

Surveying interiors

Rilievo d'interni

Vermessung von Innenräumen

Relevé d'intérieurs

Levantamiento de planos

# ArchiMap™

vers. 1.0



PLUG-IN FOR ARCHICAD®



# ArchiMap™

## User Guide

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# Index

## The ArchiMap Plug-in 1

<b>The First Plug-in for Creating As-Built Surveys of Interiors</b>	<b>1</b>
What are ArchiCAD Plug-ins?	1
System Requirements	1
Memory	1
ArchiCAD Version	2
How are ArchiCAD Plug-ins Used?	2
Where to Install Plug-Ins	2
Package Installation	3

## ArchiMap 1.0 5

### The ArchiMap Palette 5

#### Tools on the Palette 5

##### Room Tool 6

Rectangular Room	6
L-shaped Room	7
Freeform Room	8
Rename Room	9
Insert Door	10
Modify Door	11
Insert Window	12
Modify Window	13

##### Trilateration Tool 14

Single Diagonal	14
Radial Diagonals	15
90° Angle	16
Change Status of Diagonals	17
Insert Hotspot	18
Edit Hotspot	20

##### Measurements Tool 21

Input Measurements Manually	21
Input All Measurements in Sequence	22
Input All Missing Measurements in Sequence	24

<b>Edit Tool</b>	<b>26</b>
Move Node	26
Rotate Node	27
Mirror Node	28
Duplicate Rooms	29
<b>Delete Tool</b>	<b>30</b>
Delete Diagonals	30
Delete Hotspot	30
Delete Door	31
Delete Window	31
Delete 90° Angle	31
<b>Join Tool</b>	<b>32</b>
Join Using Doors	32
Join Using Hotspots	34
Separate Room	36
Perimeter	37
<b>3D Construction Tool</b>	<b>38</b>
Explode Rooms	38
Erect Walls Automatically	39
Erect Single Wall Manually	40
Erect Multiple Walls Manually	41
Install Doors	45
Install Windows	46
3D Construction Settings	47
Perimeter Wall Default Thickness	48
Perimeter Wall Maximum Thickness	49
Internal Walls Maximum Thickness	50
Trapezoidal Wall Limit	51
Limit for Difference in Aligned Walls' Thicknesses	52
Store and Retrieve Rooms from the Archive	53
<b>Help Tool</b>	<b>54</b>
<b>Step-by-step 1</b>	<b>55</b>
Step 1 – Organize your work file	55
Step 2 – Draw a Room	56
Step 3 – Insert the Doors	59
Step 4 – Define the Room's Graphics	62
Step 5 – Store the Room	64

Step 6 – Continue Creating the As-built Survey	65
Step 7 – Insert the Windows	66
Step 8 – Draw a Room in Freeform Mode	67
Step 9 – Place an Element in the Surveyed Room	70
Step 10 – Join the Rooms	72
Step 11 – Create the Perimeter	75
Step 12 – 3D Construction	77
<b>Using the Leica Disto™ Plus with ArchiMap</b>	<b>79</b>



# The ArchiMap Plug-in

## The First Plug-in for Creating As-Built Surveys of Interiors

### **What are ArchiCAD Plug-ins?**

ArchiCAD plug-ins are software components that add functionality to the standard features of ArchiCAD.

Extensions are currently available for import/export operations, for executing special GDL functions and for some of the display methods that come with the standard ArchiCAD package. ArchiMap is one of these extensions.

### **System Requirements**

From a technical standpoint, ArchiCAD plug-ins are code fragments.

This means that they cannot be launched directly from the Finder (Macintosh platform) or from Windows Explorer (Windows platform). ArchiCAD opens and closes them automatically using the Code Fragment Manager's service routines.

### **Memory**

As import libraries are not applications, they do not require special memory configurations.

Import libraries are loaded into the system heap when they are activated. If there is not enough memory available, a warning will be displayed.

If this occurs, make more memory available to the operating system by quitting other applications or reducing the memory allocated to ArchiCAD.



### **ArchiCAD Version**

ArchiMap is compatible with ArchiCAD 8.1 (release 8.1 – R2 is recommended) and later versions.

It will not run with earlier versions of ArchiCAD.

### **How are ArchiCAD Plug-ins Used?**

Normally, you will not even realize you are using a plug-in.

When you select a particular command or action, ArchiCAD automatically executes the appropriate code. You will only notice that new functionality has been implemented within the program.

The only special attention required by the user involves the location of the ArchiCAD plug-ins on the computer's hard drive.

### **Where to Install Plug-Ins**

Plug-ins must be copied into ArchiCAD's Add-Ons folder.

Different types of code can be placed in various levels of subfolders.

- Mac OS: The Add-Ons folder can be located either in the same folder as the ArchiCAD application or in the Graphisoft folder inside the System Folder.
- Windows: The Add-Ons folder must be in the same folder as ArchiCAD. If placed in any other location, ArchiCAD will not be able to access it.

ArchiCAD verifies the presence of the plug-ins at start-up. If they are not in the correct folder, you will have to exit the program, move them to the appropriate location and restart ArchiCAD.

If a plug-in is used on an infrequent basis, you can launch it using the Load Add-On... command from the Tools menu.

## **Package Installation**

To ensure correct installation of the package, follow the procedure described below:

- Copy the ArchiMap folder to the Add-Ons folder, which is located in the same folder as the ArchiCAD application.

If the installation is successful, a new menu will be added to the Menu Bar (typically in the Extra menu).

This new menu will allow you to show or hide the ArchiMap Palette depending on your needs.

The method used when working with ArchiMap is the same one used when carrying out an as-built survey. You move through the structure room by room, preparing a sketch, adding the measurements of the sides and diagonals and inserting the windows, doors and all other data and notes relating to the room you are surveying.



# ArchiMap 1.0

## The ArchiMap Palette

Displaying the ArchiMap Palette gives you access to all of the plug-in's commands and functions.

Some of the icons on the palette access subsets of commands. Clicking these icons displays other icons representing the functions available.

To return the palette to its original state, just click again on the icon whose group of subcommands is currently displayed.

Or, alternatively, you can activate other tools to access the plug-in's other functions directly.

## Tools on the Palette

The first seven icons allow access to secondary functions:

- Rooms;
- Trilateration;
- Measurements;
- Edit;
- Delete;
- Join;
- 3D Construction;

The next three are:

- Help;
- Room Archive;
- Retrieve from Room Archive;
- The STOP command interrupts the cycle of an active function.



## Room Tool

The Room tool allows you draw the Rooms included in the as-built and add and edit Notes, Windows and Doors.

Clicking the Room tool displays the following commands:

- Rectangular Room;
- L-shaped Room;
- Freeform Room;
- Rename Room;
- Insert Door;
- Modify Door;
- Insert Window;
- Modify Window.

The logic behind drawing the Rooms is the same as freehand sketching on a sheet of paper.

When drawing Rooms in the Floor Plan Window you only have to define their shape. The measurements taken will be added later.

### Rectangular Room

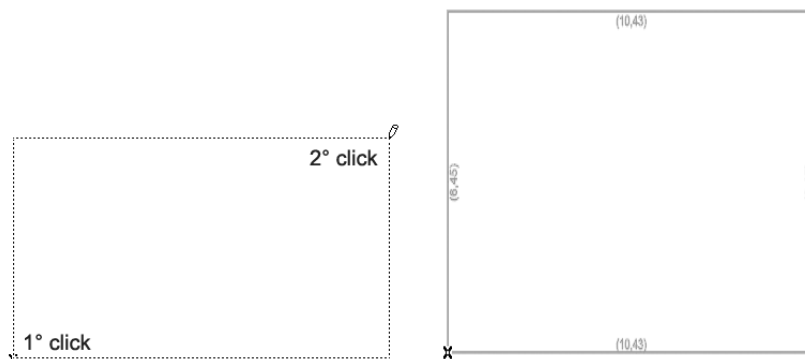
This command lets you draw a rectangular Room.

- 1- Click the tool icon;
- 2- Click the Floor Plan once, then move the mouse diagonally. Click a second time to define the rectangle;
- 3- A window opens in which you can enter a name for the Room (in the top part) and other relevant information (bottom part).



When you finish entering the information about the Room, ArchiMap draws a rectangle on the Floor Plan. Its measurements are displayed in parenthesis inside the sides.

The graphic representation is the same for the other drawing tools (obviously, the shape of the Room will be different depending on the tool used).



The element created on the Floor Plan is a GDL Object (ArchiMap\_ROOM), meaning that its parameters can be edited.

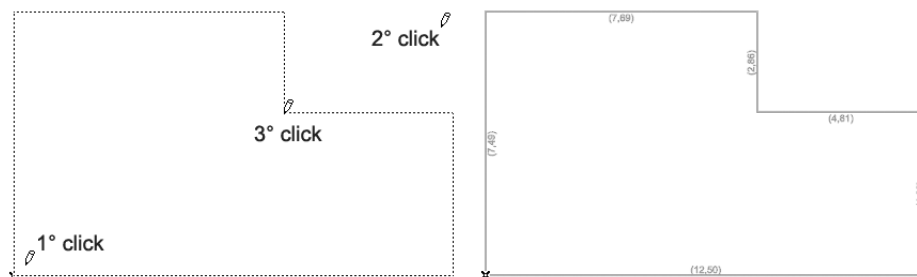
### **PRACTICAL APPLICATION: STEP 2 – DRAW A ROOM**

#### **L-shaped Room**



This command allows you to quickly draw a six-sided Room.

- 1- Click the tool icon;
- 2- Click the Floor Plan once, then move the mouse diagonally. Click a second time to define a rectangle, then move the mouse diagonally to shorten the distance of the previous move. Click one last time to close;



- 3- A dialog box opens in which you can enter information about the Room.

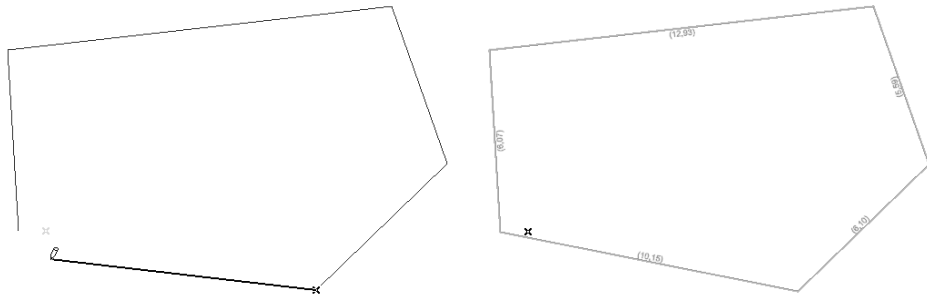


### Freeform Room



This command allows you to quickly draw a freeform Room. It is similar to ArchiCAD's Polyline tool.

- 1- Click the tool icon;
- 2- Click the Floor Plan once, then continue clicking to define the Room's nodes, as if you were defining a polyline;

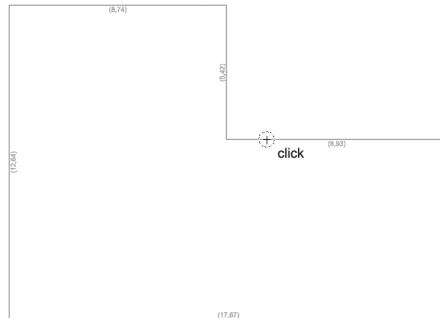


- 3- A dialog box opens in which you can enter information about the Room.

**PRACTICAL APPLICATION: STEP 8 – DRAW A ROOM IN FREEFORM MODE.****Rename Room**

This command lets you modify the information you entered about the Room during the drawing phase.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over a side or corner and click;



- 3- A dialog box opens in which you can make the necessary changes.

Rename room

previous name:  
room 1

new name:  
room 1

room facing south

Cancel OK

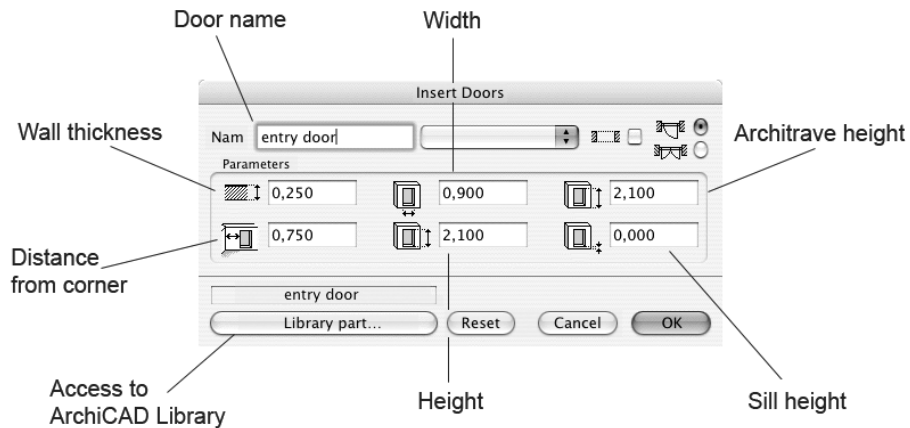




## Insert Door

This command lets you insert Doors into the sides of Rooms.

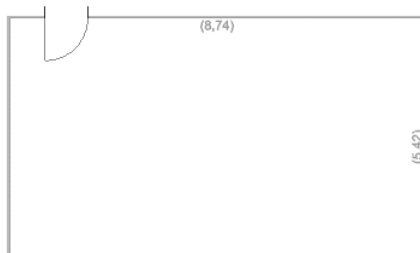
- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over one of the sides of the Room, near the corner from which the distance was measured for placing the Door. Click;
- 3- A dialog box opens in which you can define the Door's settings, as shown in the figure below.



It is important that you name the Door. This will allow you to join the Room to the as-built survey later on.

You can use a generic Door Object (single- or double-door), or choose one from the active ArchiCAD Library.

- 4- Click the Floor Plan to define the swing direction. The Door is inserted into the side you selected.



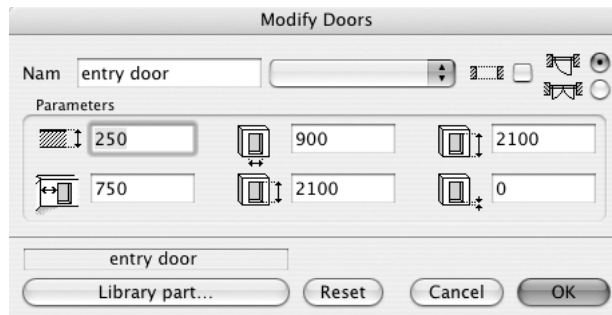
After the first Door is inserted, the tool remains active so you can continue inserting others.

**PRACTICAL APPLICATION: STEP 3 – INSERT DOORS****Modify Door**

This command allows you to modify the Doors you have inserted.



- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over the Door you want to modify, then click;
- 3- A dialog box opens in which you can enter the data necessary for the modification. You can change the size of the Door, move it in relation to the corner from which the measurement was taken or, if necessary, change the corresponding Door Object in the active ArchiCAD Library.

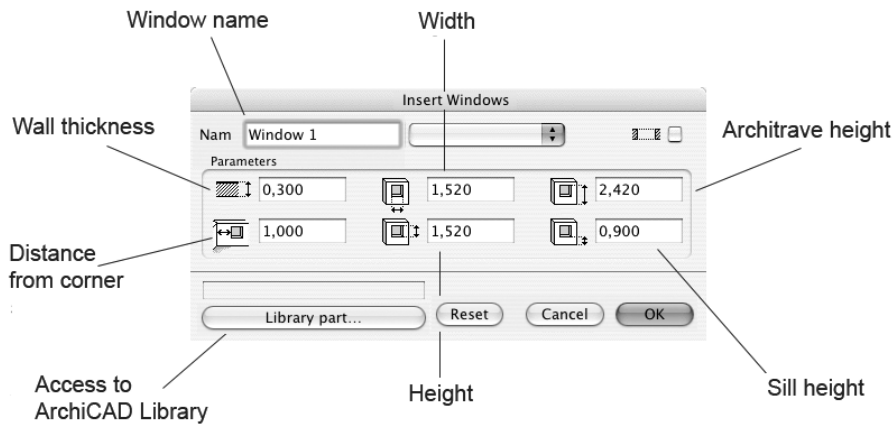




## Insert Window

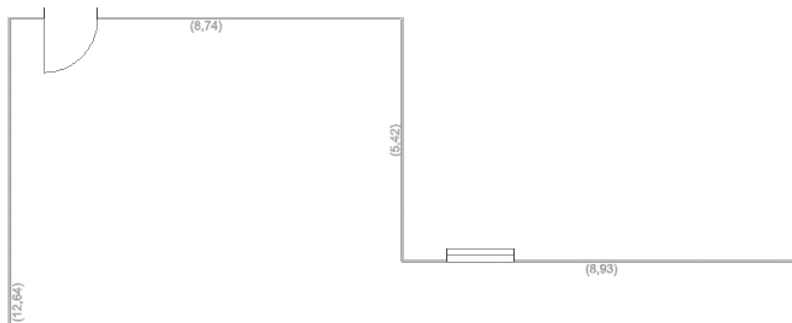
This command allows you to insert Windows into the sides of Rooms. The process is the same as for inserting Doors.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over a side, near the corner from which the distance was measured for placing the Window. Click;
- 3- A dialog box opens in which you can define the Window's settings, as shown in the figure below.



You can use a generic Window Object, or you can choose one from the active ArchiCAD Library.

- 4- Click the Floor Plan to define the swing direction. The Window is inserted into the side you selected.

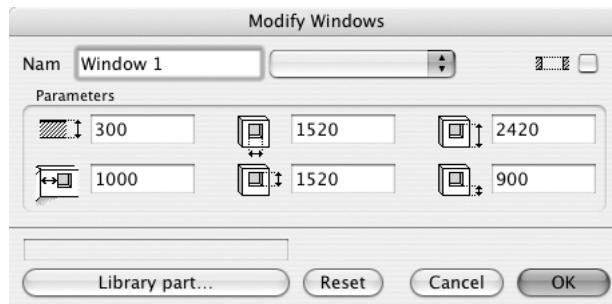


After the first Window is inserted, the tool remains active so you can continue inserting others.

**PRACTICAL APPLICATION: STEP 7 – INSERT WINDOWS****Modify Window**

The command lets you modify the Windows you have inserted.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair on the Window you want to modify, then click;
- 3- A dialog box opens in which you can enter the data needed for the modification. You can change the size of the Window, move it in relation to the corner from which the measurement was taken or, if necessary, change the corresponding Window Object in the active ArchiCAD library.



## Trilateration Tool

The Trilateration tool allows you draw the Room's diagonals. The diagonals allow you to block the Room's measurements and define the as-built survey geometrically. ArchiMap does not modify the Room's geometry until all of the diagonals have been inserted.

Clicking the Trilateration tool displays the following commands:

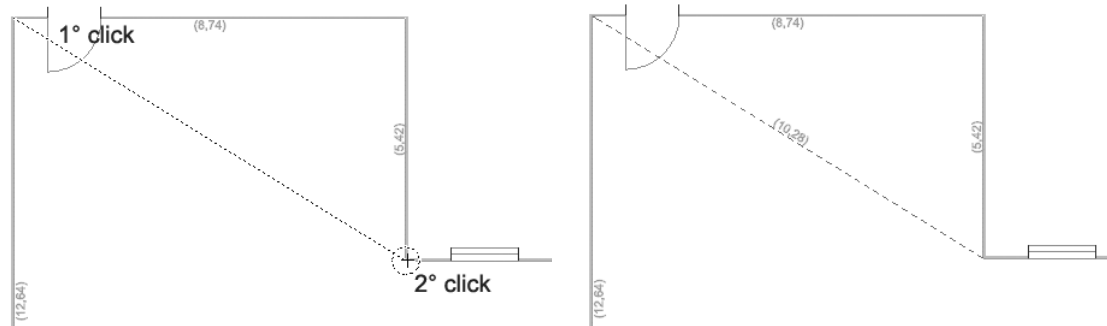
- Single Diagonal;
- Radial Diagonals;
- Change Status of Diagonals;
- Insert Hotspot;
- Edit Hotspot.



### Single Diagonal

This command allows you to draw diagonals in the Room one at a time.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over the corner from which you want to start drawing the diagonal. Click the Floor Plan once. Move the crosshair to the corner where you want the diagonal to end. Click a second time.



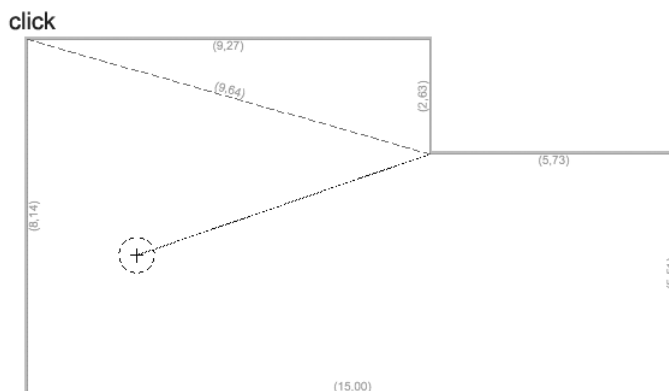
The diagonal and its length are displayed.

**PRACTICAL APPLICATION: STEP 2 – DRAW A ROOM****STEP 8 – DRAW A ROOM IN FREEFORM MODE****Radial Diagonals**

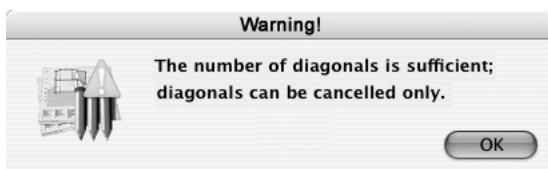
This command allows you to draw radial diagonals inside the Room.



- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the cursor over the corner from which you want to start drawing the diagonals and click once. Move the crosshair to the corner where you want the diagonal to end.



Click a second time. The command remains active. Move to another corner and click. Continue until you have inserted all of the diagonals needed. ArchiMap displays a message when you have inserted the number of diagonals needed to define the area.



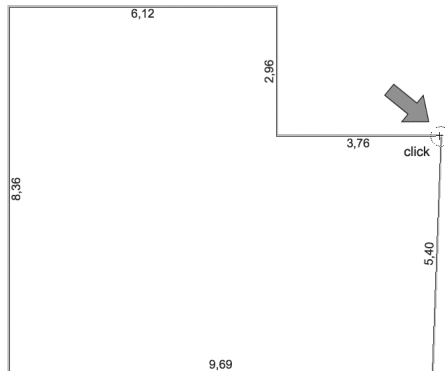
The diagonals and their lengths are displayed.



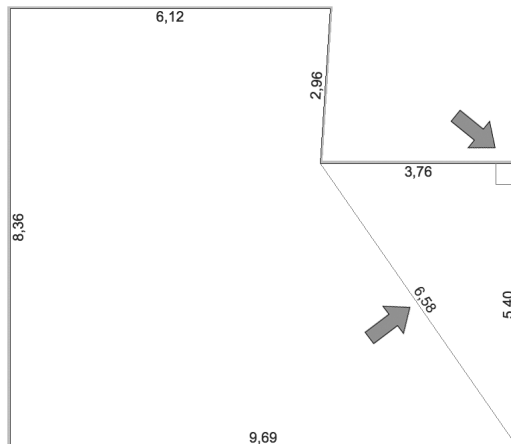
## 90° Angle

This command allows you to block a 90° angle; a diagonal is then inserted opposite the angle (creating a right triangle). The command can only be used if measurements have already been entered for the sides.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over the angle you want to adjust, then click. ArchiMap places a square symbol in the corner (this means the angle is blocked);



- 3- A diagonal is inserted opposite the 90° angle, closing the triangle. In this case, the diagonal's length does not need to be entered.



### **Note:**

*Once a diagonal's length has been set, the diagonal changes from a dashed line to a solid line.*

**PRACTICAL APPLICATION: STEP 8 – DRAW A ROOM IN FREEFORM MODE****Change Status of Diagonals**

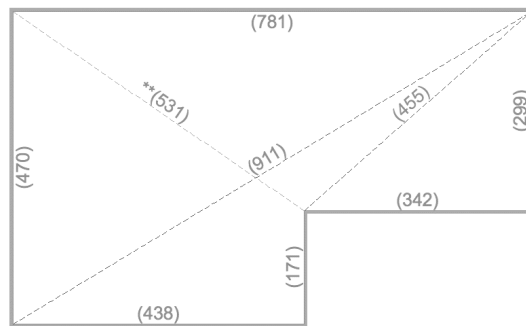
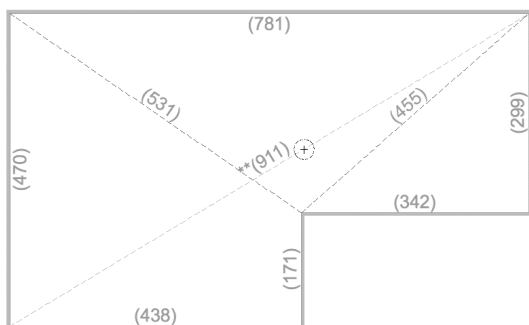
This command allows you to change the order of the diagonals.

When defining a Room, there may be instances where you will have to draw diagonals that intersect each other.

In order to block a Room, ArchiMap needs diagonals to complete the trilateration process. If two of these diagonals intersect each other, you can specify a primary diagonal (the first diagonal considered for rendering) and a secondary diagonal (the second diagonal considered for rendering).

Two asterisks appear before the secondary diagonal's measurement.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over the diagonal you want to be considered the primary diagonal and click. The primary diagonal becomes the secondary diagonal and vice versa.





## PRACTICAL APPLICATION: STEP 8 – DRAW A ROOM IN FREEFORM MODE

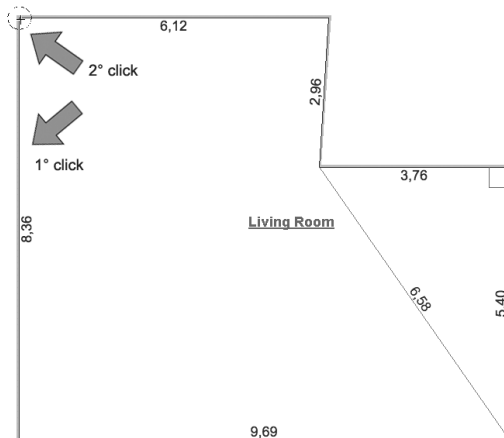
### Insert Hotspot



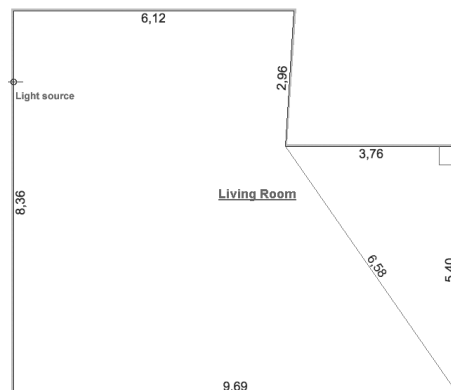
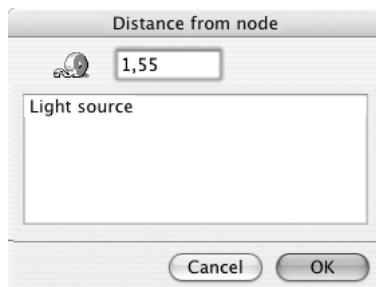
This command allows you to insert hotspots inside the Room being surveyed (for example, to identify the position of a light source on a side or for placing a pillar).

First, let's look at placing a hotspot on a side:

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair on the side you want to place the hotspot on, then click. Position the crosshair over the corner from which the distance should be measured. Click a second time.

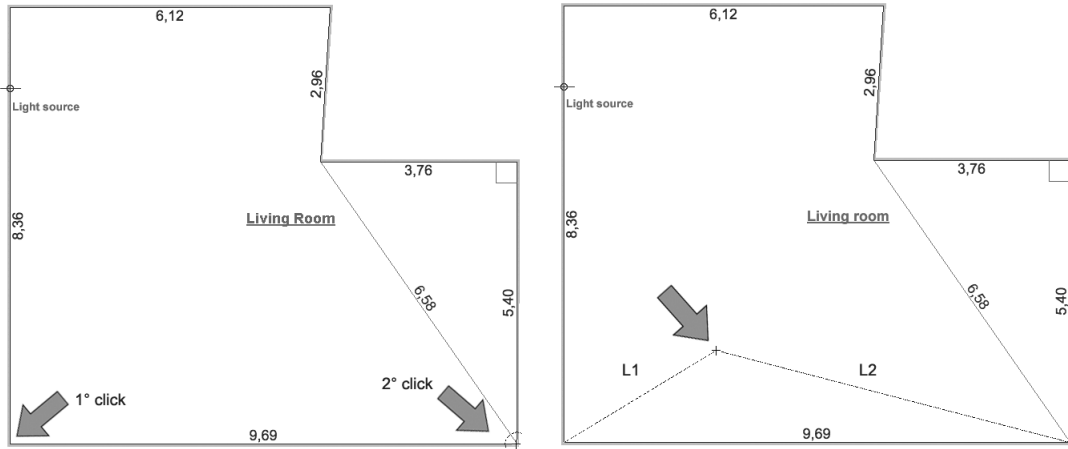


- 3- ArchiMap opens a dialog box where you can enter the measurement (L1) and notes, if desired.



Now let's look at placing a hotspot in the middle of a Room:

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over the corner from which the first distance should be measured, then click. Position the crosshair over the corner from which the second distance should be measured, then click;



- 3- ArchiMap opens a window where you can enter the measurements (L1 and L2) and notes, if desired.

Hotspot diagonals

L1:  L2:

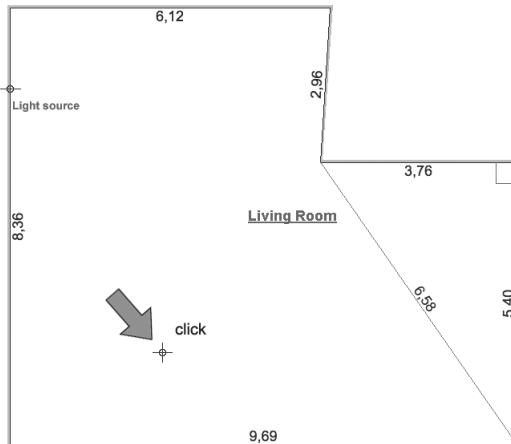
## **PRACTICAL APPLICATION: STEP 9 – PLACE AN ELEMENT IN THE SURVEYED ROOM**

### **Edit Hotspot**



This command allows you to change the position of a hotspot that has been placed in the Room.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the cursor over the hotspot you want to edit, then click;
- 3- ArchiMap displays the dialog box for inputting the measurements (L1 or L1 and L2) and notes. You can now change the hotspot's settings.



## Measurements Tool

The Measurements tool allows you to enter the measurements of the sides and diagonals.

Clicking the Measurements tool displays the following commands:

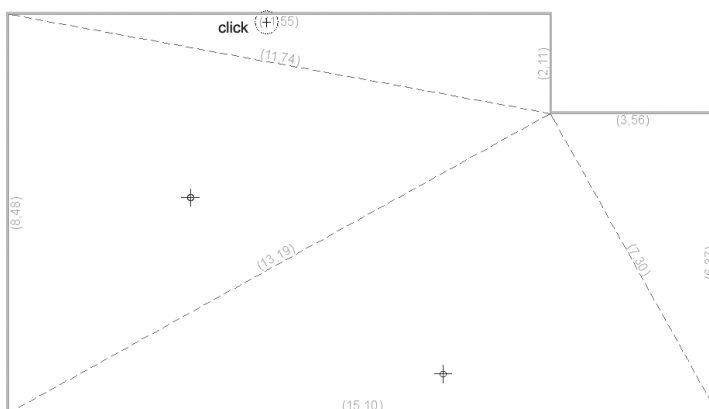
- Input Measurements Manually;
- Input All Measurements in Sequence;
- Input all Missing Measurements in Sequence.

### Input Measurements Manually

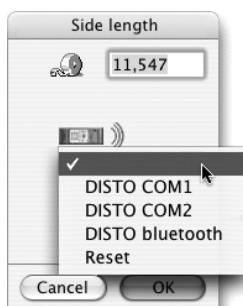
This command allows you to enter measurements for the sides and diagonals by selecting them one by one in the order you desire.



- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over one of the sides or diagonals for which you want to specify a measurement and click;



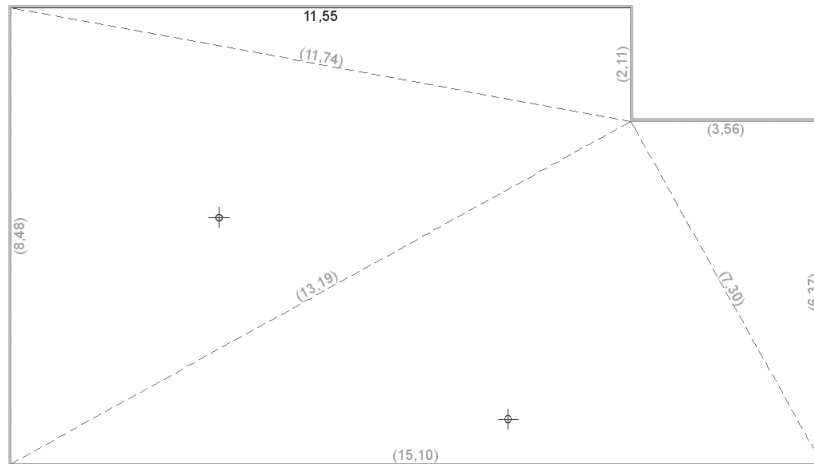
- 3- The measurement input window opens.



Type the measurement in the appropriate field.

If, when preparing your as-built, you are using a laptop computer with ArchiCAD, ArchiMap and DISTO (optical surveying tool), you can use DISTO (via a connection with BlueTooth) to send the measurements to ArchiMap (see the Appendix).

- 4- After inputting the measurement, click OK. The measurement turns blue and the parenthesis are removed. The side itself turns blue as well.



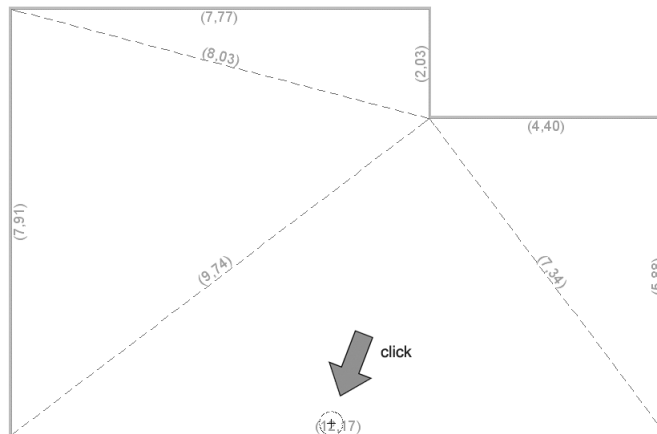
## **PRACTICAL APPLICATION: STEP 2 – DRAW A ROOM**

### **Input All Measurements in Sequence**

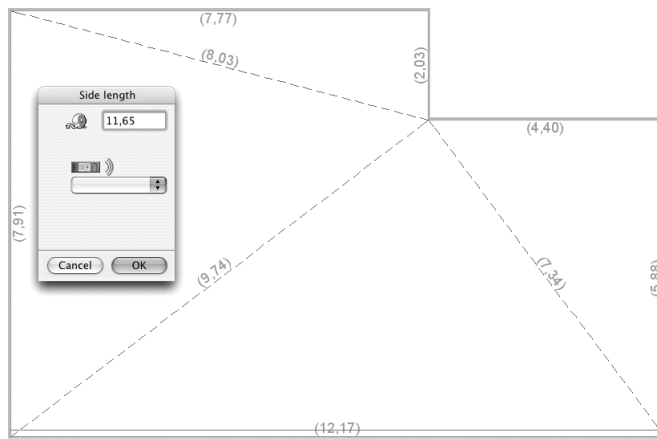
This command allows you to enter the measurements of all of the sides and diagonals in sequence. This is very useful when ArchiCAD and ArchiMap interface with an electronic surveying tool.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over one of the sides or diagonals for which you want to specify a measurement and click;

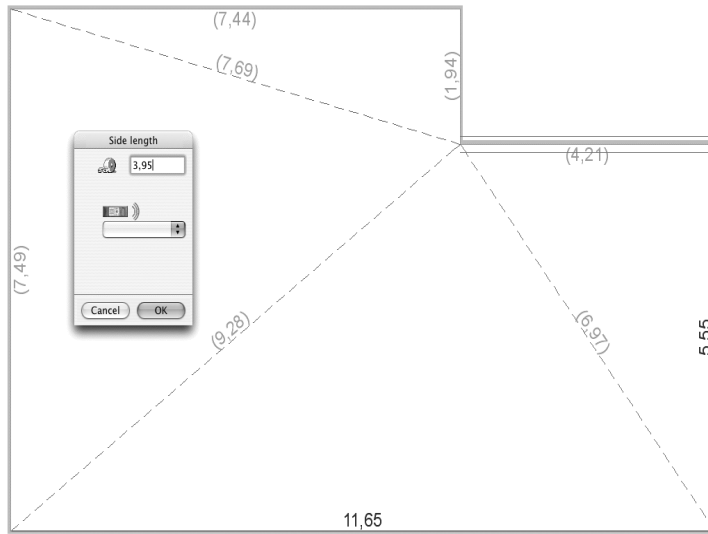




- 3- Regardless of the side or diagonal clicked, ArchiMap positions the crosshair on the first side to which a measurement must be assigned. Enter the measurement, then click OK.



- 4- ArchiMap saves the measurement and automatically moves on to the next side for which a measurement must be assigned



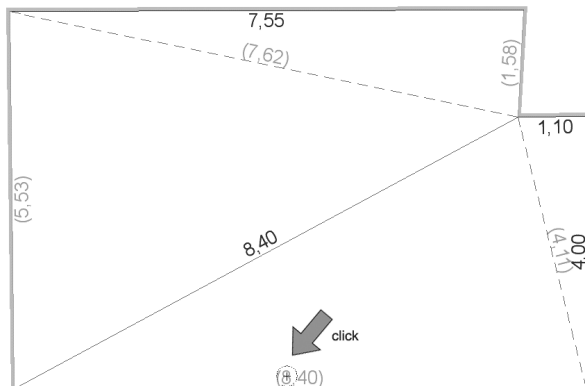
The sequence can be interrupted by clicking STOP on the ArchiMap Palette, CANCEL (in the ArchiCAD Control Box) or ESC on your keyboard.

### **PRACTICAL APPLICATION: STEP 8 – DRAW A ROOM IN FREEFORM MODE**

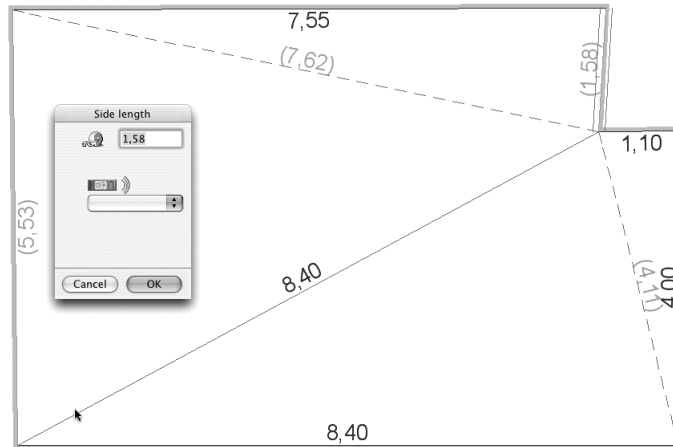
#### **Input All Missing Measurements in Sequence**

This command allows you to enter, in sequence, any missing measurements for the sides and diagonals.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Position the crosshair over one of the sides or diagonals for which you want to specify a measurement and click;

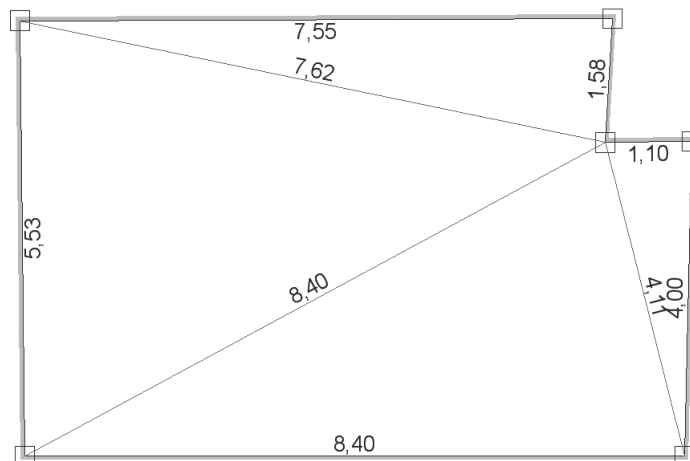


- 3- After typing in the measurement and clicking OK, ArchiMap automatically positions the crosshair over the first side for which a measurement must be defined. The process continues in this manner until measurements have been defined for all sides and diagonals.



The sequence can be interrupted by clicking STOP (on the ArchiMap Palette) or the ESC key on your keyboard.

Once all of the measurements have been entered, the as-built survey of the Room is complete. All of the sides turn blue, the diagonals turn red and the measurements are displayed without parenthesis. Furthermore, all of the corners of the Room are marked with a blue square.





## Edit Tool

The Edit tool allows you to modify the Room's individual elements.

Clicking the Edit tool displays the following commands:

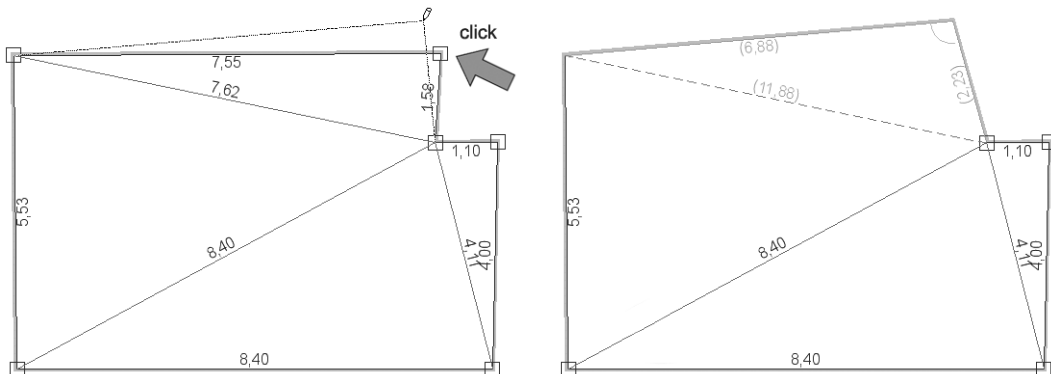
- Move Node;
- Rotate Node;
- Mirror Node;
- Duplicate Rooms.



### Move Node

This command allows you to change the position of a node in the Room drawn on the Floor Plan.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click a node and drag it to the desired position.



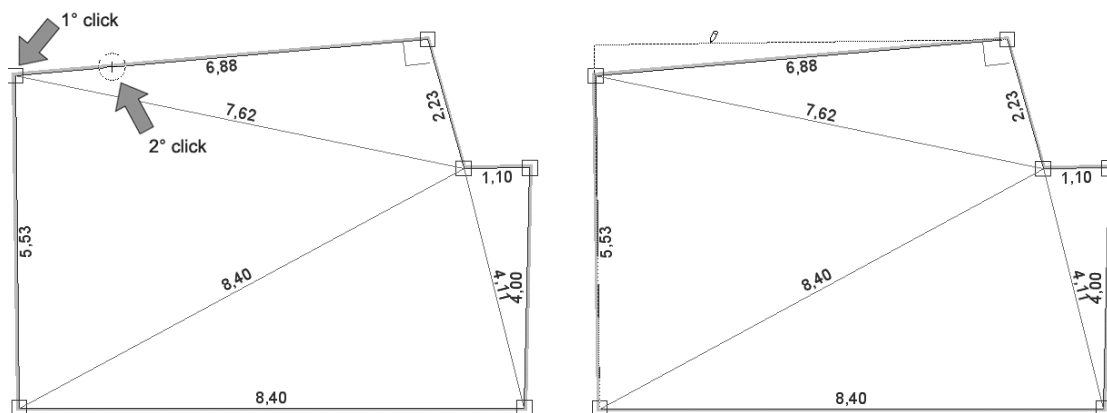
You can change the position of a node in a Room that has been completely surveyed. When you move the node to a new position, ArchiMap redraws the graphic symbol of the elements that must be edited and their measurements.



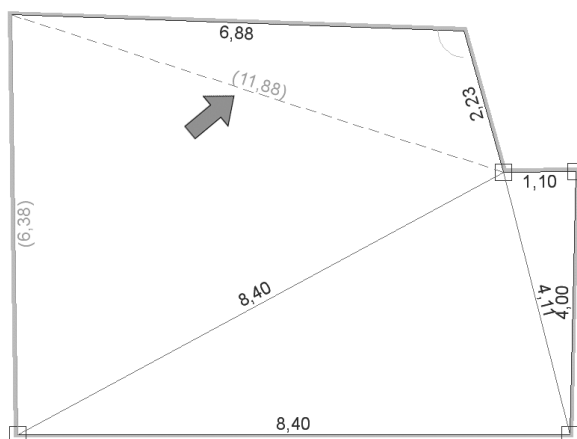
## Rotate Node

This command allows you to rotate a node around a center of rotation while keeping the length of a side fixed.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. First, click the node you want to move, then click the side whose length you want to remain unchanged. The node's center of rotation will be the vertex at the opposite end of the side whose length is to remain unchanged.



You can also rotate a node in a Room that has been completely surveyed. When you move the node to a new position, ArchiMap redraws the symbol of the elements that must be edited and their measurements.

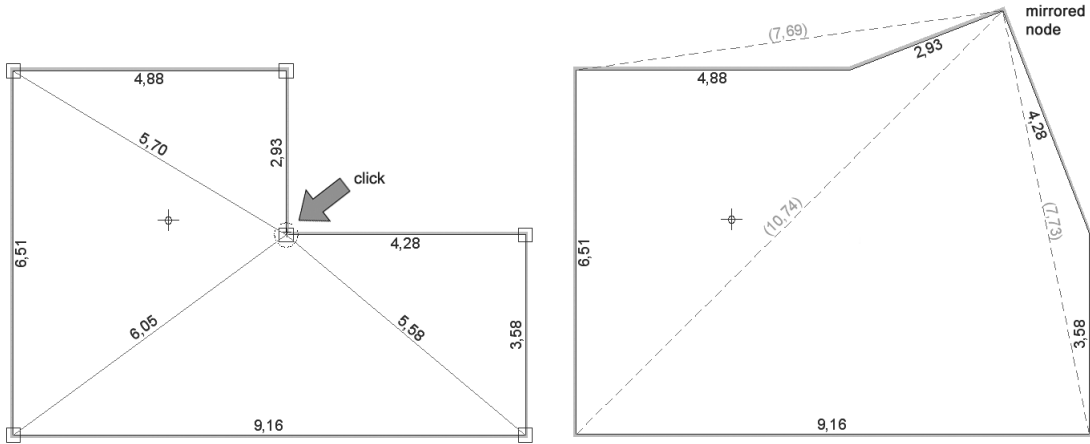


## PRACTICAL APPLICATION: STEP 8 – DRAW A ROOM IN FREEFORM MODE

### Mirror Node

This command allows you to mirror a node.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click the node you want to mirror.  
The command is automatically activated and the node is mirrored.



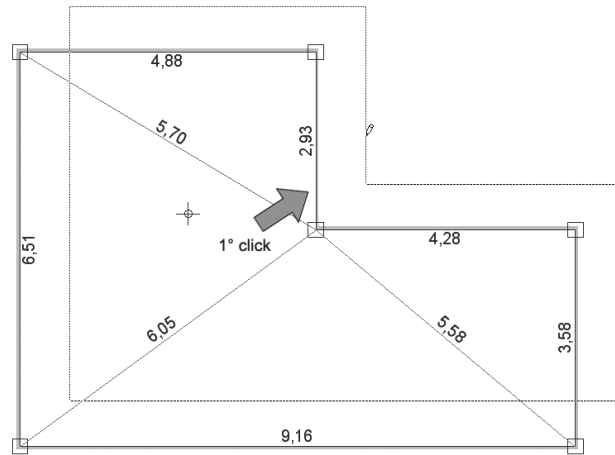
Some nodes cannot be mirrored; if the operation is not possible, ArchiMap tells you that an overlay error has occurred. The diagonal is used as the mirror axis.



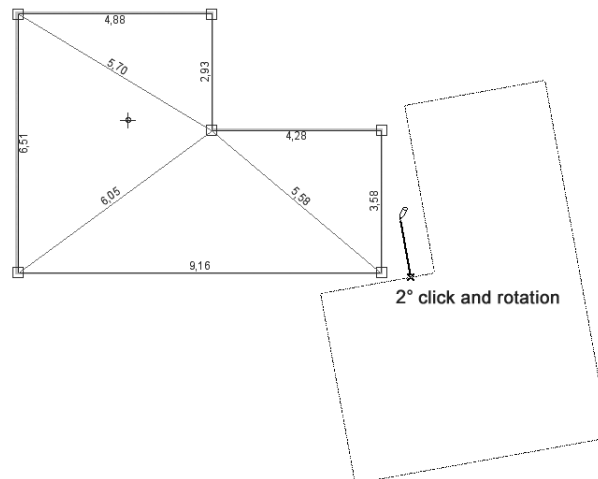
## Duplicate Rooms

This command allows you to duplicate a Room.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click a node or a side. You can now move the duplicate Room to a new location;



- 3- Click the desired anchor point and define a rotation angle, if necessary. Click a second time to place the Room.



## Delete Tool

The Delete tool allows you to delete the Room's individual elements (Doors, Windows, Diagonals, etc.).

Clicking the Delete tool displays the following commands:

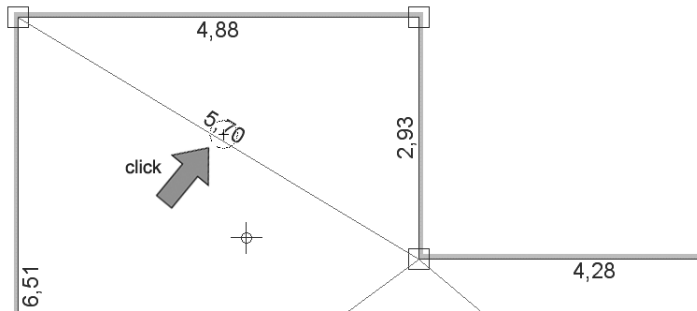
- Delete Diagonals;
- Delete Hotspot;
- Delete Door;
- Delete Window;
- Delete 90° Angle.



### Delete Diagonals

This command allows you to delete the diagonals that have been drawn and assigned a measurement.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click the diagonal you want to delete. ArchiMap deletes the diagonal.



### Delete Hotspot

This command allows you to delete the hotspots you have placed in your as-built survey. This command is similar to the previous one..

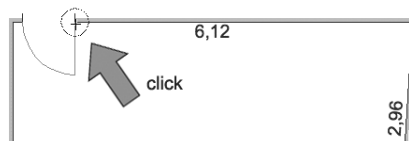
- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click the hotspot you want to delete. ArchiMap deletes the hotspot.



### Delete Door

This command allows you to delete the Doors you have inserted in your as-built survey.

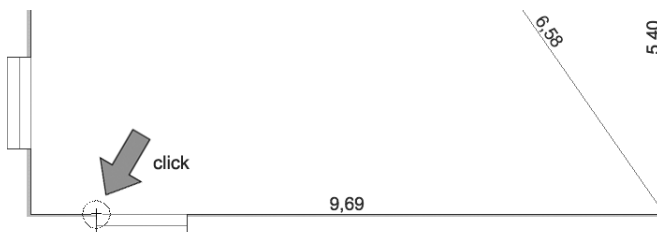
- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click the Door you want to delete. ArchiMap deletes the Door.



### Delete Window

This command allows you to delete the Windows you have inserted in your as-built survey.

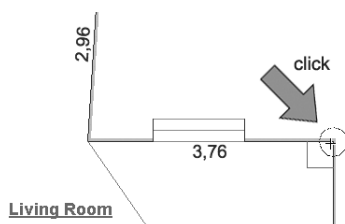
- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click the Window you want to delete. ArchiMap deletes the Window.



### Delete 90° Angle

This command allows you to delete an angle that has been set to 90°.

- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click the 90° angle you want to delete. ArchiMap deletes the angle; or rather, it is no longer constrained to 90°.



## Join Tool

The Join tool allows you to connect Rooms that have been surveyed.

Clicking the Join tool displays the following commands:

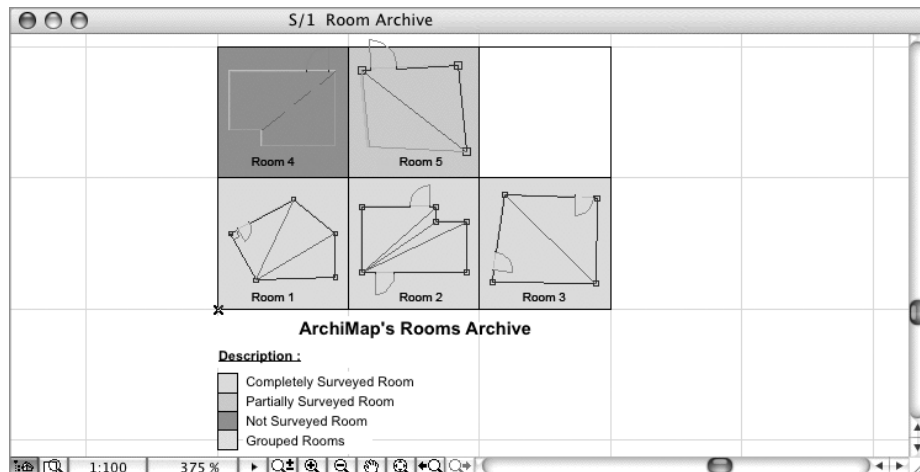
- Join Using Doors;
- Join Using Hotspots;
- Separate Room;
- Perimeter.



### Join Using Doors

This command allows you to join Rooms that have been surveyed and stored using the Doors connecting the Rooms.

- 1- Activate the Room Archive Section window (ArchiMap automatically creates a Section in ArchiCAD's Navigator palette).



- 2- Click the icon of the Retrieve from Archive tool;







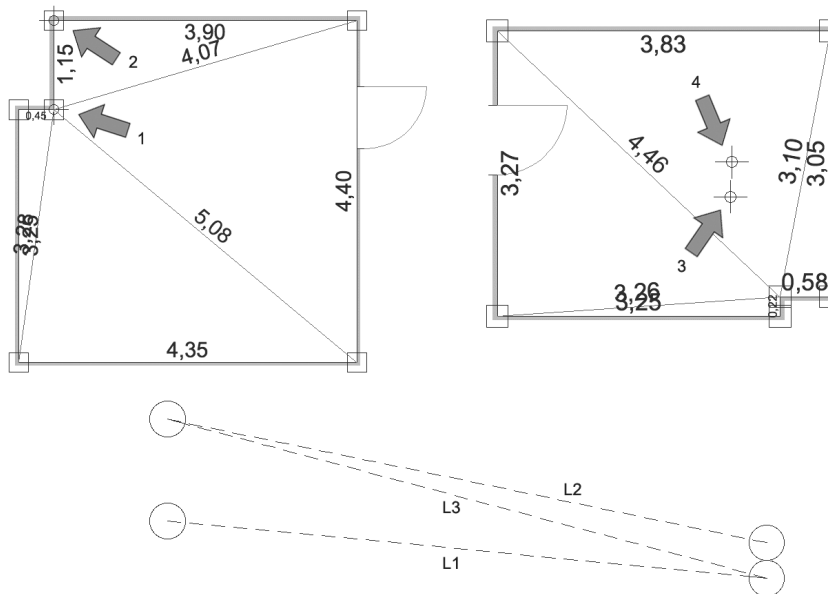
## PRACTICAL APPLICATION: STEP 10 – JOIN THE ROOMS

### Join Using Hotspots



This command allows you to join surveyed Rooms using four points: two in one Room and two in another. The distance between the points must have already been measured. This type of join is useful when the thickness of the wall separating the Rooms is not uniform.

Let's join the two Rooms shown in the figure below. We use the highlighted points, which ArchiMap numbers 1, 2, 3 and 4. The distances are indicated with L1, L2 and L3.

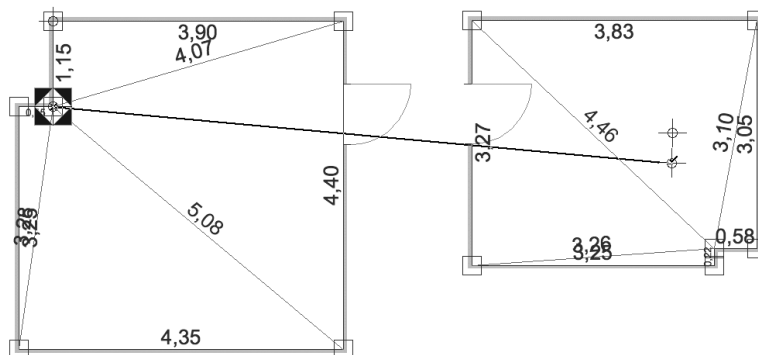


- 1- Click the tool icon;
- 2- The cursor becomes a crosshair. Click the first hotspot, then move the mouse to the second hotspot (as shown in the figure) and click. When you click, a window opens prompting you to input the distance between the two points. Click OK. The segment changes to a dashed line and is labeled with its length.

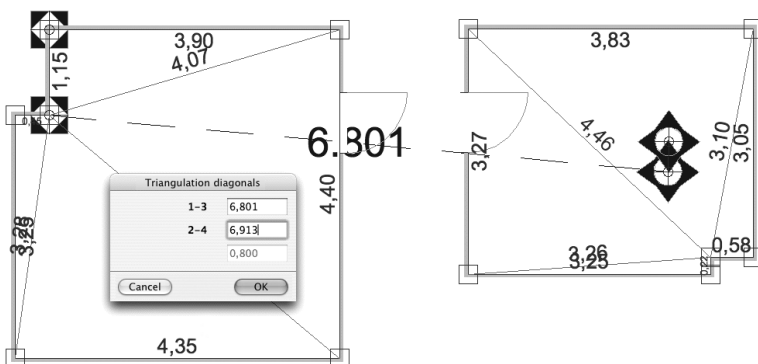
Triangulation diagonals

1-3	6,801
	1,282
	0,800

Cancel OK



3- Continue with the other distances;

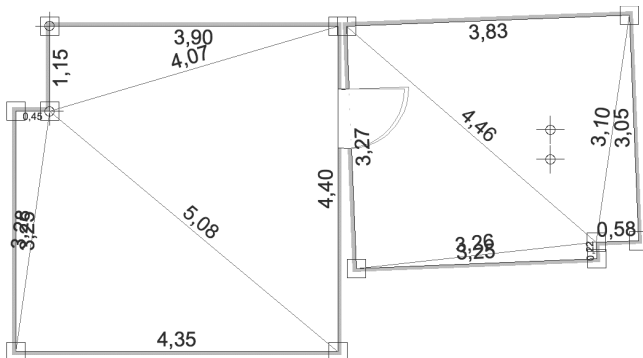


4- When you enter the last distance, an APPLY button appears in the dialog box. Click this button to automatically join the Rooms. As you can see, the thickness of the wall between the Rooms is not uniform.

Triangulation diagonals

1-3	6,801
2-4	6,913
2-3	7,005

Cancel Apply OK

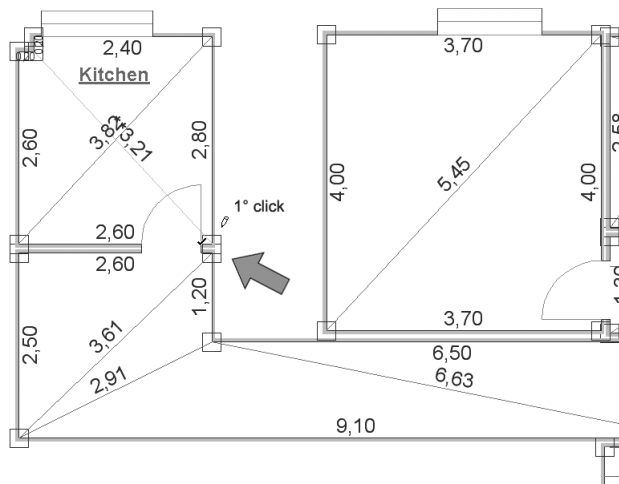




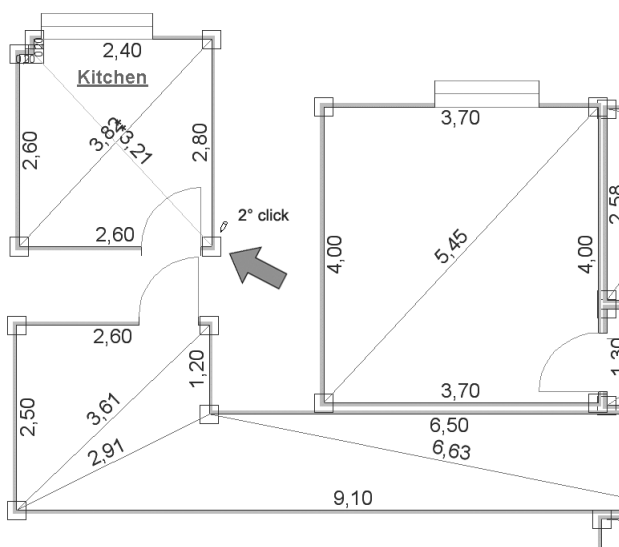
### Separate Room

The command lets you separate joined Rooms.

- 1- Click the tool icon;
- 2- Click the Room you want to separate;



- 3- Click the Floor Plan Window to define a new position for the Room.



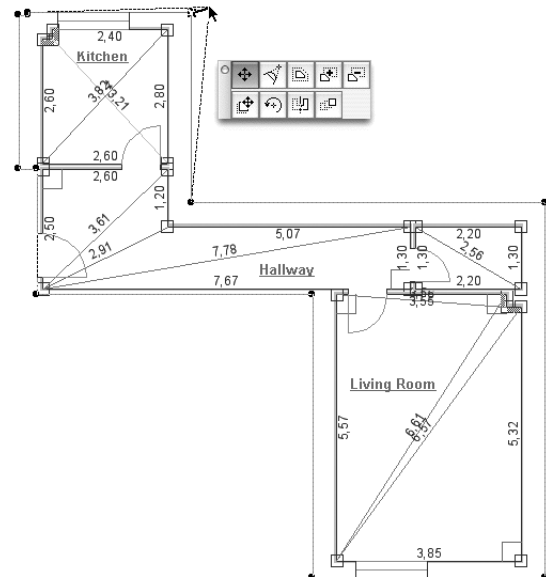
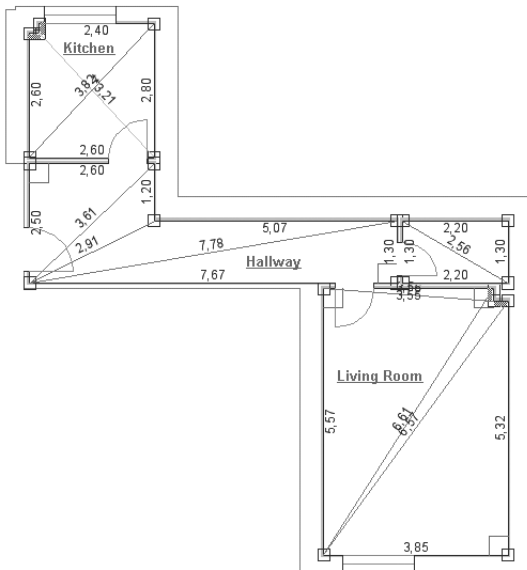
**PRACTICAL APPLICATION: STEP 10 – JOIN THE ROOMS****Perimeter**

This command allows you to create a Perimeter around joined Rooms.

- 1- Select the group of Rooms;
- 2- Click the tool icon;
- 3- ArchiMap places a Perimeter around the group of Rooms. Its thickness is determined by the thicknesses of the walls defined in the Insert Door dialog.

For Perimeter Walls without openings, ArchiMap uses the default thickness defined in the 3D Construction Settings dialog.

The Perimeter is a Fill that is placed on the "ArchiMap\_entities" layer; you can modify it later, if desired.



**PRACTICAL APPLICATION: STEP 11 – CREATE THE PERIMETER**

## 3D Construction Tool

The 3D Construction tool allows you to transform as-built surveys so they can be used as 3D models in ArchiCAD.

Clicking the 3D Construction tool displays the following commands:

- Explode Rooms;
- Erect Wall Automatically;
- Erect Single Wall Manually;
- Erect Multiple Walls Manually;
- Install Doors;
- Install Windows;
- Settings.



### Explode Rooms

The command allows you to explode Rooms. This must be done in order to automatically erect walls.

- 1- Select a group of Rooms with a Perimeter;
- 2- Click the tool icon;

ArchiMap explodes the group and converts it into lines.

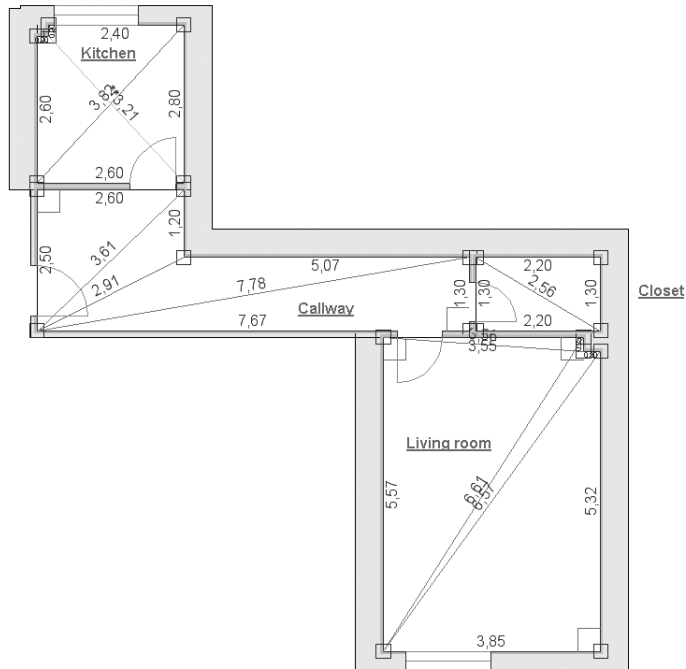


## PRACTICAL APPLICATION: STEP 12 – 3D RENDERING

## Erect Walls Automatically

This command allows you to erect walls automatically.

- 1- Select a group of Rooms;
- 2- Click the tool icon;
- 3- ArchiMap builds the walls with the default settings currently defined for ArchiCAD's Wall tool.



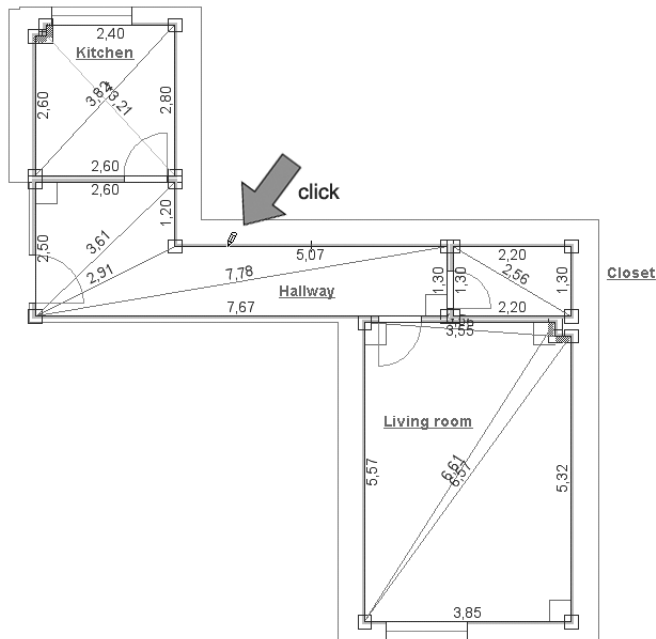
## PRACTICAL APPLICATION: STEP 12 – 3D RENDERING

### Erect Single Wall Manually

This command allows you to erect a single wall manually.



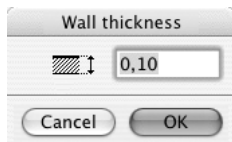
- 1- Click the tool icon;
- 2- The cursor becomes a pencil.
- 3- Click the side you want to transform into a wall; it will be used as the ArchiCAD Wall's reference line. The line is selected on the Floor Plan;



- 4- Now click the sides opposite the selected line to define the thickness of the wall, then click an empty space on the Floor Plan. ArchiMap asks you if you clicked by mistake or if you are ready to erect the wall. You can either continue selecting sides or erect the wall.



- 5- The wall is drawn on the ArchiMap\_walls layer. The wall's settings are the default parameters defined for the ArchiCAD Wall tool.



### Erect Multiple Walls Manually

This command allows you to erect multiple walls manually. The concept is the same as for a single wall.

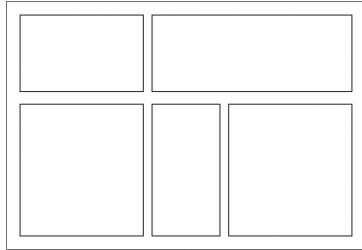
- 1- Click the tool icon;
- 2- The cursor becomes a pencil.
- 3- Click the side you want to transform into a wall; it will be used as the ArchiCAD Wall's reference line. The line is selected on the Floor Plan;
- 4- Now click the sides opposite the selected line to define the thickness of the wall, then click an empty space on the Floor Plan. ArchiMap asks you if you clicked by mistake or if you are ready to erect the wall. You can either continue selecting sides or erect the wall;
- 5- Choose the Erect option to create the wall immediately. The wall is drawn on the ArchiMap\_walls layer. The wall's settings are those defined as default parameters.
- 6- After erecting the wall, ArchiMap selects/activates the next line (which is connected to the first line; it will be used as the wall's reference line), and the procedure continues.



### ***A practical example:***

Let's look at a practical example to better explain this procedure.

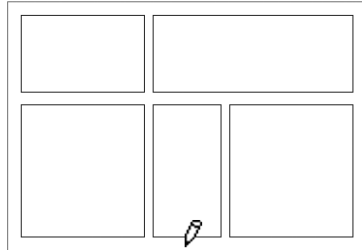
We'll use the Erect Multiple Walls Manually tool to create the perimeter wall of the following plan:



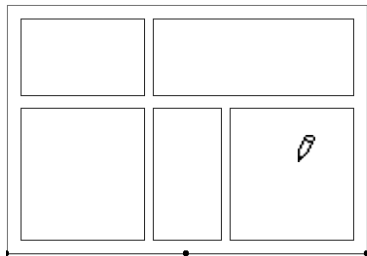
Let's suppose that we want to use the external line as the reference line.

We start with the horizontal wall on the bottom.

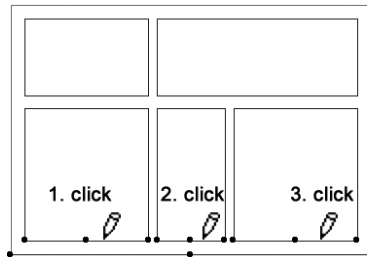
After clicking the icon of the Erect Multiple Walls Manually tool to start the procedure, we click the bottom horizontal side of the perimeter (this line will be the reference line of the walls we are creating).



ArchiMap highlights the wall we clicked as the reference line and waits for us to click the lines opposite it in order to define the walls to generate.

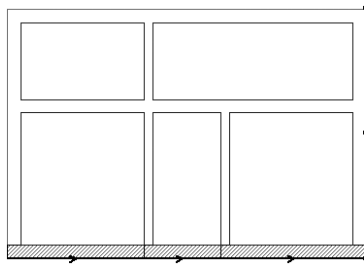


We click the three segments above, one after the other (the internal sides of the lower Rooms).

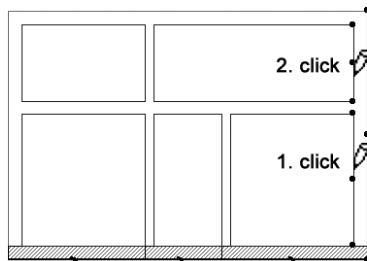


Lastly, to finish defining the wall, we click an empty area on the Worksheet. ArchiMap displays a dialog box prompting us to continue clicking or erect the wall.

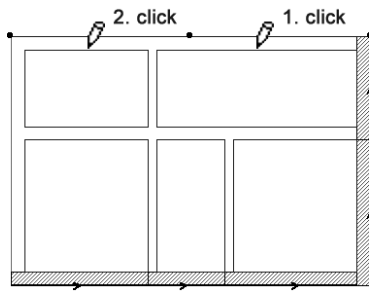
We click the Erect button, and ArchiMap generates the wall and chooses – once again, as a reference line – the line connected to the one we just used.



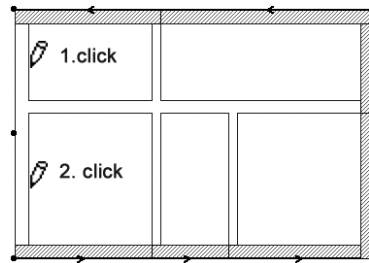
We repeat the same procedure for this side,



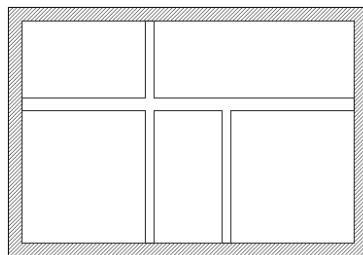
and then for the next side selected by ArchiMap.



Finally, we complete the procedure with the last side of the perimeter.



With just a few clicks, our perimeter line has been transformed into 3D perimeter walls.

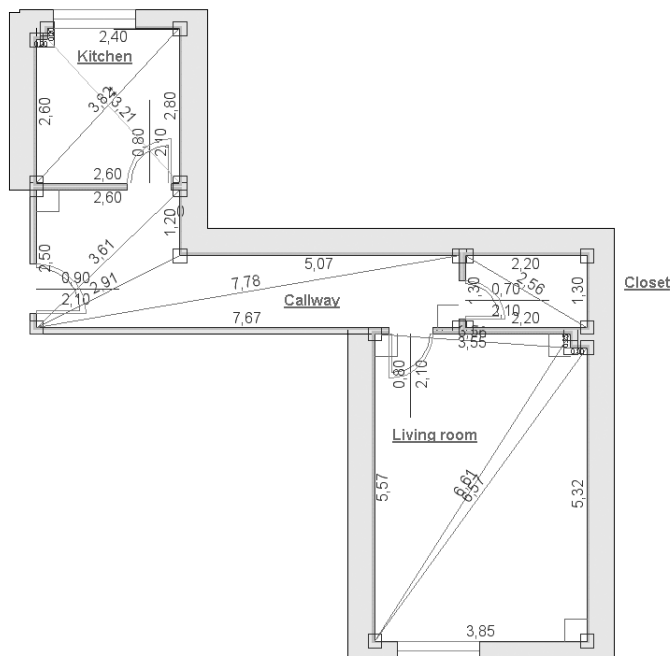




## Install Doors

This command allows you to automatically install the Doors in the walls.

- 1- With the walls placed on the Floor Plan, click the tool icon;
- 2- ArchiMap automatically installs the Doors that were defined during the insert procedure.



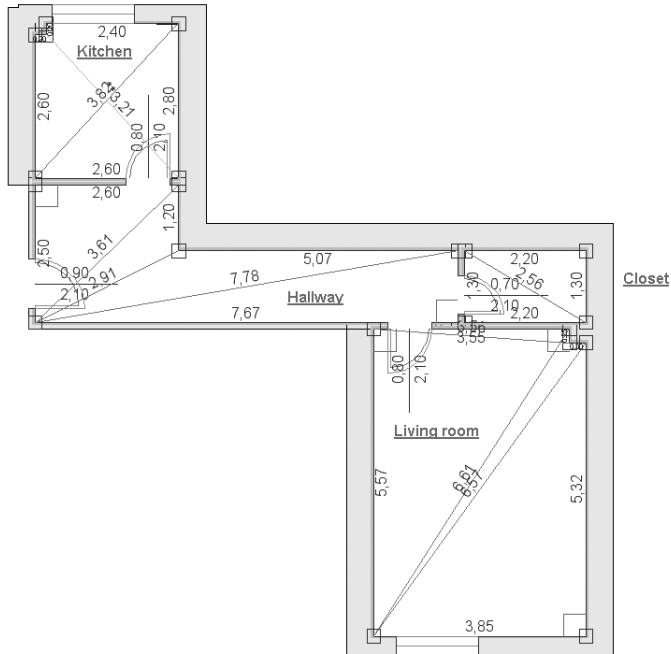
## PRACTICAL APPLICATION: STEP 12 – 3D RENDERING

### Install Windows



This command allows you to automatically install the Windows in the walls.

- 1- With the walls placed on the Floor Plan, click the tool icon;
- 2- ArchiMap automatically installs the Windows.

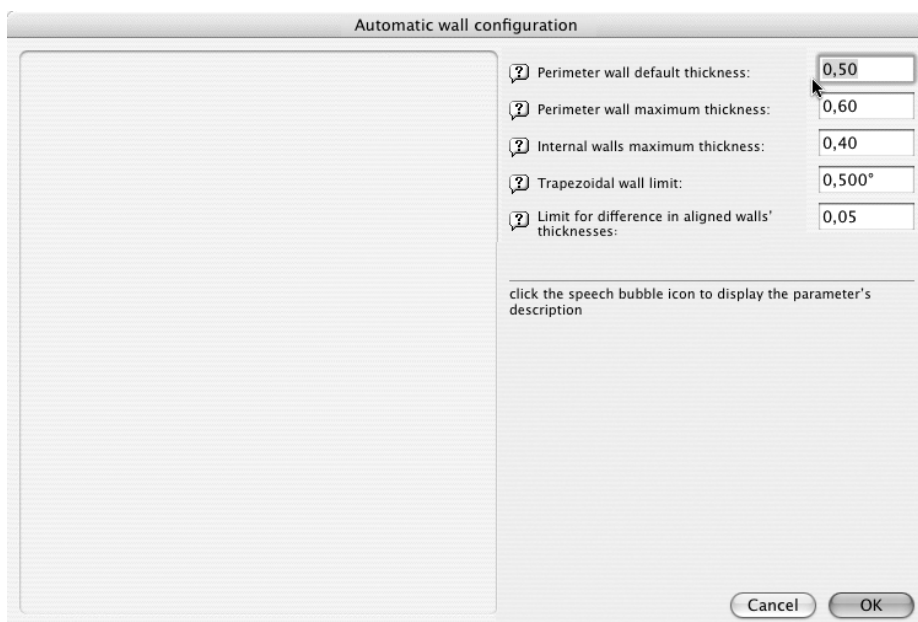


**PRACTICAL APPLICATION: STEP 12 – 3D RENDERING****3D Construction Settings**

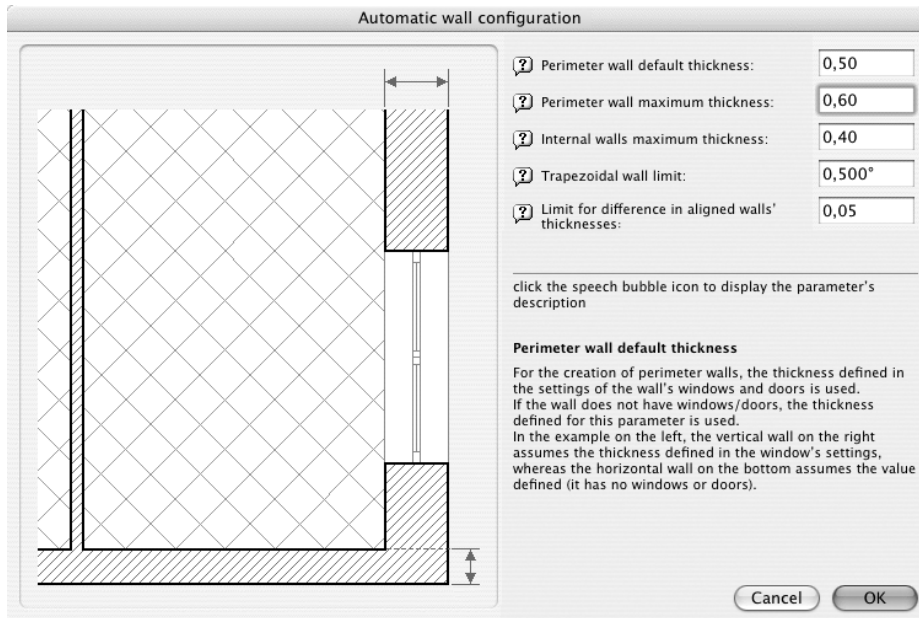
The settings allow you to define the general parameters affecting wall creation.

Clicking the tool icon opens the settings dialog box. The right side of the dialog box contains a list of the parameters that can be set. Each parameter has a speech bubble icon with a question mark beside it.

Click this icon to display a description of the associated setting.



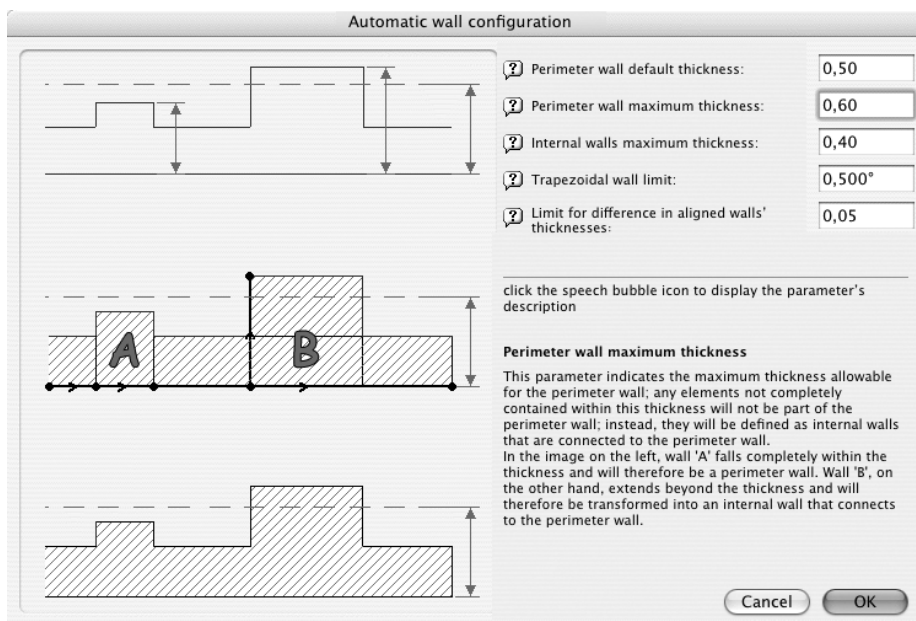
## Perimeter Wall Default Thickness



When creating perimeter walls, the thickness defined in the settings dialog box for Doors and Windows is used. If the wall does not have Doors or Windows, the parameter defined here will be used.

## PRACTICAL APPLICATION: STEP 11 – CREATE THE PERIMETER WALL

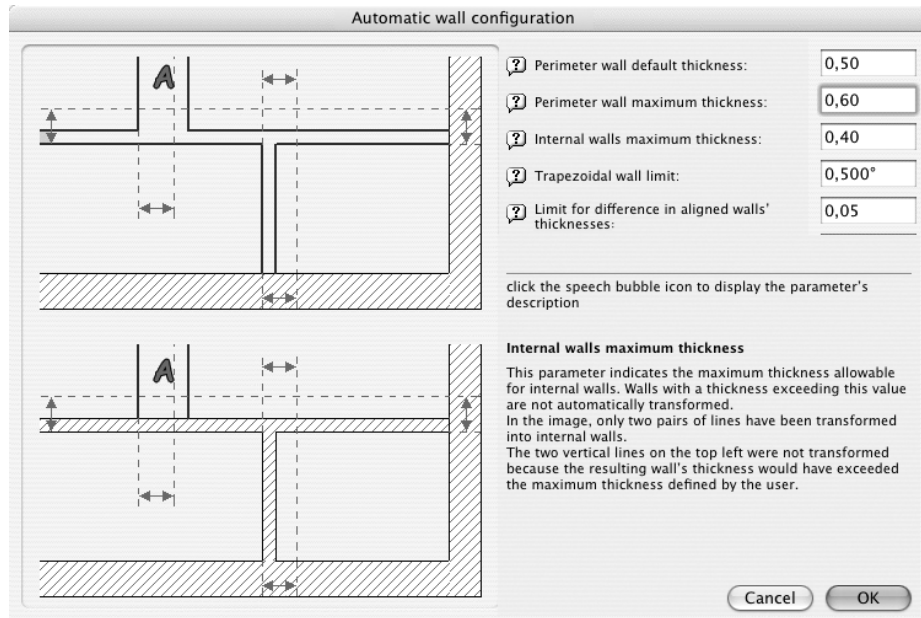
### Perimeter Wall Maximum Thickness



This value determines the maximum thickness allowable for the perimeter wall. Any elements not completely contained within this thickness will not be part of the wall; instead, they will be defined as internal walls that are connected to the perimeter wall.

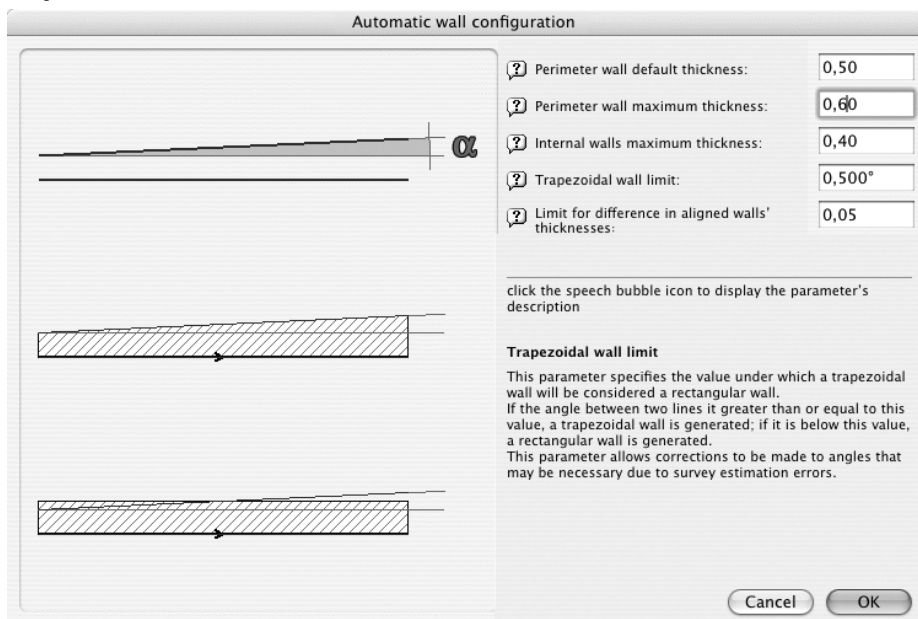


## Internal Walls Maximum Thickness



This parameter indicates the maximum thickness allowable for the internal walls. Walls with a thickness that exceeds this value will not be automatically transformed.

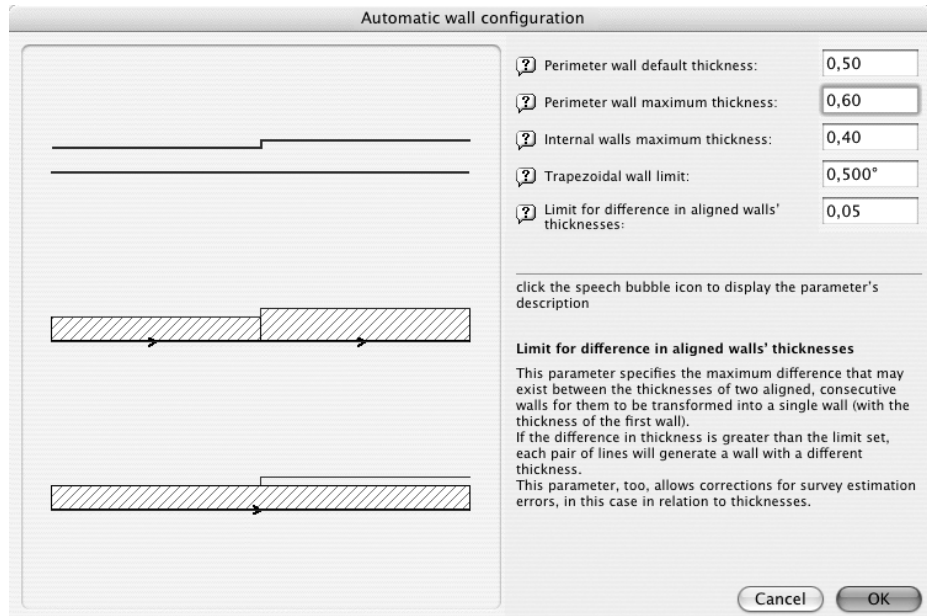
## Trapezoidal Wall Limit



This parameter specifies the value under which a trapezoidal wall will be considered rectangular. If an angle formed by two lines exceeds this limit, a trapezoidal wall will be created. If the angle is smaller, the wall will be rectangular.

The command allows corrections to angles that may be necessary due to survey estimation errors.

## Limit for Difference in Aligned Walls' Thicknesses



This parameter specifies the value under which two aligned, consecutive walls with different thicknesses will be transformed into a single wall with the thickness of the first wall.

If the difference in thickness exceeds this limit, each set of lines will generate a wall with a different thickness.

The command, too, allows corrections for survey estimation errors.

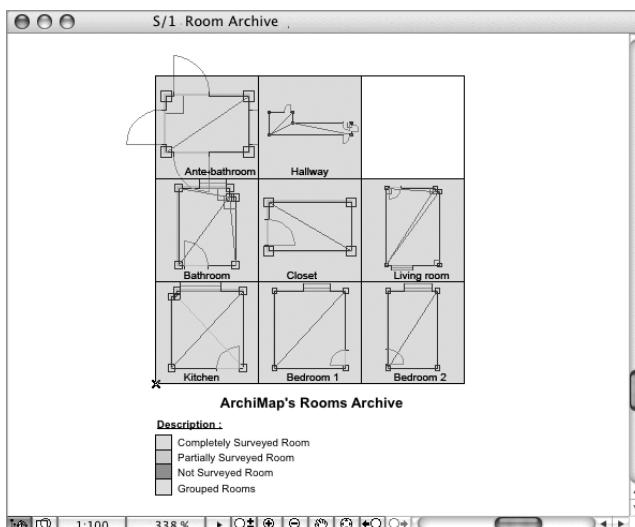
## PRACTICAL APPLICATION: STEP 5 – STORE THE ROOM



### Store and Retrieve Rooms from the Archive

The Store Rooms tool allows you to store Rooms, even if they have not been fully surveyed.

When the command is activated, ArchiMap creates a section named Room Archive. Stored Rooms are placed in this section. The Rooms are displayed inside boxes with a background color. As you can see from the legend in the Section Window, the background color indicates the Rooms' survey status.



If you need to make changes to the Rooms, you can retrieve them from within the Floor Plan Window. To do this, activate the Retrieve from Archive tool and click the Room you want to edit from the Archive window. The Room you choose is placed in the ArchiCAD Floor Plan Window so you can make the necessary modifications.





## **Help Tool**

This is not actually an ArchiMap command. It is a tool that, when activated, allows you to view the ArchiMap User Manual in PDF format.

# Step-by-step

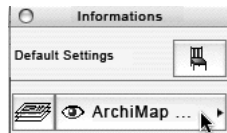
We will now see how to use ArchiMap's functions to do an as-built survey. For our example, we will use an office with a warehouse.

Let's see how to proceed.

## ***STEP 1 – ORGANIZE YOUR WORK FILE***

Before beginning the creation of your as-built, you must first organize your ArchiCAD files.

- 1- Associate a Library with the file. For this example, use the ArchiCAD 9 Basic Library.
- 2- In the Layer Settings dialog box, create a layer called Room As-built Survey. Set this layer as the default for the Object tool.



- 3- Specify the measurement unit and accuracy using the Working Units and Levels... command.

For this example, set the measurement unit to meter with three decimals.

- 4- Under Preferences > Dimensioning, define the measurement unit to be used for dimensioning. This setting affects both the Dimension Tool and the ArchiMap\_ROOM object, which defines the Room.

## STEP 2 – DRAW A ROOM

You can now begin creating your as-built survey.

The first room to draw is the entry room.

The concept underlying the drawing of rooms is the same as if you were doing an as-built survey on-location: you sketch the room on a piece of paper minding its shape but not the measurements. Here, you will follow the same procedure using ArchiCAD with ArchiMap's tools.

ArchiMap takes care of sizing the sketch based on the measurements you input.



- 1- Since the entrance is rectangular, use the Room > Rectangular Room tool.

Click the Floor Plan once, then move the mouse diagonally and click a second time.

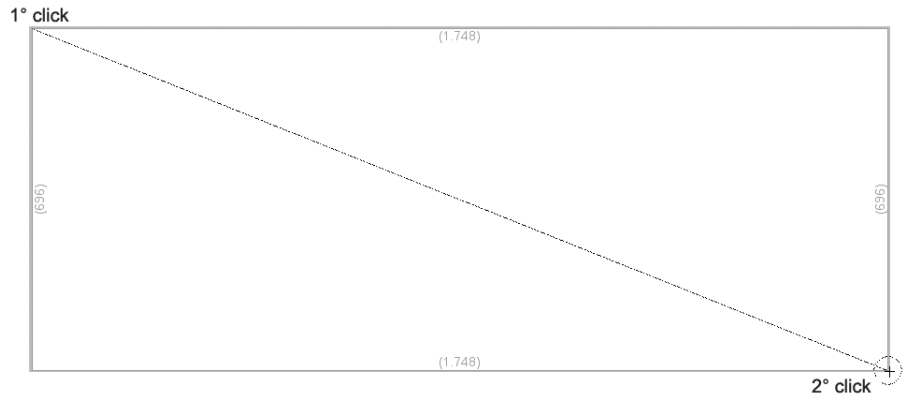


A dialog box opens where you can enter a name for the Room and notes, if necessary. Type "Entry", then confirm with OK.



- 2- Select the Trilateration > Single Diagonal tool.

As shown in the figure, place the diagonal by clicking the first corner and then the second corner..

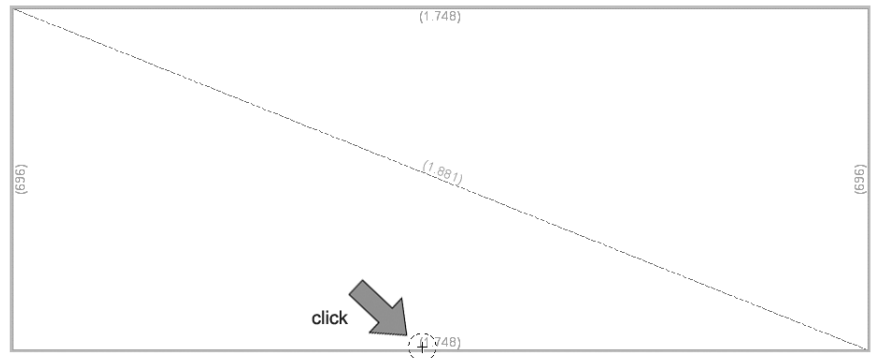


The command remains active so you can place another diagonal. Click the STOP button on the ArchiMap Palette. You can also use the ESC key on the keyboard or the CANCEL button in the Control Box to exit the command.

3- Now let's input the measurements.

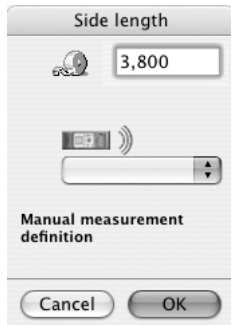
Choose the Measurements > Input Measurements Manually.

Click the first side to define its length.





A dialog box opens allowing you to input the measurement. Type the measurement taken (3.8 meters) then click OK.



ArchiMap can interface with optical surveying tools, allowing measurements to be input automatically when they are taken.



The command remains active so that you can edit another side. Click the vertical side. Enter the length (1.6 meters), then click OK.

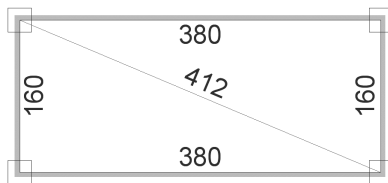
Note that ArchiMap sizes the rectangle based on the measurements you input.

Input the lengths for the other sides.

Now we can enter a measurement for the diagonal.

Given the room's proportions, the length indicated on the diagonal corresponds to the measurement taken.

Once the diagonal's length has been specified, ArchiMap blocks the room as completely surveyed and indicates this by placing a square on every corner.



## STEP 3 – INSERT THE DOORS

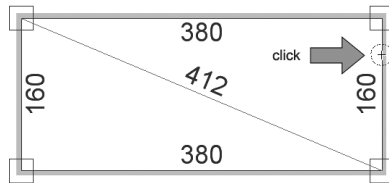


Now that the Room has been surveyed, you can insert its Doors.

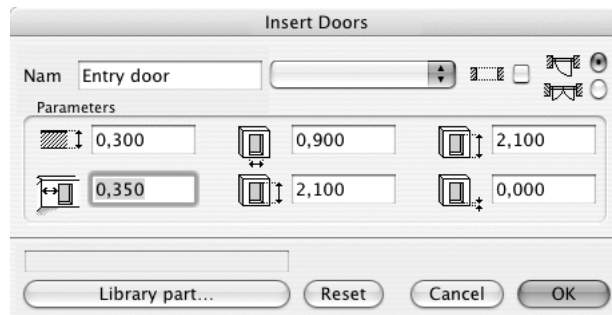
Insert the entry door first. Its width is 90 cm and its distance from an internal corner is 35 cm.

- 1- Activate the Rooms > Insert Door tool.

With the command active (the cursor becomes a pencil), click the side on which you want to place the Door. Define the corner from which the measurement should be applied by clicking near it.



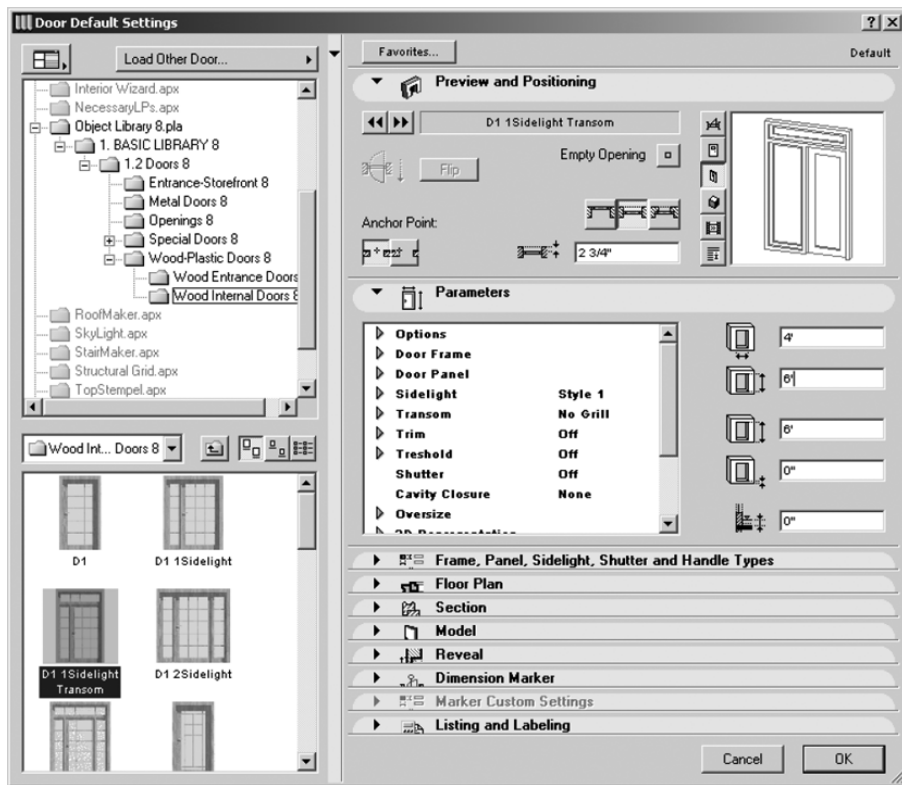
- 2- A dialog box opens in which you can define the Door to be inserted.  
Enter the following data:



- Door name: entry door.
- Door type: single door
- Parameters: wall thickness 30 cm; distance from corner 35 cm; width 90 cm; height 210 cm; threshold 0 cm.

Choose a Library Part from the active Library. When you click the button, the dialog box for the Door Object opens.

Define the Object.

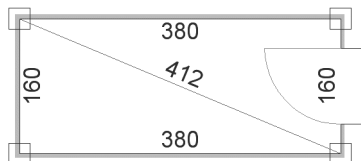


You can also choose to not define settings for the Object and leave the generic single- or double-door configuration.

3- After clicking OK and closing the Door Object dialog box (the object's name appears above the button for the selecting the Library Part), click OK in the ArchiMap Door dialog box and insert the Door into the desired side.

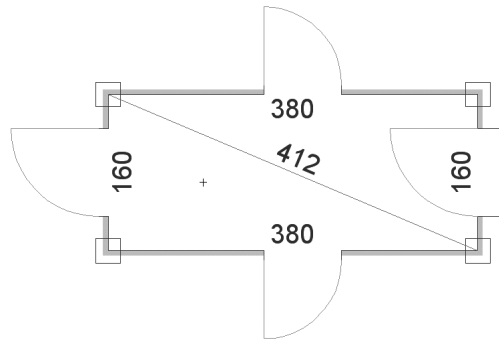
To define the swing direction, use the same system as in ArchiCAD.

4- The Door is inserted as shown in the figure below.



The Insert Door command remains active to allow you to continue placing doors. Using the procedure above, insert the other three doors in the Entry Room.

Once all the doors have been inserted, exit the command by clicking STOP in the ArchiMap Palette or ESC on your keyboard.



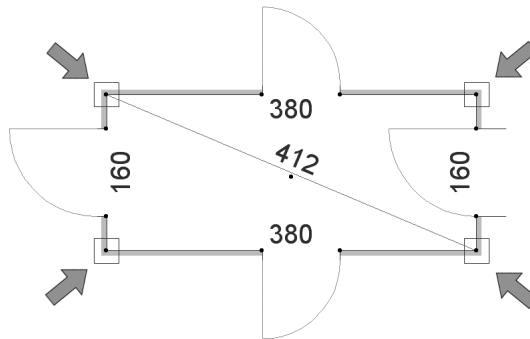
## STEP 4 – DEFINE THE ROOM'S GRAPHICS

The Room you designed on the Floor Plan is a GDL Object. As you know, every GDL Object contains parameters that allow it to be customized.

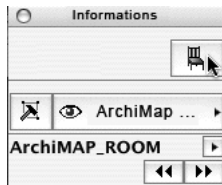
Let's see how the ArchiMap\_ROOM Object can be customized.

1- Select the Room on the Floor Plan.

The most convenient points to click to select the Room are its corners.



2- After selecting the Room, open its settings dialog box.



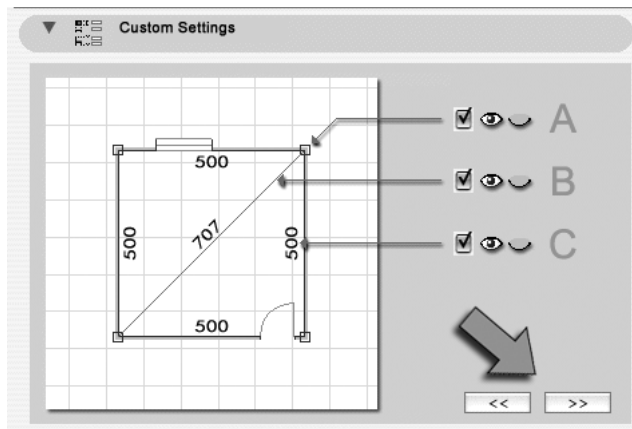
In the Custom Settings section, click the button shown in the figure.

3- The second panel is displayed, in which you can control the display of the:

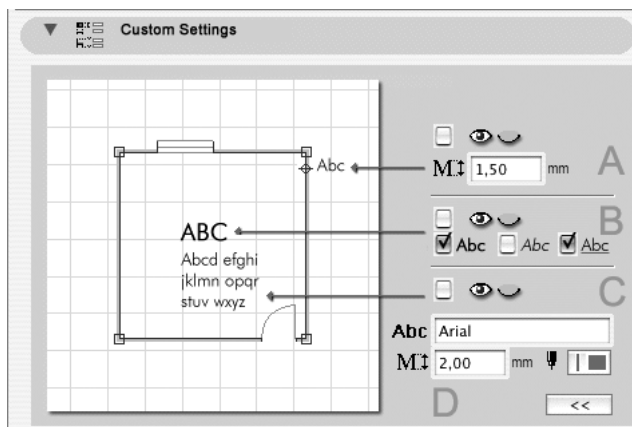
- A) Squares on the corners
- B) Diagonals
- C) Measurements

If the elements are checked, this means that they will be shown on the Floor Plan.

The buttons with <<< and >>> on them allow you to move between sections. Click the >>> button.



- 4- The third panel is displayed. Here, you can control the display of the:
- A) Hotspot names and notes and related font size
  - B) Name of the Room and font style
  - C) Notes for the Room
  - D) Font, size and pen for the elements included in B and C



## STEP 5 – STORE THE ROOM

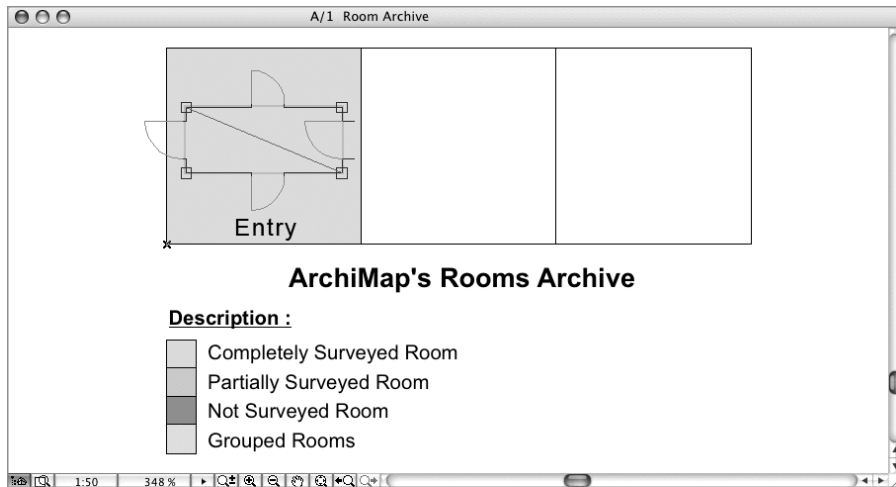
When you have finished defining the Room, you can store it.



1- With the Room you want to store on the Floor Plan, click the Store button.

2- ArchiMap stores the Room.

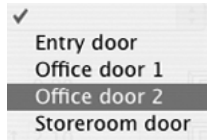
To see the Rooms that have been stored, just open the Room Archive Section (in the ArchiCAD Navigator).



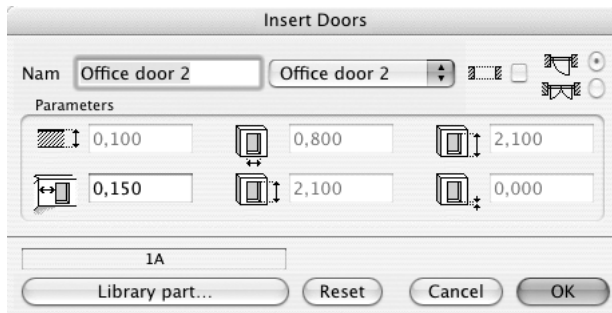
## STEP 6 – CONTINUE CREATING THE AS-BUILT SURVEY

Using the procedure described in Step 2, draw Office Room 2 and input its measurements.

Insert the Door using the method shown in Step 3, point 1. As regards the Door's settings, since the connecting Door to the Entry Room has already been inserted, you can retrieve it from the popup menu beside the name input field.



This way, all of the information that was previously defined reappears in the settings dialog box. The only value you can change is the Door's distance from the corner. In this case, it is 160 cm.



Click OK to insert the Door into the side of the Room.

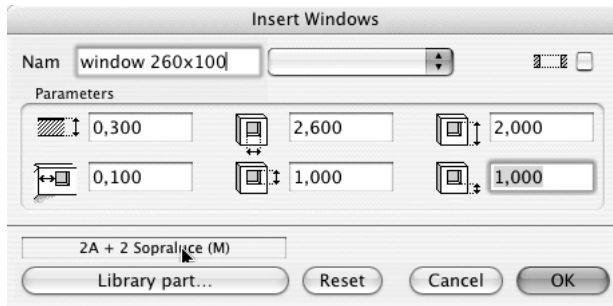


## STEP 7 – INSERT THE WINDOWS

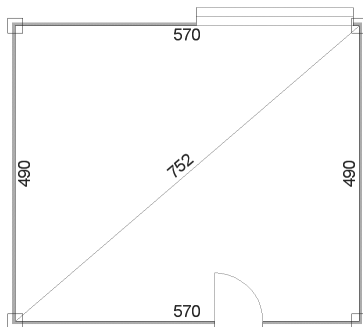
Now let's insert a Window.

1- Activate the Rooms > Insert Window tool.

*The procedure is the same as the one described in Step 3.*

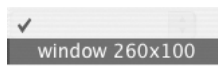


2- When you click OK, the Window is inserted into the desired side.



3- The command remains active, allowing you to insert another Window. Repeat the procedure.

When the settings dialog box opens, as you did for the Office 2 Door, you can retrieve the settings of the previously inserted Window.



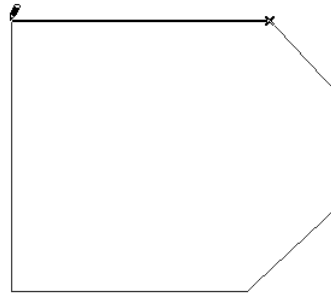
Store the Room.

## STEP 8 – DRAW A ROOM IN FREEFORM MODE

1- Activate the Room > Freeform Room tool.

The tool works like a continuous Polyline. Draw the shape of the Office 1 Room.

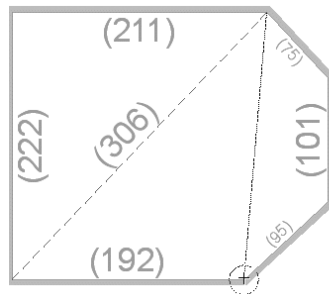
As you draw the Room, use the mouse constraints and alignment methods you normally use with the ArchiCAD tools to help you.



Now let's input the measurements.

2- Input the measurements using the Measurements > Input All Measurements in Sequence tool.

With this command, all of the measurements are entered in sequence without requiring you to click the next side.

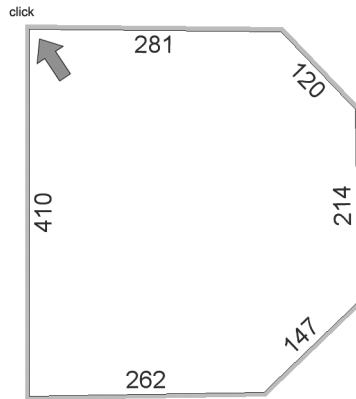


3- Given the Room's unusual shape, you can adjust its angles to help you in preparing your as-built survey.

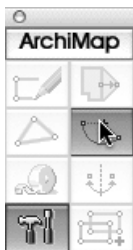
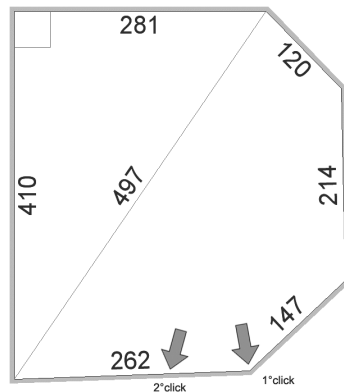


ArchiMap has a function that allows you to set the angles to  $90^\circ$ .

To use this function, activate the Trilateration >  $90^\circ$  Angle tool. Click the angle shown in the figure.



4- Now, keeping the bottom side's length fixed (262 cm), rotate the vertex on the right (the one indicated in the figure).



Activate the Edit > Rotate Node tool.

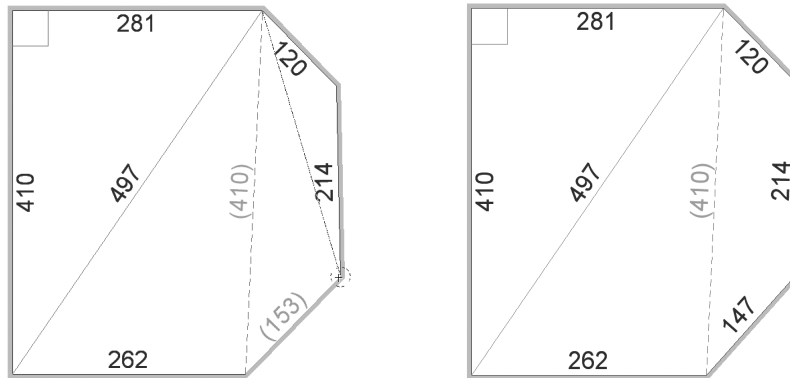
First click the node you want to rotate, then click the side whose length should remain unchanged.

Rotate the node until the bottom side is horizontal. In this case as well, you can use the ArchiCAD mouse constraints to assist you.

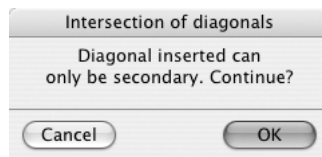
5- Insert the missing diagonals.

Activate the Trilateration > Single Diagonal tool.

Insert the desired diagonal, as shown in the figure.



With the command still active, insert the second diagonal. Since this diagonal intersects another diagonal that has already been defined, it can only be secondary; in other words, its status cannot be changed using the Trilateration > Change Status of Diagonals.



6- Define the remaining measurements. As you can see, when the diagonals' measurements have been input, the as-built survey of the Room is complete.

*Continue defining the Room's elements by inserting Doors and Windows as described in Steps 3 and 7. Define the Room's graphics as shown in Step 4.*

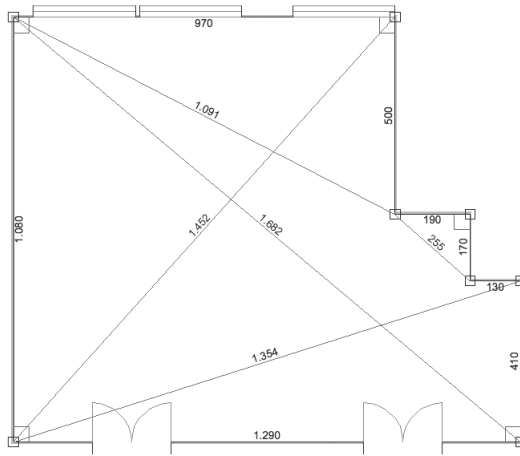
When you are done, store the Room as described in Step 5.

The Room named Warehouse can be inserted using the same mode (freeform) used above.

The only difference is the placement of a pillar in the middle of the Room. Let's see how to do this in Step 9.

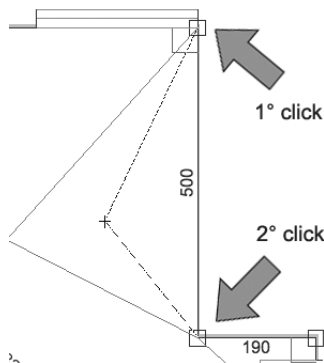
## STEP 9 – PLACE AN ELEMENT IN THE SURVEYED ROOM

Let's use the Warehouse Room as an example. We need to insert a pillar in the middle of it. The diagonals extending from the corners of the room to the corners of the pillar were measured for the survey. The only thing left to do now is input these measurements and define the pillar's position.

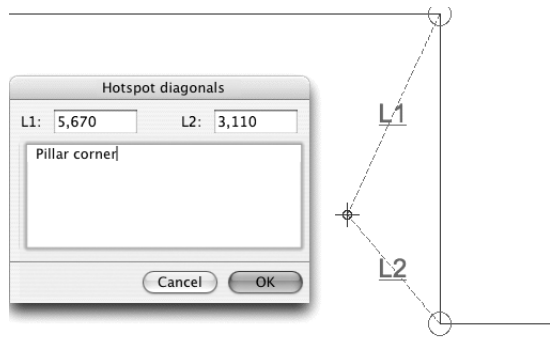


Activate the Insert Hotspot tool.

Click the first corner from which the measurement was taken, click the second corner, then move towards the center of the Room. Two segments will follow the cursor.



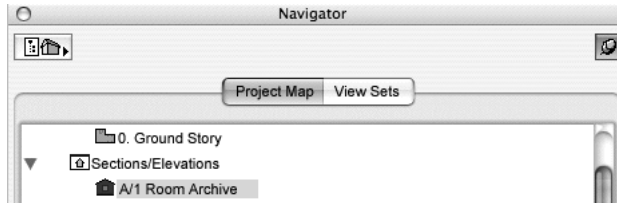
Click again to open the window for editing the measurements (L1 and L2) and adding any notes.



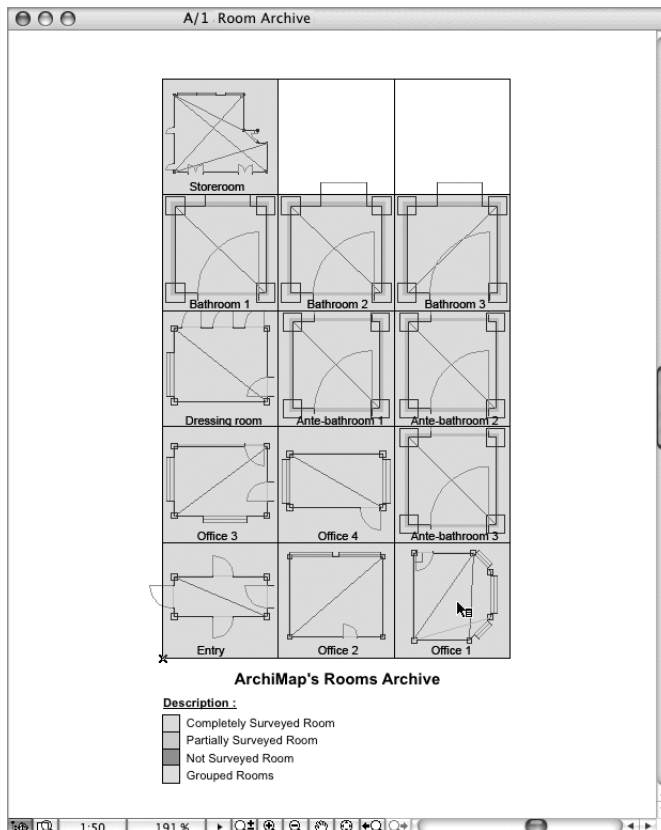
After you input the measurements, the hotspot is placed inside the Room.

## STEP 10 – JOIN THE ROOMS

Once the Rooms have been stored, the as-built survey must be joined. You must first retrieve the Rooms to be joined from ArchiMap's Room Archive. The Room Archive is found in a Section that is activated automatically by ArchiMap.



Using ArchiCAD's Navigator, retrieve the Archive Section.



When the Archive Section is active, the Retrieve from Archive function is enabled on the ArchiMap Palette. Clicking the icon opens a window in which you can select the Rooms you want to transfer to the Floor Plan. The available options are: Selected or All.

Selected: places one Room at a time on the Floor Plan (as indicated by the user's clicks).

All: places all stored Rooms on the Floor Plan.

For this example, click All.

The Rooms are placed in the Floor Plan Window.

You can now join the Rooms.

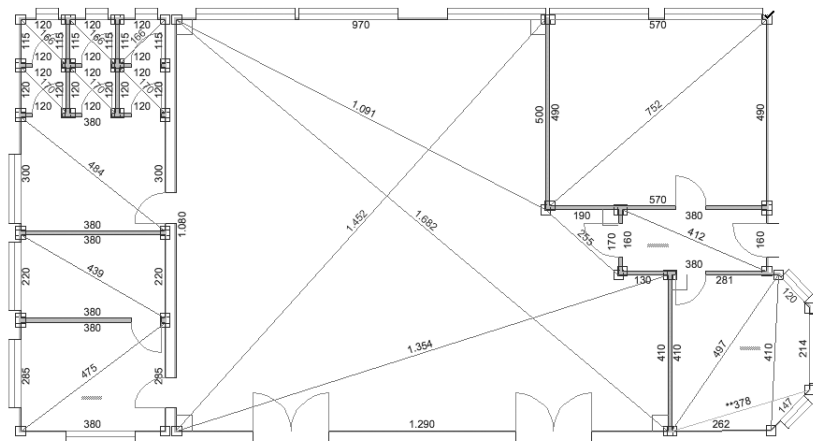
The join will be carried out automatically using the Doors that connect the Rooms.

To begin, activate the Join > Join Using Doors tool.

The cursor becomes a crosshair.

Click a Door (it must be a Door that connects one Room to another). The appropriate Rooms are automatically joined.

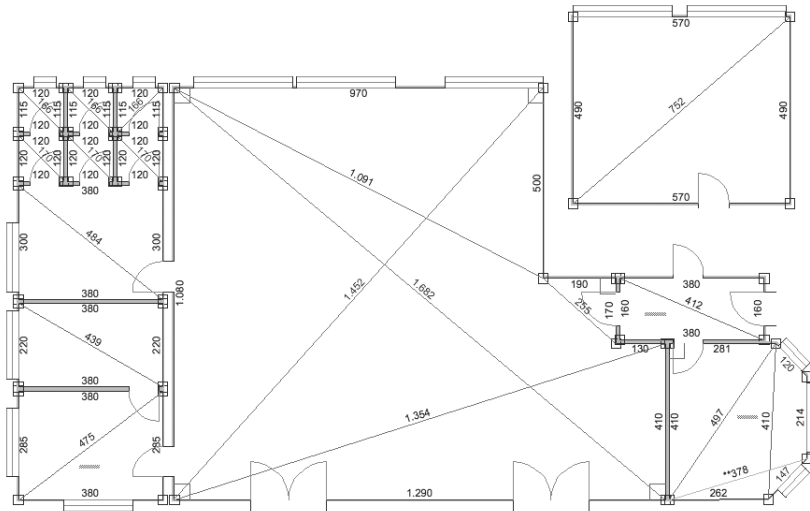
Using this procedure, join all of the Rooms.



If you realize that you must make corrections to one of the Rooms after it has already been joined, you can use the Join > Separate Room command.



With the command activated, click the Room you want to separate. Then, with a second click, specify where you want to position it.



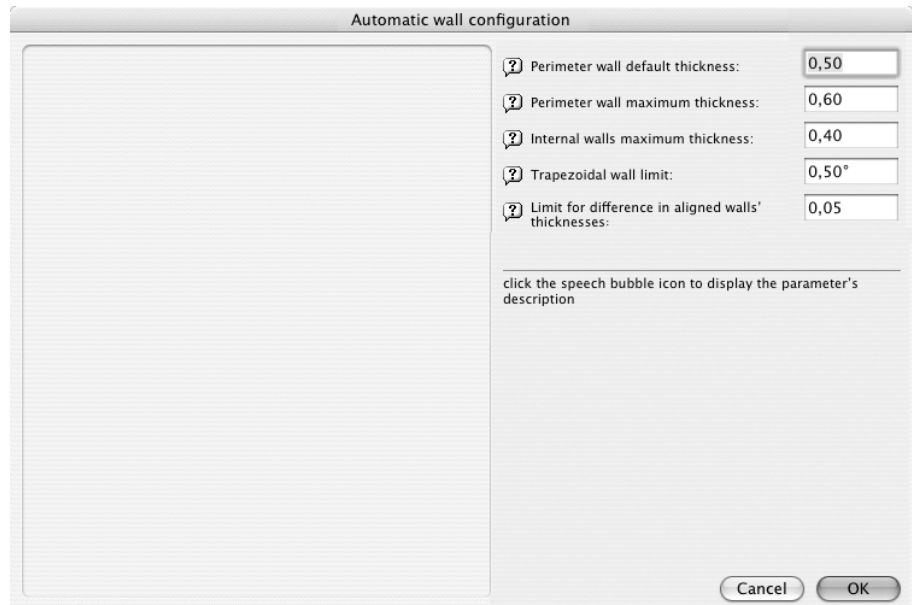
When you have completed the modifications, rejoin it using the Join Using Doors command.

## STEP 11 – CREATE THE PERIMETER

Let's create the as-built's Perimeter.

Before creating the Perimeter, first check the settings that have been defined. To access the settings, activate the 3D Construction > 3D Construction Settings.

For this example, set the default thickness for the Perimeter to 30 cm and the other values as indicated in the figure.



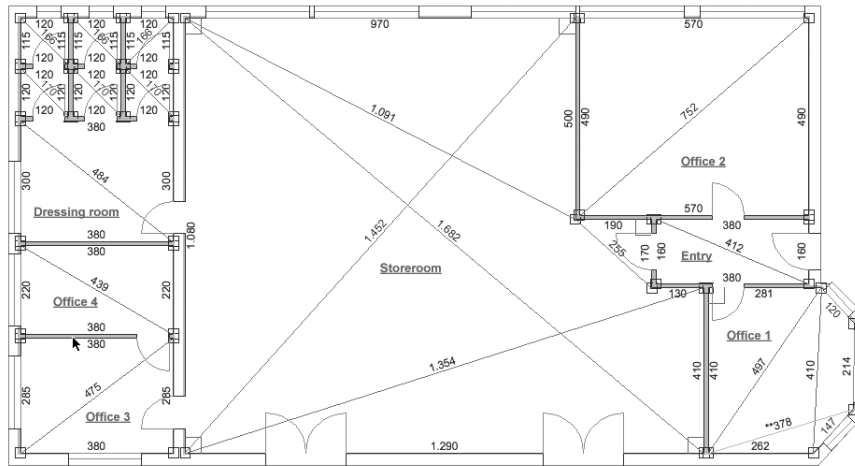
You can now start building the Perimeter.

Select the entire joined as-built survey.

With the as-built selected on the Floor Plan, activate the Join > Perimeter command.

A Fill is drawn on the Floor Plan to create the as-built's perimeter.





This Fill is drawn on the ArchiMap\_entitites Layer (which is automatically created in the Layers list). It can be modified later if necessary.

## STEP 12 – 3D CONSTRUCTION

After creating the Perimeter, you can build the 3D model of the as-built survey.

Let's take a step-by-step look at this important operation, which allows you to create a 3D as-built survey automatically.

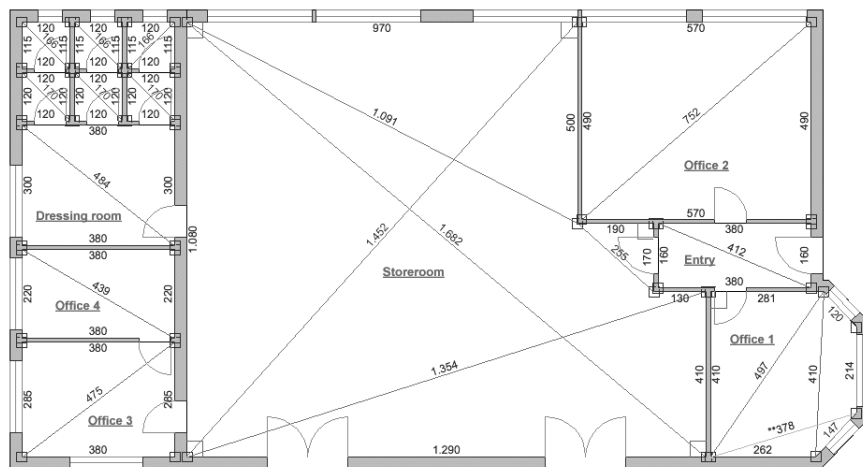
- 1- First, select the entire drawing.
- 2- Explode the Rooms with the command 3D Construction > Explode Rooms.
- 3- The Rooms are converted into lines, which are positioned on the ArchiMap\_entities Layer.

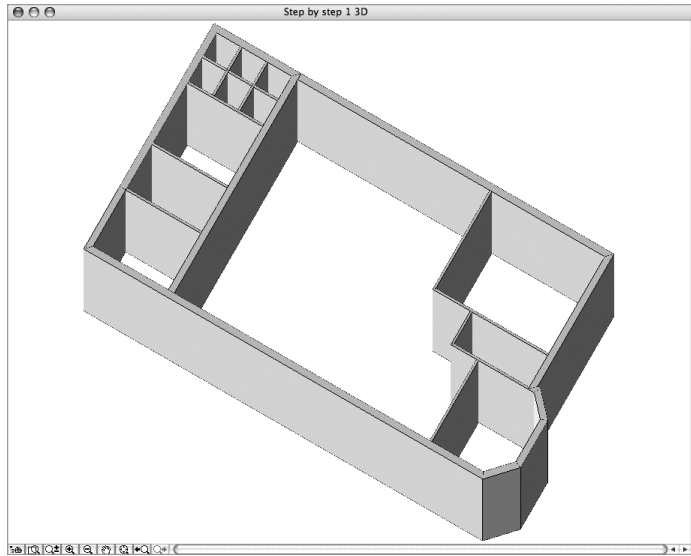


- 4- Now select the entire drawing, and activate the 3D Construction > Erect Walls Automatically command.

- 5- ArchiMap automatically processes the walls.

The settings used, including height, materials, pen, internal hatching and attributes, are those defined as defaults for ArchiCAD's Wall tool.



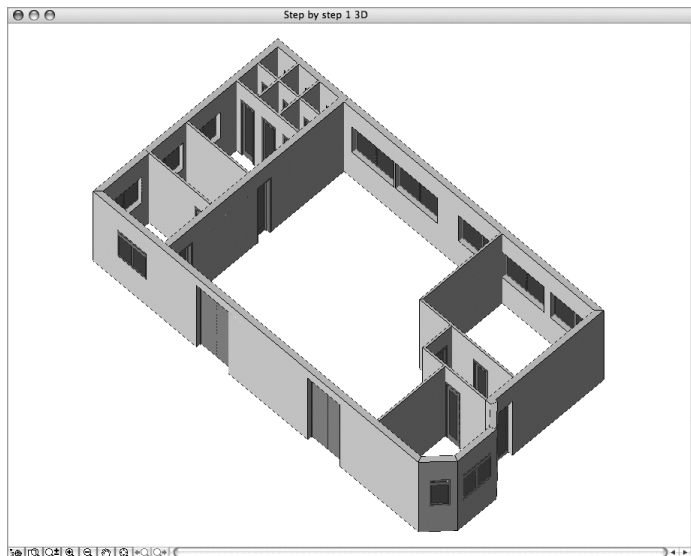


Now let's convert the Doors and Windows into 3D.

6- To convert the Doors into 3D, activate the 3D Construction > Create Doors tool. When you click the command, ArchiMap automatically converts the Doors into the Door Objects you defined during creation of the as-built..

The process is the same for Windows.

7- Select the 3D Construction > Create Windows tool.



# Using the Leica Disto™ Plus with ArchiMap

ArchiMap is compatible with Leica's Disto™ Plus laser distance meter (via Bluetooth communication).



When using the Measurements tool to input the lengths of the sides and diagonals (all other dimensions are entered manually), you can use the Disto™ Plus to send the measurements taken to ArchiMap.

In the dialog box for inputting measurements, choose the type of connection from the popup menu under the distance measurer icon.

If you want to use the Disto™ Plus, you must specify the connection as "DISTO Bluetooth."



Then, from the popup menu below, select the virtual port used for the Bluetooth connection and click Enter.

**Note:**

*for the program to function correctly, the port chosen must be one of the first ten.*



Upon completion of this step, the communication port is connected (as you can verify from the message that appears).



This procedure is only necessary the first time; after that, you will not have to repeat it again until the Disto™ Plus automatically disconnects (after a certain period of inactivity).

Once the connection has been established, you will be able to send the data read with your Disto™ Plus to the program, or you can choose to enter it manually.

To connect your Disto™ Plus to your computer (whether you use Macintosh or Windows), and for information on sending data via the BlueTooth connection, consult the user guide that was supplied with your electronic distance measurer.

**Important:** *when you connect the Disto™ Plus to your computer, the operating system may ask for your access key (or passkey). For Disto™ Plus, it is:  
0000  
(con alcuni modelli: 000000).*