
SpheroV2 Documentation

Release 0.12

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An unofficial Python library for [Sphero](#) toys that supports its Version 2 Bluetooth low energy API described [here](#). Toys that are supported includes (implemented ones are checked):

- ☒ Sphero 2.0 / SPRK
- ☒ Sphero Ollie
- ☒ Sphero BB-8
- ☒ Sphero BB-9E
- ☒ Sphero R2-D2 / R2-Q5
- ☒ Sphero BOLT (In Progress)
- ☒ Sphero SPRK+ / SPRK 2.0
- ☒ Sphero Mini
- ☒ Sphero RVR

Current Progress:

- Found a better way to decompile, fixing a few things like Controls, Command Queueing, and Waiting for responses
- ☐ Controls
 - ☐ Animation Control
 - ☐ Drive Control
 - ☒ LED Control
 - ☐ Sensor Control
 - ☐ Stats Control
 - ☐ Streaming Control

The logic is written based on reverse-engineering the official [Sphero Edu for Android](#), with the help from available documentation and other unofficial community-based Sphero libraries like [igbopie/spheroV2.js](#) and [EnotYoyo/pysphero](#).

This project uses the [hbl dh/bleak](#) Bluetooth Low Energy library, which works across all platforms.

USAGE

To install the library, run `pip install spherov2`. Python version `>= 3.7` are supported.

The library currently has two adapters, `BleakAdapter` and `TCPAdapter`. `BleakAdapter` is used by default when adapter is not specified, which connects to toys using the local Bluetooth adapter. For example:

```
from spherov2 import scanner

with scanner.find_toy() as toy:
    ...
```

`TCPAdapter` allows the user to send and receive Bluetooth packets connected to another host via a server running on that host as a relay. To start the server, run `python -m spherov2.adapter.tcp_server [host] [port]`, with host and port by default being `0.0.0.0` and `50004`. To use the adapter, for example:

```
from spherov2 import scanner
from spherov2.adapter.tcp_adapter import get_tcp_adapter

with scanner.find_toy(adapter=get_tcp_adapter('localhost')) as toy:
    ...
```

The TCP server is written in asynchronous fashion using `asyncio`, so that it supports `bleak` on all platforms.

On whichever device you decide to connect to the toys, you have to first install the BLE library by `pip install bleak`.

1.1 Scanner

You can scan the toys around you using the scanner helper. To find all possible toys, simply call `scanner.find_toys()`. To find only a single toy, use `scanner.find_toy()`.

You can also find toys using specific filters. Please refer to the [document](#) for more information.

1.2 APIs

There are two ways you can interact with the toys, one is to use the low-level APIs implemented for each toy with the commands they support. Low-level APIs can be found for each toy under `spheroV2.toy.*`, and is not documented.

The other and recommended way is to use the high level API `spheroV2.sphero_edu.SpheroEduAPI`, which is an implementation of the official [Sphero Edu APIs](#). Documentations can be found inside the source files with the docstrings, or [here](#) as an HTML rendered version. For example:

```
from spheroV2 import scanner
from spheroV2.sphero_edu import SpheroEduAPI

toy = scanner.find_toy()
with SpheroEduAPI(toy) as api:
    api.spin(360, 1)
```


ACKNOWLEDGMENTS

This library is made for educational purposes. It is used by students in [CIS 521 - Artificial Intelligence](#) at the University of Pennsylvania, where we use Sphero robots to help teach the foundations of AI.

It is published as an open-source library under the [MIT License](#).

AUTHORS

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3.1 Scanner

`spheroV2.scanner.find_toys(*, timeout=5.0, toy_types: Optional[Iterable[Type[Toy]]] = None, toy_names: Optional[Iterable[str]] = None, adapter=None) → List[Toy]`

Find toys that matches the criteria given.

Parameters

- **timeout** – Device scanning timeout, in seconds.
- **toy_types** – Iterable of toy types (subclasses of `Toy`) that needs to be scanned. Set to `None` to scan all toy types available.
- **toy_names** – Iterable of strings of toy names that needs to be scanned. Set to `None` to scan toys with all kinds of names.
- **adapter** – Kind of adapter to use for scanning bluetooth devices. Set to `None` to use default `BleakAdapter`.

Returns

A list of toys that are scanned.

`spheroV2.scanner.find_toy(*, toy_name: Optional[str] = None, **kwargs) → Toy`

Find a single toy that matches the criteria given.

Parameters

- **toy_name** – A string of toy name that needs to be scanned. Set to `None` to scan toy with all kinds of names.
- **timeout** – Device scanning timeout, in seconds.
- **toy_types** – List of toy types (subclasses of `Toy`) that needs to be scanned. Set to `None` to scan all toy types available.
- **adapter** – Kind of adapter to use for scanning bluetooth devices. Set to `None` to use default `BleakAdapter`.

Returns

A toy that is scanned.

Raises

ToyNotFoundError – If no toys could be found

`spheroV2.scanner.find_R2D2(toy_name: str = None, **kwargs)`

Same as `find_toy(toy_types=[R2D2], toy_name, **kwargs)`.

`spheroV2.scanner.find_R2Q5(toy_name: str = None, **kwargs)`

Same as `find_toy(toy_types=[R2Q5], toy_name, **kwargs)`.

3.2 Adapter

This library abstracts the Bluetooth communication layer as a single adapter class, to potentially support all platforms and all environments.

3.2.1 BleakAdapter

class spheroV2.adapter.bleak_adapter.BleakAdapter

This adapter uses `hbl dh/bleak` library directly on the host machine. Make sure there is a low energy Bluetooth adapter (Bluetooth 4.0 or above) on your computer. Then, install the Bluetooth library by `pip install bleak`.

`BleakAdapter` is used by default by the scanner:

```
from spheroV2 import scanner

with scanner.find_toy() as toy:
    ...
```

3.2.2 TCPAdapter

class spheroV2.adapter.tcp_adapter.TCPAdapter

This adapter allows the user to send and receive Bluetooth packets connected to another host via a server running on that host as a relay.

To start the server, run `python -m spheroV2.adapter.tcp_server [host] [port]`, with `host` and `port` are optional and by default being `0.0.0.0` and `50004`.

`spheroV2.adapter.tcp_adapter.get_tcp_adapter(host: str, port: int = 50004)`

Gets an anonymous `TCPAdapter` with the given address and port.

To use the adapter, for example:

```
from spheroV2 import scanner
from spheroV2.adapter.tcp_adapter import get_tcp_adapter

with scanner.find_toy(adapter=get_tcp_adapter('localhost')) as toy:
    ...
```

3.3 Sphero Edu API

3.3.1 Get Started

Sphero robots aren't just toys – they are programmable robots that are great for learning about computer science! This wiki is a guide to learn how to program Sphero robots with Python. You will need a [Sphero robot](#), a Python 3 environment, and a hunger to learn.

Hello World!

Using your device with the Sphero Edu API, create a new python code file, and copy and paste these code samples into the file. Don't forget to aim your robot, and then run the script to see what happens!

```
import time
from spheroV2 import scanner
from spheroV2.sphero_edu import SpheroEduAPI
from spheroV2.types import Color

toy = scanner.find_toy()
with SpheroEduAPI(toy) as droid:
    droid.set_main_led(Color(r=0, g=0, b=255))
    droid.set_speed(60)
    time.sleep(2)
    droid.set_speed(0)
```

3.3.2 Movement

Movements control the robot's motors and control system. You can use sequential movement commands by separating them with line breaks, like the *Hello World!* program. Sphero robots move with three basic instructions: heading, speed, and duration. For example, if you set heading = 0°, speed = 60, duration = 3s, the robot would roll forward for 3s at a moderate speed.

```
class spheroV2.sphero_edu.SpheroEduAPI
```

Sphero BOLT Movements

Sphero BOLT has a compass (magnetometer) sensor that has unique functionality. Nearby metallic and magnetic objects can affect the accuracy of the compass, so try to use this feature in an area without that interference, or hold it up in the air if you can't get away from interference.

Star Wars Droid Movements

```
class spheroV2.sphero_edu.SpheroEduAPI
```

R2-D2 & R2-Q5 Movements

The R2-D2 and R2-Q5 Droids are physically different from other Sphero robots, so there are some unique commands that only they can use.

```
class spheroov2.sphero_edu.SpheroEduAPI
```

3.3.3 Lights

Lights control the color and brightness of LEDs on a robot.

```
class spheroov2.sphero_edu.SpheroEduAPI
```

```
    set_back_led(color: int)
```

Sets the brightness of the back aiming LED, aka the “Tail Light.” This LED is limited to blue only, with a brightness scale from 0 to 255. For example, use `set_back_led(255)` to set the back LED to full brightness. Use `time.sleep()` to set it on for a duration. For example, to create a dim and a bright blink sequence use:

```
set_back_led(0)    # Dim
delay(0.33)
set_back_led(255)  # Bright
delay(0.33)
```

Sphero BOLT Lights

Sphero BOLT has unique lighting capabilities with a front led, back led, and 8x8 led matrix. The matrix has 3 methods to program in increasing abstraction and sophistication that are very fun to play with! The 3 methods are setting pixels, text, and animations.

```
class spheroov2.sphero_edu.SpheroEduAPI
```

```
    set_front_led(color: spheroov2.types.Color)
```

Changes the color of the front LED light. Set this using RGB (red, green, blue) values on a scale of 0 - 255. For example, the magenta color is expressed as `set_front_color(Color(239, 0, 255))`

```
    set_back_led(color: spheroov2.types.Color)
```

Changes the color of the back LED light, aka the “Tail Light” or “Aim Light.” Set this using RGB (red, green, blue) values on a scale of 0 - 255. For example, the green color is expressed as `set_back_led(Color(0, 255, 0))`. Sphero BOLT has this as an RGB LED on the back, whereas previous Spheros are limited to *blue only*.

Sphero RVR Lights

```
class spheroov2.sphero_edu.SpheroEduAPI
```

```
    set_front_led(color: spheroov2.types.Color)
```

Changes the color of RVR’s front two LED headlights together. Set this using RGB (red, green, blue) values on a scale of 0 - 255. For example, the magenta color is expressed as `set_front_color(Color(239, 0, 255))`.

set_back_led(*color: sphero2.types.Color*)

Changes the color of the back LED light, aka the “Tail Light” or “Aim Light.” Set this using RGB (red, green, blue) values on a scale of 0 - 255. For example, the above green color is expressed as `set_back_led(Color(0, 255, 0))`.

BB-9E Lights

class sphero2.sphero_edu.SpheroEduAPI

R2-D2 & R2-Q5 Lights

class sphero2.sphero_edu.SpheroEduAPI

set_front_led(*color: sphero2.types.Color*)

Changes the color of the front LED light. Set this using RGB (red, green, blue) values on a scale of 0 - 255. For example, the fuchsia color is expressed as `set_front_color(Color(232, 0, 255))`

set_back_led(*color: sphero2.types.Color*)

Changes the color of the back LED light. Set this using RGB (red, green, blue) values on a scale of 0 - 255. For example, the above green color is expressed as `set_back_led(Color(0, 255, 0))`.

3.3.4 Sounds

Control sounds and words which can play from your programming device’s speaker or the robot (R2-D2 & R2-Q5 only).

class sphero2.sphero_edu.SpheroEduAPI

3.3.5 Sensors

Querying sensor data allows you to react to real-time values coming from the robots’ physical sensors. For example, “if accelerometer z-axis > 3G’s, then set LED’s to green.”

class sphero2.sphero_edu.SpheroEduAPI

get_back_led()

`get_back_led().b` is the brightness of the back LED, from 0 to 255. For Sphero BOLT, use `get_back_led()` to get the RGB value.

Sphero BOLT Sensors

class sphero2.sphero_edu.SpheroEduAPI

get_back_led()

Provides the RGB color of the back LED, from 0 to 255 for each color channel.

get_front_led()

Provides the RGB color of the front LED, from 0 to 255 for each color channel.

Sphero RVR Sensors

```
class sphero2.sphero_edu.SpheroEduAPI
```

R2-D2 & R2-Q5 Sensors

```
class sphero2.sphero_edu.SpheroEduAPI
```

```
    get_back_led()
```

Provides the RGB color of the back LED, from 0 to 255 for each color channel.

```
    get_front_led()
```

Provides the RGB color of the front LED, from 0 to 255 for each color channel.

3.3.6 Communications

Infrared (IR) is invisible light with longer wavelengths than visible light, and it is commonly used in TV remote controls to transmit small amounts of data. IR is used in Sphero BOLT to transmit data such as relative distance and heading between robots to enable following and evading behavior among multiple robots, as well as to send custom messages. There are four IR emitters and receivers (pairs) for 360° awareness assuming there is a clear line of sight between two or more robots. The effective range is up to about 3 meters.

```
class sphero2.sphero_edu.SpheroEduAPI
```

```
    listen_for_ir_message()
```

Refer to *IR Message Received Event* for usage.

```
    listen_for_color_sensor()
```

Refer to *Color Event* for usage.

3.3.7 Events

Events are predefined robot functions into which you can embed conditional logic. When an event occurs, the conditional logic is called in a newly spawned thread. The event will be called every time it occurs by default, unless you customize it. For example, “on collision, change LED lights to red and play the Collision sound,” while the main loop is still running.

```
class sphero2.sphero_edu.SpheroEduAPI
```

On Collision

Executes conditional logic when the robot collides with an object.

```
def on_collision(api):
    # code to execute on collision

api.register_event(EventType.on_collision, on_collision)
```

For example, below is a basic [pong](#) program where Sphero bounces off walls, or your hands/feet in perpetuity. Place the robot on the floor between two parallel walls/objects and run the program with the robot pointed perpendicularly at one wall. On collision, the program will print “collision” and change the LED’s to red, then continue in the opposite direction:


```
def on_collision(api):
    api.stop_roll()
    api.set_main_led(Color(255, 0, 0))
    print('Collision')
    api.set_heading(api.get_heading() + 180)
    time.sleep(0.5)
    api.set_main_led(Color(255, 22, 255))
    api.set_speed(100)

api.register_event(EventType.on_collision, on_collision)
api.set_main_led(Color(255, 255, 255))
api.set_speed(100)
```

On Freefall

Executes conditional logic when gravity is the only force acting on the robot, such as when dropping or throwing it. Freefall is measured by an accelerometer reading of $< 0.1g$ for $\Rightarrow 0.1s$, where $1g$ is resting. On earth, objects in freefall accelerate downwards at 9.81 m/s^2 . If you are in orbit, objects appear to be at rest with a reading of $0g$ because they (and you) are always in freefall, but they never hit the Earth.

```
def on_freefall(api):
    # code to execute on freefall

api.register_event(EventType.on_freefall, on_freefall)
```

For example, to print “freefall” and change the LED’s to red on freefall use:

```
def on_freefall(api):
    api.set_main_led(Color(255, 0, 0))
    print('freefall')

api.register_event(EventType.on_freefall, on_freefall)
api.set_main_led(Color(255, 255, 255))
```

On Landing

Executes conditional logic when the robot lands after an being in freefall. You don’t need to define an `on_freefall` event for the robot to experience an `on_landing`, but the robot must meet the conditions for freefall before land.

```
def on_landing(api):
    # code to execute on landing

api.register_event(EventType.on_landing, on_landing)
```

For example, to print “landing” and change the LED’s to green after landing use:

```
def on_landing(api):
    api.set_main_led(Color(0, 255, 0))
    print('land')

api.register_event(EventType.on_landing, on_landing)
api.set_main_led(Color(255, 255, 255))
```

On Gyro Max

Executes conditional logic when the robot exceeds the bounds of measurable rotational velocity of $-2,000^{\circ}$ - $2,000^{\circ}$ per second. This can be triggered by spinning the robot around like a top on a table really fast. You need to spin it around > 5.5 revolutions per second.

```
def on_gyro_max(api):  
    # code to execute on gyromax  
  
api.register_event(EventType.on_gyro_max, on_gyro_max)
```

For example, to print “gyromax” and change the LED’s to red when you reach gyromax, use:

```
def on_gyro_max(api):  
    api.set_main_led(Color(255, 0, 0))  
    print('gyromax')  
  
api.register_event(EventType.on_gyro_max, on_gyro_max)  
api.set_stabilization(False)  
api.set_back_led(255)  
api.set_main_led(Color(255, 255, 255))
```

On Charging

Executes conditional logic called when the robot starts charging its battery. This can be triggered by placing your robot in it’s charging cradle, or by plugging it in.

```
def on_charging(api):  
    # code to execute on charging  
  
api.register_event(EventType.on_charging, on_charging)
```

On Not Charging

Executes conditional logic called when the robot stops charging its battery. This can be triggered by removing your robot from it’s charging cradle, or unplugging it.

```
def on_not_charging(api):  
    # code to execute on not charging  
  
api.register_event(EventType.on_not_charging, on_not_charging)
```

For example, to have Sphero execute 2 different conditions for on charging, and on not charging, use the below.

```
def on_charging(api):  
    api.set_main_led(Color(6, 0, 255))  
    print('charging')  
    time.sleep(1)  
    print('remove me from my charger')  
  
api.register_event(EventType.on_charging, on_charging)
```

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```
def on_not_charging(api):
    api.set_main_led(Color(255, 0, 47))
    print('not charging')

api.register_event(EventType.on_not_charging, on_not_charging)

print('place me in my charger')
while True:
    api.set_main_led(Color(3, 255, 0))
    time.sleep(0.5)
```

On IR Message Received

Executes conditional logic called when an infrared message is received on the specified channel. This can be triggered by one Sphero BOLT robot receiving a message from another Sphero BOLT. For example, to have Sphero BOLT change the matrix to red when receiving a message on channel 4:

```
message_channels = (4, )

def on_ir_message_4(api, channel):
    if channel != 4:
        return
    api.set_main_led(Color(255, 0, 0))
    api.listen_for_ir_message(message_channels)

api.register_event(EventType.on_ir_message, on_ir_message_4)
api.listen_for_ir_message(message_channels)
```

On Color

Executes conditional logic called when Sphero RVR's color sensor returns a specified RGB color value.

```
color = (Color(255, 15, 60), )

def on_color(api, color):
    if color != Color(255, 15, 60):
        return

api.register_event(EventType.on_color, on_color)
api.listen_for_color_sensor(colors)
```

The color that RVR's color sensor returns needs to be very close to the color set with `listen_for_color_sensor()` for the event to execute correctly.

3.4 Toys

3.4.1 Sphero 2.0 / SPRK

```
class sphero.v2.toy.sphero.Sphero(toy, adapter_cls)
```

Bases: Toy

```
toy_type = ToyType(display_name='SPRK/2.0', prefix=None, filter_prefix='Sphero',
cmd_safe_interval=0.06)
```

```
sensors = {'accelerometer': {'x': ToySensor(bit=32768, min_value=-32768.0,
max_value=32767.0, modifier=<function Sphero.<lambda>>), 'y': ToySensor(bit=16384,
min_value=-32768.0, max_value=32767.0, modifier=<function Sphero.<lambda>>), 'z':
ToySensor(bit=8192, min_value=-32768.0, max_value=32767.0, modifier=<function
Sphero.<lambda>>)}, 'attitude': {'pitch': ToySensor(bit=262144, min_value=-179.0,
max_value=180.0, modifier=None), 'roll': ToySensor(bit=131072, min_value=-179.0,
max_value=180.0, modifier=None), 'yaw': ToySensor(bit=65536, min_value=-179.0,
max_value=180.0, modifier=None)}, 'back_emf': {'left': ToySensor(bit=64,
min_value=-32768.0, max_value=32767.0, modifier=None), 'right': ToySensor(bit=32,
min_value=-32768.0, max_value=32767.0, modifier=None)}, 'gyroscope': {'x':
ToySensor(bit=4096, min_value=-20000.0, max_value=20000.0, modifier=<function
Sphero.<lambda>>), 'y': ToySensor(bit=2048, min_value=-20000.0, max_value=20000.0,
modifier=<function Sphero.<lambda>>), 'z': ToySensor(bit=1024, min_value=-20000.0,
max_value=20000.0, modifier=<function Sphero.<lambda>>)}}
```

```
extended_sensors = {'accel_one': {'accel_one': ToySensor(bit=33554432,
min_value=0.0, max_value=8000.0, modifier=None)}, 'locator': {'x':
ToySensor(bit=134217728, min_value=-32768.0, max_value=32767.0, modifier=None), 'y':
ToySensor(bit=67108864, min_value=-32768.0, max_value=32767.0, modifier=None)},
'quaternion': {'w': ToySensor(bit=268435456, min_value=-10000.0,
max_value=10000.0, modifier=<function Sphero.<lambda>>), 'x':
ToySensor(bit=2147483648, min_value=-10000.0, max_value=10000.0, modifier=<function
Sphero.<lambda>>), 'y': ToySensor(bit=1073741824, min_value=-10000.0,
max_value=10000.0, modifier=<function Sphero.<lambda>>), 'z':
ToySensor(bit=536870912, min_value=-10000.0, max_value=10000.0, modifier=<function
Sphero.<lambda>>)}, 'speed': {'speed': ToySensor(bit=4194304, min_value=0.0,
max_value=32767.0, modifier=None)}, 'velocity': {'x': ToySensor(bit=16777216,
min_value=-32768.0, max_value=32767.0, modifier=<function Sphero.<lambda>>), 'y':
ToySensor(bit=8388608, min_value=-32768.0, max_value=32767.0, modifier=<function
Sphero.<lambda>>)}}
```

```
wake()
```

```
add_battery_state_changed_notify_listener(listener: Callable)
```

```
remove_battery_state_changed_notify_listener(listener: Callable)
```

```
add_collision_detected_notify_listener(listener: Callable)
```

```
remove_collision_detected_notify_listener(listener: Callable)
```

```
add_did_sleep_notify_listener(listener: Callable)
```

```
remove_did_sleep_notify_listener(listener: Callable)
```

```

add_gyro_max_notify_listener(listener: Callable)
remove_gyro_max_notify_listener(listener: Callable)
add_sensor_streaming_data_notify_listener(listener: Callable)
remove_sensor_streaming_data_notify_listener(listener: Callable)
add_will_sleep_notify_listener(listener: Callable)
remove_will_sleep_notify_listener(listener: Callable)
begin_reflash(proc=None)
here_is_page(proc=None)
jump_to_main(proc=None)
enable_battery_state_changed_notify(enable: bool, proc=None)
get_bluetooth_info(proc=None)
get_charger_state(proc=None)
get_power_state(proc=None)
get_versions(proc=None)
jump_to_bootloader(proc=None)
ping(proc=None)
set_bluetooth_name(name: bytes, proc=None)
set_inactivity_timeout(timeout: int, proc=None)
sleep(interval_option: IntervalOptions, unk: int, unk2: int, proc=None)
boost(s, s2, proc=None)
configure_collision_detection(collision_detection_method: CollisionDetectionMethods, x_threshold,
                             y_threshold, x_speed, y_speed, dead_time, proc=None)
configure_locator(flags, x, y, yaw_tare, proc=None)
get_chassis_id(proc=None)
get_persistent_options(proc=None)
get_temperature(proc=None)
set_temporary_options(options: Options, proc=None)
roll(speed, heading, roll_mode: RollModes, reverse_flag: ReverseFlags, proc=None)
self_level(opt1: bool, opt2: bool, opt3: bool, opt4: bool, angle_limit, timeout, true_time, proc=None)
set_back_led_brightness(brightness, proc=None)
set_data_streaming(interval, num_samples_per_packet, mask, count, extended_mask, proc=None)

```

```
set_heading(heading: int, proc=None)

set_main_led(r, g, b, proc=None)

set_motion_timeout(timeout: int, proc=None)

set_persistent_options(options: Options, proc=None)

set_raw_motors(left_mode: RawMotorModes, left_speed, right_mode: RawMotorModes, right_speed,
               proc=None)

set_rotation_rate(rate: int, proc=None)

set_stabilization(stabilize: bool, proc=None)

property drive_control

property sensor_control

property stats_control

property firmware_update_control
```

3.4.2 Ollie

```
class spheroV2.toy.ollie.Ollie(toy, adapter_cls)
    Bases: Sphero

    toy_type = ToyType(display_name='Ollie', prefix='2B-', filter_prefix='2B',
                        cmd_safe_interval=0.06)

    get_sku(proc=None)
```

3.4.3 BB-8

```
class spheroV2.toy.bb8.BB8(toy, adapter_cls)
    Bases: Ollie

    toy_type = ToyType(display_name='BB-8', prefix='BB-', filter_prefix='BB',
                        cmd_safe_interval=0.06)

    get_factory_config_block_crc(proc=None)
```

3.4.4 BB-9E

```
class spheroV2.toy.bb9e.BB9E(toy, adapter_cls)
    Bases: ToyV2

    toy_type = ToyType(display_name='BB-9E', prefix='GB-', filter_prefix='GB',
                        cmd_safe_interval=0.12)
```

```
class LEDs(value)
    Bases: IntEnum
    An enumeration.
    BODY_RED = 0
    BODY_GREEN = 1
    BODY_BLUE = 2
    AIMING = 3
    HEAD = 4

class Animations(value)
    Bases: IntEnum
    An enumeration.
    EMOTE_ALARM = 0
    EMOTE_NO = 1
    EMOTE_SCAN_SWEEP = 2
    EMOTE_SCARED = 3
    EMOTE_YES = 4
    EMOTE_AFFIRMATIVE = 5
    EMOTE_AGITATED = 6
    EMOTE_ANGRY = 7
    EMOTE_CONTENT = 8
    EMOTE_EXCITED = 9
    EMOTE_FIERY = 10
    EMOTE_GREETINGS = 11
    EMOTE_NERVOUS = 12
    EMOTE_SLEEP = 14
    EMOTE_SURPRISED = 15
    EMOTE_UNDERSTOOD = 16
    HIT = 17
    WWM_ANGRY = 18
    WWM_ANXIOUS = 19
    WWM_BOW = 20
    WWM_CURIOUS = 22
```

```
WWM_DOUBLE_TAKE = 23
WWM_EXCITED = 24
WWM_FIERY = 25
WWM_HAPPY = 26
WWM_JITTERY = 27
WWM_LAUGH = 28
WWM_LONG_SHAKE = 29
WWM_NO = 30
WWM_OMINOUS = 31
WWM_RELIEVED = 32
WWM_SAD = 33
WWM_SCARED = 34
WWM_SHAKE = 35
WWM_SURPRISED = 36
WWM_TAUNTING = 37
WWM_WHISPER = 38
WWM_YELLING = 39
WWM_YOOHOO = 40
WWM_FRUSTRATED = 41
IDLE_1 = 42
IDLE_2 = 43
IDLE_3 = 44
EYE_1 = 45
EYE_2 = 46
EYE_3 = 47
EYE_4 = 48
```



```

sensors = {'accel_one': {'accel_one': ToySensor(bit=512, min_value=0.0,
max_value=8000.0, modifier=None)}, 'accelerometer': {'x': ToySensor(bit=32768,
min_value=-8.19, max_value=8.19, modifier=None), 'y': ToySensor(bit=16384,
min_value=-8.19, max_value=8.19, modifier=None), 'z': ToySensor(bit=8192,
min_value=-8.19, max_value=8.19, modifier=None)}, 'attitude': {'pitch':
ToySensor(bit=262144, min_value=-179.0, max_value=180.0, modifier=None), 'roll':
ToySensor(bit=131072, min_value=-179.0, max_value=180.0, modifier=None), 'yaw':
ToySensor(bit=65536, min_value=-179.0, max_value=180.0, modifier=None)},
'core_time': {'core_time': ToySensor(bit=2, min_value=0.0, max_value=0.0,
modifier=None)}, 'locator': {'x': ToySensor(bit=64, min_value=-32768.0,
max_value=32767.0, modifier=<function BB9E.<lambda>>), 'y': ToySensor(bit=32,
min_value=-32768.0, max_value=32767.0, modifier=<function BB9E.<lambda>>)},
'quaternion': {'w': ToySensor(bit=4194304, min_value=-1.0, max_value=1.0,
modifier=None), 'x': ToySensor(bit=33554432, min_value=-1.0, max_value=1.0,
modifier=None), 'y': ToySensor(bit=16777216, min_value=-1.0, max_value=1.0,
modifier=None), 'z': ToySensor(bit=8388608, min_value=-1.0, max_value=1.0,
modifier=None)}, 'speed': {'speed': ToySensor(bit=4, min_value=0.0,
max_value=32767.0, modifier=None)}, 'velocity': {'x': ToySensor(bit=16,
min_value=-32768.0, max_value=32767.0, modifier=<function BB9E.<lambda>>), 'y':
ToySensor(bit=8, min_value=-32768.0, max_value=32767.0, modifier=<function
BB9E.<lambda>>)}}

extended_sensors = {'gyroscope': {'x': ToySensor(bit=33554432, min_value=-20000.0,
max_value=20000.0, modifier=None), 'y': ToySensor(bit=16777216, min_value=-20000.0,
max_value=20000.0, modifier=None), 'z': ToySensor(bit=8388608, min_value=-20000.0,
max_value=20000.0, modifier=None)}}

play_animation(animation: IntEnum, proc=None)

stop_animation(proc=None)

enable_idle_animations(enable: bool, proc=None)

enable_trophy_mode(enable: bool, proc=None)

get_trophy_mode_enabled(proc=None)

ping(data, proc=None) → bytearray

get_api_protocol_version(proc=None) → ApiProtocolVersion

send_command_to_shell(command: bytes, proc=None)

add_send_string_to_console_listener(listener: Callable)

remove_send_string_to_console_listener(listener: Callable)

set_bluetooth_name(name: bytes, proc=None)

get_bluetooth_name(proc=None)

set_raw_motors(left_mode: RawMotorModes, left_speed, right_mode: RawMotorModes, right_speed,
proc=None)

reset_yaw(proc=None)

drive_with_heading(speed, heading, drive_flags: DriveFlags, proc=None)

```

```
set_stabilization(stabilization_index: StabilizationIndexes, proc=None)

get_factory_mode_challenge(proc=None)

enter_factory_mode(challenge: int, proc=None)

exit_factory_mode(proc=None)

get_chassis_id(proc=None)

get_pending_update_flags(proc=None)

play_audio_file(sound, playback_mode: AudioPlaybackModes, proc=None)

set_all_leds_with_16_bit_mask(mask, values, proc=None)

start_idle_led_animation(proc=None)

set_sensor_streaming_mask(interval, count, sensor_masks, proc=None)

get_sensor_streaming_mask(proc=None)

add_sensor_streaming_data_notify_listener(listener: Callable)

remove_sensor_streaming_data_notify_listener(listener: Callable)

set_extended_sensor_streaming_mask(sensor_masks, proc=None)

get_extended_sensor_streaming_mask(proc=None)

enable_gyro_max_notify(enable, proc=None)

add_gyro_max_notify_listener(listener: Callable)

remove_gyro_max_notify_listener(listener: Callable)

configure_collision_detection(collision_detection_method: CollisionDetectionMethods, x_threshold,  
                             y_threshold, x_speed, y_speed, dead_time, proc=None)

add_collision_detected_notify_listener(listener: Callable)

remove_collision_detected_notify_listener(listener: Callable)

reset_locator_x_and_y(proc=None)

set_locator_flags(locator_flags: bool, proc=None)

set_accelerometer_activity_threshold(threshold: float, proc=None)

enable_accelerometer_activity_notify(enable: bool, proc=None)

add_accelerometer_activity_notify_listener(listener: Callable)

remove_accelerometer_activity_notify_listener(listener: Callable)

set_gyro_activity_threshold(threshold: float, proc=None)

enable_gyro_activity_notify(enable: bool, proc=None)

add_gyro_activity_notify_listener(listener: Callable)
```

```

remove_gyro_activity_notify_listener(listener: Callable)

enter_deep_sleep(s, proc=None)

sleep(proc=None)

get_battery_voltage(proc=None)

get_battery_state(proc=None)

enable_battery_state_changed_notify(enable: bool, proc=None)

add_battery_state_changed_notify_listener(listener: Callable)

remove_battery_state_changed_notify_listener(listener: Callable)

wake(proc=None)

add_will_sleep_notify_listener(listener: Callable)

remove_will_sleep_notify_listener(listener: Callable)

add_did_sleep_notify_listener(listener: Callable)

remove_did_sleep_notify_listener(listener: Callable)

enable_battery_voltage_state_change_notify(enable: bool, proc=None)

add_battery_voltage_state_change_notify_listener(listener: Callable)

remove_battery_voltage_state_change_notify_listener(listener: Callable)

get_main_app_version(proc=None)

get_bootloader_version(proc=None)

get_board_revision(proc=None)

get_mac_address(proc=None)

get_stats_id(proc=None)

get_secondary_main_app_version(proc=None)

add_secondary_main_app_version_notify_listener(listener: Callable)

remove_secondary_main_app_version_notify_listener(listener: Callable)

get_processor_name(proc=None)

get_secondary_mcu_bootloader_version(proc=None)

add_get_secondary_mcu_bootloader_version_notify_listener(listener: Callable)

remove_get_secondary_mcu_bootloader_version_notify_listener(listener: Callable)

get_three_character_sku(proc=None)

property drive_control

property firmware_update_control

```

property multi_led_control

property sensor_control

property stats_control

3.4.5 R2-D2

class spheroV2.toy.r2d2.R2D2(*toy, adapter_cls*)

Bases: [BB9E](#)

toy_type = ToyType(display_name='R2-D2', prefix='D2-', filter_prefix='D2',
cmd_safe_interval=0.12)

class LEDs(*value*)

Bases: [IntEnum](#)

An enumeration.

FRONT_RED = 0

FRONT_GREEN = 1

FRONT_BLUE = 2

LOGIC_DISPLAYS = 3

BACK_RED = 4

BACK_GREEN = 5

BACK_BLUE = 6

HOLO_PROJECTOR = 7

class Audio(*value*)

Bases: [IntEnum](#)

An enumeration.

TEST_1497HZ = 1

TEST_200HZ = 32

TEST_2517HZ = 63

TEST_3581HZ = 94

TEST_431HZ = 125

TEST_6011HZ = 156

TEST_853HZ = 187

BB8_ALARM_1 = 218

BB8_ALARM_10 = 235

BB8_ALARM_11 = 254

BB8_ALARM_12 = 258
BB8_ALARM_2 = 264
BB8_ALARM_3 = 268
BB8_ALARM_4 = 272
BB8_ALARM_6 = 279
BB8_ALARM_7 = 288
BB8_ALARM_8 = 296
BB8_ALARM_9 = 301
BB8_BOOT_UP = 309
BB8_BOOR_UP_2 = 330
BB8_CHATTY_1 = 352
BB8_CHATTY_10 = 356
BB8_CHATTY_11 = 360
BB8_CHATTY_12 = 368
BB8_CHATTY_13 = 375
BB8_CHATTY_14 = 381
BB8_CHATTY_15 = 390
BB8_CHATTY_16 = 397
BB8_CHATTY_17 = 404
BB8_CHATTY_18 = 410
BB8_CHATTY_19 = 417
BB8_CHATTY_2 = 430
BB8_CHATTY_20 = 464
BB8_CHATTY_22 = 471
BB8_CHATTY_23 = 479
BB8_CHATTY_24 = 492
BB8_CHATTY_25 = 518
BB8_CHATTY_26 = 525
BB8_CHATTY_27 = 537
BB8_CHATTY_3 = 544
BB8_CHATTY_4 = 557

BB8_CHATTY_5 = 570
BB8_CHATTY_6 = 577
BB8_CHATTY_7 = 581
BB8_CHATTY_8 = 587
BB8_CHATTY_9 = 599
BB8_DONT_KNOW = 606
BB8_EXCITED_1 = 612
BB8_EXCITED_2 = 622
BB8_EXCITED_3 = 630
BB8_EXCITED_4 = 644
BB8_HEY_1 = 671
BB8_HEY_10 = 682
BB8_HEY_11 = 686
BB8_HEY_12 = 690
BB8_HEY_13 = 700
BB8_HEY_2 = 724
BB8_HEY_3 = 732
BB8_HEY_4 = 734
BB8_HEY_5 = 739
BB8_HEY_6 = 743
BB8_HEY_7 = 747
BB8_HEY_8 = 753
BB8_HEY_9 = 757
BB8_LAUGH_1 = 761
BB8_LAUGH_2 = 764
BB8_NEGATIVE_1 = 787
BB8_NEGATIVE_10 = 792
BB8_NEGATIVE_11 = 802
BB8_NEGATIVE_12 = 813
BB8_NEGATIVE_13 = 825
BB8_NEGATIVE_14 = 831

BB8_NEGATIVE_15 = 836
BB8_NEGATIVE_16 = 859
BB8_NEGATIVE_17 = 867
BB8_NEGATIVE_18 = 874
BB8_NEGATIVE_19 = 888
BB8_NEGATIVE_2 = 896
BB8_NEGATIVE_20 = 902
BB8_NEGATIVE_21 = 916
BB8_NEGATIVE_22 = 927
BB8_NEGATIVE_23 = 935
BB8_NEGATIVE_24 = 946
BB8_NEGATIVE_25 = 953
BB8_NEGATIVE_26 = 963
BB8_NEGATIVE_27 = 969
BB8_NEGATIVE_28 = 983
BB8_NEGATIVE_29 = 988
BB8_NEGATIVE_3 = 998
BB8_NEGATIVE_30 = 1003
BB8_NEGATIVE_4 = 1010
BB8_NEGATIVE_5 = 1020
BB8_NEGATIVE_6 = 1032
BB8_NEGATIVE_7 = 1040
BB8_NEGATIVE_8 = 1052
BB8_NEGATIVE_9 = 1064
BB8_POSITIVE_1 = 1077
BB8_POSITIVE_10 = 1082
BB8_POSITIVE_11 = 1087
BB8_POSITIVE_12 = 1092
BB8_POSITIVE_13 = 1096
BB8_POSITIVE_14 = 1102
BB8_POSITIVE_15 = 1109

BB8_POSITIVE_16 = 1113
BB8_POSITIVE_2 = 1118
BB8_POSITIVE_3 = 1123
BB8_POSITIVE_4 = 1130
BB8_POSITIVE_5 = 1135
BB8_POSITIVE_6 = 1138
BB8_POSITIVE_7 = 1147
BB8_POSITIVE_8 = 1150
BB8_POSITIVE_9 = 1157
BB8_SAD_1 = 1163
BB8_SAD_10 = 1170
BB8_SAD_11 = 1178
BB8_SAD_12 = 1186
BB8_SAD_13 = 1192
BB8_SAD_14 = 1199
BB8_SAD_15 = 1205
BB8_SAD_16 = 1213
BB8_SAD_17 = 1220
BB8_SAD_18 = 1230
BB8_SAD_2 = 1236
BB8_SAD_3 = 1240
BB8_SAD_4 = 1250
BB8_SAD_5 = 1268
BB8_SAD_6 = 1275
BB8_SAD_7 = 1281
BB8_SAD_8 = 1295
BB8_SAD_9 = 1303
BB8_SHORTCUT = 1308
BB8_WOW_1 = 1324
BB9E_ALARM_1 = 1329
BB9E_ALARM_2 = 1347

BB9E_ALARM_3 = 1363
BB9E_ALARM_4 = 1375
BB9E_ALARM_5 = 1384
BB9E_CHATTY_1 = 1394
BB9E_CHATTY_2 = 1408
BB9E_EXCITED_1 = 1432
BB9E_EXCITED_2 = 1442
BB9E_EXCITED_3 = 1463
BB9E_HEY_1 = 1476
BB9E_HEY_2 = 1486
BB9E_NEGATIVE_1 = 1494
BB9E_NEGATIVE_2 = 1505
BB9E_NEGATIVE_3 = 1516
BB9E_NEGATIVE_4 = 1523
BB9E_POSITIVE_1 = 1531
BB9E_POSITIVE_2 = 1549
BB9E_POSITIVE_3 = 1558
BB9E_POSITIVE_4 = 1571
BB9E_POSITIVE_5 = 1583
BB9E_SAD_1 = 1592
BB9E_SAD_2 = 1600
R2_FALL = 1609
R2_HIT_1 = 1623
R2_HIT_10 = 1628
R2_HIT_11 = 1635
R2_HIT_2 = 1642
R2_HIT_3 = 1647
R2_HIT_4 = 1653
R2_HIT_5 = 1659
R2_HIT_6 = 1664
R2_HIT_7 = 1669

R2_HIT_8 = 1676
R2_HIT_9 = 1684
R2_STEP_1 = 1690
R2_STEP_2 = 1693
R2_STEP_3 = 1696
R2_STEP_4 = 1698
R2_STEP_5 = 1700
R2_STEP_6 = 1702
R2_ACCESS_PANELS = 1704
R2_ALARM_1 = 1737
R2_ALARM_10 = 1747
R2_ALARM_12 = 1756
R2_ALARM_13 = 1763
R2_ALARM_14 = 1771
R2_ALARM_15 = 1784
R2_ALARM_16 = 1791
R2_ALARM_2 = 1809
R2_ALARM_3 = 1821
R2_ALARM_4 = 1831
R2_ALARM_5 = 1835
R2_ALARM_6 = 1843
R2_ALARM_7 = 1858
R2_ALARM_8 = 1867
R2_ALARM_9 = 1893
R2_ANNYED = 1910
R2_BURNOUT = 1915
R2_CHATTY_1 = 1950
R2_CHATTY_10 = 1959
R2_CHATTY_11 = 1966
R2_CHATTY_12 = 1977
R2_CHATTY_13 = 1987

R2_CHATTY_14 = 2002
R2_CHATTY_15 = 2007
R2_CHATTY_16 = 2010
R2_CHATTY_17 = 2019
R2_CHATTY_18 = 2028
R2_CHATTY_19 = 2039
R2_CHATTY_2 = 2061
R2_CHATTY_20 = 2072
R2_CHATTY_21 = 2080
R2_CHATTY_22 = 2085
R2_CHATTY_23 = 2095
R2_CHATTY_24 = 2105
R2_CHATTY_25 = 2121
R2_CHATTY_26 = 2132
R2_CHATTY_27 = 2143
R2_CHATTY_28 = 2157
R2_CHATTY_29 = 2170
R2_CHATTY_3 = 2174
R2_CHATTY_30 = 2184
R2_CHATTY_31 = 2188
R2_CHATTY_32 = 2198
R2_CHATTY_33 = 2202
R2_CHATTY_34 = 2211
R2_CHATTY_35 = 2221
R2_CHATTY_36 = 2232
R2_CHATTY_37 = 2241
R2_CHATTY_38 = 2253
R2_CHATTY_39 = 2264
R2_CHATTY_4 = 2276
R2_CHATTY_40 = 2285
R2_CHATTY_41 = 2292

R2_CHATTY_42 = 2307
R2_CHATTY_43 = 2322
R2_CHATTY_44 = 2332
R2_CHATTY_45 = 2344
R2_CHATTY_46 = 2357
R2_CHATTY_47 = 2368
R2_CHATTY_48 = 2377
R2_CHATTY_49 = 2387
R2_CHATTY_5 = 2399
R2_CHATTY_50 = 2413
R2_CHATTY_51 = 2424
R2_CHATTY_52 = 2439
R2_CHATTY_53 = 2452
R2_CHATTY_54 = 2457
R2_CHATTY_55 = 2463
R2_CHATTY_56 = 2474
R2_CHATTY_57 = 2492
R2_CHATTY_58 = 2509
R2_CHATTY_59 = 2519
R2_CHATTY_6 = 2524
R2_CHATTY_60 = 2535
R2_CHATTY_61 = 2543
R2_CHATTY_62 = 2554
R2_CHATTY_7 = 2562
R2_CHATTY_8 = 2572
R2_CHATTY_9 = 2579
R2_ENGAGE_HYPER_DRIVE = 2586
R2_EXCITED_1 = 2600
R2_EXCITED_10 = 2615
R2_EXCITED_11 = 2633
R2_EXCITED_12 = 2644

R2_EXCITED_13 = 2654
R2_EXCITED_14 = 2662
R2_EXCITED_15 = 2680
R2_EXCITED_16 = 2691
R2_EXCITED_2 = 2708
R2_EXCITED_3 = 2726
R2_EXCITED_4 = 2730
R2_EXCITED_5 = 2736
R2_EXCITED_6 = 2753
R2_EXCITED_7 = 2767
R2_EXCITED_8 = 2777
R2_EXCITED_9 = 2787
R2_HEAD_SPIN = 2797
R2_HEY_1 = 2813
R2_HEY_10 = 2824
R2_HEY_11 = 2828
R2_HEY_12 = 2833
R2_HEY_2 = 2841
R2_HEY_3 = 2856
R2_HEY_4 = 2861
R2_HEY_5 = 2882
R2_HEY_6 = 2893
R2_HEY_7 = 2898
R2_HEY_8 = 2904
R2_HEY_9 = 2912
R2_LAUGH_1 = 2919
R2_LAUGH_2 = 2935
R2_LAUGH_3 = 2950
R2_LAUGH_4 = 2955
R2_MOTOR = 2970
R2_NEGATIVE_1 = 3101

```
R2_NEGATIVE_10 = 3111
R2_NEGATIVE_11 = 3115
R2_NEGATIVE_12 = 3121
R2_NEGATIVE_13 = 3132
R2_NEGATIVE_14 = 3136
R2_NEGATIVE_15 = 3148
R2_NEGATIVE_16 = 3152
R2_NEGATIVE_17 = 3157
R2_NEGATIVE_18 = 3164
R2_NEGATIVE_19 = 3167
R2_NEGATIVE_2 = 3172
R2_NEGATIVE_20 = 3178
R2_NEGATIVE_21 = 3191
R2_NEGATIVE_22 = 3200
R2_NEGATIVE_23 = 3213
R2_NEGATIVE_24 = 3219
R2_NEGATIVE_25 = 3226
R2_NEGATIVE_26 = 3230
R2_NEGATIVE_27 = 3233
R2_NEGATIVE_28 = 3241
R2_NEGATIVE_3 = 3251
R2_NEGATIVE_4 = 3258
R2_NEGATIVE_5 = 3263
R2_NEGATIVE_6 = 3268
R2_NEGATIVE_7 = 3274
R2_NEGATIVE_8 = 3282
R2_NEGATIVE_9 = 3291
R2_POSITIVE_1 = 3302
R2_POSITIVE_10 = 3309
R2_POSITIVE_11 = 3318
R2_POSITIVE_12 = 3326
```

R2_POSITIVE_13 = 3340
R2_POSITIVE_14 = 3353
R2_POSITIVE_15 = 3358
R2_POSITIVE_16 = 3364
R2_POSITIVE_17 = 3369
R2_POSITIVE_18 = 3375
R2_POSITIVE_19 = 3388
R2_POSITIVE_2 = 3394
R2_POSITIVE_20 = 3403
R2_POSITIVE_21 = 3410
R2_POSITIVE_22 = 3422
R2_POSITIVE_23 = 3434
R2_POSITIVE_3 = 3439
R2_POSITIVE_4 = 3446
R2_POSITIVE_5 = 3449
R2_POSITIVE_6 = 3454
R2_POSITIVE_7 = 3460
R2_POSITIVE_8 = 3471
R2_POSITIVE_9 = 3478
R2_SAD_1 = 3484
R2_SAD_10 = 3495
R2_SAD_11 = 3518
R2_SAD_12 = 3526
R2_SAD_13 = 3536
R2_SAD_14 = 3543
R2_SAD_15 = 3553
R2_SAD_16 = 3561
R2_SAD_17 = 3570
R2_SAD_18 = 3593
R2_SAD_19 = 3600
R2_SAD_2 = 3608

R2_SAD_20 = 3612
R2_SAD_21 = 3619
R2_SAD_22 = 3632
R2_SAD_23 = 3639
R2_SAD_24 = 3649
R2_SAD_25 = 3661
R2_SAD_3 = 3686
R2_SAD_4 = 3693
R2_SAD_5 = 3703
R2_SAD_6 = 3739
R2_SAD_7 = 3755
R2_SAD_8 = 3782
R2_SAD_9 = 3790
R2_SCREAM = 3797
R2_SCREAM_2 = 3810
R2_SHORT_OUT = 3825
R2Q5_ALARM_1 = 3864
R2Q5_ALARM_2 = 3869
R2Q5_CHATTY_1 = 3875
R2Q5_CHATTY_2 = 3891
R2Q5_HEY_1 = 3896
R2Q5_HEY_2 = 3901
R2Q5_NEGATIVE_1 = 3907
R2Q5_POSITIVE_1 = 3914
R2Q5_POSITIVE_2 = 3920
R2Q5_SAD_1 = 3925
R2Q5_SHUTDOWN = 3929
BB9E_EXTRA_1 = 3941
BB9E_EXTRA_2 = 4021
BB9E_EXTRA_3 = 4246
BB9E_EXTRA_4 = 4568


```
BB9E_EXTRA_5 = 4929
BB9E_EXTRA_6 = 5156
BB9E_EXTRA_7 = 5315
BB9E_HEAD_TURN_1 = 5441
BB9E_HEAD_TURN_2 = 5483
BB9E_HEAD_TURN_3 = 5513
```

```
class Animations(value)
```

```
    Bases: IntEnum
```

```
    An enumeration.
```

```
CHARGER_1 = 0
CHARGER_2 = 1
CHARGER_3 = 2
CHARGER_4 = 3
CHARGER_5 = 4
CHARGER_6 = 5
CHARGER_7 = 6
EMOTE_ALARM = 7
EMOTE_ANGRY = 8
EMOTE_ATTENTION = 9
EMOTE_FRUSTRATED = 10
EMOTE_DRIVE = 11
EMOTE_EXCITED = 12
EMOTE_SEARCH = 13
EMOTE_SHORT_CIRCUIT = 14
EMOTE_LAUGH = 15
EMOTE_NO = 16
EMOTE_RETREAT = 17
EMOTE_FIERY = 18
EMOTE_UNDERSTOOD = 19
EMOTE_YES = 21
EMOTE_SCAN = 22
```

```
EMOTE_SURPRISED = 24

IDLE_1 = 25

IDLE_2 = 26

IDLE_3 = 27

WWM_ANGRY = 31

WWM_ANXIOUS = 32

WWM_BOW = 33

WWM_CONCERN = 34

WWM_CURIOUS = 35

WWM_DOUBLE_TAKE = 36

WWM_EXCITED = 37

WWM_FIERY = 38

WWM_FRUSTRATED = 39

WWM_HAPPY = 40

WWM_JITTERY = 41

WWM_LAUGH = 42

WWM_LONG_SHAKE = 43

WWM_NO = 44

WWM_OMINOUS = 45

WWM_RELIEVED = 46

WWM_SAD = 47

WWM_SCARED = 48

WWM_SHAKE = 49

WWM_SURPRISED = 50

WWM_TAUNTING = 51

WWM_WHISPER = 52

WWM_YELLING = 53

WWM_YOOHOO = 54

MOTOR = 55
```

```

extended_sensors = {'gyroscope': {'x': ToySensor(bit=33554432, min_value=-20000.0,
max_value=20000.0, modifier=None), 'y': ToySensor(bit=16777216, min_value=-20000.0,
max_value=20000.0, modifier=None), 'z': ToySensor(bit=8388608, min_value=-20000.0,
max_value=20000.0, modifier=None)}, 'r2_head_angle': {'r2_head_angle':
ToySensor(bit=67108864, min_value=-162.0, max_value=182.0, modifier=None)}}

get_battery_voltage_state(proc=None)

generic_raw_motor(index: GenericRawMotorIndexes, mode: GenericRawMotorModes, speed,
proc=None)

perform_leg_action(leg_action: R2LegActions, proc=None)

set_head_position(head_position: float, proc=None)

get_head_position(proc=None)

set_leg_position(leg_position: float, proc=None)

get_leg_position(proc=None)

get_leg_action(proc=None)

enable_leg_action_notify(enable: bool, proc=None)

enable_head_reset_to_zero_notify(enable: bool, proc=None)

add_head_reset_to_zero_notify_listener(listener: Callable)

remove_head_reset_to_zero_notify_listener(listener: Callable)

set_audio_volume(volume, proc=None)

get_audio_volume(proc=None)

stop_all_audio(proc=None)

```

3.4.6 R2-Q5

```
class spheroV2.toy.r2q5.R2Q5(toy, adapter_cls)
```

Bases: [R2D2](#)

```
toy_type = ToyType(display_name='R2-Q5', prefix='Q5-', filter_prefix='Q5',
cmd_safe_interval=0.12)
```

```
class Animations(value)
```

Bases: [IntEnum](#)

An enumeration.

```
CHARGER_1 = 0
```

```
CHARGER_2 = 1
```

```
CHARGER_3 = 2
```

```
CHARGER_4 = 3
```

```
CHARGER_5 = 4
CHARGER_6 = 5
CHARGER_7 = 6
EMOTE_ALARM = 7
EMOTE_ANGRY = 8
EMOTE_ATTENTION = 9
EMOTE_FRUSTRATED = 10
EMOTE_DRIVE = 11
EMOTE_EXCITED = 12
EMOTE_SEARCH = 13
EMOTE_SHORT_CIRCUIT = 14
EMOTE_LAUGH = 15
EMOTE_NO = 16
EMOTE_RETREAT = 17
EMOTE_FIERY = 18
EMOTE_UNDERSTOOD = 19
EMOTE_YES = 21
EMOTE_SCAN = 22
EMOTE_SURPRISED = 24
IDLE_1 = 25
IDLE_2 = 26
IDLE_3 = 27
WWM_ANGRY = 31
WWM_ANXIOUS = 32
WWM_BOW = 33
WWM_CONCERN = 34
WWM_CURIOUS = 35
WWM_DOUBLE_TAKE = 36
WWM_EXCITED = 37
WWM_FIERY = 38
WWM_FRUSTRATED = 39
```

```
WWM_HAPPY = 40
WWM_JITTERY = 41
WWM_LAUGH = 42
WWM_LONG_SHAKE = 43
WWM_NO = 44
WWM_OMINOUS = 45
WWM_RELIEVED = 46
WWM_SAD = 47
WWM_SCARED = 48
WWM_SHAKE = 49
WWM_SURPRISED = 50
WWM_TAUNTING = 51
WWM_WHISPER = 52
WWM_YELLING = 53
WWM_YOOHOO = 54
```

3.4.7 RVR

```
class sphero2.toy.rvr.RVR(toy, adapter_cls)
```

Bases: `ToyV2`

```
toy_type = ToyType(display_name='Sphero RVR', prefix='RV-', filter_prefix='RV',
cmd_safe_interval=0.075)
```

```
class LEDs(value)
```

Bases: `IntEnum`

An enumeration.

```
RIGHT_HEADLIGHT_RED = 0
RIGHT_HEADLIGHT_GREEN = 1
RIGHT_HEADLIGHT_BLUE = 2
LEFT_HEADLIGHT_RED = 3
LEFT_HEADLIGHT_GREEN = 4
LEFT_HEADLIGHT_BLUE = 5
LEFT_STATUS_INDICATION_RED = 6
LEFT_STATUS_INDICATION_GREEN = 7
```

```
LEFT_STATUS_INDICATION_BLUE = 8
RIGHT_STATUS_INDICATION_RED = 9
RIGHT_STATUS_INDICATION_GREEN = 10
RIGHT_STATUS_INDICATION_BLUE = 11
BATTERY_DOOR_REAR_RED = 12
BATTERY_DOOR_REAR_GREEN = 13
BATTERY_DOOR_REAR_BLUE = 14
BATTERY_DOOR_FRONT_RED = 15
BATTERY_DOOR_FRONT_GREEN = 16
BATTERY_DOOR_FRONT_BLUE = 17
POWER_BUTTON_FRONT_RED = 18
POWER_BUTTON_FRONT_GREEN = 19
POWER_BUTTON_FRONT_BLUE = 20
POWER_BUTTON_REAR_RED = 21
POWER_BUTTON_REAR_GREEN = 22
POWER_BUTTON_REAR_BLUE = 23
LEFT_BRAKELIGHT_RED = 24
LEFT_BRAKELIGHT_GREEN = 25
LEFT_BRAKELIGHT_BLUE = 26
RIGHT_BRAKELIGHT_RED = 27
RIGHT_BRAKELIGHT_GREEN = 28
RIGHT_BRAKELIGHT_BLUE = 29
UNDERCARRIAGE_WHITE = 30
```

```
ping(data, proc=None) → bytearray
```

```
get_api_protocol_version(proc=None) → ApiProtocolVersion
```

```
send_command_to_shell(command: bytes, proc=None)
```

```
add_send_string_to_console_listener(listener: Callable)
```

```
remove_send_string_to_console_listener(listener: Callable)
```

```
get_supported_dids(proc=None)
```

```
get_supported_cids(s, proc=None)
```

```
get_main_app_version(proc=None)
```

```

get_bootloader_version(proc=None)
get_board_revision(*, proc=Processors.PRIMARY)
get_mac_address(*, proc=Processors.PRIMARY)
get_stats_id(*, proc=Processors.PRIMARY)
get_processor_name(proc=None)
get_boot_reason(*, proc=Processors.PRIMARY)
get_last_error_info(*, proc=Processors.PRIMARY)
write_config_block(*, proc=Processors.PRIMARY)
get_config_block(*, proc=Processors.PRIMARY)
set_config_block(metadata_version, config_block_version, application_data, *,
                  proc=Processors.PRIMARY)
erase_config_block(j, *, proc=Processors.PRIMARY)
get_swd_locking_status(proc=None)
get_manufacturing_date(*, proc=Processors.PRIMARY)
get_sku(*, proc=Processors.PRIMARY)
get_core_up_time_in_milliseconds(*, proc=Processors.PRIMARY)
get_event_log_status(proc=None)
get_event_log_data(j, j2, proc=None)
clear_event_log(proc=None)
enable_sos_message_notify(enable: bool, *, proc=Processors.PRIMARY)
add_sos_message_notify_listener(listener: Callable)
remove_sos_message_notify_listener(listener: Callable)
get_sos_message(*, proc=Processors.PRIMARY)
clear_sos_message(*, proc=Processors.PRIMARY)
get_out_of_box_state(*, proc=Processors.PRIMARY)
enable_out_of_box_state(enable: bool, *, proc=Processors.PRIMARY)
enter_deep_sleep(s, *, proc=Processors.PRIMARY)
sleep(*, proc=Processors.PRIMARY)
force_battery_refresh(*, proc=Processors.PRIMARY)
wake(*, proc=Processors.PRIMARY)
get_battery_percentage(*, proc=Processors.PRIMARY)

```

```
get_battery_voltage_state(*, proc=Processors.PRIMARY)

add_will_sleep_notify_listener(listener: Callable)

remove_will_sleep_notify_listener(listener: Callable)

add_did_sleep_notify_listener(listener: Callable)

remove_did_sleep_notify_listener(listener: Callable)

enable_battery_voltage_state_change_notify(enable: bool, *, proc=Processors.PRIMARY)

add_battery_voltage_state_change_notify_listener(listener: Callable)

remove_battery_voltage_state_change_notify_listener(listener: Callable)

get_battery_voltage_in_volts(reading_type: BatteryVoltageReadingTypes, *,
                             proc=Processors.PRIMARY)

get_battery_voltage_state_thresholds(*, proc=Processors.PRIMARY)

get_current_sense_amplifier_current(amplifier_id: AmplifierIds, *, proc=Processors.PRIMARY)

get_efuse_fault_status(efuse_id: EfuseIds, *, proc=Processors.PRIMARY)

add_efuse_fault_occurred_notify_listener(listener: Callable)

remove_efuse_fault_occurred_notify_listener(listener: Callable)

enable_efuse(efuse_id: EfuseIds, *, proc=Processors.PRIMARY)

set_raw_motors(left_mode: RawMotorModes, left_speed, right_mode: RawMotorModes, right_speed, *,
               proc=Processors.SECONDARY)

reset_yaw(*, proc=Processors.SECONDARY)

drive_with_heading(speed, heading, drive_flags: DriveFlags, *, proc=Processors.SECONDARY)

set_control_system_type(s, s2, *, proc=Processors.SECONDARY)

set_component_parameters(s, s2, f_arr, *, proc=Processors.SECONDARY)

get_component_parameters(s, s2, *, proc=Processors.SECONDARY)

set_custom_control_system_timeout(timeout, *, proc=Processors.SECONDARY)

enable_motor_stall_notify(enable, *, proc=Processors.SECONDARY)

add_motor_stall_notify_listener(listener: Callable)

remove_motor_stall_notify_listener(listener: Callable)

enable_motor_fault_notify(enable, *, proc=Processors.SECONDARY)

add_motor_fault_notify_listener(listener: Callable)

remove_motor_fault_notify_listener(listener: Callable)

get_motor_fault_state(*, proc=Processors.SECONDARY)
```



```

enable_gyro_max_notify(enable, *, proc=Processors.SECONDARY)
add_gyro_max_notify_listener(listener: Callable)
remove_gyro_max_notify_listener(listener: Callable)
reset_locator_x_and_y(*, proc=Processors.SECONDARY)
set_locator_flags(locator_flags: bool, *, proc=Processors.SECONDARY)
get_bot_to_bot_infrared_readings(*, proc=Processors.SECONDARY)
get_rgbc_sensor_values(*, proc=Processors.PRIMARY)
magnetometer_calibrate_to_north(*, proc=Processors.SECONDARY)
add_magnetometer_north_yaw_notify_listener(listener: Callable)
remove_magnetometer_north_yaw_notify_listener(listener: Callable)
start_robot_to_robot_infrared_broadcasting(far_code, near_code, *,
                                           proc=Processors.SECONDARY)
start_robot_to_robot_infrared_following(far_code, near_code, *, proc=Processors.SECONDARY)
stop_robot_to_robot_infrared_broadcasting(*, proc=Processors.SECONDARY)
add_robot_to_robot_infrared_message_received_notify_listener(listener: Callable)
remove_robot_to_robot_infrared_message_received_notify_listener(listener: Callable)
get_ambient_light_sensor_value(*, proc=Processors.PRIMARY)
stop_robot_to_robot_infrared_following(*, proc=Processors.SECONDARY)
start_robot_to_robot_infrared_evading(far_code, near_code, *, proc=Processors.SECONDARY)
stop_robot_to_robot_infrared_evading(*, proc=Processors.SECONDARY)
enable_color_detection_notify(enable, interval, minimum_confidence_threshold, *,
                              proc=Processors.PRIMARY)
add_color_detection_notify_listener(listener: Callable)
remove_color_detection_notify_listener(listener: Callable)
get_current_detected_color_reading(*, proc=Processors.PRIMARY)
enable_color_detection(enable, *, proc=Processors.PRIMARY)
configure_streaming_service(token, configuration, proc=None)
start_streaming_service(period, proc=None)
stop_streaming_service(proc=None)
clear_streaming_service(proc=None)
add_streaming_service_data_notify_listener(listener: Callable)

```

```
remove_streaming_service_data_notify_listener(listener: Callable)

enable_robot_infrared_message_notify(enable, *, proc=Processors.SECONDARY)

send_infrared_message(infrared_code, front_strength, left_strength, right_strength, rear_strength, *,
                      proc=Processors.SECONDARY)

add_motor_current_notify_listener(listener: Callable)

remove_motor_current_notify_listener(listener: Callable)

enable_motor_current_notify(enable, *, proc=Processors.SECONDARY)

get_motor_temperature(motor_index, *, proc=Processors.SECONDARY)

configure_sensitivity_based_collision_detection(method:
                                                SensitivityBasedCollisionDetectionMethods,
                                                level: SensitivityLevels, i, *,
                                                proc=Processors.SECONDARY)

enable_sensitivity_based_collision_detection_notify(enable, *,
                                                    proc=Processors.SECONDARY)

add_sensitivity_based_collision_detected_notify_listener(listener: Callable)

remove_sensitivity_based_collision_detected_notify_listener(listener: Callable)

get_motor_thermal_protection_status(*, proc=Processors.SECONDARY)

enable_motor_thermal_protection_status_notify(enable, *, proc=Processors.SECONDARY)

add_motor_thermal_protection_status_notify_listener(listener: Callable)

remove_motor_thermal_protection_status_notify_listener(listener: Callable)

set_bluetooth_name(name: bytes, *, proc=Processors.PRIMARY)

get_bluetooth_name(*, proc=Processors.PRIMARY)

get_bluetooth_advertising_name(*, proc=Processors.PRIMARY)

set_all_leds_with_32_bit_mask(mask, values, *, proc=Processors.PRIMARY)

set_compressed_frame_player_one_color(r, g, b, *, proc=Processors.PRIMARY)

save_compressed_frame_player_animation(animation_id, fps: int, fade_animation: bool,
                                       palette_colors, frames_indexes, *,
                                       proc=Processors.PRIMARY)

play_compressed_frame_player_animation(animation_id, *, proc=Processors.PRIMARY)

play_compressed_frame_player_frame(i, *, proc=Processors.PRIMARY)

get_compressed_frame_player_list_of_frames(*, proc=Processors.PRIMARY)

delete_all_compressed_frame_player_animations_and_frames(*, proc=Processors.PRIMARY)

pause_compressed_frame_player_animation(*, proc=Processors.PRIMARY)

resume_compressed_frame_player_animation(*, proc=Processors.PRIMARY)
```

```

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add_compressed_frame_player_animation_complete_notify_listener(listener: Callable)

remove_compressed_frame_player_animation_complete_notify_listener(listener: Callable)

assign_compressed_frame_player_frames_to_animation(s, i, i_arr, *, proc=Processors.PRIMARY)

save_compressed_frame_player_animation_without_frames(s, s2, z, s3, s_arr, i, *,
                                                    proc=Processors.PRIMARY)

play_compressed_frame_player_animation_with_loop_option(animation_id, loop, *,
                                                         proc=Processors.PRIMARY)

get_active_color_palette(*, proc=Processors.PRIMARY)

set_active_color_palette(rgb_index_bytes, *, proc=Processors.PRIMARY)

get_color_identification_report(red, green, blue, confidence_threshold, *,
                                proc=Processors.PRIMARY)

load_color_palette(palette_index, *, proc=Processors.PRIMARY)

save_color_palette(palette_index, *, proc=Processors.PRIMARY)

get_compressed_frame_player_frame_info_type(*, proc=Processors.PRIMARY)

save_compressed_frame_player16_bit_frame(i, i2, i3, i4, i5, *, proc=Processors.PRIMARY)

release_led_requests(*, proc=Processors.PRIMARY)

get_current_application_id(proc=None)

get_all_updatable_processors(*, proc=Processors.PRIMARY)

get_version_for_updatable_processors(*, proc=Processors.PRIMARY)

set_pending_update_for_processors(data, *, proc=Processors.PRIMARY)

get_pending_update_for_processors(*, proc=Processors.PRIMARY)

reset_with_parameters(strategy, *, proc=Processors.PRIMARY)

clear_pending_update_processors(data, *, proc=Processors.PRIMARY)

get_factory_mode_challenge(proc=None)

enter_factory_mode(challenge: int, proc=None)

exit_factory_mode(proc=None)

get_chassis_id(proc=None)

enable_extended_life_test(enable, *, proc=Processors.PRIMARY)

get_factory_mode_status(proc=None)

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property multi_led_control

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```


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