CONNECTMYPOOL HOME AUTOMATION INTEGRATION GUIDE

1.0 Introduction

This document explains the interface provided to integrate a pool or spa system connected to the ConnectMyPool website with a third-party home automation system to allow querying and control functionality.

Integration into a home automation system is a technical process and should only be attempted by professional system integrators with knowledge of the home automation system being used as well as programming principles in general.

Communication between a home automation system and a pool connected to the ConnectMyPool website is achieved via an API (Application Programming Interface). The API is a “RESTful” API based on an exchange of “json” formatted packets between the home automation system and the ConnectMyPool website.

2.0 System Requirements

For a pool system to use the API the following requirements must be met:

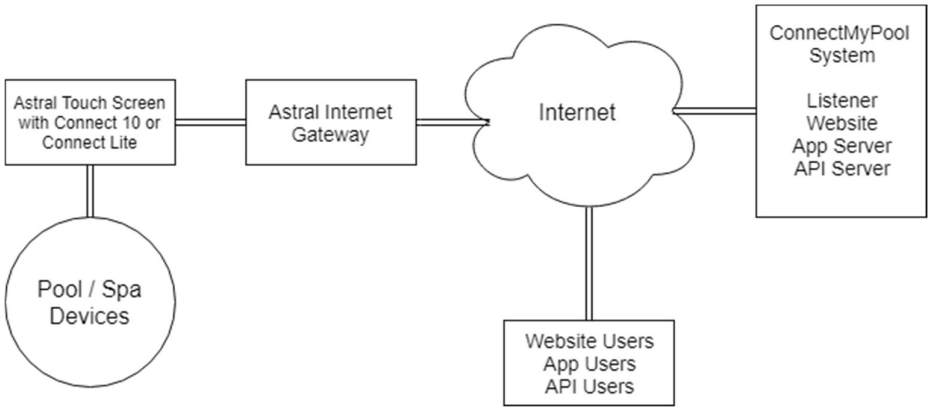
- The pool or spa must be configured with an Astral Internet Gateway, Astral Touch Screen and either an Astral Connect 10 or Astral Connect Lite device
- The pool must be registered and communicating with the ConnectMyPool website or mobile app
- The pool must be approved for API access by Astral Pool

3.0 Communication Overview

Pool and spa systems currently communicate on a schedule with the ConnectMyPool system to pass through pool configuration and state information as well as pick up user actions. The website and mobile app query the system to read a pools configuration and state information as well as to deposit user actions.

The API is simply an extension of this functionality to allow home automation systems to act in a similar way to the website and mobile app by querying a pools configuration and state information as well as deposing user actions.

The diagram below describes the ConnectMyPool architecture:



4.0 Key Concepts

Below is an explanation of key concepts used in the API to give a better understanding of the anatomy of a pool system:

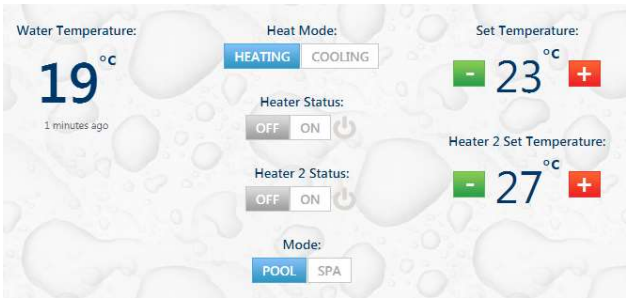
4.1 Pools and Spas

The ConnectMyPool system can control a stand-alone pool, a stand-alone spa, or a pool and spa combined. When a pool and spa are combined then the API provides for functionality to switch between “pool mode” and “spa mode”. This action has several effects on the operation of the system but for API purposes the main difference is the ability to set a separate heater “set temperature” for each mode.

4.2 Heaters

Pool systems can have one or more heaters connected to them to heat and optionally cool the temperature of the water. Heaters operate on a “set temperature” and will heat or cool the water until that temperature is reached. Heaters can also be switched to on or off modes.

The API provides the ability to query a pools heater configuration as well as change a heaters mode, set temperature, as well as switch between heating and cooling modes



4.3 Solar Systems

Pool systems can have a solar heater attached to them to heat the water. Like heaters, solar systems operate on a “set temperature” and will heat the water until the temperature is reached. Heaters can be switched to on, off, or auto modes.

The API provides the ability to query a pools solar system configuration as well as change a solar systems mode and set temperature.

4.4 Channels

Pool systems can have one or more channel devices connected to them such as filter pumps, cleaning systems, fountains, and audio systems. Each of these devices has a mode that can be cycled through to change their behaviour. e.g.

Filter Pump cycles: On -> Auto -> Off

Fountain: On -> Off

The API provides the ability to query a channels configuration and current mode as well as cycle through a device's modes.

4.5 Valves

Pool systems can have one or more valve devices connected to them. Each of these devices can be switched to on, off, or auto modes

The API provides the ability to query a valves configuration and current mode as well as change its mode.

4.6 Lighting Zones

Pool systems can have one or more lighting systems connected to them. Lighting systems can be "color enabled" which means that they can be switched to different colors or color patterns. Each lighting system can be switched to on, off, or auto modes.

The API provides the ability to query a lighting zones configuration, mode, and current color as well as change its mode and color (if color enabled). The API also provides a list of valid colors in the configuration.

4.7 Favourites

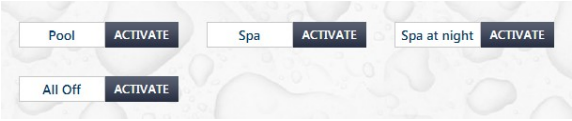
Pool systems can be configured with different “favourites”. A favourite is simply a collection of pool settings bundled together in one convenient action. For example, a user could configure a “Spa at night” favourite that would automatically turn on the spa jets and heater and turn on a lighting zone and audio system.

Favourites can also be optionally activated on a timed schedule. When a device such as a channel or valve is set to auto then it will operate based on the current active favourites setting for that device.

In addition to user configured favourites, all pools have access to the standard favourites “All On”, “All Off”, and “All Auto” (if a scheduled is enabled)

Note that currently all favourite configuration is currently done via the Astral Touch Screen.

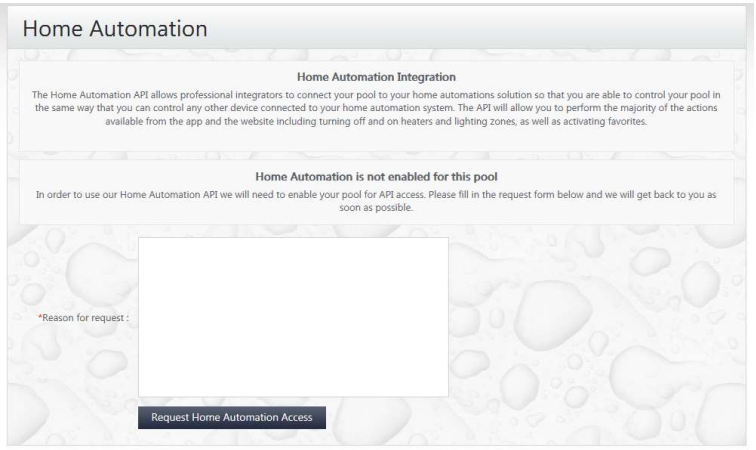
The API provides the ability to get a list of possible favourites as well as the ability to change to favourite.



5.0 Requesting API Access & Pool API Code

For a pool to use the API, a request must be lodged and approved with Astral Pool. To request access for a pool simply do the following:

1. Log in to ConnectMyPool via a browser on a PC (not tablet or mobile device)
2. From the “Settings” menu select “Home Automation”

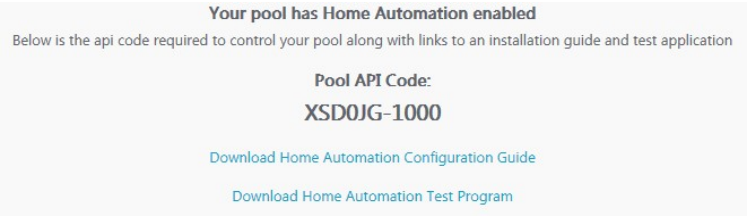


3. Fill in the “Reason for request” field and click on “Request Home Automation Access”

You will be emailed back when you have been approved for API access.

Once you have been given access you will need to retrieve you Pool API Code. This code is required to access the API.

To get your API code go back to the “Home Automation” page in ConnectMyPool. It will now display your API Code as well as a link to download the test program



6.0 API Overview

All API functions are implemented using a RESTFUL approach using JSON. The specifics of each request are transmitted using POSTed JSON formatted request data.

The following RESTFUL URL's are currently implemented:

DESCRIPTION	URL	DATA POSTED	DATA RECEIVED
Receive information about a pools configuration	/api/poolconfig	Pool API Code	Pool configuration data such as what devices are attached to the pool. e.g.: lighting zones, filter pumps, heaters, audio
Receive current state information about a pool	/api/poolstatus	Pool API Code	Current pool data such as current temperature, lighting colors and modes, and channel and valve modes
Execute an action such as changing a temperature or turning a device on or off	/api/poolaction	Pool API Code Action Code Action Parameters	Action ID and execution status
Check action execution status	/api/poolactionstatus	Pool API Code Action Number	Action execution status

7.0 API Call: Pool Configuration

The Pool Configuration API allows a request to be sent to receive pool configuration information such as what heaters, channels, valves, lighting zones, and favourites are configured.

URL: /api/poolconfig

Required JSON POST object:

```
{
    pool_api_code: string
}
```

Successful Response JSON object:

```
{
    pool_spa_selection_enabled: boolean,
    heat_cool_selection_enabled: boolean,
    has_heaters: boolean,
    has_solar_systems: boolean,
    has_channels: boolean,
    has_valves: boolean,
    has_lighting_zones: boolean,
    has_favourites: boolean,
    heaters: [
        {
            heater_ number: integer
        }
    ],
    solar_systems: [
        {
            solar _number: integer
        }
    ],
    channels: [
        {
            channel_ number: integer,
            function: integer,
            name: string
        }
    ],
```

```
        valves: [
                {
                        valve_number: integer,
                        function: integer,
                        name: string
                }
        ],
        lighting_zones: [
                {
                        lighting_zone_number: integer,
                        name: string,
                        color_enabled: boolean,
                        colors_available: [
                                {
                                        color_number: integer,
                                        color_name: string
                                }
                }
        ],
        favourites: [
                {
                        favourite_number: integer,
                        name: string
                }
        ]
}
```

Definitions

OBJECT	SECTION	VALUE	DESCRIPTION
request	main	pool_api_code	String representing the pools API code. This code must be requested from Astral before a pool can be controlled via the API's
response	main	pool_spa_selection_enabled	Boolean to show if the system can be switched between pool and spa mode. Note this is only applicable for a combined pool and spa
response	main	heat_cool_selection_enabled	Boolean to show if the system can be switched been heating and cooling mode
response	main	has_heaters	Boolean to show if any heaters are attached to the system
response	main	has_solar_systems	Boolean to show if any solar heaters are attached to the system

response	main	has_channels	Boolean to show if any channels are attached to the system
response	main	has_valves	Boolean to show if any valves are attached to the system
response	main	has_lighting_zones	Boolean to show if any lighting zones are attached to the system
response	main	has_favourites	Boolean to show if any favourites are configured in the system
response	main	heaters	List of heaters attached to the system
response	heaters	heater_ number	Integer id representing the heater being described.
response	main	solar_systems	List of solar heaters attached to the system
response	solar	solar_ number	Integer id representing the solar heater being described.
response	main	channels	List of channel devices attached to the system
response	channels	channel_number	Integer id representing the channel being described.
response	channels	function	Enumeration representing the function of the channel 1 = Filter Pump 2 = Cleaning Pump 3 = Heater Pump 4 = Booster Pump 5 = Waterfall Pump 6 = Fountain Pump 7 = Spa Pump 8 = Solar Pump 9 = Blower 10 = Swimjet 11 = Jets 12 = Spa Jets 13 = Overflow 14 = Spillway 15 = Audio 16 = Hot Seat 17 = Heater Power 18 = Custom Name
response	channels	name	String representing the descriptive name of the channel
response	main	valves	List of valve devices attached to the system
response	valves	valve_number	Integer id representing the valve being described.
response	valves	function	Enumeration representing showing the function of the valve 1 = pool/spa 2 = solar
response	valves	name	String representing the descriptive name of the valve

response	main	lighting_zones	List of lighting zones attached to the system
response	lighting_zones	lighting_zone_number	Integer id representing the lighting zone being described.
response	lighting_zones	color_enabled	Boolean showing if the lighting zone can change color
response	lighting_zones	colors_available	List representing the available color patterns the lighting zone can be switched to. The list contains a name description of the color pattern as well as its color number. (see list of available colors below)
response	main	favourites	List of favourites configured in the system
response	favourites	favourite_number	Integer id representing the favourite being described.
response	favourites	name	String representing the descriptive name of the favourite

Notes:

- To reduce load on our servers, this API is time throttled and will only respond to this request at a maximum of every 60 seconds. If this call is requested before the 60 second limit it will respond with an error. Note after an instruction has been sent all API calls are not time throttled for a period of 5 minutes.

8.0 API Call: Pool Status

The Pool Status API allows a request to be sent to receive key pool information such as current temperature settings, lighting modes, and channel and valve modes

URL: /api/poolstatus

Required JSON POST object:

```
{
    pool_api_code: string,
    temperature_scale: integer,
}
```

Successful Response JSON object:

```
{
    pool_spa_selection: integer,
    heat_cool_selection: integer,
    temperature: integer,
    active_favourite: integer,
    heaters: [
        {
            heater_number: integer,
            mode: integer,
            set_temperature: integer,
            spa_set_temperature: integer
        }
    ],
    solar_systems: [
        {
            solar_number: integer,
            mode: integer,
            set_temperature: integer
        }
    ],
    channels: [
        {
            channel_number: integer,
            mode: integer
        }
    ],
    valves: [
        {
            valve_number: integer,
            mode: integer
```

```
                }
        ],
        lighting_zones: [
                {
                        lighting_zone_number: integer,
                        mode: integer,
                        color: integer
                }
        ],
}
```

Definitions

OBJECT	SECTION	VALUE	DESCRIPTION
request	main	pool_api_code	String representing the pools API code. This code must be requested from Astral before a pool can be controlled via the API's
request	main	temperature_scale	Enumeration representing the temperature scale measurements are sent in 0 = Celsius 1 = Fahrenheit
response	main	pool_spa_selection	Enumeration representing the current selection of a combined pool and spa 0 = Spa 1 = Pool Note this is only applicable for a combined pool and spa
response	main	heat_cool_selection	Enumeration representing the current heat / cool selection for heating 0 = Cooling 1 = Heating Note this is only applicable for systems will heat cool selection enabled
response	main	temperature	Integer representing the current water temperature in degrees
response	main	active_favourite	Integer representing the favourite_number currently selected as the active favourite Note a value of 255 indicates on active favourite.
response	main	heaters	List of heaters attached to the system
response	heaters	heater_ number	Integer id representing the heater being described.
response	heaters	mode	Enumeration showing the current heater mode 0 = Off 1 = On
response	heaters	set_temperature	Integer representing the pool set temperature in degrees

response	heaters	spa_set_temperature	Integer representing the spa set temperature. Only used with a pool and spa combination. For stand-alone spa's set_temperature is used
response	main	solar_systems	List of solar heaters attached to the system
response	solar_systems	solar_number	Integer representing the solar heater being described.
response	solar_systems	mode	Enumeration showing the current solar heater mode 0 = Off 1 = Auto 2 = On
response	solar_systems	set_temperature	Integer representing the solar set temperature in degrees
response	main	channels	List of channel devices attached to the system
response	channels	channel_number	Integer id representing the channel being described.
response	channels	mode	Enumeration representing the current channel mode 0 = Off 1 = Auto 2 = On 3 = Low Speed 4 = Medium Speed 5 = High Speed Modes available are device-dependant.
response	main	valves	List of valve devices attached to the system
response	valves	valve_number	Integer representing the valve being described.
response	valves	mode	Enumeration representing the current channel mode 0 = Off 1 = Auto 2 = On
response	main	lighting_zones	List of lighting zones attached to the system
response	lighting_zones	lighting_zone_number	Integer representing the lighting zone being described.
response	lighting_zones	mode	Enumeration representing the current lighting zone mode 0 = Off 1 = Auto 2 = On
response	lighting_zones	color	Enumeration representing showing the current lighting zone color (see list of available colors below) Note that this option is only available for color lighting systems. Mono color zones will not return a value

Notes:

- To reduce load on our servers, this API is time throttled and will only respond to this request at a maximum of every 60 seconds. If this call is requested before the 60 second limit it will respond with an error. Note after an instruction has been sent all API calls are not time throttled for a period of 5 minutes.

9.0 API Call: Pool Action

The Pool Action API call allows users to interact with a pool system by setting properties such as set temperatures, as well as switching on and off devices such as lighting zones and cycling through channel modes

URL: /api/poolaction

Required JSON POST object:

```
{
    pool_api_code: string,
    action_code: integer,
    device_number: integer,
    string: string,
    temperature_scale: integer,
    wait_for_execution: boolean
}
```

Success Response JSON object:

```
{
    action_number: integer,
    execution_status: integer
}
```

Definitions

OBJECT	SECTION	VALUE	DESCRIPTION
request	main	pool_api_code	String representing the pools API code. This code must be requested from Astral before a pool can be controlled via the API's
request	main	action_number	Enumeration representing the action to be performed. See table below
request	main	device_number	Integer representing the device the action is being performed on. See table below
request	main	value	String holding the value of the action. See table below
request	main	temperature_scale	Enumeration representing the temperature scale measurements are sent in 0 = Celsius 1 = Fahrenheit
request	main	wait_for_execution	Boolean to determine if the API should wait until the command has completed before responding

response	Main	action_number	Integer representing a unique number for the instruction. This can be referenced in the “check action execution status” API call if wait_for_execution is set to false
response	main	execution_status	Enumeration representing the status of the action sent: 0 = Waiting for Execution 1 = Executed Successfully 2 = Execution Failed 3 = Execution Time Out

Actions

Below is a list of actions and a description of what they do

ACTION_NUMBER	DESCRIPTION	DETAILS
1	Cycle Chanel Mode	Cycles through a channel devices modes.
2	Set Valve Mode	Sets a valve devices mode
3	Set Pool Spa Selection	Sets a system to either pool or spa mode. Note this is only applicable for a combined pool and spa system
4	Set Heater Mode	Sets a heaters mode
5	Set Heater Set Temperature	Sets a heaters set point temperature. For combined pool and spa systems, the appropriate set temperature is set. e.g. if the system is in spa mode then the spa set temperature is set.
6	Set Lighting Zone Mode	Sets a lighting zones mode
7	Set Lighting Zone Color	Sets a lighting zones color. Only applicable for color enabled lighting zones
8	Set Active Favourite	Sets the current active favorite
9	Set Solar Mode	Sets a solar heaters mode
10	Set Solar Set Temperature	Sets a solar heaters set point temperature. For combined pool and spa systems, the appropriate set temperature is set. e.g. if the system is in spa mode then the spa set temperature is set.
11	Send Lighting Zone Color Sync	For some lighting zones, there is a chance that a power cycle will cause the lights to get out of sync with the current selected color. This instruction re-syncs the lighting color to the value last selected.
12	Set Heat Cool Selection	Sets the current heat cool mode

Below is a list of actions and the devices and values required to be sent with the action

ACTION_NUMBER	DESCRIPTION	DEVICE NUMBER	VALUE
1	Cycle Chanel Mode	Valid channel_number	
2	Set Valve Mode	Valid valve_number	Valid valve mode: 0 = Off 1 = Auto 2 = On
3	Set Pool Spa Selection		Valid pool spa selection mode: 0 = Spa 1 = Pool
4	Set Heater Mode	Valid heater_number	Valid heater mode: 0 = Off 1 = On
5	Set Heater Set Temperature	Valid heater_number	Valid heater set temp (10 – 40) °C (50 – 104) °F
6	Set Lighting Zone Mode	Valid lighting_zone_number	Valid lighting zone mode: 0 = Off 1 = Auto 2 = On
7	Set Lighting Zone Color	Valid lighting_zone_number	Valid lighting zone color. (see list of available colors below)
8	Set Active Favourite	Valid favourite_number	
9	Set Solar Mode	Valid solar_number	Valid solar mode: 0 = Off 1 = Auto 2 = On
10	Set Solar Set Temperature	Valid solar_number	Valid heater set temp (10 – 40) °C (50 – 104) °F
11	Send Lighting Zone Sync	Valid lighting_zone_number	
12	Set Heat Cool Selection		Valid heat cool selection: 0 = Cooling 1 = Heating

10.0 API Call: Pool Action Execution Status

The Pool Action Execution Status API call allows users to see the status of an instruction submitted earlier. This call is only useful in tracking the execution status of instructions submitted with wait_for_execution set to false.

URL: /api/poolactionstatus

Required JSON POST object:

```
{
    pool_api_code: string,
    action_number: integer
}
```

Success Response JSON object:

```
{
    execution_status: integer
}
```

Definitions

OBJECT	SECTION	VALUE	DESCRIPTION
request	main	pool_api_code	String representing the pools API code. This code must be requested from Astral before a pool can be controlled via the API's
request	main	action_number	Integer representing a unique number for the instruction.
response	main	execution_status	Enumeration representing the status of the action sent: 0 = Waiting for Execution 1 = Executed Successfully 2 = Execution Failed

11.0 API Errors

If an API call errors for some reason, then a failure object is returned. Below is a description of the failure object.

Error Response JSON object:

```
{
        failure_code: integer,
        failure_description: string
}
```

Definitions

OBJECT	SECTION	VALUE	DESCRIPTION
response	main	failure_code	Integer representing one of the following failure codes: 1 = General Error 2 = Invalid Pool System 3 = Invalid API Code 4 = API Not Enabled 5 = Invalid API Key 6 = Time Throttle Exceeded 7 = Pool Not Connected 8 = Invalid Action Code 9 = Invalid Value 10 = Invalid Channel Number 11 = Invalid Valve Number 12 = Pool Spa Selection Not Enabled 13 = Invalid Heater 14 = Invalid Heater Set Temp 15 = Invalid Lighting Zone 16 = Lighting Zone Not Color Enabled 17 = Invalid Lighting Zone Color 18 = Invalid Favourite Number 19 = Invalid Solar System Number 20 = Invalid Solar Set Temp 21 = Lighting Zone Does Not Support Sync 22 = Heat Cool Selection Not Supported
request	main	failure_description	String representing the description of the failure.

12.0 Lighting Zone Colors

Possible lighting zone colors are shown below:

COLOR_NUMBER	NAME
1	Red
2	Orange
3	Yellow
4	Green
5	Blue
6	Purple
7	White
8	User 1
9	User 2
10	Disco
11	Smooth
12	Fade
13	Magenta
14	Cyan
15	Pattern
16	Rainbow
17	Ocean
18	Voodoo Lounge
19	Deep Blue Sea
20	Royal Blue
21	Afternoon Skies
22	Aqua Green
23	Emerald
24	Warm Red
25	Flamingo
26	Vivid Violet
27	Sangria
28	Twilight
29	Tranquillity
30	Gemstone
31	USA
32	Mardi Gras
33	Cool Cabaret
34	Sam

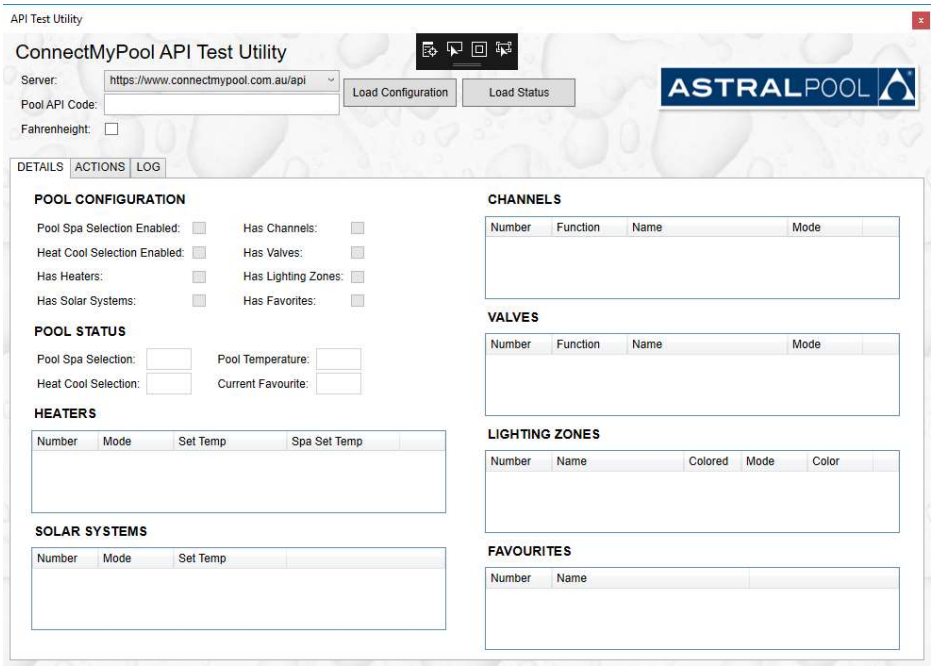
35	Party
36	Romance
37	Caribbean
38	American
39	California Sunset
40	Royal
41	Hold
42	Recall
43	Peruvian Paradise
44	Super Nova
45	Northern Lights
46	Tidal Wave
47	Patriot Dream
48	Desert Skies
49	Nova
50	Pink

Note that only some options are available based on the type of lighting system installed

13.0 Test Program

A test program can be downloaded from the “Home Automation” page on the ConnectMyPool website. This program allows you to try out the API on a pool and helps you sort out any issues with your integration.

When you run the test program you get the following interface:



Simply enter in a valid Pool API Code and then you can use the Load Configuration and Load Status buttons to get pool information.

You can interact with the pool under the “Actions” tab by sending actions to the pool

The “Log” tab is particularly useful as it shows all the connection and response details including headers.