



Pentair IntelliCenter v2.0.1 SIMPL Window Module Application Guide

Description

The SIMPL Windows Module allows control of a Pentair IntelliCenter via TCP/IP. The SIMPL windows version of this module supports 2 bodies of water and their filter circuits, 60 Circuits, 30 Feature Circuits, 30 Circuit Groups, 2 IntelliChem's, 2 IntelliChlor's.

This Module uses an Instance License that can be obtained at store.controlworks.com. Each combination of Crestron processor and IntelliCenter Controller requires a separate license in order to function. See below for detailed instructions on license ordering and activation.

Supported Processors

Any 3-series or 4-series processor that supports Ethernet and Direct Sockets.

Compatibility				Processor Requirements	
					

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License Overview

This Module requires an Instance License that can be obtained here <http://www.controlworks.com/Modules/Product.aspx?pid=3119>. Each Module in a program requires a separate license in order to function. Licenses are tied to the Crestron processor and IntelliCenter combination.

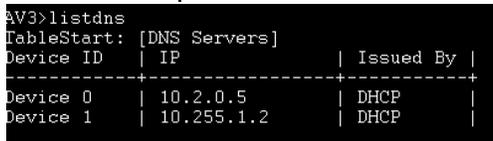
License Changes

If a device fails and is replaced (IntelliCenter Control Panel or Crestron Processor) the license will need to be updated. ControlWorks offers one complimentary transfer of the license as described in the [ControlWorks Consulting, LLC License Agreement](#). Subsequent changes to either device (IntelliCenter or Crestron Processor) will be assessed a handling fee to transfer the license. We encourage the use of our 30-minute [trial period](#) to allow for testing and evaluation prior to purchasing licenses.

Steps for Purchasing a License

Licenses are tied to the Crestron Processor and IntelliCenter combination. The steps below outline how to purchase a license and activate your module.

1. Ensure the IntelliCenter is connected to a network and can be reached by the Crestron processor.
2. Ensure the [reboot_finished] signal on the module is being latched high (not pulsed i.e. not using a STEPPER, MV, and not driven from an out* from a SR or equivalent) after boot. See the demo program for an example.
3. Open Text Console in toolbox, connect to the processor.
4. Ensure the processor has DNS servers by using the command [LISTDNS].



```
AV3>listdns
TableStart: [DNS Servers]
Device ID | IP | Issued By |
-----+-----+-----+
Device 0 | 10.2.0.5 | DHCP |
Device 1 | 10.255.1.2 | DHCP |
```

Figure 1- LISTDNS Example

5.
 - a. If no DNS servers are present, add them by using [ADDDNS <DNS server>] or using the Ethernet Addressing dialog box.



```
AV3>adddns 8.8.8.8
Success:New DNS value set.
AV3>
```

Figure 2 - ADDDNS Example

b. You can also test your DNS server by using the command [TESTDNS

```
www.controlworks.com].  
AV3>testdns www.controlworks.com  
IPAddress = 173.236.4.201  
AV3>|
```

Figure 3 - TESTDNS Example

6. Load your program to the processor.
7. After the program has been loaded, in text console, use the command [UCMD: <program slot number> "GET ACTIVATION INFO"]. i.e UCMD:1 "GET ACTIVATION INFO" This will provide you with an activation key.

```
CP3>ucmd:1 "GETACTIVATIONINFO"  
S-2.1: Activation key for ControlWorks.com: 00107f
```

Figure 4 - GETACTIVATIONINFO Example

8. In a web browser, browse to <http://www.controlworks.com/Modules/Product.aspx?pid=3119>. The website will prompt you for the Activation Key and Site Name. Enter the Activation Key from the processor and a Site Name of your choosing (the Site Name is an aid for your future reference and to help speed support if required, but is not part of the license), then click the proceed button to go through the checkout process.
9. After the checkout process has completed, in text console issue the command [UCMD: <program slot number> "RETRYAUTH"], or restart the program, and the module will attempt to contact the activation server to retrieve its license. Once activated, the [module_authorized] will be high.

```
CP3>ucmd:1 "RETRYAUTH"  
S-2.1: Retrying DoorBird authorization for all module instances, this may take a moment.
```

Figure 5 - RETRYAUTH Example

Once the module has activated its license, the license information is stored on the processor and the module will not need to reach the ControlWorks activation server for any reason. Certain Crestron recovery or troubleshooting procedures may clear the license information; if this occurs the module will automatically connect to the ControlWorks activation server to check for a license. Should the module require to reach out to the ControlWorks server to receive its license, this process will attempt to occur automatically and be transparent to the user as long as the processor has internet access.

If your processor is not connected to the Internet, after purchasing a license please contact us via email support@controlworks.com or call us at 440-449-1100 for the offline licensing procedure. ControlWorks normal office hours are 9 AM to 5 PM Eastern, Monday through Friday, excluding holidays. You will need to provide the key noted in step 4.

Trial Period

To aid testing your programming before deployment, the module includes a complimentary trial period of 30 minutes; during this time the module is fully functional. Trial functionality only works for systems that have an active Internet connection and are able to reach ControlWorks' activation servers.

When the [reboot_finished] signal is held high, the module will attempt to activate. If the module has not been previously activated and doesn't find a valid license when checking the activation server, the trial period will be enabled for 30 minutes. After 30 minutes, the module will automatically attempt reactivation. If a license has been purchased, the module will retain full functionality; if a license has not been purchased the module will be disabled. If you are developing in a lab or staging environment, simply restart your program to reset the trial period

To prevent abuse of this service, the total number of trial activations for any individual IntelliCenter or Crestron Processor may be limited in ControlWorks sole discretion.

Module Application

Locating device on your LAN

From the touchscreen located on the IntelliCenter controller, select Settings -> Advanced System Configuration -> Network and WiFi setup. On that page, the IP address will be displayed.

Reading Configuration and Unsolicited Responses

The Pentair IntelliCenter provides unsolicited responses after the Module has subscribed to requested values. After the Module validates its license or trial status and is connected to the IntelliCenter, the Module will read the configuration, and setup subscriptions to receive change of state messages. If your configuration changes on the pool controller, restarting the program or processor will acquire all new data points from the IntelliCenter and the updated configuration will be reflected on the module.

Additionally, if the TCP/IP connection between the Crestron processor is lost and reconnects for any reason, for example, removing and restoring Ethernet link, rebooting a network switch, the Module will automatically rebuild the configuration and update the User Interfaces when connectivity is restored.

Circuits

The assignment of Aux Relays to Circuits is automatically preformed by the IntelliCenter. To determine what Circuit number your aux relay is attached to:

- Place the `Pentair_IntelliCenter_v2.0(ControlWorks)` module in your program, set the Module Instance ID, compile and load.
- Once the main module has read the configuration, in debugger, view the `[circuit#_available]` and `[circuit#_name$]` to determine where your desired aux has been assigned by the IntelliCenter controller.
- Then insert a `Pentiar_IntelliCenter_Aux_Circuits_v2.0_(ControlWorks)` into your program for each Circuit you wish to control.

The `Pentiar_IntelliCenter_Aux_Circuits_v2.0_(ControlWorks)` allows you to control circuits individual attributes i.e. colors as needed.

Each Aux Circuit module has two parameters, Main Pentair IntelliCenter Module ID and Circuit Number. Set the Main Pentair IntelliCenter Module ID in the Aux Circuit Module to match the Instance ID parameter on the Main Pentair IntelCenter in which the Circuit is located.

Feature Circuits

Similar to Circuits, the IntelliCenter assigns feature circuits dynamically. To determine what feature circuit your feature circuit id is attached to, place the main `Pentair_IntelliCenter_v2.0(ControlWorks)` module in your program, compile and load.

Once the module has read the configuration, in debugger, view the `[feature_circuit#_available]` and `[feature_circuit#_name$]` to determine where your desired feature circuit has been placed.

Unlike the aux circuits, feature circuits are on/off control only and do not need an additional module to control them. Control of these circuits is located on the main module.

Circuit Groups and Light Groups

With Circuit Groups and Light Groups the pool contractor may assign circuits or lights to perform a macro. Although the Circuit Groups and Light Groups are featured in different menus on the IntelliCenter, they are both presented in the Circuit Groups section of the module. These Circuits have on and off functionality only.

Same as Circuits and Feature Circuits, the IntelliCenter assigns Circuit Groups dynamically.

Knowledge Base

Please be sure to visit our Knowledge Base for additional information that can assist in developing your solutions. <http://controlworks.com/ResourceLibrary/KnowledgeBase.aspx>

Signal and Parameter Descriptions (Pentair_IntelliCenter_v2.0)

Bracketed signals such as "[signal_name]" are optional signals

DIGITAL INPUTS

[reboot_finished]_(latch_high).....	Latch this signal high after your reboot is complete. Do not use a 1. The module will evaluate its activation status when this input goes high. If no activation status was found, the module will attempt to connect the activation server. After activation, this signal will manage the connection to the pool controller. When high, it will connect, if low the module will disconnect.
[refresh_config]	This signal does not need to be used in most circumstances. Pulsing will tell the module to read the configuration from the pool controller. This is useful when debugging and if the installer adds or removes features.
[body#_on].....	pulse to turn the filter pump on for the specified body of water.
[body#_off].....	pulse to turn the filter pump off for the specified body of water.
[body#_heating_setpoint+/-]	pulse to increment or decrement the heating setpoint by 1 degree.
[body#_cooling_setpoint+/-].....	pulse to increment or decrement the cooling setpoint by 1 degree.
[body#_select_heater#]	pulse to select the desired heater for the specified body. Heater must be available for selection, see [body#_heater#_available_fb] for indication that the heater is available for selecting. Off is always available.
[body#_intellichlor_primary_body_duty_cycle+/-]	pulse to increment or decrement the target duty cycle for chlorination. This is how strongly the user wants to turn the chlorinator for this body of water. Typically this is the pool body.
[body#_intellichlor_secondary_body_duty_cycle+/-].....	pulse to increment or decrement the target duty cycle for chlorination. This is how strongly the user wants to turn the chlorinator for this body of water. Typically this is the spa body.
[body#_intellichlor_superchlor_on/off]	pulse to turn on or off the SuperChlorinator.
[body#_intellichem_ph_setpoint+/-]	pulse raise or lower the target ph setpoint of the IntelliChem.
[body#_intellichem_orp_setpoint+/-].....	pulse raise or lower the target ORP setpoint of the IntelliChem.
[body#_intellichem_calcium_hardness_setpoint+/-].....	pulse raise or lower the target calcium hardness ppm setpoint of the IntelliChem.
[body#_intellichem_cyanuric_acid_setpoint+/-]	pulse raise or lower the target cyanuric acid setpoint of the IntelliChem.
[body#_intellichem_total_alkalinity_setpoint+/-].....	pulse raise or lower the target total alkalinity ppm setpoint of the IntelliChem.
[feature_circuitx_on/off]	pulse to turn the associated feature circuit on or off.
[circuit_group_x_on/off]	pulse to turn the associated circuit group on or off.

ANALOG INPUTS

SERIAL INPUTS

[from_circuit_modules\$]connect to to_IntelliCenter signal on all circuit modules.

DIGITAL OUTPUTS

[module_authorized]Latched high after the module is authorized. The module will not function if this output is low.

[connected_to_IntelliCenter_fb]High when the module is connected to the IntelliCenter.

[config_initialization_busy]High when the module is gathering data from the IntelliCenter, as well as during activation.

[service_mode_on_fb]High when IntelliCenter reports the service mode has been turned on.

[body#_on_fb]High when the IntelliCenter reports the body's filter pump is on.

[body#_off_fb]High when the IntelliCenter reports the body's filter pump is off.

[body#_heater#_available_fb]High when the module finds a heater for the body. Each heater# is assigned as found during initial polling. Off is always available.

[body#_heater#_selected_fb]High when the IntelliCenter indicates the heater has been selected as the heat source for the body.

[body#_intellichlor_defined_fb]High when the IntelliCenter reports there is an IntelliChlor defined for this body of water.

[body#_intellichlor_superchlor_on_fb]High when the IntelliCenter reports that the IntelliChlor's SuperChlorinator is active.

[body#_intellichlor_device_error_fb]High when the IntelliChlor reports a generic error.

[body#_intellichlor_salt_low_fb]High when the IntelliChlor reports a low salt reading.

[body#_intellichlor_very_low_salt_fb]High when the IntelliChlor reports a very low salt reading.

[body#_intellichlor_over_current_fb]High when the IntelliChlor reports an over current error.

[body#_intellichlor_voltage_error_fb]High when the IntelliChlor reports a voltage error.

[body#_intellichlor_communication_error_fb]High when the IntelliCenter reports a general RS485 Communication error with the IntelliChlor.

[body#_intellichem_defined_fb]High when the IntelliCenter reports there is an IntelliChem defined for this body of water.

[body#_intellichem_no_flow_fb]High when the IntelliChlor reports the no flow error.

[body#_intellichem_ph_high_fb]High when the IntelliChlor reports a pH high error.

[body#_intellichem_ph_low_fb]High when the IntelliChlor reports a pH low error.

[body#_intellichem_orp_high_fb]High when the IntelliChlor reports a ORP high error.

[body#_intellichem_orp_low_fb]High when the IntelliChlor reports a ORP low error.

[body#_intellichem_ph_container_fb]High when the IntelliChlor is reporting to check the pH container.

[body#_intellichem_orp_container_fb]High when the IntelliChlor is reporting to check the ORP container.

[body#_intellichem_probe_failure_fb]High when the IntelliChlor is reporting a probe failure.

[body#_intellichem_ph_lockout_fb]High when the IntelliChlor is reporting pH lockout.

[body#_intellichem_ph_feed_limit_fb]High when the IntelliChlor is reporting pH feed limit.

[body#_intellichem_invalid_setting_fb]High when the IntelliChlor is reporting an invalid setting has been entered.

[body#_intellichem_comm_failure_fb]High when the IntelliCenter is reporting a peripheral communication error, communication to IntelliChlor failed.

[body#_intellichem_general_rs485_communication_error_fb]	High when the IntelliCenter is reporting a general RS485 communication error with the IntelliChlor.
[body#_intellichem_memory_failure_fb]	High when the IntelliChlor reports a memory failure.
[body#_intellichem_calibration_failure_fb]	High when the IntelliChlor reports a calibration failure.
[circuit#_available]	High when the IntelliCenter reports that a circuit exists in that position.
[feature_circuit#_available]	High when the IntelliCenter reports that a feature circuit exists in that position.
[feature_circuitx_on_fb/off_fb]	High when the IntelliCenter indicated the feature circuit is on or off.
[circuit_group#_available]	High when the IntelliCenter reports that a circuit or light group exists in that position.
[circuit_group#_on_fb/off_fb]	High when the IntelliCenter indicated the circuit or light group is on or off.

ANALOG OUTPUTS

[air_temperature_fb]	Indicates the air temperature as reported by the IntelliCenter.
[body#_temperature_fb]	Indicates the temperature as reported by the IntelliCenter.
[body#_heating_setpoint_fb]	indicates the heating setpoint as reported by the IntelliCenter.
[body#_cooling_setpoint_fb]	indicates the cooling setpoint as reported by the IntelliCenter.
[body#_intellichlor_primary_body_duty_cycle_fb]	indicates the IntelliChlor's target duty cycle for the specified body.
[body#_intellichlor_secondary_body_duty_cycle_fb]	indicates the IntelliChlor's target duty cycle for the specified body.
[body#_intellichlor_superchlor_timeout_fb]	indicates the IntelliChlor's time remaining for the SuperChlorinator.
[body#_intellichlor_salt_level_fb]	indicates the IntelliChlor's salt level in ppm/50.
[body#_intellichem_ph_setpoint_fb]	indicates the IntelliChem's pH setpoint. Range is 720d – 760d with in hundredths. To display on a touchpanel, use a formatted text object, insert a dynamic text object, select analog, and select a floating point. Adjust the CIP tag to display one whole number, and two decimal places by using %1.2f.
[body#_intellichem_ph_reading_fb]	indicates the IntelliChem's pH reading. Valid range is 40d-100d in tenths. To display on a touchpanel, use a formatted text object, insert a dynamic text object, select analog, and select a floating point. Adjust the CIP tag to display one whole number, and two decimal places by using %1.1f.
[body#_intellichem_ph_tank_level_fb]	indicates the IntelliChem's pH tank level. Valid range is 1d-7d. 1=0% 7d = 100%.
[body#_intellichem_ph_feedings_fb]	indicates the IntelliChem's pH feedings. Valid range is 0d-2d. Dosing=0, Mixing=1, Monitor=2.
[body#_intellichem_ph_feed_time_fb]	indicates the IntelliChem's pH feed time in seconds. 1d = 1 second.
[body#_intellichem_ph_feed_volume_fb]	indicates the IntelliChem's pH feed volume in ml. 1d = 1ml.
[body#_intellichem_ORP_setpoint_fb]	indicates the IntelliChem's ORP setpoint in mv. Range is 650d – 800d
[body#_intellichem_ORP_reading_fb]	indicates the IntelliChem's ORP reading in mv. Range is 0d – 9999d

[body#_intellichem_ORP_tank_level_fb]	.....	indicates the IntelliChem's ORP tank level. Valid range is 1d-7d. 1=0% 7d = 100%.
[body#_intellichem_ORP_feedings_fb]	.....	indicates the IntelliChem's ORP feedings. Valid range is 0d-2d. Dosing=0, Mixing=1, Monitor=2.
[body#_intellichem_ORP_feed_time_fb]	.....	indicates the IntelliChem's ORP feed time in seconds. 1d = 1 second.
[body#_intellichem_ORP_feed_volume_fb]	.....	indicates the IntelliChem's ORP feed volume in ml. 1d = 1ml.
[body#_intellichem_total_alkalinity_setpoint_fb]	.....	indicates the IntelliChem's total alkalinity setpoint in ppm. Valid range is 25d-800d.
[body#_intellichem_cyanuric_acid_setpoint_fb]	.....	indicates the IntelliChem's cyanuric acid setpoint. Valid range is 0d-201d.
[body#_intellichem_calcium_hardness_setpoint_fb]	.....	indicates the IntelliChem's calcium hardness setpoint in ppm. Valid range is 25d-800d.
[body#_intellichem_saturation_index_fb]	.....	indicates the IntelliChem's saturation index. Valid range is -99d-99d.
[body#_intellichem_salt_reading_fb]	.....	indicates the IntelliChem's salt reading in ppm/50.

SERIAL OUTPUTS

[air_temperature_sensor_status_fb\$]	.....	indicates the air temperature sensors status. Values may be "OK", "ERR".
[body#_name_fb\$]	.....	indicates the name that is given to the associated body of water.
[body#_heat_mode_fb\$]	.....	indicates the current heat mode for the associated body.
[body#_heat_source_fb\$]	.....	indicates the current heat source for the associated body.
[body#_heater#_name\$]	.....	indicates the associated heaters assigned name as reported by the IntelliCenter. Heater off is specified in the module.
[body#_intellichlor_name_fb\$]	.....	indicates the name of the IntelliChlor for the associated body.
[body#_intellichem_name_fb\$]	.....	indicates the name of the IntelliChem for the associated body.
[to_circuit_module#\$]	.....	tie to aux circuit module. Each circuit you are using in a system should have its own aux circuit module. One serial output should be tied to the corresponding circuit modules from_intellicenter input.
[circuit#_name\$]	.....	indicates the name of the associated circuit as defined in the IntelliCenter.
[feature_circuit#_name\$]	.....	indicates the name of the associated feature circuit as defined in the IntelliCenter.
[circuit_group#_name\$]	.....	indicates the name of the associated circuit or light group as defined in the IntelliCenter.

Signal and Parameter Descriptions (Pentair_IntelliCenter_Aux_Circuits_v2.0)

Bracketed signals such as "[signal_name]" are optional signals

DIGITAL INPUTS

[circuit_on/off]	pulse to turn the circuit on or off. Valid for all circuits.
[dimmer_off/%].....	pulse to set the level of a light. Only valid if circuit is defined as aux_type_dimmer_fb.
[globrite_color_x]	pulse to set the light to the specified mode. Only valid if circuit is defined as aux_type_globrite_color_fb.
[globrite_white_off/%]	pulse to set the light to the specified level. Only valid if circuit is defined as aux_type_globrite_white_fb.
[intellibrite_x].....	pulse to set the light to the specified mode. Only valid if circuit is defined as aux_type_intellibrite_fb.
[magic_stream_x].....	pulse to set the light to the specified mode. Only valid if circuit is defined as aux_type_magic_stream_fb.
[color_cascade_x].....	pulse to set the light to the specified mode. Only valid if circuit is defined as aux_type_color_cascade_fb.

ANALOG INPUTS

SERIAL INPUTS

from_IntelliCenter.....	connect to IntelliCenter circuit output i.e. if this module is controlling circuit 2, tie [to_circuit_module2\$] to this input.
-------------------------	---

DIGITAL OUTPUTS

[aux_type_x_fb]	High when circuit is of the defined type.
[circuit_on/off_fb]	High when the IntelliCenter reports the circuit is on or off.
[circuit_delay_on/off_fb]	High when the IntelliCenter reports the circuit is in delay.
[circuit_override_on/off_fb]	High when the IntelliCenter reports the circuit is in override.
[dimmer_off/%_fb]	High when the IntelliCenter reports the circuit set to the indicated level.
[globrite_color_x_fb]	High when the IntelliCenter reports the circuit set to the indicated mode.
[globrite_white_off/%]	High when the IntelliCenter reports the circuit set to the indicated mode.
[intellibrite_x]	High when the IntelliCenter reports the circuit set to the indicated mode.
[magic_stream_x]	High when the IntelliCenter reports the circuit set to the indicated mode.
[color_cascade_x]	High when the IntelliCenter reports the circuit set to the indicated mode.

ANALOG OUTPUTS

SERIAL OUTPUTS

to_intellicenter.....tie to [from_circuit_modules\$].

PARAMETERS

Main Pentair IntelliCenter Module ID	The main IntelliCenter this circuit is located on. This should match the Module ID parameter that the circuit is located on.
Circuit Number.....	1-60d, this is the circuit number of the circuit as reported by the Main Pentair Module.

Support

This module is supported by ControlWorks Consulting, LLC. Should you need support for this module please email support@controlworks.com or call us at 440-449-1100. ControlWorks normal office hours are 9 AM to 5 PM Eastern, Monday through Friday, excluding holidays.

Before calling for support, please ensure that you have loaded and tested operation using the included demonstration program and touchpanel(s) to ensure that you understand the correct operation of the module. It may be difficult for ControlWorks to provide support until the demonstration program is loaded.

Updates, when available, are automatically distributed via Email notification to the address entered when the module was purchased. In addition, updates may be obtained using your username and password at <https://www.controlworks.com/Customers/Login.aspx>.

Distribution Package Contents

The distribution package for this module should include:

Distribution Contents	
Pentair_IntelliCenter_V2.0_(ControlWorks).umc	Crestron User Module.
Pentair_IntelliCenter_Engine_V2.0_(ControlWorks).usp	SIMPL+ file used within the processor module.
Pentair_IntelliCenter_Engine_V2.0_(ControlWorks).ush	SIMPL+ header file.
Pentair_IntelliCenter_Aux_Circuits_V2.0_(ControlWorks).umc	Crestron User Module for aux circuits.
Pentair_Intellicenter_Circuit_Engine_V2.0_(ControlWorks).usp	SIMPL+ file used within aux circuits module.
Pentair_Intellicenter_Circuit_Engine_V2.0_(ControlWorks).ush	SIMPL+ header file.
Pentair_IntelliCenter_V2.0_(ControlWorks).vtp	Demo touchpanel for TSW-1052
Pentair_IntelliCenter_V2.0_(ControlWorks).smw	Demo program for PRO3 processor
PentairIntelliCenter.clz	SIMPL# Library
PentairIntelliCenter.pkg	Crestron Home Driver

Revision History

V2.0.1 caleb@controlworks.com 2020.02.16

- Corrected issue where Aux Circuit Modules in SIMPL Windows may not be properly initialized preventing proper control of Aux Circuits. This update affects only the CLZ file; no changes to UMC, USP, USH or Crestron Home are required.

V2.0 caleb@controlworks.com 2020.02.16

- Reimplementation leveraging SIMPL#.
- Added Driver support for Crestron Home.

V1.3 caleb@controlworks.com 2020.08.18

- Bug fix when refreshing the config from the digital input or on a reconnect, duplicate hardware would appear.
- Added Circuit Groups.
- Fix for SIMPL Windows 4.14 processor type issue.
- Minor bug fix in activation for 4 series compatibility.
- Added UPPER to UCMD's so lower case versions return data.
- Fixed an issue where module would not parse pool temp correctly, and cause buffer overflows.
- Added buffer to body temperature feedback to suppress updates unless the corresponding body is on.

V1.2 caleb@controlworks.com 2019.04.17

- Updates to increase buffer size to accommodate large systems.
- Pentair supports 2 bodies of water in current FW releases. Updated module to reflect the correct body amount.
- Fix where cooling dead band would limit the spa setpoint.
- Known issue - It has been identified that in some cases the IntelliCenter system will report the incorrect heater selection. This results in no feedback for the heater selection. Pentair is aware of the issue, no timeline for a fix has been communicated to ControlWorks.

V1.1 caleb@controlworks.com 2019.03.05

- Added service mode.
- Added air temperature.
- Added heater selection.
- Added feature circuits.

V1.0 caleb@controlworks.com 2018.03.14

- initial release

Development Environment

This Module and Driver version was developed on the following hardware and software. Different versions of hardware or software may or may not operate properly. If you have questions, please contact us.

Manufacturer Hardware	Software Version
i5P	1.047
Crestron Hardware	Firmware Version
Crestron PRO4 Processor	V4.008.0026
Crestron MC4 Processor	V2.4454.17318
Crestron CP4-R Processor	V2.4508.00041
Crestron AV3 Processor	v1.504.3687.28729
Software	Software Version
SIMPL Windows	4.14.20
Vision Tools Pro-e	6.2.00
Smart Graphics Controls	2.15.04.01
Crestron Database	200.00.004.00
Device Database	200.00.015.00

ControlWorks Consulting, LLC Module Instance License Agreement

Definitions:

ControlWorks, We, and Us refer to ControlWorks Consulting, LLC, with headquarters located at 8228 Mayfield Road, Suite 6B Rear Chesterland, Ohio 44026. *You and Dealer* refer to the entity purchasing the module. *Client and End User* refer to the person or entity for whom the Crestron hardware is being installed and/or will utilize the installed system. *System* refers to all components described herein as well as other components, services, or utilities required to achieve the functionality described herein. Instance License refers to a module license that is granted to a specific combination of a Crestron Processor and a single Controlled Device (for example, based on the respective serial numbers or other uniquely identifying information); a separate Instance License must be purchased for each such combination. *Module* refers to files required to implement the functionality provided by the Module and may include source files with extensions such as UMC, USP, SMW and VTP. *Driver* refers to the files required to implement the functionality in the Crestron Home environment. *Demo Program* refers to a group of files used to demonstrate the capabilities of the Module, for example a SIMPL Windows program and VisionTools Touchpanel file(s) illustrating the use of the Module but not including the Module. *Software* refers to the Module and the Demo Program.

Disclaimer of Warranties

ControlWorks Consulting, LLC software is licensed to You as is. You, the consumer, bear the entire risk relating to the quality and performance of the Software. In no event will ControlWorks Consulting, LLC be liable for direct, indirect, incidental or consequential damages resulting from any defect in the Software, even if ControlWorks Consulting, LLC had reason to know of the possibility of such damage. If the Software proves to have defects, You and not Us must assume the cost of any necessary service or repair resulting from such defects.

Provision of Support

We provide limited levels of technical support only for the most recent version of the Module and Driver as determined by Us. We do not provide support for previous version of the Module or Driver, modifications to the Module or Driver not made by Us, to persons who have not purchased the Module, Driver, or corresponding license(s) from Us. In addition, we may decline to provide support if the Demo Program has not been utilized. We may withdraw a Module, Driver, or corresponding license(s) from sale and discontinue providing support at any time and for any reason, including, for example, if the equipment for which the Module or Driver is written is discontinued or substantially modified. The remainder of your rights and obligations pursuant to this license will not be affected should ControlWorks discontinue support for a Module or Driver.

Modification of Software

You may not decrypt (if encrypted), reverse engineer, modify, translate, disassemble, or de-compile the Module or Driver in whole or part. Any modifications to the Module or Driver shall immediately terminate any licenses purchased with respect thereto. You may, however, modify the Demo Program. In no event will ControlWorks Consulting, LLC be liable for direct, indirect, incidental or consequential damages resulting from You modifying the Software in any manner.

Indemnification/Hold Harmless

ControlWorks, in its sole and absolute discretion may refuse to provide support for the application of the Module or Driver in such a manner that We feel has the potential for property damage, or physical injury to any person. Dealer shall indemnify and hold harmless ControlWorks Consulting LLC, its employees, agents, and owners from any and all liability, including direct, indirect, and consequential damages, including but not limited to personal injury, property damage, or lost profits which may result from the operation of a program containing a ControlWorks Consulting, LLC Module or any component thereof.

License Grant

This Module or Driver is licensed under the Instance License system, and Licenses are valid only for the specific combination of Crestron Processor and Controlled Device identified when the License was purchased or otherwise acquired and licenses may not be transferred to other Crestron processors or controlled devices. In ControlWorks sole discretion, ControlWorks may grant a transfer of an existing license to a new Crestron Processor or Controlled Device, not both. If granted, transfer may be subject to an administrative fee as determined by ControlWorks from time to time.

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