Altium Designer

Advanced Training with Altium 365

Multi-Channel Design 2 - Rooms in the PCB

Software, documentation and related materials:

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Multi-Channel Design 2 - Rooms in the PCB

1 Purpose

A room is an area where components can either be kept within or 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.

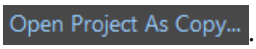
You can find information about creating Multi-Channel Designs in module `Multi-Channel Design 1 - Schematic Entry` of the Advanced Training.

2 Shortcuts

Shortcuts used when working with Multi-Channel Design 2 - Rooms in the PCB

F1	Help
T » P or ⚙	Preferences
U » A » M	Autoroute a Room
D » M » C	Copy Room Format
D » M » A	Arrange Rooms
CTRL+S	Save Document

3 Preparation

1. Close all existing projects and documents.
2. Next, create a copy of the Training Project: `Multi-Channel Design 2 - Rooms in the PCB`.
3. Select **File » Open Project...** to open the *Open Project* dialog.
4. Enable the folder view button  .
5. Navigate to the predefined Training Project `Multi-Channel Design 2 - Rooms in the PCB (Top\Projects\Altium Designer Advanced Training Course\...)`.
6. Select **Open Project as Copy...** 

.
7. In the new dialog *Create Project Copy:*
   a) Add your name to the project name: `Multi-Channel Design 2 - Rooms in the PCB - [Your Name]`.
   b) Add a description: `Altium Advanced Training - [Your name]`.
   c) Open the *Advanced* section.
   d) Select the **Ellipsis Button**  from the *Folder* configuration to open the *Choose Folder* dialog.
      i) Select the folder with your name: `Project\For Attendees\[Your name]`.
      ii) Select **OK**.
   e) Change the **Local Storage** path if needed.
   f) Select **OK** to create the copy.
8. Wait until Altium Designer creates the copy of the project and opened the Project for you in the *Projects* panel, this may take up to 1 minute.

Hint: For details how to copy the predefined training project, see module *03 Getting started - Opening a Project*.

4 Preparing the First Room

4.1 Moving the Room

9. Open the `Mixer Placed.PcbDoc` document. You can see 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.

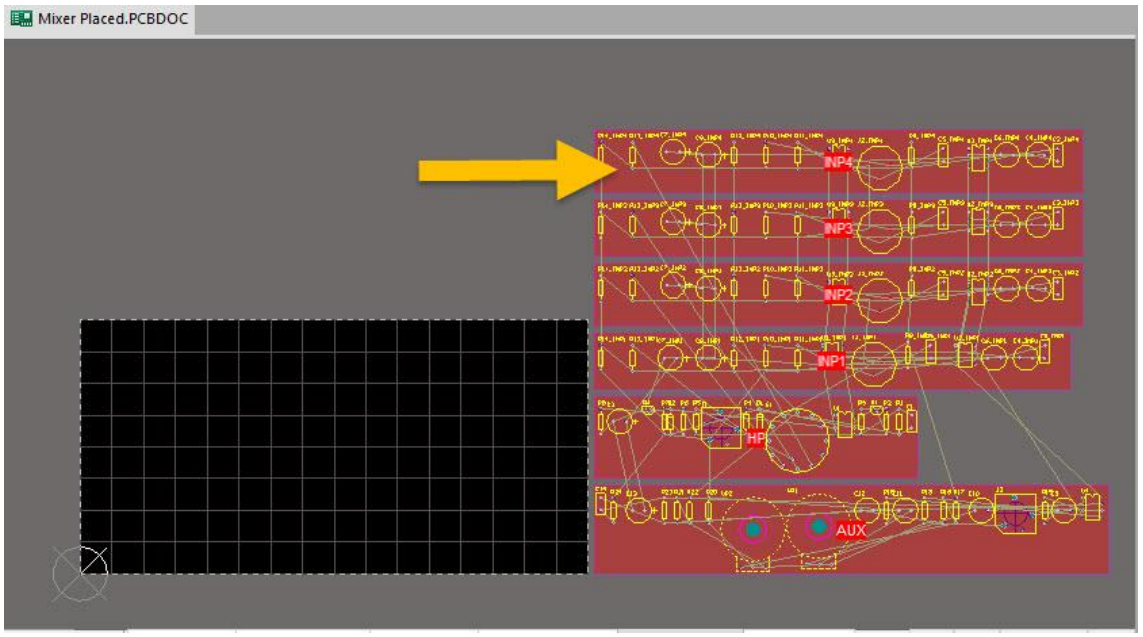


Figure 1. Room INP4

10. Select 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, as shown in Figure 2.
    c) Select **OK** to close the *Preference* dialog.

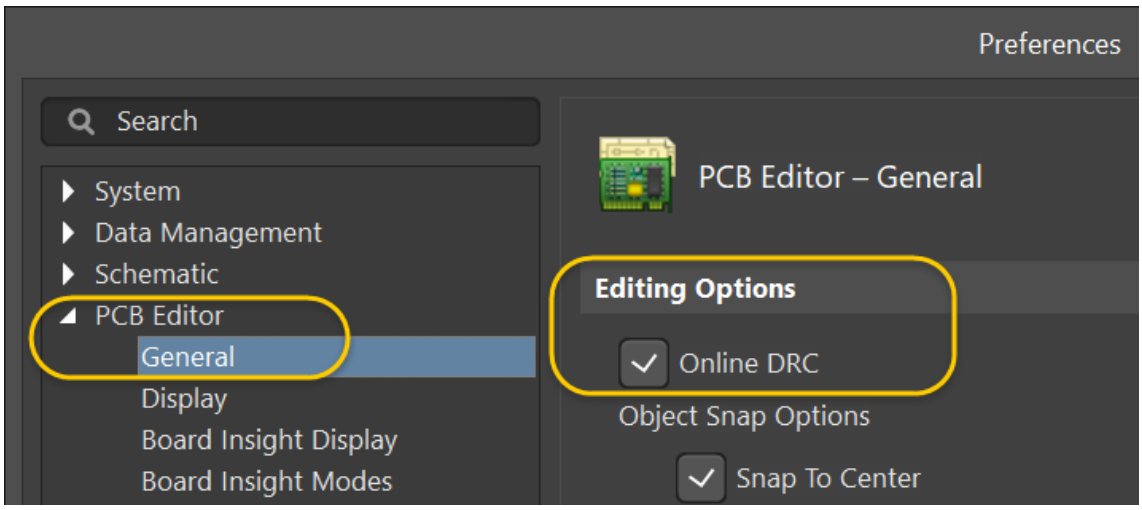


Figure 2. Online DRC preference

11. 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.

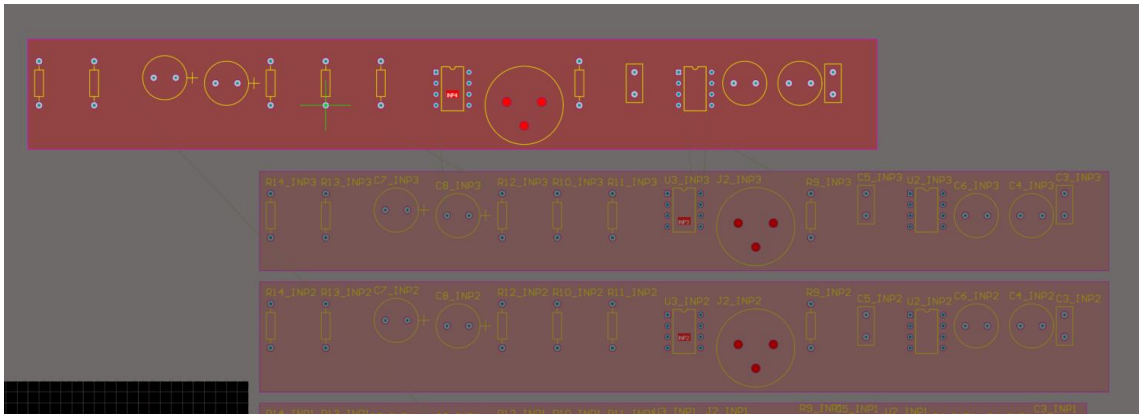


Figure 3. Moving room INP4

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

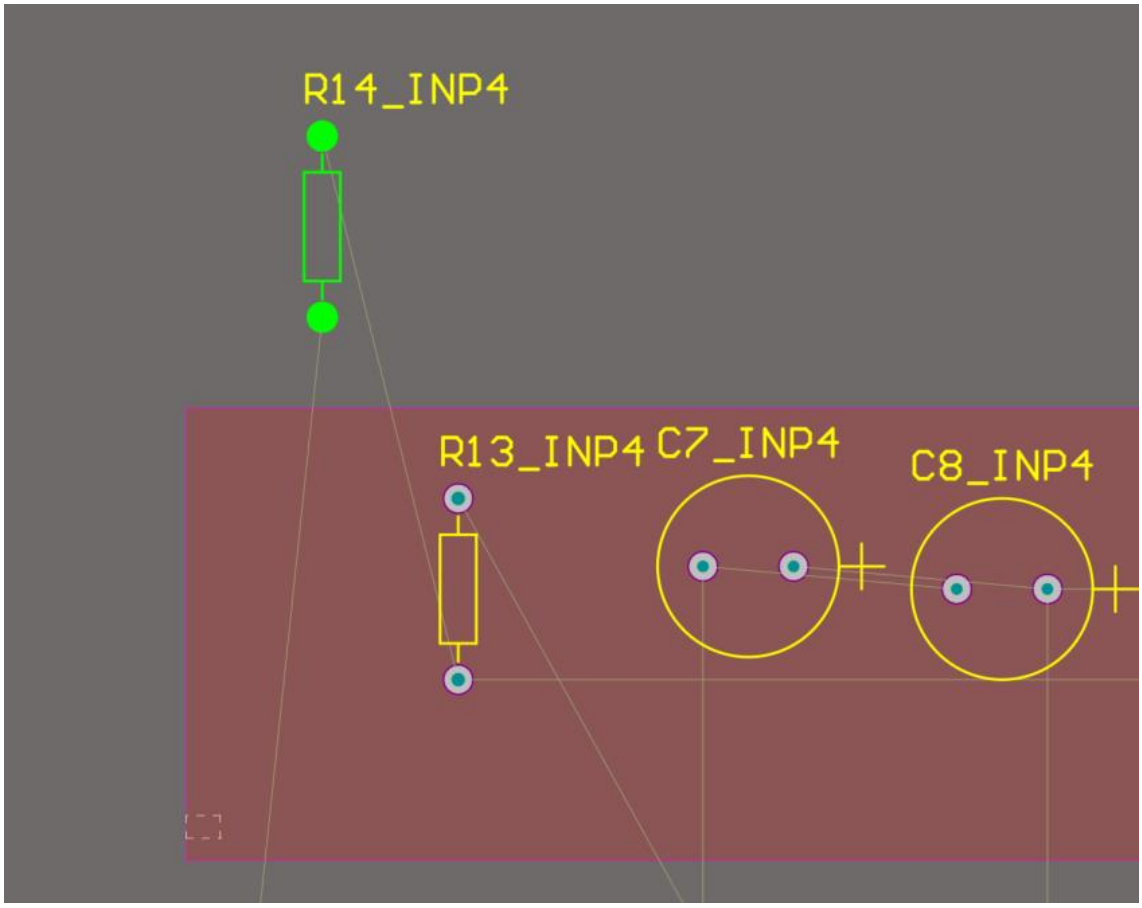


Figure 4. Moving a component outside of its room

4.2 Resizing the Room

13. Double-click on the room to open the *Edit Room Definition* dialog.
14. Select **Define...** to resize the room as shown in Figure 5.

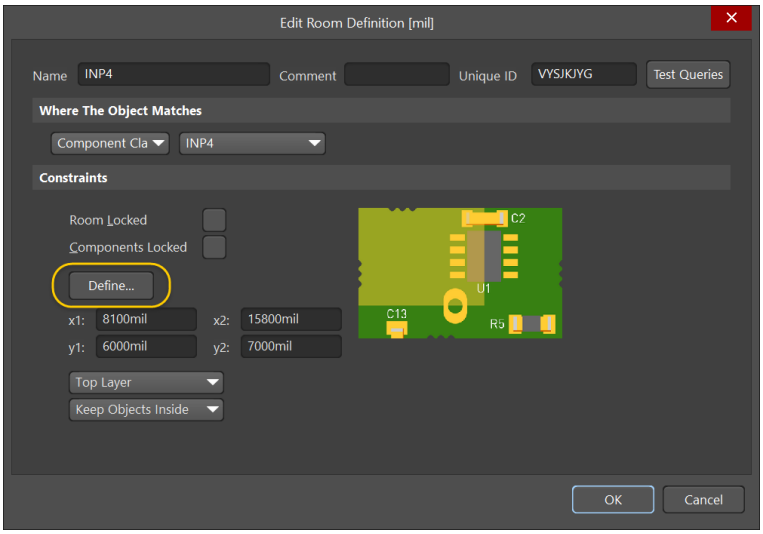


Figure 5. Defining the size of the room

15. Starting from the origin in the bottom left-corner of the PCB, left-click at coordinates (0,0) to start room resizing.
16. 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)`

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

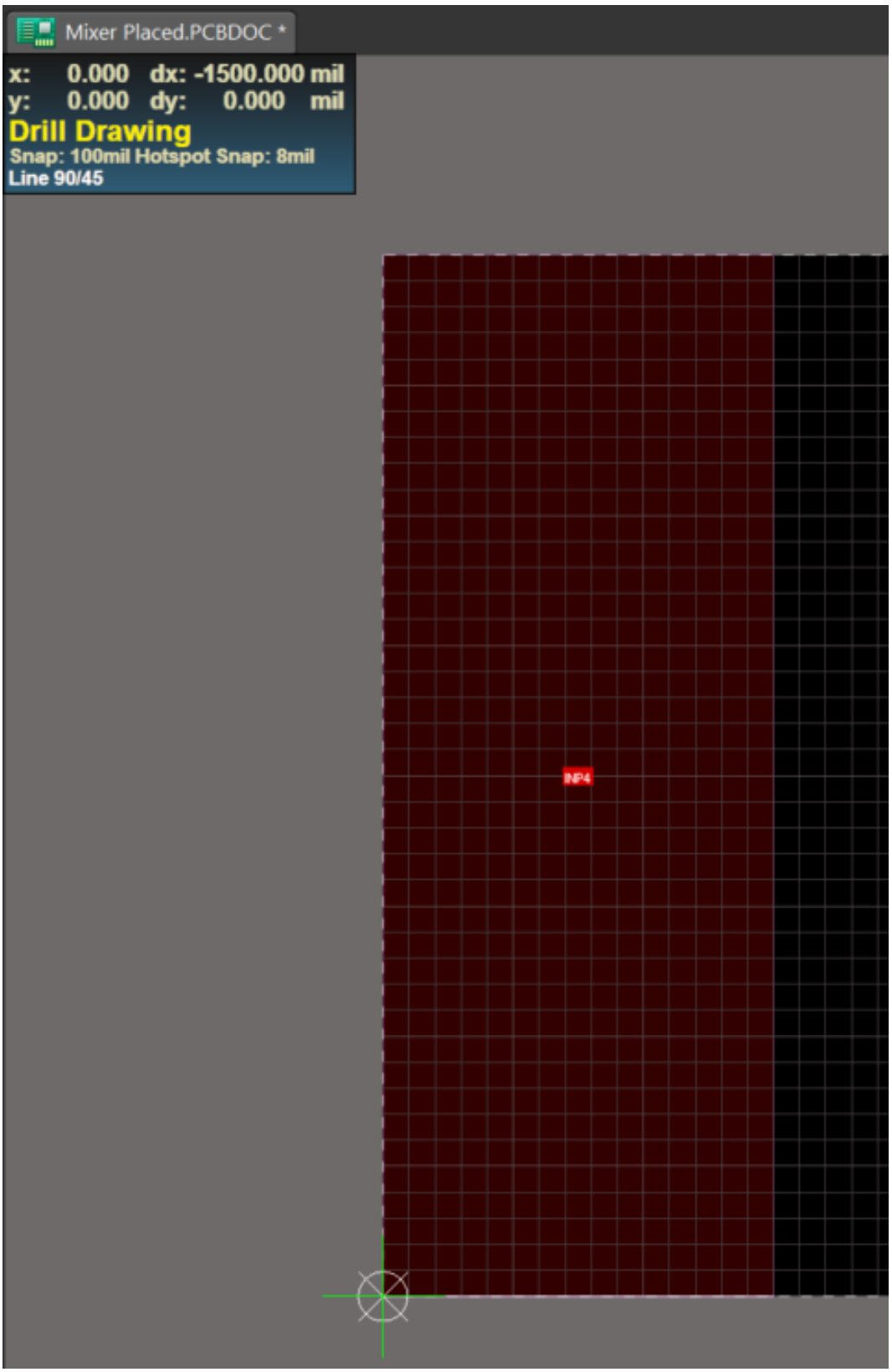


Figure 6. Resizing room INP4

18. When the *Edit Room Definition* dialog appears after resizing the room, select **OK** to continue.

19. Take the components that belong to the room, and manually position them roughly as shown in Figure 7.

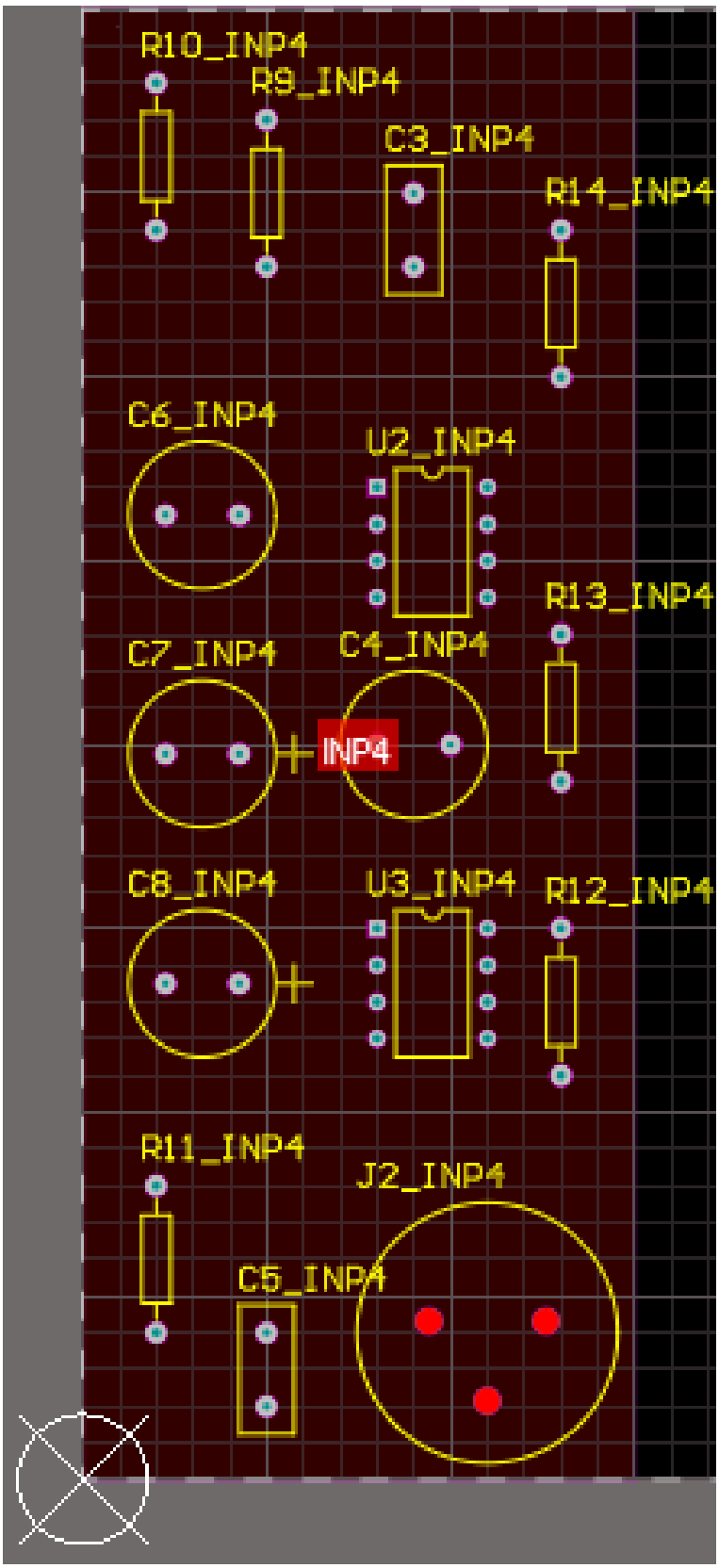


Figure 7. Resizing and position components in Room 4

4.3 Auto Route Room

Prior to copying the room format, you will add some routing to the room. For the next step, you will use *Situs Autorouter* to automatically route the room. It's only necessary to add a couple of routes for illustration for the *Copying Rooms* section that follows.

20. From the **Route** menu, select **Auto Route » Room** to automatically route the room.
21. 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.
22. Right-click to end the command and exit the **Auto Route** command. It's okay if a few connections aren't complete.
23. Close the *Messages* panel when the routing is done.

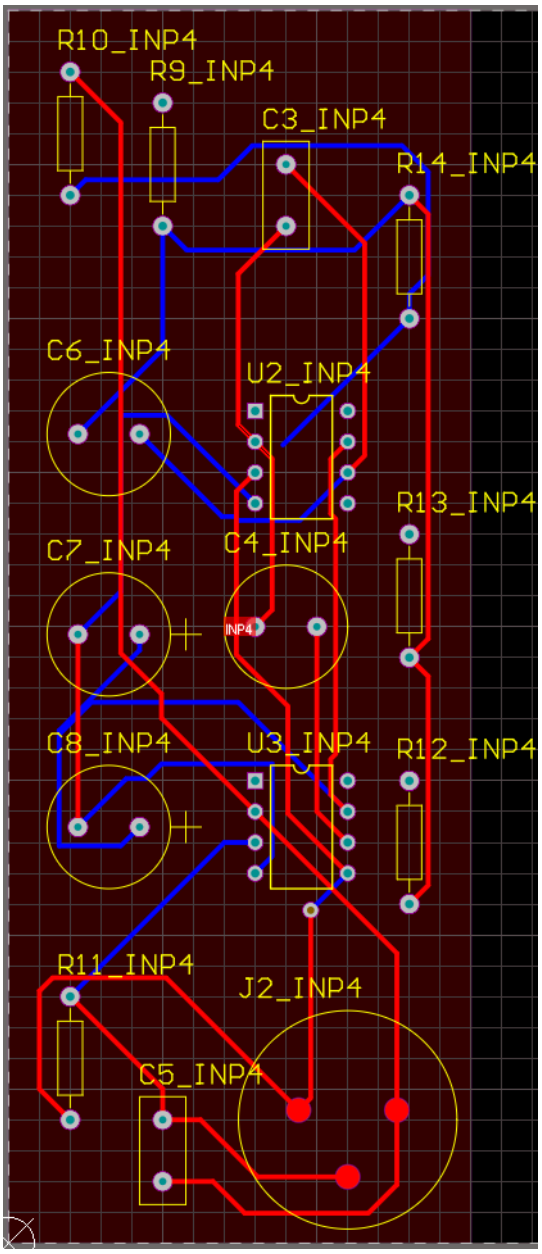


Figure 8. Room after auto routing

5 Copying Rooms

First, you will arrange the rooms in such a way that they don't overlap.

24. **Shift+ left-click** to select rooms `INP1`, `INP2`, and `INP3`.
25. 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**.

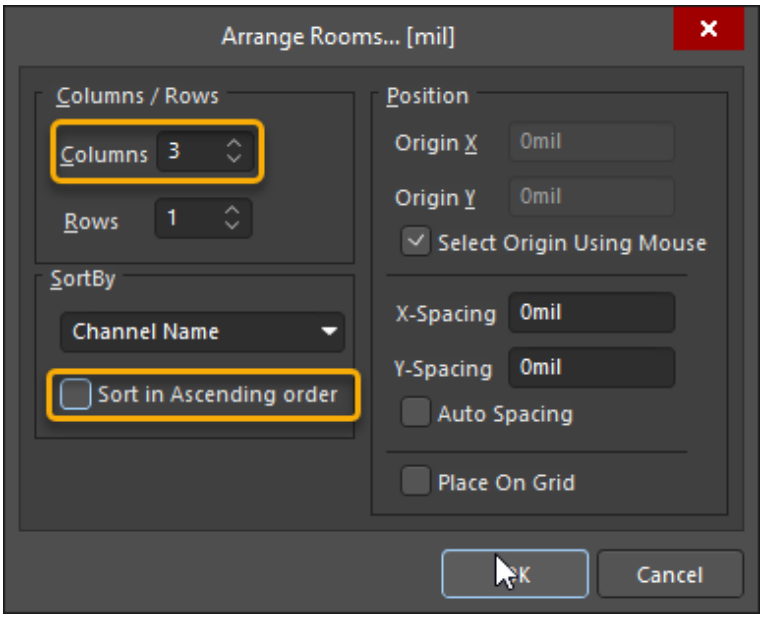


Figure 9. Arrange room dialog

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

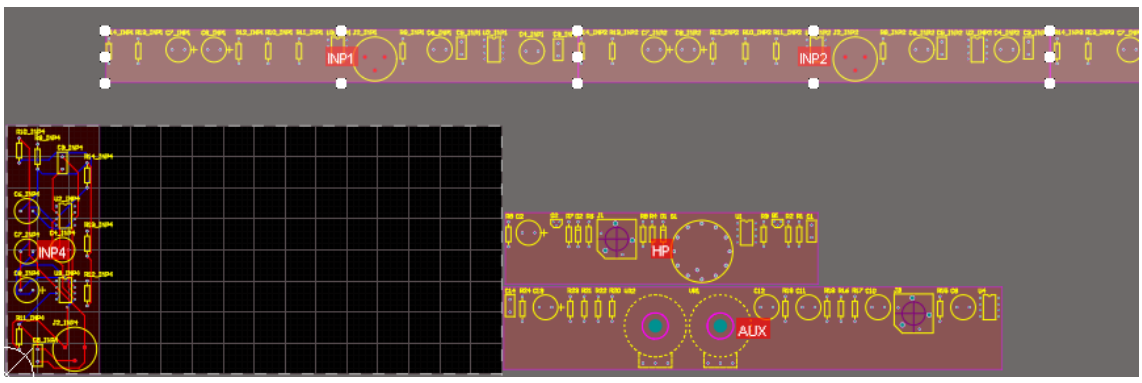


Figure 10. Room arrangement preparation for copy format

26. From the **Design** menu, select **Rooms » Copy Room Formats**. With this command, you can copy the layout of the INP4 room to the other rooms in the same channel.
27. With the crosshair on your cursor, click on Room `INP4` to designate it as the *Source Room.*

28. 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.

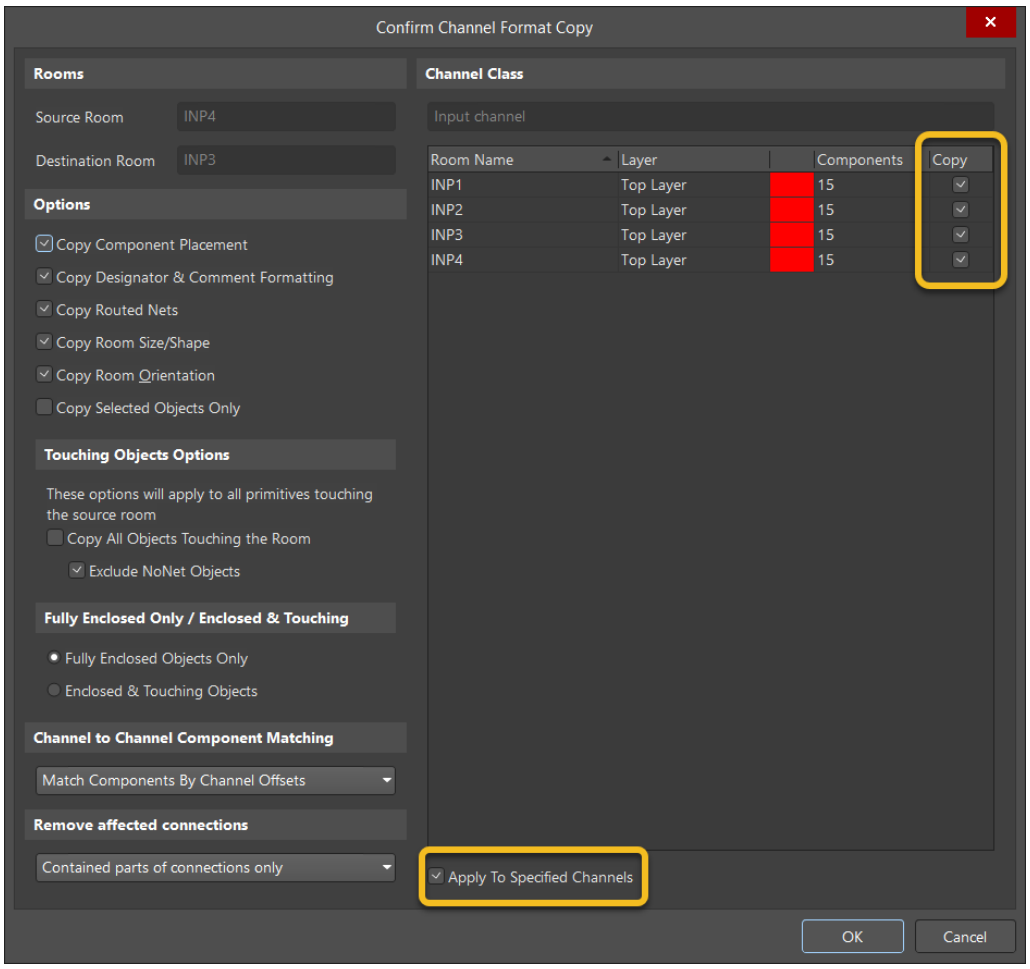


Figure 11. Copy Room Format dialog

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 isn't checked, the copy room format will only apply to the initially selected room.

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

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

e) Right-click to terminate the command.

29. Notice that the rooms have adopted the component placement and routing from our source room, but you still need to neatly arrange the rooms into the board area. This could be done by dragging the rooms individually, but you will use the *Arrange Room* command again.

30. While the rooms are still selected, **Shift+select** to select room `INP4`, so that all of the `INP` rooms are now selected, as shown in Figure 12 below.

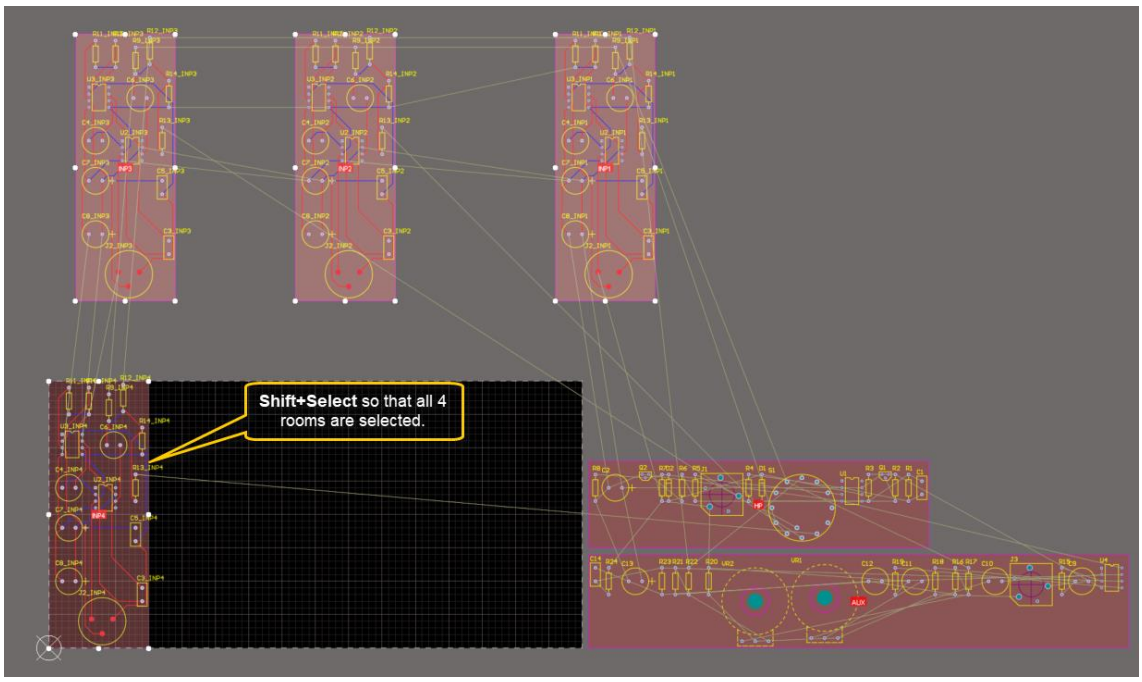


Figure 12. Selection of rooms for the re-arrangement

31. 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.

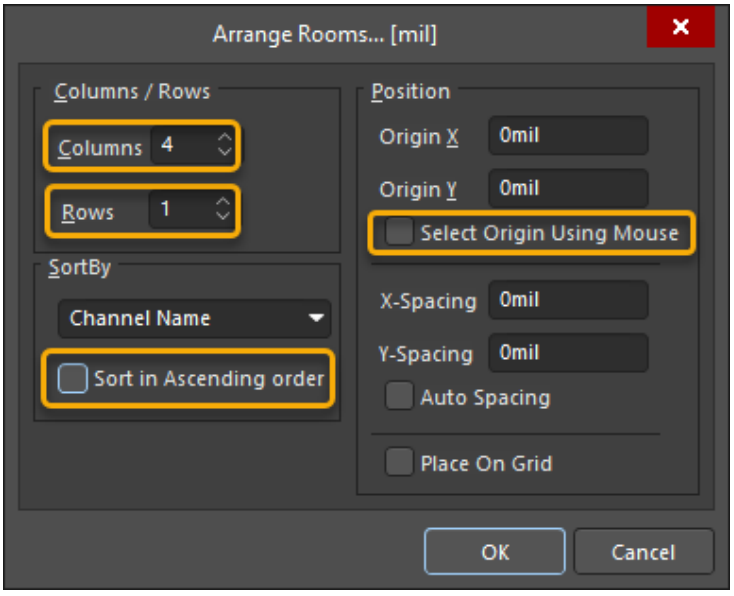


Figure 13. Automatic Room Arrangement

    b) Uncheck the **Sort in Ascending order** checkbox.
    c) Uncheck the **Select Origin Using Mouse** checkbox.
    d) Select **OK** to accept the settings.

The rooms should be arranged similar to what is shown in Figure 14 below. You can add a gap (space) to the rooms, if needed.

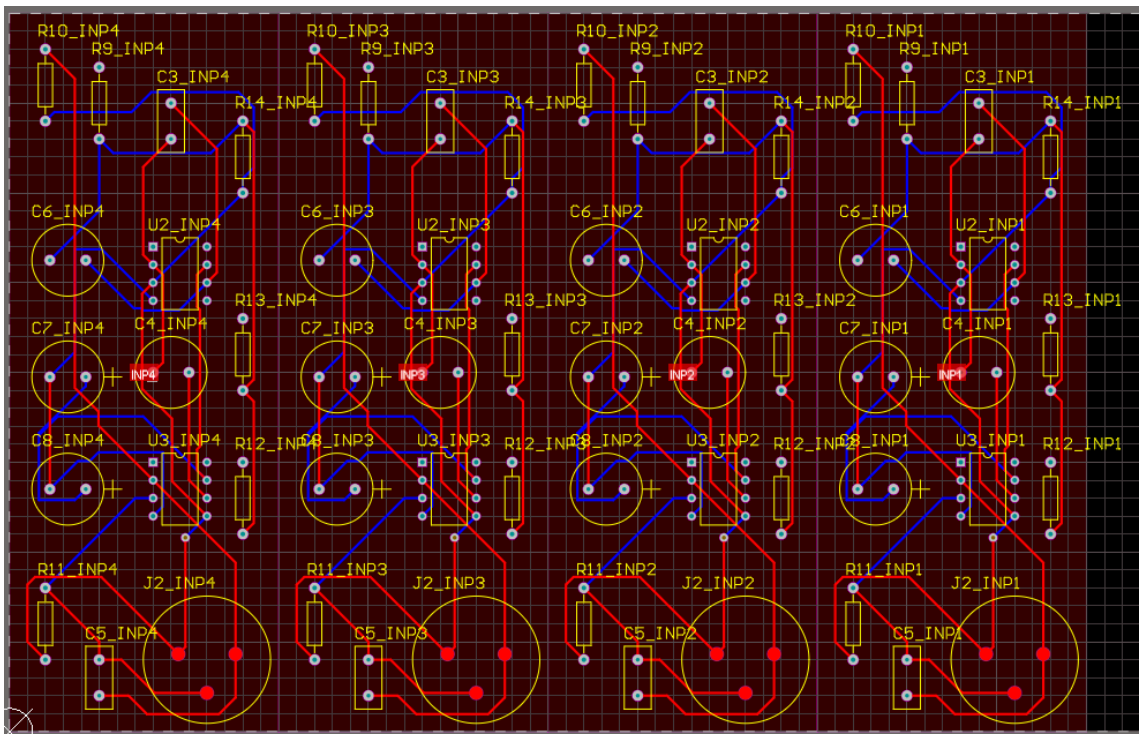


Figure 14. Rooms INP1, INP2 and INP3 copied from source room INP4

6 Changing Designator Format

32. 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 you can remove the suffix 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.

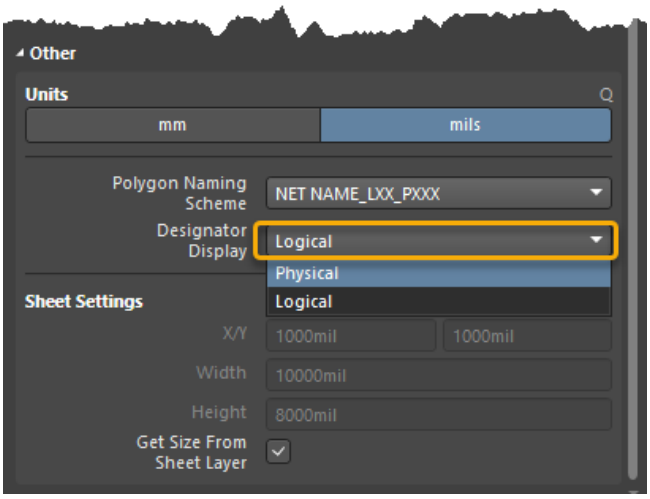


Figure 15. Board Options to Change Designator Display

33. 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.

Hint: You can configure designators in PCB printouts for either Logical or Physical. Physical designators will always be used for the Bill of Materials and related BOM reports.

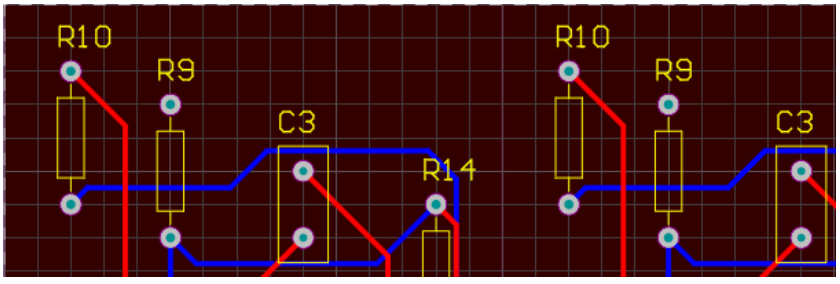
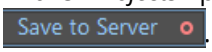


Figure 16. Logical Designators

Hint: It is also possible to re-annotate all designators, so that they are unique to avoid potential confusion with duplicated designators between rooms. You can do it with the **Board Level Annotation** that will be discussed in a different module.

34. Save all documents using **File » Save All**.
35. Save the modifications to the server:
    a) In the *Projects* panel, next to the Project name you find the command **Save to Server** 

.
    b) Select **Save to Server**.
    c) In the dialog *Save [Project Name]:*
        i) Add the comment `Multi-Channel Design 2 - Rooms in the PCB - [Add Your Name] - Finished`.
        ii) Select **OK**.
36. When ready, close the project and any open documents, **Window » Close All**.

Congratulations on completing the Module!

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