



DIRECTV IP v1.1 Module Application Guide

Description

This module is compatible with set top box models H2x (with the exception of H20, and TiVo), HR2x, HR34, HR44. The Genie Cx1 client is also supported when attached to a server. You can have up to eight Genie clients on one HR server.

Supported Processors

Any 2-series with an Ethernet card or 3-series processor is supported.

Compatibility			Processor Requirements	
				

Ethernet Configuration Information

This module utilizes direct sockets to communicate with the DIRECTV STB. To determine the IP Address of the receiver, use the on screen menu. Using the IR remote, press Menu->Settings->Info & Test -> More System Info -> then scroll down to Network. The IP address must be entered into the Server IP Address parameter on the module. Any Genie clients that are connected to this server and that are being controlled by Crestron must use the Server STB address.

ControlWorks recommends using a static IP address to maintain control of the server STB and that the IP Address does not change.

Module Application

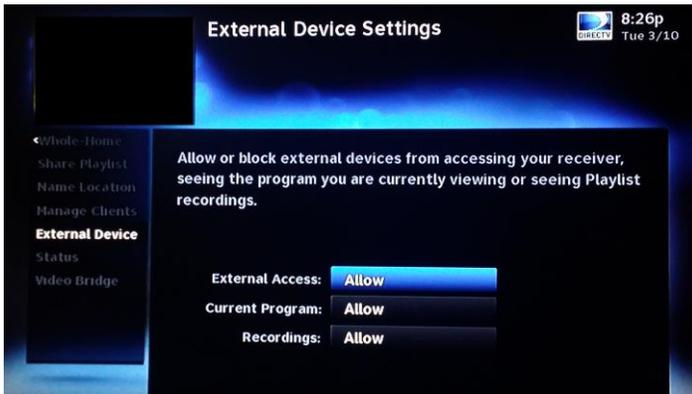
This module allows bi-directional TCP/IP communication with DIRECTV receivers equipped with an Ethernet port or wireless adapter and that utilize the SHEF API. These receivers include the H2x (with the exception of H20), HR2x, HR34, HR44. The Genie Cx1 is also supported when attached to a server STB. The TiVo versions are not supported.

Receiver Address Parameter

The **Receiver Address** parameter is to specify which receiver you would like the module to control. When controlling the main server STB receiver, or any standalone receiver, use "0" as the address. The main servers address is ALWAYS "0". To control a Genie set top box, use its MAC address in the parameter field. The MAC address should be entered in all caps without any delimiters, such as "08EB74C1C2F2".

Menu Setting

In order for the module to be fully functional, the Whole Home security settings must be set to allow for external control. On the Server STB, press Menu->Settings->Whole-Home->External Device->External Access: Allow.



Power Saving

Power Saving must be disabled. If power saving is on, the receiver will turn off due to inactivity and the API does not allow the receiver to be turned on. At the current time of development the Genie receivers when powered off do not respond to any commands.

Static IP

ControlWorks recommends using a wired Ethernet connection to the receiver as well as setting a static IP addresses to the DIRECTV hardware. Testing the module over a wireless connection has proven communication with the receivers to be unreliable.

Polling Frequency and TCP/IP Queue

The module will poll for current channel info after [\[poll_current_program_info\]](#), any channel up or down release, [\[ir_previous_channel\]](#), [\[ir_enter\]](#), or after 5 seconds of any [\[ir_key_kp_x\]](#) is pressed. It will also poll when any channel is sent via [\[channel\\$\]](#) or [\[channel\]](#).

All commands are entered into a TCP/IP queue and will be sent in the order they were put into the queue. In the case of heavy polling, it is advised to use a second module and second TCP/IP client to handle polling while the other module handles button presses so they are not delayed.

IMPORTANT NOTE ABOUT EXCESSIVE POLLING AND COMMANDS

Testing has revealed that sending an excess of commands for a sustained period of time causes the STB to stop responding to requests. The STB eventually starts responding to commands on its own after a period of inactivity.

An example of something not to do is to constantly poll the STB for now playing info. Our lab testing indicates that polling the receiver once every minute for now playing and power to be a successful solution. This timing may be different for your installation.

A timeout notice will be logged if the Crestron Processor is waiting for a connection or has connected and not received any data for 5 seconds. This is typical with excessive polling.

Connection Timeouts

On occasion, the DIRECTV STB will not respond when issued a command. If this happens, after a timeout of ten seconds the module will drop the connection. The module includes a digital [\[enable_timeout_logging_in_error_log\]](#) to log instances when the STB does not respond.

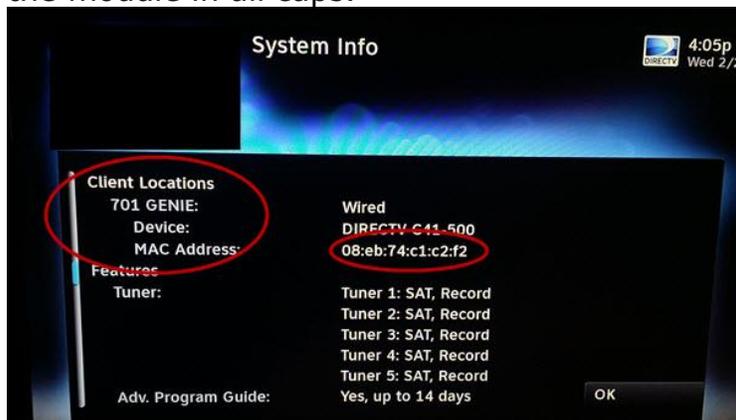
Finding Genie MAC Addresses

You can find MAC address for the Genies by one of two ways:

- 1. On the Genie itself:** Using the IR remote control and viewing the video output, press Menu, Settings & Help, Settings. Under the Info & Test tab, the client's information will be displayed, including the MAC address. MAC addresses should be entered into the module in all caps.



- 2. On the Main Server:** Using the IR remote control and viewing the video output, press Press Menu, Settings & Help, Settings, Info & Test, More System Info. Scroll down the list to see the info for Genie clients. MAC addresses should be entered into the module in all caps.



Using the module to find connected Genie receivers: Using the module that is intended to run the main server STB, and with "0" defined in the **Receiver Address** parameter, you can pulse the [[poll_connected_devices](#)] digital input. A list of connected devices, their names, and their MAC addresses will be sent to the message log of the Crestron processor for easier copying/pasting.

Signal and Parameter Descriptions

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

DIGITAL INPUTS

reboot_finished	Latch this signal high after startup is complete. See demo program for example.
[ir_key_xxx].....	Pulse these optional inputs to perform the labeled functions. These emulate the IR commands found on the remote control for the receiver.
[kp_enter].....	Sends the channel number selected using the [kp_x] number keys.
[kp_clear]	Clears the digits entered on [channel_entered\$].
[kp_backspace]	Deletes the last entered digit on [channel_entered\$].
[kp_0]-[kp_9], [kp_-]	Pulse to enter digits for tuning to a channel. Pulse [kp_enter] to send the command to tune to the entered channel. [channel_entered\$] will populate when the keypad inputs are pressed.
[poll_current_program_info].....	Pulse to poll the receiver for information on the currently tuned channel. This module will poll after some commands that could generate a channel change described above. If there is no interaction with those inputs, the module will not automatically poll for current info.
[poll_power_mode]	Pulse to poll the receiver for the receiver's power state; On or Off.
[poll_connected_devices].....	Pulse to poll the main receiver (server) for any registered or connected devices (Genies). The results will appear in the message log of the processor and can be retrieved by using the "ERR" command in text console. This can be used to find the MAC address of Genie clients, which is used in the Receiver Address Parameter of the module to control these clients. Main servers use "0" for the Receiver Address Parameter.
[poll_version]	Pulse to poll the main receiver for version information. Currently, access card number, receiver software version, and protocol version are available.
[enable_timeout_logging_in_error_log]	latch high to enable timeouts to get logged to the error log in the processor. Testing has shown that the server does not respond to every command sent to it. See the Timeout section above for more detail.

ANALOG INPUTS

[channel]	Changes the channel to the specified analog value. Use an INIT to drive this input. Sub channels are not supported with this input. If a sub channel is required, use the [channel\$] input.
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SERIAL INPUTS

[channel\$]	Input a string containing the channel number to tune the receiver to. Strings should only contain numerals or a "-" and no more than 10 characters. For example, send "215" to tune to channel 215, or "220-1" to tune to 220-1 subchannel. Ensure the entire channel number comes in as one string, and not broken into multiple segments. Using an SIO will ensure proper
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operation. This input string can be used with the Smart Graphics dynamic channel presets object.

[info_channel\$]Input a string containing the channel number to query the receiver for program information on a channel other than the currently tuned channel. Strings should only contain numerals or a "-" and no more than 10 characters. For example, send "215" to tune to channel 215, or "220-1" to tune to 220-1 subchannel. Ensure the entire channel number comes in as one string, and not broken into multiple segments. Using an SIO will ensure proper operation.

DIGITAL OUTPUTS

[off_air_fb]Feedback of currently tuned program. Latched high when current program is an ATSC event.

[is_ppv]Feedback of currently tuned program. Latched high when current program is a pay per view event.

[is_recording]Feedback of currently tuned program. Latched high when current program is currently being recorded.

[is_vod]Feedback of currently tuned program. Latched high when current program is a video on demand event.

[parental_control_mode_xxxx]Feedback of currently tuned program. Latched high when current program matches one of the parental control modes.

[other_xxx]Same as above for currently tuned program, except for the channel set by the [info_channel\$] input.

ANALOG OUTPUTS

[major_channel_number]Feedback of currently tuned channel. Just contains the major portion of the channel number, not any subchannel. Example 202d

[minor_channel_number]Feedback of currently tuned channel. Just contains the subchannel portion of the channel number.

[duration]Analog feedback in minutes for the currently tuned channel. 1d = 1 minute.

[other_xxx]Same as above for currently tuned channel, except for the channel set by the [info_channel\$] input.

SERIAL OUTPUTS

[channel_entered\$]String output that displays the currently entered channel number from the kp_x digital inputs. The output will be cleared on the rising edge of the [kp_clear] or [kp_enter] digitals.

[channel_fb\$]Serial output that displays the currently tuned channel number. This output updates after the kp_enter digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.

[call_sign\$]Serial output that displays the currently tuned channels call sign. This output updates after the kp_enter digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.

[station_id\$]Serial output that displays the currently tuned channels station ID. This output updates after the kp_enter digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.

[title\$]Serial output that displays the currently tuned channels show title. This output updates after the kp_enter

	digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.
[air_date\$].....	Serial output that displays the currently tuned channels shows air date. This output updates after the kp_enter digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.
[start_time\$].....	Serial output that displays the currently tuned channels shows start time. This output updates after the kp_enter digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.
[rating\$]	Serial output that displays the currently tuned channels shows rating. This output updates after the kp_enter digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.
[program_id\$]	Serial output that displays the currently tuned channels shows Program ID. This output updates after the kp_enter digital is pressed or after the receiver tunes to the channel sent on the [channel_entered\$] input.
[music_station_artist\$].....	Serial output that will display the current music station artist. Testing has found that when tuning to a music channel, it may take a significant amount of time before the receiver receives the station meta data. Manual polling will be needed to keep this field up to date as songs change.
[music_station_cd\$].....	Serial output that will display the current music station cd. Testing has found that when tuning to a music channel, it may take a significant amount of time before the receiver receives the station meta data. Manual polling will be needed to keep this field up to date as songs change.
[music_station_title\$].....	Serial output that will display the current music station title. Testing has found that when tuning to a music channel, it may take a significant amount of time before the receiver receives the station meta data. Manual polling will be needed to keep this field up to date as songs change.
[other_xxxx\$}	Same as above for currently tuned channel, except for the channel set by the [info_channel\$] input.
[access_card_id\$]	Serial output that indicates the receiver's access card ID. This serial propagates with the current information when the [poll_version] input is pulsed.
[receiver_id\$].....	Serial output that indicates the receivers ID. This serial propagates with the current information when the [poll_version] input is pulsed.
[receiver_software_version\$]	Serial output that indicates the receiver's software version. This serial propagates with the current information when the [poll_version] input is pulsed.
[shef_version\$]	Serial output that indicates the receiver's SHEF version. This serial propagates with the current information when the [poll_version] input is pulsed.

PARAMETERS

Receiver Address.....Enter "0" for the main server STB or stand alone receiver. For Genie clients enter the MAC address of the Genie client. For information on how to find this, please refer to the module application section of this help file.

Server IP AddressEnter the IP address of the server STB. To find the address, visit the module application section of this help file. s

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:

DIRECTV_IP(ControlWorks)_v1.1.umcCrestron User Module
DIRECTV_IP_Engine(ControlWorks)_v1.1.uspSIMPL+ file used within the control module
DIRECTV_IP_Engine(ControlWorks)_v1.1.ushSIMPL+ header file
UTF-8_Processor_(ControlWorks)_v1.1.uspSIMPL+ file used within the control module
UTF-8_Processor_(ControlWorks)_v1.1.ushSIMPL+ header file
DIRECTV_IP_TSR-302_Demo(ControlWorks)_v1.1.vtpDemo touchpanel for TSR-302 remote
DIRECTV_IP_XPANEL_Demo(ControlWorks)_v1.1.vtpDemo XPANEL
DIRECTV_IP_Demo_Program(ControlWorks)_v1.1.smw ..Demo program for AV3 processor

Revision History

V1.1 caleb@controlworks.com 2015.12.11

-Added Sonic Tap outputs

-Improvements on when to poll after issuing channel commands.

-Added work around for a 2-series firmware bug that would require a program restart to reestablish communications with the DIRECTV receiver.

V1.0 gary@controlworks.com 2/25/2015

-initial release

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.

Manufacturer Hardware	Software Version
DirecTV HR44/500	0x987
Crestron Hardware	Firmware Version
Crestron AV3 Processor	1.010.0060
Software	Software Version
Crestron SIMPL Windows	4.02.56.01
Crestron Vision Tools Pro-e	5.5.11.01
Crestron Database	48.05.003.00
Crestron Symbol Library	508

ControlWorks Consulting, LLC Module License Agreement

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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