

# Cambrionix Hub API

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User Manual

# Cambrionix Hub API

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## 2. Introduction

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This manual describes the Cambrionix Hub API, which is used to control Cambrionix products. The Cambrionix Hub API resides in a locally installed daemon called 'CambrionixApiService'. This provides a programming interface to control Cambrionix units.

A Python wrapper is provided with a public domain JSON-RPC library that will allow scripts to be written without needing to be overly familiar with JSON. Alternatively, you may use the programming language of your choice to connect directly to the daemon over a standard TCP/IP socket and send and receive JSON formatted data. When the API is used to communicate with a remote network attached hub, this is done over an SSH tunnel.

The Cambrionix Hub API supports multiple simultaneous client connections to itself and supports concurrent access to numerous hubs.

The Cambrionix Hub API is implemented in CambrionixApiService, which sits between the application and the Cambrionix units. It maps the properties of the Cambrionix units into API commands.

You can download the latest version of this manual from our website at the following link.

[www.cambrionix.com/products/api](http://www.cambrionix.com/products/api)

### JSON-RPC library

The API uses JSON-RPC over TCP. JSON-RPC is a connection to JSON as a data format. JSON-RPC stands for 'JavaScript Object Notation Remote Procedure Call'. In short, JSON represents a lightweight format for data interchange. It is a format for structuring data that is easy to transfer.

Any programming language that supports JSON-RPC can be used; libraries are widely available for other languages.

## 2.1. Installation

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### macOS® Installation

For macOS®, an installer is provided that will set up CambrionixApiService to run as a daemon process. The service is configured to load on-demand when it's configured, the listening port is attached to by launchd.

The installation can also perform all necessary steps to configure any installed versions of Python 2 and 3 and direct you to various example scripts.

### Windows Installation

For Windows, a self-extracting installer is provided that will set up CambrionixApiService to run as a Windows service.

The installation can also perform all necessary steps to install and configure Python 2 and 3, and direct you to various example scripts.

### Linux Installation

The Linux® package comes as a Debian package which you can install either via the GUI or from the command line using apt:

```
sudo dpkg -i /Downloads/cambrionix-api-setup-?????????.deb
```

You can also set the API to run in a persistent mode which will then run when you reboot your system this can be achieved by using the following command

```
sudo /usr/bin/CambrionixApiService --install --persistent
```

An armhf version has also been tested on oDroid and Raspberry Pi.

We currently do not have support for rpm files; if you require assistance, then you can obtain more information from the page below.

<https://fedingo.com/how-to-convert-deb-to-rpm-files-in-linux/>

### USB Drivers

The USB drivers that are required to access Cambrionix hubs are included with most OS's by default.

These drivers are included in the installer and can be installed by selecting the optional component during installation. The option will not appear if the necessary drivers are already present. However, installation of these drivers does not complete until a Cambrionix charger is attached to the host machine. If you install the API and the USB drivers before the first time you connect a Cambrionix

charger, then the API will not start, and you will need to reboot the host machine after connecting a Cambrionix hub that will trigger the completion of the USB driver installation, to ensure that the API service is correctly started.

## 2.2. Prerequisites

Before using the Cambrionix Hub API, a few steps and checks need to be completed.

### Direct access to USB hardware

For the API to retrieve USB information from connected devices, it must have direct access to the hardware. This means that running in a Virtual machines (VM) such as Parallels, VirtualBox and Microsoft Hyper-V are not supported as the virtualisation prevents the API from determining which USB device is connected to which physical port. Also, it is not unusual that such a virtual environment will not have access to serial devices necessary to communicate with the hub to query information.

### Thunderbolt™ with Windows

You may need to update your Thunderbolt™ Bus Drivers and possibly the BIOS on Windows. Once the Thunderbolt™ device has been accepted to connect, you may need to turn it off and on again for Windows to connect physically

### Sync capable charger for USB information

For the API to return USB device information such as the VID, PID, Manufacturer, Description or Serial Number, there must be a USB connection from the host machine to the connected device. This is only present on sync-capable products. Charge-only products have a USB connection to the charger but not to connected devices. The API is functional with charge-only chargers but cannot return the USB device information.

### Version for universal firmware products

When used with this API, products using the universal firmware must have firmware version 1.52 or later installed. We recommend that the latest version is installed available from our website or through Cambrionix Connect; a table of all products and the firmware used is below.

Firmware	Part Number	Product Name
Universal	PP15S	PowerPad15S
Universal	PP15C	PowerPad15C
Universal	PP8S	PowerPad8S
Universal	SS15	SuperSync15
Universal	TS3-16	ThunderSync3-16
SMART	TS3-C10	ThunderSync3-C10
Universal	U16S Spade	U16S Spade
Universal	U8S	U8S
PDSync	PDSync-C4	PDSync-C4
Universal	ModIT-Max	ModIT-Max
Motor Control	Motor control board	ModIT-Max

## USB drivers

The Cambrionix Hub API daemon (CambrionixApiService) must be able to communicate with the local hub. The hub will appear as a USB device. The USB device will be accompanied by a virtual communications port (VCP). The virtual communications operates like a standard serial communications port, or COM port as it is often called. The operating system must have the appropriate VCP (Virtual COM Port) driver installed.

Linux®	macOS	Windows
The default support in the kernel is sufficient. Do not install the D2XX drivers as this conflicts with the required VCP drivers.	The default support in OS is sufficient. Do not install the D2XX drivers as this conflicts with the required VCP drivers.	The D2XX support can coexist with the VCP support. These drivers are automatically installed on newer versions of Windows 10.



## 3. Quick start

Some example scripts in Node.JS, C#, VB.Net, and Python are included with the installed files. For Python, we recommend using the newer asyncio example rather than the older synchronous examples.

- Windows: %ProgramFiles%\Cambrionix\CambrionixAPI/examples
- Linux: /usr/local/share/cambrionix/apiservice/examples.
- macOS: /Library/Cambrionix/ApiService/examples.

For each code type in the examples folder you will need to install the necessary programs.

- Python 3.4 for the python examples, as well as Python 3.4, you will need the jsonrpc-websocket module. Reference information on using Python can be found [here](#).
- Node.JS for the nodejs example, will also require either NPM or Yarn. More information can be found [here](#).
- Visual Studio for the C# or VB.Net examples

To install the Python async api package go to examples/python/asyncio and run

```
pip install .
```

### 3.1. Python Example

The jsonrpc-websocket module automatically converts python script to a JSON-RPC request. The below example is how the websocket will convert a simple script.

Python.

```
cbrxapi.cbrx_connection_open("DJ000102")
```

JSON-RPC Translation.

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_open",
  "params": [
    "DJ000102"
  ]
}
```

Replies are automatically converted back from JSON into a Python dictionary, or list or value as appropriate.

Here is an example of using the API, the code is written in Python 3.6: The example code doesn't check for errors so the Python script will simply stop on an error. Robust code error handling should be incorporated in your own software.

```
# Import the cbrxapi library.
import sys
from cbrxapi import cbrxapi

print("Querying API Version...")
try:
    result = cbrxapi.cbrx_apiversion()
except Exception as e:
    print(f"Could not communicate with API : {e}")
    result = None

if result:
    print(f"API Version {result[0]}.{result[1]}")

# Call cbrx_discover with "local" to find any locally attached Cambrionix units.
# This will return a list of local Cambrionix units.
print("Discovering local devices..")
result = cbrxapi.cbrx_discover("local")
if not result or len(result) == 0:
    print("No Cambrionix unit found.")
    sys.exit(0)

print(f"Discovered {len(result)} units")

for unit_id in result:
    serial_port = cbrxapi.cbrx_discover_id_to_os_reference(unit_id)

    try:
        # Open a connection to the Cambrionix unit, which will return a handle for
        # the connection.
        handle = cbrxapi.cbrx_connection_open(unit_id)
    except Exception as e:
        print(f"Could not open connection to {unit_id} : {e}")
        handle = None

    if handle:
        # Using the handle, get the "Hardware" and "nrOfPorts" properties
        hardware = cbrxapi.cbrx_connection_get(handle, "Hardware")
        n_ports = cbrxapi.cbrx_connection_get(handle, "nrOfPorts")

        # Done using the Cambrionix unit, close the handle.
        cbrxapi.cbrx_connection_close(handle)

        # Finally, print out the information retrieved from the Cambrionix unit.
        print(f"* {hardware} on {serial_port} has {n_ports} ports")
```

## 3.2. TypeScript Example

This is a simple example of using TypeScript to use the API to obtain information on the hubs and devices. Further information on TypeScript can be found [here](#).

```
import React from 'react';
import WebSocket from 'react-websocket';

class MyApiInterface extends React.Component {
    lastId = 0;

    render() {
```

```

    return (
      <Websocket ref={r => this.websocket = r} reconnect
        url="ws://localhost:43424" protocol="jsonrpc"
        onMessage={this.onDataReceived.bind(this)}
        onOpen={this.onApiConnection.bind(this)}
        onClose={this.onApiDisconnection.bind(this)} />
    );
  }

  requests = {};

  onDataReceived(json) {
    const data = JSON.parse(json);
    const id = data.id;
    if (id) {
      const request = this.requests[id];
      if (request && request.callback) {
        request.callback(data);
      }
      delete this.requests[id];
    }
    else
    {
      //Could get a notification here if you enable them on active connection
      //Notifications have no id and can arrive at any time
    }
  }

  makeRequest(method, params, callback) {
    var packet = {
      jsonrpc: "2.0",
      id:      ++this.lastId,
      method:  method,
      params:  params,
    };

    this.requests[packet.id] = {packet: packet, callback: callback};

    this.websocket.sendMessage(JSON.stringify(packet));
  }

  onApiConnection() {
    console.log("Connected");
    this.makeRequest("cbrx_discover", ["local"], console.log);
  }

  onApiDisconnection() {
    console.log("Disconnected");
    this.requests = {}
  }
}

```

### 3.3. HTTP GET Example

Connections can be made directly to an http prefixed URI, in which case the json is extracted from either the address itself, or the body content of the GET request. You can try this example in your browser or from the command line, using curl:

```
curl -get http://localhost:43424/?{"id":0,"jsonrpc":"2.0","method":"cbrx_discover","params":["all"]}
```

Socket connections can be simple binary data, http GET requests or Web-sockets (such as from Node.js). For example, pasting the following into the address bar of your browser should allow you to see quick results:

```
http://localhost:43424/?{"jsonrpc":"2.0","id":1,"method":"cbrx_discover","params":["all"]}
```

Please be aware that on some Terminal/Command Prompt windows, you may find that you need to encode the URL to prevent error's from occurring. Once encoded, the above URL should look like:

```
http://localhost:43424/%7B%22jsonrpc%22:%222.0%22,%22id%22:0,%22method%22:%22cbrx_apidetails%22%7D
```

## 3.4. Error Handling

A JSON-RPC error will return an error member containing the following members:

- **code (mandatory)** – an integer indicating either a pre-defined JSON-RPC error code in the range -32768 to -32000 or a CBRXAPI error code as documented in the section CBRXAPI specific errors section.
- **message (optional)** – a message string explaining the error code
- **data (optional)** – extra information about the error like debug messages or handles.

The Python JSON-RPC used causes an exception for an error response with the following mapping:

- member code is returned in `e.error_code`
- member message is returned in `e.error_message`
- member data is returned in `e.error_data`.

You can catch an error response with:

```
try:
    handle = cbrxapi.cbrx_connection_open(id)
except jsonrpc.RPCFault as e:
    gotException = True
    errorCode = e.error_code
    errorMessage = e.error_message
    errorData = e.error_data
```

Example of how to create an error and the response it will give:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_open",
  "params": [
    "0"
  ]
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "error": {
    "code": -10001,
    "message": "ID not found"
  }
}
```

## 4. API call structure

The descriptions of the API calls contain JSON-RPC requests / responses as you would see them on the wire.

### 4.1. JSON-RPC request object

JSON-RPC is a stateless, light-weight remote procedure call (RPC) protocol. A JSON-RPC is represented by sending a Request object. The Request object has the following members:

#### jsonrpc

A String specifying the version of the JSON-RPC protocol. MUST be exactly "2.0".

#### id

An identifier established by the Client that MUST contain a String, Number, or NULL value if included. If it is not included it is assumed to be a notification.

#### method

A String containing the name of the method to be invoked.

#### params

A Structured value that holds the parameter values to be used during the invocation of the method. This is not required for every method

Grouping this all together will give the complete JSON-RPC request:

```
{
  "jsonrpc": "version",
  "id": 0,
  "method": "method-name",
  "params": [
    "structured-params"
  ]
}
```

### 4.2. JSON-RPC response object

When a rpc call is made, there will be a Response, except for in the case of Notifications. The Response is expressed as a single JSON Object, with the following members:

#### jsonrpc

A String specifying the version of the JSON-RPC protocol. MUST be exactly "2.0".

## id

This member is the same as the value of the id member in the Request Object.

## result

The value of this member is determined by the method in the Request object.

## error

This member is returned only on error.

Grouping this all together will give the complete JSON-RPC response:

```
{
  "jsonrpc": "version",
  "id": 0,
  "result": "method-result"
}
```

## 4.3. JSON-RPC error object

When a call encounters an error, the Response Object will contain the error member with a value that is an Object with the following members:

### code

A Number that indicates the error type that occurred. This is an integer.

### message

A String providing a short description of the error.

### data

A Primitive or Structured value that contains additional information about the error.

Grouping this all together will give the complete JSON-RPC response:

```
{ "jsonrpc": "version", "id": 0, "error": { "code": "error-code",
  "message": "error-message" } }
```

## 4.4. Calls within this manual

This part has been removed from the Syntax and Return sections throughout this manual to simplify the documentation.

Two further key-value pairs need to be passed to complete the JSON-request; One indicating the version of JSON-RPC being used, in this case 2.0 and an id identifying this request:

The id is mandatory but only relevant if multiple requests can be outstanding simultaneously over the same connection. It helps to match responses to (asynchronous) requests. The response for a request will be given the matching id by CambrionixApiService.

```
{  
  "jsonrpc": "2.0",  
  "id": 0  
}
```



## 5. API Methods

There are 3 groups of calls in the API:

- Version - Obtain details about the API
- Discovery - Obtain details about what is connected to the API
- Connection - Manage connections and devices connected

### Version

API Call	Description
<a href="#">cbrx_apiversion</a>	Obtain the version of the API
<a href="#">cbrx_apidetails</a>	Obtain an enhanced version of the details of the API

### Discovery

API Call	Description
<a href="#">cbrx_discover</a>	Discover Cambrionix units
<a href="#">cbrx_discover_id_to_os_reference</a>	Map a unit ID from unit to device as used by the OS
<a href="#">cbrx_find</a>	Search for devices attached to local Cambrionix units
<a href="#">cbrx_get_usb (tree)</a>	Return the entire USB tree that has been discovered
<a href="#">cbrx_get_usb (descriptors)</a>	Request entire dump of a USB device's descriptor information
<a href="#">cbrx_config_set</a>	Set configuration options

### Connection

API Call	Description
<a href="#">cbrx_certificate</a>	Manage certificates and private keys to the API
<a href="#">cbrx_connection_open</a>	Open a connection to a hub
<a href="#">cbrx_connection_close</a>	Close an open connection to a hub
<a href="#">cbrx_connection_getdictionary</a>	Get all keys on a hub specified by the connectionHandle.
<a href="#">cbrx_connection_get</a>	Get a key from a hub specified by connectionHandle
<a href="#">cbrx_hub_get</a>	Get a key from a hub specified by hubs serial number

API Call	Description
<a href="#">cbrx_device_get</a>	Get a key from a hub specified by USB device's serial number
<a href="#">cbrx_connection_setdictionary</a>	List all writeable and command keys for the hub specified by connectionHandle
<a href="#">cbrx_connection_set</a>	Set a key to the value specified on a hub specified by connectionHandle
<a href="#">cbrx_hub_set</a>	Set a key to the value specified on a hub specified by hubs serial number
<a href="#">cbrx_notifications</a>	Send notifications
<a href="#">cbrx_firmware</a>	Add or remove firmware files
<a href="#">cbrx_connection_closeandlock</a>	Close all connections to a hub and lock it
<a href="#">cbrx_connection_unlock</a>	Unlock a hub that was previously locked.
<a href="#">cbrx_connection_cli</a>	Perform command line interface operation
<a href="#">cbrx_pair_device</a>	Initiaite pairing of an iOS device
<a href="#">cbrx_exit</a>	Restart the API

## 5.1. cbrx\_apidetails

Returns an enhanced version of the details of the API. This information can also be gained by passing an optional true parameter to cbrx\_apiversion.

**Syntax:** see Calls within this manual

```
{
  "method": "cbrx_apidetails"
}
```

**Returns:**

```
{
  "result": {
    "version": [version-number],
    "semver": "semver-variant",
    "commitid": commitid-number,
    "branch": "branch-name",
    "capability": [API-capability],
    "notifications": [possible-notification],
    "install": "install-location",
    "logging": "logs-location",
    "settings": "settings-location",
    "documentation": "documentation-location",
    "cpu": {
      "brand": "brand-information",
      "arch": "CPU-architecture",
      "features": [CPU-features],
      "cores": cores-value
    },
    "os": "OS-information"
  }
}
```

Output	Description
<i>version-number</i>	Version number of API as an integer (Major,Minor,Revision,Build)
<i>semver-variant</i>	The full name of the API version
<i>commitid-variant</i>	The number value of the Commit ID
<i>branch-name</i>	The branch of API installed
<i>API-capability</i>	available with version of API

Output	Description
<i>possible-notification</i>	Array of strings to show possible notification. see <a href="#">API Notifications</a>
<i>install-location</i>	The location of install files
<i>logs-location</i>	The location of where logs are stored
<i>settings-location</i>	The location of API settings
<i>documentation-location</i>	The web address of API documentation
<i>brand-information</i>	The brand of the CPU
<i>CPU-architecture</i>	The architecture of the CPU
<i>CPU-features</i>	Features available on CPU
<i>cores-value</i>	How many cores the CPU has
<i>os-information</i>	Operating system running on local machine

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_apidetails"
}
```

Example Successful response

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "version": [
      3,
      7,
      0,
      34
    ],
    "semver": "3.7.0+34",
    "guid": {
      "id": "d0dc3cac-e165-4e38-88bb-39064431bdc9",
      "computerId": "35aea4bc-44d3-4e9e-9b3c-c33b965c5639"
    },
    "host": [
      {

```

```

    "ip": "10.167.111.81",
    "port": 0,
    "nameServer": "10.167.111.241",
    "domainName": "CBRX.LOCAL",
    "hostName": "CBRXPC-011",
    "adapterName": "Intel(R) Ethernet Controller (3) I225-V",
    "adapterType": "Ethernet"
  }
],
"commitid": 4287981321,
"branch": "release",
"capability": [
  "protobuf",
  "crash-report",
  "notification"
],
"notifications": [
  "usb-changed",
  "usb-device-attached",
  "usb-device-detached",
  "discover-changed",
  "dead-hub-changed",
  "firmware-progress",
  "rfid-received",
  "rfid-removed",
  "over-temperature",
  "over-voltage",
  "under-voltage",
  "certificate-changed"
],
"install": "C:\\Program Files\\Cambrionix\\API",
"logging": "C:\\ProgramData\\Cambrionix\\Log",
"settings": "C:\\ProgramData\\Cambrionix",
"documentation": "C:\\Program Files\\Cambrionix\\API\\Cambrionix Hub API Reference.html",
"cpu": {
  "brand": "12th Gen Intel(R) Core(TM) i9-12900K",
  "arch": "x64",
  "features": [
    "aes",
    "avx",
    "avx2",
    "bmi1",
    "bmi2",
    "clflushopt",
    "clflush",
    "clwb",
    "cx16",
    "cx8",
    "erms",
    "f16c",
    "fma3",
    "fpu",
    "mmx",
    "movbe",
    "pclmulqdq",
    "popcnt",
    "rdrnd",
    "rdseed",
    "sha",
    "smx",
    "ss",

```

```
        "sse",
        "sse2",
        "sse3",
        "sse4_1",
        "sse4_2",
        "ssse3",
        "tsc",
        "vaes",
        "vpclmulqdq"
    ],
    "cores": 24
},
"os": "Windows 10 Pro 21H2 Build 19044.1889 64-bit"
}
```

## 5.2. cbrx\_apiversion

---

Return the version of the API running.

**Syntax:** See [Calls within this manual](#)

```
{
  "method": "cbrx_apiversion"
}
```

There is another method which can be used, see [cbrx\\_apidetails](#) for more information.

**Returns:**

```
{
  "result": [Version-number]
}
```

*Version-number* consists of two numbers separated by commas. The leftmost number is called the major, The rightmost number is called the minor.

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_apiversion"
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [
    3,
    7
  ]
}
```



## 5.3. cbrx\_certificate

---

Supply (or remove) a certificate and private key to the API to allow SSL connections from outside of localhost (the machine the API is running on). Without this certificate, the API will only listen for connections on localhost:43424. Once a valid certificate and private key are provided, this will change to 0.0.0.0:43424. External connections (not from localhost) will only be allowed if they are SSL connections (HTTPS or Secure WebSockets).

The API does not make a copy of the certificate or private key as this could violate security if they are in limited access folders. The user that the API is running as will need access to the files to be able to use them. This is all tested when the "set" command is issued and should provide sufficient error information if it does not work.

It is up to the user to supply a certificate that is suitable for their usage. For example, if it is not signed by a certificate authority, then you will need to deal with this in the usual way, such as signing your certificate with your own certificate authority and adding that to your application or browser.

With Google Chrome you can use this [guide](#).

With Firefox you can use this [guide](#).

With Safari you can use this [guide](#).

for other browsers there are guides that can be found online.

Only a single certificate configuration is supported. If a password is supplied, it is obfuscated for security.

## 5.4. cbrx\_certificate (set)

Supply a certificate and private key to the API.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_certificate",
  "params": [
    "set", {
      "private-key": key-filename,
      "certificate": certificate-filename,
      "password": password
    }
  ]
}
```

Parameter	Description
<i>key-filename</i>	The filename including the path of the private key
<i>certificate-filename</i>	The filename including the path of the certificate
<i>password</i>	optional password if required by private key

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Notes

- The files will need to be stored in a location that is accessible by the system and API.

### Examples

Example JSON-RPC request:

```
{
```

```
"jsonrpc": "2.0",
"id": 0,
"method": "cbrx_certificate",
"params": [
  "set",
  {
    "private-key": "C:\\git\\capi\\cbrxjson\\certificate\\key.pem",
    "certificate": "C:\\git\\capi\\cbrxjson\\certificate\\cert.pem"
  }
]
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## 5.5. cbrx\_certificate (remove)

---

Remove the certificate and private key from the API:

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_certificate",
  "params": ["remove"]
}
```

**Returns:**

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_certificate",
  "params": [
    "remove"
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## 5.6. cbrx\_certificate (get)

Get the supplied certificate and private key information from the API.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_certificate",
  "params": "get"
}
```

### Returns:

```
"result": {
  "certificate": "Certificate",
  "subject": {
    "C": "Country",
    "L": "Location",
    "O": "Organisation",
    "CN": "Common name"
  },
  "issuer": {
    "C": "Country",
    "O": "Organisation",
    "CN": "Common name"
  },
  "serial_number": "Serial number",
  "algorithm": "Algorithm",
  "extensions": {
    "subjectAltName": [Alternative names]
  },
  "validity": {
    "not_after": Vaild until,
    "not_before": Valid from
  }
}
```

Variable	Description
<i>Certificate</i>	The public certificate in its entirety
<i>Country</i>	Country code
<i>Location</i>	Specific Location company is registered
<i>Organisation</i>	The organisations name
<i>Common name</i>	The name the organisation is referred to in the certificate

Variable	Description
<i>Serial number</i>	Used to uniquely identify the certificate within a CA's systems
<i>Algorithm</i>	This contain a hashing algorithm and a digital signature algorithm. For example "sha256RSA" where sha256 is the hashing algorithm and RSA is the signature algorithm
<i>Alternative names</i>	All name associated with the certificate
<i>Valid until</i>	The time and date past which the certificate is no longer valid
<i>Valid from</i>	The earliest time and date on which the certificate is valid

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_certificate",
  "params": "get"
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "certificate": "-----BEGIN CERTIFICATE-----\r\D....CF7ig==\r\n-----END\nCERTIFICATE-----\r\n",
    "subject": {
      "C": "GB",
      "L": "Cambridge",
      "O": "Cambrionix Limited",
      "CN": "*.api.cambrionix.com"
    },
    "issuer": {
      "C": "US",
      "O": "DigiCert Inc",
      "CN": "DigiCert TLS RSA SHA256 2020 CA1"
    },
    "serial_number": "096...9BFBE",
    "algorithm": "sha256WithRSAEncryption",
    "extensions": {
```

```
    "subjectAltName": [  
      "*.api.cambrionix.com",  
      "api.cambrionix.com"  
    ],  
    "validity": {  
      "not_after": 169...99,  
      "not_before": 16...400  
    }  
  }  
}
```

## 5.7. cbrx\_config\_set

This function allows setting persistent configuration options. Multiple configuration keys can be set at once as the Example below shows.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_config_set",
  "params": {
    "configuration-key": configuration-value
  }
}
```

Parameter	Description
<i>configuration-key</i>	The configuration key you wish to change, as per table below.
<i>configuration-value</i>	The value you wish to change the configuration to.

Configuration-key	Description
adb_path	The full pathname to the ADB executable from Android™ Developer Tools.
battery-update-enabled	Will the battery update be performed at all.
battery-updated-concurrency	How many concurrent battery updates will be run simultaneously.
battery-update-frequence-seconds	How many seconds between battery updates.

**Returns:**

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:



```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_config_set",
  "params": {
    "battery-update-enabled": true,
    "battery-update-concurrency": 2,
    "battery-update-frequency-seconds": 60
  }
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## 5.8. cbrx\_connection\_cli

Perform command line interface operation on the connected hub and return the complete result. This allows you to run commands directly on the hub's command line without stopping the API service. This method is only for using the CLI commands to obtain information and not update settings, if you wish to change the internal hub settings please use the [Settings](#) command.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_cli",
  "params": [
    connection-handle
    cli-command
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>cli-command</i>	The CLI command you wish to send. For all CLI commands see the CLI Documentation <a href="http://www.cambrionix.com/cli">www.cambrionix.com/cli</a>

### Returns:

```
{
  "result": [cli-response]
}
```

*cli-response* is an array of strings containing all the lines of output returned from the command. For more information see [www.cambrionix.com/cli](http://www.cambrionix.com/cli)

## Examples

### Example JSON-RPC request

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_cli",
  "params": [
    7654,
    "id"
  ]
}
```

### Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": ["mfr:cambrionix,mode:main,hw:PP15S,hwid:0x13,fw:1.83,bl: 0.12,s-
n:000000,group:-,fc:un"]
}
```

## 5.9. cbrx\_connection\_close

---

Close a connection to a hub previously opened, as specified by the connection handle.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_close",
  "params": [connection-handle]
}
```

*connection-handle* is the [The Connection handle](#) as an integer

**Returns:**

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_close",
  "params": [
    7654
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## 5.10. cbrx\_connection\_closeandlock

Close all connections to a hub and lock it against further use until released by `cbrx_connection_unlock`. Other processes that were using these connections will get errors returned if trying to access this hub.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_closeandlock",
  "params": [hub-id]
}
```

*hub-id* is a string which is the serial number of the hub, each string is guaranteed to be unique.

**Returns:**

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_closeandlock",
  "params": [
    "DB0074F5"
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## 5.11. cbrx\_connection\_get

From the hub specified by the connection handle, get the key value.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "dictionary-key"
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>dictionary-key</i>	as returned by a call to <a href="#">cbrx_connection_getdictionary</a> see <a href="#">Get Dictionary</a> for more information

**Returns:**

```
{
  "result": [dictionary-value]
}
```

*dictionary-value* is the value of the dictionary key, see [Get Dictionary](#) for more information.

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_get",
  "params": [
    569,
    "nrOfPorts"
  ]
}
```

Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": 10  
}
```

## 5.12. cbrx\_connection\_getdictionary

Get all keys that can return information on the hub specified.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_getdictionary",
  "params": [connection-handle]
}
```

*connection-handle* is the [Connection handle](#) as an integer

**Returns:**

```
{
  "result": [dictionary]
}
```

*dictionary* is an array of strings containing the names of the keys and values for the device. Please see [Get Dictionary](#) section.

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_getdictionary",
  "params": [
    7654
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [dictionary]
}
```



*dictionary* is an array of strings containing the names of the keys and values for the device. Please see [Get Dictionary](#) section.

## 5.13. cbrx\_connection\_open

Open a connection to the hub specified. A successful open results in a connection handle that can be used for further calls.

**Syntax:** see Calls within this manual

```
{
  "method": "cbrx_connection_open",
  "params": [
    hub-id ,
    location
  ]
}
```

Parameters	Description
<i>hub-id</i>	This is the serial number of the hub returned from <a href="#">cbrx_discover</a>
<i>location</i>	see below table, if not included will default to local

Location parameter	Description
local	connect to the local hub
docks	connect to a hub in a <a href="#">Docks</a> the id must be specified which can be found from <a href="#">cbrx_discover</a>

**Returns:**

```
{
  "result": [connection-handle]
}
```

*connection-handle* is the [Connection handle](#) as an integer

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_open",
  "params": [
    "DB0074F5"
  ]
}
```

**Example successful response:**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 579
}
```

## 5.14. cbrx\_connection\_set

On the hub specified by the connection handle, set the key value. Calls to a dock will result in the relevant key being set on both the chargers except for the port specific keys which will be directed to the appropriate charger only.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "dictionary-key",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>dictionary-key</i>	as returned by a call to <a href="#">cbrx_connection_setdictionary</a> see <a href="#">Set Dictionary</a> for more information
<i>Value</i>	The value you wish to set the key too

**Returns:**

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    5313,
```

```
    "TwelveVoltRail.OverVoltage",  
    true  
  ]  
}
```

Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": true  
}
```

## 5.15. cbrx\_connection\_setdictionary

List all writeable value keys and command keys for the hub specified by [Connection handle](#).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_setdictionary",
  "params": [connection-handle]
}
```

*connection-handle* is the [Connection handle](#) as an integer

**Returns:**

```
{
  "result": [dictionary]
}
```

*dictionary* is an array of strings containing the names of the writeable keys and command keys for the device. Please see [Set Dictionary](#) section.

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_setdictionary",
  "params": [
    7654
  ]
}
```

Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": [dictionary]  
}
```

For *dictionary* please see [Set Dictionary](#) section

## 5.16. cbrx\_connection\_unlock

---

Unlock a hub that was previously locked.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_unlock",
  "params": [hub-id]
}
```

*hub-id* is a string which is the serial number of the hub, each string is guaranteed to be unique.

**Returns:**

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

Example JSON-RPC request

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_unlock",
  "params": [
    "DB0074F5"
  ]
}
```



Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": true  
}
```

## 5.17. cbrx\_device\_get

From the hub specified by the serial number, get the key value. similar to [cbrx\\_connection\\_get](#) Only get values that are relevant to ports are accepted.

Note that this is slower then other methods if you need to do multiple operations on the same device.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_device_get",
  "params": [
    device-id,
    dictionary-key
  ]
}
```

Parameter	Description
<i>device-id</i>	Device Serial number
<i>dictionary-key</i>	as returned by a call to <a href="#">cbrx_connection_getdictionary</a> see <a href="#">Get Dictionary</a> for more information

**Returns:**

```
{
  "result": [dictionary-value]
}
```

*dictionary-value* is the key value that is specified see [Get Dictionary](#) for more information.

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_device_get",
```

```
"params": [  
  "0000802000184C390CD2002E",  
  "USBSpeed"  
]
```

Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": "High"  
}
```

## 5.18. cbrx\_discover

Discover Cambrionix units, obtain hub serial number.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_discover",
  "params": [unit]
}
```

Unit parameter	Description
local	Unit ID for hub attached
docks	Unit IDs for multiple hubs connected together and attached

**Returns:**

```
{
  "result": [hub-id]
}
```

*hub-id* is a string which is the serial number of the hub, each string is guaranteed to be unique.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_discover",
  "params": [
    "local"
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [
    "000000897FD0505A"
  ]
}
```

## 5.19. cbrx\_discover ("all")

Discover all units and return detailed information about the hubs and their connected devices. Note that only devices that show up in a USB scan will be included. Unlike the other discovery methods, instead of an array of serial numbers, it will be an object of serial numbers with contents.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_discover",
  "params": ["all"]
}
```

**Returns:**

```
{
  "result": {
    "hub-id":
    {
      "Status": "status",
      "Manufacturer": "manufacturer-name",
      "Firmware": "firmware-version",
      "Bootloader": "bootloader-version",
      "SerialNumber": "hub-id",
      "Group": "group-order",
      "FormFactor": "firmware-type",
      "PanelID": hardware-id,
      "Hardware": "product-name",
      "HostSerialPort": "serial-port",
      "USBVersion": usb-version,
      "LocationID": location-ID,
      "nrOfPorts": port-quantity,
      "ExtPSU": external-PSU,
      "Uptime_sec": runtime,
      "Rebooted": reboot-flag,
      "SyncSupported": sync-possible,
      "FiveVolt": 5V-present,
      "TwelveVolt": 12V-present,
      "TemperatureMonitoring": temp-possible,
      "HardwareFlags": "hardware-flags",
      "Devices": {device-string}
    }
  }
}
```

Output	Description
<i>hub-id</i>	This is the serial number of the hub returned from <a href="#">cbrx_discover</a>
<i>status</i>	whether there is a serial port open, see <a href="#">Status</a>
<i>manufacturer-name</i>	Defined name of manufacturer, Default is 'Cambrionix'
<i>firmware-version</i>	Version number of the firmware. Format 'N.nn'
<i>bootloader-version</i>	Version number of the bootloader. Format 'N.nn'
<i>group-order</i>	Used to order hubs which is useful when updating connected products so that down-stream products are updated and rebooted first.
<i>firmware-type</i>	Used to denote which firmware the product accepts
<i>hardware-id</i>	hardware ID number of front panel product
<i>product-name</i>	Hardware name of product
<i>serial-port</i>	The <a href="#">Serial port</a> the product is connected to.
<i>usb-version</i>	The USB version number of the connection to the hub. Format 'N.nn'
<i>location-ID</i>	The <a href="#">Location ID</a> as an Integer
<i>port-quantity</i>	How many ports the product has
<i>external-psu</i>	Whether the product has an external power supply unit
<i>runtime</i>	How long the product has been powered (in ms). No limit
<i>reboot-flag</i>	Whether the reboot flag is true or false
<i>sync-possible</i>	Whether the product is capable of sync. true or false
<i>5V-present</i>	Whether the product has 5V supplied. true or false
<i>12V-present</i>	Whether the product has 12V supplied. true or false
<i>temp-possible</i>	Whether the product is can of monitor temperature. true or false
<i>hardware-flags</i>	Hardware flags as detailed in <a href="#">Get Dictionary</a>
<i>device-string</i>	Information from connected devices, see <a href="#">Device string</a>

## Example

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_discover",
  "params": [
    "all"
  ]
}
```

**Example successful response:**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "000000897FD0505A": {
      "Status": "active",
      "Manufacturer": "cambrionix",
      "Firmware": "1.88.0",
      "Bootloader": "0.21",
      "SerialNumber": "000000897FD0505A",
      "Group": "-",
      "FormFactor": "un",
      "PanelID": 48,
      "Hardware": "SuperSync15",
      "HostSerialPort": "COM3",
      "USBVersion": 2.1,
      "LocationID": 574750720,
      "USB3CompanionLocationID": 2723151872,
      "HostPortLocationID": 574771200,
      "nrOfPorts": 15,
      "ExtPSU": true,
      "Uptime_sec": 167551,
      "Rebooted": true,
      "SyncSupported": true,
      "FiveVolt": true,
      "TwelveVolt": true,
      "TemperatureMonitoring": true,
      "HardwareFlags": "SLET",
      "Devices": {}
    }
  }
}
```

## 5.20. cbrx\_discover\_id\_to\_os\_reference

Map a unit ID for a discovered hub to a device name as used by the OS. This can only be used for locally attached Cambrionix products.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_discover_id_to_os_reference",
  "params": "[hub-id]"
}
```

*hub-id* is a string which is the serial number of the hub, each string is guaranteed to be unique.

**Returns:**

```
{
  "result": ["device-name"]
}
```

*device-name* is what the OS uses for the connection that the hub which is identified by the *hub-id*. For more information please see [Serial port](#)

**Example:**

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_discover_id_to_os_reference",
  "params": [
    "DB0074F5"
  ]
}
```



Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": "COM9"  
}
```

## 5.21. cbrx\_exit

---

Restart the API.

**Syntax:** See Calls within this manual

```
{
  "method": "cbrx_exit"
}
```

**Returns:**

```
{
  "result": true
}
```

**Errors**

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

**Examples**

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_exit"
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## 5.22. cbrx\_find

Search for devices attached to local Cambrionix units.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_find",
  "params": [ID]
}
```

*ID* can be any of the following forms:

ID Paramater	Description
VID	Search for any devices matching the vendor ID. Displayed as an Integer
VID & PID	Search for devices exactly matching the vendor and product IDs. Displayed as an Integer
NAME	Search for anything that matches the provided regex. The regex is run against a string made up of the manufacturer, product name, USB serial number and DeviePath (For an iPhone this is the UDID). "<manufacturer-name>\x1D<product-name>\x1D<serial-number>". The regex is performed as a search, rather than a match, so you do not need to do things like ".*iPhone.*" to match substrings; "iPhone" is sufficient. You can be as strict as you like. Additionally, if the phone's identity or internal serial number have been detected, then these will also be matched.

**Returns:**

```
{
  "result": {
    "device-id": {
      "HostDevice": "hub-id",
      "HostPort": device-port,
      "HostDescription": "product-name",
      "HostSerial": "serial-port",
      "Device": ["device-string"]
    }
  }
}
```

Output	Description
<i>device-id</i>	The serial number of the device

Output	Description
<i>hub-id</i>	This is the serial number of the hub returned from <a href="#">cbrx_discover</a>
<i>device-port</i>	Port number of the hub the device is attached too
<i>product-name</i>	Hardware name of product
<i>serial-port</i>	The <a href="#">Serial port</a> the product is connected to.
<i>device-string</i>	Information from connected devices, see <a href="#">Device string</a>

The returned data is keyed on the serial number of any devices matching the search criteria. The value of each node holds details of the location and the exact device details.

The entire USB tree is searched for the specified items, and if found anywhere beneath a Cambrionix hub, then the connection details will be returned. This would be especially useful for devices that are plugged into an intermediate hub device rather than being directly connected to the Cambrionix hub, such as a phone with battery extended and extra USB slots.

For any search results that do not have their own device serial number, there will be an additional entry of NoSerial that is an array of such results, see information in below example.

## Example

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_find",
  "params": [
    "i (Phone|Pad) "
  ]
}
```

Example successful response

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "974a9d1e6848316264a8a9d8b094b7d5e63a7ae5": {
      "HostDevice": "60003",
      "HostPort": 2,
      "HostDescription": "TS3-C10",
      "Device": {
        "VID": 1452,
        "PID": 4779,
        "Manufacturer": "Apple Inc.",
        "Description": "iPad",
        "SerialNumber": "974a9d1e6848316264a8a9d8b094b7d5e63a7ae5",
        "DeviceType": "Apple",

```

```

    "LocationID": 856686592,
    "DevicePath": "\\?\\usb#vid_1234&pid_5678#{a5dcbf10-653004fb951ed}",
    "USBVersion": 2,
    "USBPower": {
      "State": "D0",
      "Description": "On"
    },
    "USBSpeed": {
      "Speed": "480Mbps",
      "Description": "High"
    },
    "Endpoints": {
      "Active": 6,
      "Maximum": 8,
      "Memory": 32768
    },
    "Battery": {
      "DataSource": "imobiledevice",
      "TrustLevel": "paired",
      "PairingSupported": true,
      "CurrentLevel": 100,
      "CurrentTime": 1663145986,
      "StartingLevel": 100,
      "StartingTime": 1663145986,
      "CapacityNew": 11560,
      "Capacity": 11441,
      "ChargingStatus": "full",
      "HealthPercent": 98
    },
    "PhoneSerialNumber": "DLXKJ4QAF182",
    "PhoneIdentity": "iPad",
    "MacAddress": "60:fe:c5:b1:98:8c",
    "PhoneSoftwareVersion": "10.3.3"
  }
},
"8b2f4103b3b74117c5bc7ca57829cb0daedcad19": {
  "HostDevice": "60003",
  "HostPort": 1,
  "HostDescription": "TS3-C10",
  "Device": {
    "VID": 1452,
    "PID": 4779,
    "Manufacturer": "Apple Inc.",
    "Description": "iPad",
    "SerialNumber": "8b2f4103b3b74117c5bc7ca57829cb0daedcad19",
    "DeviceType": "Apple",
    "LocationID": 857735168,
    "USBVersion": 2,
    "USBPower": {
      "State": "D0",
      "Description": "On"
    },
    "USBSpeed": {
      "Speed": "480Mbps",
      "Description": "High"
    },
    "Endpoints": {
      "Active": 6,
      "Maximum": 8,
      "Memory": 32768
    },
    "Battery": {

```

```
        "DataSource": "imobiledevice",  
        "LastError": "ideviceinfo returned PASSWORD_PROTECTED",  
        "TrustLevel": "error",  
        "PairingSupported": true  
    }  
}  
}  
}
```

## 5.23. cbrx\_firmware

The firmware methods can control all aspects of updating the firmware on Cambrionix hubs. There are several sub-commands that allow you to add or remove firmware files from the API's local storage, list the currently available firmware files, update firmware from provided files and check the status of existing firmware updates.

The firmware type for can be one of "un" for Universal, "pd" for PDSync, "st" for the TS3-C10 or "mc" for motor control board. For information on your hubs requirements you can use the [Firmware Requirements](#) API method.

Firmware	Part Number	Product Name
Universal	PP15S	PowerPad15S
Universal	PP15C	PowerPad15C
Universal	PP8S	PowerPad8S
Universal	SS15	SuperSync15
Universal	TS3-16	ThunderSync3-16
SMART	TS3-C10	ThunderSync3-C10
Universal	U16S Spade	U16S Spade
Universal	U8S	U8S
PDSync	PDSync-C4	PDSync-C4
Universal	ModIT-Max	ModIT-Max
Motor Control	Motor control board	ModIT-Max

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_firmware",
  "params": [firmware-call]
}
```

firmware-call	Description
add	Provides firmware to the API as an available update source. see <a href="#">cbrx_firmware (add)</a>
remove	Removes firmware from being available to the API. see <a href="#">cbrx_firmware (remove)</a>
list	List all available firmware. see <a href="#">cbrx_firmware (list)</a>
update	Start the firmware update. see <a href="#">cbrx_firmware (update)</a>
status	Get the status of the firmware update. see <a href="#">cbrx_firmware (status)</a>

## 5.24. cbrx\_firmware (add)

Adds the firmware file to the API local storage on the host running the API. Adding firmware files is done by providing a Base64 encoded zip of the file. For more information on Base64 encoding please see the following [link](#).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_firmware",
  "params": [
    "add",
    "filename",
    encoded-Bytes
  ]
}
```

Parameters	Description
<i>filename</i>	The name of the firmware file
<i>encoded-Bytes</i>	The encoded zip of the file in Base64

**Returns:**

```
{
  "result": true
}
```

## Examples

Example JSON-RPC request: (note in this example the base64 encoded text has been reduced for simplification and clarity within the manual)

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_firmware",
  "params": [
    "add",
    "CambrionixFirmware-v1.87-un.enfir",
    "eJwsnduOLTFSbd9Lqn/8f8BywVzYg=="
  ]
}
```

Example successful response:



```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": true  
}
```

## 5.25. cbrx\_firmware (list)

Obtain a list of all available firmware versions

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_firmware",
  "params": ["list"]
}
```

**Returns:**

```
{
  "result": [
    "filename": "filename",
    "version": "firmware-version"
  ]
}
```

Parameter	Description
<i>filename</i>	Name of the file
<i>firmware-version</i>	Version number of the firmware

### Example

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_firmware",
  "params": [
    "list"
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [
    {
```

```
    "filename": "CambrionixFirmware-1.0.3+39-00-st.enfir",  
    "version": "1.0.3+39"  
  },  
  {  
    "filename": "CambrionixFirmware-v1.86-un.enfir",  
    "version": "1.86"  
  },  
  {  
    "filename": "CambrionixFirmware-v1.87-un.enfir",  
    "version": "1.87"  
  }  
]  
}
```

## 5.26. cbrx\_firmware (remove)

---

Remove the firmware file from the API local storage on the host running the API.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_firmware",
  "params": [
    "remove", "filename"
  ]
}
```

*filename* is the name of the firmware file.

**Returns:**

```
{
  "result": true
}
```

### Example

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": "0",
  "method": "cbrx_firmware",
  "params": [
    "remove",
    "CambrionxFirmware-v1.86-un.enfir"
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": "0",
  "result": true
}
```

## 5.27. cbrx\_firmware (status)

This method can be used to obtain the status of a firmware update.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_firmware",
  "params": [
    "status",
    "connection-handle",
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer

**Returns:**

```
{
  "result": [
    "Version": "firmware-version",
    "Type": "firmware-type",
    "Progress": progress-percentage,
    "Stage": "stage-value"
  ]
}
```

Parameter	Description
<i>firmware-version</i>	Version number of the firmware
<i>firmware-type</i>	Used to denote the type of firmware
<i>progress-percentage</i>	The update progress as a percentage
<i>stage-value</i>	The "stage" the firmware update is currently in

stage-value	Description
none	Firmware is not being updated
connecting	Connecting to the hub to update the firmware
init	The update is initialising
erasing	Erasing current firmware
erased	Current firmware has been erased

stage-value	Description
updating	New firmware is being installed
updated	New firmware has finished being installed
verifying	Checking that the firmware has installed correctly
complete	The check has completed
rebooting	Rebooting the hub after all checks and installation complete
rebooted	Hub has been rebooted and is ready for use
skipped	Update skipped as hub already updated

## Errors

If there is an error in the stage then one of the below errors will appear in the stage values. Any of these stage errors mean that the hub's firmware is in an invalid state and would need to be re-done.

stage-error	Description
crypt-init-failed	The wrong type of firmware was used for the selected device
init-failed	The initialisation stage failed
erase-failed	The current firmware could not be erased
flash-failed	The new firmware could not be installed onto the hub
check-failed	The installation checks failed
reboot-failed	The hub was unable to be rebooted

## Example

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_firmware",
  "params": [
    "status",
    "7654"
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [
    {
      "Version": "1.79",
      "Type": "un",
      "Progress": 60,
      "Stage": "verifying"
    }
  ]
}
```

## 5.28. cbrx\_firmware (update)

Use this method to start firmware updates, some products can have multiple firmware such as display, motor control firmware etc. You can start the update of multiple firmware with a single command as documented in the example.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_firmware",
  "params": [
    "update",
    "connection-handle",
    "firmware-type""filename"
  ]
}
```

Parameter	Description
<i>firmware-type</i>	This is a two letter code to define the specific firmware type on the device, more information on the firmware type can be found in the <a href="#">cbrx_firmware</a> section
<i>filename</i>	Name of the file. A particular firmware file can be used from those available, to obtain available files use <a href="#">cbrx_firmware (list)</a>
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer

From version 3.9 onwards with the Cambrionix Hub API you can substitute the connection-handle with the hubs serial number.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a JSON-error object will be returned.

### Example

Example JSON-RPC request:



```
{
  "jsonrpc": "2.0",
  "id": "0",
  "method": "cbrx_firmware",
  "params": [
    "update",
    "7654",
    {
      "un": "CambrionixFirmware-v1.86-un.enfir",
      "mc": "CambrionixFirmware-v1.0.0-mc.enfir"
    }
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": "0",
  "result": true
}
```

## 5.29. cbrx\_get\_usb (tree)

Return the entire USB tree that has been discovered.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_get_usb",
  "params": ["tree"]
}
```

### Returns

```
{
  "result": [
    {
      "VID": vendor-id,
      "PID": product-id,
      "Description": "description",
      "LocationID": location-id,
      "USBVersion": USB-version,
      "USBPower": {
        "State": "power-state",
        "Description": "power-description"
      },
      "HostController": {
        "Type": "host-controller-type",
        "EndpointTotal": active-endpoints,
        "EndpointPeakTotal": peak-endpoints,
        "EndpointMemoryUsed": endoint-memory,
        "EndpointPeakMemoryUsed": peak-endpoint-memory
      },
      "children": [
        {
          "VID": vendor-id,
          "PID": product-id,
          "LocationID": location-id,
          "USBVersion": USB-version,
          "USBPower": {
            "State": "power-state",
            "Description": "power-description"
          },
          "USBSpeed": {
            "Speed": "USB-speed",
            "Description": "speed-name"
          },
          "Endpoints":
```

```

    {
      "Active": active-endpoints,
      "Maximum": maximum-endpoints,
      "Memory": endpoint-memory
    }
  ]
}

```

Output	Description
<i>Vendor-ID</i>	Device Vendor ID number or VID. Displayed as an Integer
<i>product-ID</i>	Product ID number or PID. Displayed as an Integer
<i>description</i>	Name of hardware
<i>location-id</i>	The <a href="#">Location ID</a> as an Integer
<i>usb-version</i>	The USB version number of the connection to the hub. Format 'N.nn'
<i>power-state</i>	USB <a href="#">Power state</a> code
<i>power-description</i>	USB power turned on/off
<i>host-controller-type</i>	The type of USB host controller
<i>peak-endpoints</i>	Peak endpoint usage on the USB host controller. see <a href="#">Endpoints</a>
<i>peak-endpoint-memory</i>	Peak endpoint memory usage. see <a href="#">Endpoints</a>
<i>USB-speed</i>	Maximum speed USB connection capable of
<i>speed-name</i>	Name of USB connection i.e. SuperSpeed USB 5Gbps
<i>active-endpoints</i>	How many endpoints the device is using
<i>maximum-endpoints</i>	How many endpoints the device is capable of using
<i>endpoint-memory</i>	Amount of memory being used by endpoints

## Examples

Example JSON-RPC request:

```
{
```

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_get_usb",
  "params": ["tree"]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [
    {
      "VID": 32902,
      "PID": 40429,
      "Description": "Intel(R) USB 3.1 eXtensible HostController - 1.10  
(Microsoft)", "LocationID": 553648128, "USBVersion": 3.1, "USBPower": {
        "State": "D0",
        "Description": "On"
      }
    },
    {
      "HostController": {
        "Type": "XHCI",
        "EndpointTotal": 9,
        "EndpointPeakTotal": 60,
        "EndpointMemoryUsed": 57344,
        "EndpointPeakMemoryUsed": 331776
      },
      "children": [
        {
          "VID": 3141,
          "PID": 26403,
          "LocationID": 558891008,
          "USBVersion": 2.01,
          "USBPower": {
            "State": "D0",
            "Description": "On"
          },
          "USBSpeed": {
            "Speed": "480Mbps",
            "Description": "High"
          },
          "Endpoints": {
            "Active": 2,
            "Maximum": 3,
            "Memory": 12288
          }
        },
        {
          "VID": 1161,
          "PID": 57506,
          "LocationID": 560988160,
          "USBVersion": 1.1,
          "USBPower": {
            "State": "D2",
            "Description": "Low power"
          },
          "USBSpeed": {
            "Speed": "12Mbps",
            "Description": "Full"
          }
        }
      ]
    }
  ]
}
```

```
    },  
    "Endpoints": {  
      "Active": 6,  
      "Memory": 24576  
    }  
  },  
  {  
    "VID": 0,  
    "PID": 0,  
    "LocationID": 563085312,  
    "USBVersion": 0,  
    "USBSpeed": {  
      "Speed": "1.5Mbps",  
      "Description": "Low"  
    },  
    "Endpoints": {  
      "Active": 1,  
      "Memory": 4096  
    }  
  }  
]  
}  
}
```

## 5.30. cbrx\_get\_usb (descriptors)

Request entire dump of a USB device's descriptor information. This can be a lot of data for some devices (especially phones and tablets).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_get_usb",
  "params": ["descriptors", locationID | hub-id " ]
}
```

Variable	Description
<i>locationID</i>	The <a href="#">Location ID</a> as an Integer
<i>hub-id</i>	This is the serial number of the hub returned from <a href="#">cbrx_discover</a>

### Returns

All variable names in the returned data match the names in [Chapter 9 of the USB 3.2 specification](#) for ease of reference. Each descriptors raw fields (as taken from the USB 3.2 spec) are represented first, and where appropriate an additional "Derived" member will be present that shows bitfields or resolved string descriptors.

For example, on the device's main descriptor there is an iManufacturer field, which is the index of the string descriptor used for that name. This will also be present in Derived.Manufacturer.

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "method": "cbrx_get_usb",
  "params": ["descriptors", "123456789abcdef"],
  "id": 0
}
```

Example successful response from a standard USB flash drive:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "RawBytes": "1201200300000000951092b17010001020301",

```

```

    "bLength": 18,
    "bDescriptorType": 1,
    "bNumConfigurations": 1,
    "bcdUSB": 800,
    "bDeviceClass": 0,
    "bDeviceSubClass": 0,
    "bDeviceProtocol": 0,
    "bMaxPacketSize0": 9,
    "idVendor": 2385,
    "idProduct": 5931,
    "bcdDevice": 1,
    "iManufacturer": 1,
    "iProduct": 2,
    "iSerialNumber": 3,
    "Derived": {
      "DescriptorType": "Device",
      "CurrentConfiguration": 1,
      "DeviceClass": "Reserved"
    },
    "Configurations": {
      "1": [
        {
          "RawBytes": "09022c00010100ff8025",
          "bLength": 9,
          "bDescriptorType": 2,
          "wTotalLength": 44,
          "bConfigurationValue": 1,
          "bmAttributes": 128,
          "bNumDescriptors": 1,
          "iConfiguration": 0,
          "reserved1": 0,
          "reserved2": 1,
          "SelfPowered": 0,
          "Derived": {
            "DescriptorType": "Configuration",
            "MaxPower": 37,
            "RemoteWakeUp": 0,
            "BusPowered": 0
          }
        },
        {
          "RawBytes": "090400000208065000",
          "bLength": 9,
          "bDescriptorType": 4,
          "iInterface": 0,
          "bInterfaceNumber": 0,
          "bAlternateSetting": 0,
          "bNumEndpoints": 2,
          "bInterfaceClass": 8,
          "bInterfaceSubClass": 6,
          "bInterfaceProtocol": 80,
          "Derived": {
            "DescriptorType": "Interface"
          }
        },
        {
          "RawBytes": "0705ff8102000400",
          "bLength": 7,
          "bDescriptorType": 5,
          "bInterval": 0,
          "bEndpointAddress": 129,
          "bmAttributes": 2,

```

```

        "wMaxPacketSize": 1024,
        "Derived": {
            "DescriptorType": "Endpoint",
            "EndpointAddress": 1,
            "Direction": "In",
            "Type": "Bulk"
        }
    },
    {
        "RawBytes": "06300f000000",
        "bLength": 6,
        "bDescriptorType": 48,
        "wBytesPerInterval": 0,
        "bMaxBurst": 15,
        "bmAttributes": 0,
        "Derived": {
            "DescriptorType": "SuperSpeedEndpointCompanion",
            "MaxStreams": 0,
            "Mult": 0,
            "SspCompanion": 0
        }
    },
    {
        "RawBytes": "07050202000400",
        "bLength": 7,
        "bDescriptorType": 5,
        "bInterval": 0,
        "bEndpointAddress": 2,
        "bmAttributes": 2,
        "wMaxPacketSize": 1024,
        "Derived": {
            "DescriptorType": "Endpoint",
            "EndpointAddress": 2,
            "Direction": "Out",
            "Type": "Bulk"
        }
    },
    {
        "RawBytes": "06300f000000",
        "bLength": 6,
        "bDescriptorType": 48,
        "wBytesPerInterval": 0,
        "bMaxBurst": 15,
        "bmAttributes": 0,
        "Derived": {
            "DescriptorType": "SuperSpeedEndpointCompanion",
            "MaxStreams": 0,
            "Mult": 0,
            "SspCompanion": 0
        }
    }
]
},
"Strings": {
    "1": "Kingston",
    "2": "DataTraveler 70",
    "3": "1831BFBD3065F551C96001E7"
},
"BOS": {
    "RawBytes": "050f160002",
    "bLength": 5,
    "bDescriptorType": 15,

```



```
"Derived": {  
    "DescriptorType": "BOS"  
},  
"wTotalLength": 22,  
"bNumDescriptors": 2,  
"Capabilities": [  
    {  
        "RawBytes": "07100206000000",  
        "bLength": 7,  
        "bDescriptorType": 16,  
        "bDevCapabilityType": 2,  
        "bmAttributes": 6,  
        "Derived": {  
            "DescriptorType": "DeviceCapability",  
            "CapabilityType": "USB20Extension",  
            "LPMCapable": 1,  
            "BESLAndAlternateHIRDSupported": 1,  
            "BaselineBESLValid": 0,  
            "DeepBESLValid": 0,  
            "BaselineBESL": 0,  
            "DeepBESL": 0  
        }  
    },  
    {  
        "RawBytes": "0a1003000e00020affff07",  
        "bLength": 10,  
        "bDescriptorType": 16,  
        "bDevCapabilityType": 3,  
        "wU2DevExitLat": 2047,  
        "bmAttributes": 0,  
        "wSpeedsSupported": 14,  
        "bFunctionalitySupport": 2,  
        "bU1DevExitLat": 10,  
        "Derived": {  
            "DescriptorType": "DeviceCapability",  
            "CapabilityType": "SuperSpeedUSB",  
            "LTMCapable": 0,  
            "SpeedsSupported": [  
                "Full",  
                "High",  
                "SuperSpeed"  
            ]  
        }  
    }  
]  
}  
}
```

## 5.31. cbrx\_hub\_get

From the hub specified by the hubs serial number, get the key value. similar to [cbrx\\_connection\\_get](#).

Note that this is function will be slower if you need to do multiple operations on the same hub.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    hub-id,
    dictionary-key
  ]
}
```

Parameter	Description
<i>hub-id</i>	This is the serial number of the hub returned from <a href="#">cbrx_discover</a>
<i>dictionary-key</i>	See <a href="#">Get Dictionary</a> for more information

**Returns:**

```
{
  "result": [dictionary-value]
}
```

*dictionary-value* is the key value that is specified see [Get Dictionary](#) for more information.

**Errors**

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_hub_get",
  "params": [
    "000000897FD0505A",
    "nrOfPorts"
  ]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 15
}
```

## 5.32. cbrx\_hub\_set

On the hub specified by the connection handle, set the key value. Similar to [cbrx\\_connection\\_set](#)

Note that this function will be slower if you need to do multiple operations on the same hub.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_hub_set",
  "params": [
    hub-id,
    dictionary-key,
    Value
  ]
}
```

Parameter	Description
<i>hub-id</i>	This is the serial number of the hub returned from <a href="#">cbrx_discover</a>
<i>dictionary-key</i>	See <a href="#">Set Dictionary</a> for more information
<i>Value</i>	The value you wish to apply to the key

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_hub_set",
  "params": [
    "7FD0505A",
    "TwelveVoltRail.OverVoltage",
  ]
}
```

```
    true  
  ]  
}
```

Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": "0",  
  "result": true  
}
```

## 5.33. cbrx\_notifications

The API supports sending of notifications for certain events. Notification packets are the same as other JSON-RPC Response objects, except that they do not have an "id" field.

Note: Notifications are only sent to active socket connections that have requested them. Closing a socket and opening another one will mean you need to re-request notifications. See the [Quick start](#) for examples

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_notifications",
  "params": ["notification"],
}
```

*notification* is from the array of strings to shown when sending [cbrx\\_apidetails](#) a full list of possible notifications can be found in the section [API Notifications](#)

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_notifications",
  "params": [
    "usb-device-attached"
  ]
}
```

Example successful response:

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": true  
}
```

## 5.34. cbrx\_pair\_device

Initiate pairing of an iOS device. This is not usually necessary as it will occur automatically when the API attempts to query battery information.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_pair_device",
  "params": ["UDID"]
}
```

Variable	Description
<i>UDID</i>	The device USB serial number

### Returns

```
{
  "result": true
}
```

### Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_pair_device",
  "params": ["1234567"]
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```



## 6. API Notifications

API notification packets are the same as other JSON-RPC packets, except that they do not have an "id" field. Most of these notifications do not supply anything in the "params" field. These notifications will only be sent if they are enabled using the [cbrx\\_notifications](#) method.

A list of possible notifications available using our API can be found in the table below. Most of these notifications do not supply anything in the "params" field.

Notification	Description
all	Request all notifications
<a href="#">discover-changed</a>	The API detected a change in the available hubs. You should re-run <a href="#">cbrx_discover</a> at this point.
<a href="#">dead-hub-changed</a>	The API detected that a hub has either become unresponsive or cannot be connected to
<a href="#">firmware-progress</a>	Request updates on firmware update progress
<a href="#">over-temperature</a>	Hub is over temperature
<a href="#">over-voltage</a>	Hub is over voltage
<a href="#">rfid-received</a>	Receive notification when a RFID card is presented to a sensor
<a href="#">rfid-removed</a>	Receive notification when an RFID card is removed from a sensor
<a href="#">usb-device-attached</a>	More detailed than usb-changed, this will tell you of specific devices that have attached.
<a href="#">usb-device-detached</a>	More detailed than usb-changed, this will tell you of specific devices that have detached.
<a href="#">under-voltage</a>	Hub is under voltage
<a href="#">usb-changed</a>	The API detected a change in the USB Tree.

## discover-changed

A change in the hubs that are available to the API has been detected.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "discover-changed"
}
```

## dead-hub-changed

The API detected that a hub has either become unresponsive or cannot be connected to, for example because another program has its serial port opened.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "dead-hub-changed",
  "params": {
    "IsDead": True
  }
}
```

## firmware-progress

Information on the firmware update progress. For more information on the output see [cbxr\\_firmware \(status\)](#)

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "firmware-progress",
  "params": {
    "Progress": 60,
    "Stage": "flashing",
    "Type": "charger",
    "HostDevice": "1212343456567878",
    "HostSerial": "/dev/tty.usbmodem1421502",
    "HostDescription": "PS15-USB3"
  }
}
```

## over-temperature

The hub is over operating temperature, see [product user manuals](#) for more details.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "over-temperature"
}
```

## over-voltage

The hub is over recommended voltage, see [product user manuals](#) for more details.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "over-voltage"
}
```

## rfid-received

An RFID sensor has detected that a RFID card is present.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "rfid-received",
  "params": "12784556655489628"
}
```

## rfid-removed

An RFID sensor has detected that a RFID card has been removed.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "rfid-removed",
  "params": "12784556655489628"
}
```

## usb-device-attached

A device has become available to the API and a detailed information output is presented about the device.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "usb-device-attached",
  "params": {
    "HostDevice": "1212343456567878",
    "HostSerial": "/dev/tty.usbmodem1421502",
    "HostPort": 7,
    "HostDescription": "PS15-USB3",
    "USB2": {
      "Description": "iPhone",
      "LocationID": 573710336,
      "Manufacturer": "Apple Inc.",
      "PID": 4776,
      "SerialNumber": "012a37d1fa07617ad7ef0430ba49f479ab9fb6b8",
      "USBVersion": 2,
      "VID": 1452
    }
  }
}
```

## usb-device-detached

A device is no longer available to the API and a detailed information output is presented about the device.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "usb-device-detached",
  "params": {
    "HostDevice": "1212343456567878",
    "HostSerial": "/dev/tty.usbmodem1421502",
    "HostPort": 7,
    "HostDescription": "PS15-USB3",
    "USB2": {
      "Description": "iPhone",
      "LocationID": 573710336,
      "Manufacturer": "Apple Inc.",
      "PID": 4776,
      "SerialNumber": "012a37d1fa07617ad7ef0430ba49f479ab9fb6b8",
      "USBVersion": 2,
      "VID": 1452
    }
  }
}
```

## under-voltage

The hub is under recommended voltage, see [product user manuals](#) for more details.

Example notification packet:

```
{
  "jsonrpc": "2.0",
  "method": "under-voltage"
}
```

## usb-changed

There has been a change in the USB-tree.

Example notification packet:

```
{  
  "jsonrpc": "2.0",  
  "method": "usb-changed"  
}
```

## 7. Deprecated Methods

---

These methods exist to support backwards compatibility only and should not be used. These methods may be removed in future versions.

API Call	Description
<code>cbrx_apiversion (true)</code>	Obtain a detailed version of the API

## 7.1. cbrx\_apiversion (true)

**This method was deprecated in API version 3.0 please use 'cbrx\_apidetails'!**

Return a detailed version of the API running.

**Syntax:** see Calls within this manual

```
{
  "method": "cbrx_apiversion",
  "params": [true]
}
```

**Returns:**

```
{
  "result": {
    "version": [version-number],
    "semver": "semver-variant",
    "commitid": commitid-number,
    "branch": "branch-name",
    "capability": [API-capability],
    "notifications": [possible-notification],
    "install": "install-location",
    "logging": "logs-location",
    "settings": "settings-location",
    "documentation": "documentation-location",
    "cpu": {
      "brand": "brand-information",
      "arch": "CPU-architecture",
      "features": [CPU-features],
      "cores": cores-value
    },
    "os": "OS-information"
  }
}
```

Output	Description
<i>version-number</i>	Version number of API as an integer (Major, Minor, Revision, Build)
<i>semver-variant</i>	The full name of the API version
<i>commitid-variant</i>	The number value of the Commit ID
<i>branch-name</i>	The branch of API installed



Output	Description
<i>API-capability</i>	API information for Cambrionix internal use
<i>possible-notification</i>	Array of strings to show possible notifications. see <a href="#">API Notifications</a>
<i>install-location</i>	The location of install files
<i>logs-location</i>	The location of where logs are stored
<i>settings-location</i>	The location of API settings
<i>documentation-location</i>	The web adress of API documentation
<i>brand-information</i>	The brand of the CPU
<i>CPU-architecture</i>	The architecture of the CPU
<i>CPU-features</i>	Features available on CPU
<i>cores-value</i>	How many cores the CPU has
<i>os-information</i>	Operating system running on local machine

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_apiversion",
  "params": [
    True
  ]
}
```

Example Successful response

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "version": [
```

```

    3,
    7,
    0,
    34
  ],
  "semver": "3.7.0+34",
  "guid": {
    "id": "d0dc3cac-e165-4e38-88bb-39064431bdc9",
    "computerId": "35aea4bc-44d3-4e9e-9b3c-c33b965c5639"
  },
  "host": [
    {
      "ip": "10.167.111.81",
      "port": 0,
      "nameServer": "10.167.111.241",
      "domainName": "CBRX.LOCAL",
      "hostName": "CBRXPC-011",
      "adapterName": "Intel(R) Ethernet Controller (3) I225-V",
      "adapterType": "Ethernet"
    }
  ],
  "commitid": 4287981321,
  "branch": "release",
  "capability": [
    "protobuf",
    "crash-report",
    "notification"
  ],
  "notifications": [
    "usb-changed",
    "usb-device-attached",
    "usb-device-detached",
    "discover-changed",
    "dead-hub-changed",
    "firmware-progress",
    "rfid-received",
    "rfid-removed",
    "over-temperature",
    "over-voltage",
    "under-voltage",
    "certificate-changed"
  ],
  "install": "C:\\Program Files\\Cambrionix\\API",
  "logging": "C:\\ProgramData\\Cambrionix\\Log",
  "settings": "C:\\ProgramData\\Cambrionix",
  "documentation": "C:\\Program Files\\Cambrionix\\API\\Cambrionix Hub API Reference.html",
  "cpu": {
    "brand": "12th Gen Intel(R) Core(TM) i9-12900K",
    "arch": "x64",
    "features": [
      "aes",
      "avx",
      "avx2",
      "bmi1",
      "bmi2",
      "clflushopt",
      "clflush",
      "clwb",
      "cx16",
      "cx8",
      "erms",

```

```
    "f16c",
    "fma3",
    "fpu",
    "mmx",
    "movbe",
    "pclmulqdq",
    "popcnt",
    "rdrnd",
    "rdseed",
    "sha",
    "smx",
    "ss",
    "sse",
    "sse2",
    "sse3",
    "sse4_1",
    "sse4_2",
    "ssse3",
    "tsc",
    "vaes",
    "vpclmulqdq"
  ],
  "cores": 24
},
"os": "Windows 10 Pro 21H2 Build 19044.1889 64-bit"
}
```

## 7.2. cbrx\_get\_usbtree

**This method was deprecated in API version 3.5 please use 'cbrx\_get\_usb (tree)'!**

Return the entire USB tree that has been discovered.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_get_usbtree",
}
```

### Returns

```
{
  "result": [
    {
      "VID": vendor-id,
      "PID": product-id,
      "Description": "description",
      "LocationID": location-id,
      "USBVersion": USB-version,
      "USBPower": {
        "State": "power-state",
        "Description": "power-description"
      },
      "HostController": {
        "Type": "host-controller-type",
        "EndpointTotal": active-endpoints,
        "EndpointPeakTotal": peak-endpoints,
        "EndpointMemoryUsed": endoint-memory,
        "EndpointPeakMemoryUsed": peak-endpoint-memory
      },
      "children": [
        {
          "VID": vendor-id,
          "PID": product-id,
          "LocationID": location-id,
          "USBVersion": USB-version,
          "USBPower": {
            "State": "power-state",
            "Description": "power-description"
          },
          "USBSpeed": {
            "Speed": "USB-speed",
            "Description": "speed-name"
          }
        }
      ]
    }
  ]
}
```

```

    },
    "Endpoints":
    {
      "Active": active-endpoints,
      "Maximum": maximum-endpoints,
      "Memory": endpoint-memory
    }
  ]
}

```

Output	Description
<i>Vendor-ID</i>	Device Vendor ID number or VID. Displayed as an Integer
<i>product-ID</i>	Product ID number or PID. Displayed as an Integer
<i>description</i>	Name of hardware
<i>location-id</i>	The <a href="#">Location ID</a> as an Integer
<i>usb-version</i>	The USB version number of the connection to the hub. Format 'N.nn'
<i>power-state</i>	USB <a href="#">Power state</a> code
<i>power-description</i>	USB power turned on/off
<i>host-controller-type</i>	The type of USB host controller
<i>peak-endpoints</i>	Peak endpoint usage on the USB host controller. see <a href="#">Endpoints</a>
<i>peak-endpoint-memory</i>	Peak endpoint memory usage. see <a href="#">Endpoints</a>
<i>USB-speed</i>	Maximum speed USB connection capable of
<i>speed-name</i>	Name of USB connection i.e. SuperSpeed USB 5Gbps
<i>active-endpoints</i>	How many endpoints the device is using
<i>maximum-endpoints</i>	How many endpoints the device is capable of using
<i>endpoint-memory</i>	Amount of memory being used by endpoints

## Examples

Example JSON-RPC request:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_get_usbtrees"
}
```

Example successful response:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [
    {
      "VID": 32902,
      "PID": 40429,
      "Description": "Intel(R) USB 3.1 eXtensible HostController - 1.10  
(Microsoft)", "LocationID": 553648128, "USBVersion": 3.1, "USBPower": {
        "State": "D0",
        "Description": "On"
      }
    },
    {
      "HostController": {
        "Type": "XHCI",
        "EndpointTotal": 9,
        "EndpointPeakTotal": 60,
        "EndpointMemoryUsed": 57344,
        "EndpointPeakMemoryUsed": 331776
      },
      "children": [
        {
          "VID": 3141,
          "PID": 26403,
          "LocationID": 558891008,
          "USBVersion": 2.01,
          "USBPower": {
            "State": "D0",
            "Description": "On"
          },
          "USBSpeed": {
            "Speed": "480Mbps",
            "Description": "High"
          },
          "Endpoints": {
            "Active": 2,
            "Maximum": 3,
            "Memory": 12288
          }
        },
        {
          "VID": 1161,
          "PID": 57506,
          "LocationID": 560988160,
          "USBVersion": 1.1,
          "USBPower": {
            "State": "D2",
            "Description": "Low power"
          },
          "USBSpeed": {
            "Speed": "12Mbps",
            "Description": "Full"
          }
        }
      ]
    }
  ]
}
```

```

    },
    "Endpoints": {
      "Active": 6,
      "Memory": 24576
    }
  },
  {
    "VID": 0,
    "PID": 0,
    "LocationID": 563085312,
    "USBVersion": 0,
    "USBSpeed": {
      "Speed": "1.5Mbps",
      "Description": "Low"
    },
    "Endpoints": {
      "Active": 1,
      "Memory": 4096
    }
  }
]
}

```

## 8. Device string

When the API queries a device it can return the below string.

```
"Device": {
  "VID": Vendor-ID,
  "PID": product-ID,
  "Manufacturer": "device-manufacturer",
  "Description": "description",
  "SerialNumber": "device-id",
  "LocationID": location-id,
  "DevicePath": device-path,
  "USBVersion": usb-version,
  "USBPower": {
    "State": "power-state",
    "Description": "power-description"
  },
  "USBSpeed": {
    "Speed": "USB-speed",
    "Description": "USB-description"
  },
  "Capability": {
    "Speed": "capable-speed",
    "Description": "capable-description"
  }
},
"Endpoints": {
  "Active": active-endpoints,
  "Maximum": maximum-endpoints,
  "Memory": endpoint-memory
},
"Battery": {
  "DataSource": "battery-data-source",
  "TrustLevel": "trust-level",
  "PairingSupported": support-pairing,
  "CurrentLevel": battery-current-level,
  "CurrentTime": current-hub-time,
  "StartingLevel": charge-start-level,
  "StartingTime": charge-start-time,
  "CapacityNew": new-battery-capacity,
  "Capacity": current-battery-capacity,
  "ChargingStatus": "charge-status",
  "HealthPercent": battery-health
},
"PhoneSerialNumber": "phone-serial",
"PhoneIdentity": "phone-name",
"IMEI": "IMEI-number",
"MacAddress": "MacAddress",
"PhoneSoftwareVersion": "phone-OS-version"
}
```



Output	Description
<i>Vendor-ID</i>	Device Vendor ID number or VID. Displayed as an Integer
<i>product-ID</i>	Product ID number or PID. Displayed as an Integer
<i>device-manufacturer</i>	The name of the device manufacturer
<i>description</i>	Name of the hardware
<i>device-id</i>	Device Serial number
<i>location-id</i>	The <a href="#">Location ID</a> as an Integer
<i>device-path</i>	The platform specific path for the device
<i>usb-version</i>	The USB version number of the connection to the hub. Format 'N.nn'
<i>power-state</i>	USB <a href="#">Power state</a> code
<i>power-description</i>	USB power turned on/off
<i>USB-speed</i>	Maximum speed USB connection capable of
<i>USB-description</i>	Name of USB connection i.e. SuperSpeed USB 5Gbps
<i>capable-speed</i>	Maximum data speed device capable of
<i>capable-description</i>	Name of maximum data speed device capable of
<i>active-endpoints</i>	How many endpoints the device is using
<i>maximum-endpoints</i>	How many endpoints the device is capable of using
<i>endpoint-memory</i>	Amount of memory being used by endpoints
<i>battery-data-source</i>	The source of the device battery information
<i>trust-level</i>	Whether the device is trusted/ paired
<i>support-pairing</i>	Whether the device supports being trusted/ paired
<i>battery-current-level</i>	Current battery level of device displayed as a percentage

Output	Description
<i>current-hub-time</i>	The hub time, shown as an integer in ms
<i>charge-start-level</i>	Battery percentage level when device connected
<i>charge-start-time</i>	The hub time charging started, shown as an integer in ms
<i>new-battery-capacity</i>	The battery capacity of device from new
<i>current-battery-capacity</i>	The battery capacity of the device now
<i>charge-status</i>	Charging status of the battery i.e. full
<i>battery-health</i>	Battery health shown as a percentage
<i>phone-serial</i>	Phone serial number
<i>phone-name</i>	Name of the phone
<i>IMEI-number</i>	The IMEI number of the phone
<i>MacAdress</i>	A unique address assigned to the mobile device. It is a 48 bit value, consisting of twelve hexadecimal characters
<i>phone-os-version</i>	Version number of the OS on the phone

## 9. Additional information

### Cambrionix Connect Recorder Service

The Recorder service is an optional installation component, which can record events such as device health, charging history and connection events. These can subsequently be viewed in client software.

### Stopping the API service

If you wish to stop the Cambrionix Hub API service or the Recorder service from running then issue the following command

```
sudo /usr/bin/CambrionixApiService --remove
```

### Limitations

The API provides a means of controlling most of the features of Cambrionix products, however there are some limitations. The API can only be used with the following products.

Firmware	Part Number	Product Name
Universal	PP15S	PowerPad15S
Universal	PP15C	PowerPad15C
Universal	PP8S	PowerPad8S
Universal	SS15	SuperSync15
Universal	TS3-16	ThunderSync3-16
SMART	TS3-C10	ThunderSync3-C10
Universal	U16S Spade	U16S Spade
Universal	U8S	U8S
PDSync	PDSync-C4	PDSync-C4
Universal	ModIT-Max	ModIT-Max
Motor Control	Motor control board	ModIT-Max

### Connection handle

A connection handle is a representation of a physical connection. The connection handle defines not only which driver to use but which data source to use with that driver. Within a segment of code the connection handle identifies a structure that contains connection information.

You can obtain a connection handle by using [cbrx\\_connection\\_open](#)

If there is no activity on an open handle for more than 30s, the handle will become invalid. Subsequent calls attempting to use a deleted handle will fail with CBRXAPI\_ERRORCODE\_

INVALIDHANDLE. Software using the API must be able to cope with this situation and respond accordingly. Software may simply call `cbrx_connection_open` again in order to obtain a fresh handle, or if you register for notifications they will be left open indefinitely.

## Location ID

A Location ID is a 32-bit unsigned integer that represents the location of the device in the USB tree. For example, if the driver creates a location string for the device of the form `a&b&c`, the Location ID will be `0x00000abc`.

## Serial port

The serial port the device is connected to will vary in its description depending on the OS the API is running on. For macOS and Linux this will be shown as the location, for Windows this will be shown as a COM port, please see examples below.

Windows

```
COM5
```

macOS

```
dev/tty.usbmodem141502
```

Linux

```
/dev/ttyUSB0
```

## Endpoints

If you experience the endpoint limit, you are likely to see an error indicating you have “run out of USB resources” on your host computer, although you may not see any error message at all and (any of) your USB devices may randomly fail to operate correctly or become intermittent. The USB endpoint limitation applies to xHCI (USB3) host controllers on recent motherboards only. These USB host controllers have limited memory and typically offer between 64 and 128 USB endpoints.

The problem with the limited number of endpoints provided by xHCI host controllers is that most USB devices, especially mobile phones and tablets, enumerate as more than one endpoint. A typical mobile device might enumerate as 5 endpoints. Consequently, if your host controller has 64 available endpoints you would only be able to connect  $64/5$  devices to that host controller, equivalent to 12 devices. Please be aware that all USB devices, including USB hubs, require endpoints, so when you are setting up your work flow it is important to factor in this limitation.

## Power state

Device power states are named D0, D1, D2, and D3. D0 is the fully on state, and D1, D2, and D3 are low-power states. The state number is inversely related to power consumption: higher numbered states use less power.

## Status

The API can return the following options on the status of the hub connection.

status response	Description
idle	Hub is connected but not talking
active	Hub is connected and in use
missing	Hub is no longer on the USBtree
unresponsive	Hub is no longer responding
locked	Hub connection is locked

## 10. Logging

The API is able to generate logging information for all USB events, and store information on what has happened and specific hardware information. This is useful to see what is happening with the API and can capture any faults or issues.

To enable logging you will need to create a config file ending in `.log.cfg`. You can use the following command to create the logging cfg file manually:

```
echo*=DEBUG>/etc/opt/cambrionix/cambrionix.log.cfg
```

Then after re-producing the problem, you can zip the logs from the folder

```
/var/log/cambrionix
```

You may delete the file below when you are finished with it.

```
/etc/opt/cambrionix/cambrionix.log.cfg
```

### Default locations

Log messages generated by the CambrionixApiService go to syslog.

Using Windows the logs will default to the below location

```
C:\ProgramData\Cambrionix
```

Using macOS the logs will default to the below location

```
Library>Logs>Cambrionix
```

Using Linux the logs will default to the below location

```
/var/log/cambrionix
```

### Logging to investigate behaviour

If you are experiencing a bug or an issue, you can obtain logs of the behaviour, to see in more detail what is happening.

1. Enable logging on the API
2. Use the hub in a way that causes the issue you are seeing.
3. Wait for the issue to occur
4. Make a note of the time that the issue occurs then zip the folder the logs are stored.

Once you have this information you can either review the logs yourself or if you are in contact with Cambrionix regarding support you can send the logs via the support ticket system.

## List of logging options.

There is a list of different options for logs to capture within the Cambrionix Hub API below is a list of all logs that can be enabled directly from the .log.cfg file and what needs to be entered in the file to enable the specific logs.

We would advise to have all logging enabled with the API so if any issue occurs the event is captured in the logs and investigation can take place.

api.battery=DEBUG
api.client=DEBUG
api.client.getset=DEBUG
api.core=DEBUG
api.core.discovery=DEBUG
api.daemon=DEBUG
api.daemon.handle.manager=DEBUG
api.dictionary=DEBUG
api.encoder=DEBUG
api.hub=DEBUG
api.hub.state=DEBUG
api.json=DEBUG
api.json.socket=DEBUG
api.json.websocket=DEBUG
api.serial=DEBUG
api.usbtrees=DEBUG
lib.console=DEBUG
lib.filesystem.watcher=DEBUG
lib.network=DEBUG
lib.service=DEBUG
lib.service.user=DEBUG
lib.settings=DEBUG
lib.task=DEBUG
lib.thread=DEBUG
lib.timer=DEBUG
lib.watchdog=DEBUG

## 11. Docks

---

When multiple products have been connected, with the second charger connected to an expansion port of the first charger and so on, this is known as a Dock. For some operations it may be convenient to treat these two chargers as a single unit, that combines the ports of both chargers.

To access the dock as a single unit, first call `cbrx_discover` with the parameter `docks` to obtain the list of docks available. Then call `cbrx_connection_open` with the ID in question and also specifying "docks".

The dock unit will return the combined total for keys such as `nrOfPorts` and `TotalCurrent_mA`. The range of ports is expanded to cover the combined total number of ports for connected products. The product directly connected to the computer will have its ports referenced first followed by those of the charger connected to first charger's expansion port.

Some keys such as `Hardware` or `Firmware` do not combine and so these keys will return the value for the parent charger. If it is desired to get the values of these keys from the downstream charger then it is possible to open and retrieve them from that charger in the usual manner. Opening a charger does not interfere with access to the dock except as to when settings are changed.



## 12. Dynamic hubs

It is possible to open a dynamic hub that is a combination of various other hubs. This behaves in the same way that [Docks](#) do. To open a dynamic hub, simply combine the serial numbers of all the hubs you wish to open into a special "Dynamic:" prefixed name as shown in this example.

```
# Given three Cambrionix hubs with serial numbers of 'AAAAAAA',  
  'BBBBBBB' and 'CCCCCCC'  handleA =  
  cbrxapi.cbrx_connection_open("AAAAAAA") handleB =  
  cbrxapi.cbrx_connection_open("BBBBBBB") handleC =  
  cbrxapi.cbrx_connection_open("CCCCCCC") handleABC =  
  cbrxapi.cbrx_connection_open("Dynamic:AAAAAAA:BBBBBBB:CCCCCCC")  
  print(cbrxapi.cbrx_connection_get(handleA, "nrOfPorts")) # 15  
  print(cbrxapi.cbrx_connection_get(handleB, "nrOfPorts")) # 8  
  print(cbrxapi.cbrx_connection_get(handleC, "nrOfPorts")) # 8  
  print(cbrxapi.cbrx_connection_get(handleABC, "nrOfPorts")) #  
  31
```

This dynamic hub is treated as a single entity with it's ports being numbered from 1 to N, where N is the total number of ports across all hubs included.

## 13. Dictionaries

For each hub, the API can return two dictionaries:

- The Get dictionary, containing keys that can be read.
- The Set dictionary, containing keys which can be set.

The key-value pairs returned depend on the feature set(s) supported by the unit.

### 13.1. Feature Sets

The following feature sets are available:

Feature set	Description
base	Base level functionality supported by all Cambrionix units
sync	Syncing capability
5V	The unit has a fixed 5V power supply
12V	The unit has a 12v power supply
temperature	The unit has a temperature sensor
PD	The unit implements the USB Power Delivery Specification
gate	The unit has a motor control product to control locking gates to secure devices connected to ports.

All products support the base feature set.

The range of possible values for a key in the base feature set can be extended if an additional feature set is also available.

The Hardware key returns a value for the type of hub.

These are the extra feature sets CambrionixApiService supports for the various types of hub:

hub type returned by "Hardware"	sync	5V	12V	Temperature	PD	gate
PP8C		yes	yes	yes		
PP8S	yes	yes	yes	yes		
PP15C		yes	yes	yes		
PP15S	yes	yes	yes	yes		
SS15	yes	yes	yes	yes		
Series8		yes				

hub type returned by “Hardware”	sync	5V	12V	Temperature	PD	gate
U8C-EXT		yes	yes	yes		
U8C		yes				
U8RA	yes	yes				
U8S-EXT	yes	yes	yes	yes		
U8S	yes	yes				
U10C		yes				
U10S	yes	yes				
U12S	yes	yes				
U16S Spade-NL	yes	yes				
PD-Sync 4	yes*1			yes	yes	
ThunderSync2-16	yes	yes		yes		
ThunderSync3-16	yes	yes		yes		
ModIT Max*2	yes	yes		yes		yes

\*1 It is to be noted that while the PDSync-C4 does not implement the “sync” feature set as such, nevertheless it does have sync capabilities and these are always available. This means that there is no need to switch between charge mode and sync mode.

\*2 The ModIT Max will identify itself as a ThunderSync3-16, but it has additional hardware for gate control.

## 13.2. Get Dictionary

Key	Feature set
Attached	5V
Compiled	base
EnabledProfiles	5V
Firmware	base
Firmware Requirements	base
FiveVoltRail_flags	5V
FiveVoltRail_Limit_Max_V	5V
FiveVoltRail_Limit_Min_V	5V
FiveVoltRail_V	5V
FiveVoltRailMax_V	5V
FiveVoltRailMin_V	5V
Gates	gate
Group	base
Hardware	base
HardwareFlags	base
HardwareInformation	base
Health	base
HostPresent	PD
InputRail_flags	PD
InputRail_Limit_Max_V	PD
InputRail_Limit_Min_V	PD
InputRail_V	PD
InputRailMax_V	PD
InputRailMin_V	PD
Key.N	5V
ModeChangeAuto	sync

Key	Feature set
nrOfPorts	base
PanelID	base
Port.N.Battery	sync
Port.N.Current_mA	base
Port.N.Description	PD
Port.N.Energy_Wh	base
Port.N.Flags	base
Port.N.FlashDrive	sync
Port.N.LocationID	sync
Port.N.Manufacturer	PD
Port.N.Mode	base
Port.N.PID	PD
Port.N.ProfileID	5V
Port.N.Profiles	5V
Port.N.SerialNumber	PD
Port.N.TimeCharged_sec	base
Port.N.TimeCharging_sec	base
Port.N.USBStrings	PD
Port.N.VID	PD
Port.N.Voltage_10mV	PD
PortInfo.N	base
PortsInfo	base
Profile.N.enabled	5V
pwm_percent	temperature
Rebooted	base
SecurityArmed	5V
Settings	base
SystemTitle	base
Temperature_C	temperature

Key	Feature set
Temperature_flags	temperature
Temperature_Limit_Max_C	temperature
TemperatureMax_C	temperature
TotalCurrent_mA	5V
TotalPower_W	5V
TwelveVoltRail_flags	12V
TwelveVoltRail_Limit_Max_V	12v
TwelveVoltRail_Limit_Min_V	12v
TwelveVoltRail_V	12V
TwelveVoltRailMax_V	12V
TwelveVoltRailMin_V	12V
Uptime_sec	base

## Attached

---

A bit-field with one bit set for each port with a device attached, port 1 in bit 0, port 2 in bit 1 and so on.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Attached"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": attached-bit
}
```

*attached-bit* is an integer value.

Example, of three devices connected to ports 1,2,3

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 7
}
```

## Compiled

Timestamp of firmware version.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Compiled"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "compiled-date"
}
```

*compiled-date* is the timestamp of when the Firmware was compiled format "MMM DD YYYY HH mm SS"

Timestamp	Description
MMM	Month first 3 letters in english
DD	Date of the month as an integer
YYYY	Year as an integer
HH	Hour of build, 0-23
mm	Minute of build, 0-59
SS	Second of build, 0-59

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "Jul 08 2015 10:43:20"
}
```



## EnabledProfiles

---

List of global profiles currently enabled

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "EnabledProfiles"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "profiles"
}
```

*profiles* is list of all the charging profiles which are applied to the hub, profiles are displayed as a single number with a space between each profile.

### Example

Return value where charging profiles 1,2,3 and 4 are enabled.

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "1 2 3 4"
}
```

## Firmware

---

Firmware version string.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Firmware"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "firmware-version"
}
```

*firmware-version* is the version number of the firmware. Format 'N.nn'

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "1.55"
}
```

## Firmware Requirements

Get the types of firmware applicable to this hub, returned as an array containing information for all types of firmware that the hub accepts. For each entry, the form factor field indicates the firmware type for that part, which can be one of “un” for Universal, “pd” for PDSync, “st” for the TS3-C10 or “mc” for motor control board.

Firmware	Part Number	Product Name
Universal	PP15S	PowerPad15S
Universal	PP15C	PowerPad15C
Universal	PP8S	PowerPad8S
Universal	SS15	SuperSync15
Universal	TS3-16	ThunderSync3-16
SMART	TS3-C10	ThunderSync3-C10
Universal	U16S Spade	U16S Spade
Universal	U8S	U8S
PDSync	PDSync-C4	PDSync-C4
Universal	ModIT-Max	ModIT-Max
Motor Control	Motor control board	ModIT-Max

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "FirmwareRequirements"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

Returns an array of information about each type of firmware currently installed, with details of the firmware types required to update them.

```
{
  "result": [
    {
      "Manufacturer": "manufacturer-name",
```

```

    "Hardware": "product-name",
    "Firmware": "firmware-version",
    "Bootloader": "bootloader-version",
    "Group": "group-order",
    "FormFactor": "firmware-type",
    "HardwareID": hardware-id,
    "Group": "group-order"
    "SerialNumber": "hub-id",
  }
]
}

```

Output	Description
<i>hub-id</i>	This is the serial number of the hub returned from <a href="#">cbrx_discover</a>
<i>manufacturer-name</i>	Defined name of manufacturer, Default is 'Cambrionix'
<i>firmware-version</i>	Version number of the firmware. Format 'N.nn'
<i>bootloader-version</i>	Version number of the bootloader. Format 'N.nn'
<i>group-order</i>	Used to order hubs which is useful when updating connected products so that down-stream products are updated and rebooted first.
<i>firmware-type</i>	Used to denote which firmware the product accepts
<i>hardware-id</i>	hardware ID number of front panel product
<i>product-name</i>	Hardware name of product

## Example

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "result": [
    {
      "Manufacturer": "cambrionix",
      "Hardware": "ThunderSync3-16",
      "Firmware": "1.87",
      "Bootloader": "0.21",
      "FormFactor": "un",
      "HardwareID": 50,
      "Group": "-",
      "SerialNumber": "DJ00ASBK"
    },
    {
      "Manufacturer": "cambrionix",

```

```
    "Hardware": "Motor Board",  
    "Firmware": "0.08",  
    "Bootloader": "0.05",  
    "FormFactor": "mc",  
    "HardwareID": 1,  
    "Group": "+",  
    "SerialNumber": "DJ00ASBK"  
  }  
]  
}
```

## FiveVoltRail\_flags

Returns list of 5V supply rail error flags that have been detected, if any.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "FiveVoltRail_flags"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": "flag"
}
```

Flag	Description
UV	Under voltage occurred
OV	Over voltage occurred
UV OV	Both under and over voltage occurred.

**Example**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "UV OV"
}
```

## FiveVoltRail\_Limit\_Max\_V

---

Upper limit of the 5V rail that will trigger the error flag.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "FiveVoltRail_Limit_Max_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": FiveVoltRail-Limit-Max
}
```

*FiveVoltRail-Limit-Max* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 5.58
}
```

## FiveVoltRail\_Limit\_Min\_V

---

Lower limit of the 5V rail that will trigger the error flag

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "FiveVoltRail_Limit_Min_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": FiveVoltRail-Limit-Min
}
```

*FiveVoltRail-Limit-Min* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 3.50
}
```



## FiveVoltRail\_V

---

Current 5V supply voltage in Volt (V)

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "FiveVoltRail_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": FiveVoltRail_V
}
```

*FiveVoltRail\_V* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 5.25
}
```

## FiveVoltRailMax\_V

---

Highest 5V supply voltage measured in Volt (V)

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "FiveVoltRailMax_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": FiveVoltRailMax_V
}
```

*FiveVoltRailMax\_V* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 5.25
}
```

## FiveVoltRailMin\_V

---

Lowest 5V supply voltage measured in Volt (V)

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "FiveVoltRailMin_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": FiveVoltRailMin_V
}
```

*FiveVoltRailMin\_V* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 5.20
}
```

## Gates

Returns an object describing the states of all gates on the expansion product if present. Currently, this is only available on the ModIT range.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Gates"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result":
  {
    "N": "state"
  }
}
```

*N* is the port number

state	Description
open	The gate is open
closed	The gate is closed
opening	The gate is opening
closing	The gate is closing
stalled	The gate has stopped moving
timeout	The gate has taken too long to respond
unknown	Neither the top nor bottom end switches are engaged
open-stalled	The gate has stalled in the open position
closed-stalled	The gate has stalled in the closed position
opening-stalled	The gate has stalled whilst opening

state	Description
closing-stalled	The gate has stalled whilst closing
disabled	Disabled flag has been set which prevents the gate from opening/ closing

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "1": "open",
    "2": "closed",
    "3": "closed",
    "4": "opening"
  }
}
```

## Group

---

Group letter read from PCB jumpers.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Group"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "group-order"
}
```

*group-order* Is used to order hubs which is useful when updating connected products so that downstream products are updated and rebooted first., or “-” if no group jumper was fitted.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "-"
}
```

## Hardware

---

Part number of the hub.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Hardware"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "product-name"
}
```

*product-name* is the hardware name of product

### Example

```
{
  "result": "ThunderSync3-16"
}
```

# HardwareFlags

Flags indicating whether features are present

Syntax: see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "HardwareFlags"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

## Returns:

```
{
  "result": "flag"
}
```

Flag	Description
S	Sync feature set
L	5V feature set
E	12V feature set
T	Temperature feature set
P	PD feature set

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "SLET"
}
```



## HardwareInformation

---

Information on the hub

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "HardwareInformation"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": {
    "ProductName": "product-name",
    "ProductWebPage": "product-webpage",
    "TemperatureRangeC": {
      "Min": min-temperature,
      "Max": max-temperature
    },
    "HumidityRange": {
      "Min": min-humidity,
      "Max": max-humidity
    },
    "DimensionsMillimetres": {
      "Width": product-width,
      "Length": product-length,
      "Height": product-height
    },
    "HostPortType": "host-port",
    "HostPortBandwidth": "host-port-bandwidth",
    "HubMaxPowerOutputWatts": hub-max-power-output,
    "Ports": {
      "1": {
        "HardwareInformation": {
          "Type": "port-type",
          "Bandwidth": "port-bandwidth",
          "VoltageMax": port-max-volts,
          "MilliampsMax": port-max-current
        }
      },
      // etc all ports.
    }
  }
}
```

```

    }
  }
}

```

Variable	Description
<i>product-name</i>	Product name of the hub
<i>product-webpage</i>	The webpage for the hub
<i>min-temperature</i>	The minimum recommended temperature for the hubs enviroment (°C)
<i>max-temperature</i>	The maximum recommended temperature for the hubs enviroment
<i>min-humidity</i>	The minimum ambient humidty % for the hubs enviroment
<i>max-humidity</i>	The maximum ambient humidity % for the hubs enviroment
<i>product-width</i>	The width of the hub (mm)
<i>product-length</i>	The length of the hub (mm)
<i>product-height</i>	The height of the hub (mm)
<i>host-port</i>	The USB type of the host port
<i>host-port-bandwidth</i>	The maximum bandwidth for the host port (Gbps)
<i>hub-max-power-output</i>	The maximum power output for the whole hub
<i>port-type</i>	The USB type of the downstream ports
<i>port-bandwidth</i>	The maximum bandwidth for the downstream ports (Gbps)
<i>port-max-volts</i>	The maximum Voltage output for the downstream ports (V)
<i>port-max-current</i>	The maximum Current output fo the downstream ports (mA)

## Example

```

{
  "jsonrpc": "2.0",
  "id": 1,
  "result": {
    "ProductName": "ThunderSync3-C10",
    "ProductWebPage": "https://www.cambrionix.com/products/thundersync3-c10",
    "TemperatureRangeC": {

```

```

        "Min": 10,
        "Max": 35
    },
    "HumidityRange": {
        "Min": 5,
        "Max": 95
    },
    "DimensionsMillimetres": {
        "Width": 193,
        "Length": 136,
        "Height": 34
    },
    "HostPortType": "Thunderbolt 3",
    "HostPortBandwidth": "40Gbps",
    "HubMaxPowerOutputWatts": 150,
    "Ports": {
        "1": {
            "HardwareInformation": {
                "Type": "USB Type-C",
                "Bandwidth": "5Gbps",
                "VoltageMax": 5.2,
                "MilliampsMax": 3000
            }
        },
        // etc all ports.
    }
}

```

## Health

All available keys that are not port specific and change dynamically, as a dictionary.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Health"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": {
    "Uptime_sec": Uptime_sec,
    "FiveVoltRail_V": FiveVoltRail_V,
    "FiveVoltRailMin_V": FiveVoltRailMin_V,
    "FiveVoltRailMax_V": FiveVoltRailMax_V,
    "FiveVoltRail_flags": "FiveVoltRail_flags",
    "TwelveVoltRail_V": TwelveVoltRail_V,
    "TwelveVoltRailMin_V": TwelveVoltRailMin_V,
    "TwelveVoltRailMax_V": TwelveVoltRailMax_V,
    "InputRail_V": InputRail_V,
    "InputRailMin_V": InputRailMin_V,
    "InputRailMax_V": InputRailMax_V,
    "TwelveVoltRail_flags": "TwelveVoltRail_flags",
    "InputRail_flags": "InputRail_flags",
    "Temperature_C": Temperature_C,
    "TemperatureMax_C": TemperatureMax_C,
    "Temperature_flags": "Temperature_flags",
    "Rebooted": Rebooted
  }
}
```

Output	Description
<i>Uptime_sec</i>	see <a href="#">Uptime_sec</a>
<i>FiveVoltRail_V</i>	see <a href="#">FiveVoltRail_V</a>
<i>FiveVoltRailMin_V</i>	see <a href="#">FiveVoltRailMin_V</a>

Output	Description
<i>FiveVoltRailMax_V</i>	see <a href="#">FiveVoltRailMax_V</a>
<i>FiveVoltRail_flags</i>	see <a href="#">FiveVoltRail_flags</a>
<i>TwelveVoltRail_V</i>	see <a href="#">TwelveVoltRail_V</a>
<i>TwelveVoltRailMin_V</i>	see <a href="#">TwelveVoltRailMin_V</a>
<i>TwelveVoltRailMax_V</i>	see <a href="#">TwelveVoltRailMax_V</a>
<i>InputRail_V</i>	see <a href="#">InputRail_V</a>
<i>InputRailMin_V</i>	see <a href="#">InputRail_Limit_Min_V</a>
<i>InputRailMax_V</i>	see <a href="#">InputRailMax_V</a>
<i>TwelveVoltRail_flags</i>	see <a href="#">TwelveVoltRail_flags</a>
<i>InputRail_flags</i>	see <a href="#">InputRail_flags</a>
<i>Temperature_C</i>	see <a href="#">Temperature_C</a>
<i>TemperatureMax_C</i>	see <a href="#">TemperatureMax_C</a>
<i>Temperature_flags</i>	see <a href="#">Temperature_flags</a>
<i>Rebooted</i>	see <a href="#">Rebooted</a>

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "Uptime_sec": 528422,
    "FiveVoltRail_V": 5.23,
    "FiveVoltRailMin_V": 5.14,
    "FiveVoltRailMax_V": 5.25,
    "FiveVoltRail_flags": "",
    "TwelveVoltRail_V": 12.12,
    "TwelveVoltRailMin_V": 11.99,
    "TwelveVoltRailMax_V": 12.2,
    "InputRail_V": 12.12,
    "InputRailMin_V": 11.99,
    "InputRailMax_V": 12.2,
    "TwelveVoltRail_flags": "",
    "InputRail_flags": "",
    "Temperature_C": 37.3,
    "TemperatureMax_C": 41.1,
    "Temperature_flags": "",
    "Rebooted": true
  }
}
```

## HostPresent

The hub monitors the host USB socket for an attached host computer.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "HostPresent"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result":host
}
```

host	description
true	Host is detected
false	No host is detected

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## InputRail\_flags

List of input rail error flags if any are set.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "InputRail_flags"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": flag
}
```

Flag	Description
UV	under voltage occurred
OV	over voltage occurred
no flags	voltage is acceptable

**Example**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "OV UV"
}
```

## InputRail\_Limit\_Max\_V

---

Upper limit of the input rail that will trigger the error flag

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "InputRail_Limit_Max_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": InputRail-Limit-Max
}
```

*InputRail-Limit-Max* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 24.7
}
```



## InputRail\_Limit\_Min\_V

---

Lower limit of the input rail that will trigger the error flag.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "InputRail_Limit_Min_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": InputRail-Limit-Min
}
```

*InputRail-Limit-Min* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 9.59
}
```

## InputRail\_V

---

Current input rail supply in Volts (V).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "InputRail_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": InputRail_V
}
```

*InputRail\_V* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 24.03
}
```

## InputRailMax\_V

---

Highest input voltage measured in Volts (V).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "InputRailMax_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": InputRailMax_V
}
```

*InputRailMax\_V* is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 24.14
}
```

## InputRailMin\_V

---

Lowest input voltage measured in Volts (V).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "InputRailMin_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": InputRailMin_V
}
```

is a decimal number in Volts, format n.nn

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 23.82
}
```

## Key.N

Get information if a button has been pressed, double-clicks cannot be detected.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Key.N"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": button
}
```

button	Description
0	button n has not been pressed since the last time this entry was read
1	button n has been pressed since the last time this entry was read

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## ModeChangeAuto

Mode change from Charge to Sync is automatic.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "ModeChangeAuto"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": auto-change
}
```

auto-change	Description
true	Mode change from Charge to Sync is automatic.
false	Mode change from Charge to Sync is manual.

**Example**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## nrOfPorts

---

Number of USB ports on the hub.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "nrOfPorts"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": portsnumber
}
```

*portsnumber* is an integer of the amount of ports available

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 8
}
```

### Note

- On the PDSync-C4 you will have an additional port 0, which is the information on the host port.

## PanelID

---

PanelID number of front panel board, if fitted.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "PanelID"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "Panel-ID"
}
```

*Panel-ID* is the ID number of front panel product, if not fitted will return Absent/None

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "Absent"
}
```



## Port.N.Battery

If possible, retrieve the current battery level of the connected device. See notes about battery information collection. Depending on the device type (Android™, iOS etc.) and the host OS, different data may be returned.

For Apple, "Apple Mobile Device Support" must be installed (included with iTunes)

For Android, adb must be installed and running.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle
    "Port.N.Battery"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": {
    "CurrentLevel": battery-current-level,
    "CurrentTime": current-hub-time,
    "StartingLevel": charge-start-level,
    "StartingTime": charge-start-time,
  }
}
```

Output	Description
<i>battery-current-level</i>	Current battery level of device displayed as a percentage
<i>current-hub-time</i>	The hub time, shown as an integer in ms
<i>charge-start-level</i>	Battery percentage level when device connected
<i>charge-start-time</i>	The hub time charging started, shown as an integer in ms

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "CurrentLevel": 78,
    "CurrentTime": 15234254346,
    "StartLevel": 23,
    "StartTime": 15124151512,
  }
}
```

## Port.N.Current\_mA

---

Current being delivered to the USB device connected to this USB port in milli-Amperes (mA).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.Current_mA"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": Current_mA
}
```

*Current\_mA* is the current being delivered to the device, in mA (milliamperes)

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## Port.N.Description

---

Description as reported by the USB device attached to this USB port if it could be detected. Empty string is returned if it could not be detected.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.Description"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": "Description"
}
```

*Description* is the name of the hardware.

**Example**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "SuperPhone6"
}
```

## Port.N.Energy\_Wh

---

Energy the USB device on this USB port has consumed.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.Energy_Wh"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": energy-Wh
}
```

*energy-Wh* is the power in Watt-hours (calculated every second), format of n.n

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0.0
}
```

## Port.N.Flags

Get a list of all flags on a specific port

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.Flags"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "flag"
}
```

List of case-sensitive flag characters, separated by spaces. O, S, B, I, P, C, F are mutually exclusive. A, D are mutually exclusive.

Flag	Description
O	Port is in OFF mode
S	Port is in SYNC mode
B	Port is in Biased mode
I	Port is in charge mode, and is IDLE
P	Port is in charge mode, and is PROFILING
C	Port is in charge mode, and is CHARGING
F	Port is in charge mode, and is has FINISHED charging
A	Device is ATTACHED to this port
D	No device is attached to this port. Port is DETACHED
T	Device has been stolen from port: THEFT
E	ERRORs are present. See health command
R	System has REBOOTED. See crf command
r	Vbus is being reset during mode change

## Example

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": "R D S"  
}
```

## Port.N.FlashDrive

If detected, returns the mount point of a USB flash drive. For Windows this will be a drive letter, otherwise it will be a volume mount point.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.FlashDrive"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "Path:": "location",
  "Capacity":total-memory,
  "Available":available-memory
}
```

Output	Description
<i>location</i>	Location the disk is in the host system
<i>total-memory</i>	Total memory on disk
<i>available-memory</i>	Memory on disk not being used

### Examples:

Windows:

```
{
  "json": "2.0",
  "id": 0,
  "Path:": "H:",
  "Capacity": 123123123,
  "Available": 123123
}
```

macOS®:



```
{
  "json": "2.0",
  "id": 0,
  "Path": "/Volumes/SanDisk1",
  "Capacity": 123123123,
  "Available": 123123
}
```

#### Linux:

```
{
  "json": "2.0",
  "id": 0,
  "Path": "/media/bob/SanDisk1",
  "Capacity": 123123123,
  "Available": 123123
}
```

If there is no flash drive, the return value will simply be false.

This same information will also be provided in PortsInfo, PortInfo.N or cbrx\_discover('all') in a "FlashDrive" field where applicable and present. If not applicable or preset, this field will be absent.

## Port.N.LocationID

Return the location ID for a specific port. This does not require a device to be attached and so may be used to uniquely identify a USB slot. Location IDs indicate the bus number that a USB host controller is on in the first byte, then the port numbers down the tree for child devices.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.LocationID"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": location-id
}
```

*location-id* Is the [Location ID](#) as an Integer

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 563154944
}
```

#### Note

- for USB3 hubs, this location ID will be different when a USB3 device is plugged in compared to a USB2 device

## Port.N.Manufacturer

---

Manufacturer as reported by the USB device attached to this USB port, if it could be detected. Empty string is returned if it could not be detected.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.Manufacturer"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "device-manufacturer"
}
```

*device-manufacturer* is the name of the device manufacturer

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "SuperPhone Makers Inc."
}
```

## Port.N.Mode

Current port mode.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle
    "Port.N.Mode"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "mode"
}
```

For Standard USB hubs, the mode can be any of:

mode character	Description
s	Sync mode
c	Charge mode
b	Biased mode
o	Off

For Type-C hubs, the mode can be:

mode character	Description
c	On
o	Off

## Example

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "result": "s"  
}
```

## Port.N.PID

---

Product ID of the USB device attached to this USB port, if it could be detected.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.PID"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": product-id
}
```

*product-id* is the product ID number or PID. Displayed as an Integer. 0 (zero) is returned if it could not be detected.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## Port.N.ProfileID

---

Profile ID number.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.PID"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": profile-ID
}
```

*profile-ID* is the profile number, or 0 if not charging.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## Port.N.Profiles

---

List of enabled profiles for this port.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.Profiles"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "profiles"
}
```

*profiles* is list of all the charging profiles which are applied to the port, profiles are displayed as a single number with a space between each profile.

### Example

charging profiles 1,2,3 and 4 are enabled.

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "1 2 3 4"
}
```



## Port.N.SerialNumber

---

Serial number as reported by the USB device attached to this USB port, if it could be detected. Empty string is returned if it could not be detected.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.SerialNumber"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": "device-id"
}
```

*device-id* is the Device Serial number

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "1127dfa9037s1a8cb1"
}
```

## Port.N.TimeCharged\_sec

---

Time in seconds since this USB port detected the device has completed charging.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.TimeCharged_sec"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": charge-complete
}
```

*charge-complete* is the time in seconds that has passed since the device completed charging, -1 will be returned if this port has not detected completed charging.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## Port.N.TimeCharging\_sec

---

Time in seconds since this USB port started charging an attached device. 0 will be returned if the USB port has not started charging an attached device.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.TimeCharging_sec"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": charging-time
}
```

*charging-time* is the time passed in seconds that a port has been charging a device.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## Port.N.USBStrings

A dictionary containing the values for “Manufacturer”, “Description” and “SerialNumber” for this USB port.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.USBStrings"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "SerialNumber": "device-id",
  "Description": "description",
  "Manufacturer": "device-manufacturer"
}
```

Output	Description
<i>device-id</i>	Device Serial number
<i>description</i>	Name of the hardware
<i>device-manufacturer</i>	The name of the device manufacturer

### Example

```
{
  "json": 2.0,
  "id": 0,
  "SerialNumber": "23213dfel2e2412",
  "Description": "SuperPhone6",
  "Manufacturer": "SuperPhone Makers Inc."
}
```

## Port.N.VID

---

Vendor ID of the USB device attached to this USB port.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.VID"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": Vendor-ID
}
```

*Vendor-ID* is the vendor ID number or VID. Displayed as an Integer. 0 (zero) is returned if it could not be detected.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## Port.N.Voltage\_10mV

---

Voltage being supplied to the port in 10mV.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Port.N.Voltage_10mV"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": voltage-10mV
}
```

*voltage-10mV* is the voltage supplied to the port as an integer in increments of 10mV.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 520
}
```

## PortInfo.N

Get all port information for specified port. All available keys and values for this port as a dictionary.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "PortInfo.N"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": {
    "Port": port-number,
    "Current_mA": Current_mA,
    "LocationID": location-id,
    "Flags": flags,
    "USBVersion": usb-version,
    "VID": Vendor-ID,
    "PID": product-ID,
    "Manufacturer": "device-manufacturer",
    "Description": "description",
    "SerialNumber": "device-id",
    "USBTree": {
      "LocationID": location-id,
      "USBVersion": usb-version,
      "USBPower": {
        "State": "power-state",
        "Description": "power-description"
      },
      "USBSpeed": {
        "Speed": "USB-speed",
        "Description": "USB-description"
      },
      "Capability": {
        "Speed": "capable-speed",
        "Description": "capable-description"
      }
    },
    "Endpoints": {
      "Active": active-endpoints,
      "Memory": endpoint-memory
    }
  }
}
```

```

    }
  }
}

```

Output	Description
<i>port-number</i>	The number of the port on the hub
<i>Current_mA</i>	Current being delivered to the device, in mA (milliamperes)
<i>location-id</i>	The <a href="#">Location ID</a> as an Integer
<i>flags</i>	Flags on the port, see <a href="#">Port.N.Flags</a>
<i>usb-version</i>	The USB version number of the connection to the hub. Format 'N.nn'
<i>Vendor-ID</i>	Device Vendor ID number or VID. Displayed as an Integer
<i>product-ID</i>	Product ID number or PID. Displayed as an Integer
<i>device-manufacturer</i>	The name of the device manufacturer
<i>description</i>	Name of the hardware
<i>device-id</i>	Device Serial number
<i>power-state</i>	USB <a href="#">Power state</a> code
<i>power-description</i>	USB power turned on/off
<i>USB-speed</i>	Maximum speed USB connection capable of
<i>USB-description</i>	Name of USB connection i.e. SuperSpeed USB 5Gbps
<i>capable-speed</i>	Maximum data speed device capable of
<i>capable-description</i>	Name of maximum data speed device capable of
<i>active-endpoints</i>	How many endpoints the device is using
<i>endpoint-memory</i>	Amount of memory being used by endpoints

## Example

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "result": {
    "Port": 1,

```



```

    "Current_mA": 1084,
    "LocationID": 563154944,
    "Flags": "R A S",
    "USBVersion": 2.1,
    "VID": 1256,
    "PID": 26720,
    "Manufacturer": "SAMSUNG",
    "Description": "SAMSUNG_Android",
    "SerialNumber": "RFCN20Q8LJM",
    "USBTree": {
      "LocationID": 563154944,
      "USBVersion": 2.1,
      "USBPower": {
        "State": "D0",
        "Description": "On"
      },
      "USBSpeed": {
        "Speed": "480Mbps",
        "Description": "High",
        "Capability": {
          "Speed": "10Gbps",
          "Description": "SuperSpeed USB 10Gbps"
        }
      },
      "Endpoints": {
        "Active": 9,
        "Memory": 36864
      }
    }
  }
}

```

## PortsInfo

Get all port information for all ports. All available information for all ports as a dictionary of dictionaries. Most of these values can be queried individually

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "PortsInfo"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

## Returns

```
{
  "Port.1": {
    "Port": port-number,
    "Current_mA": Current_mA,
    "Flags": flags,
    "ProfileID": profile-ID,
    "TimeCharging_sec": charging-time,
    "TimeCharged_sec": charge-complete,
    "Energy_Wh": energy-Wh,
    "VID": Vendor-ID,
    "PID": product-ID,
    "Manufacturer": "device-manufacturer",
    "Description": "description",
    "SerialNumber": "device-id",
    "PhoneSerialNumber": "phone-serial",
    "PhoneIdentity": "phone-name",
    "IMEI": "IMEI-number",
    "MacAddress": "MacAdress",
    "PhoneSoftwareVersion": "phone-OS-version"
    "USBTree": {
      "USB2": {
        "LocationID": location-id,
        "VID": Vendor-ID,
        "PID": product-ID,
        "Manufacturer": "device-manufacturer",
        "Description": "description",
        "SerialNumber": "device-id",
        "USBVersion": usb-version,
        "Battery": {
          "DataSource": "battery-data-source",

```

```

    "TrustLevel": "trust-level",
    "PairingSupported": support-pairing,
    "HealthPercent": battery-health,
    "CurrentLevel": battery-current-level,
    "CurrentTime": current-hub-time,
    "StartingLevel": charge-start-level,
    "StartingTime": charge-start-time,
    "CapacityNew": new-battery-capacity,
    "Capacity": current-battery-capacity,
    "ChargingStatus": "charge-status",
  },
  "PhoneSerialNumber": "phone-serial",
  "PhoneIdentity": "phone-name",
  "IMEI": "IMEI-number",
  "MacAddress": "MacAdress",
  "PhoneSoftwareVersion": "phone-OS-version"
}
},
"Battery": {
  "DataSource": "battery-data-source",
  "TrustLevel": "trust-level",
  "PairingSupported": support-pairing,
  "CurrentLevel": battery-current-level,
  "CurrentTime": current-hub-time,
  "StartingLevel": charge-start-level,
  "StartingTime": charge-start-time,
  "CapacityNew": new-battery-capacity,
  "Capacity": current-battery-capacity,
  "ChargingStatus": "charge-status",
  "HealthPercent": battery-health
}
}
}

```

Output	Description
<i>port-number</i>	The number of the port on the hub
<i>Current_mA</i>	Current being delivered to the mobile device, in mA (milliamperes)
<i>flags</i>	Flags on the port, see <a href="#">Port.N.Flags</a>
<i>profile-ID</i>	The profile number, or 0 if not charging.
<i>charging-time</i>	Time passed in seconds that a port has been charging a device.
<i>charge-complete</i>	Time in seconds since the device completed charging
<i>energy-Wh</i>	Power in Watt-hours (calculated every second), format of n.n
<i>Vendor-ID</i>	Device Vendor ID number or VID. Displayed as an Integer

Output	Description
<i>product-ID</i>	Product ID number or PID. Displayed as an Integer
<i>device-manufacturer</i>	The name of the device manufacturer
<i>description</i>	Name of the hardware
<i>device-id</i>	Device Serial number
<i>phone-serial</i>	Phone serial number
<i>phone-name</i>	Name of the phone
<i>IMEI-number</i>	The IMEI number of the phone
<i>MacAdress</i>	A unique address assigned to the mobile device. It is a 48 bit value, consisting of twelve hexadecimal characters
<i>phone-OS-version</i>	Version number of the OS on the phone
<i>location-id</i>	The <a href="#">Location ID</a> as an Integer
<i>usb-version</i>	The USB version number of the connection to the hub. Format 'N.nn'
<i>battery-data-source</i>	The source of the device battery information
<i>trust-level</i>	Whether the device is trusted/ paired
<i>support-pairing</i>	Whether the device supports being trusted/ paired
<i>battery-health</i>	Battery health shown as a percentage
<i>battery-current-level</i>	Current battery level of device displayed as a percentage
<i>current-hub-time</i>	The hub time, shown as an integer in ms
<i>charge-start-level</i>	Battery percentage level when device connected
<i>charge-start-time</i>	The hub time charging started, shown as an integer in ms
<i>new-battery-capacity</i>	The battery capacity of device from new

Output	Description
<i>current-battery-capacity</i>	The battery capacity of the device now
<i>charge-status</i>	Charging status of the battery i.e. full
<i>support-pairing</i>	Whether the device supports being trusted/ paired
<i>battery-health</i>	Battery health shown as a percentage

## Example

Trimmed example of information returned.

```
{
  "json": "2.0",
  "id": 0,
  "Port.1": {
    "Port": 1,
    "Current_mA": 126,
    "Flags": "R A S",
    "ProfileID": 0,
    "TimeCharging_sec": 0,
    "TimeCharged_sec": 0,
    "Energy_Wh": 0.0,
    "VID": 1452,
    "PID": 4776,
    "Manufacturer": "SuperPhone Makers Inc.",
    "Description": "SuperPhone",
    "SerialNumber": "012a37d1fa07617ad7ef0430ba49f479ab9fb6b8",
    "PhoneSerialNumber": "ZCZCZCZCZCZC",
    "PhoneIdentity": "My Old SuperPhone",
    "IMEI": "354430099009999",
    "MacAddress": "aa:bb:cc:ff:ee:ff",
    "PhoneSoftwareVersion": "12.4.8",
    "USBTree": {
      "USB2": {
        "LocationID": 589570048,
        "VID": 1452,
        "PID": 4776,
        "Manufacturer": "SuperPhone Makers Inc.",
        "Description": "SuperPhone",
        "SerialNumber": "012a37d1fa07617ad7ef0430ba49f479ab9fb6b8",
        "USBVersion": 2.0,
        "Battery": {
          "DataSource": "imobiledevice",
          "TrustLevel": "paired",
          "PairingSupported": true,
          "HealthPercent": 95,
          "CurrentLevel": 100,
          "CurrentTime": 1613056296,
          "StartingLevel": 100,
          "StartingTime": 1613056293,
          "CapacityNew": 1751,

```

```

        "Capacity": 1678,
        "ChargingStatus": "full"
    },
    "PhoneSerialNumber": "ZCZCZCZCZCZC",
    "PhoneIdentity": "My Old SuperPhone",
    "IMEI": "354430099009999",
    "MacAddress": "aa:bb:cc:ff:ee:ff",
    "PhoneSoftwareVersion": "12.4.8"
},
{
    "Battery": {
        "DataSource": "imobiledevice",
        "TrustLevel": "paired",
        "PairingSupported": true,
        "HealthPercent": 95,
        "CurrentLevel": 100,
        "CurrentTime": 1613056296,
        "StartingLevel": 100,
        "StartingTime": 1613056293,
        "CapacityNew": 1751,
        "Capacity": 1678,
        "ChargingStatus": "full"
    }
},
{
    "Port.2": {
        "Port": 2,
        "Current_mA": 0,
        "Flags": "R D S",
        "ProfileID": 0,
        "TimeCharging_sec": 0,
        "TimeCharged_sec": 0,
        "Energy_Wh": 0.0,
        "VID": 0,
        "PID": 0,
        "Manufacturer": "",
        "Description": "",
        "SerialNumber": ""
    },
    "Port.3": ...
}

```

## Profile.N.enabled

Get information if a specific profile is enabled. See specific product user manuals on profiles available on your hub.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Profile.N.enabled"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": profile-enabled
}
```

profile-enabled	Description
true	Specific profile is enabled
false	Specific profile is not enabled

**Example**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": false
}
```

## pwm\_percent

---

Fan speed.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "pwm_percent"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": fan-percent
}
```

*fan-percent* is the fan speed as a percentage, displayed as a number 0-100

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 100
}
```



## Rebooted

A flag indicating if the system has been rebooted since power up.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Rebooted"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": rebooted
}
```

Rebooted	Description
true	system has been rebooted
false	no reboot has occurred.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": true
}
```

## SecurityArmed

Is security armed?

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "SecurityArmed"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": security-armed
}
```

<b>security-armed</b>	<b>Description</b>
true	Security has been armed
false	Security has not been armed

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": false
}
```

## Settings

Obtain current hub Internal hub settings.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Settings",
    true
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": {
    "company_name": "manufacturer-name",
    "product_name": "product-name",
    "local_name": "local-name",
    "attach_threshold": "attach-threshold",
    "default_profile": [default-profile],
    "remap_ports": [port-order],
    "ports_on": [ports-on],
    "sync_chrg": [sync-charge],
    "alt_sync_chrg": [alt-sync-charge],
    "misc_flags": Internal hub-flags,
    "display_mode": "display-mode",
    "charged_threshold": "charged-threshold",
    "temperature_max": "shutdown-temperature",
    "stagger": "stagger"
  }
}
```

Variables	Description
<i>manufacturer-name</i>	Defined name of manufacturer, Default is 'Cambrionix'
<i>product-name</i>	Hardware name of product
<i>local-name</i>	Local or friendly name set by the user, "-" if not set

Variables	Description
<i>attach-threshold</i>	Current drawn in mA that the hub detects a device is connected, "d" means factory default is set
<i>default-profile</i>	Default profile for each port, comma seperated list
<i>port-order</i>	Order the ports are by port number, comma seperated list
<i>ports-on</i>	Whether each port is default on, 0 is default off 1 is default on, comma seperated list
<i>sync-charge</i>	Whether CDP* on each port on, 0 is off, 1 is on, comma seperated list
<i>alt-sync-charge</i>	Whether alternative CDP* on each port on, 0 is off, 1 is on, comma seperated list
<i>Internal hub-flags</i>	If any Internal hub Misc flags are active
<i>display-mode</i>	Change the display mode for logs, "d" means factory default is set
<i>charged-threshold</i>	Current drawn in mA that the hub detects a device is fully charged, "d" means factory default is set
<i>shutdown-temperature</i>	Temperature that will shutdown the hub if reached in Celcius, "d" means factory default is set
<i>stagger</i>	A delay between ports turning on in ms, "d" means factory default is set

\*Charging Downstream Port (CDP) Being enabled means that a port is capable of transferring data and charging the device at the same time with a higher current than just data syncing alone. With CDP enabled the hub can supply up to 1.5A

## Example

```
{
  "jsonrpc": "2.0",
  "id": 5,
  "result": {
    "company_name": "cambrionix",
    "product_name": "SuperSync15",
    "local_name": "-",
    "attach_threshold": "d",
    "default_profile": [0,0,0,0,0,0,0,0,0,0,0,0,0,0,0],
    "remap_ports": [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15],
    "ports_on": [0,0,0,0,0,0,0,0,0,0,0,0,0,0,0],
    "sync_chrg": [1,1,1,1,1,1,1,1,1,1,1,1,1,1,1],
    "alt_sync_chrg": [1,1,1,1,1,1,1,1,1,1,1,1,1,1,1],
    "misc_flags": 0,
    "display_mode": "d",
  }
}
```

```
    "charged_threshold": "d",  
    "temperature_max": "d",  
    "stagger": "d"  
  }  
}
```

## SystemTitle

---

The system identification text.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "SystemTitle"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": system-title
}
```

*system-title* is the full descriptive name of the hub

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "cambrionix U8S-EXT 8 Port USB Charge+Sync"
}
```

## Temperature\_C

---

Present PCB temperature in degrees Celsius.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Temperature_C"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": temperature
}
```

*temperature* is a measured temperatures as a decimal.  $\leq 0$  °C will return 0. Measured temperatures  $\geq 100$  °C will return 100.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 37.7
}
```

## Temperature\_flags

---

Temperature error flags:

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Temperature_flags"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": temperature-flags
}
```

temperature-flags	Description
OT	over temperature event has occurred.
empty	temperature is acceptable

**Example**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "OT"
}
```



## Temperature\_Limit\_Max\_C

---

Upper limit of the acceptable temperature range that will trigger the error flag.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Temperature_Limit_Max_C"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": temperature-limit-max
}
```

*temperature-limit-max* the upper limit in Celcius displayed as a decimal.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 65.0
}
```

## TemperatureMax\_C

---

Highest PCB temperature recorded in degrees Celsius.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TemperatureMax_C"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": temperature-max
}
```

*temperature* is a measured temperatures displayed as a decimal.  $\leq 0$  °C will return 0. Measured temperatures  $\geq 100$  °C will return 100.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 39.9
}
```

## TotalCurrent\_mA

---

Total current in mA for all USB ports.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TotalCurrent_mA"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": total-current
}
```

*total-current* is the total current across all ports in mA displayed as a decimal

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 0
}
```

## TotalPower\_W

---

Total power being consumed on all USB ports in Watts (W).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TotalPower_W"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns

```
{
  "result": total-power
}
```

*total-power* is the total power across all ports in W displayed as an decimal.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 3.4
}
```

## TwelveVoltRail\_flags

List of 12V supply rail error flags.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TwelveVoltRail_flags"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

**Returns:**

```
{
  "result": twelve-volt-flags
}
```

twelve-volt-flags	Description
“UV”	under voltage occurred
“OV”	over voltage occurred
“OV UV”	both over and under voltage occurred
“ ”	voltage is acceptable

**Example**

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": " "
}
```

## TwelveVoltRail\_Limit\_Max\_V

---

Upper limit of the 12V rail that will trigger the error flag.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TwelveVoltRail_Limit_Max_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": twelve-volt-limit-max
}
```

*twelve-volt-limit-max* is the maximum amount of volts before error is flagged in Volts displayed as a decimal.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 14.5
}
```

## TwelveVoltRail\_Limit\_Min\_V

---

Lower limit of the 12V rail that will trigger the error flag.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TwelveVoltRail_Limit_Min_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": twelve-volt-limit-min
}
```

*twelve-volt-limit-min* is the minimum amount of volts before error is flagged in Volts displayed as a decimal.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 9.59
}
```

## TwelveVoltRail\_V

---

Current 12V supply voltage in Volts (V).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TwelveVoltRail_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": twelve-volt
}
```

*twelve-volt* is the amount of volts being supplied in Volts displayed as a decimal.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 12.43
}
```



## TwelveVoltRailMax\_V

---

Highest 12V supply voltage measured.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TwelveVoltRailMax_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": twelve-volt-max
}
```

*twelve-volt-max* is the highest amount of volts seen in Volts displayed as a decimal.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 12.52
}
```

## TwelveVoltRailMin\_V

---

Lowest 12V supply voltage measured in Volts (V).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "TwelveVoltRailMin_V"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": twelve-volt-min
}
```

*twelve-volt-min* is the smallest amount of volts seen in Volts displayed as a decimal.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 12.31
}
```

## Uptime\_sec

---

Time in seconds the hub has been running since the last reset.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Uptime_sec"
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "result": uptime
}
```

*uptime* is the amount of time in seconds of continuous running, displayed as an integer.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": 151304
}
```

## 13.3. Set Dictionary

Key	Feature set
Beep	5V
ClearErrorFlags	base
ClearLCD	5V
ClearRebootFlag	base
FiveVoltRail.OverVoltage	5V
FiveVoltRail.UnderVoltage	5V
InputRail.OverVoltage	PD
InputRail.UnderVoltage	PD
LCDText.ROW.COL	5V
Mode	base
Port.N.gate	gate
Port.N.led1	base
Port.N.led2	base
Port.N.led3	base
Port.N.leds	base
Port.N.mode	base
Port.N.profiles	sync
Port.N.RGB	gate
ProfileEnable.n	5V
Reboot	base
RemoteControl	base
RGBControl	gate
SecurityArmed	5V
Settings	base
Temperature.OverTemperature	temperature
TwelveVoltRail.OverVoltage	12V
TwelveVoltRail.UnderVoltage	12V

## Beep

Beep for the number of milliseconds passed in.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "beep",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
time period	An integer for the amount of time required for the beep in ms

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "beep",
    250
  ]
}
```

## ClearErrorFlags

Clear all error flags

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "ClearErrorFlags",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Clear the error flags

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "ClearErrorFlags",
    true
  ]
}
```

## ClearLCD

Clear the LCD.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "ClearLCD",
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "ClearLCD",
  ]
}
```

## ClearRebootFlag

Clear the reboot flag.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "ClearRebootFlag",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Clear the Rebooted flag

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "ClearRebootFlag",
    true
  ]
}
```



## FiveVoltRail.OverVoltage

Force the behaviour of a 5V over voltage condition.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "FiveVoltRail.OverVoltage",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Set 5V over voltage flag

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "FiveVoltRail.OverVoltage",
    true
  ]
}
```

## FiveVoltRail.UnderVoltage

Force the behaviour of a 5V under voltage condition.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "FiveVoltRail.UnderVoltage",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Set 5V under voltage flag

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "FiveVoltRail.UnderVoltage",
    true
  ]
}
```

## InputRail.OverVoltage

Force the behaviour of an input rail over voltage condition.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "InputRail.OverVoltage",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Set voltage input over voltage flag

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "InputRail.OverVoltage",
    true
  ]
}
```

## InputRail.UnderVoltage

Force the behaviour of an input rail under voltage condition.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "InputRail.UnderVoltage",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Set voltage input under voltage flag

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
  "params": [
```

```
7654,  
"LCDText.4.5",  
"hello"  
]  
}
```

## LCDText.ROW.COL

Write the string on the LCD at (row, column). Row and column are zero based.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "LCDText.ROW.COL",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>ROW</i>	LCD Row you wish to start writing
<i>COL</i>	LCD Collum you wish to start writing
<i>Value</i>	The value you wish to set for the key

Value	Description
String	A Text string you wish to display on the LCD

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_connection_set",
```

```
"params": [  
  7654,  
  "InputRail.UnderVoltage",  
  true  
]  
}
```

## Mode

Set same mode to all USB Ports. Please see [product user manuals](#) for details on the modes supported by each hub.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "mode",
    "Value"
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
c	Charge mode
s	Sync and Charge mode
b	biased mode
o	off

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.



## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "Mode",
    "s"
  ]
}
```

## Port.N.gate

Open or close specified gate. You should monitor the state of the required gate via `cbrx_connection_get(handle, "Gates")` to ensure it completes.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.gate",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port number
<i>Value</i>	The value you wish to set for the key

Value	Description
open	Open gate
close	Close gate
stop	Stop current gate action

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "Port.1.gate",
    "open"
  ]
}
```

## Port.N.led1

Set the status of the first LED

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.led1",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port number
<i>Value</i>	The value you wish to set for the key

Value	Description
Flash pattern	0-255 with the LEDs flashing according to the bit pattern represented by the value.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
```

```
        7654,  
        "Port.1.led1",  
        170  
    ]  
}
```

## Port.N.led2

Set the status of the second LED

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.led2",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port number
<i>Value</i>	The value you wish to set for the key

Value	Description
Flash pattern	0-255 with the LEDs flashing according to the bit pattern represented by the value.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
```

```
        7654,  
        "Port.1.led2",  
        170  
    ]  
}
```

## Port.N.led3

Set the status of the third LED

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.led3",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port number
<i>Value</i>	The value you wish to set for the key

Value	Description
Flash pattern	0-255 with the LEDs flashing according to the bit pattern represented by the value.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
```



```
        7654,  
        "Port.1.1ed3",  
        170  
    ]  
}
```

## Port.N.leds

Set the status of all three LEDs

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.leds",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port Number
<i>Value</i>	The value you wish to set for the key

### Value

A 24 bit numeric value consisting of the individual LED settings as 8 bit values shifted and OR'ed together. i.e.  $\text{led1} | (\text{led2} \ll 8) | (\text{led3} \ll 16)$ , so with led1 and led2 as zero, and led3 being 0b10101010 (decimal 170), the result should be 11,141,120 decimal.

On a ThunderSync3, 255 is Green, 65,280 is red, 16,711,680 is Yellow.

On a ModIT, Blue is used instead of Yellow, but you can of course mix colours into any RGB mix.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "Port.1.1eds",
    11193404
  ]
}
```

## Port.N.mode

Set mode of a single USB port. Sync mode can only be set on device that implement the sync feature set. Biased mode can only be set on devices that implement the 5V feature set.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.mode",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port number
<i>Value</i>	The value you wish to set for the key

Value	Description
c	Charge mode
s	Sync and Charge mode
b	Biased mode
o	Off

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "Port.1.Mode",
    "c"
  ]
}
```

## Port.N.profiles

Set the list of enabled profiles.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.profiles",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port number
<i>Value</i>	The value you wish to set for the key

Value	Description
profile	A comma separated list of profiles to enable, see <a href="#">product user manuals</a> for details on profiles applicable to your hub.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
```

```
"params": [  
  7654,  
  "Port.1.profiles",  
  "1,2,3"  
]  
}
```

## Port.N.RGB

Set RGB colour of ModIT LEDs.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Port.N.RGB",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	Port number
<i>Value</i>	The value you wish to set for the key

### Value

Colour value can either be an integer (where you must supply full RGBA), or a string. For a string, you can specify it as RGB, RGBA, RRGGBB or RRGGBBAA. Much like you can with an HTML colour. For example, use “FF0000” or “F00” for red, “FFFFFF” for white and so on. Optionally supply the alpha (intensity) digits, so “FFFFFF80” for half bright white.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
```



```
"id": 0,  
"jsonrpc": "2.0",  
"method": "cbrx_connection_set",  
"params": [  
    7654,  
    "Port.1.RGB",  
    "ff08"  
]  
}
```

## ProfileEnable.n

Enable or disable the global profile *n*

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "ProfileEnable.n"
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>n</i>	Profile number

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "ProfileEnable.n"
  ]
}
```

## Reboot

Reboot the hub now. The API will attempt to re-establish connection automatically, but you should not expected to receive updated results for several seconds.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Reboot",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Reboot the hub.

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
```

```
        "Reboot",  
        "true"  
    ]  
}
```

## RemoteControl

Enable / disable controlling of the unit controls. This will allow the LEDs or LCD to be updated or panel button pushes to be detected.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "RemoteControl",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Enable manual remote control mode
false	Disable manual remote control mode
"auto"	Enable auto control mode via the API

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
```

```
"jsonrpc": "2.0",  
"method": "cbrx_connection_set",  
"params": [  
    7654,  
    "RemoteControl",  
    "true"  
]  
}
```

## RGBControl

Enable / disable ModIT RGB LED control for ports. This does not require RemoteControl to be enabled.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "RGBControl",
    {
      "port": N,
      "enable":
        value
    }
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	port number
<i>value</i>	The value you wish to set for the key

Value	Description
true	Enable control of the RGB LED's
false	Disbale control of the RGB LED's

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "RGBControl",
    {
      "port": 8,
      "enable": true
    }
  ]
}
```

## Multiple ports

If you wish to set control on a range of ports then the params would change. You would need to enter two values the 'start' value of the port to start with and the 'end' value of the port to finish with.

**Syntax: see Calls within this manual**

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "RGBControl",
    {
      "start": N,
      "end": N,
      "enable":
        value
    }
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>N</i>	port number
<i>value</i>	The value you wish to set for the key

Value	Description
true	Enable control of the RGB LED's
false	Disbale control of the RGB LED's



## Returns:

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "RGBControl",
    {
      "start": 1,
      "end": 8,
      "enable": true
    }
  ]
}
```

## SecurityArmed

Enable / disable security feature. If the security is enabled, removal of a device from a port will sound an alarm (if installed) and flash lights (if installed).

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "SecurityArmed",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	enable security
false	disable security

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
```

```
"params": [  
  7654,  
  "SecurityArmed",  
  "true"  
]  
}
```

## Settings

Perform command line interface operation on the connected hub and return the complete result. This allows you to run commands directly on the hub's command line without stopping the API service. In order to update the settings the CLI setting will require a settings\_unlock\n prefix to the command for more information on using CLI commands please see the CLI documentation [www.cambrionix.com/cli](http://www.cambrionix.com/cli)

**Syntax:** see Calls within this manual

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Settings",
    "settings_unlock\nCommand"
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Command</i>	The Command you wish to send to the hub For all CLI commands see the CLI Documentation <a href="http://www.cambrionix.com/cli">www.cambrionix.com/cli</a>

### Returns:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "result": "Unlocked \nSetting updated"
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

If you attempt to update a setting that is already set you will receive a message stating that the setting is already set such as the example of sending the ports on below

```
{
  "jsonrpc": "2.0",
```

```
"id": 0,  
"result": "Unlocked \nForcing ports on has already been defined."  
}
```

## Example

```
{  
  "jsonrpc": "2.0",  
  "id": 0,  
  "method": "cbrx_hub_set",  
  "params": [  
    "DM01K2A8",  
    "settings",  
    "settings_unlock\nsettings_set ports_on 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1"  
  ]  
}
```

## Temperature.OverTemperature

Force the behaviour of an over temperature condition.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "Temperature.OverTemperature",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Set the over temperature flag

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "Temperature.OverTemperature",
    "true"
  ]
}
```

## TwelveVoltRail.OverVoltage

Force the behaviour of a 12V over voltage condition. TwelveVoltRail is the same as InputRail.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "TwelveVoltRail.OverVoltage",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Set the 12V over voltage flag

**Returns:**

```
{
  "result": true
}
```

## Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

## Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
    "TwelveVoltRail.OverVoltage",
    "true"
  ]
}
```

## TwelveVoltRail.UnderVoltage

Force the behaviour of a 12V under voltage condition.  
TwelveVoltRail is the same as InputRail.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_set",
  "params": [
    connection-handle,
    "TwelveVoltRail.UnderVoltage",
    Value
  ]
}
```

Parameter	Description
<i>connection-handle</i>	The <a href="#">Connection handle</a> as an integer
<i>Value</i>	The value you wish to set for the key

Value	Description
true	Set the 12V under voltage flag

### Returns:

```
{
  "result": true
}
```

### Errors

If there is an error in the API method then a [JSON-RPC error object](#) will be returned.

### Example

```
{
  "id": 0,
  "jsonrpc": "2.0",
  "method": "cbrx_connection_set",
  "params": [
    7654,
```



```
        "TwelveVoltRail.UnderVoltage",  
        "true"  
    ]  
}
```

## 13.4. Deprecated Dictionaries

These dictionaries exist to support backwards compatibility only and should not be used. These key-values may be removed in future versions.

API Call	Description
<a href="#">Settings</a>	Obtain current hub Internal hub settings.

## Settings

Obtain current hub Internal hub settings, returns as text.

**Syntax:** see [Calls within this manual](#)

```
{
  "method": "cbrx_connection_get",
  "params": [
    connection-handle,
    "Settings",
  ]
}
```

*connection-handle* is the [Connection handle](#) as an integer.

### Returns:

```
{
  "jsonrpc": "2.0",
  "id": 5,
  "result": [
    "Current memory Settings :",
    "",
    "settings_set company_name manufacturer-name",
    "settings_set product_name product-name",
    "settings_set local_name local-name",
    "settings_set attach_threshold attach-threshold",
    "settings_set default_profile default-profile",
    "settings_set remap_ports port-order",
    "settings_set ports_on ports-on",
    "settings_set sync_chrg sync-charge",
    "settings_set alt_sync_chrg alt-sync-charge",
    "settings_set misc_flags Internal hub-flags",
    "settings_set display_mode display-mode",
    "settings_set charged_threshold charged-threshold",
    "settings_set temperature_max shutdown-temperature",
    "settings_set stagger stagger"
  ]
}
```

Variables	Description
<i>manufacturer-name</i>	Defined name of manufacturer, Default is 'Cambrionix'
<i>product-name</i>	Hardware name of product

Variables	Description
<i>local-name</i>	Local or friendly name set by the user, "-" if not set
<i>attach-threshold</i>	Current drawn in mA that the hub detects a device is connected, "d" means factory default is set
<i>default-profile</i>	Default profile for each port
<i>port-order</i>	Order the ports are by port number
<i>ports-on</i>	Whether each port is default on, 0 is default off 1 is default on
<i>sync-charge</i>	Whether CDP* on each port on, 0 is off, 1 is on, comma seperated list
<i>alt-sync-charge</i>	Whether alternative CDP* on each port on, 0 is off, 1 is on
<i>Internal hub-flags</i>	If any Internal hub Misc flags are active
<i>display-mode</i>	Change the display mode for logs, "d" means factory default is set
<i>charged-threshold</i>	Current drawn in mA that the hub detects a device is fully charged, "d" means factory default is set
<i>shutdown-temperature</i>	Temperature that will shutdown the hub if reached in Celcius, "d" means factory default is set
<i>stagger</i>	A delay between ports turning on in ms, "d" means factory default is set

\*Charging Downstream Port (CDP) Being enabled means that a port is capable of transferring data and charging the device at the same time with a higher current than just data syncing alone. With CDP enabled the hub can supply up to 1.5A

## Example

```
{
  "jsonrpc": "2.0",
  "id": 5,
  "result": [
    "Current memory Settings :",
    "",
    "settings_set company_name cambrionix",
    "settings_set product_name SuperSync15",
    "settings_set local_name -",
    "settings_set attach_threshold d",
    "settings_set default_profile 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ",
    "settings_set remap_ports 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 ",
    "settings_set ports_on 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ",
    "settings_set sync_chrg 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 ",
    "settings_set alt_sync_chrg 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 ",
    "settings_set misc_flags 0000",
    "settings_set display_mode d",
  ]
}
```

```
        "settings_set charged_threshold d",  
        "settings_set temperature_max d",  
        "settings_set stagger d"  
    ]  
}
```

## 14. Socket Connections

---

When using the Python wrapper that provides the `cbxapi` module, each time a call is made to the API, a socket is created. This socket is then used to send the command and receive the response before being closed.

If you are writing your own program, you may wish to consider creating a single socket at the start of your communication with the API and keeping this socket open until you wish to stop using the API. Keeping the socket open for the lifetime of your communication with the API will reduce the load on the system and lead to shorter communication cycles with the API.

If you do choose to manage your own socket connections to the API, it is important that you do not close the socket before receiving the response from the final command. Closing the socket without waiting to receive the response may lead to the requested operation not being completed, this is especially important on set and close operations.

## 15. Controlling the LEDs

---

The API can control product LEDs. By default these LEDs are controlled automatically by the product to indicate the state that a port is in.

In order for the LEDs to be controlled by the API this automatic control must be disabled and this is done by setting the “RemoteControl” key to be ‘True’. If you wish to return control of the LEDs to the automatic control you set “RemoteControl” to be ‘False’. See [cbrx\\_connection\\_set](#) for more information on using this Method.

Control of an LED is achieved by providing an 8 bit value which is interpreted in binary as a pattern that is continuously cycled through. So by setting the value 11110000b, the LED will flash slowly. The LED will be lit where there is a ‘1’ and unlit where there is a ‘0’. Alternatively setting the value 10101010b will make the LED flash fast. The pattern need not be symmetrical so 10010000b will produce two short flashes close together with a longer pause before the cycle repeats.

Any value set for an LED while RemoteControl is False will be overwritten and so have no effect. A special argument of "auto" in place of True allows the hub to override the user set LED pattern when a device attached to that port is removed.

## 16. Battery Information

Battery information can be retrieved for connected devices. For Android™ devices using Android Debug Bridge (ADB), and for iOS devices an in-built build of libimobile.

ADB can be used to query the battery level on any Android™ devices providing a few conditions are met.

- The Android platform tools are installed, these can be downloaded from [here](#).
- The ADB binary is in the path, or it's path is provided to the API via `cbrx_config_set`.
- The device has USB debugging enabled.
- You have trusted the computer from the phone if the phone requires it.

See [this page](#) for details on enabling debug mode on Android™ devices. The only options that are required are to enable developer mode and USB debugging.

```
# Install Android platform tools on Linux sudo apt install
Android-platform-tools# # Install Android platform tools on macOS
brew cask install Android-platform-tools # Install Android
platform tools on Windows # Goto
https://developer.Android.com/studio/releases/platform-tools # Download
SDK Platform-Tools for Windows # Extract and add the folder to your path
or use # cbrx_config_set("adb_path" <pathname>) to add to API
settings.
```

### Finding adb without the path

Alternatively from setting the path, we can tell the API where to find these programs.

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cbrx_config_set",
  "params": {
    "adb_path": "/usr/local/bin"
  }
}
```

### Mobile-device battery trust-levels

To obtain the battery information on mobile devices (phones / tablets) the device must be paired with the host system. To pair a device you will need to trust the host system on the mobile device when first connecting. There are various trust levels which are documented below.

Trust level	Description
"not-paired"	Device not paired
"paired"	Device paired



Trust level	Description
"pending"	Battery information pending
"failed"	Failed to obtain battery information
"prohibited"	Prohibited from obtaining battery information
"error"	Error on obtaining battery information

## 17. Cambrionix Hub API JSON-RPC Error codes

Code	Value	Description
CBRXAPI_ERRORCODE_IDNOTFOUND	-10001	ID not found. The unit ID passed in does not represent a hub or it has been disconnected since discovery was last run. Note that there is an internal timeout that will close unused handles after a minute.
CBRXAPI_ERRORCODE_NOHANDLINGTHREAD	-10002	Unable to start handling thread. This error is not applicable past 2.1.
CBRXAPI_ERRORCODE_KEYNOTFOUND	-10003	Key not found. A key that is passed in cannot be found. It may be misspelled or not exist in the dictionary for this unit.
CBRXAPI_ERRORCODE_ERRORSETTINGVALUE	-10004	Could not set value. The (key value) pair was not acceptable. This could mean the key does not exist or is misspelled the value is of the wrong type or the value passed is invalid or out of range.
CBRXAPI_ERRORCODE_INVALIDHANDLE	-10005	Invalid handle. The handle passed in to a function is not valid or no longer valid. This could happen either by passing in an incorrect value or if the handle has already been closed (i.e. by <code>cbrx_closeandlock</code> being called) or the unit has been disconnected from the computer.
CBRXAPI_ERRORCODE_TIMEOUT	-10006	Timeout on communication. An operation towards a hub took too long to complete. It may have been disconnected or just slow to respond. It is worth retrying the operation.
CBRXAPI_ERRORCODE_DROPPED	-10007	Socket connection to remote has been dropped.
CBRXAPI_ERRORCODE_METHOD_REMOVED	-10008	The method has been removed.
CBRXAPI_ERRORCODE_AGAIN	-10009	System not ready. Try again. This is likely caused by a very prompt call to an API function and the system has not progressed through startup enough to service it.
CBRXAPI_ERRORCODE_FIRMWARE_UPDATE	-10010	Error performing firmware update.
CBRXAPI_ERRORCODE_FIRMWARE_FILE	-10011	Firmware file error. This would usually be due to file format errors.
CBRXAPI_ERRORCODE_DEVICE_NOT_FOUND	-10012	Device not found.
CBRXAPI_ERRORCODE_CONNECTION_ERROR	-10014	Could not open the serial port connection to the hub.

Code	Value	Description
CBRXAPI_ERRORCODE_ HUB_NOT_FOUND	-10013	Hub not found.

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<https://downloads.cambrionix.com/documentation/en/Cambrionix-Licence-Agreement.pdf>

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