Appendix 10
Protocol Bridges

This appendix describes a feature in HCA that, with little setup, allows you to control devices that respond to one protocol with controllers that transmit a different protocol. For example, control an X10 device from a UPB keypad or an Insteon device with an X10 motion sensor. These topics are covered:

- What is a Protocol Bridge?
- Configuring a bridge
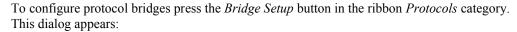- Limitation of bridging

What is a Protocol Bridge?

A Protocol Bridge is a feature in HCA designed to receive signals from a transmitting device and then retransmit them in the different protocol. For example, when HCA receives an ON command from an Insteon keypad, an X10 ON command can be transmitted to a specified house and unit code. This means that your Insteon keypad can be used to control an X10 light. Another user might be using an X10 motion sensor to turn on or off an UPB light.
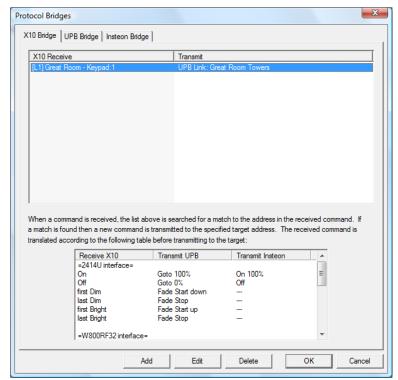
The information you provide on both sides of the bridge depends upon the protocol – X10, UPB, or Insteon.

Most of the functionality of a Protocol Bridge can also be done with an HCA program. For example, an HCA program can be started upon receipt of an Insteon ON command and the program can contain an ON element that sends to an X10 device. In the simple command translation case, configuring and maintaining a bridge is much simpler than an HCA program

The HCA bridge implementation is designed to act quickly. This means that as you press a key on a keypad you should see the effect of that key press very quickly on the target even though the keypad and target are not talking the same protocol. This is especially important when using a Dim or Bright buttons.

Configuring a bridge

To configure protocol bridges press the *Bridge Setup* button in the ribbon *Protocols* category. This dialog appears:

As you can see on this dialog there is a separate tab for X10, Insteon and UPB. The top section shows the actions of the bridge you have configured. For example, in the above picture the bridge is configured so that when an L1 is received a UPB Link command is sent using the *Great Room Towers* link. What command is sent? This is where Protocol Bridges are smart. HCA does all the command translation for you!

The list at the bottom of the dialog shows the command translations. For example, an X10 ON command translates to a Goto 100% in UPB or an Insteon ON command with level 100.

Sometimes the translation depends upon the receiving or translating interface. What would this be? Some interfaces provide enough information to handle the "real time" aspect of a bridge and some don't. An example may help explain this.

Suppose you press the ON button of an X10 keypad. The keypad is set up for housecode B and you press the button corresponding to a unit code of 2. That's easy. HCA received the B2 ON and can easily translate that into an Insteon ON or UPB Goto. But now you press the Bright key and hold it down. What the keypad does is to send a stream of Bright commands on to the powerline. If HCA is given information each time one of those Bright commands appear on the powerline, HCA can send similar commands in the other protocols and the light should visibly get brighter.

However if the powerline interface saw the stream of bright commands, counted them, and when the button is released **then** HCA is informed, it wouldn't be much good. Since HCA doesn't know about the commands sent by the keypad until it's too late. You couldn't visually track the light level of the device and release the button when it matches what you want. And that is what makes the protocol bridges most useful.
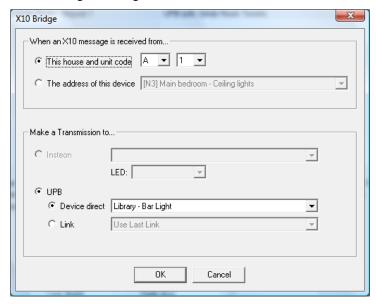
Some interfaces report each Bright command and others just count and report at the end of the command stream. Because of this, it is a good idea to look at the translation table at the bottom of the dialog to see what the bridge can and can't do using your hardware.

The bottom line on a bridge: You specify the reception and transmission addresses and HCA handles the command translation.

The other items on this dialog are buttons to allow configuring a new item in the bridge, deleting an existing item, or modifying an item.
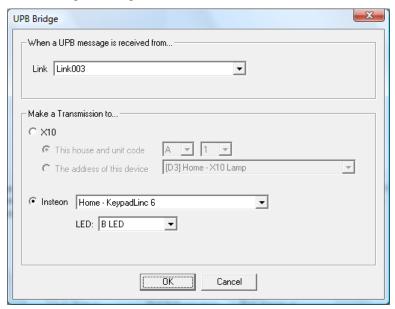
X10 Bridge

An X10 bridge is configured as:

For the reception side of the bridge an X10 address is needed. This can be entered simply as a house and unit code or using the address of one of the devices already in your design.

The transmission side of the bridge can be UPB or Insteon. In the case of UPB you can transmit directly to a device or use a link. For Insteon all you need do is to name the target device.
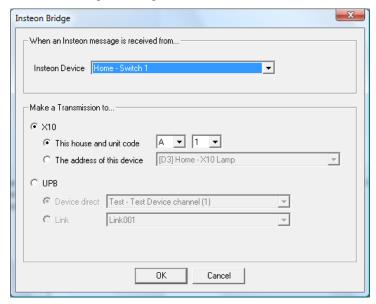
UPB Bridge

A UPB Bridge is configured as:

The receive side of the bridge is always configured as a link since all UPB device transmissions are by a link.

For an X10 transmission an address is needed. This is entered as a house and unit code or as the address of a device already in your design. For an Insteon transmission a device is selected.

Insteon Bridge

An Insteon Bridge is configured as:

For the receive side of the bridge, select an Insteon device and if the device has more than one button, select a button. In this example an Insteon KeypadLinc controller is selected and the bridge specifies what happens when the C button is pressed.

For the X10 transmission side of the bridge an X10 address is needed. This can be entered as a house and unit code or as the address of a device already in your design.

For a UPB transmission, you must select if the transmission is to be direct to a UPB device or a link transmission.

Limitation of Bridges

Most of the limitations of bridges come from the interfaces in use. Some reasons for this are described above in the section on configuring a bridge.

Another limitation comes when one interface is used to transmit on more than one protocol. For example, the Insteon 2414U interface is often used for X10 and Insteon transmissions. Because of this, it doesn't work well to bridge X10 and Insteon especially when X10 DIM and BRIGHT commands are on the powerline. Having the X10 commands reported to the computer quick enough at the same time Insteon commands are being sent just doesn't work well enough to be useful.

If you look at the command translation table on the X10 bridge tab you will see that the protocol bridge does much better when bridging X10 to Insteon when , for example, X10 receptions are coming from a whole house wireless receiver that when they come from the 2414U interface.

If your need for simple translations fit inside the limitations of what an HCA Protocol Bridge can do, then this can be a quick way to control newer devices with your older keypads or motion sensors.