

Global Controller & Room Selector

Integration Designer APEX 10.2

Guided Walk-through

Note: This tutorial assumes you are familiar with RTI Integration Designer APEX. You should be accustomed to the workspace, creating rooms, adding controllers, drivers, libraries and page sets and have some experience creating macros and variables. Some general knowledge of tag usage is also required.

Overview:

RTI's powerful new global controller feature provides an effortless way to give your clients control of devices in every room with a single controller. In addition, powerful features in the programming provide pre-programmed tags that allow you to select a room and have all room-based functions (such as volume control, home page jumps and source selections) reflect the functionality for that selected room. The room proxy feature allows you to use a system variable test to identify the room selected and perform room-specific specific functions within the programming.

System Design Scenario:

- Four- Zone (Room) Control system
- Each room has a dedicated Controller specific to that zone (Room).
- A matrix distributes four shared sources to each zone (Room).
- One iPad with the RTiPanel app that functions as the **Global** Controller

Workspace Rooms:

Theater Room	Living Room	Master Bedroom	Bar
T2x	T2x	T3x	Pro24.z
JVC Projector	LG TV	Samsung TV	Sony TV
Yamaha AVR	Denon AVR	Integra AVR	Marantz AVR
	Xbox 360		

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Workspace Global:

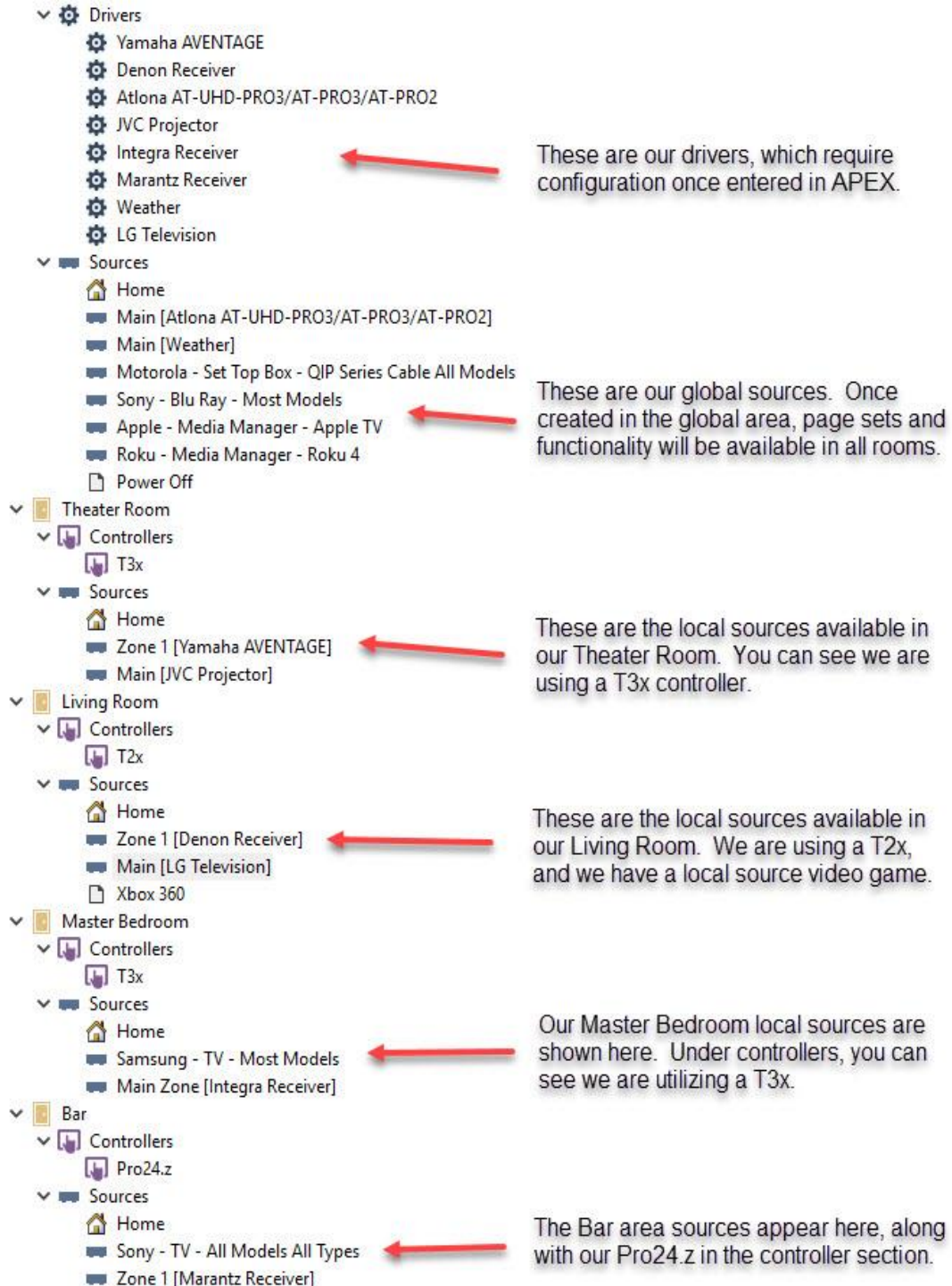
Global	iPad	Cable	Blu-Ray	Apple	Roku	Atlona	Weather
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With Integration Designer APEX, it is best to identify your system layout prior to adding items to the workspace. Below are a few examples of key things to consider prior to programming:

- 1) What functions are shared in two or more rooms in the system?** In this example, the ability to watch cable, Blu-Ray, Apple TV and Roku is needed in each room. That means the matrix driver as well as the individual drivers and/or IR/RS-232 libraries need to be placed in the global area. In addition, since the weather driver requires an interface and is available on each controller in every room, this will also be placed in the global area.
- 2) What functions are only needed in an individual room?** In this example, each room has its own dedicated video (TV and Projector) & audio (Receiver). Since these devices only need to be controlled from the room they are in, we can add them directly to the room instead of the global area. In our example system, we also have a local video game source in the Living Room which is not part of the centralized matrix system. We will want to create an interface for this device either by adding a driver, IR/RS-232 library, or page set.
- 3) What page sets, if any, need to be added to our system?** In addition to the pages controlling the devices in the system, there can also be extra pages such as “Please Wait” pages and power off confirmation pages. In this case, we do not require a please wait page set because we will have our activity buttons immediately jump to their activity page with their automatically assigned page link. We do want to create a power off confirmation page because we want the client to confirm his decision to power off the system. This will also work well with the global controller which will be explained in detail later. Lastly, since our video game system in the Living Room does not support any command functionality, we will build a page set for this source, so the client will be taken to a page labeled “Video Game Mode”.
- 4) Which devices that I add need pages created for them? Which ones don’t?** Our client does not require any dedicated pages for any video displays such as TV or Projectors. Also, to keep things simple, no pages will be created for the audio devices (such as the receivers) in each room. They also do not need to have a dedicated interface for the matrix switcher, as these will be controlled from our activity macros. We would like to see interfaces on all four controllers in each of the four rooms on the 4 sources of the matrix switcher. We also need an interface for the weather driver, power off confirmation page, and, most importantly, a home page.
- 5) What control processor should we use?** When determining what control processor should be used, one should look at the functionality needed: How many IR, RS-232, Contact Closure, 12V Trigger, and sensing ports are needed? How much processing power and storage is needed? Are there many IP-based drivers running at the same time? Are there a lot of controllers, including RTIPanel devices? Is a rack-mountable product necessary?

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Based on the above information, let's now create a four room system file paying careful attention to what is put in the global area vs. individual rooms. Our tree should look like this:



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When you look at the above workspace tree, you can see how the system is constructed in a single glance. You can identify the drivers in the system, the shared sources and pages available in the global area. You can also see each room and its individual controller, home page, and sources assigned to that room only. By clicking on any source you can easily see the pages created for that device.

The screenshot displays a workspace tree on the left and a macro list on the right. The workspace tree is organized into a 'Global' section and three room-specific sections: Theater Room, Living Room, and Master Bedroom. Under 'Global', there are sub-sections for Processor, Controllers, Drivers, and Sources. The 'Sources' section includes Home, Main [Atlona AT-UHD-PRO3/AT-PRO3/AT-PRO2], Main [Weather], Motorola - Set Top Box - QIP Series Cable All Models (highlighted with a red arrow), Sony - Blu Ray - Most Models, Apple - Media Manager - Apple TV, Roku - Media Manager - Roku 4, and Power Off. The room-specific sections follow a similar structure with their own controllers and sources. The macro list on the right, titled 'Macro List', shows a list of pages for each source. The pages for 'T3x (Theater Room)' and 'T2x (Living Room)' are highlighted with blue bars and red arrows pointing from the text on the right. The pages listed are IR Properties, Add Blank Page, Merge Pages, Page Wizard, Cable/Satellite TV, and Pro24.z (Bar). The 'Cable/Satellite TV' pages have sub-items like Presets and Navigation.

Clicking on the individual source page in the global area will identify the page sets created for each device in the 4 rooms in our system file. These can be edited.

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Take a moment to examine some of the macros and variables on the individual interfaces that share the same tag structure.



As referenced above, every controller in the system will use the same tag names. In the example of the volume gauge on top, since APEX does not tag this automatically, it is important to place the tags on it on every controller and room in the system file. The volume buttons, activity macros, page links and power off button will be tagged automatically by APEX, using the same naming convention throughout. This sets up for what is a powerful experience with the global controller.

Adding the global controller

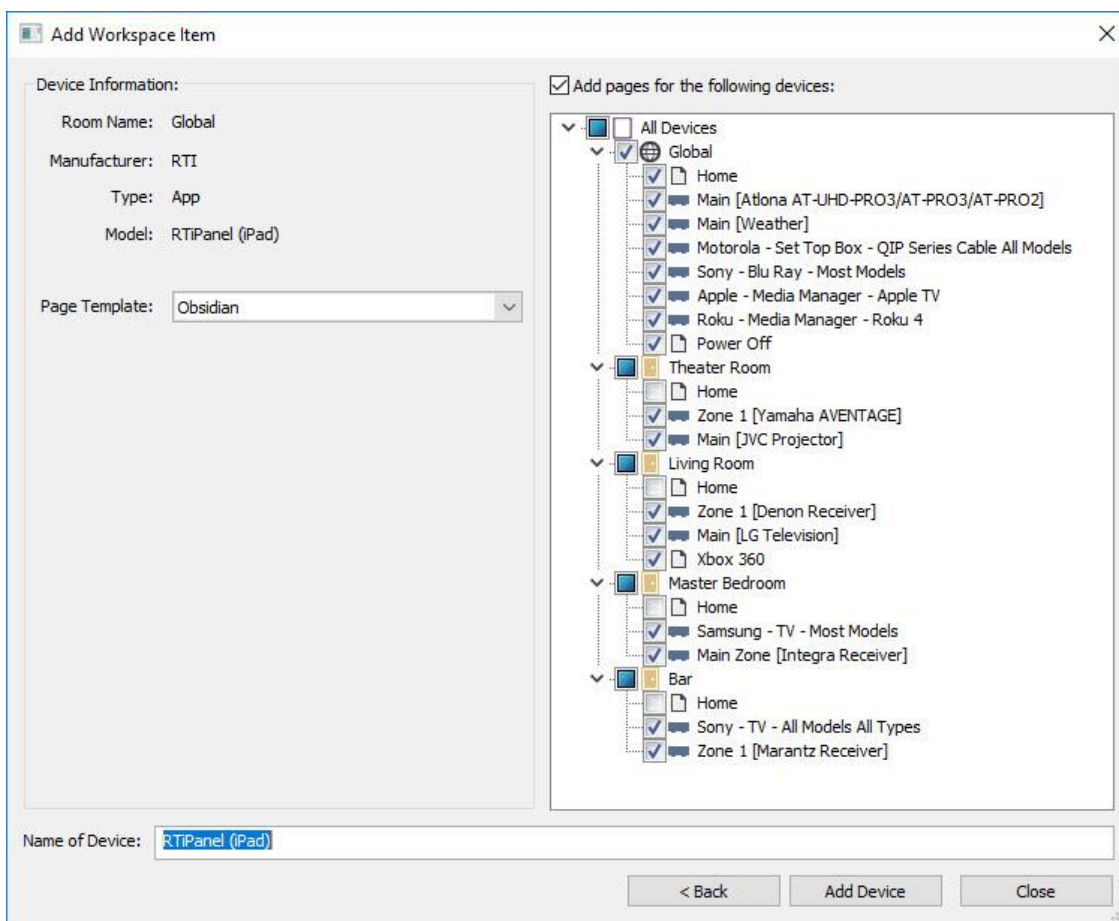
The four room system should now have a dedicated controller in each zone. The matrix switcher, weather driver, power off pages, and all four sources connected to the matrix are in the global section of the workspace. Each room was assigned a dedicated handheld touchscreen controller, an activity based home

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page, a display, and a receiver. In the living room, there is a local source that is used only in that room. The client has asked for an iPad that will give him or her the ability to control all the rooms and underlying functions in the home.

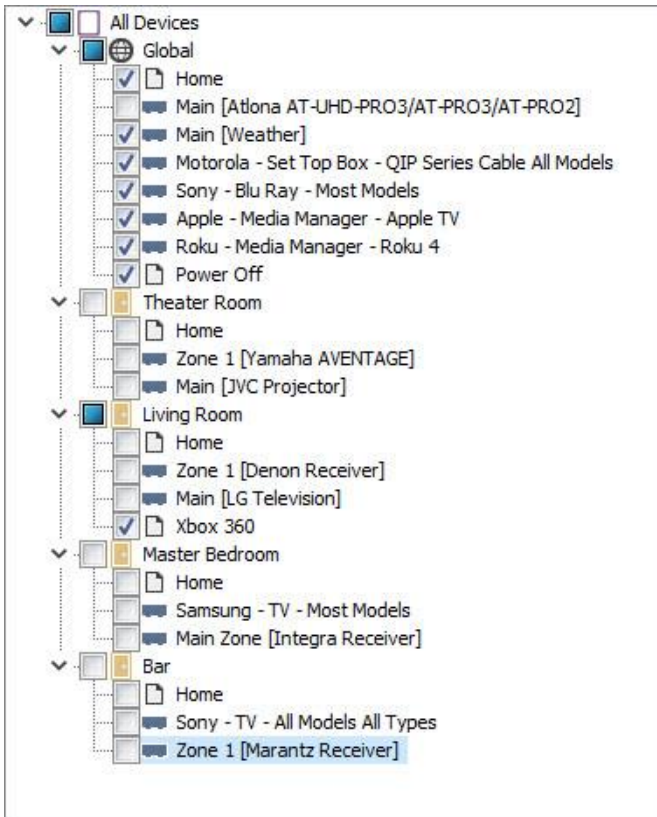
Programming considerations

This controller is now known as a “global” controller. The iPad will be added to the **Global** section of the workspace. There is an option to create pages for all the devices and drivers created in the global area, as well as for devices that were created in the local rooms. Once a controller is added to the global area, it is assumed to be sharing functionality with two more rooms in your system file.



Shown above, APEX gives you the option to add every single device in every room. It will provide an option to create a main home page for the iPad in the global area, and a home page for each of the rooms. Now you can use the global home page to serve as a room selection, and each underlying room page to reflect activities available to us in that room. Remove the individual home pages for the four rooms, and un-check any specific devices that are not intended for the user. Once completed, the page selection should look like this:

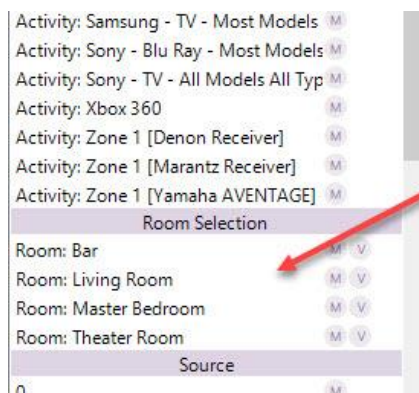
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In this scenario the system fairly simple – a single 4x4 matrix that is controlling four sources across four zones, with one of the zones having a local source. However, more complicated systems that do not have common items that are shared throughout may require you to create home pages not only in the global area, but in each individual room. In that more complex situation, you would use the global home page as your room selection menu, and store your activities on each individual room home page.

FEATURE #1: ROOM SELECTION TAGS

For every room you create, a tag will be created with a room selection activity. Click on the “Tags” tab in the workspace on the right and you will see four tags (one for each room) under the Room Selection category.

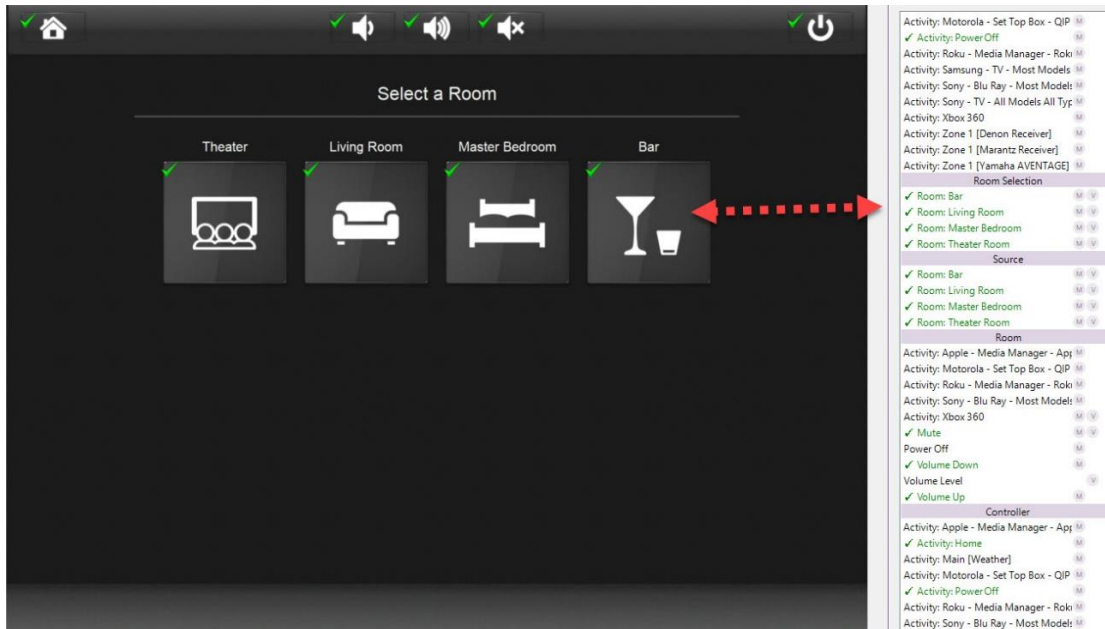


A new category called "Room Selection" is created with a tag labeled Room: {room name} for each room in the system.

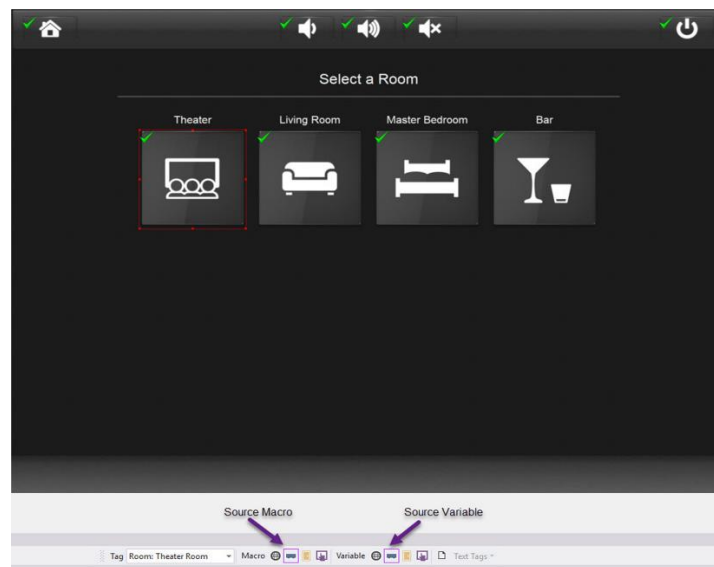
If you add additional rooms, there will be additional room tags created.

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Drag the respective room icons on the home page. Then drag and drop the “Room Selection” tags on the corresponding room.

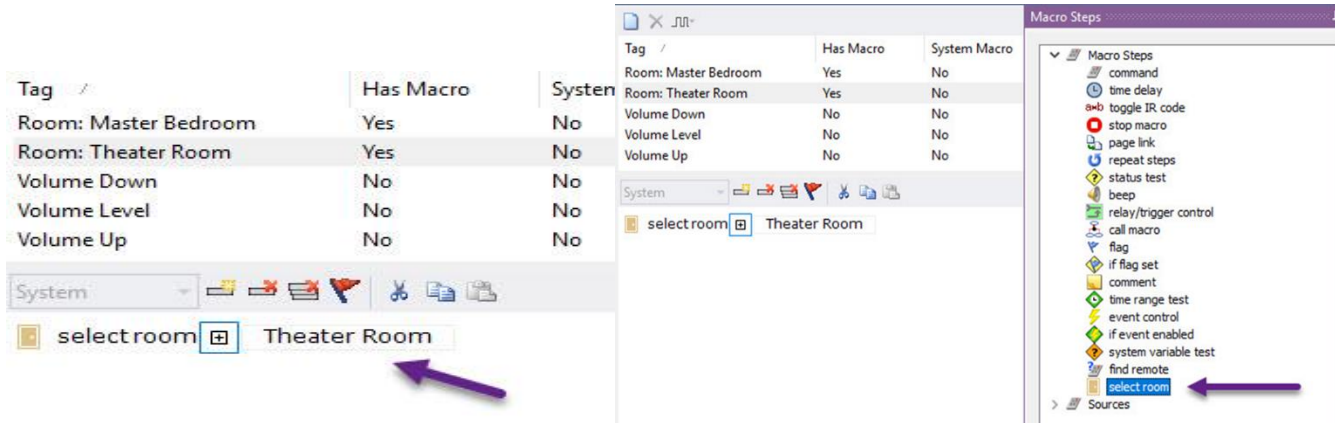


By dragging and dropping the room selection tags, APEX will tag the room button and add a source macro which tells APEX which room you selected. Hover over the green check mark on the Theater button and you will see that it has been tagged “Room: Theater Room”.



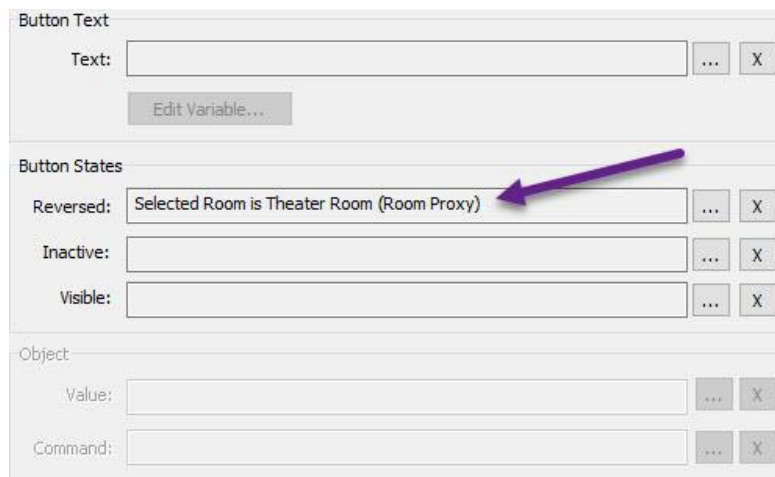
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Click on the Theater button and observe that the tag toolbar shows that there is a source macro and variable automatically generated by APEX. After clicking on the source macro, APEX will be directed to the macro list view:



APEX has created a macro with a new feature, called “Select Room {room name}”. This feature is also an option that can be dragged into any macro. However, APEX conveniently adds this auto-programmed button with the select room and applicable room selection.

Click the back button and right click on the Theater room selection icon on our global home page and select “Edit source variable” to see what APEX auto-generated for our source variable when we tagged the button:



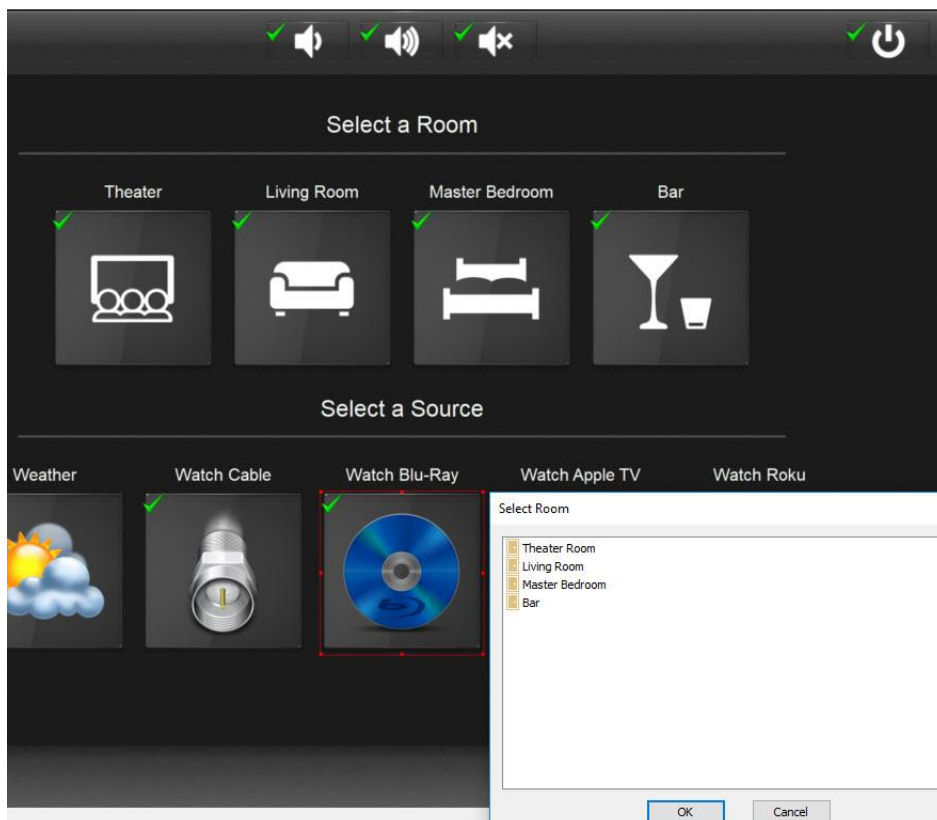
From this illustration, APEX has created a reverse state variable when the selected room is the Theater Room. This will reverse that button when the client selects the Theater Room. Note the (Room Proxy) above. The Room Proxy is a built-in feature in APEX that tracks the selected zone and allows you to create variable tests and commands based on the current room selected.

Now add source selections to the current page, and drag the activity tags that are created for the various global activities which encompass all the activities throughout the system file:

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Dragging activity tags over from the activity tags window not only tagged the buttons, but put room macros for all the activities on each of the buttons. Each room has its own corresponding activity macro for example, the Blu-Ray.



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Once you select one of the four rooms (Theater, Living Room, Master Bedroom, and Bar), any buttons tagged with a tag that matches a room macro in that room will run the macro for that selected room! Press Living Room, and the volume buttons will run the room macros that are in your living room, in this case the Denon receiver. Press “Bar” and your activity macro “Watch Cable” will run the “Watch Cable” activity in your Bar area. In the same instance, it even passes along page jumps. Since every page has the weather, the page link will pass for every room, taking the end user to the weather page. The home button will page link by default to the individual home pages for that room, but since we only created a global home page, every home page button in our global controller will jump to this single common page.

Let’s edit one of the room macros to see what happens:

The screenshot shows a macro editor interface with a table at the top and a list of macro steps below. The table has columns for 'Tag /', 'Has Macro', 'System Macro', and 'Redirect To So...'. The steps include comments, system variable tests, commands, end markers, time delays, and call macros, all configured for a specific room (Living Room) and device (Denon Receiver).

Tag /	Has Macro	System Macro	Redirect To So...
Activity: Sony - Blu Ray - Most ...	Yes	No	...
Activity: Xbox 360	Yes	No	
Aspect	No	No	
Back	No	No	

System

- comment Set Output/Input on Matrix (If not set)
- system variable test Atlona AT-UHD-PRO3/AT-PRO3/AT-PRO2 Living Room (Out 2) \ Living Room (Out 2), Routed to Blu-Ray (In 2)
- else
 - command Atlona AT-UHD-PRO3/AT-PRO3/AT-PRO2 Living Room (Out 2) \ Blu-Ray (In 2)
- end
- comment Turn TV On (if off) and set a delayed macro that sets input (if not set)
- system variable test LG Television Operation \ Power
- else
 - command LG Television Operation \ Discrete On
 - time delay 0.3
 - call macro Living Room Main [LG Television] Set TV Input
- end
- comment Turn source on for activity
- command Sony - Blu Ray - Most Models POWER ON
- comment Check AVR is on and if input is set. If not, turn on and set.
- system variable test Denon Receiver Main Zone \ Power
 - system variable test Denon Receiver Source Input \ Source Sat/Cable
 - else
 - command Denon Receiver Source Select \ Input Source Sat/Cable
- end
- else
 - command Denon Receiver System Power \ Power On
 - time delay 3.0
 - system variable test Denon Receiver Source Input \ Source Sat/Cable
 - else
 - command Denon Receiver Source Select \ Input Source Sat/Cable
- end
- end
- comment Page jump not needed - macro will create a page jump to current activity page.
- comment Some delays have been removed to make this easier to understand.

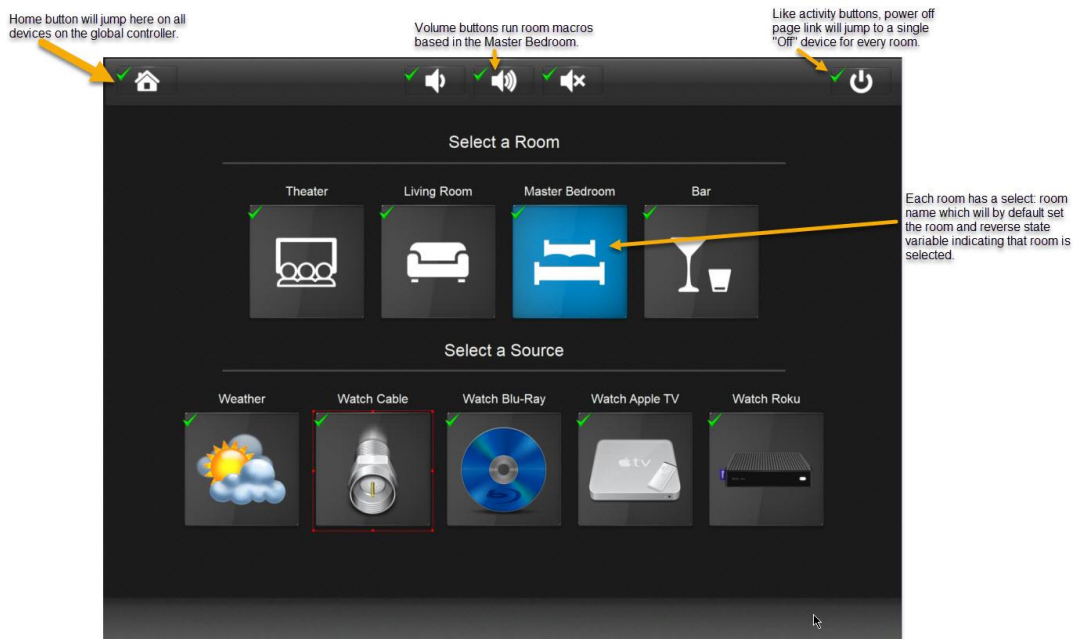
This macro will run perfectly on our global controller home page if, and only if, the Living Room is selected first. What we have done here is create a way for dealers to use “Selected Room” very much the same way they use “Selected Zone” in many different drivers, including the AD-64. Again, since all the room macros in the four rooms share the same tag as the general buttons in the global area and subsequent pages, they are passed through when the user selects that room using the room selection feature built into APEX.

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Clicking on the different room macros on our home page will give you the same type of situation. In the example of the volume control (volume up/down & mute), you will see the same four-room choice. Pressing one of the rooms drills down to the volume up macro in the specific room, which will be a re-direct to a receiver.

In the example of our home page button, which in the individual room pages jumps to the home pages for that room, will be made to jump to the global controller home, since we chose not to set up individual home pages in our example here. They would have easily jumped to the home page of our current room selection. Like the individual activity devices, such as Cable, Blu-Ray, Apple TV and Roku, we only need to set one power off page as well. Since you select a room before you select an activity, selecting a room will take you to a single cable page where all the buttons that contain room macros will change to that room. Yes, only a single page required. Let's see this in action:

Like the individual activity devices, such as Cable, Blu-Ray, Apple TV and Roku, we only need to set one power off page as well. Since you select a room before you select an activity, selecting a room will take you to a single cable page where all the buttons that contain room macros will change to that room. Yes, only a single page required. Let's see this in action:

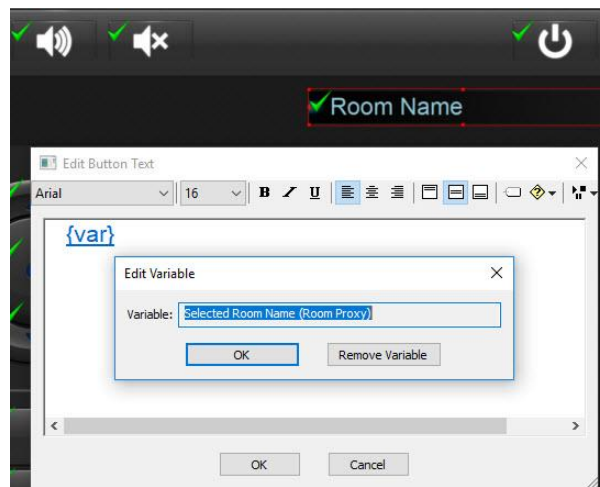


When we press "Watch Cable" in our example above, the Watch Cable button will run the room macro from the Master Bedroom with the same Activity: Cable tag. We didn't need to rebuild any of our activities. We create them once in the individual rooms, and since they share the same tag name in our global controller, they will run based on room selection.

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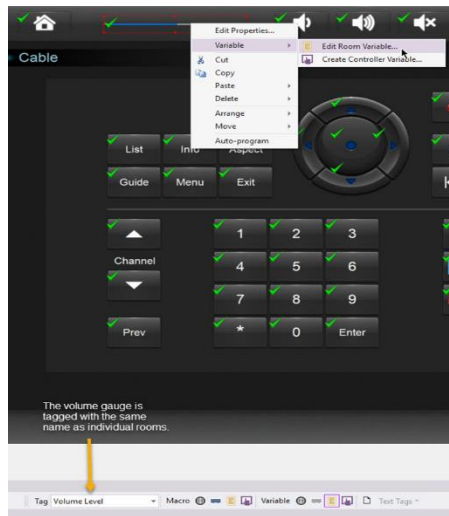
As we jump to our cable interface we maintain the room selection “Master Bedroom” and our room macros continue to reflect that of the Master Bedroom. Our Home page will jump back to the global home, the volume buttons will control the volume in the Master Bedroom, and the power button will take us to the power confirmation page which is shared as well. You might notice in our example above that we have specified a “Room Name”. This is a text variable that will always reflect the current room selection.



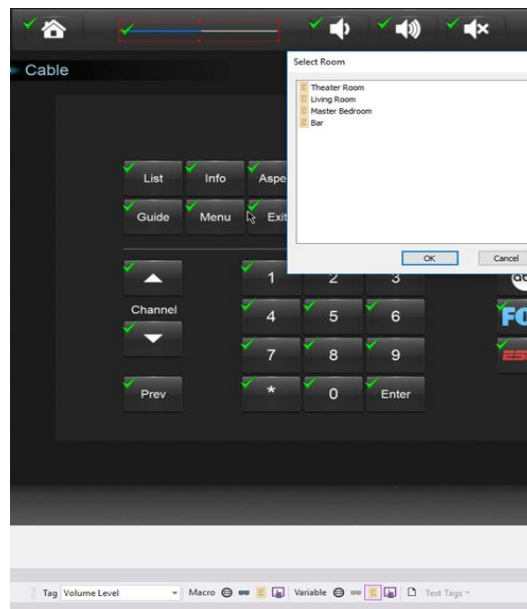
This will always reflect the current room in our interface. If you choose to make this a room macro, you can copy it anywhere on your global controller, on any device. Other variables can be utilized as well. Since we already have volume room macros that change with the current room selected and reflect the volume in that corresponding room, we can also create a room variable reflecting the volume level in that room.

For example, in each of our individual rooms, we created a volume gauge with a tag we made up called “Volume Level”. If we create a gauge on any page in the global controller in the form of a room macro (like the volume buttons) with the tag “Volume Level” it will automatically create the four-room room macro choice selection and pass through the volume level of that room.

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Once we edit the room variable, we drill down even further to the 4 room selections:



And finally, drilling down to one of the rooms (in this case the Master Bedroom) reveals the object value stored on our Master Bedroom volume gauge which was originally created on our T3x controller in the Master Bedroom. You can see how important it is to design your individual rooms with some custom variables you can bring to the global controller. This volume gauge can be copied throughout your interface and it will replace the tedious process of “stacking” volume gauges on top of volume gauges in the form of hidden buttons to reflect the room they are used in.

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Button Text
Text: ... X
Edit Variable...

Button States
Reversed: ... X
Inactive: ... X
Visible: ... X

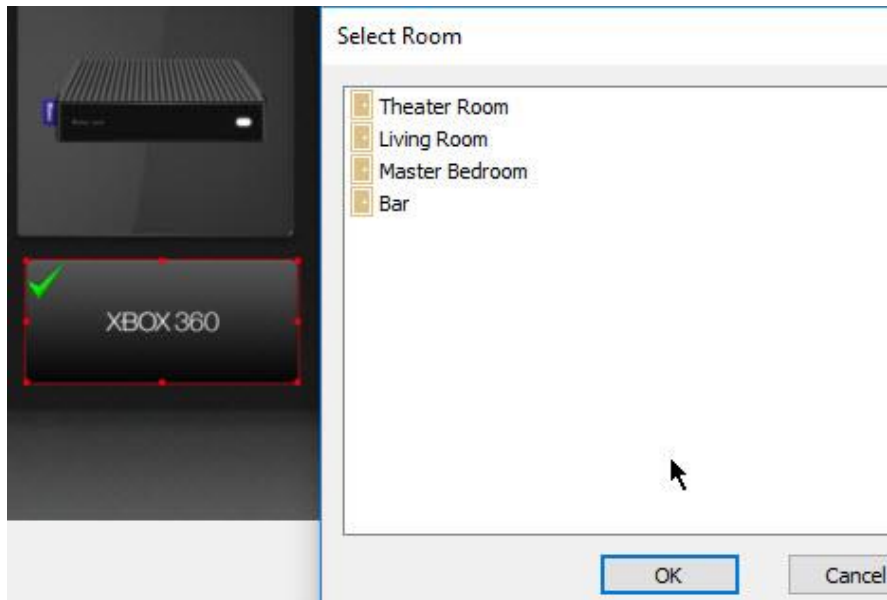
Object
Value: Denon Volume (Denon Receiver \Main Zone) ... X
Command: ... X

Let's complete our home page and the rest of our interfaces by copying the volume gauge tagged "Volume Level" and on various pages on our global controller. Since we only need to create a single source page for the four sources are four rooms are utilizing, copy the text "room selection" variable to each source page, including the weather. This way the user will always know what room they are in. Here is our completed home page interface:

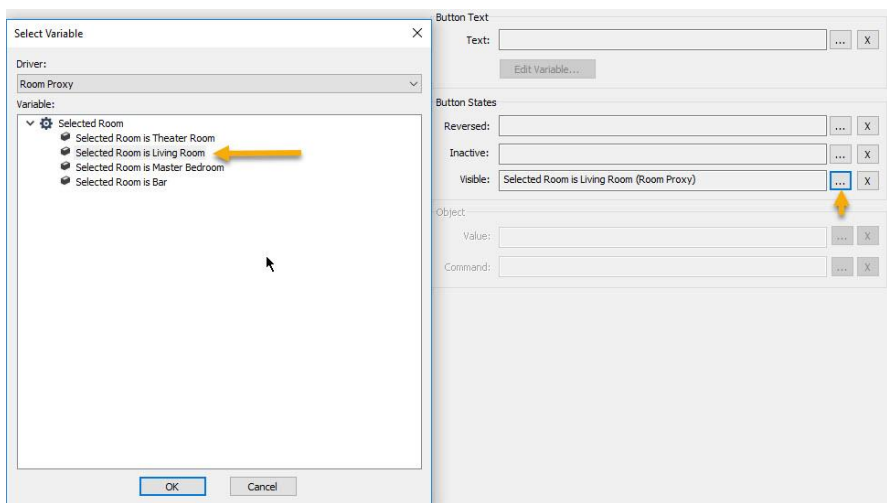


A single button press selects the room and then the room macros all use the room macros created in that room in the system file. Even page links change with the room selection. However, you might notice we forgot about our Xbox video game, which is only needed in the Living Room. Since we don't want to confuse the end user, we only want the Xbox button to show up when the Living Room is selected. Let's create the Xbox 360 button and tag it with the activity tag for that device which will exist in our activity tag selection on the right under "Tags".

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Select the button, edit the room variable, and click the Living Room, since this will be needed when the Living Room is selected. Now we will see the Room Proxy feature in action.



Click the menu selection under the visible button state, and locate the Room Proxy under the driver section. Select the choice “Selected Room is Living Room” and click OK. You have just created a video game activity button on your home page that will only be displayed when you select the Living Room, and since the Xbox video game activity tag and macro only appear in our individual Living Room, will run the room macro it was intended.

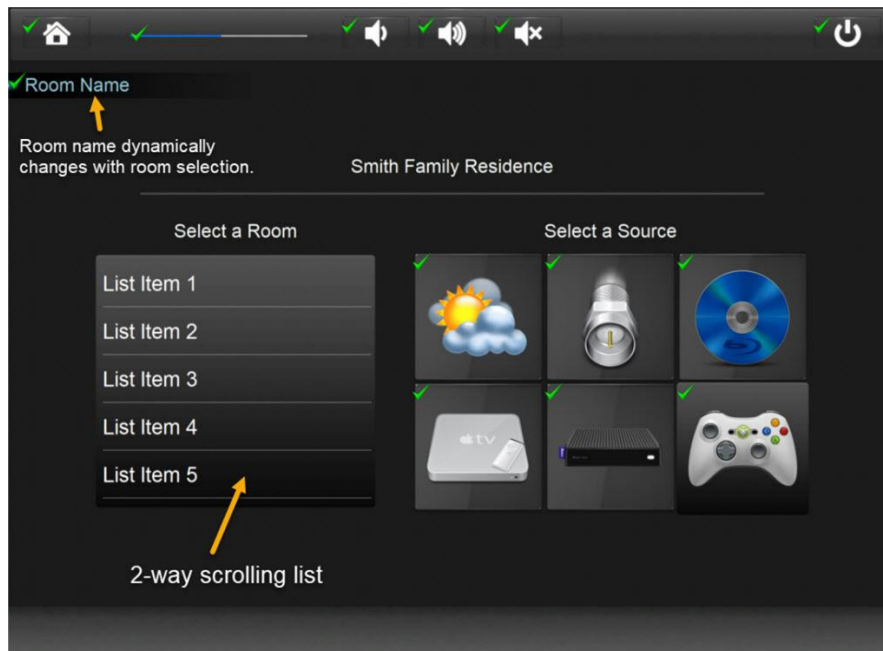
The Room Proxy can be used for other variables as well, including the following:

- Button Text – create a variable that will always reflect the selected room and display the room name as it appears in your APEX tree.
- Reversed State – set the reversed state on a button if a room is selected

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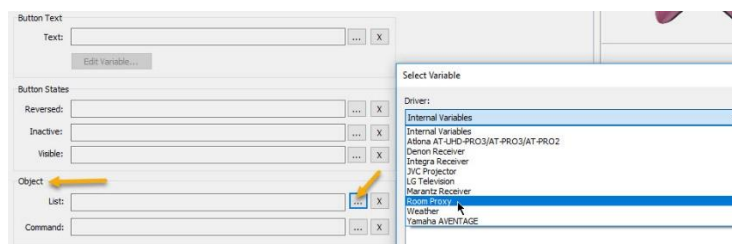
- Inactive State – render a button inactive if a certain room is selected.
- Room Selection List – Create an object list of all available rooms. Selecting a room will have the same function as if you created individual buttons.

Let's show how you would design an interface taking advantage of the room selection object list variable. First, create a home page with a 2-way list. In the case of the global iPad controller, select the pencil in the toolbar and then select the "2" icon, which will allow you to draw a 2-way list:



Your client still has the same objective: select a room, then select the source. All the room macros, including the activities will reflect that of the room you selected. Since we need to add a driver command AND a variable to the 2-way scrolling list, let's take a look at how it's done.

Select the scrolling list, select Variable, then select "Create Source Variable". NOTE: If you make this a room macro you will have to enter the room proxy criteria for each of the four rooms. The scrolling list will only be placed on our global list home page, so no need to worry about having an issue from source to source. You will be taken to the different types of variable criteria. Since this is an object list type, select the menu button in the object section under "List:". Find Room Proxy in the list and click on it.

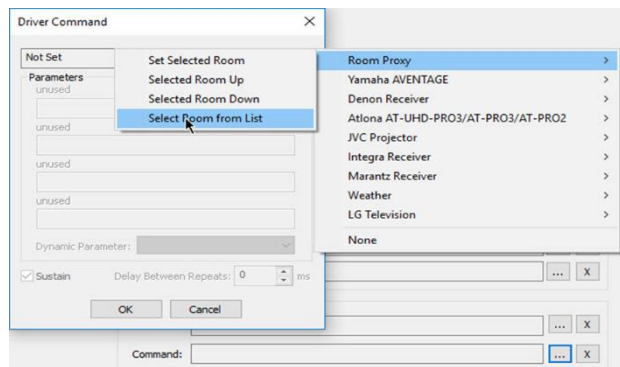


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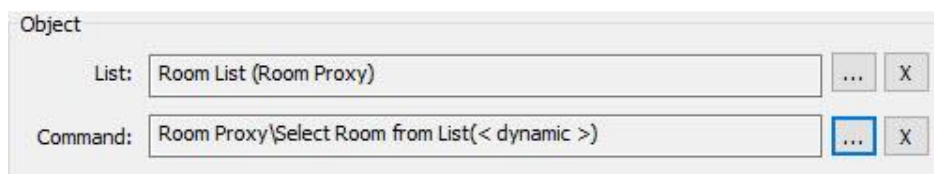
Select the “Room List” option.



That will display the list properly with all the rooms, but we still need to set the command that runs when a room is selected using the browsing list. Select the Command: menu button.



Under Room Proxy, select the option “Select Room from list”. NOTE: You may see other options here that are not currently available in APEX. Your variable should now look like this:

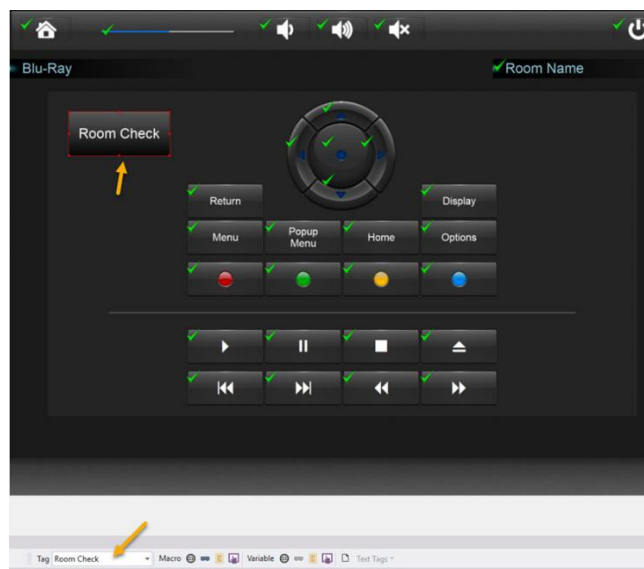


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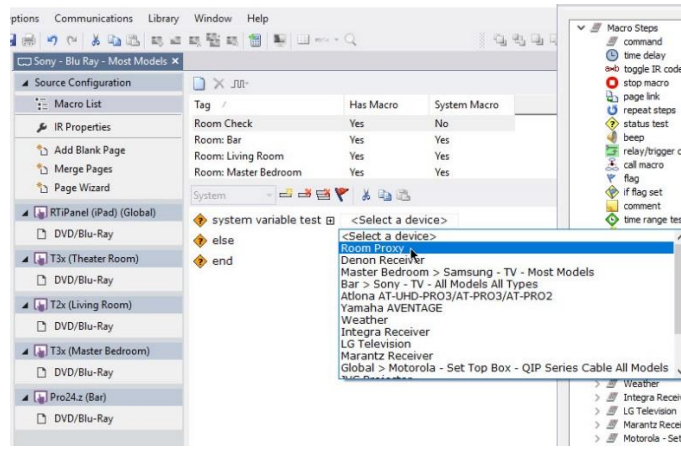
The list will now have a check mark and your interface is completed. The user selects the room in the two-way scrolling list, and then selects a source which run the applicable macro. All variables, room macros, variables, and page jumps will reflect that of the selected room. Because of the room selection feature, you only need one page for your global page and a single page for every source. You have created a 4x4 matrix device with only a few pages, avoiding repetition and button stacking. And equally important, you now have an option for a global controller, or a controller which can control at least a single room and criteria from two or more rooms.

Before we close, let's look at another great feature of the room proxy: You can perform system variable checks based on the room selection and create powerful if/then/else statements. Perhaps you want to perform a function on a certain button that will change based on the room you are in. Let's add a button to our Blu-Ray page as a test, tag and name it "Room Test" and create a source macro on it to perform a check, and a command based on the room.

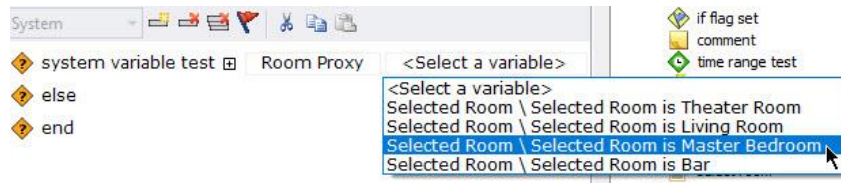


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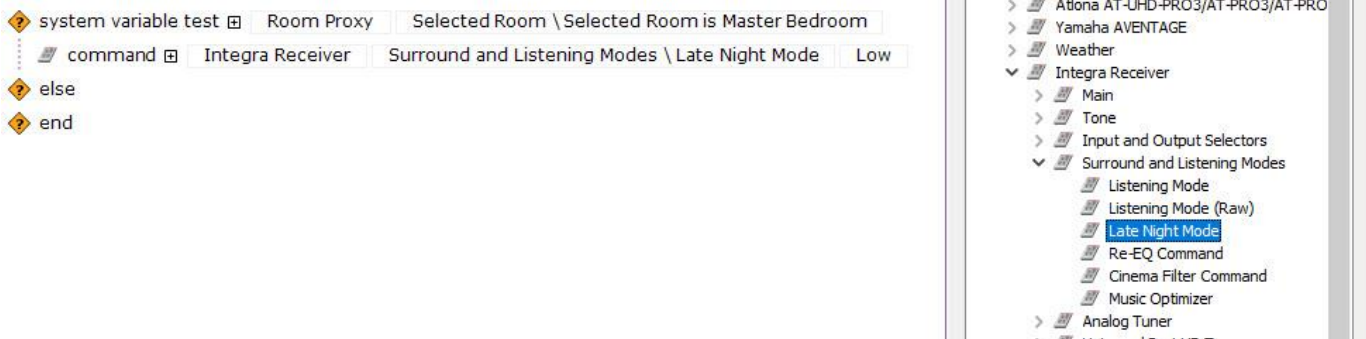
Select our system variable check, and then select Room Proxy.



Then select the room under variable to determine what the current selected room is.



We can then drag a driver command into our if/then/else statement. In the example above, since we only have a single Blu-Ray page for every room, maybe we want to have a function that only sets a late-night surround mode in the Master Bedroom. You can use these checks on actual activity macros, or wherever you see fit.



In summary, with the new Global Controller feature in Integration Designer APEX 10.2, you now can add a controller to the global section, which can create pages for the sources in every room. In addition to being able to access all the drivers and commands in every room, we have incorporated automatic tags that create room selection macro and variables on buttons. Combined with the built-in room proxy functionality that handles room selection graphics, variables and system variables, you can create an extremely powerful

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interface without the hassle of creating a page for every source in every room. And while we have illustrated a video matrix switch in a small 4-room application, you can also use the room selection feature for audio systems using the built-in room proxy just like the AD-64 and other selected room drivers. You can create video walls, hospitality venues with numerous TV locations, and complicated audio and video distribution systems with the power of APEX.

Some tips:

- Start with a very organized approach to designing your system. It does not matter when you add your global controller to the system file, but always have a plan to how you want to reflect the global controller experience to the client.
- Always put devices like matrix switchers, lighting control, climate and shade controllers and other generally shared resources in the global area. A global controller can always access a page set and device functions no matter where they are, but you still need to be concerned about individual rooms that have designated controllers and what they can access. If you are unsure, always put it in the global area.
- When designing a multi-room system try to keep your tags and usage as consistent as possible. For example, if you are performing a specific function in every room but you tag it differently throughout, you will not be able to take full advantage of the room selection feature and inheriting macros, variables, and page links in your global controller.
- When setting up a global controller, try and give your client a similar experience in terms of look and flow as you did in each specific room on the dedicated controller.
- Name your rooms in APEX exactly as you want them to appear in scrolling lists, button text variables and other room proxy criteria.
- Practice these principles on a test system and get a good understanding before you deploy at a client's house.