

## Chapter 27

### HCA Client-Server

Everything described in the User Guide up to this point describes what is called *stand-alone HCA*. It works just like most other Windows applications – you install it on your Windows computer, start it, work with it, and leave it running so it can control your home.

But HCA can also operate in client-server mode. This is what is called *Client-Server HCA*. If you are unfamiliar with the term “client-server” here is a definition:

*Client/server describes the relationship between two computer programs in which one program, the client, makes a service request from another program, the server, which fulfills the request. Although the client/server idea can be used by programs within a single computer, it is a more important idea in a network. In a network, the client/server model provides a convenient way to interconnect programs that are distributed efficiently across different locations*

Client-Server HCA consists of these components:

- The **HCA Server** loads and “executes” your automation design. This application has a very minimal user interface. It communicates with all your attached interfaces, runs schedules and programs contained in your design, and handles triggers for programs and devices. You can think of the server as giving the same function as stand-alone HCA after you loaded your design and then if you never touched the UI. Your design just runs in the background.
- Once the server is running and loaded your design then you access it using a client. There is a client for iPhone/iPad, a client for Android phones and tablets, and a client for Windows. All of these clients are control only. That is, you can control items but not make changes to your design.
- You can also run HCA itself in client mode - the same HCA executable works in both stand-alone mode and as a client to the HCA Server. What can HCA do when operating as a client? It can do anything that you can do with stand-alone HCA except for creation of a whole new design. From a client you can modify programs, add new devices, scan an Insteon network, control devices, etc. The experience working with the client should be the same as when working with stand-alone HCA.

A very important point is that multiple clients can be connected to the HCA server at one time. When you do this, any change made on one client to the state of an object – on, off, or dim – or a change to the design – adding a new device, changing a program etc - automatically updates the other clients with those same changes.

Why would you want to use HCA Client-Server? The major advantage of HCA is that it can integrate all your different powerline technologies, weather, IR, wireless, and the internet with your programming and schedules. With client-server you can get access to HCA from any client – phone, tablet, laptop – from anywhere.

You also may want to run a client on a shared computer in your home. If you configure that client to use the Touch-Screen User Interface – described in its own chapter – then everyone can control just those devices you want to expose. And they are prevented from making any design changes.

**Note:** Don’t be confused with the term “HCA Server”. The HCA Server is not a “Windows Service”. The HCA Server is just another Windows application.

## First some words about security

Before even describing how to use the HCA Server and connect a client it is important to first consider security.

***HCA controls real things in your home and you should do whatever it takes to limit that control to authorized users.***

Using client-server you can expose your home automation design to external access. You may want to do this so you can access your home from anyplace – from your work computer or a laptop when on the road - and control devices and programs. But if you can do that, anybody can do that unless you work to prevent it!

There are many ways to limit access and you should use all of them:

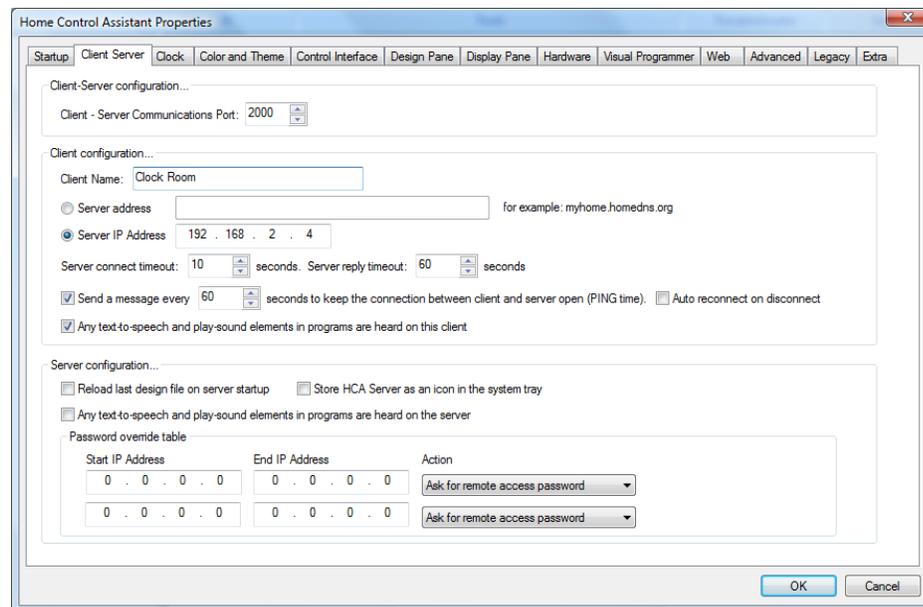
- You should choose a non-default port number.
- You should assign a remote access password to your home design.
- You should enable any password protection features that your router may provide.

***Remember: HCA controls real things in your home and you should do whatever it takes to limit that control to authorized users. Security is your responsibility!***

## Using the HCA Server

Before you can use the HCA Server you have to configure it. All server configuration is performed from the *HCA Options* dialog. This means that even if you want to run only the HCA Server on a computer you must install and run HCA at least once to get access to all the options.

To configure the server press the *HCA Options* button in the HCA application menu.



As the dialog says, some of the sections configure the server, some the client, and some configure both. The parameters that configure the server are:

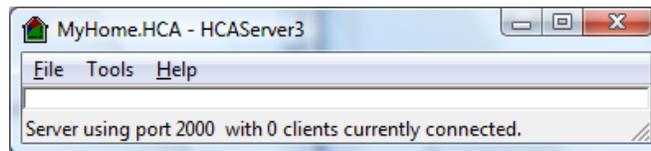
- Port  
Communication happens between the client and the server using a designated port number. You can choose any port number you would like.

- **Reload on startup**  
This option directs the HCA Server to reload your design file when it starts. This is similar to the reload option in stand-alone HCA on the startup tab.
- **System notification area on startup**  
This option directs the HCA Server to minimize itself to the system notification area upon startup. This is similar to the system notification area option in stand-alone HCA on the startup tab.
- **Text to speech**  
If any program executes a text to speech element, if the option is enabled then the server's audio system is used. A message is also sent to the connected clients and they too can use their auto systems for the text to speech operation.

The last section of the client-server tab has to do with the HCA Security model. When you open the home properties, on the security tab you can assign several different passwords. The one password important for this discussion is the Remote Access Password. This password is checked each time client attempts to connect to the server

In order to make it simpler for you on an internal network – your house-side of the firewall – you can assign a password to your design but configure the server to not request the password from some computers – identified by a range of IP addresses. You should, of course, only use this password suppression on internal IP addresses.

You can start the HCA server from the Windows Start button. Once started its main window appears:



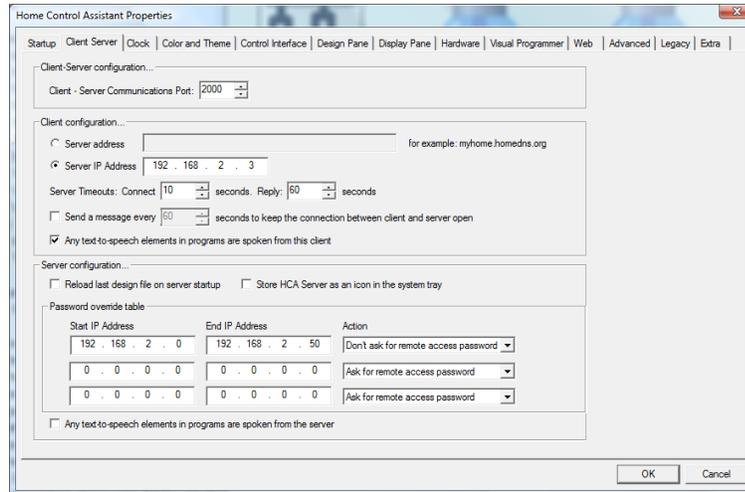
This is the whole interface for the HCA Server! We did say it has a very minimal user interface! The status bar shows the port it is using as well as the number of currently connected clients. The title bar shows the filename of the loaded design file. The menu selections are:

- **File – Open**  
Open a selected file
- **File – Minimize to notification area**  
Store HCA Server as an icon in the Windows notification area. This is different than using the minimize box in the title bar which minimizes the application to the task bar.
- **Tools – Remote Access Viewer**  
This opens a window where the various messages that flow between the client and the server display. This is largely for diagnostic purposes of technical support. Also displayed in this viewer are any log entries generated by the server in a compressed form. You can use this dialog if you want to be reassured that the server is doing something.
- **Tools – Show Connected Clients**  
Opens a dialog that shows the IP address of all connected clients
- **Tools – DDSN Update and DDNS Test**  
See the DDNS technical note for more information.

Once the design is loaded by the server, it is operational. Schedules run, triggers are responded to, weather observations taken, etc.

## Connecting a Client

Once the Server is started and your design loaded, then a client can be connected. Before the connection can be made the client must first be configured. To configure HCA to run in client mode, run HCA and open *HCA Options* and choose the Client-Server tab.



As the dialog says, some of the sections configure the server, some the client, and some configure both. The parameters that configure the client are:

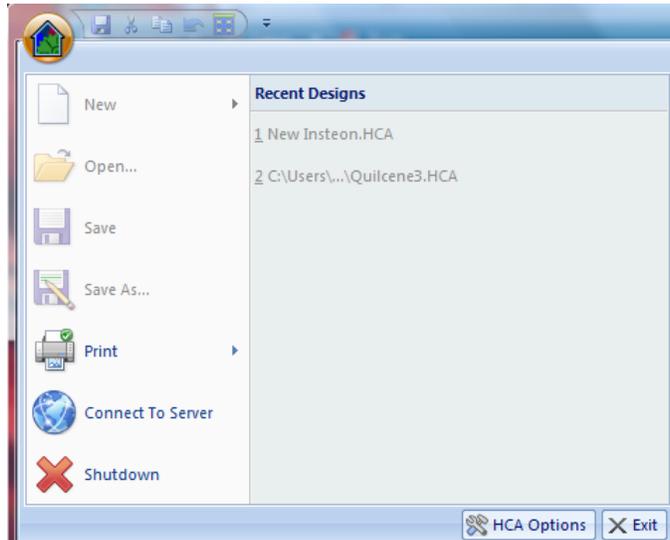
- **Port**  
Communication happens between the client and the server using a designated port number. You can choose any port number you would like. The port selected for the server and client must match.
- **Client Name**  
Assigning a name to each client is necessary for some places in HCA where you can explicitly have an action carried out by the server with only a single client. For example, the Visual Program element that requests user input when executed by the server can be routed to a named client.
- **Server IP Address**  
This can be entered by using a four part IP address – a.b.c.d – or using a text string that can be translated into an IP address. Depending upon how you have Windows configured, it may be possible to use a computer name here.

If your internet access gets assigned an IP address that can change over time you probably have setup an account with one of the services – like DynDNS.org – that give you the ability to reference your home network using something like “myhome.HomeDNS.org”. You can also use the HCA DDNS Service. See the DDNS Tech note for more info.

- **Server Connect Time**  
The number of seconds to allow for a connection to be made to the server
- **Server Reply Timeout**  
The number of seconds to wait for a reply to any request sent to the server
- **Periodic messages**  
The client can periodically send a short message to the server every ‘n’ seconds. Depending upon the hardware and operating system settings, this may be necessary to keep the server to client communication connection open over time.

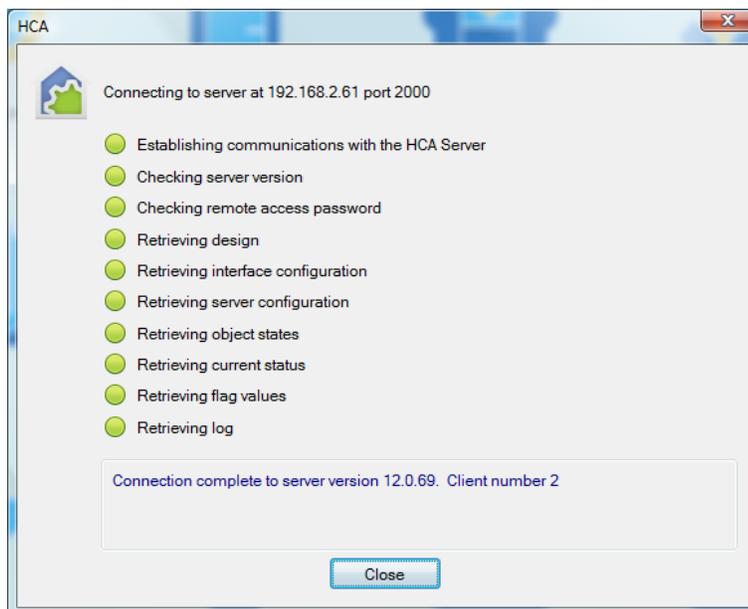
- Auto reconnect  
If the client becomes disconnected for any reason, if this option is enabled then the client tries to reconnect

Once you have configured the server and the client, started the server, and loaded your file you can now connect the client. To do this start HCA and select from the application menu *Connect To Server*.



Note: If you are running the client and the server on the same computer, when you start HCA it determines that the HCA Server is running and configures the menu to disable all the options for stand-alone operation - the actions that work with a file directly like Open, New, Save, etc.

Once *Connect to Server* is selected HCA establishes a connection to the server and then requests your design, configuration settings, the state of all your devices, and any log entries generated since you last connected.



And that's it! You can now interact with your design. To terminate HCA Client just select *Exit* from the application menu or click on the close box in the title bar.

**Note:** As your design is being loaded, any external files that are referenced – DXF files, IR definition files, icon files, etc are requested from the server and moved to the client. These files are all stored in the Temp subfolder in your HCA documents area.

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## What can you do with HCA Client – Server

As stated above, the goal of the HCA Client is that you can do anything you would normally do with HCA except for creation of a new file.

This means that each of your actions results in a communication with the server. If you control a light, for example, the client sends a message to the server to turn on the light.

Any operation that happens in the background when you are using stand-alone HCA happens on the server when in client-server mode. This includes:

- Schedules
- Program execution
- Trigger response for programs, devices, and groups
- Periodic status export
- Home Mode changes and Power Track statistics gathering
- Web Component
- Alert Manager
- Weather observations
- Power failure and restore
- Startup status polling
- Protocol Bridges
- Any device control initiated from the user interface

From the client, you can do more than just action operations. You can also change schedules and programs, add new devices, etc.

One important point to keep in mind as you work with your design are those areas that reference external files. For example, suppose you modify a program that uses the Read-Data element. This element reads an external file. Where does that file need to reside and what is the path that goes in the element properties?

Since all programs are executed on the server, the path in the element needs to be a *path to the file on the server* and not a path on the client computer. Those dialogs that accept a path contain a warning to remind you of this when HCA is working in client mode.

You can also work with those settings that are made in HCA – Properties. For example, you can test the connection to your hardware interfaces, start and stop the web component, and change program execution options. All these result in communication from the client to the server to carry out the action.

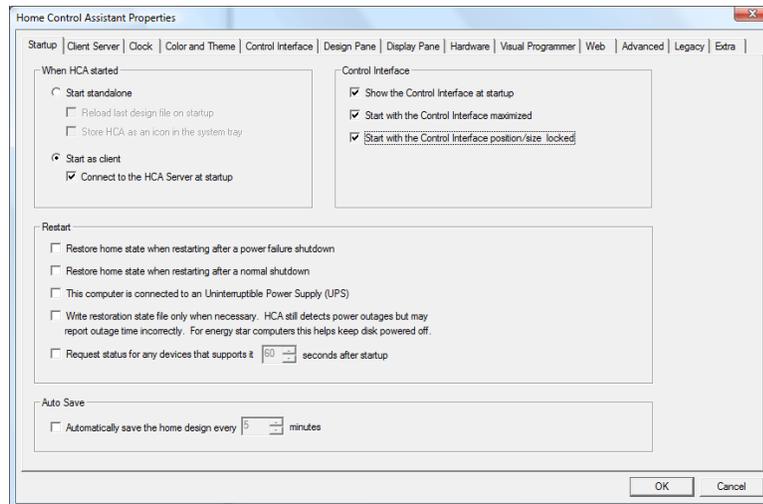
Should your connection to the server be lost – this can happen with network communications for a variety of reasons – you can reconnect to the server by selecting from the menu File – Reconnect to server. This causes your design to be reloaded.

**Note:** Some HCA settings are local and others are global. For example, you can configure a client’s display pane settings (HCA – Properties Display Pane tab) and those settings are local to that client. Other settings, like the Advanced Settings (HCA – Properties Advanced tab) are communicated to the server when changed on the client as they effect the action of the server.

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## Automatically Starting as a Client

Depending upon your application it might be convenient to have HCA when started to automatically connect to the server. This is accomplished by settings in HCA Options on the Startup tab.



In the *When HCA started* box, enable the options “Start as a client” and “Connect to the HCA Server at startup”. Once enabled, HCA automatically connects at startup and closes the connection progress dialog when the connection is completed.

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## Remote Access to the HCA Server

Everything described above in configuring the server and the client may be only part of what you need to do to establish communication between them.

You may need to configure your firewall and router to allow the selected port through and pass request from that port to the computer on your network running the HCA Server.

Configuring your firewall and router – software and hardware – is outside the scope of HCA and, we admit, can be a real challenge. All we can do is to suggest that you look carefully over your router documentation and consult the many different helpful guides you can find on the internet.

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## Other Clients

In addition to using HCA as a client to the server, you can also use the other clients. These are described in the next chapter on Clients.