

blcons is a driver that changes its icons based on the value of a public variable or another driver's variable. blcons is packaged with several Icon Sets like battery, power on/off, water tanks, propane tank, fuel tanks, solar, air conditioners, fans, PH/ORP dials, temperatures, voltages, generic frames, gauges and dials.

SETUP

- 1) Within your Control4 project, install an instance of the blcons driver for every Variable you wish to visually represent as an icon
- 2) Icon Sets must be enabled before they are accessible - Using the BNet / Icon Sets composer tab, enabled the Icons Sets for all blcons instances (this is a global configuration). See Custom Driver Build section for more information
- 3) Set the Device Name, Device Variable and Icon Set properties
- 4) Configure the driver's Click Behavior to change how the icon behaves to a Select event from a navigator interface
- 5) Configure the driver's visibility for each room using the Room's Navigator Menu Settings
- 6) Refresh Navigators

PROPERTIES

DRIVER SETUP

Driver Version	Installed driver version
MAC Address	Unique network interface identifier for the Controller
Upgrade Mode	BNet Solutions drivers automatically update themselves. Options are "Automatic", and "Upgrade Now". See "Upgrade Mode" section below
Admin Token	Token required to access the driver's Admin Portal

BLCONS SETUP

Device Name	List of devices available on the controller
Device Variable	Selected Device's public variables
Current Value	Current value of the selected variable
Variable Type	Data type of the selected Variable. NUMBER, BOOL and FLOAT are supported Variable Types
Adjustment	Adjustment to apply to Variable *see Adjustment section for discussion
Icon Set	List of Icon Sets available for the selected Variable Type *see Icons Sets section for discussion

NAVIGATOR SETUP

Click Behavior	Set the behavior when a Select Event is received from a C4 navigator. Webview will open a browser session on the navigator, Select will trigger one of the "Click" events.
Webview URL	Starting address of a Webview browser session

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Click Window	<p>*property only visible when Click Behavior is set to Webview</p> <p>Duration during which all clicks are interpreted as a single action. For example, the Triple Click event will only trigger if all three Select events are received within the Click Window *property only visible when Click Behavior is set to Select. See Click Window section for discussion</p>
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DEBUG SETTINGS

Debug Mode	Sets where the driver outputs debug information. See "Troubleshooting" section below for more information
Debug Level	Sets how much debug detail the driver outputs

ACTIONS

Refresh Device List	Forces Device and Variable refresh
Display All Variables	Formatted display of all device variables in project

COMMANDS

Change Icon Set	Changes the Icon Set. *only Icon Sets compatible with the currently selected Device variable are displayed
Set Click Behavior	Sets the Click Behavior Property

EVENTS

Selected	Built-in Control 4 proxy event fired when the bIcons instance is 'clicked' on a navigator. Only program this event if Double and Triple Click events are not implemented
Single Click	Fired when the bIcon instance is 'clicked' once during the Click Window
Double Click	Fired when the bIcon instance is 'clicked' twice during the Click Window
Triple Click	Fired when the bIcon instance is 'clicked' three times during the Click Window

VARIABLES

BOOL	Value of the associated BOOL Variable
NUMBER	Value of the associated NUMBER Variable (and FLOAT)
STRING	Value of the associated STRING variable
WEBVIEW URL	Starting address of the Webview browser instance

CUSTOM DRIVER BUILD

The icons displayed by C4 Navigators are defined within each driver. Unfortunately, there is currently no C4 APIs to dynamically add or remove icon names or references - they are static and hard-coded into every driver. In most cases, the range of icons is relatively small so developers will simply add all icon references to a driver in a "just in case" approach.

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With blcons, there are several thousand (and growing) possible icons that could be displayed rendering the “just in case” approach slow and inefficient. Furthermore, during the refresh process, the icon states of each instance of every driver is aggregated into a larger configuration and sent to each navigator. So, if there are 10 blcon instances, each with 5,000 icon references, the refresh process would create 10 sections of 5,000 identical icon references.

Including this many icon references can overwhelm the navigator causing the refresh to fail. Control4 is aware of the issue and has said that enabling a more dynamic UI is high priority.

In the meantime, using the Icon Sets configuration tool (located on the Icon Sets subtab of the BNet tab), the blcons driver can be custom-built with only the Icon Sets that will actually be used in a project. The best of both worlds - access to all Icon Sets without a bloated configuration and navigator refresh issues.

ADJUSTMENTS

There are two adjustments applied to a numeric variable’s value: Default Adjustment and Property Adjustment. The Property Adjustment is applied first (if configured in Composer) then the Default Adjustment is applied.

Adjustments can be applied to Variables to make them “fit” into an Icon Set’s defined range. Using an Icon Set with an absolute range of 0-100 as an example: a tracked Variable has a value of 120.95, the Property Adjustment of “Divide by 10” would transform the value into 12.095 and the Default Adjustment of “Round to Ones” would round the value to 12.

Adjustments are applied before a Variable is tested against the Icon Set’s upper and lower limits.

The following table show the impact of the different Adjustment options on the number “1234.567”:

None	1234.567
Round To Thousandths	1234.567
Round To Hundredths	1234.57
Round To Tenths	1234.6
Round To Ones	1235
Round To Tens	1230
Round To Hundreds	1200
Round To Thousands	1000
Multiply By 10	12345.67
Multiple by 100	123456.7
Multiply by 1000	1234567
Divide by 10	123.4567
Divide by 100	12.34567
Divide by 1000	1.234567
Inverse	-1234.567

CLICK WINDOW

The Click Window is used to determine the duration, in seconds, during which all select/click events are interpreted as a single action. This is necessary to differentiate between two sequential single clicks, each triggering the Single Click event and two sequential clicks intended to trigger the Double Click event. All selects/clicks received during the Click Window, starting upon the first click, are aggregated into a single action and the appropriate event is fired.

Because the driver must wait for the entire Click Window duration to determine the user's intent, the Click Window should be set according to the planned usage. For example, if there is no programming associated with the Double or Triple Click, the Click Window should be small - .1 is the minimum. When programming is associated with a Double Click, 1 to 1.5 may be required depending on the responsiveness of the system. Triple Click may require a Click Window of 2 or greater.

The Control4 SELECT event is built into the proxy driver and will trigger for each select/click. To avoid issuing duplicate events, DO NOT USE the built-in SELECT event when implementing Double or Triple click functionality. Instead use the Single / Double / Triple events defined by the driver.

ICON SETS

BICON SETS

<u>Usage Description</u>	<u>Icon</u>
Displayed when Icon Set is not selected	
The requested icon could not be found	
An Icon Set is in the process of downloading	
An error was encountered downloading or installing an Icon Set. Tap the icon to try again	
Trial License has expired. Please purchase to continue usage	

BOOL ICON SETS

<u>Name</u>	<u>True</u>	<u>False</u>
Checkbox Green/Red		

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NUMBER ICON SETS

Number Icon Sets use either a Relative or Absolute scale. When using an Absolute scale, the Variable is expected to be integer/whole number that falls within the defined Range. Absolute scales are used in Icon sets where there is an actual icon representation for every number in the range.

Relative scales accept any number within the Icon Set's range but the displayed icon is determined by calculating the difference between the Variable value and the nearest Step. For example, the battery Icon Set has 6 Steps so the Variable will be represented by the icon that is most relative to its value. A value of 0, 2 or 5 will use the 1st step while values of 90, 93, and 99 will use the last (6th) step. In other words, the 0-100 range is divided into 6 steps, each with a unique icon.

When a tracked Variable's value falls outside the Icon Set's defined range, the icon will display an "OOB" or Out Of Bounds. A few Icon Sets, like PH and ORP will display L for a low OOB and H for high OOB.

Absolute Scale Icon Sets use Adjustments while Relative Scale Icon Sets use Steps

<u>Name</u>	<u>Range</u>	<u>Scale</u>	<u>Adjustment / Steps</u>	<u>Low Range</u>	<u>High Range</u>
Battery	0-100	Relative	6		
Blue Frame	0-100	Absolute	Round 1s		
Fan 4-Speed Bars	L, H, 0-3	Absolute	Round 1s		
Fan 5-Speed Bars	L, H, 0-4	Absolute	Round 1s		
Fan 6-Speed Bars	L, H, 0-5	Absolute	Round 1s		
Fuel Tank	0-100	Absolute	Round 1s		

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Fuel Tank	0-1000	Absolute	Round 10s		
Gauge Dial	0-100	Absolute	Round 1s		
PH Dial	L, H, 6.8-8.0	Absolute	Round .1		
Propane Tank	0-95	Relative	20		
Level Bars Green	0-100	Relative	5		
ORP Dial	L, H, 300-975	Absolute	Round 25s		
Salt	L, H, 2500-5000	Absolute	Round 100s		
Solar	0 (black)	Absolute	-		
	+/- 1-100 (green/red)	Absolute	Round 1s		
	+/- 101-300 (green/red)	Absolute	Round 5s		
	+/- 301-990 (green/red)	Absolute	Round 10s		
Temperature F	60-85	Absolute	Round 1s		
Temperature C	15-30	Absolute	Round 1s		
Temperature Cool Ring F	60-85	Absolute	Round 1s		
Temperature Cool Ring C	15-30	Absolute	Round .5s		
Temperature Heat Ring F	60-105	Absolute	Round 1s		
Temperature Heat Ring C	15-41	Absolute	Round .5s		
Temperature Ring F	-30-120	Absolute	Round 1s		
Temperature Ring C	-45-55	Absolute	Round .5s		
Tank Tower #	0-950	Relative	20		

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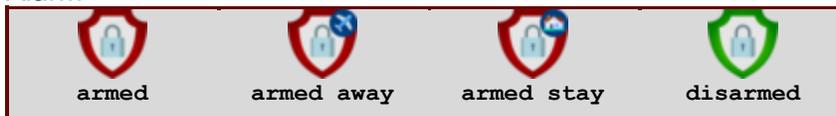
Tank Tower %	0-100	Absolute	Round 1s		
Voltage Low	L, H, 0-30	Absolute	Round .5		
Voltage 120	L, H, 100-140	Absolute	Round 1s		
Voltage 240	L, H, 220-260	Absolute	Round 1s		
Wall Unit C	L, H, 0-3	Absolute	Round 1s		
Wall Unit H	L, H, 0-3	Absolute	Round 1s		
Water Tank #	0-950	Relative	20		
Water Tank %	0-100	Abolute	Round 1s		
Wind	L, H, 0-75	Absolute	Round 1s		
Wood Frame	L, H, 0-100	Absolute	Round 1s		

STRING ICON SETS

Use a String Icon Set to display a specific icon - unlike the Numeric Icon Sets, there are no adjustments, variations or text overlays applied to an icon. The watched string variable must exactly match (including capitalization and spacing) the icon labels below or the "Not Found" icon is displayed.

Setting the watched variable to "demo" for any String Icon Set will loop through all the available icons in that set.

Alarm



Arrows Blue/Blue



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double up carat	double up left carat	double up right carat	down	down carat	down curve left
					
down curve right	down from line	down left	down right	down to line	expand left right
					
expand up down circle	expand up left down right	expand up right down left	inward from lines	inward left right carats	inward to line
					
inward up down carats	left	left carat	left down curve	left from line	left right swap
					
left to line	right	right carat	right down curve	right from line	right to line
					
trippel down carat	trippel right carat	trippel up carat	up	up carat	up down carat
					
up down swap	up from line	up left	up left down right	up right	up to line

Christmas

					
angel	bear	bell	bird	bow	cake
					
candle	candy	candy cane	champagne	christmas	christmas card
					
coca	confetti	crown	drum	elf	fireplace

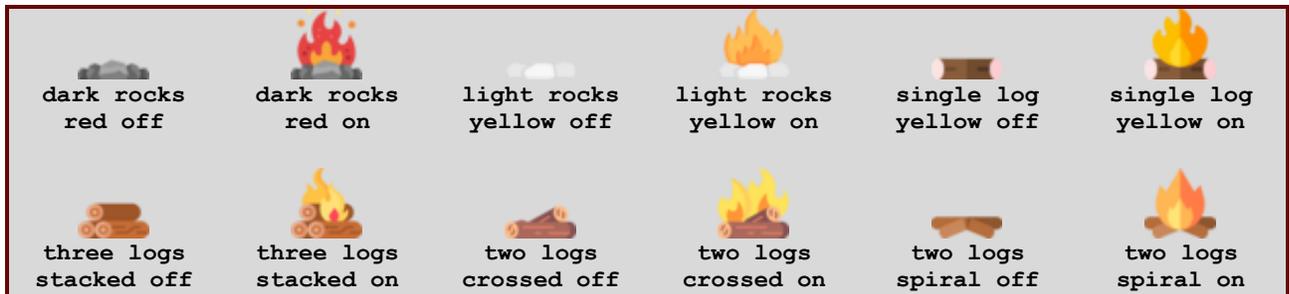
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Emergency



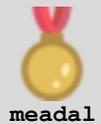
Fire



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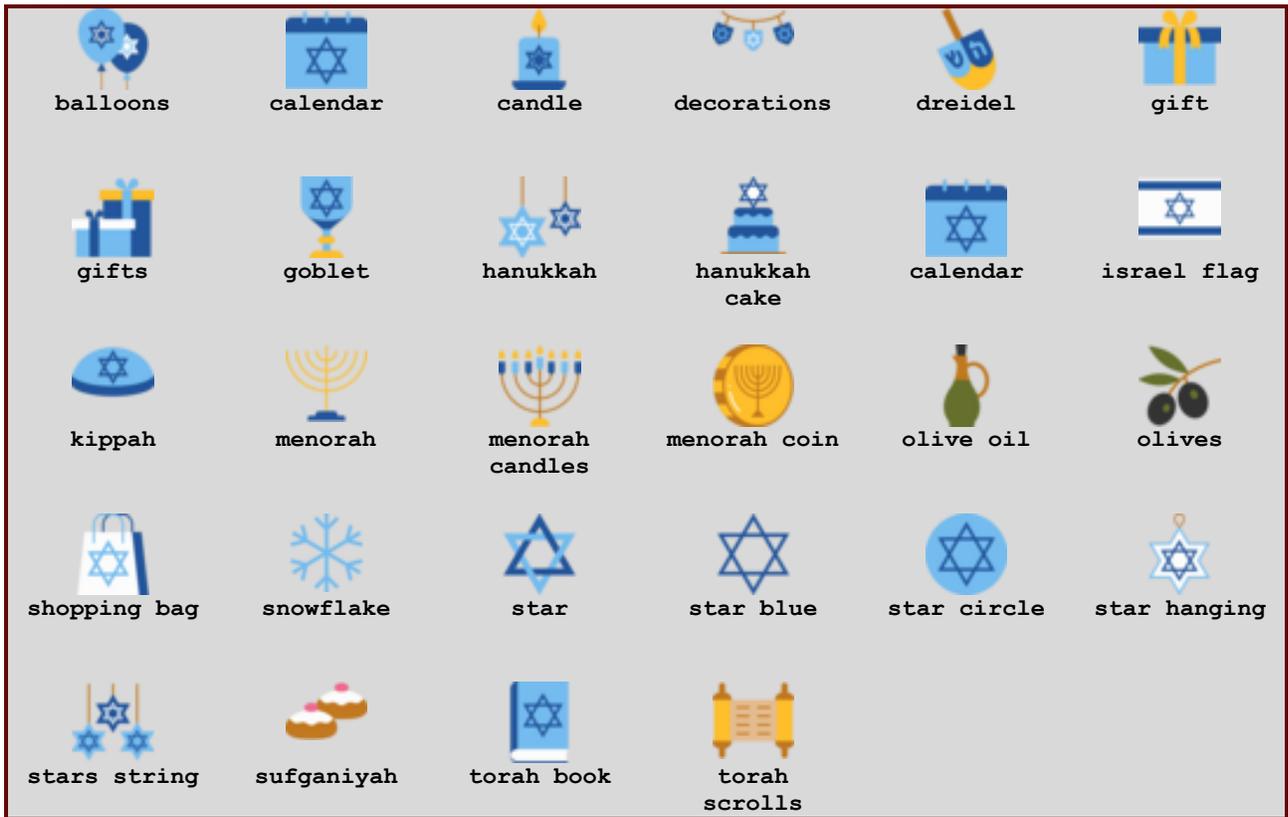
Games



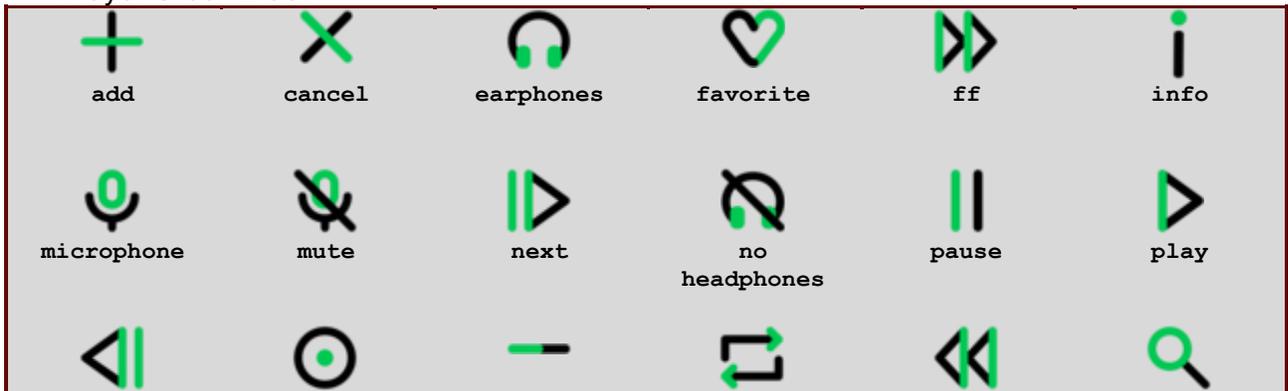
blcons Driver



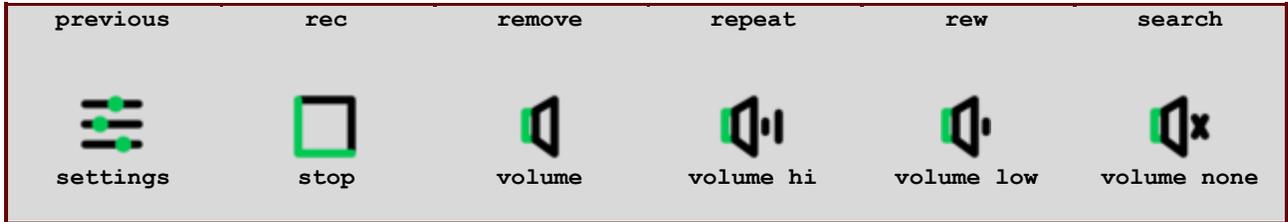
Hanukkah



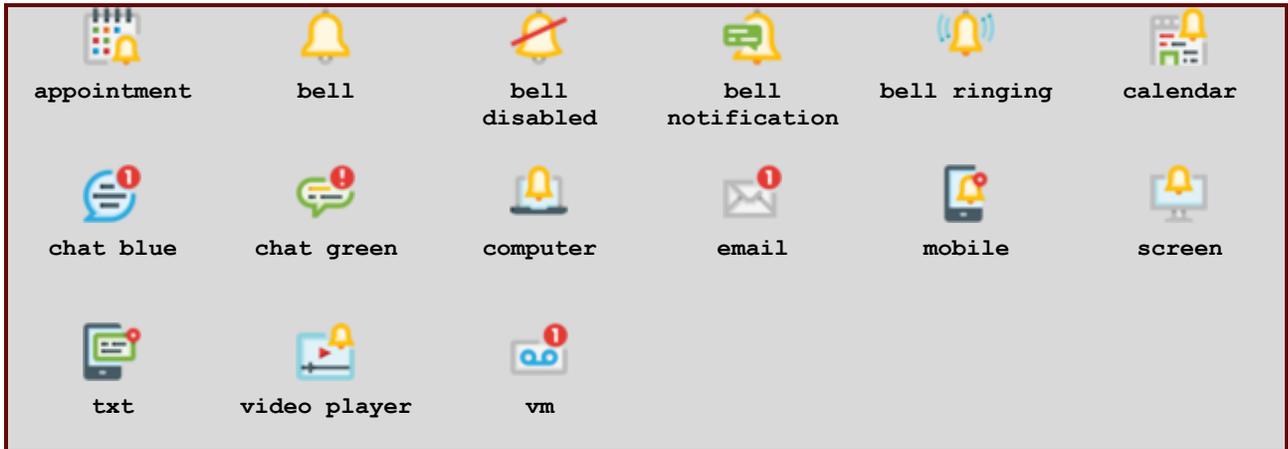
MM Player Green/Black



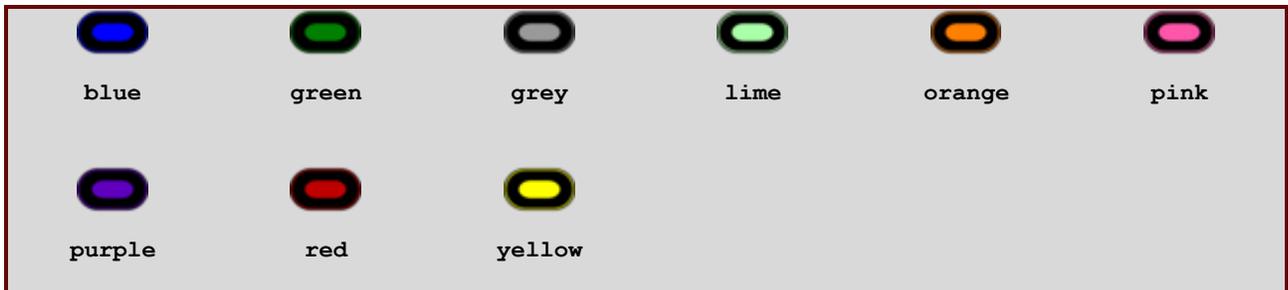
blcons Driver



Notification



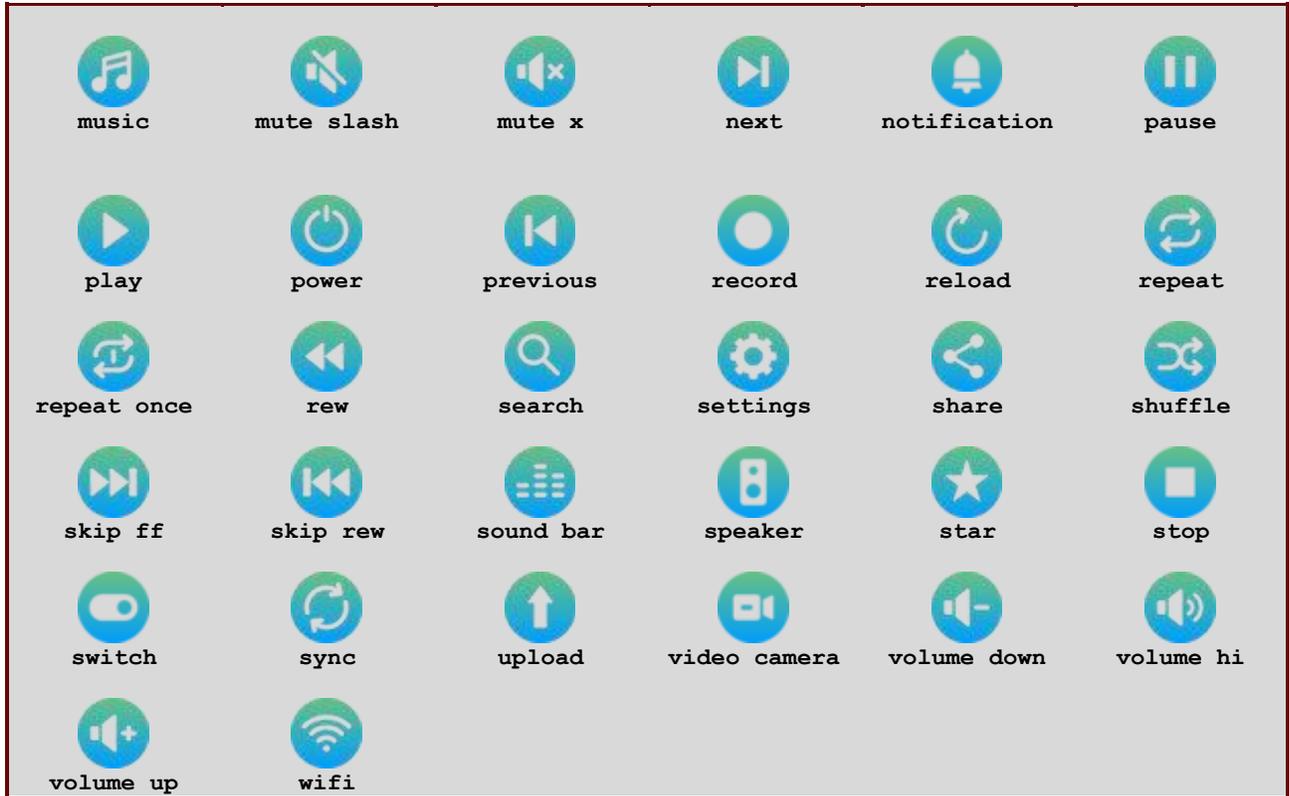
Oval Buttons



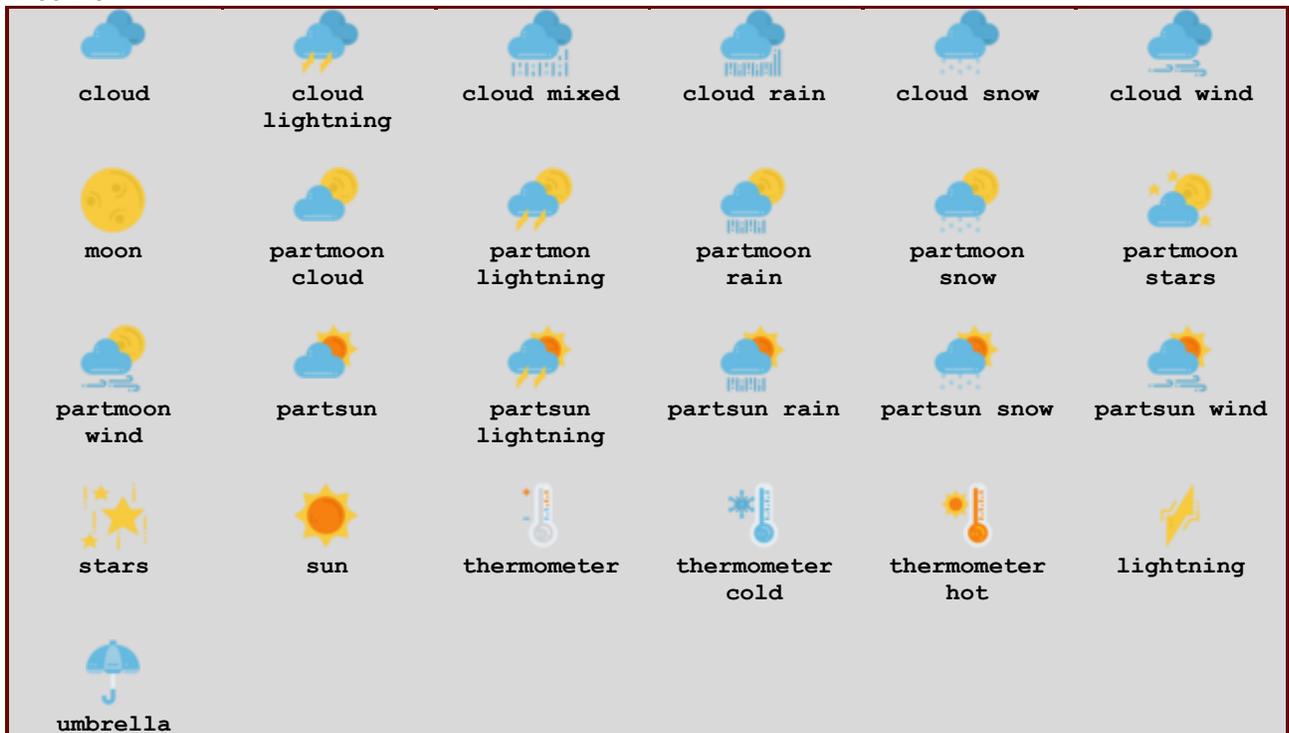
MM Player Blue/Green



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Weather



ADMIN PORTAL

BNet Solutions drivers have a built-in Admin Portal that include an Information, Properties, Variables, Actions, Lua, Documentation and License tabs. Additionally, if the driver supports additional custom tabs, these are displayed as well.

blcons's Admin Portal can be reached at the following address template: [https://\[controller ip\]/driver/blcons/admin.html](https://[controller ip]/driver/blcons/admin.html) where "controller ip" is the IP Address of your Control4 Director.

Because of the security model used by modern browsers, there are two configuration steps to successfully connect to the Admin Portal:

- 1) The Admin Portal communicates to the controller via a secured websocket. The BNet Certificate Authority that signed the Admin Portal's server certificate must be trusted for your browser to make the SSL/TLS websocket connection. The BNet CA bundle must be downloaded and install as a root certificate. The bundle can be found at https://ca.bnet4solutions.com/get_ca_bundle.php
- 2) Each Director uses a privately signed Control4 server certificate that must be trusted before your browser will allow you to navigate to the Admin Portal. On your first visit to the Portal, you will be asked to make a security exception and continue.

The Admin Portal is protected by a challenge page that requires a token to continue. By default, the token is "blconsAdmin". Once authenticated, the token is stored in a cookie (technically hashed, then stored) so you won't need to log in every time. The token is configurable via the driver's property page. The Admin Server is enabled by default but can be disabled entirely via the driver's property page.

UPGRADE MODE

BNet Solutions drivers can automatically update themselves. New driver functionality or capability is typically packaged as an incremental "Major" version (v3, v4 etc). "Minor" versions (v2.3, v2.4) are typically maintenance releases that update underlying libraries, address a specific issue or usability concern.

- | | |
|------------|---|
| Automatic | When "Automatic" is selected, the driver will upgrade/update itself when a new version is available. This is currently the only available option. |
| Update Now | Checks for and upgrades to any newer Major or Minor version. |

KNOWN ISSUES AND LIMITATIONS

- Requires C4 OS v3.1.1 or greater
- Cached icons are very "sticky" in that even after a Navigator Refresh, when an icon design has been updated, the new design will not display until the Navigator power cycles

TROUBLESHOOTING

All BNet Solutions products have an additional 'Submit' Debug Mode. With this mode selected, the driver creates a unique log file to capture the Lua output based on the selected Debug Level (usually set to "5 - Debug"). Once 'Submit' Debug Mode is deselected, either manually or when the Debug Timer expires, the Submit Debug Log is uploaded to the BNet Solutions Server for

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analysis.

The server notifies me when Submit files are uploaded but if you have not purchased a license, I will have no way to reach back out to you for troubleshooting so please email me your contact information.

TRIAL AND PURCHASE

All BNet Solutions drivers are fully functional for a 7-day Trial Period. To continue usage after the Trial Period, you will need to purchase a license. Purchase functionality is provided by the License tab that may be accessed in one of two ways:

- a) In Composer, on the System Design side panel, click on the driver. The License tab is displayed as a subtab of the BNet tab
- b) In the Admin Portal, the License tab is displayed as one of the main tabs

Once the required fields are filled in, select one of the PayPal payment options and follow the prompts to complete the purchase. Upon completion, the driver will auto-populate the license key and activate. You will receive a receipt from PayPal for the transaction.

An example License tab:

The screenshot shows the 'License' tab in the BNet Solutions Admin Portal. The sidebar on the left displays the BNet Solutions logo and the device information: bROOMBA ADMINv9.0 (DEVICE #402). The main content area has two tabs: 'Documentation' and 'License'. The 'License' tab is active and contains the following sections:

- LICENSE KEY**: A text input field for the license key and a 'Set Key' button.
- LICENSE STATUS**: A table with the following data:

Valid	False
Trial	False
Remaining	Trial Expired
Revoked	False
- DRIVER COST**: \$75.00 *plus tax
- PURCHASER INFORMATION**: Three input fields for Email, First Name, and Last Name.
- Payment Options**: Three buttons for 'PayPal', 'venmo', and 'Debit or Credit Card'. Below these buttons is the text 'Powered by PayPal'.

There are no refunds so please review the documentation for any limitations or known issues and determine acceptance during the Trial Period.

LEGAL

By using this driver, you are indicating that you have read and agree with the Policies and Terms that govern its usage as published [here](#).

CONTACT INFORMATION

You can reach me at blucas@bnet4solutions.com for comments or questions.

CHANGE LOG

v1 - 09/21 Initial Release