

# DCM5 Driver User's Guide

**(Control4 Driver for Axxess 5-Channel Dimming Control Module)**



## Table of Contents

DCM5 Driver User's Guide .....	1
Change Log.....	3
Driver Overview .....	4
Description .....	4
Features .....	5
Electrical Specs.....	5
Properties.....	6
Actions .....	9
Variables.....	11
C4 Programming Commands .....	12
Connections .....	14
Setup Guide.....	15
Setup for RGB Control.....	15
Setup for RGBW Control .....	15
Setup for Individual Strip/Zone Control.....	16
3 <sup>rd</sup> Party Integrations .....	17
Extra Notes.....	19
My Property Fields Are Blank.....	19
Renaming Proxy Devices .....	19
Known Issues.....	19

## Change Log

### Rev 1.00 – Released April 29, 2020

[AP] – First revision, no changes to report.

### Rev 1.01 – Released June 3, 2020

[AP] – Added 'Known Issues' section.

[AP] – Added new action button definitions.

[AP] – Added Electrical Specs section.

### Rev 1.02 – Released May 17, 2021

[AP] – Added 3<sup>rd</sup> party integration information for Janus Color Wheel and Domaudeo Generic Color Wheel drivers.

[AP] – Added information for new connections available in driver.

[AP] – Added physical channel output diagram.

[AP] – Added more information for control methods.

## Driver Overview

### Description

The DCM5 driver consists of a primary light\_v2 proxy device and 5 child light\_v2 proxy devices. The primary proxy represents the master dimmer channel of the device, and each child proxy represents one of 5 dimmers which each of the DCM5's physical outputs (channels) can be mapped to.

The driver gives the user the ability to customize how they use the DCM5 to suit almost any application from colorful lighting control, white color corrected lighting, accent lighting, or individual light load control.

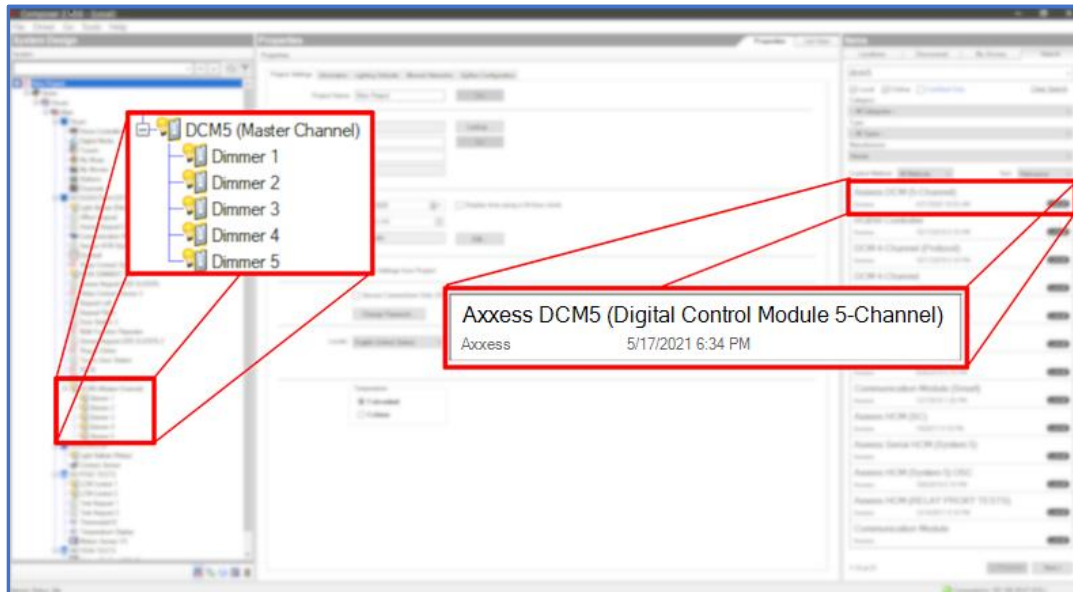


Figure 1: DCM5 Physical Output Channels

## Features

- Advanced Lighting Scene support
- Fun color modes like breathing and random color blending
- Custom dimmer-to-channel mapping with 5 individual logical dimmers
- Individual channel gamma correction
- Master channel control + opt-in master control for each channel
- Color control built around human eye color perception
- Custom channel load layout
- Easy to revert to defaults
- Warm/Cool white mixing

## Electrical Specs

### *Current:*

4A per channel max

5 Channels

Common Anode

### *Power Output:*

At 12VDC Input, 48W per channel max, 240W Total max (all channels)

At 24VDC Input, 96W per channel max, 480W Total max (all channels)

## Properties

### Proxy Properties

Properties			
Properties			
<b>Dimmer Information</b>			
<b>Click Rates</b>			
Preset Level	100	0-100%	Set
Ramp Up	750	Milliseconds	Set
Ramp Down	750	Milliseconds	Set
<b>Hold Ramp Rates</b>			
Up	5	Seconds	Set
Down	5	Seconds	Set
<b>Range Levels</b>			
Min On	1	1-100%	Set
Max On	100	1-100%	Set

These proxy properties are supported for the Master dimmer proxy and dimmer proxies 1 through 5. Setting 'Max On' and 'Max Off' levels are not supported for the Primary/Master dimmer proxy.

### Master Properties

Master Properties	
Master Dimmer Mode	Not Affected
Master Ramp Rate	1

**Master Dimmer Mode:** This property controls how all 5 logical dimmers respond to changes on the master dimmer channel. Setting this property will set the master dimmer mode for all 5 channels simultaneously.

**Master Ramp Rate:** This property defines the ramp rate of the master dimmer.

### Physical Output Channel Properties

Physical Output Channel Properties	
Channel x Dimmer	Dimmer 1
Channel x Gamma Correction	1.0
Channel x Gain	1

**Channel x Dimmer:** This property is used to bind physical channel outputs (as seen in Figure 1) to logical dimmer proxies in the driver. Eg) If Channels 1, 2, and 3 are bound to Dimmer 1, changing the light level of the Dimmer 1 proxy in the driver will cause Channels 1, 2, and 3 on the DCM5 to change too.

**Channel x Gamma Correction:** This property is used to set the gamma correction on the corresponding channel. This is used as a color correction setting, much like setting gamma correction on a computer monitor.

**Channel x Gain:** Applies the specified gain to the values that are sent to the corresponding channel. (Note that this gain is not applied to the dimmer light level value for this channel, but rather the color value sent to this channel). This property is most useful when doing RGB or RGBW LED strip control and one or more of the LED colors is overpowering the rest. (Usually it is the white LEDs that overpower the colored LEDs). A gain could be applied to the strong LEDs to correct their intensity. As an example, one might apply a gain of 0.2 to the Warm White LED channel so it does not wash out the colored LEDs while doing RGBW color control.

### Logical Dimmer Properties

Logical Dimmer Properties	
Dimmer x Master Mode	Always Applied
Dimmer x Ramp Rate	10

**Dimmer x Master Mode:** This property defines how the corresponding dimmer proxy will respond when the master dimmer proxy's light level changes. The three available options are:

**No Effect:** This dimmer is not affected by changes to the master dimmer level.

**Last Dimmer Wins:** This dimmer will be factored by the master dimmer level when the master dimmer level is changed. When this dimmer level is changed, however, the dimmer will no longer be factored by the master dimmer level.

**Always Applied:** This dimmer level is always factored by the master dimmer level regardless of which dimmer level was changed more recently. Ex) dimmer output = dimmer level % \* master dimmer level %

**Dimmer x Ramp Rate:** Defines the dimmer ramp speed as the amount of time (in seconds) required to ramp from 0-100% or vice versa.

### Color Properties

Color Properties	
Control Method	RGBWCT
Channel 1 Light Load	Red LED
Channel 2 Light Load	Green LED
Channel 3 Light Load	Blue LED
Channel 4 Light Load	Warm White LED
Channel 5 Light Load	Cool White LED
Color Temperature	<input type="range"/> <span>87</span>

**Control Method:** Defines how the channel colors are controlled:

**RGB:** DCM5 will try to make a chosen color using RGB LEDs only.

**RGBW:** DCM5 will try to make a chosen color by making a fully saturated color with the RGB LEDs and the white components with the specified white LEDs (use 'White LED' Channel Light Load for white channels).

**RGBWCT:** Same as RGBW except the white component will be corrected based on the color temperature property/proxy dimmer. This allows for colors with white color temperature correction (use '**Warm White LED**' and '**Cool White LED**' Channel Light Loads for white channels).

**WCT:** Disables the ability for the DCM5 to choose a color and instead sets warm and cool white values based on color temperature setting (use only '**Warm White LED**' and '**Cool White LED**' Channel Light Loads for this setting).

**Dimmer Control:** Disables the ability for the DCM5 to choose a color or set color temperature. Channels will be controlled purely by the dimmer proxies. This is good for situations where the channels should be treated as independent loads, or if color mixing is to be done using a 3<sup>rd</sup> party driver that handles color mixing using separate dimmer proxies to control each color.

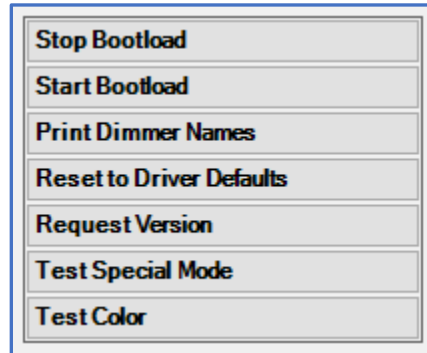
**Channel x Light Load:** Defines the type of LED load connected to the corresponding channel. This is used by the driver to determine which channels to send each color value to. The available options are:

Red LED, Green LED, Blue LED, Warm White LED, Cool White LED, White LED, and Other.

**Color Temperature:** Controls how white output is mixed between warm and cool white LED outputs. A value of 100 = fully cool, and a value of 0 = fully warm. This property is connected to the Color Temperature dimmer proxy; updates to one will update the other.



## Actions



### *Stop Bootload*

If a bootloader (a.k.a device firmware upgrade) is currently in progress, this button will abort the bootloader process.

### *Start Bootload*

If there is a new firmware file available for the driver/device, this button will begin the process of downloading new firmware to the DCM5.

### *Print Dimmer Names*

This action button will print, in the Lua window, the names of the 5 child dimmer proxies in the DCM5 driver along with their corresponding dimmer #. This is available due to the fact that the dimmer proxy devices can be renamed within Composer; while they should always retain their correct order in the System Design list, some users may find it helpful to see which properties and commands correspond to their renamed dimmer proxy devices.

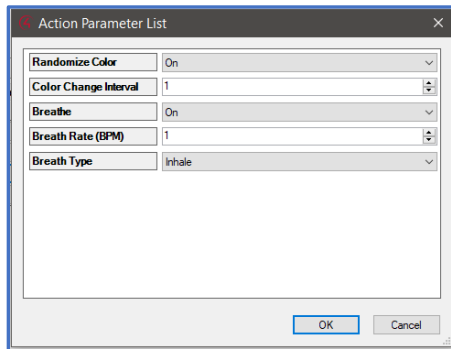
### *Reset to Driver Defaults*

This action button will reset all driver properties, light proxy settings, and dimmer proxy names (except for the root proxy). It will then synchronize the DCM5 with the driver by pushing the newly defaulted settings out.

### *Request Version*

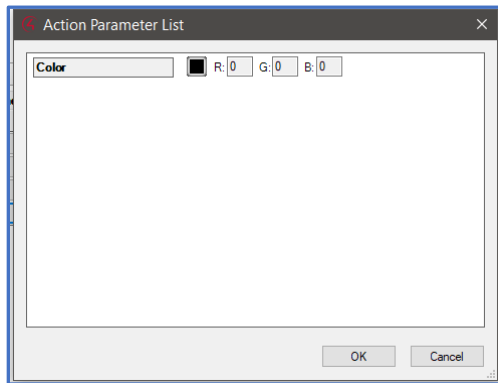
This action button will send a version request message to the DCM5. This causes the DCM5 to respond with microcontroller and radio firmware versions.

### Test Special Mode



This action button will open a menu that allows the user to set the DCM5 to breath/color randomize mode as a test. The button can be used again to turn the mode off.

### Test Color



This action button will open a menu that allows the user to choose a color that the DCM5 should display on the connected RGB/RGBW LED strip. This command relies on the driver property 'Control Method' being set to either 'RGB' or 'RGBW'.

## Variables

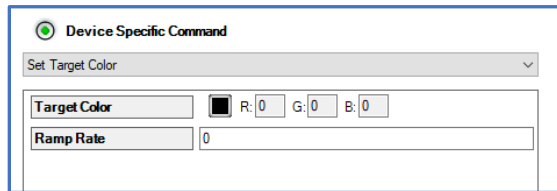
This list only encompasses custom C4 variables that are not associated with the light\_v2 proxies.

### *COLOR\_PALETTE\_INDEX*

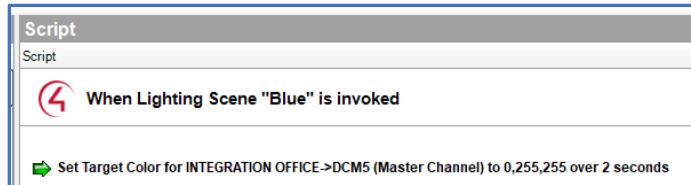
Device variable used to keep track of/set the color palette index. Setting this variable's value will cause the DCM5 to display the color at the specified palette index. (Not recommended for general use, but good for choosing a color using a single index value)

## C4 Programming Commands

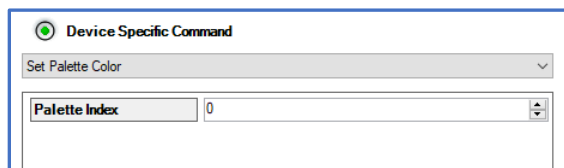
### Set Target Color



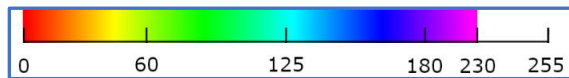
This command is used to set the output color for the DCM5. Since RGB lighting scenes are not yet supported in the Advanced Lighting Scene Agent, it is recommended to use this command to set the DCM5 output color when the 'Scene Invoked' event is fired for the desired scene.



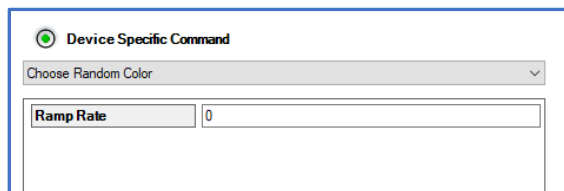
### Set Palette Color



This command is used to pick an output color on the DCM5 based on a palette index that ranges from 0-255. The default color palette stored on the DCM5 is demonstrated by the following graphic:

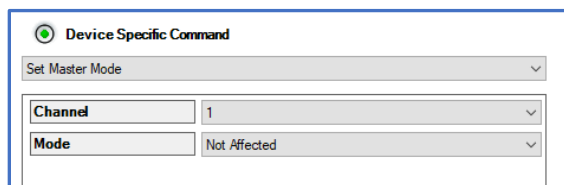


### Choose Random Color



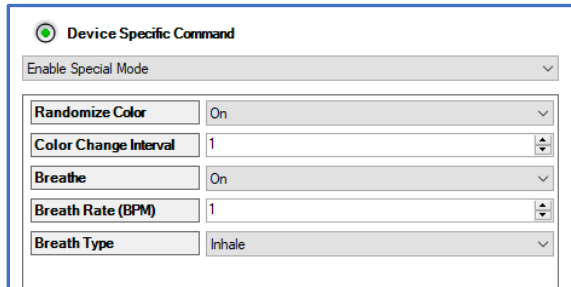
This command causes the driver to choose a random color from the color palette from 0-229 (excludes selecting white).

### Set Master Mode



This command allows the user to define how a dimmer proxy will respond to changes in the master dimmer level programmatically.

### Enable Special Mode



The screenshot shows a software window titled "Device Specific Command". Inside, there is a dropdown menu labeled "Enable Special Mode". Below this, there are two sections of controls. The first section has a label "Randomize Color" and a value of "On". The second section has a label "Color Change Interval" with a value of "1". Below these, there is a label "Breathe" with a value of "On". The next section has a label "Breath Rate (BPM)" with a value of "1". The final section has a label "Breath Type" with a value of "Inhale".

This command allows the user to turn on color changing and color breathing modes on the DCM5. These options can be turned on separately or simultaneously. The modes are described below.



























**Randomize Color Mode:** This mode will cause the DCM5 to randomize its color output at an interval described by the 'Color Change Interval' value in seconds.

**Breathe Mode:** This mode will cause the DCM5 to make the master dimmer level 'breathe' at the rate specified by the 'Breath Rate (RPM)' value. If the reader is unfamiliar with the concept of breathing effects on a lighting device, it can be thought of as the level of the lights ramping up, then ramping down, then repeating that process indefinitely. The 'Breath Type' value can be set to 'Inhale' or 'Exhale' which results in the dimmer level spending slightly more time at either the top or the bottom end respectively while going through the breath cycles.

**Both Modes Enabled:** If both modes are enabled simultaneously, the 'Color Change Interval' value will be ignored, and the DCM5 color output will change with every breath cycle.

## Connections

The connections that are available in the DCM5 driver are all compatible with Axxess Keypad driver 'SLIDER\_LINK' connections. If the user does not have an Axxess Keypad, this section of the document can be ignored. All 'BUTTON\_LINK' connections are compatible with standard 'BUTTON\_LINK' input connections such as on Axxess or Control4 keypads. Button LED states will be synchronized when connected to these outputs.

Name	Type	Connection	Input/Output	Connected To
<b>Control Inputs</b>				
 Dimmer 1 Slider	Control	SLIDER_LINK	Input	
 Dimmer 2 Slider	Control	SLIDER_LINK	Input	
 Dimmer 3 Slider	Control	SLIDER_LINK	Input	
 Dimmer 4 Slider	Control	SLIDER_LINK	Input	
 Dimmer 5 Slider	Control	SLIDER_LINK	Input	
 Color Palette Slider	Control	SLIDER_LINK	Input	
 Color Temperature Slider	Control	SLIDER_LINK	Input	
 Master Dimmer Slider	Control	SLIDER_LINK	Input	
<b>Control Outputs</b>				
 On (Dimmer 1)	Control	BUTTON_LINK	Output	
 Off (Dimmer 1)	Control	BUTTON_LINK	Output	
 Toggle (Dimmer 1)	Control	BUTTON_LINK	Output	
 On (Dimmer 2)	Control	BUTTON_LINK	Output	
 Off (Dimmer 2)	Control	BUTTON_LINK	Output	
 Toggle (Dimmer 2)	Control	BUTTON_LINK	Output	
 On (Dimmer 3)	Control	BUTTON_LINK	Output	
 Off (Dimmer 3)	Control	BUTTON_LINK	Output	
 Toggle (Dimmer 3)	Control	BUTTON_LINK	Output	
 On (Dimmer 4)	Control	BUTTON_LINK	Output	
 Off (Dimmer 4)	Control	BUTTON_LINK	Output	
 Toggle (Dimmer 4)	Control	BUTTON_LINK	Output	
 On (Dimmer 5)	Control	BUTTON_LINK	Output	
 Off (Dimmer 5)	Control	BUTTON_LINK	Output	
 Toggle (Dimmer 5)	Control	BUTTON_LINK	Output	
 On (Master Dimmer)	Control	BUTTON_LINK	Output	
 Off (Master Dimmer)	Control	BUTTON_LINK	Output	
 Toggle (Master Dimmer)	Control	BUTTON_LINK	Output	

### *Dimmer x Slider*

Used to directly connect a Keypad slider with a dimmer light level.

### *Color Palette Slider*

Used to control the color output of the DCM5 using a Keypad slider.

### *Master Dimmer Slider*

Used to directly connect a Keypad slider with the master dimmer light level.

### *On/Off/Toggle*

These connections correspond to their respective dimmers and work in the same fashion as typical Control4 Top/Bottom/Toggle 'BUTTON\_LINK' connections. Tapping a button connected to On will turn the corresponding dimmer on, while holding the button will cause the dimmer to ramp up based on the hold rate defined for that dimmer and will stop ramping when the button is released.

## Setup Guide

### Setup for RGB Control

To set up the DCM5 for RGB LED control, it is recommended to configure the RGB output channels to be controlled by a single dimmer. By default, channels 1, 2, and 3 are configured to have Red LED, Green LED, and Blue LED as loads respectively, and are all controlled by dimmer #1 by default.

The 'Control Method' property must then be set to 'RGB', which it is by default.

The color output of the DCM5 can now be set programmatically or via the 'Test Color' action button.

Note that if the selected color has any white in it (meaning all three RGB values are greater than 0), the color output of the DCM5 will try to replicate that color using the RGB LEDs. RGBW works differently in this regard and will be explained in its corresponding setup section.

### Setup for RGBW Control

To set up the DCM5 for RGBW LED control, it is recommended to configure the RGBW output channels to be controlled by a single dimmer. By default, channels 1, 2, and 3 are configured to have Red LED, Green LED, and Blue LED as loads respectively, and are all controlled by dimmer #1 by default. Channel 4, or channels 4 and 5 (depending on how the white portion will be implemented), should be configured to be controlled by dimmer #1 as well.

The 'Control Method' property must then be set to 'RGBW'.

If the RGB LED strip being used has one white LED line, the channel controlling the white LED line should have its load configured for the 'White LED' option.

If the LED strip has both warm and cool white LEDs, or, if the user has somehow incorporated both warm and cool white LEDs into the lighting fixture, then channels 4 and 5 should be set to 'Warm White LED' and 'Cool White LED' based on which LED is connected to which channel. The 'White Color Correction' property should be set to 'On', and the desired mix of warm/cool LED output can be selected with the 'Color Temperature' slider.

When using RGBW control, if the color that is selected contains any white (meaning all three RGB values are greater than 0), the white component of the color will be directed to the white LED loads and only two color channels will be utilized for proper color replication. It is important to note that the white LED channels are likely going to overpower the RGB color channels, resulting in an inaccurate representation of the color chosen by the user. This is where the 'Channel x Gain' properties come in handy. The white LED channels can be scaled back to better represent the selected colors.

### Setup for Individual Strip/Zone Control

To set up the DCM5 for individual LED strip/zone control, determine which channels will be controlled by the same dimmers (if any at all), and assign dimmers to the channels based on the assessment. There are 5 dimmers available, so each channel can be controller by its own dimmer if that is desired.

The 'Control Method' property must then be set to 'Dimmer Control'.

The difference with 'Dimmer Control' mode is that the DCM5 will be told to set all channels to maximum output. From there, the light level will be varied by the dimmer values.



### 3<sup>rd</sup> Party Integrations

#### *Color Wheel by Janus*

Driver URL: <https://janustechnology.co.uk/products/drivers/type/lighting/colour-wheel-for-control4/>

The integration with Janus' Color Wheel driver is built into the Janus driver. However, some setup is required on the Axxess DCM5 driver to ensure that the Janus driver can control the DCM5 as intended.

#### Recommended steps to integrate these products:

- 1) Set the DCM5 'Control Method' property to 'RGB', 'RGBW', 'RGBWCT', or 'WCT'. Janus can recognize which mode the DCM5 is in and is not compatible with the 'Dimmer Control' control method.
- 2) Map the physical output channels to their corresponding dimmers. In this instance it is recommended to map the physical channels that control red, green, and blue to a single dimmer. In the case of RGBW, the white LED should also be mapped to the same dimmer.
- 3) Set the 'RGB Load Name' property in the DCM5 driver to the name of your choosing. This name will be used by the Janus Color Wheel driver to identify the RGB load.
- 4) Set the 'CT Load Name' property in the DCM5 driver. This name identifies the color temperature load in the Janus Color Wheel driver if a color temperature compatible control method was chosen.
- 5) Select the 'RGB Load Dimmer' in the DCM5 driver. This will be the proxy dimmer that is controlling the brightness of the RGB load.
- 6) Select the 'CT Load Dimmer' in the DCM5 driver. This will be the proxy dimmer that is controlling the brightness of the color temperature load.

**NOTE:** If the RGB and CT are part of the same load, set the RGB and CT Load Dimmer properties to use the same dimmer. This way, when controlling the brightness from the Janus Color Wheel, the entire load brightness will be controlled while still allowing independent control of the RGB and CT values.

- 7) You will now be able to use the Janus Color Wheel driver to control the DCM5.

*Generic Color Wheel by Domaudeo*

Driver URL: <https://www.blackwiredesigns.com/store/generic-color-wheel-for-control4/>

Recommended steps to integrate these products:

- 1) Set the DCM5 'Control Method' property to 'Dimmer Control'.
- 2) Rename the first 3 (non-master) dimmer proxies of the DCM5 driver to 'Red', 'Green', and 'Blue'.
- 3) Rename the mast dimmer proxy of the DCM5 driver to 'DCM5 Brightness'
- 4) Map the physical output channels to their corresponding dimmer colors.
- 5) Set 'Master Dimmer Mode' property to 'Always Applied' in DCM5 driver.
- 6) Select appropriate 'Red Device', 'Green Device', 'Blue Device', and 'Brightness Device' proxies in the Color Wheel driver. (Select the Primary/Master proxy dimmer of the DCM5 driver as the Brightness Device).
- 7) You will now be able to use the Domaudeo Color Wheel driver to control the DCM5.

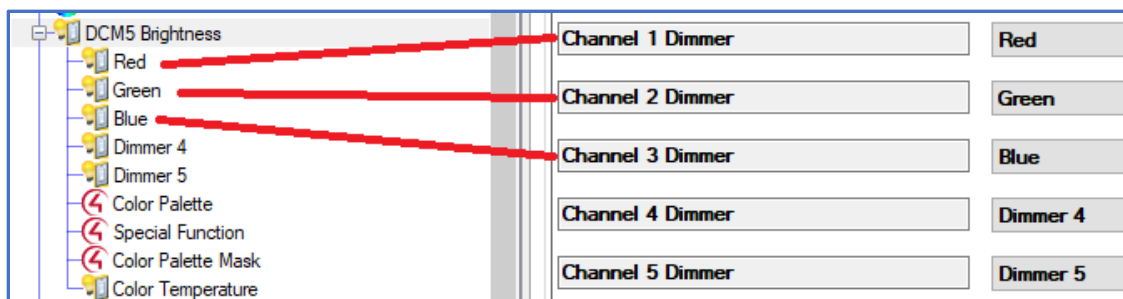


Figure 2: DCM5 settings for Domaudeo Color Wheel

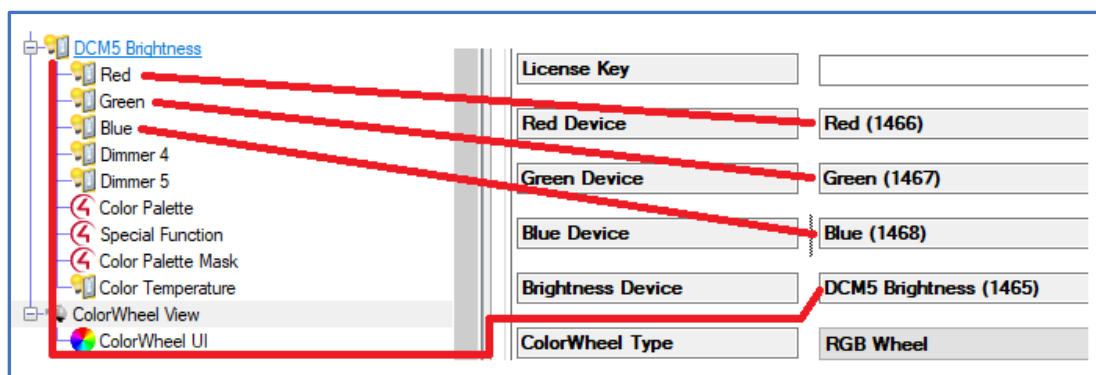


Figure 3: Domaudeo Color Wheel settings for DCM5

## Extra Notes

### My Property Fields Are Blank

The 'Channel x Dimmer' properties are DYNAMIC\_LIST property types, which means they are prone to failing to display the current property value from time to time. If one of these property fields ever appears blank, do not fret, the value is still present, it has just failed to populate. Change the property field, then click 'Cancel' instead of 'Set' and the property should revert to its current value.

Physical Output Channel Properties	
Channel 1 Dimmer	Dimmer 1
Channel 2 Dimmer	Dimmer 1
Channel 3 Dimmer	
Channel 4 Dimmer	
Channel 5 Dimmer	Dimmer 3

### Renaming Proxy Devices

Changing the names of the 5 child dimmer proxies in the driver will also affect the 'Channel x Dimmer' property lists. This is to make it easy for the user to determine which dimmer they are linking a channel to. However, keep in mind that the proxy name only changes in the 'Channel x Dimmer' list and does not change anywhere else in the driver such as in property field names like 'Dimmer x Ramp Rate' or 'Dimmer x Master Mode'. To determine the name of any given dimmer, simply click the 'Print Dimmer Names' action button.

Physical Output Channel Properties	
Channel 1 Dimmer	RGB Dimmer
Channel 2 Dimmer	RGB Dimmer
Channel 3 Dimmer	RGB Dimmer
Channel 4 Dimmer	Dimmer 2
Channel 5 Dimmer	Dimmer 3

### Known Issues

Once a DCM5 driver has been added to a project, if the child proxy dimmer objects are not renamed, it will cause issues for any subsequent DCM5 drivers in that the 'Channel x Dimmer' properties **must** be set to one of the available options before the driver will work correctly.