



# APC HS-500 UPS Control Module Module Application Guide

## Description

This module provides control of a APC Back-UPS HS-500 Uninterruptible Power Supply (UPS) via a TCP/IP connection on port 80. The Crestron processor must be able to connect to the UPS via TCP/IP, so an Ethernet card is required for the Crestron processor. No RS-232 control is possible of this UPS.

This module provides a wide variety of control and status reporting from the UPS from a Crestron processor including:

- Current UPS Status (power source, battery capacity, estimated run time, and current load)
- Discreet Power On, Power Off, and Reboot control for each outlet.
- UPS Self-testing
- Sensitivity controls as well as high and low voltage transfer point control
- The ability to enable and disable the audible alarm

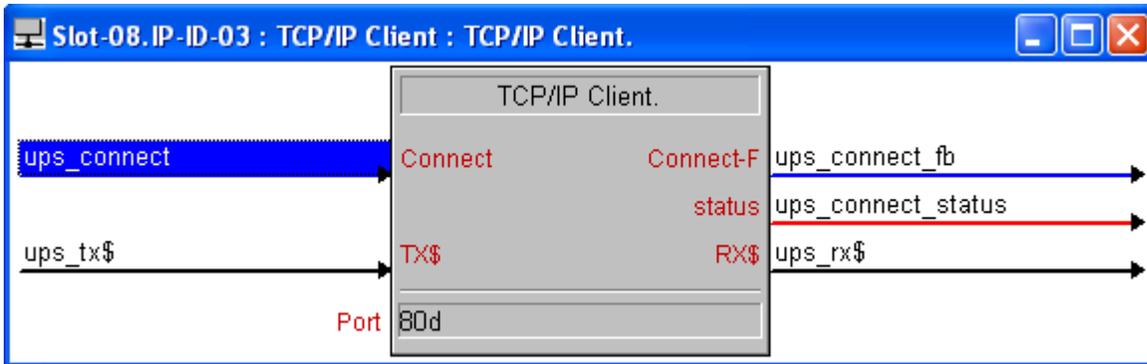
Compatibility			Processor Requirements	
 2-Series Compatible	 NOT CNMSX Compatible	 NOT System Builder Compatible	 Ethernet REQUIRED	 Compact Flash NOT NEEDED

## Ethernet Configuration Information

You will have to enter information in two different places in your Crestron program in order for the module to function. Under **System Views** drop a **TCP/IP Client** onto your Ethernet Slot. Now double click on the Client and select the **IP Net Address** tab. Enter the **IP Address of your HS-500** so your Client is setup like this (replace 10.2.0.105 with the IP Address of your HS-500):



Next under the **Program View** open up the **Client** you inserted. Set the port number to **80d**. To keep implementation simple use the same signal names from the demonstration program. Your Client with signal names should look like this:



Now launch a second instance of SIMPL Windows and open the program APC\_HS500\_Demo\_Pro2\_v1.SMW. If the program you are writing is in the same directory as the demo program you can simply copy and paste the module with all of its signal names from the demo program into your program.

# Signal and Parameter Descriptions

Bracketed signals such as "[signal\_name]" are optional signals

## DIGITAL INPUTS

tcp_connection_fb .....	connect to the connect-F output of the TCP/IP Client symbol used for the UPS.
login .....	pulse to login and establish a connection to the UPS after entering the username and password serials. The default login and password is "apc". If no value is specified for username or password, the values in the parameter will be used. <b>NOTE: If you are logged in to the UPS and pulse this signal you will be logged out. This is a function of the UPS.</b>
[logout] .....	pulse to end the session with the APC UPS. Note that it is not necessary to logout in most cases
[poll_now] .....	pulse this input to poll the current status and configuration of the UPS. As polling (and the accompanying parsing of data) can be somewhat processor-intensive, it is recommended to "poll in moderation" and not poll more than twice a minute. The module will automatically poll for status after a configuration change (i.e. turning an outlet on or off)
[sensitivity_high], [_medium] [_low] .....	pulse to set the sensitivity of the UPS to voltage fluctuations
[audible_alarm_on], [_off] .....	pulse to enable or disable the UPS's audible alarm
[transfer_high_voltage_high], [_medium], [_low] .....	pulse to set the upper limit of the voltage before the UPS will transfer to battery (as of writing of this manual, they are 142, 136, and 136 volts)
[transfer_low_voltage_high], [_medium], [_low] .....	pulse to set the lower limit of the voltage before the UPS will transfer to battery (as of writing of this manual, they are 96, 92, and 88 volts)
[outletN_on] .....	Pulse to turn the selected outlet (1-3) on
[outletN_off] .....	pulse to turn the selected outlet (1-3) off
[outletN_reboot] .....	pulse to reboot the selected outlet (1-3) by turning the outlet off momentarily and then back on
[self_test] .....	pulse to initiate a self-test of the UPS. The module will automatically poll for updated status 20 seconds after this input is pulsed.

## ANALOG INPUTS

tcp_connection_status .....	connect to the status output of the TCP/IP symbol for the UPS
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## SERIAL INPUTS

ups_rx\$ .....	route from TCP/IP client RX\$ line
username\$ .....	route from ASCII keyboard if the user is to enter the username, or other appropriate logic. If no username is entered the value in the "username" parameter will be used. Refer to the "login and password" subfolder of the demo program for one example of how to implement this logic.
password\$ .....	route from ASCII keyboard if the user is to enter the password or other appropriate logic. If no password is entered, the value in the "password" parameter will be used.

## DIGITAL OUTPUTS

ups_connect .....	Route to the Connect input of the TCP/IP client symbol for the UPS
login_required_fb .....	Indicates that a login to the system is required before control will be possible.
module_busy_fb .....	Indicates that the module is busy processing a command or data. It will not be possible to issue another command until this goes low.
[module_timeout_fb] .....	Indicates that the module timed out before completing the request, usually indicating either network communications issues or that the UPS has been physically turned off. This output will remain high for 5 seconds.
[sensitivity_high_fb], _medium_fb], _low_fb].....	Indicates the current sensitivity setting of the UPS
[audible_alarm_on_fb], _off_fb] .....	Indicates if the audible alarm is currently enabled or disabled.
[transfer_high_voltage_high_fb], _medium_fb], low_fb]	Indicates the current high voltage transfer setting
[transfer_low_voltage_high_fb], _medium_fb], _low_fb]	Indicates the current low voltage transfer setting.
[outletN_on_fb], _off_fb], _reboot_fb].....	Indicates the current status for the selected outlet. For example, if the user selects "Reboot" for outlet 1 while the outlet is on, the status will go to outlet1_reboot_fb will go high; after the outlet has rebooted, outlet1_reboot_fb will go low, and outlet1_on_fb will go high.

## ANALOG OUTPUTS

This module does not utilize any analog outputs.

## SERIAL OUTPUTS

ups_tx\$.....	route to TCP/IP client TX\$ line
[ups_power_source\$].....	indicates the current power source of the UPS's outlets (normal indications are "On Line" or "On Battery")
[ups_battery_capacity\$] .....	indicates the amount of battery remaining from 0-100%
[ups_runtime\$] .....	indicates the estimated runtime remaining in minutes.
[ups_battery_status\$] .....	indicates the current status of the battery (normal indications include "Charged" and "Charging")
[ups_last_transfer_cause\$] .....	indicates the reason the UPS last transferred to battery (e.g. "No Transfer", "Blackout", "Low Voltage", "Selftest", etc.)
[ups_selftest_result\$] .....	indicates the results of the last self test.
[ups_current_load\$] .....	indicates the current load of the UPS, in watts. <b>Note:</b> We have found in tests that output #3 is not included in this count.

## PARAMETERS

username .....	This parameter may be used to "hard code" a username for use by the module; use a pair of double quotes ("") if the user is to enter the username,
password.....	This parameter may be used to "hard code" a password for use by the module; use a pair of double quotes ("") if the user is to enter the password,

## Support

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This module is supported by ControlWorks Consulting, LLC. Should you need support for this module please email [support@controlworks.com](mailto: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 <http://www.thecontrolworks.com/customerlogin.aspx>.

## Distribution Package Contents

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The distribution package for this module should include:

APC_HS500_UPS_Module_Help_v1.pdf .....	this help file
APC_HS500_Control_Module_v1.umc .....	Crestron user module to insert in program
APC_HS500_Config_Parser_v1.usp.....	SIMPL+ module that is inside the UMC
APC_HS500_Config_Parser_v1.ush .....	compiled SIMPL+ header
APC_HS500_Status_Parser_v1.usp .....	SIMPL+ module that is inside the UMC
APC_HS500_Status_Parser_v1.ush .....	compiled SIMPL+ header
APC_HS500_Password_v1.usp.....	SIMPL+ module that is inside the UMC
APC_HS500_Password_v1.ush.....	compiled SIMPL+ header
APC_HS500_Demo_XPANEL.vtp.....	example touchpanel (XPANEL)
APC_HS500_Demo_Pro2_v1.smw .....	example program (PRO2)

# Revision History

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V1 lincoln@controlworks.com 2006.03.20  
Initial Release

## Development Environment

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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.

<b>manufacturer Hardware</b>	<b>Software Version</b>
APC BH500 UPS	revision I1 Web Firmware Revision I2
<b>Crestron Hardware</b>	<b>Firmware Version</b>
Crestron PRO2 Processor	3.155.1143
<b>Software</b>	<b>Software Version</b>
Crestron SIMPL Windows	2.07.32
Crestron Vision Tools Pro-e	3.5.1.6
Crestron Database	18.1.5
Crestron Symbol Library	387
Crestron Device Library	387

# ControlWorks Consulting, LLC Module License Agreement

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## Definitions:

*ControlWorks*, *We*, and *Us* refer to ControlWorks Consulting, LLC, with headquarters located at 701 Beta Drive, Suite 22 Mayfield Village, Ohio 44143-2330. *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. *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. *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.

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## 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 version of the module, modifications to the module not made by Us, 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 ControlWorks discontinue support for a module.

## Modification of Software

You may not decrypt (if encrypted), reverse engineer, modify, translate, disassemble, or de-compile the Module in whole or part. You may 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

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