

bRoomba is a driver that enables your Control4 system to send commands to your WiFi-enabled iRobot Roomba. Currently supported commands are: Start, Stop, Pause, Resume and Dock. bRoomba also supports selective room scheduling for Roombas that implement room mapping functionality and can activate and toggle Lighting Scenes.

This driver is known as a "UI Button" driver. This class of drivers does not use Control4's standard template as an interface but instead can use an icon or series of icons to communicate the driver's status and send commands.

## SETUP

- 1) Setup your iRobot device including network, name and floorplans
- 2) Within your Control4 project, install an instance of the bRoomba driver for each Roomba you wish to control
- 3) Place your Roomba(s) on its charging station
- 4) Fill in the iRobot Username and Password driver properties. Once populated, bRoomba will download information about all robots associated with the account and start the network discovery process
- 5) Select the Roomba to be controlled from the Roomba Name property - the Roomba IP, ID and Password will automatically populate

## 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

### ROOMBA SETUP

Roomba Name	List of discovered Roombas
Roomba IP	IP Address of selected Roomba. Auto populated with discovered IP or manually entered if Roomba is on a different subnet
Roomba ID	Identification of selected Roomba
Roomba Password	Password of selected Roomba
Operational Feedback	Turn On/Off the polling process that gathers operational status. See "Operational Feedback" section
Roomba Poll	Frequency, in minutes, to check Roomba's status
Lighting Scene	Turn On/Off bRoomba's ability to control Advanced

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Integration	Lighting Scenes based on Roomba's activities. See "Lighting Scene Setup" section
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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

Find Roomba*	Searches and reports found Roomba(s)
Get Id and Password*	Extracts and Decodes Id and Password from Roomba
Start	Starts cleaning cycle for all rooms -- or -- If capable and scheduled, starts cleaning cycle for scheduled rooms only
Stop Pause Resume & Dock	Standard Roomba Commands
Disconnect	Forces network connection(s) between bRoomba and Roomba closed. Should not be invoked but provided in case of abnormal network condition
Discover Lighting Scenes*	Queries the Advanced Lighting Agent for scenes matching the bRoomba Scene Naming Patterns
Get Operational Status*	Initiates a connection to the Roomba and retrieves basic information about the Roomba and what it is doing
Display Floorplans	Displays the currently learned floorplans including Floorplan Id, Room Id and Name

\*result can be reviewed in Lua Output with "Debug Mode" set to "Print" and "Debug Level" set to "5-Debug"

## COMMANDS

Start	Starts cleaning cycle for all rooms -- or -- If capable and scheduled, starts cleaning cycle for scheduled rooms only
Stop Pause Resume & Dock	Standard Roomba Commands
ClearScheduledRooms	Removes all previously scheduled rooms from the cleaning list
Schedule F[1-3] R[1-10]	Add the Room associated with "slot" to the scheduled cleaning list. "Slots" are uniquely identified by a Floorplan (from 1 to 3) and Room (from 1 to 10) combination
CancelToggleScenes	Prevents bRoomba from activating any lighting Toggle scenes. Must be invoked after a Start command and only applies to that Start command and not any subsequent Start commands. Useful for when Start is invoked during a home's "Away" event but the Roomba's cleaning is not complete upon "Home"
BypassLightingScenes	Prevents bRoomba from activating any Lighting Scenes. Useful use when you generally want to invoke Lighting Scenes (including Toggles) but

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currently want to bypass based on an external condition like a global "Home" mode

## TEST CONDITIONS

Roomba Running	T/F to indicate if Roomba is currently executing a cleaning mission including relocation and charging time
Rooms Schedules	T/F to indicate if any rooms have been scheduled to clean since the last mission completed

## FLOORPLAN SETUP

Control 4 commands are named at design/compile time. As a result, it is not possible to dynamically name commands to reflect a specific floorplan like "Main Floor / Laundry Room". Instead, bRoomba can learn your floorplan and assign it and its rooms to predetermined "slots". Each "slot" has a matching command that will add that room to the list of rooms for cleaning. For example, "Main Floor / Laundry Room" becomes "Floorplan 1, Room 5" with a paired command of "Schedule F1 R05".

Currently, bRoomba supports 3 Floorplans each with 10 rooms. While you can technically learn more than 3 floorplans and more than 10 rooms, there is no command pair for the additional "slots" and therefore no method to schedule its cleaning. The 3/10 limitation seems to accommodate all the setups I've seen so far but if you find it too restrictive, please provide that feedback - it is simply a balance between functionality and excessive command clutter.

### Learn A New Floorplan

- 1) From the iRobot App, select "Clean" then "Choose Rooms"
- 2) Select all the rooms you want bRoomba to learn
- 3) Select "Clean X Rooms Now", wait for Roomba to start cleaning then kill the app (do not select the home button or multitask to another app allowing the iRobot app to continue in the background)
- 4) Run the "Learn Floorplan" action on bRoomba
- 5) You can now stop the Roomba from the app or "Stop Roomba" action
- 6) Repeat steps for each floorplan to learn

### View Learned Floorplans

\*Note that more recent Roomba firmwares do not provide the Room Name. When not provided, the room name is set to "Not Reported"

- 1) Set "Debug Mode" to "Print" and "Debug Level" to "5 - Debug"
- 2) Run "Display Floorplans" action on bRoomba
- 3) In the Lua Output tab, you should see your learned Floorplans / Rooms

Floorplan	Room	Name
1	01	Kitchen
1	02	Hallway
1	03	Living Room
1	04	Family Room
1	05	Laundry Room
1	06	Study
2	01	Hallway

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2	02	Storage Room
2	03	Game
2	04	Guest Bedroom

Schedule and Start Cleaning Specific Room(s)

To schedule the Kitchen and Family Room for cleaning using the above sample floorplan:

- 1) Run the command "Schedule F1 R01"
- 2) Run the command "Schedule F1 R04"
- 3) Run the command "Start"

## FLOORPLAN NOTES

- Best practice is to map and setup your room boundaries within the iRobot app before learning floorplans into bRoomba. If you change your floorplan map, it will need to be relearned by bRoomba.
- Adding or removing rooms in the iRobot app WILL change "slot" assignments.
- The order rooms are assigned to "slots" seems consistent but is not guaranteed - always confirm slot assignment after a floorplan is relearned.
- If the Start Action/Command is invoked and rooms are scheduled, those rooms are removed from the cleaning schedule immediately AFTER the clean command is sent to the Roomba. If you wish to do a second clean in the same room(s), you will need to reschedule them before issuing a second Start Action/Command.
- bRoomba will ignore scheduling requests for unassigned "slots".
- Only schedule rooms belonging to the same floorplan. Scheduling rooms from different floorplans is not supported by bRoomba or the iRobot app.

## OPERATIONAL FEEDBACK

The design of the Operational Feedback has changed dramatically while working on this functionality. Originally, I wanted the driver to throw all manner of events - Bin Full, Stuck, Battery Low... and originally it did. But once implemented, I was hard-pressed to find a realistic use case for them. Furthermore, the functionally duplicated what already worked well in the iRobot app.

When the dust settled, all that a project really needed to know is: Is the Roomba I started still running? With that information, the driver implements the conditional test "Roomba is Running" and fires the "Mission Complete" event when a cleaning job finishes. Note that bRoomba will only report Operational Feedback if it was the initiator of the Start/Clean action.

The iRobot app and bRoomba use the same network path to communicate with a Roomba and once one is connected, it will block the other's connection attempts. Set the "Roomba Poll" property to control how frequently (in minutes) bRoomba queries the Roomba's Operational state. A higher value of say 30 will minimize the possibility of one blocking the other while a lower setting will enable a project to be more responsive to the end of a cleaning job. Each query takes approximately 3-5 seconds. There is little harm, except inconvenience, with a blocked connection attempt - both the app and bRoomba will just try to connect again. My setting is 10.

## LIGHTING SCENE SETUP

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When the "Lighting Scene Integration" property is "On", bRoomba will activate and deactivate (toggle) lighting scenes defined in the Advanced Lighting Agent. If a room or rooms are scheduled for cleaning when the "Start Cleaning" command is invoked, the lighting scene(s) associated with those rooms are activated. If specific room(s) are not scheduled for cleaning or if your Roomba does not support Room Mapping, bRoomba will activate a generic "All" Lighting Scene. When the Roomba reports "Mission Complete" to bRoomba (based on polling frequency), the associated Toggle scene is activated.

Lighting scenes must follow a specific naming pattern and subsequently be discovered via the "Discover Lighting Scene" action to be properly activated (and toggled) by bRoomba:

Room Mapping Naming Pattern: "bRoomba-F[1-3]R[01-10]"

<u>Example</u>	<u>Description</u>	<u>When Activated</u>
"bRoomba-F1R03"	Scene for Floorplan 1, Room 3	Start Cleaning
"bRoomba-F2R10"	Scene for Floorplan 2, Room 10	Start Cleaning
"bRoomba-F2R10 (Toggle)"	Toggle scene for Floorplan 1, Room 3	Mission Complete

Naming Pattern for Clean All or Non-Room Mapping devices: "bRoomba-All"

<u>Example</u>	<u>Description</u>	<u>When Activated</u>
"bRoomba-All"	Scene for entire floorplan	Start Cleaning
"bRoomba-All (Toggle)"	Toggle scene for entire floorplan	Mission Complete

It is possible to have multiple instances of bRoomba, each linked to a different iRobot device. In my house, for example, I have a 980 (non-mapping) and an i7 (mapping). In order for bRoomba to determine which scenes belong to which Roombas, use the alternate Scene Naming Pattern that includes the Control4 Device ID.

Pattern when using multiple Roombas: "bRoomba[C4DeviceID]-F[1-3]R[01-10]"

<u>Example</u>	<u>Description</u>
"bRoomba2209-F1R03"	bRoomba (with Device ID 2209) scene
"bRoomba2210-All"	bRoomba (with Device ID 2210) scene

Use the "Discover Lighting Scenes" Action to confirm the Lighting Agent is found and that your scenes match a pattern expected by bRoomba. Once invoked, the Lua Output should show something similar to my Controller's output (Debug Mode=Print, Debug Level=5-Debug):

```
Found Advanced Lighting Device Id: 788
Scene Name          Id
bRoomba2209-F2R01  191
bRoomba2209-F2R02  192
bRoomba2209-F2R03  193
bRoomba2209-F2R04  194
bRoomba2209-F2R05  195
bRoomba2209-F2R06  196
bRoomba2209-F2R07  197
bRoomba2209-F2R08  198
bRoomba2209-F2R01 (Toggle)  200
bRoomba2209-F2R02 (Toggle)  201
bRoomba2209-F2R03 (Toggle)  202
bRoomba2209-F2R04 (Toggle)  203
```

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bRoomba2209-F2R05 (Toggle)	204
bRoomba2209-F2R06 (Toggle)	205
bRoomba2209-F2R07 (Toggle)	206
bRoomba2209-F2R08 (Toggle)	207

Use caution when implementing the Toggle scenes. The last thing you want is for bRoomba to turn lights off leaving you to navigate a dark house or stairs. Use the CancelToggleScenes command to prevent bRoomba from activating Toggle scene when the environment has changed (someone push the “Home” button after a cleaning was started or motion is detected in the room).

## LIGHTING SCENE NOTES

- Best practice is to create all lighting scenes before invoking the “Discover Lighting Scenes” Actions. See Known Issues Section.
- Lighting scenes will only be invoked when the Roomba is started via bRoomba, not the iRobot app
- When “Operational Feedback” is Off, bRoomba will have no means to determine when the cleaning job is complete and therefore will not trigger the Toggle scenes.
- The “Discover Lighting Scenes” Action will discover both Room Mapping and Non-Room Mapping naming patterns.
- There is no means for bRoomba to determine which room the Roomba is currently cleaning or when it transitions from one room to the next. Therefore, the lighting scenes for all scheduled rooms will be activated immediately when the Roomba starts a cleaning job and all Toggle lighting scenes will be activated when the Roomba is finished with the entire cleaning job.

## UI BUTTON

As mentioned above, bRoomba is a driver of type "UI Button". As such, an icon can be added to Navigators and used to issue commands to bRoomba.

If, within 2 seconds, the bRoomba icon is clicked:  
1 time: bRoomba issues “Start Roomba” command  
2 times: bRoomba issues “Stop Roomba” command  
3+ times: bRoomba issues “Dock Roomba” command

Sending commands via the driver icon works reliably on all connected Navigators (T3s, EA1, etc.) and on the Control4 app when the current view is refreshed (not to be confused with a navigator refresh). That is, when the app is opened directly to a view that contains the driver, Control4 does not always register a click. Instead, you may need to back out, then navigate back into the view containing the driver icon.

To help discern when Control4 successfully registers a click, the driver’s icon changes to the ‘dot-dot-dot’ icon when it receives a click event and then shows the invoked command after the click window ends. Once the click window ends, a connection is made to the Roomba, the connection is authenticated and the command published - it may take several seconds for the Roomba to perform the command so try to be patient and do not keep clicking! Lastly, the driver icon will revert back to the default icon.

## KNOWN ISSUES AND LIMITATIONS

- By default, most routers do not forward broadcast messages between subnets. As a result, bRoomba will likely only find a Roomba if it is on the same network subnet. If your network is segmented, you may need to follow the Manual Setup steps above.
- Only one device can control the Roomba at a time - if you have any other processes connected to your Roomba, the driver will be unable to connect and send commands. The iRobot app must be closed but my Alexa iRobot skill does NOT seem to cause any issues.
- The Control4 API used to discover the Advanced Lighting Agent and Lighting Scenes seems to cache the query results such that newly added scenes are not always reported. Always add all bRoomba Lighting Scenes and Toggles before invoking the “Discover Lighting Scenes” Action. As a workaround, you can reload the bRoomba driver (right-click then Upgrade Driver) - the “Discover Lighting Scenes” will now reflect all scenes.
- bRoomba creates a new session for each issued command so as to not block other devices from also communicating with the Roomba. As a result, commands cannot be issued in quick succession. You will need to space commands approximately 3-5 seconds apart. While sending commands once connected is quick, my Roomba can take a good 2-3 seconds just to authenticate.
- More recent Roomba firmwares do not provide the Room Name. When learning floorplans and the Room Name is not provided, “Not Reported” will be displayed.
- This driver must be installed from a file named “bRoomba.c4z” otherwise bLicense (the driver used to purchase activation keys) will not recognize it as a valid driver. This is especially important with subsequent driver versions as many OSs will not overwrite downloaded files but will rename the newly downloaded file to something like driver(1).c4z.

## 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.

A driver’s Admin Portal can be reached using the following address template:

[https://\[controller ip\]/driver/bPentair/admin.html](https://[controller ip]/driver/bPentair/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](https://ca.bnet4solutions.com/get_ca_bundle.php)
- 2) Your controller 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,

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the token is "bPentairAdmin". 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
- Not an issue with the driver per se but of Contrl4's handling of Script Actions: when an action is added to an event, that action and all of its attributes is set and immutable. For example, when adding an action to turn on an auxiliary button (let's say Lights) that button's ID is hard coded into the script. If later, the Lights Aux ID is changed from 3 to 7, the script will continue to issue the command to ID 3 (old ID) and not to ID 7 (new ID). This is similar to changing the contents of a Push Notification after adding the notification to a script - it will only show the message that was current at the time it was added.

## TROUBLESHOOTING

If your Roomba locks up or stop receiving commands from ANY source, perform a soft reset - please refer to <https://homesupport.irobot.com> for instructions.

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 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



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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 displays the 'License' tab within a web application. On the left, a sidebar identifies the product as 'bnet SOLUTIONS bROOMBA ADMINv9.0 (DEVICE #402)'. The main panel features a 'License' tab, which includes a 'LICENSE KEY' input field and a 'Set Key' button. Below this is a 'LICENSE STATUS' table with the following data:

Property	Value
Valid	False
Trial	False
Remaining	Trial Expired
Revoked	False

The 'DRIVER COST' is listed as \$75.00 \*plus tax. The 'PURCHASER INFORMATION' section contains three input fields for 'Email', 'First Name', and 'Last Name'. At the bottom, there are three payment method buttons: 'PayPal', 'venmo', and 'Debit or Credit Card'. A 'Powered by PayPal' logo is also present.

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](#).

## MY CONTACT INFORMATION

You can reach me at [blucas@bnet4solutions.com](mailto:blucas@bnet4solutions.com) for comments or questions.

## CHANGE LOG

v1 - 5/19	Beta Release
v2 - 6/19	Initial Release
v3 - 7/19	Add support for selective room scheduling and cleaning
v4 - 7/19	Resolved lost activation status after unclean director shutdown Updated architecture modules

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v5 - 09/19	Added Operational Feedback Added Lighting Scene Integration
v6 - 11/19	Added auto-update functionality
v7 - 11/20	Architecture Upgrade
v8 - 06/21	Architecture Upgrade
v9 - 12/22	Cloud ID / Password retrieval, web tabs