OMNI, PulseWorx, and UPStart: A joint effort

If you use the HAI/Leviton OMNI you can use PulseWorx devices with the OMNI with very little additional effort. You may want to do that because there are additional features available in the PulseWorx devices not present in the HAI/Leviton device models. Also, there are additional PulseWorx products that can be used with the OMNI that are not available in HAI/Leviton product line. For example, there are PulseWorx Load dimmers and Relay dimmers that combine a keypad with the direct control of a load. This makes it much simpler to replace an existing switch during a retrofit with a keypad for scene control.

When adding a new device to an OMNI installation, the OMNI programs that device with the configuration necessary for its operation as part of the OMNI installation. Unfortunately, the OMNI only has the capability to program HAI/Leviton devices. The method outlined in this application note is to use the UPB Configuration program UPStart to do that programming. All the other steps of adding a device to the OMNI system remain the same and are outlined in this note to provide context and a step-by-step procedure.

Note: This application note assumes that you have access to and are familiar with the HAI/Leviton PC-Access Software. Screen images are taken from this version of that software. In this application note when it says the OMNI does “this or that”, take that to mean that the PC-Access software in conjunction with the OMNI does “this or that”.

This application note applies to the UPB Configuration program UPStart version 8.2.1 or later.
If you are very familiar with the OMNI and/or UPStart this application note may be duplicative of your knowledge so quickly scan those sections that don’t provide fresh knowledge.

Overview of the OMNI and UPB

The OMNI operates with devices that work with several different protocols, UPB being one. Before the OMNI can send to and receive from any UPB device it must be added to a UPB network. Once done, you have full access to the built-in function of the OMNI for scheduling and device control. UPB devices are also controllable via the OMNI mobile application (SnapLink and 3rd party versions of it) as well as the OMNI display panels.

To review, the OMNI has the concept of a “room”. Each room contains devices that are controlled as part of the room. Each room can operate in two different modes: “HLC” and “UPB” and it is important to understand the differences, advantages, and limitations of each. Also note that some rooms can use HLC mode and others UPB mode, all in the same design.

In HLC mode the OMNI oversees how all the devices operate. A room has a room controller keypad and that keypad controls all the devices in the room to fixed scenes (100%, 80%, 60%, 40%, 20%, OFF). All devices are controlled as a group. That is, press a button on the room controller keypad and all devices in that room respond. The advantage of HLC mode is that it’s simple and robust. Because the OMNI has programmed the devices as it expects, it “knows” how all devices in the room respond when a scene is activated or deactivated. This state tracking is important as the state of the devices appear in display panels and mobile applications.

The OMNI can also operate a room in UPB mode. In UPB mode you will have a much greater ability to use all the scene features that UPB devices have – HAI/Leviton and PulseWorx – and this can create more usable installations specifically tailored to the needs of the homeowner. However, with a room in this mode, the OMNI doesn’t automatically understand the scenes that exist in your installation and so can’t keep track of the state of all devices. While there are techniques to overcome that – discussed later in this app note – it puts much more of the burden on the installer to both create the scenes and understand this state keeping problem.

Room setup in HLC mode with the OMNI

Typically, the addition of a new device to an installation is handled by the OMNI programming a switch or module to respond to the room scenes. For a switch, the rocker is also programmed to report state when locally controlled. For keypads, each button is programmed to transmit the room scenes. Here is a brief review of the device add process.

In PC-Access locate the room that you wish to add the device into. Each room usually contains a Room Controller (a 6-button keypad and while there can be more than one, typically only one is used) and up to 7 devices to be controlled by that keypad. In this example file shown below, there are two rooms shown: “Mstr
Bedroom” and “Kitchen”. Room 1 is the master bedroom (in slot 0 and designated as “RM1”), Room 2 is the Kitchen (in slot 9 and designated as “RM2”.

In the Master Bedroom are 4 devices and these are in slots 2 to 5 and are designated “RM1-2” to “RM1-5”. In the kitchen are 2 devices in slots 9 and 10 designated “RM2-2” and “RM2-3”.

It is important to become comfortable with this type of numbering as it will be seen later when using UPStart.

To add a new device, locate an open slot for it in the room you want and click on it to begin the naming process. In this example, slot 6 “RM1-6” is used.
In this example a new switch is being added. If a new Room Controller was being added it would typically be added as the first device in the room.

If the PC-Access software connected to the OMNI panel, the programming of this new device can be accomplished. When connected, a “Status/Control” tab is available – it doesn’t appear when not connected. When selected, all the devices that you have configured – programmed or not – appear. For this new device, right-click on the device and select “Configure HLC device” from the popup menu. When selected the OMNI will locate the device in setup mode and program it for its use.

And that is all there is to it. The device is programmed exactly as the OMNI wants it to be. The only problem is that it will only perform this action with HAI branded devices.

**UPStart and non-HAI/Leviton devices**

To use non-HAI/Leviton devices with the OMNI there are two prerequisites. First, you must download, install, and learn to use a different configuration tool called UPStart. Second, you will need a power line interface called a “PIM” (Powerline Interface Module, PIM-U or PIM-R) available from PCS. The OMNI uses a PIM to program and control UPB devices, but you also need one connected to the computer where you run UPStart.

The good news is that UPStart is available at no cost from the Powerline Control Systems web. Upstart can be a bit overwhelming at first but there is a User Guide – also available from the PCS website – and a brief *Getting Started with UPStart* application note that is also available on the PCS website.

**NOTE:** What follows assumes that you are familiar with UPStart or have read over the *Getting Started with UPStart* application note, you have UPStart installed, a PIM available and UPStart configured to use it. You don’t have to create a network file of your entire installation as outlined in the Getting Started App note, or use the technique shown in there to find your network id and password. You can instead find these from the PC-Access program as shown below.
Creating a New File in UPStart

Before moving to UPStart, you need two pieces of info that you can find from the PC-Access program. Each UPB installation has a network id – a number between 1 and 250 – and a 4-digit password. You must know these for UPStart to be able to program your devices as the OMNI expects them.

In the PC-Access software choose the “Dealer Settings” under “Units” on the “Setup” tab.

The key items that you should write down are the "UPB Network Address” and the “UPB Network Password”. In this example the network address is 1 and the password is 1234.

In UPStart, open the application menu and choose “New Network” and then “Blank Network File”.
A popup appears asking for the Network information. This is where you enter the UPB Network Address and UPB Network Password that you copied down from the PC-Access software. The network name isn’t really used but to be consistent with the OMNI programs you may want to use “HAI Lighting” as is shown in the image below.

Press the OK button and you may see a popup message.

If you see this message it is a good thing! This means that the network ID you entered was the correct one and UPStart has seen that there are already installed UPB devices that your OMNI has been controlling.

Note: At this point it is possible to have UPStart create a file containing all the information about all your already installed UPB devices. This could prove useful if you want to do more than just program a new device in HLC mode to use with the OMNI. This is covered in the Getting Started with UPStart application note but for now we don’t need to do that.
Adding a new device

When adding a new device, you must first begin in the PC-Access software. Open the devices list and find an unused slot in the room that you want to add the device to.

In this example a new device is being added to the Kitchen (room 2) and as device 4 in that room. The key piece of information is the number in the first column. In this example “12”. Make sure you write that down. At this point you should also click on the cell and enter the name of the device as it was shown in the HLC Section above.

Back in UPStart, choose the Devices ribbon category, and in the Add/Delete panel press the Add button. The first step of a 3-step Wizard opens.
As the dialog text described, put the device into setup mode and then press Next. If you are familiar with the PC-Access software and have not used UPStart before you will immediately see that UPStart shows a lot more detail. You can review or ignore, that is up to you. What it is doing is reading all the information contained in the configuration memory of the device.

Step 2 is the most important part. Set the “Unit Id” to the open slot you want to use in the PC-Access software before you press Next. You should enter the room name and device name for this new device for your own use, but what you entered with the PC-Access software is the name that the OMNI uses. Once you are sure that you have set the unit id correctly, press Next.

Note: You can tick the Erase existing configuration checkbox or not. It will not matter.

UPStart then writes out any changes to the configuration memory needed and then displays a dialog showing completion.
It also added an icon for the device to the screen. Don’t worry about the scenes displayed in the left pane as they are just default scenes present in a new switch. They will be replaced by the correct ones needed for the OMNI in the next step.
Configure for OMNI

Now that the device is part of your UPB Network, the final step can be performed to make the OMNI understand it. What UPStart does is write to its configuration memory all the settings that the OMNI would program into it.

To begin, right-click on the OMNI and select *Configuration for OMNI.*
A popup opens:

![OMNI Configuration](image)

The OMNI Unit Id will already be filled in with the Unit Id you selected during the add process. As a double-check, it displays the room and device number as the PC-Access software shows it. Verify it is correct and press OK.

What this menu pick does is configure the device exactly as the OMNI would have configured it. What the “Configure HLC Device” operation in PC-Access does. However, unlike PC-Access the device isn’t programmed at this point.

Note that this menu pick is available for keypads and modules as well as switches. If a PulseWorx 6-button keypad is the one selected, the keypad is configured as a room controller. If a PulseWorx 8-button keypad is configured it is configured for a house controller for the rooms that it encompasses. For a PulseWorx-7 button keypad, UPStart asks how it should be configured.

The PulseWorx 7-button keypad has several different configurations:
- As a room controller with 6 scenes (100%, 80%, 60%, 40%, 20%, OFF). This is the same as a 6-button HAI keypad. The bottom button, shipped as a split dim/bright button, is made into a single scene button and can be replaced by a custom engraved button that says “OFF”.
- As a house controller that shows the state of 6 rooms. This is two rooms less than the HAI 8-button house controller.

The methods to programming changes are outlined in the *Getting Started with UPStart* note but here are some brief instructions. To program the device with the changes, right-click on the device icon or on the name of the device in the left pane and select *Program* from the popup menu. Or select the device in the left pane and in the *Devices* ribbon category, *Program panel*, press the *Program* button.

And that’s it! The device is now programmed as the OMNI expects it. All that you need do is to save the changes to the OMNI in the usual manner.
What you don’t need to do is use the “Configure HLC device” right-click in the PC-Access software. You could try it, but it will not work anyway because that only configured HAI/Leviton devices.

Isn’t this all a lot of work?

You may answer yes to that question but here are some points to consider.

- A lot of this was just getting ready to use UPStart. Once that is done, next time you will not have to do any of that again.

- If you wanted to add more than one device, you can easily do that. Just find the open room slots in the PC-Access software and write down the slot # and what kind of device you want to put there – room controller or room device. Then save that to the OMNI. In UPStart just add each device using the add wizard – it even asks in the last step if you want to add more devices. Add each device in turn giving it the name you want to use and the appropriate unit number. Then perform the “Configure for OMNI” on each and then program them all at once using the Program All Modified button on the Network ribbon category. Much less back and forth between the OMNI and UPStart.

Why use PulseWorx?

The advantage of using this method comes in several areas. To start, there are many PulseWorx devices you may want to use that have no HAI/Leviton equivalents. While there is a HAI/Leviton appliance and lamp modules, you may want to use these PulseWorx products instead.

RM1 - Receptacle module
FMD2 – 2-channel Fixture module
FMR – Relay Fixture module
OCM2 – 2-Channel Output Control Module
All of these can be configured for OMNI in the same way as a lamp or appliance module. The Fixture modules are designed for built-in installations where the module is hidden. The Receptacle module can offer a better look than a plug-in module.

PulseWorx also has load dimmer keypads. These are a hybrid of a keypad and a load controller (relay and dimmer models available) that makes it possible to retrofit a keypad into a room and still maintain the load control needed when replacing an existing switch.

**Using UPStart without breaking HLC mode too badly**

Now that you have UPStart and a file containing UPB devices you can make some changes to them without breaking HLC mode.

It’s best to start with what you can’t do: You can’t change the scene settings of a switch rocker or the scenes stored in any receiver. You can add additional scenes but there is programming work to do in the OMNI if you want to have the OMNI keep track of the state of your devices.

What you can do is change anything in the device that isn’t part of what the OMNI knows about. Here are some examples.

**LED settings**

The OMNI programs all the small “status LEDs“ to be ON when the device is on and off when it isn’t. The LED can make a nice “night light“ and some users prefer them to be ON all the time. This setting is also on the Options tab with many LED color choices. You can also set the intensity of the LED for High or Low.
On levels

Normally when you tap on a wall switch paddle top the load comes on at 100%. But, using UPStart this can be changed. In the configuration of the device, on the Rocker Switch tab:

In this example, the switch will now come on only to 80%. Why do this? Energy savings for one, and if the lights are too bright you may want a lower setting. The Enable Top Rocker Max Out Option, which lets the user double-tap the top rocker to go to the max level, is not available in HAI switches but is in PulseWorx switches.

Receive Sensitivity
The receiver sensitivity can be very helpful in configuring reliable operation of your UPB network. As the text in the dialog says a higher sensitivity may help improve reception while a lower sensitivity may help noise immunity. This can be changed with no effect on the OMNI.

**Additional Scenes**

You can create and add additional scenes in the receive components of any devices and then activate those scenes from the OMNI. The problem will be that the OMNI, without additional work by you, will not understand the effect of these scenes.

As an example, suppose you have two switches that control outside lighting. Late at night you want one set of lights to remain on and another to go off. Both were added to an “Outside” room.

![Scene Activation](image)

And to a relay switch controlling under counter lighting

![Scene Activation](image)

In UPStart you can create new scenes and update the devices that respond to that scene on their “Receive Components” tab of their properties. When you create a scene in UPStart make sure you choose a scene that isn’t being used by the OMNI. There are two problems to overcome when adding scenes. First, how is the scene activated and second how does OMNI know the effects?

Here is an automation block in the OMNI that handles both:

```
TIMED 10:15 AM MTWTFSS
THEN UNIT 193 SET SCENE D [RM25-D (UPB LINK 150 ON)]
THEN SET LIGHTING LEVEL Front Lights TO 40%
THEN Back Lights OFF
```

The scene is activated at the specified time. What’s up with the room 25 button D? In UPStart this new scene was given the ID of 150 and in the OMNI “mind” that maps to button D on the room controller of room 24. Which, of course, doesn’t exist. The important piece is that it is scene 150.

The last two parts of the automation block are to carry out the same effects that the scene has already accomplished. What is that? What that does, beside being redundant, is to make the OMNI control the devices and in so doing so it now has the correct state for them.
If the OMNI already is doing it, why create an extra scene? Scenes are nice in that they are implemented by a single command, so the actions of the responders are simultaneous. That makes for a better visual presentation. Also, using the scene you can set the time that the scene change happens in – called the ramp rate – and that is something that OMNI can’t do.

Important note: If you don’t care that the OMNI has the correct state for those devices then you don’t need to do this redundant control. With some thought you may decide that the actual state of some devices isn’t important – closet lights for example – and not worth the effort in cases like this.

**Configuring rooms in UPB Mode**

The OMNI has a second mode for a room. Up until now all the explanation was about HLC mode where the OMNI did all the work of programming the devices. Also in HLC mode the OMNI knows all the configuration so it can keep state up to date without any action on your part. How does it do that? Since it programmed the keypad, when you press a button, the OMNI knows that and, as it also programmed all the receivers, it knows what receivers are affected.

With a room in UPB mode, all that built-in knowledge is unfortunately lost, and you are on your own. So why would anyone want to use UPB mode for a room? Here are a few examples.

- In HLC mode a keypad controls all devices in the room equally. Press a button and all the devices respond equally – to 80%, 60%, whatever. Suppose you want the device to respond differently: Some of the ceiling lights go to 80%, others go off, and the under-counter lights go to 20%.
- In a room you have a wall switch. You want to tap the paddle of the switch and have it also control a module as well in addition to its own load.
- You want to change the double-tap actions of a wall switch to make it do something different than just control the same loads but quicker.

Once you put a room into UPB mode, add devices to that room using the same method as before, but you can no longer “Configure as HLC”.

**Putting a room into UPB mode**

To change a room from HLC mode to UPB mode, just click on the dropdown arrow on the room slot.
Note: When you change a room to UPB mode it changes that room and the next one as well. So, you can only change room 1, 3, 5, etc.

To add a device to a room in UPB mode it is the same procedure as before: find an open slot for it in PC-Access, write down its number, give it a name, and then save to the OMNI. In UPStart add the device giving it the correct id on step 2 of the Add Wizard, and then use UPStart to configure as needed.

**UPB Mode rooms: Problems and Solutions**

The biggest problem of using a room in UPB mode may be state keeping. The OMNI will not know the effect of scene transmissions as it doesn’t know the receivers of those scenes.

The most important question is: Do you care? While that may seem a silly question, it is important to consider as it takes quite a bit of work to program the OMNI around this issue. It is all about correct state reporting of devices in the OMNI Mobile app and in any display panels you have. Think carefully about what devices you really care about showing correct state. Some you will care about – outside lights for example – and others maybe not so much – closet lights.

For each of those scenes that effect devices, whose state you want to be shown correctly, you will have to create an automation block as was done in the last section of the HLC room discussion above. Again, you want to program the OMNI to, in effect, re-control the devices as the scene already did. And since the OMNI initiated the control it will then know the state of all the receivers.

In all these examples, the key is knowing what scene the transmitter is sending, and what devices are receiving. In UPStart you can supply names to individual scenes so instead of “Scene 1” you can have it named “Outside nighttime”. However, in the OMNI world the scenes are simply named “Link 1”, “Link 2”, etc. So, it is
important in UPStart to take note of the scene numbers. A simple way to do this is to open UPStart Options from the application menu, and on the “UPStart Operation” tab tick this box:

When displayed, suffix device names with the unit number. Also suffix scene names with the scene number
- Show unit/scene numbers

It is unfortunate that in UPStart they are called “Scenes” and in the OMNI “Links” but they mean the same thing.

When that option enabled, then the left pane of UPStart shows the scene name and the scene number. In the picture below, the “Bath” scene is scene 24 and the “Bedroom” scene is scene 13.

Example: Keeping a switch up to date, method 1

Suppose that you have a switch in a room configured in “UPB” and not “HLC” mode. When that switch is tapped to control the load, if the switch is not configured to activate/deactivate a scene, you can just tick the “report state” option and it will broadcast its state that the OMNI will receive. This option is on the “Rocker switch” tab:

- Report light level after rocker switch is pressed
- Enable Top Rocker Max Out Option

When this option is enabled the first single-tap of the top rocker causes the load to go to its configured level but the next single-tap of the top rocker causes the load to go up to 100%. When this option is disabled then all single-taps of the top rocker causes the load to go to (and stay at) its configured light level.

If the rocker is configured to transmit a scene you can’t use this as the OMNI doesn’t handle this message.
Example: Keeping a switch up to date, method 2

If the switch is activating a scene, you must add an automation block that is triggered on that scene activate (and deactivate) and then control both the receivers plus control the switch itself, so that the OMNI knows that the load controlled by the switch is ON also.

Example: Keeping devices controlled from a keypad or switch up to date

In this example, a switch or keypad button has been configured to transmit a scene – scene 177 in this example. Add an automation block that receives the scene that was transmitted and then re-control the effected devices.

Example:

<table>
<thead>
<tr>
<th>WHEN UNIT 233 SCENE A [RM30-A (UPB LINK 177 ON)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEN L Bed Spot ON</td>
</tr>
<tr>
<td>THEN R Bed Spot ON</td>
</tr>
</tbody>
</table>

In this example, the switch was configured to transmit link177 and the receivers are the “L Bed Spot” and the “R Bed Spot”. You would, of course, add another automation block to handle the scene deactivate as well.

Example: Keeping a keypad button LED up to date

One nice use of UPB keypads is to use the LED’s and Buttons to show if the loads are turned on or off. The PulseWorx keypads are especially good at this and there are a whole series of Application notes discussing how the indicators can be programmed.

For example, suppose you have several switches in a room and you want the ON button to control them when that button is pressed. That’s easy. But you also want the ON button of the keypad to illuminate when you turn one of those switches on at the paddle. That way, when the indicator is illuminated, a press of it will deactivate the scene and control the scene devices off.

All of this is accomplished by UPB scenes. The switches transmit a scene that the keypad uses to turn on the keypad indicator.

<table>
<thead>
<tr>
<th>WHEN Overhead ON PRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEN Spots ON PRESS</td>
</tr>
<tr>
<td>THEN UPB LINK 221 ON</td>
</tr>
</tbody>
</table>
But is any of this really important?

To keep device states correct with the OMNI is a lot of work. And, it may not be possible in all cases since there are limitations on how many automation blocks you can add. Also, as you modify devices with change scene configurations, you would have to update your work as well and that’s perhaps too much to do.

The best advice is to limit the expectations of those who use the installation - the homeowners – as regards to state. Work on those devices that they will care about and ignore the rest. And remember that once you leave HLC mode all the features that make UPB devices very powerful for scene control become available. There are many application notes on what can be done with scene control and the UPStart User Guide has a good discussion of scenes as well. Don’t let HLC mode stop you from creating a great system for your installations.

Conclusion

The title of this application note says it all “OMNI, PulseWorx, UPStart: A joint effort”. The OMNI is an excellent system in that it can do so much more than just UPB. The benefit of its built-in HLC mode is that it is simple, quick, and reliable. And that isn’t to be argued with.

But to get more out of your UPB devices, using UPStart can make it possible to unlock all the UPB features you have been missing as well as taking advantage of a different set of PulseWorx devices that have additional features that can improve the installation.

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