Appendix 9 Insteon

This appendix describes the features in HCA in support of the Insteon technology and Insteon products available from SmartHome. These topics are covered:

- What is Insteon?
- Insteon devices
 - Adding an Insteon device
 - Modifying an Insteon device
- Insteon PowerLinc interface
 - PowerLinc address database
 - PowerLinc Interface models and Insteon firmware
- Insteon Tools
 - Network Multi-Add
 - The Insteon linking model
 - PowerLinc swap
 - Network Capture
 - Network Map
 - Network Clean
 - Device Replace
 - Changing local level and ramp rate
- Device and keypad linking
 - Device Linking tabs
 - Multi-Way Wizard
- Scene Control without Scenes
- Insteon message triggers for programs
- What HCA knows of the Insteon network and what it doesn't know

What is Insteon?

Insteon is a powerline carrier technology created by SmartHome Design. Like X10 and UPB it allows commands to be sent over the powerline wiring in your home. Signals generated by an Insteon transmitter, for example a keypad, can be received by the computer. HCA can also "listen in on" the communication between Insteon devices and act on that communication, or simply log the activity.

To use HCA with Insteon devices and keypads you need the USB Insteon PowerLinc (model 2413) available from SmartHome. This interface can also be used for X10 communication as well.

Insteon devices

Insteon devices come from the factory with an address permanently already assigned. This address is a three part number and is on a sticker someplace on the device. When you add an Insteon device to your HCA design that address is captured from the device in a step of the New Device Wizard.

Adding an Insteon Device

In step 3 of the New Device Wizard you choose the type of Insteon device. Select as the manufacturer "Insteon".

New Device Wizard	- Step 3 (Living Room - Lights)	x
	What type of device are you creating? If the device is not listed select either a similar device or generic device. You can always change the properties of the device later if necessary. Manufacturer	
	■ Insteon ■	
< <u>B</u> ack	> Next Finish Cano	el

In the wizard step 4 the Insteon address of the new device is determined. There are two ways to do this.

New Device Wizard	tep 4 of 5 (Living Room - Lights)						
	Address and type: ??.??? Generic Insteon switch						
	For devices always powered on - switches, wired-in keypads, modules, etc.						
	Step 1. Press this button to put the PowerLinc into linking mode PowerLinc linking mode						
-	Step 2: Place the device you are adding to your HCA design into Linking mode. Press and hold the "Set" button on the face of the device and then release it.						
	Some devices beep when they have reported their address Step 3. Come back to the computer and the device's address and type should be displayed above						
	For wireless devices - motion sensors, keypads, etc.						
	Step 1. Place the device into linking mode						
	Step 2. Press this button to put the PowerLinc into linking mode PowerLinc linking mode						
	Step 3. The device's address and type should be displayed above						
	the above procedure doesn't work, configure the device manually: Manual Configuration						
< <u>B</u> ack	lext Finish Cancel]					

The best method is to have HCA capture the address from the device when it is placed into linking mode.

As the text in the dialog says, if the device is wired-in, press the top "PowerLinc linking mode" button and the PowerLinc is placed in linking mode – the more recent versions of the PowerLinc beep when you do this. Next, go to the device and press and hold its "set" button until the link is made. Again, some more recent device types beep when you do this. When the link is complete the address and type of the device displays in the dialog.

For devices that are wireless, place the dvice in linking mode first – press and hold there "set" button" and when it is in linking mode then return to HCA and press the second "PowerLinc Linking mode" button. The link is made and the device address and type displayed in the dialog.

The second method is to enter the device address and type manually. You should only do this as a last resort as the address capture method builds an important link in the device that is needed for HCA to control it.

Insteon Device Manual Configuration: Living Room - Lights
What is the Insteon address of this device?
Address: 00 . 00 Test
Note: Put wireless devices into linking mode to turn on their receiver before pressing the Test button
What is the type of this device?
Kind
Switch 🗸
Model number and description
Generic Insteon switch 🔹
OK Cancel

The Test button in this dialog verifies the address you entered. If it can't communicate with the device then this popup gives you options.

Insteon Device Ad	b b b b b b b b b b b b b b b b b b b								
The device at that address didn't respond to an Insteon version request.									
This could be because there is no device at the address you entered or the device is of a newer firmware version that will not respond until it is linked to the PowerLinc.									
You have these	options:								
[Accept the address as entered								
	Let me enter a new address								
	Attempt to link to the device								

If you are sure the address entered was correct, then accept it and continue the wizard. If you think this is a device containing the newest firmware, try using the *Attempt to link* button.

Modifying an Insteon Device

Like other device types, to modify the properties of a previously created Insteon device, select its icon or its name in the design pane, right-click and select Properties.

ving Roor	m - L	ights" Pr	ropertie	s													
lame N	lotes	Room	Туре	Insteon	Options	Linking	Triggers	Restart	Icon	Display	Key Names	Log	Groups	Schedule	References	Power Track	Gree
		Please pro For examp	ovide a n ble you m	name for th night use K	is device. itchen Ligi	The name ht, Entry K	e you ente eypad, etc	r identifies c.	s it in you	r home de	sign.						
		Design Fo	older	m													
		- Design															
		 Lar 	np	7		🔘 Keypa	d										
		© Sw	itch	ţ		Motion	n										
		⊚ Mo	dule	2		Group		90									
		© Ou	tlet			Progra	im	łĝ₽									
		You can on it by a	mark this schedul)isabled	s device as e or progra	s disabled f	to remove effect.	it from you	ur design v	vithout d	eleting it.	When disable	d, any ac	ction				
															ОК	Car	ncel

One very nice feature of Insteon devices is that they all work just about the same. All Insteon devices respond to the same commands in the same manner. As such, unlike some other device types there is no place in HCA to set any options that describe a device's function – the options tab only gives you options on how the icon operates.

One final word on Insteon devices: Make sure the address captured by the New Device Wizard or in the device Property dialog matches the address on the device. Pay particular care that you enter it correctly or HCA will not be able to communicate with the device.

If you factory reste the device you must recapture it address. There is a button for this on the "Insteon" tab.



Insteon PowerLinc Interface

Before HCA can send and receive Insteon commands over the powerline, you must connect an Insteon PowerLinc to the computer HCA is running on. Open the *HCA Options* dialog then choose the *Hardware* tab. When you do that this dialog appears:

Home Control Assistant Options		×
Startup Client Server Clock Color and Theme Control Interface Design Pane Interface hardware attached to this computer:	Display Pane Hardware Visual Programmer Web Advanced Legacy Ed	tra
SmartHome Insteon Modem - Serial (2412S/2413S) Comm 17 Configure Connect	Unused Configure Connect	
Unused Unused Configure Connect	Unused Unused Configure Connect	
Unused Configure Connect	Unused Configure Connect	
Unused Unused Configure Connect	Unused Unused Configure Connect	
	ОК Са	ancel

HCA Supports both the current Insteon PowerLinc (2413). HCA also supports the older model PowerLinc (2412 and 2414) but these are not recommended. The 2414 can't send and receive the commands needed by the most current Insteon devices. This is described in greater detail in a later section in this appendix.

Hint: There are many different PowerLinc controllers, make sure you select the correct one!

In the same way you identify all automation interfaces to HCA, all you need do is to select the interface type, communications port, and then press the Test button. If HCA can read information from the PowerLinc it displays a success message. Any problems with connection are noted in a failure message.

As you can see in this dialog, you can attach up to eight automation interfaces to HCA simultaneously. This means that you can use other interfaces as well for UPB and Wireless. One feature of the Insteon PowerLinc is that it can be used for X10 devices as well. To enable this pres the Configure button to choose one or both of the supported protocols.

Interface Configuration
This interface supports multiple protocols. Which of these protocols should be used?
✓ Insteon
☑ x10
Logging
Log entries associated with this interface go to: Primary Log 🔹
OK Cancel

On this dialog you can also choose the log used for this interface.

PowerLinc Address Database

Unlike other power line technologies, the Insteon PowerLinc will only pass on messages from devices it knows about. This can help prevent you from receiving messages from other users near your home. But it may mean an extra step for you.

As devices are added to your HCA design they are automatically added to the database in the PowerLinc, so normally you need not be concerned about this. The problem arises if the PowerLinc is reset or you get a new PowerLinc to replace a failing unit, or you move your design to another computer with a different PowerLinc.

HCA can rebuild the PowerLinc table. Click on the *PowerLinc* button in the ribbon *Interfaces* category and select from the menu *PLC Utilities*. This dialog appears:

I gives you the ability to	view and modify this F	LC linking table.			
perations	Database Conter	its			
Read	Address	Unit address	Name	Data	
	FFB0	0A.40.13	Home - Motion S	00 07 40 0A 01 00 00 00	
Clear Used	FF30	0D.51.33	Home - V2 Switch	00 05 51 0D 01 00 00 00	
	FF00	0B.BB.3E	Home - Relay	00 04 BB 0B 01 00 00 00	
Add Devices	FED0	0E.3A.4A	Hall - Celing Lights	00 04 3A 0E 01 00 00 00	
	FEC8	05.8A.4C	Home KeypadL	00 06 84 05 01 00 00 00	
Clear Full	FDE0	11.76.87	Home - IOLinc R	00 05 76 11 01 00 00 00	
	🗖 FD70	0B.88.A2	Home - Switch 1	00 04 88 0B 01 00 00 00	
Add Link	🗖 FD68	0C.C9.A5	Home - V2 relay	00 05 C9 0C 01 00 00 00	
Remove Checked	FCA8	03.E3.D4	Home Switch 2	00 04 E3 03 01 00 00 00	

The operations are:

- Read: Read and display the PowerLinc database
- Clear Used: Clear any entries that are marked as used. Can only be done after a read.
- Clear Full: Clear all entries in the PowerLinc database. This can take several minutes.
- Add Devices. Add to the table the addresses of all of your Insteon devices. Use this operation if you replace the PowerLinc with a new one.

PowerLinc Interface models and Insteon firmware

HCA supports all models of the PowerLinc interface but not all have the same capabilities. Also, not all Insteon devices have the same level of firmware in them. You may be working with a PowerLinc model and device firmware that can present challenges.

Some Insteon firmware has a requirement that that the device's linking table include a responder link for HCA (actually the PowerLinc address but you know that) to have HCA even turn the device on or request its status.

During the New Device Wizard, when you get to the Insteon Address step there are two options as described above. The address capture method is key as it also builds the needed responder link in the device that the new firmware needs.

But there are problems. Here is what works and what doesn't and why

- Version 1 firmware is the newest Insteon devices.
- Version 2 is newer firmware
- Version 3 is the most recent at the time of HCA 11 release firmware.
- This firmware has the requirement as described above.

If you are using a 2413 PowerLinc, here are the operations that work with each device firmware version.

	Capture	Test
V1	ok	ok
V2	ok	ok
V3	ok	ok

If you are using a 2414 PowerLinc, here are the operations that work with each device firmware version.

	Capture	Test
V1	no	ok
V2	no	ok
V3	no	no

This means that if you ware working with a device with version 3 firmware, and you are using the 2414 model PowerLinc you will have to manually link each device to the powerline or HCA can't even turn it on.

Insteon Tools

This section describes a number of tools that work with Insteon devices. All of these tools are started from buttons in the *Insteon* section of the ribbon *Protocols* category.

Multi-Add

One method to quickly add a number of already installed Insteon devices is to use Insteon Multi-Add. This dialog appears as:

Insteon Multi-Add						
The Insteom Multi-Add tool lets you add a number of already installed Insteom devices to your design. Step 1: First press the "Start" button and then go to the first Insteom device you want to add and place it in Inking mode. As soon as the device enters linking mode, the address of the device is captured. Then move to the next device and repeat the process. You can add up to 32 devices during this step. Not all wireless devices work with this tool. You should take notes on the order of the devices you went to so when you return to the computer you can name them and assign to rooms or folders.						
Address Model - Product Version Room Name Device Name						
1 v Ignore						
2 v J Goore						
3 V V I Ignore						
4 v i Ignore v						
Start Get Types						
Step 2: Press the Get Types button to query each device for its version and type						
Step 3: Replace the default device and room names with more descriptive ones. Select the type for any device listed as Unknown. If there was a problem with the discovery process - always a possibility - you can check the ignore box and an HCA device is not created for it.						
Step 4: Press OK to create the HCA devices. Once created you may want to open their properties and change the icon and other HCA settings.						
OK Cancel						

Here is how this works: Press the start button and then walk around your home putting devices into linking mode. Keep track of the location of the devices and the order you do them in!

Once the Start button is pressed he dialog tells you to begin.

Insteon Multi-A	dd			×				
The Insteon Mu	The Insteon Multi-Add tool lets you add a number of already installed Insteon devices to your design.							
Step 1: First press the "Start" button and then go to the first Insteon device you want to add and place. It in Inking mode. As soon as the device enters linking mode, the address of the device is captured. Then move to the next device and repeat the process. You can add up to 32 devices during this step. Not all wireless devices work with this tool. You should take notes on the order of the devices you went to so when you return to the computer you can name them and assign to rooms or folders.								
Address	Model - Product	Version Room Name	Device Name					
1		<u>v</u>	Ψ.	J Ignore				
2		Y	y	🚽 🗌 Ignore				
3			v	🖳 🗌 Ignore				
4		<u>_</u>	_	👻 🗐 Ignore 🗸				
		Get Typ	es					
	Wai	ing for Linking report Press Stop when you have a	dded all your devices					
Step 2: Press t	he Get Types button to query each device t	or its version and type						
Step 3: Replace the default device and room names with more descriptive ones. Select the type for any device listed as Unknown. If there was a problem with the discovery process - always a possibility - you can check the ignore box and an HCA device is not created for it.								
Step 4: Press C	Step 4: Press OK to create the HCA devices. Once created you may want to open their properties and change the icon and other HCA settings.							
		OK Cancel						

Here is the dialog after three devices have been added. Each added device appears on its own row. That section of the dialog scrolls and you can add up to 32 devices at once although, as said below, you shouldn't try to do that many unless you are very fast and have a good memory.

Inc	teen Multi-Add									
Ims	Steph Multi-Add									
1	The Insteon Multi-Add tool lets you add a number of already installed Insteon devices to your design.									
5	Step 1: First press the "Start" button and then go to the first Insteon device you want to add and place it in linking mode. As soon as the device enters linking mode,									
	me address of the device is captured. I nen move to the next device and repeat the process. You can add up to 32 devices during this step. Not all wireless devices work with this tool.									
	You should take notes on the order of the devices you went to so when you return to the computer you can name them and assign to rooms or folders.									
	Address	Model - Product		Version	Room Name		Device Name	,		
	18.34.DE	JUnknown	•	1	New Devices	•	Device 18.34.DE	-	Ignore	
1	2 14.9F.3E Unknown 💌 1 New Devices 💌 Device 14.9F.3E 💌 🗖 Ignore									
:	3 05.8A.4C Unknown 🔹 1 New Devices 💌 Device 05.8A.4C 💌 🗖 Ignore									
	4 v I Ignore v									
	Get Types									
	Waiting for Linking report Press Stop when you have added all your devices									
1	tep 2: Press t	ne Get Types button to query each device for it	s version and ty	pe						
9	tep 3: Replace	the default device and room names with more	descriptive ones	. Select	t the type for any devic	e listed as U	Inknown.			
	If there	was a problem with the discovery process - alw	ays a possibility	- you ca	n check the ignore box	and an HCA	device is not created for it.			
9	tep 4: Press C	K to create the HCA devices. Once created yo	u may want to c	pen the	r properties and chang	e the icon ar	nd other HCA settings.			
	OK Cancel									

When you have completed all your additions, press the *Stop* button and then press the *Get Types* button to start the next step of multi-add. HCA requests the status of each device and from that determines its type.

Insteon Multi-A	bb	and and a second second	x				
The Insteon Mu	lti-Add tool lets you add a number of already ins	alled Insteon devices to your design.					
Step 1: First pro the add devices You sho	ess the "Start" button and then go to the first In: ress of the device is captured. Then move to th work with this tool. uld take notes on the order of the devices you w	teon device you want to add and place it in linking mode. As soon as the device enters linking mode, next device and repeat the process. You can add up to 32 devices during this step. Not all wireless ent to so when you return to the computer you can name them and assign to rooms or folders.					
Address	Model - Product	Version Room Name Device Name	_				
1 18.34.DE	2477D SwitchLinc Dimmer (Dual-Band)	▼ 3 New Devices ▼ Device 1B.34.DE ▼ Igno	·e 📥				
2 14.9F.3E	2475F FanLinc	▼ 2 New Devices ▼ Device 14.9F.3E ▼ Igno	re				
3 05.8A.4C	2486D KeypadLinc Dimmer	▼ 1 New Devices ▼ Device 05.8A.4C ▼ Ignc	re				
4		y I Igor	re 🗸				
		Start Get Types					
Step 2: Press the Get Types button to query each device for its version and type							
Step 3: Replace the default device and room names with more descriptive ones. Select the type for any device listed as Unknown. If there was a problem with the discovery process - always a possibility - you can check the ignore box and an HCA device is not created for it.							
Step 4: Press C	K to create the HCA devices. Once created you	may want to open their properties and change the icon and other HCA settings.					
		OK Cancel					

To complete the add operation, enter a device name and room name for each device and the close the dialog with OK.

A few notes on using Multi-Add

- You have only a limited time to complete the process before the PowerLinc exits linking mode. It is best to do only a few devices at one time.
- If you find that you have added a device more than once or made some other error, just "tick" the ignore box next to the device to it and it isn't added to your design.

The Insteon linking model

Described in the next sections are a number of tools in HCA to help manage your Insteon Network. These tools are for reading, writing, modifying, and displaying links between devices, so a short tutorial on Insteon links may be helpful.

If you are familiar with how keypads work in the X10 world, you may find Insteon keypads much more capable but more complex to work with. Each button push on an Insteon keypad sends an Insteon message. The destination of that message depends upon what was linked to that button.

Links can be created by a manual method. When you press and hold the keypad button until it goes into linking mode, the keypad sends out a message that says "My address is this and who would like to join my group 'n'?" Where 'n' is the button number.

At the lamp module you want to respond to that keypad button you press and hold its set button for a few seconds. That action sends a message to the keypad saying "Yes, I want to join your group n". The keypad then sends back a message saying "OK you're in" and then the lamp module acknowledges that message. Now linking is complete.

What happened is that the memory of the keypad and the lamp module were updated. The keypad added an entry to its internal memory that says "Group n has as one of its members the device addressed as xx.xx.xx". The lamp module updated its memory to say "If I receive an ON message from yy.yy.yy I should go to the level I was at when I was linked in".

In this example we used a KeypadLinc and a lamp module but the same things apply if you were linking with a SwitchLinc – as either a controller or receiver.

Hint: The preceding paragraphs are a bit simplified but it is correct enough for this discussion. See the SmartHome technical information for the complete story.

HCA can read and write these linking tables from all your devices.

This is important for two reasons: HCA can then understand all the connections between all your devices and, more importantly, be able to create new ones. This means that using HCA you need not spend time running around *pressing and holding* and *tapping set buttons*. In most cases, HCA can do it all for you.

PowerLinc Swap

The Insteon linking model described above presents a major challenge. Since each device that is linked to HCA is really liked to the PowerLinc used by HCA, if you change that PowerLinc all the links in all your devices that reference the old PowerLinc address will stop functioning. HCA tries to detect when the PowerLinc has changed and provides a tool to reprogram all your devices with the new PowerLinc address.

When HCA detects a PowerLinc change, this dialog appears when you load your design file.

НСА						
	There may be a problem!					
	The address of the PowerLinc connected to your computer has address 22.3F.E9. The PowerLinc in use when your file was last saved has address 1E.D9.56					
	This can be a problem if you have devices linked to HCA. Those links reference the old PowerLinc address and must be reprogrammed with the new address.					
	Select "PLC Swap Tool" from the "PowerLinc" menu in the "Interfaces" category.					
	I understand					

And it is even a bit worse than that. In the section above that explains that a "responder link" is needed in most devices before HCA can control it, the existing responder link is to the old PowerLinc and this needs to be updated. The only method to do this is to recapture the address of all devices.

HCA						
	Some of the devices that are linked to the old PowerLinc are version 3 (i2CS)					
	This means that they will be unable to communicate with the new PowerLinc until there is a responder link in their linking table naming the new PowerLinc address.					
	The best way to do that is to perform the address capture in the same manner as is done by the Add Device Wizard.					
	When you press the "Program For New PowerLinc" button if the device to be updated is a version 3 type device a address capture dialog appears					
	If you cancel out of the capture for the device it will not get updated.					

The Swap tool shows what needs to be programmed.

Swap Insteon Power	line Interface Tool	×						
This tool is used to chang address are changed to l	This tool is used to change the PowerLinc used to access your network. Any devices that are linked to the old PowerLinc address are changed to link to the new PowerLinc address.							
This can be a long proce For some devices you wil to tum their receiver on b	This can be a long process as each device is updated independently with a dialog appearing before each device. For some devices you will have to manually link them to the new PowerLinc. For wireless devices you will have to turn their receiver on by putting them into linking mode.							
HCA makes updates base PowerLinc and it is function	HCA makes updates based upon what it has stored in the HCA file for the linking tables of a device. If you have the old PowerLinc and it is functioning you should try to get a Network Capture done before you swap to the new one.							
Also check that the old a	nd new PowerLinc addresses are correct and press the Update button if you make cha	anges.						
Old PowerLinc address:	22 . 3F . E9 New PowerLinc address: 22 . 3F . EA	Update						
Device	Component Re	esult						
Living Room - Lights	Load responds to HCA initiated scene							
	Program for new PowerLinc	Close						

Carefully enter the old and new PowerLinc address and then start the operation. Changing the PowerLinc is not a simple operation. This isn't HCA's fault but just an outcome of the way that Insteon works.

Network Capture

The Network Capture tool reads the linking databases out of each Insteon device. The Network Capture tool is started by pressing the *Network Capture* button in the ribbon *Protocols* category. This dialog appears:

known V 0E,34,4A Hall-Celling Lights known V 11.76.87 Home - IoLinc Relay known V 0B,89.32 Home - Felay iknown V 0B,88.32 Home - Switch 1 iknown V 03.83.04 Home - Switch 2 iknown V 02.05.35 Home - V2 relay iknown V 00.51.33 Home - KeypadLinc 6 iknown V 05.84.4C Home - KeypadLinc 6							
known V 11,76.87 Home - IOLine Relay known ØB.89.3E Home - Relay known ØB.89.2E Home - Switch 1 iknown ØD.83.2A Home - Switch 1 iknown ØD.05.33 Home - V2 relay iknown ØD.05.133 Home - V2 switch 1 iknown ØD.58.4.4C Home - KeypadLinc 6							
known ØB.88.2 Home - Felay known ØB.88.2 Home - Switch 1 known ØB.25.04 Home - Switch 2 known ØC.05.85 Home - V2 relay known ØD.51.33 Home - KeypadLinc 6 known Ø ØS.84.4C Home - KeypadLinc 6 Home - KeypadLinc 6							
known ØB.88.A2 Home - Switch 1 known Ø 03.83.D4 Home - Switch 2 known Ø 01.05.A5 Home - V2 relay known Ø 00.51.33 Home - V2 relay known Ø 05.84.4C Home - KeypadLinc 6							
known Ø 1282.0.4 Home - Switch 2 known Ø 0C.03.A5 Home - V2 lelay known Ø 0D.51.33 Home - V2 switch known Ø 05.8A.4C Home - KeypadLinc 6							
known ØC.CSA.5 Home - V2 relay known ØD.51.33 Home - V2 Switch known ØD.58.4.4C Home - KeypadLinc 6							
kmown ØD.51.33 Home - V2 Switch kmown Ø 05.84.4C Home - KeypadLinc 6							
known 🗹 05.84.4C Home - KeypadLinc 6							

This is the most important tool of all! All the other Insteon Tools – Network Map, Network Clean, Device Replace, and the Visual Scene Editor – rely upon having complete and correct knowledge of all devices' linking databases.

When HCA reads the database of each device and copies its contents to the HCA design file, it also reads the version number of the database. The version number is updated as links are added, deleted, or modified. This lets HCA skip the reading of a device if it can determine if the database already matches what it has in the design file.

The database version for scene-capable Insteon a device is stored in its memory and gets reset to zero on factory reset or power cycle. If you have a power outage, all of your devices will get reset to version zero.

HCA has to assume that any device with Database version zero has been reset or modified and forces a database re-read before programming it again. Upon first reading a device database with a zero version number, HCA writes to it in order to change the version to one so that it does not have to re-read it again. You may notice that all devices have a database version of one after the first network scan after a power outage.

Programming a device changes the database version number. The final version number is determined by the number of bytes written to it (not links, but bytes). The actual number of bytes written varies depending on what changes are being made to the links. HCA only writes the bytes necessary, which saves a lot of time.

Occasionally the database number increments back to zero (roll-over), in which case HCA forces a re-read prior to programming the device again.

Reading out the database may take some time. If you have lots of devices you may want to choose only some of them to read. To do this, use the checkboxes in front of each device's name.

The same Remote Memory Access popup dialog used by all the other Insteon tools appears when you press the Start Network Scan button.

Hint: In some large networks the number of message repeats can be very large. This can really slow down the reading of linking databases. On the HCA Properties dialog Advanced tab is an option that sets a time limit on how long HCA will work at reading an entry from the linking database before giving up,. You may need to increase this timeout if you find that the Network read is reporting timeouts too frequently.

There is a visual programmer element that initiates the reading of a device linking table. You can use this in a program that you schedule to run infrequently – once a week or once a month – to make sure that the linking tables are up to date. It is not recommended that you don't do this too frequently as it takes a lot of network access time and the messages sent to read the devices can collide with other uses – like turning things on and off.



Network Map

The network map is a textual representation of your Insteon network. Displayed are what each device controls and what it respond to. To open the network map, press the *Network Map* button in the ribbon *Protocols* category

Component 05.78.68 ON button	Info	Scene Name
05.78.68 ON button		
A button	Database version: I Controls 05.FC:80 *** Controls Computer Room - Desk Lamp Controls 05.FC:80 **	Ceiling Light:ON > (many) Ceiling Light:A > Desk Lamp
04.99.A3 Responds to	Database version: 1 Computer Room - Ceiling Light Button A 05.FC.8D (group 101) [∞]	
0E.62.19	Database version: 25	
00.4C.DA Responds to	Database version: 1 05.FC.8D (group 101) ™	
0D.D5.56	Database version: 25	
00.4C.D3 Responds to	Database version: 2 05.FC.8D (group 101) ™	
05.A6.B8 Switch paddle	Database version: 1 Controls 05.FC.8D **	Exhaust Fan > (many)
07.26.F4 Switch paddle Responds to	Database version: 1 Controls 05.FC.8D *** 05.FC.8D (group 101) **	Vanity Lights > (many)
07.27.82 Switch paddle	Database version: 35 Controls Kitchen - Ceiling Fan/Lights Slave 2 Controls Kitchen - Ceiling Fan/Lights Slave	Ceiling Fan/Lights > (many)
Responds to	Kitchen - Ceiling Fan/Lights Slave Switch Paddle Kitchen - Ceiling Fan/Lights Slave 2 Switch Paddle 05.FC.8D (group 101) ™	
07.27.2D Switch paddle	Database version: 28 Controls Kitchen - Ceiling Fan/Lights Slave 2 Controls Kitchen - Ceiling Fan/Lights	Ceiling Fan/Lights Slave > (many)
Responds to	Kitchen - Ceiling Fan/Lights Switch Paddle	
	04.99.A3 Responds to 0E.52.19 00.4C.DA Responds to 0D.D5.56 00.4C.D3 Responds to 05.A5.89 Switch paddle 07.25.F4 Switch paddle Responds to 07.27.20 Switch paddle Responds to 07.27.20 Switch paddle Responds to	04.99.A3 Responds to Database version: 1 Computer Room - Celling Light Button A (6F.FC.8D (group 101) ** 0E.62.19 Database version: 25 0.4C.DA Responds to Database version: 1 (6F.FC.8D (group 101) ** 0D.05.56 Database version: 25 0.4C.D3 Responds to Database version: 2 0.4C.D3 Responds to Database version: 1 (6F.FC.8D (group 101) ** 05.46.88 Switch paddle Database version: 1 Controls (6F.C.8D ** Controls (6F.C.8D ** Network) 07.26.74 Switch paddle Database version: 35 Controls (Kichen - Celing Far/Lights Slave 2 Controls (Kichen - Celing Far/Lights Slav

This is a great method to document your network – a very handy thing in case something breaks and you need to re-establish some links. You can get a printout of this in one of two ways. The standard HCA printing features (*Application menu* – *Print* - *Printout Setup*) can print the network map. Or if you want to format it differently or use your own tools, you can save the map in CSV form using the Copy to Clipboard function. You can then paste it into other applications – perhaps an Excel worksheet..

Network Clean

It is easy for there to be problems with links in an Insteon network. If a device gets reset or you relink a switch or keypad button and don't first remove the existing link you may wind up with problems.

For two devices to be correctly linked there must be a controller link in one and a responder link in the other. If one of the two is missing then the controller can't control the responder.

The Network Clean dialog analyzes your network and looks for problems. To perform this, press the *Network Clean* button in the ribbon *Protocols* category.

i controller limit table has no reference for the device. In this case the limit can be removed as it is benign but useless. A more sensus error is a controller ving a link to a device that either doesn't exist or does exist but it has no link to respond to the controller. In this case the controller sends commands diverve sees an acknowlednement						
Device	Link to	Issue	Fix Option 1	Fix Option 2		
Living Room - Lights	0C.C9.A5	Button A controls "Living Room - Switch" but "Living Room - Switch" is not linked to this device	Fix by remove link	Fix by add link		
Living Room - Lights	0C.C9.A5	Button A responds to "Living Room - Switch" but "Living Room - Switch" is not linked to this device	Fix by remove link	Fix by add link		

The Cleaning process corrects problems either by removing or adding links. For each error listed press the button for the kind of correction that you want to perform.

There may be some devices that, for whatever reason, you don't want the network clean tool to work with. These can be listed in the exception table. This has the effect of removing them from all consideration by the Clean tool.

Netwo	ork Cl	ear	Exce	ptic	ns	×
Igno	re Net	wor	k Clea	an is:	sues t	hat references any of these addresses.
1:	1B].	34] .	DE	Clear Table
2:	00].	00		00	
3:	00].	00		00	
4:	00].	00		00	
5:	00].	00		00	
6:	00].	00		00	
						OK Cancel

- BIG Note: Don't get too carried away with the network clean tool. While the rules of device linking say one thing there are exceptions. Insteon is not a perfectly consistent system. There are devices types that seem to break these rules. Think before you act and, as has been said many times; if it isn't broken don't fix it.
- **Hint:** For the Network Clean tool to be able to detect and correct problems it needs to have the most current linking databases to analyze. Make sure that you use the Network Capture tool often.

Device Replace

A major problem in the Insteon linking model is what happens if a device fails. Not only do you have to replace the device but you have to reprogram it with all the stored links in it. And, as important, you have to reprogram any device that is linked to the failed device since those devices reference the old device's address. This can be a long and complex operation.

HCA can help with this. Press the Device Replace button in the ribbon Protocols category.

Insteon Device Replace						
Replacing a Insteon device that has failed is not a simple thing. Links are built from device to device using the Insteon addresses of the devices. So if a device fails, all other devices that reference this failed device must be updated with the address of the replacement device. Also the linking table in the replacement device must be written to match the contents of the failed device.						
HCA can do all this work for you. Select the existing device - the failed device - and press the "Perform Replacement" button. The first action of the Replace tool is to capture the address of the new device.						
Existing device: Living Room - Lights Device Address: 29.4C.2A						
Perform Replacement Close						

Starting the operation is simple: All you need do is to select the failed device – its Insteon address shows next to it - and press the Perform Replacement button. The procedure is exaplained:

НСА						
1	It may be helpful to know					
	Device replacement proceeds in three phases:					
	The first phase asks you to put the replacement device into linking mode so its address can be captured. Then checks are made to see if communications can be established with the replacement device and that it has an empty linking table.					
	Phase two programs the replacement device with the linking table from the failed device.					
	Phase three programs all devices that reference the old device address to use the new device address.					
	Each phase must complete without error before the next can begin.					
	If you continue then the next dialog seen is for capturing the address of the new device so have it installed and powered on.					
	I understand					

Once the popup is closed then the operation proceeds as described. Each phase requires action on your part and subsequent popups show that.

Hint: For the Device Replace tool to be able to correctly program the replacement device it needs to have the most current linking databases to analyze. Make sure that you use the Network Capture tool to keep HCA up to date. But you know that already!

Changing Local ramp rate and Local Level

For some device types – switches and load controlling keypads– you can set the level and rate the load goes to when locally controlled. For switches when the paddle top is tapped, to what level and at what rate does it turn on? And for the paddle bottom, at what rate does it go off?

This is set from the Insteon tab of the device properties in the "Local Settings" box.

Local Setup	
2 sec 🔹	Set Local Rate
80	Set Local Level
Read	

You can read the settings from the device, modify them, and then store the changes to the device.

Note: This is an area where Insteon is not consistent and not all device types support this nor do all device types – and firmware versions – operate the same. So if it works for your device then great. If not, you can always set these options manually – see the device documentation from SmartHome.

Device and Keypad Linking

In the preceding section the subject of linking and linking databases has been covered in detail. But most of that description focused on reading and storing those tables into HCA. The section discusses the tools HCA has for creating links.

There are three methods:

- The linking tab in device properties. These are good for linking HCA to the device so that HCA can respond to signals from keypads and switches, and control KeypadLinc LEDs.
- The Visual Scene Editor. This visual tool is for creating links between devices that can be activated by HCA or by an Insteon device. This is covered in the VSE chapter of the User Guide.
- The Multi-Way wizard. This is a tool for creating multi-way associations. A multi-way association is a set of devices where if one is controlled (tapping the switch paddle or pressing a KeypadLinc button) all the others in the association are controlled as well.

Device Linking Tabs

While the Visual Scene Editor is a general tool that can be used to build links between devices and HCA, you may want to create links with HCA in a simpler manner.

When you open an Insteon device property dialog, the linking tab appears as:

"Living Room - Switch" Properties	×
Name Notes Room Type Insteon Linking Triggers Restart Icon Display Key Names Log Groups Schedule Ref	ferences Power Track Green
When you link an insteon keyoad or switch to a device, the device is controlled when you press the	
keypad button or tap the switch paddle.	
In this same way, you can link a keypad button or switch paddle to HCA. When the button is pressed or switch paddle tapped, HCA receives the Insteon message and you can use that as a trigger for	
a program.	
Link	
To link a keypad button, switch paddle, or module sense to HCA, press the "Link Device to HCA"	
button and follow the directions.	
Link Device to HCA	
	OK Cancel

If you press the *Link Device to HCA* button HCA writes the necessary link to the device's linking table so that each time you tap the switch paddle, HCA receives a message. Once linked in this way, you can then create a trigger so that the Switch paddle starts a HCA program.

Insteon Remote Memory Access	
Action	Info
✓ Send status request to Living Room	Status reply ok
Check database version	Version 0. Does not match previously read version
🗸 Read link database	Database read OK
🗸 Add link	Write OK
Read link	Read OK
Check for correct write	Data matches!
Read new database version	Status reply ok
	Close

If the device is already linked the button text says *Already Linked to HCA*. If you press that button, this popup appears:

НСА		x
?	Are you sure?	
	Do you want to unlink this switch? If you do this then HCA will no longer be able to receive from it and trigger programs.	
	Yes. Go ahead No. Don't do it	

This gives you the ability to unlink an already linked device.

Linking a controller – like a KeypadLinc - is a bit more complex. The linking tab appears as:

	16	ad Du		× 110	٨	Device in	itiates the	linking ar	nd once r	complete ti	ne device			
	кеур	ad Bu	πon	→ HC	А	sends co	mmands th	nat HCA o	can use a	is program	triggers			
Whe wher input	n you link n the inpu t transmits	t an Instea t transmits t HCA rec	on inpu . In thi eives t	:-like a ke s same wa he Insteor	eypad butt ay, you ca message	on - to a d n link an ir and you d	levice, the nput to HC an use the	A. When a receipt	s controlle 1 the of	ed	ON B			
the m	nessage a	as a trigge	r for a p	orogram.	on the rid	bt you wa	at to link a	nd follow	any direc	tione				
10 11		at to HGA,	press	ne batton	on the lig	ni you wa			any area		OFF			
						HCA initia	ates the lin	king and	once cor	nplete the	1 HCA			
	HCA -	⇒ ney	pad		ea	can send	to the de	vice to tu	m on and	l off keypa	d buttons			
Whe tum o	n you link off or on t	t an Insteo he switch	on swite from th	ch to a Key e paddle.	/padLinc t In this sa	outton, the me way yo	LED is co u can link	ntrolled v HCA to a	when you a		ON B			
Keyp	adLinc b	utton. In t	his way	you can	control the	KeypadL	inc button	LED from	n HCA.					
TO III	ік а кеур	ad bullon		A, press tri	e bullon y	ou wanii io	IINK ANU I	ollow trie	direction	s	OFF			

This dialog is divided into two sections. The upper section is for linking buttons so that when pressed a message is sent to HCA. Like the switch paddle case, once a button is linked then a HCA program can be triggered by that button press.

The lower section of the dialog is for linking the KeypadLinc LEDs to HCA so HCA can send commands that turn the LEDs on and off. Unless HCA and the KeypadLinc LED are linked, HCA can't control the LED.

To create a link all you need do is to press the button and HCA will program the switch as needed. If the button or LED is already linked to HCA the txt on the button is HCA. Pressing it will offer you a chance to unlink the button or LED and HCA.

Hint: There is no magic here. The linking tab is only a quicker way to do what the Visual Scene Editor could also have done.

Multi-Way Wizard

A Multi-way association is a collection of two or more devices that all work together. An example is best to illustrate this. Suppose you have a number of lights in your kitchen. There are separate switches but when you tap the paddle of one you want them all to come on. And it doesn't matter which one you tap – controlling any of them causes them all to come on. This collection of switches is a multi-way association. You can also add a KeypadLinc button – for the KeypadLinc load or not - to an association so that if you tap an associated switch, the KeypadLinc button illuminates to show that the association is on.

The key concept of the multi-way wizard is that each member of the multi-way must be able to control all the others and respond to all the others. Since a module, for example, can only receive it can't be part of a multi-way. Only devices that both transmit and receive can join a multi-way.

There is no magic in the Multi-Way wizard. All it is doing is creating links in each of the devices in the association. You could create this in the Visual Scene Editor but since the number of links can be large, the multi-way wizard may be more convenient.

To start the wizard, pres the *Multi-Way* button in the ribbon *Protocols* category. The first step of the dialog is:

Inste	eon Multi-way setup wizard - Step 1	×
A ex eit	multiway association is a set of devices that work together. Controlling any one of them controls them all. For ample, you could have two switches and a KeypadLinc button all in the same multiway association Tapping her switch paddle top or the KeypadLinc button turns on both switch loads and turns on the KeypadLinc button.	
Tł	iis wizard can create new associations or modify existing ones.	
	Create a new multi-way association	
	C Edit an existing multi-way association	
	< Back > Next Finish	Cancel

The multi-way wizard doesn't only create multi-way associations, you can also edit an existing association to add or remove members.

The next step in creating a new association is to select the devices you want to associate.

Insteon Multi-way setup wizard - Step 2			×
Which devices are in this multi-way association ?			
Name: Mud Room			
Possible Multi-Way participants		In the Multi-Way	
Full Bath - Vanity Lights Kitchen - Ceiling Farv/Lights Slave Kitchen - Ceiling Farv/Lights Slave 2 Kitchen - Ceiling Farv/Lights Slave 2 Master Bath - Exhaust Fan Master Badroom - Ceiling Jights Master Bedroom - Ceiling Lights (LED A) Master Bedroom - Ceiling Lights (LED B) Master Bedroom - Ceiling Lights (LED D) Master Bedroom - Ceiling Lights (LED D) Master Bedroom - Ceiling Lights (DvOff: Controlled Load) Master Bedroom - Ceiling Lights (DvOff: Controlled Load)	E	Mud Room - Ceiling Light Mud Room - Ceiling Light Slave	
< Back >Next		Finish	ncel

All you need do is to select what devices you want in the association. Use the \rightarrow and \leftarrow buttons to move items between the two lists. When you have made your selections press the Next button.

Insteon Multi-way setup wi	izard - Step 3	X
To implement the multi-way a to all the other participants in	association, links are written to each devices linking table to both control and respond n the multi-way	
Program	Press program to write changes to the devices in the multi-way association	
< <u>B</u> ack > <u>N</u> ext	Finish	e

Press the Program button and HCA will create all the necessary links.

To edit an existing association, the second step of the dialog is:

Insteon Multi-way setup wizard - Step 2		×
In analyzing the linking tables of all the Insteon de	vices, these multi-way associations have been found.	
Select the one you want to modify.		
Multi-Way associations: Mud Room Nichen	Kitchen - Ceiling Fan/Lights Kitchen - Ceiling Fan/Lights Slave Kitchen - Ceiling Fan/Lights Slave 2	
< <u>B</u> ack > <u>N</u> ext	Finish	Close

HCA lists all the multi-way association it finds – by analyzing the linking databases of all your devices – and presents you with a list. When you select a multi-way in the left list, the right display shows what are the devices that make up the association. Select one and press Next.

Hint: If you want to rename the multi-way just click on the name in the right pane and HCA allows you to edit the name.

The next step of the edit is the same as when you are creating a new association:

Insteon Multi-way setup wizard - Step 3		— X
Which devices are in this multi-way association ?		
Name: Kitoteen Possible Multi-Way participants [Computer Roon - Celing Light (LED A]	In the Multi-Way Kitchen - Ceiling Fan/Lights	
Computer Room - Ceiling Light (LED B) Computer Room - Ceiling Light (LED C)	Kitchen - Ceiling Fan/Lights Slave Kitchen - Ceiling Fan/Lights Slave 2	
Computer Room - Ceiling Light (LED D) Computer Room - Ceiling Light (On/Off: Controlled Load)		
Full Bath - Exhaust Fan		
Master Bath - Exhaust Fan		
Master Bath - Vanity Lights Master Bedroom - Ceiling Ean	<	
Master Bedroom - Ceiling Lights [LED A]		
Master Bedroom - Ceiling Lights [LED B] Master Bedroom - Ceiling Lights [LED C]		
Master Bedroom - Ceiling Lights [LED D]		
Master Bedroom - Ceiling Lights [On/Off: Controlled Load]	-	
<back> Next</back>	Finish	ancel

You can add or remove devices from the association and then press Next. If you have made changes then the Program step appears and you an write those changes to your devices.

Hint: For the multi-way wizard to be able to edit existing associations it needs to have the most current linking databases to analyze. Make sure that you use the Network Capture tool often.

Scene Control without scenes

In the User Guide chapter on the Insteon Visual Scene Editor that tool was described along with how scenes can be invoked using the Scene Visual Programmer element and in schedules. There is an additional way to get "scene like" behavior.

One usual problem with Insteon devices because of its linking model is that no controller can pretend to be another controller. An example: Suppose you have a switch that controls a load linked as a controller of a KeypadLinc button LED. You tap on the paddle, the load comes on, and the KeypadLinc button turns on as well.

What happens if you use HCA to turn on the load? The load comes on but the KeypadLinc button does not. This is because HCA can't "pretend" to be the switch and have the KeypadLinc button LED respond.

There are three ways to solve this. One method is to create a scene where HCA was the controller and have the scene include the switch and the button LED. Another method is to create a program that controlled the switch and the button LED. In either case you have to remember to use the scene or program rather than control the switch directly.

The final method is to use an option that can be enabled on Insteon devices:

References							Power Track	¢				G	ireen	
lame	Notes	Room	Туре	Insteon	Linking	Triggers	Restart	lcon	Display	Key	Names	Log	Groups	Schedu
Addres	s									Lo	cal Setup			
🔘 Ca	pture from	the device:	1B .	34 DE		Capture		Test			0.5 see	c 🔻	Set Local	Rate
En	ter device	address:	1B .	34 . DE		Test	Insteon ve	rsion 3			100		Set Local	Level
						1	1							
🔲 Th	is <mark>device</mark> ł	nas an <mark>altern</mark>	ate X10 ad	ddress with Ho	ouse code	: [A	Unit co	de: [1			Re	ad		
12 340		- ان منطق معا		ated and d	inn 11 in 11-1		ataslas Tri-				a sector 13			
VVI	nen contro	lling this dev	lice also co	ontrol any dev	ICE IT IS IINK	ced to as a co	ntroller. I his	can simula	ite a scene	e or local	CONTROL:			
Linking	database	version 2												
Addres	s Flags				Group	ID			D1	D2	D3			
OFF	8 (EA) Ir	n use, Contri	oller, ACK		1	29.4C.2A (Kit	chen - Keyp	ad)	3	28	1			
OFF	0 (AA) Ir	n use, Respi	onder, ACH	C	1	22.3F.E9 (HO	CA)		254	28	1			
	.0 (00) 0	nuseu												
R	ead Datab	ase	Save as	text file	Remove	Checked	Write D	atabase						

With this option enabled - and if HCA has the current linking table of the device - then when the device is controlled, HCA also controls any device that is linked to the device as a responder.

There is one major difference between what this option does and a "real" scene. With a scene all devices respond at the same time. They also respond using the ramp rate configured in the scene. When this option is enabled, HCA must send individuals commands to each device and the ramp rates are not used. For keeping one device and an associated keypad indicator up to date this is a excellent method.

Program triggers for Insteon messages

Once you have completed linking HCA to respond to a switch paddle tap or keypad button press the next step is to create program triggers that respond to Insteon messages and start programs.

Just like other program triggers, it all starts on the Triggers tab of the program property dialog. To create an Insteon trigger press *Add Trigger* and choose the trigger type *Insteon Message*.

"Living Room - Light controller" F	Properties					and a second	×
Name Notes Triggers Visual	Programmer Advanced R	lestart Icor	n Dis	play Log	Schedule	References	
Start the program on any of these	triggers:						
Trigger			Edit	Delete			
When Living Room - Lights	sends On by A button		Edit	Delete			
Add Trigger							
						ОК	Cancel

Trigger	citabe' hearing	X
Trigger Type: Ins	steon Message	
Start the program	i on this trigger:	
When Living Ro	pom - Lights sends On by A button	
- Device sendin	g command	
Dev: Living F	Room - Lights 🔹 🗸	
Company		
component.		
Command		
© On	C Fast On	
0 Off	(in Fast Off	
© Dim		
Bright		
Fade Start		
Fade Stop		
© All On		
© All O ll		
	OK Cancel	

This dialog lets you choose any of the Insteon devices that transmit in your design.

The only other part that needs to be specified is the command to trigger on. You can create a trigger that responds to an On button press and another trigger that responds to an Off button press. Not all devices send all the commands listed so choose carefully.

Hint: Remember that triggers will not work unless the devices are linked to HCA. The trigger dialog presents all possibilities for triggers not just those linked. The Design Inspector, using the device linking tables, will look for any triggers that will not work as the necessary links are not in place.

What HCA knows of the Insteon network

The Insteon network is expressed in the contents of the link databases in each device. For example, when you have linked a lamp module and a ControlLinc, when you press the linked button on the ControlLinc, the lamp comes on at a certain level and rate. That level and rate are established when you performed the linking.

If you have read all the linking databases of all your devices and you keep them up to date – that is, if you create links using the manual method you reread the network using the Network Capture dialog – then HCA can track the state changes of your devices fairly accurately. If the linking databases that HCA saves with your design file are different than what is in the devices then HCA can't keep its state correct.

Let's take an example: Suppose that you have a KeypadLinc linked to a SwitchLinc. You press a button on the KeypadLinc. The SwitchLinc comes on - but at what level? If HCA has the linking databases of the KeypadLinc and the SwitchLinc it can tell what level it went to and make sure that the HCA state is current with the SwitchLinc. Without the linking databases HCA could know that the SwitchLinc came on (due to the ACK message it sends) but not at what level.

Another case where the HCA state may get out of sync with Insteon devices is if you manually dim a device. Even if the device is linked to another device so that they both dim together, the Insteon commands don't provide enough information for HCA to know what level they are at when you stop dimming.

Hint: You can always request the status of an Insteon device to find out its actual state. This can be done from a Visual Program using the Test or GetStatus element. It can also been done from the user interface by right-clicking on the device and selecting 'Get Status' from the popup menu.

Hints and Tips

Multiple Interfaces

Don't forget that HCA can use multiple automation interfaces simultaneously. In this way you can use X10, wireless and IR devices along with your Insteon switches and keypads in your automation design. For example, a HCA program, started from an Insteon keypad trigger, can send commands to both UPB devices and X10 devices. Or a wireless motion sensor can be used to start a program that controls Insteon devices. In this way HCA can bridge all your automation technologies. You may want to look at the Protocol Bridge feature if you find you are using devices of different technologies that want to work together.

Insteon PowerLinc Support for X10

While the Insteon PowerLinc supports X10, if you have many legacy X10 devices, especially those that use the most primitive form of dimming, you may find that the Insteon PowerLinc doesn't dim them as smoothly as you would like. This is due to the X10 implementation capabilities of the Insteon PowerLinc. If this is a problem you could use an X10 interface like the CM15 for X10 sends and receives and use the Insteon PowerLinc for Insteon messages only.