

Circadian Lighting for Control4



Control4 Driver Integration Guide

v208

Introduction

Circadian Lighting is a new driver suite by Janus Technology that allows you to easily program a circadian rhythm for any tunable white dimmers in your project. Common use cases of this would be to synchronize the colour temperature of your lamps to your location's daylight, or possibly even your sleep schedule to give warmer colours at bedtime and cooler ones during the day.

This suite comes with 2 drivers; a circadian lighting controller, and a webview component to enhance the configuration of your schedules.

Each circadian lighting controller can configure a schedule entirely from composer for a subset of lights *you* choose from your project - this means you can have multiple entirely different schedules running in one project, with a different subset of lights being controller by each!

The Circadian Webview driver that also comes in this suite provides a very intuitive way to configure all circadian lighting controller drivers in your project, by using Control4's WebView technology. You can access this enhanced interface through the Control4 iOS & android apps and T3/T4 screens, making it quick and intuitive for your client to modify their circadian schedules whenever they choose.

Quick Start Guide

1. Copy the .c4z file from the zip package to your Control4 driver folder location (e.g. My

Documents\Control4\Drivers) and then open Composer.

2. Add 1 or more instances of the Circadian Lighting Controller driver to your project, and 1 instance of the Circadian Lighting Webview driver.
 3. In the Properties tab of each Circadian Lighting Controller, set the appropriate properties:
 - a. Choose the devices that should be controlled on the circadian cycle.
 - b. Indicate whether you want Smart Light Level Monitoring enabled (this allows you to adjust light levels of a single bulb without interrupting the circadian rhythm).
 - c. Create/configure your schedule using the scheduler and switchpoint configuration properties (this could also be done through the webview driver, which can be accessed from any Control4 UI after you have completed steps 4 & 5).
 4. Set the visibility of the Circadian Lighting Webview driver in an appropriate room(s) by modifying device visibility on an experience menu for a room's navigator settings.
 5. Refresh navigators.
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Circadian Configuration

The schedule you will create using these drivers is done by defining switchpoints - specific points in time where you define a brightness and colour temperature. The schedule will then interpolate a curve between each set of switchpoints, giving a smooth transition between them.

E.g. - If you configure a switchpoint at 1:00pm to have a colour temperature of 4000K, then a switchpoint at 5:00pm to have a colour temperature of 3000K, at 3:00pm you can expect that the lights will be showing a colour temperature of around 3500K.

In the **System Design** view, select a *Circadian Lighting Controller* driver to begin the configuration of setting up a schedule.

Using the device selector property, select the lights from your project that you wish to include in the schedule. Once you have chosen these lights, you can continue the configuration either in the rest of the driver properties, or by using the webview interface!

Creating a Schedule with Composer

1 - Set the number of switchpoints

The property *Number of Switchpoints* can be set between 3 and 10. For each switchpoint, you will need to define the exact brightness, colour temperature for a given time. 4 switchpoints is recommended for most scenarios.

2 - Choose which mode to use the driver in

The property *Scheduler Mode* lets you choose how the driver is to be used; whether you want to control

both the brightness and colour temperature of your fixtures, just the colour temperature, or just the brightness, you can choose your desired method using this property.

3 - Define the Colour Temperature limits

Tunable white bulbs have varying ranges of colour temperatures that they can produce, so you should match this to your bulbs to give the most accurate experience.

4a - Configure astronomical switchpoints

SP 3 Type	Astronomical
SP 3 Astronomical Reference	Sunrise
SP 3 Offset (mins)	20
SP 3 Brightness	<input type="range" value="66"/> 66
SP 3 Colour Temperature	<input type="range" value="3000"/> 3000

Driver Properties for Astronomical setpoints

When *Type* is set to *Astronomical*, you can select an astronomical reference for the switchpoint to be based around (*Sunrise*, *Solar Noon*, *Sunset*, *Solar Midnight*), and provide an offset from -180 to 180 minutes.

The astronomical times are re-calculated every day at midnight, and use the latitude and longitude provided in your project settings - so please ensure these are correct for the site for using astronomical switchpoints.

You can then also use the brightness and colour temperature sliders to configure the values of this switchpoint. Note that Colour Temperature is constrained to be within the limits you defined in step 2.

4b - Configure set time switchpoints

SP 1 Type	Set Time
SP 1 Time	14:00
SP 1 Brightness	<input type="range" value="60"/> 60
SP 1 Colour Temperature	<input type="range" value="2600"/> 2600

Driver Properties for Set-time setpoints

When *Type* is set to *Set Time*, you can select an absolute time for this switchpoint to be configured at. This is formatted in 24-hour format as HH:MM.

You can then also use the brightness and colour temperature sliders to configure the values of this switchpoint. Note that Colour Temperature is constrained to be within the limits you defined in step 2.

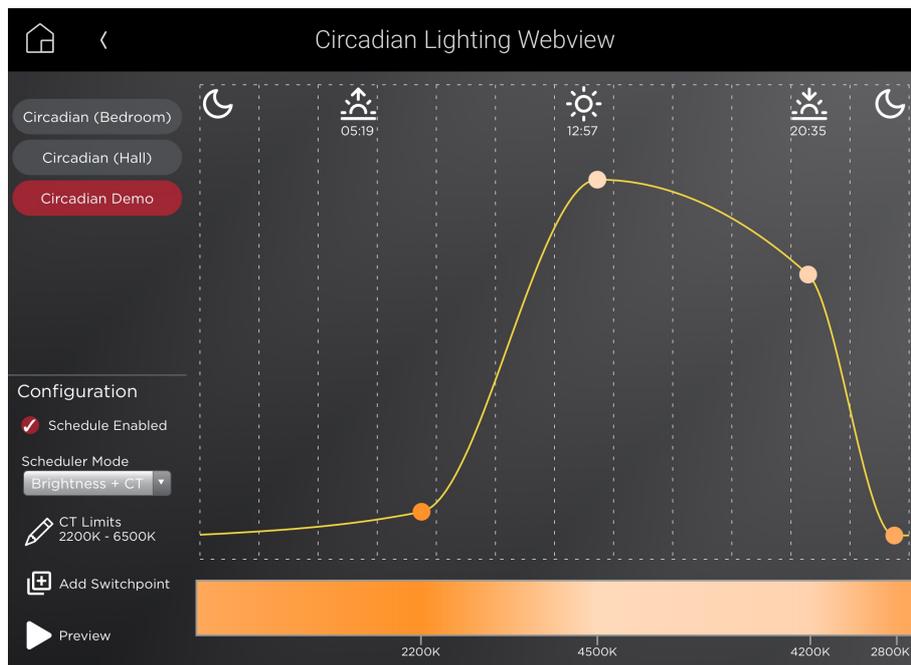
5 - Saving the Schedule

The schedule is automatically recalculated each time you modify a driver property, so no additional steps are needed to save the schedule. When configuring the schedule, you may find it useful to press the action Toggle Schedule Activity, which will pause the schedule operation, preventing the driver from changing light values during your configuration. Just make sure to press this action again to re-enable the schedule once you are done configuring it!

6 - Previewing the Schedule

You can preview your configured schedule by pressing the action 'Preview Schedule' for any Circadian Controller driver. This will cycle through the entire schedule over just under 2 minutes. Make sure you switch back to the **Properties** tab, as you can see the associated time in the Operational Mode feedback!

Creating a Schedule with webview



Webview UI

The webview interface allows you to configure multiple circadian controllers independently (*Circadian Demo* is selected, top left).

The curve on the graph shows how the brightness changes throughout the day, while the gradient underneath shows how the colour temperature changes. Press and hold on the gradient to reveal a curve on the graph modelling the colour temperature change!

The vertical lines on the graph are positioned every 2 hours (e.g. 00:00, 02:00, 04:00...).

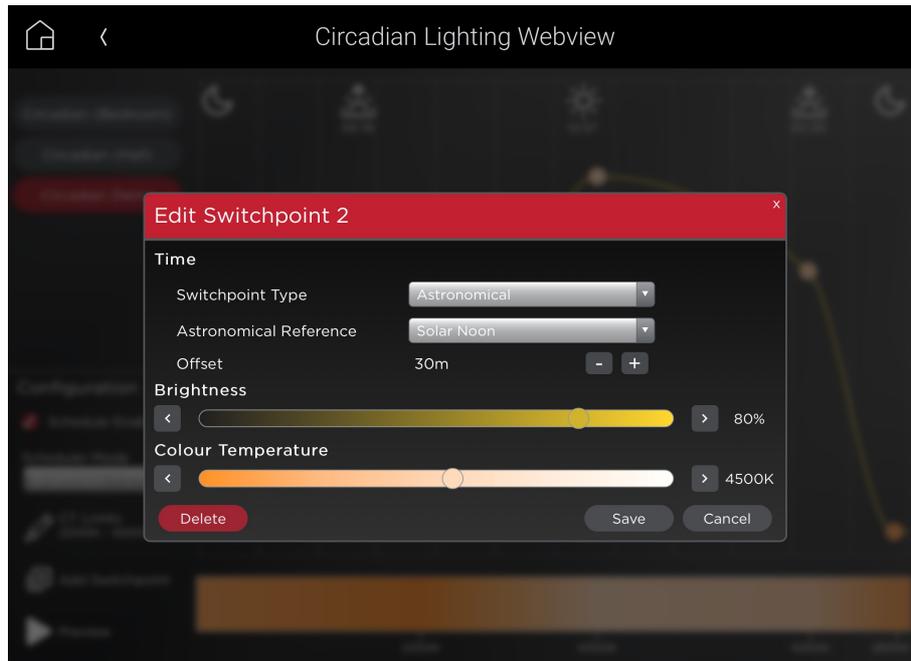
Current astronomical times for sunrise, solar noon and sunset are positioned at the top of the graph to more easily visualise how the schedule changes with daylight.

1 - Define the Colour Temperature limits

In the bottom-left of the webview, press the Set button next to CT Limits. This will reveal two sliders, allowing you to set the minimum and maximum colour temperature for your selected controller.

Tunable white bulbs have varying ranges of colour temperatures that they can produce, so you should match this to your bulbs to give the most accurate experience.

2 - Configuring Switchpoints



Webview Switchpoint Configuration

You can add a new switchpoint (up to 10) by pressing the *Add Switchpoint* button or edit an existing one by pressing the switchpoint dot on the graph.

Each switchpoint can be tied to an astronomical event (plus/minus some offset), or a set time (in 24-hour HH:MM format). The two sliders are used to define the brightness and colour temperature for that switchpoint.

3 - Previewing the schedule

You can preview your configured schedule by pressing the *Preview* button in the bottom-left of the webview interface. This will cycle through the entire schedule over just under 2 minutes, with a marker appearing underneath the graph to indicate the current progress of the preview.

Controller Driver Configuration

Properties

In the **System Design** view, select a Circadian Lighting Controller driver to view all available properties for setup:

Driver Information

- **Driver Version** - Reports the current version of the driver.

- **Operational Mode** - Reports the operational mode of the driver, including feedback as to whether the schedule is running.

DriverCentral Cloud Settings

- **Cloud Status** - Reports the DriverCentral cloud connection status.
- **Automatic Updates** - Set this property to *On* to enable automatic updates of this driver.

Operational Configuration

- **Controlled Devices** - Use the device selector to choose which lights in your project should be controlled by this circadian controller.
- **Smart Light Level Monitoring** - With this property enabled, it allows you to adjust light levels of a single bulb without interrupting the circadian rhythm. See FAQ for more details.
- **Follow Lights when Schedule Resumed** - If set to *Yes*, any light which is not currently following the programmed schedule (tracked via Smart Light Level Monitoring) will re-align with the schedule.
- **Fade Time (s) to Re-align with Schedule** - Define the fade time that should be used when the schedule is resumed (via actions/commands/webview) or a light is re-aligned with the schedule (See FAQ for details explaining *Smart Light Level Monitoring*).
- **Debounce Time (s) on level changed** - If the lights you are using take a while to settle on a new level (e.g. for systems with slow response times or unreliable networks), set this to a higher level to ensure Smart Light Level Monitoring continues to work. In most scenarios, the default value (1 second) is recommended.

Scheduler Configuration

- **Number of Switchpoints** - Define the number of switchpoints that are included on this schedule. Each switchpoint will have an associated colour temperature (and brightness).
- **Include Brightness** - Define whether the configured schedule should control colour temperature only (*No*), or both colour temperature and brightness (*Yes*).
- **Minimum/Maximum Colour Temperature** - Define the minimum and maximum colour temperatures (K) that are available from your tunable white fixtures. This is needed to accurately convert the Colour Temperatures used by Circadian Lighting to the 0-100 dimmer scale that is typically used in Control4 dimmer drivers.

Switchpoint 1..10

- **Type** - Choose what the time of this switchpoint should be based on. Choices are *Set Time*, or *Astronomical*.
- **Time** - For a type of *Set Time*, define the exact time of the switchpoint, in the format HH:MM.
- **Astronomical Reference** - For a type of *Astronomical*, choose which astronomical event (e.g. sunset/sunrise) should be used as a reference.
- **Offset (mins)** For a type of *Astronomical*, define the offset (in minutes) that the switchpoint should be from the chosen astronomical reference.
- **Brightness** - Set the brightness level for this switchpoint.
- **Colour Temperature** - Set the colour temperature for this switchpoint.

Actions

In the **System Design** view, select a Circadian Lighting Controller driver and press on the *Actions* tab:

- **Preview Schedule** - This will cycle through the entire schedule over just under 2 minutes. Make sure you switch back to the Properties tab, as you can see the associated time in the Operational Mode feedback!
- **Pause Schedule** - Pauses the schedule without changing its configuration.
- **Resume Schedule** - Resumes a previously paused schedule and sets all lights to follow the schedule once again.
- **Display Stored Schedule** - Displays a printout of the stored schedule in the Lua Output tab.
- **Follow All Lights** - Sets all lights to follow the schedule once again (useful if you are using Smart Light Level Monitoring).
- **Show Astronomical Data** - Displays a printout of the stored astronomical data (sunset, sunrise, noon, midnight times) in the Lua Output tab.
- **Retrieve Astronomical Data** - Forces the driver to re-calculate the astronomical references for the schedule.
- **Copy Schedule** - Choose other Circadian Lighting controllers to copy your schedule to. NOTE - this will override the schedule on the target controllers.

Programming Interface

All Events and Actions described here are available through the **Programming** view in Composer.

Events

Events are shown in the left pane of the programming interface.

- **Schedule Paused** - The circadian schedule has been paused.
- **Schedule Resumed** - The circadian schedule has been resumed.
- **Preview Started** - The preview has been started.
- **Preview Stopped** - The preview has been stopped.

Actions

Actions are shown in the upper-right pane of the programming interface.

- **Pause Schedule** - Pauses the schedule without changing its configuration.
- **Resume Schedule** - Resumes a previously paused schedule and sets all lights to follow the schedule once again.
- **Follow All Lights** - Sets all lights to follow the schedule once again (useful if you are using Smart Light Level Monitoring).
- **Start Preview** - Starts a preview of the Circadian schedule.
- **Stop Preview** - Stops a preview from running.

Variables

Variables are shown in the lower-right pane of the programming interface.

Variables show as child objects of the device interface, with each being available as an Event (Changed) and a Conditional (if value).

- **SCHEDULE_ACTIVE** - Indicates whether the schedule is active (boolean).
 - **PREVIEW_ACTIVE** - Indicates whether the preview is active (boolean).
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Webview Driver Configuration

Properties

In the **System Design** view, select the Circadian Lighting Webview driver to view all available properties for setup:

Driver Information

- **Driver Version** - Reports the current version of the driver.
- **Operational Mode** - Reports the operational mode of the driver, including feedback as to whether the schedule is running.
- **Language** - Displays the locale used for the Circadian Webview UI. This uses the project's locale (if supported), and defaults to English if the project locale is not supported. Currently supported locales are: *English, Italian*.

DriverCentral Cloud Settings

- **Cloud Status** - Reports the DriverCentral cloud connection status.
- **Automatic Updates** - Set this property to *On* to enable automatic updates of this driver.

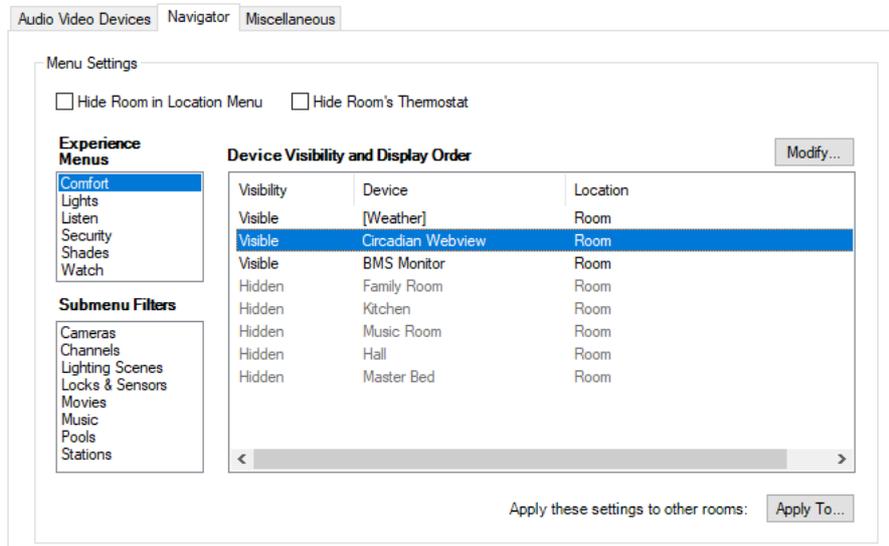
Actions

In the **System Design** view, select a Circadian Lighting Webview driver and press on the *Actions* tab:

- **Clear Touchscreen Cache** - Clears the webview cache for the selected T3/T4 touch panels. This will ensure the webview is completely re-loaded on next load (no schedule configuration will be lost).
- **Rebuild Webview** - Rebuilds the webview client, used in-case network configuration has changed (no schedule configuration will be lost).

Navigator Accessibility

To set where you can access Circadian Webview, in the **System Design** view, click on a room and then on the **Navigator** tab.



Navigator menu visibility

Press the experience menu you wish to place the webview in, and press **Modify** (note that custom UI buttons such as this cannot be added to all experience menus due to limitations set by Control4).

Highlight *Circadian Webview* and press **Show** then **OK**.

Now refresh the navigators in your project, and Circadian Webview will now be accessible from the experience menu (and room) you placed it in.

FAQ

What Lighting Systems are supported?

For systems running OS3.3.0+, Circadian Lighting is fully compatible with any lighting driver that uses the new native colour control functionality.

In addition to this, the following drivers that do not use this native colour control are supported:

- **Aurora** – Uses the new AOne lighting driver suite that will be available from the Janus Technology website soon!
- **Axxess** – Uses the Axxess DCM5 lighting driver.
- **Collingwood** – Specific CT light driver suit, available from DriverCentral.
- **KNX Coloured Lighting** - Support for all valid KNX datapoints, available from DriverCentral.
- **LIFX** - Uses the LIFX driver suite by ChowMain, available from DriverCentral.

- **Mode eDin** – Uses the new tunable white drivers in the Mode eDin suite, available soon from the Janus Technology website!
- **Philips Hue** – White Warmth and Full Color driver variants, available from the Control4 cloud.
- **Shelly** - Supports both the ChowMain and Janus variants of the Shelly tunable white dimmers.
- **TP-Link** - Uses the TP-Link driver suite by ChowMain, available from DriverCentral (*v20191009 or higher*).
- **Tuya** – Uses the Tuya driver suite by ChowMain, available from DriverCentral.
- **YeeLight** - Uses the YeeLight driver suite by ChowMain, available from DriverCentral (*v20190712 or higher*).
- **Zuma Lumisonic** – Uses the new driver suite, available from the Janus Technology website.
- **Enhanced Lighting Interface** – This allows existing individual dimmers to group as tunable white fixtures, available from DriverCentral.

The following drivers are compatible via Enhanced Lighting Interface, which allows existing individual dimmers to group as tunable white fixtures:

- Adeo DALI/DMX
- ArtNet DMX (ExtraVeg and Nexgentec)
- Clipsal C-Bus
- ColorBeam CBNA TP
- Control4 Centralized Lighting
- KNX
- Lutron Homeworks
- Lutron Homeworks QS
- Rako (RakoControls, ExtraVeg)

Additional systems can be very quickly added – please send us a copy of the driver and we will gladly incorporate compatibility!

What interfaces does the webview work on?

Circadian Webview appears where you have placed it via navigator. Currently this is available on T3/T4 screens, and for systems running OS v3.2.0 or later, also on Control4's iOS / Android Apps.

You can also access the webview from any browser, by accessing

http://<controller_ip>/c4z/janus_circadian_webview_dc/www/dist/

How does the 'smart light level monitoring' work?

Smart Light-Level Monitoring allows you to adjust the brightness or temperature of a controlled light without interrupting the circadian rhythm.

Say you have a bulb included within a circadian schedule, and you want to manually change the brightness of that bulb as a one-off change. The circadian lighting controller will notice that this bulb has had its brightness changed externally, and so will not set its brightness with any future commands, while keeping the temperature in line with the circadian rhythm.

A bulb will be automatically re-aligned with the circadian rhythm when it is switched on from 0, or if the

circadian brightness matches that of the bulb which has been changed.

Can I place Circadian Webview within the lights experience menu?

Unfortunately, the Control4 UI prohibits devices that are not specifically light drivers from appearing within the lights experience menu.

Circadian Webview can, be shown alongside Comfort, Listen, Security and Watch. This can be customised from the room navigator interface in composer.

For systems running OS v3.x, you can also favourite Circadian Webview to the room by pressing and holding on the UI icon from navigator.

Do you offer free demo license for dealer showroom?

Yes - we offer a free showroom demo license via the DriverCentral showroom project.

What kind of Interpolation does the driver use?

The schedule that is created uses monotone cubic interpolation to smoothen the line that connects each switchpoint.

Troubleshooting

If you encounter any issues with the driver, please contact us at <http://www.janustechnology.co.uk/support>, and we will be happy to assist however needed.