronic components yourself. Non-expert handling may damage the product and cause injury to the user.

Strobe Warning
There is some anecdotal evidence that strobe lighting may induce epilepsy in certain susceptible individuals, although no associated product warnings have been issued by United States government according to the Food and Drug Administration.

If strobe lights are used, some international regulatory agencies¹ recommend keeping flicker rates at or below four flashes per second (as less of the flicker-sensitive population will then be at risk of an attack). This flicker rate applies only to the overall output of any group of lights in direct view. However, when more than one strobe light is used, the flashes should be synchronized. End users should also consider issuing a warning, alerting audience or viewers to the presence of strobe lighting.

- The DON'Ts**
- Do not block metallic cooling fins or vents.
 - Do not insert anything into these openings.
 - Do not use the C-Series products if the power cable has been damaged.
 - Do not allow anything to rest on the power cable.
 - Do not keep power and data cables in high traffic areas.
 - Do not paint, dye, repackage or alter the physical housing.
 - Do not use this unit near high humidity or water or expose it to rain. If a C-Series product gets wet, unplug it and contact Color Kinetics Technical Support Group immediately.
 - Do not store units in dirty, dusty areas.
 - Do not tamper with grounded plug configuration.

- The DOs**
- Make sure the fins are clear and unobstructed.
 - Operate only in places where sufficient airflow to cool the unit is present.
 - Keep the unit dry. Precipitation, humidity and liquids contain minerals that corrode electronic circuits.
 - Use a 3-wire grounded plug for powering all C-Series products as a mandatory safety feature. The plug will fit only into a grounded outlet. If it does not fit, contact an electrician to upgrade the obsolete outlet. Do NOT defeat the purpose of this by cutting that pin off the plug.
 - Handle the C-Series as you would any delicate product. Be careful not to drop the units.
 - Have fun with the C-Series and let Chromacore™ open your imagination.

If any problems occur during usage, unplug the product immediately and call or email:
Color Kinetics Technical Support Group:
1-888-FULL RGB or 617-423-9999 or
support@colorkinetics.com

¹Guide to Health, Safety and Welfare at Pop Concerts and Similar Events, HMSO Publications (UK)