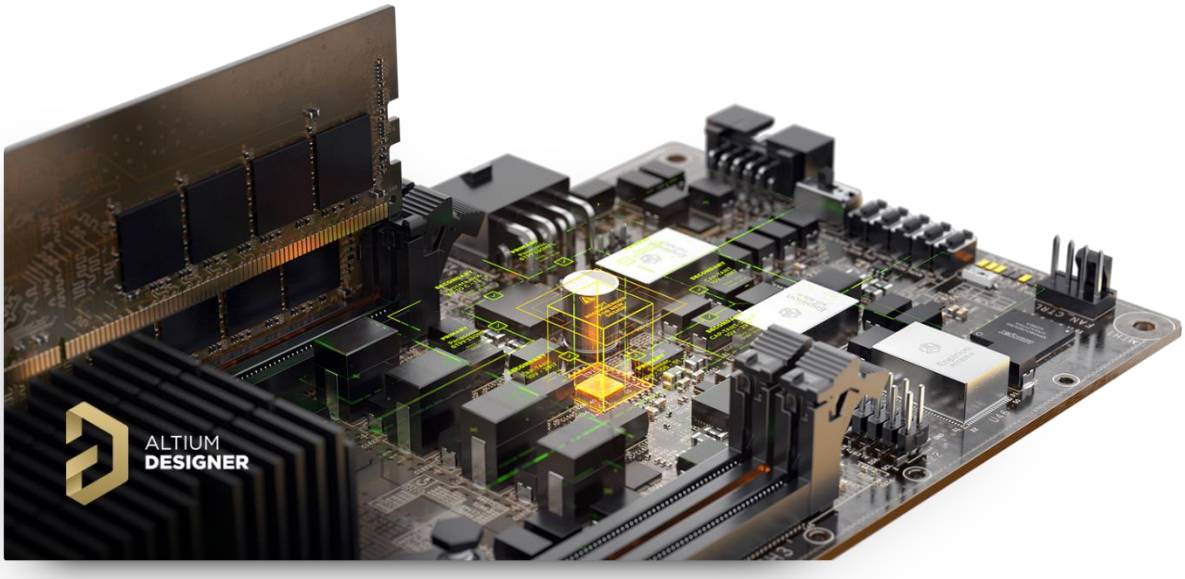


# Altium Designer

## Advanced Course

### Module: Working with Rooms in a Multi-Channel Design

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# Working with Rooms in a Multi-Channel Design

## 1.1 Purpose

A room is an area where components can either be kept within or kept out. Rooms can also be used to ensure component placement and routing is identical between Rooms or Channels. This exercise will show you how to create and manipulate a room in a multi-channel design.
Information about Multi-Channel Designs and how to create these can be found in a other module of the Advanced Training.

## 1.2 Shortcuts

Shortcuts when working with Working with Rooms in a Multi-Channel Design

| | |
|---|---|
| **F1:** | **Help** |
| **T-P or :** | **Preferences** |
| **U-A-M:** | **Autoroute a Room** |
| **D-M-A:** | **Arrange Rooms** |
| **D-M-C:** | **Copy Room Format** |
| **CTRL+S:** | **Save Document** |

## 1.3 Preparation

1. **Close all existing projects and documents.**
2. Open the `Working with Rooms.PrjPCB` project found in its respective folder of the Advanced Training (Working with Rooms in a Multi-Channel Design).

## 1.4 Preparing the First Room

### 1.4.1 Moving the Room

3. Open the `Mixer Placed.PcbDoc` document. You'll notice that the components are placed within their Rooms as shown in Figure 1. A Room is created for each schematic document or channel in the design depending on your Project Options.

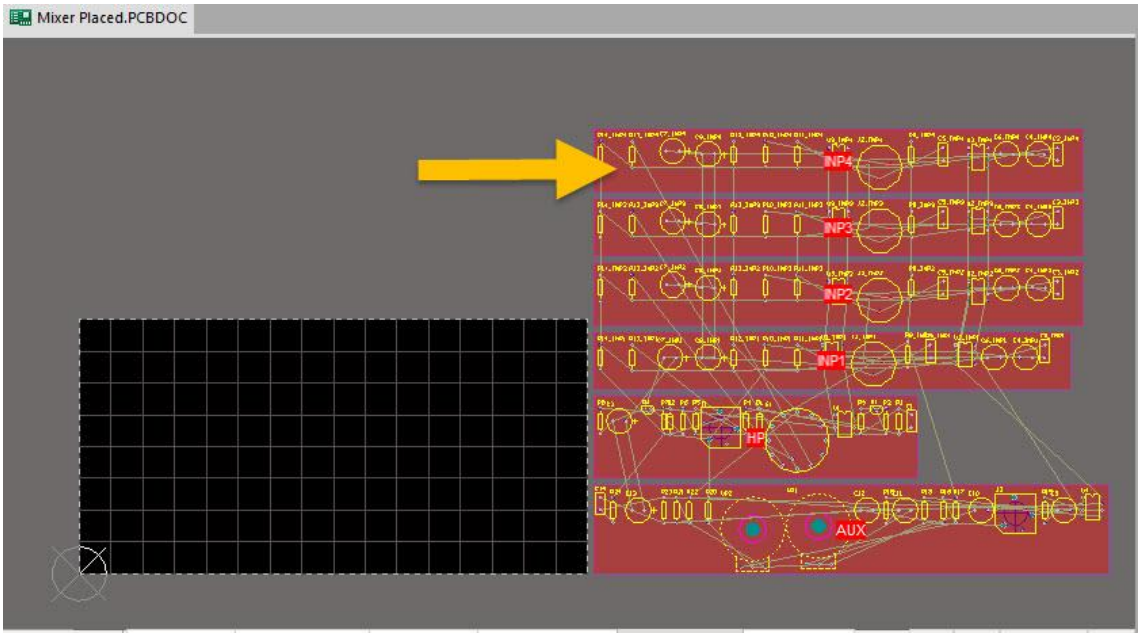


*Figure 1. Room INP4*

4. Click on the gear icon to open the *Preferences*.
   a) Under *PCB Editor* section, select the *General* page.
   b) Ensure that the **Online DRC** checkbox is enabled a shown in Figure 2.
   c) Click **OK** to close the *Preference* dialog.

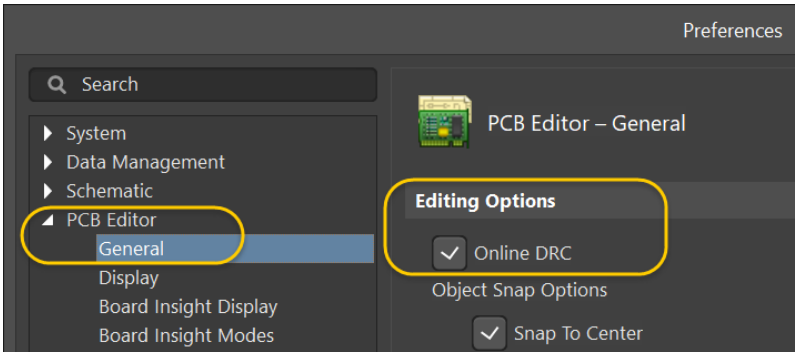


*Figure 2. Online DRC preference*

5. Back in the PCB, click on room `INP4` located on the top right of the editor workspace and drag it to the left as shown in Figure 3 . Notice that all of the components in the room move as well.

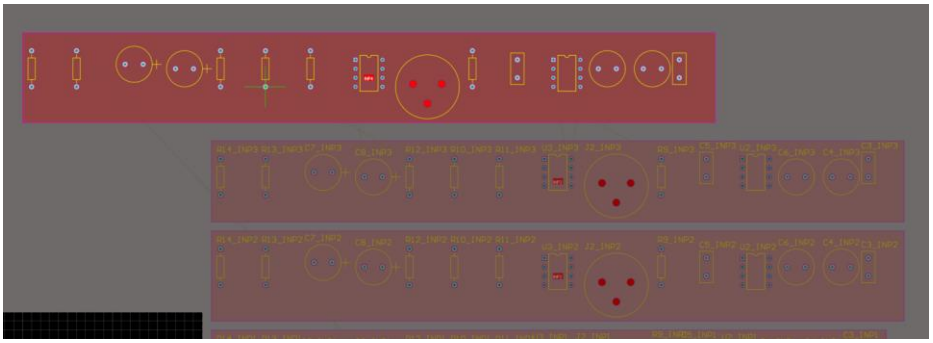

*Figure 3. Moving room INP4*

6. Drag one of the components out of the room and notice that it turns bright green indicating that there is a violation because it is no longer within the boundary of the room, as shown in Figure 4.

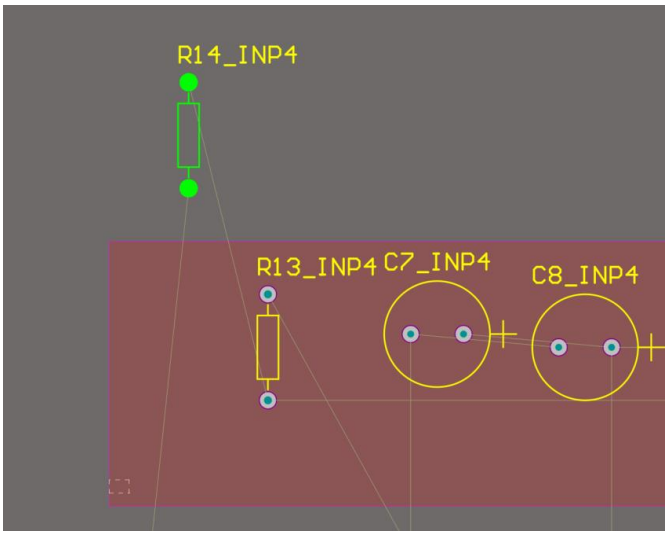


*Figure 4. Moving a component outside of its room*

## 1.4.2 **Resizing the Room**

7. Double-click on the room to open the *Edit Room Definition* dialog.
8. Click **Define…** to resize the room as shown in Figure 5.

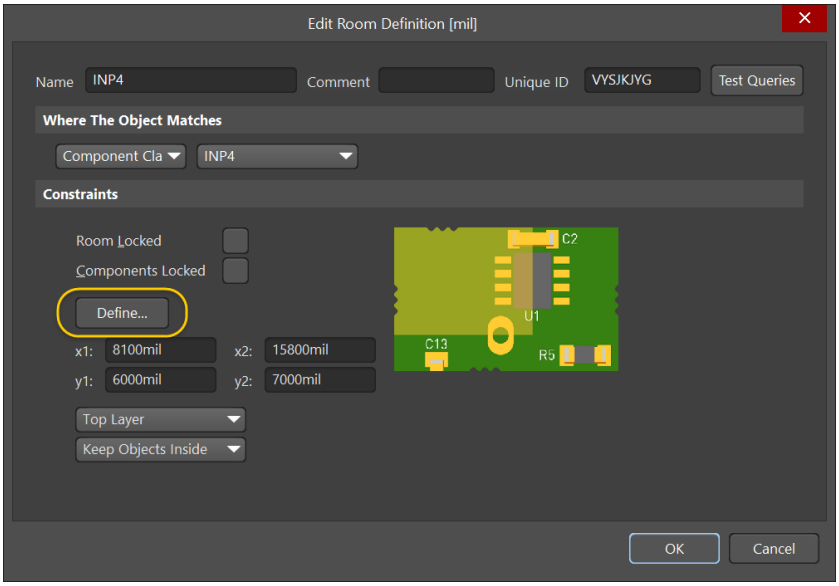


*Figure 5. Defining the size of the room*

9. Starting from the origin in the bottom left-corner of the PCB, left-click at coordinates (0,0) to start resizing the room.
10. Using the *Heads-Up Display*, resize the room to 1500 mils wide by 4000 mils tall. Left-clicking at each of the following coordinates will help you resize the room:
    a) (0,0)
    b) (0,4000)
    c) (1500,4000)

d) (1500,0)

e) (0,0)

11. Right-click to exit the command once you're finished. Your end result should look similar to Figure 6.

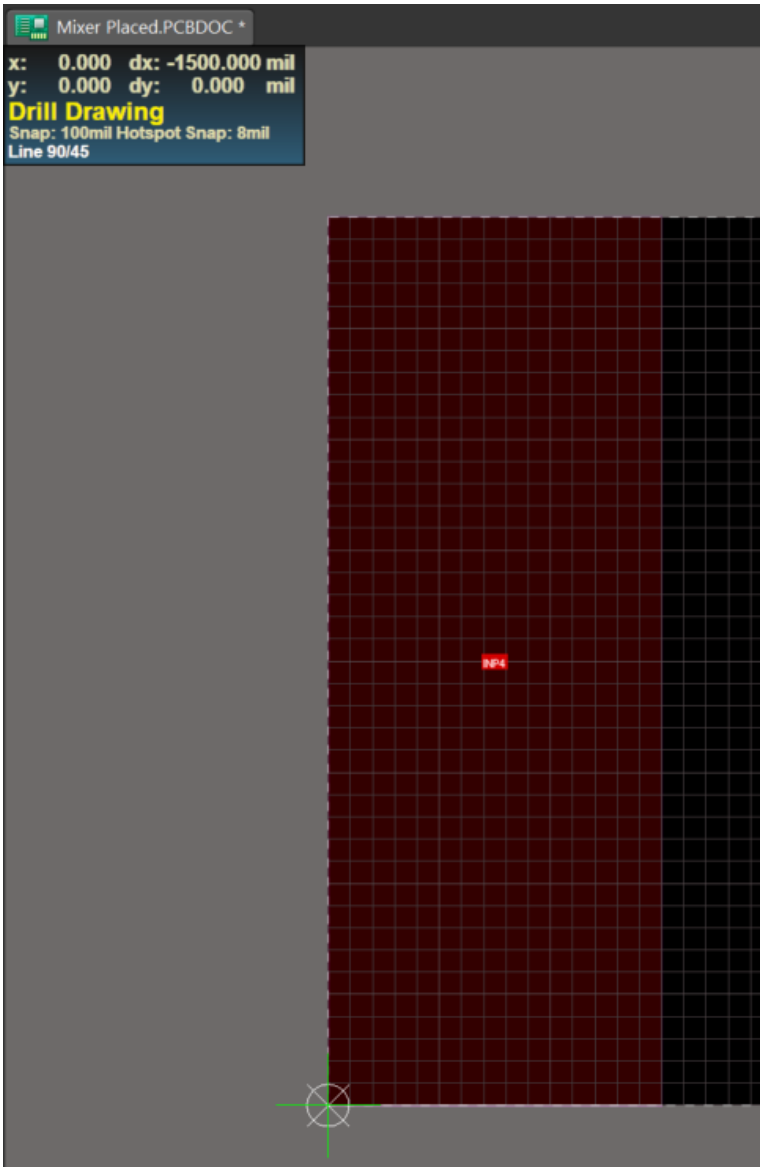


*Figure 6. Resizing room INP4*

12. When the *Edit Room Definition* dialog appears after resizing the room, click **OK** to continue.
13. Take the components that belong to the room, and manually position them roughly as shown in Figure 7.

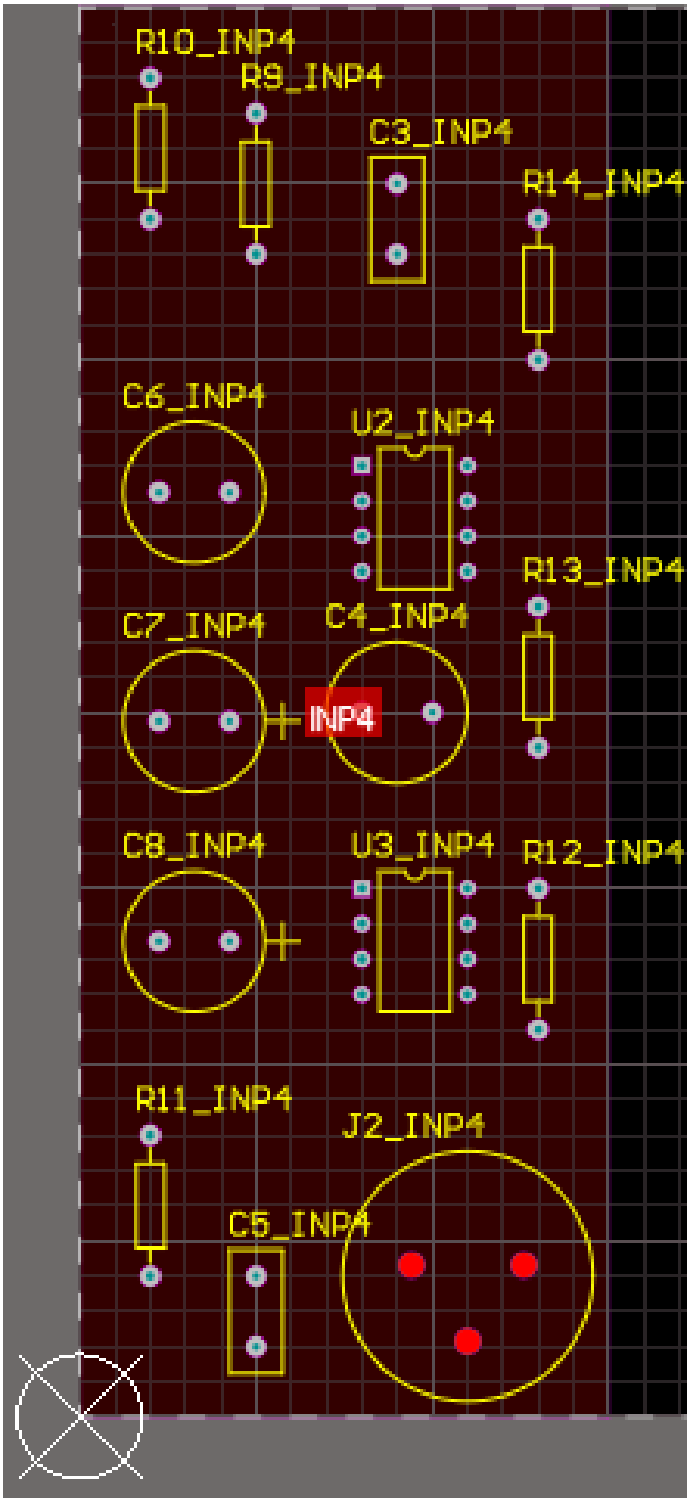


*Figure 7. Resizing and position components in Room 4*

## 1.4.3 **Auto Route Room**

In preparation for copying the room format, we will add some routing to the room. For this next step, we will use our *Situs Autorouter* to automatically route the room. It is only necessary to add a couple of routes for illustration for the *Copying Rooms* section that follows.

14. Automatically route the room by going to the **Route** menu, select **Auto Route » Room**.
15. With the crosshair on your cursor, click on room `INP4` that you have resized and placed. In a few seconds the room will be routed as shown in Figure 8.
16. Right-click to end the command after a few seconds to exit the **Auto Route** command. It's okay if a few connections are not complete.
17. Close the *Messages* panel when it's done routing.

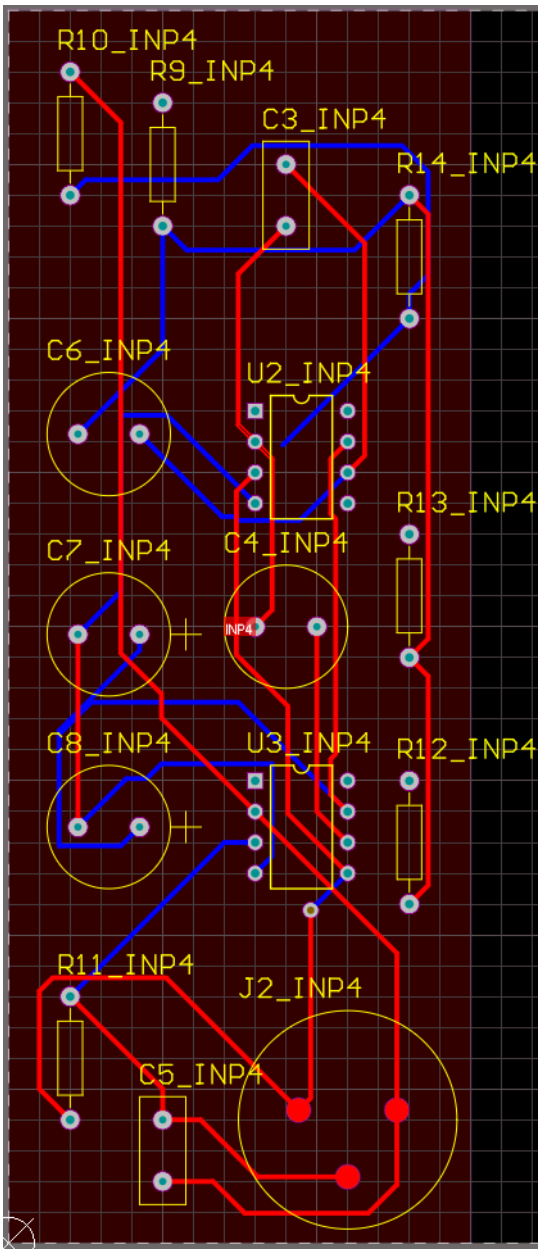


*Figure 8. Room after auto routing*

# 1.5 Copying Rooms

First, we will arrange the rooms so the copy format command does not cause the rooms to overlap.

18. **Shift+ left-click** to select rooms `INP1, INP2,` and `INP3`.
19. From the **Design** menu, select **Rooms » Arrange Rooms**.
    a) Set the columns to `3` as shown in Figure 9.
    b) Uncheck the **Sort in Ascending order**.

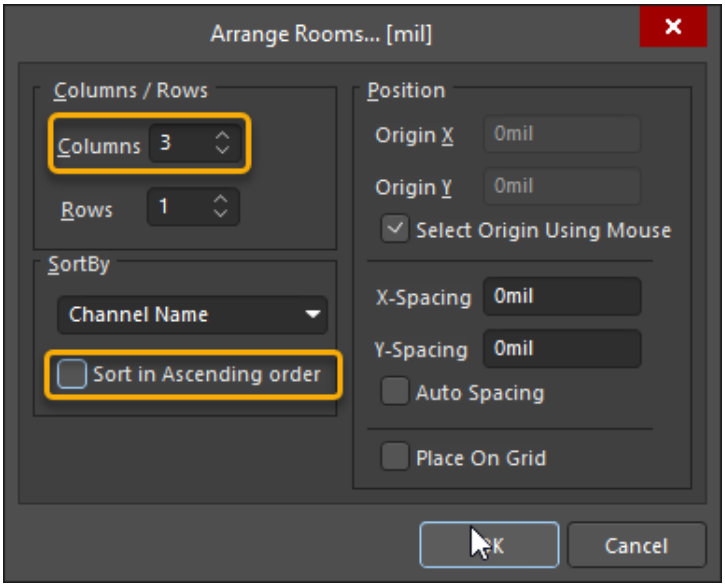


*Figure 9. Arrange room dialog*

    c) Press **OK**. You'll notice you now have a crosshair on your cursor.
    d) Left-click above the board. The room arrangement should be similar to Figure 10.

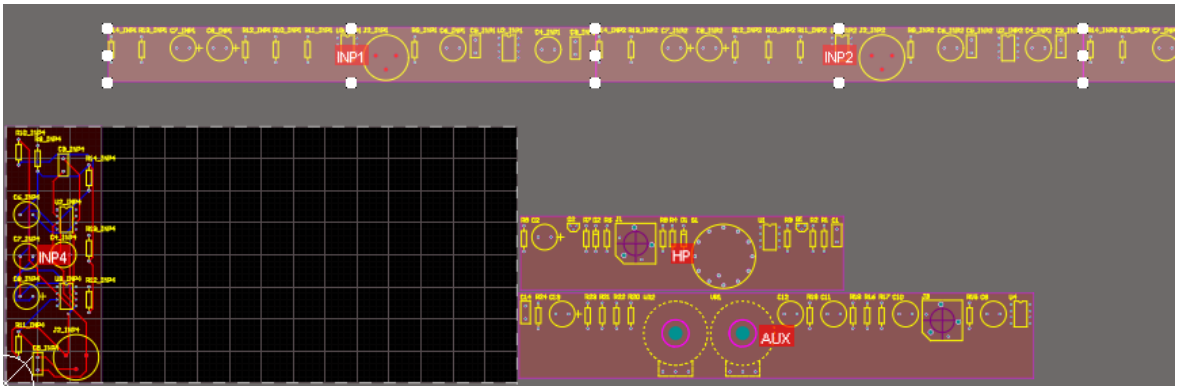


*Figure 10. Room arrangement preparation for copy format*

20. From the **Design** menu, select **Rooms » Copy Room Formats**. This command will allow us to copy the layout of the INP4 room to the other rooms in the same channel.
21. With the crosshair on your cursor, click on Room `INP4` to designate it as the *Source Room.*
22. Then, click on Room `INP1` to designate it as the *Destination Room.* The *Confirm Channel Format Copy* dialog will appear as shown in Figure 11.

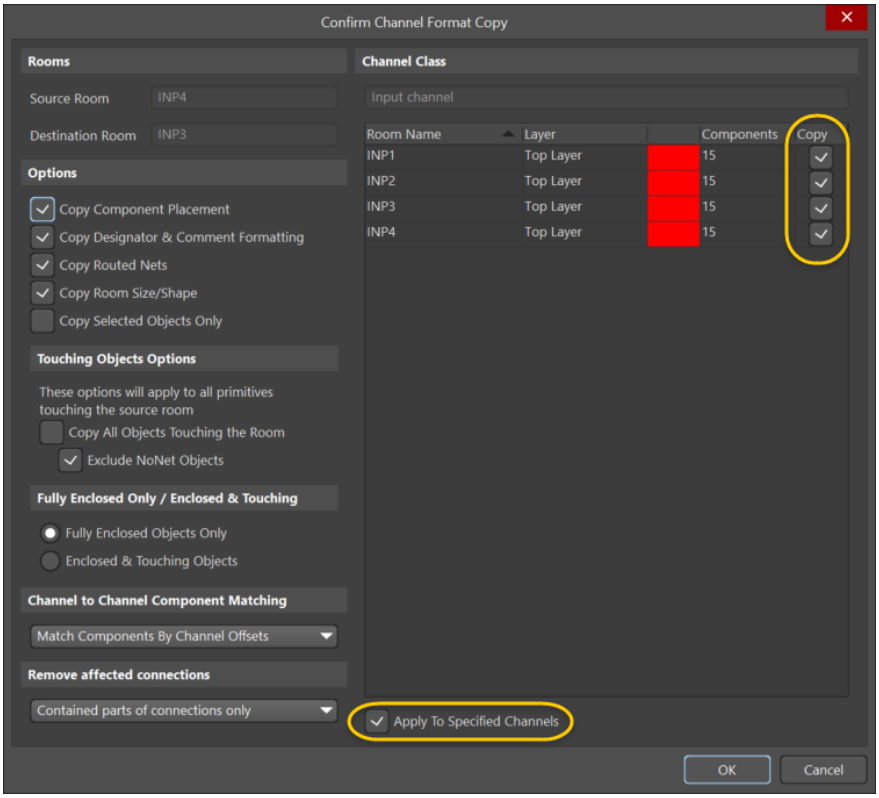


*Figure 11. Copy Room Format dialog*

a) Enable the **Apply to Specified Channel** checkbox. This will copy the room formatting to all of the `INP` rooms.

b) Ensure that the **Copy** checkbox is also enabled, to the far right of the displayed channels. If this option is not checked, the copy room format will only apply to the initially selected room.

c) Click **OK** to apply the changes.

d) The *Information* dialog window will appear stating the components and rooms have been updated. Click **OK** to close it.

e) Right-click to terminate the command.

23. Notice that the rooms have adopted the component placement and routing from our source room, but we still need to neatly arrange the rooms into the board area. This could be done by dragging the rooms individually, but we will use the *Arrange Room* command once again.
24. While the rooms are still selected, **Shift+select** to select room `INP4` so all of the `INP` rooms are now selected as shown in Figure 12 below.

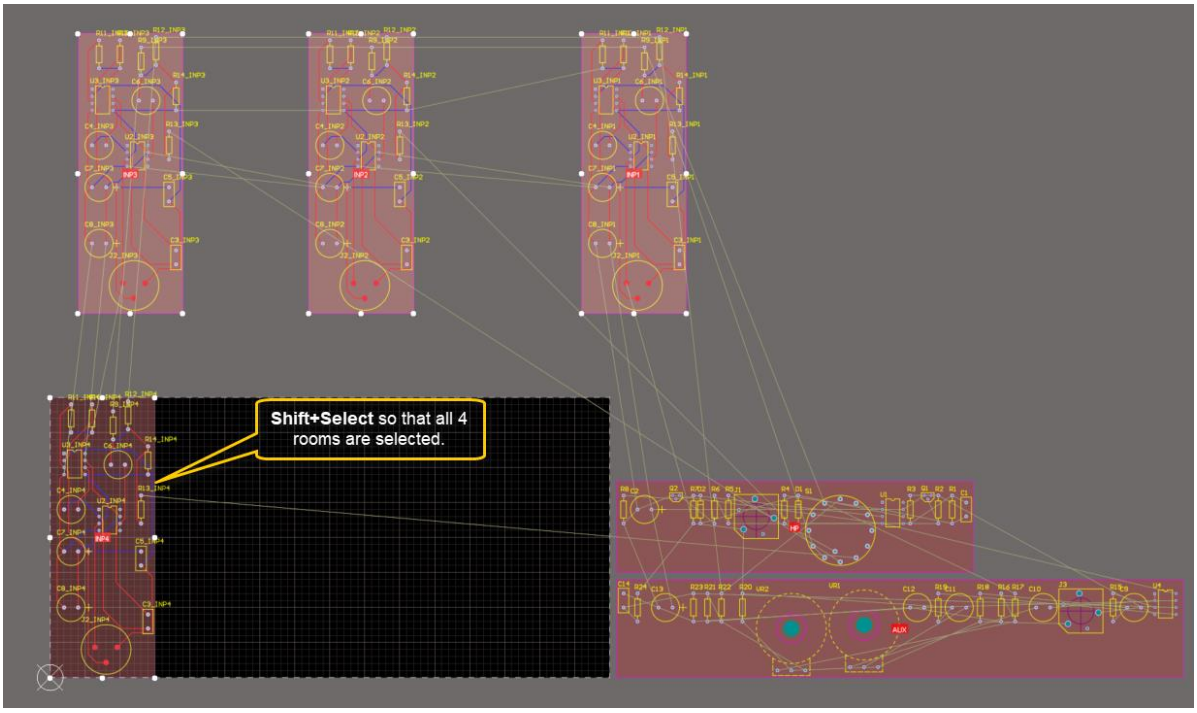


*Figure 12. Selection of rooms for the re-arrangement*

25. From the **Design** menu, select **Rooms » Arrange Rooms**.
    a) In the *Arrange Rooms* dialog, set the *Columns* value to `4`, and *Rows* to `1` as shown in Figure 13.

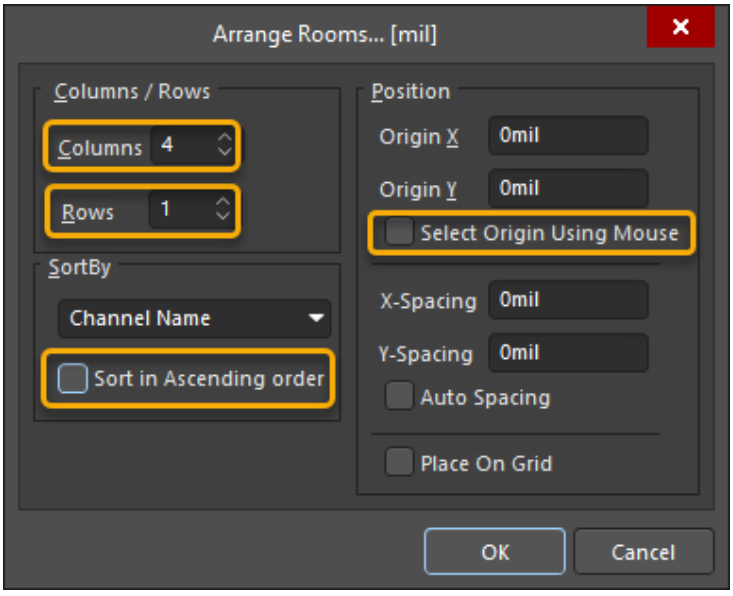


*Figure 13 Automatic Room Arrangement*

    b) Uncheck the **Sort in Ascending order** checkbox.
    c) Uncheck the **Select Origin Using Mouse** checkbox.
    d) Click **OK** to accept these settings and continue.
    e) The rooms should be arranged similar to what is shown in Figure 14 below. A gap/space could have been added to the rooms if desired.

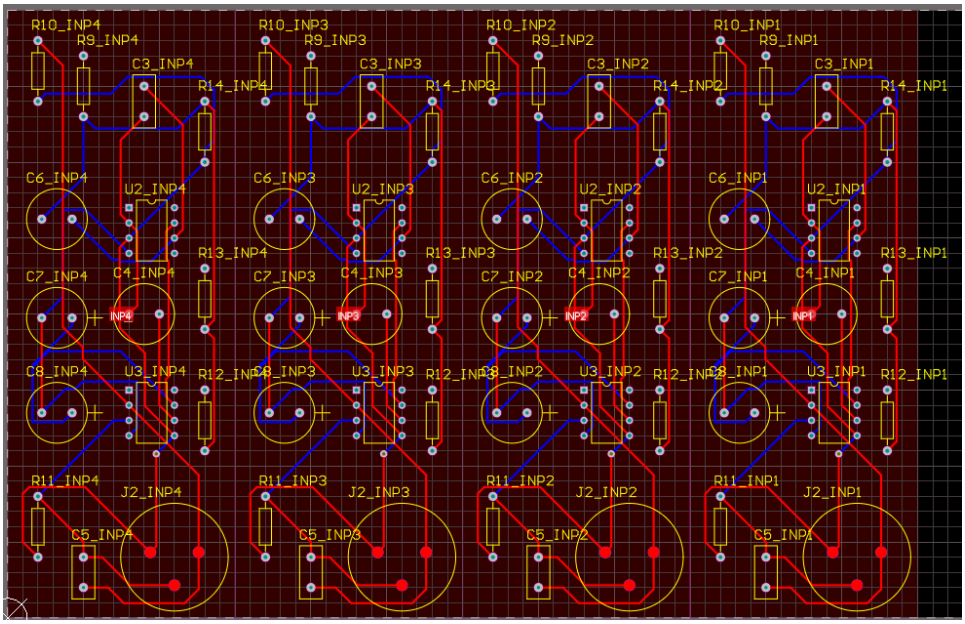


*Figure 14. Rooms INP1, INP2 and INP3 copied from source room INP4*

# 1.6 Changing Designator Format

26. Zoom in close enough to a room to view some of the component designators. Notice that the default component designators have a room suffix. This may be cumbersome for some boards, but the suffix can be removed by changing the **Designator Display** option in the *Properties* panel as described in the following steps:
    a) Press **Shift + C** to clear any selections in the workspace.
    b) In the *Properties* panel, scroll to the bottom to see the *Other* section.
    c) Change the **Designator Display** drop-down from **Physical** to **Logical** as shown in Figure 15.

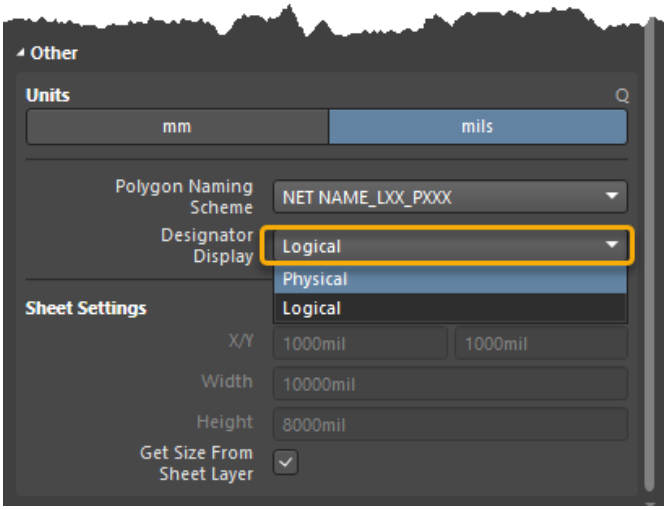


*Figure 15. Board Options to Change Designator Display*

27. Zoom back in to one of the rooms and notice the designators no longer have the room suffixes as shown in Figure 16. This compact format uses the original Logical designators, which correspond to the designators in the Editor tab of the schematic, for the channel input components.

Designators can be configured in PCB printouts for either Logical or Physical. Physical designators will always be used for the Bill of Materials and related BOM reports.

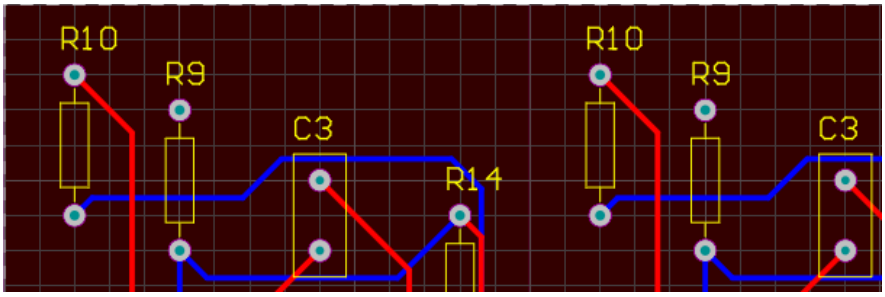


*Figure 16. Logical Designators*

It is also possible to re-annotate all designators so they are unique to avoid potential confusion with duplicate designators between rooms. This could be done with the **Board Level Annotation,** discussed in a different module.

28. Feel free to save your modifications.
29. **Close the project and any open documents.**

**Congratulations on completing module**

Working with Rooms in a Multi-Channel Design

**from the**

**Altium Designer Advanced Course**

**Thank you for choosing Altium Designer**