



# TechNotes

Revision 6/17/2023

## Control4 Lighting Control White Paper

### Understanding C4 Composer Lighting Controls as supported by Converging Systems LED Lighting Controller Systems (C4 OS3.3.3)

#### Min. Requirements

- e-Node
- Control4 Composer 3.3.3 or later
- Compatible Converging Systems Luminaries

#### Table of Contents

<a href="#">Composer and Converging System Customized Driver Backgrounder</a>
<a href="#">Understanding “Previous” and “Preset”</a>
<a href="#">Color (HSV) and Color Temperature (CCT)</a>
<a href="#">Examples</a>
<a href="#">Advanced Programming Functions Available within Composer</a>
<a href="#">Appendix 1-Advanced Example on Using Overrides</a>

#### Composer and Converging Systems Customized Driver Backgrounder

Recent C4 Composer software releases have significantly enhanced the functionality available with Control4 platforms especially as it relates to the control of lighting fixtures. Converging Systems has continued to work with Control4 as a technical partner in the development of the post C4 OS 3.0.0 lighting control offerings. The current feature set is quite rich and for those installers new to lighting or recent C4 platform releases, this Tech Note has been designed to steer you through the intricacies likely to be encountered when creating a UI (user interface) that will match or exceed your customer’s expectations. Few if any alternative lighting solutions in the field are likely to be encountered that provide the rich set of features that are available from the Converging Systems’ e-Node gateway and connected controller/fixtures.

#### Understanding “Previous” versus “Preset”

A standard low-cost light switch typically has two functions- On and Off. With simple white/monochrome luminaries there is not much confusion as to what ON and Off mean. But then came the dimmer... More advanced versions of these ubiquitous controls have added a third type of modality to the standard ON/OFF functionality and that is the dimming level. With this new paradigm, more sophisticated dimmers (i.e., offered by Lutron and others) have introduced the concept of an ON to be

something intelligent in nature and which can remember/playback the lighting state displayed prior to last OFF command being issued. However, even though this Intelligent ON technology had its beginnings with higher-priced but still off-the-shelf consumer-level dimmers, various C4 integration partners had not yet developed this type of “Intelligent ON” technology with their CI products, so C4 was forced for a number of years to offload the setting and memorizing of these levels to its own C4 processors—the setting and programming of which was referred to by C4 as “Brightness ON to a Preset level.” And this worked quite well with the standard/dimmable monochrome offerings.

Then came C4 OS 3.x... A significant contribution by Converging Systems to the Control4 lighting control architecture occurred when Converging Systems introduced its own Intelligent ON technology for CI products to C4 and what emerged now is the support within Composer of this alternative ON technology (“Intelligent ON”) which in C4 parlance is referred to as “Brightness ON to Previous Level.” As a result, the programming options within C4 more than doubled to accommodate this bi-modal “ON” world. This Tech Note attempts to simplify what otherwise might be considered a complex set of programming options for the unsuspecting C4 integrator. But since we helped bring this technology to the table, we are in the best position to document it for the C4 CI community.

### Definitions



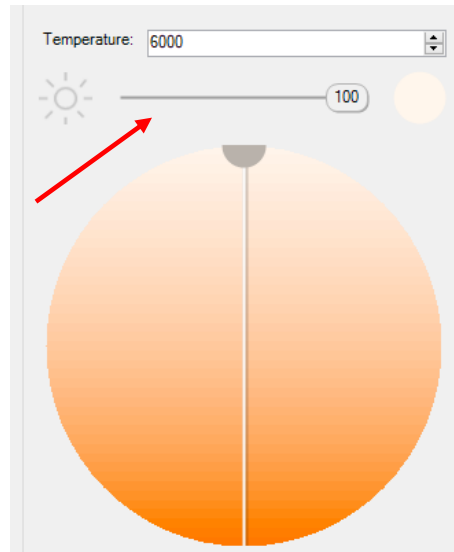
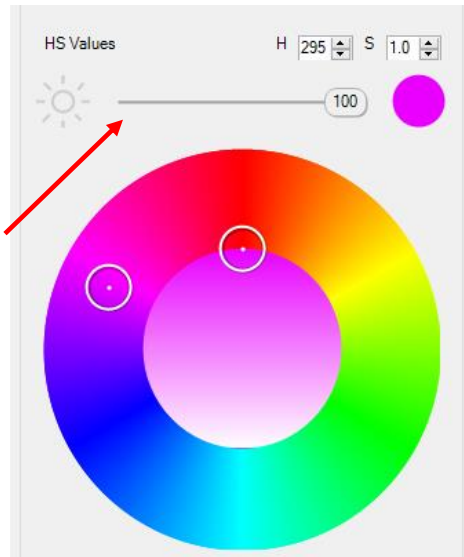
**Brightness ON to a Preset Level**—A specific Brightness (guessed and programmed) by the dealer as to what the Home Owner might desire as the turn-on brightness level triggered upon the Press of an “ON” button

**Brightness ON to a Previous Level**—A dynamic/learnable brightness level that can be recalled by the Press of an “ON” button, but in this *case to state of the lighting luminary prior to the last issuance of the OFF command*. (Editors Note—who better is there to know what an End-User desires than that End-User)

## Next Comes Color and Color Temperature

The natural next step to the history summarized in the above section continued with the availability of

- Full-spectrum color (“**HSV**”) (any **Hue/Saturation/Brightness** setting of a color output device from a palette of 16.4 million colors which can be selected), and/or
- Correlated color temperature (“**CCT**”) output (adjustable CCT output typically from 1700K to 7000K which can be selected).



The C4 UI (user interfaces) above easily enables the setting of any **HS** “color” as well as any “**CCT**” level along with **Brightness** level (also referred to as “Intensity” or “Value” for the brightness component (see red arrows above).



### Definition

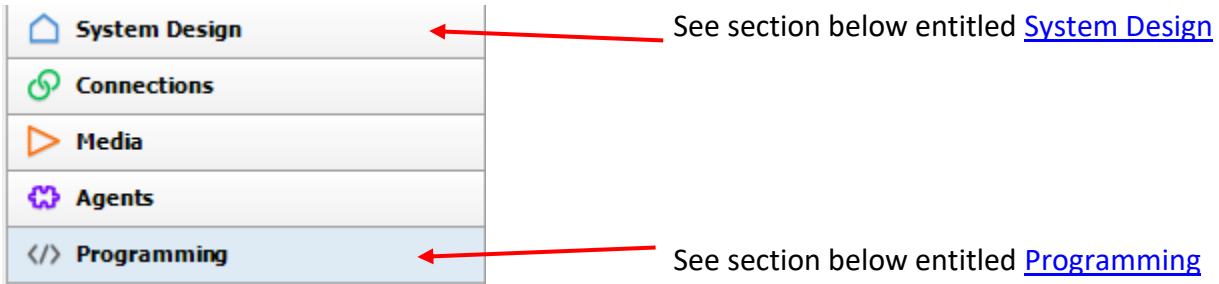
**HSV/HSB Color Space**—The “**H**” (Hue) refers to the basic “color.” the “**S**” (Saturation) refers to the presence or absence of the White component, while the “**V**” or “**B**” specifies the Brightness component.

**Note:** *The traditional RGB and RGBW color spaces are really old school nowadays-Please do not consider using. Just ask yourself, where is the Brightness component in the RGB or RGBW color space?*

If you successfully navigated through the above section “[Understanding Previous and Preset](#)”, then you probably can understand that with the disrupters of **Color** and **CCT**, that the C4 Composer program logically needed to expand its programming capabilities to handle the concept of **Previous** and **Preset** as they relate to **Color** and **CCT**. And in fact, that is what has happened. The simple wall dimmer that was initially designed to control a monochrome light and to vary its brightness is now wholly inadequate to control these new functionalities available today.

***An intelligent automation system (C4) along with an intelligent lighting controller technology (such as in available from CSI) now can solve the **Previous** and **Preset** problem seamlessly.***

You can find references to **Previous** and **Preset** in two areas within C4’s Composer.

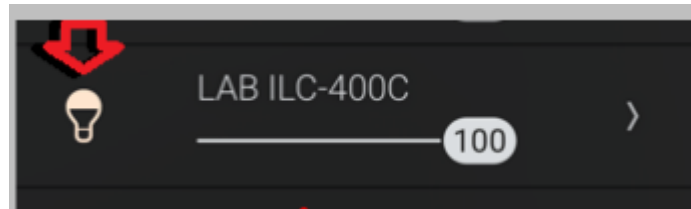


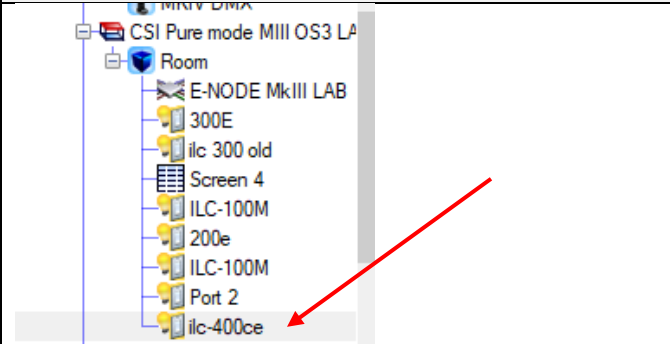
In order to better understand **Previous** and **Preset**, let us review a simple example and where their settings can be found within Composer. More detailed information of C4 lighting control advanced programming can be found after this example in [Advanced Programming Choices Available within Composer](#). But let's walk before we start running here....

## Examples

### System Design section with Composer.

This example shows the simple steps required to program the logic that will be obeyed when an ON is pressed on a Touchscreen UI (the Lightbulb below) to invoke either the logic inherent to the **Previous ON** modality or the **Preset ON** modality.



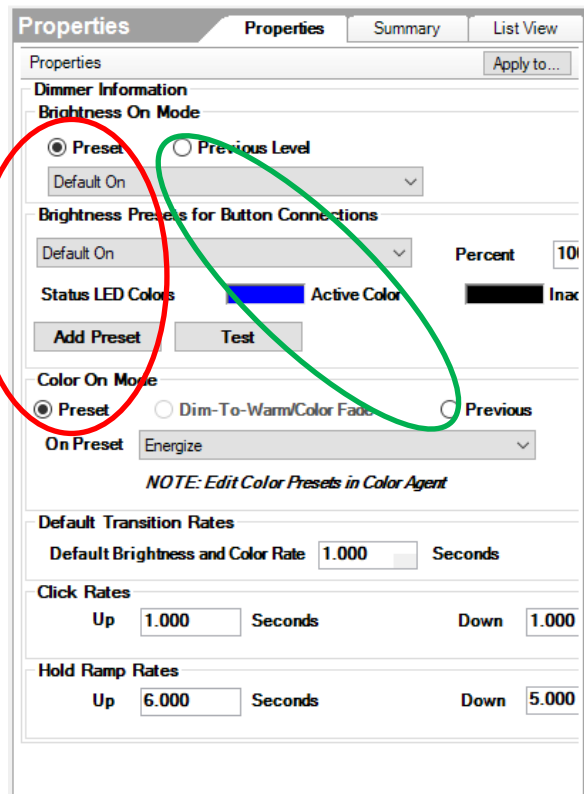
Steps	Details/Images
-Select the lighting controller that you wish to program	

-Within **Properties** under Dimmer Information select for the **Brightness On Mode** either **Preset** or **Previous Level**

**BUT DON'T FORGET TO ALSO...**

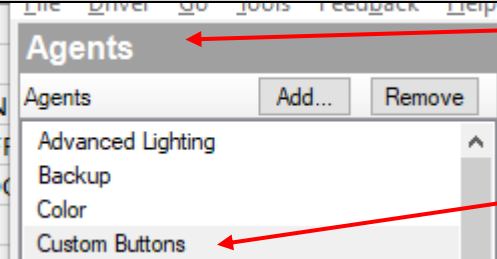
-Within **Properties** under Dimmer Information select for the **Color On Mode** either **Preset** or **Previous Level AS WELL**

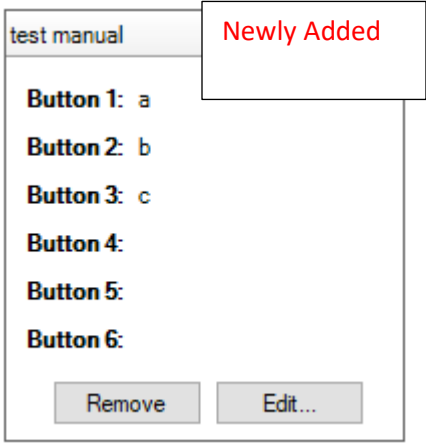
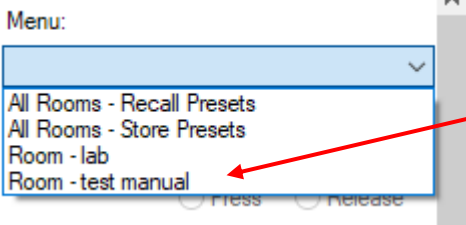
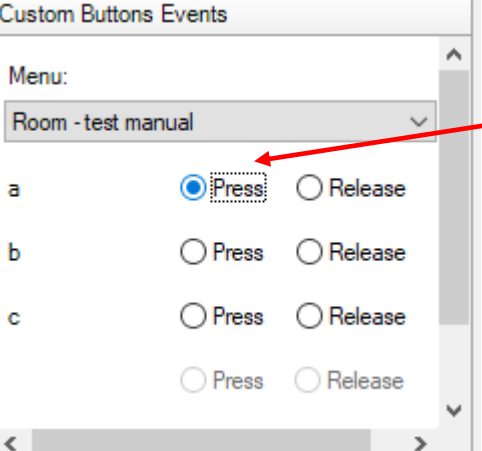
**Note:** Typically, we find that you should set the entries for **Brightness On Mode** and **Color On Mode** the same way (i.e., **Preset** and **Preset**, or **Previous** and **Previous**). Unexpected results may occur if you don't set them in parallel.



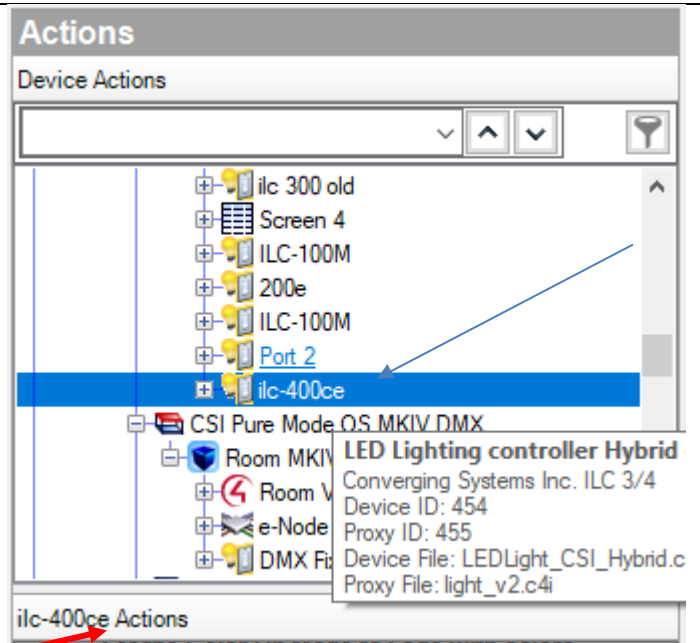
**Programming section within Composer.**

This example shows the simple steps to program a Custom Button to perform either a **Previous** or **Preset** operation for an ON.

Steps	Details/Images
<p>-Within <b>Agents</b>, select <b>Custom Buttons</b>, pick a Room, and then add a new Button set within that targeted Room</p>	

	
<p>-Within <b>Programming</b>, select <b>Custom Buttons</b>, and under <b>Custom Button Events</b>, select the above newly created Button set.</p>	
<p>-Select an <b>Operation</b> for that Button set (i.e., <b>Press</b> or <b>Release</b>). Here we are going to program a set of actions for a Press of Button 1 ("a").</p> <p>Proceed to <a href="#">Subsection 1</a> below if you wish to implement the <b>Previous On</b> logic type.</p> <p>Proceed to <a href="#">Subsection 2</a> below if you wish to implement the <b>Preset On</b> logic type.</p>	
<p><b>Subsection 1--Steps for Programming Previous ON state (recommended)</b></p>	

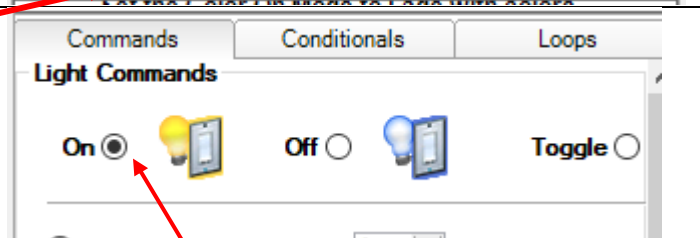
-Within **Actions**, scroll down to find the lighting controller that you wish to program



-Under the target controller **Action** window, Select the On command radial button from the **Light Commands** section.

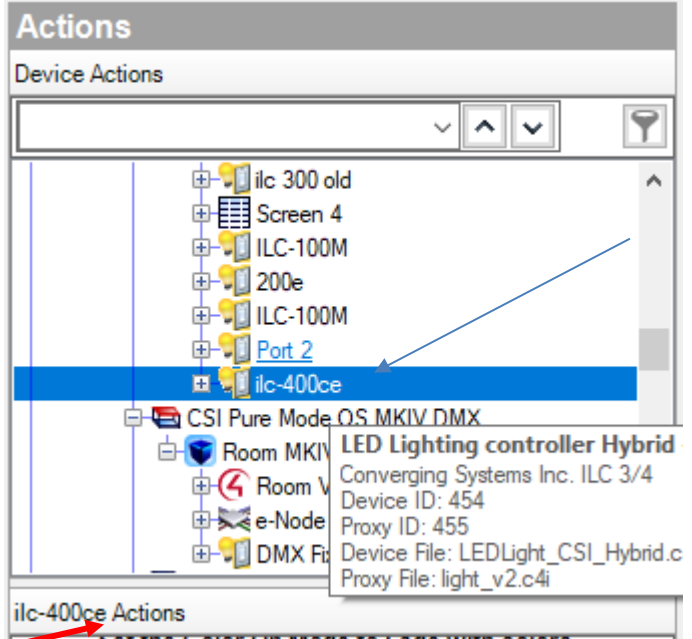
-Verify that within **System Design** for this lighting element, both [radial buttons](#) for **Previous** have been selected.

**Note:** without any additional programming, the logic for an Intelligent **ON to Previous** is simply picked up from the [original programming](#) within System Design.

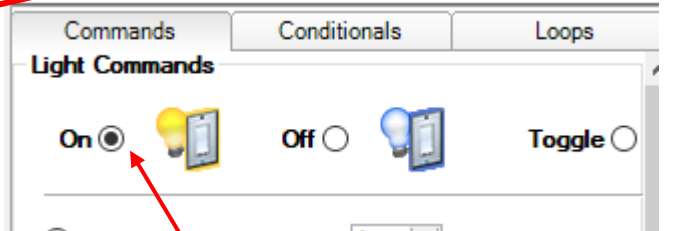


**Subsection 2--Steps for Programming Previous ON state (if you really want to do this)**

-Within **Actions**, scroll down to find the lighting controller that you wish to program



-Under the target controller **Action** window, Select the **On** command radial button from the **Light Commands** section.  
 -Verify that within **System Design** for this lighting element, both [radial buttons](#) for **Preset** have been selected.







**Note:** without any additional programming, the logic for an Intelligent **ON to Preset** is simply picked up from the [original programming](#) within System Design.



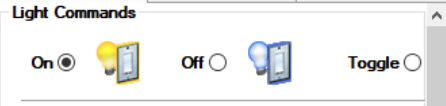

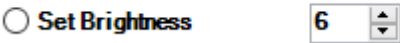

## Advanced Programming Functions available within Composer/Programming



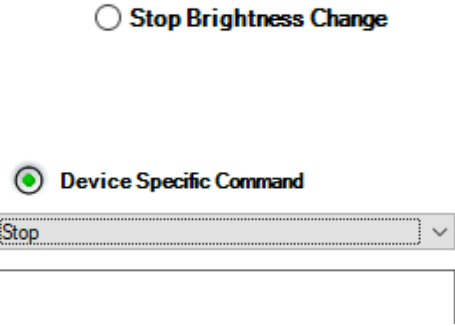

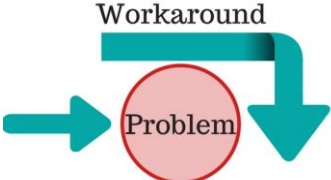


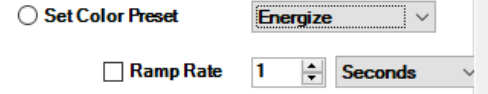



In addition to the above examples, there are a broad variety of additional controls available within the **Programming Tab**. See [Table](#) below for specifics.

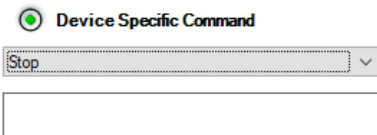
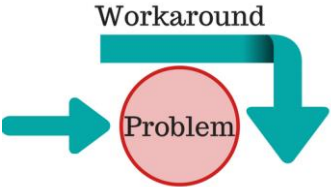
**Legend for Column 3 in below Table**

	Yes, whatever was programmed within System Design prevails with this operator.
	In this case the current setting overrides the setting in System Design
	Not directly supported but there is a workaround
	Specific command follows a previous required operator

## Commands/Operations Supported within Programming/Actions/Commands

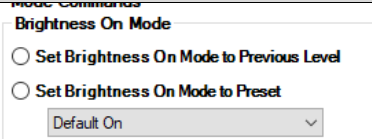

Command	Images	Logical link to programmed state in System Design
<p><b>-On.</b> Sends the <b>ON</b> command. <b>On</b> will behave here as it was initially set up within <b>System Design</b> (i.e., <b>Previous</b> or <b>Preset</b>)</p> <p><b>-Off.</b> Sends the <b>OFF</b> command</p> <p><b>-Toggle.</b> Sends out the Toggle command which sequences between the <b>ON</b> (as programmed within <b>System design</b>) and <b>Off</b></p>		 <p><b>Note:</b> If one either mode (<b>Previous</b> or <b>Preset</b>) is set up within <b>System Design</b>, it is possible to <b>Override</b> that setting using the commands below</p>
<b>Override Brightness Commands to what was programmed within System Design</b>		
<p><b>-Set Brightness</b> (to a number from 0 to 100%)</p>		 <p>(Note: this changes the Brightness of whatever color/CCT has been selected previously)</p>

<p><b>-Set Brightness Preset</b> (Default On or off) along with Ramp Rate</p>		 <p><b>Default On</b> sends the Brightness preset set within <b>System Design</b></p>
<p><b>Stop Brightness Change.</b> <b>Note:</b> currently operator not supported in this menu option. But you can use the “<b>STOP</b>” command available under Device Specific Commands</p> <p><b>Device Specific Commands</b> can be found by scrolling down to bottom of Commands</p>		 <p>Workaround</p> 
<p><b>Override Color Commands to what was programmed within System Design</b></p>		
<p><b>-Set Color</b> (to a HSV color/CCT with popup)</p> <p><b>Note:</b> Remember if you want to use this command, you must first issue a <a href="#">brightness</a> command otherwise system will not know what brightness level is desired.</p>		 <p>DEPENDANT UPON PRIOR OPERATOR</p> <p><i>(Set <a href="#">Brightness</a> command required to be sent prior)</i></p>
<p><b>-Set Color Preset</b> (Select from previously stored C4 Presets) along with Ramp Rate</p> <p><b>Note:</b> only integer values for Ramp Rate will be accepted.</p>		 <p>DEPENDANT UPON PRIOR OPERATOR</p> <p><i>(Set <a href="#">Brightness</a> command required to send first)</i></p>
<p><b>Stop Color Change</b> <b>Note:</b> currently not supported in this menu option. But you can use the</p>		

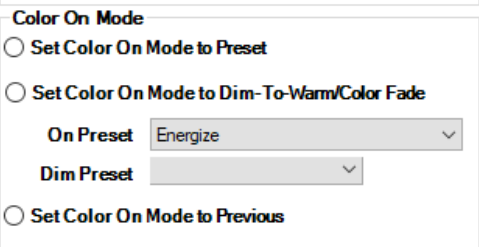

<p>“STOP” command available under Device Specific Commands</p>		
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**Mode Commands (Navigator Only)** See [Appendix 1](#) for an example of how this could be used (This section changes the Navigator ON mode (Previous to Preset and vis-a-versa) and only applies to Navigator. It does not apply to the above “ON” commands programmed for custom buttons. Note: These operators do not actually change the color/brightness at the moment of selection, but only changes the logic for when the next Navigator ON command is received).

**Brightness On Mode**

<p><b>Set Brightness On mode to Previous Level.</b> This changes in real time the operation of the next ON command (useful if the dealer default setting was set to the logic utilized with <b>Preset</b>). Think about this as a “state toggle”</p> <p><b>Set Brightness On mode to Preset.</b> This changes in real time the operation of the next ON command (useful if the dealer default setting was set to the logic utilized with <b>Previous</b>). Think about this as a “state toggle”</p>		
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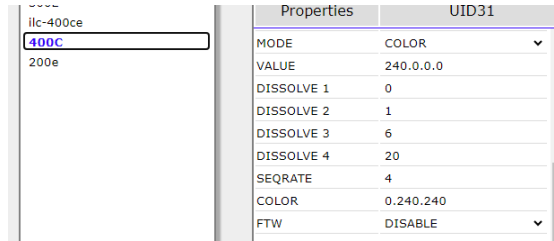
**Color On Mode**

<p><b>Set Color On Mode to Preset.</b> This changes in real time the operation of the next ON command to <b>Preset</b> mode (useful if the dealer default setting was set to the logic utilized with <b>Previous</b>).</p>		
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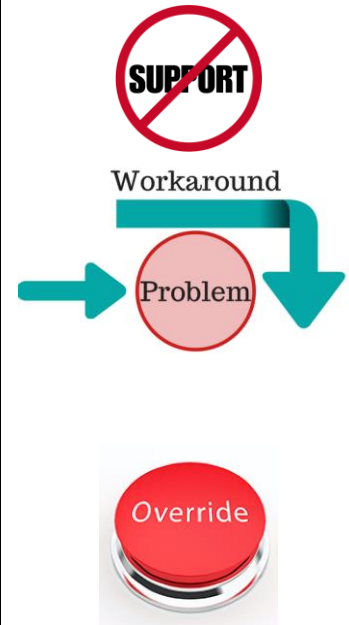
**Set Color On Mode to Dim-To-Warm/Color Fade.**

**Note:** currently not supported in this menu option. But you can use the “Fade To Warm” function inside Web Pilot for the targeted load device (ILC or DMX fixture)

**Set Color On Mode to Previous.** This changes in real time the operation of the next **ON** command (useful if the dealer default setting was set to the logic utilized with **Preset**).



Properties	UID31
MODE	COLOR
VALUE	240.0.0.0
DISSOLVE 1	0
DISSOLVE 2	1
DISSOLVE 3	6
DISSOLVE 4	20
SEQRATE	4
COLOR	0.240.240
FTW	DISABLE



# Appendix 1

## Advanced Topic on Overrides

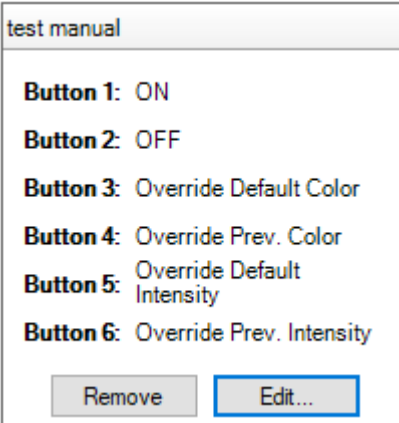
### Example 1

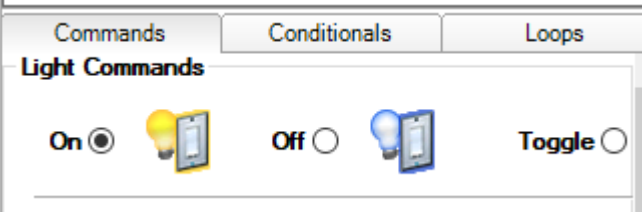


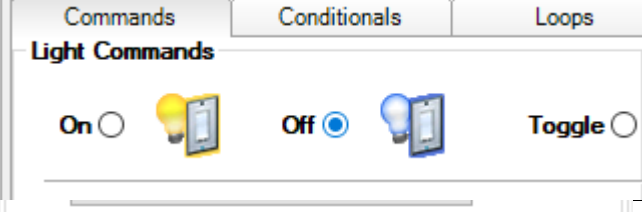


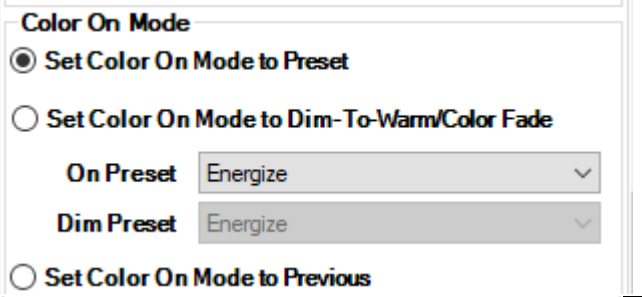
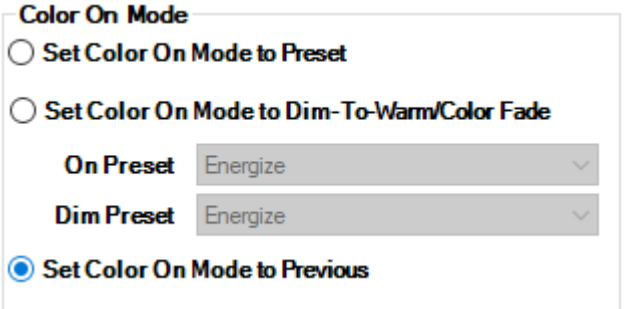
This is an advanced topic example reserved for the sophisticated Control4 installer. This Appendix is provided for information purposes only and Converging Systems cannot provide any additional information other than what is provided due to the complexity of this topic and the time requirements potentially required to train dealers on this advanced concept.

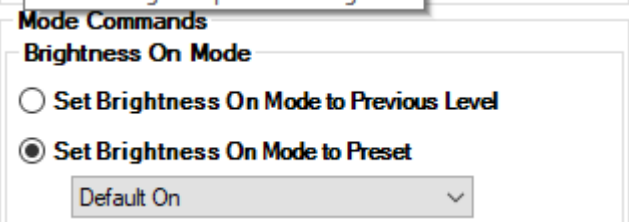
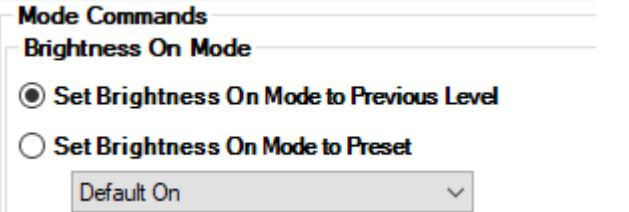
But we do realize that some C4 dealers may have an interest in this advanced topic so enjoy.

**Background.** The C4 Dealer may have programmed the system for the end-user using the Default ([Preset](#)) logic for ON. But the customer may desire rather than having the C4 dealer return to change this logic to **Previous** in the future, that the dealer simply provide a “backdoor” such that the end-user may freely change the Logic at his/her own discretion from **Previous** to **Preset** or then back again. In order to pull off this magic, the dealer can simply create a custom keypad that is displayed on the C4 Touchscreen/UI devices with these options surfaced. Please follow the directions below to create this magic.

### Programming Steps.

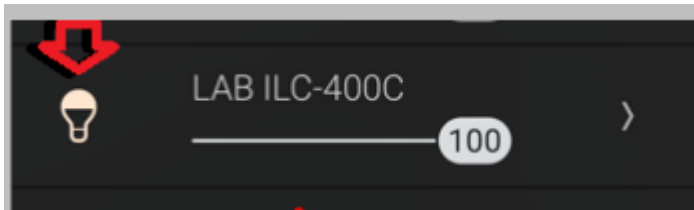
Step	Description	Detail
1	Create a custom keypad with six buttons and label them as shown	

<p>3</p> <p>Program those buttons as shown here for a <b>Press</b></p> <p>(see sections 3a to 3f corresponding to buttons “a” through “f”)</p>		<p>Menu: Room - test manual</p> <p>a <input type="radio"/> Press <input checked="" type="radio"/> Release</p> <p>b <input type="radio"/> Press <input type="radio"/> Release</p> <p>c <input type="radio"/> Press <input type="radio"/> Release</p> <p>d <input type="radio"/> Press <input type="radio"/> Release</p> <p>e <input type="radio"/> Press <input type="radio"/> Release</p> <p>f <input type="radio"/> Press <input type="radio"/> Release</p>
<p>3a</p>	<p>Program--Set Light Command ON</p>	 <p>Commands   Conditionals   Loops</p> <p><b>Light Commands</b></p> <p>On <input checked="" type="radio"/>  Off <input type="radio"/>  Toggle <input type="radio"/></p>
<p>3b</p>	<p>Program--Set Light Command OFF</p>	 <p>Commands   Conditionals   Loops</p> <p><b>Light Commands</b></p> <p>On <input type="radio"/>  Off <input checked="" type="radio"/>  Toggle <input type="radio"/></p>
<p>3c</p>	<p>Set Color On Mode to <b>Preset</b></p>	 <p><b>Color On Mode</b></p> <p><input checked="" type="radio"/> Set Color On Mode to Preset</p> <p><input type="radio"/> Set Color On Mode to Dim-To-Warm/Color Fade</p> <p>On Preset <input type="text" value="Energize"/></p> <p>Dim Preset <input type="text" value="Energize"/></p> <p><input type="radio"/> Set Color On Mode to Previous</p>
<p>3d</p>	<p>Program--Set Color On Mode to <b>Previous</b></p>	 <p><b>Color On Mode</b></p> <p><input type="radio"/> Set Color On Mode to Preset</p> <p><input type="radio"/> Set Color On Mode to Dim-To-Warm/Color Fade</p> <p>On Preset <input type="text" value="Energize"/></p> <p>Dim Preset <input type="text" value="Energize"/></p> <p><input checked="" type="radio"/> Set Color On Mode to Previous</p>

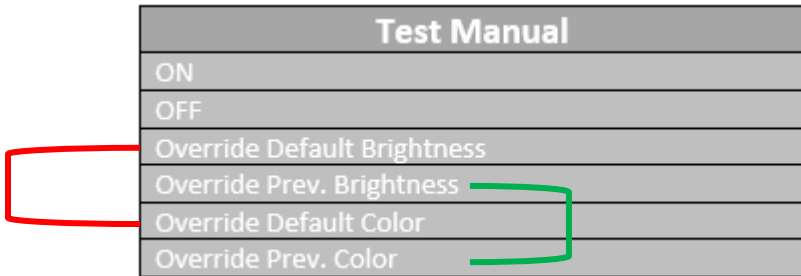
3e	Program--Set Brightness On Mode to <b>Preset/Default On</b>	
3f	Program--Set Brightness On Mode to <b>Previous</b>	

**Instructions for End-User**

System has been programmed to (**Previous**) or (**Preset**) Mode (**you tell them which mode**). If you wish to change the Mode for the operation of the ON button on Navigator or their mobile device



Simply go to this custom keypad on Navigator/UI and select your desired new logic pattern.



Once selected the logic pattern will remain in effect until overridden. Typically, you should select both items marked by the left pointer or both items marked by the right point. That is all there is to it.