AprilAire S86WMUPR
SIMPL Windows Application Guide

Description

This module allows direct control of the AprilAire S86WMUPR Thermostat, offering a comprehensive range of features for managing the device and receiving real-time status updates. Features include:

- Heat, cool, and auto setpoint control and feedback
- System mode control and feedback
- Fan mode control and feedback
- Humidity control and feedback
- Sending outdoor temperature from external sensors
- Equipment status feedback
- Raw sensor data for all sensors
- Support for Fahrenheit and Celsius
- Contractor information feedback
- Device identification feedback

This Module requires a license that can be obtained by following the steps in later in this document. Each Module requires a license. e.g., if you have 2 thermostats you wish to control, thus having 2 modules in the program, 2 licenses are required. Licenses are tied to the Crestron processor and program slot; not the individual thermostat(s).

Supported Processors

Any 3 or 4 series appliance, or VC-4 instance, with Ethernet and internet access is required. This module is not supported on 2-series or earlier processors.

Compatibility			Processor Requirements	
4 SERIES CONTROL COMPATIBLE	3 COMPATIBLE	NOT COMPATIBLE SERIES	Ethernet REQUIRED	USB REMOVABLE MEDIA NOT REQUIRED

AprilAire S86WMUPR SIMPL Windows Module V1.0   ControlWorks Consulting, LLC
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Contents

Module Instance License

This Module requires a License that can be obtained by following the steps below. Each instance of a module in a program module requires an associated license. For example, controlling two thermostats requires 2 licenses.

Licenses (and the Activation Key) are tied to the:
- Appliance processors:
    - Processor and program slot.
- VC-4-PC-3 processors:
    - Processor and RoomID.

Licenses are purchased using the Activation Key. The Activation Key is unique to each program slot (appliance processor) or VC-4 Room (VC-4 processor), and a different key is generated for different program slots or VC-4 Rooms.

If you have purchased a license(s) for the processor previously, and you would like to add additional licenses, additional licenses can be purchased at any time using the same Activation Key.

License Changes and Transfers
If a processor fails and is replaced the license will need to be updated. If the program slot (appliance processor) or Room ID (VC-4 processor) changes, the license will need to be reassigned. We offer one complimentary reassignment of the license. A processing fee is required for subsequent reassignment of the licenses. Before purchasing a license, we encourage the use of our Trial Period to allow for development and testing before purchasing licenses.

All licenses associated with an Activation Key must be transferred together. Unused licenses, or a quantity of used or unused licenses cannot be transferred.

Trial Period
To aid testing, the Module includes a complimentary 7-day trial period, during which time the Module is fully functional. This Trial Period functionality requires that the system has active Internet connection and are able to reach ControlWorks' activation servers. For offline activation, please contact us.

Trial mode is only available when no licenses have been purchased for this Module. If a license(s) has been purchased and applied, any additional Modules that are not licensed will not enter trial mode and will not function.

Steps for Purchasing a License
Licenses are tied to the Crestron Processor and program slot. The steps below outline how to purchase a license(s) and how to apply them to the processor. The process is the same for a Crestron processor appliance or VC-4.

1. Add the Module(s) to your program

- Ensure the reboot_finished signal is being latched high after program is started and initialized.
- Ensure the signals [license_status_fb$], [activation_key_fb$], [activation_url_fb$], [refresh_license_from_file], and [refresh_license_from_server] are defined. You may comment them out to avoid unconnected signal warnings.
- Compile and load.

2. Open Crestron Debugger and connect to the system.

3. After the reboot_finished is latched high, the Modules will attempt to retrieve the license. [license_status_fb$] will display the retrieval status. If the license has been retrieved, [activation_url_fb$] will contain a URL, that when navigated to, the license page will be displayed, and the activation key will automatically be entered into the web site.

   - Alternatively, you may copy the value for [activation_key_fb$] and proceed to the license page at https://store.controlworks.com/products/Aprilaire-S86WMUPR-License.

     i. Place the Activation Key into the Activation Key field on the web page.

4. Enter a Site Reference Name. This is used to help you identify your purchased licenses and may speed support in some cases.

5. Enter the quantity you wish to purchase. Note that unused licenses cannot be transferred to a different processor or program slot/room at a later time.

6. Press Order Online for Instant License Activation and complete the payment process. Once the purchase is complete, the licenses are immediately available for the processor to be retrieved. Follow the steps below for the processor to retrieve the purchased licenses.

Steps to Apply Licenses
Once the license(s) have been purchased, you will need to apply them to the processor. This can be done a few different ways.

Applying licenses from Crestron Debugger:
- Ensure the signals [license_status_fb$], [activation_key_fb$], [activation_url_fb$], [refresh_license_from_file], and [refresh_license_from_server] are defined in your program.
- Open Crestron Debugger and connect to the system.
- If you have purchased licenses from the web store, pulse the [refresh_license_from_server] digital input.
- Alternatively, you may send a console command to initiate a license refresh.

Using a console command to apply licenses:
- Connect to the Crestron Processor using console (for example, using Crestron Toolbox Text Console, or PuTTY).
- Send the command UCMD:[program slot #] "RETRYAUTH"
  i.e UCMD:1 "RETRYAUTH"

- The Modules will check the activation server for updated licensing information and will apply the license.
- The console will display updated license information.
- [license_status_fb$] will be updated showing the current license information.

Offline Activation

We understand that not all installations have access to the Internet. Because of this, we offer an offline activation method. Please contact us for the specific procedure, and please have the Activation Key available.

Signal and Parameter Descriptions

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

DIGITAL INPUTS

reboot_finished...set to high after reboot is finished and program is started. Do not use 1.

[refresh_license_from_file]...............................Pulse to refresh license from the file system.

[refresh_license_from_server] ....Pulse to refresh the license from the licensing server.

[connect] ....Pulse this after the program has started and after reboot_finished has been set high. Upon pulsing, the module will attempt to connect to the thermostat.

[disconnect] ....Pulse to disconnect from the thermostat.

send_control_system_time..While high, will send the control systems time periodically. This may be driven by a 1.

[system_mode_off/heat/cool/emergency heat/auto] ......Pulse to set the thermostat into the desired mode. Note that auto mode is only available if it is enabled on the thermostat and if [supports_auto_mode_fb] is high.

[fan_mode_on/auto/circ] ....Pulse to set the desired fan mode.

[heat_setpoint_increment/decrement].........................Pulse to increment or decrement the heat setpoint.

[cool_setpoint_increment/decrement] ....Pulse to increment or decrement the cool setpoint.

[humidification_setpoint_increment/decrement] ....Pulse to increment or decrement the humidification setpoint.

ANALOG INPUTS

[external_outdoor_temperature]..................................Use to send an external temperature to the thermostat. Thermostat must be configured to accept a external outdoor temperature. See Thermostat Configuration for how to enter setup mode. Values are in tenths of a degree, and can be signed, i.e. 65°F would be 650d. -10°F would be -100d. Celsius is supported with half degree steps i.e. 20°C would be 200d and -25°C would be -250d.

[heat/cool_setpoint_set]...Use to set the thermostat to a specified temperature. Do not ramp this input. Drive this with an Initialize to set the value. To increment or decrement, use the provided digitals as they tell the thermostat to increment or decrement the setpoint value. Input values are in tenths of a degree, and can be signed, i.e. 65°F would be 650d. -10°F would be -100d. Celsius is supported with half degree steps i.e. 20°C would be 200d and -25°C would be -250d.

[humidification_setpoint_set] ....Use to set the desired humidity value. The input values change depending on humidity mode. If [humidifier_supports_auto_mode_fb] is high, the input values are 0-7 with 0 = off, 1 = low and 7 = highest. If [humidifier_supports_manual_mode_fb] is high, the input values are 10d-50d representing percent.

SERIAL INPUTS

[ip_address_override$]..Set to an IP address. Typically used with a dynamic configuration file. Set this value after reboot_finished is high, but before connecting. If already connected, and the value changes, you will need to disconnect and reconnect for the new value to be used.

DIGITAL OUTPUTS

[licensed_fb] ....High when there is a license present.

[trial_license_valid_fb] ....High when there is a license and the license is trial.

[perpetual_license_valid_fb].......................................High when there is a license and the license is perpetual.

[connected_fb] ....High when the module is connected to the thermostat.

[system_type_heat-cool_fb].......................................High when the thermostat configuration supports heat and cool modes.

[system_type_heat/cool_only_fb] ....High when the thermostat supports only heat or cool modes.

[supports_auto_mode_fb]...High when the thermostat supports auto mode.

[humidifier_[not_]installed_fb] ....High when the thermostat indicates if it supports humidity or not.

[humidifier_supports_auto_mode_fb] ....High when the thermostat supports a humidifier in auto mode.

[humidifier_supports_auto_mode_fb] ....High when the thermostat supports a humidifier in manual mode.

[scale_fahrenheit_fb]..High when the thermostat indicates the scale is Fahrenheit.

[scale_celsius_fb] ....High when the thermostat indicates the scale is Celsius.

[system_mode_off/heat/cool/em heat/auto_fb] ....High when the thermostat indicates the mode.

[fan_mode_on/suto/circ_fb] ....High when the thermostat indicates the fan mode.

[fan_status_not_active_fb]......................................High when the thermostat is not calling for fan.

[fan_status_active_fb]..High when the thermostat is calling for fan.

[heating/cooling/PR_equipmnet_status_xxx_fb]............High when the thermostat is calling for the heating/cooling/progressive recovery equipment.

[built_in/wired/zigbee/web_sensor_temp_status_xxx]....These signals are high when the Thermostat indicates a particular value status feedback for the temperature sensor.

[built_in/wired/zigbee/web_sensor_hum_status_xxx].....These signals are high when the Thermostat indicates a particular value status feedback for the humidity sensor.

[built_in/wired/zigbee/web_sensor_status_xxx].............These signals are high when the Thermostat indicates a particular installed status value for the sensor.

ANALOG OUTPUTS

[maximum/minimum_heat/cool_setpoint_fb] ....Analog indicating the maximum and minimum heat and cool setpoints as configured on the thermostat. Values are in tenths of a degree, and can be signed, i.e. 65°F would be 650d. -10°F would be -100d. Celsius is supported with half degree steps i.e. 20°C would be 200d and -25°C would be -250d.

[indoor_temperature_controlling_sensor_value_fb] ....Analog indicating the indoor temperature controlling sensors value. This is what is displayed on the thermostat. Values are in tenths of a degree, and can be signed, i.e. 65°F would be 650d. -10°F would be -

[outdoor_temperature_controlling_sensor_value_fb] ..... 100d. Celsius is supported with half degree steps i.e. 20°C would be 200d and -25°C would be -250d. Analog indicating the outdoor temperature controlling sensors value. This is what is displayed on the thermostat. Values are in tenths of a degree, and can be signed, i.e. 65°F would be 650d. -10°F would be -100d. Celsius is supported with half degree steps i.e. 20°C would be 200d and -25°C would be -250d.

[heat/cool_setpoint_fb]... Analog indicating the current setpoint. Values are in tenths of a degree. i.e. 65°F would be 650d. Celsius is supported with half degree steps i.e. 20.5°C would be 205d.

[humidification_setpoint_fb]..................................... Analog indicating the current humidification setpoint. When [humidifier_supports_auto_mode_fb] is high, the values are 0d-7d with 0d = off, 1d = low and 7d = highest. If [humidifier_supports_manual_mode_fb] is high, the output values are 10d-50d representing percent.

[xxx_sensor_temperature_value_fb] .... Analog indicating the sensors temperature value. Values are in tenths of a degree, and can be signed, i.e. 65°F would be 650d. -10°F would be -100d. Celsius is supported with half degree steps i.e. 20°C would be 200d and -25.5°C would be -255d.

[xxx_sensor_humidity_value_fb] .... Analog indicating the sensors humidity value. Values are 0d-100d representing percent.

[xxx_sensor_battery_value_fb]................................... Analog indicating the sensors battery value. Values are 0d-100d representing percent.

SERIAL OUTPUTS

[license_status_fb$].. String indicating the current status of the license.

[activation_key_fb$] .... Serial indicating the Activation Key.

[activation_url_fb$].. Serial indicating the License purchase URL.

[xxx_temperature_controlling_sensor_status_fb$] .... Serial indicating the sensors current status i.e. "No Error", "Not Installed", "Connection lost".

[humidity_controlling_sensor_status_fb$].................... Serial indicating the sensors current status i.e. "No Error", "Not Installed", "Connection lost".

[fan_status_fb$] .... Serial indicating the fan status "Not Active (Off)" or "Active (On)".

[heating_equipment_status_fb$] .... Serial indicating the heating equipment status "Not Active (Idle)", "Equipment Wait (Wait)", "Stage 1(On)", "Stage 1 and 2 (On)", "Stage 1, 2, and 3 (On)", "Comp 1 (On)", "Comp 1 and 2 (On)", "Aux Heat 1 (On)", "Aux Heat 2 (On)", "Comp1, Elec Heat 1 (On)", "Comp1, Elec Heat 2 (On)", "Comp 1 and 2, Elec Heat 1 (On)", "Comp 1 and 2, Elec Heat 2 (On)", "Elec Heat 1 (On)", "Elec Heat 2 (On)".

[cooling_equipment_status_fb$] .... Serial indicating the cooling equipment status "Not Active (Idle)", "Equipment Wait", "Stage 1 (On)", "Stage 1 and 2(On)", "Stage 1, 2, and 3 (On)", "Comp 1 (On)", "Comp 1 and 2 (On)".

[progressive_recovery_status_fb$] .... Serial indicating the progressive recovery equipment status "Not Active", "Active (Progressive Recovery)".

[xxx_sensor_name_fb$] .... Serial indicating the sensors name.

[xxx_sensor_temperature_status_fb$] .... Serial indicating the temperature sensors status "No Error", "Out of Range Low", "Out of Range High", "Not Installed", "Open/Error", "Short", "Sensor not available", "Connection lost".

[xxx_sensor_humidity_status_fb$].............................Serial indicating the humidity sensor status "No Error", "Not Installed", "Error", "Sensor not available", "Connection lost".
[xxx_sensor_battery_status_fb$]...............................Serial indicating the sensors battery status "No Error", "Not Installed", "Sensor not available", "Connection lost", "Low Battery".
[contractor_name_fb$] ....Serial indicating the HVAC vendors name.
[contractor_phone_fb$] ....Serial indicating the HVAC vendors phone number.
[contractor_email_fb$] ....Serial indicating the HVAC vendors email.
[contractor_web_fb$] ....Serial indicating the HVAC vendors web address.
[mac_address]..Serial indicating the MAC address of the thermostat.
[hardware_revision] ....Serial indicating the thermostats HW revision.
[firmware_revision]...Serial indicating the thermostats firmware.
[zigbee_firmware_revision] ....Serial indicaing the thermostats Zigbee radio firmware.

PARAMETERS
IP Address...Enter the IP address of the thermostat.

Support

This Module is supported by ControlWorks Consulting, LLC. Should you need support for this Module you may email us at support@controlworks.com or call us at:

- (+1) 440 449 1100 (Cleveland, Ohio)
- (+1) 508 695 0188 (Boston, Massachusetts)
- (+1) 202 381 9070 (Washington, DC)
- (+44) (0)20 4520 4600 (London, England)

ControlWorks normal office hours are 9 AM to 5 PM US Eastern time, Monday through Friday, excluding holidays.

Updates

Updates, when available, are free of charge, and are automatically distributed via our webstore. If you have purchased a license, you will receive an email notification to the address entered when the license was purchased. In addition, updates may be obtained using your username and password at https://store.controlworks.com/account/login.aspx.

Distribution Package Contents

The distribution package for this module should include:

AprilAire_S86WUMPR_Thermostat_Demo_v1.0_(ControlWorks).smw	Demonstration Program
AprilAire_S86WUMPR_Thermostat_v1.0_(ControlWorks).umc	Main User Module
AprilAire_S86WMUPR_Thermostat_Engine v1.0_(ControlWorks).usp	SIMPL+ for use inside main module
AprilAire_S86WMUPR_Thermostat_Engine v1.0_(ControlWorks).ush	SIMPL+ header file, for use inside main module
AprilaireS86WMUPR.clz	SIMPL# module for use in SIMPL+ module
AprilAire_S86WUMPR_Thermostat_Demo_TSW1060_v1.0_(ControlWorks).vtp	Demonstration TSW-1060 file
AprilAire_S86WUMPR_v1.0_(ControlWorks)_Help.doc	This help file.

Revision History

V1.0 caleb@controlworks.com 2024.05.01
    -Initial Version

Development Environment

This module 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.

Crestron Hardware	Firmware Version
CP3	v1.8001.5362.29861
PRO4	v2.8003.00055
VC-4	4.0003.00045
TSW-1060	v1.002.0031
Software	**Software Version**
SIMPL Windows	4.28
Device Database	200.345
Crestron Database	224.05

ControlWorks Consulting, LLC Type 5 Module/Driver License Agreement

Definitions:

"ControlWorks", "We", and "Us" refers to ControlWorks Consulting, LLC, with headquarters located at 8228 Mayfield Road Suite 6B Rear, Chesterland, Ohio 44026.

"You" refer to the entity installing, integrating, or otherwise deploying the Module.

"End User" refer to the person or entity for whom the Crestron hardware is being installed, utilize, and/or will utilize the installed system.

"Module", "Driver", and "Licensed Software" each include all components provided by ControlWorks pursuant to this license agreement required for or useful in implementing the functionality described herein. The Licensed Software includes but is not limited to files with extensions such as UMC, USP, CLZ, SMW, VTP, and PKG.

"Type 2 Module/Driver License" refers to a module license that is granted to a specific Crestron processor and a single controlled device; a separate license must be purchased for each combination of Crestron processor and controlled device.

"System" refers to all components described herein as well as other components, services, or utilities required to achieve the functionality described herein.

"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 and any files provided by ControlWorks as part of the distribution package including the Module, Demo Program, and associated documentation.

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 Licensed Software. In no event will We or any of our Licensors be liable for direct, indirect, incidental or consequential damages resulting from your use or attempt to use the Licensed Software, or for any defect in the Software, breach of security, or other failure or malfunction even if We had reason to know of the possibility of such damage. If the Licensed Software proves to have defects, You and not Us must assume the entire cost of any necessary service, repair, or other loss resulting from such defects.

Indemnification/Hold Harmless

ControlWorks, in its sole and absolute discretion may refuse to provide support for the application of the Module in such a manner that We feel has the potential for property damage, or physical injury to any person. Dealer shall fully and unconditionally indemnify and hold harmless ControlWorks Consulting LLC, its employees, agents, licensors, 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 in any way from the operation (or failure to operate) of a program or System containing Licensed Software or any component thereof.

Provision of Support

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

Modification of Software

You may not decrypt (if encrypted), reverse engineer, modify, translate, disassemble, or de-compile the Licensed Software in whole or part. Any modifications to the Licensed Software shall immediately terminate any licenses purchased with respect thereto. You may, however, modify the Demo Program.

License Grant

You may use the Licensed Software on the specific Crestron Processor identified when the license was purchased or otherwise granted by ControlWorks. You may integrate with only as many devices using the Licensed Software as you have been granted licenses for (for example, if you purchase 3 licenses associated with a processor, you may control up to 3 devices using the Licensed Software from that processor).

Licenses are generally non-transferrable, however in ControlWorks sole discretion, ControlWorks may grant a transfer of an existing license to a new Crestron Processor. If granted, transfer may be subject to an administrative fee as determined by ControlWorks from time to time, and the prior license may be disabled remotely.

You may permit End Users to utilize the functionality provided by the Licensed Software as part of a Crestron Home configuration or Crestron Program, as applicable.

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